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River Basin Management Plan of Cyprus for the Implementation of the Directive 2000/60/EC

(Period 2016-2021)

October 2016

«CONSULTING SERVICES FOR THE ELABORATION OF THE 2ND RIVER MANAGEMENT PLAN OF CYPRUS, FOR THE IMPLEMENTATION OF DIRECTIVE 2000/60/EC, AND FOR THE ELABORATION OF THE FLOOD RISK MANAGEMENT PLAN FOR THE IMPLEMENTATION OF THE DIRECTIVE 2007/60/EC»

WDD 10/2014

LDK CONSULTANTS

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Consortium	
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Maps accompanied the present document

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ABBREVIATIONS

BQEs	Biological Quality Elements
E-PRTR	European Pollutant Release and Transfer Register
IED	Industrial Emissions Directive – 2010/75/EE
IPPC	Integrated Prevention Pollution Control
SCI	Site of Community Importance
SPA	Special Protection Area
WISE	Water Information System of Europe
DA	Discharge Authorization
WECD	Waste from excavation, construction and demolition
GDP	Gross Domestic Product
EAC	Electricity Authority of Cyprus
RES	Renewable Energy Sources
MSW	Municipal Solid Waste
IA	Industrial Area
EC	European Commission
EWF	Extracted Waste Facilities
WWTF	Waste water treatment facilities
EC	European community
CMAC	Cyprus Marine Aquaculture Centre
SPS	South Pipeline Scheme
NVZ	Nitrate Vulnerable Zones
EEC	European Economic Community
OP	Operational Programme
NSSD	National Strategy for Sustainable Development,
SPA	Special Protected Areas
ARI	Agricultural Research Institute
RPF	Research Promotion Foundation
HMWB	Heavily Modified Water Bodies
RMSC	Recyclable Materials Sorting Center
RAP	Regulation Administrative Provision
LORF	Larnaka Oil Rafinery Facilities
MS	Member States

CAPO	Cyprus Agricultural Payments Organisation
GAPC	Good Agricultural Practice Code
CWSS	Central Water Supply Systems
GWP	Governmental Water Projects
IWWF	Industrial Waste Treatment Facility
EIAS	Environmental Impact Assessment Study
DoM	Department of Meteorology
IWMF	Integrated Waste Management Facilities
WFD	Water Framework Directive
EA	Environmental Authority
RDP	Rural Development Programme
PA	Programme for Application of Directive 91/271/EEC
RBD	River Basin District
EQS	Environmental Quality Standards
RBP	Rural Development Plan
PFS	Petrol Filling Stations
SBLA	Sewerage Board of Limassol – Amathus
DS	Desalination Plan
FRMP	Flood Risk Management Plan
RBMP	River Basin Management Plan
SEIAS	Strategic Environmental Impact Assessment Study
SEIS	Strategic Environmental Impact Study
SEA	Strategic Environmental Assessment
SES	Strategic Environmental Study
GWB	Groundwater Body
DFMR	Department of Fisheries and Marine Research
WDD	Water Development Department
DA	Department of Agriculture
GSD	Geological Survey Department
DF	Department of Forests
SCI	Site of Community importance
DE	Department of Environment
LP	Local Plan
AWB	Artificial Water Body

MARD & E	Ministry of Agriculture, Rural Development and Environment
MS	The Mines Service
WB	Water Body
UWDS	Unmonitored waste disposal sites
UAA	Utilised Agricultural Area
LS	Landfill Site
RLS	Residue Landfill Site

SUMMARY

This report concerns the 2nd River Basin Management Plan of Cyprus (RBMP). The 2nd River Basin Management Plan and the 1st Flood Risk Management Plan which is also prepared by WDD are the basic tools for the Water Management in Cyprus for the period 2016-2021.

The framework of the water management is formulated in the Water Framework Directive. The Republic of Cyprus has transposed Water Framework Directive into national law with the law N13 ((I) 2004 concerning water protection and management.

According to the above mentioned law, Competent Authority for the implementation of the Water Framework Directive's provisions is the Ministry of Agriculture, Rural Development and Environment. According to Articles 4(3), 19 and 22 of the above mentioned law, the Competent Authority is also responsible for the coordination of the preparation of the Program of Measures and the River Basin Management Plan which are approved by the Ministerial Council of the Republic of Cyprus.

WFD imposes the implementation of the appropriate measures for the promotion of the sustainable use of water and for the protection and/or the improvement of the status of the surface waters (rivers, lakes and coastal) and groundwaters. According to the WFD provisions a Water Management Plan should be adopted for each River Basin District. Cyprus has defined one River Basin District that covers the country's whole territory.

It should be noted that according to the provisions of the Protocol 10 of the Act of Accession of the Republic of Cyprus to the EU the application of the European acquis is suspended in the areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control.

The River Basin Management Plan is a strategic document in which the objectives for the status of waters and the necessary measures are set out for the river basin district.

After its adoption, the River Basin Management Plan has the same status as any other regulation approved by the Government, and any administrative decision should be in conformity with its provisions.

For the preparation of the 2nd River Basin Management Plan the following has been considered:

- The EU's legislative framework as transposed to the national legislation.
- The relevant Guidance Documents issued by the European Committee and the current state-of-the-art.
- The 1st River Basin Management Plan and the recommendations of the European Committee as they have been formulated in the «Report on the progress in implementation of the WFD Programs of Measures (SWD (2015 50 final)» and the Action Plan agreed between EC and Cyprus.

- The results of studies that has been completed and data that has been collected from WDD and other authorities after the adoption of the 1st River basin Management Plan
- The results of the public consultation on the significant water management issues which was held for the preparation of the 2nd River Basin Management Plan.
- The 2nd River Basin Management Plan was subject to a Strategic Environmental Assessment (SEA) according to the provisions of the law 102(I)/2005) The Process of the Strategic Environmental Assessment consists of the following 4 stages:
- The examination of the environmental issues through the study for environmental impact assessment of the proposed plan.
- The public consultation.
- The incorporation of the results of the environmental impact assessment and of the public consultation into the River Basin Management Plan before its adoption.
- The monitoring of the impacts from the implementation of the Plan.
- The River Basin Management Plan is adopted after the completion of the Strategic Environmental Assessment process in order to include all the results and provisions of the final approvement of the Strategic Environmental Assessment Study.

Additionally a six month public consultation on the Draft River Basin Management Plan is provided in order to encourage the participation of all interested parties in the water management in Cyprus.

The main actions for the preparation of the 2nd River Basin Management Plan include the following:

- Monitoring of the surface and groundwater status which is carried out according the provisions of the WFD and other relevant Directives.
- Revision of the characterization of the surface water and groundwater. As a result of this activity:
  - The 11 reservoirs of the 1st River Basin Management Plan are included in the category River Water Bodies after the recommendations of the European Committee.
  - The number of the River Water Bodies has changed after revision as proposed in the 1st River Basin Management Plan and also as the result of the new typology used and the new data derived from the monitoring network.
  - The number of the Coastal Water Bodies has changed as a result of the new data from the monitoring network and studies that have been completed and proposed the merging of neighboring coastal water bodies.
  - The number of the Groundwater Bodies has changed as a result of the division of 3 groundwater bodies due either to different pressures acting on them or to different geological environment.

- Assessment of the status of the revised water bodies according to Article 5(2) of the WFD. The assessment includes the following actions:
  - The contract of WDD: “Review and update of Article 5 of Directive 2000/60/EC (water reservoirs) & Classification of water status (rivers, natural lakes, water reservoirs) that will establish baseline information and data for the 2nd Cyprus River Basin Management Plan”.
  - A study of the Department of Fisheries and Marine Research for the Coastal Waters which concerns the revision of the coastal water bodies according to the provisions of Article 5 of WFD.
  - A study of the WWD for the revision of the groundwater bodies according to the provisions of Article 5 of WFD.
- Revision of the pressures and impacts on the surface water and groundwater which has been completed according to the provisions of Article 5 of WFD.
- Identification of the significant water management issues which has been completed after the relevant six month public participation process as provided by the WDF.

Additionally, for the preparation of the 2nd River Basin Management Plan supplementary actions have been completed. The results of these actions are presented in special reports which with the reports resulted from the above mentioned actions for the preparation, they constitute the background documents of the present River Basin Management Plan

These supplementary reports concern the following issues:

- Economic analysis of water uses.
- Completion of the assessment/classification of the surface water quality status (ecological and chemical) and of the groundwater quality (chemical) and quantity status.
- Identification of Heavily Modified and Artificial Water Bodies.
- Identification of the exemptions to the achievement of the environmental objectives of the WDF and establishment of the objectives pursued.
- Revision of the Drought Management Plan.

The River Basin Management consists of the following:

- A brief presentation of the general provisions of the WDF, the provisions for its implementation, the description of its role in water protection and management and a brief presentation of the legislative framework for the implementation of the WDF in Cyprus (Chapter 2).
- A description of the role of the River Basin Management Plan to the achievement of the objectives of the WDF and a presentation of the general principles concerning its preparation and implementation (Chapter 3).
- A presentation of the public participation process as provided in Article 14 of the WDF, its objectives and its importance. A brief description of the actions taken for the public

participation during the preparation of the 2nd River Management Plan is also given (Chapter 4)

- A description of the River Basin District of Cyprus including information about its natural and anthropogenic characteristics (Chapter 5).
- A presentation of the Competent Authority for the preparation and implementation of the River Basin Management Plan according to the provisions of Article 3 of the WDF (Chapter 6).
- A description of the methodology for the identification and the delineation of the water bodies including an analysis of the typological characterization of the river, lake and coastal water bodies and the designation of the natural, heavily modified and artificial water bodies. For groundwater bodies is presented the methodology used for their characterization and their final delineation. The Register of Protected Areas according to Article 6 of the WDF is also presented (Chapter 7)
- A brief presentation of the pressures including the key points of the analysis for the point and diffuse sources and their impacts on surface water bodies and groundwater bodies, (Chapter 8).
- Information concerning the water status monitoring program (Chapter 9).
- A presentation of the water status with references to the available data from the monitoring program and the methodology for the classification of the ecological and chemical status of the surface water bodies and the quality and quantity status of the groundwater bodies, according to Article 8 and Annex V of the WFD (Chapter 10).
- A brief presentation of the main results of the economic analysis of water uses and the cost recovery according to Articles 5 and 9 of the WFD (Chapter 11).
- A presentation of the environmental objectives for the surface water bodies, groundwater bodies and protected areas including the exemptions to these objectives as mentioned to Articles 4.4 to 4.7 of the WDF (Chapter 12)
- A summary of the program of measures which includes basic measures concerning the minimum requirements as provided in Article 11 paragraph 3 of the WDF and supplementary measures which according to Article 11 par.4 of the WFD are required in order to achieve the environmental objectives set out according to Article 4 of the WFD (Chapter 13).
- A presentation of the synergy between the River Basin Management Plan and especially the program of measures and the provisions of the Flood Risk Management Plan, the Drought management Plan which is part of the RBMP and the actions related to the Marine Strategy (Chapter 14).
- A presentation of basic actions that are planned to be taken for the implementation of the 2nd River Management Plan as proposed during the Public Consultation of the draft River Basin management Plan (Chapter 15).

1. PREFACE

1.1 GENERAL ISSUES

The contract for the project "Consulting Services for the elaboration of the 2nd River Basin Management Plan of Cyprus (RBMP), for the implementation of the Water Framework Directive 2000/60 EC, and for the elaboration of the Flood Risk Management Plan, for the implementation of the Directive 2007/60/EC" was commissioned by the Water Development Department (WDD) of the Ministry of Agriculture, Rural Development and Environment after the open competition WDD 10/2014 in the Consortium of LDK Consultants and of ECOS Consulting S.A. and was signed on 05.18.2015 in Cyprus.

The contract documents include:

– the General terms,
– the Specific terms, and
– the Terms of Reference (specifications).

The contract is followed up by a Steering Committee composed by the following members:

– Nicos Neocleous, First Deputy Water Chief Officer, WDD, Chairman
– Panayiota Hadjigeorgiou, Senior Executive Engineer, WDD, Coordinator
– Gerald Dörflinger, Hydrology, Hydrometry Service WDD
– Constantinos Aristeidou, Hydrology, Hydrology and Hydrometry Service WDD
– Maria Filippou, Executive Engineer, EU Service WDD
– Riana Daniel Makridi, Executive Engineer, Planning Service, WDD
– Christos Christofi, Geological Officer of 1st Class, Geological Survey Department
– Georgios Nicolaou, Agriculture Officer, Department of Agriculture
– Neoklis Antoniou, Environment Officer, Department of Environment
– Marilena Aplikioti, Fisheries and Marine Research Officer, Department of Fisheries and Marine Research
– Andreas Chatzipakkos, Assistant District Officer of Nicosia
– Stavros Giavris, Civil Engineer, Ministry of Interior

1.2 CONTRACT OBJECT

The project concerns:

1. The elaboration of the 2nd River Basin Management Plan of Cyprus (RBMP), taking into account:
    - the institutional framework of the EC,
    - the relative guidance documents of the EC and the state of the art expertise,
    - the 1nd River Basin Management Plan of Cyprus of 2011,
    - the comments of the EC on this, and the agreed Action Plan
    - other relative studies commissioned by the Water Development Department
    - all available relevant data collected by the Service
    - the required program of measures and the related Strategic Environmental Assessment (SEA).
2. The revision of the Management Plan of drought and water scarcity in Cyprus, taking particular account:
    - the relative guidance documents of the EC and the state of the art expertise,
    - the Drought Management Plan, accompanying the first River Basin Management Plan of 2011
    - the modified the Drought Management Plan of 2013
    - all available relevant data collected by the Service.
3. the elaboration of the 1st Flood Risk Management Plan of Cyprus, taking particular account:
    - the institutional framework of the EC,
    - the relative guidance documents of the EC and the state of the art expertise,
    - other relative studies commissioned by the Water Development Department
    - all available relevant data collected by the Service,
    - the required program of measures and the related Strategic Environmental Assessment (SEA).

The items of the contract include 10 activities:

- Activity 1 : Checking / gap filling / updating data in Article 5 of the WFD
- Activity 2: Elaboration of the 2nd River Basin Management Plan
- Activity 4: Preparatory Actions / Actions for the preparation of the FRMP

- Activity 5: Elaboration of the Flood Risk Management Pl
- Activity 6: Elaboration of the Program of Measures
- Activity 7: Assessment of proposed measures
- Activity 8: Elaboration of the Strategic Environmental Assessment Study
- Activity 9: Public Consultation Campaign
- Activity 10: Preparing Digital data / results for submission to the EC.

1.3 DELIVARBLE OBJECT

This report concerns the Activity 2-Preparation of the 2nd River Basin Management Plan for the whole of Cyprus, apart from the areas which are not under the control of the Republic of Cyprus. So, it will include information about all waters of Cyprus, the Environmental objectives for these waters and the measures which are necessary to be taken in order to achieve good status of waters up to 2021 and the environmental goals as set out in Article 4 of the WFD.

The works that are envisaged in this activity, as derive by the Terms of Reference include the following:

- list of total number, total length or area, maximum and minimum size of the water bodies per water categories (rivers, lakes, coastal, underground),
- list of the number of types for each surface water category, list of the types and brief descriptions of each type,
- list of the number of Groundwater Systems, which are directly associated with surface waters or terrestrial ecosystems,
- description of the methodology and criteria for the identification and for the designation of surface and Groundwater Systems,
- description of the way with which, the process of establishing threshold values for pollutants of groundwater and pollution indicators in Part A of Annex II to Directive 2006/118/EC and the record of the information which are required for the determination of threshold values, was applied in accordance with Part C of Annex II to Directive 2006/118 / EC, as these are amended by Directive 2014/80 / EU,
- methodology description of the determination of threshold values of concentrations of pollutants, groups of pollutants, and indicators of pollution in bodies or groups of groundwater (Directive 2006/118/EC, Directive 2014/80/EU) such as it was established by the relevant Committee MARD & E,
- methodology description for detection and assessment of tendencies of pollutant concentrations, groups of pollutants and indicators of pollution in bodies or groups of groundwater bodies as it has determined by the relevant Committee MARD & E and it is mentioned in the Action Plan 2013,

- methodology description for the definition of starting points for reversal of significant and sustained upward tendencies (Art. 5, Directive 2006/118 / EC) as it has defined by the relevant Committee MARD & E and it is mentioned in the Action Plan 2013,
- description of general plan/action protocol for effective management of significant and sustained upward tendencies of pollutants concentrations, groups of pollutants, and indicators of pollution in bodies or groups of groundwater bodies as mentioned in the Action Plan 2013,
- association maps of groundwater bodies and the associated with those surface waters and the directly dependent terrestrial ecosystems for the best assessment of their situation in accordance with Annex III of Directive 2006/118 / EC,
- study of the final summary of the Oroklini Lake in RBMP, which it started in the framework of Convention 1/2014 and processing of all the necessary works,
- the recommendations of the Action Plan 2013,
- all the information which are described in detail in Annex VII of the WFD (see and section 3.1), as:
    - General description of the characteristics of river basin (Article 5 and Annex II of the WFD, see Chapter 5.
    - Summary of significant pressures and impact of human activity on the status of surface water and groundwater (see Chapter 8).
    - Identification and mapping of protected areas (Article 6 and Annex IV of the WFD, see section 7.4).
    - Monitoring networks (Article 8 and Annex V of the WFD) and presentation, in the form of map, of the results of the monitoring programs which are carried out, following these requirements, for the status of surface water (ecological and chemical); groundwater (chemical and quantitative) and protected areas (see Chapter 9).
    - List of the Environmental objectives for surface waters, groundwater and protected areas which are established based on Article 4 of the WFD (see Chapter 12).
    - Summary of the economic analysis of water use (Article 5 and Annex III thereof of the WFD), see Chapter 11.
    - Summary of Measures Program (which occur from the activity 10 below) (Article 11 of the WFD), including of the ways with which, the objectives which are established, in accordance with Article 4 of the WFD, will be achieved (see Chapter 13).
    - A register of any more detailed programs and management plans for the river basin, which mainly concerns sub-basins, sectors, issues or water types, as well as summary of their content.

- Summary of the consultation measures that was taken with the public, of their results and of the consequent changes of the plan.
- List of the competent authorities (Annex I of the WFD, see Chap. 6).
- The contact points and procedures for the provision of the documents and data which are referred in Article 14 (1) of the WFD, in particular details of the control measures that are adopted in accordance with Article 11 (3) (g) and 11 (3) 8 (i) of the WFD and of the actual monitoring data which are gathered in accordance with Article 8 and Annex V of the WFD.
- Summary of any changes or updates from the publication of the previous version of the RBMP, including of summary of the reviews that are carried out in accordance with Article 4, paragraphs 4,5,6 and 7 of the WFD.
- Assessment of progress towards the achievement of the environmental objectives, including of the presentation of the monitoring results for the period of the previous plan in the form of map, and clarifications for the environmental objectives which were not achieved.
- Summary of any measures that had been foreseen in the earlier version of the RBMP which were not implemented and relevant explanation.
- Summary of additional interim measures which were adopted in accordance with Article 11, paragraph 5 of the WFD after the publication of the previous version of the RBMP.
- Report submission for the River Basin Management Plan, through the system Water Information System for Europe (WISE), as it is specified in, under evolution, new guidance document «WFD Reporting Guidance 2016».

1.4 GROUND OF STUDY

For the implementation of the present Convention, the following scientists worked:

- Dr. Panagiotis Panagopoulos, Civil. Engineer NTUA, Ph.D.,
- Dr. Katerina Triantafyllou, Civil. Engineer NTUA, Ph.D.,
- Anastasios Varveris, Chemist & Environmentalist, D.E.S.S
- Dr. Andreas Efstratiades, Dr. Civil Engineer, MSc hydrology
- Dr. Nickolaos Mamassis, Rural and Surveying Engineer NTUA, Ph.D.,
- Dr. Xenophon Stavropoulos, Hydrogeologist, Ph.D.,
- Dr. Alcibiades Economou, Biologist Ph.D.,
- Dr. Panagiotis Panagiotidis, Biologist Ph.D.,

- Effie Filandra, Economist ,
- Brian Cox, MA Natural Sciences, MSc Hydrology, PhD Geography,
- Graydon Jeal, Environmental Engineer, Mastère Spécialisé, MSc, Postgraduate Diploma (Finance),
- Dr. Georgios Papanicolaou, Agriculturist, Ph.D.,
- Eveline De Vos, Environmental Chemist, Bsc, MSc, PhD,
- Dr. Nickolaos Markatos, Chemical Engineer, Professor NTUA,
- Andreas Loukatos, Chemical - D.E.A. environment,
- Dr. George Chatzinikolaou, Environmentalist-Biologist Ph.D.,
- Dr. Nomiki Sympoura, Hydrobiology-Oceanographer Ph.D.,
- Dr. Calliope Papapavlou Biologist-Ecologist M.Sc.,
- Vasilis Gerakaris, Hydrobiology-Oceanographer M.Sc,
- Dr. Spiros Christopoulos, Civil. Engineer Ph.D.,
- Konstantinos Nikolopoulos, Environmental Engineer, M.Sc.,
- Dimitris Zarris, Civil Engineer M.Sc. NTUA- Hydrology,
- Xenophon Mpakouras, Environmental Engineer, M.Sc. in Environmental Technologies,
- Maria Kotsareli, Mining - Metallurgical Engineering, M.Phil in Engineering for Sustainable Development,
- Eleni Avramidi, Environmental Engineer, GIS Analyst,
- Effie Panagopoulou-Flaski, Environmentalist,
- Panagiotis Vlachos, Economist with M.Sc. on Administrative Development,
- Stella Bechlivanou, Technologist Engineer of Geotechnology and Environment,
- Maria Tzima, Geologist M.Sc.,
- Solon Christodoulou, Civil Engineer with M.Eng in Energy Technologies and Sustainable Design,
- Ilias Mousoulis, Environmentalist, M.Sc. Engineering and management of water resources and M.S.c. environmental Biogeochemistry

Acknowledgments

For their constructive cooperation in the preparation of this report, we would like to thank:

- the Director of WDD, Mr. Andreas Manolis
- the First Deputy Water Chief Officer, Nick Neocleous
- the Head Coordinator of the Convention, Mrs. Panagiota Chatzigeorgiou

- the members of the Steering Commitee and
- the Scientific Staff of WDD

2. REQUIREMENTS OF DIRECTIVE 2000/60/EC AND OBJECTIVES OF MANAGEMENT PLAN

The water management framework determined at European level by the Water Framework Directive (WFD). The Republic of Cyprus has fully transposed the WFD in the National Legislation with the "On the Protection and Management of the 2004 Water Law" (N13 (I) / 2004).

According to this Law, the Competent Authority for the implementation of the provisions of WFD is the Ministry of Agriculture, Rural Development and Environment (YGAA & W) (see Chapter 6). The Competent Authority is responsible for all obligations related to the WFD apart from the training program of measures and the Management Plan of River Basin, which in accordance with Articles 4 (3), 19 and 22 are coordinated by the Competent Authority and approved by the Republic of Cyprus.

The Directive requires appropriate measures to promote the sustainable use of water and for the protection and / or improvement of the status of surface water (river, lake and coastal) and groundwater.

Pursuant to the provisions of the Directive is required the establishment of a Water Management Plan at river basin district level. A river basin is usually a geographical area from which all surface run –off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta. Small watersheds Can be grouped to create a River Basin District. Cyprus is one such case and the Management Plan implemented for Basin District Cyprus River.

It should be noted that according to the provisions of the Protocol N °. 10, which is attached to the Act of Accession of Cyprus to the European Union (EU), the application of the acquis is suspended in those areas of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control. Also, the Memorandum of Understanding between the Government of the Republic of Cyprus and the Government of Great Britain United Kingdom and Northern Ireland concerning responsibility for the implementation of Protocol No. 3, which is attached to the Act of Accession of Cyprus to the EU, provides to implement the Framework Directive on Water in the Sovereign base Areas of Akrotiri and Dhekelia in Cyprus.

The River Basin Management Plan is a strategic document, which sets out the objectives for the state of water level in the river basin district and the necessary measures and actions planned to attain these objectives.

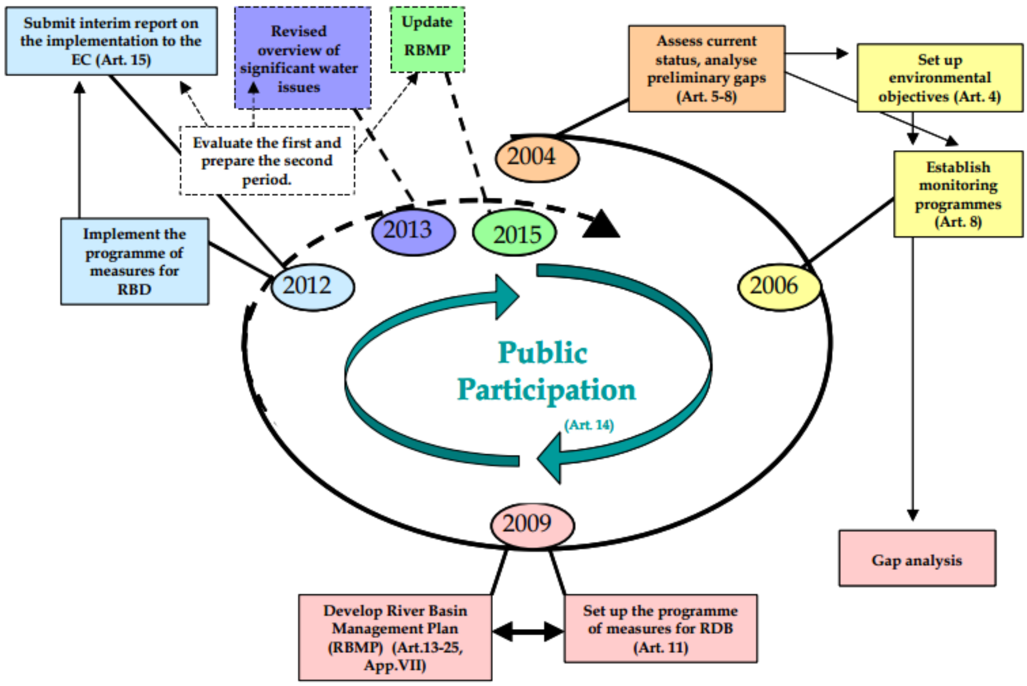
With the adoption of the Water Management Plan by the Ministerial Cabinet, it is an institutional obligation and should be considered by all public bodies in decisions making process.

The first River Basin Management Plan River of Cyprus (2009-2015) was approved by the Ministerial Cabinet on 9 June 2011.

This is a revision of the 1st Water Management Plan of Cyprus.

Water management and establishment of the Water Management Plan is an iterative process which is divided into six-year cycles. The flow chart shown in the figure below comprises the steps provided for the establishment of the first and second management cycle and indicates the iterative process required for continuity. The second management cycle evolves based on experience and results from the application of the first.

Figure 2-2-1 : Schematic diagram of training steps River Watershed Management Plan



Since the adoption of 1st River Basin Management Plan of Cyprus new data derived at national and European level, on which the revision of the Plan is necessary. These data include:

- Reviewing the definition of surface bodies and groundwater.
- The new data from the monitoring of water status.
- The revision of the pressures on the waters of Cyprus and the improvement of the knowledge of their correlation with their condition.
- The redefinition and a more detailed examination of the hydromorphological pressures on surface water bodies and the impact on their situation.
- Identification of the significant water management issues for which conducted biannual consultation which raised new issues to consider.

- Increasing knowledge about the evaluation methodologies of ecological and chemical status of waters.
- The issue of new directives that are directly or indirectly related to the water and should be taken into account in the planning process (such as the Directive on the management of flood risks).
- The organization, but also the best knowledge for the water management issues gained as a result of the implementation of the 1st River Basin Management Plan measures.
- The approval and design of new financing programs, which are important tools for financing of actions related to water including, inter alia, for rational water management.
- The need for skilled and targeted approach certain actions, resulting from the requirements for rational management of available water resources and it is now possible to do, based on experience gained from the implementation and application of the 1st River Basin Management Plan.

The preparation of the 2nd River Basin Management Plan of Cyprus, is taking into account of:

- the framework of the European Union as transposed to National law
- guidance documents issued by the European Commission and the current (state-of-the-art) expertise,
- 1st River Basin Management Plan (2009-2015) and the European Commission's recommendations thereon, as reflected in the agreed Action Plan (Action Plan) and the «Report on the progress in implementation of the WFD Programmes of Measures (SWD 2015 50 final) »,
- individual studies that have been carried out and data collected by WDD and other public bodies since the adoption of first Water Management Plan,
- the results of the consultation on Significant Issues of Water Management in Cyprus implemented during the preparation for the 2nd River Basin Management Plan.

The revised River Basin Management Plan follows the Strategic Environmental Assessment (SEA) process under the Law (Nr. 102 (I) / 2005). The Strategic Environmental Assessment process includes the following four basic steps:

- exploring environmental issues through the impact assessment study on the environment of the proposed project,
- consultation with public,
- integrating the results of environmental investigation and consultation in form for approval of the Plan,
- monitor the future impact of the implementation of the Plan.

The adoption of the RBMP is made after completion of the Strategic Environmental Assessment process, in order to be included therein, the conditions and constraints that arise during the approval of the SEA.

The Republic of Cyprus has fully transposed WFD in the National Legislation with the "On the Protection and Management of the 2004 Water Law" (N13 (I) / 2004). The law approved by the Parliement on February 5, 2004 and published in the Official Gazette of the Republic on February 20, 2004 (No.3812, pages 85, 1 (1) -180, 1 (1)) with effect from December 22, 2003.

3. RIVER BASIN MANAGEMENT PLAN - CLIMATE CHANGE - STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

3.1 CONTENTS OF RIVER BASIN MANAGEMENT PLAN

This Water Management Plan is structured into the following chapters:

Chapter 1. Preface

It includes general information on this report.

Chapter 2. Institutional Framework - Implementation of Water Framework Directive 2000/60/EC

It includes general information for WFD, how to apply and its role in water management and protection as well as the Cyprus institutional framework related to the implementation of the Directive.

Chapter 3. River Basin Management Plan - Climate change - Strategic Environmental Assessment

Described the content of the RBMP the that climate change has taken into account during its preparation and the results of the process of the Strategic Environmental Impact Assessment undertaken according to the provisions of Directive 2001/42/EC (Law 102 (I) / 2005).

Chapter 4. Consultation process - Results

Reference is made to the importance and objectives of the consultation process foreseen by the Directive (Article 14) in the course of preparation of the RBMP and presented public consultation activities that took place.

Chapter 5. Description of Cyprus River Basin District

General information is given about the River Basin District of Cyprus and is described the natural and anthropogenic issues.

Chapter 6. Competent authorities

Competent authorities responsible for the implementation of the Management Plan in accordance with Article 3 of the WFD and their responsibilities are presented.

Chapter 7. Characterization of water bodies

According to Article 5 and Annex V of WFD, is presented the approach for the typological division of river, lake and coastal water bodies and the results of the typology applied in each category of water bodies. Information about natural, heavily modified and artificial water bodies is given. For groundwaters the methodology for their characterization and their delination is presented.

Chapter 8. Pressures

It describes the analysis of point and diffuse pressures and their impacts on surface water bodies and groundwater bodies.

Chapter 9. Monitoring program

brief details of the water status monitoring program is given.

Chapter 10. Condition of water bodies

available data and the methodology used for the classification of ecological and chemical status of surface water bodies and the quantitative and chemical status of groundwater bodies in accordance with Article 8 and Annex V of the Directive is given. Data are also provided for the areas included in the register of protected areas in accordance with Article 6 and Annex IV of the WFD.

Chapter 11. Economic analysis of water uses

It summarizes the economic analysis of water use, the estimation of total water cost, the current level of cost recovery and pricing policies. The economic analysis is based on the application of Articles 5 and 9 of WFD.

Chapter 12. Environmental Objectives - Exceptions

the environmental objectives for surface and groundwater and for protected areas are presented. Additionally are presented exemptions from the environmental objectives, set out in accordance with Articles 4.4 through 4.7 of WDD.

Chapter 13. Program of Measures

Program of measures is presented which comprises Basic measures for the minimum requirements according with par. 3 of Article 11 of the Directive, and the Supplemmentary measures which, according with par. 4 of Article 11 of Directive , are included in addition to the basic measures in order to achieve the objectives set out in Article 4 of WFD.

Chapter 14. Synergies between RBMP and other relevant to water Management Plans

It summarizes the synergies, between RBMP and especially the Program of measures and the provisions of the Flood Risk Management Plan, the Drought Management Plan that is an integral part of the RBMP of Cyprus and the actions implemented in the framework of Marine Strategy Directive

Chapter 15. Next Steps

It presents the key activities / actions planned to be undertaken within the scope of the 2nd RBMP in order to facilitate its implementation.

3.2 CLIMATE CHANGE

3.2.1 Climate Change

The aquatic environment is vulnerable to climate change. The impact of climate change, already dawning around the world varies from region to region depending on climatic, geographical, social and economic conditions. Particularly climate change impacts are expected to be significant in Cyprus and in the rest of the islands in the sensitive Mediterranean basin.

Climate change in Cyprus as recorded in the last decades, it concerns the increasing of the mean annual temperature and the decrease of the average annual rainfall. According to the forecasts for climate, these trends, combined with the increasing of the frequency and the intensity of extreme weather events will continue to occur, causing negative effects.

The world community and Europe with a series of decisions and institutional texts adopt policies and actions for this issue based on both axes. One axis includes actions to reduce emissions of greenhouse gases, pollutants responsible for climate change, in aim to reduce the growth in global average temperature below 20° C by 2020. The second axis, include adaptation measures to effectively deal with the unavoidable impacts of this climate change, focusing on the development and implementation of national adaptation strategies.

The Republic of Cyprus established in 2014 the "Proposal for the Plan Adjustment of Cyprus to Climate Change" under the "Development of a National Strategic Programme on Adaptation to adverse impacts of climate change in Cyprus'. This program identifies the key climatic changes expected to take place over the next years in Cyprus, which mainly concerns the pollowing:

- Increasing of air temperature
- Increase of the evapotranspiration
- Reduced rainfall and increased frequency of droughts
- Increasing the fluctuations in rainfall
- Increase of heavy rains
- Warming of the surface waters
- Rise of the sea level

From the above expected situation the adverse impacts on water status are summarized on the following issues:

- Reducing runoff because of increased evaporation and reduced rainfall will possible increase the salinity in the groundwater.
- Increase of long periods of drought, may lead to increased water scarcity, and create conditions for non-achievement of the WFD objectives in relation to the status of water bodies.
- Increasing the frequency of floods due to the increase of heavy rains.
- Impact on quality characteristics of groundwater, due to rising of sea level.

These issues are taken into account in the planning and prioritization of measures and actions included in the Program of Measures for the period 2016-2021 and are presented below in section 13. The integrating actions are concerning the following:

- Promotion of efficient use of water (surface and groundwater), by replacing the use of groundwaters with water derived from other non-conventional sources and promote artificial recharge of groundwater, where conditions permit.
- Control of all abstractions from groundwater.
- More rational management of existing and new water supply infrastructure to increase preparedness water scarcity phenomena.

3.2.2 Flood Risk Management Plan

In dealing with flood risks, the provisions of the Flood Risk Management Plan, prepared by WDD, is an integral part of the programming period 2016-2021 for the management of water. The Flood Risk Management Plan drawn up for areas of potentially serious risks Flood, set the application of Flood Risk Management Directive 2007/60 / EC. Information on these sites is available on the website of WDD.

3.2.3 Drought Management Plan

During the 1st RBMP Cyprus has elaborated a Drought Management Plan, which is reviewed and is an integral part of this RBMP. DMP is set out appropriate indicators for the early detection of drought in order to allow proper water management and to reduce adverse effects. Based on these indicators the level of alert is determined and actions which are to be implemented are defined. Actions are foreseen for 4 alert levels concerning the following:

- Alert Level - Mild drought
  - Inform competent officers.
  - Inform users for increased attention.
  - Maximize water production from desalination units.

  - Abstractions from large projects in accordance with the stock index.
- Alert Level - Moderate drought
  - Inform competent officers.
  - Inform users for increased attention.
  - Maximize water production from desalination units.
  - Intensification of public awareness raising program.
  - Intensify controls to limit uncontrolled abstraction and abstraction and reduce over consumption.
  - Abstractions from big projects in accordance with the reserve index.
- Alert Level - High Drought
  - Inform competent officers.
  - Inform users for increased attention.
  - Maximize water production from desalination units.
  - Intensification of public awareness raising program.
  - Intensify controls to limit uncontrolled abstraction and abstraction and reduce over consumption.
  - Abstractions from big projects in accordance with the reserve index but no more than those corresponding to the action 'significant cuts'
  - Calculate the monthly regime index and lunch measures on upstream withdrawals if necessary (ratio less than 5%).
- Alert Level - Extremely High Drought
  - Inform competent officers.
  - Inform users for increased attention.
  - Maximize water production from desalination units.
  - Intensification of public awareness raising program.
  - Intensify controls to limit uncontrolled abstraction and abstraction and reduce over consumption. Disclosure situation and intensification of public awareness program.

The provisions of the Drought Management Plan are an integral part RBMP.

3.3 BACKGROUND DOCUMENTS

The preparation of this RBMP is based on studies and data that derived of activities implemented since the adoption of the 1st RBMP. All of these studies are presented in Chapter

16. The main studies that consist the main background documents which include the detailed information presented in this report are the following:

- REPUBLIC OF CYPRUS, Preparation of an Inventory of Emissions, Discharges and Losses of Priority and Priority Hazardous Substances Contract Number 14/2012, December, 2012
- REPUBLIC OF CYPRUS, MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT/WATER DEVELOPMENT DEPARTMENT, Review and update of article 5 of directive 2000/60/EC (water reservoirs) & classification of water status (rivers, natural lakes and water reservoirs), that will establish baseline information and data for the 2nd Cyprus River Basin Management Plan, Report on the classification of water status (rivers, natural lakes, water reservoirs), April 2014
- REPUBLIC OF CYPRUS, MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT/WATER DEVELOPMENT DEPARTMENT, Review and update of article 5 of directive 2000/60/EC (water reservoirs) & classification of water status (rivers, natural lakes and water reservoirs), that will establish baseline information and data for the 2nd Cyprus River Basin Management Plan, Report on the review & update of article 5 (water reservoirs), march 2014
- REPUBLIC OF CYPRUS, MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT/WATER DEVELOPMENT DEPARTMENT, Updating of Article 5 of the Framework Directive on water (2000/60 / EC) on the Review of pressures and impacts of human activity on the status of surface water and groundwater, and Article 14 (1) (b) for the Review of Significant Water Management issues in Cyprus, Updating of Article 5 of Directive (2000/60 / EC on the Overview of pressures and Impacts of Human Activities in the Status of Surface and Groundwater December 2014
- REPUBLIC OF CYPRUS, MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT/WATER DEVELOPMENT DEPARTMENT, WDD 10/2014, Interim Report No. 1, entitled "Checking / Filling of Article 5 of the WFD data gap" - Final Designation of Heavily Modified and Artificial Water Bodies.
- REPUBLIC OF CYPRUS, MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT/WATER DEVELOPMENT DEPARTMENT, WDD 10/2014, Interim Report No. 1, entitled "Checking / Filling of Article 5 of the WFD data gap" - Determination of exemptions from achieving the environmental objectives of Directive 2000/60 / EC and determination of the objectives pursued.
- REPUBLIC OF CYPRUS, MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT/WATER DEVELOPMENT DEPARTMENT, WDD 10/2014, Interim Report No. 1, entitled "Checking / Filling of Article 5 of the WFD data gap" - Assessment / classification quality (ecological and chemical) status of surface water and quality (chemical) and quantitative status of groundwater.
- REPUBLIC OF CYPRUS, MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT/WATER DEVELOPMENT DEPARTMENT, WDD 10/2014,

Interim Report No. 1, entitled "Checking / Filling gaps in Article 5 of the WFD data" - Economic analysis of water uses.

- REPUBLIC OF CYPRUS, MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT/WATER DEVELOPMENT DEPARTMENT, WDD 10/2014, "Evaluation Report of the Consultation process results for the 2nd Draft River Basin Management in Cyprus.

3.4 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (DIRECTIVE 2001/42/EC)

As part of the Law 102 (I) / 2005 on Impact Assessment in the Environment from Certain Projects and/or Programs, a Strategic Environmental Impact Assessment study is drafted for this RBMP and submitted to the Competent Environmental Authority.

On this basis and in accordance with the provisions of this law the Competent Environmental Authority issued a positive opinion "for SEA submitted by the Water Development Department for the preparation of the 2nd Cyprus River Basin Management Plan for the implementation of Directive 2000/60/EC (Reg. Fak. 02.10.013.010)», setting specific terms and conditions which are detailed in Annex I to the mentioned opinion.

These terms briefly include the following:

Section A: General Essential Terms

Implementation of the Framework Directive provisions on water (WFD) and the main objectives on the ecological quality and improvement, sustainable management and protection of water, protection and improvement of the environment, protect the structure and function aquatic ecosystems, improvement of ecosystems (habitat) in terms of their water needs for the habitat types and species that depend on water.

Be prepared and implemented by the Competent Authority in collaboration with other relevant authorities appropriate monitoring plan as described in Annex II. The initial findings of the monitoring program should be reported within six months from the adoption of this opinion and submitted to the Department of Environment, and thereafter, the updated information / data to be sent annually, not later than December 20 of each calendar year. If the results of the Monitoring Program reflect a significant departure from the implementation of the objectives of the 2nd RBMP, the Competent Authorities should conduct when possible corrective action.

Before the implementation of projects falling under the Annexes of the rules on Impact Assessment in the Environment from Certain Projects Laws 2005 to 2014 and/or fall into protected areas of the Natura 2000 network and programmed to take place within the 2nd RBMP should be submitted the appropriate Environmental Impact Assessment Studies, in accordance with the provisions of Laws on the Environmental Impact Assessment of certain projects, 140 (I) / 2005 and the Nature Protection and Management of Wildlife, 153 (I) / 2003 and any amendments to those laws (if required). When planning should be avoided to exclude narrow strip of land between the new projects and seek the combined use of the premises.

Compatibility Certificate be issued for the Environment of the Environmental Authority, for all projects of the 2nd RBMP.

Section B: General Terms

To ensure the ecological flow downstream of existing dams as defined in RBMPs, as well as the possible authorization of new dams will the ecological flow should be ensured downstream in such a way so as to protect the riparian, coastal and marine ecosystem structure and functions there.

Monitoring in all water bodies on the state of conservation of biological and chemical data, hydromorphological characteristics and structure and function in accordance with the provisions of Directive 2000/60 / EC.

Monitoring of quality elements mainly of organic aquatic organisms, hydromorphological elements of morphological conditions.

Identification of anthropogenic pressures and assessment of impacts on water bodies mainly on abstraction, water flow (drift, balance transfer) the pollution of significant morphological alterations and ecological quality, in accordance with the provisions of Directive 2000 / 60 / EC.

Practices/ projects will be used to apply the criteria of the Action Plan for Green Procurement 2012-2014, with the aim of reducing environmental impacts and maintaining economic viability.

Avoid interference and hydrological changes (land reclamation for the bulldozer, concrete coatings, etc.), in riverbeds and embankments of rivers and streams and clearing of vegetation. Avoid, in priority the soil sealing (cementing) with concrete of streams and rivers and hydrological alteration (diversion etc.). Avoid underground rivers and the smooth flow of the water bodies.

Do not allow planting of invasive alien species, and any habitat restoration by planting (native / native species) in water bodies be made in consultation with the relevant Departments (Department of Environment and Forestry Department) and attempt to conserve ecosystems biodiversity (habitats and species).

Implement measures to restore degraded Water Bodies and halting the ongoing deterioration in order to improve groundwater bodies which are in poor chemical or poor quantitative status through the implementation of the Program of Measures (14 exceptions). Do not deteriorate groundwater bodies, which are in good status as laid down in the objectives of the 2nd RBMP.

The quality characteristics of the available water after processing for human consumption should comply with the requirements of Directive 98/33 / EC on the quality of water for human consumption.

Ensure adequate protection to prevent deterioration of water quality in order to reduce the degree of treatment for drinking water.

Preserve, protect and improve the quality of bathing waters, pursuant to the quality management of bathing waters provisions of Law of 2008 (N.57 (I) / 2008).

Correlation of the Strategy and Action Plan for Integrated Management of Coastal Areas to be completed in 2018 with the Management Plan of River Basin.

For nitrates vulnerable zones continue reducing of water pollution by nitrates from agricultural sources, according to the 1991/671 / EEC Directive.

Avoid in priority the creation of new private boreholes and/or other projects in the areas of Natura 2000 Network, according to Directive 92/43 / EEC where negatively affected species and habitats listed in Annexes I and II.

Establish pilot interventions after consultation with the competent authorities in natural river systems and lakes for the improvement of the situation of habitats and species in protected areas.

Attempt to remove the horizontal barriers in order to improve the hydromorphological characteristics of selected water bodies that support important ecological elements (mainly concrete) in accordance with the provisions of the second RBMP.

Incorporate the provisions of the second RBMP in the Action Plans of habitat protection areas and species.

Complete the establishment of protection zones in total groundwater abstraction points for water supply purposes.

Cleaning/rearrangement of active bed to improve the hydromorphological characteristics of selected water bodies supporting significantly ecological elements as specified in the RBMP.

Local interventions in the watercourse of selected WB (e.g. local wells to maintain the water element) to improve the hydromorphological characteristics that supporting significantly biological elements as defined in RBMPs

Avoid degradation / loss / fragmentation of habitats of species dependent on watert, especially endangered and endemic species (including habitat living) and maintaine the total number of vertebrate species.

Record the abstraction points of groundwater.

Attempt to implement projects that increase recycled water use in agriculture (construction of winter storage tanks, projects for distribution and disposal of recycled water).

Synergies between water status monitoring program and the rehabilitation program of the abandoned mining waste, in order to improve the chemical status of water bodies that appear with a status less than good

Implement specific intensive monitoring program for Ni (nickel) in River Kourris for the temporal and spatial registration of high concentrations.

Monitoring of the chemical status of the water body Argaki tis Limnis for the evaluation of the effectiveness of the rehabilitation works of Mine Lake on water status and use of the conclusions in similar projects in other regions.

Environmental Authority recommends begin full restoration procedure ASKAREL project. It is suggested as preliminary assessment study conducted in collaboration with the Geological Survey Department to transport of waste and cleaning of the area.

Elaborate action plan to address stormwater runoff from residential areas and industrial facilities to protect water.

Conduct special monitoring program for chemical-physicochemical parameters and in sediments of ephemeral bodies, harmonized with the relevant methodological requirements of WFD.

Pursuant to the provisions of the current legislation of the Republic of Cyprus, the implementation of the above is mandatory when applying RBMP.

4. PUBLIC CONSULTATION

4.1 REQUIREMENTS OF DIRECTIVE 2000/60 / EC

According to Article 14, Member States should encourage the active participation of all parties in the implementation of the Directive, particularly in the preparation of RBMP. Additionally, MS, for each river basin district, publish and make available to the public, for comments:

- a timetable and work program for the production of the management plan, at the latest by December 2006 for the 1st RBMP or three years before the adoption of the 2nd RBMP,
- an interim overview of the significant management issues identified at the latest by December 2007, for the first RBMP or two years before the adoption of the 2nd RBMP and
- copy of the draft river basin management plan, at the latest by December 2008, for the 1st RBMP or one year before the adoption of the 2nd RBMP.

4.2 PARTICIPANTS, CONSULTATION TIMETABLE AND CONSULTATION METHODS

The Republic of Cyprus organized and performed successfully the following Public Consultation campaigns:

- The First Consultation phase started in December 2012 and was completed within six months (May 2013), in which the following actions were taken:
  - Published a report on the First Consultation Phase of the 2nd River Basin Management Plan
  - Organized Conference / Meeting bodies Public Consultation - (April 2013)
  - Organized Public Consultation on the implementation of the Water Framework Directive (April 2013) with the 'Report on the First Phase Consultation for the 2nd Draft River Basin Management Plan' concerning the publication and consultation of the timetable and of the work program for the preparation of 2nd RBMP.
- In the period June 2014-December 2014, the Second Phase of public Consultation is organized on Significant Issues of Water Management in Cyprus (Article 14.1.v) in the preparation of the 2nd RBMP. The competent authority established in its central website a page for public information and exchange views on important issues of Water Management in Cyprus. In this context, the following actions were taken:

- The text "Report Important Issues of Water Management in Cyprus" was published
- A special questionnaire for the issue was published.
- An official presentation of the consultation results was held on 11/03/2014 in the multipurpose hall of the Agriculture Department in Nicosia.

All the above are posted promptly on WDD website (www.wfd.wdd.moa.gov.cy).

The program included presentations from the competent authority and discussion with the participants. The conference was attended by 86 people from a total of 33 Bodies.

The main issues raised in the discussion are divided as follows:
a) issues where necessary clarifications were provided:

- the abstraction licensing regime,
- the grouping of the WWTP construction in small communities,
- The rehabilitation of the mines and the settlement of landfills,
- the non-construction of green points
- The compliance with the provided ecological flow

b) issues that should be considered further:

- Most controls of drinking water,
- explore possibilities for building more dams recharge,
- improper treatment and lack of necessary control in pigsties,
- more detailed measurements or estimates and comparative data from other countries, as regards the conclusion that the recycled water does not cause a problem in the aquifers,
- explore whether the cost of the artificial recharge of the aquifers projects in the future is configured so high, (because of the controls, measurements, increased requirements for control for presence of specific pollutants and pharmaceuticals etc.) as now is comparable to costs of desalination of sea water,
- investigation to form a comprehensive knowledge on industrial waste,
- Benefit communities in the municipalities with more efficient control and management of drinking water,
- monitoring of the pricing and cost of the water supply

c) Other issues which addressed in the review of pressures:

- examination of golf courses and green space within categories of significant pressures,
- Address the issues of water scarcity-climate change and taking demand restraint measures,

- Inclusion of hydromorphlogical alterations in the categories of significant pressures.

The third phase of the six month consultation for the 2nd RBMP was implemented from August 2015 to February 2016, and included the following activities.

The competent authority created in its central website a page (www.wfd.wdd.moa.gov.cy) for public information and consultation on the draft 2nd River Basin Management Plan (RBMP) in Cyprus.

Material of the consultation was posted and was accessible from the public and all stakeholders in order to to submit wtitten comments and comments. The materal available to public consists of the following - documents:

Consultation Form (non-technical summary of Draft Water Management Cyprus)

Questionnaire

Draft River Basin Management Plan

Maps Cyprus 2nd River Basin Management Plan

Background documents including the following:

- Classification of Water Bodies
- Heavily Modified Water Bodies
- Exceptions
- Economic Analysis of Water Uses
- Draft Program of Measures
- Draft assessment of the effectiveness of MM
- Draft Drought Management Plan
- Draft Strategic Environmental Impact Assessment study and a non-technical summary of this.

As part of the consultation campaign are organized five (5) total public open meetings.

- Meetings with Stakeholders Bodies Nicosia - Larnaca - Amochostos Public Consultation on Draft RBMP of Cyprus (2016-2021) - November 26, 2015.
- Meetings with stakeholders Limassol - Paphos Public Consultation on Draft RBMP of Cyprus (2016-2021) - November 27, 2015.
- Provincial Meeting on Draft RBMP of Cyprus and Draft Flood Risk Management Plan in Paphos for Limassol, Paphos - 04 February 2016.
- Provincial Meeting on Draft RBMP of Cyprus and Draft Flood Risk Management Plan in Larnaca for Nicosia, Larnaca, Amochostos - 05 February 2016.
- Pancyprian Conference for raft RBMP of Cyprus and Draft Flood Risk Management Plan in Nicosia - February 19, 2016.

Note that 3 of the 5 meetings were common for the RBMP and Flood Risk Management Plan.

In addition the opportunity to all participants to assess each meeting / conference attended was given by a special evaluation form.

To improve the participatory process and the active involvement of the main actors involved in the Management and Protection of Water of Cyprus, WDD decided to establish a Special Committee (Steering Committee) with members/representatives from key departments and ministries.

The purpose of this committee is to participate actively in the formulation of the draft RBMP and SDKP.

The committee consists of representatives from the following Ministries, departments, services and agencies of local government:

- Ministry of Interior
- Environment (DE)
- Geological Survey Department (GSD)
- Department of Agriculture (DA)
- Fisheries and Marine Research (DFMR)
- Representative of Nicosia District Officer
- WDD units (Hydrometry, Hydrology and hydrogeology, European Union office, Planning Office).

In addition to these ad hoc representatives of other bodies were participated according to the topics of discussion as the Game and Fauna Service, Department of Forestry, Department of Building and Housing, State General Chemical Laboratory, etc.

The representatives of these bodies were informed for the progress of the preparatory work of Drafts Pans and other relevant specific issues in the following ways:

- Review of the individual deliverables / reports and Draft managmenet palns before the initial acceptance of the WDD for placing them on the six-month consultation.
- Regular workshops to discuss specific issues and express opinions on matters of their competence and preliminary formulation of the program of measures and Management Plans.
- Special workshops on specific issues after the start of the consultation (08.20.2015).

Apart from the above workshops special meetings were held with organizations indirectly involved in the implementation of the measures associated to the potential financing tools that can be used for this purpose In this context meeting were held:

- With representatives of DG EPSA on issues related to the financing of the program of measures from the Structural Funds.
- With representatives of the Managing Authority of the RDP on issues related to finance measures related to pressure from agriculture.
- Department of Environment on the specific measures related to HMWBs and protected areas.

During the consultation for the preparation of the 2nd RBMP of Cyprus River, and following the above mentioned 5 meetings carried out it seemed appropriate to organize a special meeting with the NGOs of the country. Subject of the meeting was the discussion of various aspects of the RBMP in order to exchange views. For this purpose, were invited the following environmental organizations (including professional associations and relevant chambers) and NGOs:

- Cyprus Centre for Environmental Research and Education (CY.CERE)
- «Azur» Studies and Research Center
- Cyprus Wildlife Society
- Environmental Larnaca Movement
- Animal Protection Association and Bird Larnaca - Famagusta
- Pancyprian Organisation of Architectural Heritage
- Ecologists Citizens Cooperation
- Friends of the Earth Cyprus
- Friends of Nature Cyprus
- Cyprus Conservation Foundation - CCF
- Cyprus Union of Marine Environment Protection (CYMEPA)
- BirdLife Cyprus
- Pancyprian Union of Agronomists
- Environmental Studies Center
- Office Environment Commissioner
- Cyprus Institute of Research, Technology and Innovation
- Cyprus Green Party
- Environmental Movement Cyprus
- Climbing Mountaineering Association "KORFES"
- Ecological Intervention - Friends of Akamas
- Cyprus Federation of Environmental Organizations
- Environmental Verde Group

The meeting took place on Thursday, February 18, 2016 at the headquarters of the Water Development Department in Nicosia. From the invited actors were present included representatives of the following organizations:

- Cyprus Union of Marine Environment Protection
- Office Environment Commissioner
- Bird Life Cyprus

4.3 RESULTS OF THE CONSULTATION ON THE DRAFT MANAGEMENT (Article 14 (1) c)

Consultation activities, minutes of meetings and the evaluation of the questionnaires and the Conference evaluation forms are recorded in a special report which is available as background document of thiw report.

The Table below summarizes the number of participants listed in the workshops as well as the number of organizations represented.

Meeting	number of participants
Meeting with stakeholders	
Nicosia - Larnaca - Amochostos (26/11/2015)	75
Limassol - Paphos (27/11/2015)	32
Regional meetings	
Limassol - Paphos (04/02/2016)	57
Nicosia - Larnaca - Amochostos(05/02/2016)	68
Nationwide	
Nicosia (19/02/2016)	68

During the meetings given sufficient time was given to all concerned agencies or private entities to express questions, make interventions and comments and to submit proposals on all relevant consultation documents.

During the consultation process 47 completed questionnaires placed on the website of the Department for this purpose were received concerning issues related to water management and issues addressed in the RBMP

The conduct of the consultation was admittedly successful. 60% of those present in meetings / provincial conferences and the Pancyprian conference, who completed the evaluation form were very satisfied with the meetings / workshops and their contents

All meetings / workshops were completed in a constructive atmosphere of fruitful dialogue. The participation was satisfactory as represented a significant number of relevant stakeholders whose opinions were expressed.

In conclusion changes / additions contained in the Final RBMP as a result of the consultation include the following:

1. A Special reference to the objectives of the first RBMP as resulted from the monitoring of water status in a way that is comparable to the data given, since River

WB have been changed in the revision. Comparison of the status of the WB today in comparison to the to the first RBMP is given in detail in a specific annex of this report

2. Inclusion of the ephemeral river WB which are directly related to priority habitats and species dependent on water in Natura 2000 sited. 11 ephemeral river WBs are Included in the final RBMP which are presented in the following table:

Table 4-1. Ephemeral water bodies in the final RBMP

Ephemeral water bodies (Code/ Name)	Area Natura 2000 (Code – Name – Type)
1. CY_1-3-e_RE_HM (Xeros Potamos)	CY4000007 Xeros Potamos SPA/ SCI CY4000018 Estuaries Ezousa, Xeros and Dhiarizos SPA
2. CY_2-1-a_RE (Ayiou Ioanni)	CY4000023 Peninsula Akamas SPA
3. CY_2-3-e_RE (Xeropotamos)	CY2000006 Paphos forest SPA
4. CY_6-5-h_RE (Alykos)	CY2000002 Alykos Potamos - Ag. Sozomenos SCI
5. CY_6-5-i_RE (Almyros)	
6. CY_6-5-g_RE (Villourkon)	
7. CY_8-3-a_RE (Kalo Chorio)	CY6000002 Larnaca Alikes SPA/ SCI
8. CY_8-3-b_RE (no name)	
9. CY_8-4-g_RE (Agios Ioannis)	CY6000007 Potamos Panagias Stazousa SPA
10. CY_9-7-b_RE (Symvoulas)	CY 5000009 – Potamos Paramali SPA
11. CY_3-7-m_RE Likythia	CY 2000003 Area Mitsero SCI

3. Integration of the Natura site CY 2000003 Area Mitsero (SCI) in the register of protected areas, since in this area is located the habitat 92DO Thermo riparian galleries (Nerio-Tamaricetea) - Scrub Nerium oleander, Tamarix smyrnensis that depends directly on water.

4. Corrections in the environmental flows proposed in measures SM-vii-05, SM-vii-06 and SM-vii-07. Also, addition of targeted environmental flow downstream Asprokremos dam of 0,3 hm^3. This flow will be adjusted according to the available water in reservoirs Kannaviou system Asprokremmos Mavrokolympos and in the manner prescribed in measure SM-vii-06.

5. Addition of a special chapter in RBMP describing the next steps required for the optimal implementation of the proposed action program This chapter contains a summary including the following:

- Indicative timetable for implementation of the Road Maps for groundwater and surface waters described in the Programme of Measures
- Directions concerning the review of the water status monitoring program
- Directions for targeted information / awareness raising campaigns for farmers

6. Small verbal adjustments in 6 Basic measures and 1 Supplementary measure.

Details are presented in the special report evaluating the consultation results.

5. DESCRIPTION OF CYPRUS RIVER BASIN DISTRICT

This chapter provides basic information about the characteristics of the River Basin District Cyprus which affect or are affected by the availability and / or the status of the Isle of water resources.

5.1 RIVER BASIN DISTRICTS

In application of Article 3, the entire island of Cyprus is considered as a RBD consisting of 70 major watersheds. The area controlled by the Government of the Republic includes 47 major watersheds.

Hydrographic, the island of Cyprus is subdivided into 9 hydrological regions:

5.2 PHYSICAL CHARACTERISTICS

Cyprus is an island country in the eastern Mediterranean, located east of Greece (east of 270 km of the coast of Crete, Rhodes and Kastelorizo), south of Turkey (70km from the Turkish coast) and west of Syria (110 km from the Syrian coast). In particular, Cyprus is located between parallels 34 ° 33 ' and 35 ° 42' N and the meridians 32 ° 16 ' and 34 ° 35' A. It occupies an area of 9.251 Km^2 (of which 5.760Km^2 where exercised effective control by the Government of the Republic) and is the third largest Mediterranean island after Sicily and Sardinia. It has a maximum length of 225 km (distance between Cape Drepano and Apostolos Andreas) and a width of 94 km (distance between Cape Kormakitis and Cat). The total length of its coastline is 772 km.

The morphology of Cyprus is dominated by the following morphological units:

- Troodos Mountains, located in the central-western part of the island with the highest peak, Mount Olympus have a height of 1.951m above sea level,
- Pentadaktylos which has a relatively small width and extends along the northern coast of the island with peaks up to 1,000 meters altitude,
- the central plain of Mesaoria traversed by two rivers the Pedhieos and the Yialias. The Mesaoria plain located between the mountain ranges of Troodos and Pentadaktylos and has a low altitude,
- the coastal plains and valleys along the coast.

Cyprus has an intense Mediterranean climate with a typical seasonal variation strongly marked with respect to temperature and rainfall. The rainfall heights vary with latitude and with altitude. At the eastern end of the island, in Amochosts average annual rainfall is 320 mm and height increases westwards reaching at Paphos District 540 with 550 mm. Besides the spatial variation, annual rainfall presents extremely high temporal variability. On average of 80% to 85% of the precipitation returns to the atmosphere as evapotranspiration rate may reach 95% drier years. This means that, in terms of annual contribution to water resources, variability of precipitation strengthened by increasing the rate of loss to the atmosphere as the rainfall diminishes.

In terms of runoff, the decisive factor is the massif of Troodos from which start many large and small rivers. All 25 important in terms of runoff, rivers and streams come from the mountains of Troodos. The total average runoff in Cyprus is of the order of 300 x10^6 m^3 per year. Part of these effluents is also part of the aquifers feeding. Hydrographic, the island of Cyprus is subdivided into 9 hydrological regions.

From 21 gated Groundwater Systems (GWB) in the free areas, 20 are bounded with the run offs the massif of Troodos, or recharges directly from runoff from it. An exception is the GWB of Kokkinohoria (CY-1) in Amochostos. But this, however to a lesser extent, is recharges by Yialias river that flows from the Troodos massif.

The natural water potential of GWB in the area where effective control is exercised by the Government of Cyprus is approximately 220x106m^3 year (period 2008-2013). In natural reachrge is added and artificial recharge volumes in Yermasogeia area with water from the Yermasogiea dam and the region of Ezousas, where artificial recharge project is done through utilization of WWTP Paphos treated water.

5.3 ANTROPOGENIC CHARACTERISTICS

5.3.1 Population and development

5.3.1.1 Administrative structure

Cyprus became an independent Republic on August 16, 1960 and has a presidential system of government. Since 1974, about 37% of the territory of Cyprus is under Turkish occupation. In these occupied areas the Government of Cyprus does not exercise effective control.

Administratively, Cyprus is divided into six (6) provinces. The administrative capital of each province is the namesake Municipality (Nicosia, Limassol, Larnaca, Paphos, Amochostos and Kyrenia). Each region is headed by the District Officer, who is a senior civil servant under the Ministry of Interior. The District Administration, in addition to its institutional role, in accordance with the provisions of the 1999 Law on Communities, coordinate, guide and implement development projects in the communities.

Regions comprise Municipalities and Communities. Municipalities (33) cover approximately 65% of the population, while the communities the rest of the population.

The Municipal Corporations Law was passed by the Parliament in 1985. After the Turkish invasion in 1974 and the occupation of the northern part of Cyprus by Turkey, nine (9) municipalities ceased to exert the usual municipal powers and responsibilities, but retain their legal status in the free areas of the Republic, in which temporarily have their headquarters.

Besides municipalities, other first degree Local Authorities in Cyprus are the community councils with generally similar powers to those of Municipalities, . The community councils and community councils cover in the free areas 353 communities, and about 35% of the population and 90% of the land area of Cyprus.

5.3.1.2 Demographic characteristics

The total population recorded in 2011 in the free areas was 840 407, increased 21.9% since 2001. It has been estimated, based on the coverage check survey after the census, that a rate of 1.93% was not recorded (absent, not declared, not responded etc.), bringing the population to 856 960 on October 1, 2011 compared to 703.529 in 2001 [77].

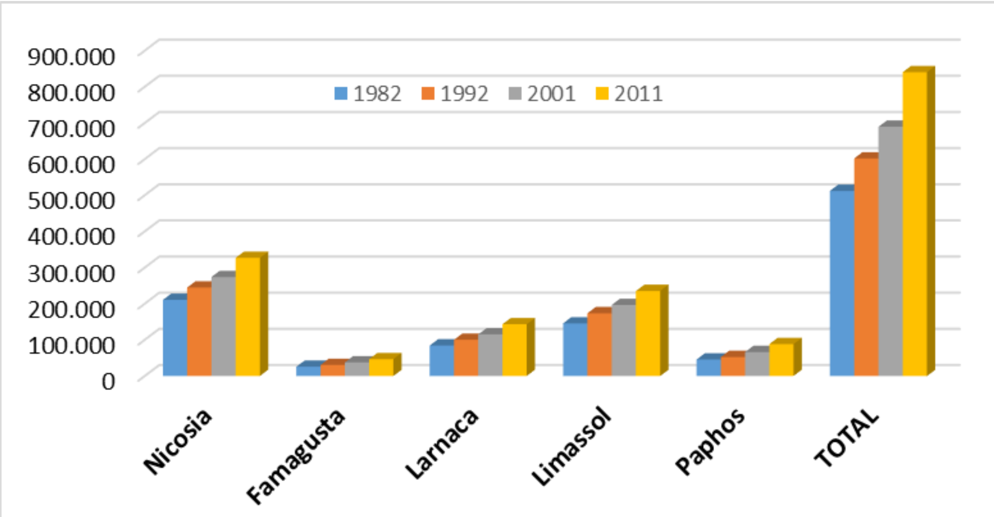
The data by district show that the population in Paphos and Larnaca grew faster than the other provinces in the last decade.

Significantly increased the population of non-Cypriot nationals. Foreigners who have their habitual residence in Cyprus, i.e. those. who reside in Cyprus for at least one year, is 20.3% of the recorded population, reaching 170 383 compared to 64 811 (9.4% of total population) in 2001.

Table 5-2: Population and Percentage population change, by region and the whole of Cyprus, 1982-2011

Province	1982	Variation 1982-1992	1992	Variation 1992-2001	2001	Variation 2001-2011	2011
Nicosia	210.684	16,2%	244.779	11,8%	273.642	19,5%	326.980
Famagusta	25.659	20,0%	30.798	22,5%	37.738	23,6%	46.629
Larnaka	84.496	18,6%	100.242	15,0%	115.268	24,2%	143.192
Limassol	145.614	19,2%	173.634	13,2%	196.553	19,7%	235.330
Pafos	45.645	15,2%	52.572	26,2%	66.364	33,0%	88.276
TOTAL	512.098	17,6%	602.025	14,5%	689.565	21,9%	840.407

Figure 5-1: Population variation, by region and the whole of Cyprus, 1982-2011



In Cyprus, as in all European countries, the percentage of urban population is constantly increasing at the expense of people living in mountainous and less favored areas. The percentage of population in urban areas was estimated at 68.8% compared to 67.4% in 2001 and 67.7% in 1992, retaining the population in rural areas generally observed, although in villages to reduce residents continued.

5.3.2 Economic and Productive structure

5.3.2.1 General Financial Data

The Cypriot economy is in a fiscal adjustment program which covers the period 2013-2016. The period 2008-2013 is characterized by a decrease of Gross Domestic Product by 3.5%, a significant increase in the unemployment rate from 3.6% to 15.9% and budget deficit of the General Government.

Table 5-3: Socioeconomic background characteristics of Cyprus (2008-2013)

	2008	2013	Variations
Population*	796,9	858,0	7,7%
Households Number*	282,6	312,7	10,7%
GDP **	18.768,8 €	18.118,9 €	-3,5%
GDP derived from the Primary Sector	369,2	420,0	13,8%
GDP derived from the Secondary Sector	3.426,1	1.915,4	-44,1%
GDP derived from the Tertiary Sector	12.931,5	14.349,8	11,0%
General Government Revenue **	7.474,7	6.610,4	-11,6%
General Government Expenses **	7.310,1	7.501,1	2,6%
Budget deficit-surplus General Government	164,6	-890,7	
Budget deficit-General Government surplus as% of GDP	0,9	-4,9	
Gross Government General Government debt	8.388,2	18.518,8	
Gross government debt General Government as% of GDP	44,7%	102,2%	
Average per capita income	23.362 €	20.378 €	-12,8%
Export Word / Import	16,2%	33,5%	
Total Imports (million €)	7.366,5	4.810,5	-34,7%
Export Total (million €)	1.190,4	1.611,6	35,4%
Inflation	4,7%	-0,4%	
Consumer Price Index (2005 = 100)	109,83	118,88	
Unemployment	3,6%	15,9%	
Employment Total *	389,1	355,0	-8,8%
Employment Primary *	26,6	27,2	2,3%
Secondary Employment *	80,4	55,2	-31,3%
Employment Tertiary *	282,1	273,2	-3,2%

** Thousands, ** million, at current prices*

The **total** GDP of the country showed a decrease of 3.5% from € 18.77 billion in 2008 to € 18.11 billion in 2013.

The **Primary Sector** contributes to GDP (2.3%) in 2013 rate slightly higher than 2008 (2%).

The **Secondary Sector** shows a significant decrease (-44.1%) on the contribution to GDP of € 3.4 billion in 2008 to € 1,9 billion in 2013. The participation of the total GDP of the country for 2013 is about 10.6%.

The **Tertiary sector** is the dominant sector of economic activity in Cyprus with the most significant contribution to GDP (79.1% in 2013) with the key tourism industry.

5.3.2.2 Rural economy

The rural economy is in transition due to the new economic environment created as a result of full accession to the European Union and the initial stage preceding. After joining the EU, the Cypriot economy is continually adapting to the new economic environment and intense international competition. The ongoing liberalization of international trade and the expansion of free trade agreements between the EU and Mediterranean partner countries (in the context of the Euro-Mediterranean Partnership), intensify the competitive pressure on the Cypriot agricultural sector, because of the similarity in agricultural production, both among Cyprus and the Mediterranean EU countries, and between Cyprus and the Mediterranean partner countries.

The contribution of agriculture, forestry and food processing industry, in Cyprus economy is very important, accounting for more than 7.5% of GDP, more than 10% of the total workforce and more than one third of total exports. The agricultural sector, apparently suffering from reduced contribution to total GDP formation and this is easily attributable to the rapid growth of the service sector. However it is still necessary for the Cyprus economy in fundamental aspects related to:

- social cohesion,
- maintaining rural life and tradition,
- food safety,
- Employment and
- morphological and topological characteristics of Cyprus.

Given the associated and resulting economic activity affected by the agricultural sector, forestry and food, and not just the financial activities of the primary sector, it is estimated that the total contribution of agriculture to the economy of Cyprus is great. The multiplier of the direct contribution to GDP is estimated at about 4. This means that the reduction of the agricultural GDP in one unit can cause a four-fold equivalent reduction in the total GDP of the entire national economy. The agricultural sector as a whole, has an important role in growth and employment and therefore in achieving the objectives of the Lisbon strategy. Indicative of the role to be played by the agricultural sector is the fact that the past two to three years, with the onset of economic crisis, has recorded a shift of the productive resources to agriculture [SOURCE YGAA & P, 2015].

5.3.2.3 Labor Market - Employment

The Economically active population for the period 2008-2013 increased by 5.2%, from 403 thousand to 424 thousand. Employment, however, fell from 389 thousand in 2008 to 355 thousand in 2013 to 8.8%.

The number of unemployed has increased significantly from 14.5 thousand in 2008 to 68.9 in 2013 with respective unemployment rates of 3.6% in 2008 to 16.2% in 2013.

The largest decrease in employment is mainly the secondary sector at a rate of 31.3% from 80.4 thousand employees in 2008 to 55.2 thousand in 2013, mainly from the decrease in employment in construction and manufacturing. Smaller reduction showed employment in the tertiary sector 3.2% mainly due to reduced employment in economic activities such as, Real estate, Public Management, Wholesale and Retail. The only production sector grew even small is the primary at a rate, 2.3%.

5.3.2.4 Industry

For the period 2008-2013 the gross industrial output value decreased by 17.7%, from € 4.8 billion in 2008 to € 3,9 billion in 2013. The largest decrease experienced by the processing rate of 29.9%. Similar is the reduction in gross value added of industry decreased by 19.7% from € 1.68 billion in 2008 to € 1.35 billion in 2013.

Employment in the industrial sector for the period 2008-2013, decreased by 19%, from 39.4 thousand employees in 2008 to 31.9 thousand in 2013. The largest decrease experienced by the processing rate of 21.1%. Significant increase in employment presented by the management and treatment of water by 31.5% from 1.2 thousand employees in 2008 to 1.6 thousand in 2013.

5.3.2.5 Tourism

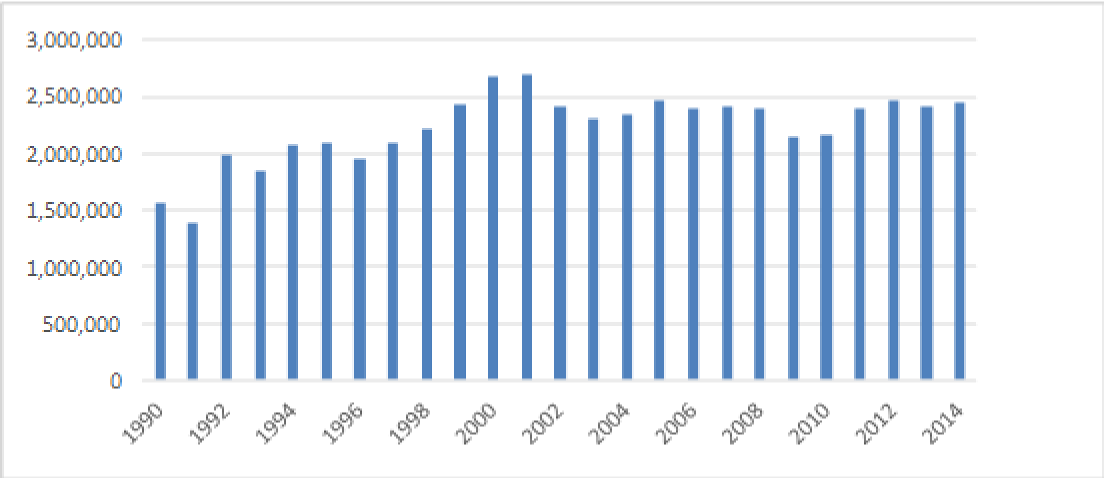
Tourism plays an important role in the Cyprus economy and the 1960 Cyprus became one of the main tourist centers of the Mediterranean. In tourism development contributed to its geographical location and climatic conditions. Also based on the National Strategic Plan prepared by the Cyprus Tourism Organization for the period 2003 - 2010, places emphasis on the development of specific forms of tourism, such as Conference and Incentive Tourism, Cultural Tourism, Athletic Tourism, Walk and Cycling Tourism, Cruises.

Over the last decade, tourist arrivals have stability at the beginning and end of the period with 2.4 million arrivals. Most arrivals are displayed in 2012 and lower in 2009.

Table 5-4: Evolution of employment - unemployment 2000-2013

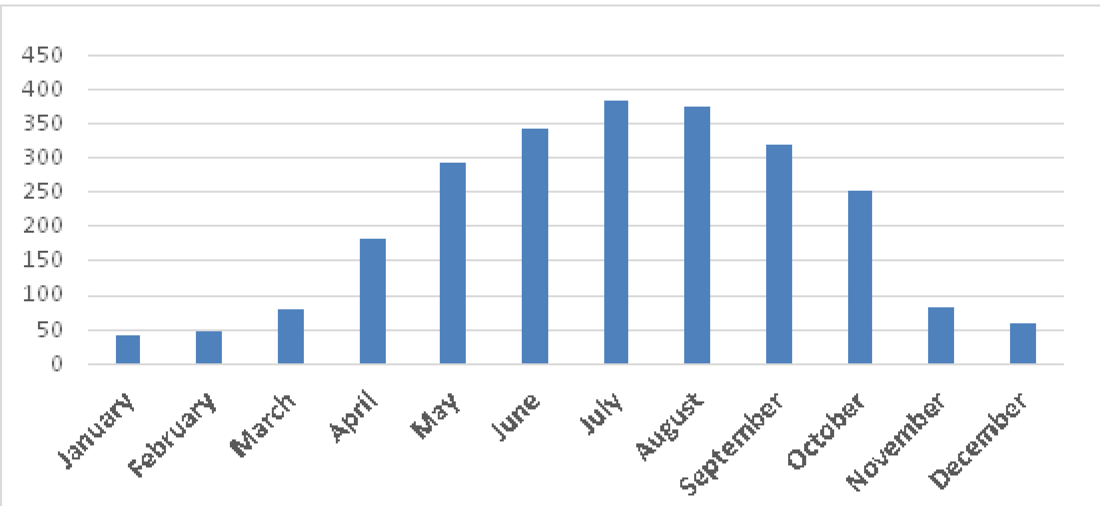
	2013**	**2012***	**2011**	**2010**	**2009**	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**	**Variation 2008-2013**
total Population	858,0	865,9	862,0	839,8	819,1	796,9	776,4	757,9	744,0	733,0	722,9	713,7	705,5	697,5	**7,7%**
Economically active population (thousands)	424,5	428,0	423,2	413,6	408,1	403,6	394,5	386,0	380,8	370,7	357,7	347,2	343,2	336,9	**5,2%**
% of total population	49,5%	49,4%	49,1%	49,2%	49,8%	50,6%	50,8%	50,9%	51,2%	50,6%	49,5%	48,6%	48,6%	48,3%	
The employed population (thousands)	355,6	376,0	389,2	387,2	386,4	389,1	379,1	369,0	361,3	354,0	343,6	336,4	330,4	321,5	**-8,6%**
% Of the economically active population	83,8%	87,9%	92,0%	93,6%	94,7%	96,4%	96,1%	95,6%	94,9%	95,5%	96,1%	96,9%	96,3%	95,4%	
Number of unemployed (thousands)	68,9	52,0	34,0	26,4	21,7	14,5	15,4	17,0	19,5	16,7	14,1	10,8	12,8	15,4	**375,2%**
% Unemployment	16,2%	12,1%	8,0%	6,4%	5,3%	3,6%	3,9%	4,4%	5,1%	4,5%	3,9%	3,1%	3,7%	4,6%	

Figure 5-2 : Total tourist arrivals in the period 1990-201



The following figure shows the increase of tourists during the summer months. Positive is the fact that increased tourism is observed from May to October, increasing the tourist season in six months.

Figure 5-3: Monthly tourist distribution (2014)



The countries from which comes mainly tourism of Cyprus are the UK, Russia, Greece, Sweden, Germany, Norway, Switzerland and France. 2014 in terms of the performance of the UK market remained far in the first place, however, recording a decrease of 0,6% for July

The areas with the increased tourist traffic in the year 2014 is Paphos and City Khrysokhou with highest percentage during the year 42.6%, Agia Napa and Lemesos rate reaches 22.7%, and Paralimni with 21.3% share (http://www.cystat.gov.cy/mof/cystat/statistics.nsf/index_gr/index_gr?OpenDocument).

According to the Statistical Service of Cyprus visit Cyprus reasons are mainly recreation (89.1%, 2014), while a small proportion (18.8%, 2014) professional. The type of accommodation with the highest preference by tourists is the star hotels (56.4%, 2014), followed by organized apartments and tourist villages at the rate of 22.6% (2014). Also, tourists visiting Cyprus prefer package tours (60.4%, 2014) compared with the non-organized (39.6%, 2014).

Income from tourism for the same period has increased by 16.2%, from approximately € 1.8 billion in 2008 to € 2.1 billion in 2013.

Table 5-5: Revenue from tourism for the period 2008-2013

TOURISM REVENUES (million €)						
PERIODS	2008	2009	2010	2011	2012	2013
TOTALS	1.792,8	1.493,2	1.549,8	1.749,3	1.927,6	2.082,4

5.4 WATER NEEDS COVERAGE

5.4.1 Water Sources[1]

5.4.1.1 History

Water has always been a resource shortage in Cyprus. During the Frankish period (1192-1571 AD) was storage of rainwater and abstraction from wells (laoumi). This continued in the Ottoman Empire (1571-1878 AD).

The systematic management of water began during the British colonial rule (1878-1960), the first concern of water and then irrigation. In 1896 he founded the Department of Public Works designed and the construction of hydraulic works. The period until the early 20th century characterized by failed attempts to exploit surface water and groundwater resources. Then began an increasingly intensive use of groundwater.

In 1939 he created the Water and Development Department (which in 1955 was renamed the Water Development Department). In 1940 and 1950 the department was limited to the implementation of small irrigation projects with diversion dams and small water reservoirs while drilled thousands of wells.

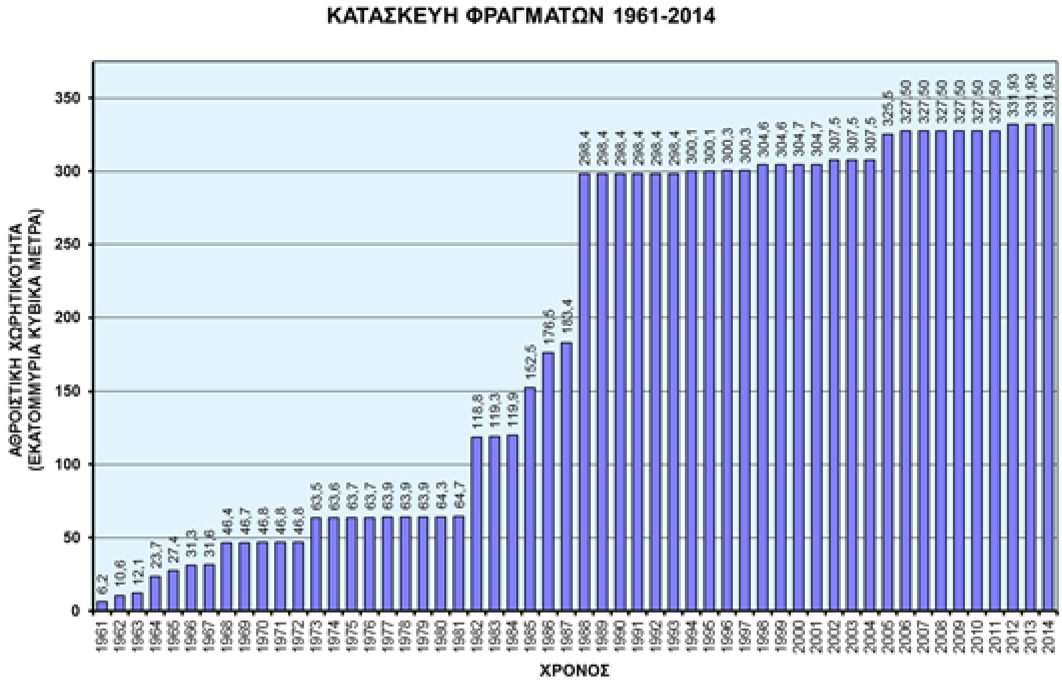
The result was the overexploitation of groundwater resources that lead to falls in water the level and to gradual salination in coastal areas. After independence, the Republic of Cyprus proceeded to systematically design and construction of many dams such as dams Pomos, Ayia Marina, Argakas, Lefkara, Yermasogeia, Polemidia and Mavrokolympos. Alongside constructed of water distribution networks.

The period after 1974 is characterized by the construction of major projects such as the Paphos Irrigation Project, the Khrysokhou Irrigation Project, the Vasilikos-Pentaschoinos Plan,

[1] It includes information from "Development of Water Resources of Cyprus History, 2003" and from Chapter 2.5 of the Economic Analysis 2009 Report 2.1, Volume II

Rural Development Plan Pitsilia and, finally, the Plan of Southern Conveyor. At the same time, the water supply of cities and communities strengthened and built the water treatment Choirokitia, Kornos, Limassol and Tersefanou Asprokremmos.

The gradual development of the available water resources from dams in Cyprus is shown in the attached chart.



Despite this significant growth of available water resources available water is still not sufficient due to the growth in water demand and also to the downward trend in rainfall quantities. As a result restrictions on irrigation and water supply are needed.

To address the situation, awareness raising campaigns reduce consumption are implemented and an ambitious desalination plants is established to enhance security in the supply of drinking water.

Finally, water recycling use gradually develops after tertiary treatment of waste water. Recycled water can be used for irrigation of all crops (excluding leafy vegetables, bulbs and tubers are eaten raw) and also foe artificial recharge of groundwater systems. Note that due to the content of the recycled water in nutrients, smaller quantities lubrication plant required.

5.4.1.2 Available Water Resources

The main water sources in Cyprus are:

- dams, reservoirs and weirs,
- groundwater through boreholes and springs,

- desalination and
- recycled water.

In Cyprus have been built to date 108 dams and weirs and the related to them infrastructure. Information on this infrastructure is given in the table below [site WDD, 2015].

Table 5-6 : Dams in Cyprus

A/A	NAME	YEAR	RIVER	TYPE	HEIGHT	CAPACITY
98	Kouris	1988	Kouris	Earth	110	115.000.000
80	Asprokremmos	1982	Xeros	Earth	53	52.375.000
95	Evretou	1986	Stavros tis Psokas	Rock	70	24.000.000
106	Kannaviou	2005	Ezousa	Earth/ Rock	75	18.000.000
93	Kalavasos	1985	Vasilikos	Rock	60	17.100.000
94	Dipotamos	1985	Pendaskhinos	Rock	60	15.500.000
63	Lefkara	1973	Sirgatis (Pendaskhinos)	Earth/ Rock	71	13.850.000
54	Yermasogeia	1968	Yermasogeia	Earth	49	13.500.000
96	Achna	1987	Off - stream	Earth	16	6.800.000
1	Kouklia	1900	-	Earth	6	4.545.000
37	Ag. Louka- (Recharge)	1964	-	Earth	3	4.545.000
108	Solea	2010	Off - stream	Earth	56	4.500.000
103	Arminou	1998	Diarizos	Earth / Rock	45	4.300.000
40	Polemidia	1965	Garyllis	Earth	45	3.400.000
105	Tamassos	2002	Pedhieos	Earth/ Rock	34	2.800.000
64	Masari (Recharge)	1973	Serraxis	Earth	15	2.273.000
43	Mavrokolymbos	1966	Mavrokolymbos	Earth	45	2.180.000
107	Klirou-Malounta-Akaki	2007	Akaki (Serraxis)	Earth	38	2.000.000
17	Morfou	1962	Serraxis	Earth	13	1.879.000
99	Vyzakia	1994	Off - stream	Earth	37	1.690.000
32	Kiti (Tremithos)	1964	Tremithos	Earth	22	1.614.000
81	Xyliatos	1982	Lagoudhera (Elia)	Rock	42	1.430.000
35	Agios Nikolaos- (Recharge)	1964	-	Earth	2	1.365.000
36	Paralimni Lake - (Recharge)	1964	-	Earth	1	1.365.000
55	Sygkrasis	1968	Merikeros	Earth	7	1.115.000
24	Kanlikiogiou	1963	Tzinar (Pedhieos)	Earth	19	1.113.000
19	Kioneli	1962	Armyros (Pedhieos)	Earth	15	1.045.000
29	Argaka	1964	Magounda	Rock	41	990.000
44	Pomos	1966	Livadhi	Rock	38	860.000
31	Ovgos	1964	Ovgos	Earth	16	845.000
20	Athalasa	1962	Kaloguros(Pedhieos)	Earth	18	791.000
65	Palaixori - Kambi	1973	Akaki (Serraxis)	Gravity	33	620.000

A/A	NAME	YEAR	RIVER	TYPE	HEIGHT	CAPACITY
10	Ayios Loukas	1955	-	Earth	3	455.000
18	Leuka	1962	Setraxos(Marathasa)	Gravity	35	368.000
42	Kalopanagiwths	1966	Setraxos (Marathasa)	Earth	40	363.000
30	Mia Milia	1964	Simeas (Pedhieos)	Earth	22	355.000
34	Liopetri	1964	Potamos	Earth	18	340.000
15	Trimiklini	1958	Kouris	Gravity	33	340.000
41	Ayia Marina	1965	Xeros	Rock	33	298.000
14	Pyrgos	1957	Katouris	Gravity	22	285.000
83	Kiperounta No.2	1983	Off - stream	Earth	27	273.000
68	Lympia (Neon)	1977	Tremithos	Gravity	12	220.000
91	Xoirokitia	1984	Off - stream	Earth	16	205.000
45	Makrasika - (Recharge)	1966	-	Earth	8	195.000
79	Arapakas No .1	1982	Off - stream	Earth	12	192.000
25	Recharge Famagusta	1963	-	Earth	8	165.000
90	Dierwna	1984	Off - stream	Earth	24	159.000
60	Vrisoules - (Recharge)	1969	-	Earth	7	140.000
76	Akapnou - Eptagwnia *	1981	Off - stream	Earth	9	132.000
59	Recharge Morphou	1969	-	Earth	5	130.000
67	Arapakas	1975	Yermasogeia	Gravity	23	129.000
78	Eptagwnia No .2	1982	Off - stream	Earth	8	127.000
73	Pelendri *	1980	Off - stream	Earth	18	123.000
16	Prodromos	1962	Off - stream	Earth	10	122.000
89	Arapakas No.2	1984	Exopotamio reservoir	Earth	12	120.000
26	Paralimni - (Recharge)	1963	-	Earth	5	115.000
38	Frenaros - (Recharge)	1964	-	Earth	5	115.000
9	Kafizis	1953	Xeros (Morphou)	Gravity	23	113.000
77	Cato Milos	1981	Off - stream	Earth	23	104.000
11	Gipsou	1955	-	Earth	3	100.000
56	Ormideia - (Recharge)	1968	-	Earth	5	100.000
104	Tsakistra	2000	Limnitis	Gravity	23	100.000
33	Agros	1964	Limnatis	Earth	26	99.000
102	Melini No.2	1996	Off - stream	Earth	36	97.000
70	Eptagwnia No.1	1980	Off - stream	Earth	16	92.000
23	Ayios Georgios - (Recharge)	1962	-	Earth	6	90.000
97	Aradippou	1987	Parthenitis	Gravity	14	90.000

A/A	NAME	YEAR	RIVER	TYPE	HEIGHT	CAPACITY
51	Achna Mesania - (Recharge)	1967	-	Earth	4	90.000
62	Proto/pades - (Recharge)	1970	-	Earth	6	90.000
49	Xulofagou - (Recharge)	1966	-	Earth	7	86.000
3	Kalo Chorio Klirou	1947	Akaki (Serraxis)	Gravity	9	82.000
48	Kontea - (Recharge)	1966	-	Earth	5	82.000
52	Lisi - (Recharge)	1967	-	Earth	7	77.000
84	Lagoudhera	1983	Off - stream	Earth	36	71.000
71	Xandria	1980	Off - stream	Earth	35	70.000
53	Ayios Georgios - (Recharge)	1967	-	Earth	3	68.000
47	Avgorou - (Recharge)	1966	-	Earth	3	68.000
75	Eptagwnia No.3	1981	Off - stream	Earth	12	65.000
85	Ora *	1983	Off - stream	Earth	18	62.000
88	Pharmakas No.2	1984	Off - stream	Earth	24	61.000
82	Agridia	1983	Off - stream	Earth	18	59.000
72	Melini No.1	1980	Off - stream	Earth	22	59.000
27	Ayia Napa - (Recharge)	1963	-	Earth	8	55.000
69	Ayioi Vavatsinias No.1	1980	Off - stream	Earth	17	55.000
13	Pera Pedi	1956	Kryos (Kouris)	Gravity	22	55.000
74	Ayioi Vavatsinias	1981	Vasilikos	Arch	19	53.000
101	Odou No. 2	1996	Off - stream	Earth	34	53.000
28	Flood protection Famagusta	1963	-	Earth	5	50.000
66	Kuperounta No.1	1974	Off - stream	Earth	7	50.000
61	Xulotumvou - (Recharge)	1969	-	Earth	7	50.000
58	Akanthou - (Recharge)	1968	-	Earth	6	45.000
22	Panagia Famagusta - (Recharge)	1962	-	Earth	7	45.000
21	Sotira - (Recharge)	1962	-	Earth	8	45.000
46	Frenaros - (Recharge)	1966	-	Earth	7	45.000
86	Ayioi Vavatsinias Ap.2	1984	Off - stream	Earth	25	43.000
92	Esso Galata	1985	Off - stream	Earth	27	35.000
57	Ayios Epiktitos - (Recharge)	1968	-	Earth	6	34.000
12	Kantou	1956	Ταπάχανα (Kouris)	Gravity	15	34.000
2	Luthrodontas (Cato)	1945	Koutsos (Yialias)	Gravity	11	32.000

A/A	NAME	YEAR	RIVER	TYPE	HEIGHT	CAPACITY
8	Lithrodontas (Pano)	1952	Koutsos (Yialias)	Gravity	10	32.000
100	Odou No.1	1996	Off - stream	Earth	33	32.000
6	Petra	1948	Atsas	Gravity	9	32.000
50	Sotira - (Recharge)	1966	-	Earth	5	32.000
4	Akrounta	1947	Yermasogeia	Gravity	7	23.000
5	Galini	1947	Kambos	Gravity	11	23.000
39	Deruneia - (Recharge)	1964	-	Earth	6	23.000
7	Petra	1951	Atsas	Gravity	9	23.000
87	Pharmakas Ap.1	1984	Off - stream	Earth	18	21.000

Of this infrastructure, the Major Governmental Projects that are operated by the Water Development Department, are consists of the following:

- South Pipeline Scheme, which includes:
  - Arminou dam (with the abstraction of Diarizos and Khapotami), with a capacity 4,3 hm^3, which supplies the Kouris dam
  - Kouris dam with capacity 115 hm^3,
  - the Irrigation Project Yermasogeia-Polemidion that includes:
    - Yermasogeia dam, with a capacity of 13.5hm^3, and
    - Polemidia dam, with a capacity of 3.5 hm^3,
  - the Irrigation Vassilikos-Pentaschoinos, that includes:
    - Kalavasos dam with a capacity of 17.1 hm^3, and
    - Dipotamos dam (with the abstraction Maroni), with capacity of 15,5 hm^3
    - Lefkara dam, with capacity of 13,85 hm^3, and
    - the off-stream of Achnas, with capacity of 6,8 hm^3.
- Paphos' works, that include:
  - Kannaviou dam, with capacity of 18 hm3, which feeds Asprokremou dam,
  - Asprokremmos dam, with capacity of 52,375 hm^3, and
  - Mavrokolympos dam, with capacity of 2,18 hm^3.
- Khrysokhou works', that includes:
  - Evretou dam with capacity of 24 hm^3, which supplies and Argaka dams, Ag. Marina and Pomos
  - Argaka dam, with capacity of 990 thousand m^3,
  - Agia Marina dam,with capacity of 298 thousand m^3, and
  - Pomos dam, with capacity of 860 thousand m^3.

- Works of Nicosia Region:
  - the Irrigation Pitisilas that includes:
    - Xyliatos dam, with capacity of 1.43 hm^3, which feeds and Vyzakia dam
    - Vyzakia off - stream dam with a capacity of 1.69 hm^3
  - Kalopanayiotis dam,
  - Lympia dam, and the dams Tamassou and Klirou

There are also other Governmental Water Supply Works, which are usually isolated and small government works which are not included in the Major Governmental Water Supply Scheme and supply communities. These works are managed by Committees, chaired by the Provincial Governor.

From them:

1. The Irrigation Structure Yermasogeia-Polemidia, which as mentioned above is part of the South Pipeline Work, is used for the irrigation of 3,500 ha, both directly and through recharge of the groundwater (for the Yermasogeia dam). It is noted that Polemidia dam is supplied with recycled water.
2. The irrigation Vasilikos-Pentaschoinos, which as mentioned above is part of the South Pipeline Work, is used for:
   - Drinking water supply of Nicosia through the WTP of Kornos and Tersefanou (for the Kalavassos dam),
   - local irrigation Scheme of Vassilikos (801 ha), the Pentaschoinos Scheme (422 ha) and Maroni Scheme (206 ha), ie a total of 1.420 ha,
   - irrigation through the South Pipeline Work, see below.

It is noted that the dam of Kalavassos has received water from the desalination of Vassilikos in 2014, as the main water pipeline for Drinking water supply of Nicosia is not yet constructed.

Additional to the above, other dams of South Pipeline Scheme are used for:

- Drinking water supply of Limassol, Nicosia (via water treatment plants of Tersefanou and Kornos), Larnaca and free areas of amochostos (through water treatment plant of Choirokoitia),
- local irrigation, such as area of Akrotiri from Kouris dam (1.680 ha) and an area from the Lefkara dam,
- irrigation through the South Pipeline Scheme which includes:
  - irrigation of Kokkinohoria (9.270 ha),
  - irrigation of Athienou (451 ha),
  - irrigation of Trouli-Avdelero (46 ha),

- irrigation of Kiti (1.206 ha),
- irrigation of Mazotos (609 ha),
- irrigation of Pareklisia (400 ha), and
- irrigation of Aradippou (250 ha),

ie total 13.512 ha.

Note: Now the irrigation of Pareklisia is irrigated by the SBLA

Paphos Work is used:

- for public water supply, and
- for irrigation 5.000 ha.

Khrysokhou Work is used for irrigation of an area of 3.100 ha

The Irrigation Pitsilias, which as mentioned above is part of Nicosia works, is used to:

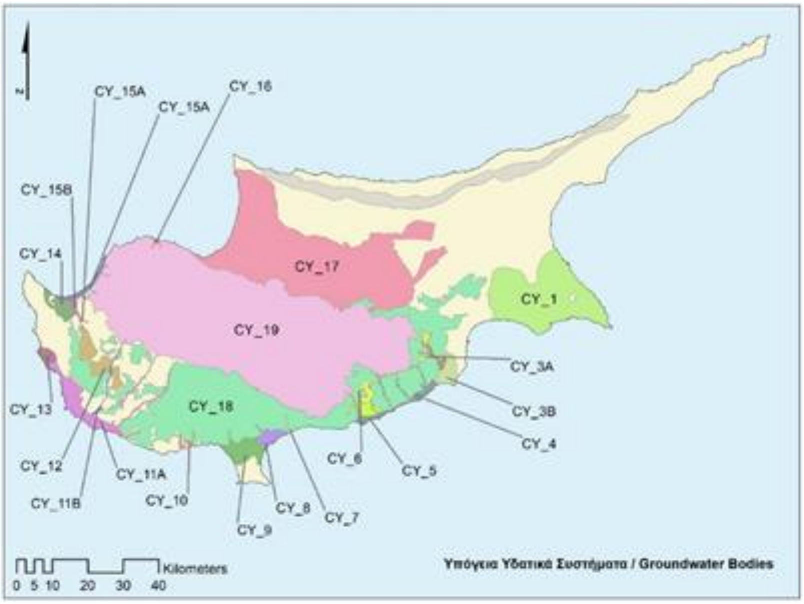
- drinking water supply through recharge of the underground horizon (from Vyzakia dam)
- irrigation.

Apart from the above, the other dams of the Nicosia District Work are used for irrigation.

Groundwater bodies that are used for public water supply are the following:

Riverbed of Tremithios (CY-03a), Mari-Kalo Chorio (CY-06), Akrotiri (CY-09), Paramali-Evdhimou (CY-10), Paphos (CY-11A), Letymbou-Giolou (CY-12), Androlikou (CY-14), Khrysokhou-Yialias (CY-15A), Pyrgos (CY-16), Central & Western Mesaoria (CY-17), Lefkara-Pachna (CY-18), Troodos (CY-19) and SALI[2] (See Figure below).

Figure 5-4: Groundwater Bodies



2 SALI: Smaill Aquifiers of Local Importance which are not included in GWBs

Today operate the following desalination plants:

- Larnaca, with capacity 62.000 m^3/day,
- Dhekelia, with capacity 60.000 m^3/day,
- Episkopi (of Limassol), with capacity 40.000 m^3/day, expandable to 60.000 m^3/day,
- Vasilikos (from 2014), with a capacity 60.000 m^3/day,

with total capacity 222.000 m^3/day or ~73 hm^3/years[3].

Finally, tertiary treatment plants have implemented in the following Stations Wastewater Treatment [WDD, 2015]:

- SWT of Limassol, with capacity 40.000 m^3/day,
- SWT of Paphos, with capacity 19.500 m^3/day,
- SWT of Ayia Napa, with capacity 21.000 m^3/day,
- SWT of Larnaka, with capacity 18.000 m^3/day,
- SWT of Anthoupolis (Nicosia), with capacity 13.000 m^3/day,
- SWT of Vathia Gonia (SBL), with capacity 22.000 m^3/day,
- SWT of Vathia Gonia (WDD), with capacity 2.200 m^3/day,

with total capacity 135.700 m^3/day.

According to available information the areas that are irrigated with recycled water are:

- Fasouri
- Pareklisia
- Pentakomo (SBLA)
- Agios Georgios Alamanou (SBLA)
- Larnaca (Dromolaxia), and
- Greater Area of Nicosia (SBL Vathia Gonia)

5.4.2 Water Consumption

The total average annual water consumption for the period 2005-2007 is presented in the following table [Economic Analysis, 2009 Report 2.1, Issue B].

Table 5-7: Aggregated results of consumption (in million m^3) per Water Service - Average 2005-2007

Service	WITHIN GWP (***)	OUT OF GWP	TOTAL
Drinking water supply	69,8	11,2	79,9
Irrigation	38,2	105	143,2
Wastewater drainage *	20,6		20,6
Recycled Water Supply **	9,9		9,9

3 It is considered that the plants operate 90% of the time

* It includes and the quantities of Mia Milia, which are 6.3 million m^3 (25.000 m^3 per day *365 days * 70%)

** Refers to quantities of recycled water which have consumed (priced)

***The consumption of Drinking water supply, irrigation within of Governmental Works concerns the final-billed consumption and does not include losses networks, evaporations etc.

The quantities of drainage (and treatement) of wastewater and provision of recycled water have expanded in recent years compared to those that are shown in the above table

As derive from the available consumption data, the allocated amounts of water for the period 2008-2014 were:

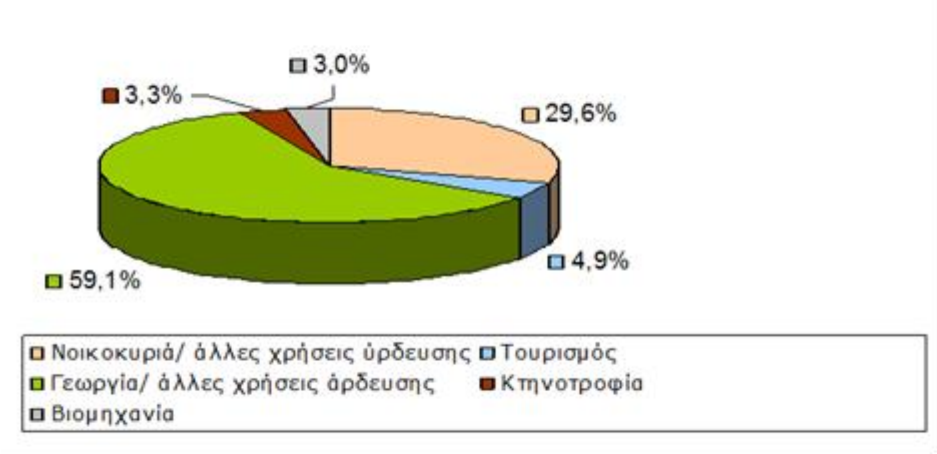
1. Average annual total water supply: ~80 hm^3, of which:
    - From dams ~40,2 hm^3 or 50%
    - From Government Boreholes ~7,3 hm^3 or 9%, και
    - From desalination 32,5 hm^3 or 41%
2. Average annual total irrigation from Governmental Works : ~58 hm^3, of which:
    - From dams 41,1 hm^3 or 71%
    - From Government wells 5,1 hm^3 or 9%, and
    - From recycling 11,6 hm^3 or 20%.

According to the above it is estimated that:

– the total drinking water demand is between 90 and 95 hm^3 / year,
– the total irrigation water demand is in the order of 150 hm^3/year

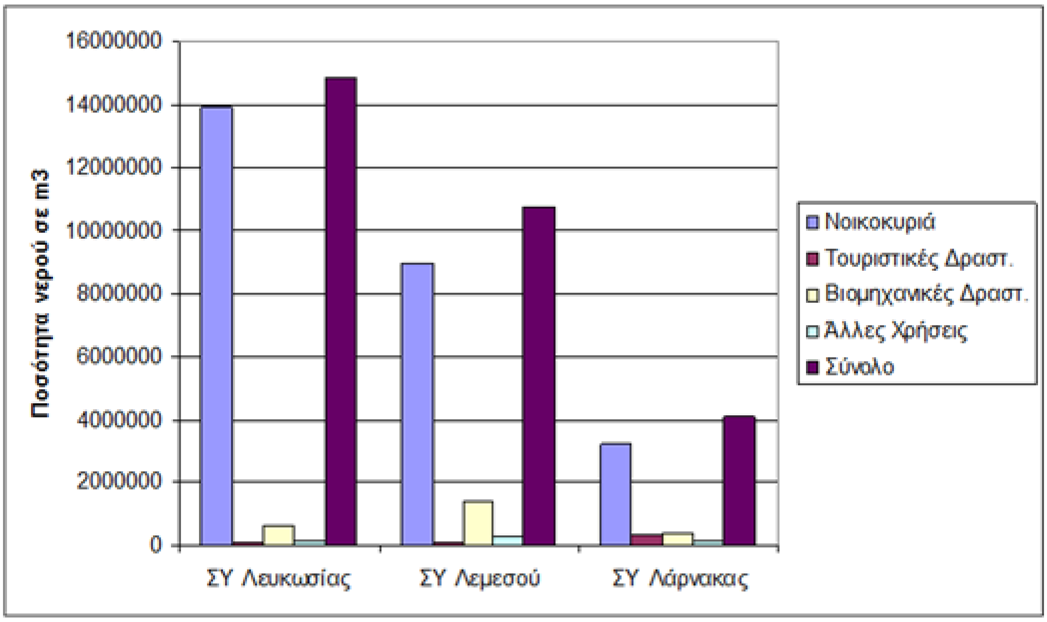
From the distribution of quantities of water consumption to major uses [Economic Analysis, 2009 Report 2.1, Issue B], it is clear that agriculture is the sector that consumes the greatest amount of water in proportion to the other activities with a percentage of 59,1%. Next comes domestic use with 29.6%, tourism 4.9% and industry and stock farming with 3% and 3.3%, respectively, see. figure bellow [Economic Analysis, 2009 Report 2.1, Issue A].

Figure 5-5: Major water uses for each activity



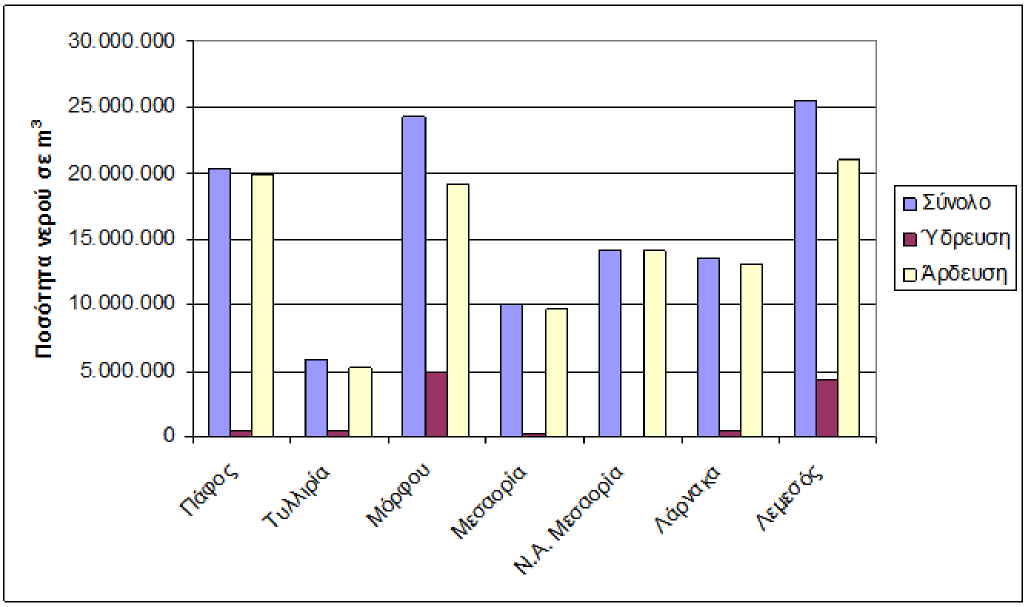
Regarding the distribution of Drinking water consumption per sector of the Water Boards, water quantities that is used in households are significantly higher than those for other activities, see figure below [Economic Analysis, 2009 Report 2.1, Issue A].

Figure 5-6: Water consumption of Water Service (Drinking Water Supply) per user



In the following figure is illustrated the total amount of water consumption in each Hydrological Area from other than Governmental Works and the corresponding quantities for drinking water and irrigation [Economic Analysis, 2009 Report 2.1, Issue B]. It is obvious that besides Governmental Works, the largest percentage of water is used for irrigation, while the drinking water supply is a very small percentage of the total.

Figure 5-7: Quantity of water which is available from works besides GWP-per-use and monthly total



6. COMPETENT AUTHORITIES

6.1 NAME AND ADDRESS OF THE COMPETENT AUTHORITY

The following Table presents the Competent Authority for the implementation of the provisions of WFD in accordance with Article 3.

Official name of the Competent Authority	Ministry of Agriculture, Rural Development and Environment
Abbreviation/Acronym	MARD & E
Member State Code	CY
Street	Amfipoleos 6
City	Nikosia
Country	Cyprus
Postcode	2025
Website	www.moa.gov.cy
Contact point name	Olympia Stylanou
Title of the position of the contact point	Permanent Secretary of the Ministry of Agriculture Rural Development and Environment
Status of the contact point	-
Phone number	(+357) 22408317
Email	registry@moa.gov.cy

Only a Competent Authority (MARD & E) has been designated.

6.2 LEGAL STATUS OF THE COMPETENT AUTHORITY

The legislation which refers to the establishment and definition of the Competent Authority's responsibilities in relation to WFD is the "Law of 2004 on the protection and management of water» (N.13 (I) / 2004). The relevant articles of the Law on the establishment of the Competent Authority and the identification of the river basin District in power from December 22, 2003, are Articles 4, 5 and 34.

The above law was voted on February 5, 2004 and was published in the official Government Gazette on February 20, 2004 (Nos. 3812, pages 85, I (I) - 180, I (I)), with power from 22 December 2003.

The legislations for the establishment of other competences of the Competent Authority that is related to the WFD are:

- The Law No. 106 (I) / 2002 which is the main tool by which all the issues related to the control of the water pollution and the soil pollution from industrial and other activities are regulated. This Law together with the amending Laws (Nos. 160 (I) / 2005, 76 (I) / 2006, 22 (I) / 2007, 11 (I) / 2008, 53 (I) / 2008, 68 (I) / 2009) and 78 (I) / 2009) are referred to as' On the Water Pollution Control Laws of 2002 to 2009 "and
- The "Law of 2003 on the protection and management of nature and wildlife» (N.153 (I) / 2003, as amended by Law 131 (I) / 2006). You can download both these laws from the website of WDD.

6.3 GEOGRAPHICAL AREA OF THE RESPONSIBILITY OF THE COMPETENT AUTHORITY

The Competent Authority is responsible for the entire river basin district. It is also noted, however, that in accordance with the provisions of the Article 1 of Protocol No. 10 in Cyprus, the application of the European acquis is suspended in those areas of Cyprus in which the Republic of Cyprus does not exercise effective control.

In addition the Memorandum of Understanding between the Government of Great Britain United Kingdom and Northern Ireland and the Government of the Republic of Cyprus which is related to the responsibility for the implementation of the Protocol on the Sovereign Base Areas of Akrotiri and Dhekelia in Cyprus provides for the application of WFD in the Sovereign Base of Akrotiri and Dhekelia in Cyprus.

6.4 BASIC RESPONSIBILITIES OF THE COMPETENT AUTHORITY

According to the "Law of 2004 for the protection and management of water» (N.13 (I) / 2004) the Competent Authority (MARD & E) is responsible for all the obligations related to the WFD in the river district basin except for the elaboration of a program of measures and the river basin management plan. According to Article 4 (3), 19 and 22 of the Law, the elaboration of the program of measures and the preparation of the river basin management plans are coordinated by the Competent Authority and are approved by the Council of Ministers of the Republic of Cyprus.

The Table below lists the obligations of the Competent Authority and the Council of the Ministers which are arising from the WFD.

Identification of the river district basin areas	MARD & E
Identification of water bodies	MARD & E
Identification of Heavily modified and artificial water bodies	MARD & E
Identification of protected areas	MARD & E
Elaboration and updating of the Protected Areas Registry	MARD & E
Characterization and classification of water bodies	MARD & E
Identification of Reference conditions	MARD & E
Review of Human activities Impacts	MARD & E
Economic analysis of water uses	MARD & E
Determination of deviations	MARD & E
Monitoring of surface water bodies	MARD & E
Monitoring of groundwater bodies	MARD & E
Monitoring of protected areas	MARD & E
Taking into account the principle of cost recovery for water services	MARD & E
Establishment of emission controls etc.	MARD & E
Implementation of emission control etc.	MARD & E
Establishment of Program of measures	Council of Ministers
Implementation of Program of measures	MARD & E
Control of discharges	MARD & E
Control of abstractions	MARD & E
Ensuring of the compliance with the prohibition of discharges of pollutants into groundwater	MARD & E
Implementation of measures to reduce pollution from accidents, etc..	MARD & E
Publication of the information	MARD & E
Public Consultation	MARD & E
Implementation of the controls relevant to the Priority Substances	MARD & E

It should be noted that for the issues that are related to the application of certain provisions of the law, the Council of Ministers, in accordance with Article 32 (1) (a) of the Law, may issue regulations that impose obligations or give powers to any public authority or any natural or legal person, except of the Competent Authority.

So far, this possibility has not been invoked.

7. CHARACTERISATION OF WATER BODIES

7.1 SURFACE WATER BODIES

7.1.1 Rivers WBs

7.1.1.1 Review and Update of River Water Bodies

The typology of rivers and river water bodies that were used for the first RBMP and for the first management cycle revealed significant disadvantages during of practical implementation of the provisions of the Directive 2000/60/EC. The shortage of knowledge about the different types of rivers with non-permanent flow and their spatial area, which is critical for the selection of data quality which will be used for the assessing their status, was identified as a major problem.

One more disadvantage which was identified was the fact that the definition of river water bodies does not responded adequately to pressures on water bodies. In view of the mentioned disadvantages, it was decided the establishment of a new network of river water bodies, with a new typology.

The network of river water bodies was investigated and was determined by WDD [G. Dörflinger, 2015]. Specifically, the rivers and streams which were included as water bodies were selected from a network of streams which was created based on a Digital Elevation Model (DEM).

The definition of the streams was implemented by the use of Peuker Douglas algorithm which is included in the package TauDEM (e.g. Tarboton et al. 2009) and identified a dense network in all over Cyprus, with morphological features per sections, which allowed the application of quantitative criteria for the selection of these streams which were considered as water bodies. The threshold or the delination of the stream is determined from measurements on topographic maps of the series K717 with scale 1: 50.000.

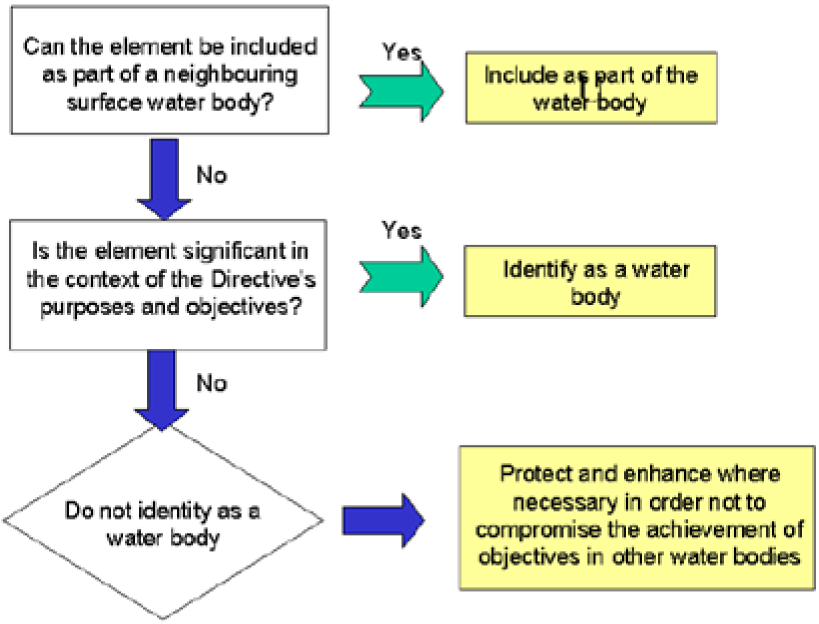
The criteria which were adopted finally for the selection of the streams which were considered as water bodies are:

- minimum area of the river basin of 10 km^2, that was applied both at the level of the main streams and in tributaries
- streams of the 1st order according to Strahler were not taken into account and were removed from the network
- the unselfconscious streams were selected based on the size of the river basin, and
- existence of visible riverbed in thalwegs in aerial and / or satellite images.

The network of streams which occurred includes 60 streams with a total river basin area of 6.529,2 km^2, from which 1.555,1 km^2 (24%) are located in areas of the Republic of Cyprus, in which the Government does not exercise effective control. According to the provisions of Protocol No. 10, which is attached to the Act of accession of Republic of Cyprus to EU, the implementation of the European asquis is suspended in those areas of Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control.

This approach is compatible with the prediction of minimum size of river basin equal to 10 km^2 in the system A of the typology. As is indicated in the Guidance Document Note 2, the smaller streams requires protection and specifies an approach for the insurance of their protection, see the following Figure 7-1

Figure 7-8: Proposed method for the insurance of adequate protection of small surface bodies



Based on the above, the network of streams that occurred is different from that was used in the first RBMP and the administrator period as follows:

- six rivers with an overall river basin 104.9 km^2 and a total length of stream 40,9 km were added and
- 25 small streams that do not fulfill the criteria for selection of the streams mentioned above, with a total river basin 83 km^2 (corresponding to 0.9% of the terrestrial area of the RBD of Cyprus, with an area of 9.250 km^2) and an average size of river basin 3,4 km^2 were removed
- 42 tributaries that do not fulfill the criteria for selection of the streams as noted above were removed

Regarding the typology, according to Annex II of the Directive, the surface water bodies must be differentiated according to the type. The types must be defined using either the system A through specific factors or system B through mandatory and optional parameters. The main purpose of these types is the reliable determination of specific biological reference conditions.

For the 1st RBMP were defined three types according to the system B by the use of parameter "annual rain volume" (on the riverbasin) and the "continuity of flow". The flow regime has paramount importance for the Mediterranean running water ecosystems, which has been recognized in many scientific publications which related to this subject, e.g. Argyroudi et al. (2009), Sánchez-Montoya et al. (2012), and Nikolaidis et al. (2013). The factor "discharge class" is noted that is included as an optional factor to the system B and therefore is acceptable for the determination of typology according to the Directive.

Based on the above, the new typology of rivers of Cyprus, which was developed by the Water Development Department [G. Dörflinger, 2015], based on the different flow regimes and for the determination of typology were exploited available flow data of Cyprus rivers. For this purpose, the time series of discharge of the streams form 29 flow measuring stations was selected, without significant impact on hydrology for the period 1985/86-2004/05 (20years). For the selection of the stations «without any significant impact on the hydrology», the capacity of upstream dams and water tanks were evaluated compared with the average annual flow of each station. Stations where the upstream capacity storage was greater than 10% of the average annual flow were rejected. In the cases where there were available data, the time series were checked for differences between the periods before and after the construction of dams, etc. The stations and the time series were selected as the best compromise between the number of available stations and the available length of time series «without any significant impact on the hydrology».

For the classification of the streams according to their hydrological characteristics which are associated with the responsiveness of living organisms and facilitate the effective future monitoring and management, was applied the Temporary Stream Regime Tool (TSR-Tool) as described by Gallart et al. (2012). This method requires the calculation, for each station, of two parameters from the flow data of stream:

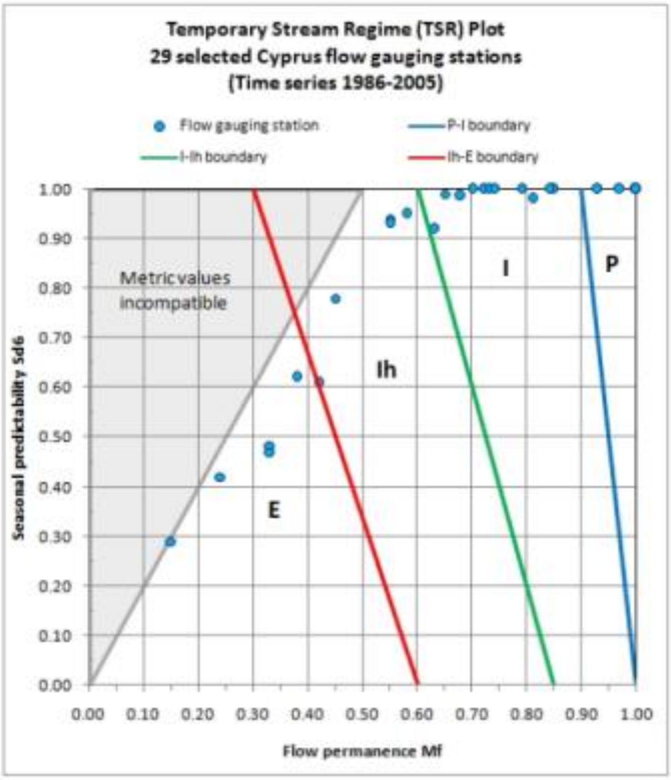
- the average percentage of the months of the year with flow, Mf (with values between 0 and 1), and
- the seasonal predictability of 6-months dry periods, Sd6 (with values between 0 and 1), saying the stability of seasonal conditions (as regards to the existence of flow or not).

The streams are classified into one of the four flow regimes, based on the values for the two parameters which are appeared above:

- P (Permanent or multiannual),
- I (Intermittent streams, with stagnant water in dry periods),
- Ih (Intermittent streams, without water in dry periods), and
- E (Ephemeral / episodic)

according to the limits which are specified in Temporary Stream Regime Plot. The chart with the aforementioned 29 stations measuring of flow of Cyprus, is presented in Figure 7-2.

Figure 7-9: Chart of Typology of Rivers for the assessment of type of water bodies that correspond to the selected 29 hydrological stations



The adoption of the TSR-Tool is appropriate for Cyprus for the following specific reasons:

1. The method is well suited to the Cyprus data and results from the date of Cyprus are responded very well to the results from Cazemier et al. (2011) for the rivers of Greece, according to a comparable climate region.
2. The data of Cyprus allowed the coverage of the entire range of flow regimes from perennials to intermittent and to ephemeral/episodic.
3. Analysis of clusters was performed using different combinations of various hydrological metric of 29 stations for the measuring of flow. The water metrics had been chosen based on the bibliography, e.g. Oueslati et al. (2010), and the resultant clusters were remarkably similar to the groups of stations which are identified by the TSR-tool, thereby supporting the adoption.
4. The authors of the TSR-Tool relate the four types of streams with the relevance of the biological communities for monitoring purposes under the Directive (Gallart et al. 2012, Prat et al. 2014). Therefore, it is expected that the types which were defined with the TSR-Tool will facilitate the adjustment of biological monitoring according to the formula.
5. The method is relatively simple to implement, as it does not necessarily imply continuous series of hydrological data, as the parameters that are required to be introduced concerns the monthly regime of streams. Therefore, in cases of doubts regarding the type of some of streams, the TSR types can be estimated from time

series of individual observations within each month, namely without the need of installation of a permanent gauging stations.

6. The above types are fully compatible with the types of Intercalibration Exercise. Specifically, the type R-M4 corresponds to the type P (perennial flow) whereas type R-M5 to the type I (and Ih).

Regarding to the ephemeral type, Gallart et al. (2012, p.3173) declare that for the assessment of biological quality of this type of streams, are required "other methods beyond the usual study of water fauna" and that "these methods are not yet available”. So, it is not really possible, with the currently existing/available methods, the measurement of the Biological Quality Elements (BQEs) in water bodies of this type (see. the Annex to this).

For the identification of types of different parts of rivers of Cyprus, the river basins that correspond to were identified as follows [G. Dörflinger, 2015]:

- In rivers with sufficient flow data, for the determination of Typology by TSR, their flow regime was determined from the data flow of the stream and was attributed directly.
- In river sections where there haven't been water metering, the characteristics of the riverbasin, were used in order to determine their flow regime.

For this purpose, the relations between the types by TSR and various characteristics of the river basin were investigated in river basins, for which there were measurements. Appropriate criteria and limits were set, and those, in their turn, allowed the characterization of parts of rivers that have not been measured based on the characteristics of the river basin. The characteristics of the rive rbasin which were used were the average elevation of the river basin, precipitation, the slope of basin, the slope of the stream and the geology of the riverbasin.

This approach was applied in a graduated process, resulting in types of streams, using initially the most reliable and safe criteria, where possible been and then proceeding in application criteria with increased uncertainty until all rivers be classified.

Subsequently for the final characterization of river sections:

- completed inspections of the relevant parts of rivers were performed,
- river types were evaluated about the "right" sequence of flow regimes from upstream to downstream,
- the opinion by experts, with local knowledge, relating to the flow regimes in specific rivers was demanded, and
- the transition points between different types were determined, taking into account the local geology, vegetation patterns, topography, etc.

This procedure described all the river parts, with each part to correspond to only one type river. There are 184 rivers classified parts of river which correspond to the network of rivers of Cyprus, under near-natural hydrological conditions, with no significant impact on hydrology. A corresponding map is presented in Figure 7-3 while the following Table 7-1 shows the percentage of each type in the river network, for areas of the Republic of Cyprus, in which the Government of the Republic of Cyprus exercises effective control.

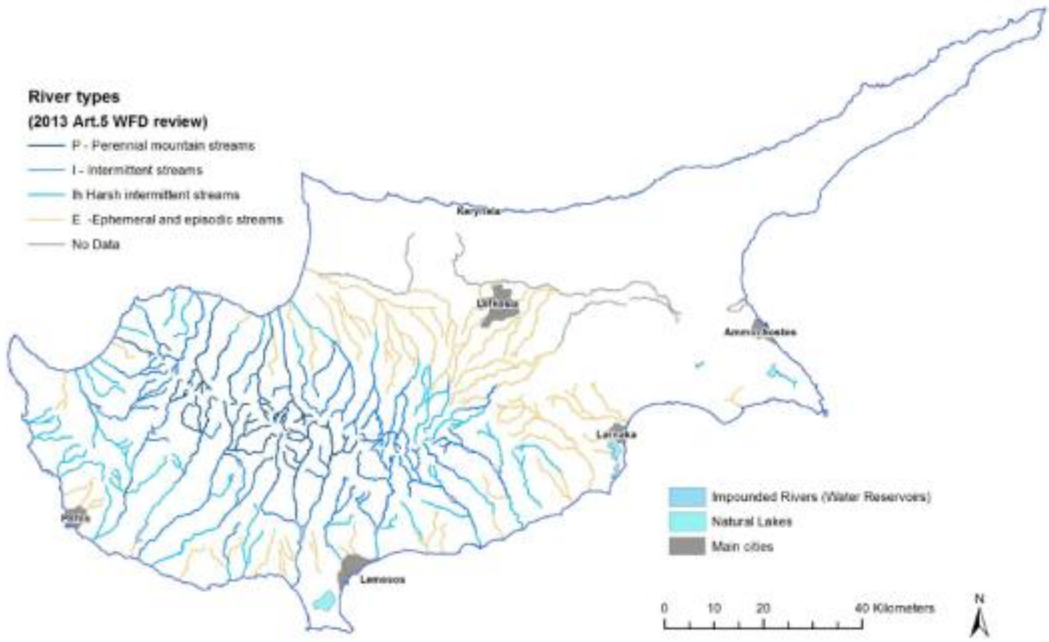
Table 7-8 Participation of types of rivers in network of streams of Cyprus

TSR type	P	I	Ih	E	No data*	Total
Length [km]	368.8	701.2	567.2	825.5	160.2	2623.1
Percentage of length	14%	27%	22%	31%	6%	100%

(*) «No data» corresponds to three WB in the areas, in which the Government of the Republic of Cyprus does not exercise effective control and the implementation of the acquired is suspended, in accordance with the provisions of the Protocol No. 10, which is attached to the Act of Accession of Republic of Cyprus to EU

Regarding the degree of differentiation which is achieved by the above process, based on the system B, it is considered at least the same as with the degree of differentiation, that would be achieved using system A, because the criterion of minimum size of river basin of the system A is respected and also for the definition of relations between the types by TSR and characteristics of the riverbasin (see. above)were used and the factors of system A «elevation» και «geology».

Figure 7-10: Revised river network of Directive and types of streams.



The categorized parts of rivers were converted then into water bodies with their segmentation, where it was necessary.

For the determination of the water bodies, were followed the recommendations that are contained in the Guidance Document No. 2 (European Commission 2003a), which concerns repetitive verification and improvement of delimited water bodies, with the application of an iterative process where each iteration entails the revision of river basins which correspond to streams. The data which are evaluated sequentially are [G. Dörflinger, 2015]:

– consideration of the recommendations which are included in the 1st RBMP,

- evaluation of pressures and monitoring data,
- Tests on the difference in the status, with the use of the classification results ENVECO S.A. and I.A.CO LTD (2013),
- investigation of protected areas, and
- bodies that have been established in the 1st RBMP as HMWB

Regarding with the water bodies that crosses the so-called Green Line in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control, any separation or something else was not implemented. According to the provisions of Article 1 of Protocol No. 10 for the country of Cyprus, which is attached to the Act of Accession of Republic of Cyprus to EU, the implementation of the acquired is suspended in those areas of Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control.

The above procedure provided the new network of river water bodies. The number of river water bodies in Cyprus, as mentioned above, is 245, including 15 of rivers dams HMWB. The number of water bodies in each new type of river is illustrated in Table (Table 7-2) below [G. Dörflinger, 2015]:

Table 7-9: Number of river water bodies for each type River

River Type	Name of river type	Number of water bodies*
P	Perennial flow (mountainous streams)	33 (with 3 dams HMWB)
I	Intermittent flow	73 (with 9 dams HMWB) [2]
Ih	Intensely Intermittent flow	60 (with 3 dams HMWB) [1]
E	Ephemeral / episodic flow	79 (with any dams HMWB) [3**]
Total		**245 (with 15 dams HMWB) [6]**

* In brackets «[ ]» is illustrated the number of WB which are included in the number of water bodies and which fall entirely in the areas in which the Government of the Republic of Cyprus does not exercise effective control and the implementation of the acquired is suspended in accordance with the provisions of Protocol No. 10, which is attached to the Act of Accession of Republic of Cyprus to EU None of them includes HMWB
** About the WB them, there are no data for the determination of the type. Regarded as ephemeral flow based on expert recommendations.

As mentioned above, the ephemeral river present only occasional flow, so they do not show measurable ecological situation - at least as understood in other river systems. The relevant Guidance Document of the Directive [Guidance document No. 2, Identification of water bodies] indicate that:

1. Target of the procedure of definition of WB is the correlation with the environmental aims of WFD - especially its environmental situation.
2. Each WB includes the qualities that are described in the WFD, for the assessment of their ecological status, which include:

- the hydromorphological quality data, which include the flow, riverbed etc., and
- the relevant biological quality data.

Considering that the ecological staus constitute the basic parameter for the assessment of status of the water bodies for the purposes of the Directive, the ephemeral rivers, that present the above characteristics, were assessed as not important in the context of the Water Directive, whereby were not included rivers of this type according to Figure 7-1. From these 79 water bodies, were removed:

- 35 are in river basins with only ephemeral flow,
- 18 are downstream river sections that present ephemeral flow, and
- 26 are tributaries with ephemeral flow.

From the above 79 ephemeral bodies, which were removed during the process of consultation, 11 were considered important because of their association with important ecosystems. Therefore the final total number of removed ephemeral bodies is 68 bodies, three of which WB are located where the Republic of Cyprus does not exercise effective control. These bodies are presented in Annex A.

The 68 bodies are protected from pollution by the national law that has incorporated the relevant essential European Directives, see. Also Figure 7-1 above. For this purpose has been included in the program of measures a special measure for the monitoring of the physicochemical and chemical parameters of the ephemeral WB.

Taking into account the above, the image of typology of water bodies of Cyprus occurs, illustrated in the following table (Table 7-3).

Table 7-10: Number of river water bodies for each type River

River type	Name of river type	Number of water bodies*
P	Perennial flow (mountainous streams)	33 (with 3 dams HMWB)
I	Intermittent flow	73 (with 9 dams HMWB) [2]
Ih	Intensely Intermittent flow	60 (with 3 dams HMWB) [1]
E	Ephemeral / episodic flow	11
Total		**177 (with 15 dams HMWB) [3]**

In brackets «[ ]» is illustrated the number of WB which are included in the number of water bodies and which fall entirely in the areas in which the Government of the Republic of Cyprus does not exercise effective control and the implementation of the acquired is suspended in accordance with the provisions of Protocol No. 10, which is attached to the Act of Accession of Republic of Cyprus to EU None of them includes HMWB

Taking into consideration the above, occurs the image of typology of river bodies in the areas of the Republic of Cyprus in which the Government of the Republic of Cyprus exercises effective control which is illustrated in the table below (Table 7-4).

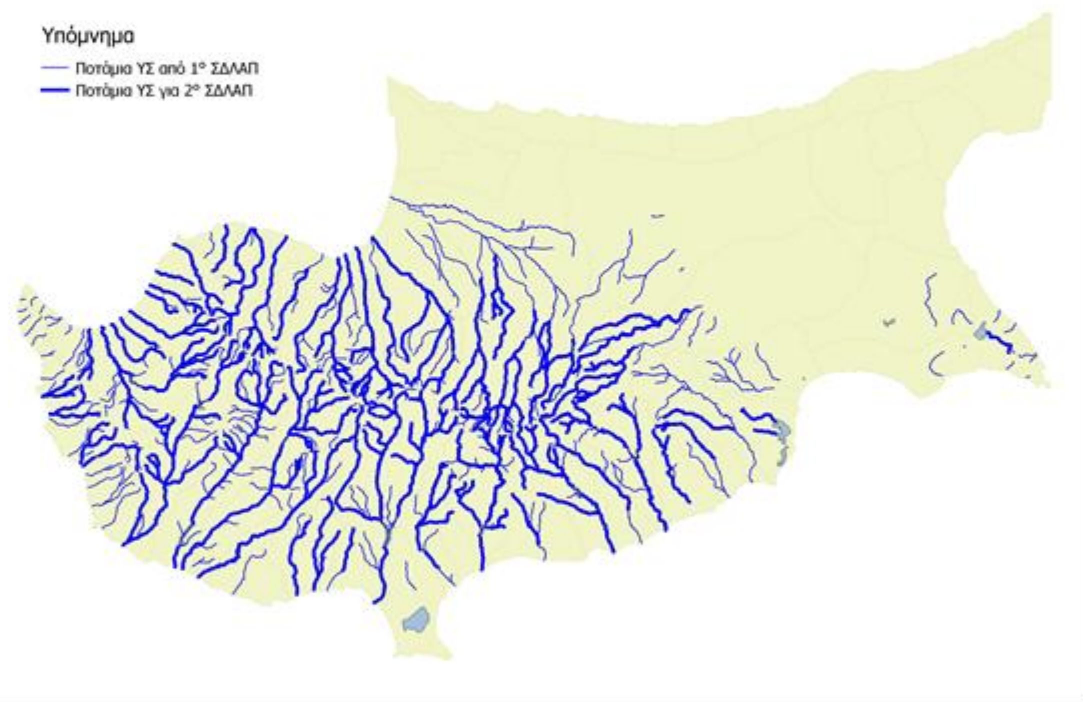
Table 7-11: Number of river water bodies for each type River

River type	Name of river type	Number of water bodies*
P	Perennial flow (mountainous streams)	33 (with 3 dams HMWB)
I	Intermittent flow	71 (with 9 dams HMWB)

River type	Name of river type	Number of water bodies*
Ih	Intensely Intermittent flow	59 (with 3 dams HMWB)
E	Ephemeral flow	11
Total		**174 (with 15 dams HMWB)**

The Figure below presents the Water Bodies of the 1st RBMP and water bodies that derive from this revision.

Figure 7-11: Water Bodies in the 1st RBMP and in this revision



The streams which were removed correspond to river area 1339 km^2, in areas in which the Government of the Republic of Cyprus exercises effective control, which corresponds to 14% of the terrestrial area of the RB of Cyprus.

It is noted that in any case, all the pressures in above river basins and the effects of arising from these on the waters are assessed in this Management Plan as follow:

- within river basins, with only ephemeral flow, and in the rive rbasins that correspond to ephemeral WB on the downstream of rivers, the pressures and their impact are assessed in the GWB, as well as in coastal water bodies, and
- in river basins of ephemeral tributaries, the pressures and their impact are assessed in the GWB as well as in downstream water bodies.

7.1.1.2 Review and Update of impounded river water bodies

An additional change, based on the review and the update of Article 5 of the Directive, concerns the impounded river water bodies. In the 1st RBMP of Cyprus, the impounded river water bodies have been identified as heavily modified lake water bodies and had attributed to them, a typology. However, for comparison purposes with information from other Member States in the 2nd RBMP was decided that the impounded rivers of water will be attributed as heavily modified river water bodies.

These impounded river water bodies are characterized as HM River WB, given that this is the initial water category of those water bodies before the occurrence of hydromorphological changes from the human activity. However, the closest comparable natural water category to these HMWBs, in this situation, is a lake and therefore the descriptions which are used, for the assessment of the statusof quality, are those which are suitable for lake WB.

Moreover, four new WB (impounded rivers) have identified relative to the 1st RBMP, namely total of 15 HMWB that concerns impounded rivers.

Table 7-12: Typology and number of water bodies, rivers and impounded rivers in 2nd RBMP.

A/A	Code	Name	Type	Length [km]
Rivers				
1	CY_1-1-a_RP	Khapotami	P	5,9
2	CY_1-1-b_RI	Khapotami	I	17,2
3	CY_1-1-c_RIh	Khapotami	Ih	19,3
4	CY_1-1-d_RIh_HM	Khapotami	Ih	4,8
5	CY_1-1-e_RI	Malleta	I	9,6
6	CY_1-2-a_RP	Dhiarizos	P	38,6
7	CY_1-2-b_RP	Dhiarizos	P	20,1
8	CY_1-2-d_RI_HM	Dhiarizos	I	31,3
9	CY_1-2-e_RI	Tholos	I	7,5
10	CY_1-2-f_RIh	Yerovasinos	Ih	11,2
11	CY_1-3-a_RP	Roudhias	P	42,0
12	CY_1-3-b_RI	Xeros Potamos	I	6,4
13	CY_1-3-c_RIh	Xeros Potamos	Ih	11,7
14	CY_1-3-f_RI	Lazaridhaes	I	6,5
15	CY_1-3-g_RIh	Lefkarkon	Ih	8,2
16	CY_1-4-a_RP	Ayia & Klimadhiou	P	13,6
17	CY_1-4-b_RI	Ayia	I	7,5
18	CY_1-4-d_RI_HM	Ezousa	I	7,4
19	CY_1-4-e_RIh_HM	Ezousa	Ih	4,8
20	CY_1-4-f_RP_HM	Ezousa	P	5,2
21	CY_1-4-g_RI_HM	Ezousa	I	5,9
22	CY_1-4-h_RIh_HM	Ezousa	Ih	8,1

A/A	Code	Name	Type	Length [km]
23	CY_1-4-i_RI	Paleomylou	I	5,6
24	CY_1-4-j_RIh	Ayios Nepios	Ih	7,1
25	CY_1-4-k_RIh	Varkas	Ih	14,1
26	CY_1-4-L_RIh	Milarkou	Ih	12,9
27	CY_1-4-m_RIh	Kochatis	Ih	13,2
28	CY_1-6-a_RIh	Mavrokolymbos	Ih	11,9
29	CY_1-6-c_RIh_HM	Mavrokolymbos	Ih	2,7
30	CY_1-6-d_RIh	Xeros	Ih	17,1
31	CY_1-8-a_RIh	Kalamouli (Avgas)	Ih	18,3
32	CY_1-8-b_RIh	Pevkos	Ih	15,3
33	CY_2-2-a_RIh	Neraidhes & Ammadhkiou	Ih	21,0
34	CY_2-2-b_RI	Garyllis	I	6,2
35	CY_2-2-c_RI	Stavros tis Psokas	I	36,6
36	CY_2-2-d_RI	Stavros tis Psokas	I	5,8
37	CY_2-2-f_RI_HM	Stavros tis Psokas	I	2,7
38	CY_2-2-g_RI_HM	Khrysokhou	I	2,8
39	CY_2-2-h_RIh_HM	Khrysokhou	Ih	6,8
40	CY_2-3-a_RIh	Mirmikoph	Ih	15,0
41	CY_2-3-b_RIh	Argaki tis Limnis	Ih	8,5
42	CY_2-3-c_RI	Magounda	I	24,7
43	CY_2-3-d_RIh_HM	Magounda	Ih	4,0
44	CY_2-3-f_RP	Yialia	P	10,9
45	CY_2-3-g_RI	Yialia	I	1,1
46	CY_2-4-a_RIh	Xeros	Ih	4,2
47	CY_2-4-b_RIh_HM	Xeros	Ih	2,9
48	CY_2-4-c_RP	Maroti & Diali	P	6,1
49	CY_2-4-d_RI	Livadhi	I	8,7
50	CY_2-4-e_RIh_HM	Livadhi	Ih	4,0
51	CY_2-5-a_RIh	Ayios Theodoros	Ih	9,6
52	CY_2-6-a_RIh	Katouris	Ih	9,9
53	CY_2-6-b_RIh_HM	Katouris	Ih	5,3
54	CY_2-7-a_RI	Pyrgos	I	30,2
55	CY_2-8-a_RP	Limnitis	P	33,2
56	CY_2-9-a_RI	Kambos	I	2,4

A/A	Code	Name	Type	Length [km]
57	CY_2-9-b_RP	Kambos	P	7,3
58	CY_2-9-c_RI	Kambos	I	2,6
59	CY_2-9-d_RIh_HM	Kambos	Ih	3,0
60	CY_3-1-a_RP	Xeros	P	9,9
61	CY_3-1-b_RI	Xeros	I	2,5
62	CY_3-1-c_RI_HM	Xeros	I	9,5
63	CY_3-2-a_RP	Marathasa	P	15,8
64	CY_3-2-b_RP_HM	Marathasa	P	12,1
65	CY_3-2-d_RI	Rkondas	I	5,8
66	CY_3-3-a_RP	Ayios Nikolaos	P	14,8
67	CY_3-3-b_RP	Karyiotis	P	13,4
68	CY_3-3-c_RI	Karyiotis	I	11,4
69	CY_3-3-d_RP	Argaki tou Karvouna	P	12,6
70	CY_3-3-e_RI	Alykhnos	I	6,1
71	CY_3-4-a_RI	Atsas	I	15,3
72	CY_3-4-b_RIh	Atsas	Ih	2,1
73	CY_3-4-c_RIh_HM	Atsas	Ih	6,0
74	CY_3-5-a_RI	Lagoudhera	I	11,8
75	CY_3-5-c_RI_HM	Lagoudhera	I	12,6
76	CY_3-5-d_RIh_HM	Elia	Ih	13,3
77	CY_3-5-e_RI	Kannavia	I	15,4
78	CY_3-5-f_RI	Asinou	I	15,3
79	CY_3-7-a_RI	Peristerona	I	53,2
80	CY_3-7-b_RIh	Peristerona	Ih	6,7
81	CY_3-7-d_RI	Maroullenas	I	12,6
82	CY_3-7-e_RI	Kambi	I	7,5
83	CY_3-7-f_RI_HM	Maroullenas	I	13,4
84	CY_3-7-g_RI	Pharmakas	I	13,2
85	CY_3-7-h_RI_HM	Pharmakas	I	3,0
86	CY_3-7-j_RIh_HM	Akaki	Ih	4,5
87	CY_3-7-n_RIh	Koutis & Aloupos	Ih	22,4
88	CY_6-1-a_RIh	Pedhieos & Ayios Onouphrios	Ih	30,0
89	CY_6-1-c_RIh_HM	Pedhieos	Ih	1,0
90	CY_6-5-a_RIh	Yialias	Ih	13,0

A/A	Code	Name	Type	Length [km]
91	CY_6-5-b_RI	Yialias	I	12,8
92	CY_6-5-e_RIh	Koutsos	Ih	8,6
93	CY_6-5-f_RIh_HM	Koutsos	Ih	6,2
94	CY_7-2-a_RIh	Vathys	Ih	6,6
95	CY_8-5-a_RIh	Pouzis	Ih	16,1
96	CY_8-6-a_RIh	Xeropotamos	Ih	18,9
97	CY_8-7-a_RI	Syrkatis	I	20,0
98	CY_8-7-c_RI_HM	Syrkatis	I	6,7
99	CY_8-7-d_RIh	Argaki tou Mylou	Ih	16,9
100	CY_8-7-f_RI_HM	Pendaskhinos	I	7,3
101	CY_8-7-g_RIh_HM	Pendaskhinos	Ih	9,5
102	CY_8-8-a_RI	Ayiou Mina	I	16,8
103	CY_8-8-b_RIh	Ayiou Mina	Ih	2,9
104	CY_8-8-c_RIh_HM	Ayiou Mina	Ih	8,1
105	CY_8-9-a_RI	Vasilikos	I	5,5
106	CY_8-9-b_RI_HM	Vasilikos	I	2,1
107	CY_8-9-c_RI	Vasilikos	I	33,0
108	CY_8-9-e_RI_HM	Vasilikos	I	9,0
109	CY_8-9-f_RIh_HM	Vasilikos	Ih	4,5
110	CY_8-9-g_RIh	Exovounia	Ih	9,7
111	CY_8-9-h_RIh	Argaki tis Asgatas	Ih	13,1
112	CY_9-1-b_RIh	Pyrgos	Ih	11,0
113	CY_9-2-a_RI	Karydhaki	I	17,6
114	CY_9-2-b_RP	Ayios Pavlos	P	6,5
115	CY_9-2-c_RI	Yermasogeia	I	5,2
116	CY_9-2-d_RI_HM	Yermasogeia	I	2,6
117	CY_9-2-e_RI	Yermasogeia	I	5,7
118	CY_9-2-f_RI	Yermasogeia	I	9,1
119	CY_9-2-h_RIh_HM	Yermasogeia	Ih	6,4
120	CY_9-2-i_RIh	Pissokamina	Ih	7,6
121	CY_9-2-j_RI	Yialiadhes	I	9,1
122	CY_9-2-k_RI	Yialiadhes	I	4,3
123	CY_9-2-L_RI_HM	Yialiadhes	I	2,1
124	CY_9-4-b_RI	Garyllis	I	24,2

A/A	Code	Name	Type	Length [km]
125	CY_9-4-c_RI	Garyllis	I	3,9
126	CY_9-4-e_RIh_HM	Garyllis	Ih	3,8
127	CY_9-4-g_RIh	Phasoula	Ih	7,8
128	CY_9-6-a_RP	Ayios Ioannis	P	5,3
129	CY_9-6-b_RP	Ambelikos-Agros	P	17,6
130	CY_9-6-c_RP	Without Name	P	0,3
131	CY_9-6-d_RP_HM	Without Name	P	1,4
132	CY_9-6-e_RP	Ambelikos-Xylourikos	P	11,4
133	CY_9-6-f_RI	Limnatis	I	7,0
134	CY_9-6-g_RI	Pelendri	I	6,2
135	CY_9-6-h_RI	Ayios Mamas	I	5,9
136	CY_9-6-i_RP	Loumata	P	3,1
137	CY_9-6-k_RP_HM	Loumata	P	2,9
138	CY_9-6-L_RP	Kouris	P	19,5
139	CY_9-6-m_RP_HM	Kouris	P	13,1
140	CY_9-6-n_RP	Mesapotamos	P	6,5
141	CY_9-6-o_RP	Moniatis	P	5,9
142	CY_9-6-p_RP	Kryos	P	8,0
143	CY_9-6-q_RP_HM	Kryos	P	6,0
144	CY_9-6-r_RI_HM	Kryos	I	15,0
145	CY_9-6-t_RI_HM	Kouris	I	11,4
146	CY_9-8-a_RIh	Paramali	Ih	28,0
147	CY_9-8-b_RI	Evdhimou (Mandalas)	I	11,3
148	CY_9-8-c_RIh	Evdhimou	Ih	4,2
149	CY_1-3-e_RE_HM	Xeros Potamos	E	3,9
150	CY_2-1-a_RE	Ayiou Ioanni	E	12,8
151	CY_2-3-e_RE	Xeropotamos	E	7,6
152	CY_3-7-m_RE	Likythia	E	32,2
153	CY_6-5-h_RE	Alykos	E	31,2
154	CY_6-5-i_RE	Almyros	E	20,9
155	CY_6-5-g_RE	Villourkon	E	9,5
156	CY_8-3-b_RE	Without Name	E	3,7
157	CY_8-3-a_RE	Kalo Chorio	E	7,4
158	CY_8-4-g_RE	Ayios Ioannis	E	15,2

A/A	Code	Name	Type	Length [km]
159	CY_9-7-b_RE	Symvoulas	E	7,8
Impounded rivers				
1.	CY_1-2-c_RP_HM_IR	Arminou	P	0,36
2.	CY_1-3-d_RIh_HM_IR	Asprokremmos	Ih	2,25
3.	CY_1-4-c_RI_HM_IR	Kannaviou	I	0,93
4.	CY_1-6-b_RIh_HM_IR	Mavrokolympos	Ih	0,18
5.	CY_2-2-e_RI_HM_IR	Evretou	I	1,14
6.	CY_3-5-b_RI_HM_IR	Xyliatos	I	0,05
7.	CY_3-7-i_RI_HM_IR	Akaki-Malounda	I	0,18
8.	CY_6-1-b_RIh_HM_IR	Tamassos	Ih	0,36
9.	CY_8-7-b_RI_HM_IR	Lefkara	I	0,45
10.	CY_8-7-e_RI_HM_IR	Dipotamos	I	0,92
11.	CY_8-9-d_RI_HM_IR	Kalavasos	I	0,87
12.	CY_9-2-g_RI_HM_IR	Germasogia	I	0,68
13.	CY_9-4-d_RI_HM_IR	Polemidia	I	0,17
14.	CY_9-6-j_RP_HM_IR	Pano Platres	P	0,03
15.	CY_9-6-s_RP_HM_IR	Kouris	P	3,32

SOURCES: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Tables 5.1.1-1& 5.1.2-1)]

Figure 7-12: Types River WB (number and percentage)

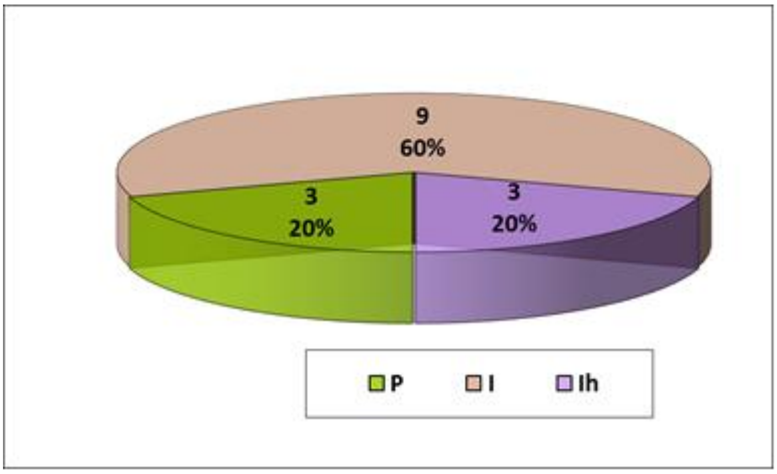
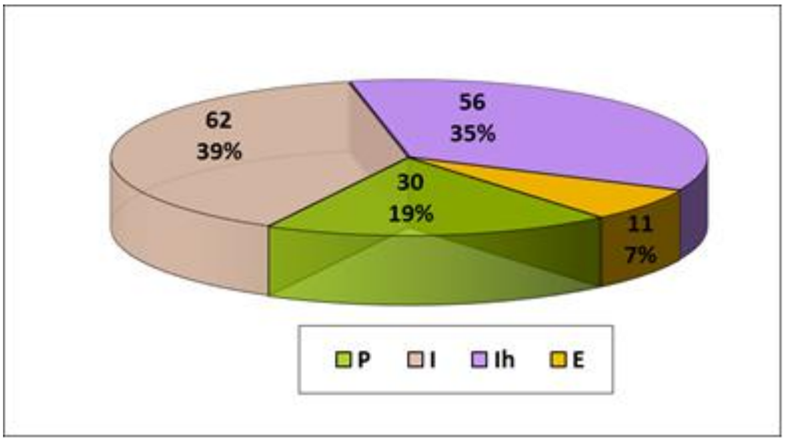


Figure 7-13: Type of impounded rivers (number and percentage)



7.1.2 Lake WBs

The distinction of the type of lakes may be done using the System A (elevation, average depth, area and geology) or the B system (mandatory factors of System A and physicochemical factors) according to Annex II to the Framework Directive. The Cyprus appertain to the Ecoregion 6: the Mediterranean Sea System A: Ecoregions for transitional and coastal waters and on the Ecoregion 26 at A: Ecoregion System for rivers and lakes (N. 13 (10/2004).

The B system was used for the typology of lakes, because of the evidence shows that the content of salt is an important feature, which can be taken into account with this system. The elevation is a factor unrelated for the categorization of data as all lakes are located less than 100 meters elevation. There is also no indication that the geology affects significantly the ecology of the lakes of Cyprus and that can lead to different types. Moreover, despite the fact that the depth of water is an important factor in the ecology of lakes, all lakes in Cyprus have a depth less than 3m.

The salinity is the most important feature for the ecology in lakes of Cyprus and therefore the types of lakes. The salinity was used for the typology, based on three classes, that is salty, brackish and freshwater and two classes for the water depth (under or over 5 m), despite the fact that all lakes appertain to less than 5 meters depth.

Result of the dry Mediterranean climate is the existence of a limited number of natural lakes which are brackish or salty. The rest of water systems have been developed by humans as a result of the creation of lake reservoirs.

In the 1st Management Plan were recognized 7 Lakes WB, 6 of which are natural Lakes and one refers to Lake reservoir of Achnas which is Artificial Water Body. The WB are listed below (Table 7-13).

For the preparation of the 2nd RBMP, it was considered appropriate to integrate in Lakes WB and Oroklini lake, due to the special interest for the conservation of biodiversity. Also from the data of new research, which carried out for the lakes of Cyprus, is appeared the need for adjustment of the spatial representations of Aerodromiou Lake, in order to historical results and data which are reported to coincide and the spatial representation of the lake. Detailed data are provided in the 1st Interim Report «Checking / Supplementation of shortcomings of data of Article 5 of the WFD - Assessment / classification of quality (ecological and chemical) status of surface water as well as of quality (chemical) and quantitative status of the groundwater» that was implemented during of the preparation of the 2nd RBMP and is available on the website of the WDD.

So in this RBMP the lake water bodies of Cyprus includes a total of 7 natural lakes, which are brackish or salty and one water reservoir, which is Artificial Water Body.

All lakes in Cyprus can be described as dynamic systems. The natural salty and brackish lakes are dried often, but not every year. Both the salty and brackish lakes include the typical species for this type of conditions.

From the natural lakes a water body is characterized as a salty lake due to the high values of salinity, 6 are characterized as brackish lakes with a wide range of salinity and one body of water is freshwater reservoir.

Paralimni and Oroklini lakes have classified as HMWB because of the significant modifications in their hydromorphological characteristics. Furthermore, the reservoir of Achnas has classified as an AWB, as it is a human constructed reservoir, created for agricultural purposes. Detailed information about the Determination of HMWB and AWB are provided in «1st Interim Report" Checking / Supplementation of shortcomings of data of Article 5 of the WFD - Designation of Heavily Modified Water Bodies» which is available on the website of the WDD.

Table 7-13: Types of lake water bodies, the number of water bodies for each type and the area covered

Lake type	Description	Number of water bodies	Ground cover (%)
L1: Lakes with salty water	Salty water, isolated from the river, water depth <5m.	1	22,5
L2: Lakes with brackish water	Brackish water, isolated from the river, water depth <5m	6	74,2
L3: Shallow Lake reservoir	Freshwater, isolated from the river, water depth <5m.	1	3.3
L4: Deep Lake reservoir	Freshwater, isolated from the river, water depth >5m.	0	0

For the determination of reference conditions in lake water bodies of Cyprus, is in progress specific project that includes the monitoring of biological and physicochemical elements. The results of this project will provide the appropriate framework and the basis for future assessment of natural lakes of Cyprus.

Table 7-14: Lake water bodies of Cyprus, which are identified according to the reconsideration and the update of Article 5 of the WFD

Code of water body	Name of water body	Area in level of overflow (ha)	Average depth (m)	WFD-type	Modified
CY_8-3-2_11_L1	Larnaka main salt lake	452,8	0,42	1	-
CY_8-3-2_17_L2	Larnaka Limni aerodromiou	23,9	0,31	2	-
CY_8-3-2_13_L2	Larnaka Limni Soros (Glossa)	24,5	0,41	2	-
CY_8-3-2_12_L2	Larnaka Limni Orfani	147,0	0,36	2	-
CY_9-5-3_10_L2	Akrotiri salt lake	1005,3	-	2	-
CY_7-2-6_16_L2-HM	Paralimni	290,4	1	2	HMWB
CY_7-1-2_34_L3-A	Achna	66,5	2	3	HMWB
CY_8-1-2_09_L2-HM	Oroklini	6	<1	2	HMWB

- : natural water body.

1 : lake with salty water,

2 : brackish lake,

3 : freshwater lake reservoir

SOURCES: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.4-1)] AND 1st INTERIM REPORT «CHECK / SUPPLEMENTATION OF SHORTCOMINGS OF DATA OF

ARTICLE 5 OF WFD – ASSESSMENT / CLASSIFICATION OF QUALITY (ECOLOGICAL AND CHEMICAL) STATUS OF SURFACE WATER AS WELL AS OF QUALITY (CHEMICAL) AND QUANTITATIVE STATUS OF THE GROUNDWATER

7.1.3 Coastal WBs

The determination of types of riparian water bodies was based both on the same WFD (Annex II) and the Guidance Document No 5: Transitional and Coastal Waters. Typology, Reference Conditions and Classification Systems [See bibliography, 17].

The separation of types of coastal waters can be carried out either by System A (Ecoregion, Average Annual Salinity, Average depth) or the system B (mandatory and optional physico-chemical agents). In the case of Cyprus is used the System B which is more flexible and offers a more detailed and ecologically relevant characterization of coastal waters compared to the System A.

The **exposure to wave action, the type of substrate, the depth and the temperature** are the most appropriate, important and ecologically relevant descriptive characteristics for the coastal waters of Cyprus. Based on this classification scheme, 4 types of coastal waters which occur in Cyprus were determined (Table 7-15). This approach produces a relative ecological classification which is confirmed by the results of the monitoring program which is applied in Cyprus from other scientific information and sources.

C1: Hard substrate, deep, moderately exposition to protected, lower temperature. Typical examples of this type are the north-west coast of island (coast of Tillyria and the Akamas peninsula). This type covers 15% of the marine area of Cyprus.

C2- Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature. Typical examples of this type are mainly the Khrysokhou Bay and the bays of Limassol and Larnaca. This type covers 40% of the marine area of Cyprus.

C3- Hard substrate (biogenic), deep, moderately exposition to protected, higher temperature. Typical examples of this type are the coast of Cape Pyla and of Cape Agia Napa, in the south-eastern and eastern coasts. This type covers 12% of the marine area of Cyprus.

C4- Hard substrate, deep, moderately exposition to exposed, lower temperature. Typical examples of this type are the western coast of the Akamas, coastline of Paphos and of Episkopi. This type covers 33% of the marine area of Cyprus.

Table 7-15: Types of coastal waters and the number of water bodies for each type.

Types of coastal water	Description	Number of coastal water bodies	Ground cover (%)
C1	Hard substrate, deep, moderately exposition to protected, lower temperature	4	15,0
C2	Movable substrate, intermediate depth, moderately exposition to protected, lower temperature	9	40,2
C3	Hard substrate, deep, moderately exposition to protected, higher temperature	4	12,2
C4	Hard substrate, deep, moderately exposition to exposed, lower temperature	5	32,6

In order to designate the coastal waters of Cyprus in the framework of the revision of Article 5 of the Water Framework Directive (WFD, 2000/60 / EC), the criteria which are defined both in the WFD and the Guidance Documents No. 2 (Identification of Water Bodies) and No. 5 (Transitional and Coastal Waters- Typology, Reference Conditions and Classification Systems) were applied. The main purpose was to observe the principles of *distinctness* and *importance* of WB in the context of objectives and targets of the WFD, and also of the economy and optimal and efficient management. In this context, for the recognition-confirmation of coastal WB was followed a hierarchical approach with the following steps-criteria:

- Water Category: Coastal Water (CW)
- Type of coastal waters: each coastal WB belongs only to one type (CW1, CW2, CW3, CW4)
- Other geographical, morphological and hydrographic features, which may vary significantly between the adjacent WB of the same type
- Data that dictate the characterization of a WB as Heavily Modified (HM)
- Pressures/impacts, e.g. if a certain pressure causes eutrophication in 2 adjacent coastal WB of the same type then they should be integrated into one body, but if the effect is limited only to one of the two, then is justified them to be separate
- Status of WB based on the monitoring program of coastal water according to the Article 8 of the WFD: if the situation (ecological, chemical) of two adjacent coastal WB of the same type are the same then they may be united in one WB if it isn't the same then they must be separate
- Regime of protection: e.g. if a WB or one part of it, is under protection (e.g. marine areas Natura 2000)

For example, the coastal bodies of a bay or cape that belongs to the same type, is not subdivided into different bodies but only if are specified significant point or diffuse sources of pollution or morphological alterations. Based on the above, **22 different water bodies** have been designated in Cyprus, which are presented in the table below (Table 7-16). The total length of the coastline of the River Basin of Cyprus is 767 km. Nearly the 364 km are located in the area where is applied the European Community acquis. The CY_0-C0 water body indicates the coastal waters of Cyprus in which the Republic of Cyprus does not exercise effective control.

Table 7-16: Geographic data of demarcation and of typology of coastal water bodies

Number	Name	Heavily modified	Types according to the Water Framework Directive	Ground cover (km^2)
CY_1-C1	East Tylliria	No	Hard substrate, deep, moderately exposition to protected, lower temperature	44,4
CY_2-C1	West Tylliria	No	Hard substrate, deep, moderately exposition to protected, lower temperature	29,9
CY_3-C2	Khrysokhou Bay	No	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	44,7
CY_4-C1	Akamas North	No	Hard substrate, deep, moderately exposition to protected, lower temperature	28,6
CY_5-C4	West Akamas	No	Hard substrate, deep, moderately exposition to exposed, lower temperature	51,1
CY_6-C4	North Paphos	No	Hard substrate, deep, moderately exposition to exposed, lower temperature	70,1
CY_7-C4-HM	Paphos-city	Yes	Hard substrate, deep, moderately exposition to exposed, lower temperature	4,0
CY_8-C4	South Paphos	No	Hard substrate, deep, moderately exposition to exposed, lower temperature	71,0
CY_9-C4	Episkopi bay	No	Hard substrate, deep, moderately exposition to exposed, lower temperature	87,1
CY_10-C1	Cape Gata	No	Hard substrate, deep, moderately exposition to protected, lower temperature	27,8
CY_11-C2	Lemesos Bay South	No	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	30,3
CY_12-C2-HM	Lemesos Bay	Yes	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	59,3
CY_13-C2	Moni	No	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	26,5
CY_14-C2-HM	Port Vassilikou	Yes	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	15,7
CY_15-C2	Cape Zygi-Kiti	No	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	72,9
CY_16-C2	Larnaca-West	No	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	27,5
CY_17-C2-HM	Larnaca-center	Yes	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	9,8

Number	**Name**	**Heavily modified**	**Types according to the Water Framework Directive**	**Ground cover (km^2)**
CY_18-C2	Bay Larnaca-northeast	No	Movable substrate (sand, gravel, mud), intermediate depth, moderately exposition to protected, lower temperature	62,1
CY_19-C3	Cape Pyla	No	Hard substrate, deep, moderately exposition to protected, higher temperature	8,5
CY_20-C3	Cape Pyla-AquaFarm	No	Hard substrate, deep, moderately exposition to protected, higher temperature	7,2
CY_21-C3	Ayia Napa	No	Hard substrate, deep, moderately exposition to protected, higher temperature	42,5
CY_22-C3	Protaras	No	Hard substrate, deep, moderately exposition to protected, higher temperature	47,9

Figure 7-14: Surface WB

7.2 GROUNDWATER BODIES

7.2.1 GWB of 1st RBMP

In the 1st RBMP of Cyprus were delineated initially 20 GWB, of which the CY-20 Pentadaktylos is located in an area, where the Republic of Cyprus does not exercise effective control. Therefore, the final number which was evaluated, refers to 19 Groundwater Bodies (GWB) (Table 7-10).

The initial characterization and the designation of GWB was implemented with criteria the following factors:

- Geological - hydrogeological conditions as well as the potentiality of aquifers that constitute the groundwater body.
- The supernatant geological formations in the expansion of the riverbasin and supernatants layers of the aquifer.
- The existing uses of groundwaters, the regime exploitation and the data of abstraction and total discharge of aquifers.
- The existing sources of pollution and the total of pressures.
- The interdependence of the Groundwater Bodies with surface waters and terrestrial ecosystems.

In the general context, GWB such as it have configured, include the following types of dominant geological formations:

- Quaternary formations from alluvium and sedimentary deposits, the GWB CY-1, CY-3, CY-4, CY-7, CY-8, CY-9, CY-10, CY-11, CY-15, CY-16 και CY-17.
- Miocene plaster (CY-2, CY-5,CY-12).
- Paleogene chalks and Miocene sandstones (CY-6,CY-18).
- Miocene limestone (CY-13, CY-14).
- Ophiolite complex (CY-19).

7.2.2 GWB of 2nd RBMP

In the framework of the preparation for the 2nd RBMP of Cyprus, a review of GWB of Cyprus was carried out, which is based on the results of the monitoring programs of the quantitative and qualitative state of the GWBs as was implemented by the WDD during the 2008-2013 period. The review is also based on the reassessment of the monitoring data, on the conclusions of Summary Report of the WDD in the framework of application of Articles 5 and 6 of the WFD in Cyprus and in previous assessment of qualitative (chemical) and quantitative status of GWBs from the WDD, which was carried out in 2010, in the framework of application of Articles 11,13 and 15 of WFD in Cyprus

The information about GWBs covers spatially the area of Cyprus, which is controlled effectively by the Government of Cyprus. Therefore is not evaluated the GWB of CY-20 Pentadaktylos, which is located out of control area but are reviewed and are evaluated to the extent practicable the 4 GWB (CY-1, CY-17, CY-18 and CY-19) which are extended partially, outside of the area which is controlled effectively by the Government of the Republic of Cyprus.

Since the year 2007 were established monitoring programs of qualitative (chemical) and quantitative status of GWBs in accordance with Article 8 of WFD. In this context, WDD created and updates on permanent basis the Data base of hydrological and hydrogeological information CYMOS (Cyprus Monitoring System) in which are inserted all the quantitative data and qualitative condition of surface and groundwaters.

From the review of the GWB and the reassessment of the total data of pressures and mainly of the hydrogeological conditions, was raised the following reformulations with which is estimated that the operational and efficient management of GWB is ensured:

- The GWB CY-2 Aradippou was removed by the assessment as groundwater body because according to the information which derived from the application of the monitoring program, the hydrogeological data which are arisen from the stop of two new drillings and hydrogeological data from the number of previous drillings, is about to low potentiality and a no single system that doesn't fulfill the conditions as a definition of GWB.
- The GWB CY-3 Kiti - Pervolia was separated into two GWB, the CY-3A Koitis Treminthou whose water is used for public water supply and CY-3B Kiti-Pervolia in which there is pressure of seawater intrusion because of the penetration of sea and the water is not used for public water supply. The separation of the original, single system was made for the following reasons: (a) different geological environment because the CY-3A are developed in alluvium deposits of the river bed of Tremithios and CY-3B in formation Pleistocene marine terraces and (b) uses, because the CY-3A is used for public water supply and irrigation while the CY-3B is only used for irrigation.
- The GWB CY-11 Paphos was devided into two GWB, the CY-11A Paphos of which the water is used and for drinking water supply purposes and CY-11B Koitis Ezousa in which is exerted seawater intrusion pressure due to transitions in it, groundwater water to high concentrations of sulfates ions from neighboring gypsiferous aquifer and the water is not used for public water supply purposes. The separation of the original, single system was made for the following reasons: (a) different geological environment because the CY-11A is developed in reparian asvestarenites Athalassas and alluvium deposits of riverbed while CY-11B in the alluvium deposits of the river Ezousa and (b) uses, because the CY-11A is used mainly for public water supply while the CY-11B is only used for irrigation.
- The GWB CY-15 Khrysokhou-Yialias was devided into two GWB, the CY-15A Khrysokhou-Yialias of which the water is used for public water supply purposes and CY-15B Koitis Khrysokhou in which is exerted seawater intrusion because of transitions in this underground water with high concentrations of sulfates ions from neighboring gypsiferous aquifer and the water is not used for public water supply purposes. The separation of the original, single system was made for the following reasons: (a) different geological environment because the CY-15A is developed in marine terraces and alluvium delta while the CY-15B in alluvium deposits of the

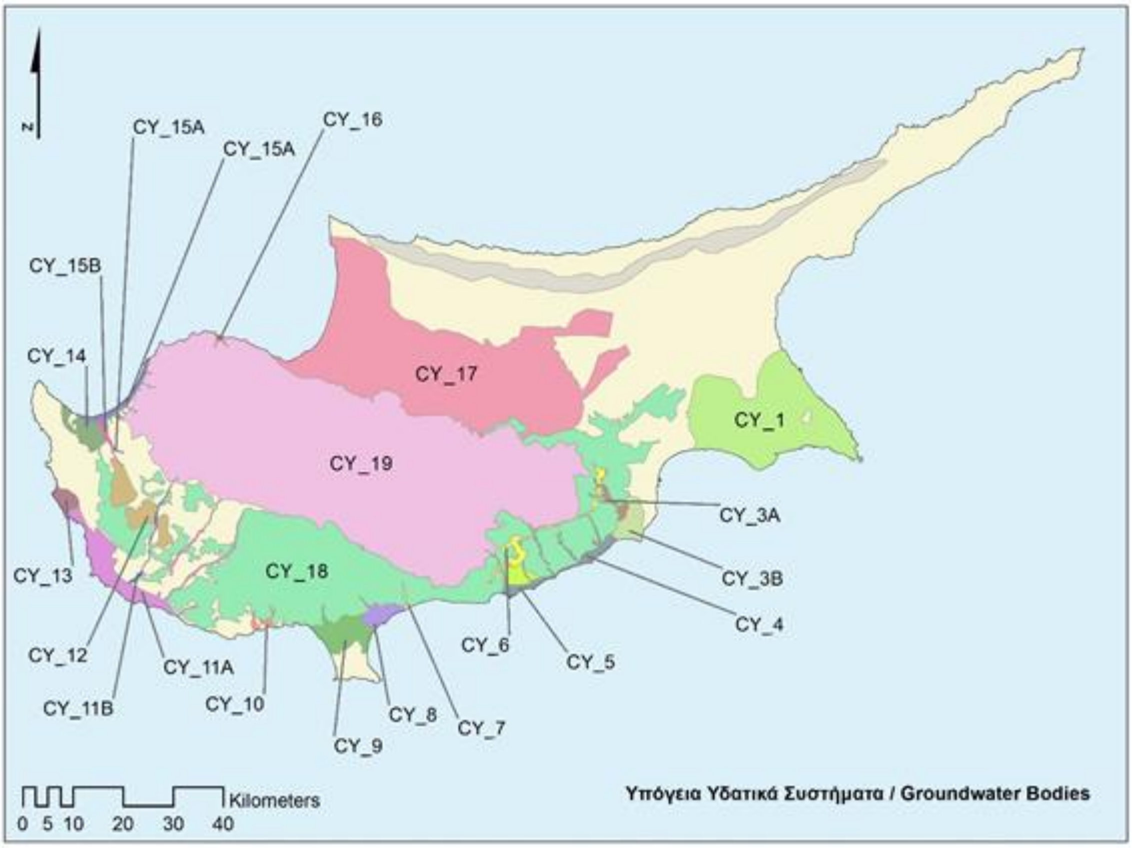
riverbed of Khrysokhou river and (b) uses, because the CY-15A is used mainly for public water supply while the CY-15B is used for irrigation.

Therefore according to reconsideration of GWB in the framework of the preparation for the 2nd RBMP of Cyprus, the Republic of Cyprus exercises effective control in twenty-one (21) GWBs which present the spatial characteristics which are illustrated in Figure in Table below.

Table 7-17: Revised GWB in framework of preparation for the 2nd RBMP

A/A	Initial GWB Code 1st RBMP	Revised Code GWB 2nd RBMP	Name
1	CY-1	CY-1	Kokkinochoria
2	CY-3	CY-3A	Kiti Treminthou
3		CY-3B	Kiti-Pervolia
4	CY-4	CY-4	Softades-Vasilikos
5	CY-5	CY-5	Maroni
6	CY-6	CY-6	Mari-Kalo Chorio
7	CY-7	CY-7	Yermasogeia
8	CY-8	CY-8	Limassol
9	CY-9	CY-9	Akrotiri
10	CY-10	CY-10	Paramali-Evdhimou
11	CY-11	CY-11A	Paphos
12		CY-11B	Kiti Ezousa
13	CY-12	CY-12	Letymvou-Giolou
14	CY-13	CY-13	Pegeia
15	CY-14	CY-14	Androlykou
16	CY-15	CY-15A	Khrysokhou-Yialias
17		CY-15B	Kiti Khrysokhou
18	CY-16	CY-16	Pyrgos
19	CY-17	CY-17	Central and Western Mesaoria
20	CY-18	CY-18	Lefkara-Pachna
21	CY-19	CY-19	Troodos

Figure 7-15: Groundwater Bodies



7.3 HEAVILY MODIFIED WATER BODIES (HMWB) AND ARTIFICIAL WATER BODIES (AWB)

The identification of the HMWB was reviewed during the preparation of the 2nd RBMP. According to the indicated issues in the Guidance Document for the HMWB and AWB, during the 2nd cycle of the management, the main difference is that the water bodies (natural, HMWB & AWB) that were characterized in the first RBMP will be in effect a fully compliant monitoring program. Thus, the characterization is likely to begin with a review of monitoring data which will determine the current (around 2013) status of water. Based on this information, the designated HMWBs could change at least partly. For example, if the monitoring shows that the situation of a half water body has changed, then the water body could be divided into two, while if the status of two adjacent water bodies are the same, then these bodies could be consolidated. The procedure of the assessment of the risk of achieving good status in the second cycle will be based on a better understanding of GES and GEP. Therefore, the assessment process will identify the risks of failure, of good status for the natural water bodies and GEP for HMWB and AWB.

Regarding the tests of Article 4(3) in the second RBMP, they may be implemented in three main cases:

i) in HMWB and AWB, which probably were not determined in the first RBMP,

ii) in recently modified WB and

iii) as a part of the review of existing HMWB and AWB. The designatio of HMWB and AWB should be reviewed every six years

The revisions are part of the 2nd RBMP. The revision of HMWB and of the Artificial WB includes review of the tests for the identification of the WB.

7.3.1 HMWBs and AWBs in the 1st Management Plan

In the 1st River Basin Management Plan (RBMP) of Cyprus were identified as HMWB twelve (12) lake water bodies, forty-nine (49) river water bodies and five (5) coastal water bodies.

The river HMWB concern either in downstream dam bodies or bodies that have been experienced modifications or water abstractions.

As lake HMWB were characterized 11 impounded rivers which have been formulated by dams of rivers and Lake Paralimni, which has experienced significant pressures related to the hydromorphological conditions due to drainage works.

Regarding to the coastal water bodies which have been characterized as HMWB, they serve significant economic functions of the Republic of Cyprus, which allow only their characterization as HMWB.

Also in the 1st RBMP was identified and 1 lake AWB (Lake reservoir Achnas).

7.3.2 Actions for the preparation of the 2nd Management Plan

After the approval of the first Management Plan by the Council of Ministers in June 2011, and its submission to the European Commission, the Ministry of Agriculture, Rural Development and Environment and other competent authorities, implemented the necessary actions planned. In this context, actions related to the review process of the identification of the HMWB and AWB have been implemented and concern the followings:

- The characterization and the classification of the surface WB and the groundwater bodies (GWB) were reviewed. During this review:
    - All 11 reservoirs of the first Management Plan are included in the category of river HMWBs in accordance with the EU recommendations,
    - the number of the river WBs under the relevant investigation which was proposed by the first Management Plan is changed as a result of the applied typology and of the new data that are resulted from the monitoring network,
    - lake Oroklini is included in the lake WB

  - the number of coastal WB is changed due to the information that from the Monitoring Network and other relevant researches that led to the unification of neighboring coastal WB.

- The status of the updated/revised WB based on the work which were carried out within the scope of Article 5 (2) of the WFD was evaluated, as part of preparation of the 2nd RBMP in particular:

  - The Contract of WDD: "Review and update of Article 5 of Directive 2000/60 / EC (water reservoirs) & Classification of water status (rivers, natural lakes, water reservoirs) that will establish baseline information and data for the 2nd Cyprus River Basin Management Plan", which is available on the website of the WDD.

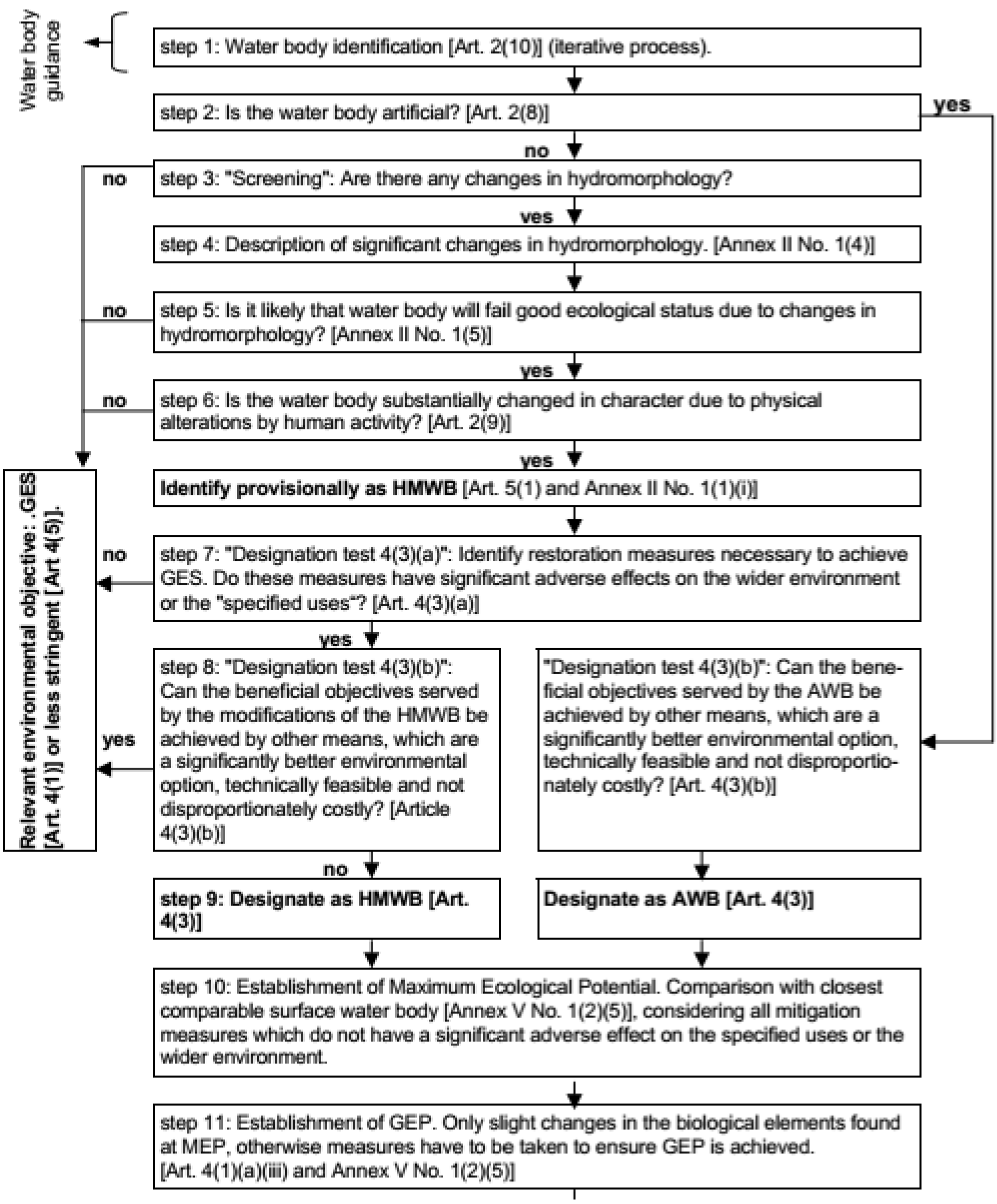
  - The study of the Department of Fisheries and Marine Research (DFMR) for the coastal waters.

- The updating of the review of the pressures and impacts of human activities on the status of the surface water and groundwater in accordance with the Article 5 of the WFD was completed. The results of this survey are available on the website of WDD

7.3.3 Designation of HMWB and AWB

Based on the above mentioned data reported during the preparation of the present report, for the designation of HMWBs and AWBs in the RBD of Cyprus the methodology which is proposed in the guidance document for heavily modified and artificial water bodies (GD 4, 2003) was applied. The following figure (Figure 7-8) summarizes the steps that are included in this methodology. The full analysis is given in the Interim Report No. 1 on the Final Designation of Heavily Modified and Artificial Water Bodies, July 2015 [See. reference, 5] which is available on the website of the WDD.

Figure 7-16: Designation process of HMWB and AWB in accordance with the GD 4.



In this context, in the RBMP of Cyprus were designated, **fifty six (56)** heavily modified water bodies (**50** river WBs - including 15 impounded rivers, **2** lake water bodies and **4** coastal WB) and **one (1)** artificial water body (lake). These water bodies are shown in the following table and the accompanied figure.

Table 7-18: Final Designation of HMWB

A/A	Category of WB	WB Name	New Code of. WB	Length of WB in km	WB Surface in km^2	Main reasons/Uses that are served
1	RWB	Khapotami	CY_1-1-d_RIh_HM	4,78		Local irrigation
2	RWB	Dhiarizos	CY_1-2-d_RI_HM	31,33		Irrigation. Upstream Armini dam. Diversion to Kouri dam and connection with the work of the South Pipeline. Is watering the 76% of the population of Cyprus. Water supply of mountain communities of Diarizos.
3	RWB	Xeros Potamos	CY_1-3-c_RIh	11,66		Irrigation. Point abstractions
4	RWB	Ezousa	CY_1-4-d_RI_HM	7,43		Irrigation/public water supply downstream of Kanavios dam, diversion to reservoir Asprokremmos. Water supply of upland communities of Paphos.
5	RWB	Ezousa	CY_1-4-e_RIh_HM	4,84		
6	RWB	Ezousa	CY_1-4-f_RP_HM	5,16		
7	RWB	Ezousa	CY_1-4-g_RI_HM	5,91		
8	RWB	Ezousa	CY_1-4-h_RIh_HM	8,13		
9	RWB	Mavrokolymbos	CY_1-6-c_RIh_HM	2,67		Irrigation. Downstream Mayrokolympos dam/ Irrigation work of Paphos
10	RWB	Stavros tis Psokas	CY_2-2-f_RI_HM	2,74		Irrigation. Downstream of Evrettos dam. Irrigation work of Khrysokhou
11	RWB	Khrysokhou	CY_2-2-g_RI_HM	2,82		
12	RWB	Khrysokhou	CY_2-2-h_RIh_HM	6,79		
13	RWB	Magounda	CY_2-3-d_RIh_HM	4,03		Irrigation. Downstream of Argaka dam/Irrigation work of Khrysokhou
14	RWB	Xeros	CY_2-4-b_RIh_HM	2,87		Irrigation. Downstream of Ag. Marinas dam/ Irrigation work of Khrysokhou
15	RWB	Livadhi	CY_2-4-e_RIh_HM	4,04		Irrigation. Downstream of Pompos dam/ Irrigation work of Khrysokhou

A/A	Category of WB	WB Name	New Code of. WB	Length of WB in km	WB Surface in km^2	Main reasons/Uses that are served
16	RWB	Katouris	CY_2-6-b_RIh_HM	5,26		Irrigation. Downstream of Pyrgos dam
17	RWB	Marathaa	CY_3-2-b_RP_HM	12,06		Irrigation. Downstream od Kalopanayioti dam (and Leyka.
18	RWB	Karyiotis	CY_3-3-c_RI	11,44		Irrigation. Point abstractions
19	RWB	Atsas	CY_3-4-c_RIh_HM	6		Irrigation. Downstream of Petras dam/ local irrigation
20	RWB	Lagoudhera	CY_3-5-c_RI_HM	12,55		Irrigation. Downstream of Xyliatos dam / Plan of integrated Rurala Development Pitsilia.
21	RWB	Elia	CY_3-5-d_RIh_HM	13,33		
22	RWB	Akaki	CY_3-7-j_RIh_HM	4,5		Irrigation /Public water supply. downstream of Klhrou Malounta dam
23	RWB	Pedhieos	CY_6-1-c_RIh_HM	0,97		Irrigation /Recharge. downstream of Tamassos dam
24	RWB	Koutsos	CY_6-5-f_RIh_HM	6,21		Irrigation. downstream of Litharodonta dam
25	RWB	Syrkatis	CY_8-7-c_RI_HM	6,68		Irrigation /public water supply. downstream of Leukaron dam. Southern Pipeline work. watered the 76% of the population of Cyprus
26	RWB	Pendaskhinos	CY_8-7-f_RI_HM	7,26		Public Water Supply/irrigation. Downstream to r. Dipotamos / southern pipeline work \ watered the 76% of the population of Cyprus and contributing to the irrigation of vasilikos-Pentaschoinos Plan
27	RWB	Pendaskhinos	CY_8-7-g_RIh_HM	9,54		
28	RWB	Ayiou Mina	CY_8-8-c_RIh_HM	8,1		Public Water Supply/irrigation downstream abstraction Maroni abstraction to the Dipotamos reservoir. Southern Pipeline work. watered the 76% of the population of Cyprus \
29	RWB	Vasilikos	CY_8-9-e_RI_HM	8,98		Public Water Supply/irrigation \ Downstream of kalavasos dam / Southern Pipeline work. watered the 76% of the population of Cyprus \ and irrigation in the plan Vasilikos-Pentaschoinos
30	RWB	Vasilikos	CY_8-9-f_RIh_HM	4,53		

A/A	Category of WB	WB Name	New Code of. WB	Length of WB in km	WB Surface in km^2	Main reasons/Uses that are served
31	RWB	Yermasogeia	CY_9-2-d_RI_HM	2,63		Irrigation. Downstream of Arakapa dam/ Local irrigation
32	RWB	Yermasogeia	CY_9-2-h_RIh_HM	6,36		Irrigation/public water supply indirectly though recharge of WGB. downstream to Yermasogeia dam public water supply Limassol. Irrigation work Yermasogeia Polemidi\. Southern Pipeline work. watered the 76% of the population of Cyprus
33	RWB	Garyllis	CY_9-4-e_RIh_HM	3,79		Irrigation Downstream to Polemidi dam-irrigation water Yermasogeia-Polemidi\ Contributes to coverage of the Southern Pipeline Project needs. Without being bound to it
34	RWB	Kryos	CY_9-6-r_RI_HM	14,97		Irrigation downstream to Pera Pediou dam Local irrigation
35	RWB	Kouris	CY_9-6-t_RI_HM	11,42		Public Supply Water /Irrigation. downstream to Kouris dam / Southern Pipeline work. watered the 76% of the population of Cyprus
36	RWB-impounded	Pano Platres	CY_9-6-j_RP_HM_IR		0,03	
37	RWB-impounded	Xyliatos	CY_3-5-b_RI_HM_IR		0,05	Irrigation Plan of intergrated Rural Development Pitsilias.
38	RWB-impounded	Polemidia	CY_9-4-d_RI_HM_IR		0,17	Irrigation Irrigation work Yermasogeia - Polemidi. Contributes to coverage of the Southern pipeline Project needs. Without being bound to it
39	RWB-impounded	Mavrokolymbos	CY_1-6-b_RIh_HM_IR		0,18	Irrigation / Public water supply Irrigation / Public water supply Work of Paphos
40	RWB-impounded	Lefkarkon	CY_8-7-b_RI_HM_IR		0,45	Irrigation / Public water supply Southern Pipeline work. watered the 76% of the population of Cyprus
41	RWB-impounded	Yermasogeia	CY_9-2-g_RI_HM_IR		0,68	Irrigation / Public water supply indirectily though the recharge of WGB Irrigation of Limassol. Irrigation work of Yermasogeia Polemidi. Southern Pipeline work. watered the 76% of the population of Cyprus

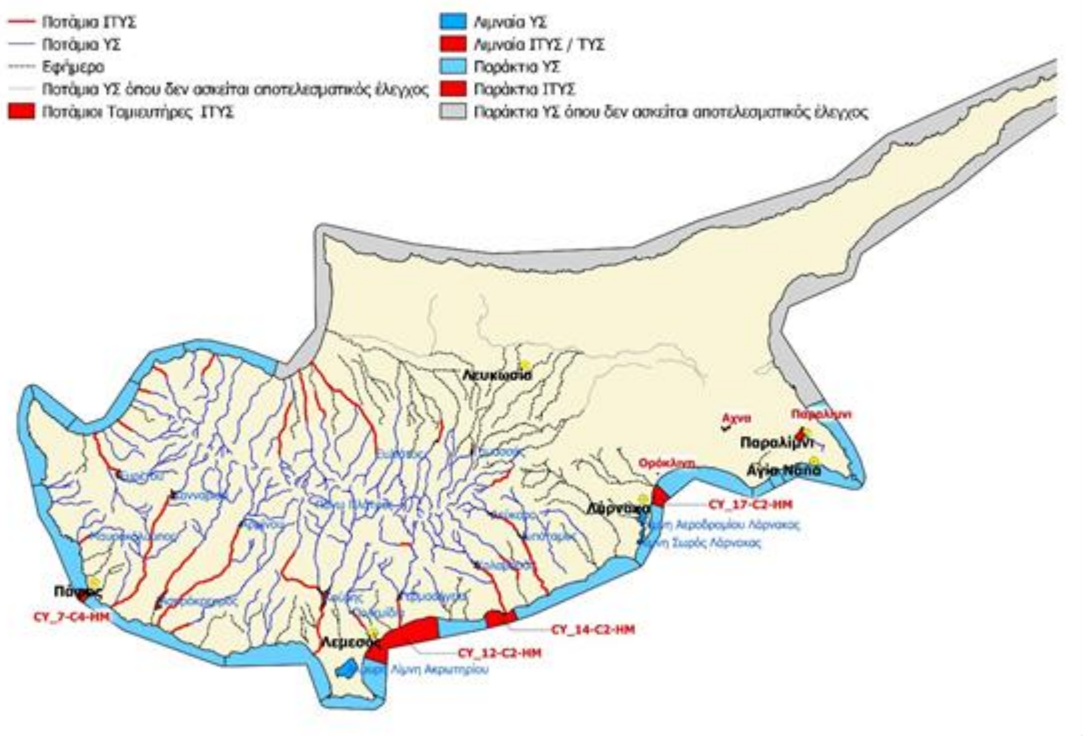
A/A	Category of WB	WB Name	New Code of. WB	Length of WB in km	WB Surface in km^2	Main reasons/Uses that are served
42	RWB-impounded	Kalovasos	CY_8-9-d_RI_HM_IR		0,87	Irrigation / Public water supply Southern Pipeline work. watered the 76% of the population of Cyprus and irrigation in the plan vasilikos-Pentaschoinos
43	RWB-impounded	Dipotamos	CY_8-7-e_RI_HM_IR		0,92	Irrigation / Public water supply Southern Pipeline work. watered the 76% of the population of Cyprus and irrigation in the plan vasilikos-Pentaschoinos
44	RWB-impounded	Evretou	CY_2-2-e_RI_HM_IR		1,14	Irrigation Irrigatio work of Khrysokhou
45	RWB-impounded	Kouris	CY_9-6-s_RP_HM_IR		3,32	Irrigation / Public water supply Southern Pipeline work. watered the 76% of the population of Cyprus
46	RWB-impounded	Asprokremmos	CY_1-3-d_RIh_HM_IR		2,25	Irrigation / Public water supply Irrigation work of Paphos
47	RWB-impounded	Arminou	CY_1-2-c_RP_HM_IR		0,36	Irrigation/Public water Supply diversion to the dam Kouri and connection with project of the South Pipeline. Is watering the 76% of the population of Cyprus. Water supply of mountain communities of Diarizos
48	RWB-impounded	Kannaviou	CY_1-4-c_RI_HM_IR		0,93	Irrigation / Public water supply Diversion to dam Asprokemmou. water supply of upland communities of Paphos.
49	RWB-impounded	Tamasos	CY_6-1-b_RIh_HM_IR		0,36	Recharge
50	RWB-impounded	Akaki-Malounda	CY_3-7-i_RI_HM_IR		0,18	Irrigation / Public water supply Local irrigation
51	CWB	Pafos- City	CY_7-C4-HM		4	Urbanization and recreation
52	CWB	Bay of Limassol	CY_12-C2-HM		59	Navigation / port facilities, recreation and urbanization.
53	CWB	Lake Vasilikos	CY_14-C2-HM		16	Navigation / port facilities
54	CWB	Larnaca-center	CY_17-C2-HM		10	Navigation / port facilities, recreation and urbanization
55	LWB	Paralimni	CY_7-2-6_16_L2-HM		2,9	urbanization

A/A	Category of WB	WB Name	New Code of. WB	Length of WB in km	WB Surface in km^2	Main reasons/Uses that are served
56	LWB	Oroklini	CY_8-1-2_09_L2-HM		0,06	Urbanization and transport networks

Table 7-19: Final Identification of AWB

WB Category	Name	WB Code	Extent in the overflow level (km2)	Main reasons/Use which is served
LWB	Axna	CY_7-1-2_34_L3-A	0,07	Irrigation

Figure 7-17: HMWB/ AWB



7.4 REGISTER OF PROTECTED AREAS

In accordance with Article 6 of the WFD, the MS ensure the establishment of a register, which includes all water bodies identified under the Article 7 paragraph 1 of WFD and all the protected areas covered by the Annex IV of the WFD, in particular:

– areas that are used for the abstraction of water intended for the human consumption, in accordance with Article 7,

- areas which are intended for the protection of aquatic species of economic importance,
- water bodies which have characterized as recreational waters, including areas characterized as bathing waters under the Directive 76/160 / EEC,
- areas sensitive to the existence of nutrient Substances , including areas which are designated as vulnerable zones and sensitive areas according to EU Directives 91/676 / EEC and 91/271 / EEC respectively and
- areas which are intended for the protection of habitats or species where the maintenance or the improvement of water status is important for their protection, including relevant sites of «NATURA 2000» that are established under the Directive 92/43 / EEC and 79 / 409 / EEC.

The following paragraphs present WBs and areas that are included in the Register of Protected Areas of the WFD.

7.4.1 Areas for water abstraction intended for Human Consumption

According to the Article 7 of the WFD, for each river basin district, are designated:

- all water bodies used for the water abstraction intended for human consumption, providing more than 10 m^3 a day as an average or serving more than 50 persons, and
- those water bodies intended for such future use.

For each such as the above WB, in addition to the compliance of the objectives of the Article 4 of the WFD for the surface WB, the MS ensure that under the applied water treatment regime, and in accordance with the legislation of the Community, the water derived will meet the requirements of the Directive 80/778 / EEC, as amended by the Directive 98/83 / EC.

Water that used in Cyprus for the abstraction of drinking water is impounded rivers or groundwater and are presented in the following Table.

Table 7-20: Water bodies used for drinking water supply

Category	WB Name	WB Code	Code of protected area
river HMWB (Impounded rivers)	Arminou	CY_1-2-c_RP_HM_IR	CY_PR-DRW_S-11*
	Asprokremmos	CY_1-3-d_RIh_HM_IR	CY_PR-DRW_S-19
	Evretou	CY_2-2-e_RI_HM_IR	CY_PR-DRW_S-9*
	Xyliatos	CY_3-5-b_RI_HM_IR	CY_PR-DRW_S-8*
	Kannaviou	CY_1-4-c_RI_HM_IR	CY_PR-DRW_S-10*
	Akaki-Malounda	CY_3-7-i_RI_HM_IR	CY_PR-DRW_S-7*
	Tamassos	CY_6-1-b_RIh_HM_IR	CY_PR-DRW_S-6*
	Lefkara	CY_8-7-b_RI_HM_IR	CY_PR-DRW_S-3

Category	WB Name	WB Code	Code of protected area
	Dipotamos	CY_8-7-e_RI_HM_IR	CY_PR-DRW_S-4
	Kalavasos	CY_8-9-d_RI_HM_IR	CY_PR-DRW_S-2
	Yermasogeia	CY_9-2-g_RI_HM_IR	CY_PR-DRW_S-5*
	Kouris	CY_9-6-s_RP_HM_IR	CY_PR-DRW_S-1
	Argakas	not WB	new area*
Groundwater	River bed r. Treminthos	CY_3A	CY_PR-DRW_GW-3
	Μαρί-Kalo Chorio	CY_6	CY_PR-DRW_GW-6
	Yermasogeia	CY_7	CY_PR-DRW_GW-9
	Acrotiri	CY_9	CY_PR-DRW_GW-10
	Paramali και Evdhimou	CY_10	CY_PR-DRW_GW-11
	Pafos	CY_11A	CY_PR-DRW_GW-12
	Phinia	CY_13	CY_PR-DRW_GW-13
	Androiki	CY_14	CY_PR-DRW_GW-14
	Khrysokhou-Yialia	CY_15A	CY_PR-DRW_GW-15
	Pyrgos	CY_16	CY_PR-DRW_GW-16
	Cenrtral and Western Mesaoria	CY_17	CY_PR-DRW_GW-17
	Lefkara-Pachna	CY_18	CY_PR-DRW_GW-6, CY_PR-DRW_GW-7, CY_PR-DRW_GW-9, CY_PR-DRW_GW-11,CY_PR-DRW_GW-12, CY_PR-DRW_GW-18
	Troodos	CY_19	CY_PR-DRW_GW-18

*New Area. not included in 1st RBMP

7.4.2 Water Bodies designated as recreational waters

In accordance with WFD the Register of Protected areas includes water bodies which have been designated as recreational waters, including areas that are designated as bathing waters in accordance with the Directive 76/160/EEC.

On December 31, 2014, the Directive 76/160/EEC on "the quality of bathing water" 'was repealed by the Directive 2006/7/EC. The harmonization of the legislation of Cyprus with the above directives became by the "On the Water Pollution Control" Law 2002 (N.106 (I) / 2002), from the "On the Water Pollution Control" (Quality of the Bathing Water) Order of 2000 (Κ.Δ.Π 99/2000) and the "on management of the quality of bathing waters" Law of 2008 (Law. 57 (I) / 2008).

As part of the implementation of the Directive 2006/7/EC, Cyprus in 2010 adopted after public consultation, **113** water bathing areas. Areas of bathing waters are exist almost in all coastal water bodies of Cyprus for which the EU acquis is applied. The Water bodies and the corresponding number of bathing water areas are shown in the following Table.

Table 7-21: Coastal Water Bodies and Bathing Water Areas

Code	Name	Heavily modified	Extent (Km^2)	Number of Bathing Areas
CY_1-C1	Eastern Tylliria	NOT	44	3
CY_2-C1	Western Tylliria	NOT	30	1
CY_3-C2	Bay Khrysokhou	NOT	44	5
CY_4-C1	Akamas-North	NOT	29	2
CY_5-C4	Akamas	NOT	28	0
CY_6-C4	North Pafos	NOT	70	9
CY_7-C4-HM	Pafos- City	YES	4	0
CY_8-C4	South Pafos	NOT	71	13
CY_9-C4	River bed Episkopi	NOT	87	3
CY_10-C1	Akroitri Gata	NOT	28	0
CY_11-C2	River bed limassol- South	NOT	30	3
CY_12-C2-HM	Limassol	YES	52	20
CY_13-C2	Moni	NOT	26	4
CY_14-C2-HM	Port Vasilikos	YES	16	0
CY_15-C2	Zygi-Akrotiri KIti	NOT	73	2
CY_16-C2	Larnaca-West	NOT	28	8
CY_17-C2-HM	Larnaca-Center	YES	10	1
CY_18-C2	River bed of Larnaca-Northeast	NOT	62	13
CY_19-C3	Akrotiri Pyla	NOT	9	0
CY_20-C3	Akrotiri Pyla- Aqua Farm	NOT	7	1
CY_21-C3	Ayia Napa	NOT	42	14
CY_22-C3	Protaras	NOT	48	13

Table 7-22: Protected bathing areas

α/α	Area Code according to the Directive 2006/7/EC	Coastal WB Code	Protected Area Code
1	CY0003101000000001	CY_22-C3	CY_PR-BW_29
2	CY000310100000001A	CY_22-C3	CY_PR-BW_115
3	CY0003101000000002	CY_22-C3	CY_PR-BW_28
4	CY000310100000002A	CY_22-C3	CY_PR-BW_114
5	CY0003101000000003	CY_22-C3	CY_PR-BW_27
6	CY0003101000000004	CY_22-C3	CY_PR-BW_26
7	CY0003101000000005	CY_22-C3	CY_PR-BW_31
8	CY0003101000000006	CY_22-C3	CY_PR-BW_30
9	CY000310100000006A	CY_22-C3	CY_PR-BW_25
10	CY0003101000000007	CY_22-C3	CY_PR-BW_24
11	CY0003101000000008	CY_22-C3	CY_PR-BW_23
12	CY0003101000000009	CY_22-C3	CY_PR-BW_22
13	CY0003100000000010	CY_22-C3	CY_PR-BW_21
14	CY0003100000000011	CY_21-C3	CY_PR-BW_20
15	CY000310000000011A	CY_21-C3	CY_PR-BW_19
16	CY0003100000000012	CY_21-C3	CY_PR-BW_18
17	CY0003100000000013	CY_21-C3	CY_PR-BW_17

α/α	Area Code according to the Directive 2006/7/EC	Coastal WB Code	Protected Area Code
18	CY000310000000013A	CY_21-C3	CY_PR-BW_16
19	CY000310000000014A	CY_21-C3	CY_PR-BW_15
20	CY000310000000014B	CY_21-C3	CY_PR-BW_14
21	CY0003100000000015	CY_21-C3	CY_PR-BW_13
22	CY0003100000000016	CY_21-C3	CY_PR-BW_12
23	CY000310000000016A	CY_21-C3	CY_PR-BW_11
24	CY0003100000000017	CY_21-C3	CY_PR-BW_10
25	CY0003100000000018	CY_21-C3	CY_PR-BW_9
26	CY000310000000018A	CY_21-C3	CY_PR-BW_8
27	CY0003100000000019	CY_21-C3	CY_PR-BW_7
28	CY0003103000000020	CY_20-C3	CY_PR-BW_6
29	CY0004107000000024	CY_18-C2	CY_PR-BW_4
30	CY000410600000024A	CY_18-C2	CY_PR-BW_113
31	CY0004106000000025	CY_18-C2	CY_PR-BW_3
32	CY0004106000000028	CY_18-C2	CY_PR-BW_1
33	CY0004104000000031	CY_18-C2	CY_PR-BW_32
34	CY0004104000000032	CY_18-C2	CY_PR-BW_33
35	CY0004104000000033	CY_18-C2	CY_PR-BW_34
36	CY0004102000000034	CY_18-C2	CY_PR-BW_35
37	CY0004102000000036	CY_18-C2	CY_PR-BW_36
38	CY000410200000036A	CY_18-C2	CY_PR-BW_112
39	CY0004102000000037	CY_18-C2	CY_PR-BW_37
40	CY0004102000000038	CY_18-C2	CY_PR-BW_38
41	CY000400000000038A	CY_18-C2	CY_PR-BW_39
42	CY0004000000000040	CY_16-C2, CY_17-C2-HM	CY_PR-BW_40
43	CY0004000000000041	CY_16-C2	CY_PR-BW_41
44	CY0004000000000046	CY_16-C2	CY_PR-BW_43
45	CY0004000000000048	CY_16-C2	CY_PR-BW_44
46	CY0004000000000049	CY_16-C2	CY_PR-BW_45
47	CY0004000000000050	CY_16-C2	CY_PR-BW_46
48	CY0004000000000052	CY_16-C2	CY_PR-BW_47
49	CY0004111000000054	CY_16-C2	CY_PR-BW_48
50	CY0004120000000055	CY_16-C2	CY_PR-BW_111
51	CY0004120000000056	CY_15-C2	CY_PR-BW_110
52	CY0004300000000058	CY_15-C2	CY_PR-BW_50
53	CY0005126000000063	CY_13-C2	CY_PR-BW_51
54	CY0005126000000066	CY_13-C2	CY_PR-BW_52
55	CY0005127000000067	CY_13-C2	CY_PR-BW_109
56	CY000512900000068A	CY_12-C2-HM, CY_13-C2	CY_PR-BW_53
57	CY000512900000069	CY_12-C2-HM	CY_PR-BW_116
58	CY000512500000069A	CY_12-C2-HM	CY_PR-BW_54
59	CY0005124000000071	CY_12-C2-HM	CY_PR-BW_55
60	CY0005124000000073	CY_12-C2-HM	CY_PR-BW_56
61	CY0005124000000074	CY_12-C2-HM	CY_PR-BW_57
62	CY0005124000000075	CY_12-C2-HM	CY_PR-BW_58
63	CY0005124000000076	CY_12-C2-HM	CY_PR-BW_59
64	CY0005124000000077	CY_12-C2-HM	CY_PR-BW_60
65	CY0005124000000078	CY_12-C2-HM	CY_PR-BW_61
66	CY0005013000000080	CY_12-C2-HM	CY_PR-BW_62
67	CY0005013000000084	CY_12-C2-HM	CY_PR-BW_63
68	CY0005013000000085	CY_12-C2-HM	CY_PR-BW_64

α/α	Area Code according to the Directive 2006/7/EC	Coastal WB Code	Protected Area Code
69	CY0005013000000087	CY_12-C2-HM	CY_PR-BW_65
70	CY0005013000000089	CY_12-C2-HM	CY_PR-BW_67
71	CY0005013000000090	CY_12-C2-HM	CY_PR-BW_68
72	CY0005012000000092	CY_12-C2-HM	CY_PR-BW_69
73	CY0005012000000093	CY_12-C2-HM	CY_PR-BW_70
74	CY0005000000000097	CY_12-C2-HM	CY_PR-BW_71
75	CY0005000000000099	CY_12-C2-HM	CY_PR-BW_72
76	CY0005000000000106	CY_11-C2	CY_PR-BW_73
77	CY0005000000000108	CY_11-C2	CY_PR-BW_74
78	CY0005000000000109	CY_11-C2	CY_PR-BW_75
79	CY0005212000000111	CY_9-C4	CY_PR-BW_76
80	CY0005222000000113	CY_9-C4	CY_PR-BW_77
81	CY0005227000000116	CY_9-C4	CY_PR-BW_78
82	CY0006100000000118	CY_8-C4	CY_PR-BW_100
83	CY0006100000000119	CY_8-C4	CY_PR-BW_108
84	CY0006104000000120	CY_8-C4	CY_PR-BW_107
85	CY000610400000120A	CY_8-C4	CY_PR-BW_106
86	CY0006010000000121	CY_8-C4	CY_PR-BW_99
87	CY0006010000000120B	CY_8-C4	CY_PR-BW_105
88	CY0006010000000123	CY_8-C4	CY_PR-BW_98
89	CY0006010000000124	CY_8-C4	CY_PR-BW_117
90	CY0006000000000125	CY_8-C4	CY_PR-BW_97
91	CY0006000000000127	CY_8-C4	CY_PR-BW_96
92	CY0006000000000128	CY_8-C4	CY_PR-BW_95
93	CY0006000000000129	CY_8-C4	CY_PR-BW_94
94	CY0006000000000132	CY_8-C4	CY_PR-BW_93
95	CY000600000000134A	CY_6-C4	CY_PR-BW_92
96	CY0006000000000135	CY_6-C4	CY_PR-BW_104
97	CY0006020000000136	CY_6-C4	CY_PR-BW_91
98	CY000602700000136A	CY_6-C4	CY_PR-BW_103
99	CY0006027000000137	CY_6-C4	CY_PR-BW_90
100	CY0006027000000138	CY_6-C4	CY_PR-BW_102
101	CY0006133000000139	CY_6-C4	CY_PR-BW_89
102	CY0006133000000141	CY_6-C4	CY_PR-BW_88
103	CY0006133000000142	CY_6-C4	CY_PR-BW_118
104	CY0006344000000143	CY_4-C1	CY_PR-BW_84
105	CY000634400000143A	CY_3-C2	CY_PR-BW_82
106	CY0006344000000145	CY_3-C2, CY_4-C1	CY_PR-BW_83
107	CY0006344000000146	CY_3-C2	CY_PR-BW_81
108	CY0006343000000148	CY_3-C2	CY_PR-BW_80
109	CY0006343000000149	CY_3-C2	CY_PR-BW_79
110	CY0006367000000150	CY_2-C1	CY_PR-BW_87
111	CY0001460000000151	CY_1-C1	CY_PR-BW_86
112	CY0001457000000154	CY_1-C1	CY_PR-BW_85
113	CY0001457000000155	CY_1-C1	CY_PR-BW_101

7.4.3 Nutrient - sensitive areas

This category includes areas that are designated as Nitrate vulnerable zones under the Directive 91/676/EEC and areas that are designated as Sensitive Areas under the Directive 91/271/EEC.

According to the Directive 91/676/EOK MS:

- Are obliged in the determination of waters which are affected by nitrate pollution and also those which could be potentially affected if the appropriate measures will be not taken.
- Define and characterize as vulnerable zones all the areas of land that are in their territories, of which the waters drain into the waters that are determined as waters that are affected or could be affected nitrate pollution and which areas contribute to the pollution.

By the Order of 2008 (ΚΔΠ 186/2008) on the Water Pollution Control (Nitrate Vulnerable Zones and Water categories that exist or may suffer Nitrate Pollution), as it has been amended and is in force, has already established in Cyprus six (6) Vulnerable Zones in Kokkinochoria areas, Kiti - Pervolia, Akrotiri, Paphos, City Khrysokhou and Orounta. According to the same Decree as water categories that are suffering or could suffer nitrate pollution from agricultural sources were identified the aquifers: Kokkinochoria, Akrotiri, Paphos (Peyia), Kiti and Khrysokhou City and a part of the Western Mesaoria aquifer.

For the characterization of the surface waters as sensitive areas under the Directive 91/271/EEC is provided for the definition of sensitive receivers (surface water in which is becoming directly or indirectly disposal of urban waste water) with the following criteria:

- eutrophication or the risk of eutrophication
- increased presence of nitrates in waters which are intended for human consumption
- the need of further elaboration to meet the requirements of other directives

Cyprus has designated waters of the Polemidia reservoir and the territories in which the surface waters are flowing to it, as sensitive area for urban wastewater discharges, with the Pollution Control of Water (Sensitive Areas for Disposal of Urban Wastewater) Order 2004 (ΚΔΠ 111/2004), as was amended and is in force.

Table 7-23: Vulnerable Zones

Protected Area Code	Name	WB Codes which are related to Vulnerable Zones	GWB Code affected by nitrates
CY_PR-NSA_N-1	City Khrysokhou	CY_2-2-h_RIh_HM CY_2-2-g_RI_HM CY_2-2-b_RI CY_2-2-f_RI_HM CY_2-3-a_Rih CY_2-3-b_Rih CY_2-3-d_RIh_HM CY_2-3-e_RE CY_2-3-g_RI	CY_15A & CY_15B

Protected Area Code	Name	WB Codes which are related to Vulnerable Zones	GWB Code affected by nitrates
		CY_3-C2	
CY_PR-NSA_N-3	Kokkinochoria	CY_7-2-a_Rih CY_7-2-6_16_L2-HM CY_18-C2 CY_19-C3 CY_20-C3 CY_21-C3 CY_22-C3	CY_1
CY_PR-NSA_N-4	Kiti - Perivolia	CY_15-C2 CY_16-C2	CY_3B
CY_PR-NSA_N-5	Pafos	CY_1-6-c_RIh_HM CY_1-6-d_RIh CY_6-C4	CY_11A
CY_PR-NSA_N-6	Akrotiri	CY_9-6-t_RI_HM CY_9-C4 CY_11-C2	CY_9
CY_PR-NSA_N-7	Orountas	CY_3-7-b_Rih CY_3-7-a_RE	CY_17

Table 7-24: Sensitive Areas

Protected Area Code	Name	WB Codes in sensitive areas
CY_PR-NSA_U-7	Polemidia	CY_9-4-g_RIh CY_9-4-c_RI CY_9-4-b_RI CY_9-4-e_RIh_HM CY_9-4-d_RI_HM_IR CY_18 CY_19

7.4.4 Areas intended for the protection of habitats or species

In these protected areas are included the protected areas of Natura 2000 Network where the maintenance or the improvement of the water status is important for their protection as well as the areas that are protected by national legislation.

The **Natura 2000** network consists of two types of areas:

- The Special Protection Areas (SPA) for birds, as are defined in the Directive 79/409
- The Sites of Community Importance (SCI), as are defined in the Directive 92/43/

The SPA after their characterization by the MS, are automatically included in Natura 2000 Network, and their management follows the provisions of the Article 4 of the Directive 79/409/EEC (as amended) and the provisions of the Article 6 of the Directive 92/43 /EC.

As for the SCI, each MS propose a list of sites in where there are natural habitats and wild animal and plant species. Based on the national lists and in agreement with each of the MS, the Commission issue list of SCIs for each of the seven biogeographical regions of the EU (Alpine, Atlantic, Boreal, Continental, Macaronesian, Mediterranean).

Cyprus has transposed these European Directives into national law as follows: [See. literature, 150]:

- The Directive for the Habitats through on the Protection and Management of Wildlife Law of 2003 153 (I) / 2003 and its amendments 131 (I) / 2006 and 131 (I) / 2012, and
- the Directive for Birds, through the Protection and Management of Wild Birds and Quarries Law of 2003 152 (I) / 2003 and its amendments until the 129 (I) / 2012.

The list of NATURA 2000 network of the protected areas of Cyprus have been included **64** areas as **SCI 40** areas as **SPAs** and **10** areas as **SCIs and SPAs** of which **thirty-six (36**) areas are associated with the surface water bodies and in particular:

- **seventeen (17)** are protected as Sites of Community Importance (SCI)
- **fourteen (14)** as Special Protection Areas (SPAs) and
- **five (5)** areas are protected as SCIs and SPAs**.**

Additional areas have been defined as equivalent to the SPA to the Western British Bases of Akrotiri in accordance with the order of the Administration for the Protection and Management of Nature and Wildlife (26/2007), which largely reflects the Cyprus analog law.

The following table lists the Network of areas, which includes habitats or species that are directly depended on water.

Table 7-25:NATURA 2000 Areas depended the water

Protected Area Code	NATURA Code 2000	Area Name	Type	WB Codes. Which are related to the area		
				Rivers & impounded rivers	Lake Wbs	Coastal Wbs
CY_PR-NP-2000002	CY2000002	Alykos River-Ayios. Sozomenos	SCI	CY_6-5-b_RI CY_6-5-h_RE CY_6-5-i_RE	-	-
CY_PR-NP-2000003	CY2000003	Area Mitserou	SCI	CY_3-7-m_RE		
CY_PR-NP-2000005	CY2000005	Madari-Papoutsa	SCI	CY_3-3-d_RP CY_3-5-c_RI_HM CY_3-5-a_RI CY_3-5-b_RI_HM_IR CY_3-5-e_RI CY_3-7-a_RI CY_9-2-b_RP	-	-
CY_PR-NP-2000006	CY2000006	Pafos Forest	SPA	CY_1-2-a_RP CY_1-2-b_RP CY_1-3-a_RP CY_1-3-f_RP CY_1-4-b_RI CY_1-4-a_RP CY_2-2-c_RI CY_2-3-c_RI CY_2-3-e_RE CY_2-3-f_RP	-	-

Protected Area Code	NATURA Code 2000	Area Name	Type	WB Codes. Which are related to the area		
				Rivers & impounded rivers	Lake Wbs	Coastal Wbs
				CY_2-4-a_RIh CY_2-4-b_RIh_HM CY_2-4-c_RP CY_2-4-d_RI CY_2-5-a_RIh CY_2-6-a_Rih CY_2-6-b_RIh_HM CY_2-7-a_RI CY_2-8-a_RP CY_2-9-b_RP CY_2-9-c_RI CY_2-9-d_RIh_HM CY_3-1-a_RP CY_3-1-b_RI CY_3-1-c_RI_HM		
CY_PR-NP-2000007	CY2000007	Plati Area	SCI	CY_1-2-b_RP	-	-
CY_PR-NP-2000010	CY2000010	River Maroullenas	SCI	CY_3-7-f_RI_HM CY_3-7-j_RIh_HM	-	-
CY_PR-NP-2000011	CY2000011	River Peristerona	SCI	CY_3-7-a_RI CY_3-7-b_RIh	-	-
CY_PR-NP-2000012	CY2000012	Valley Karkoti	SCI	CY_3-3-b_RP CY_3-3-c_RI	-	-
CY_PR-NP-3000005	CY3000005	Cape greco	SPA/ SCI		-	CY_21-C3 CY_22-C3
CY_PR-NP-3000006	CY3000006	Marine Area Nisia	SCI		-	CY_22-C3
CY_PR-NP-3000007	CY3000007	Dam Achnas	SPA		CY_7-1-2_34_L3-A	
CY_PR-NP-3000008	CY3000008	Lake Paralimni	SPA		CY_7-2-6_16_L2-HM	-
CY_PR-NP-4000001	CY4000001	Town- Yialias	SCI	CY_2-3-d_RIh_HM CY_2-3-b_Rih CY_2-3-a_RIh	-	CY_3-C2
CY_PR-NP-4000002	CY4000002	Khapotami	SCI	CY_1-1-c_RIh	-	-
CY_PR-NP-4000003	CY4000003	Valley Dharizou	SCI	CY_1-2-d_RI_HM CY_1-2-f_RIh CY_1-2-e_RI	-	-
CY_PR-NP-4000005	CY4000005	Episkopi Morou Nerou	SCI	CY_1-4-f_RP_HM CY_1-4-e_RIh_HM CY_1-4-g_RI_HM CY_1-4-L_RIh CY_1-4-k_Rih CY_1-4-j_RIh	-	-
CY_PR-NP-4000006	CY4000006	Marine area Moulia	SCI		-	CY_8-C4

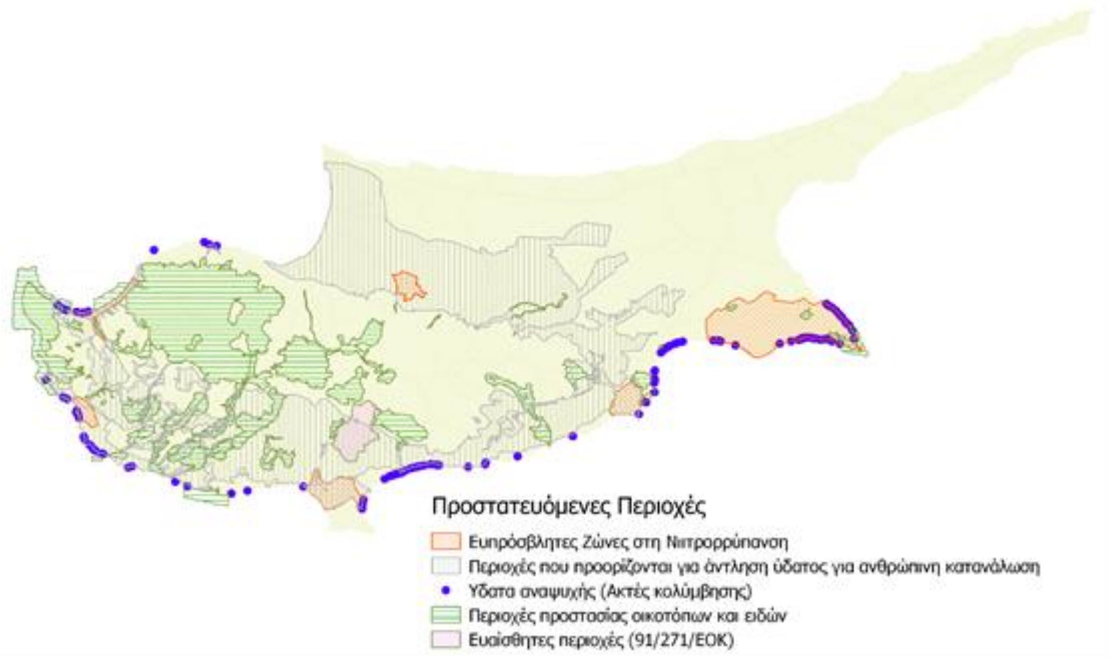
Protected Area Code	NATURA Code 2000	Area Name	Type	WB Codes. Which are related to the area		
				Rivers & impounded rivers	Lake Wbs	Coastal Wbs
CY_PR-NP-4000007	CY4000007	Xeros Potamos	SPA/ SCI	CY_1-3-c_Rih CY_1-3-b_RI CY_1-3-d_RIh_HM_IR CY_1-3-g_RIh CY_1-3-e_RE	-	-
CY_PR-NP-4000008	CY4000008	Mavrokolymbos	SCI	CY_1-6-a_RIh CY_1-6-b_RIh_HM_IR	-	-
CY_PR-NP-4000009	CY4000009	Area Skoulli	SCI	CY_2-2-h_RIh_HM CY_2-2-g_RI_HM	-	-
CY_PR-NP-4000011	CY4000011	Area Ayati	SCI	CY_1-4-a_RP	-	-
CY_PR-NP-4000018	CY4000018	Mouths of rivers Ezousa, Xerou και Dharizos	SPA	CY_1-2-d_RI_HM CY_1-4-m_RIh CY_1-4-h_RIh_HM CY_1-3-e_RE	-	CY_8-C4
CY_PR-NP-4000019	CY4000019	Valley Saramas	SPA	CY_2-2-d_RI CY_2-2-c_RI CY_2-2-e_RI_HM_IR CY_2-2-f_RI_HM CY_2-3-a_RIh	-	-
CY_PR-NP-4000020	CY4000020	Valley Dhiarizos	SPA	CY_1-2-a_RP CY_1-2-e_RI CY_1-2-f_Rih CY_1-2-d_RI_HM	-	-
CY_PR-NP-4000021	CY4000021	Valley Ezousa	SPA	CY_1-4-m_Rih CY_1-4-f_RP_HM CY_1-4-h_RIh_HM CY_1-4-e_RIh_HM CY_1-4-g_RI_HM CY_1-4-L_RIh CY_1-4-k_RIh	-	-
CY_PR-NP-4000023	CY4000023	Akama Peninsula	SPA	CY_1-8-a_Rih CY_1-8-b_Rih CY_1-6-d_RIh CY_2-1-a_RE	-	CY_5-C4 CY_4-C1 CY_6-C4 CY_3-C2
CY_PR-NP-5000001	CY5000001	Forest of Limassol	SCI	CY_9-2-f_RI CY_9-2-g_RI_HM_IR CY_9-4-b_RI CY_9-2-i_RIh CY_9-2-j_RI	-	-
CY_PR-NP-5000004	CY5000004	Troodos National Forest Park	SPA/ SCI	CY_3-2-a_RP CY_3-3-a_RP CY_3-3-b_RP CY_3-3-d_RP CY_9-6-j_RP_HM_IR CY_9-6-p_RP	-	-

Protected Area Code	NATURA Code 2000	Area Name	Type	WB Codes. Which are related to the area		
				Rivers & impounded rivers	Lake Wbs	Coastal Wbs
				CY_9-6-L_RP CY_9-6-k_RP_HM CY_9-6-i_RP CY_9-6-n_RP CY_9-6-o_RP CY_1-2-a_RP		
CY_PR-NP-5000005	CY5000005	Akrotiri Asprp-Petra of Romiou	SPA/ SCI			CY_8-C4 CY_9-C4
CY_PR-NP-5000006	CY5000006	Valley Limnatis	SCI	CY_9-6-f_RI	-	-
CY_PR-NP-5000008	CY5000008	Valley Area Xylourikou	SPA	CY_9-6-b_RP CY_9-6-h_RI CY_9-6-g_RI CY_9-6-e_RP	-	-
CY_PR-NP-5000009	CY5000009	River Paramali	SPA	CY_9-7-b_RE CY_9-8-a_RIh	-	-
CY_PR-NP-5000010	CY5000010	Khapotami	SPA	CY_1-1-b_RI CY_1-1-a_RP CY_1-1-c_RIh CY_1-2-f_RIh	-	-
CY_PR-NP-6000002	CY6000002	Alikes Larnaca	SPA/ SCI	CY_8-3-a_RE CY_8-3-b_RE	CY_8-3-2_11_L1 CY_8-3-2_12_L2 CY_8-3-2_13_L2 CY_8-3-2_17_L2	CY_9-C4
CY_PR-NP-6000007	CY6000007	River Panagias Stazousas	SPA	CY_8-4-g_RE CY_8-5-a_RIh	-	-
CY_PR-NP-6000008	CY6000008	River Pendaskhinos	SPA	CY_8-7-b_RI_HM_IR CY_8-7-c_RI_HM CY_8-7-d_RIh CY_8-7-e_RI_HM_IR CY_8-7-f_RI_HM CY_8-7-g_RIh_HM CY_8-7-a_RI	-	-
CY_PR-NP-6000010	CY6000010	Lake Oroklini	SPA		CY_8-1-2_09_L2-HM	-

7.4.5 Areas which are designated for the protection of aquatic species of economic importance

There have not been identified such areas in RBD of Cyprus.

Figure 7-18: Protected Areas



8. PRESSURES

The pressures on waters were reviewed and revised in accordance with the Article 5 of the WFD, in 2013-2014 in a special project which was commissioned by the WDD . The following chapters present briefly, the information on the pressures as they calculated and evaluated as part of this project. The study is available on the website of the WDD.

8.1 DIFFUSE SOURCES

The main sources of diffuse pollution in Cyprus which were recorded are the follows:

- the runoff and the infiltration of the fertilizers from the agricultural activities,
- the livestock waste,
- the urban waste water in cases where there are not collective sewerage networks and wastewater treatment plants, and
- the rainwater run-off.

8.1.1 Urban wastewater from settlements which are not served by Waste Water Treatment Facilities (WWTP)

The current practice in Cyprus, in the settlements (inside and outside PA) in which there are not available networks and WWTP or appropriate individual systems is the use of individual waste disposal systems (cesspool) which in many cases is not tight. There are a small number of communities where there are overflows of cesspools. A characteristic example is Kilani.

In the cases of tight cesspools, their evacuation is done by tankers. The evacuation and the transport of the sewage in WWTP is done with the property owners' initiative who call licensed tankers. In the in the Measures Programme report has found the need to subject the management of the extraction and transport of the sewage to a more stringent control framework with a view of the competent authority.

Overall, there are communities Agios Ioannis of Limassol, Agios Mamas, Apliki, Arakapas, Kilani, Pera, Skarinou and Choletria, which have partly Network Sewerage, but their wastewater are not treated.

Based on the completion of the construction of municipal wastewater management systems in Cyprus as has established by the Act of Accession of the Republic of Cyprus to the EU for all the settlements with population equivalent over 2000 is expected significant reduction of the diffuse pollution from urban waste water in Cyprus.

8.1.2 Agricultural Activities

There are major non-point pollution sources that are associated with the agricultural activities and contribute to the recharge of the surface and groundwater with nutrients (nitrogen and phosphorus). The agricultural activity is carried out spatially in 30% of the total area of Cyprus. As a result of the agricultural activity the basic pressures that are exercised in the area are the pollution from nutrients (nitrogen and phosphorus), because of the compounds that are needed oxygen (BOD, COD) and because of the salinity and the pesticides.

In Cyprus are already implemented, actions which are part of the implementation of the Directive 91/676 / EEC with the drafting of the Code of Good Agricultural Practice (GAPC) the definition of the Nitrate vulnerable Zones (NVZ) and the definition and the Implementation of the Action Plan.

Calculation of loads and demand of irrigation water

During the preparation for the second RBMP, the contract 1 / 2014 was implemented with purpose the review of the pressures and impacts on the water status [See. bibliography 10] in accordance with the Article 5 of the Water Framework Directive . This study is available on the website of WDD.

According to this above mentioned study, agricultural activity exercises strong pressures on water resources such as water-pumping from the groundwater and the surface water resources to cover the irrigation needs, the fertilizer inputs and the crop protective substances inputs into the groundwater. The assessment of farming pressures was based on census data of the crops of Cyprus Agricultural Payments Organisation (CAPO) of 2013. The calculations of the irrigation demand were made on an annual basis and in accordance with the methodology that was applied in the Water Policy Report (2011), while there were some adjustments concerning to the annual water needs of different crops based on the newest data of Decree 281/2014. In the cases of crops for which there was no evidence in the two above sources of data, data from other related species were received.

Table 8-26: Applied Lubrications and rates of capture of elements

Crop/Cover	Crop Category	Applied Lubrication (AL) (kg/decare)		% Capture of element	
		N	P	N	P
VINEYARDS FOR PRODUCTION RAISIN	VINEYARDS	11,00	3,49	80	90
VINEYARDS TABLE	VINEYARDS	19,00	4,36	80	90
VINEYARDS WINE, GIANNOUDI, LEFKADA, MARATHEFTIKO, MORIKANELA, PROMARA, SPOYRTIKO	VINEYARDS	11,00	2,18	80	90

Crop/Cover	Crop Category	Applied Lubrication (AL) (kg/decare)		% Capture of element	
		N	P	N	P
FLOWERS, GREENHOUSE CROPS - FLOWERS	FLOWERS	37,20	7,26	90	90
HERBS	PLANTS	10,00	2,18	85	85
OTHER CROPS TREES	TREES	17,00	3,49	*85*	*85*
FOINIKIES		5,00	3,00	*85*	*85*
CHAROUPIES		0,00	0,00	0	0
ALMOND TREES	TREES - ACRODYRIA	23,40	3,49	85	85
WALNUT TREES		25,00	2,62	85	85
PEANUTS TREES, HAZEL TREES		30,00	3,05	85	85
PEAR TREES, APPLE TREES	TREES - PIP	24,00	5,23	*80*	80
QUINCE TREES		24,00	3,05	*80*	80
OIL TREES	TREES - OLIVES	16,00	4,36	80	85
PERIVOLI		15,00	4,36	80	85
CITRUS	TREES - CITRUS	25,00	4,36	85	85
KIWI	TREES - OTHER FRUITING	20,00	4,40	*85*	*85*
LOTUS		20,00	5,00	*85*	*85*
PAPATSOUKA		5,00	1,31	*85*	*85*
POMEGRANTE TREES		12,00	4,36	*85*	*85*
FIG TREES		12,00	2,62	*85*	*85*
PLUM TREES	TREES - STONE	30,00	3,49	*85*	*85*
CHERRY TREES		16,00	4,36	*85*	*85*
MESPILIES		18,00	4,36	*85*	*85*
NECTARINES TREES		30,00	6,40	*85*	*85*
PEACH TREES		45,00	4,36	*85*	*85*
CHRYSOMILIES-KAISIES		30,00	4,36	*85*	*85*
AVOCADO	Trees- Subtropical FRUITING	40,00	3,92	*85*	*85*
KOUAFA		30,00	2,62	*85*	*85*
SIERIMOGIA		30,00	13,20	*85*	*85*
OTHER VEGETABLES	VEGETABLES	18,00	3,49	90	90
GREENHOUSE CROPS - OTHER		22,00	3,05	90	90
LEAF VEGETABLES		18,00	3,49	90	90
ARTICHOKES	VEGETABLES - asteroids / COMPOSITE	30,00	5,23	90	90
GHERKINS	VEGETABLES - cucurbitaceae	30,00	6,10	90	90
WATERMELONS		17,00	6,10	80	95
PUMPKINS		20,00	6,10	90	90
MELONS		15,00	5,23	90	95
ONIONS	VEGETABLES -LEIRIIDES	18,00	6,54	85	85
STRAWBERRIES	VEGETABLES - RODIDES	30,00	6,54	90	90
EGGPLANTS	VEGETABLES - Solanaceae	20,00	6,54	90	90
TOMATOES		30,00	6,54	90	90
POTATOES		28,65	5,23	90	90
PEPPERS		20,00	7,85	90	90
CAULIFLOWERS	VEGETABLES - crucifer	10,00	6,54	85	85
Other forage plants	forage plants	4,00	2,18	85	83
OTHER CEREALS	CEREALS	10,50	2,18	80	83
MAIZE		20,00	4,36	85	90

Crop/Cover	Crop Category	Applied Lubrication (AL) (kg/decare)		% Capture of element	
		N	P	N	P
BARLEY		7,10	2,18	80	83
LOLITA		18,70	5,28	80	83
MIXTURE		5,00	1,31	80	83
MIXTURE OF GREEN MANURE		0,00	0,00	0	0
WHEAT FOR HAY		10,50	2,18	80	83
SIFONARI		8,00	1,31	80	83
HARD WHEAT		10,50	3,05	80	83
SORGO		15,00	2,18	80	83
BANANAS	TROPICAL SUBTROPICAL	125,00	8,72	90	90
VIKOS FOR SEED	PSYCHANTHI	0,00	2,64	0	83
Vikos, BROAD BEANS, CHICKPEAS, PEAS, FAVETTA, Louw, Louvana (For green manure)		0,00	0,00	0	0
BROAD BEANS	PSYCHANTHI	15,00	4,80	85	83
LOYVANA, CHEAKPEA		8,00	1,31	85	83
MEDIC		22,00	3,49	90	95
FORAGE PEAS		15,00	4,36	85	83
PERSIMI, SESAME, FAVETTA ROVION FOR SEED		5,00	1,31	85	83
LENTIL		8,00	1,74	85	83
BEAS		7,00	4,36	85	83
PEANUTS		20,00	3,49	85	83
Fallow / permanent pasture	-	0,00	0,00	0	0

Table 8-27: Categorization of GWB by category of permeability

CODE	NAME	CATEGORIES OF PERMEABILITY
CY_1 CY_3A CY_3B CY_4 CY_5 CY_6 CY_10 CY_12 CY_13 CY_14 CY_17	Kokkinogoria Kiti-Perivolia Doftades-Vasilikos Maroni Μαρί-Kalo Chorio Paramali και Evdhimou (Mandalas) Letymvou- Yiolou Pheyia Androliki Central and Wes Measaoria	B
CY_7 CY_8 CY_9 CY_11 A CY_11B CY_15 A CY_15B CY_16	River bed r.Treminthos Yermasogeia Limassol Akrotiri Pafos River bed Ezousa Khrysokhou-Yialia River bed r. Khrysokhou Pyrgos	A
CY_18	Lefkara-Pachna	Γ

CODE	NAME	CATEGORIES OF PERMEABILITY
CY_19	Troodos	

Table 8-28: Segregation rates of polluted loads by category of permeability

Categories of Permeability	% Nitrogean in Surface water	% Nitrogean in groundwater	% Phosphorus in surface water
A	10	90	3
B	20	80	3
Γ	30	70	3

Table 8-29: Irrigation needs in accordance with the Water Policy Report (2011)

Category	Crop Type	Extent (ha)	Amount of Irrigation Needs (m^3/έτος)
PERMANENT	AVOCAO	814	541.228
PERMANENT	OLIVES PRODUCTIVE	77.585	20.198.507
PERMANENT	OLIVES TABLE	13.732	6.424.399
PERMANENT	CITRUS	47.903	35.567.103
PERMANENT	WALNUT TREES	2.617	2.080.166
PERMANENT	BANANAS	2.357	2.445.648
PERMANENT	PEANUT TREES	1.148	294.224
PERMANENT	POMEGRANTE FIG TREES	2.247	1.053.274
PERMANENT	GRAPES	7.687	1.717.336
PERMANENT	DESIDUOUS	34.497	17.851.789
SEASONAL	ARTICHOKS	1.366	521.706
SEASONAL	CUCCUMBERS	287	161.225
SEASONAL	FORAGE PLANTS (LIOLIO)	6.729	5.382.311
SEASONAL	GREENHOUSE CROPS	3.074	1.669.066
SEASONAL	ORNAMENTAL PLANTS	507	487.465
SEASONAL	TOBACO	602	227.118
SEASONAL	WATERMELONS	2.723	1.046.363
SEASONAL	PUMPINKS	755	367.712
SEASONAL	BROAD BEANS	1.550	258.574
SEASONAL	CAULIFLOWERS	228	80.782
SEASONAL	KRAMPIA	466	183.844
SEASONAL	ONIONS	1.657	600.892
SEASONAL	LETTUS	14.507	4.161.967
SEASONAL	EGGPLANTS	96	40.362
SEASONAL	PEAS	642	143.384
SEASONAL	POTATOES	38.101	14.731.344
SEASONAL	MELONS	924	368.043
SEASONAL	PEPPERES	156	84.865
SEASONAL	FORAGE PLANTS(CLOVER)	6.730	8.799.856
SEASONAL	SPINACH	7.458	2.316.096
SEASONAL	TOMATOES	1.361	669.128
SEASONAL	BEAS	2.617	890.656
SEASONAL	STRAWBERRIES	439	287.904
SEASONAL	PEANUTS	639	257.983
Total		284.198	131.912.322

8.1.3 Livestock and Poultry Farms

Animal breeding is a widespread rural employment in Cyprus. The farms where pigs cattle are rearing, and poultry are in different places while the rearing of free range goats are a usual activity too.

The livestock waste are presenting a diverse composition, which determines their physicochemical properties and their original texture, while their form may be either solid or liquid. As liquid is considered the waste that have a water content greater than 95% and they is free flowing (natural flow) or by assistance of pumps in pipelines. As solid form is considered the waste containing less than 80% water and form a pile if they are deposited on the ground.

Due to the lack of a specific point of release, especially of the manure, the load that is generated is perceived as non-point pollution outbreak that is spread in the environment, which particularly occurs in areas that are close to farms.

In Cyprus, according to the results of the contract 1 / 2014 on the review of pressures and impacts on water status [See. literature, 10], the environmental problems are large and are directly linked to the intensification of livestock farming (pig, poultry, cattle breeding),with result the production of large manure and wastewater volumes. The problems are particularly intense because of the following reasons:

1. The adjacency of units (livestock) with residential areas, water-streams and wells and/or the fact that they are related to aquifers,
2. The amount of waste due to the creation of extremely large units (e.g. pig),
3. The intense concentration of units and waste in some areas,
4. The inability to find appropriate arable land mainly with cereals for the deposition of waste,
5. The non-installation of waste treatment systems because of the cost,
6. The preference of the farmers to use chemical fertilizers because of their low cost, ease of use, the odor avoidance and other potential problems,
7. the non-application of hygiene and cleanliness standards in the collection, storage and disposal of waste,
8. the use of unsuitable earthen tanks for storage of liquid waste with the known bleeding or uncontrolled disposal problems (leakage) in rivers, small irrigation canals and adjacent fields,
9. the use of rations and water with high salt and nitrogen content.

In Cyprus today operates a large number of poultry facilities, pig and cattle farms. It is noted that the provisions of the Directive on the Integrated Prevention and Control of Pollution (IPPC) covered 30 farms and 37 pig farms.

The increased livestock farming is linked to numerous of environmental problems [See. 10 in chap] as:

- the production of large volumes of manure, (750,000 tons of wastes from swine breeding throughout Cyprus) and liquid waste,
- the inability of disposal of untreated waste to crops due to high salinity and the content of phosphorus and nitrogen,
- the contamination of surface and groundwater and the overexploitation of groundwater reserves,
- the gaseous emissions, mainly of ammonia and the strong odors.

Also significant environmental problem is caused by the uncontrolled discharge of wastewater of the Slaughterhouses and the abattoirs due to the high organic load and the fatty substances that are containing.

The large livestock facilities are subjected to the authorization for the disposal of liquid and solid waste (Waste Disposal License - WDL).

Calculation of loads

According to the assumptions that were made in the calculation of loads, during the preparation for the 2nd RBMP under the contract 1/2014 with purpose the review of the pressures and the impacts on water status [See. literature, 10], the calculation of loads by using manure was based on the number of animals and the related factors that are found in the literature [See. literature, 10].

Table 8-30: Annual production of loads by the livestock (data for 2013)

	Number of units in operation	Number of units with available data for calculations	BOD (tonnes/year)	TN (tonnes/year)	TP (tonnes/year)
IPPC poultry	13	13	1.932,82	319,89	145,67
IPPC pigsty	33	33	15.407,10	3.081,42	539,25
Dairy farm	345	345	13.118,20	3.364,09	743,52
Other poultry	108	67	1.951,83	325,09	167,17
other pigsty	29	11	1.739,55	347,91	60,88
pens	3.200	3.200	6.473,51	3.798,37	881,16
Total	3.728	3.669	40.623,01	11.236,77	2537,65

Table 8-31: Organic load and nutrients in the waters from farming and livestock waste treatment facilities

2013	BOD (tonnes/year)	TN (tonnes/year)	TP (tonnes/year)
IPPC poultry	175,90	6,60	0,60
IPPC pigsty	3.540,06	69,33	2,90
Dairy farm	8.373,17	661,66	20,34
other poultry	1.366,28	61,59	5,01
other pigsty	524,87	8,73	0,40
pens	4.531,45	735,43	26,43
Facilities of Mod.Livestock waste	No data		

2013	BOD (tonnes/year)	TN (tonnes/year)	TP (tonnes/year)
Total	18.511,73	1543,34	55,68

8.1.4 Other diffuse sources

The runoff of the rainwater that are came from the rainfall mainly in impervious areas can be a source of pollution with significant pressures on the quality of the surface and the groundwater as a point or usually as diffuse source. The Urban areas are mostly impermeable due to the built environment and they generate a significant amount of rainwater runoff. For the same reason the industrial areas and the infrastructure for the transport, such as the highways and the airports also produce a significant volume of rainwater runoff. Additionally, because of the waste gases and the different ways is the use of land in these areas the runoffs have many pollutants such as organic matter (COD), nutrients (N, P), heavy metals (Cu, Pb and Zn) , oils and hydrocarbons. The airports also pollute the waters with quantities of oil. In this way, the runoffs from these areas can cause serious problems to the surface and, potentially, into the groundwater.

In connection with the GWBs is indicated that almost 100% of CY_8 Limassol is covered by the urban tissue and also intense urbanization is observed in areas that are growing and related to GWBs CY_7 Yermasogeia, CY_11A Paphos and CY_17 Central and Western Mesaoria.

Regarding the pressures of the road network, 221 parts of the hydrographic network of 500 m were evaluated as it concerns the alterations that have been suffered and because of the other activities that are carried out in the surrounding area (urbanization, crops in the river bed etc.), and it was considered that 139 parts of these have been disrupted [See. literature, 10].

As regards the pressure of the artificial/structured areas initially were identified a total of 312 segments of the drainage network of 500 m including:

- 176 segments run entirely within the artificial areas,
- 136 include flow length in artificial areas of more than 300m.

Eventually 8 water bodies was considered that there are suffered significant pressures due to the proximity to road network or artificial areas, were taking into account:

- the cases of segments that are altered or disrupted either due to the proximity to the road network or because they pass through "artificial" areas,
- the total disordered length for each body and the assumption that significant pressures are received by the bodies with disturbed length of its total length greater than 30%.

Table 8-32: River WBs suffered significant pressures due to their adjacent road network or artificial areas

A/A	WB Code	Total Length of the body (m)	Length of the disturbed. segment of the body (m)	% of the disturbed segment
1	CY_1-1-a_RP	5.872,71	2.500	42,57%
2	CY_1-1-d_RIh_HM	4.778,11	4.278	89,54%
3	CY_2-9-a_RI	2.423,66	2.000	82,52%
4	CY_3-1-d_RIh_HM	3.994,33	1.500	37,55%
5	CY_3-2-c_RI_HM	5.998,37	2.000	33,34%
6	CY_8-9-e_RI_HM	8.980,37	3.000	33,41%
7	CY_9-2-h_RIh_HM	6.359,75	2.000	31,45%
8	CY_9-6-k_RP_HM	2.917	1.000	34,28%

8.2 POINT SOURCES

The point pollution sources in Cyprus as recorded under the review of the pressures in accordance with the Article 5 of the WFD (see detail in the relevant study which is available on the website of WDD) are the followings:

- urban waste waters, which are potential sources of point pollution where there are cases in which there are collective sewage systems and central wastewater treatment plants
- industrial waste and waste from large technical installations
- solid waste disposal sites
- mines - quarries to a lesser extent
- Aquaculture, the desalination plants and ports also to a lesser extent.

In the following paragraphs are given data for the above categories of the point pressures.

8.2.1 Waste Water Treatment Plants (WWTP)

The collection, the treatment and the disposal of the urban waste waters and waste waters from the certain industrial sectors are regulated by the Directive 91/271/EEC as was amended by the Directive 98/15 / EC, which was integrated into the law of the Republic of Cyprus:

- the on Control of the Pollution of Water and the Land Laws of 2002 to 2009 (106 (I) / 2002 - Basic Law) and
- the Law on Sewerage Systems (Amending Act No.. 108 (I) / 2004).

As well as by:

- the on Pollution Control of Water (Urban water Disposal) Regulations of 2003 (Κ.Δ.Π. 772/2003)

- the on Water Pollution Control (Sensitive Areas for Disposal of Urban Wastewater) Order of 2004 (PI 111/2004).

Under the above legislation, Cyprus has established **2** sensitive areas of urban waste water discharges by the Water Pollution Control Order:

The water of the dam Polemidia and the territories in which are flowing surface waters leading to the dam and

The areas of coastal waters which are extending from Paralimni Municipality to the Acrotiri of Pyla.

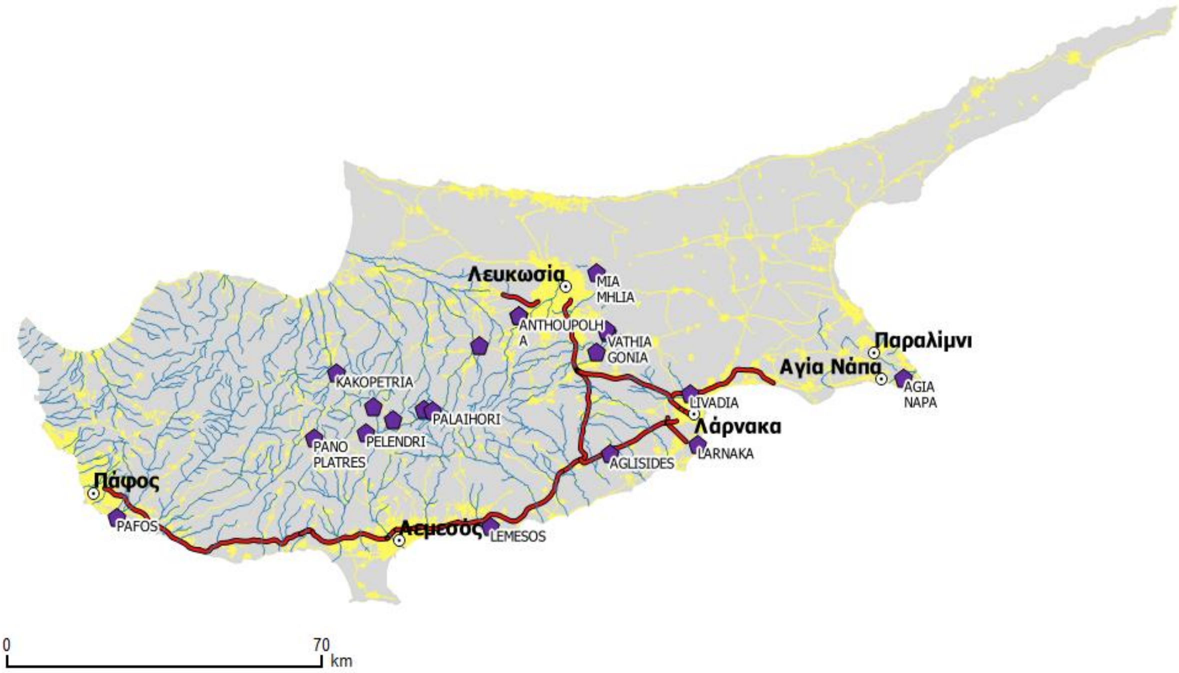
The degree of compliance of the Republic of Cyprus with the requirements of the Directive 91/271/EEC, is high. The complete, however, comply with the provisions of the Directive by the year 2012 (as is provided for all the settlements of more than 2,000 population equivalent) will lead to a significant reduction of the diffuse pollution as the equivalent population, which will be connected with the collective sewerage networks and sewage treatment plants, will increase by 417 990 (30/6/2008) to 860,000. It is also provided that the construction of collective sewerage networks in 57 settlements with a total equivalent population, 995.000, of which:

- 7 are the Urban Settlements with equivalent population 736 000 Nicosia, Limassol, Larnaca, Paphos, Ayia Napa, Paralimni, Ayia Phyla,
- 50 is the Rural Settlements with equivalent population of 259,000

On 31/12/2011 in the settlements of PA 2011, from 995.000 ICS were served by operating Networks Sewerage and Sewage Treatment Plants or Individual Suitable systems (ISS) 728. 653 while was remained the construction of drainage works and their link with existing or new WWTP for 266.347 population equivalent.

During the preparation for the second RBMP under the contract 1/2014 with purpose the review of the pressures and impacts on water status [See. literature, 10], stated that the state of sanitation in Cyprus today, work on the 36 Sewage Treatment Plants (WWTP), which treat wastewater of Municipalities and Communities, hospitals and military camps.

Figure 8-19 : Waste water treatment facilitie



Calculation of Loads

Under the contract 1 / 2014 that was implemented during the preparation of the 2nd RBMP with purpose the review of the pressures and impacts on water status [See. literature, 10], for the quantification of point pressures from the production and disposal of urban waste water was followed the following procedure:

- Were identified the settlements according to the data PA 2011 were served by WWTP or Individual Suitable Systems.
- The resulted loads mood of the disposal of those modified wastewater per WWTP.
- For the settlements that have not WWTP and sewerage systems or part of their wastewater generated are treated in WWTP, the load calculations were based on the ICS-2011 population equivalent
- Also for the settlements which are outside the PA-2011, the produced loads were calculated based on the 2011 Census population.
- In cases of settlements in which there is constructed sewerage network, but which does not result in WWTP, but directly to the recipient is considered as a pressure point to the specific recipient in the outfall point of the sewage network and is calculated on the basis of 2011 Census population.

The quantification of the pressures of the settlements that are drained in WWTP concern the parameters BOD_5, TN and TP and are evaluated on annual base. Where there were not available measured data of channels or parameters were used the data of chemical analysis of each WWTP. Where there were not chemical analyzes loads were selected as an organic load of 60 g BOD_5/resident/day, total nitrogen equal to 12 g TN/resident/day, total phosphorus equal to 2,5 g TP/resident/day and the produced quantity of wastewater equal to 250 liters resident/day. The final disposed VOD_5 loads and nutrient (N and P) is considered to be reduced depending on the degree of treatment provided.

Below are listed the collective loads from the disposal of urban waste water by pressure category.

Table 8-33: Annual Loads from the disposal of urban water waste

Pressure Source	Category	BOD_5	N	P
		tn/year		
Outflow WWTP	Diffuse, Underground	103	204	45
	Point, Surface	173	285	62
	Point, Underground	16	36	4
	Total	292	526	110
Wastewater from settlements without treatment systems	Diffuse, Underground	5.797	1.656,42	345,09
	Point, Surface	29	6	1
	Point, Underground	27	8	2
	Total	5.854	1.670	348
Total		6.146	2.196	458

Table 8-1 : Annual loads in GWBs from the disposal of urban wastewaters (kg/year)

Settlements- Diffuse Pollution			WWTF Diffuse Pollution		
BOD	N	TP	BOD	N	TP
5.797.453	1.656.415	345.087	102.972	203.865	44.655

Table 8-34: Annual loads in WGB by the disposal of urban water waste (kg/year)

Settlements- Point Pollution			WWTF Point Pollution		
BOD	N	TP	BOD	N	TP
26.828	7.665	1.597	15.660	36.230	3.612

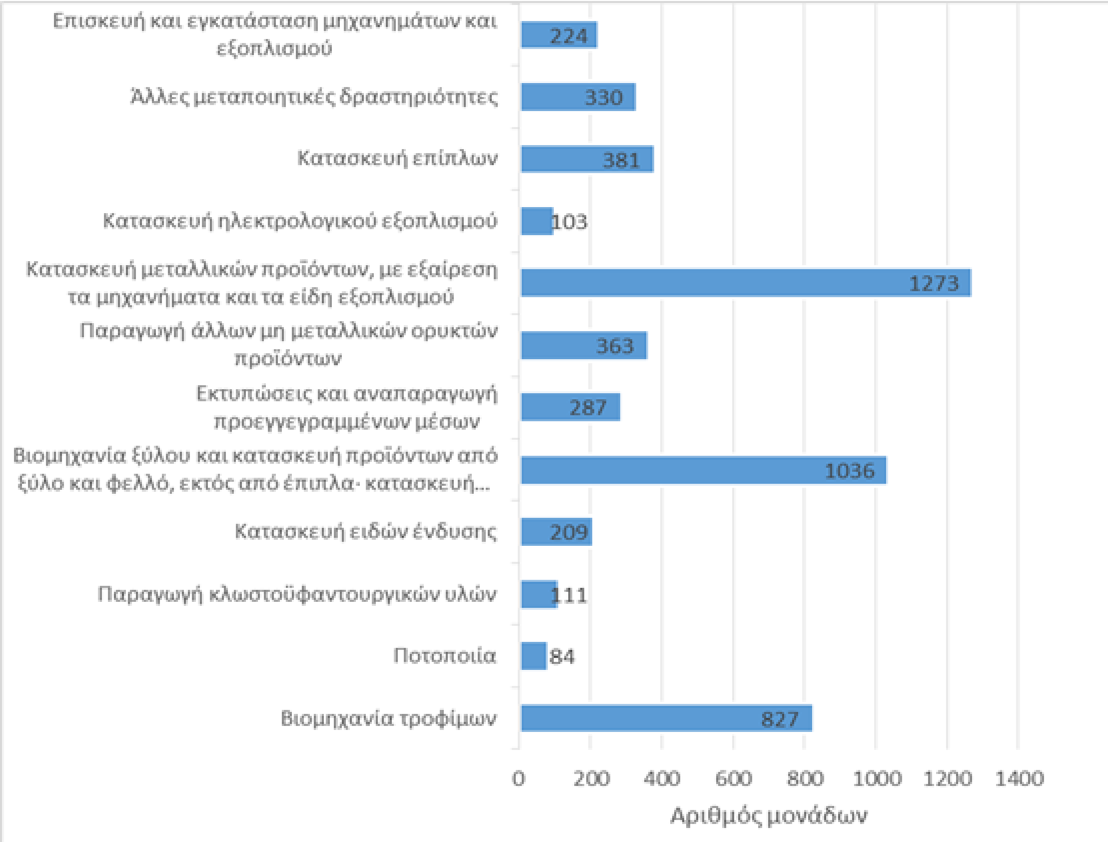
Table 8-35: Annual loads in surface WB by the disposal of urban water waste (kg/year)

Settlements- Point Pollution			WWTF Point Pollution		
BOD	TN	TP	BOD	TN	TP
29.390	5.878	1.225	173.230	285.500	61.822

8.2.2 Industrial Facilities

According to the Statistical Service of Cyprus; Census of the installations by Sector Economic Activity (2012), in the manufacturing sector, 5.632 units are recorded. Individual sectors are presented in the following figure [See. literature, 10].

Figure 8-20: Main industrial sectors



The main categories of wastewater are:

- Waste residues from plants (60.0%),
- Special organic residues (10.8%),
- Alkaline wastewater (10.0%),
- Acidic wastewater (8.9%), and
- Wastewater containing heavy metals (1.0%)

For hazardous waste, according to recent data, in Cyprus are produced around 81.000 m^3 of hazardous waste, of which 11,500 m^3 are produced in two tanneries and 37.500 m^3 in 1 paintshop.

The majority of the industries are installed in Industrial Areas and in Industrial/Small Industries Zones.

The Industrial/Small Industries Zones are different from the Industrial Areas. The pieces of land in the industrial/ Small Industries Zones are owned to private. Throughout Cyprus, there are 45 industrial Zones. Also, through the Local Urban Planning Schemes are specified the Small Industries Areas.

Industrial areas of Cyprus are:

- Industrial Area of Strovolos

- Industrial Area of Workers
- Industrial Area Kokkinotrimithia
- Larnaca Industrial Area (adjacent to the Free Zone)
- Industrial Area Aradippou
- Industrial Area Athienou
- Industrial Area Frenaros
- A Industrial Area of Limassol
- B Industrial Area of Limassol (Agios Athanasios)
- C Industrial Area of Limassol (Ipsona / St. Silas)
- Industrial Area of Paphos (Mesogi)
- Industrial Area of Paphos (Agia Varvara)

These areas are potential sources of point and diffuse pollution for the aquatic environment. The disposal of wastewaters from industrial units can create point source pollution for the neighboring water bodies. On the other hand, industrial areas are sources of diffuse pollution through the controlled or non-controlled drainage of the rainwater, which contain pollutants from unfinished materials that are processed every industry in its area, as well as from particles that are came from the precipitating gaseous emissions.

Regarding to the Industrial Areas (IA), only the Industrial Waste Treatment Plan (IWWTP) in the IA of Limassol was operating until recently. The disposal of the treated waste was in a dirt tank and it was recommending possible point pressure for GWB CY_9 (Akrotiri).

The IWWTP of Limassol has now suspended its operation, since the industrial units were connected to the sewerage network SBLA before the end of 2014. On 16.12.2014 the IWWTP sent a letter to the Department of Environment under which her operation was terminated and the conductors were sealed.

Near the disposal area of IWWTP is located the area that is stored **ASKAREL**. In 1986, machine oils toxic PCB (ASKAREL) were disposed uncontrolled in the area Kato Polemidia in Limassol. The Geological Survey Department proceeded to the burial of contaminated soil in 2 special watertight cells pens. The quantities of contaminated soil in the 2 cells were estimated at 30,000 m^3 and contamination by PCBs, was evaluated to be in the range of several mg/ kg, to a few hundred mg/kg. The total amount of PCB in soil is estimated between 50 and 100 tonnes. During 2000 and 2003 the Geological Survey Department in collaboration with the Swedish Society, investigated the possibility of PCB leakage from these cells and it was not found to leak. In order to monitor potential leaks was installed a monitoring system, according to which are received water and soil samples 2 times per year for PCB tracking. The investigation has not detected a leak in the surroundings.

In progress is the study for the construction of Central Industrial Wastewater Treatment Plant of the Third Industrial Area Limassol (Ypsona/Agios Silas), as well as the project of construction and operation of domestic sewage and sludge from septic tanks, industrial liquid waste and excess sludge and leachate of UWDS in Vati.

It is noted that Vathi is located in the area of the dam Polemidia that consist an area for disposal of the wastewater of the wider area of Limassol and industrial and urban waste water from tankers. According to the Board of Limassol-Amathus Sewerage data until 1995 75 tankers were arriving daily at Vati which had about 1.500m^3 wastewater (sewage and industrial waste). Due to the expansion of the sewerage network these sizes have been decreased significantly and in the future will be eliminated, with the completion of drainage works in 2012. Already in 2007 these quantities were halved (35 tankers/day and 700m^3/day).

It is noted that the Vassilikos Cement Public Company (Vassiliko Unit) does not discharge in surface water, but of course there is a charge of the surface waters (in particular the marine waters) from deposits of waste gas, fuel residues from cargo operations at Vassilikos harbor any contaminated rainwater that flow into sea, etc.

The unit Cement in Moni has shut down and is at an advanced stage of decommissioning.

The Power Stastion in Moni has shut down and is in a EIAS stage for decommissioning.

Table 8-36: Industrial Areas / Zones -SWB

Code Surface Wb	Name Wb	Industrial Areas, Zones
CY_1-4-h_RIh_HM	Ezousa	IZ PAPHOS - AGIA BARBARA (ANATOLIKOU)
CY_6-1-f_R	Pedhieos	IZ SOPAZ, IZ MIA MILIA
CY_9-4-e_RIh_HM	Garyllis	IZ PANO POLEMIDON

Table 8-37: Industrial Areas/Zones – GWBs

GWB Code	GWB Name	Industrial Area Name
CY_1	Kokkinochoria	IZ DERYNEIA, IZ FRENAROUS, BZ ACHNA, ACHNA IZ DASAKI ACHNA
CY_11A	Pafos	IZ KONION, IZ PAFOS (MESOGI)
CY_17	Central a d Western Mesaoria	IZ ERGATON, IZ MILIAS, IZ AGLATZIAS, IZ YIEROY, IZ LAKATAMIAS, BΠ STOVOLOU, IZKOKINOTRIMITHIA, IZ LATSION, IZ EGKOMI, IZ SOPAZ, IZ IDALIOY
CY_18	Lefkara_Pachna	IZ MONI, BΠ yPSONA, IZ PANO POLEMIDIA, IZ AYIOY SILA, IZ ALABRAS
CY_8	Limassol	IZ LIMASSOL

Other industrial facilities

Larnaka Oil Rafinery Facilities (LORF) was the main pressure on the water of the area in the past. According to the decision of the Republic of Cyprus, the LORF terminated its operation on April 22, 2004, after 32 years continuous operation. With this decision, the facilities will be used for a transitional phase six (6) years, as terminal dock for petroleum products. As part of the terminal operation, all the products will be managed in the LORF and they will be imported by private oil companies. The oil companies owned the import, storage and distribution of petroleum products in Larnaca terminal. The total capacity of Larnaca terminal including the storage areas of the refinery is about 300,000 MT.

The Greek Chemical Industries settled in Vasilikos area, very close to the Port of Vasilikos and next to the Power Station in a lication of total area of 32.66 hectares, 25 kilometers east of Limassol. Their operation started in 1982, for the production of sulfuric and phosphoric acid and complex fertilizers to cover the domestic market needs and for export.

The facilities of the Greek chemical industries included the three main production units (the sulfuric acid plant with a capacity of 180,000 tonnes per year, the ammonia production unit with capacity of 40,000 tonnes per year, the composite fertilizer plant with capacity 150,000 tons per year), and other supporting facilities, such as tanks storage power plant, laboratories, administration buildings, warehouses etc.

The operation of the units ended in 1995. The decision for the dissolution of the company was obtained with a judgment on 18 January 2002. The council of the Ministers in its decision on January 21, 2003 decided to: authorize the Minister of Commerce, Industry and Tourism to make a compulsory purchase of the site of the Greek Chemical Industries (GCHIN) with purpose to create the Energy Centre that will include oil and gas storage facilities and the committal of the management of that area to the Ministry of Commerce, Industry and Tourism, which will take the discharge, the decontamination, the dismantling and the recovery of the installations of GCHIN.

The dismantling work of GCHIN began in October 2006 and was completed in May 2007. During the execution of the project were transferred abroad 400 tonnes of asbestos, 235 tons of vanadium pentoxide, 318 tons of sodium silicate and 400 tonnes of other hazardous chemical waste. The work of dismantling of Greek Chemical Industries and the remediation of the site was successfully completed on May 31, 2007.

Concerning the Petrol Filling Stations (PFS) - Gas Oil is likely to be linked to the soil pollution and the aquifer. Although there are not data in Cyprus (as in other European countries)that demonstrate the explicit association of PFS with the recorded pollution of the aquifer, the scientific community has now started to actively occupy with the issue [See. literature, 10].

Calculation of loads

The pressure that is exercised by the industrial activity in the ground and surface water bodies is not easy to be quantified from the available data. Part, however of the pressure that is exercised has indirectly addressed through the relevant calculations for the WWTP that are serving industries and waste-reservoirs in Vati. The table below shows data for the waste disposal as derived from Disposal permissions of the facilities based on the information given in the study for the review of pressures that was implemented during the preparation of the second Management Plan in 2014 and is available on the website of the WDD [See. literature, 10].

Table 8-38: Discharges to Surface Waters

α/α	IED	NAME	WB	Activity	Waste for disposal	potential pollutants
1	YES	ELECTRICITY AUTHORITY OF CYPRUS, POWER-STATION VASSILIKO	CY_14-C2-HM	electric stream production	cooling water and treated wastewater after the diversion if	Heavy metals, petroleum residues

α/ α	IED	NAME	WB	Activity	Waste for disposal	potential pollutants
2	YES	ELECTRICITY AUTHORITY OF CYPRUS, POWER STATION DEKELIAS	CY_18-C2		olives	
3	YES	ECOFUEL (CYPRUS) LTD	CY_14-C2-HM	Treatment and disposal of hazardous waste	Tertiary treated waste disposed at sea	Heavy metals, hydrocarbons, phenols
4	NO	LOEL LTD	CY_12-C2-HM	Winery	Cooling waters disposed at sea	It is observed sewage drain high organic load together with the cooling water

As in concerns the Gas Stations - Gas Oil is likely to be linked to the soil pollution and the aquifer. Although there are no data in Cyprus (as in other European countries) to demonstrate the explicit association of Gas Stations with the recorded pollution of the aquifer. Scientific community has now started actively to address the issue [See. literature, 10]. The following table lists the main potential pollutants that are typically associated with the handling and the storage of fuel.

Table 8-39: Main and Secondary pollutants from Gas Stations

A/A	Main pollutants	Secondary Pollutants
1	TRHs (hydrocarbon oils)	PHA (Phenols such as kerosene or diesel oils tanks)
2	BTEX benzene, tolouonio, ethylbenzene, xylene)	acids
3	Ethanol, methyl tert-butyl ether (MTBE), Lead	Asbestos, heavy metals
4	Naphthalene	Phosphates ladia- fats
5	Volatile organic compounds (VOCs)	

8.2.3 Mining activity

Quarry Operations

Unlike mining, the quarrying industry is intensely activated although the fact that the financial crisis and the demand for quarry materials has decreased significantly compared with 2008.

Table 8-40: Total quantities produced of quarry materials in 2013

Quarry material	Quantity in tonnes
aggregates	4.561.152
Striped and Chavarochalika	18.000
limestones	2.363.000
Clay for cemen	582.000
Clay for bricks and tiles	77.800
stone Building	2.600
boulders	5.200
Bentonite	174.000

Quarry material	Quantity in tonnes
Umber and ocher	61.310
Marble	900
Lime	3.730
Plaster	330.000

In the contract 1 / 2014 that was conducted during the preparation of the 2nd RBMP with purpose the review of the pressures and impacts on waters [See. literature, 10], is reported that 159 active quarries have recorded, of which 32 were for rehabilitation. From those:

- 19 are engaged in quarrying limestone aggregates,
- 12 are engaged in read quarrying of aggregates,
- 7 are engaged in quarrying bentonite,
- 36 are engaged in quarrying of calcareous sandstone,
- 6 are engaged in quarrying gypsum,
- 6 are engaged in quarrying Umbria,
- 1 are engaged in quarrying ocher.

Also, there were recorded 50 closed / abandoned quarries, of which:

- 18 were engaged in quarrying limestone and sandstone
- 1 was engaged in quarrying Umbria.

Overall, of the **159** active quarries mining activities, **24** of these have **28** active EWF.

Mines

The Cypriot mining industry was activated in the production of ores and copper concentrates, pyrite, gold, chromite and asbestos fibers. The main mining areas of the island are Skouriotissa areas Agrokipia, Kambia, Kalavasos Lake. Individual mines found in Trullo areas Magallanes, Peravasa and Vretsia.

Calculation of loads

The quarrying activity in impermeable formations cause effects on WBs, eg change the course of the runoff and hydro-morphological alterations. The quarrying activity in karst systems, namely in underground water resources can have greater range impacts, such as increased runoff, reduced water quality and local reduction of storage of the aquifer.

Karst areas where the unsaturated zone of the aquifer is deep and well developed, have the ability to temporarily store significant amounts of rain water collected from runoff with the result to observe quality degradation of the aquifer where there are drain quarries in the area. The karst systems have very low self-cleaning capabilities, which makes the water of karst very vulnerable to pollution.

Quarrying can substantially modify the recharge of the aquifer and degrade its quality. However in aggregates quarries, limestone, if unsaturated, can act as a protective cover for the underlying aquifer. Under the contract 1/2014 that was conducted during the preparation of the 2nd RBMP with the purpose the review of the pressures and impacts on water status

[See. literature, 10], the following table presents the potential soil contamination sources by type of quarrying activity.

Table 8-41: Potential existence of pollutants per type of quarrying activity

Type of activity	Potential pollution	
	Organic pollutant	Anorganic pollutant
Mining and quarrying	BTEX, PAHs, PCBs, TPH	As, Cr, Cu, Ni, Zn
Umbria mining	*BTEX, PAHs, PCBs, TPH*	*Fe, Mn*
bentonite mines	*BTEX, PAHs, PCBs, TPH*	-
Gypsum mining	*BTEX, PAHs, PCBs, TPH*	-

BTEX: benzene, toluene, ethylbenzene, xylenes, PAHs: Polycyclicaromatichydrocarbons, PCBs: PolyChlorinatedBiphenyls, TPH: Total Petroleum Hydrocarbons

All of these above effects depends on the extent of this digging areas.

In connection with the GWBs, pressures from quarry activity can not be considered as significant as it is local and there is no evidence until today to suggest the opposite.

Compared with the existing quarries it is noted that are not generally observed to impose create hydro-morphological alterations in the surface WBs. Morphological alterations in local scale are found in the following cases:

- Part of the river bed of WB Pyrgos (CY_9-1-b_RIh) is occupied by the facilities of K.KYTHREOTIS HOLDINGS PUBLIC LTD
- Part of the river bed of WB Ampeliki - Xylourikos (CY_9-6-e_RP) is occupied by the facilities of Company Skyros ESKAL LTD

The operation of the mining installations in the last 100 years has created than 200 mil. Tonnes of mineral waste that are stored around the abandoned mines. In the mining wastes the increased metal concentrations are very likely to be driven by rainwater runoff both surface and groundwater water bodies. This view for the surface water is confirmed by the results of the Cyprus water monitoring program as at the monitoring stations located downstream mines systematically are detected metals that are associated with the wastes from the mines. For groundwaters there are not such indications.

The main problems with the water quality of WBs that are related to these wastes are associated with the acidity of the heavy metals (Fe, Cu, Zn, Mg, Ni, Cd, Mn), the high salinity and the high COD, which reduces the concentration of the dissolved oxygen Under the contract 1/2014 that was implemented during the preparation of the 2nd RBMP with purpose the review of the pressures and impacts on water status [See. literature, 10], in the sediments of rivers that receive acidic runoff from the mines in Cyprus have detected concentrations of metals. These concentrations are controlled by the mobility of metals in acidic conditions.

Data that concerning the mobility of metals telated to the corrosion of sulphide minerals, are presented in the following table:

Table 8-42: Data concerning pollutants direved form the erosion of sulphide minerals

Relative Mobility	Secondary Elements	Primate Elements
High Mobility	S, Cl	Br, I, Mo, B, Se
Medium Mobility	Ca, Na, Mg, K	Zn, Ba, U
Low Mobility	Si, Mn	Ni, Co, Cu, As, Sb, Pb
Very Low Mobility	Fe, Al, Ti	Cr

Before extraction these elements are in stable form (CuFeS2, ZnS, PbS, etc.), after extraction oxygen of the atmosphere and the rain may cause acidity and the elements are released and are moving in different directions.

In conclusion it is noted that:

- In **Asbestos' mines** the risk of the corrosion of the extractive waste and their transport downstream is considerably limited by the rehabilitation works. However, due to the long mining activity in the area is possible the contamination with asbestos fibers, Co, Cr and Ni.
- In **chromite mines** (areas Kokkinorotsos, Kannoures and Hadjipavlou) because of the underground exploitation and use of excavated material for refilling there are not generated large waste volumes. Large quantities remain **in Agios Nikolaos Kakopetria** where there is potential risk of erosion of the extractive waste and transport downstream and pollution of alluvial deposits with As, Co, Cr, Ni, V and Zn.
- In **Memi** there is possibility of soil contamination with As, Ba, Co, Cr, Cu, V and Zn. The radial drainage in mine **Grind** is a potential risk of erosion of the extractive waste and transport downstream. There is a risk of alluvial deposits with Ba, Co, Cr, Cu, Ni, V and U. In a point of Elea river monitoring downstream of the mines are observed systemic metal detections (mainly Cd, Ni, Zn, Mn). The Cd concentrations exceeding those that are laid down in Directive 2008/105 / EC
- In **Mitsero - Kokkinopezoula** there is potential risk of erosion of the extractive waste and pollution of alluvial deposits with As, Ba, Co, Cr, Cu, U, V and Zn.
- In **Kambia** (Kokkinonero and Kokkinokanouros) - **Kapedes** there is a potential risk of erosion of the extractive waste and pollution of alluvial deposits with As, Ba, Co, Cr, Cu, U, V and Zn.
- In Mathiatis (North) there is risk of corrosion of piles of mining waste and pollution of the downstream alluvial deposits with As, Ba, Co, Cu, U, V and Zn and of the impounded river Limpia. There are also analyzes in sediment from the reservoir Limpia that are showing increased metal concentrations.
- In **Sia** there is danger of corrosion of piles of mining waste and pollution of downstream alluvial deposits with As, Ba, Co, Cr, Cu, U, V and Zn. In the point of the monitoring of surface waters that are in the downstream of the mines are observed systemic metal detections.

– In the **reservoir Kalavasos** uranium values (U) in the sediments was alarming, while the high Cr values and Ni are not associated with the mineralization of Kalavasos region and it should be found in the ultramafic rocks of the Forest Limassol (NW part of the river reservoir), where appears chromite mineralization.

By type of mining activity is expected the presence of the following pollutants in soil.

Table 8-43: Possible presence of pollutants by type of mining activity

Type of activity	Potential pollution	
	Organic pollutant	Anorganic pollutant
Mining and quarrying	BTEX, PAHs, PCBs, TPH	As, Cr, Cu, Ni, Zn
Asbestos mines	BTEX, PAHs, PCBs, TPH	Co, Cr, Ni, ίνες αμιάντου
Chromite mines	BTEX, PAHs, PCBs, TPH	As, Cr, Ni, Fe, V, Zn
Copper mines	BTEX, PAHs, PCBs, TPH	As, Ba, Cd, Co, Cr, Cu, Fe, Ni, Pb, U, V, Zn
Iron-Piretus mines	BTEX, PAHs, PCBs, TPH	As, Ba, Cd, Co, Cr, Cu, Fe, Ni, Pb, U, V, Zn

8.2.4 Desalination units

In order to cover the needs of drinking water supply in Cyprus operate two (2) desalination units from 2011:

– in Dhekelia which was built in 1997, with a capacity of 60.000m^3 / day,

– in Larnaca which operate since June 2001 with a capacity of 62.000m^3 / day.

These two units cover in a large extend the needs of Nicosia, Larnaca and Amochostos districts and contribute to the water balance of about 84% of the total of the requirements for drinking water [See. literature, 10].

In order to cover the needs of the district of Pafos was developed in the area Kouklia a Mobile Desalination Unit of capacity 30.000m^3/day. The Unit was put into operation in November 2010 and stopped working in 2011.

In 2011, in aim to cover the needs of Limassol District for the next twenty years it was decided to build a permanent Unit in Akrotiri-Episkopi area.

Also, the desalination plant at the Power Station Vasilikos area has a capacity of 60.000m^3 / day [See. literature, 10].

According to the data of DFMR, although the desalination constitute a potential pressure, their impact on the marine environment has local character. Moreover, the degree of the influence depends on the operating status (active/inactive) and their production, which vary each year depending on the rainfall and the water requirements.

8.2.5 Waste Disposal Sites –Unmonitored Waste Disposal Sites

In 2012 is adopted the Management Strategy for Household and Similar Type of Waste which constist of the development of the National Action Plan for Solid Waste Management. With the adoption of the new Strategy repealed the provisions of the previous strategy in the part that are related to the management of household and similar type waste. The Ministry of Interior which has undertaken the implementation of the National Strategy for the management of urban waste promotes the following environmental infrastructure:

- Construction of Integrated Waste Management Facility (IWMF) in Limassol district in Pentakomo and is expected to be completed in 2016,
- Construction of Waste Integrated Waste Management Facility (IWMF) in Nicosia in Agioi Heliophotoi area
- Rehabilitation of Unmonitored waste disposal sites (UWDS).

Landfill Site and Integrated Waste Management Plants

They are related to the integrated plants of management of the wastes of the districts Amochostos Larnaka and Pafos.

Unmonitored waste disposal sites

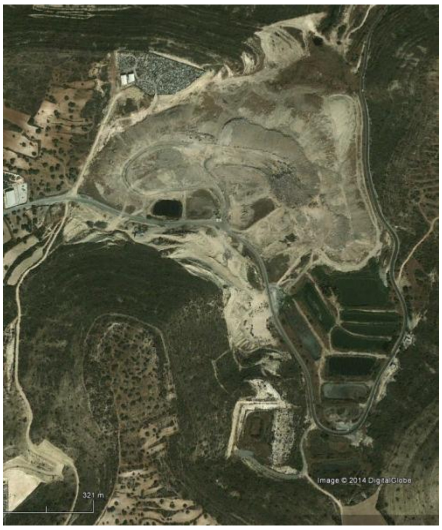
Under the Cosntract1 / 2014 that was implemented during the preparation of the 2nd RBMP with purpose the review of the pressures and impacts on water status [See. literature, 10], it is recorded that there are 121 UWDS in operation in rehabilitation process including UWDS in Vathia Gonia, that is a 30,000m² area in which they have deposited inert materials, road building materials, waste electrical appliances.

UWDS and wastewaters-reservoirs in Vati

Due to the absence of sewerage networks in some areas of Limassol and also in small communities of district of Limassol,

- the sewage-waste that are collected from the overflowing absorption pits,
- the sludge from septic pits,
- the waste water of some small industries (which are either due to the lack of space or to the small size are not able to build their own sewage treatment systems),
- the sludge from IWW treatment plants (treatment plant for liquid industrial waste),
- the excess of liquid sludge from small sewage treatment plants in communities which do not have systems of processing of produced sludge,

are disposed in the gravel waste-reservoirs in Vati area. After consecutive tanks with rods, the overfilling of a tank is transferred to the next taking place in each tank partial treatment, precipitation and evaporation. The overflows in the last tank are driven through the adjacent Argaka in Garyllis River and eventually into the impounded river of the dam Polemidia.



Vati (14/9/2010)

Vati (13/2/2014)

Today the Water Development Department implements the cosnstuction and operation of a treatment of a plant of household sewage waste and sludge from septic tanks, industrial waste, excess liquid sludge and leachate from uncontrolled UWD which will be restored in Vati area.

The objective of the project is the improvement of the water status of Garyllis and of the impounded river Polemidia that is located near the Vati, and is expected to be achieved by the termination of the existing earthen septage receiving tank in Vati area and the construction of a suitable treatment plant for household sewage and industrial waste.

Calculations of loads

For the LS of Pafos and the IWMTF of Larnaca-Amochostos was considered that their function is not affected by leaks to the groundwater.

For the inactive UWDS was taken into account the annual volume of leachate and concentrations of the loads considered as BOD_5 equal to 230 mg/l, TN equal to 920 mg/l and TP equal to 6,8 mg/l. For the rest, an estimation was done based on their size taking into account the proportion between the leachate - area that is resulting from UWDS Pafos, Larnaca and Amochostos, which have similar rainfall. The loads that were calculated as point pressure on the **groundwater** except for cases that UWDS are located <500m from streams. In these cases, a small percentage (20%) of the load was considered that affect surface bodies. For UWD in Vati the quantity of the leachate that was calculated under the Vati recovery study increased is taken into account. In the table below are listed the aggregated loads of all UWDS [See. literature, 10].

Table 8-44: Total Loads from UWDS, LS and Vati

Category	Total Load (tonnes/year)			Diffuse Pollution Groundwater (tonnes/year)			Point Pollution Surface Water (tonnes/year)			Point Pollution Groundwater (tonnes/year)		
	BOD_5	TN	TP	BOD_5	TN	TP	BOD_5	TN	TP	BOD_5	TN	TP
Vati-WASTE-RESERVOIRS	912,13	78,86	11,16				729,71	63,09	8,93	182,43	15,77	2,23
BATI-UWD	864,01	89,72	1,99				691,21	71,78	1,60	172,80	17,94	0,40

Category	Total Load (tonnes/year)			Diffuse Pollution Groundwater (tonnes/year)			Point Pollution Surface Water (tonnes/year)			Point Pollution Groundwater (tonnes/year)		
	BOD_5	TN	TP	BOD_5	TN	TP	BOD_5	TN	TP	BOD_5	TN	TP
UWD	703,73	239,41	2,79				0,84	3,35	0,02	702,89	236,06	2,76
LS	3,14	2,35	1,57	3,14	2,35	1,57	0,00	0,00	0,00	0,00	0,00	0,00

* By the completion of the projects in Vati the loads that are mentioned in the table will be eliminated

Table 8-45:List of UWD Registry of Priority Substances

Name UWD	District	Cd	Pb	Hg	Ni	As
Kornos	Larnaca		v	v		
Apsiou	Limassol	v		v	v	v
Dierona	Limassol		v	v		
Argaki tis Asgatas	Limassol	v	v	v		
Ag. Therapon	Limassol	v				v
Eptagonia	Limassol		v	v		
Kellaki	Limassol		v	v		
Kato Kividdes	Limassol	v				v
Moutagiaka	Limassol		v	v		
Prastio Kilakiou	Limassol	v		v		
Vati	Limassol	v	v	v	v	v
Alona	Nikosia	v	v			v
Fterikoudi	Nicosia	v	v			v
Ag. Marina - Kelokedaron	Pafos	v		v		
Ag. Ioannis	Pafos	v		v		
Amargeti	Pafos	v		v		
Anadiou	Pafos	v	v		v	
Filousa	Pafos	v	v	v	v	v
Foiti	Pafos	v	v	v	v	v
Galataria	Pafos	v		v		
Kelokedara (A)	Pafos	v		v		
Kelokedara (B)	Pafos	v		v		
Lysos	Pafos	v	v		v	
Pentalia	Pafos	v		v		
Salamiou	Pafos	v		v		
Zacharias	Pafos	v	v		v	

8.2.6 Ports – Marinas –Navigation

Cyprus is an island state, which due to its geographical location is far away from other areas of Europe and at the same time very close to third countries, and particularly those in the Middle East. Therefore relies almost entirely, on the ports for the international trade. Over the past two decades the ports of Cyprus have evolved at major cruise service centers and until recently were significant international trade service nodes.

The Authority of Ports of Cyprus manages the commercial ports of Limassol and Larnaca, the industrial port of Vasiliko, the old port of Limassol, the Pafos harbor, the harbor of Latchi and the special petroleum stations in Larnaca, Moni, Vasiliko and Dhekelia. The ports of

Amochostos and Kyrenia and the special station at Karavostasi are located in areas where the Republic of Cyprus does not exercise effective control.

In addition to the above ports in Cyprus are operated three large marinas (Larnaca-395 berths, Agiou Rafael-234 berths and Limassol-650 berths). Also are operating 12 fishing shelters, in Agia Triada in Paralimni, Ayia Napa, Liopetri River, Xylofagou, Ormidhia, Dhekelia, Larnaca, Zygi, Old Limassol Port, Akrotiri Agios Georgios of Peyia, Pafos, Latsi, Pomos, Pyrgos,.

In the only fishing shelters where are docking ferry passenger vessels are in Paralimni (14 vessels), Agia Napa (18 vessels) and Larnaca (2 vessels) Old Harbour Limassol, Paphos and Latchi.

The harbors, the marinas and the fishing shelters are managed by the Cyprus Ports Authority, CPA and DFMR respectively. In some cases in an areas such as the fishing settle of the old port of Limassol there are two managers, the CPA for ferry boats and the DFMR for the fishing boats. Similar cases are found in the port K. Paphos and in Latchi.

Since 2009 the DFMR implement a management plan for wastes in the fishing shelters.

In the most port facilities in Cyprus for the handling of the wastewater are used tanks. Exceptions are the private marina "Agios Raphael" in Limassol, the marina of Limassol, the marina of Larnaca and the port K. Pafos.

The installations of the Cyprus Petroleum Refinery in Larnaca are now used as a terminal station for petroleum storage, in which oil companies owned the facilities for import, storage and distribution of petroleum products. The total capacity of the terminal in Larnaca including the storage areas of the refinery is about 300,000 MT.

The Coastal WB in which there are ports are CY_12-C2-HM (Bay of Limassol), CY_13-C2 (Moni), CY_14-C2-HM (Port of Vasilikos), CY_15-C2 (Zygi - Cape Kiti), CY_16-C2 (Larnaca West), CY_17-C2-HM (Larnaca center), CY_18-C2 (Larnaca Bay-Northeast), CY_1-C1 (East Tylliria), CY_20-C3 (Pyla-AquaFarm Akrotiri), CY_21-C3 (Ayia Napa) , CY_22-C3 (Protaras), CY_2-C1 (West Tylliria), CY_3-C2 (Khrysokhou Bay), CY_6-C4 (North of Pafos) and CY_7-C4-HM (Paphos-city).

8.2.7 Aquacultures

A) Aquacultures in inland waters

The sector of the aquaculture in inland waters includes:

a. seven (7) small units some of which some serve as hatcheries,
b. two (2) small units for production of ornamental fish, and
c. a government research unit

The freshwater fish farms are operating in the Troodos Mountains. The cultivation takes place in concrete tanks which utilize water from the nearby springs and adjacent rivers. The total annual production for 2012 is 55 tonnes of trout, and 6 tonnes of sturgeon 271.500 tonnes trout and sturgeon totaling approximately € 0.51 million. In 2013 the total annual production was 54.7 tonnes of trout, sturgeon 0.2 tonnes and 146,000 tonnes trout and sturgeon with a totaling value approximately € 0.49 million.

The river WBs related to these units are: CY_9-6-m_RP_HM (Kouris), CY_3-3-d_RP (Argaki tou Karvouna), CY_1-2-a_RP (Dhiarizos), CY_3-3-b_RP (Karyotis) and CY_9- 6-p_RP (Kryos).

B) Open Sea Units

There are nine (9) licensed marine units of fattening Mediterranean species (see. The following Table). The cultivation takes place in circular floating cages with a circumference of about 60-70 meters, which are spaced in 1- 4 kilometers distance from the coast and at depths of 20-70 meters.

The course of the marine aquaculture sector in the last two decades shows significant growth and in 2012 the value of the annual production was estimated at approximately € 22,97 million, while the same for 2013, was € 28,5 million

The Coastal bodies related are: CY_12-C2-HM (Bay of Limassol), CY_13-C2 (Moni), CY_14-C2-HM (Port Vasilikos) and CY_20-C3 (Akrotiri Pyla- Acre. Pyla Aqua Farm).

Γ) Incubators of Marine Species and Marine Shrimp

In Cyprus there are three (3) licensed hatcheries of marine species that are located in shore facilities in Liopetri River, Akrotiri of Limassol and Kouklia of Paphos. In 2012, the value of their total annual production is estimated at € 2,1 mil. And the total fry production to 13.4 million. Juveniles, while in 2013 the production of fry was 17.8 mil. Fry and the value of the total annual production was € 3.26 million.

The incubator / marine shrimp farm (Parapenaeusindicus) is located in Akrotiri of Limassol and adopted a 30 tonnes production license. In 2012, the value of the total annual shrimp production was estimated at € 71,000, while in 2013 produced a total of 18.6 tons of shrimp with total value of 252,000 €,

The Coastal Water Bodies related are: CY_8-C4 (South Paphos), CY_9-C4 (Episkopi Bay) and CY_20-C3 (Akrotiri Pyla- Acre. Pyla Aqua Farm).

Δ) Government Research Stations

There are the following two government aquaculture research stations (for which there are not analytical data in relation to the production):

a. Cyprus Marine Aquaculture Centre (CMAC) in Meneou, which is associated with the coastal body CY_16-C2 (Larnaca-West)

b. The Aquaculture Research Station of Freshwater, in Kalopanayiotis which is associated with river body CY_3-2-b_RP_HM (Marathassas).

Calculations of loads

The pressures on the environment from the fish farms are mainly concerning the intensive and semi-intensive type of farming as well in these types are presented large fish concentrations. The surface of marine substrate is affected by the piscicultural activity. The effects depend mainly on the speed of the streams and depth. These effects are a highly localized phenomenon, which does not exceed 20-50 meters. The main source of nitrogen and phosphorus that is released from the aquaculture operation derives from the fish feed. Nitrogen and phosphorus discharges from unused fish food, undigested nitrogen and phosphorus (feces) and secretions through gills and urine.

Under the Contract 1/2014 that was implemented during the preparation of the 2nd RBMP with purpose to the review of the pressures and impacts on water status [See. literature, 10], , the following tables are prepared, based on the capacity and the production of 2012.

Table 8-46: Annual Production of load BOD, TN & TP from inland aquaculture

α/α	Name	Load Disposal in river WB	Calculations of loads based on the license			Calculations of loads based on the production 2012		
			BOD (kg/year)	TN (kg/year)	TP (kg/year)	BOD (kg/year)	TN (kg/year)	TP (kg/year)
1	MEDKOI LTD	no data						
2	CYPRI KOI FISHERIES LTD	No data						
3	CHRISTOFIS	CY_9-6-m_RP_HM	873,5	193,0	32,5	873,5	193,0	32,5
4	FINI FISHERIES LTD	CY_1-2-a_RP	12.324,0	2.366,0	382,0	6.162,0	1.183,0	191,0
5	G.I. KYRILLOU TRADING LTD	CY_3-3-b_RP	21.567,0	4.140,5	668,5	10.783,5	2.070,3	334,3
6	VAMARIA LTD	CY_3-3-b_RP	12.324,0	2.366,0	382,0	6.162,0	1.183,0	191,0
7	SABRINA FISH FARM LTD	CY_3-3-d_RP	12.324,0	2.366,0	382,0	6.162,0	1.183,0	191,0
8	PSILO DENTRO LTD	CY_9-6-p_RP	4.313,4	828,1	133,7	2.156,7	414,1	66,9
9	CHRYSANTHOS ANDREOU	CY_3-3-d_RP	3.081,0	591,5	95,5	1.540,5	295,8	47,8
10	RESEARCHE UNIT KALOPANAGIOTI	CY_3-2-b_RP_HM	NO DATA					
TOTAL			66.806,9	12.851,1	2.076,2	33.840,2	6.522,1	1.054,4

Table 8-47: Annual Production of load BOD, TN & TP from marine aquaculture

α/α	Name	Load Disposal in river WB	Calculations of loads based on the license			Calculations of loads based on the production		
			BOD (kg/ year)	TN (kg/ year)	TP (kg/ year)	BOD (kg/year)	TN (kg/year)	TP (kg/year)
1	APZ AQUARIUM LTD	CY_9-C4	17.049,0	2.943,0	762,0	3.949,7	681,8	176,5
2	SAGRO AQUACULTURE LTD	CY_8-C4	35.670,0	5.907,0	1.052,0	16.629,7	2.753,9	490,5
3	BLUE FISHERIES	CY_9-C4	35.670,0	5.907,0	1.052,0	29.495,5	4.884,5	869,9
4	ΤΕΛΙΆΣ AQUAMARINE HATCHERIES	CY_20-C3	5.350,5	886,1	157,8	1.626,6	269,4	48,0
5	KIMAGRO FISHFARMING LTD	CY_12-C2-HM	1.212.780,0	200.838,0	35.768,0	898.261,9	148.753,4	26.492,1
6	EMAT LTD (EAST MEDITERRANEAN AQUA TECHNIQUE LTD)	CY_13-C2	713.400,0	118.140,0	21.040,0	266.123,9	44.070,5	7.848,7
7	BLUE ISLAND HOLDINGS LTD	CY_13-C2	927.420,0	153.582,0	27.352,0	657.982,4	108.962,8	19.405,6
8	TELIAS TUNA LTD	-	-	-	-	-	-	-
9	KITIANA FISHERIES LTD	-	-	-	-	-	-	-
10	ICHTHYSECO-FARMLTD (ΠΡΩΗΝΑΛΚΥΟΝΗ)	CY_13-C2	214.020,0	35.442,0	6.312,0	0,0	0,0	0,0
11	SEAWAVE FISHERIES LTD	CY_14-C2-HM	535.050,0	88.605,0	15.780,0	575.440,6	95.293,7	16.971,2
12	TELIAS VASILIKO LTD	-	-	-	-	-	-	-
13	TELIAS AQUA MARINE LTD	CY_20-C3	356.700,0	59.070,0	10.520,0	372.424,0	61.673,9	10.983,7
14	STATION MENEOY (MFRD)	CY_16-C2	No data					
TOTAL			4.053.109,5	671.320,1	119.795,8	2.821.934,3	467.343,8	83.286,1

8.3 WATER ABSTRACTIONS

8.3.1 Surface Water Abstractions

Traditionally, the use of the surface water resources in Cyprus took place on a relatively small scale by the construction of small catchment weirs that diverted small discharges in small irrigation canals. This practice continues to a significant extent, particularly in areas of Troodos with spring waters. The overall impact in terms of the reduction of the river runoff is small, but during the irrigation period when the natural disharges are low, may have as a result up to the elimination of the natural flows.

In the 20th century began the construction of water reservoirs, however, for a long time the main source of stored water were been remained the aquifers. The combination of the increased demand and the deterioration of the groundwater have led to the maximization of the use of surface waters in the Republic of Cyprus. Thus, was promoted the construction of several dams, water pipelines and irrigation networks.

Most of the main rivers of Cyprus have dams and older dams have been constructed in river basin district of Troodos with NA, N and SW orientation. A typical example is the areas of Limassol and Pafos where they have been constructed 20 of the 40 large dams of Cyprus.

It is worth to note that under the standards of the International Commission on Large Dams (ICOLD), Cyprus comes first in Europe in the number of dams per square kilometer. So far they have been built and operated more than 100 dams, of which 56 are registered in the ICOLD list. From the large dams, 18 are Off-river reservoirs.

There is available an exhaustive list of the dams of Cyprus on WDD website (see. And Section 5.4.1). In the table bellow are presented summarized data for the abstraction works and storage of surface water for drinking water supply and irrigation.

Table 8-48: List of Major Drinking Water Supply and Irrigation Works

MAIN SCHEME	DAMS RELATED	MAIN OTHER SURFACE ABSTRACTIONS
WATER SUPPLY **SCHEME** AND IRRIGATION **SCHEME** AND IRRIGATION OF THE SOUTHERN PIPELINE	Arminiou (abstraction Dhiarizou), Kouris, Achna, kalavasos, Dipotamos, Lefkara	Khapotami abstraction Maroni
IRRIGATION **SCHEME** YERMASOGEIAS – POLEMIDIA	Yermasogeia, Polemidia	
WATER SUPPLY AND IRRIGATION **SCHEME** PAFOS	Mavrokolymbos, Asprocremmos, Kanavia	abstractions r. Dhharizou, r. Ezousa
IRRIGATION **SCHEME** CHRYSOXOOS	Evretou, Ayia. Marina, Pomos, Argakas	

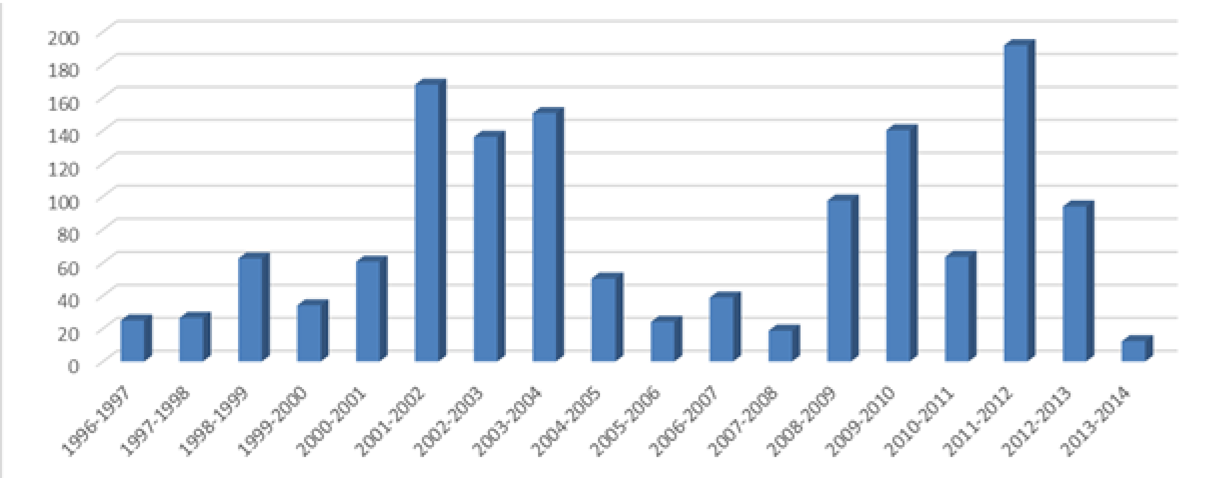
MAIN SCHEME	DAMS RELATED	MAIN OTHER SURFACE ABSTRACTIONS
RURAL DEVELOPMENT PROJECT SINGLE PITSILIAS	Ayioi Vavatsinias, Xyliatos	26 Irrigation out river reservoir
OTHER **SCHEMES**	Klti, Vayzakias, Kalopanayiotis, Lybia, Evdhimou (Mandalas), Paramali and other dams and other small works of surface abstractions	

It is reported that the available storage capacity of the dams in 1960 reached about the 6x10^6 m³, amounted to approximately the 300x10^6 m³ in the early 1990s and reaches approximately the 330x10^6 m³ today.

In the following figure is indicated, the total inflow in significant dams of Cyprus for the last eighteen hydrological (Oct.-Sept.) Years. These dams are: Kouris, Asprokremmos, Evretou, Kannaviou, Kalavassos, Lefkara, Dipotamos, Yermasogeia, Arminou, Polemidia, Mavrokolymbos, Vyzakia, Xyliatos, Argaka, Pomos Kalopanagiotis, Agia Marina, Achna.

Typical is the extremely high variability of the values, which derives from the extremely high variability in the annual rainfalls.

Figure 8-21: Total inflows in Significant Dams of Cyprus



The Table below presents the watersheds with particularly large abstractions pressures.

Table 8-49: Main Pressures abstractions in Surface Waters

River Basin Code	River Basin Name	Main Pressures Abstractions
CY-1-2	Dhiarizos	dam Armini. abstraction to the dam Kouri. Drinking Water supply of the mountain communities.of Diarizos
CY-1-3	Xeros Potamos	dam Asprokremmou. Drinking Water supply and irigation work of Pafos.
CY-1-4	Ezousa	dam Kannaviou. Abstraction to the dam Mavrokolympos. Drinking Water supply of upland communities in Paphos.
CY-1-6	Mavrokolymbos	dam Mavrokolympos. Drinking Water supply and irigation work of Pafos.

River Basin Code	River Basin Name	Main Pressures Abstractions
CY-2-2	Khrysokhou	dam Evretou. irrigation work Khrysokhou.
CY-2-3	Magounda	dam Argaka. irrigation work Khrysokhou.
CY-2-4	Livadi και Xeros	dam Pomos and Agias Marinas. irrigation work Khrysokhou.
CY-3-2	Marathasa	dam Kalopanagioti. local irrigation.
CY-3-5	Elias	dam Xyliato and outriver dam Vyzakias. Local Irrigation.
CY-3-7	Sirahis	dam Akaki Malounta. Local Irrigation.
CY-6-1	Pedhieos	dam Tamasos. Recharge.
CY-8-4	Treminthos	dams Limpia and Kiti. local irrigation and recharge.
CY-8-7	Pendaskhinos	dams Lefkara and Dipotamos. PublicWater supply and irrigation of the southern pipeline.
CY-8-8	Maroni	abstraction to the dam Dippotamos.
CY-8-9	Vasilikos	dam Kalavasou. PublicWater supply and irrigation of the southern pipeline.
CY-9-2	Yermasogeia	dam Yermasogeia. Public water supply of Limassol. irrigation water Yermasogeia Polemidia.
CY-9-4	Garyllis	dam Polemidia irrigation work Yermasogeia -Polemidia
CY-9-6	Kouris	dam Kouri. Drinking Water supply and irrigation of the southern pipeline.

Under the contract for the review of the pressures on water bodies [See. literature, 10] were investigated the pressures on surface water bodies from small point abstractions. To this aim segments of 500 m of each river Water Body are related to all the abstractions that are register at a distance up to 50 m of the river bed (diversions, small dams, etc.).

There were identified 237 abstraction points in total, which are related to 210 segments of the RWBs. Then the total number of abstraction points per water body it was calculated and it was concluded that in 13 WB where are registered more than 5 abstracted points pressures are likely to be classified as a significant.

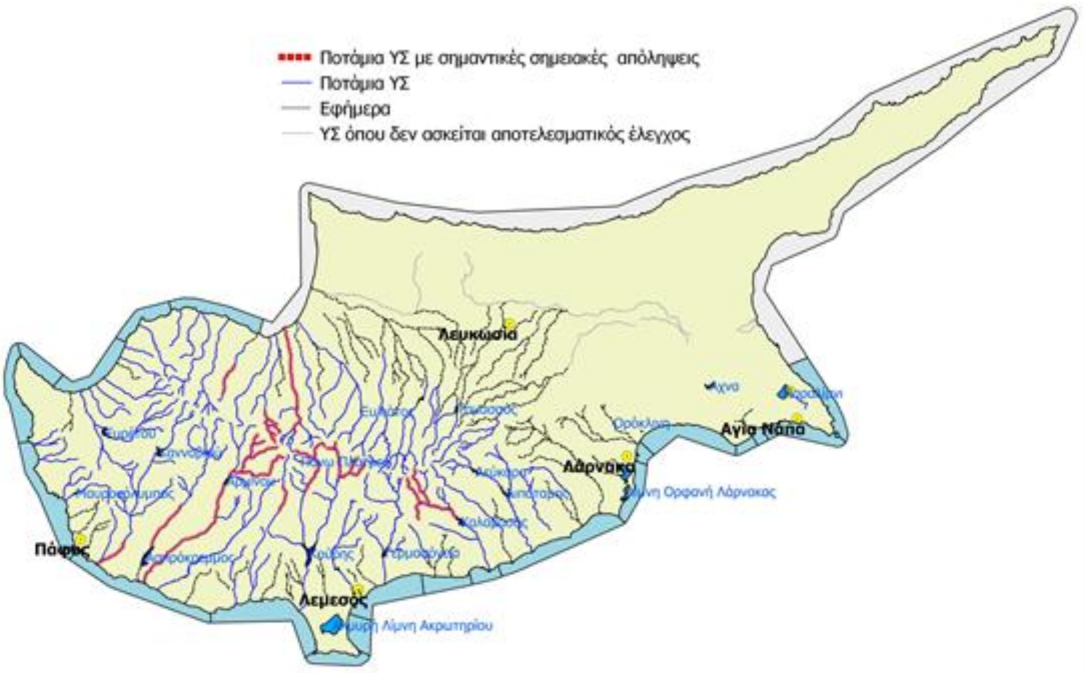
Table 8-50: River WBs with significant pressures from small abstractions

A/A	WB Code	WB Total Length (m)	Number of Abstractions
1	CY_1-2-a_RP	38,554	15
2	CY_1-2-d_RI_HM	31,330	8
3	CY_1-3-c_RIh	11,662	7
4	CY_1-4-h_RIh_HM	8,128	11
5	CY_2-9-b_RP	7,262	22
6	CY_3-2-a_RP	15,828	7

A/A	WB Code	WB Total Length (m)	Number of Abstractions
7	CY_3-3-b_RP	13,444	14
8	CY_3-3-c_RI	11,439	5
69	CY_8-9-c_RI	33,022	9
10	CY_9-6-a_RP	5,263	5
11	CY_9-6-b_RP	17,569	11
12	CY_9-6-L_RP	19,491	5
13	CY_9-6-q_RP_HM	6,017	5

The total of the above was evaluated in detail in the Assay Report of heavily modified and artificial surface water bodies which is available on the website of the WDD.

Figure 8-22: River WB with significant hydromorphological pressures due to point abstractions



8.3.2 Abstractions from groundwater bodies

Water abstractions from groundwater Bodies (GWBs) to the cover drinking water supply and irrigation needs are an important pressure and result negative values of piezometric levels and negative balances of the groundwaters. The following data (Table 8.27 & 8.28) are related to the assessments of the Water Balances of GWBs (natural recharge and inflows - abstractions and outflows) that derived from:

a. the first RBMP and are corresponded to the period 2000-2008,

b. the revuew of the pressures that was held during the preparation of the 2nd RBMP (Review of Article 5 of the Framework Directive on Water 2000/60 / EC on the Overview of the pressures and impacts of human activity on the status of surface water and groundwater, and the Article 14 (1) (b) for the Review of Significant Management Issues - December 2014),

c. the update of the data on the GWB Kokkinochoria related to the irrigated areas served, the crops and the water requirements such as are encountered during the implementation of this report.

Table 8-51: Water Balance of Groundwater Bodies (GWB) for the period 2000-2008

					PERIOD 2000 - 2008					
α/α	GWB NAME	GWB CODE	WGB EXTENT (km^2)	WATER USE	PRECIPITATIONS (10^6 m^3 /yr)	INFLOWS (10^6 m^3 /yr)	**TOTAL RECHARGE INFLOWS (10^6 m^3 /yr)**	ABSTRACTIONS (10^6 m^3 /yr)	OUTFLOWS (10^6 m^3 /yr)	**TOTAL ABSTRACTIONS - OUTFLOWS (10^6 m^3/yr)**
1	Kokinochoria	CY_1	451,79	IRRIGATION	9,30	4,20	**13,50**	10,50	2,00	**12,50**
2	River Bed r.Treminthos	CY_3A	13,37	PUBLIC WATER SUPPLY&IRRIGATION	1,87	1,63	**3,50**	2,80	0,50	**3,30**
3	Kiti-Perivolia	CY_3B	35,57	IRRIGATION						
4	Softades-Vasilikos	CY_4	45,13	IRRIGATION	2,28	3,22	**5,50**	3,30	1,90	**5,20**
5	Maroni	CY_5	35,03	IRRIGATION	0,40	0,80	**1,20**	1,70		**1,70**
6	Μαρί-Kalo Chorio	CY_6	27,53	PUBLIC WATER SUPPLY&IRRIGATION	1,10	1,40	**2,50**	1,60	0,80	**2,40**
7	Yermasogeia	CY_7	2,46	PUBLIC WATER SUPPLY&IRRIGATION	0,29	6,71	**7,00**	6,20	0,70	**6,90**
8	LImassol	CY_8	25,6	IRRIGATION	0,40	4,90	**5,30**	3,40	2,30	**5,70**
9	Acrotiri	CY_9	61,82	PUBLIC WATER SUPPLY&IRRIGATION	4,20	3,50	**7,70**	4,40	3,20	**7,60**
10	Paramali-Evdhimou	CY_10	6,71	PUBLIC WATER SUPPLY&IRRIGATION	0,30	0,50	**0,80**	1,00	0,04	**1,04**
11	Pafos	CY_11A	114,37	PUBLIC WATER SUPPLY&IRRIGATION	5,10	23,90	**29,00**	19,50	9,60	**29,10**
12	River Bed Ezousa	CY_11B	10,98	IRRIGATION						
13	Letymvos-Yiolos	CY_12	71,00	IRRIGATION	2,29	0,30	**2,59**	0,90	1,60	**2,50**
14	Peyia	CY_13	17,14	PUBLIC WATER SUPPLY&IRRIGATION	0,40	1,30	**1,70**	1,60	0,20	**1,80**
15	Androliki	CY_14	44,94	PUBLIC WATER SUPPLY&IRRIGATION	1,05	1,25	**2,30**	0,67	1,60	**2,27**

					PERIOD 2000 - 2008						
α/α	GWB NAME	GWB CODE	WGB EXTENT (km^2)	WATER USE	PRECIPITATIONS (10^6 m^3 /yr)	INFLOWS (10^6 m^3 /yr)	**TOTAL RECHARGE INFLOWS (10^6 m^3 /yr)**	ABSTRACTIONS (10^6 m^3 /yr)	OUTFLOWS (10^6 m^3 /yr)	**TOTAL ABSTRACTIONS - OUTFLOWS (10^6 m^3/yr)**
16	Khrysokhou-Yialia	CY_15A	23,05	PUBLIC WATER SUPPLY&IRRIGATION	1,67	3,77	**5,44**	2,30	3,40	**5,70**
17	bed r. Khrysokhou	CY_15B	8,87	IRRIGATION						
18	Pyrgos	CY_16	1,89	PUBLIC WATER SUPPLY&IRRIGATION	0,14	1,39	**1,53**	0,90	0,70	**1,57**
19	Central and Western Mesaoria	CY_17	1125,53	PUBLIC WATER SUPPLY&IRRIGATION	9,36	25,17	**34,53**	26,70	12,00	**38,73**
20	Lefkra-Pachna	CY_18	1461,78	PUBLIC WATER SUPPLY&IRRIGATION	32,90	1,80	**34,70**	19,00	18,00	**37,00**
21	Troodos	CY_19	2395,06	PUBLIC WATER SUPPLY&IRRIGATION	91,40	4,00	**95,40**	28,00	70,00	**98,00**

The above table shows that the average annual inflows in the groundwater are of the order of 256 million m^3 while the abstractions are of the order of 269 million m^3. The water inflows data and the data of the abstractions that are related to the revised GWB CY-3A & CY-3B, CY-11A & CY-11B, CY-15A & CY- 15B are derived from the "Report and Review and reclassification of Groundwater Systems of Cyprus for the Implementation of the Article 5 of the Framework Directive on Water, 2000/60/EC" accomplished by Water Development Department of the Ministry of Agriculture, Rural Development and Environment (December 2014).

From the comparison of the data, the following conclusions derive:

- the GWBs CY_1, CY_3A & CY_3B (total), CY_12, CY_17 and CY_18 show deterioration of their quantitative status with negative water balance,
- the GWBs CY_5, CY_8, CY_15 CY_16 present an improved picture of the quantitative status with positive water balance,
- the other GWBs do not show significant changes.

Table 8-52: Comparison of GWB water balances for periods 2000-2008 and 2008- 2013

α/α	CODE	NAME	quantitative Status	Comparison Water Balance (Result Inflows – Outflows /abstractions *in millons. m^3*)	
				2000-2008	2008-2013
1	CY_1	KokinoChoria	Bad	1,1	-3,4
2	CY_3A	River Bed r.Treminthos	Bad	0,2	-0,4
3	CY_3B	Klti-Perivolia	Bad		
4	CY_4	Softades-Vasilikos	Bad	0,3	0,5
5	CY_5	Maroni	Bad	-0,5	0,1
6	CY_6	Mari-Kalo Chorio	Bad	0,1	1,0
7	CY_7	Yermasogeia	Good	0,1	0,1
8	CY_8	LImassol	Bad	-0,4	1,6
9	CY_9	Akrotiri	Bad	0,1	0,1
10	CY_10	Paramali-Evdhimou	Bad	-0,2	-0,2
11	CY_11A	Pafos	Good	-0,1	-0,1
12	CY_11B	River Bed Ezousa	Good		
13	CY_12	Letimvo- Yilos	Bad	0,1	-1,9
14	CY_13	Peyia	Bad	-0,1	-0,1
15	CY_14	Androliki	Good	0,0	0,0
16	CY_15A	Khrysokhou-Yialia	Bad	-0,3	1,7
17	CY_15B	River bed r. Khrysokhou	Bad		
18	CY_16	Pyrgos	Bad	0,0	0,5
19	CY_17	Central and Western Mesaoria	Bad	-4,2	-6,0
20	CY_18	Lefkara-Pachna	Bad	-2,3	-4,1
21	CY_19	Troodos	Good	-2,6	-2,3

8.3.3 Water Exploitation Index (WEI και WEI+)

8.3.3.1 Introduction

The Water Exploitation Index (WEI) and its variation (WEI+) is used by the European Environment Agency for an overview of water scarcity across Europe and it has been defined by the European Union as the main drought index into the WFD.

Water scarcity occurs when the available water resources are not enough to meet the long-term water needs. It refers to a long-term imbalance between the available water resources and the demand in a region (or in a water supply system) that is exceeding the bypass capacity of the natural system. The water scarcity is characterized by the rapid increase in water demand and/or the low available water resources that are related to the population growth, the expansion of water consuming crops, etc. It also caused by the lack of infrastructure in water management (dams, water transmission and distribution systems, etc.).

Moreover, the concept of water supply should be further studied, as there is not the same as the natural availability of water, but it depends on a large extent, both on the characteristics of engineering structures of the exploitation of water resources (capture works, storage projects, transfer and distribution water projects) and on the way of their management. If there are no works, even in unrestricted water supply conditions, the demand can not be met. On the other hand, if there are projects of sufficient capacity for the over-annual regulation the runoffs, which have stored sufficient water from previous periods of high natural water availability, it is possible to meet the demand of a single hydrological year, even in extreme drought conditions. Similar is the case of the large aquifers with big regulation capacity, which respond with much more lag in meteorological droughts, compared to the surface waters (river flows).

8.3.3.2 Water Exploitation Index – Basic Definitions

The main documents of the EU on the WEI index + are the following:

- Update on Water Scarcity and Droughts indicator development of Henriette Faergemann (DG ENV) (May 2012) which describes the calculation of WEI + as has been agreed by the relevant WG and valid until today.
- European Water Assets Accounts and updating the use of freshwater resources indicator (CSI 018) – Draft for consultation of data sources and technical application of the WEI+ formulas Report version 3.2 (2015).

The Water Exploitation Index (WEI) as also its variation (WEI+) defined as the ratio (%) of the total annual water abstraction to the mean annual availability of water resources (Renewable Water Resources, RWR).

$$WEI+ = (TWA – R) / RWR,$$

where:

- TWA (Total Water Abstraction) (in units: hm^3): Total amount of water abstraction from all the water consumers (water supply, industry, farming, agriculture, etc.) and all the water bodies (underground and surface) in the reference area (e.g. catchment area, river basin district).

- R (Returned Water): Volume of the water return back in the overall system (in hm3) (e.g. water used for cooling in industry, water for hydropower generation, water from treated sewage etc.)
- RWR (Renewable Water Resources): Total renewable water quantity which is available (in hm3).

The index WEI+ is still in process of determination of the way of his calculation in the corresponding Working Group, which is becoming complicated especially in complex hydrological systems that have been undergone significant alterations by the human activity through water reservoir works, abstractions and diversion of a basin to another.

Recently published by the European Commission the WFD Reporting Guidance 2016 where in Section 9.4.2.1 further instructions are given to EU information on the index WEI+. The most important requirement is that the calculation of WEI+ at the national level should be done for the last 5 years.

Based on this indicator, the following levels have been defined:

- for values of WEI< 20%: no water stress
- for values of WEI 20% - 40%: there is water stress
- for values of WEI> 40% : there is severe water stress

In areas where there is generally pressure on water resources (such as Cyprus) is considered that the WEI value that is shown the significant water pressure should be set at higher levels such as 60%.

The value of 60% is considered in this second Management Plan as the threshold of the "significant water pressure."

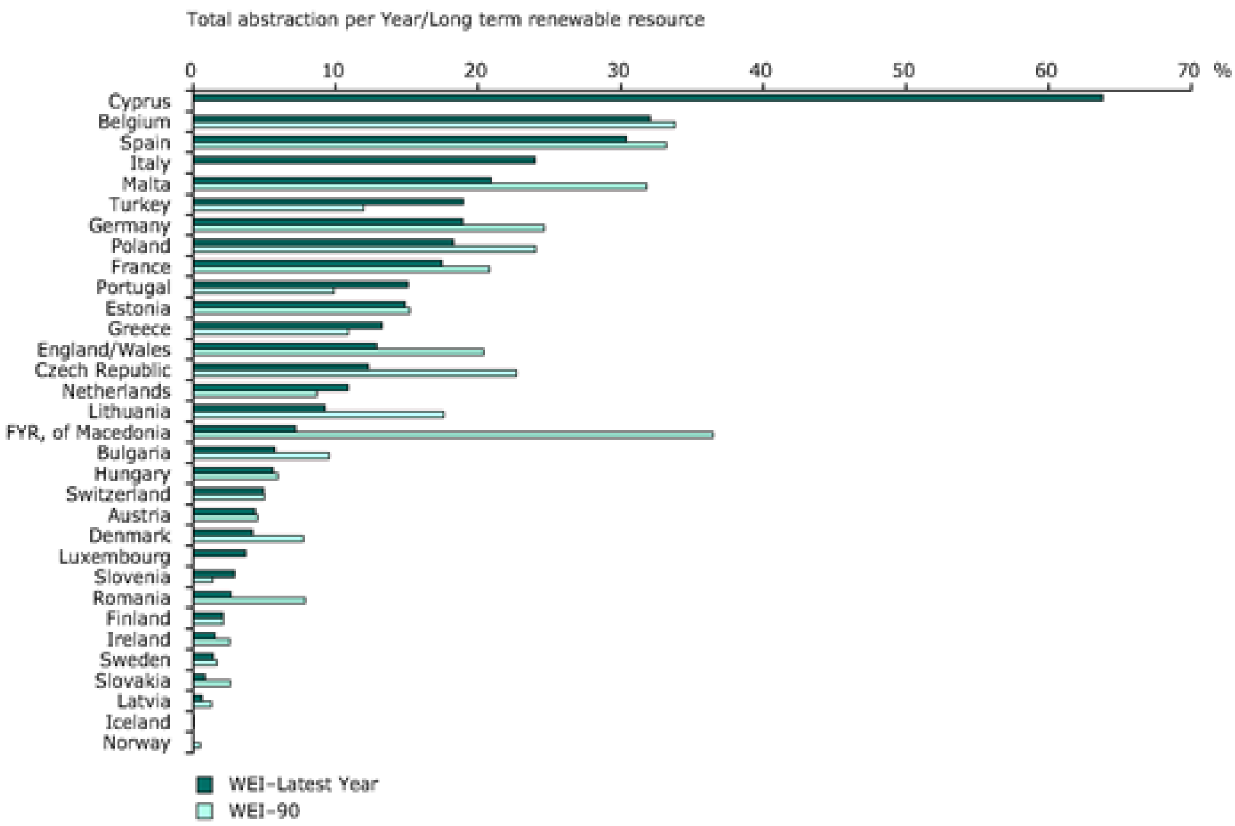
8.3.3.3 Implementation of the index WEI+ in Cyprus

In detail, the index was calculated through a revision of the Drought Management Plan that is part of the 2nd RBMP. The Drought Management Plan is available on the website of the WDD. In the present summary are given the results and conclusions of this calculation at national level.

As follows from the calculations that were done, the total index WEI+ is equal to 73.1%, that is leading to the conclusion that Cyprus is under significant pressure on water resources status even with the propitious limit of 60% as it was mentioned above.

The value of WEI+ for Cyprus as is calculated is in agreement with the previously published values of the index from the EU as is calculated for the whole Cyprus. For example in the figure below (available on the EAA website: http://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources/use-of-freshwater-resources-assessment-2) is presented the index WEI+ for whole European Union where it seems that the index WEI+ for Cyprus is approximately 65% for the year of the calculation 2007.

Figure 8-23: Comparative Assessment of the index WEI+ in the countries of EU with Cyprus occupying the first seat for the year 2007 without published data for the period 1990-2000.



Also during the consultation to determination of the WEI index+ was done the calculation of the index for all the European countries (available at EIONET) where the index WEI+ for Cyprus was estimated coarsely under the water balance and it was calculated from 62% to 77%.

8.4 SPECIAL TOURIST ACTIVITIES

Specifically are mentioned the golf courses which were examined during the review of the pressures on water as a result of the consultation that was held in June 2014 - December 2014 on Significant Issues of Water Management in Cyprus (2014).

Golf courses may cause pressure on the WB in three ways:

A. Pressures on quantity due to the large water needs of the courses

For all of the approximately 2,200 acres that are covered by 4 golf courses currently operating in Cyprus is consumed annually approximately 2 million. m^3 of water in condition that rational management of water use by all modern means for the water conservation that are internationally imposed are implemented.

B. Pressures on quality due to the high demanding on fertilizers and pesticides for the maintenance of lawns

The quantities of fertilizers that are applied to the golf courses are identified after the laboratory tests soil. In EIAS for the creation of the golf "LIMNI" in Pafos the amounts that are reported for nitrogen, phosphorus and potassium are 5, 2 and 7 kg/ha/week for the maintenance of the grass and 1, 0.25 and 1kg/ha/week for the first 8 weeks [See. literature, 10].

Regarding to pesticides and herbicides, in the above study are mentioned the following substances (a total area of 144 acres).

PESTICIDES	ACTIVE INGREDIENT	ANNUAL QUANTITY
insecticides	Cypermethrin	60 lit
	Chlorpyrifos	400 lit
	Bacillus Thuringiensis	100 kg
	Spinosad	50 lit
herbicides	Glyphosate	20 kg
	2,4-D	300 lit
fungicides	Iprodione	9 kg
	Fosetyl Al	18 kg
	Chlorothalonil	30 lit
Wetting agents		245 lit
TGR (turf growth regulator		18 lit
Micro Nutrients		195 kg

As it concerns the leaching of nutrients in WB, some researchers have reported a little or no leaching, while others have measured 80% or more of the applied amount of nitrogen.

In general the nitrate concentrations that are reported in the aquifer in golf course areas are ranging between 0,1 mg/L and 30 mg/L [See. literature, 78].

Regarding the loads to WBs from the surface runoff, in tests that were carried out in extreme conditions, ie sloping plot (9-11% gradient), at a rate of application of nitrogen 4 kg N/100 m^2 / year and irrigation 150 mm/hr, there was a little or no transfer of nitrogen through runoff (Douglas et al 1995) [See. literature, 10].

C. Hydromorphological alterations, due to the following:

- Loss of riparian vegetation,
- loss of wetlands

- Amendment of flow regime,
- Increase of the nutrients, salts, pesticides etc. to the surface WB,
- Import, movement and disturbance of fauna,
- Shifts and watercourse diversions.

The Golf courses in Cyprus are linked to the following WB and WGB:

Course	WB	WGB
Elea Golf Club	CY_1-4-m_RIh	-
Minthis Hills Golf Course	CY_1-4-m_RIh	CY_18
Aphrodite Hills Golf Course	CY_1-1-d_RIh_HM	CY_18
Secret Valley Golf Course	CY_1-1-d_RIh_HM	CY_11A

Although the EUROPEAN GOLF ASSOCIATION (EGA) considers that the presence of golf courses are compatible with the objectives of the Directive and did not recognize them as a significant pressure on WB, provided that their rational operation, though their evaluation should, in addition to the operating conditions, consider and related to their spatial concentration (how many courses in what area). The relative pressures and estimates in Cyprus should take into account and scenarios of climate change.

8.5 FLOW CONTROL AND MORPHOLOGICAL CHANGES

Some water bodies have been configured as HMWB or AWB in order to serve various needs and sustainable development activities, such as flood protection, storage of water for irrigation and drinking water supply, navigation etc. Detailed analysis of the pressures from the regulation of the flows and the morphological alterations in surface water bodies as well as their impact on their staus is accomplished in the 1st Interim Report No. 1 on the Final Designationof Heavily Modified and Artificial water bodies, July 2015 which is available on the website of the WDD. The conclusions of this study, regarding to the final designation of HMWBs and AWBs are given briefly in Chapter 7.3.3 of this report.

8.6 ARTIFICIAL RECHARGE OF GROUNDWATERS

artificial recharge is an effective method which is contributing to the protection, the preservation and the increase of available water resources. The application aims to the increase of the groundwater storage during winter with an expected effect of the increase of the recharge of the aquifers and enriching the available groundwater resources. In this context, is enabling the creation of conditions of combined use and rational management of the available surface and groundwater.

The expected contribution of a systematic application of the artificial recharge is the increase of the volume of available groundwater resources, the improvement of the quality of groundwater with storage of good water quality during the winter period of low consumption for the use during the summer peak season and the reduction and gradual repelling of the front seawater intrusion in coastal aquifers.

A basic parameter for the successful implementation of the recharge is the quality of the water used, which must be at least compatible and/or better than the water quality of recharged groundwater body. Of course, the artificial recharge should not be confused with the practices such as the subsurface disposal of degraded water that may cause quality degradation of the groundwater resources.

The choice of the most suitable method for the application of artificial recharge depends on many factors, the most significant of which are the hydrogeological conditions and especially the hydraulic parameters of the aquifers, the qualitative and quantitative characteristics of the available for recharge water and the conditions of transport and water availability.

The artificial recharge is a widely accepted method that is applied with great success for many decades. In Cyprus the artificial recharge of groundwater has gradually developed in specific areas with favorable conditions, first in research level and then at the application level.

Recharge of the groundwater aquifers is done today in Cyprus to the Yermasogeia area with water from the homonymous dam and in Ezousa area where through the respective Recharge project is done the utilization of treated water of the WWTP of Pafos but also in other areas with recharge small mounds.

Still, there have been studies related to the recharge with recycled water in the aquifer Akrotiri - Kouris river bed.

8.7 NATURAL BACKGROUND LEVELS OF POLLUTANS OF GROUNDWATER QUALITY

In some Groundwater Bodies (GWB) increased background levels for certain qualitative parameters are observed due to the natural bedrock and especially to the composition of the geological formations. GWBs for which Threshold Values (TV) with higher values for specific substances have been defined are the following:

- GWS CY-5 Gypsoi Maroni, with high concentrations for sulphates and high electrical conductivity due to the natural effects from the geological formation of gypsum.

- GWS CY-11B River bed Ezousa, with high concentrations of sulphates due to the transitions from the neighboring gypsiferous aquifer with high concentrations of sulfate ions. Water from this GWB is not used for water supply purposes.
- GWB CY-12-Letymvo Giolo with high concentrations of sulphates and high electrical conductivity due to the natural effects from the geological formation of gypsum.
- The GWB CY-15B River Bed Khrysokhou, with high concentrations of sulphates due to the transitions from the neighboring gypsiferous aquifer with high concentrations of sulfate ions. Water from this GWB is not used for water supply purposes.

It is noted that in the GWB CY-19 Troodos are still under investigation the observed in some regions, increased sulfate anion concentrations whose origin is thought to be due to the physical effects of the bedrock and in particular the establishment of the geological formations and the tectonic elements .

8.8 IMPACTS

8.8.1 Aggregated presentation of the loads

The following tables 16-1 and 16-2 present the aggregated presentation of the loads per pressure category. The main conclusions of the evaluation of these elements are the following:

- The most significant source of P & N is the agriculture (about 50%).
- Organic load is originated primarily from the animal livestock (70%).
- WWTP do not consist significant pressure and contribute about 2% to the total load of N and P.
- Significant is also the contribution of the settlements with no sewage network, which produce 14% of the organic load, 6% of P and 6% of N.
- Significant source of BOD is Vati which represents the 9% of total BOD at RWB level. With the completion of the recovery works these loads will be eliminated.
- The contribution of the marine aquaculture represents the 5% of the BOD.

Overall at RBD level the significant sources of the organic load production and nutrients are in order:

- Agriculture
- Livestock
- Settlements outside the sewerage system and
- Waste-reservoirs in Vathi

In the figures and tables below are presented the percentages for each pressure per pollutant category as are derived from the review of pressures that was made during the preparation of the 2nd RBMP. Detailed information is posted on the website of WDD.

Figure 8-24: Point sources. Rates of activity participation per pollutant category

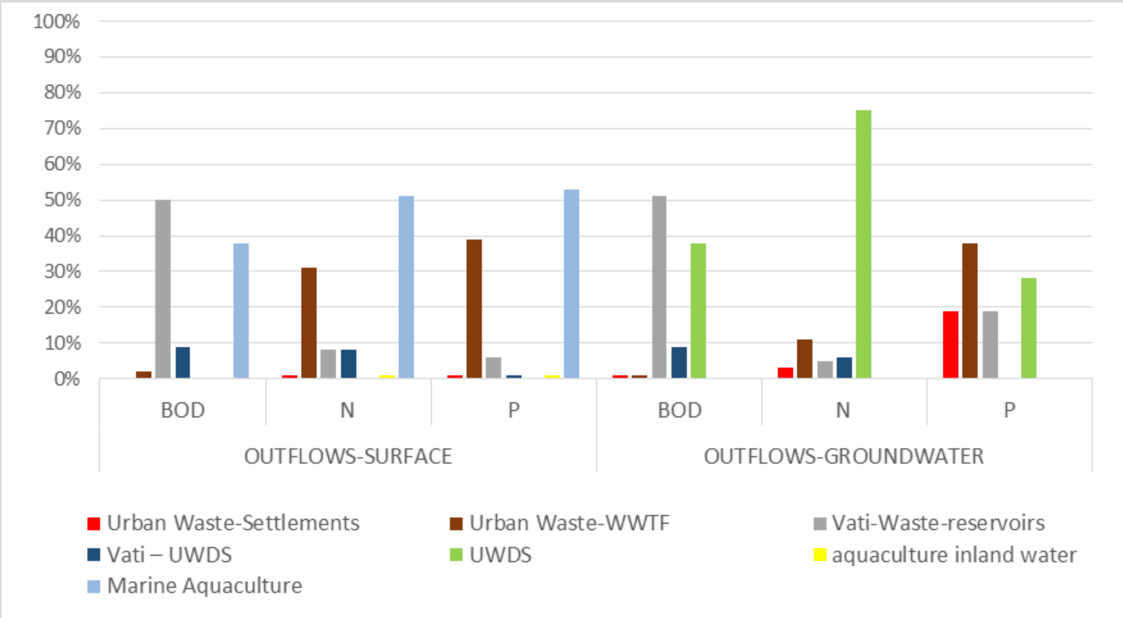


Figure 8-25: Diffuse sources. Rates of activity participation per pollutant category

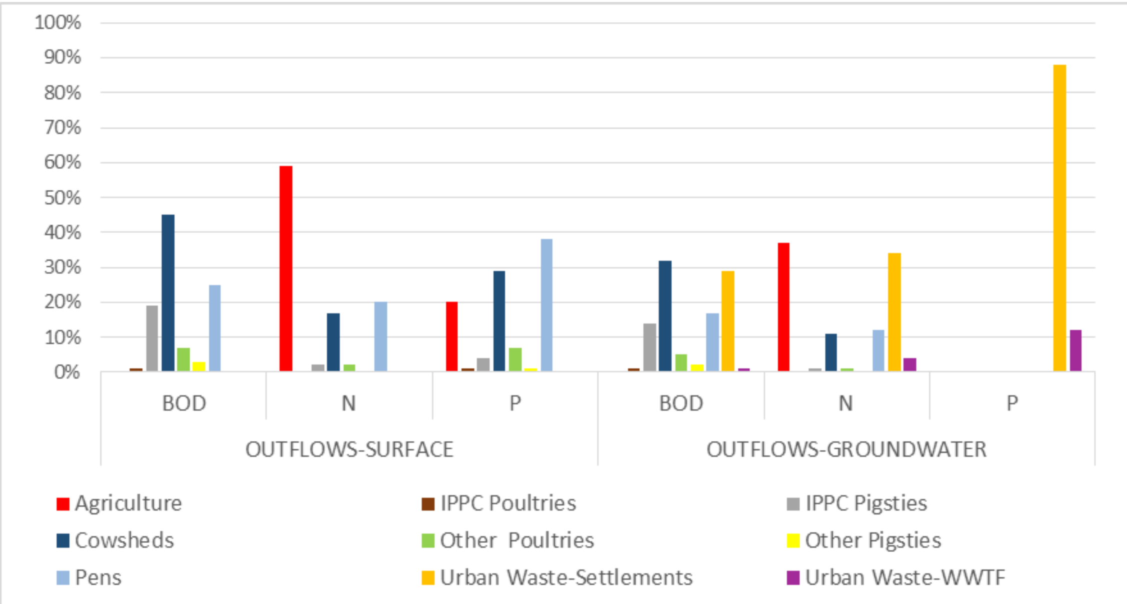


Table 8-53: Aggregated results from the evaluation of loads (tones/year)

Pressure Category	INFLOWS (tones/year)			DIFFUSE POLLUTION (tones/year)						POINT POLLUTION (tones/year)					
				OUTFLOWS-SURFACE			OUTFLOWS-GROUNDWATER			OUTFLOWS-SURFACE			OUTFLOWS-GROUNDWATER		
	BOD	N	P	BOD	N	P	BOD	N	P	BOD	N	P	BOD	N	P
TOTAL	58.403,2	27.584,0	6.276,2	4.311,4	880,9	70,1	20.103,9	4.800,6	391,3	7.520,0	909,2	157,9	1.860,6	315,1	10,6

Table 8-54: Aggregated results ffrom the the evaluation of loads Rates per pollutant and pressure category

	INFLOWS			DIFFUSE POLLUTION						POINT POLLUTION					
				OUTFLOWS-SURFACE			OUTFLOWS-GROUNDWATER			OUTFLOWS-SURFACE			OUTFLOWS-GROUNDWATER		
	BOD	N	P	BOD	N	P	BOD	N	P	BOD	N	P	BOD	N	P
Aggriculture	0%	48%	51%	0%	59%	21%	0%	37%	0%	0%	0%	0%	0%	0%	0%
Livestock	70%	41%	40%	100 %	41%	79%	71%	25%	0%	0%	0%	0%	0%	0%	0%
IPPC Poultry	3%	1%	2%	1%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
IPPC Pigsties	26%	11%	9%	19%	2%	4%	14%	1%	0%	0%	0%	0%	0%	0%	0%
Cowsheds	22%	12%	12%	45%	17%	29%	32%	11%	0%	0%	0%	0%	0%	0%	0%
Other Poultry	3%	1%	3%	7%	2%	7%	5%	1%	0%	0%	0%	0%	0%	0%	0%
Other Pigstries	3%	1%	1%	3%	0%	1%	2%	0%	0%	0%	0%	0%	0%	0%	0%
Pens	11%	14%	14%	25%	20%	38%	17%	12%	0%	0%	0%	0%	0%	0%	0%
Urban Waste-Settlements	14%	6%	6%	0%	0%	0%	29%	35%	88%	0%	1%	1%	1%	2%	15%
Urban Waste-WWTF	0%	2%	2%	0%	0%	0%	1%	4%	11%	2%	31%	39%	1%	11%	34%
Vati-Waste-reservoirs	8%	0%	0%	0%	0%	0%	0%	0%	0%	50%	8%	6%	51%	5%	21%
Vati – UWDS	1%	0%	0%	0%	0%	0%	0%	0%	0%	9%	8%	1%	9%	6%	4%
UWDS	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	38%	75%	26%
LS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
aquaculture inland water	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%
Marine Aquaculture and hatcheries	5%	2%	1%	0%	0%	0%	0%	0%	0%	38%	51%	53%	0%	0%	0%
	100%	100 %	100%	100 %	100 %	100%	100%	100 %	100%	100 %	100 %	100%	100%	100%	100 %

8.8.2 Assessment of pressures in GWB

The methodology that was used to determine the significant pressures on the GWB under the review of the pressures on the water are the following:

- The loads were determined per source category and pollutant.
- The loads were allocated to each GWB.
- the rate of participation of each source and pollutant category in the total load that any specific GWB receives was estimated
- It was considered that the crucial parameter that determines the significance of the pressures on the groundwater is the nitrogen load N.
- It was investigated the correlation of the chemical status of GWB with:
  - the load of nitrogen per unit of area of the groundwater body
  - the nitrogen-load ratio related to the threshold load resulting takinf into account the concentration of 50 mg NO_3 /l is in the annual recharge of the body.

It is noted that for GWB, that are located in areas that the Government of Cyprus does not exercise effective control, the assessment of the significance of the pressures may be underestimated, given the lack of data on the total area of these GWB.

As it concerns the loads rate is concluded that when loads are less than 0.8 the body is very unlikely to be found in poor quality (chemical) status. The same happens when the total amount of the nitrogen / ha is less than 10kg / ha.

Finally the characterization of the significance of the pressures that are associated with the quality (chemical) status of the GWB is based on the following criteria:

No pressure (**NP**) when the percentage of N in the total load of N of the GWB from a specific source is <5%.

No significant pressure NS (<) when the percentage of N in the total load of N of the GWB from a specific source is> 5% and <30%.

Significant pressure (**SP**) when the percentage of N in the total load of N of GWB from a specific source is> 30%.

Table 8-55: Assessment of the significance of the pressures n GWB in poor chemical status

GWB	Name	Marine Penetration *	Agriculture	Livestock	Settlements	WWTF	UWD
CY-1	Kokinochoria	Significant	Significant	Less Significant	Significant	Non Significant	Non Significant
CY-3B	Klti-Perivolia	Significant	Less Significant	Less Significant	Significant	Less Significant	Non Significant
CY-4	Softades-Vasilikos	Significant	Significant	Less Significant	Less Significant	Non Significant	Non Significant
CY-8	Limassol	Significant	Non Significant	Non Significant	Significant	Non Significant	Non Significant
CY-9	Akrotiri	Significant	Significant	Non Significant	Significant	Less Significant	Non Significant
CY-12	Letimvou- Ylolou	Non Significant	Significant	Less Significant	Less Significant	Non Significant	Non Significant
CY-15A	Khrysokhou-Yialia	Non Significant	Significant	Less Significant	Less Significant	Non Significant	Non Significant

** Mainly as a result of overflow*

8.8.3 Assessment of impacts on Surface WBs

The degree of impact of the pressures finally is estimated by the results of the monitoring program of the status of water bodies. In this constex WBs with significant pressures according to the above do not show status less than of good.

The tables below present WBs for which significant pressures that could impact on their status were identified. For thesr , in a separate column is given the ecological and chemical status / potential as an indicator of the impact of these pressures. Also as an indicator of the impact of the pressures on water, in a special table are given for each surface WB parameters that have exceeded the limits that have been set for the evaluation of water status and / or the qualitative parameters which has been assessed with significant changes.

Table 8-56: Significant pressures and impacts on river WB

WB Code	WB Name	Ecological Status / Potential	Chemical status	PRESSURE										
				Agriculture	UWD	Livestock	Vati wastewater	WWTF	Settlements WWTF sites	Aquaculture	Rainwater run-off cities and IA	Industries	Artificial surfaces	Abstractions
CY_1-1-a_RP	Khapotami	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	SP	NS
CY_1-1-b_RI	Khapotami	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-1-c_RIh	Khapotami	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-1-d_RIh_HM	Khapotami	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP	SP
CY_1-1-e_RI	Malleta	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-2-a_RP	Dhiarizos	G	G	NS	NS	NS	NS	NS	NS	SP	NS	NS	NS	SP
CY_1-2-b_RP	Dhiarizos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-2-d_RI_HM	Dhiarizos	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_1-2-e_RI	Tholos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-2-f_RIh	Yerovasinos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-3-a_RP	Roudhias	H	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-3-b_RI	Xeros Potamos	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-3-c_RIh	Xeros Potamos	M	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_1-3-e_RE_HM	Xeros Potamos	M	U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_1-3-f_RI	Lazaridhaes	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-3-g_RIh	Lefkarkon	G	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-4-a_RP	Ayia & Klimadhiou	H	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-4-b_RI	Ayia	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-4-d_RI_HM	Ezousa	M	G	SP	NS	SP	NS	NS	NS	NS	NS	SP	NS	SP
CY_1-4-e_RIh_HM	Ezousa	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_1-4-f_RP_HM	Ezousa	G	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_1-4-g_RI_HM	Ezousa	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_1-4-h_RIh_HM	Ezousa	G	U	SP	NS	SP	NS	NS	NS	NS	SP	NS	NS	SP
CY_1-4-i_RI	Paleomylou	G	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-4-j_RIh	Ayios Nepios	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-4-k_RIh	Varkas	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-4-L_RIh	Milarkou	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-4-m_RIh	Kochatis	M	G	SP	SP	SP	NS	NS	NS	NS	NS	NS	NS	NS

WB Code	WB Name	Ecological Status / Potential	Chemical status	PRESSURE										
				Agriculture	UWD	Livestock	Vati wastewater	WWTF	Settlements WWTF sites	Aquaculture	Rainwater run-off cities and IA	Industries	Artificial surfaces	Abstractions
CY_1-6-a_RIh	Mavrokolymbos	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-6-c_RIh_HM	Mavrokolymbos	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_1-6-d_RIh	Xeros	M	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-8-a_RIh	Kalamouli (Avgas)	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-8-b_RIh	Pevkos	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-1-a_RE	Ayiou Ioanni	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-2-a_RIh	Neraidhes & Ammadhkiou	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-2-b_RI	Garyllis	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-2-c_RI	Stavros tis Psokas	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-2-d_RI	Stavros tis Psokas	G	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-2-f_RI_HM	Stavros tis Psokas	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_2-2-g_RI_HM	Khrysokhou	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_2-2-h_RIh_HM	Khrysokhou	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_2-3-a_RIh	Mirmikoph	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-3-b_RIh	Argaki tis Limnis	M	F	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-3-c_RI	Magounda	G	G	SP	NS	NS	NS	NS	NS	NS	NS	SP	NS	NS
CY_2-3-d_RIh_HM	Magounda	G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_2-3-e_RE	Xeropotamos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-3-f_RP	Yialia	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-3-g_RI	Yialia	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-4-a_RIh	Xeros	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-4-b_RIh_HM	Xeros	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-4-c_RP	Maroti & Diali	H	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-4-d_RI	Livadhi	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-4-e_RIh_HM	Livadhi	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_2-5-a_RIh	Agios Theodoros	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-6-a_RIh	Katouris	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-6-b_RIh_HM	Katouris	M	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_2-7-a_RI	Pyrgos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-8-a_RP	Limnitis	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-9-a_RI	Kambos	G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	SP	NS

WB Code	WB Name	Ecological Status / Potential	Chemical status	PRESSURE										
				Agriculture	UWD	Livestock	Vati wastewater	WWTF	Settlements WWTF sites	Aquaculture	Rainwater run-off cities and IA	Industries	Artificial surfaces	Abstractions
CY_2-9-b_RP	Kambos	M	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_2-9-c_RI	Kambos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-9-d_RIh_HM	Kambos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-1-a_RP	Xeros	H	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-1-b_RI	Xeros	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-1-c_RI_HM	Xeros	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-2-a_RP	Marathasa	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_3-2-b_RP_HM	Marathasa	G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_3-2-d_RI	Rkondas	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-3-a_RP	Agios Nikolaos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-3-b_RP	Karyiotis	M	G	SP	NS	SP	NS	NS	NS	SP	NS	NS	NS	SP
CY_3-3-c_RI	Karyiotis	M	U	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_3-3-d_RP	Argaki tou Karvouna	M	G	NS	NS	NS	NS	NS	NS	SP	NS	NS	NS	NS
CY_3-3-e_RI	Alykhnos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-4-a_RI	Atsas	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-4-b_RIh	Atsas	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-4-c_RIh_HM	Atsas	M	U	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_3-5-a_RI	Lagoudhera	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-5-c_RI_HM	Lagoudhera	M	F	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_3-5-d_RIh_HM	Elia	M	F	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_3-5-e_RI	Kannavia	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-5-f_RI	Asinou	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-7-a_RI	Peristerona	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-7-b_RIh	Peristerona	G	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-7-d_RI	Maroullenas	G	G	NS	NS	SP	NS	NS	SP	NS	NS	NS	NS	NS
CY_3-7-e_RI	Kambi	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-7-f_RI_HM	Maroullenas	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-7-g_RI	Pharmakas	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-7-h_RI_HM	Pharmakas	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-7-j_RIh_HM	Akaki	M	U	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_3-7-m_RE	Likythia	G	U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

WB Code	WB Name	Ecological Status / Potential	Chemical status	PRESSURE										
				Agriculture	UWD	Livestock	Vati wastewater	WWTF	Settlements WWTF sites	Aquaculture	Rainwater run-off cities and IA	Industries	Artificial surfaces	Abstractions
CY_3-7-n_RIh	Koutis & Aloupos	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_6-1-a_RIh	Pedhieos & Ayios Onouphrios	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_6-1-c_RIh_HM	Pedhieos	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_6-5-a_RIh	Yialias	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_6-5-b_RI	Yialias	P	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_6-5-e_RIh	Koutsos	G	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_6-5-f_RIh_HM	Koutsos	M	G	SP	NS	SP	NS	NS	NS	NS	NS	SP	NS	SP
CY_6-5-g_RE	Villourkon	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_6-5-h_RE	Alykos	M	U	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_6-5-i_RE	Almyros	G	U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_7-2-a_RIh	Vathys	M	U	SP	NS	SP	NS	NS	NS	NS	SP	NS	NS	NS
CY_8-3-a_RE	Kalo Chorio	M	U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_8-3-b_RE	Ανώνυμο	M	U	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-4-g_RE	Agios Ioannis	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-5-a_RIh	Pouzis	G	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-6-a_RIh	Xeropotamos	M	G	SP	NS	SP	NS	NS	NS	NS	NS	SP	NS	NS
CY_8-7-a_RI	Syrkatis	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-7-c_RI_HM	Syrkatis	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_8-7-d_RIh	Argaki tou Mylou	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-7-f_RI_HM	Pendaskhinos	M	G	SP	NS	SP	NS	NS	SP	NS	NS	NS	NS	SP
CY_8-7-g_RIh_HM	Pendaskhinos	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_8-8-a_RI	Ayiou Mina	G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-8-b_RIh	Ayiou Mina	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-8-c_RIh_HM	Ayiou Mina	M	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_8-9-a_RI	Vasilikos	G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-9-b_RI_HM	Vasilikos	G	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-9-c_RI	Vasilikos	M	G	SP	NS	NS	NS	NS	NS	NS	NS	SP	NS	SP
CY_8-9-e_RI_HM	Vasilikos	M	U	NS	NS	SP	NS	NS	NS	NS	NS	NS	SP	SP
CY_8-9-f_RIh_HM	Vasilikos	M	U	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	SP
CY_8-9-g_RIh	Exovounia	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-9-h_RIh	Argaki tis Asgatas	G	U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

WB Code	WB Name	Ecological Status / Potential	Chemical status	PRESSURE										
				Agriculture	UWD	Livestock	Vati wastewater	WWTF	Settlements WWTF sites	Aquaculture	Rainwater run-off cities and IA	Industries	Artificial surfaces	Abstractions
CY_9-1-b_RIh	Pyrgos	M	U	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-a_RI	Karydhaki	G	G	NS	NS	NS	NS	NS	SP	NS	NS	NS	NS	NS
CY_9-2-b_RP	Agios Paulos	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-c_RI	Yermasogeia	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-d_RI_HM	Yermasogeia	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_9-2-e_RI	Yermasogeia	G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-f_RI	Yermasogeia	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-h_RIh_HM	Yermasogeia	M	G	NS	NS	SP	NS	NS	NS	NS	SP	NS	SP	SP
CY_9-2-i_RIh	Pissokamina	M	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-j_RI	Yialiadhes	H	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-k_RI	Yialiadhes	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-L_RI_HM	Yialiadhes	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-4-b_RI	Garyllis	G	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-4-c_RI	Garyllis	P	F	NS	SP	SP	SP	NS	NS	NS	NS	NS	NS	NS
CY_9-4-e_RIh_HM	Garyllis	M	U	NS	NS	SP	NS	NS	NS	NS	SP	NS	NS	SP
CY_9-4-g_RIh	Phasoula	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-a_RP	Ayios Ioannis	M	G	SP	NS	SP	NS	NS	SP	NS	NS	NS	NS	SP
CY_9-6-b_RP	Ambelikos-Agros	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_9-6-c_RP		G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-d_RP_HM		M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-e_RP	Ambelikos-Xylourikos	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-f_RI	Limnatis	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-g_RI	Pelendri	G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-h_RI	Agios Mamas	G	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-i_RP	Loumata	H	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-k_RP_HM	Loumata	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_9-6-L_RP	Kouris	P	F	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	SP
CY_9-6-m_RP_HM	Kouris	M	G	SP	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-n_RP	Mesapotamos	H	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-o_RP	Moniatis	M	G	NS	NS	NS	NS	SP	NS	NS	NS	NS	NS	NS
CY_9-6-p_RP	Kryos	G	G	NS	NS	NS	NS	SP	NS	SP	NS	NS	NS	NS

WB Code	WB Name	Ecological Status / Potential	Chemical status	PRESSURE										
				Agriculture	UWD	Livestock	Vati wastewater	WWTF	Settlements WWTF sites	Aquaculture	Rainwater run-off cities and IA	Industries	Artificial surfaces	Abstractions
CY_9-6-q_RP_HM	Kryos	G	G	SP	NS	SP	NS	SP	SP	NS	NS	NS	NS	SP
CY_9-6-r_RI_HM	Kryos	M	G	NS	NS	SP	NS	SP	NS	NS	NS	NS	NS	SP
CY_9-6-t_RI_HM	Kouris	M	U	NS	NS	SP	NS	SP	NS	NS	NS	NS	NS	SP
CY_9-7-b_RE	Symvoulas	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-8-a_RIh	Paramali	M	G	NS	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-8-b_RI	Evdhimou (Mandalas)	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-8-c_RIh	Evdhimou	M	G	SP	NS	SP	NS	NS	NS	NS	NS	NS	NS	NS

Ecological Status	*H: High*	*G:Good*	*M:Moderate*	*P:Poor*	*B:Bad*	*U:Unkown*
Chemical Status	*G:Good*				*F:Lower than bad*	

Table 8-2 : Significant pressures and impacts on impounded rivers (RWBs)

WB Code	WB Name	Status/ Potential	Chemical status	Agriculture	UWD	Livestock	VATi Waste	WWTF	Settlements sites WWTF	Aquacultures/	Rainfall runoffs of cites and IA	Industries	Road Network / Artificial Surfaces	Abstractions
CY_1-2-c_RP_HM_IR	Arminou	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-3-d_RIh_HM_IR	Asprokremmos	G	G	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-4-c_RI_HM_IR	Kannaviou	G	G	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
CY_1-6-b_RIh_HM_IR	Mavrokolymbos	G	G	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
CY_2-2-e_RI_HM_IR	Evretou	G	G	S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-5-b_RI_HM_IR	Xyliatos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_3-7-i_RI_HM_IR	Akaki-Malounda	M	G	S	S	S	NS	NS	NS	NS	NS	NS	NS	NS
CY_6-1-b_RIh_HM_IR	Tamassos	G	G	S	NS	S	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-7-b_RI_HM_IR	Lefkara	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-7-e_RI_HM_IR	Dipotamos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_8-9-d_RI_HM_IR	Kalavasos	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-2-g_RI_HM_IR	Yermasogeia	M	F	S	S	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-4-d_RI_HM_IR	Polemidia	B	F	NS	NS	S	NS	S	NS	NS	NS	NS	NS	NS
CY_9-6-j_RP_HM_IR	Pano Platres	G	G	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CY_9-6-s_RP_HM_IR	Kouris	G	G	NS	NS	S	NS	S	NS	NS	NS	NS	NS	NS

Ecological Pottential		*G:Good*	*M:Moderate*	*P: Poor*	*B:Bad*
Chemical Status	*G:Good*				*F:Less than good*

For impounded rivers, significant pressures which affect their status are recorded for the reservoirs Polemidia, Yermasogeia and Klirou Malounta

In impounded river Polemidia are observed exceedances for pH, TP, coliforms and enterococci as well as Cd, Hg, Pb, Chlorpyrifos that are likely come from the Vati and WWTP of Limassol.

In the impounded river Yermasogeia are observed exceedances for pH, the TP, coliforms and Lead as likely to come from the uncontrolled waste disposal sites in the region.

For the impounded river Klirou Malounta moderate status due to Biological Quality Standards can not be associated with the pressures which and mainly concern rural activities that are developed in the region and in the presence of a Quarry and an UWDS.

Detailed presentation of the pressures of the impounded rivers is done in the Study of the WDD «Review and update of Article 5 of Directive 2000/60 / EC (water reservoirs) & Classification of water status (rivers, natural lakes and water reservoirs), that will establish baseline information and data for the 2nd Cyprus River Basin Management Plan »2014 which is available on the website of WDD

For lake WBs were used the findings of the study 02 / 2013 in conjunction with the review of the pressures accomplished through the contract pressures 1/2014 that was implemented during the preparation of the 2nd RBMP with purpose the review of the pressures and impacts on water status [See. literature, 10]. This study is available on the website of the WDD.

Table 8-57: Assessment of the significance of the pressures on lake WBs

WB Code	WB Name	Agriculture	Livestock	hydromorphological Alterations	Rainwater run-off of cities and IA
CY_8-3-2_11_L1	Larnaca main almiri lake	SP	NS	SP	SP
CY_8-3-2_17_L2	Larnaca Aerport Lake	SP	NS	SP	SP
CY_8-3-2_13_L2	Larnaca lake Soros	SP	NS	SP	SP
CY_8-3-2_12_L2	Larnaca LAke Orfani	SP	NS	SP	SP
CY_9-5-3_10_L2	Alimiri Lake Akrotiri	SP	NS	SP	NS
CY_7-2-6_16_L2-HM	Paralimni	SP	SP	SP	SP
CY_7-1-2_34_L3-A	Achna	SP	NS	SP	NS
CY_8-1-2_09_L2-HM	Oroklini	SP	NS	SP	SP

Finally as it concerns coastal water bodies, according to the conclusions of a study conducted by DFMR they are all in a good stauts and above and they are not affected by significant pressures except of hydromorphological alterations, which was the reason for the designation 4 of them as HMWB.

Table 8-58: Impacts on Surface WBs. Excedences for qualitative parameters Effects on quality characteristics

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
River WBs								
CY_1-1-a_RP	Khapotami	NO_3^-	NS**	YES	NS**	NS**	Composition and abundance of macroinvertebrates / Impact on macrophytes	NS**
CY_1-1-b_RI	Khapotami	NS**	NS**	NS**	NS**	NS**	Composition and abundance of macroinvertebrates	NS**
CY_1-1-c_RIh	Khapotami	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-1-d_RIh_HM	Khapotami	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_1-1-e_RI	Malleta	NS**	NS**	NS**	NS**	NS**	Composition and abundance of macroinvertebrates	NS**
CY_1-2-a_RP	Dhiarizos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-2-b_RP	Dhiarizos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-2-d_RI_HM	Dhiarizos	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_1-2-e_RI	Tholos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-2-f_RIh	Yerovasinos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-3-a_RP	Roudhias	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-3-b_RI	Xeros Potamos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-3-c_RIh	Xeros Potamos	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_1-3-e_RE_HM	Xeros Potamos	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_1-3-f_RI	Lazaridhaes	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-3-g_RIh	Lefkarkon	NS**	NS**	NS**	NS**	NS**	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
CY_1-4-a_RP	Ayia & Klimadhiou	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-4-b_RI	Ayia	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-4-d_RI_HM	Ezousa	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_1-4-e_RIh_HM	Ezousa	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_1-4-f_RP_HM	Ezousa	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_1-4-g_RI_HM	Ezousa	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_1-4-h_RIh_HM	Ezousa	NS**	NS**	NS**	NS**	NS**	NS**	ES
CY_1-4-i_RI	Paleomylou	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-4-j_RIh	Ayios Nepios	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_1-4-k_RIh	Varkas	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_1-4-m_RIh	Kochatis	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_1-6-a_RIh	Mavrokolymbos	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_1-6-c_RIh_HM	Mavrokolymbos	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_1-6-d_RIh	Xeros	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_1-8-a_RIh	Kalamouli (Avgas)	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-8-b_RIh	Pevkos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-1-a_RE	Ayiou Ioanni	NO3-	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-2-a_RIh	Neraidhes & Ammadhkiou	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
CY_2-2-b_RI	Garyllis	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_2-2-c_RI	Stavros tis Psokas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-2-d_RI	Stavros tis Psokas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-2-f_RI_HM	Stavros tis Psokas	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_2-2-g_RI_HM	Khrysokhou	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_2-2-h_RIh_HM	Khrysokhou	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_2-3-a_RIh	Mirmikoph	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_2-3-b_RIh	Argaki tis Limnis	NO_3^-	NH4-	YES	B	Cd	NS**	NS**
CY_2-3-c_RI	Magounda	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-3-d_RIh_HM	Magounda	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_2-3-e_RE	Xeropotamos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-3-f_RP	Yialia	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-3-g_RI	Yialia	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-4-a_RIh	Xeros	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-4-b_RIh_HM	Xeros	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_2-4-c_RP	Maroti & Diali	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-4-d_RI	Livadhi	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-4-e_RIh_HM	Livadhi	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_2-5-a_RIh	Άγιος Θεόδωρος	NS**	NS**	NS**	NS**	NS**	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
CY_2-6-a_RIh	Katouris	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-6-b_RIh_HM	Katouris	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_2-7-a_RI	Pyrgos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-8-a_RP	Limnitis	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-9-a_RI	Kambos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-9-b_RP	Kambos	NO3-	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-9-c_RI	Kambos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_2-9-d_RIh_HM	Kambos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-1-a_RP	Xeros	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-1-b_RI	Xeros	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-1-c_RI_HM	Xeros	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-2-a_RP	Marathasa	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-2-b_RP_HM	Marathasa	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_3-2-d_RI	Rkondas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-3-a_RP	Ayios Nikolaos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-3-b_RP	Karyiotis	NO3-	NO2-	YES	NS**	NS**	Macrophytes / Macroinvertebrates	NS**
CY_3-3-c_RI	Karyiotis	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_3-3-d_RP	Argaki tou Karvouna	NO3-	NS**	YES	NS**	NS**	Macrophytes / Macroinvertebrates	NS**
CY_3-3-e_RI	Alykhnos	NS**	NS**	NS**	NS**	NS**	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substanc es *	Effects on Biological Quality Elements	hydromorpho-logical alterations
CY_3-4-a_RI	Atsas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-4-b_RIh	Atsas	NO3-	NS**	YES	NS**	NS**	NS**	NS**
CY_3-4-c_RIh_HM	Atsas	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_3-5-a_RI	Lagoudhera	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-5-c_RI_HM	Lagoudhera	NS**	NS**	NS**	NS**	Cd	phytobenthos / macroinvertebrates	YES
CY_3-5-d_RIh_HM	Elia	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_3-5-e_RI	Kannavia	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-5-f_RI	Asinou	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-a_RI	Peristerona	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-b_RIh	Peristerona	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-d_RI	Maroullenas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-e_RI	Kambi	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_3-7-f_RI_HM	Maroullenas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-g_RI	Pharmakas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-h_RI_HM	Pharmakas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-j_RIh_HM	Akaki	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_3-7-m_RE	Likythia	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-n_RIh	Koutis & Aloupos	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_6-1-a_RIh	Pedhieos & Ayios	NS**	NS**	NS**	NS**	NS**	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
	Onouphrios							
CY_6-1-c_RIh_HM	Pedhieos	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_6-5-a_RIh	Yialias	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_6-5-b_RI	Yialias	NO3-	NH4-, NO2-	YES	NS**	NS**	macroinvertebrates	NS**
CY_6-5-e_RIh	Koutsos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_6-5-f_RIh_HM	Koutsos	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_6-5-g_RE	Villourkon	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_6-5-h_RE	Alykos	NO3-	NS**	NS**	NS**	NS**	NS**	NS**
CY_6-5-i_RE	Almyros	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_7-2-a_RIh	Vathys	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_8-3-a_RE	Kalo Chorio	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-3-b_RE	Without name	NO3-	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-4-g_RE	Agios Ioannis	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-5-a_RIh	Pouzis	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-6-a_RIh	Xeropotamos	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_8-7-a_RI	Syrkatis	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-7-c_RI_HM	Syrkatis	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_8-7-d_RIh	Argaki tou Mylou	NS**	NS**	NS**	NS**	NS**	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
CY_8-7-f_RI_HM	Pendaskhinos	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_8-7-g_RIh_HM	Pendaskhinos	NO3-	NS**	NS**	NS**	NS**	NS**	YES
CY_8-8-a_RI	Ayiou Mina	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-8-b_RIh	Ayiou Mina	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_8-8-c_RIh_HM	Ayiou Mina	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_8-9-a_RI	Vasilikos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-9-b_RI_HM	Vasilikos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-9-c_RI	Vasilikos	NO3-	NO2-	YES	NS**	NS**	NS**	NS**
CY_8-9-e_RI_HM	Vasilikos	NS**	NS**	NS**	NS**	NS**	NS**	YES
CY_8-9-f_RIh_HM	Vasilikos	NO3-	NS**	NS**	NS**	NS**	NS**	YES
CY_8-9-g_RIh	Exovounia	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_8-9-h_RIh	Argaki tis Asgatas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-1-b_RIh	Pyrgos	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_9-2-a_RI	Karydhaki	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-2-b_RP	Agios Pavlos	NO3-	NS**	YES	NS**	NS**	Macrophytes / Macroinvertebrates	NS**
CY_9-2-c_RI	Yermasogeia	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_9-2-d_RI_HM	Yermasogeia	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_9-2-e_RI	Yermasogeia	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-2-f_RI	Yermasogeia	NS**	NS**	NS**	NS**	NS**	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
CY_9-2-h_RIh_HM	Yermasogeia	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_9-2-i_RIh	Pissokamina	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_9-2-j_RI	Yialiadhes	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-2-k_RI	Yialiadhes	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-4-b_RI	Garyllis	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-4-c_RI	Garyllis	PO4-, NO3-	BOD, NH4-, NO2-, TP	YES	NS**	Hg, Ni, Trifluralin	phytobenthos / macroinvertebrates	NS**
CY_9-4-e_RIh_HM NS**	Garyllis	NO3-	NS**	NS**	NS**	NS**		YES
CY_9-4-g_RIh	Phasoula	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_9-6-a_RP	Agios Ioannis	PO4-, NO3-	BOD, DO, NH4-, NO2-,TP	NS**	NS**	NS**	NS**	NS**
CY_9-6-b_RP	Ambelikos-Agros	PO4-, NO3-	NO2-, TP	NS**	NS**	NS**	macroinvertebrates	NS**
CY_9-6-c_RP		NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-d_RP_HM		NO3-	NS**	YES	NS**	NS**	NS**	NS**
CY_9-6-e_RP	Ambelikos-Xylourikos	NO3-	NO2-	NS**	NS**	NS**	NS**	NS**
CY_9-6-f_RI	Limnatis	NO3-	NO2-	NS**	NS**	NS**	NS**	NS**
CY_9-6-g_RI	Pelendri	NS**	NS**	NS**	NS**	NS**	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
CY_9-6-h_RI	Ag. Mamas	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-i_RP	Loumata	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-k_RP_HM	Loumata	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-m_RP_HM	Kouris	NO3-	NS**	YES	NS**	NS**	NS**	NS**
CY_9-6-n_RP	Mesapotamos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-o_RP	Moniatis	NO3-	NS**	YES	NS**	NS**	Macrophytes / Macroinvertebrates	NS**
CY_9-6-p_RP	Kryos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-q_RP_HM	Kryos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-r_RI_HM	Kryos	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_9-6-t_RI_HM	Kouris	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	YES
CY_9-7-b_RE	Symvoulas	NS**	NS**	NS**	NS**	NS**		NS**
CY_9-8-a_RIh	Paramali	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_9-8-b_RI	Evdhimou (Mandalas)	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
CY_9-8-c_RIh	Evdhimou	NS**	NS**	NS**	NS**	NS**	macroinvertebrates	NS**
Impounded rivers								
CY_1-2-c_RP_HM_IR	Armini	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-3-d_RIh_HM_IR	Asprocremmou	NS**	NS**	NS**	NS**	NS**	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
CY_1-4-c_RI_HM_IR	kanavia	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_1-6-b_RIh_HM_IR	Mavrokolymbos	NS**	DO	NS**	NS**	NS**	NS**	NS**
CY_2-2-e_RI_HM_IR	Evretou	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-5-b_RI_HM_IR	Xyliatos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_3-7-i_RI_HM_IR	Araki-Malounta	NS**	NS**	NS**	NS**	NS**	phytoplankton	NS**
CY_6-1-b_RIh_HM_IR	Tamasos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-7-b_RI_HM_IR	lefkarom	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-7-e_RI_HM_IR	dipotammos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_8-9-d_RI_HM_IR	kalavassos	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-2-g_RI_HM_IR	Yermasogeia	NS**	TP	NS**	NS**	Pb	phytoplankton	NS**
CY_9-4-d_RI_HM_IR	Polemidia	NS**	TP	YES	NS**	Cd, Hg, Pb, Chlorpyrifos	phytoplankton	NS**
CY_9-6-j_RP_HM_IR	Pano Platres	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-s_RP_HM_IR	Kouris	NS**	NS**	NS**	NS**	NS**	NS**	NS**
CY_9-6-L_RP	Kouris	NO3-	NO2-	NS**	NS**	Ni	NS**	NS**

Code	Name	Excesses of nutrients *	Organic Pollution *	Salinity (High conductivity prices)	Specific Pollutants *	Priority substances *	Effects on Biological Quality Elements	hydromorpho-logical alterations
Lake WBs								
CY_1-4-L_RIh	Milarkou	NS**	NS**	NS**	NS**	NS**	Unable to assess	NS**
CY_7-1-2_34_L3-A	Achna	NS**	NS**	NS**	NS**	NS**	Unable to assess	Artificial WB
CY_7-2-6_16_L2-HM	Paralimni	NS**	NS**	NS**	NS**	NS**	Unable to assess	YES
CY_8-1-2_09_L2-HM	oroklini	NS**	NS**	NS**	NS**	NS**	Unable to assess	YES
CY_8-3-2_11_L1	Larnaca main almiri lake	NS**	NS**	NS**	NS**	NS**	Unable to assess	NS**
CY_8-3-2_12_L2	Larnaca Laka Orfani	NS**	NS**	NS**	NS**	NS**	Unable to assess	NS**
CY_8-3-2_13_L2	Larnaca lake Soros	PO4-, NO3-	NS**	NS**	NS**	NS**	Unable to assess	NS**
CY_8-3-2_17_L2	Larnaca Lake Airport	PO4-, NO3-	NS**	NS**	NS**	NS**	Unable to assess	NS**
CY_9-2-L_RI_HM	Yialiadhes	NO3-	BOD, NH_4^-	YES	NS**	NS**	Unable to assess	NS**
CY_9-5-3_10_L2	Almiri Lake Ακρωτήρι	PO4-, NO3-	NS**	NS**	NS**	NS**	Unable to assess	NS**

* are Indicated the parameters that are showing the exceedances of quality limits

** Non Significant pressure (NS) –excesses do not appeared to quality standard

9. MONITORING PROGRAM OF WATER STATUS

According to Article 8 of the WFD, Member States ensure the establishement of monitoring programs of water status in order to establish a cohesive and comprehensive overview of water status within each RBD. The programs concern the monitoring of the ecological and chemical status of surface waters and the qualitative and quantitative status of groundwaters. Moreover is ensured the monitoring of water status of protected areas.

The monitoring program of Cyprus was initially designed based on results of a specific project, which was implemented within the framework of Contract WDD 46/2005 «Development of Integrated Water Monitoring Programmes and Tools for cost – effective Monitoring and assessment to support sustainability of water resources and the implementation of Water Framework Directive 2000/60/EC in Cyprus», and then was revised based on the results of the 1st RBMP in order to cover fully the relevant providence of the WFD.

9.1 MONITORING PROGRAM OF SURFACE WBs

The monitoring program of surface water includes:

- **Surveillance Monitoring,** which aims to the provision of information for the assessment of impacts which are arisen from pressures, the design of future monitoring programs and the assessment of long-term changes in natural conditions that have arisen as a result of human activity.
- **Operational Monitoring,** that aims to the identification of status of water bodies which are estimated that are at risk to achive the Environmental objectives of WFD and to the evaluation of possible changes that may arise from the implementation of the program of measures.

9.1.1 Monitoring Program of RWBs

9.1.1.1 Ecological Status

For the assessment of status of river water bodies, all Member State needs to develop national methods for BQE.

Cyprus has developed a monitoring program (since 2006) and relevant national methods for the biological monitoring of river WB. For this purpose, Cyprus has participated in the 1st

(2004-2008) and in the 2nd phase (2008-2011) of the Intercalibration exercise in Geographical Group of Mediterranean successfully. (MedGIG), [See bibliography, 122].

After the submission of the 1st RBMP in 2011, Cyprus revised and developed further the monitoring network according to the proposed program of measures. Also, all necessary actions were implemented in order to fill the shortcomings, which concern the BQE methods and the monitoring in river water bodies. In this context, in water bodies of Cyprus was checked the applicability of all the BQE, which were not available and therefore aren't included in the assessment of the situation for the 1st RBMP.

The revision of the monitoring program of rivers has as target:

- the implementation of functional monitoring in water bodies, which failed to have good ecological status based on the data of the 1st RBMP,
- its expansion with more stations in order to be covered and River WB with intermittent flow.

As a result, the new monitoring network that was implemented and its results are utilized in the 2nd RBMP which includes more stations by 50% compared to the monitoring network of the 1st RBMP (61 monitoring stations compared to 40 stations in the 1st RBMP).

Of the total of 61 monitoring stations:

- 28 stations have included in the operational monitoring network and
- 33 stations have included in the surveillance monitoring program.

For the impounded rivers because of the different characteristics which shows, compared to the rivers, the development of other methods for the assessment of their situation compared to the biological quality elements is required. In this context, Cyprus has developed the Mediterranean Assessment System for Reservoirs Phytoplankton (MASRP).

During the 2nd phase of Intercalibration exercise, the method was slightly modified and was renamed to NMASRP (New Mediterranean Assessment System for Reservoirs Phytoplankton, Mediterranean Lake Phytoplankton ecological assessment methods - Intercalibration Technical Report, 2014).

Samplings were conducted according to the NMASRP methodology and samples were collected at least two times per year, during the summer period. In total, 125 phytoplankton samples were collected from 13 impounded river water bodies and analyzed during the period 2009-2013 for the evaluation of ecological potential of impounded rivers[4].

In addition to the Biological Quality Elements which were mentioned above for the assessment of ecological status are required data and physico-chemical parameters and specific pollutants. The assessment system for these parameters have not changed compared to the 1st RBMP because its correlation with physicochemical data of Cyprus is strong [See bibliography, 124].

4 For the reservoirs Tamassou and Klirou data are available is since 2014

The chemical (specific pollutants) and Physico-chemical parameters are determined at 63 stations of the above monitoring network by Hydrometry Department of WDD.

The parameters that tested for **river WB** as well as the Chronological Range of measurements for each parameter are presented in the following Table.

Table 9-59: Data on Chemical - Physicochemical Parameters in RWBs monitoring stations

Category of Chemical – Physicochemical parameters	Parameter	Chronological Range	
		Starts at	Ends at
Organic Load	BOD_5	6/2009	5/2013
	DO	6/2009	6/2013
	NH_4^+	6/2009	5/2013
	NO_2^-	6/2009	5/2013
	TP	6/2009	5/2013
Chemical Load,	NO_3^-	6/2009	5/2013
	PO_4^{-3}	6/2009	5/2013
Salinity	EC	6/2009	6/2013
	Na^+ (for SAR)	6/2009	5/2013
	Ca^{+2} (for SAR)	6/2009	5/2013
	Mg^{+2} (for SAR)	6/2009	5/2013
Specific pollutants	Cu	11/2009	5/2013
	B	6/2009	5/2013
	Zn	1/2010	5/2013

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.2.1.2-1)]

Apart from the data presented in the above table, data concerning the water hardness were also utilised in order to set the limits for Cu and Zn.

For the assessment of the ecological potential of impounded rivers chemical - physicochemical parameters are tested which are presented in the table below.

Data for water hardness at rivers monitoring stations (apart from the impounded rivers) chronologically range from 06/2009 to 06/2013.

Table 9-60: Data on e chemical physico-chemical quality elements at monitoring stations of impounded rivers

Chemical - Physicochemical Quality	Chronological Range of available data	
	Starts at	Ends at
DO	06/2009	07/2013
EC	06/2009	07/2013
NH_4-N	06/2009	07/2013
TP	06/2009	07/2013
pH	06/2009	07/2013
Total coliforms	06/2009	09/2012
As	02/2010	03/2013
B	11/2009	03/2013
Cr	02/2010	03/2013
Cu	02/2010	03/2013
Fe	02/2010	03/2013
Zn	02/2010	03/2013

In addition to the above, in water bodies with high ecological status according to the Biological Quality Standards and the standards for Chemical - Physicochemical parameters, the hydromorphological quality elements are tested in accordance with the Guidance Document No.13/ These data are taking into account for the classification between high ecological status and good ecological status.

In this context from the examination of 68 regions, 31 areas were found to be in high hydromorphological condition, 19 of these 31 areas that have high status, correspond to hydromorphological estimates, which carried out in reference areas [See. bibliography, 124].

In the case of <u>impounded rivers</u>, there isn't "High" quality potential, only "more than good". Consequently, no further assessment of this quality of data is required for these HMWB [See. bibliography, 124].

9.1.1.2 Chemical status

The monitoring network of the chemical status of river WB includes 41 monitoring stations in rivers and 15 stations in the impounded rivers.

Measurements for priority substances in river WB that are utilized for the 2nd RBMP concerns the period from 2009 to 2013 and for impounded rivers from 2010 to 2013. For the Tamassou and Klirou reservoirs the data is since 2014. Auxiliary information with regard to the water hardness per station is utilized for the same period [See. bibliography, 122]. In the following tables (Table 9-3 and Table 9-4) are illustrated details of the parameters which are monitored per monitoring station.

Table 9-61: Priority substances which are monitored in RWBs monitoring stations (impounded rivers excluded)

Priority substance in accordance with Annex I of the Directive 2008/105/EC		CAS Number	r1-1-3-95	r1-2-6-89	r1-3-5-05	r1-4-3-35	r2-2-3-95	r2-2-5-75	r2-3-2-96	r2-3-4-80	r2-9-2-50	r3-2-1-85	r3-3-1-60	r3-3-3-95	r3-4-2-90	r3-5-4-40	r3-7-1-55	r3-7-1-84	r3-7-3-71	r6-1-1-72	r6-1-1-80	r6-1-2-38	r6-1-2-90	r6-1-5-52	r6-5-3-15	r6-5-3-50	r8-4-1-37	r8-4-1-52	r8-4-3-40	r8-4-5-30	r8-7-1-65	r8-7-2-60	r8-9-5-40	r9-2-3-05	r9-2-3-85	r9-2-4-95	r9-4-3-41	r9-4-3-80	r9-6-1-44	r9-6-1-87	r9-6-3-36	r9-6-4-92	r9-6-6-32
1	Alachlor	15972-60-8	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
2	Anthracene	120-12-7	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
3	Atrazine	1912-24-9	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
4	Benzene	71-43-2	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
6	Cadmium	7440-43-9	V		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
6a	Carbon tetrachloride	56-23-5	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
8	Chlorfenvinphos	470-90-6	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
9	Chlorpyrifos (Chlorpyrifos-ethyl)	2921-88-2	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
9a	Aldrin	309-00-2	V		V	V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
9a	Dieldrin	60-57-1	V		V	V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
9a	Endrin	72-20-8	V		V	V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
9b	DDT Total	not applicable	V		V	V	V		V		V	V		V		V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
9b	para-para-DDT	50-29-3	V		V	V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
10	1,2-Dichloroethane	107-06-2	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V

Priority substance in accordance with Annex I of the Directive 2008/105/EC		CAS Number	r1-1-3-95	r1-2-6-89	r1-3-5-05	r1-4-3-35	r2-2-3-95	r2-2-5-75	r2-3-2-96	r2-3-4-80	r2-9-2-50	r3-2-1-85	r3-3-1-60	r3-3-3-95	r3-4-2-90	r3-5-4-40	r3-7-1-55	r3-7-1-84	r3-7-3-71	r6-1-1-72	r6-1-1-80	r6-1-2-38	r6-1-2-90	r6-1-5-52	r6-5-3-15	r6-5-3-50	r8-4-1-37	r8-4-1-52	r8-4-3-40	r8-4-5-30	r8-7-1-65	r8-7-2-60	r8-9-5-40	r9-2-3-05	r9-2-3-85	r9-2-4-95	r9-4-3-41	r9-4-3-80	r9-6-1-44	r9-6-1-87	r9-6-3-36	r9-6-4-92	r9-6-6-32
11	Dichloromethane	75-09-2	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
12	DEHP	117-81-7	V		V	V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
13	Diuron	330-54-1	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
14	Endosulfan	115-29-7	V		V	V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
15	Fluoranthene	206-44-0	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
16	Hexachloro-benzene	118-74-1	V		V	V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
17	Hexachloro-butadiene	87-68-3	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
18	Hexachloro-cyclohexane	608-73-1	V		V	V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
19	Isoproturon	34123-59-6	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
20	Lead	7439-92-1	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
21	Mercury	7439-97-6	V		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V			V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
22	Naphthalene	91-20-3	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
23	Nickel	7440-02-0	V		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
28	Benzo(a)pyrene	50-32-8	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V

Priority substance in accordance with Annex I of the Directive 2008/105/EC		CAS Number	r1-1-3-95	r1-2-6-89	r1-3-5-05	r1-4-3-35	r2-2-3-95	r2-2-5-75	r2-3-2-96	r2-3-4-80	r2-9-2-50	r3-2-1-85	r3-3-1-60	r3-3-3-95	r3-4-2-90	r3-5-4-40	r3-7-1-55	r3-7-1-84	r3-7-3-71	r6-1-1-72	r6-1-1-80	r6-1-2-38	r6-1-2-90	r6-1-5-52	r6-5-3-15	r6-5-3-50	r8-4-1-37	r8-4-1-52	r8-4-3-40	r8-4-5-30	r8-7-1-65	r8-7-2-60	r8-9-5-40	r9-2-3-05	r9-2-3-85	r9-2-4-95	r9-4-3-41	r9-4-3-80	r9-6-1-44	r9-6-1-87	r9-6-3-36	r9-6-4-92	r9-6-6-32
28	Benzo(b)fluor-anthene & Benzo(k)fluor-anthene	205-99-2	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
28	Benzo(g,h,i)-perylene & Indeno(1,2,3-cd)-pyrene	191-24-2	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
29	Simazine	122-34-9	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
29a	Tetrachloro-ethylene	127-18-4	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
29 b	Trichloro-ethylene	79-01-6	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
31	Trichloro-benzenes	12002-48-1	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
32	Trichloro-methane	67-66-3	V				V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V
33	Trifluralin	1582-09-8	V			V	V		V		V	V		V	V	V	V	V		V		V	V	V	V	V			V	V			V	V			V	V		V		V	V

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 4.1.1-1)]

It is highlighted that the priority substances which are monitored per station are selected according to the results of a special study that was conducted in 2012, in order to record all emissions, discharges and losses of priority substances in Cyprus. [Contract Number 14/2012, Preparation of an Inventory of Emissions, Discharges and Losses of Priority and Priority Hazardous Substances].

Table 9-62: Priority substances monitored per monitoring station of impounded rivers

Priority substance in accordance with Annex I of the Directive 2008/105/EC		CAS number	d1-2-4-61	d1-3-9-50	d1-4-3-95	d1-6-2-63	d2-2-6-91	d3-5-1-65	d8-7-2-05	d8-7-4-05	d8-9-5-60	d9-2-5-20	d9-4-3-95	d9-6-3-17	d9-6-9-10
1	Alachlor	15972-60-8	V	V	V	V	V	V	V	V	V	V	V	V	V
2	Anthracene	120-12-7	V	V	V	V	V	V	V	V	V	V	V	V	V
3	Atrazine	1912-24-9	V	V	V	V	V	V	V	V	V	V	V	V	V
4	Benzene	71-43-2	V	V	V	V	V	V	V	V	V	V	V	V	V
6	Cadmium	7440-43-9	V	V	V	V	V	V	V	V	V	V	V	V	V
6a	Carbon tetrachloride	56-23-5	V	V	V	V	V	V	V	V	V	V	V	V	V
8	Chlorfenvinphos	470-90-6	V	V	V	V	V	V	V	V	V	V	V	V	V
9	Chlorpyrifos (Chlorpyrifos-ethyl)	2921-88-2	V	V	V	V	V	V	V	V	V	V	V	V	V
9a	Aldrin	309-00-2	V	V	V	V	V	V	V	V	V	V	V	V	V
9a	Dieldrin	60-57-1	V	V	V	V	V	V	V	V	V	V	V	V	V
9a	Endrin	72-20-8	V	V	V	V	V	V	V	V	V	V	V	V	V
9b	DDT Total	not applicable	V	V	V	V	V	V	V	V	V	V	V	V	V
9b	para-para-DDT	50-29-3	V	V	V	V	V	V	V	V	V	V	V	V	V
10	1,2-Dichloroethane	107-06-2	V	V	V	V	V	V	V	V	V	V	V	V	V
11	Dichloromethane	75-09-2	V	V	V	V	V	V	V	V	V	V	V	V	V
12	DEHP	117-81-7	V	V	V	V	V	V	V	V	V	V	V	V	V
13	Diuron	330-54-1	V	V	V	V	V	V	V	V	V	V	V	V	V
14	Endosulfan	115-29-7	V	V	V	V	V	V	V	V	V	V	V	V	V
15	Fluoranthene	206-44-0	V	V	V	V	V	V	V	V	V	V	V	V	V
16	Hexachloro-benzene	118-74-1	V	V	V	V	V	V	V	V	V	V	V	V	V
17	Hexachloro-butadiene	87-68-3	V	V	V	V	V	V	V	V	V	V	V	V	V
18	Hexachloro-cyclohexane	608-73-1	V	V	V	V	V	V	V	V	V	V	V	V	V

Priority substance in accordance with Annex I of the Directive 2008/105/EC		CAS number	d1-2-4-61	d1-3-9-50	d1-4-3-95	d1-6-2-63	d2-2-6-91	d3-5-1-65	d8-7-2-05	d8-7-4-05	d8-9-5-60	d9-2-5-20	d9-4-3-95	d9-6-3-17	d9-6-9-10
19	Isoproturon	34123-59-6	V	V	V	V	V	V	V	V	V	V	V	V	V
20	Lead	7439-92-1	V	V	V	V	V	V	V	V	V	V	V	V	V
21	Mercury	7439-97-6	V	V	V	V	V	V	V	V	V	V	V	V	V
22	Naphthalene	91-20-3	V	V	V	V	V	V	V	V	V	V	V	V	V
23	Nickel	7440-02-0	V	V	V	V	V	V	V	V	V	V	V	V	V
28	Benzo(a)pyrene	50-32-8	V	V	V	V	V	V	V	V	V	V	V	V	V
28	Benzo(b)fluor-anthene & Benzo(k)fluor-anthene	205-99-2	V	V	V	V	V	V	V	V	V	V	V	V	V
28	Benzo(g,h,i)-perylene & Indeno(1,2,3-cd)-pyrene	191-24-2	V	V	V	V	V	V	V	V	V	V	V	V	V
29	Simazine	122-34-9	V	V	V	V	V	V	V	V	V	V	V	V	V
29a	Tetrachloro-ethylene	127-18-4	V	V	V	V	V	V	V	V	V	V	V	V	V
29b	Trichloro-ethylene	79-01-6	V	V	V	V	V	V	V	V	V	V	V	V	V
31	Trichloro-benzenes	12002-48-1	V	V	V	V	V	V	V	V	V	V	V	V	V
32	Trichloro-methane	67-66-3	V	V	V	V	V	V	V	V	V	V	V	V	V
33	Trifluralin	1582-09-8	V	V	V	V	V	V	V	V	V	V	V	V	V

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 4.1.1-2)]

9.1.2 Monitoring program of lake WB

9.1.2.1 Ecological Status

For the assessment of ecological status of the lakes of Cyprus the appropriate method has not fully developed. During this period, a special work is implemented from the WDD for this purpose, from the results of which would be possible to be organized the appropriate monitoring network. For this period, the available data is originated mainly from research programs and relate to the Chlorophyll concentration from the Larnaka main salt lake and Larnaka Orfani lake [See. bibliography, 122].

Chemical - physicochemical data were collected for Achna lake and for Larnaka salt lakes complex and Akrotiri lake. Sampling in Achna lake for physicochemical samples was conducted approximately every three months. The dataset collected includes several parameters such as Electrical conductivity, Dissolved oxygen concentration, Temperature, pH, N and P nutrients concentration, etc.

Collection of data from Larnaka salt lake complex and Akrotiri lake was conducted on a monthly basis, when water was available, and included parameters such as temperature, salinity, pH and in two lakes (Larnaka main salt lake and lake Orfani) nutrients concentration. In addition, toxicity tests were performed from samples taken from Larnaka lakes.

Hydromorphological elements monitoring was limited to water level measurements (lake depth variation) in Larnaka salt lakes and Akrotiri lake. Depth data were collected every month in accordance with the monitoring Programme.

9.1.2.2 Chemical status

Regarding the monitoring network of chemical status, this period includes three lakes: Larnaka main salt lake, lake Orfani in Larnaka lake Achna. In the remaining, monitoring of the priority substances was not implemented [See. bibliography, 122].

On lake Achna, the available analyses concern to a surveillance character measure while for the other two lakes the available measurements covers the period from 2009-2013. The network includes the monitoring of the following priority substances and measurements of water hardness:

- Alachlor
- Anthracene
- Atrazine
- Benzene
- Cadmium
- Carbon tetrachloride
- Chlorfenvinphos
- Chlorpyrifos (Chlorpyrifos-ethyl)
- Aldrin
- Dieldrin
- Endrin
- DDT Total
- para-para-DDT
- 1,2-Dichloroethane
- Dichloromethane
- DEHP
- Diuron
- Endosulfan
- Fluoranthene
- Hexachloro-benzene
- Hexachloro-butadiene
- Hexachloro-cyclohexane
- Isoproturon
- Lead
- Mercury
- Naphthalene
- Nickel
- Benzo(a)pyrene
- Benzo(b)fluor-anthene & Benzo(k)fluor-anthene
- Benzo(g,h,i)-perylene & Indeno(1,2,3-cd)-pyrene
- Simazine
- Tetrachloro-ethylene
- Trichloro-ethylene
- Trichloro-benzenes
- Trichloro-methane
- Trifluralin

9.1.3 Monitoring program of coastal bodies

The network is composed from 22 control points (18 points for surveillance monitoring and 4 points for operational monitoring).

Biological Quality Elements, BQEs and other parameters which are monitored according to the requirements of WFD, and include the following:

- Phytoplankton (a parameter: concentration Chlorophyll-a)
- Macrophytes
- Posidonia oceanica
- Benthica Macroinvertebrates
- Nutritious salts
- General Physicochemical parameters
- Priority substances

9.2 MONITORING PROGRAM OF GROUNDWATER BODIES

WFD requires the establishment of monitoring programs that covers the quantitative and chemical status of groundwaters and the assessment of important, long-term pollutant trends as a result of human activity as well as any additional monitoring requirements that related to protected areas.

Since 2007 were established monitoring programs for the quality (chemical) and quantitative status of GWB in accordance with the provisions of Article 8 of the WFD.

9.2.1 Monitoring program of quantitative status

The quantitative monitoring network of groundwater level aims to the assessment of the quantitative status of all the GWB (Guidance on Groundwater Monitoring No 15) and its planning is based on the following considerations and parameters:

- in the water balance which is the result of the quantities of abstractions in relation to the annual renewal of reserves of Groundwater System.
- in the existing data and the time series of measurements with regard to the level of groundwater and the discharge of sources.
- To the extent of interaction between of GWB and with the surface water bodies which are associated with GWB and of terrestrial ecosystems.

The quantitative monitoring of GWB is occured initially by assessing the level of groundwater and the discharge in the entire of underground system while, consequently focuses more on areas where quantitative data of deterioration are identified (e.g. coastal areas).

In GWB which are at risk for the achievement of good quantitative status, the distribution and the densification of monitoring points occurs with such way in order to illustrates the conditions of quantitative deterioration. The density of the quantitative monitoring points is important also for the determination of the amounts which are pumped by groundwater.

The frequency of the quantitative monitoring follows the basic rule of the annual cycle of the high level at the end of the wet season and of the low level at the end of dry season. However, it is determined by the quantitative status of each system and the risk of not achieving of targets of the Directive in conjunction with the possible application of a program with the quantitative monitoring frequency of GWB, to be ranged from monthly up to biannual, depending on the state of the GWB.

During the year 2014 the monitoring network for quantitative status consists of 81 monitoring stations.

9.2.2 Monitoring program of quality status

The monitoring network for quality (chemical) status of groundwater is planned in order to assess the quality (chemical) status of Groundwater Bodies (GWB) and the identification of significant and sustained upward pollution tendencies in the concentrations of pollutant substances.

This network consists of operational monitoring stations. The frequency of sampling is the same in all systems. Also repetitive samples are accomplished in case of a sudden increase and exceedance of threshold value of some pollutant.

The measurements of the quality parameters are carried out two times during the year and correspond to the period of high level of underground water at the end of the wet season (April-May) and of low level of groundwater at the end of the dry season (October-November).

During the year 2014 the monitoring network of quality (chemical) status was increased from 88 to 95 monitoring stations.

9.3 MONITORING PROGRAM OF PROTECTED AREAS

In addition to the above monitoring networks of the water status, the protected areas are covered, also, by other monitoring networks of specific parameters which are developed on the basis of obligations which derive form relevant with their protection Directives. In the following chapters are provided summary information for these networks.

9.3.1 Recreation Water

It includes the monitoring of 113 bathing areas in accordance with the provisions of Directive 2006/7/EC. Two basic parameters are monitored monthly; Intestinal **enterococci** and

Escherichia coli, based on these two parameters, occurs the assessment of the quality of bathing waters and their classification according to their quality.

9.3.2 Areas which are intended for the consumption of people

It includes the monitoring of water which is intended for people consumption which is implemented in accordance with the provisions of Directive 80/778/EEC as amended by 98/83/EC.

9.3.3 Sensitive areas

It includes cheeks for compliance of the operationsof Urban Waste Water Treatment Plans in accordance with the provisions of the article 15 of Directive 91/271/EEC. The quality monitoring program of urban waste water treatment plant started in 2007 and includes the collection of approximately 265 samples per year (data 2011) from 15 establishments. The parameters for which the monitoring is conducted are BOD, COD and SS and the results are recorded in the relevant database in Department of Environment.

9.3.4 Nitrate Vulnerable Zones

The network consists of 222 monitoring stations. The major part of the WFD monitoring network is part of the monitoring network for nitrate pollution. It is noted that in all monitoring stations for water status, the nitrate concentration is determined in accordance with the provisions of Directive 91/676 / EEC.

10. CLASSIFICATION OF WATER BODIES

10.1 CLASSIFICATION OF RIVER WBs

10.1.1 Methodology for the Classification of river WBs

10.1.1.1 Type-specific reference condition

For the preparation of the 2nd RBMP, is accomplished the contract REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60 / EC (WATERRESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS) with purpose the classification of surface WB [See. literature, 124] with aim the classifications of the ecological and chemical status of river water bodies.

This study is available on the website of WDD

A) Biological Quality Elements – BQE

To assess the ecological status of the river water bodies, have designated four BQEs:

- Benthic macroinvertebrates (Composition and abundance),
- Phytobenthos (diatoms) (Composition and abundance),
- Macrophytes (Composition and abundance) and
- Fish (Composition and abundance).

For each quality element which monitored, an EQR is calculated and assigned to an ecological status class. Each class is characterized by a color code, reflecting a range of high status ranging from HIGH to BAD.

For the development of national indicators, was implemented an adjustment procedure with boundaries during the preparation process which was confirmed during the 2 phases of the Intercalibration exercise. The limit EQR class values for each indicator are shown in the following Table.

Table 10-63: Ecological class boundary values for BQE's monitored in Cyprus rivers

			HIGH	GOOD	MODERATE	POOR	BAD
Benthic invertebrates	P (R-M4)	STAR ICMi	0.972	0.729	0.486	0.243	
	I και Ih (R-M5)	STAR ICMi	0.982	0.737	0.491	0.249	
Diatoms	P (R-M4)	IPS	0.91	0.68	0.46	0.23	
	I και Ih (R-M5)	IPS	0.96	0.72	0.48	0.24	
Aquatic macrophytes	P (R-M4)	IBMR	0.795	0.596	0.397	0.198	

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.2.1.1-1)]

B) Chemical Elements/ Physico-chemical quality

For the estimation of physico-chemical quality elements, the estimation method used in the 1st RBMP is reviewed in order to assess whether it could be an adjustment-improvement. The assessment system, as it is applied in WDD 54/2009 contract, was not based in Cyprus data since in 2009 there were not enough data to adapt in local conditions. However, a significant amount of data has become available since 2009,and the review and the possible adjustment was possible for the 2nd RBMP.

Thus, the monitoring results for the physico-chemical parameters compared to the corresponding results of biological quality data were analyzed to determine whether the limit values of the physicochemical parameters correspond to the state of the biological quality elements.

The analyses showed that reliable limit can't be set in the different quality classes for the general physicochemical parameters, based on of the available data set. Also, the assessment system as applied in WDD 54/2009 contract and in the 1st RBMP is in compliance with the physicochemical data of Cyprus. Therefore, it has been decided to continue the same assessment for physicochemical data in 2nd RBMP. In the following paragraphs, the methodology for the physicochemical data evaluation system is described.

According to WFD, for the assessment of physico-chemical status of surface waters, physico-chemical data to support the biological elements (thermal conditions, oxygenation conditions, salinity, acidification status, nutrient conditions and specific pollutants) are used.

The physicochemical parameters -which support the biological quality data- which finally used to estimate the river WB (except impounded rivers) in Cyprus, based on local conditions, reflected in the table below.

Table 10-64: Physicochemical parameters for the assessment of river WB in Cyprus

Chemical – Physicochemical Category	Parameters
Organic Load	BOD_5,DO, NH_4^+, NO_2^-,TP
Chemical Load	NO_3^-, PO_4^{-3}
Salinity	EC, SAR
Specific pollutants	Cu, B, Zn

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.2.2.2-1)]

For the assessment of the chemical - physicochemical status of river monitoring stations, the chemical – physicochemical parameters of a water body are grouped based on pressure types. The quality of each group is calculated according to the overall average of the averages for each parameter. Then, the total chemical - physicochemical quality of each monitoring station is classified using the principle “one out, all out”, i.e. based on the worst rate between all the corresponding groups of water quality parameters.

The classification systems for the various Chemical – Physicochemical parameters that were utilised for classification of the Chemical – Physicochemical status of Cyprus river monitoring stations are presented in the following Table.

Table 10-65: Classification systems for the Chemical – Physicochemical elements at river monitoring stations (excluding impounded rivers)

Classification system per parameter	Unit	High	Good	Moderate	Poor	Bad
Norway criteria for DO	mg/l	>9,0	9,0-6,4	6,4-4,0	4,0-2,0	<2,0
Odense Pilot RB criteria for BOD_5	mg/l	<0,5	0,5-2,0	2,1-3,5	3,5-5,0	>5,0
NCS[5] for N-NH_4^+	mg/l	<0,024	0,024-0,060	0,061-0,200	0,210-0,500	>0,500
NCS revised for N-NO_2^-	mg/l	<3,0	3,0-8,0	8,1-30,0	30,1-70,0	>70,0
NCS revised for TP	mg/l	<85	86-165	166-220	221-405	>405
NCS revised for P-PO_4^{-3}	mg/l	<30	30-105	106-165	166-340	>340
NCS for N-NO_3^-	mg/l	<0,22	0,22-0,60	0,61-1,30	1,30-1,80	>1,80
Xerothermic area criteria (Messara. Crete) for EC	μS/cm	<250	250-750	750-2000	2001-3000	>3000
Xerothermic area criteria (Messara. Crete) for SAR		<3	3-5	5,1-10	10-15	>15

5 Skoulikidis, N.T., Amaxidis, Y., Bertahas, I., Laschou, S. and Gritzalis, K. (2006). Analysis of factors driving stream water composition and synthesis of management tools—A case study on small/medium Greek catchments. Science of The Total Environment, 362(1–3), pp.205–241.

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.2.2.2-2)]

By applying all of the above mentioned ranges for limit values for all the parameters, the overall assessment system, which is presented in next Table, is applied so that all the groups of water quality parameters may be comparable. The quality of each group is calculated according to the overall average of the averages for each parameter. Then, the total chemical - physicochemical quality of each monitoring station is classified using the principle “one out, all out”.

Table 10-66: Assessment system for water quality parameters and groups of water quality parameters

Class	Rating range	Mean value for the rating range	
H (High)	>4-5	(4,1+5)/2=	4,55
G (Good)	>3-4	(3,1+4)/2=	3,55
M (Moderate)	>2-3	(2,1+3)/2=	2,55
P (Poor)	>1-2	(1,1+2)/2=	1,55
B (Bad)	<1	1/2=	0,5

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.2.2.2-4)]

10.1.1.2 Grouping of Rivers WB

The grouping of the river WB was conducted by Mr. Gerald Dörflinger, Hydrologist at the Water Development Department and it is presented in detail in the study REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60 / EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATERRESERVOIRS) [See. literature, 124] which elaborated in the framework of preparation of the 2nd RBMP and is available on the website of the WDD. Below are the key points as they result from this work:

The aim of the establishment of groups of water bodies was to enable the prediction of the status of unmonitored WBs with the data collected in monitored WBs. The general idea was to group water bodies into groups of similar pressure levels, while keeping the river types separate, as suggested by Guidance Documents no. 7 (European Commission 2003c, p.12). This approach result in groups of water bodies with similar pressure levels within each river type, and would enable to predict and assign water body ecological status to the WBs that are not being monitored, using the data from the monitoring stations within each group.

In this context, as a first step, the pressures to be examined were identified. For this purpose, the available data of water bodies monitoring were examined in order to identify the quality elements (Quality Elements, QEs) that lead to the failure of achieving good status.

The analysis of the results of status assessment indicated that, for organic qualitative characteristics, the vast majority of failures to achieve good ecological status are due to the benthic macroinvertebrates. As far as the physiochemical parameters, the vast majority of failures to achieve good chemical status was due to high concentrations of nitrates and fertilizers as considerable pressure.

Subsequently, a research for available data or suitable substitute data (proxies) for the identified potentially important pressures above was conducted and it was decided to use the following pressure characteristics to quantify the pressure levels of the river water bodies:

- Population density; Census 2011 (CYSTAT 2013) combined with CORINE category “urban fabric” (Department of the Environment 2008)
- Livestock annual Nitrogen load; data provided by the Cyprus’ Veterinary Services combined with indicative loads per animal (Defra 2009)
- Areas of “intensive agriculture”, assumed to be largely irrigated; selected CORINE categories (Department of the Environment 2008)

The above pressure characteristics were determined for each WB, at the river basin level.

For the water bodies with available monitoring data, the pressure characteristics were then related to the water bodies’ ecological status represented on box plots.

The variation on ecological status for varying pressure intensities were assessed on the box plots to determine whether the data sets allow calculation of numerical thresholds corresponding to the high-good and good-[moderate-poor-bad] boundaries for each pressure characteristic; the three status classes high (H), good (G) and the combined class [moderate-poor-bad, MPB] were considered to correspond to negligible, minor and important pressure levels. It was found that the data sets for P and I types allow the calculation of numerical thresholds using a defined procedure; these findings were supported by statistically significant differences between the magnitudes of both the livestock and agriculture pressures in the Good and MPB ecological status class groups

For the Ih and E types, the corresponding thresholds were set using expert evaluation and only for those pressure characteristics where the few available data allowed an acceptably sound judgment. By applying the thresholds, each water body was classified into one of three pressure levels (negligible, minor and important) for each pressure characteristic.

Because each water body can only belong to one grouping category in the end, the categorizations according to the three pressure characteristics had to be combined into a single index. To this end, numerical values were assigned to the three pressure levels of each pressure characteristic and the average pressure value was calculated for each water body, yielding the “combined pressure indicator”.

The indicator "combined pressure" was then plotted on plots for all water bodies with monitoring results, grouped by the ecological status classes. The graphs showed very good distinctions between the three pressure levels for the P and I types; these distinctions were much clearer than for each separate pressure characteristic and were supported by statistically significant differences in the magnitude of the "combined pressure indicator" between the Good and MPB status class groups.

Subsequently, thresholds of the indicator were derived for the two river types P and I, corresponding to the high-good and good-[moderate-poor-bad] boundaries of ecological status. For the Ih, due to the small number of data, thresholds for the "combined pressure indicator" could not be determined. Instead, the water bodies of these two river types were assigned into the three pressure levels (negligible, minor and important) based on the thresholds of the pressure characteristics using defined criteria.

The above thresholds and procedures allowed the assignment of the combined pressure levels to all river water bodies of all four types, yielding twelve groups of water bodies (negligible, minor and important combined pressure level for each of the river types P, I, Ih). A table of all water bodies and their corresponding pressure level is given below.

Finally, those monitoring stations located on the water bodies that have valid data for the status classification for the 2nd RBMP, were plotted together according to the water body group to which their respective water body belongs. This provided the groups of monitoring stations that would be used for the assessment of the ecological status of the unmonitored water bodies in each assessment group.

Table 10-67: Assessment Groups of River Water Bodies for the assessment of their Ecological Status, Number of water bodies and monitoring stations per group and Water Bodies total length (km) per Group

<table>
<tr><th>Assessment Group</th><th>Water Body Code</th><th>Water Body Name</th><th>Monitoring Station(s)</th><th>Number of Monitoring Stations/ Water Bodies per Group</th><th>Water Bodies Total Length (km)</th></tr>
<tr><td rowspan="6">E-Important</td><td>CY_2-1-a_RE_HM</td><td>Ayiou Ioanni</td><td></td><td rowspan="6">6 WBs
6 MON.ST. in ephemeral rivers (1)</td><td rowspan="6">66</td></tr>
<tr><td>CY_6-5-h_RE</td><td>Αλυκος</td><td></td></tr>
<tr><td>CY_8-3-b_RE</td><td>(Ανώνυμο)</td><td></td></tr>
<tr><td>CY_8-7-g_RIh_HM</td><td>Pendaskhinos</td><td></td></tr>
<tr><td>CY_8-9-f_RIh_HM</td><td>Vasilikos</td><td></td></tr>
<tr><td>CY_9-4-e_RIh_HM</td><td>Garyllis</td><td></td></tr>
<tr><td rowspan="7">E-Minor</td><td>CY_1-3-e_RE_HM</td><td>Xeros Potamos</td><td></td><td rowspan="7">15 WBs
3 MON.ST. of which 2 in ephemeral rivers (2)</td><td rowspan="7">145</td></tr>
<tr><td>CY_1-4-h_RIh_HM</td><td>Ezousa</td><td></td></tr>
<tr><td>CY_1-6-c_RIh_HM</td><td>Mavrokolymbos</td><td></td></tr>
<tr><td>CY_2-2-h_RIh_HM</td><td>Khrysokhou</td><td></td></tr>
<tr><td>CY_2-3-d_RIh_HM</td><td>Magounda</td><td></td></tr>
<tr><td>CY_2-3-e_RE</td><td>Xeropotamos</td><td></td></tr>
<tr><td>CY_2-4-b_RIh_HM</td><td>Xeros Potamos</td><td></td></tr>
</table>

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km)
	CY_3-7-m_RE	Likythia	r3-7-2-93 (No data, due to no flow)		
	CY_6-5-g_RE	Villourkon			
	CY_6-5-i_RE	Almyros			
	CY_8-3-a_RE	Kalo Chorio			
	CY_8-4-g_RE	Άγιος Ιωάννης			
	CY_8-7-f_RI_HM	Pendaskhinos			
	CY_8-9-e_RI_HM	Vasilikos			
	CY_9-7-b_RE	Symvoulas			
E- Negligible	CY_1-1-d_RIh_HM	Khapotami		1 WBs 0 MON.ST.	5
Ih-Important	CY_1-2-d_RI_HM	Dhiarizos	r1-2-6-89	26 WBs 4 MON.ST.	271
	CY_1-4-d_RI_HM	Ezousa			
	CY_1-4-e_RIh_HM	Ezousa			
	CY_1-4-j_RIh	Ayios Nepios			
	CY_1-4-k_RIh	Varkas			
	CY_1-4-m_RIh	Kochatis			
	CY_2-2-a_RIh	Neraidhes & Ammadhkiou			
	CY_2-2-f_RI_HM	Stavros tis Psokas			
	CY_2-3-a_RIh	Mirmikoph			
	CY_2-3-b_RIh	Argaki tis Limnis	r2-3-2-96		
	CY_3-4-b_RIh	Atsas	r3-4-2-90		
	CY_3-4-c_RIh_HM	Atsas			
	CY_3-5-d_RIh_HM	Elia			
	CY_3-7-b_RIh	Peristerona			
	CY_3-7-j_RIh_HM	Akaki			
	CY_6-1-c_RIh_HM	Pedhieos			
	CY_6-5-f_RIh_HM	Koutsos			
	CY_8-6-a_RIh	Xeropotamos			
	CY_8-7-c_RI_HM	Syrkatis	r8-7-2-60		
	CY_8-9-g_RIh	Exovounia			
	CY_9-1-b_RIh	Pyrgos			
	CY_9-2-i_RIh	Pissokamina			
	CY_9-4-g_RIh	Phasoula			
	CY_9-6-t_RI_HM	Kouris			
	CY_9-8-a_RIh	Paramali			
	CY_9-8-c_RIh	Evdhimou			

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km)
Ih-Minor	CY_1-1-c_RIh	Khapotami	r1-1-6-65	25 WBs 8 MON.ST.	315
	CY_1-2-f_RIh	Yerovasinos			
	CY_1-3-c_RIh	Xeros Potamos	r1-3-8-60		
	CY_1-3-g_RIh	Lefkarkon			
	CY_1-4-L_RIh	Milarkou			
	CY_1-6-a_RIh	Mavrokolymbos			
	CY_1-6-d_RIh	Xeros ποταμός			
	CY_1-8-a_RIh	Kalamouli (Avgas)			
	CY_1-8-b_RIh	Pevkos			
	CY_2-4-e_RIh_HM	Livadhi			
	CY_2-5-a_RIh	Ayios Theodoros			
	CY_2-6-b_RIh_HM	Katouris			
	CY_3-5-c_RI_HM	Lagoudhera	r3-5-4-40		
	CY_3-7-n_RIh	Koutis & Aloupos			
	CY_6-1-a_RIh	Pedhieos	r6-1-1-48, r6-1-1-72, r6-1-1-80		
	CY_6-5-a_RIh	Yialias			
	CY_6-5-e_RIh	Koutsos			
	CY_7-2-a_RIh	Vathys			
	CY_8-5-a_RIh	Pouzis			
	CY_8-7-d_RIh	Argaki tou Mylou			
	CY_8-8-b_RIh	Ayiou Mina			
	CY_8-8-c_RIh_HM	Ayiou Mina	r8-8-2-95		
	CY_8-9-h_RIh	Argaki tis Asgatas			
	CY_9-2-h_RIh_HM	Yermasogeia			
	CY_9-6-r_RI_HM	Kryos	r9-6-2-60		
Ih-Negligible	CY_2-4-a_RIh	Xeros		3 WBs 0 MON.ST.	17
	CY_2-6-a_RIh	Katouris			
	CY_2-9-d_RIh_HM	Kambos			
I-Important	CY_1-1-b_RI	Khapotami	r1-1-3-95	16 WBs 9 MON.ST.	144
	CY_1-1-e_RI	Malleta			
	CY_2-2-b_RI	Garyllis	r2-2-3-95		
	CY_2-2-d_RI	Stavros tis Psokas	r2-2-6-24		
	CY_2-2-g_RI_HM	Khrysokhou			
	CY_3-3-c_RI	Karyiotis			
	CY_3-7-e_RI	Kambi			
	CY_6-5-b_RI	Yialias	r6-5-1-85		
	CY_8-9-c_RI	Vasilikos	r8-9-5-40		
	CY_9-2-c_RI	Yermasogeia			
	CY_9-2-d_RI_HM	Yermasogeia			

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km)
	CY_9-2-e_RI	Yermasogeia	r9-2-3-05		
	CY_9-2-L_RI_HM	Yialiadhes	r9-2-4-95		
	CY_9-4-c_RI	Garyllis	r9-4-3-80, r9-4-3-89, r9-4-3-94		
	CY_9-6-f_RI	Limnatis	r9-6-7-29, r9-6-7-70		
	CY_9-8-b_RI	Evdhimou (Mandalas)			
I-Minor	CY_1-2-e_RI	Tholos		30 WBs 15 MON.ST.	396
	CY_1-3-b_RI	Xeros Potamos	r1-3-6-53		
	CY_1-4-g_RI_HM	Ezousa			
	CY_1-4-i_RI	Paleomylou			
	CY_2-2-c_RI	Stavros tis Psokas	r2-2-5-02, r2-2-5-75		
	CY_2-3-c_RI	Magounda	r2-3-4-80		
	CY_2-3-g_RI	Yialia			
	CY_2-7-a_RI	Pyrgos	r2-7-2-75		
	CY_2-9-a_RI	Kambos			
	CY_3-2-d_RI	Rkondas			
	CY_3-3-e_RI	Alykhnos			
	CY_3-4-a_RI	Atsas			
	CY_3-5-a_RI	Lagoudhera	r3-5-1-50		
	CY_3-5-e_RI	Kannavia			
	CY_3-5-f_RI	Asinou			
	CY_3-7-a_RI	Peristerona	r3-7-1-55		
	CY_3-7-d_RI	Maroullenas			
	CY_3-7-f_RI_HM	Maroullenas	r3-7-3-71		
	CY_3-7-g_RI	Pharmakas			
	CY_3-7-h_RI_HM	Pharmakas			
	CY_8-7-a_RI	Syrkatis	r8-7-1-65		
	CY_8-8-a_RI	Ayiou Mina			
	CY_8-9-a_RI	Vasilikos			
	CY_8-9-b_RI_HM	Vasilikos			
	CY_9-2-a_RI	Karydhaki			
	CY_9-2-f_RI	Yermasogeia	r9-2-3-29, r9-2-3-85		
	CY_9-2-k_RI	Yialiadhes			
	CY_9-4-b_RI	Garyllis	r9-4-1-38, r9-4-1-63, r9-4-1-93, r9-4-3-41		
	CY_9-6-g_RI	Pelendri			
	CY_9-6-h_RI	Ayios Mamas			
I-Negligible	CY_1-3-f_RI	Lazaridhaes		7 WBs 4 MON.ST	46
	CY_1-4-b_RI	Ayia	r1-4-3-35		
	CY_2-4-d_RI	Livadhi	r2-4-6-68		

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km)
	CY_2-9-c_RI	Kambos			
	CY_3-1-b_RI	Xeros	r3-1-2-30		
	CY_3-1-c_RI_HM	Xeros			
	CY_9-2-j_RI	Yialiadhes	r9-2-4-27		
P-Important	CY_1-1-a_RP	Khapotami		10 WBs 15 MON.ST.	111
	CY_3-3-b_RP	Karyiotis	r3-3-3-27, r3-3-3-95		
	CY_3-3-d_RP	Argaki tou Karvouna			
	CY_9-2-b_RP	Ayios Pavlos			
	CY_9-6-a_RP	Ayios Ioannis	r9-6-5-66, r9-6-5-67		
	CY_9-6-b_RP	Ambelikos-Agros	r9-6-5-17, r9-6-5-53, r9-6-5-57, r9-6-5-62, r9-6-5-69, r9-6-5-74, r9-6-5-75		
	CY_9-6-e_RP	Ambelikos-Xylourikos	r9-6-6-32, r9-6-6-93		
	CY_9-6-L_RP	Kouris	r9-6-3-36		
	CY_9-6-m_RP_HM	Kouris	r9-6-4-92		
	CY_9-6-o_RP	Moniatis			
P-Minor	CY_1-2-a_RP	Dhiarizos	r1-2-4-25	11 WBs 7 MON.ST.	125
	CY_1-2-b_RP	Dhiarizos			
	CY_1-4-f_RP_HM	Ezousa	r1-4-5-73, r1-4-7-10		
	CY_2-3-f_RP	Yialia	r2-3-8-48		
	CY_2-9-b_RP	Kambos	r2-9-2-50		
	CY_3-2-a_RP	Marathasa	r3-2-1-85		
	CY_3-2-b_RP_HM	Marathasa			
	CY_9-6-c_RP				
	CY_9-6-d_RP_HM				
	CY_9-6-p_RP	Kryos	r9-6-1-44		
	CY_9-6-q_RP_HM	Kryos	r9-6-1-87		
P-Negligible	CY_1-3-a_RP	Roudhias	r1-3-5-05, r1-3-5-91	9 WBs 6 MON.ST.	132
	CY_1-4-a_RP	Ayia & Klimadhiou			
	CY_2-4-c_RP	Maroti & Diali			
	CY_2-8-a_RP	Limnitis	r2-8-3-10		
	CY_3-1-a_RP	Xeros			
	CY_3-3-a_RP	Ayios Nikolaos	r3-3-1-60		
	CY_9-6-i_RP	Loumata	r9-6-3-15		
	CY_9-6-k_RP_HM	Loumata			
	CY_9-6-n_RP	Mesapotamos			

It refers to the stations r6-1-2-90 in Pedhieos, r6-1-5-52 in Kalogeros, r6-5-3-15 and r6-5-3-50 in Yialias and r8-4-3-40 and r8-4-5-30 in Treminthos

It refers to the stations r3-7-1-84 in Peristerona and r6-1-2-38 in Pedhieos.

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 5.1.3-1)]

10.1.1.3 Level of uncertainty in the classification

A) Ecological status / potential

According to the contract REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60 / EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATERRESERVOIRS), which was implemented during the preparation of the 2^{nd} RBMP for classification of surface WB [see. literature, 124], the uncertainty in the results of both the Biological Quality Elements (BQEs) and the Chemical / physicochemical Elements, taken into account the function of the number of measurements (n) and relative standard deviation (Relative Standard Deviation):

$$Uncertainty\ Index = \%RStDev \div n$$

Where [%RSt Dev= 100*(standard deviation / mean of measurement]

This calculation is used for each quality element (i.e. macroinvertebrates, diatoms and macrophytes) and for each parameter (e.g. BOD, DO, EC, NO_3, etc.) for each monitoring station.

If there was only one measurement, the uncertainty indicator is preselected as high (rank=3).

So the overall biological uncertainty was calculated as follows:

- If the biological status of a monitoring station designated by more than one BQE, and no difference in the situation, then the uncertainty of the overall situation is equal to the uncertainty rate of determinants BQE.
- If the biological status of a monitoring station designated by more than one BQE and no difference in the situation, then the uncertainty of the overall situation is equal to the average of the uncertainties of BQEs.
- If the biological status of a monitoring station designated by only one BQE, then the uncertainty in the overall situation is equal to the uncertainty rate of this BQE.

Regarding the Data of chemical/physic-chemical monitoring, the Uncertainty Index for each group presents a different type of pressure (organic load, chemical load, salinity, and other substances) was calculated using the following equation:

$$\frac{\sqrt{\sum_{i=1}^{n}(x_1)^2+(x_2)^2+\ldots+(x_n)^2}}{n-1}$$

where n is the number of parameters.

The total chemical/physic-chemical uncertainty index for each monitoring station is equal to the uncertainty of the status of the decisive group.

The above are resulted in a rate range of uncertainty index which is categorized as follows:

Rates of uncertainty indicator	Uncertainty	uncertainty class
0 - 10	Low	1
10 - 20	Moderate	2
20 - 30	High	3
> 30	Very high	4

Respectively, to determine the overall uncertainty in the ecological status/potential of river WB, were made the following considerations:

– For WB where, there was a monitoring station, the status/potential was the same as the status/potential of the monitoring station. Therefore, the classification uncertainty class equivalent to the monitoring station uncertainties class.

– For the WB where, there was more than one monitoring station, the status/potential was the average of all the monitoring station. Therefore, the classification uncertainty class equivalent of the determining QE.

– For the WB where, there was no monitoring station, the status/potential is equivalent with the state of the group to which they belong. Therefore, the uncertainty class of WB equivalent with the uncertainty class of the group to which belonged.

For the calculation of the uncertainty of each group, the same principles are used as have described earlier. However, the range of uncertainty of indicator rates is classified as below:

Rates of uncertainty indicator	Uncertainty	Uncertainty class
0 - 1	LOW	1
1 - 2	MODERATE	2
2 - 3	HIGH	3
> 3	VERY HIGH	4

In the case of assessment classes it is considered that no water body whose status is assigned based on the condition of a group will have a low uncertainty. That is why the rates of uncertainty indicator of 0-2 have been classified as moderate.

Furthermore, for the group of river WB with strong intermittent flow, without pressure where there are not monitoring stations, uncertainty was defined as very high. Also in the case of river WB with strong intermittent flow which receive low pressures, the uncertainty was defined as very high by expert evaluation since, organic QEs can only marginally be monitored because of the flow regime and this is reflected in the volatility of results and the degree of implementation of BQEs in this type of river water bodies.

Apart from the above, for some water bodies in the group I-D-Minor, is used the evaluation of the experts for the ecological status/potential and moderate status/potential changed in good condition/potential where there is no significant pressure. This is because the flow regime in this group allows only marginally the monitoring of biological data and therefore there is uncertainty in the status of WB under biological QEs. Also for some WB, which are mainly affected by hydromorphological pressures, the expert evaluation was used to their ecological status/potential. In most cases the good ecological status/potential downgraded to moderate ecological status/potential. The uncertainty about the state of all these WB was set too high (rank=4).

The overall results of uncertainty per WB are summarised in the below Table (Table 10-7). Of the **159 river water bodies:**

– **39** have classified with low uncertainty,
– **49** have classified with moderate uncertainty,
– **13** have classified with high uncertainty,
– **58** have classified with very high uncertainty:

These 58 river water bodies with very high uncertainty mainly concern WB Intense intermittent and ephemeral flow where there is real high variability of results and less available data.

B) Chemical status

For the uncertainty in the results of the chemical monitoring was took into account the function of the number of measurements (n) and relative standard deviation as in the ecological status (see. chapt. 10.1.1.3 A)).

This calculation was used for each priority substance at each monitoring station. If there was only one measurement, then the uncertainty index was set by default as high.

Then for the Total Chemical Status Uncertainty Index for each monitoring station, the following assumptions were made:

– If the chemical status is good, then the Uncertainty Index of the monitoring station chemical status equals the maximum uncertainty among the parameters.
– If chemical status is bad, then the Uncertainty Index of the monitoring station chemical status equals the minimum uncertainty among the parameters with exceedance

This resulted in a range of uncertainty indicator values that were also categorized just as in eco situation (see. Table in chap 10.1.1.3 A)).

Then in water body level, the methodology of the chemical status classification is as follows:

– For water bodies where there is one or more monitoring station (s), then their status is the same as status of monitoring station (s). Thus, the uncertainty class of the water body equals the uncertainty class of the monitoring station (s).
– Water Bodies that are upstream a water body with "Good chemical status", then their status is set as well as "Good" assuming that if there was a source of priority substances upstream of the monitoring station, this would have shown on the

monitoring results. The uncertainty class of these water bodies is set as one level higher than the downstream monitoring station/water body uncertainty.

- Water bodies that are downstream of a water body with “Failing to achieve good status” status, then their status is set as well as “Failing to achieve good status”. The uncertainty class of these water bodies is set as very high.
- Water Bodies in Assessment Groups of negligible or minor pressures were given Good Chemical Status only after evaluating also point pressures as mines, industrial facilities and industrial areas. The uncertainty class of these water bodies is set as very high.
- Case by case, water bodies that belong in groups with important pressures, were given Good Chemical Status only after evaluating pressures as mines, industrial facilities and industrial areas and significant urban areas. The uncertainty class of these water bodies is set as very high.

The overall results of uncertainty per water body are already presented in the Table 5.7 of this report. Out of the **59 river water bodies**:

- 22 have classified with low uncertainty,
- 26 have classified with moderate uncertainty,
- 13 have classified with high uncertainty,
- 81 have classified with very high uncertainty:
- 17 have no classified

10.1.2 Status of river WB

For the preparation for the 2nd RBMP, the contract REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60 / EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATERRESERVOIRS) for classification of surface WB [See. literature, 124] is sonducted. This study is available on the website of the WDD. Data obtained from this study are presented in the following tables.

Table 10-68: Ecological Status and uncertainty for each river WB Assessment Group

Uncertainty Class: 1 = Low, 2 = Medium, 3 = High, 4 = Very High

ASSESSMENT GROUP	BIOLOGICAL STATUS/ POTENTIAL				PHYSICO-CHEMICAL STATUS/ POTENTIAL				OVERALL ECOLOGICAL STATUS/ POTENTIAL	UNCERTAINTY CLASS
	# stations per GROUP	# stations per GROUP	# stations per GROUP	# stations per GROUP	# stations per GROUP	WB status	Uncertainty Index	Uncertainty Class		
E-important					6	MODERATE	8,90	4	MODERATE	4
E-minor					2	GOOD	11,85	4	GOOD	4
E-negligible									GOOD	4
Ih-important	1	MODERATE	4,42	4	4	GOOD	4,11	4	MODERATE	4
Ih-minor	6	MODERATE	1,18	2	8	GOOD	1,01	2	MODERATE	4
Ih-negligible									GOOD	4
I-important	8	MODERATE	0,90	2	7	GOOD	1,83	2	MODERATE	2
I-minor	13	GOOD	0,44	2	11	GOOD	0,94	2	GOOD	2
I-negligible	4	GOOD	1,33	2	4	HIGH	0,97	2	GOOD	2
P-important	13	MODERATE	0,85	2	8	MODERATE	1,17	2	MODERATE	2
P-minor	7	GOOD	0,66	2	7	GOOD	2,32	3	GOOD	2
P-negligible	6	HIGH	0,55	2	5	HIGH	0,60	2	HIGH	2

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 5.1.4-1)]

Table 10 7: Classification of River Water Bodies (impounded rivers excluded) and confidence level

Uncertainty Class: 1 = Low, 2 = Medium, 3 = High, 4 = Very High

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
1	CY_1-1-a_RP	Khapotami	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
2	CY_1-1-b_RI	Khapotami	NO	I	I-important	MODERATE	1	GOOD	1	MODERATE
3	CY_1-1-c_RIh	Khapotami	NO	Ih	Ih-minor	GOOD	1	GOOD	4	GOOD
4	CY_1-1-d_RIh_HM	Khapotami	YES	Ih	E-negligible	GOOD	4	GOOD	4	GOOD
5	CY_1-1-e_RI	Malleta	NO	I	I-important	MODERATE	2	GOOD	4	MODERATE
6	CY_1-2-a_RP	Dhiarizos	NO	P	P-minor	GOOD	2	GOOD	4	GOOD
7	CY_1-2-b_RP	Dhiarizos	NO	P	P-minor	GOOD	2	GOOD	4	GOOD
8	CY_1-2-d_RI_HM	Dhiarizos	YES	I	Ih-important	GOOD	4	GOOD	1	GOOD
9	CY_1-2-e_RI	Tholos	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
10	CY_1-2-f_RIh	Yerovasinos	NO	Ih	Ih-minor	GOOD	4	GOOD	2	GOOD
11	CY_1-3-a_RP	Roudhias	NO	P	P-negligible	HIGH	1	GOOD	3	HIGH
12	CY_1-3-b_RI	Xeros Potamos	NO	I	I-minor	GOOD	1	GOOD	4	GOOD
13	CY_1-3-c_RIh	Xeros Potamos	YES	Ih	Ih-minor	MODERATE	1	GOOD	4	MODERATE
14	CY_1-3-e_RE_HM	Xeros Potamos	NO	E	E-minor	MODERATE	4	UNKNOWN	0	
15	CY_1-3-f_RI	Lazaridhaes	NO	I	I-negligible	GOOD	2	GOOD	4	GOOD
16	CY_1-3-g_RIh	Lefkarkon	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
17	CY_1-4-a_RP	Ayia & Klimadhiou	NO	P	P-negligible	HIGH	2	GOOD	4	HIGH
18	CY_1-4-b_RI	Ayia	NO	I	I-negligible	GOOD	1	GOOD	3	GOOD

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
19	CY_1-4-d_RI_HM	Ezousa	YES	I	Ih-important	MODERATE	4	GOOD	4	MODERATE
20	CY_1-4-e_RIh_HM	Ezousa	YES	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
21	CY_1-4-f_RP_HM	Ezousa	YES	P	P-minor	GOOD	1	GOOD	4	GOOD
22	CY_1-4-g_RI_HM	Ezousa	YES	I	I-minor	GOOD	2	GOOD	4	GOOD
23	CY_1-4-h_RIh_HM	Ezousa	YES	Ih	E-minor	GOOD	4	UKNOWN	0	GOOD
24	CY_1-4-i_RI	Paleomylou	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
25	CY_1-4-j_RIh	Ayios Nepios	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
26	CY_1-4-k_RIh	Varkas	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
27	CY_1-4-L_RIh	Milarkou	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
28	CY_1-4-m_RIh	Kochatis	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
29	CY_1-6-a_RIh	Mavrokolymbos	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
30	CY_1-6-c_RIh_HM	Mavrokolymbos	YES	Ih	E-minor	MODERATE	4	GOOD	4	MODERATE
31	CY_1-6-d_RIh	Xeros	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
32	CY_1-8-a_RIh	Kalamouli (Avgas)	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
33	CY_1-8-b_RIh	Pevkos	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
34	CY_2-1-a_RE	Ayiou Ioanni	NO	E	E-important	MODERATE	4	GOOD	4	MODERATE
35	CY_2-2-a_RIh	Neraidhes & Ammadhkiou	NO	Ih	Ih-important	MODERATE	4	GOOD	2	MODERATE
36	CY_2-2-b_RI	Garyllis	NO	I	I-important	MODERATE	1	GOOD	1	MODERATE
37	CY_2-2-c_RI	Stavros tis Psokas	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
38	CY_2-2-d_RI	Stavros tis Psokas	NO	I	I-important	GOOD	3	GOOD	4	GOOD

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
39	CY_2-2-f_RI_HM	Stavros tis Psokas	YES	I	Ih-important	MODERATE	4	GOOD	4	MODERATE
40	CY_2-2-g_RI_HM	Khrysokhou	YES	I	I-important	MODERATE	2	GOOD	4	MODERATE
41	CY_2-2-h_RIh_HM	Khrysokhou	YES	Ih	E-minor	MODERATE	4	GOOD	4	MODERATE
42	CY_2-3-a_RIh	Mirmikoph	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
43	CY_2-3-b_RIh	Argaki tis Limnis	NO	Ih	Ih-important	MODERATE	1	LOWER THAN GOOD	3	MODERATE
44	CY_2-3-c_RI	Magounda	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
45	CY_2-3-d_RIh_HM	Magounda	YES	Ih	E-minor	GOOD	4	GOOD	4	GOOD
46	CY_2-3-e_RE	Xeropotamos	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
47	CY_2-3-f_RP	Yialia	NO	P	P-minor	GOOD	1	GOOD	4	GOOD
48	CY_2-3-g_RI	Yialia	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
49	CY_2-4-a_RIh	Xeros	NO	Ih	Ih-negligible	GOOD	4	GOOD	4	GOOD
50	CY_2-4-b_RIh_HM	Xeros	YES	Ih	E-minor	GOOD	4	GOOD	4	GOOD
51	CY_2-4-c_RP	Maroti & Diali	NO	P	P-negligible	HIGH	2	GOOD	4	HIGH
52	CY_2-4-d_RI	Livadhi	NO	I	I-negligible	GOOD	1	GOOD	4	GOOD
53	CY_2-4-e_RIh_HM	Livadhi	YES	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
54	CY_2-5-a_RIh	Ayios Theodoros	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
55	CY_2-6-a_RIh	Katouris	NO	Ih	Ih-negligible	GOOD	4	GOOD	4	GOOD
56	CY_2-6-b_RIh_HM	Katouris	YES	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
57	CY_2-7-a_RI	Pyrgos	NO	I	I-minor	GOOD	1	GOOD	4	GOOD

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
58	CY_2-8-a_RP	Limnitis	NO	P	P-negligible	GOOD	1	GOOD	4	GOOD
59	CY_2-9-a_RI	Kambos	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
60	CY_2-9-b_RP	Kambos	NO	P	P-minor	MODERATE	1	GOOD	1	MODERATE
61	CY_2-9-c_RI	Kambos	NO	I	I-negligible	GOOD	2	GOOD	4	GOOD
62	CY_2-9-d_RIh_HM	Kambos	NO	Ih	Ih-negligible	GOOD	4	GOOD	4	GOOD
63	CY_3-1-a_RP	Xeros	NO	P	P-negligible	HIGH	2	GOOD	4	HIGH
64	CY_3-1-b_RI	Xeros	NO	I	I-negligible	GOOD	1	GOOD	4	GOOD
65	CY_3-1-c_RI_HM	Xeros	NO	I	I-negligible	GOOD	2	GOOD	4	GOOD
66	CY_3-2-a_RP	Marathasa	NO	P	P-minor	GOOD	1	GOOD	1	GOOD
67	CY_3-2-b_RP_HM	Marathasa	YES	P	P-minor	GOOD	2	GOOD	4	GOOD
68	CY_3-2-d_RI	Rkondas	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
69	CY_3-3-a_RP	Ayios Nikolaos	NO	P	P-negligible	GOOD	1	GOOD	1	GOOD
70	CY_3-3-b_RP	Karyiotis	NO	P	P-important	MODERATE	1	GOOD	1	MODERATE
71	CY_3-3-c_RI	Karyiotis	YES	I	I-important	MODERATE	2	UKNOWN	0	MODERATE
72	CY_3-3-d_RP	Argaki tou Karvouna	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
73	CY_3-3-e_RI	Alykhnos	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
74	CY_3-4-a_RI	Atsas	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
75	CY_3-4-b_RIh	Atsas	NO	Ih	Ih-important	MODERATE	3	GOOD	1	MODERATE
76	CY_3-4-c_RIh_HM	Atsas	YES	Ih	Ih-important	MODERATE	4	UKNOWN	0	MODERATE
77	CY_3-5-a_RI	Lagoudhera	NO	I	I-minor	GOOD	1	GOOD	4	GOOD

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
78	CY_3-5-c_RI_HM	Lagoudhera	YES	I	Ih-minor	MODERATE	1	LOWER THAN GOOD	1	MODERATE
79	CY_3-5-d_RIh_HM	Elia	YES	Ih	Ih-important	MODERATE	4	LOWER THAN GOOD	4	MODERATE
80	CY_3-5-e_RI	Kannavia	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
81	CY_3-5-f_RI	Asinou	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
82	CY_3-7-a_RI	Peristerona	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
83	CY_3-7-b_RIh	Peristerona	NO	Ih	Ih-important	GOOD	4	GOOD	3	GOOD
84	CY_3-7-d_RI	Maroullenas	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
85	CY_3-7-e_RI	Kambi	NO	I	I-important	MODERATE	2	GOOD	2	MODERATE
86	CY_3-7-f_RI_HM	Maroullenas	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
87	CY_3-7-g_RI	Pharmakas	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
88	CY_3-7-h_RI_HM	Pharmakas	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
89	CY_3-7-j_RIh_HM	Akaki	YES	Ih	Ih-important	MODERATE	4	UKNOWN	0	MODERATE
90	CY_3-7-m_RE	Likythia	NO	E	E-minor	GOOD	3	UKNOWN	0	
91	CY_3-7-n_RIh	Koutis & Aloupos	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
92	CY_6-1-a_RIh	Pedhieos & Ayios Onouphrios	NO	Ih	Ih-minor	GOOD	1	GOOD	2	GOOD
93	CY_6-1-c_RIh_HM	Pedhieos	YES	Ih	Ih-important	MODERATE	4	GOOD	3	MODERATE
94	CY_6-5-a_RIh	Yialias	NO	Ih	Ih-minor	GOOD	4	GOOD	3	GOOD

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
95	CY_6-5-b_RI	Yialias	NO	I	I-important	POOR	1	GOOD	3	POOR
96	CY_6-5-e_RIh	Koutsos	NO	Ih	Ih-minor	GOOD	4	GOOD	3	GOOD
97	CY_6-5-f_RIh_HM	Koutsos	YES	Ih	Ih-important	MODERATE	4	GOOD	3	MODERATE
98	CY_6-5-g_RE	Villourkon	NO	E	E-minor	GOOD	4	GOOD	3	GOOD
99	CY_6-5-h_RE	Αλυκος	NO	E	E-important	MODERATE	4	UKNOWN	0	MODERATE
100	CY_6-5-i_RE	Almyros	NO	E	E-minor	GOOD	4	UKNOWN	0	GOOD
101	CY_7-2-a_RIh	Vathys	NO	Ih	Ih-minor	MODERATE	3	UKNOWN	0	MODERATE
102	CY_8-3-a_RE	Kalo Chorio	NO	E	E-minor	MODERATE	4	UKNOWN	0	MODERATE
103	CY_8-3-b_RE	(Ανώνυμο)	NO	E	E-important	MODERATE	4	UKNOWN	0	MODERATE
104	CY_8-4-g_RE	Ayios Ioannis	NO	E	E-minor	GOOD	4	GOOD	2	GOOD
105	CY_8-5-a_RIh	Pouzis	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
106	CY_8-6-a_RIh	Xeropotamos	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
107	CY_8-7-a_RI	Syrkatis	NO	I	I-minor	GOOD	1	GOOD	3	GOOD
108	CY_8-7-c_RI_HM	Syrkatis	YES	I	Ih-important	MODERATE	1	GOOD	3	MODERATE
109	CY_8-7-d_RIh	Argaki tou Mylou	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
110	CY_8-7-f_RI_HM	Pendaskhinos	YES	I	E-minor	MODERATE	4	GOOD	4	MODERATE
111	CY_8-7-g_RIh_HM	Pendaskhinos	YES	Ih	E-important	MODERATE	4	GOOD	4	MODERATE
112	CY_8-8-a_RI	Ayiou Mina	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
113	CY_8-8-b_RIh	Ayiou Mina	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
114	CY_8-8-c_RIh_HM	Ayiou Mina	YES	Ih	Ih-minor	MODERATE	1	GOOD	4	MODERATE
115	CY_8-9-a_RI	Vasilikos	NO	I	I-minor	GOOD	2	GOOD	2	GOOD

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
116	CY_8-9-b_RI_HM	Vasilikos	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
117	CY_8-9-c_RI	Vasilikos	NO	I	I-important	MODERATE	2	GOOD	1	MODERATE
118	CY_8-9-e_RI_HM	Vasilikos	YES	I	E-minor	MODERATE	4	UKNOWN	0	MODERATE
119	CY_8-9-f_RIh_HM	Vasilikos	YES	Ih	E-important	MODERATE	4	UKNOWN	0	MODERATE
120	CY_8-9-g_RIh	Exovounia	NO	Ih	Ih-important	MODERATE	4	GOOD	2	MODERATE
121	CY_8-9-h_RIh	Argaki tis Asgatas	NO	Ih	Ih-minor	GOOD	4	UKNOWN	0	GOOD
122	CY_9-1-b_RIh	Pyrgos	NO	Ih	Ih-important	MODERATE	4	UKNOWN	0	MODERATE
123	CY_9-2-a_RI	Karydhaki	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
124	CY_9-2-b_RP	Ayios Pavlos	NO	P	P-important	MODERATE	2	GOOD	4	MODERATE
125	CY_9-2-c_RI	Yermasogeia	NO	I	I-important	MODERATE	2	GOOD	4	MODERATE
126	CY_9-2-d_RI_HM	Yermasogeia	YES	I	I-important	MODERATE	2	GOOD	4	MODERATE
127	CY_9-2-e_RI	Yermasogeia	NO	I	I-important	GOOD	1	GOOD	3	GOOD
128	CY_9-2-f_RI	Yermasogeia	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
129	CY_9-2-h_RIh_HM	Yermasogeia	YES	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
130	CY_9-2-i_RIh	Pissokamina	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
131	CY_9-2-j_RI	Yialiadhes	NO	I	I-negligible	HIGH	3	GOOD	2	HIGH
132	CY_9-2-k_RI	Yialiadhes	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
133	CY_9-2-L_RI_HM	Yialiadhes	NO	I	I-important	MODERATE	1	GOOD	1	MODERATE
134	CY_9-4-b_RI	Garyllis	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
135	CY_9-4-c_RI	Garyllis	NO	I	I-important	POOR	2	LOWER THAN	1	POOR

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
								GOOD		
136	CY_9-4-e_RIh_HM	Garyllis	YES	Ih	E-important	MODERATE	4	UKNOWN	0	MODERATE
137	CY_9-4-g_RIh	Phasoula	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
138	CY_9-6-a_RP	Ayios Ioannis	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
139	CY_9-6-b_RP	Ambelikos-Agros	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
140	CY_9-6-c_RP		NO	P	P-minor	GOOD	2	GOOD	2	GOOD
141	CY_9-6-d_RP_HM		NO	P	P-minor	MODERATE	2	GOOD	2	MODERATE
142	CY_9-6-e_RP	Ambelikos-Xylourikos	NO	P	P-important	MODERATE	1	GOOD	1	MODERATE
143	CY_9-6-f_RI	Limnatis	NO	I	I-important	MODERATE	1	GOOD	4	MODERATE
144	CY_9-6-g_RI	Pelendri	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
145	CY_9-6-h_RI	Ayios Mamas	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
146	CY_9-6-i_RP	Loumata	NO	P	P-negligible	HIGH	3	GOOD	4	HIGH
147	CY_9-6-k_RP_HM	Loumata	NO	P	P-negligible	GOOD	2	GOOD	4	GOOD
148	CY_9-6-L_RP	Kouris	NO	P	P-important	POOR	2	LOWER THAN GOOD	2	POOR
149	CY_9-6-m_RP_HM	Kouris	NO	P	P-important	MODERATE	1	GOOD	1	MODERATE
150	CY_9-6-n_RP	Mesapotamos	NO	P	P-negligible	HIGH	2	GOOD	4	HIGH
151	CY_9-6-o_RP	Moniatis	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
152	CY_9-6-p_RP	Kryos	NO	P	P-minor	GOOD	1	GOOD	1	GOOD
153	CY_9-6-q_RP_HM	Kryos	NO	P	P-minor	GOOD	1	GOOD	1	GOOD

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
154	CY_9-6-r_RI_HM	Kryos	YES	I	Ih-minor	MODERATE	1	GOOD	4	MODERATE
155	CY_9-6-t_RI_HM	Kouris	YES	I	Ih-important	MODERATE	4	UKNOWN	0	MODERATE
156	CY_9-7-b_RE	Symvoulas	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
157	CY_9-8-a_RIh	Paramali	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
158	CY_9-8-b_RI	Evdhimou (Mandalas)	NO	I	I-important	MODERATE	2	GOOD	4	MODERATE
159	CY_9-8-c_RIh	Evdhimou	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE

SOURCE: Processed data from:

Table 5.1.4-2[REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014]

Table 4-19 [Interim Report No.1 entitled "Checking / Filling of Article 5 of the WFD data gaps" - Final Determination of Heavily Modified and Artificial Water Bodies, July 2015]

10.1.3 Methodology for Classification of Impounded Rivers

10.1.3.1 Type-specific conditions

a) Biological Quality Elements

For the evaluation of impounded rivers (water reservoirs) ecological quality, Cyprus has developed a national method based on Phytoplankton, the Mediterranean Assessment System for Reservoirs Phytoplankton (MASRP). During the 2nd phase of Intercalibration exercise, the method was slightly modified and was renamed to NMASRP (New Mediterranean Assessment System for Reservoirs Phytoplankton, Mediterranean Lake Phytoplankton ecological assessment methods - Intercalibration Technical Report, 2014).

The NMASRP (New Mediterranean Assessment System for Reservoirs Phytoplankton) index incorporates four parameters, grouped in two types: those related to biomass, i.e. Chlorophyll-a concentration and Phytoplankton biovolume, and those related to phytoplankton composition, i.e. Catalan index (Index des Grups Algals) and Cyanobacterial biovolume (replacing the metric “percentage of Cyanobacteria” that was included in MASRP).

During the Intercalibration Exercise a boundary setting procedure was implemented for the assignment of two quality classes, Good and above and below Good Ecological Potential. However, according to the Guidance Document No. 4 for HMWB and AWB four quality classes of ecological potential must be established. Therefore, the ecological potential for HMWB was decided to be expressed according to the Guidance Document, while maintaining the crucial "Good and Above/Moderate Ecological Potential" limit value at 0.6 as calculated by the Med GIG.

The range of the two remaining classes was evenly spaced over the remaining interval and therefore M/P and P/B ecological potential boundary values were set to 0,4 and 0,2 respectively (Table 10-3).

Table 10-3: Limit values for the classification of Ecological Potential in HMWB of Cyprus

			GOOD AND ABOVE	MODERATE	POOR	BAD
Phytoplankton	Calcareous arid Reservoirs (L4)	NMASRP	0.6	0.4	0.2	

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.3.2.1-1)]

Samplings were conducted according to the NMASRP methodology and samples were collected at least two times per year in summer period. The data provided for each sample, consisted of the numerical values of the four metrics: Chlorophyll-a concentration, Phytoplankton biovolume, Catalan index and Cyanobacterial biovolume, which were used to calculate the NMNASRP index.

The general principle for the quality evaluation of impounded rivers follows the guidelines of WFD (Chapter 3.1 of this report), also applied for rivers. The ecological potential is calculated comparing the observed value in a given reservoir, to the reference value (EQR). According to the calculated EQR value, the reservoir is then matched to a quality class, according to the boundary values given for the NMASRP index.

For the calculation of NMASRPEQR, the summer values of the four component metrics provided were used, and more specifically the values from June and September samples, to calculate the mean summer EQR for each metric. Then the separate EQR values were aggregated for the calculation of the NMASRPEQR, according to which the water body was assigned to a quality class. Finally, for the overall assessment of reservoirs biological potential, the mean value of each annual NMASRPEQR was calculated for each reservoir.

b) Chemical - Physicochemical Quality Elements

For the estimation of chemical/physico-chemical quality elements, the assessment method which used was identical to that described for WB systems (see. Para. 10.1.1.1 B)).

According to these analyses, it was concluded that the assessment system as applied in contract TAY54/2009 and in the 1st RBMP seems to be in line with the Cyprus physicochemical data apart from Electric Conductivity (EC) and Ammonium ($NH4+$). Therefore, it was decided to continue with the same assessment system for the physicochemical data in the 2nd RBMP. The methodology for the evaluation system of the physicochemical data was the same as described for the WB systems (see. Section 10.1.1.1 B)).

The water reservoirs in Cyprus are used for drinking and/or irrigational purposes or they are included in a Natura 2000 site. So for their protection it must be taken into account these water uses. So the limit values for the chemical - physicochemical parameters were based in some cases on the drinking water directive/national legislation or on protection or improvement in order to support fish life. The physicochemical parameters -supporting biological quality elements- that were finally used for the assessment of impounded rivers (water reservoirs) in Cyprus, based on local conditions, are as presented in the following Table.

Table10-4: Physicochemical parameters used for the assessment of impounded river water bodies (water reservoirs) in Cyprus

Chemical – Physicochemical Category	Parameters
Oxygenation conditions	DO
Salinity	EC

Chemical – Physicochemical Category	Parameters
Acidification status	pH
Nutrient conditions	NH_4^+,TP, PO_4^{-3}
Specific pollutants	Cr, Cu, As, B, Fe, Zn

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.3.2.2-1)]

For the assessment of the chemical - physicochemical potential of Cyprus water reservoir (impounded river) monitoring stations, the first step is to calculate the individual quality classe of each parameter, by averaging the values of all the samples for each parameter (period 2009-2013) and comparing them to the parameter limit values, as they are described in the following paragraphs. Finally, the total chemical - physicochemical potential of each monitoring station is classified by averaging the individual quality classes (rating ranges) of each parameter.

The classification systems (limit values) for the various Chemical – Physicochemical parameters that were utilised for classification of the Chemical – Physicochemical potential of Cyprus impounded rivers' monitoring stations are presented in the following Table

Table 10-5 : Classification systems for the Chemical – Physicochemical elements at impounded river monitoring stations (except for water reservoirs)

Classification system per parameter	Unit	Good	Moderate
pH [Directive 2006/44/EC]		9	
DO [Norway criteria]	mg/l	6.4	
EC [based on Cyprus data]	μS/cm	1250	
Total P [based on Cyprus data]	mg/l	0.05	
NH_4^+ [based on Cyprus data]	mg/l	0.3	
Total Coliforms [based on Cyprus data]	/100ml	1200	
Cr [National Legislation for Drinking Waters, L.87.I.2001]	mg /l	50	
As [National Legislation for Drinking Waters, L.87.I.2001]	mg /l	10	
Cu [Directive 2006/44/EC]	mg /l	40 mg/l (water hardness between 100 - 300 mg/l CaCO3) 112 mg/l (water hardness greater than 300 mg/l CaCO3)	
B [National Legislation for Drinking Waters, L.87.I.2001]	mg /l	1000	
Fe [Directive 75/440/EEC & UKTAG]	mg /l	1000	
Zn [Directive 2006/44/EC]	mg /l	1000 mg/l (water hardness between	

Classification system per parameter	Unit	Good	Moderate
		100 - 500 mg/l CaCO3) 2000 mg/l for water hardness greater than 300 mg/l CaCO3)	

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 3.3.2.2-2)]

For the evaluation of the chemical physico-chemical potential of the monitoring stations of impounded river of Cyprus, the first step was the calculation of the individual calculation of separate quality classes for each parameter, with the average of all the samples for each parameter and comparing them with the limit values of parameter. Then, applied the general evaluation mechanism which presented above for River WB (Table 10 4). Finally, the total chemical potential physicochemical each monitoring station classified by the average of the individual quality classes (scales) of each parameter.

10.1.3.2 Degree of uncertainty

The methodology for the calculation of the uncertainty for impounded rivers in the results of the chemical and ecological monitoring is similar to the methodology which described in paragraph 10.1.1.3 for WB systems.

The total uncertainty in the ecological status of the water body monitoring station for each reservoir was equivalent to the value of uncertainty of the situation of the class determinants QE. If there was no difference in the situation, then the uncertainty of the overall situation amounted to an average of uncertainties categories QEs.

The results of estimation uncertainty at the monitoring station and per quality element category presented below. Of the **15 impounded rivers**:
a) concerning the ecological situation:

- **13** have classified with low uncertainty,
- **1** have classified with moderate uncertainty ,
- **1** have classified with very high uncertainty.

b) concerning the chemical situation:

- **6** have classified with low uncertainty,
- **3** have classified with moderate uncertainty,
- **6** have classified with high uncertainty.

10.1.4 Status of Impounded Rivers

Of the 15 impounded rivers that were evaluated, 12 was classified to good or higher status, while 3 impounded rivers (Yermasogeia, Polemidia και Akaki-Malouda) is lower than good status. This is attributed to ecological potential and/or the chemical status. The overall status of the impounded rivers is presented in the next table:

Table 10-6 : Overall Status of the impounded rivers

Uncertainty Class: **1 = Low, 2 = Medium, 3 = High, 4 = Very High**

Water Body Code	Name	ECOLOGICAL POTENTIAL	Uncertainty Class	CHEMICAL STATUS	Uncertainty Class	OVERALL STATUS
CY_1-2-c_RP_HM_IR	Arminou	GOOD	1	GOOD	1	GOOD
CY_1-3-d_RIh_HM_IR	Asprokremmos	GOOD	1	GOOD	3	GOOD
CY_1-4-c_RI_HM_IR	Kannaviou	GOOD	1	GOOD	3	GOOD
CY_1-6-b_RIh_HM_IR	Mavrokolympos	GOOD	1	GOOD	2	GOOD
CY_2-2-e_RI_HM_IR	Evretou	GOOD	1	GOOD	2	GOOD
CY_3-5-b_RI_HM_IR	Xyliatos	GOOD	1	GOOD	2	GOOD
CY_3-7-i_RI_HM_IR	Akaki-Malounda	MODERATE	1	GOOD	1	MODERATE
CY_6-1-b_RIh_HM_IR	Tamassos	GOOD	1	GOOD	1	GOOD
CY_8-7-b_RI_HM_IR	Leukara	GOOD	1	GOOD	3	GOOD
CY_8-7-e_RI_HM_IR	Dipotamos	GOOD	1	GOOD	3	GOOD
CY_8-9-d_RI_HM_IR	Kalavasos	GOOD	1	GOOD	1	GOOD
CY_9-2-g_RI_HM_IR	Germasogia	MODERATE	1	LOWER THAN GOOD	1	MODERRATE
CY_9-4-d_RI_HM_IR	Polemidia	BAD	2	LOWER THAN GOOD	1	BAD
CY_9-6-j_RP_HM_IR	Pano Platres	GOOD	4	GOOD	3	GOOD
CY_9-6-s_RP_HM_IR	Kouris	GOOD	1	GOOD	3	GOOD

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 5.1.5-1)]

10.1.5 Statistical data on the status of river WB

10.1.5.1 Ecological status/potential

Regarding the ecological status/potential of **159 river WB**:

- **Seven (7)** River WB with a total length of 90,1 km, ie 5.1% of the total river length WB classified at **high** ecological status**,**
- **Seventy-eight (78)** River WB with a total length of 965,3 km, ie 54.4% of their total length are classified into **good** ecological condition / potential,
- **seventy-one (71)** River WB with a total length of 683,8 km, ie 38.5% of their total length, classified in **moderate** condition/potential and
- **three (3)** River WB with a total length of 36,2 km, ie 2% of their total length are classified into **poor** ecological status / potential.
- There are no bodies in a poor ecological status or potential.

Table10-7: Ecological status / potential of River WB (except from impounded rivers)

Status / potential	Number of river WB - ecological status / potential:					Total
	HIGH	GOOD	MODERATE	POOR	BAD	
Natural WBs	7	68	46	3	0	124
HMWBs	-	10[6]	25	0	0	35
Total	7	78	71	3	0	159
	Number of river WBs - ecological status / potential					
Natural WBs	5.6%	54.8%	37.1%	2.4%	0.0%	100%
HMWBs	-	28.6%	71.4%	0.0%	0.0%	100%
Total	4.4%	49.1%	44.7%	1.9%	0.0%	100%
	Length (km) of river WBs - ecological status / potential:					
Natural WBs	90.1	873.8	504.8	36.2	0.0	1505.0
HMWBs	0	91.5	179	0	0	270.5
Total	90.1	965.3	683.8	36.2	0.0	1775.5
	Percentage (%)of length of river WBs - ecological status / potential:					
Natural WBs	6.0%	58.1%	33.5%	2.4%	0.0%	100%
HMWBs	0	33.8%	66.2%	0.0%	0.0%	100%
Total	5.1%	54.4%	38.5%	2.0%	0.0%	200%

SOURCE: Processed data from:

6 Take into account only the biological quality elements and chemical and physicochemical parameters

Table 5.1.4-3 [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014]

Table 4-19 [Intermediate Report No.1 entitled "Checking / Filling data gaps of Article 5 of the WFD " - Final Determination of Heavily Modified and Artificial Water Bodies, July 2015]

Figure 10-26: Ecological status of river WB (excluding inland reservoirs) -number and rate HS

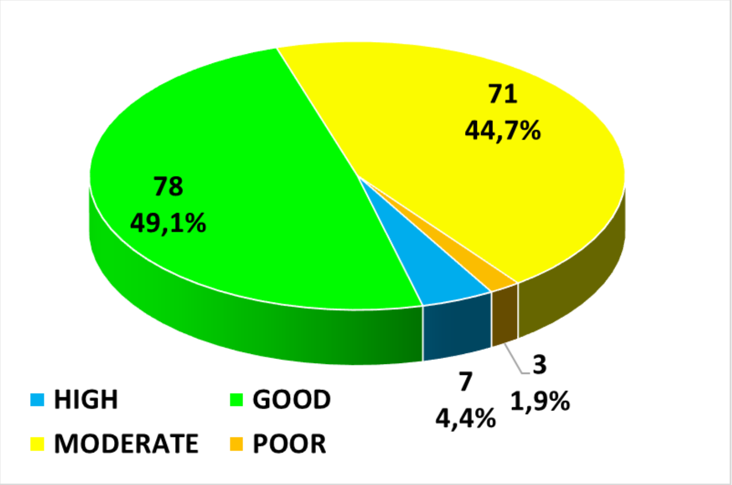
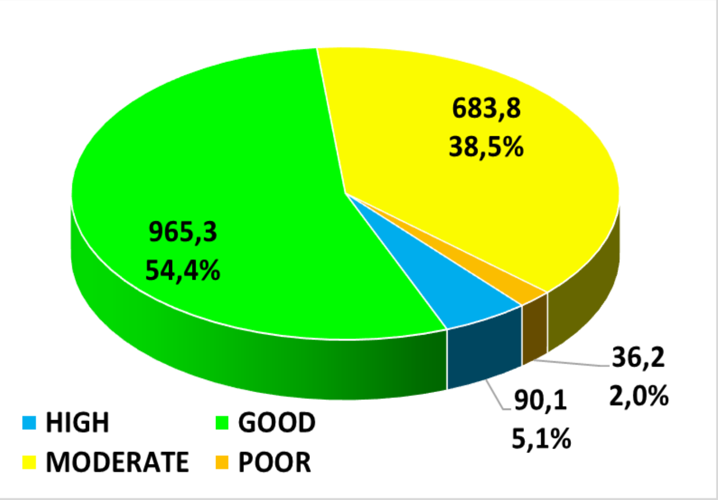


Figure 10-27: Ecological status of river WB (excluding impounded rivers) - length in km and percentage of WB



As for the ecological potential of the **15 impounded rivers**:

- **Twelve (12**) impounded rivers, with a total area of 10.9 km^2, ie 91.6% of the total area of the impounded rivers classified in **good** ecological status,
- **two (2)** impounded rivers with an area of 0.8 km^2, ie 6.7% of the total surface area, is classified in **moderate** condition lower than good and
- **one (1)** impounded river with an area of 0.2 km^2, ie 1.7% of their total surface area is classified in **poor** ecological condition.

– There are no impounded rivers on incomplete and unknown ecological status or potential.

Table 10-8 : Ecological potential of impounded rivers

Number of impounded rivers with ecological potential:				Total
GOOD	*MODERATE*	*POOR*	*BAD*	
12	*2*	*0*	*1*	15
Percentage (%) of impounded rivers with ecological potential:				
80,0	*13,3*	*0,0*	*6,7*	100
Area (Km^2) of impounded rivers with ecological potential:				
10,9	*0,8*	*0,0*	*0,2*	11,9
Percentage (%) of area of impounded rivers with ecological potential:				
91,6	*6,7*	*0,0*	*1,7*	100

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 5.1.5-2)]

Figure 10-28: Ecological status (number and percentage) of impounded rivers

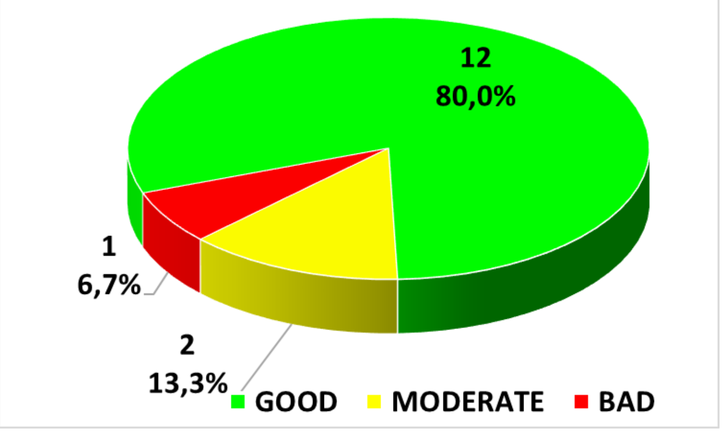
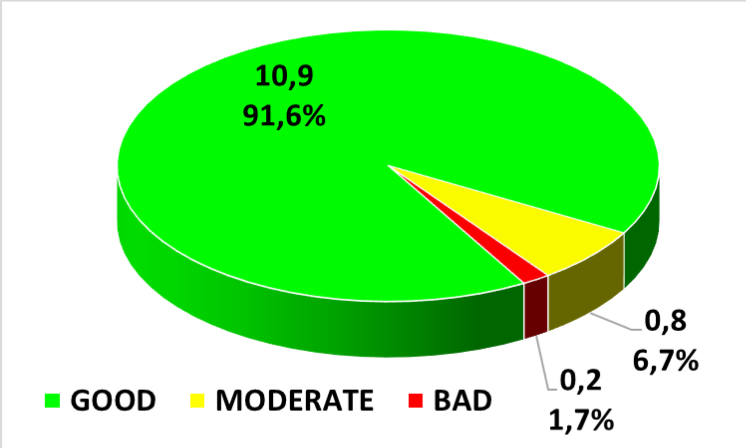


Figure 10-29: Ecological situation (area in km² and percentage) of impounded rivers



10.1.5.2 Chemical status

In Cyprus RBD, as regards the chemical status of the **159 river WB**:

- **One hundred and thirty-seven (137)** River WB with a total length of 1528,8 km, ie 86.1% of the total river length WB classified in **good** chemical status,
- **Five (5)** River WB with a total length of 57,8 km, ie 3.3% of the total length are classified in **a lower than good** chemical status and
- **Seventeen (17)** River WB with a total length of 188,8 km, ie 10.6% of their total length, classified in an **unknown** chemical status.

Table 10-9: Chemical Status of River Water Bodies (apart from Impounded Rivers)

Status/Potential	Number of River Water Bodies with Chemical Status			Total
	GOOD	FAILING TO ACHIEVE GOOD	UNKNOWN	
WB	111	3	10	124
HMWB	26	2	7	35
Total	137	5	17	159
	Percentage (%) of Water Bodies with Chemical Status:			
WB	89.5%	2.4%	8.1%	100%
HMWB	74.3%	5.7%	20.0%	100%
Total	86.2%	3.1%	10.7%	100%
	Length (Km) of Water Bodies with Chemical Status:			
WB	1338.5	31.9	134.5	1505.0
HMWB	190.3	25.9	54.3	270.5
Total	1528.8	57.8	188.8	1775.5

Status/Potential	Number of River Water Bodies with Chemical Status			Total
	GOOD	FAILING TO ACHIEVE GOOD	UNKNOWN	
	Percentage (%) of Length of Water Bodies with Chemical Status:			
WB	88.9%	2.1%	8.9%	100%
HMWB	70.3%	9.6%	20.1%	100%
Total	86.1%	3.3%	10.6%	100%

SOURCE: Processed data from:

Table 5.1.4-5 [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014]

Table 4-19 [Interim Report No.1 entitled "Checking / Filling data gaps of Article 5 of the WFD " - Final Determination of Heavily Modified and Artificial Water Bodies, July 2015]

Figure 10-30: Chemical status (number and percentage) of river WB

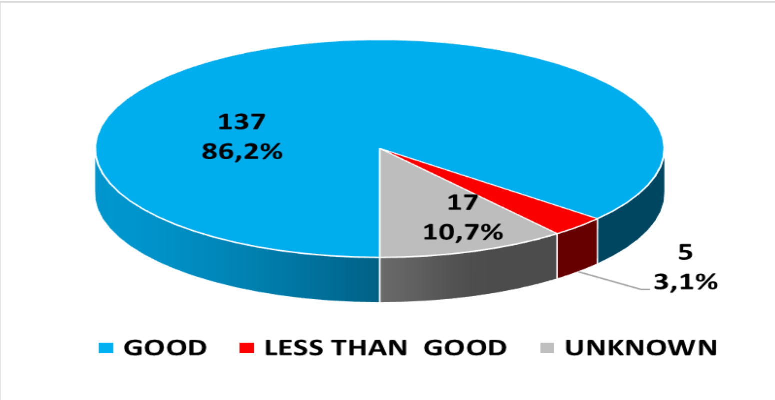
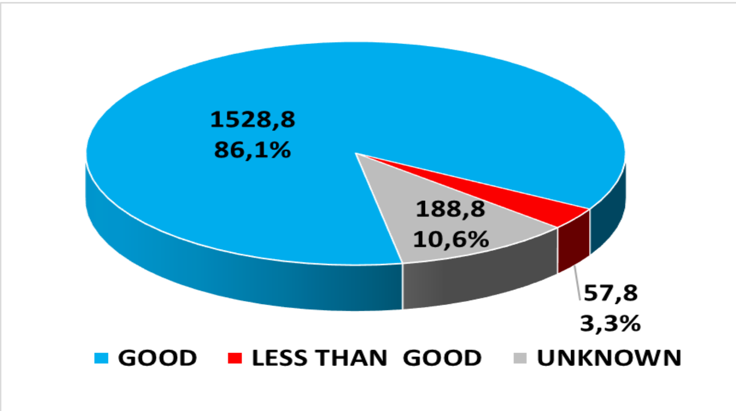


Figure 10-31: Chemical status (length in km and percentage) of river WB



Regarding the chemical status of the **15 impounded rivers**:

- **Thirteen (13**) impounded rivers, with total area of 11.0 km^2, i.e. 89% of the total area of the impounded rivers are classified as good chemical status and
- **Two (2)** impounded rivers, with total area of 0.8 km^2, or 6 8% of the total surface area, are classified as less than **good** chemical status.

Table 10-10 : Chemical status of impounded rivers

Number of impounded rivers with a chemical status:		Total
GOOD	LESS THAN GOOD	
13	2	15
Percentage (%) of impounded rivers with a chemical status:		
86,7	13,3	100
Area (km2) of impounded rivers with a chemical status:		
11,0	0,8	11,8
Percentage (%) of the area impounded rivers with a chemical status:		
93,2	6,8	100

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 5.1.5-3)]

Figure 10-32: Chemical status (number and percentage) of impounded rivers

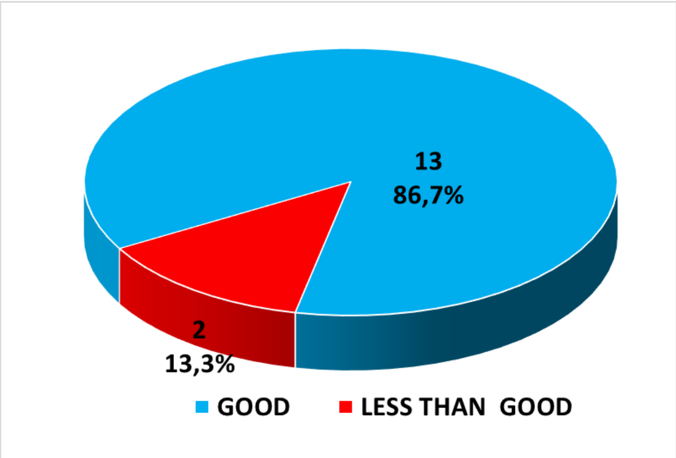
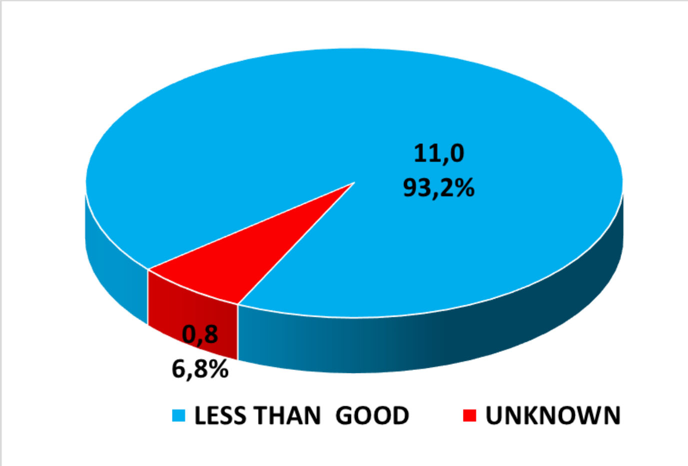


Figure 10-33: Chemical status (area in km^2 and percentage) of impounded rivers



10.1.6 Overall status of rivers and impounded rivers

Based on the analysis of the preceding paragraphs, the following is valid:

A) Regarding the ecological status/potential (Figure 10-9), from the total of **174 river WB (including 15 impounded rivers)**

- **7 (4 %)** are at high ecological status / potential,
- **90 (51,7%)** are at good ecological status / potential,
- **73 (42%)** are at moderate ecological status / potential,
- **3 (1,9%)** are at poor ecological status / potential,
- **1 (0,6%)** are at bad ecological status / potential,

Table 10-11: Ecological Status / Potential for all river water bodies

Status / potential	Number of all river water bodies ecological status / potential:					Total
	HIGH	GOOD	MODERATE	POOR	BAD	
Natural WBs	7	68	46	3	0	124
HMWBs	0	22[7]	27	0	1	50
Total	7	90	73	3	1	174
	Percentage (%) of all river water bodies with ecological status / potential:					
Natural WBs	5,6	54,8	37,1	2,4	0,0	100
HMWBs	0,0	44,0	54,0	0,0	2,0	100
Total	4,0	51,7	42,0	1,9	0,6	100

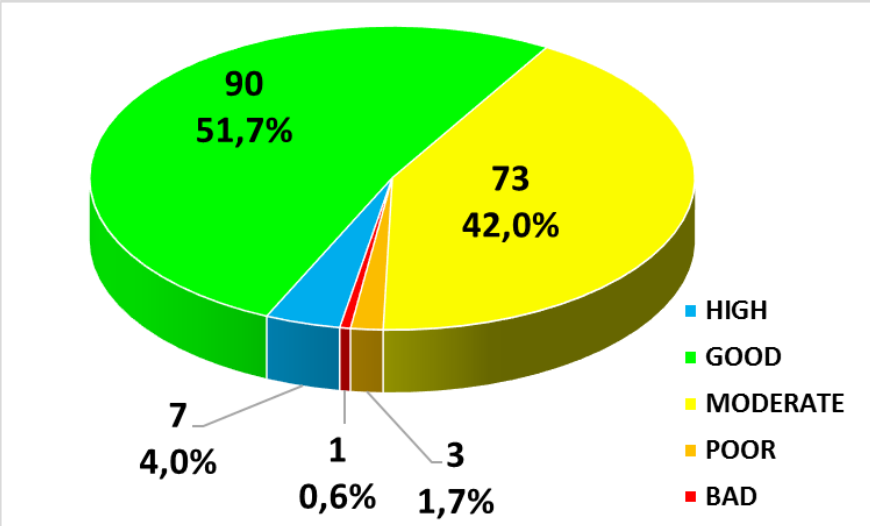
SOURCE: Processed data from

7 For River HMWBs hydromorphological alterations are not considered

Table 5.1.6-1 [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014]

Table 10 - 13 and 10- 13, see. Above

Figure 10-34: Ecological status / potential in all river water bodies- number and percentage of WB



B) Regarding the chemical status (Figure 10-10), from the total of **163 river WB (including 15 impounded rivers)**

- **145 (89%)** in good chemical status,
- **7 (4,3%)** in less than good chemical status,
- **11 (6,7%)** in unknown chemical status.

Table 10-12: Chemical status of all river water bodies

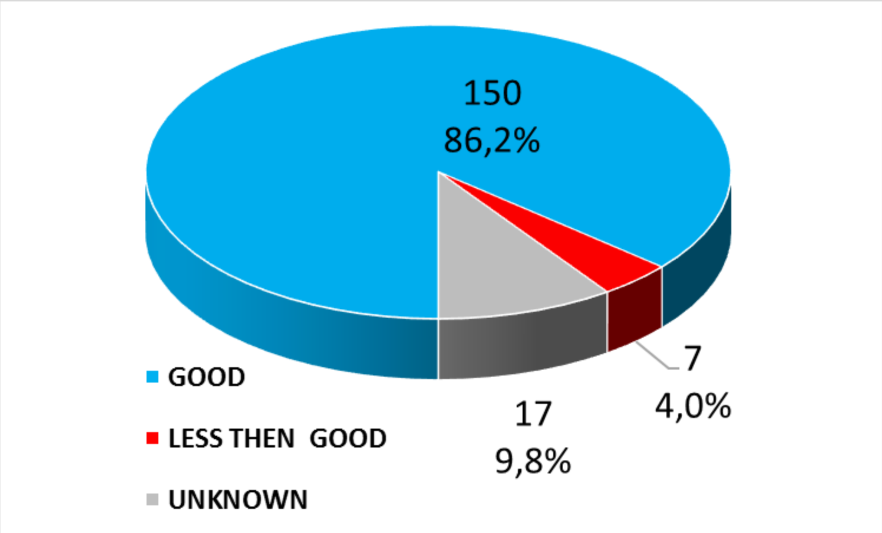
Status / potential	Number of all river water bodies with chemical status:			Total
	GOOD	LESS THAN GOOD	UNKNOWN	
WB	111	3	10	124
HMWB	39	4	7	50
Total	150	7	17	174
	Percentage (%) of all water bodies with a chemical status:			
WB	89,5	2,4	8,1	100
HMWB	78,0	8,0	14,0	100
Total	86,2	4,0	9,8	100

SOURCE: Processed data from:

Table 5.1.6-2 [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014]

Table 10 -14 & 10 15, see. above

Figure 10-35: Chemical status in all river water bodies- number and proportion



10.2 CLASSIFICATION OF LAKE WBs

10.2.1.1 Classification Methodology

A total of 6 phytoplankton samples were collected from Achna lake in summer season during the period 2009-2012. The samples were analyzed following the methodology applied for impounded rivers, for the calculation of NMASRP index (described in Chapter 3.3.2.1). The quality status was derived according to the mean values of the index in the corresponding years. This methodology is only indicative since Achna lake is an artificial water body, not connected to a river, and thus these indices and their boundaries do not apply in this case. However, it was decided to include this analysis only for indicative purposes.

For Achna Artificial Lake the assessment of the chemical - physicochemical potential was according to the methodology of impounded rivers (water reservoirs) as described in Chapter 3.3.2.2 of this report. Firstly, the individual quality classes of each parameter were calculated, by averaging the values of all the samples for each parameter (period 2009-2013) and comparing them to the parameter limit values (Table 3.3.2.2-2). Finally, the total chemical - physicochemical status is classified by averaging the individual quality classes (rating ranges) of each parameter.

For the rest of the lake WBs (salt and brackish lakes), there is no straight forward methodology for the determination of Ecological Status. All available data on contract REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60 / EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS) presented and analyzed and an indicative assessment based on expert evaluation. The results of WDD project for the determination of reference conditions in the lake water bodies of Cyprus will provide a framework and basis for the future assessment of the natural lakes of Cyprus.

Concerning the chemical and physicochemical data available, these were analysed in order to examine their variability through time and to compare their concentration levels in relation to other water bodies' types.

It must be noted that because of absence of any data, Paralimni lake was not assessed on the frame of this project.

10.2.1.2 Degree of uncertainty in the classification

In the lake WB both the ecological and chemical status, include many sources of uncertainty. As have already mentioned there is no one methodology for monitoring (parameters, evaluation, limit values, etc.) Of natural lakes in Cyprus, and lack of data.

The Convention of WDD to determining the conditions for lake WB of Cyprus will provide an initial tool to resolve these issues.

Therefore, the lake WB where their condition is set based on expert judgment, the uncertainty was as high (Table 10 18).

10.2.2 Status of lake WB

The overall status/potential of the lake WB, according to the study REVIEW AND UPDATE OF ARTICLE 5 OFDIRECTIVE 2000/60 / EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), presented in the Table below. Regarding the ecological status, because:

- the lack of a methodology for the biological monitoring of natural lakes of Cyprus,
- the absence of biological data,
- the limited data on physicochemical parameters,
- assessment of natural lakes of Cyprus based on expert evaluation.

Various pressures have been identified in all salt and brackish natural lakes and management measures are considered a priority. Thus, the salt - brackish lakes of Cyprus have been classified in Moderate status, apart from Paralimni and Oroklini where there is no monitoring data at all and its status is set to unknown. This is in accordance to the 1st RBMP. In addition, due to absence of methodology, it was decided that Achna lake will be of Unknown status also despite the assessment that was made with the methodology applied for impounded rivers. In the 1st RBMP, Achna lake was classified as moderate ecological potential. However, due to the fact that the available physicochemical data was at good and above status, it was decided to classify it as unknown for the present time. [See. literature, 124].

Concerning the Chemical Status, it was decided to classify all salt and brackish lakes as unknown due to the fact that their high salinity affects the priority substances measurements/values and another assessment method must be further examined. In the 1st RBMP, all salt/ brackish lakes were classified as Good Chemical Status (apart from Paralimni which was unknown). Due to the exceedance that were observed, in the frame of this Contract the status was set as unknown. Achna lake was classified in Good Chemical Status, an improvement in relation to the 1st RBMP where its status was unknown [See.literature,124].

Table 10-69: Overall Status/Potential of lake WB

Uncertainty Class: 1 = Low, 2 = Moderate, 3 = High, 4 = Very High

Water body code	Water body name	ECOLOGICAL STATUS/ POTENTIAL	Uncertainty Class	CHEMICAL STATUS	Uncertainty Class	OVERALL STATUS
CY_8-3-2_11_L1	Larnaka main salt lake	Moderate*	4	Unknown ****	4	Moderate*
CY_8-3-2_17_L2	Larnaka Limni aerodromiou	Moderate*	4	Unknown **	-	Moderate*
CY_8-3-2_13_L2	Larnaka Limni Soros (Glossa)	Moderate*	4	Unknown **	-	Moderate*
CY_8-3-2_12_L2	Larnaka Limni Orfani	Moderate*	4	Unknown ****	4	Moderate*
CY_9-5-3_10_L2	Akrotiri salt lake	Moderate*	4	Unknown **	-	Moderate*
CY_7-2-6_16_L2-HM	Paralimni	Unknown **	-	Unknown **	-	Unknown **
CY_7-1-2_34_L3-A	Achna	Unknown***	-	GOOD	4	Unknown***
CY_8-1-2_09_L2-HM	Oroklini	Unknown***	-	Unknown***	-	Unknown***

* Expert judgment

** Unknown due to no data

*** Unknown due to no classification system developed

**** Although there are some exceedance in priority substances, these need to be further investigated

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 5.2-1)]

10.2.3 Statistical data on the status of lake WBs

10.2.3.1 Ecological status

As for the Ecological status / potential (Figure 10- 11 and Figure 10 -12) from all **8 lake WB:**

- **Five (5)** lake WB, with total area of 16.6 km^2, ie 82.1% of the total area of the lake WB classified into **moderate** ecological status, while
- **Three (3)** lake WB (Paralimni, Achna and Oroklini), covering a surface of 3,6 km², ie 17.9% of the total area of the lake is classified into **unknown** ecological situation.

Table 10-70: Ecological Status/ Potential of Lake WBs

Status/Potential	Number of Lake Water Bodies with Ecological Status / Potential:						Total
	HIGH	GOOD	MODERATE	POOR	BAD	UNKNOWN	
Water Bodies	0	0	5	0	0	0	5
Heavily Modified / Artificial Water Bodies	0	0	0	0	0	3	3
Total	0	0	5	0	0	3	8
	Percentage (%) of Lake Water Bodies with Ecological Status / Potential:						
Water Bodies	0	0	100,0	0	0	0	100
Heavily Modified / Artificial Water Bodies	0	0	0	0	0	100	100
Total	0	0	62,5	0	0	37,5	100
	Area (Km^2) of Lake Water Bodies with Ecological Status / Potential:						
Water Bodies	0	0	16,6	0	0	0	16,6
Heavily Modified / Artificial Water Bodies	0	0	0	0	0	3,6	3,6
Total	0	0	16,6	0	0	3,6	20,2
	Percentage (%) of Area of Water Bodies with Ecological Status / Potential:						
Water Bodies	0	0	100	0	0	0	100
Heavily Modified / Artificial Water Bodies	0	0	0	0	0	100	100
Total	0	0	82,1	0	0	17,9	100

SOYRCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 5.1.4-1)]

Figure 10-36: Ecological status (number and percentage) of lake WBs

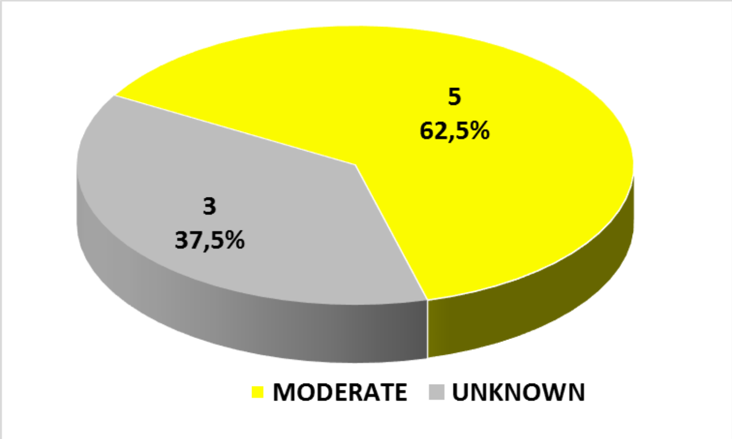
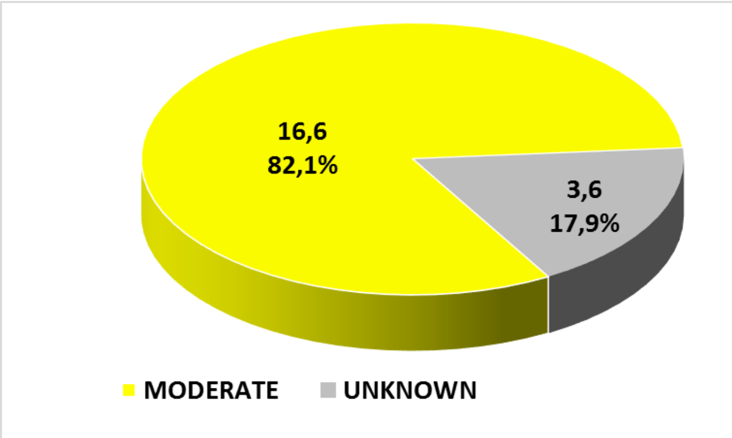


Figure 10-37: WB Ecological situation (area in km^2 and percentage) of lake WBs



10.2.3.2 Chemical status

Regarding the chemical status (Figure 10 13 and Figure 10- 14), of the **8 lake WB:**

- **One (1)** lake WB, with an area of 0.7 km², ie 3.5% of the total area of the lake WB is classified in **good** chemical status and
- **Seven (7)** lake WB with a total area of 19.5 km^2, ie 96.5% of their total surface area is classified into **unknown** chemical status**.**

Table 10-71: Chemical status of lake WB

Status / potential	Number of lakes - chemical status:			Total
	GOOD	LESS THAN GOOD	UNKNOWN	
Natural WBs	0	0	5	5
HMWBs/AWBs	1	0	2	3
Total	1	0	7	8
	Percentage (%) of lakes - chemical status:			
Natural WBs	0	0	100	100
HMWBs/AWBs	33,3	0	66,7	100

Status / potential	Number of lakes - chemical status:			Total
	GOOD	LESS THAN GOOD	UNKNOWN	
Total	12,5	0	87,5	100
	Area (Km^2) of lakes - chemical status:			
Natural WBs	0	0	16,6	16,6
HMWBs/AWBs	0,7	0	2,9	3,6
Total	0,7	0	19,5	20,2
	Percentage (%) of the area of the lakes - chemical status:			
Natural WBs	0	0	100	100
HMWBs/AWBs	19,4	0	80,6	100
Total	3,5	0	96,5	100

SOURCE: [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014 (Table 5.1.4-1)]

Figure 10-38: Chemical status (number and percentage) of lake WB

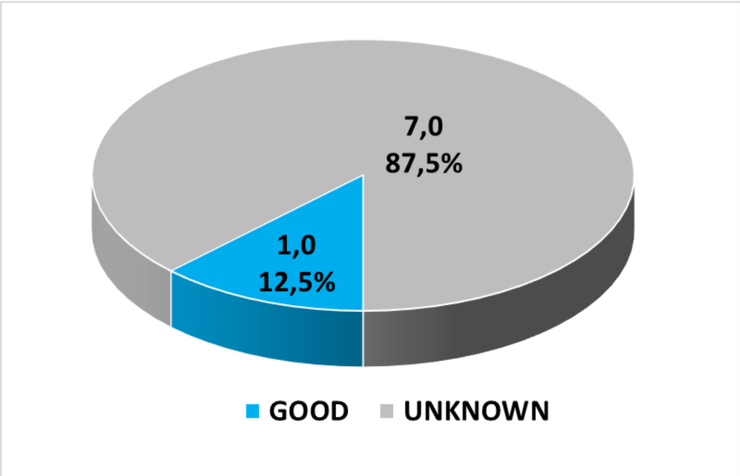
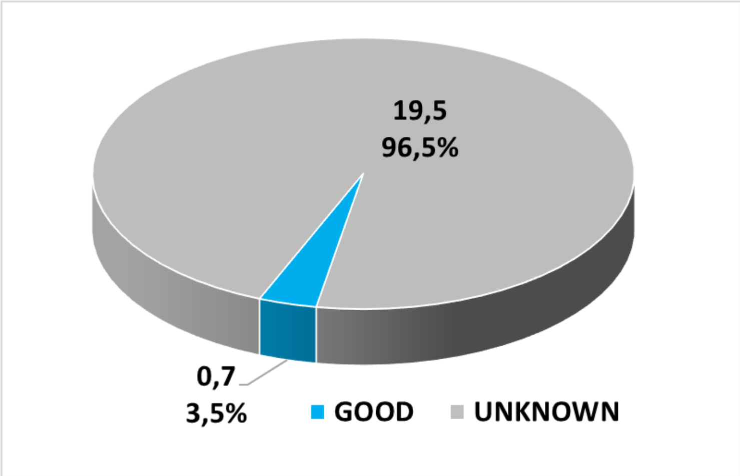


Figure 10-39: Chemical status (extent and rate) of lake WB



10.3 CLASSIFICATION OF COASTAL WBs

For the classification of the status of coastal WBs are taken into account the results of the monitoring network. Coastal WBs which are not monitored are grouped based on the pressures.

From the results of the monitoring of the status of coastal WB derives that none of the pressure is significant, because all monitoring stations, show that the statis of coastal WBs in Cyprus is good and more than good.

Specifically, the status of coastasl WBs is presented in the Table below.

Table 10-72: Monitoring Stations and Ecological status / potential of coastal WBs *

Monitoring Stations	Code of WB	Type of WB	Status based on the results of the monitoring program
	CY_1-C1	C1	-
	CY_2-C1	C1	
1. **cCY_3-C2_S1/LT3** 2. **cCY_3-C2_S1/LT4**	CY_3-C2	C2	GOOD
3. **cCY_4-C1-S1/B3**	CY_4-C1	C1	HIGH
4. **cCY_5-C4_S1/B2** 5. **cCY_5-C4_S1/LR2** 6. **cCY_5-C4_S1/LR3**	CY_5-C4	C4	HIGH
Station not integrated into the WFD network with measurements for the period 2005-2013	CY_6-C4	C4	HIGH
7. **cCY_7-C4_S1/B2**	CY_7-C4-HM	C4	GOOD

Monitoring Stations	Code of WB	Type of WB	Status based on the results of the monitoring program
8. **cCY_8-C4_S1/B2**	CY_8-C4	C4	HIGH
	CY_9-C4	C4	
	CY_10-C1	C1	
9. **cCY_11-C2_S1/B4**	CY_11-C2	C2	GOOD
10. cCY_12-C2_O1/B3 **11. cCY_12-C2_O1/B4** **12. cCY_12-C2_O1/PS** 13. **cCY_12-C2_O2/B1**	CY_12-C2-HM	C2	GOOD
14. **cCY_13-C2_S1/B4**	CY_13-C2	C2	GOOD
15. cCY_14-C2-S1/B3 **16. cCY_14-C2_S1/B4** 17. **cCY_14-C2_S1/PS**	CY_14-C2-HM	C2	GOOD
18. **cCY_15-C2_S1/B4**	CY_15-C2	C2	GOOD
Station not integrated into the WFD network with measurements for the period 2005-2013	CY_16-C2	C2	HIGH
	CY_17-C2-HM	C2	
	CY_18-C2	C2	
19. **cCY_29-C3_S1/B2**	CY_19-C3	C3	GOOD
20. **cCY_20-C3_S1/B2**	CY_20-C3	C3	GOOD
Station not integrated into the WFD network with measurements for the period 2005-2013 period	CY_21-C3	C3	HIGH
21. cCY_22-C3_S1/B3 22. **cCY_22-C3_S1/B4**	CY_22-C3	C3	HIGH

* The chemical state at all stations is good

Evaluating the above mentioned information and taking into account the pressures on coastal WB as reflected in the DFMR report on the review of pressures implemented in 2014 and summarized in the table below the coastal WBs can be grouped as described below.

Table 10-73: Summary table of pressures on the Coastal WB per Type

Pressure		Type (WB number and area in km^2)							
		C1		C2		C3		C4	
		Num	Surface	Num	Surface	Num	Surface	Num	Surface
Point	Industry (and desalination)			6	200,9	0		2	
	Sewage			2	36,3	1	42,5	0	
	Mines			1	44,7	0		0	
	Aquaculture			4	129	2	15,7	2	158,1
Diffuse	Agriculture			0	0	4	106,1	0	

Pressure		Type (WB number and area in km^2)							
		C1		C2		C3		C4	
		Num	Surface	Num	Surface	Num	Surface	Num	Surface
	Sewage			1	59,3	0		0	
* Morphological changes		4 (0 HMWB)	130,7	7 (3 HMWB)	292	3 (0 HMWB)	97,6	5 (1 HMWB)	283,3
Total area WB			130,7		348,8		106,1		283,3
Total Number WB		4		9		4		5	

- For coastal WBs of type C1 due to the undisturbed conditions prevailing in them (practically, no pressure beyond minor morphological alterations) have been determined.

For the grouping of these bodies:

- Their geographical area is taken into account.
- Is identified the neiγηborivg WBs
- The pressures on it are evaluated.
- The type of adjacent monitored WB is taken into account. It is noted that as basic type parameters for grouping are cosniderd the depth and the substate. Exposure level and temperature is considered to be covered by the geographical area of the WB. This consideration can be accepted at this stage since no coastal WBs is classified in status less good and essentially is used for the classification of the WBs in high and good status.
- It should be noted for the WBs classified usong these assumptions the degree of the classification uncertainty was considered high. For grouping WBs of the same type the degree of the classification uncertainty is considered low

From the above, the following result:

- WBs of type C1 which located in the north - northwest of the island CY_1-C1- East Tylliria and CY_2-C1 - West Tylliria have similar pressures and they belong to the same type as CY_4-C1 Akamas North in which there is a monitoring station located in the same geographic area. Their classification is based on the results of this station.
- For WBs of type C1 located in the southern part of the island, WB CY_10-C1, Cape Gata immediately adjacent to the WB CY_9-C4 Episkopi Bay and CY_11-C2 Lemesos Bay -South. Based on the descriptive characteristics of the types and the pressures WB CY_10-C1 can be grouped with CY_9-C4 Episkopi Bay. CY_9-C4 Episkopi Bay is not monitored but has the same type and receives the same pressures as the CY_8-C4 Southern Paphos in which there is a monitoring station.
- WB CY_6-C4 North Paphos presents similar pressures and has the same type with CY_5-C4 Akamas West where there is a monitoring station and is located in the

same geographic area. For this reason their grouping leads to a classification with low uncertainty.

- CY_16-C2-Western Larnaca and Larnaca CY_18-C2-Northeast Gulf have the same type and similar pressures to CY_13-C2 - Monastery.
- CY_17-C2-HM Larnaca-center presents the same type and similar pressures to CY_12- C2-HM Bay Limassol.
- CY_21-C3 Ayia Napa presents the same type and similar pressures with CY_22-C3 - Protaras. Although the in WB CY_21-C3 Ayia Napa there is a monitoring not intergrated in the WFD network that results high status, at this stage it was considered appropriate to group it with WB CY_22-C3 - Protaras.

Based on the above, the grouping and the classification of coastal WBs are presented in the table below.

It is noted that for coastal WBs which do not monitored, their uncertainty is characterized as high.

Table 10-74: Grouping and Classification of Coastal WB

Code of WB	Type of WB	Monitoring stations	Ecological Status / Potential	Chemical Status	Uncertainty Degree
CY_1-C1	C1	cCY_4-C1-S1/B3	HIGH	GOOD	H
CY_2-C1	C1		HIGH	GOOD	H
CY_4-C1	C1		HIGH	GOOD	L
CY_5-C4	C4	cCY_5-C4_S1/B2 cCY_5-C4_S1/LR2 cCY_5-C4_S1/LR3 Reconsidering also the measurement of station CY_6-C4 in which is not introduced in WFD network	HIGH	GOOD	L
CY_6-C4	C4		HIGH	GOOD	L
CY_3-C2	C2	cCY_3-C2_S1/LT3 cCY_3-C2_S1/LT4	GOOD	GOOD	L
CY_7-C4-HM	C4	cCY_7-C4_S1/B2	GOOD	GOOD	L
CY_8-C4	C4	cCY_8-C4_S1/B2	HIGH	GOOD	L
CY_9-C4	C4		HIGH	GOOD	L
CY_10-C1	C1		HIGH	GOOD	H
CY_11-C2	C2	cCY_11-C2_S1/B4	GOOD	GOOD	L
CY_12-C2-HM	C2	cCY_12-C2_O1/B3	GOOD	GOOD	L

Code of WB	Type of WB	Monitoring stations	Ecological Status / Potential	Chemical Status	Uncertainty Degree
CY_17-C2-HM	C2	cCY_12-C2_O1/B4 cCY_12-C2_O1/PS cCY_12-C2_O2/B1	GOOD	GOOD	L
CY_13-C2	C2	cCY_13-C2_S1/B4	GOOD	GOOD	L
CY_16-C2	C2		GOOD	GOOD	L
CY_18-C2	C2		GOOD	GOOD	L
CY_14-C2-HM	C2	cCY_14-C2-S1/B3 cCY_14-C2_S1/B4 cCY_14-C2_S1/PS	GOOD	GOOD	L
CY_15-C2	C2	cCY_15-C2_S1/B4	GOOD	GOOD	L
CY_19-C3	C3	cCY_29-C3_S1/B2	GOOD	GOOD	L
CY_20-C3	C3	cCY_20-C3_S1/B2	GOOD	GOOD	L
CY_21-C3	C3	cCY_22-C3_S1/B3 cCY_22-C3_S1/B4	HIGH	GOOD	L
CY_22-C3	C3		HIGH	GOOD	L

Summarizing, from **22 coastal** WB which located in areas where the Government of the Republic of Cyprus exercises effective control:

- **Ten (10)** coastal WB, with total surface of 499,97 km^2, ie 57.6% of the total area of coastal systems are classified with **high** ecological status, while
- **Twelve (12)** coastal WB (including 4 HMWB), covering surface 368,53 km^2, ie 42.4% of the total area are classified with **good** ecological status/good and above potential.
- There are no bodies in ecological status less than good.

Table 10-75: Ecological status / potential of coastal WB

	Number coastal WB with ecological status / potential:					Total
	High	Good and upper	Moderate	Poor	Bad	
WB	10	8	0	0	0	18
HMWB	-	4	0	0	0	4
Total	10	12	0	0	0	22
	% Number coastal WB with ecological status / potential:					
WB	55,56	44,44	0,00	0,00	0,00	100
HMWB	-	100,00	0,00	0,00	0,00	100

	Number coastal WB with ecological status / potential:					
	High	Good and upper	Moderate	Poor	Bad	Total
Total	45,45	54,55	0,00	0,00	0,00	100
	Surface (Km^2) Coastal WB ecological status / potential:					
WB	499,97	279,71	0	0	0	779,68
HMWB	-	88,82	0	0	0	88,82
Total	499,97	368,53	0	0	0	868,5
	% Surface of coastal WB with ecological status / potential:					
WB	64,13	35,87	0,00	0,00	0,00	100
HMWB	0,00	100,00	0,00	0,00	0,00	100
Total	57,57	42,43	0,00	0,00	0,00	100

Figure 10-40: Ecological status / potential of coastal WBs- number and percentage of the number of WBs

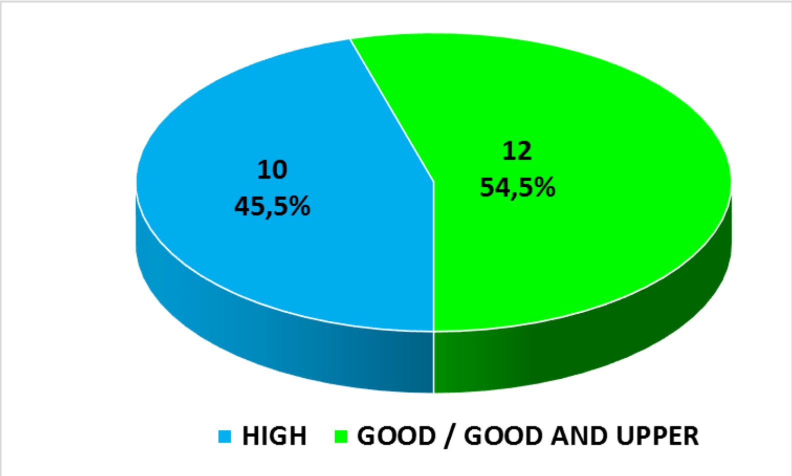
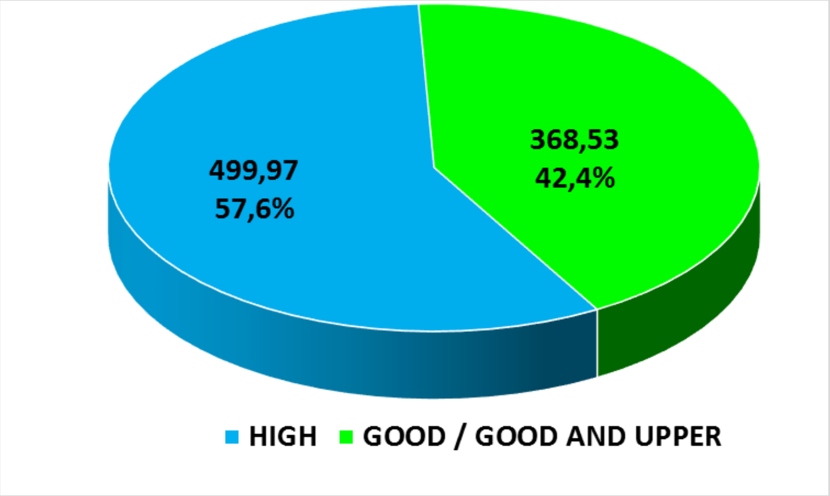


Figure 10-41: Ecological status / potential of coastal WBs - number and percentage of WBs area



All coastal WB **(22)** are classified in **good** chemical status.

10.4 AGGREGATED RESULTS ON SURFACE WATER BODIES STATUS

The following table presents the aggregated results of the status of surface WB by category (rivers, reservoirs, lakes and coastal).

Table 10-76: Statistic data of Surface WB status of Cyprus RBD

System class	Overall situation								
	Number of systems			Percentage systems			Percentage area/ length		
	High/ Good	Less than good	Unknown	High/ Good	Less than good	Unknown	High/ Good	Less than good	Unknown
Rivers	85	74	0*	53,5%	46,5%	0%	59,5%	40,5%	0%
Impounded rivers	12	3	0	80,0%	20,0%	0%	91,3%	8,7%	0%
Lakes	0	5	3	0%	62,5%	37,5%	0%	82,2%	17,8%
Coastals	22	0	0	100 %	100%	0%	10%	0 %	0%

* 11 WB wint unknoen chemical status are included based on their ecological status

10.5 CLASSIFICATION OF STATUS OF HEAVILY MODIFIED WATER BODIES

This chapter concerns the classification and the determination of good ecological potential for WB rivers that have been identified as HMWB.

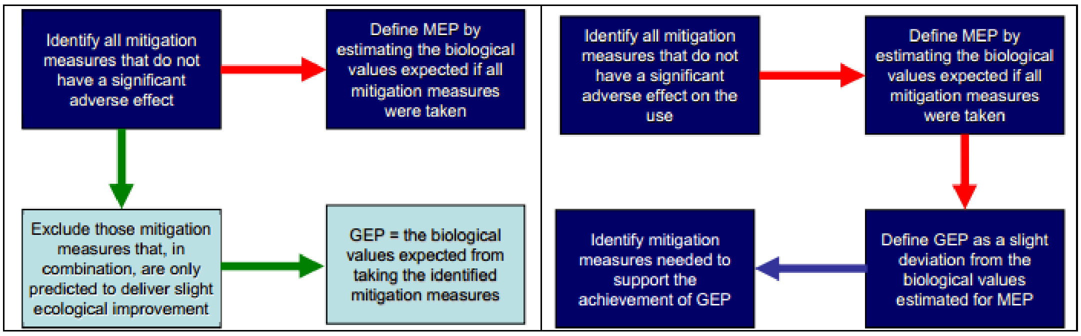
The classification methodology and the classification of impounded rivers referred in section 10.1.3 of the present document and for the heavily modified and artificial lake water bodies in Chapter 10.2.1. Regarding the coastal WB, identified as HMWB, their classification is based on the type-specific conditions of natural WB and their status is assessed as good (see in Chapter 10.3).

The review of HMWB in Cyprus led to the need for the definition of the Good Ecological Potential (GEP) for themin order to allow the classification of their condition.

Until the completion of the final Designation of river HMWB (excluding impounded rivers) the classification of their condition were based on the monitoring network measurements of the BQEs and their comparison with the type-specific reference conditions for the respective types of rivers. The status resulting from this method is reflected in the classification of river HMWB, given in section 10.1.2. This approach is reviewed following the guidance given by the European Commission and experiences of other Member States for rational classification of river HMWB.

Generally, the identification of GEP is a significant technical challenge and in many cases there is not available the necessary knowledge or data for estimation or modeling the effects which cause hydromorphological alterations in the biological quality elements. In this context, it is given the possibility of applying two alternative methodologies for determining the Good Ecological Potential. The first is described in detail in the relevant guidance document (GD4) and the second is proposed, based on the experience and the results of operations implemented by many Member States for this purpose.

The figure below shows the steps which proposed in this alternative approach and are also listed comparatively the steps resulting from the GD 4. On the left side are given the steps according to the GEP under the alternative approach and on the right side are presented the corresponding steps according to GD4. The red arrows show the order of the steps proposed in GD4 and the green arrows the differences of the new alternative method. For river HMWB is selected the alternative method of determining GEP which described above.



In this context, a list of potential measures in river HMWB with a purpose to ecological restoration in semi-natural and artificial water bodies was established. These measures were designed based on the experience in other Member States, developed in recent years in relation to the hydro-morphological alterations as shown in the respective workshops which organized for that purpose and aimed to key hydromorphological elements for the classification of ecological status / potential in rivers as listed in Annex V.1.1 of the Directive and are presented in the table below.

Table 10-13: Hydromorphological elements of classification of ecological status / potential river WB accordance with Annex V, 1.1, of WFD

Hydrological regime	**Continuity of the river***	**Morphological conditions**
Quantity and dynamics of water flow Connection with groundwater systems		Variation of the depth and width of the river Structure and substrate of the river bed Structure of the riparian zone

* Provided as an ecological continuity

– In this context, the proposed interventions include the following general types:
– Restoration-reconstruction
– Habitat enhancement
– Habitat management measures

The above structure is referred to a level of approaches from the largest complex projects to simple adjustments or point management interventions. In most cases interventions at HMWB, are targeting to special habitat management which includes mitigation measures/improvement of losses.

Based on the aforementioned, a library with measures is used whinc includes in summary the following migration measures:

Table 10-77: List of proposed mitigation measures for river HMWB. Relation to hydromorphological elements of Annex V, 1.1 of the WFD.

Code	Mitigation measures	Hydromorphological Quality Element in accordance with WFD
1	Removal of horizontal barriers	Continuation of the river
2	Cleaning / rearrangement active river bed	Morphological Conditions (depth variation and river width)
3	Planting with native species	Morphological conditions (Structure of the riparian zone)
4a	Free ecological flows	Hydrological regime (quantity and dynamics of water flow and connection to groundwater bodies)
4b	Site targeted Ecological flows from dams *	Hydrological regime (quantity and potential of water flow)
4c	Ecological flows – Flood discharges from dams **	Hydrological regime (quantity and dynamics of water flow)
5	limitation of abstractions	Hydrological regime (quantity and dynamics of water flow)
6	Removal of alien / invasive plant species	Morphological conditions (structure of the riparian zone)
7	Ecological restoration of the bank / slopes	Morphological conditions (structure of the riparian zone)
8	Maintenance / creation of water shelters	Morphological Conditions (depth variation and river width)
9	Penetration of river bed	Morphological conditions (structure and substrate of the river bed)
10	Fish way in small weirs	Continuation of the river
11	Create shallow reefs / pools for habitat enhancement	Morphological Conditions (depth variation and river width)

* Targeted discharge refers to release of water at specific positions downstream, usually in areas where there are or may be fish shelters.

** Flood discharges concerns periodical regularly or not, water releases from dams, in order to restore basic morphological river habitats.

The implementation of these mitigation measures to all river HMWB (excluding impounded rivers) is considered that will result in Maximum Ecological Potential of these bodies.

In HMWB, quality objectives of the ecological status is the "good ecological potential» (GEP), GEP refers to ecological quality which is expected if all possible measures are applied. For each water mitigation measures are defined if applicable.

For each river HMWB a package of mitigation measures that can be applied is defined and it is expected to have a positive influence on the ecological characteristics of the body. For this aim are taken into account:

- The presence of migratory fish species
- The relation of the water body with protected areas
- The importance of the WB in relation to biodiversity in the region despite their affiliation to protection.

These are evaluated:

- Based on the data of the study of the WDD related on the presence of fish in Cyprus which implemented when applying of the expected in 1st RBMP .
- From the studies and the overviews which made and/or implemented in the areas included in the network of Natura 2000.
- From site visits carried out by members over the last five years.
- From data provided by the WDD and the Department of Environment.

In this context, the basic environmental characteristics for each river HMWB were identified. Based on this information are selected the mitigation measures from those specified for the achievement of MEP, which are best suited to those WBs in order to address the pressures anf to improve is ecological characteristics.

These measures are given in the table of the page that follows.

These measures are evaluated taking into account on the following:

- Their effectiveness in relation to their cost, and
- The effectiveness of improving conditions and the degree of certainty for a successful outcome.

Based on the above, each measure is evaluated as follows:

- Low = the project is not a priority due either to high cost - low impact on the benefits expected or to high degree of uncertainty for of its success..
- Moderate or high = the measure is of priority because of the special conditions and practicable, feasible to implement with high probability of success.
- High = the measure is of priority because of the particular conditions and practices, with the possibility for immediate implementation and with almost certain success.

In addition to the above, it is also taken into account and evaluated convergancw of the proposed package of measures with the protection of the biodiversity as:

- Low = when the package of measures does not concern Natura area 2000 and/or the importance or the effect which may have on the biodiversity is not known.
- Moderate or high = when the WB either is located in a Natura 2000 site or its recovery has a confirmed importance for the enhancement of habitats or species which are associated with water.

Finally, the total package of measures is scored regarding the overall need and its significance. For this purpose, the above mentioned are taken into account and also are considered other effects and perspectives concerning the promotion of the improvement/rehabilitation at WB auch as flood protection, education and awareness raising.

The classification of good ecological potential as Good, Moderate, Poor and Bad is based on the efforts implemented for the completion of all proposed mitigation measures as follows:

- Every measure according to its importance and its effectiveness is rated with 1 when it is low, 2 when it is moderate and 3 when it is high.
- The above score is summed and the total score which is obtained is a measure corresponding to the expected values of BQEs, during the classification of values of the Good Ecological Potential . The classification of the potential is based on the percentage of implementation of the necessary mitigation measures as shown in the following table:

Table 10-78: Classification of Ecological potential of river HMWB

Potential	Percentage implementation of required defined measures
GOOD	>70%
MODERATE	50% - 70%
POOR	25% - <50%
BAD	<25%

Based on the above and taking into account the available resources to implement the proposed measures are set out the objectives for the ecological potential for HMWB rivers in 2021 and 2027.

Table 10-79: Measure to achieve GEP for river HMWB

HMWB	Length interventions in m	Code of measure												
		1	2	3	4a	4b	4c	5	6	7	8	9	10	11
CY_1-1-d_RIh_HM	4778		x			x					x		x	
CY_1-2-d_RI_HM	11928	In this section does not detect significant ecological characteristics												
	8213	x		x	x	x					x			
	8592	x	x	x				x		x	x		x	
	2599		x	x					x		x	x	x	
CY_1-3-c_RIh	11663	There are not available information to indicate significant environmental characteristics												
CY_1-3-e_RE_HM	3882	x	x	x		x	x		x	x	x	x		
CY_1-4-d_RI_HM	7433	x	x	x		x	x	x	x		x		x	
CY_1-4-e_RIh_HM	4835	x	x	x			x	x	x		x		x	
CY_1-4-f_RP_HM	5165	x	x	x			x	x	x		x			
CY_1-4-g_RI_HM	5912		x	x			x	x	x		x			
CY_1-4-h_RIh_HM	8128		x	x			x	x	x		x	x		
CY_1-6-c_RIh_HM	2673	There are not available information to indicate significant environmental characteristics. Today the remaining discharge with appropriate adjustment of the annual allocation is considered enough												
CY_2-2-f_RI_HM	2737	There are not available information to indicate significant environmental characteristics. Today the remaining discharge with appropriate adjustment of the annual allocation is considered quite as long as the needs of other measures downstream sectors are covered												
CY_2-2-g_RI_HM	2822	x	x	x		x		x	x	x	x			
CY_2-2-h_RIh_HM	6790	x	x	x		x		x	x	x	x	x	x	
CY_2-3-d_RIh_HM	4028						x							
CY_2-4-b_RIh_HM	2868		There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.											
CY_2-4-e_RIh_HM	4035		x	x			x	x	x	x				
CY_2-6-b_RIh_HM	5260	There are not available information to indicate significant environmental characteristics												
CY_3-2-b_RP_HM	12063	There are not available information to indicate significant environmental characteristics. The ecological status of the monitoring network is good and further interventions aren't required												
CY_3-3-c_RI	4995		x	x		x			x	x				x
CY_3-4-c_RIh_HM	6003	There are not available information to indicate significant environmental characteristics												

HMWB	Length interventions in m	Code of measure												
		1	2	3	4a	4b	4c	5	6	7	8	9	10	11
CY_3-5-c_RI_HM	12555						x							
CY_3-5-d_RIh_HM	13328	There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.												
CY_3-7-j_RIh_HM	4497	There are not available information to indicate significant environmental characteristics												
CY_6-1-c_RIh_HM	967						x							
CY_6-5-f_RIh_HM	6209		x	x				x	x	x	x		x	x
CY_8-7-c_RI_HM	6681		x	x	x		x		x	x	x			
CY_8-7-f_RI_HM	5284	There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.												
	1980				x		x							
CY_8-7-g_RIh_HM	9539	There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.												
CY_8-8-c_RIh_HM	8102	There are not available information to indicate significant environmental characteristics.												
CY_8-9-e_RI_HM	7587	In this section does not detect significant ecological characteristics												
	1393				x									
CY_8-9-f_RIh_HM	4529	There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.												
CY_9-2-d_RI_HM	2633		x	x					x		x			
CY_9-2-h_RIh_HM	6360		x	x	x		x	x	x	x	x	x	x	x
CY_9-4-e_RIh_HM	3789	There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.												
CY_9-6-r_RI_HM	14972	There are not available information to indicate significant environmental characteristics												
CY_9-6-t_RI_HM	11417		x	x	x		x	x	x	x	x			x

Code	**Mitigation measures**	**Code**	**Mitigation measures**
1	Removal of horizontal barriers	5	limitation of abstractions
2	Cleaning / rearrangement of active river bed	6	Removal of alien / invasive plants. species
3	Planting with native species	7	Ecological restoration bank / slopes
4a	Free ecological Flows	8	Maintenance / creation of water shelters
4b	Targeted Ecological discharge	9	Penetration of river bed
4c	Ecological Flows – Flood discharges from dams	10	Fish way of small vertical terracing
		11	Create shallow reefs / pools, habitat enhancement

Table 10-80: Rating of Measure significance for GEP river HMWB

HMWB	Length interventions in m	Code of measure													Convergence with biodiversity protection (Directives "Nature")
		1	2	3	4a	4b	4c	5	6	7	8	9	10	11	
CY_1-1-d_RIh_HM	4778		2			3					3		2		Moderate
CY_1-2-d_RI_HM	11928	In this section does not detect significant ecological characteristics													
	8213	1		3	2	3					3				High
	8592	2	2	2				2		2	3		2		High
	2599		1	1					2		3	2	2		High
CY_1-3-c_RIh	11663	There are not available information to indicate significant environmental characteristics													
CY_1-3-e_RE_HM	3882	3	2	1		3	3		1	1	3	3			High
CY_1-4-d_RI_HM	7433	2	2	2		2	3	3	1		3		3		High
CY_1-4-e_RIh_HM	4835	2	2	1			3	3	1		3		3		High
CY_1-4-f_RP_HM	5165	2	2	2			3	3	1		3				High
CY_1-4-g_RI_HM	5912		2	2			3	3	1		3				High
CY_1-4-h_RIh_HM	8128		2	2			3	3	1		3	3			High
CY_1-6-c_RIh_HM	2673	There are not available information to indicate significant environmental characteristics. Today the remaining discharge with appropriate adjustment of the annual allocation is considered quite													
CY_2-2-f_RI_HM	2737	There are not available information to indicate significant environmental characteristics. Today the remaining discharge with appropriate adjustment of the annual allocation is considered quite as long as the needs of other measures downstream sectors are covered													
CY_2-2-g_RI_HM	2822	2	3	2		3		3	2	2	3				High
CY_2-2-h_RIh_HM	6790	2	3	2		3		3	2	2	3	3	3		High
CY_2-3-d_RIh_HM	4028						3								Moderate
CY_2-4-b_RIh_HM	2868	There are not available information to indicate significant environmental characteristics Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.													
CY_2-4-e_RIh_HM	4035		3	3			3	1	3	3					Low
CY_2-6-b_RIh_HM	5260	There are not available information to indicate significant environmental characteristics													

HMWB	Length interventions in m	Code of measure													Convergence with biodiversity protection (Directives "Nature")
		1	2	3	4a	4b	4c	5	6	7	8	9	10	11	
CY_3-2-b_RP_HM	12063	There are not available information to indicate significant environmental characteristics. The ecological status of the monitoring network is good and further interventions aren't required													
CY_3-3-c_RI	4995		2	1		3			3	1				3	Moderate
CY_3-4-c_RIh_HM	6003	There are not available information to indicate significant environmental characteristics													
CY_3-5-c_RI_HM	12555						3								Moderate
CY_3-5-d_RIh_HM	13328	There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.													
CY_3-7-j_RIh_HM	4497	There are not available information to indicate significant environmental characteristics													
CY_6-1-c_RIh_HM	967						3								Moderate
CY_6-5-f_RIh_HM	6209		3	2				3	3	2	2		3	3	Moderate
CY_8-7-c_RI_HM	6681		3	1	3		2		1	2	3				High
CY_8-7-f_RI_HM	5284	There are not available information to indicate significant environmental characteristics Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.													
	1980				2		3								Moderate
CY_8-7-g_RIh_HM	9539	There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.													
CY_8-8-c_RIh_HM	8102	There are not available information to indicate significant environmental characteristics													
CY_8-9-e_RI_HM	7587	In this section are not detected significant ecological characteristics.													
	1393				3										Low
CY_8-9-f_RIh_HM	4529	There are not available information to indicate significant environmental characteristics. Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.													
CY_9-2-d_RI_HM	2633		3	2					2		3				High
CY_9-2-h_RIh_HM	6360		3	2	3		3	1	2	1	2	2	2	2	High

HMWB	Length interventions in m	Code of measure													Convergence with biodiversity protection (Directives "Nature")
		1	2	3	4a	4b	4c	5	6	7	8	9	10	11	
CY_9-4-e_RIh_HM	3789	There are not available information to indicate significant environmental characteristics Today the remaining discharge, with appropriate adjustment of the annual allocation, is supposed to cover the requirements for GEP.													
CY_9-6-r_RI_HM	14972	There are not available information to indicate significant environmental characteristics													
CY_9-6-t_RI_HM	11417		2	3	3		3	2	1	3	3			2	Moderate

1- Low

2- Moderate

3-High

10.6 GROUNDWATER BODIES STATUS

10.6.1 Methodology of classification of qualitative (chemical) status

The **Directive 2006/118/EC (12-12-2006)**, which is a subsidiary of the WFD specifying requirements in relation to groundwater, defines groundwater as a valuable natural resource which must be protected from deterioration and pollution. This is particularly important for the use of groundwater to cover human water supply needs as well as for the ecosystems that depend on groundwater. According to the provisions of the Directive, to assess the quality (chemical) status of a system of groundwater, or a group of systems of groundwater the competent authority shall use the following definitions-criteria (Article 3):

- **Quality Standards** of groundwater as further described in Annex I of the Directive.
- **Threshold values** for the concentrations of pollutants or groups of pollutants or pollution indicators values as described in Annex II of the Directive.

As a "threshold values" (TV) is defined the upper concentration values for certain pollutants in groundwater and determined by taking into account the natural background values, the use of the waters and their possible effect on surface water and land ecosystems. The determination of TV is only necessary for those Groundwater Body from the assessment of which derive that are at risk of not achieving the objective of good quality (chemical) status and for those parameters where observed or expected exceedance of quality limits which related to the uses.

The Ministry of Agriculture, Rural Development and Environment of the Republic on 18/12/2008, based on the results of the Special Commission, established threshold values (TV) separately for each Groundwater Body (GWB) The data based on which the determination of TV was made are: a) the monitoring network measurements of groundwater by the year 2008, in accordance with Article 8 of Directive 2000/60 / EC, and b) other measurements - data which came from expanded groundwater monitoring network. The latest data of the 2008-2013 measurements do not differentiate nor invalidate the data used in the determination of TV , consequently the possible review and revision of approved TV is not considered necessary. So, the already applied TV meet the requirements and remain strong for assessing the risk of exceedance of the quality limits and failure to achieve the objective of good status for GWB.

The TV selection criteria which established by the Committee, consisted of the Department of Environment (DoE), the Geological Survey Department (GSD) and the Water Development Department, based on the relevant European Commission guidance document.

These criteria based on the evaluation:
a) the natural concentrations of pollutants in groundwater,

b) existing and future water use,

c) the hydrogeological conditions prevailing in each water body.

Next, the list of Quality Standards - Threshold values of pollutants - for groundwater parameter of the Republic of Cyprus is provided, as derive from the "Proceedings of Committee Meeting for the implementation of the obligations of the State in relation to Articles 3.4 and 5 of Directive 2006/118/EC. "

Parameters - Contaminants	Threshold values (TVs)
Arcenic (As)	10 mg/l
Cadmium (Cd)	5 mg/l
Lead (Pb)	10 mg/l
Hydrargyrum (Hg)	1 mg/l
Ammonium (NH_4^+)	0,5 mg/l
Nitrite ions (NO_3^-)	50 mg/l
Chlorum ions (Cl^-)	250-3000 mg/l
Sulfate ions ($SO_4^=$)	250-3000 mg/l
Electrical conductance (EC)	2500-7000 μS/cm
Trichloroethylene (C_2HCl_3)	5 mg/l
Tetrachloroethylene (C_2Cl_4)	2 mg/l
Pesticides (total)	0,5 mg/l

- In GWB which are used for **water supply** but also and for irrigation or other uses, as threshold value (TV) of all quality parameters, the relevant parametric value is obtained, which referred in Directive 98/83/EC about water quality for human consumption.
- In GWB which are used only for **irrigation**, and regarding the quality parameters which are affected from the irrigation use, the threshold values (TVs) are defined based on the upper permissible limit for the ability of irrigation.
- In GWB with influence from the **natural background** (formulation of geological structures) and on the qualitative aspects which associated with this, the threshold values (TVs) were determined as appropriate using an empirical methodology based on the range of concentrations in monitoring data on which indicators, they show no human intervention.

As already mentioned, the Annex II of Directive 2006/118/EC is amended based on the Directive 2014/80/EU (06/20/2014). In Part B, in the list of basic pollutants and indicators, for which Member States should consider the possibility of definition TVs, is added the nitrite and total phosphorus or phosphoric salt. Regarding nitrite (NO2), since there is already a sufficient number of measurements in GWB, it is proposed to add a test substance to the list of quality parameters on GWB value of 0,50 mg/lt. Also the list of the quality parameters is proposed to add chromium (Cr) with TV 50.00 g / lt and nickel (Ni) with GWB of 20,0 mg / ls given that full measurements in the years 2008-2013 .

The proposed rates of AAT both for nitrite (NO2) and chromium (Cr) and nickel (Ni) complies with the parametric values which refer to the Directive 98/83/EC which is related to the quality of water for human consumption. For the concentrations of total phosphorus and phosphoric salt no measured data are available and until they will be obtained they will not be included in the list of the substances with the AAT.

Part A - point 3 of Directive 2006/118 is replaced by full text which concerns on how to identify the AAT where high background levels of substances or ions or their indicators due to natural hydro-geological phenomenon detect.

The determination of AAT per Groundwater Body (GWB) by the responsible Committee which set up by the Ministry of Agriculture, Rural Development and Environment of the Cyprus Republic on December 18, 2008 **covers fully** both the Directive 2006/118 and the modifications of the Directive 2014/80 on the protection of groundwater against pollution and deterioration.

10.6.2 Methodology of classification of quantitative status

According to Directive 2000/60/EC (Annex V, par. 2.1.2), a GWB has good quantitative status when the following is valid:

- the average annual supply, ie annually renewable storages of GWB is larger or equal to the corresponding average annual abstractions - outflows.
- the reduction of the water level from abstraction for human uses will not affect the qualitative (chemical) status of surface water bodies and does not degrade the land ecosystems which associated with each GWB.

For the classification of the state of GWB the water balance of GWB, its correlation with surface water bodies, any ecosystems dependent on the tested GWB, the inflow of saltwater are controlled.

10.6.3 Methodology of evaluation of trends and reverse of trends

The Directive 2006/118/EC provides that significant and sustained upward pollution trends in the concentrations of polluting substances should be identified in all groundwater bodies, which according to the analysis of pressures and impacts are in danger.

The starting point for implementing measures for the examination and decision uptaking to reverse significant and sustained upward trends is that in which the concentration of the pollutant reaches 75% of the parametric values of the groundwater quality standards, as defined by Annex I. and of the threshold values established according to Article 3, unless:

a) a lower starting point in order reversal measures of trend to prevent most economically or at least mitigate as far as possible, any environmentally significant and detrimental changes in groundwater quality,

b) justified a different starting point when the detection limit does not allow establishing the presence of a trend in 75% of the parametric values,

c) the rate of increase and the reversibility of the trend are such that, even if a lower starting is set, the reversal measures for trend to be able to prevent most cost perspective, or at least mitigate as much as possible, any environmentally significant detrimental changes in groundwater quality. The lowest possible starting point can not prevent for any reason the meet of the deadline for the environmental objectives.

According to Directive 2000/60/EC (Annex V, par. 2.4.4), for GWB which show data or trends which do not meet the environmental objectives of Article 4 of the Directive, the significant upward trends of pollutants that pose into danger the GWBs are identified and appropriate measures to address the problem with marginal trend reversal point 75% of quality standards – TVs are Determined

As it cosncenrs the examination of trends of not achieving good environmental status quality objectives, as reference year, which is the basis for considering significant upward trends in pollutants GWB, is taken the year 2008 and as return period shall be the **period from 2008 to 2014** of 7-year duration for which time series of quality monitoring data are completed. The duration of period 2008-2014 is appropriate although the duration of the examination is recommended to be more than 8 and less than 15 years (Guidance Document 18 Appendix 10.6.).

To avoid distortions due to changes in quality of groundwater status during each hydrological year, always the period of high level of underground water is taken and the annual trends in pollutant concentrations on the same base of that period are examined. This period of hydrological year is considered the most representative because it expresses the qualitative status of groundwater in natural balance.

As a significant upward trend of a parameter, according to an estimate empirical approach (there is no specific proposal on a master document) ii is considered that for which the annual rate of concentration is more than 10% of AAT for this specific parameter. The approximation of growth rate of 10% per year express via a realistic manner the current status and gives a critical dimension on the current trends for non-achievement of the objectives of good quality (chemical) status of WGB.

The control to evaluate trends in GWBs held for all quality parameters which exceeded 75% of quality standards – TVs of their annual concentrations, except for those parameters where exceedance are attributed to natural background (geological formations).

10.6.4 Classification of the status of the GWBs

The status of Groundwater Bodies (GWB) is determined through the quantitative and qualitative (chemical) status. The overall status of a GWB is marked "good" only when the quantitative and qualitative (chemical) status is characterized good.

For the preparation of this report the classification of the qualitative and quantitative status of GWBs as well as the assessment of the trends was conducted. The results of this work were presented in the study "1st Interim Report Evaluation/classification quality (ecological and chemical) status of surface water and quality (chemical) and quantitative status of groundwater," which is available on the website of the WDD.

The status of GWB as derive from the above mentioned study is summarized in the table below.

Table 10-81: Qualitative (chemical) and quantitative status of GWBs - Significant trends.

Num	Groundwater Body	Name	Quantitative status	Quality status	Qualitative Parameters Excesses Qualitative Standards - threshold values	Significant Pollution Upward Trends	Qualitative parameters Significant upward trends	Total status GWB
1	CY-1	Kokkinochoria	BAD	BAD	Cl^-,NO_3^-, NH_4^+,EC	YES	NO_3^- ,NH_4^+	BAD
2	CY-3A	Kiti Treminthou	BAD	GOOD	-	NO	-	BAD
3	CY-3B	Kiti Perivolia	BAD	BAD	Cl^-,NO_3^-, NH_4^+,EC	YES	Cl-	BAD
4	CY-4	Softades - Vasilikos	BAD	BAD	Cl^-,NO_3^-,NH_4^+ $SO_4^=$, EC	YES	NO3-	BAD
5	CY-5	Maroni	BAD	GOOD	-	NO	-	BAD
6	CY-6	Mari - Kalo Chorio	BAD	GOOD	Cl^-	YES	Cl-	BAD
7	CY-7	Yermasogeia	GOOD	GOOD	-	NO	-	GOOD
8	CY-8	Limassol	BAD	BAD	NO_3^-, C_2Cl_4, Pb	YES	NO_3^-	BAD
9	CY-9	Akrotiri	BAD	BAD	Cl^-,NO_3^-, NH_4^+ ,$SO_4^=$, EC	YES	NO_3^-	BAD
10	CY-10	Paramali-Evdhimou	BAD	GOOD	-	NO	-	BAD
11	CY-11A	Paphos	GOOD	GOOD	Cl^-,NO_3^-	NO	-	GOOD
12	CY-11B	Kiti Ezousa	GOOD	GOOD	-	NO	-	GOOD
13	CY-12	Letymbou - Giolou	BAD	BAD	NO_3^-, NH_4^+,As	YES	NH_4^+	BAD
14	CY-13	Pegia	BAD	GOOD	-	NO	-	BAD
15	CY-14	Androlikos	GOOD	GOOD	-	NO	-	GOOD
16	CY-15A	Khrysokhou-Yialias	BAD	BAD	Cl^-,NO_3^--	NO	-	BAD
17	CY-15B	Kiti Khrysokhou	BAD	GOOD	-	NO	-	BAD
18	CY-16	Pyrgos	BAD	GOOD	-	NO	-	BAD
19	CY-17	Central and Western Mesaoria	BAD	GOOD	Cl^-,NO_3^-, $SO_4^=$, NH_4^+	YES	NH_4^+	BAD
20	CY-18	Lefkara – Pachna	BAD	GOOD	Cl^-, $SO_4^=$, EC	NO	-	BAD
21	CY-19	Troodos	GOOD	GOOD	$SO_4^=$	YES	$SO_4^=$	GOOD

The evaluation and assessment of trends showed that of the 21 GWB, 10 have significant upward trends. Specifically:

- The <u>CY-1 Kokkinochoria</u> presents <u>significant upward trends</u> in quality parameters of nitrate ions (NO3-) and ammonium ions (NH4). Actions to address effectively the upward trends are related to the measures that must be taken to reduce the use of fertilizers from agricultural activities and disposal of urban wastewater.
- The <u>CY-3B Kiti Perivolia</u> presents <u>significant upward trends</u> in chloride ions (Cl-). Actions to address effectively the upward trend are related to the measures that must be taken to reduce and control of abstractions for the reduction of salination front.
- The <u>CY-4 Softades - Vasilikos</u> presents <u>significant upward trends</u> in nitrate ions (NO3-). The actions to effectively address the rising trend are associated with the measures which must be taken to reduce the excessive use of fertilizers from agricultural activities.
- The <u>CY-6 Mari - Kalo Chorio</u> presents <u>significant upward trends</u> in chloride ions (Cl-). The actions to effectively address for the upward trend associated with the measures which must be taken concerning the reduction and control of abstractions.
- The <u>CY-8 Limassol</u> presents <u>significant upward trends</u> in quality parameters of nitrate ions (NO3-). Actions to address effectively the upward trends which related to the measures which must be taken regarding the disposal of domestic waste water.
- The <u>CY-9 Akrotiri</u> presents <u>significant upward trends</u> in quality parameters of nitrate ions (NO3-). Actions to address effectively the upward trends are related to the measures which must be taken to reduce the excessive use of fertilizers from agricultural activities.
- The <u>CY-12 Letymbou - Giolou</u> presents <u>significant upward trends</u> in the qualitative parameter of ammonium ion (NH4). Actions to address effectively the upward trends of the ammonium ions are associated with the measures which must be taken to reduce the nitrate pollution.
- The <u>CY-17 Central and Western Mesaoria</u> presents significant upward trends in the qualitative parameter of ammonium ion (NH4). Investigating the source of ammonium ions. Measures to reduce the excessive use of fertilizers from agricultural activities.
- The <u>CY-19 Troodos</u> presents significant upward trends in quality parameters of sulfate ions (SO4 =). Measures for theconfrontation of local degradation effects due to pumping. Investigation of the origin of sulfate anions due to natural background.

10.7 COMPARISON WITH THE RESULTS OF THE 1ST RBMP

10.7.1 Surface WB

At present the ecological status/potential of the **159 river WBs** compared to their status in the 1st Water Management Plan is as follows:

- In **43** WB their status was improved,
- in **16** WB their status was downgraded,
- in **78** WB their status was remained the same,
- in **10** WB there is no exact correlation,
- in **12** WB whose status was unknown, today have been classified.

In the table below the total length (in km) of WB for each class of ecological status/potential as it was evaluated in the 1st Management Plan and asassessed today based on the latest data is illustrated.

Table 10-82: Comparison of ecological status/potential of river WB today in relation to the 1st Water Management Plan (total length WB for each class of ecological status / potential)

	1st RBMP *		TODAY	
	Length from WB (km)	% Length	Length from WB (km)	% Length
HIGH	0,0	0,0	90,1	5,1
GOOD	700,0	39,4	965,3	54,4
MODERATE	759,9	42,8	683,7	38,5
POOR	63,7	3,6	36,2	2,0
BAD	31,8	1,8	0,0	0,0
UNKNOWN	151,8	8,6	0,0	0,0

- * Includes only the rivers that correspond to WB of the 2nd RBMP

SOURCE: Processed data from:

Table 5.1.4-4 [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014]

See Table 10-12

Regarding the current chemical status of the **149 river WB** compared to their status in the 1st Water Management Plan is formed as follows:

- In **6** WB their status was improved,

- in **16** WB their status was downgraded,
- in **115** WB their status was remained the same,
- in **10** WB there have no exact correlation,
- in **11** WB whose status was unknown, today have been classified,
- in **14** WB whose status was known, today is unknown that concerns to WB with Ephemeral/ episodic and harsh intermittent flow, in which wasn't possible to realize samplings because of lack of flow.

These last 9 WB whose chemical status was known in the 1st Management Plan and today remains unknown, concern mainly water bodies which are downstream of dams with possible pressures. Moreover, the Table below illustrates the comparison of the total length (km) of WB in each class of chemical status today, in relation to the first Management Plan.

Table 10-83: Comparison of the current chemical status, in relation to the 1st RBMP of the total and % of length (km) of WB in each class

	1st RBMP *		TODAY	
	Length of WB (km)	% Length	Length of WB (km)	% Length
Good	1442,2	81,2	1528,8	86,1
Less than good	113,3	6,4	57,8	3,3
Unknown	151,7	8,5	188,8	10,6**

- * Includes only the rivers that correspond to WB of the 2nd RBMP
- ** It refers to WB ephemeral and harsh intermittent flow, in which it wasn't possible to be implemented sampling because of the shortage of flow.

SOURCE: Processed data from:

Table 5.1.4-6 [REVIEW AND UPDATE OF ARTICLE 5 OF DIRECTIVE 2000/60/EC (WATER RESERVOIRS) & CLASSIFICATION OF WATER STATUS (RIVERS, NATURAL LAKES AND WATER RESERVOIRS), THAT WILL ESTABLISH BASELINE INFORMATION AND DATA FOR THE 2ND CYPRUS RIVER BASIN MANAGEMENT PLAN, April 2014]

See,Table 10.14

As it concernes the lake and coastal WBs their status in relation to the 1st Management Plan has not changed.

10.7.2 Groundwater Bodies (GWB)

In the 1st RBMP were identified and classified 19 Groundwater Bodies (GWB). In the framework of preparation for the 2nd RBMP was conducted a review, based on new data of the monitoring network, but also and the new classification data which are obtained, so the necessary revision was carried out and resulted 21 GWBs.

Comparing the common GWBs results the following:

- In 5 GWB (CY-1, CY-4, CY-5, C-9, CY-12), the quantitative and qualitative (chemical) status doesn't present improvement and remains «bad».
- In 6 GWB (CY-5, CY-6, CY-10, CY13, CY17, CY18), the quantitative status remains «bad» and the qualitative (chemical) status is maintained «good», with no change from the 1st RBMP.
- In 1 GWB (CY-16) the quantitative status remains «bad» but the qualitative (chemical) status was improved and characterized «good»
- In 1 GWB (CY-19) the quantitative status was improved and characterized "good". The qualitative (chemical) status is still maintained «good».
- In 2 GWB (CY-7 & CY-14) the quantitative and qualitative (chemical) status is still maintained «good».

Table 10-84: Comparison of Quantitative and Qualitative (chemical) Status of GWB today, in relation to the 1st RBMP

	Quantitative Status	Percentage (%)	Qualitative (chemical) Status	Percentage (%)
1st RBMP				
GOOD	4	21%	11	58%
BAD	15	79%	8	42%
TODAY				
GOOD	5	24%	14	67%
BAD	16	76%	7	33%

11. ECONOMIC ANALYSIS OF WATER USES

Detailed data regarding the economic analysis of water uses and the level of the cost recovery are provided in the Report on the Economic analysis of water uses implemented under the framework of the 2nd River Basin Management Plan and is also available on the website of WDD.

In the chapters is given brief information on:

- Water service in Cyprus,
- Water uses, and
- Economic analysis of water uses.

11.1 WATER SERVICES

The main Water Services in Cyprus are defined according to the Pricing and the Recovery mechanisms Cost of Water Services (RAP128/2014) which are implemented in national legislation the provisions of the economic aspects of the WFD and the following:

- Provision of water supply,
- Provision of irrigation water,
- Sanitation and urban waste water treatment (up to secondary level processing), and
- Provision of recycled water (after further processing).

Rainwater drainage was not included in the water services because as it comes of the study above, great assessment efforts are required for the rainwater uses and their accession in the water balance.

The Water Supply Service provides drinking water to Cities, Municipalities and Communities of the island. Mainly based on water supply from reservoirs and drillings as well as the increasing use of demineralized water, (see chapter about water sources). Water provided from reservoirs is treted at refineries before being used for drinking. This service mainly includes the following specific uses:

- Domestic use,
- Industrial use,
- Touristic use.

Irrigation Service provides irrigation water to irrigated areas and livestocks mainly from reservoirs and boreholes, as well as the increased involvement of recycled water which is distinguished as a separate service, (see below). This Service mainly contains various uses:

- For agriculture use, and
- For animal husbandry use.

For the Drinking Water supply and irrigation there are two important sources:

- Water through Governmental Water Projects (GWP), and
- Water supply through non - Governmental Water Projects.

Effluents drainage and their trrearment before disposal in the natural environment is governed by Directive 91/271 /EEC, and by the Water Laws of 2002, Pollution Control up to 2013 (106 (I)/ 2002 – Basic Law) and The Drainage modifier law (Nr. 108 (I)/2004).

The competent authority which is responsible for implementing most articles of the Directive in Cyprus is the Ministry of Agriculture, Rural Development and Environment. The Department of Environment and the Water Development Department has the overall responsibility for implementing the Directive with a defined division of responsibilities. Planning, construction, operation and maintenance of the Drainage networks and the urban wastewater treatment are the responsibility of the Drainage Boards based on the Drainage Law.

According to the Directive is provided the designation of normal, sensitive and less sensitive recipients – and the required level of treatment varies accordingly. Cyprus is gradually processing the implementation of the obligations arising from the Directive, with the construction of sewage networks in 57 settlements and the construction of 23 Wastewaters treatment plants. 53 settlements of 57 discharge the treated wastewater in normal recipients and 4 of them in sensitive ones and the rate of compliance with the obligations of the Directive (in population equivalents) is 55.8% for normal recipients and 79.8% for sensitive.

The final revised plan for the implementation of the Directive in Cyprus IP-2011, dated July 2015, stated as possible estimated date of full compliance with the Directive the 31.12.2017.

The amount of sludge produced in Cyprus in 2012 is 6,533 tonnes of dry matter. 42.2% of this amount was used in agriculture as fertilizer, 38.4% transferred to waste treatment plants for anaerobic treatment and biogas production and 19.4% remained stored.

The Directive in addition to urban wastewaters also covers waste waters from certain sectors of the food industry, which are not channeled into sewage networks or routed to treatment plants or other central treatment plants but they have proprietary treatment plants. Their compliance according to the Directive is complete.

Finally, the recycled water is provided for irrigation, substituting fresh water, wherever is possible as well as for the recharge of aquifers. Particularly, recycled water can be used for irrigation of all types of plants (seasonal and permanent) in addition to leafy vegetables, bulbs and tubers which are eaten raw. The use of recycled water for irrigation is promoted both the Drainage Councils and drainage councils in rural communities.

11.2 WATER USES

In Cyprus the main identified uses (and that may have negative effects on the qualitative and quantitative water status) are the following [Regulations 128/2014]:

- Domestic use,

– Agriculture use,
– Livestock farming,
– Industrial use,
– Tourism

11.3 ECONOMIC ANALYSIS OF WATER USES

According to WFD, the subject of the economic analysis of water uses is consisting of the following:

– Assessment of existing water cost, including all components of the financial cost, environmental costs and resource costs, and
– Assessment of the degree of recovery of the above costs, through the tariffs imposed by the Water Authorities to the users and other income sources.

Water cost includes:

– The financial costs consist of the consumption (depreciation) of fixed funds and maintenance costs – water service operation. Largely, the recorded cost in the balance sheets or income statements – services' cost, with certain adjustments, regarding to the substitution of depreciation (which is an accounting presentation for the fund cost), to the depreciation of fixed assets (determined in their useful life basis and reflects their actual cost, apportioned annually.
– The environmental cost. This cost is calculated based on the cost of the interventions required to restore or prevent the environmental pollution and ensure good environmental status in the water.
– Resource cost, is defined as the opportunity cost of alternative water uses in cases that is being used a body of water beyond the rate of natural replenishment.

The cost is calculated by service as well as an overall countrywide. They are specifically examined:

– The water service in providing drinking water and serves domestic use, touristic use, industrial use and other uses. Providers of domestic water services are only WDD and authorized water suppliers in and out GWP.
– The water service in providing irrigation water that serves agricultural use, farming use, industrial use and other uses. Providers of irrigation water consist of WDD and authorized suppliers in and out of GWP.
– The Treatment service (up to secondary treatment). Service drainage providers are Drainage Boards and Agricultural Treatment Plants that have the responsibility of providing drainage services in accordance with the applicable legislation.
– The recycled water service. Providers of recycled water services consists of Water Development Department, the Committees of governmental water projects if the

government water project management is undertaken by the Commission and the Drainage Boards have the competence of the recycled supply water in accordance with the applicable legislation.

The quantitative analysis and the results were based on data collected from WDD, Drainage Boards and the review of the studies included in the 1st Management Plan.

As recovery cost of Water Services for the period 2008-2013, the rate of recovery applies as identified in the Special Report 2.1 of 2007.

Based on the available data, the overall rate of recovery of water services at country level amounts to 95%. In 2009 and 2012 the water prices were increased to cover the estimated cost of desalination. It is noted however that the full cost recovery achievement of water supply for the period 2008-2013 was reached because, apart from the revenues from the water sales, the water services held and other increased incomes, such as land rights, buildings, new connections and other permanent charges. Given that in the future the conditions that led to maximize other revenues was not likely to be repeated, it was requested to assess such a water price per cubic meter of sold water without considered revenues from fixed and other charges.

As recovery cost of Irrigation Services for the period 2008-2013, the rate of recovery applies as identified in the Special Report 2.1 of 2007.

The average recovery cost of irrigation water at country level amounts to 56%. During period 2008-2013, however, the current selling price of irrigation water in different uses remains the same as in 2005-2007. Selling fees of irrigation water are ranging from 0,05 €/m^3 to 0,56 €/m^3 depending the use. Detailed data are given in the Study of WDD 10/2014 Economic Analysis of water use.

Concerning the drainage at country level is achieved a high level of recovery cost. For 2013 amounts to 166%, while the average recovery of 2008-2013 amounts to 150%. The recovery level is high mainly because of contribution in income of drainage fees prepaid by the consumer.

For the recycled water supplied by the Government Water Projects (WDD), as an incentive for its acceptance, selling prices do not reflect the production cost and its disposal. The price of recycled water remains fixed as determined by 1/1/2004, equal to 0,07 €/m^3 to farmers and for Irrigation Departments amounts to 0,05 €/m^3. The recovery level of Recycled water service appears very low, **19,3**% for 2013 και **18,6**% averaged over six years 2008-2013. The recovery level in the country is expected considering the followed promotion policy of recycled water and the greater integration into irrigation balance. However in the future it is necessary to take into consideration of the provisions of pricing Regulation 128/2014 on the way of pricing.

12. ENVIRONMENTAL OBJECTIVES - EXCEPTIONS

In the 2nd RBMP for the determination of Environmental objectives and exemptions conducted the special study "Determination of exemptions from achieving the Environmental objectives of the Directive and definition of objectives" which is available on the website of the WDD. Activities undergone in the context of this study include the following:

- identification and recording of surface and groundwater WBs, which is projected to reach lower-level state than good and for the 'Exceptions' of achieving the environmental objectives of Article 4 of the WFD will be apply, by cause (e.g. technical feasibility, disproportionate costs, natural conditions, force majeure, , new modifications to the physical characteristics of a surface water body or alterations to the level of the groundwater system, new human development activities).
- recording and mapping of the existing situation,
- Identification of the specific pressures (point sources, diffuse sources, abstraction, etc.) Which are the causes of non-achievement of targets taking into account the results of the Contract 01 / 2014
- Definition of the objectives, by 2021, describing the planned date for achieving good status (2027)
- Detailed description of the methodology and criteria used for classifying the exceptions, and set up objectives until 2021, alternative environmental objectives
- Register of water use projects projects training projects table / valorization / water use,
- Register of the planned projectes that will affect the achievement of environmental objectives,
- Review of the application of Article 4.5 of the WFD in the case of CY_1 Kokkinochoria.
- In the following chapter is briefly presented the key points and the conclusions of this study.

12.1 METHODOLOGY FOR SETTING ENVIRONMENTAL OBJECTIVES AND EXCEPTIONS

The main objective of the Directive 2000/60 / EC (Directive - Water Framework (WFD)) is all Member States to achieve good status in all water bodies.

An integral part of the environmental objectives set out in Article 4, are exceptions. Paragraphs 4.3, 4.4, 4.5, 4.6 and 4.7 of this article describe the conditions and the process through which they can be implemented.

The Directive dictates that the deadlines for achieving the environmental objectives may be extended (gradual achievement of objectives), provided no further deterioration of the status of the water body affected, if all the following conditions are met:

a. Member States determine that not all praccable necessary improvements in the status of the WB can be achieved within the timescales set out in that paragraph for at least one of the following reasons:

    i. the scale of improvements required, can only be achieved in phases exceeding the timescale for technical reasons

    ii. Completing the improvements within the timescale would be disproportionately expensive,

    iii. Natural conditions do not allow timely improvement of WB,

b. the extension of the deadline, and the reasons are specifically set out and explained in the Management Plan (MP)

c. extensions are limited to maximum of 2 further updates, except in cases where the natural conditions are such that the objectives cannot be achieved within this period,

d. The (MP) includes a summary of the measures required under Article 11 and considered necessary for water bodies to achive required status by the extended deadline, the reasons to gradually reach and any significant delay in the implementation of these measures that is expected timetable for their implementation.

Based on the above, the exceptions range from small-scale temporary exemptions to long-term deviations from the targetof "good status by 2015", and include the following aspects:

- extending the deadline, in other words, good status must be achieved by 2021 or by 2027 at latest (paragraph 4.4) or as allow the natural conditions after 2027
- achieve less stringent environmental objectives under certain conditions (section 4.3 and 4.5)
- temporary deterioration of the status resulting from natural causes or force majeure (paragraph 4.6);
- new modifications to the physical characteristics of surface water or changes in groundwater level, or failure to prevent deterioration of surface waters (including the change from high to good status) as a result of new sustainable human development activities (paragraph 4.7).

The main environmental objectives, in accordance with Article 4 of Directive 2000/60 / EC, for each water category are:

a) For surface waters

- the non-deterioration of their status
- protection / restoration towards the good ecological and chemical status of surface waters, and
- application of the necessary measures to progressively reduce pollution from priority substances and ceasing or phasing out emissions, discharges and losses of Priority Hazardous Substances.

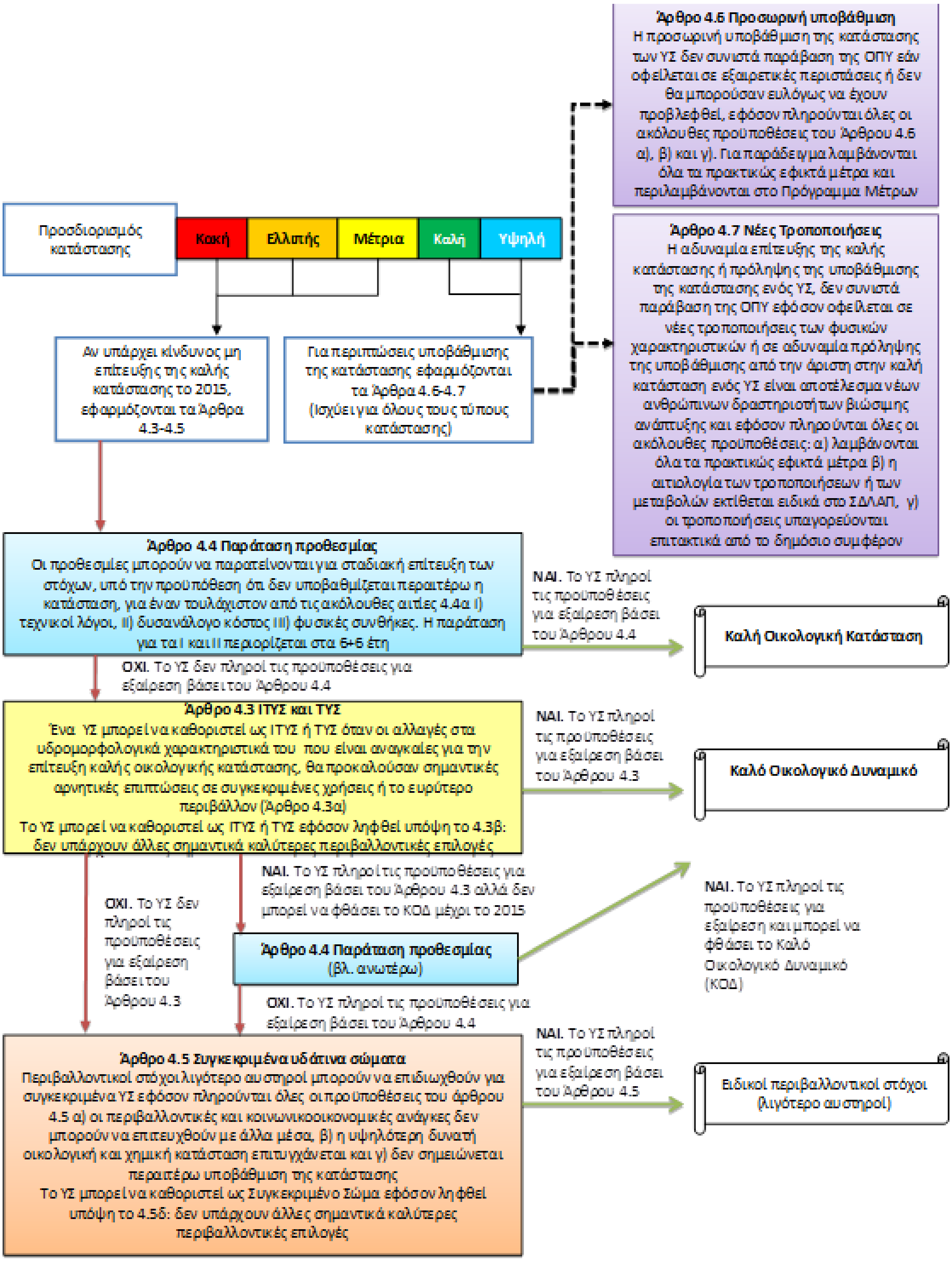
b) For ground water bodies

- implementing necessary measures to prevent or reduce the introduction of pollutants in them and the deterioration of the status of all mineral waters
- protection, enhancement and restoration of all systems of groundwater, by ensuring a balance between the discharge (physical or through Pumping) and the recharge of groundwater bodies, and
- implementing measures necessary to reverse any significant and sustained upward trend in the concentration of any pollutant, which is due to human activity, in order to reduce gradually the pollution of groundwater.
- For heavily modified and artificial water bodies, the environmental objective laid down in Directive 2000/60 / EC is the 'good ecological potential' and is in line with the general principles for the Environmental objectives of natural systems.

For protected areas:

- compliance with specified standards and Community legislation under which the individual protected areas have been established by 2015 at the latest, and
- the achievement of good status. The following figure schematically reproduced or procedure provided for in Article 4 of Directive 2000/60 / EC

Figure 12-42: Schematic of Article 4



The environmental objectives for water bodies in Cyprus are defined for each water body taking into account the following:

- The water status, as evaluated from the data of the monitoring network and the gaps in relation to the overall objective for good status set by the Framework Directive on water.

– The scale and significance of the pressures imposed.

– The degree of certainty of the correlation of water status with the pressures and the need for new investigations necessary to increase such knowledge and effectively address the issue.

– The technical and economical aspects of the interventions and project required to be implemented in order achieve good status.

– The project planning and design time needed, including any preliminary investigations and studies required for the design of appropriate interventions in order to address specific issues.

– The available resources for the implementation of all necessary interventions / projects in order to achieve good status, and the planning of the involved competent bodies.

– Any planned new modification of the physical characteristics of a water bodies in order to meet socio-economic and environmental needs and the possibility of failure to achieve the objective of good status for technical, physical or economic reasons.

– The inclusion of water bodies in the Protected Areas Registry.

12.2 ENVIRONMENTAL OBJECTIVES AND EXEMPTIONS

12.2.1 Establishment of Environmental Objectives and excemptions for SWBs

The main environmental objectives and exemptions as set out in the study "Determination of Exemptions from achieving the environmental objectives of the Directive and definition of objectives" which is available on the website of the WDD are:

For surface waters with good or high status or good ecological potential the environmental objective set out is non-deterioration of their status.

This objective concerns:

- 97 river water bodies and all coastal water bodies (22 water bodies), whose ecological status / potential is good or above good,

– 150 inland water bodies and all the coastal water bodies (22 water bodies), whose chemical status is good.

For surface waters with status / potential less than good the objective set out concerns the amelioration of their status through the implementation of the Program of Measures.

The possibility of failure to achieve in time the objectives is also evaluated, taking into account the intensity and the type of pressures identified. In these cases the tests for exemptions based on article 4.4 of 2000/60/EC Directive are applied.

This concerns

- 27 river water bodies whose ecological status / potential is expected to improve by 2021,
- 3 inland water bodies whose chemical status will improve by 2021,
- 50 river water bodies are subject to exemption for extension of deadline for 2021, whose status is expected to improve by 2027,
- five lakes with status less than good for which further investigation is required in order to refine the methodology for their assessment.

For surface water bodies whose status remains unknown due to lack of data the environmental objective set out no deterioration of their status while in the program of measures are included specific monitoring programs in order to achieve their classification as soon as possible.

This concerns:

- 17 river water bodies with unknown chemical status, and
- Practically all the lakes for which a complete assessment of their status will be possible after the completion of the proposed measures.

For surface water bodies that their physical characteristics is expected to be subject of new modifications are tested for the application of article 4.7 of WFD.

In this context, all planning works for the period 2016 -2021 likely to affect the status of the surface water bodies are tested. From these test no water bodies are subject to exemption based on this article

Finally, it is noted that all river water bodies designated as heavily modified water bodies (excluding inland reservoirs), the objective seta out for 2021, is the achievement of good ecological potential by implementing all the measures regarding hydromorphological alterations included in the program of measures. This objective concerns 35 river water bodies designated as HMWBs.

In the following chapters is presented briefly the methodology used for the identification of the surface WBs where exceptions of Article 4 of WFD are applied.

12.2.1.1 Extension of deadline (Article 4.4 of Directive 2000/60/EC)

For determination of surface WB which is not expected to achieve the Directive Objectives by 2021, therefore fall under Article 4.4 of the Directive the following is conducted:

– Natural WBs and HMWBs with status less than good (ecological and chemical), including their classification uncertainty are identified

- The Pressures on the above WBs are identified and calculated the total phosphorus and nitrogen loads BOD. From these data, the percentage of the participation of each pressure for each WB is calculated. For this purpose are used the results of the WDD Contract on the update of Article 5 of Directive (2000/60 / EC) on the Review of pressures and impacts of human activity on the status of surface water and groundwater that was conducted in December 2014.
- Loads of N, P and BOD received by each WB are compared with the transition loads from good to less than good status that derived from the analysis of preassures from agriculture, livestock and settlements, which are the main pressures of the WBs in Cyprus.
- From the above data, for each river WB is calculated the amount that should be reduced from the loads of each activity in order to create the appropriate condiintions for the achievement of good status
- For WBs resulting from the above is considered the possibility of achieving good status under the measures that can be implemented in order to reduce the gap for the loads of pollutants from the pressures or to reduce the intensity of the pressure.

The degree of uncertainty classification of WB is taken into account as a critical parameter for the implementation of measures and assessing the exceptions. It is also evaluated the correlation of load transition from good status to less than good as they are determined by the currently available data. Such as:

a) River WBs with:

   - Low degree of uncertainty classification of ecological status.
   - Status of BQE less good and with good status for physicochemical parameters thus the concentrations of N, P and BOD parameters are within the limits set out for type specific reference conditions.
   - Chemical status good or unknown that are not affected by activities that may create pressures and impacts on chemical status.

It is expected to achieve the objective of good ecological and chemical status by 2021 follwing the implementation of the basic measure.

- For natural River WB with the following global characteristics:
   - The classification of the ecological status has a high degree of uncertainty (uncertainty 3 and 4).
   - Their chemical condition is good and / or unknown and they are not under other pressures except farming and agriculture - applying fertilizers.
   - For their type it was not possible to correlate the transition loads from good to less than good status. That concerns WB for type Ih (high intermittent flow) receiving significant pressures from livestock activities.

Further investigation based on results of special investigative monitoring program, as well as detailed register and monitoring of the activities in the sub-basin of the WB are proposed.

For this purpose the RBMP includes additional measures depending on which will be possible in the next management cycle to define the necessary actions for the improvement of their status. In this context these for WBs the exemptions under Article 4.4 for 2021 is applied.

b) For natural River WB receiving significant pressures from agriculture and / or livestock and requires a reduction of N, P and BOD load less than 25% it is expected that following the implementation of the program of measure they will achieve good ecological status by 2021. Additionally HMWBs are tested for which good ecological potential is defined and assessed the possibility of achieving good ecological potential if the mitigation measures proposed are teken. In this context:

- HMWBs (excluding impounded rivers) with physicochemical parameters in good status with low degree of uncertainty are considered as the concentrations of N, P and BOD are within the limits laid down for the type-specific reference conditions. For these HMWBs is expected that with the implementation of the mitigation measures they will achieve good ecological potential by 2021.
- HMWBs (excluding impounded rivers) fro which a) the status of the physicochemical parameters is less than good b) degree of the uncertainty is low and c) pressure from agriculture and livestock are identified and is required a reduction of loads of more than 25%. is considered that further investigation is reuoired as for the natural WBs.

Measures are proposed to further investigate the causes of their status based on the results of special investigative monitoring program, and on a detailed recording and monitoring of the activities in their sub-basin. These measures included in the RBMP program of measures Based on the results of their implementation will be possible in the next management cycle to define the necessary actions for the improvement of their status. In this context for these the exemptions under Article 4.4 by 2021 is applied

Also it is evaluated the development of projects already implemented to address impacts to water from certain activities e.g. (Vati works, urban sewage treatment projects in settlements). For River WBs affected by these projects is expected that by 2021 they will achieve good status.

As it concerns lake WBs, given the very high level of uncertainty of their classification, it is not possible to relate the pressures on theirstatus and to establish effective measures that can lead to good condition during this cycle. Such correlations can be made in the next RBMP after an appropriate monitoring program and appropriate scientific investigations that will reduce these uncertainties.

The table below shows the WB included in Article 4.4 and their main reasons for their accession.

Table 12-85: Surface WB included in Article 4.4 of the WFD

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_1-1-a_RP	Khapotami	5,9	NO	M	M	M	2	G	2	Under serious pressure from agriculture (fertilizer application). It is proposed a special investigative monitoring program of the statusas well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle to devise the necessary actions to improve the status.
CY_1-4-d_RI_HM	Ezousa	7,4	YES	M	G	M	4	G	4	Concerns HMWB with high uncertainty classification. It requires more investigation to associate pressures.
CY_1-4-e_RIh_HM	Ezousa	4,8	YES	M	G	M	4	G	4	Concerns HMWB with high uncertainty classification. It requires more investigation to associate pressures
CY_1-4-j_RIh	Ayios Nepios	7,1	NO	M	G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_1-4-k_RIh	Varkas	14,1	NO	M	G	M	4	G	4	Under serious pressure from livestock activities. Proposed special investigative monitoring program of its status as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_1-4-L_RIh	Milarkou	12,9	NO	M	G	M	3	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_1-4-m_RIh	Kochatis	13,2	NO	M	G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_1-6-a_RIh	Mavrokolymbos	11,9	YES	M	G	M	3	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_1-6-c_RIh_HM	Mavrokolymbos	2,7	YES		G	M	4	G	4	Concerns HMWB with high uncertainty classification. It requires more investigation to associate pressures
CY_1-6-d_RIh	Xeros	17,1	NO	M	G	M	3	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_2-2-a_RIh	Neraidhes & Ammadhkiou	21,0	NO	M	G	M	4	G	2	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_2-2-f_RI_HM	Stavros tis Psokas	2,7	YES	M	G	M	4	G	4	Concerns HMWB with high uncertainty classification. It requires more investigation to associate pressures
CY_2-2-h_RIh_HM	Khrysokhou	6,8	YES		G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_2-3-a_Rlh	Mirmikoph	15,0	NO	M	G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_2-6-b_Rlh_HM	Katouris	5,3	NO	M	G	M	3	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_3-3-b_RP	Karyiotis	13,4	NO	M	M	M	1	G	1	Under serious pressure from livestock and agricultural activities. Implementation of the measures proposed in the RBMPs will improve the situation, but is not expected objectives of Directive 2021
CY_3-4-b_Rlh	Atsas	2,1	NO		M	M	3	G	1	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_3-4-c_Rlh_HM	Atsas	6,0	YES	M	G	M	4	U	0	Concerns HMWB with high uncertainty classification. It requires more investigation to associate pressures
CY_3-5-d_Rlh_HM	Elia	13,3	YES	M	G	M	4	F	4	Classification according to the ecological and chemical status of a high degree of uncertainty. Further investigation for correlation between the pressure imposed and the current situation. We propose a special investigative status monitoring program as well as detailed recording of data and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation.

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_3-7-j_RIh_HM	Akaki	4,5	YES	M	G	M	4	U	0	Classification according to the ecological and chemical status of a high degree of uncertainty. Further investigation for correlation between the pressure imposed and the current situation. We propose a special investigative status monitoring program as well as detailed recording of data and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation.
CY_3-7-n_RIh	Koutis & Aloupos	22,4	NO	M	G	M	3	G	4	It is under serious pressure from agricultural activities. It requires more investigation correlate the pressures imposed. It is proposed special investigative status monitoring program as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation.
CY_6-1-c_RIh_HM	Pedhieos	1,0	YES	M	G	M	4	G	3	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_6-5-b_RI	Yialias	12,8	NO	P	M	P	1	G	3	Under serious pressure from livestock and agricultural activities. Implementation of the measures proposed in the RBMPs will improve the situation, but is not expected objectives of Directive 2021
CY_6-5-f_RIh_HM	Koutsos	6,2	YES	M	G	M	4	G	3	It Concerns RBMP classified with a high degree of uncertainty.. In addition to that it is under serious pressure from livestock and requires further investigation for the correlation of the statusand loads. It is Proposed a special investigative status monitoring program as well as detailed recording and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_7-2-a_RIh	Vathys	6,6	NO	M	G	M	3	U	0	Classification according to the ecological and chemical status of a high degree of uncertainty. Further investigation for correlation between the pressure imposed and the current situation. We propose a special investigative status monitoring program as well as detailed recording of data and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation.
CY_8-6-a_RIh	Xeropotamos	18,9	NO	M	G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_8-7-f_RI_HM	Pendaskhinos	7,3	YES		G	M	4	G	4	It Concerns RBMP classified with a high degree of uncertainty.. In addition to that it is under serious pressure from livestock and requires further investigation for the correlation of the statusand loads. It is Proposed a special investigative status monitoring program as well as detailed recording and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation
CY_8-7-g_RIh_HM	Pendaskhinos	9,5	YES		M	M	4	G	4	It Concerns RBMP classified with a high degree of uncertainty. In addition to that it is under serious pressure from livestock and requires further investigation for the correlation of the statusand loads. It is Proposed a special investigative status monitoring program as well as detailed recording and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_8-9-e_RI_HM	Vasilikos	9,0	YES		G	M	4	U	0	It Concerns RBMP classified with a high degree of uncertainty. In addition to that it is under serious pressure from livestock and requires further investigation for the correlation of the statusand loads. It is Proposed a special investigative status monitoring program as well as detailed recording and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation
CY_8-9-f_RIh_HM	Vasilikos	4,5	YES		M	M	4	U	0	It Concerns RBMP classified with a high degree of uncertainty.. In addition to that it is under serious pressure from livestock and requires further investigation for the correlation of the statusand loads. It is Proposed a special investigative status monitoring program as well as detailed recording and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation
CY_8-9-g_RIh	Exovounia	9,7	NO	M	G	M	4	G	2	Classification according to the ecological and chemical status of a high degree of uncertainty. Further investigation for correlation between the pressure imposed and the current situation. We propose a special investigative status monitoring program as well as detailed recording of data and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation.
CY_9-1-b_RIh	Pyrgos	11,0	NO	M	G	M	4	U	0	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_9-2-h_RIh_HM	Yermasogeia	6,4	YES	M	G	M	3	G	4	It Concerns RBMP classified with a high degree of uncertainty.. In addition to that it is under serious pressure from livestock and requires further investigation for the correlation of the statusand loads. It is Proposed a special investigative status monitoring program as well as detailed recording and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation
CY_9-2-i_RIh	Pissokamina	7,6	NO	M	G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_9-4-e_RIh_HM	Garyllis	3,8	YES		M	M	4	U	0	It Concerns RBMP classified with a high degree of uncertainty.. In addition to that it is under serious pressure from livestock and requires further investigation for the correlation of the statusand loads. It is Proposed a special investigative status monitoring program as well as detailed recording and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation
CY_9-4-g_RIh	Phasoula	7,8	NO	M	G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_9-6-a_RP	Άγιος Ιωάννης	5,3	NO	G	BAD	M	2	G	2	Settlements without WWTP - Upon completion of works waste water Treatment Agios Ioannis,Agros the statusis expected to improve
CY_9-6-b_RP	Ambelikos-Agros	17,6	NO	M	P	M	2	G	2	Under serious pressure from livestock and agricultural activities. Implementation of the measures proposed in the RBMPs will improve the situation, but is not expected to fulfill the requirements and the objectives of Directive 2021

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_9-6-e_RP	Ambelikos-Xylourikos	11,4	NO	G	M	M	1	G	1	Under serious pressure from livestock and agricultural activities. Implementation of the measures proposed in the RBMPs will improve the situation, but is not expected to fulfill the requirements and the objectives of Directive 2021
CY_9-6-f_RI	Limnatis	7,0	NO	G	M	M	1	G	4	Reducing livestock <25% but requires a large reduction in agriculture
CY_9-6-L_RP	Kouris	19,5	NO	P	M	P	2	F	2	Asbestos quarries. A significant reduction is required of loads imposed from agriculture
CY_9-6-m_RP_HM	Kouris	13,1	NO	G	M	M	1	G	1	HMWB but with PC of less than good required measures
CY_9-6-t_RI_HM	Kouris	11,4	YES	M	G	M	4	U	0	It Concerns RBMP classified with a high degree of uncertainty. In addition to that it is under serious pressure from livestock and requires further investigation for the correlation of the statusand loads. It is Proposed a special investigative status monitoring program as well as detailed recording and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to devise the necessary actions to improve the situation.
CY_9-8-a_RIh	Paramali	28,0	NO	M	G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_9-8-c_RIh	Evdhimou	4,2	NO	M	G	M	4	G	4	It is under serious pressure from livestock activities. It is Proposed a special investigative monitoring program for its condition as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle of activities to devise the necessary actions to improve its situation.
CY_1-3-e_RE_HM	Xeros Potamos	3,88			G	M	4		0	It is Under serious pressure from agricultural activities. It requires more investigation correlate the pressures imposed. It is proposed special investigative status monitoring program as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to
CY_2-1-a_RE	Ayiou Ioanni	12,79			M	M	4	G	4	It is Under serious pressure from agricultural activities. It requires more investigation correlate the pressures imposed. It is proposed special investigative status monitoring program as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to
CY_6-5-h_RE	Alykos	31,18			M	M	4		0	It is Under serious pressure from agricultural activities. It requires more investigation correlate the pressures imposed. It is proposed special investigative status monitoring program as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to
CY_8-3-b_RE	Anonymous	3,74			M	M	4		0	It is Under serious pressure from agricultural activities. It requires more investigation correlate the pressures imposed. It is proposed special investigative status monitoring program as well as detailed logging and monitoring of activities in the sub-basin and the practices followed. These measures included in the RBMP. Based on the results obtained from this will be possible in the next cycle management to
CY_9-2-g_RI_HM_IR	Yermasogeia	0,7 (επιφάνεια σε Km^2)	YES			M	1	F	1	

Code WB	Name WB	Length WB in km	HM WB	Ecological Status / Potential				Chemical Status		Observations
				BQE	PC	Status	UD	Status	UD	
CY_9-4-d_RI_HM_IR	Πολεμίδια	0,2 (επιφάνεια σε Km^2)	YES			BAD	2	F	1	

Ecological Status/ Potential	*H:High*	*G:Good*	*M:Moderate*	*P:Poor*	*BAD: Bad*	*U:Unknown*
Chemical Status	*G:Good*				*F:Less than Good*	*U:Unknown*

Regarding the lake WB, given the high level of uncertainty of their classification, it is not possible to correlate the pressures imposed to them and their current statusand to establish effective measures that can lead to good condition during this cycle. Such correlations can be made in the next RBMP after an appropriate monitoring program and appropriate scientific investigations that will reduce these uncertainties. For this reason, all the lake WB included in Article 4.4.

12.2.1.2 Less strict objectives (Article 4.5 of Directive 2000/60 / EC)

There are no surface WBs identified for inclusion in Article 4.5 of the Directive.

12.2.1.3 Temporary deterioration (Article 4.6 of Directive 2000/60/ EC)

The Article 4 paragraph 6 of Directive 2000/60 states that 'Temporary deterioration in the status of water bodies is not in breach of the requirements of the Directive if due to circumstances of natural cause or force majeure which are exceptional or could not reasonably have foreseen, in particular extreme floods and prolonged droughts, when the following conditions are met:

- All practicable measures are taken to project the further deterioration of the status(Article 4.6 (a))
- The measures to be taken during a prolonged drought episode will not undermine the recovery of the body of water quality after the end of the episode and included in the Programme of Measures (Article 4.6 (c))
- The River Basin Management Plan sets out the conditions under which they may be declared the unforeseen or exceptional circumstances including the establishment of appropriate indicators
- The next update of the RBMP will include a summary of the effects of the circumstances and the action taken (Article 4.6 (e))
- The impacts of exceptional circumstances are reviewed annually (Article 4.6 (d).

It is important to emphasize that the prolonged drought caused by natural causes and not from non-rational use of water resources. The term "prolonged drought" is relative and RBMP used in correspondence with the term «prolonged drought» Directive 2000/60 and other accompanying documents, as well as the «Drought Management Plan Report» (DG ENV EU, Technical Report 2008-2023) in order to classify an event particularly harsh drought that, according to Article 4.6 of Directive 2000/60 the temporary deterioration in the status of water bodies not to infringe the Directive requirements.

For the activation of Article 4.6 in drought periods should this period be characterized as "prolonged".

The identification of a drought period as "prolonged", resulting from the application of three basic meteorological and hydrological indicators are:

- Since index SPI - 12 (the sum of precipitation over a period of 12 months) a recorded drought (negative with values <-1) SPI-12 values show the "**Drought Magnitude**" **(DM)**. The drought magnitude is a measure of the combined
- duration and intensity of drought phenomenon and is defined as the absolute value of the sum of all the individual monthly SPIi-12 a drought indicators (see. In detail in the exceptions determination report). If apparent DM> 30 then recognized prolonged drought conditions throughout the drought event.
- The **Stream Flow Drought Index**. The alert level for the recognition of prolonged drought conditions defined when the inputs of the hydrological year receive value of less than 15% of historical values, i.e. the corresponding alert level is considered high. These values are listed in the table below.

Table 12-86: Value index basin hydrological year (1 year) for recognition of prolonged drought conditions (m3)

Catchment area	Quantile year inflow 15%
Catchment area 1	2.227.000
Catchment area 2	1.310.000
Catchment area 3	5.447.000
Catchment area 6	634.400
Catchment area 8	464.000
Catchment area 9	1.1198.000

- The **Monthly River Regime Index**. The monthly index diet rivers considered for the drought period is recognized based on the above two indicators. If the median of average daily benefits given month is less than 5% of the historical average daily benefit (Table 1 3), the case of exemption declared for the temporary deterioration Article 4.6.

Table 12-87: Values recognition high pressure due to drought conditions (percentile less than 95%) monthly rivers diet Index (L / s)

Months	Catchment areas					
	Catchment area 1	Catchment area 2	Catchment area 3	Catchment area 6	Catchment area 8	catchment area 9
Jan	70	62	49	2	7	56
Febr	130	126	130	9	18	84
Mar	120	120	161	6	15	93
April	93	84	75	1	7	57
May	64	25	15	0	1	3
Jun	33	1	1	0	0	0
Jul	25	0	0	0	0	0
Aug	22	0	0	0	0	0
Sept	22	0	0	0	0	0
Oct	28	0	0	0	0	0
Nov	38	1	0	0	0	0
Dec	50	36	0	0	1	0

For the implementation of Article 4.6 the recognition of drought conditions made for each year and for 6 years in total by applying the following steps:

Step 1: Identified droughts (SPI-12 with negative values at least for a month less than -1) and controlled the drought magnitude (DM) of each period. If apparent DM> 30 then recognized prolonged drought conditions for the drought episode.

Step 2: Monitor the index of the basin hydrological year and identify any prolonged drought conditions, if the prices are lower than those of Table page 12-297.

Step 3: During periods of prolonged drought identified either Step 1 or Step 2, the monthly rivers diet ratio is controlled. If the median of average daily flows at least one of the test month is less than the values specified in the table on page 12-298 then Article 4.6 applies for that period.

It noted that during the period of the first RBMP (2009-2015) the application of Article 4.6 is not required under the above.

12.2.1.4 New and planned projects related to water resources (Article 4.7 of Directive 2000/60 / EC)

All plaaned projects related to waters are cosniderd.

According to available information by the Water Development Department, the planned projects in Cyprus are concerned the following categories:

- Sewerage Projects
- Projects of water supply

- Projects of recycled water
- Dams
- Projects desalination and groundwater recharge projects.

In this context the following should be noted:

- For drainage works associated with the installation of new sewerage networks in areas not served so far and construction of Wastewater Treatment Plants. These projects are implemented in compliance with Directive 91/271 / EC "on the processing and disposal of urban waste water 'and are related to the integrated management of sewage settlements and cities contributing to environmental protection. Also, the construction and operation of the planned sewage networks and the construction and operation of waste waters treatment facilities in areas where cross WBs they do not create significant morphological alterations and is not expected to affect their status. For WBs related to these projects tests for the application of Article 4.7 are not required.
- Drinking water supply works concering internal and external networks in order to drinking water supply needs and the imporvemnt of the use of the existing desalination projects. These projects do not cause adverse effects on the environment and are not related to hydromorphological alterations on WBs. For WBs related to these projects tests for the application of Article 4.7 are not required. The same applies to projects of desalination and artificial recharge.
- The recycled water projects are mostly concern pipelines fro the transfer of the recycled water in tanks or to off river reservoirs that are not related to WBs. These projects contribute to integrated management of water resources and environmental protection. By their nature pipeline projects are not related to hydromorphological alterations of WBs even at crossing points with WBs they are related to point interventions that do not change the status of the WBs. Thus, for WBs related to these projects tests for the application of Article 4.7 are not required
- The planned dams may cause changes in the hydromorphological characteristics of WBs affected. Therefore, further investigation is require based on the flowchart for Article 4.7. For this purpose, further technical and economical parameters need to be to consider, such as:
    - The level of maturity of the planned project (possibility of starting construction in the current management cycle).
    - The feasibility of the planned works (with any examined alternatives)
    - The technical characteristics of the works.
    - The impact of projects on the environment.

Fron the analysis based on the above mentioned steps according to the guidance no WB indentified that the application of article 4.7is required in this management cycle.

Details of the test for the exceptions under Article 4.7, as well as for the projects reviewed are given in the report "Determination of exemptions from achieving the environmental objectives of the Directive and definition of objectives", which is available on the website of WDD.

12.2.2 Establishement of environmental objectives and exemptions for Groundwater Bodies.

Environmental objectives and exemptions for GWB are established in the study "Determination of exemptions from achieving the environmental objectives of the Directive and definition of objectives" which is available on the website of the Department are:

For groundwater bodies with good status, the environmental objective set out is non-deterioration of their status

- This objective concerns 5 GWB.

Groundwater bodies with bad quantitative or chemical status the environmental objective set out is the improvement of their status through the implementation of the Program of Measures. Thus it is estimated that the majority of the GWBs will not achieve the objective in time as the necessary response time is long and may exceed 2027. These water bodies are subject to exception under Article 4, paragraph 4 of WFD for the period concerning the present RBMP.

This objective concerns:

- 1 Groundwater body (CY_16 Pyrgos) for which is expected the improvement of its status
- 4 Groundwater bodies which are subject to exemption for extension of the deadline by 2021. As mentioned above it is estimated that this exception will be applied also in 2027, given that the required response time of Groundwater bodies to the measures is very large.
- For Groundwater CY-1 Kokkinochoria are set out less stringent objectives and is subject to exemption under Article 4.5 of the WFD as its quantitative status, according to the data derived from long-term observations, shows that water level is up to - 30 m below the sea level, and thus the quality degradation of the system. Thus, the achievement of good status as defined for the other GWBs is not feasible. Less stringent objectives that are laid down for this water bay concerning:
    - for quantitative status of the body, no further deterioration and the gradual improvement of the state of the water level at stable rates as possible,
    - For qualitative status, no further deterioration of the status and gradual improvement of critical water quality parameters.

In the following paragraphs are presented the main elements of the methodology for the establlishement of the GWBs ASS which fall within the exceptions in Article 4 of the WFD.

12.2.2.1 Extension of deadline (Article 4.4 of Directive 2000/60/EC)

The identification of exceptions to the achievement of environmental objectives is done in accordance with the procedures described in Guidance Document No.. 20 «Guidance Document on Exemptions to the Environmental Objectives». Includes Groundwater Systems (GWB) which provided not achieve improvements consistently remain in lower-level state of good. This will provide the 'Exceptions »(exemptions) to achieve the environmental objectives of Article 4 of the WFD. According to the WFD, the reasons are accepted as sufficient justification for exemption under Article 4.4. "Extension of time ', provided that no further deterioration GWB can be:

- **Technical feasibility,** that the environmental objective can not be achieved for technical reasons and especially when there is no available technical solution or the time required is not sufficient or the available data do not allow the design of any technical solution or tackling the problem falls into event of limited jurisdiction trans boundary waters.
- **Disproportionately high costs** compared to the environmental effect, that is disproportionate to the extent that the cost of addressing the quantitative and / or qualitative issues to greatly exceed the potential benefits and the affordability of the proposed remedial measure to be difficult due to unavailability alternative financing mechanisms or the social costs of receiving disproportionately harsh measures that upset the social structure due for example reduction in income of the rural population from abandoning large cultivated land.
- Below you can find an analysis of global data and justification of Article 4.4 exceptions. "Extension of time" for each ASS with the following analysis sequence: Record and reflect the current status of each GWB, identify those that exhibit poor overall status based on the available data and degree of confidence is evaluated provided for the credibility of the findings.
- Description of the significant pressures that contribute to the poor quantitative and / or qualitative state of the GWB and the degree of influence is documented in failure to achieve the improvement goals. To this end, full use of the results of the contract "Updating of Article 5 of Directive (2000/60 / EC on the Overview of Pressures and Impacts of Human Activities in the Status of Surface and Groundwater in December 2014" Determined for each GWB the possibility of achieving or not achieving the objectives by the year 2021 and the negative predictive followed by examining the possibility of reaching or not reached by the year 2027.
- Establishing the GWB that are not expected to achieve the overall goals consistently fall in cases of exceptions and documented the evaluation in accordance with the provisions of section 4 of the WFD. The Depiction and mapping of the current statusbased on the data and the results of the re-evaluation of the quantitative and qualitative monitoring data.

Based on the above analysis analytically presented in the report "Determination of exemptions from achieving the environmental objectives of the Directive and definition of objectives", which is available on the website of the Department, resulting 14 GWD will not achieve the environmental objectives WFD and classified as "exceptions" in Article 4.4. "deadline extension". The GWD are presented in the following table (Table 12-4).

Table 12-88: Environmental objectives and exceptions of 2nd RBMP GWB justification under Article 4.4. WFD.

Code	Name	Overall condition - 2021	Overall condition - 2027	Justification of exception Article 4 of WFD
CY-3A	Tremithios Bed	BAD	BAD	A longer period for recovery of GWB
CY-3B	KITI-Pervolia	BAD	BAD	A longer period for recovery of GWB
CY-4	Softades-Vasilikos	BAD	BAD	A longer period for recovery of GWB
CY-5	Maroni	BAD	BAD	A longer period for recovery of GWB
CY-6	Mariί-Kalo Chorio	BAD	BAD	A longer period for recovery of GWB
CY-8	Limassol	BAD	BAD	A longer period for recovery of GWB
CY-9	Akrotiri	BAD	BAD	A longer period for recovery of GWB
CY-10	Paramali-Evdhimou	BAD	BAD	A longer period for recovery of GWB
CY-12	Letymbou-Giolou	BAD	BAD	A longer period for recovery of GWB
CY-13	Peyia	BAD	BAD	A longer period for recovery of GWB
CY-15A	Khrysokhou-Gyalia	BAD	BAD	A longer period for recovery of GWB
CY-15B	Khrysokhou Bed	BAD	BAD	A longer period for recovery of GWB
CY-17	Central & Western Mesaouria	BAD	BAD	A longer period for recovery of GWB
CY-18	Lefkara-Pachna	BAD	BAD	A longer period for recovery of GWB

12.2.2.2 Less strict purposes (Article 4.5 of Directive (2000/60 / EC))

Article 4.5. WFD "Less stringent objectives" include Groundwater Systems (GWB) which provided not achieve improvements consistently remain in lower-level state of the good and become "Exceptions" (exemptions) of achieving environmental objectives Article 4 of the WFD.

According to the WFD, Article 4.5 applies only to GWB for which a prior examination of Article 4.4 and found that it is possible and effective inclusion in extra time. Thus, the reasons are accepted as sufficient justification for expedition under Article 4.5. "Less stringent objectives" and on condition that must be met simultaneously, are the following:

(1) Inability to other ways to achieve, that the environmental objective can not be achieved due to strong socioeconomic weaknesses such as the need leaving thousands of acres' efficient crops and strong reduction of income of the rural population due to strict abstraction reduction measures.

(2) **No further downgrade is recorded, that the GWB has reached the point where maintaining existing conditions input - output does not cause further deterioration of the quantitative and / or qualitative status.**

(3) **Achieve the highest state, i.e. to have exhausted the interventions margins and achieved the best possible quantitative and qualitative state of the GWB.**

Before identifying less stringent objectives are examined and all possible options satisfaction by other means of environmental and socio-economic needs served by activities that prevent the achievement of good status. The instruments examined should clearly be a better environmental option and do not entail disproportionate economic costs.

If, after the examination of possible other features and application potential of other projects reveals that ultimately no alternative, then it is considered that the objective of good status for that ASS can not be achieved and now consider the possibility of choosing less stringent good status achieving goals for one (or more) of a group of quality indicators.

But in any case, shall not be accepted: a) undue degradation and possible other indicators at the level of the state of the index that is the cause of the exception and b) not improve other indicators when provided with the relevant feature.

Furthermore, it should be ensured, under rules less stringent objectives, no further deterioration in the status of an ASS, even in cases where it is impossible to improve the statusfor technical reasons or disproportionate economic cost. Consequently, service of less stringent objectives may mean and enforcement measures as stringent as in the case of serving the objective of good status.

Finally, it is clarified that the reference in Article 4.5 under natural conditions is to cover cases where natural restoration may require more time than management identified within the IC cycles.

Within this framework, the CY-1 Kokkinochoria groundwater system was included in Article 4.5 of the first RBMP.

The current state of the system characterized quantitatively bad because presents negative long-term level values and areas due to increased pumping. It is noted that during the 2009-2012 period recorded an upward trend in the level due to rainfall and greater supply of underground aquifers. The state of the system characterized and poor quality because presents high concentrations of chloride ions, sulphate, ammonium, nitrate and arsenic that are attributed to pollution farming origin, urban waste and to phenomena of seawater intrusion due to overexploitation.

The monitoring of the current statusand the characterization of the qualitative status of the system for the period 2008-2013, based on the evidence of four (4) monitoring stations (I3104-1479 Liopetri, I3105-1071 Frenaros, I3110-0461 Avgorou and I4107-0338 Xylofagou) so that the degree of confidence to be satisfactory and the classification system has good reliability. The characterization of the quantitative status based on the data of four (4) channels of quantitative monitoring network (1991-126, 2005-055, 2009WDD06 and H3105-0785) a satisfactory degree of trust and good reliability.

<u>Pressures</u> related to GWB (Ground water body) due to increased pumping water to cover large irrigation mainly but also all other uses. The irrigation water demand is particularly high due to agricultural uses and estimated that in the region there are more than 5,000 wells. The continuous and long-term pumping of groundwater in quantities of water of about $10x10^6$ m^3 annually resulted in a continuous reduction of underground water reserves which is evident by the continued decline of the state in strongly negative territory, while qualitative degradation and salination from the seawater intrusion.

The irrigation needs of the region have been estimated to amount to $25x10^6$ m^3 annually. To cover them are organized irrigation networks fed, except for pumping groundwater, and the Southern Pipeline project with significant volumes of water and the operation of many private desalination plants in coastal zones.

The coverage of water needs due to the continuous and long-term degradation of the quantitative and qualitative status of groundwater, now made using water exclusively from desalination plants. The cover part of the additional needs (Small Industries, farming, secondary uses) made using surface water conveyed through the Southern Conveyor.

Power and annual restocking of aquifers of ASS only by rainfall and the return water from irrigation. The territorial expansion of the area there are no appreciable flow streams or other surface water recipients, with the consequence that there is any power of filtering surface water or underground connection with possible transfusion waters from other neighboring groundwater systems.

<u>The artificial recharge</u> was estimated that it could also contribute to the reversal of the conditions of long-term reduction of quantitative and qualitative degradation of underground aquifers. So, we studied and became an experimental implementation of artificial recharge in the Liopetri communities area and Savior, using recycled - biologically treated water from Paralimni - Ayia Napa station to increase the reserves of the aquifer and use the water for irrigation purposes and for improving groundwater quality.

In the application area develops, the water Kokkinohoria, where due to the small recharge and overpumping, the level is negative elevations, - 25 m below sea level. The water shows high concentrations of nitrates, high values of dissolved salts in the coastal part of salination. For the application of artificial recharge, based on the hydrogeological conditions chosen method of disposal in recharge wells and built a total of 11 boreholes which was recycled drainage water supplies 6 - 20 m^3 / h.

It emerges from the recharge application for about 300 days a year, the water table in the region supplied with 36.000 m^3 / drilling, that is enriched with 1 x 10^6 m^3 of water will be required 28 wells. The study showed that in state owned it is possible to pump more than 150 recharge wells with a total annual capacity $5,4x10^6$ m^3 recycled water.

The possibilities of achieving the objectives of reversing quantitative and qualitative degradation of groundwater conditions, by the year 2021 and by the year 2027, even with drastic measures are not expected to occur. Existing pressures are not expected to be removed or reduced consistently to make it difficult to achieve the environmental objectives reversal of existing conditions in the status of groundwater.

The exception GWB CY-1 from the objectives of quantitative and qualitative rehabilitation, resulting from the assessment of the overall conditions that have been formed, as already mentioned. It is estimated that even with drastic measures will not achieve good quantitative and qualitative nor by the year 2021, but not until the year 2027.

The quantitative status, according to the data of long-term observations, shows that it is a critical point by reducing the level has reached a negative altitudes up to - 30 m below sea level. Positively received good response of underground aquifers and the gradual recovery trend when they are combined recovery efforts, such as the application of artificial stocking. In the period 2002-2006 there was a significant recovery in the level, which locally reached up to 10 m, after continuous feeding and meet irrigation needs of the Southern Conveyor with quantities of water for a 5-year period exceeded the $10x10^6$ m^3 / year. If they could keep the specific feed rates and in combination with series-saving actions, it would be predictable approach of at least partial recovery target at a time horizon of 15-20 years. But the continuous supply conditions in the area with water coming from other water bodies in these quantities needed to meet the needs and restore the balance of underground aquifers, is not feasible for longer periods. So even the goal of quantitative partial recovery over a period of 15-20 years is not considered feasible.

The qualitative statusalso seems to have touched boundary conditions degradation of groundwater, with the main problems come from increased concentrations of nitrates and seawater intrusion in coastal areas. The big drop level recorded over the years has contributed to the increase in the unsaturated zone thickness in combination with the granular texture of ground water is expected that the movement of certain pollutants in the saturated zone will continue at similar rates of recharge rates of groundwater aquifers. Consequently, the quality degradation problems of the water system with the main burden salination and nitrates, estimated to be preserved in the future, since the inversion requires more time than the quantitative recovery.

Moreover, this GWB one part, outside effective government control, which makes it even more complicated to achieve the targets.

Evaluating all of the above, and pursuant to the provisions of Article 4.5 of the WFD, the GWB CY-1 should be adopted less stringent environmental objectives, as agreed by the 2013 Action Plan of Cyprus.

Less stringent objectives on the quantitative status will involve no further deterioration in the status of the ASS and the gradual improvement in the level of the state with stable against possible rates. Regarding the qualitative status also object is no further deterioration of the statusand the gradual improvement of critical quality parameters nitrate and brackish groundwater.

However, even under regime less stringent objectives should be taken not to further deterioration of the statusof the ASS and to achieve the best possible gradual reversal of the conditions of living. These measures should include:

a) measures to improve the quantitative balance with demand management and groundwater abstraction by reducing pumping combined with the power increase actions both water transport and with artificial stocking applications and recycling - water reuse.

b) Measures to eliminate quality degradation conditions of groundwater with good agricultural practice applications, drastically reducing the use of fertilizers with side offset the economic loss with fallow subsidy practices and organic farming, and finally control the disposal of urban waste water and other secondary pollution activities.

12.2.3 Environmental Objectives of Protected Areas

In this given Environmental objectives for protected areas under Article 6 of the WFD presented in Chapter 7.4 and assessed their compliance with them.

For WB falling in these areas, the aims set for protected areas apply in addition the objectives set for the state of WB. Note that in many cases the objectives for the state of HS may not be the same as those on protected areas due to e.g. the use of a specific environmental standard or condition can be modulated in relation to the provisions for protected areas and thus aims to not always comparable. When the boundaries of a WB coincide with the boundaries of the protected area, then the most stringent shall apply.

The main objectives for each category of protected area shall be as follows.

<u>Areas designated for pumping of water for human consumption</u>

For areas for pumping of water for human consumption lays down the following purposes:

- The quality characteristics of the available water after processing for human consumption comply with the requirements of Directive 98/33 / EC on the quality of water for human consumption.
- To provide appropriate protection to prevent deterioration of water quality in order to reduce the degree of treatment to produce drinking water.
- The first purpose is achieved when the quality standards are met as defined in Directive (98/83 / EC).

The second objective is achieved with the implementation of measures to ensure the protection of water quality characteristics for human consumption.

<u>Bodies of water characterized as recreational waters</u>

The target for recreational waters identified under the Bathing Water Directive is to protect the environment and public health at swimming as well as the conservation, protection and improvement of the quality of bathing water.

This objective is achieved by the satisfaction of good or excellent quality standards set out in Directive 2006/7 / EC.

<u>Areas sensitive to presence of nutrient</u>

For nitrates vulnerable zones in the general objectives set regarding:

- the reduction of water pollution by nitrates from agricultural sources
- avoid further pollution
- These objectives are achieved through:
- identification of vulnerable zones,
- identification of action programs applicable to them.

Also good agricultural practice giving guidance on the reduction of nitrates contribute to achieving these goals.

For Sensitive Areas the main objective as defined in Directive 91/271 / EEC is to protect the environment from the adverse effects of the discharge of urban waste water and waste water from certain industrial sectors.

The sensitive areas as defined according to 91/271 / EEC relating to surface HS is sensitive to eutrophication or an increased presence of nitrates.

The objective is achieved when placing limits laid down in Directive 91/271 / EEC are satisfied.

<u>Areas designated for the protection of habitats and species</u>

The objectives of the Network Protection Natura 2000 areas defined in relation to the respective areas defined under the Habitats Directive (92/43 / EC as it stands today) and in the protection and where necessary to improve the statusof the aquatic environment to the extent necessary to achieve the conservation objectives of natural habitat and of wild flora and fauna in the Sites of Community Importance.

The objectives for the areas defined in relation to the Directive the conservation of wild birds (2009/147 / EC) is to protect, or where it is necessary to improve the aquatic environment to a degree sufficient to achieve the objectives of protection for Special Protection Areas.

Where a protected area of the Natura 2000 network is part of a WB or when a WB falls in an area Natura 2000, the objectives of the WFD on the state of WB apply in addition to the requirements for the desired state of conservation.

Some HS falling within the Natura 2000 Network of protected areas have been identified as HMWB. In these cases, the aim of achieving good ecological potential is applied in addition to the targets for the conservation status of the area.

12.2.4 Synthesis of Environmental Goals

Here are aggregated targets set for the status of water bodies and groundwater for the period 2016-2021, according to the provisions in Article 4 of the WFD. The tables below present the status of surface and groundwater in 2015, as well as the objectives for 2021 and the exceptions.

Table 12-89: Status 2015, Purposes for 2021 and Surface WB exceptions.

	Rivers		**Lakes**		**Coastal**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Natural WB	124	71%	5	63%	18	82%
HMWB	50	29%	3	38%	4	18%
Total	174	100%	8	100%	22	100%
2015 - Condition						
Ecological condtion / potential						
Good and Higher	97	56%	0	0%	22	100%
Lower than good	77	44%	5	63%	0	0%
Unknown	0	0	3	37%	0	0%
Chemical Status						
Good	150	86%	1	13%	22	100%
Lower thsn good	7	4%	0	0%	0	0%
Unknown	17	10%	6	87%	0	0%
2021 – Objective Purpose (in parenthesis is given the desired difference in 2015)						
Total with WB Ecological Status / Potential good or superior	124 (+27)	71%	the classification process is completed for all the lakes		22 (+/-0)	100%
Total WB Chemically good condition	153 (+2)	90%			22 (+/-0)	100%
Classification of all WB with status unknown						
Exceptions						
Article 4.4 – Deadline Extension	50*	28%	8	100%		
Article 4.5 –Lower purposes	Not implemented					
Artcle 4.6 – Natural Causes	Depending on the application of the criteria set out in the Drought Management Plan					

	Rivers		Lakes		Coastal	
	Number	**%**	**Number**	**%**	**Number**	**%**
Article 4.7- New adjustment	Not implemented					
2027 – Objective purposes (in parenthesis is given the desired difference in 2021)						
Total with HS Ecological Status / Potential good or superior	174 (+45)	100%	8	100%	22 (+/-0)	100%
Total WB Chemically good condition	174 (+16)	100%	8	100%	22 (+/-0)	100%

* Concerns WB 50 rivers for their ecological status of which 4 WB included in Article 4.4 and its chemical status.

Table 12-90: Status 2015 purposes for 2021 and GWB exceptions

Total number of GWB	21
2015 - Overall condition	
Number of GWB in good condition	5
% GWB in good condition	24%
Number of GWB in condition of lower than good	16
% GWB in codnition of lower than good	76%
2021 – Objective Purposes	
Number GWB in good condition	6
% GWB in good condition	29%
Article 4.4 – Exception of extended period (Estimated to be applied for in 2027)	
Number GWB	14
% GWB	66%
Article 4.5- Exception with less strict purposes.	
Number GWB	1
% GWB	5%

13. PROGRAM OF MEASURES

13.1 INTRODUCTORY DATA

The program of measures includes the "basic" measures specified in Article 11.3 of WFD and, and where is necessary, "supplementary" measures. Taking additional measures is provided in case the implementation of the basic measures is not sufficient to achieve the goals. In the following chapters are given the basic data of such measures, as derived from the provisions of the WFD, as well as, the Guidance Document WFD Reporting Guidance 2016.

13.1.1 Basic Measure

According to paragraph 3 of Article 11 of the Directive, the key measures are the minimum requirements to be met in order to achieve environmental objectives under Article 4. Key Measures categorized as follows (follow the numbering of Article 11.3 WFD):

a) Measures required to implement existing Community water legislation and other environmental legislation, set out in Article 10 and in Part a of Annex VI – detailed below:

(i) The Bathing Water Directive (76/160/EEC).

(ii) The Birds Directive (79/409/EEC).

(iii) The Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC).

(iv) The Major Accidents (Seveso) Directive (96/82/EC).

(v) The Environmental Impact Assessment Directive (85/337/EEC).

(vi) The Sewage Sludge Directive (86/278/EEC).

(vii) The Urban Waste Water Treatment Directive (91/271/EEC).

(viii) The Plant Protection Products Directive (91/414/EEC).

(ix) The Nitrates Directive (91/676/EEC).

(x) The Habitats Directive (92/43/EEC).

(xi) The Integrated Pollution Prevention Control Directive (96/61/EC).

b) measures deemed appropriate for the purposes of Article 9 (Recovery of costs for water services)

c) measures to promote an efficient and sustainable water use in order to avoid compromising the achievement of the objectives specified in Article 4; (Environmental objectives)

d) measures to meet the requirements of Article 7 (drinking water),, including measures to safeguard water quality in order to reduce the level of purification treatment required for the production of drinking water

e) controls over the abstraction of fresh surface water and groundwater, and impoundment of fresh surface water, including a register or registers of water abstractions and a requirement of prior authorization for abstraction and impoundment. These controls shall be periodically reviewed and, where necessary, updated. Member States can exempt from these controls, abstractions or impoundments which have no significant impact on water status,

f) **c**ontrols, including a requirement for prior authorization of artificial recharge or augmentation of groundwater bodies. The water used may be derived from any surface water or groundwater, provided that the use of the source does not compromise the achievement of the environmental objectives established for the source or the recharged or augmented body of groundwater. These controls shall be periodically reviewed and, where necessary, updated;

g) for point source discharges liable to cause pollution, a requirement for prior regulation, such as a prohibition on the entry of pollutants into water, or for prior authorization, or registration based on general binding rules, laying down emission controls for the pollutants concerned, including controls in accordance with Articles 10 and 16. These controls shall be periodically reviewed and, where necessary, updated;

h) for diffuse sources liable to cause pollution, measures to prevent or control the input of pollutants. Controls may take the form of a requirement for prior regulation, such as a prohibition on the entry of pollutants into water, prior authorization or registration based on general binding rules where such a requirement is not otherwise provided for under Community legislation. These controls shall be periodically reviewed and, where necessary, updated;;

i) for any other significant adverse impacts on the status of water identified under Article 5 and Annex II, in particular measures to ensure that the hydromorphological conditions of the bodies of water are consistent with the achievement of the required ecological status or good ecological potential for bodies of water designated as artificial or heavily modified. Controls for this purpose may take the form of a requirement for prior authorization or registration based on general binding rules where such a requirement is not otherwise provided for under Community legislation. Such controls shall be periodically reviewed and, where necessary, updated;

j) a prohibition of direct discharges of pollutants into groundwater subject to the following provisions:

Member States may authorize reinjection into the same aquifer of water used for geothermal purposes.

They may also authorize, specifying the conditions for

- injection of water containing substances resulting from the operations for exploration and extraction of hydrocarbons or mining activities, and injection of water for technical reasons, into geological formations from which hydrocarbons or other substances have been extracted or into geological formations which for natural reasons are permanently unsuitable for other purposes. Such injections shall not contain substances other than those resulting from the above operations,
- reinjection of pumped groundwater from mines and quarries or associated with the construction or maintenance of civil engineering works,
- injection of natural gas or liquefied petroleum gas (LPG) for storage purposes into geological formations which for natural reasons are permanently unsuitable for other purposes,
- injection of carbon dioxide streams for storage purposes into geological formations which for natural reasons are permanently unsuitable for other purposes, provided that such injection is made in accordance with Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide or excluded from the scope of that Directive pursuant to its Article 2(2), or: Member States may authorize reinjection into the same aquifer of water used for geothermal purposes.
- injection of natural gas or liquefied petroleum gas (LPG) for storage purposes into other geological formations where there is an overriding need for security of gas supply, and where the injection is such as to prevent any present or future danger of deterioration in the quality of any receiving groundwater, construction, civil engineering and building works and similar activities on, or in the ground which come into contact with groundwater. For these purposes, Member States may determine that such activities are to be treated as having been authorized provided that they are conducted in accordance with general binding rules developed by the Member State in respect of such activities,
- discharges of small quantities of substances for scientific purposes for characterization, protection or remediation of water bodies limited to the amount strictly necessary for the purposes concerned

provided such discharges do not compromise the achievement of the environmental objectives established for that body of groundwater;

k) in accordance with action taken pursuant to Article 16, measures to eliminate pollution of surface waters by those substances specified in the list of priority substances agreed pursuant to Article 16(2) and to progressively reduce pollution by other substances which would otherwise prevent Member States from achieving the objectives for the bodies of surface waters as set out in Article 4;

l) any measures required to prevent significant losses of pollutants from technical installations, and to prevent and/or to reduce the impact of accidental pollution incidents for example as a result of floods, including through systems to detect or give warning of such events including, in the case of accidents which could not reasonably have been foreseen, all appropriate measures to reduce the risk to aquatic ecosystems.

13.1.2 Supplementary measures

Supplementary measures are those measures designed and implemented in addition to the basic measures where they are necessary to achieve the Environmental Objectives of the WFD. Supplementary measures in accordance with Part B of Annex VI of the Directive could be:

- legislative instruments
- administrative instruments
- economic or fiscal instruments
- negotiated environmental agreements
- emission controls
- codes of good practice
- recreation and restoration of wetlands areas
- abstraction controls
- demand management measures, inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought
- efficiency and reuse measures, inter alia, promotion of water-efficient technologies in industry and water-saving irrigation techniques
- construction projects
- desalination plants
- rehabilitation projects
- artificial recharge of aquifers
- educational projects
- research, development and demonstration projects
- other relevant measures

13.2 SUMMARY PROGRESS PROGRAM IMPLEMENTATION MEASURES 1st RBMP

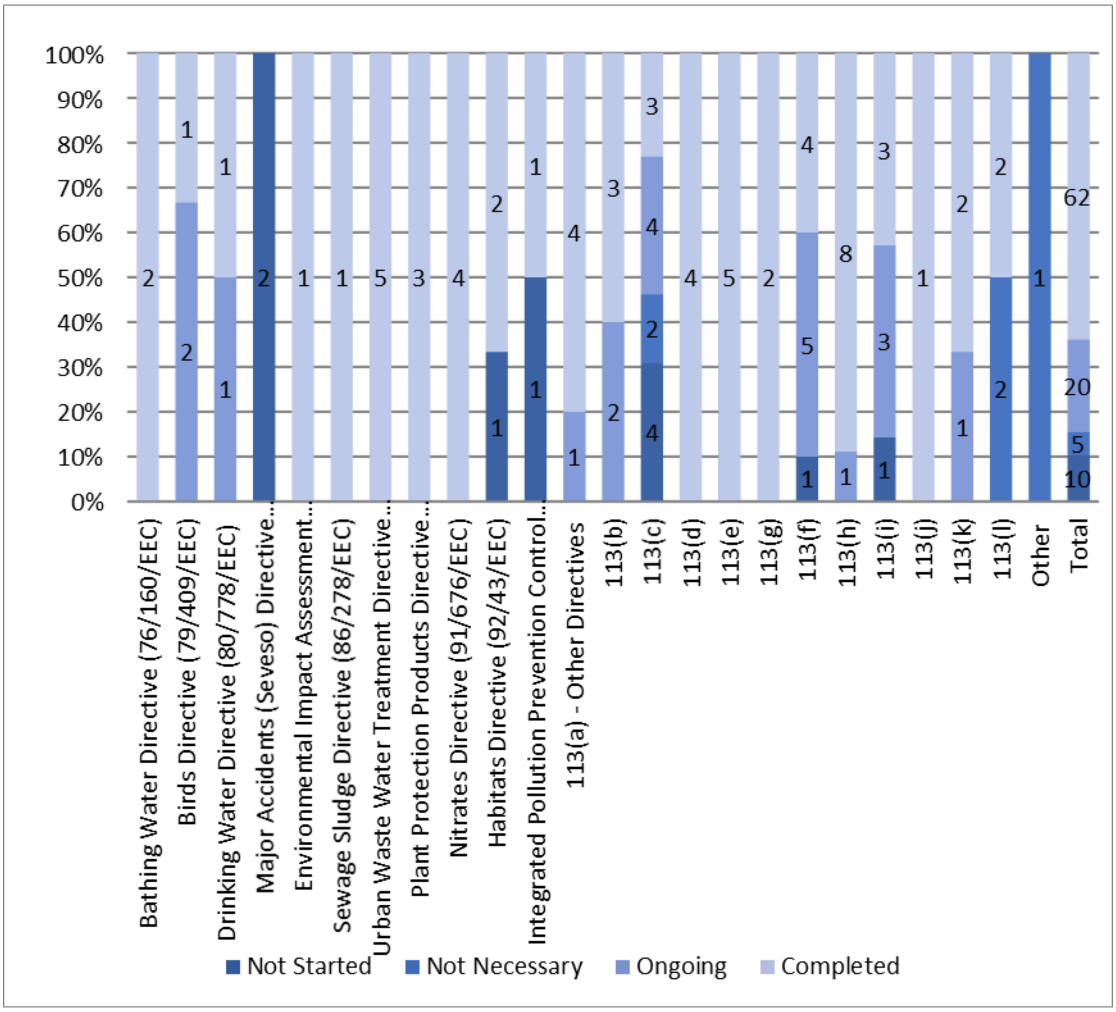
The Programme of Measures of the first RBMP included a total of 97 and 56 main Measures Complementary Measures, and budget 11.275.000 € 7.695.000 € respectively.

The funding of measures was mainly based on national resources which are relatively limited due to economic conditions traversed the country. A measure sponsored by the Swiss Federation (rehabilitation Vati)

Progress in the implementation of 97 key measures are summarized in the following table and Figure below shows the development of the implementation of measures for each paragraph of the Article 11.3 of the WFD in detail.

Table 13-91: Progress of the implementation of Key Measures

Implementation Progress	Number Measure	% of total number
Completed	62	64%
Ongoing	20	21%
Not started	10	10%
Considered as not necessary	5	5%



18 of the 20 ongoing measures are expected to be completed by the end of 2015 or no later than the first quarter of 2016 and the remainder 2 is planned to be completed whithin 2016.

The main cause that 10 measures have not started, is the restrictions to obtain the necessary financing. These measures are reviewed in this cycle for the necessity of implementation, based on new data obtained. These measures concern (see. Details in Appendix A):

- 2 measures of actions relating to the implementation of the Seveso Directive (96/82 / EK). (Measures A/A 9 and 10).
- 1 of the 3 basic measures planned for the Habitats Directive (92/43 / EEC). (Measure 27)
- 1 of the 2 measures foreseen regarding the Directive on integrated pollution prevention and control (96/61 / EC). (Measure 29)
- 4 of the 13 measures foreseen under Article 11.3c for promotion of water efficiency. (Measures 43, 47, 48, and 49)
- 1 of the 10 measures foreseen under Article 11.3f for point source discharges. (Measure 64)
- In one of the 7 measures planned under Article 11.3i on Negative Impact on Situation of Water. (Measure 84)

5 measures tha will not be implemented concern (See. Details in Appendix A):

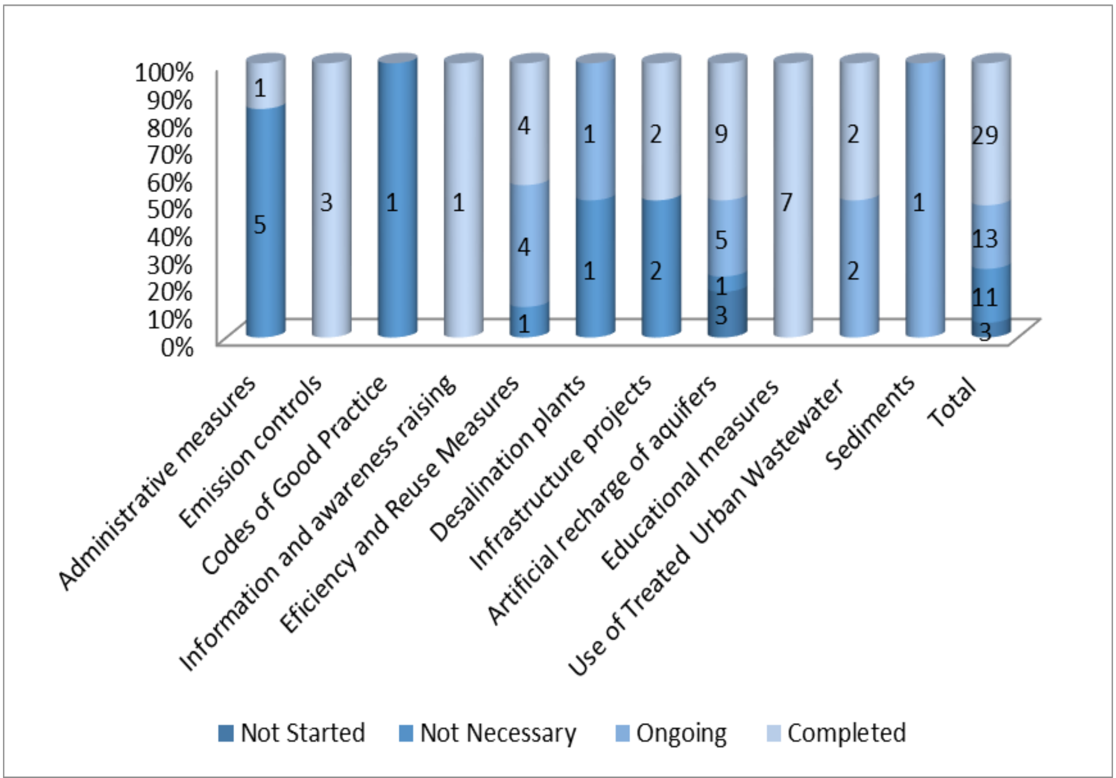
- 1 administrative measure, for which the relevant legislation has been prepared and discussed in the Parliement but withdrawn due to public reactions (Measure 41).
- 1 measure related to the strengthening of administrative structures responsible for monitoring and implementation of directives on the environment as this issue will be addressed at national level as part of the study on Restructuring of the Public Service (Measure 1).
- 3 measureds for which is considered that their implementation was obsolete. These measures include:
    - The implementation of a Study for the Strategic Assessment of exclusion zones for new golf courses apart from the already pre-approved by the Cabinet. (Measure 44), which is no longer necessary since all the golf courses have now been licensed and is not expected the limit of number of licenses to be provided for such developments will be increased.
    - Continuation of the hauling of the amount of asbestos that remains in the bottom of the port of Limassol. (Measure 96) which after detailed investigations was considered that is preferable not to move (less environmental damage).
    - Preparation of a study on the installation of an electronic fuel leak detection system in the sea area of the Larnaca oil terminal. (Measure 97). Given the recent developments after the preparation of the program of measures concerning the infrastructure energy of Cyprus (eg the planned construction of a large terminal in Vasilikos as well as the construction of many other oil and hydrocarbons facilities that are already being implemented or will be implemented in the area), it was considered that the measure is outdated at this

stage. On this basis and considering the financial difficulties of the Country it is decided not to proceed with the implementation of this measure in order to avoid unnecessary costs.

The implementation progress of the 56 sypplementary measures is summarized in the following table and in the figure below is shown in detail the implementation progress of each type of measures according to Article 11.4 of WFD.

Table 13-92: Progress of implementation of supplemantery measures

Progress status	Number of Measures	% of total number
Completed	29	52%
Ongoing	13	23%
Not started	3	5%
Considered as not necessary	11	20%



13 measures are ongoing and is expected to be completed by the end of 2015 or at the latest 1° semester 2016[8].

[8] Measure 120 on the Elaboration of final design and construction works for the dam Yermasogeia connection to the Southern Conveyor can be considered to be complete as it

3 measures have not started due to the restrictions to obtain the necessary financing. These measures are reviewed in this cycle for the necessity of implementation, based on new data obtained.

These measures concern:

– 1 of the 7 relating to technical and environmental investigation of the possibilities for building small river intakes for groundwater recharge (Measure 128).
– in 2 of the 9 measures concerning research, development and demonstration projects, including the following:
    - Special ad hoc monitoring program of water bodies with high uncertainty in their classification (Measure 147)
    - Implementation of a program investigating the river basins with uncertain sources of pollutants (Measure 148)

11 measures will not be implemented are related to:

– 5 Administrative measures whose feasibility is examined in a specific study carried out by the World Bank in which are discussed the extension of the Water Councils competences, and the possible attachment to them of Communities networks. So the implementations of the following related measures may no longer be appropriate.:
    - Establishment of single Water Board at District level. (Measure 98)
    - The administrative investigation of the terms and conditions for the establishment of a Water Board for Paphos District. (Measure 99)
    - Establishment of single Sewerage Board at District level. (Measure 100)
    - The administrative investigation of the terms and conditions for the establishment of a Water Board for the Ammochostos District. (Measure 101)
    - The administrative investigation of the terms and conditions for the establishment of a Water Board for the Ammochostos District. (Measure 102).
– Measure 107 concernig the Establishment of Code of Good Practice in Garyllis river basin for the elimination of the use of plant protection products, especially those which contain Trifluralin and Alachlor is not necessary as it was found that the presence of these substancesa are due to Vat and not to the use of plant protection products in the area.
– Measure 113 concerning the private and public swimming pools are a major consumer of water in Cyprus. and the appropriate fee for the pools that should be established due to significant reactions from stakeholders.
– Measure 118 concernig the payment of an environmental fee for licensing private desalination plants as the construction of such new units is not planned.

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has completed the preliminary study and until the finalization of the array of projects and their construction is appropriate management of water dam covering the main purposes of the measure.

- Measure 120 Preparation of the final design study and construction of projects for the connection of the Germasogeia Dam with the Southern Conveyor Project. The preliminary stady has been completedand and until the finalization of the lay out of the works and their construction the proper water management of the dam seems that covers the main objectives of the measure.
- Measure 123, Study and construction works necessary for restoring recycled water pipeline in the region of Timi which considered obsolete. The open channelis operating for 35 years. The cost of the coverage works is a deterrent and not a priority of WDD
- Measure 127 Update of the existing three dimensional model of groundwater drainage in the area of Kiti through the simulation of quality and movement of ground water for the development and evaluation of alternative scenarios of recharge. The design of artificial recharge in the area was abandoned after the adoption of the results of a present study on the disposal of recycled water in Kiti.

13.3 EXPERIENCE AND RESULTS FROM THE IMPLEMENTATION OF THE PROGRAMME OF MEASURES 1st RBMP

The formulation and the implementation of the Programme of Measures of the 1st Cycle Management was the basis for the creation of an appropriate structure for the cooperation of the public services and citizens not oon issues related to water management. but also in other sectors related directly or indirectly to the waters. Furthermore, this procces gave oport;unity for the adoption of the appropriate legislation and tools and for the creation if the basic structures through which in future will be possible to formulatie specific actions for the water protection. The following examples are given indicatively:

- It has established the framework for the cooperation and exchange of information between authorities related directly or indirectly to the water, eg (a) Water Development Department as the main governamental body responsible for water management in Cyprus and the Department of Environment which is the resposmable for permitig Waste Disposal, Department of agriculture, CAPO and Geological Survay Departement I on issues relating to agriculture and livestock, (b) Fisheries and marine Research Department responsible for the marine environment, and General State Chemical Laboratory and Quality Control Service water of the Department on matters relating Control and Water Quality Control Division of WDD, (c) Hydrology and Hydrogeology Devision of Geological Survey Department on issues relating to the mechanisms of the operation of the aquifers.
- During the implementation the 1st management cycle are dentified the main issues here it is necessary the systematization of information on water uses and the first steps were

made to this direction with the establishment of the register of small point abstractions from surface waters, and the register of the groundwater abstraction boreholes.

- The opportunity to improve knowledge on the state of water and the pressure was given and the adoption of more targeted measures is now possible.
- The structures of monitoring of water status and the related databases were systematized, improving the accessibility to the relevant information which is now available to facilitate decision making process.
- Specific issues were identified which due to lack of structured information they not properly addressed such as morphological alterations of river water bodies.

Due to the nature of the measures which in their majority were administrative or investigative measures in order to improve knowledge on certain issues, the positive effects on the immediate improvement of the situation of SWBs and GWBs are limited.

During the implementation of the programme of measures also are highlighted a number of issues which should be reviewed or should be concretised. for the preparation of the second cycle programme of measures. These issues relate to the following:

- The planning and preparation of a program should be based both on the real economic potential of the country and the availability of tools and resources of the involved stakeholders. This will prevent the phenomenon of non-implementation of measures due to lack of financial resources observed during the first cycle. It should be noted that the implementation of the first cycle coincided with unforeseen economic developments affected the whole country and resulted in drastic reduction of available financial resources.
- Measures should be particularly targeted at strategic pressures and targets, in order to increase their effectiveness. With the knowledge gained from the implementation of the first cycle measures that it will be possible to achieve in 2nd cycle. Thus, the results on improving the status of WBs are expected to be positive.

13.4 PROGRAMME OF BASIC AND SUPPLEMENTARY MEASURES IN RBD CYPRUS

The program of measures configuration was based on the following

- The requirements arising from the implementation of Directive 2000/60 / EC and also the requirements specific to the program of measures outlined in Section 13.1 and detailed in the Programme of Measures is available on the website of the WDD.
- The progress of the 1ST Water Management Plan and the experience gained during this period are summarized in Chapters 13.2 and 13.3.
- The status of surface and groundwater as classified on the basis of the results of the monitoring of the adoption of the first RBMP to date and is presented in Chapter 10.

- The environmental objectives set for the 2nd RBMP for aqueous systems and the specific objectives for protected areas presented in Chapter 12.
- The significant pressures on waters such as those identified during the preparation of the 2nd Management Plan and are summarized in section in chapter 8.
- The actions implemented to date to address these pressures are summarized below in section 13.4.1.
- The available financial tools and resources that can be drawn from them for water management and implementation of specific actions.
- The overall adaptation policy to climate change and integration activities for this purpose.
- The general policies of Cyprus in relation to environmental protection and the actions carried out in this context.
- Assess the measures in their performance.

The final program of measures modeled after the results of the consultation but the completion of the SEA process.

The following chapters include:

- Summary information on actions that have been implemented to date to address the major pressures on the waters of Cyprus. also gives information on the implementation of key Directives included in basic measures of Article 11.3.A of the WFD.
- Measures of the 1st Management Plan, relating to actions and measures consecutive and therefore already included in the activities of the competent bodies and implemented in this context. The continuation of such actions considered necessary to achieve the objectives of the Directive and are therefore included in the program of measures.
- Charts summarizing the key measures of Article 11.3.A of the WFD concerning practical implementation of Community legislation.
- Charts summarizing the key measures of Article 11.3.v - l).
- Charts summarizing the supplementary measures..
- Summary of the estimated cost of implementing measures

Detailed program of measures presented in the report of the Draft Programme of Measures Management Cyprus River Basin which is available on the website of the WDD.

13.4.1 Presentation of the main actions to address the significant pressures on water

Mentioned actions and the actions that have been implemented to date in relation to addressing the significant pressures on the waters of Cyprus as resulting from data in

Chapter 8. also given information on the implementation of key Directives contained in the key measures Article 11.3.A of the WFD.

13.4.1.1 Hydromorphological Alterations

Hydromorphological alterations consist a significant pressure on river water bodies of Cyprus. The majority of these alterations derive from infrastructure facilities that are important to society and economy of Cyprus. They are related mainly to water supply works for drinking water and irrigation. Pressures in morphological characteristics of water bodies also derived from urbanization and/or from the development of basic infrastructure works (roads, ports, coastal protection projects, etc.).

To date the Water Development Department and the Department of Lands and Surveys have registered all these pressures and a regulation and licensing framework has been established for activities potential to lead to such type of alterations. More specifically:

– Water Development Department has created a register of all dams / and weirs in Cyprus and their impacts on river water bodies have been evaluated. Water bodies with significant hydromorphological pressures from infrastructure works that serve important water uses have designated as heavily modified and for them the implementation of special mitigation measures is planned.
– A specific regulatory framework for the authorization and approval of new developments adjacent to rivers has been established taking into account both the provisions of the WFD and the provisions of Directive 2007/60/EC on the management of flood risks. Detailed information on these provisions is available on WDD's website.
– Public and private projects and activities with significant impacts on the environment including on the morphological status of the water bodies are subject to environmental licensing in accordance with the Law on Assessment of Environmental Impact of Certain Projects N. 140 (I) / 2005). More information about licensing criteria and requirements is available on the website of the Department of Environment.

Additionally during the preparation of the 2nd River Basin Management Plan, WDD have reviewed the water needs of rivers and important ecosystems or protected species downstream dams / weirs in order to establish an appropriate hydrological regime for the protection of important ecological features supported by water.

13.4.1.2 Urban wastewater

Urban wastewater management is governed by the EU directive on urban waste water (Directive 91/271). The harmonization of Cyprus legislation with the directive was made by the Control of Pollution of Water and Land Laws of 2002 to 2013 (106 (I)/2002 - Basic Law) and the Law on Sewerage (Amendment Law No 108(I)/2004).

Today in Cyprus, 17 urban wastewater treatment plants operate with maximum capacity of 1.141.350 ep, covering 57 agglomerations. Furthermore the following key projects for sewerage networks are in development:

– Sewerage System of Athienou Cluster
– Sewerage System of Kokkinochoria Cluster
– Sewerage System of the Solea Cluster
– Sewerage of Astromeritis - Peristerona - Akaki Cluster

These projects are financed by the Cohesion Fund with a total budget of about €139 million.

Additionally, the construction of the treatment plant of domestic sewage, industrial waste, liquid sludge leachates at Vati area is under construction in the framework of the Cooperation Program between the Swiss and the Republic of Cyprus, funded by the Swiss Federation with the amount of 3,55 mil. €.

According to the revised implementation plan of the Directive for the next period 2016-2021 the construction / upgrading of sewerage networks and treatment plants is planned to increase processing capacity by 312.150 ep with estimated total budget of about €480 million. Upon completion of this program, Nationwide will operate twenty-three (23) urban wastewater treatment plants.

Finally within the framework of the Directive, implementation compliance controls of existing facilities are carried out. The relevant reports as well as additional information on these controls are available on WDD's website.

13.4.1.3 Waste Disposal Sites

The management of solid waste in Cyprus is governed by the Law on Waste N.185 (I) / 2011. In Cyprus currently operate:

– The Integrated Waste Management Facility (OEDA - domestic solid waste) of Larnaka / Amochostos
– The Landfill of Pafos

These facilities have wastewater treatment plants for wastewaters resulting from their operation and waste deposit sites are properly sealed in order to protect waters from the leachates.

Unmonitored waste disposal site in Cyprus are no longer in operation with exemption of Nicosia and Limassol Unmonitored Waste Disposal Site in Vati area. Since 2003, 119 Unmonitored Waste Disposal Site are closed down gradually. For these sites the Department of Solid Waste Management of the Ministry of Interior has prepared a gradually rehabilitation program based on the results of appropriate studies. Information on these studies and the progress of the Unmonitored Waste Disposal Sites rehabilitation works is given on the website of the Department of Solid Waste Management.

13.4.1.4 Agricultural and Farming activities

Agricultural activities are the most important pressure of the waters in Cyprus. Pressures on water quality are resulted from both the fertilization of crops and the livestock. Pressures on the quantitative characteristics of the water as well as the planned measures to tackle them are mentioned in the following chapters.

In recent years major efforts have been taken to promote more rational use of fertilizers and best management practices of the wastes from livestock facilities. In this context:

– Six Nitrates Vulnerable Zones have designated under Directive 91/676 / EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources with a total area of 460 Km^2 (see. Details below in chapter 6.8).
– A new action plan has been drawn up for the Nitrate vulnerable Zones whose implementation is obligatory (Decree of 2014).
– Since 2007 a Code of Good Agricultural Practice has been published which includes water resource protection practices.
– In the framework Rural Development Program 2007-2013 a significant number of actions related to the protection of water has implemented which concerns the following indicative activities:
    - 38.120 ha have been included in agri-environmental aid schemes of which 18,100 ha aiming to improve and protect water,
    - 27,9 ha area has been afforested reinforcing tackling to climate change,
    - 3,000 farms received aid for their modernization,
    - 315 people participated in special training sessions for crops and livestock issues and organic farming issues,
    - 80 farmers make use of specialized consulting services in the framework of a specific measure of the Rural Development Program.
– Control of pollution from livestock holdings:
    - through legislation provisions for assessing the environmental impact of certain projects, according to which in order to issue a permission for the construction of a new plant or for significant extensions of an existing livestock farm, piggery, poultry, is required to submit an Environmental Impact Assessment Study,
    - Through the provisions of the Pollution Control Law of Water and Soil under which the operation of any establishment causing or likely to cause pollution in water or soils is prohibited, unless the operator of the facility have a Waste Disposal Permit.
– Waste Disposal Permits set mandatory conditions for the use of manure wastes as fertilizer on crops. Thus, due to the increased cost of fertilizers it appears that most of the livestock wastes are now used as fertilizer. In several cases, the operator can choose to use of livestock wastes as soil improvement or their disposal for processing at anaerobic plants for biogas and energy production.

Despite the great progress that has been made with the above legislative and voluntary arrangements, further strengthening and enhancement of the actions implemented today is needed, as well as the extension of actions concerning information and education of the farmers about available tools for the rational use of water.

13.4.1.5 Abstractions / diversions from surface waters

Abstractions and diversions from surface waters practically resulting in hydromorphological alterations for which a detailed presentation is given in Chapter 6.1. This chapter refers to measures and interventions related basically to the improvement of the efficient use of water for irrigation and drinking water supply which result significant pressures on water and to the potential reduction of abstractions from surface waters.

Water resources in Cyprus are extremely limited, mainly because of the climate (limited rainfall and high temperatures). Thus, much of the water bodies have intermittent flow while most groundwater bodies are in poor quantitative status due to over abstractions.

To address the drinking water (which also has great importance for tourism) and irrigation needs, Cyprus has implemented an ambitious program for construction of 108 dams and weirs and, in recent years, for construction of desalination plants and water recycling facilities (after tertiary treatment) respectively.

Water resources of Cyprus is marginally adequate for drinking water supply and practically insufficient for irrigation. The effects from the reduction of drinking water are obvious and important and affect not only the population of the island, but also the tourism, which contributes significantly to the GDP of the country.

For irrigation is used in greate degree recycled water from 8 Urban Wastewater Treatment Plants with a total capacity of 156.700 m^3 / day. In terms of quantities, the total water demand for irrigation in Cyprus has been estimated in recent studies at 150 million. m^3. About 40% of this amount is used for citrus trees and other fruit trees, 10% for potatoes, 14% for vegetables and 13% for forage corps. The application of deficit irrigation affects the production at technical level and results impacts at economic and macroeconomic level, as well as on trade at strategic level.

- Cyprus is a country where the income of farmers has fallen sharply throughout the period 2000-2012 (about 30%).
- The main irrigated crops (citrus trees, potatoes and vegetables) are the crops with the greater participation in national income and the trade balance of the country. The application of deficit irrigation affects mainly these specific products and thus affects both the already reduced farm income and national income.
- At least, this situation overturns completely the 3rd pillar of the CAP, which requires that agriculture remains a major economic and social driving force in rural areas and an important factor in maintaining a "live" countryside.

In this context many actions have implemented for rational use of water. Already in the first Management Plan had been proposed specific measures for the efficient use of water, such as:

- Reduce leakages in urban areas and agglomerations at 18% and 22% respectively by the year 2015 - Drafting relative reports.
- Draw up a management plan (masterplan) for the external pipelines of the water supply system.
- Implementation of recycled water utilization projects promoted by the WDD which are in design stage or under construction in aim to enhance the water balance with recycled water.
- Implementation of a pricing policy in accordance with the provisions of the Contract 86/2007 and taking into account the results of the consultation of the Management Plan (special provisions for large families, provisions for uniform pricing to various communities in order to avoid distortions and special provisions for water consuming sectors of manufacturing industries that cannot use recycled water).
- Provision for establishing Quota in the pricing policies to be implemented.
- Establishment of a central mechanism for the collection and recovery of environmental and resource costs (Water Fund). This Fund should finance activities for the protection of biodiversity.
- Registration and further evaluation of the data concerning the water quantity and costs in areas that do not served by governmental water works, (Municipalities, Communities, Irrigation Departments / Associations etc.).
- Formulation of a detailed water balance for all water categories based on a supply - consumption model.
- Crop restructuring study.

Additionally WDD has initiated the dissemination of simple practices for water-saving for households and farmers issuing specific targeted brochures in different languages, to cover a wide range of visitors to the island. WDD has also developed special training materials for pupils in aim to aware them for this issue. This material is available on WDD's website.

As already mentioned a register of dams and weirs has been established by WDD and their impacts on river water bodies have been assessed. Water bodies with significant hydromorphological pressures from infrastructure facilities that serve significant water uses are identified as heavily modified and for them the implementation of specific mitigation measures is planned.

In order to tackle pressures on surface water bodies from abstractions, a roadmap is established with aim to improve management practices. The key points of this road map are presented in the following chapter.

Roadmap for quantitative management of surface waters

In Cyprus, the available quantities of surface waters are not sufficient to cover drinking water and irrigation needs, despite the development of a large number of dams, the expanding use of recycled water for irrigation and the construction of desalination units in order to supply drinking water especially during drought periods.

In order to improve the management of surface water is required the following:

- Register of the abstracted quantities from surface waters for drinking water supply and irrigation, including abstractions from shallow wells in the wider bed (already ongoing action)
- Study alternative water saving practices for drinking water supply and (especially) irrigation, additionally to these already implemented, such as:
    - Pricing (ongoing)
    - Reduction of irrigation water transfer losses, concerning repairs / replacement of old pipelines[9] (planned for the next management cycle)
    - Crops restructuring specified at local level after appropriate studies. For this purpose sub measure 10.1.5 of measure 10 of the RDP 2014-20 is applied[10]
    - Improvement of existing irrigation schemes For this purpose sub measure 4.1 of Measure 4 of the RDP 2014-20 is applied[11]
    - Increase use of desalination units planning extensions and possibly construction new plants
    - Increase use of recycled water for irrigation, which involves, in addition to tertiary wastewater treatment plants (which have been implemented for all WWTP) the construction of water storage works foreseen in the sub measure 4.3.2, Action A measure 4 of the RDP 2014-20[12].
- Development of a Quantity Management Plan. The preparation requires:
    - Schematization of the water supply and transfer infrastructure (dams, desalination plants, WWTPs producing recycled water, irrigation areas, agglomerations etc.)
    - Update of the current and future water needs for drinking water, irrigation and required environmental flows
    - Update of the hydrological study for the definition of hydrologic regimes for mean hydrological years, drought years (three alert stages) and representative years.

[9] Also the substitution of open canals with pipelines (limited application in Cyprus since pipes are used mostly for water transfer).

[10] Sub measure 10.1.5 measure 10: Reducing irrigation requirements at aquifer level. Replacement / restructuring water consuming crops

[11] Sub measure 4.1 Measure 4: Investment in agricultural holdings (Improvement Plans. Livestock waste management investments Investments in infrastructure

[12] Measure 4: Investment in governmental infrastructure. Action A: WDD (recycled water) primary, secondary treatment and reservoirs connection of new farms with own expenses

  - Water balance estimation at monthly or bimonthly step for each water supply scheme e.g. South Pipeline, Paphos Works etc. in aim to assess alternative management practices.

- Policy for the water management and for the possible abstracted quantities for drinking water supply or irrigation will be determined in the above mentioned Surface Water Quantity Plan, after examination of alternative scenarios considering population (for drinking water), irrigated areas and type of crops (for irrigation) and the availability of water resources. These quantities should be reasonable, taking into account the overall needs of the agricultural holdings (including e.g. frost protection needs of potato crops) and practicable to apply. Determining the irrigation needs and the permitted quantities abstracted should consider the following issues:
  - Each water supply point may be used from more than one farmers, and
  - On the same field the crop rotation year after year (rotation) especially for non-permanent crops (e.g. trees), may involve switching from water consuming corps to dry cultivation (from potato to vetch or barley).

13.4.1.6 Abstractions from groundwaters

Water has always been a resource in shortage in Cyprus. During the Frankish period (1192-1571 AD) rainwater was stored and wells were used to abstract water. These practices continued during the Ottoman Empire (1571-1878 AD). Systematic management of water resources began during the British colonial rule (1878-1960), concerning drinking water supply and irrigation. The period until the early 20th century characterized by failed attempts to exploit surface water and groundwater resources. Then began an intensive use of groundwater's which continued during the first five decades of the 20th century, resulting in overexploitation of groundwater resources which lead to depletion of the water level and to gradual salination of groundwater in coastal areas. After 60s the Republic of Cyprus systematically proceeded to design and construction of dams such as Pomos dams, Ayia Marina, Argaka, Lefkara, Yermasogeia, Polemidia and Mavrokolympos After 1974 the construction of major projects began, such as Paphos Irrigation Scheme, Chrysochou Irrigation Scheme, Vasilikos-Pentaschoinos Project, Pitsilia Rural Development Scheme and finally the Southern Pipeline Droject in order to meet water needs.

This effort includes the WDD projects (national projects and projects related to the implementation of Water Framework Directive) for systematic monitoring of the qualitative and quantitative status of groundwater and conducting research and other studies in order to increase knowledge about the status of groundwater. It also includes the switch to new technologies and sources of water in order to alleviate the pressure on groundwater from abstractions. These efforts refers indicatively to the following:

- The systematic monitoring program implemented by WDD for the status of groundwater and also the research projects in order to increase knowledge of the mechanisms governing the functioning of groundwater systems made by the Geological Survey Department.

- The existing and planned projects of WDD for enrichment of groundwater aimed at their quantitative recovery.
- The effort to find other water supply sources and their promotion with specific administrative and institutional arrangements (such as the use of recycled water for irrigation).

Moreover, the application of the provisions of the Water Framework Directive and the implementation of the first River Basin Management Plan in Cyprus made possible to identify areas need strengthening of the registering and management of the information on water abstractions. Thus:

- The register of all abstraction points from groundwater has begun and the first Register of Groundwater Abstractions has established.
- The new drilling licensing system has established and rationalized.
- A special website for information of the public on the state of groundwaters and the monitoring results was created and is available on WDD's website.

During the 1st RBMP of Cyprus measures related to efficient water use, to incentives for conservation and rational water management, and to development of infrastructure and projects in aim to improve the quantitative status of groundwater are implemented.

The results of these measures as well as the results of other activities implemented in aim to improve groundwater status can't be evident in such a short time due to the long response time of groundwater bodies to any interventions. The campaign undertaken in recent years to protect and reduce groundwater pressures should continue and in some sectors should be intensified.

In this context in order to tackle the pressures on groundwater bodies a roadmap is established in aim to progressively reduce abstractions from agriculture activities. This Road Map includes all the necessary actions for this purpose. Part of these actions is included in the program of measures of this Management Cycle. The remaining actions will gradually be included in the activities of the competent authorities according to their available resources. The key points of this road map are presented in the following paragraph.

Roadmap for the gradual reduction of repetitions for irrigation from groundwater

Abstractions from groundwater are exceed the annual renewable quantity, resulting in the depletion of the groundwater level. For the restoration of the aquifers affected in aim to be able to act as strategic water reserves, will require a reduction of the abstracted quantities to levels less than the renewable quantities for a few decades.

The control of the abstractions requires:

1. the identification of the locations and the quantities abstracted,
2. the determination of the quantities available for abstraction annually by each GWB, and

3. the establishment and implementation of all practicable practices for water saving.

Regarding the locations of the abstractions the Governmental abstraction points are known and controlled. As it concerns the private abstractions the situation is the following:

1. All private abstraction points have been registered (around 100,000 applications), undeclared abstraction points can be sealed if identified (according to law),
2. The establishment of an electronic data base is pending and the validation of the information registered. A measure for a special contract for this purpose has been included in the program of measures (due to lack of available human resources)
3. The abstraction should be equipped with a water metering system which is checked on site controls.

The annual quantities that can be abstracted from any private abstraction point are established through the permitting process, taking into consideration the irrigated area and the corps which should be included in the above mentioned database. These quantities should reasonable and practicable considering the overall needs of the holdings (including e.g. frost protection needs of potato crops). Issues in determining the approved quantities abstraction quantities may be:

– the use of multiple abstraction point from farmers for irrigation of different fields (or holdings)
– the use of one borehole from more than one farmers and
– The crop rotation on the same field year after year especially of non-permanent crops, which may involve switching from water consuming cultivations to dry (from potatoes to vetch or barley).

Recognizing the complexity of the issue, these the above mentioned information should be included in this database, in to reflect the real situation.

To determine the annual permitted abstraction quantities from aquifers specific hydrogeological studies should be carried out which will include documented estimates of renewable rates. For this purpose the program of measures includes a measure concerning the implementation of a pilot study "Design of the rational utilization and protection of the Groundwater Body CY -19 Troodos through the preparation of a complete and comprehensive hydrogeological study, comprising an analysis of the natural recharge of the groundwater body and water uses and analysis of the groundwater balance ".

To achieve the balance of abstractions with the annual allowable water abstractions, measures concerning the reduction of consumed quantities should be examined. These may be:

1. Reduction of irrigation water transfer losses, concerning repairs / replacement of old pipelines (planned for the next management cycle)
2. Crops restructuring specified at local level after appropriate studies. For this purpose sub measure 10.1.5 of measure 10 of the RDP 2014-20 is applied

3. Improvement of existing irrigation schemes For this purpose sub measure 4.1 of Measure 4 of the RDP 2014-20 is applied
4. Increase use of desalination units planning extensions and possibly construction new plants
5. increase use of recycled water for irrigation, which involves, in addition to tertiary wastewater treatment plants (which have been implemented for all WWTP) the construction of water storage works foreseen in the sub measure 4.3.2, Action A measure 4 of the RDP 2014-20 .

The implementation of the above mentioned measures a special mechanism of incentives and control is need to be implemented:

(A) This mechanism may include

- the declaration of the abstraction points in the farmers applications,
- the establishment of allowable abstracted quantities in cross compliance obligations by creating a grid of specific obligations associated with the agricultural payment aids,
- The obligation to the owner to declare the overall quantities abstracted yearly from each borehole.

(B) Incentives may concern pricing e.g. favorable pricing of reasonable abstracted quantities and higher prices for quantities above reasonable in aim to water saving.

(C) The control mechanism may include sampling controls of quantities actually pumped and controls as response to complaints WDD is already working with the CAPO in aim to control abstraction boreholes (> 5.000 m3 / year). The control mechanism can be efficient with the integration of the controls carried out by other authorities (such as WDD) to the controls on cross-compliance (for this is required a special administrative act to be issued).

13.4.1.7 Extractive activities

Cyprus has a long mining history connected with the history and culture of the island. The production of copper from sulphide deposits dating from the Bronze Age (3900-2500 BC), and by the end of the Roman Period Cyprus remained the main copper producer in the known world. The exploitation of copper historically played a key role in the economy and culture of Cyprus. Cyprus became one of the first centers of intensive exploitation of copper in antiquity, while the Latin name of copper (cuprum) comes from the name of the island (originally aescuprium- Cypriot copper and later cuprum). The long, continuous and intense mining activity in Cyprus is evident from the presence of slag (remnants of ancient mines) that is scattered throughout the island.

As part of the implementation of Directive 2006/21 / EC "on the management of mining waste" and on Management of Waste Extractive Industry Act of 2009 (82 (I) / 2009), the Department of Environment carried out the register and the assessment of existing and closed / abandoned extractive waste facilities (ESA). As a result of this activites have registered

– 159 Active Quarries,
– 50 Closed Quarries,
– 1 Active Mine,
– 32 Closed Mines 14 Mining Leases and
– 2 Cement Quarries.

In recent years radical institutional arrangements designed to protect environment from these activities. Indicatively, some of the conditions set out for the installation and operation of mining and quarrying activities are the following:

– In granting planning permission is required the submission and approval by the Competent Environmental Authority, Impact Assessment Study on Environment.
– Every five years prepared Environmental Management Study for each installation. This study is an integral term of the license and covers the management of mining waste.
– The licensee must take all appropriate environmental protection measures.
– The Mines Service may terminate any of the licensed activity which is not in accordance with the above conditions.
– Following the termination of the activity should the area be restored in accordance with the Environmental Management Study and the Mines Service instructions. For ensuring compliance with the terms and conditions of the permit Mining Service retains such bank guarantees of the restoration costs.

This applies to new plants, but now with the monitoring of water status implemented under Article 8 of the WFD in river monitoring points located downstream of abandoned mines systematically detected high concentrations of metals. This suggests the need for specific rehabilitation interventions. Detailed information on these is available on the Mines Service website.

In this context, priority was given to the restoration of the mine Asbestos which was considered to be the most urgent case of abandoned mine rehabilitation. For other mines out limited works such as fencing excavation, channeling rainwater in directions to limit the effects of acidic drainage and limited pannus of the sites, which in most cases is not successful because the acidic environment. In recent years conducted a pilot program to chloasma Agrokipia mine, from which we draw conclusions for chloasma other mines.

The Mines Service publishes each year an annual report containing information related to the ongoing implementation of legislation and the development of rehabilitation projects implemented. These reports are available on the Mines Service website.

Also, during the implementation of Directive 2006/21 / EC of the Mining Waste Facilities evaluated and categorized based on certain risk criteria. The entire plant mentioned above were evaluated as follows:

– Of the 159 active quarries mining, 24 of these are said to have 28 active mining waste facilities. Three (3) mining waste facilities have been classified as Category A because of the risk that in case of structural failure.

– Of the closed / abandoned extractive waste facilities quarrying only one (classified as Category A because of the risk in the event of structural failure to cause serious effects on human health.

Regarding mining activities:

– All three mining waste facilities in active mine the Hellenic Copper Mines Ltd in Skouriotissa classified as Category A because of the quality of the waste composition.
– Of the 38 closed / abandoned extractive waste facilities 34 are classified as Category A because of their quality recommendation with respect to the acidic runoff from rain that potentially can affect the quality of water and soil.

For closed SEN was risk assessment, classification and prioritization in order to indicate which ones need immediate restoration and remodeling. On the basis of this assessment devised rehabilitation program.

13.4.1.8 Actions for the protection of protected areas

A. Locations for pumping water for human consumption

From 1st Water Management Plan Cyprus designated areas for abstraction of water for human consumption and have implemented specific measures for their protection. specifically:

– but their publication pending For inland reservoirs used for drinking water has completed the establishment of protection zones by the Department. In this context for the 11 river dams that provide water for human consumption and two reservoirs intended to provide water for human consumption are set four protected areas within which defined management measures to ensure the protection of water. Specifically defined as follows:
  - Direct Protection Area (AZP) which provides protection in the immediate vicinity of the plant and equipment hydrant barrier against malicious or accidental damage and / or soiling.
  - Close Protection Zone (KZP) protect possible immediate pollution of the reservoir water and the base of which is determined safe distance from human activities and developments which are the main pollution pressure on the reservoir. The zone consists of the area immediately upstream of the dam and the river beds and embankments of rivers whose contribution to flow to the reservoir is important. The width of the band increases with the slope in the region.
  - Greater Protection Area (SPA), which enhances the protection area. Protects water reservoir pressures and significant sources of pollution in the wider catchment area of the dam.
  - Riparian Area Protection (PZP), which aims to protect riparian vegetation and fauna and provide protection to all streams that contribute to the inflow of the

reservoir from direct pollution that could be caused by human activities within the riparian zone. It consists of a 5-meter-wide corridor on either bank of river.

Detailed information on the criteria, the process of defining these zones, as well as the suggested settings are provided on the website of the Department.

– for zoning Protection boreholes providing water for human consumption follow the procedure below:

  - The Geological Survey Department is preparing a file for each drilling all hydrogeological characteristics.
  - The Water Development Department defines Zones Protection sent from the Department of Environment. Defining Zones follow a procedure for consultation with the concerned departments and services (District Administration, Planning, Environment, Geological Survey Department).
  - The Department of Environment is preparing the notification and submit it for approval and signature of the Minister of Agriculture, Rural Development and Environment, and then publish the Notification in the Official Gazette.

Zones Protection wells used by the Department of Planning and Housing and the District Administration for the proper siting and licensing of various developments within these zones.

For each drilling out the following Protection Zones:

- Zone I or Zone Instant Protection. The Zone is a radius of 10-50 meters, depending on the characteristics of the aquifer and should be fenced. Zone forbidden any human activity, except for water supply works by drilling. Moreover, traffic and pedestrian crossing prohibited.
- Zone II or Controlled Zone. The band specified by the band limit of direct protection to a line from which the groundwater will need at least 50 days (usually within less than 100 meters) to reach the point of drilling. Its purpose is to protect groundwater from a microbiological point of view. Zone that the following activities are prohibited, such as: Development of livestock farming, farms, use of manure, the use of pesticides, herbicides, pesticides and fertilizers unless it is in accordance with the Code of Good Agricultural Practice The Industrial activity produces hazardous waste, refinery operation, units waste treatment, waste management, trash, disposal of treated wastewater and sewage in absorption pits, the establishment of service stations, cemeteries, camping sites, sports grounds, hospitals and sanatoria, and the development of quarrying and mining activity and borehole drilling for other purposes, removal materials, creating cavities.
- Zone III or Outdoor Area. The Outer Zone is the feed zone of the wells and is quite extensive (can cover a radius of 2 km.). The aim is to protect the source of chemical pollutants mainly origin. Zone is prohibited any industrial, agricultural or livestock activity poses pollution risks from waste or substances used and

contained in Tables in the Order. Also, placing of these substances on the ground. Implementation of Agricultural Practice Code is mandatory.

List of boreholes for which these zones are available on the website of the Environment Department established.

B. Water bodies designated as recreational waters

Concerns minutes in bathing waters monitored on an annual basis during the bathing season, in accordance with the provisions of Directive 2006/7 / EC "concerning the management of bathing water and repealing Council Directive 76/160 / EEC." For these areas monitored enterococci - Intestinal enterococci and Escherichia coli. These parameters are used for monitoring and evaluating the quality of bathing waters and for classifying these waters depending on their quality. Monitoring results made public by the Department of Environment and is available on the Department's website.

C. Areas sensitive to the presence of nutrients

It regards the areas designated as Nitrate Vulnerable Zones agricultural origin under the provisions of Directive 91/676 / EEC and areas designated as Sensitive Areas in accordance with the provisions of Directive 91/271 / EEC.

For these areas:

- For the Vulnerable Zones apply the provisions of the relevant Directive and issued (2014) the revised Action Plan provided for therein.
- To control the implementation of the Action Plan and ensuring compliance by producers, inspectors determined in each province in order to conduct spot checks. Specifically, they appointed fourteen Control Inspectors from the Department of Agriculture, where the four from the headquarters of the Department, while the other ten of the district offices.
- Relevant provisions for subsidies and compensation producers in these areas have been included in the Rural Development Programme.
- Also under the action program implemented the following:
    - Strengthening of information / education / awareness program.
    - Imposition of administrative penalties on farms that do not comply with the Waste Disposal License.
    - Analyses of land from the Department of Agriculture to formulate appropriate rational use livestock waste directives on farms.
    - Promote projects / facilities for rational management of livestock waste (treatment plants) in livestock areas sited within ENZ.
- After reassessment that was recently decided to stay the two water bodies in the list of sensitive areas for the next four years. Accordance with the regulations of the Water Pollution Control (Sensitive Areas for Disposal of Urban Wastewater) Order 2013, the area called "dam Polemidia" declared as a sensitive area for the purposes of the discharge of urban wastewater. The area called "part of the sub-basin of the river Garyllis

lagoons Vati until lock Polemidia" declared as catchment sensitive area for the purposes of the discharge of urban wastewater.

D. Natura 2000 areas under the Nature Directives (92/43 / EEC and 2009/147 / EC) to protect habitats and species

For these areas, apply the provisions of the Habitats Directive (92/43 / EEC) and the Birds Directive (2009/147 / EC), under which are included in the network NATURA 2000 63 areas. For Network NATURA areas formulated specifically Management Plans. Already to date Management Plans have been prepared for all sites under the Habitats Directive outside of Larnaca and management plans Alikes Bird prepared and will be completed in 2016.

13.4.1.9 Actions for implementation of key Directives

Special reference is done for these specific directives:

– For urban wastewater treatment directive (91/271 / EEC)
– For the protection of Nitrates Directive (91/676 / EEC)
– Directive on Integrated Pollution Prevention and Control (96/61 / EC)

which on the basis referred to in paragraph 10.1.10 of the guide WFD Reporting Guidance text, considered the most important.

13.4.1.9.1 *Directive on urban wastewater treatment (91/271 / EEC)*

The Directive 91/271 / EOK «for the treatment and disposal of urban waste water", as amended by Directive 98/15 / EC lays down the minimum necessary technical infrastructure in sewage collection and treatment facilities to be available to cities and settlements the European Union, depending on the population equivalent and the recipient of treated wastewater and distinguishing the receiving waters to which drainage resulting in three categories: normal, sensitive and less sensitive.

It also determines the maximum permissible limits of quality characteristics of treated wastewater to be achieved in discharges from wastewater treatment plants and also provides specific time limits within which the settlements within its provisions, must complete the required in any case infrastructure collection, treatment and disposal of urban waste water.

The provisions defining the required infrastructure, based on the above criteria (population equivalent, recipient category), simultaneously impose time limits within which all the necessary infrastructure should be completed. At the end of the time horizon of the Directive implementing all agglomerations with a population equivalent of more than 2,000 should have sewer and wastewater treatment plant.

The Directive 91/271 / EEC provides for the treatment and disposal of wastewater certain sectors of the food industry. These industries generated a total organic load equal to or greater than 4,000 population equivalents (ICS), you have to process the load prior to disposal in the aquatic environment to the conditions laid down under specific authorizations by the competent authorities.

The harmonization of the Cyprus legislation with Directive 91/271 / EEC was made through the following provisions:

- On the Control of Water Pollution and Soil Laws of 2002 to 2013 (106 (I) / 2002 - Basic Law),
- The Law on Sewerage Systems (Amending Act No.. 108 (I) / 2004),
- The Pollution Control of Water (Sewage Disposal) Regulations of 2003 (PI 772/2003) and
- of the Control of Water Pollution (Sensitive Areas for Disposal of Urban Wastewater) Order of 2013 (PI 280/2013).

The authority responsible for implementing most articles of the Directive 91/271 / EEC in Cyprus is the Minister of Agriculture, Rural Development and Environment.

The Environment Department is responsible:

- To issue Permits Waste Disposal (AAA)
- Monitoring as required under the 91/271 / EEC,
- For the preparation of the Report on the Monitoring Results of discharges from wastewater treatment plants and the Quality of Water that receive discharges (recipients)
- For the preparation of public information report in collaboration with the Water Development Department, and
- For the review of sensitive areas every 4 years.

The Water Development Department is responsible for the implementation of drainage networks and waste water treatment projects in communities (the municipalities the responsibility lies with the Drainage Boards), participates with the Environmental Department of the Commission for the implementation of Directive 91/271 / EEC, draw up the application program and is the technical advisor to the Cabine.

The design, construction, operation and maintenance of sewerage networks and wastewater treatment plants are the responsibility of the Drainage Boards based on the Sewerage Law. The competent authority for the implementation of the above Law is the Cabinet. Also, the Drainage Boards are responsible for issuing licenses industries connection to the drainage network.

Cyprus has set one sensitive area for urban waste water discharges by the Water Pollution Control relating to the dam Polemidia waters and territories in flowing surface waters leading to the dam. This area is part of the Register of Protected Areas Article 6 of the WFD.

Based on the Cyprus Accession Treaty to the European Community, 31/12/2012 was established as the transitional period for the installation of sewerage systems and wastewater treatment plants in Cyprus for all agglomerations of more than 2,000, while fixed and three intermediate deadlines for 4 with a population equivalent of more than 15,000, namely:

- 31/12/2008 for Limassol and Paralimni,
- 31/12/2009 for Nicosia,
- 31/12/2011 to Paphos.

According to the Revised Implementation Plan (PA-2011) Cyprus (Report describes how the Cyprus intends to implement the Directive) on the provisions of the Directive within a total of 57 settlements with a total population equivalent of 995 000, of which:

– 7 is Urban agglomerations with 736 000 Nicosia, Limassol, Larnaca, Paphos, Ayia Napa, Paralimni, Ayia Phyla and
– 50 is Rural Settlements with population equivalent of 259,000.

The number of 57 settlements, not for an equal number of sewage treatment plants, as there complexing settlements. According to the revised application program due to clustering are expected to have twenty-three (23) municipal wastewater treatment plants with the implementation of the program. with a total population equivalent capacity of 1.14135 million today 1,590,867..

Applying additional tertiary treatment (e.g. dialysis with or without flocculation-precipitation), properly considered in conjunction with the reuse of treated effluent especially for irrigation. Exceptions are the Paphos WWTF effluents which are available to enrich the underground aquifer of Ezousas and then pumped for irrigation. The effluent from industries that fall under the provisions of Directive 91/271 / EEC are available for irrigation.

The sludge produced by wastewater treatment facilities WWTF is stabilizing and dehydration and subsequently available for agricultural use and for production of biogas.

Compliance with the provisions of Directive 91/271 / EEC will lead to a significant reduction of diffuse pollution.

Under Article 15 of the Directive applies quality monitoring program of discharges from urban waste water treatment plants which are covered by the Directive. According to the program conducted monitoring of discharges from fifteen (15) municipal wastewater treatment plants in 2011. The program included the following urban wastewater treatment plants:

– Bathias Gwnias
– Nicosia (Anthoupoli)
– Limassol - Amathountas
– Larnaca
– Paphos
– Paralimnio
– Ayia Napa
– Agrou
– P. Platrwn
– Kyperountas
– Pelindriou
– Kakopetras
– Leivadia
– Lythrodontos.

All the above apply tertiary treatment stations except the station of Kakopetria which applies secondary treatment. The parameters for which monitoring is conducted BOD, COD and SS. Done total control in 262 samples and observed that urban stations Vathia Gonia, Nicosia (Anthoupolis), Nicosia (Vathia Gonia), Limassol - Amathus Larnaca, Paphos and Ayia Napa - Paralimni exhibit high rejection rate of compliance. With regard to discharges from sewage treatment plants in rural settlements observed that compliance rates are lower.

The set of actions implemented in the framework of the Directive and the results of all the checks communicated to the Commission every two years on the basis of the provisions of Article 15 of the Directive.

In the context of strengthening the provisions and application of Directive 91/271 / EEC of actions, the program of measures included specific measures. (See Chapter 13.4.3).

13.4.1.9.2 *Directive on the protection of nitrates (91/676 / EEC),*

The Directive 91/676 / EEC on the protection of water against nitrates from agricultural sources. The purpose of Directive 91/676 / EEC is to reduce water pollution caused or induced by nitrates from agricultural sources and preventing further such pollution. To achieve the purpose of Directive 91/676 / EEC Member States:

- Obliged the definition of waters affected by nitrate pollution and those which could be affected if you do not take proper precautions.
- Define and characterize vulnerable zones all areas of land in their territories, of which drain into the waters designated as waters that are or could be affected nitrates and which areas contribute to the pollution.
- In order to reduce nitrate, the MS shall establish one or more Codes of Good Agricultural Practice, which will be made compulsory within EZN by farmers and shall, where appropriate, promotion program of the application, which includes a provision for the training and information for farmers.
- Establish action programs in respect of designated vulnerable zones in order to reduce and prevent nitrate pollution.
- Draw up and implement suitable monitoring programs to assess the effectiveness of action programs established.

In Cyprus, the harmonization with the provisions of Directive 91/676 / EEC was made by the Laws of 2002 to 2009 "on the Control of Water Pollution and Soil". Additionally within the scope of the Directive and included the following provisions:

- The Pollution Control of Waters (Nitrates from Agricultural Sources) Regulations 2002 (RAP 534/2002).
- The Code of Good Agricultural Practice (KDP 263/2007) and Decree Amending the Code of Good Agricultural Practice (RAP 107/2009).

- The Pollution Control of Water (due Nitrate Vulnerable Zones and Water Categories exist or may suffer Nitrate) Order of 2008 (RAP 186/2008).
- The Pollution Control of Water (due Nitrate Vulnerable Zones and Water groups which are or may be subjected Nitrates Decree of 2011 (RAP 41/2011).
- Action Plan for the Protection of Waters by nitrates from agricultural sources (RAP 281/2014).
- The Pollution Control of Water (General Conditions Waste Disposal pigsties) Order of 2003 (RAP 737/2003).
- The Pollution Control of Water (General Conditions Waste Disposal Cattle Units) Order 2006 (RAP 433/2006).

In relation to the regulation and control functions of the relevant provisions of the Directive apply the following:

- The Environment Department is also responsible for the issuance of Permits Waste Disposal (including livestock facilities and wastewater treatment plants) and the adoption of a Code of Good Agricultural Practice. It is also the national contact point with the Commission and coordinate with other concerned departments.
- The Agriculture Department is responsible for preparing, in collaboration with the Good Agricultural Practice Code Environment Department, implementation of the Code of Good Agricultural Practice and Action Plan for the Protection of Waters by nitrates from agricultural sources.
- The Geological Survey Department in collaboration with the Water Development Department is responsible for monitoring under Directive for groundwater and inland surface waters respectively.

RAP 186/2008 as water groups which are or may suffer nitrates from agricultural sources identified the aquifers below:

- Aquifer Kokkinohoria
- Aquifer Verde
- Aquifer Paphos (Peyia)
- Kiti Aquifer
- Aquifer Khrysokhou City

Also with the RAP 41/2011 fixed part of Western Mesaoria aquifer (Orounta).

For these areas issued Action Plan which was revised last (2014). All farms (pig, poultry and cattle breeding) within vulnerable zones are subject to authorization (licenses Waste Disposal). The licenses have a limited and require periodic renewal.

To control the implementation of the Action Plan and ensuring compliance by producers, inspectors determined in each province in order to conduct spot checks. Specifically, they appointed fourteen Control Inspectors from the Department of Agriculture, where the four from the headquarters of the Department, while the other ten of the district offices. The audits are performed at random after risk analysis (Risk analysis) made by the Cyprus Agricultural Payments Organisation (CAPO). The audit which is carried out to producers divided into two parts:

- Monitoring compliance with the producer's file.

The Agriculture Department, wanting to help producers, has prepared relevant Output File.

- Spot inspection of facilities / parcels producer.

According to the audit process, the file control and monitoring of establishments / plots made over the past two months time after the extraction of the test sample by CAPO and may take place and the duration of time and especially in critical periods (peak) fertilizer use and livestock. After the inspections, checklists sent to the Cyprus Agricultural Payments Organisation, to impose penalties on producers fortunes.

The set of actions implemented in the framework of the Directive and the results of all the checks communicated to the Commission every three years under the provisions of Article 10 of the Directive.

It is noted that the register of protected areas of Article 6 of the WFD has joined all ENZ. In this context, and to achieve the objectives for these areas as defined for the period 2016-2021 except for the activities carried out within the scope of Directive 91/676 / EEC, the program of measures included specific measures (see chapter 13.4.3) .

13.4.1.9.3 *Directive on integrated pollution prevention and control (96/61 / EC), - Directive 2010/75 / EU on industrial emissions (IDE).*

With the entry into force of Directive 2010/75 / EU on industrial emissions (integrated pollution prevention and control) on 01/06/2011, is revision, recasting and consolidation of seven existing Directives into a single Directive. These relate to the following instructions:

- Directive 2008/1 / EC on Integrated Pollution Prevention and Control of Pollution (known as the IPPC Directive)
- Directive 2000/76 / EC on Waste Incineration,
- Directive 2001/80 / EC on Large Combustion Plants,
- Directive 1999/13 / EC on the limitation of emissions of Volatile Organic Compounds due to the use of organic solvents,
- Directives 78/176 / EEC, 82/883 / EEC, 92/112 / EEC on the Titanium Dioxide facilities.

The new Directive, adopted more integrated approach to the control of the main industrial activities, strengthening the provisions relating to the prevention of emissions to air, water and soil, waste management, efficient use of energy and natural resources and the prevention accidents. Such an approach contributes significantly to the promotion of a high level of environmental protection as a whole, thereby reducing potential pollution shift from one environmental medium to another.

This directive was incorporated into national law with the Industrial Emissions (Integrated Pollution Prevention and Control of Pollution) Act, 2013, N. 184 (I) / 2013, which entered into force on December 27, 2013, with the publication in the Official Journal the Republic.

The "Law on Industrial Emissions" followed the approach of Directive 2010/75 / EU, replacing previous Laws and Regulations constitute harmonization measures deeds of earlier European Directives. Therefore, they abolished 'on Integrated Pollution Prevention and Control Laws of 2003 to 2008 ", the" on the Control of Water Pollution (Wastes from Industry Titania) Regulations 2002 "and" the Pollution Control waters (Residue Disposal Incineration) Regulations 2004 ". The provisions of the above Law and Regulations incorporated in "on the 2013 Industrial Emissions Law".

The purpose of "on Industrial Emissions Law" is the integrated prevention and control of pollution from facilities and activities to prevent and, where that is not practicable, to reduce emissions into air, water and soil, and to prevent waste production, thereby achieving a high level of environmental protection as a total.

The imlpementation field of the Law covers:

- The activities set out in Annex IV of the Act, relating to large installations whose potential for pollution (previously referred to as IPPC installations). Examples of these activities are:
  - power generation (Power Stations)
  - the production and processing of metals,
  - the mineral industry (cement, lime and ceramic products)
  - the chemical industry,
  - waste management (hazardous or not) and landfilling
  - Other activities such as intensive pig and poultry farming, slaughter animals and poultry and processed animal by-products.
- Large combustion plants.
- ncineration plants and waste incineration.
- The plants using organic solvents and emit VOCs.
- The titanium dioxide production facilities.

Responsibility for implementing the "on Industrial Emissions Law of 2013" have the Environment Department of the Ministry of Agriculture, Rural Development and Environment and the Ministry of Labour Labour Inspection Department, Welfare and Social Security, since the Act includes provisions both in terms of pollution control of water and soil, and in terms of pollution control air.

Basic provision inserted in this Law, the submission of an application and the grant of a (joint) Industrial Emission Permit of the two competent ministers, in order to simplify and better implementation of legislation and reduce unnecessary financial and administrative burden.

Equally important is the welfare import obligation to obtain reliable and valid planning permission and / or a building permit and / or authorization certificate before granting Industrial Emissions Permit.

Other key provisions regarding the use of best available techniques, rational waste management, efficient use of energy and natural resources, to prevent accidents and to return the site operator upon definitive cessation of activities.

In the program of measures not integrated actions, most of the provisions and implementation of actions under the same Directive 2010/75 / EU.

13.4.2 1st RBMP measures that have joined in the actions of the competent bodies

Some meters from the first Management Plan have been completed, but they are indefinite, which eventually have joined in the operation of the relevant departments.

As such actions part of the programming of the period 2016- 2021. These measures are presented below (following Table).

Moreover some measures of the 1st management plan which have not been completed or it is appropriate to continue to apply, within the program of measures of the 2nd RBMP. The leaves of the measures given below these measures identified.

Table 13-93: Measures of the 1st River Basin Management Plan relating to ongoing activities concerning water management which are included in the operation of the competent bodies

MEASURE CODE (1st RBMP)	MEASURE NAME:	Article WFD	WFD Type of measure	DESCRIPTION	IMPLEMENTA-TION BODY
39	Registration and further study both the amount of water, and the cost data for areas not served by government water works, (Municipalities, Communities, Irrigation Departments / links etc.).	11.3.b	Measures to implement Article 9 (cost recovery).	Data concerning registration of water quantities and data and costs in areas not supplied by GWSW have been collected as part of the Contract 86/2007. Regarding the data collection by the local authorities, the collection process is started and it consist a continuous process.	WDD
40	Crop restructuring study.	11.3.c	Measures to promote efficient and sustainable water use.	The study was completed in March 2015 by a special Committee established in MRD &E and consisted of representatives of the Departments GSD, DA, WDD, DE. The decision related to the subject are based on the data resulted	MRD &E
54	Action by the Department to ensure the cooperation of stakeholders in land use control and maintenance of protected areas.	11.3.i	Measures to address any other significant impacts on status, in particular the hydromorphological condition.	In all Refional Offices except of Amochostos where there are no boreholes for the suplly of drinking water, Zones 1 and 2 are controlled once a year as part of the monitoring programe for drinking water supply form boreholes. It is continuous process. WDD collectes these data and keeps the related register	WDD
66	Systematic and continuous monitoring of compliance of industrial units with the WDPs	11.3.g	Measures to control point source discharges.	It is a continuing activity which has been included in the operation of the Department of Environment. Compliance checks are done as prescribed by WDP in priority in I.E.D. units by the staff of DE and outsourcing. The results of the controls should be published on the website of the DE in the form of annual activity reports.	DE

MEASURE CODE (1st RBMP)	MEASURE NAME:	Article WFD	WFD Type of measure	DESCRIPTION	IMPLEMENTA-TION BODY
53	Expansion of protection zones throughout abstraction points of groundwater for drinking purposes (wells and springs) in 2015.	11.3.d	Measures to protect drinking water quality and reduce level of treatment required.	The measure has been completed for all existing abstraction points. Actions required to determine the protection zones of the new abstraction of groundwater for drinking water supply are included in the operation of the involved Departments	WDD & GSD & DE
70	Continuation of the sampling program through existing wells in the area where ASKAREL was stored in Polemidia and elaboration of an action plan.	11.3.g	Measures to control point source discharges	It concerns a continued follow-up action.	GSD
79	Intensification of compliance controls of livestock facilities with the provisions of W.D.P.	11.3.g	Measures to control point source discharges.	It concerns a continuing activity which has been included in the operation of the Department of Environment. Compliance checks are done as prescribed by WDP in priority in I.E.D. units by the staff of DE and outsourcing. The results of the controls should be published on the website of the DE in the form of annual activity reports..	DE
92	Registry of installations emitting Priority substances - Action Plans.	11.3.k	Measures to eliminate or reduce pollution by Priority Substances	It concerns a continuing action	DE
108, 131, 132, 133, 134,135, 136 και 137	It includes a set of measures related to information, public awareness and education activities.	11.4.x) & 11.4.xv)	Efficiency and reuse measures / Educational measures	It concerns a continuing information activity	WDD /DE/DA

MEASURE CODE (1st RBMP)	MEASURE NAME:	Article WFD	WFD Type of measure	DESCRIPTION	IMPLEMENTA-TION BODY
109	The implementation of a system for measuring, recording and reporting the loss of Big Government Irrigation Projects. This suggests that the District Offices of WDD prepares annual reports in a way similar to that of Water Boards.	11.4.x)	Efficiency and reuse measures	It conscernes a continuing activity. The measure has been completed and is included in the operation of WDD .	WDD
110	The use of database of GAP by adding appropriate fields to track issues related to the management of irrigation demand in a strategic partnership of WDD with the GAP Code.	11.4.x)	Efficiency and reuse measures	Consinuing activity	TAY/DA
117	Compilation of a Guidance Document on specifications and codes regarding the equipment of new buildings with low water consumption appliances. The installation of these devices should be mandatory in all government buildings.	11.4.x)	Efficiency and reuse measures	It concernes a continuing activity to inform the public and to provide guidelines for the rational water through the website of WDD t	WDD
119	The correlation of the utilization of desalination plants with the specified Alert against Drought in the Final Drought Plan	11.4.xii)	Desalination plants	It concerns a continuing activity	WDD
153	Run programs assessing the quality of sediments. Implementation of a program of sampling and analysis of sediments in 9 reservoirs, 4 saline lakes and the port of Limassol	11.4.xvi i)	Other measures	It concerns a continuing activity	MFRD & WDD

13.4.3 Basic measures according to Article 11.3.a of WFD

MEASURE CATEGORY :	WFD ARTICLE	MEASURE NAME :	MEASURE CODE	1ST RBMP	PRESSURE RELATED	WB CATEGORY APPLIED	LINK TO CLIMATE CHANGE	ESTIMATED IMPLEMENTATION COST (€)	IMPLEMENTATION BOBY	FINANCING TOOL
The Urban Waste Water Treatment Directive (91/271/EEC).	11.3.a.vii	Completion of the sewage systems (sewer networks and wastewater treatment plants) of Athieno, Kokkinochoria, Soleas, and Astromeritis – Peristerona – Akaki clusters	BM-a-01	NEW MEASURE	URBAN WASTEWATERS	SWB& GWB	-	56.000.000	ΤΑΥ	Structural Funds
The Urban Waste Water Treatment Directive (91/271/EEC).	11.3.a.vii	Continuation of the compliance monitoring of WWTPs in Sensitive Areas	BM-a-02	Cosntinuation of measure of 1ου RBMP	PROTECTED AREAS	SWB	-	50.000	ΤΑΥ/ ΤΠ	National Budget
The Urban Waste Water Treatment Directive (91/271/EEC).	11.3.a.vii	For Sensitive areas. The implementation of the sewerage network construction projects and adequate treatment to the rest of the Agia Fyla settlement.	BM-a-03	NEW MEASURE	PROTECTED AREAS	SWB	-	(107.000.000)*	ΣΑΛΑ	Own resources
The Nitrates Directive (91/676/EEC).	11.3.a.ix	Continuation of the compliance controls in NVZs and annual publication of their results	BM-a-04	Continuing from 1st RBMP	PROTECTED AREAS	SWB& GWB	-	-	ΤΓ	Administrative measure
The Habitats Directive (92/43/EEC).	11.3.a.x	Completion of the Management Plans of the Habitats and Species Protected Areas	BM-a-05	Continuing from 1st RBMP	PROTECTED AREAS	SWB	-	90.000	ΤΜΗΜΑ ΘΗΡΑΣ	National Budget

– * The cost of the operation borne by the SBLA and not included in the total cost of the Programme of Measures

13.4.4 Basic Measures (Articles 11.3 b- l of WFD)

Measure name :	Measure Code	WFD Article	1st RBMP	Pressure related	Water category applied	Link to Climate Change	Estimated cost	Implementation Body	Financing tool:
Measures to promote efficient and sustainable water use									
Examination of the possibility to promote voluntary registration of the consumed quantities of groundwaters through network. Development of the special web site needed and promotion of the information and awareness of the consumers	BM-c-01	11.3.c	NEW MEASURE	GROUNDWATER ABSTRACTIONS	SWB	YES	10.000 €	WDD	National Budget
Limitation of abstractions in selected SWBs in aim to protect significant ecologic characteristics and habitats	BM-c-02	11.3.c	Reformulation / extension of measure of 1st RBMP	HYDROMORPHOLOGICAL ALTERATIONS	GWB	-	-	WDD	Administrative measure
Planning the rational use and protection of the GWB CY-19 Troodos by compiling a hydrogeological study, analyzing the recharge and consumption conditions and by formulating the water body' s water balance	BM-c-03	11.3.c	Reformulation /extension of measures 125 and 129 of 1st RBMP	GROUNDWATER ABSTRACTIONS	GWB	-	50.000 €	GSD	Own resources /National Budget
Reducing irrigation demand at aquifer level	BM-c-04	11.3.c	NEW MEASURE	GROUNDWATER ABSTRACTIONS	GWB	YES	6.700.000 €	Management Authority of RDP/CAPO	RDP

Measure name :	Measure Code	WFD Article	1st RBMP	Pressure related	Water category applied	Link to Climate Change	Estimated cost	Implementation Body	Financing tool:
Measures to control abstraction from surface and groundwater									
Upgrade of the Register of Abstraction Points from Groundwater Bodies and its operational inclusion in the permitting process for new boreholes	BM-e-01	11.3.e	NEW MEASURE	GROUNDWATER ABSTRACTIONS	GWB	YES	100.000 €	WDD	National Budget
Completion of the registration of the real abstracted quantities from groundwaters, finalization of the water balances of groundwater bodies based on these data and publication of the results in the existing website of WDD	BM-e-02	11.3.e	NEW MEASURE	GROUNDWATER ABSTRACTIONS	GWB	YES	-	WDD	Administrative measure
Upgrade and publication of the Register of Small Abstractions.	BM-e-03	11.3.e	Related to measure 89 of the 1st RBMP	HYDROMORPHOLOGICAL ALTERATIONS	SWB	YES	-	WDD	Administrative measure
Measures to control point source discharges..									
Increase the synergies of the actions taken for monitoring surface waters status in the context of WFD and the compilation of the remediation program of abandoned Waste Mining Disposal Facilities in aim to improve chemical status of water bodies with status classified as less than good.	BM-g-01	11.3.g	NEW MEASURE	MINING ACTIVITIES	SWB and GWB	-	10.000 €	GSD/Technical Committee for Asbestos	Own resources/ National Budget

Measure name :	Measure Code	WFD Article	1st RBMP	Pressure related	Water category applied	Link to Climate Change	Estimated cost	Implementation Body	Financing tool:
Establishment of a special investigative monitoring program for Ni in river Kouris.	BM-g-02	11.3.g	NEW MEASURE	MINING ACTIVITIES	SWB	-	-	GSD/Technical Committee for Asbestos	Own resources
Immediate rehabilitation of existed Waste Disposal Site of Lefkosia	BM-g-03	11.3.g	NEW MEASURE	WASTE DISPOSAL SITES	SWB and GWB	-	27.000.000 €	WDD	Structural Funds
Prioritization of the construction of the following works: • Construction of the WWTP of Arakapia • Construction of the WWTP of Apliki • Construction of sewage pipeline and WWTP in Ag Ioanni Agrou	BM-g-04	11.3.g	Reformulation of measure of 1st RBMP	URBAN WASTEWATERS	SWB and GWB	-	820.000 €	WDD	National Budget
Immediate rehabilitation of existed Waste Disposal Site of Lemessos	BM-g-05	11.3.g	NEW MEASURE	WASTE DISPOSAL SITES	SWB and GWB	-	27.000.000 €	WDD	Structural Funds
Measures to prevent or control inputs of diffuse pollutants.									
Program for reduction of nitrate from agriculture in cultivated areas within ENZs designated according Directive 91/671/EEC	BM-h-01	11.3.h	NEW MEASURE	PROTECTED AREAS	SWB& GWB	-	-	DA	Administrative measure

Measure name :	Measure Code	WFD Article	1st RBMP	Pressure related	Water category applied	Link to Climate Change	Estimated cost	Implementation Body	Financing tool:
Compilation of a special Action Plan for management of rainwater runoff in urban and industrial areas in aim to protect water bodies	BM-h-02	11.3.h	Continuations /refrmulation od measures of 1st RBMP (47 48 and 49)	HORIZONTAL ACTIONS	SWB	NAI	66.000 €*	WDD	Own resources (National Budget / Structural Funds)
Inclusion in cross compliance of rules specific arrangements – obligations related to water bodies protection in targeted areas	BM -h-03	11.3.h	NEW MEASURE	AGRICULTURAL ACTIVITIES	SWB	-	-	DA	Administrative measure
Pasture land management	BM -h-04	11.3.h	NEW MEASURE	AGRICULTURAL ACTIVITIES	SWB&ΣΥΥ	-	360.000	Management Authority of RDP/CAPO	RDP
Restrictions on use of chemical herbicides in specific corps	BM -h-05	11.3.h	NEW MEASURE	AGRICULTURAL ACTIVITIES	SWB& GWB	NAI	20.800.000 €	Management Authority of RDP/CAPO	RDP
Application of corps rotation to potato and cereal corps	BM -h-06	11.3.h	NEW MEASURE	AGRICULTURAL ACTIVITIES	SWB& GWB	NAI	14.900.000	Management Authority of RDP/CAPO	RDP

Measure name :	Measure Code	WFD Article	1st RBMP	Pressure related	Water category applied	Link to Climate Change	Estimated cost	Implementation Body	Financing tool:
Organic farming	BM -h-07	11.3.h	NEW MEASURE	AGRICULTURAL ACTIVITIES	SWB& GWB	NAI	14.000.000	Management Authority of RDP/CAPO	RDP
Streamlining and investigation of the possible automatization of the notification of the WFD monitoring results to the environmental inspectors, especially in cases of exceedances of Physicochemical chemical substances derived from agriculture, in aim to improve the planning of compliance checks.	BM -h-08	11.3.h	NEW MEASURE	AGRICULTURAL ACTIVITIES	SWB& GWB	-	-	DA/ DE /WDD/GSD	Administrative measure
Targeted agro- environmental actions for potato and citrus tree corps	BM -h-09	11.3.h	NEW MEASURE	AGRICULTURAL ACTIVITIES	SWB& GWB	NAI	7.500.000 €	Management Authority of RDP/CAPO	RDP
Measures to address any other significant impacts on water bodies status									
Conducting targeted controls/investigations for the evaluation of the status of water bodies not possible to classify with priority in lakes	BM-i-01	11.3.i	Continuing /Reformulation of measures of 1st RBMP (codes 142, 144)	HORIZONTAL ACTIONS	SWB	-	100.000 €	WDD/ DFMR	National Budget

Measure name :	Measure Code	WFD Article	1st RBMP	Pressure related	Water category applied	Link to Climate Change	Estimated cost	Implementation Body	Financing tool:
Conducting targeted investigative monitoring in water bodies imposed to significant pressures and classified with high degree of uncertainty	BM-i-02	11.3.i	Continuing /Reformulation of measures of 1st RBMP (codes 147, 148)	HORIZONTAL ACTIONS	SWB	-	50.000 €	WDD	National Budget
Rationalization of the evaluation of projects likely to impose hydromorphological modifications in water bodies by incorporating the article 4.7 tests in environmental permitting process. For this purpose special arrangements and/or amendments of the existing law are needed. .	BM-i-03	11.3.i	NEW MEASURE	HORIZONTAL ACTIONS	SWB	-	-	WDD/DE	Administrative measure
Compilation and update of a special library of mitigation measures for hydromorphological modifications from projects and activities. This library may be used for the formulation of the terms for the construction and the operation of the projects during the permitting process.	BM-i-04	11.3.i	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	-	WDD/DE	Administrative measure

Measure name :	Measure Code	WFD Article	1st RBMP	Pressure related	Water category applied	Link to Climate Change	Estimated cost	Implementation Body	Financing tool:
Establishment of a special monitoring program for physicochemical parameters and sediments in ephemeral water bodies harmonized to the methodological requirements of WFD. WDD will publish the results annually	BM-i-05	11.3.i	NEW MEASURE	HORIZONTAL ACTIONS	SWB	-	50.000 €	WDD	National Budget

– * The cost is taken from the FRMP and concerns the cost of the measures proposed in FRMP. This cost is not included in the total cost of the program of measures of RBMP

13.4.5 Supplementary Measures

Mesure name	Measure code	WFD Article	1st RBMP	Related pressure	Water category applied	Link with Climate Change	Estimated Cost	Implementation Body	Financing tool
Recreation and restoration of wetlands areas									
Pilot limited interventions in natural RWBs and Lakes for reinforcing the presence of selected protected species with priority in habitats and species protected areas and /or in other areas of special interest	ΣΜ-vii-01	11.4.vii	NEW MEASURE	PROTECTED AREAS	SWB	-	220.000 €	DE /WDD	Structural Funds /National Budget

Mesure name	Measure code	WFD Article	1st RBMP	Related pressure	Water category applied	Link with Climate Change	Estimated Cost	Implementation Body	Financing tool
Removal of horizontal obstacles for the improvement of the hydromorphological characteristics of selected SWBs supporting significant ecological elements	ΣM-vii-02	11.4.vii	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	100.000 €	WDD	National Budget
Cleaning/realigning active bed to improve hydromorphological characteristics of selected SWBs supporting significant ecological elements	ΣM-vii-03	11.4.vii	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	50.000 €	WDD	National Budget
Planting of indigenous trees to improve hydromorphological characteristics of selected SWBs supporting significant ecological elements	ΣM-vii-04	11.4.vii	Reformulation / Extension of measure of 1st RBMP	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	50.000 €	WDD / FD	National Budget
Definition of environmental flows in selected dams. Environmental flows downstream of dams to improve hydromorphological characteristics of HMWBs supporting significant ecological elements	ΣM-vii-05	11.4.vii	Reformulation / Extension of measure of 1st RBMP	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	-	WDD	Administrative measure

Mesure name	Measure code	WFD Article	1st RBMP	Related pressure	Water category applied	Link with Climate Change	Estimated Cost	Implementation Body	Financing tool
Definition of environmental flows in selected dams. Release environmental flows downstream of dams targeted in selected sites of significant ecological importance	ΣΜ-vii-06	11.4.vii	Reformulation / Extension of measure of 1st RBMP	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	-	WDD	Administrative measure
Definition of environmental flows in selected dams. Release of flood flows in selected dams	ΣΜ-vii-07	11.4.vii	Reformulation / Extension of measure of 1st RBMP	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	-	WDD	Administrative measure
Remove of non-indigenous/ invasive plant species in selected areas to improve significant ecological elements	ΣΜ-vii-08	11.4.vii	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	380.000 €	DE/ FD	Structural Funds /National Budget
Ecological rehabilitation of the banks in selected HMWBs	ΣΜ-vii-09	11.4.vii	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	100.000 €	WDD	National Budget
Preservation/creation of water shelters in selected WBs	ΣΜ-vii-10	11.4.vii	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	210.000 €	DE/ WDD/FD	Structural Funds /National Budget

Mesure name	Measure code	WFD Article	1st RBMP	Related pressure	Water category applied	Link with Climate Change	Estimated Cost	Implementation Body	Financing tool
Creation of shallow reefs/pools to reinforce habitats in selected HMWBs	ΣM-vii-11	11.4.vii	Reformulation / Extension of measure of 1st RBMP	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	70.000 €	DE / DF/DGF/WDD	Structural Funds /National Budget
Local interventions in beds of selected WBs (e.g local dredging) to improve hydromorphological characteristics supporting significant ecological elements	ΣM-vii-12	11.4.vii	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	60.000 €	DE / WDD	Structural Funds /National Budget
Creation of fish passes in small weirs to improve welfare conditions of selected fish species	ΣM-vii-13	11.4.vii	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	100.000 €	WDD	National Budget
Establishment of a special monitoring program to evaluate the efficiency of the proposed environmental flows	ΣM-vii-14	11.4.vii	NEW MEASURE	HYDROMORPHOLOGICAL ALTERATIONS	SWB	-	100.000 €	DE/DGF / WDD	Structural Funds /National Budget

Mesure name	Measure code	WFD Article	1st RBMP	Related pressure	Water category applied	Link with Climate Change	Estimated Cost	Implementation Body	Financing tool
Efficiency and reuse measures									
Launch construction of works to increase use of recycled water for irrigation, which may comprise reservoirs for storage in winter and works for water supply and distribution	ΣΜ-x-01	11.4.x	Reformulation / Extension of measure 52 of 1st RBMP του	GROUNDWATER ABSTRACTIONS	GWB	YES	29.490.000 €	WDD	Structural Funds /National Budget
Continuation of the awareness raising for water saving in households and schools. Communication of the activities undertaken to date and formulation of an ongoing information campaign for water efficiency issues.	ΣΜ-x-02	11.4.x	Συνέχιση μέτρου του 1ου ΣΔΛΑΠ	ABSTRACTIONS	SWBκαι GWB	YES	50.000 €	WDD	National Budget
Investments in physical assets Measure 4. Sub measures 4.1 and 4.3.2. (RDP 2014-20)	ΣΜ-x-03	11.4.x	NEW MEASURE	AGRICULTURAL ACTIVITIES	ΣΥΥ	-	8.500.000 €	WDD /DA/Management Authority of RDP/COPA	RDP
Construction projects									

Mesure name	Measure code	WFD Article	1st RBMP	Related pressure	Water category applied	Link with Climate Change	Estimated Cost	Implementation Body	Financing tool
Infrastructure to meet drinking water needs of Lefkosia wider area– Drinking water supply pipeline from Vasilikos Desalination Plant	ΣΜ-xi-01	11.4.xi	NEW MEASURE	GROUNDWATER ABSTRACTIONS	GWB	YES	31.000.000 €	WDD	European Investment Bank / National Budget
Desalination plants									
Construction of Pafos Desalination Plant	ΣΜ-xii-01	11.4.xii	NEW MEASURE	GROUNDWATER ABSTRACTIONS	SWB	YES	(12.000.000€)*	Public Sector	PPP
Artificial recharge of aquifers									
Extension of the program of groundwaters artificial recharge	ΣΜ-xiv-01	11.4.xiv	Συνέχιση / εξειδίκευση μέτρου του 1ου ΣΔΛΑΠ	GROUNDWATER ABSTRACTIONS	GWB	YES	50.000 €	GSD	Own resources / National Budget
Inclusion of the perspective of groundwaters artificial recharge in the design of flood protection works and in natural water retention works.	ΣΜ-xiv-02	11.4.xiv	NEW MEASURE	GROUNDWATER ABSTRACTIONS	GWB	YES	-	WDD	Administrative measure

Mesure name	Measure code	WFD Article	1st RBMP	Related pressure	Water category applied	Link with Climate Change	Estimated Cost	Implementation Body	Financing tool
Educational measures									
Knowledge transfer and information actions (Training of producers through Measure 1 of RDP 2014-20)	ΣM-xv-01	11.4.xv	NEW MEASURE	AGRICULTURAL ACTIVITIES	SWB& GWB	YES	500.000 €	Management authority of RDP/ COPA	RDP
Research, development and demonstration projects									
Special monitoring program for the trends on the chemical status in Argaki Limnis WB to draw up conclusions on the effectiveness of the rehabilitation works in Limni Mine to the water status in aim to apply them to rehabilitation works planned in other regions	ΣM-xvi-01	11.4.xvi	NEW MEASURE	MINING ACTIVITIES	SWB	-	5.000 €	GSD/Technical Committee for Asbestos /WDD	Own resources /National Budget
Conducting investigation research for the improvement of knowledge about the fish species in inland water of Cyprus (rivers – lakes).	ΣM-xvi-02	11.4.xvi	NEW MEASURE	HORIZONTAL ACTIONS	SWB	-	100.000 €	WDD /DFMR/ DE	National Budget

– * The project will be implemented through PPP and the cost in not included in the total cost of program of measures

- SWB - Surface Water Bodies
- GWB – Ground Water Bodies

13.4.6 Pre-estimation of the program's cost

The cost of the measures is estimated based on the following information

- Cost of projects derived from studies already completed and provided by the competent authorities
- Costs of similar actions and / or projects that have been implemented in the past projected in current prices
- Forecasts for the available funds for certain actions as they have estimated in conducting the planning of the competent authorities

The costs of each measure resulted from the above mentioned information is given to the idividual measure Sheet. The cost of measures presented below is grouped as follows:

- The cost of Basic Supplementary measures and measures related to some directives that have been included in the program of measures is presented (see. Section 7.2)
- The cost of each type of measures according to Article 11 of the WFD
- The cost of measures related to significant pressures as presented in chapter 5.1.

These are presented in the following tables.

Table 13-94: Cost of measures

Measure Category	Cost
Basic Measures (Article 13b - 13l)	119.450.000,00 €
Supplemantery measures	71.135.000,00 €
Measures related to the implementation of directives	56.140.000,00 €
Total	246.725.000,00 €

Table 13-95: Total cost measures for each type of measure of WFD

Category Measure	Number of measures	an estimated cost
The Urban Waste Water Treatment Directive (91/271/EEC).	3	56.050.000 €
The Nitrates Directive (91/676/EEC).	1	0 €
The Habitats Directive (92/43/EEC).	1	90.000 €
Measures to promote efficient and sustainable water use.	4	6.760.000 €
Measures to control abstraction from surface and groundwater	3	100.000 €
Measures to control point source discharges.	5	54.830.000 €
Measures to prevent or control inputs of diffuse pollutants	9	57.560.000 €
Measures to address any other significant impacts on status	5	200.000 €
Recreation and restoration of wetlands areas	14	1.440.000 €

Category Measure	Number of measures	an estimated cost
Efficiency and reuse measures	3	38.040.000 €
Desalination plants	1*	0 €
Artificial recharge of aquifers	2	50.000 €
Educational projects	1	500.000 €
Research, development and demonstration projects	2	105.000 €
Construction projects	1	31.000.000 €
Total	55	246.725.000 €

- * It concerns Pafos Desalination Plant which is planned to be constructed in the form of PPP with estimated cost 12 million €.

Table 13-96: Cost of measures to tackle significant pressures / targets

Significant pressure / Objective *	KEY TYPE MEASURE **	NUMBER OF MEASURES	COST
Hydromorphological alterations	5. Improving longitudinal continuity (e.g. establishing fish passes, demolishing old dams). 6. Improving hydromorphological conditions of water bodies other than longitudinal continuity (e.g. river restoration, improvement of riparian areas, removal of hard embankments, reconnecting rivers to floodplains, improvement of hydromorphological condition of transitional and coastal waters, etc.). 7. Improvements in flow regime and/or establishment of ecological flows	17	1.320.000 €
Urban wastewaters	1. Construction or upgrades of wastewater treatment plants.	2	56.820.000 €
Waste disposal sites	21. Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure	2	54.000.000 €
Agricultural Activities	2. Reduce nutrient pollution from agriculture.	9	66.560.000 €
Surface water abstractions / diversions	7 Improvements in flow regime and/or establishment of ecological flows 8. Water efficiency, technical measures for irrigation, industry, energy and households.	1***	- €
Groundwater abstractions	8. Water efficiency, technical measures for irrigation, industry, energy and households	9	67.400.000 €
Mining activities	14. Research, improvement of knowledge base reducing uncertainty 26.CY. Administrative and technical water	3	15.000 €

Significant pressure / Objective *	KEY TYPE MEASURE **	NUMBER OF MEASURES	COST
	pollution control measures from abandoned industrial facilities		
Protected areas	1. Construction or upgrades of wastewater treatment plants. 21. Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure. 2. Reduce nutrient pollution from agriculture. 6. Improving hydromorphological conditions of water bodies other than longitudinal continuity (e.g. river restoration, improvement of riparian areas, removal of hard embankments, reconnecting rivers to floodplains, improvement of hydromorphological condition of transitional and coastal waters, etc.).	6	360.000 €
Horizontal actions	1. Construction or upgrades of wastewater treatment plants 21. Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure. 2. Reduce nutrient pollution from agriculture. 6. Improving hydromorphological conditions (except those related to the longitudinal continuity (eg restoration of rivers, improving riparian areas, removing terracing, reconnecting rivers with floodplains, improving hydromorphological transitional water conditions etc.) 14. Research, improvement of knowledge base reducing uncertainty	6	250.000 €
Total		55	246.725.000 €

* Indicates significant pressures as assessed according to Article 5 of WFD

** Refers to Key Types Measures included in the program of measures.

*** Refers to Paphos Desalination Plant that is planned to be constructed with PPP with estimated cost 12 million euros

14. SYNERGY OF RBMP WITH OTHER MANAGEMENT PLANS

Summarizes the cooperations of Cyprus Basin Basin Management Plan and particularly the program of measures with the provisions of the Flood Risk Management Plan, the Drought Management Plan that forms an integral part of the RBMP and actions carried out under the Marine Strategy.

14.1 CONNECTION AND SYNERGY WITH THE FLOOD RISK MANAGEMENT PLAN

14.1.1 Procedures to ensure synergy of RBMP and FRMP

As part of the Integrated Management of Cyprus River Basin became login attempt and promoting synergy project management River Basin Flood Risk Ms. Cyprus.

The main guidelines on which the effort is located on:

- Taking advantage of all available information when preparing the two management plans through the implementation of a single contract for the preparation of both plans and coordinate them by the WDD with a single Steering Committee.
- In carrying out joint consultation and the two management plans in which organized workshops where the two Management Plans were presented and planned in these programs of measures, so that participants can express integrated views.
- The formulation of measures which enhance and / or supporting the purposes and actions identified in the Management Plans
- The identification of any adverse interactions between the objectives of the project management and the development of appropriate guidelines for dealing with them.

This chapter summarizes the main interface and synergy points of River Basin Management Plans and Flood Risk Management, as encountered in the above. Specifically presents the following:

- The RBMP measures that directly and / or specified by the FRMP measures
- Measures of FRMP which enhance and / or support the objectives of the Draft Basin Management and / or the general WFD
- The measures of the RBMP which is expected to influence the design and implementation of certain measures FRMP.

14.1.2 Interface and synergies of RBMP and FRMP

A significant number of FRMP measures directly related to the RBMP measures, specified and strengthened them. Additional measures FRMP, which are not directly related to the RBMP measures contribute significantly to the achievement of certain targets in the 2ND RBMP by developing a suitable framework for the protection of hydrological and hydraulic characteristics of streams and through the proposed use practices and management of stormwater water in urban areas.

Presented below:

- The RBMP measures with immediate synergy with the measures FRMP
- Other measures FRMP contributing to the strengthening of the RBMP purposes.

14.1.2.1 Direct synergy of RBMP with FRMP Measurs

Below are the measures and the RBMP elements for cooperation with measures included in FRMP.

Measure code	**Measure**
54	Action by the WDD to ensure the cooperation of involved authorities in the land use control and maintenance of the protection zones NOTE: This measure is related with the measure of the 1st APSFR which is integrated into the actions and functions of the WDD
Synergy with FRMP	
The measure supported by the measure of FRMP PREV-CY_02: **Ensuring protection zone along the watercourses in the permitting of new developments** which includes the study of integration methods in planning permission procedure for land divisions or for development of plots, bordering with streams, obligatory concession of green/protection zone along the stream without embankments, clearing or other interventions or structures.	

Measure code	**Measure**
BM-h-02	Implementation of special action program to address rainwater runoff from residential areas and Industrial Facilities to protect water.
Synergy with FRMP	
This measure is further specified by the following FRMP measures: PREV-CY_03: «Institutionalization process for the preparation of Strategic stormwater management Plans (Master Plan) during the planning process of new areas which included in development zones» PRO-CY_03: Rainwater disposal properties in absorption pits PRO-CY_04: Promoting runoff reduction practices of properties PRO-CY_05: Promoting runoff reduction and management practices from public places	

PRO-CY_06: Providing financial incentives to individuals for implementation of sustainable rainwater drainage systems (e.g. replacement surfaces paved with planted) PRO-CY_07 :Promoting private rainwater exploiting systems

Measure code	**Measure**
BM-i-04	Preparation and updating of a special library of remedies measures for morphological items which affected by the development works and activities on which will define the requirements, for the construction and operation in their licensing.
Synergy with FRMP	
This measure is directly related with measure PRO-CY_08 **«Preparation and institutionalization regulation of required annual cleaning, maintenance and management of riparian vegetation streams"** of FRMP, which include the development of guidelines and preparation and institutionalization regulation for periodic cleaning works of streams, made by municipalities and district administrations. These guidelines can be part of remedies measures and will include the special library which is provided in the BM-i-04 of the RBMP measures for cleaning operations.	

Measure code	**Measure**
ΣΜ-vii-01	Small-scale pilot interventions in natural river systems and lakes to strengthen the presence of selected protected species with priority in protected habitats areas and species and/or other areas with special interest.
Synergy with FRMP	
The measure is supported by the following measures of FRMP: PREV-CY_02 Ensuring protection zone along the streams in the permitting of new construction and developments in cases that falling spatially and PRO-CY_10: Protect streams from uncontrolled discharges and interventions given that through this the preservation of the interventions, which will be implemented under the measure of RBMP, are going to be strengthened	

Measure code	**Measure**
ΣΜ-xiv-01	Expansion of groundwater recharge program
Synergy with FRMP	
This measure practically is specialized in PRO-CY_02 measure "Recharge and retention works in river beds of rivers upstream of APSFR" which integrates the dimension of flood protection in the measure of RBMP objectives. Also supported at local level by the PRO-CY_03 measure: "Disposal of rainwater of properties in absorption pits" as the measure contribute to the recharge of GWD in applied areas.	

15.

Measure code	**Measure**

ΣΜ-xiv-02	Integration of groundwater recharges perspective in planning of flood measures and other relevant natural water retention projects.
Synergy with FRMP	
This measure is specialized with PRO-CY_02 measure: "Recharge and retention Works in the rivers beds, upstream of APSFR".	

15.1.1.1 FRMP Measures that contributes in the strengthen of RBMP targets

Apart from the above measures SDKP, which have direct synergy with the RBMP measures Apart from the above measures of FRMP, which have direct synergy with the RBMP measures, below additional FRMP measures are listed, which contribute to WFD objectives and RBMP. These measures concern:

FRMP Measures that contribute to the protection of Surface Water Bodies from pressures on the hydromorphological features, including the following:

PRO-CY_11 **"Promoting artificial retaining of sediments in streams"**, which aims at reducing regular cleaning works of streams, that not only have a large cost but also have significant environmental effects (cleaning of river basins with excavators to remove reeds and vegetation in general which causes significant hydromorphological alterations with negative impacts on river ecosystems)

PRO-CY_13 **"Restoration of continuity of flow of main streams",** which aims to ensure the continuity of watercourses which will be made either by strip expropriation in the lower elevation channel, or by situate public green areas / protective zone along this strip, or through other ways which will investigate the relevant departments.

PRO-CY_14: "Recovery and improvement of hydraulic characteristics of streams" that provides:

> The study of best recovery practices and improvement of hydraulic characteristics of streams and implementation of Standards/Guidelines for the content and methods of studies on this subject. The study/studies will examine alternative recovery solutions with priority in the promotion of soft (green) interventions in the river bed and riparian areas (using environmentally friendly materials such as rock fills gabions instead of concrete investments, etc.). In any case, the studies will take into account the commitments and obligations which arise from the provisions of the second RBMP and the environmental legislation.
>
> The implementation of Study/Studies concerning the possibility of exploring and promoting recovery and upgrading works of streams, in order to be met the needs of secure routing 20-year flood on 19 ASPFR in positions that are identified by the Flood Risk Assessment.

PRO-CY_15: **" Streamlining of the licensing procedure of rights on crossing rivers/streams"** which includes the streamlining of the procedures followed by the Land

Registry on the authorization of transit rights to landlocked pieces, to limit the number of passes over streams/rivers.

PRO-CY_16: **"Streamlining of planning of road crossing of rivers/streams"** includes the streamlining of the siting process of road crossings which is made by the Departments of Public Works, Town and District Administration, in new road engraving (similar to the previous measure).

The measure of FRMP **PRO-CY_07: "Promoting private rainwater harvesting systems",** includes the investigation of financial support to collection of storm (rain water harvesting) at existing licensed (by the enactment of the Law Flood) houses for garden watering.

The measure of FRMP **PRO-CY_01: "Exploitation of existing water reservoir works to retain flood flows"**, includes the preparation of a study with subject the investigation of the introduction of reservoirs, upstream of APSFR, and the opportunities of their optimized operation, so that on the one hand to cover with the maximum way the needs of the uses which they serve and on the other hand to provide the maximum flood protection downstream.

15.1.1.2 Measures and Provisions of the RBMP that influence the elaboration and finalization of actions for the implantation of technical measures of FRMP in specific Water water bodies

In this chapter, the measures and general provisions of RBMP which concern specific WB, about which special intervention are provided by FRMP, are presented. The water bodies are:

– The River WD CY_9-2-h_RIh_HM Germasogeia,
– The River WD CY_6-5-i_RE Almyros and
– The River WD CY_6-5-h_RE Alikos
– The Lake WD CY_7-2-6_16_L2-HM Paralimni.

For these WB, the followings are mentioned:

WB CY_9-2-h_RIh_HM Germasogeia. The FRMP does not include any specific technical interventions, but RBMP propose specific measures with interventions to the hydromorphological characteristics of rivers WB in order to achieve Good Ecological Potential, and which is expected to contribute to the objectives mentioned in FRMP for protection from floods. These measures are:

ΣΜ-vii-02: Removal of horizontal barriers to improve the hydromorphological characteristics of selected WB that support important ecological elements

ΣΜ-vii-03: Cleaning/re-arrangement of Active River bed to improve the hydromorphological characteristics of selected WR which support important ecological elements

ΣΜ-vii-04: Tree planting with native species to improve the hydromorphological characteristics of selected WB which support important ecological elements

ΣΜ-vii-08: Removal of exotic/invasive plant species in selected areas in order to improve important ecological features

ΣΜ-vii-09: Ecological recovery of river bed/bank in selected HMWB

ΣΜ-vii-12: Local interventions in the river bed of selected WB (e.g. local conditions) to improve the hydromorphological characteristics that support important biological elements

ΣΜ-vii-10: Maintaining/creating water shelters at selected WB

ΣΜ-vii-11: Create shallow reef/small lakes, enhancing habitat in selected HMWB

ΣΜ-vii-13: Develop fish ways in specific small cross runways to improve the living conditions of selected species of fish fauna.

4. For WR CY_6-5-i_RE Almyros and WR CY_6-5-h_RE Aliki, it is provided under the measure PRO-CY_14 « Recovery and improvement of hydraulic characteristics of streams" of FRMP the following interventions:

– to r. Almyros downstream of K.P. 4 + 500 to the end of the under consideration part. Recovery of the river bed. The interventions will take into account the environmental commitments for the protection of water-tortoises at THE WB.
– Store flood water in the basin of r. Almyrou via a runoff storage/buffer work that operates as a recharge project if it is compatible to the regime of NATURA
– Assessment of adequacy of road crossings along r. Almyrou and Aliki downstream the motorway A1 in order to serve the 20-years flood and projects (widening, shaping sidewalls input-output) and interventions (cleaning, removal of transverse pipes, river bed protection) for the upgrade of crossings.

During the planning of these interventions should be considered that the WB is integrated in the register of protected areas of Article 6 of the WFD since they are water bodies which are associated with protected species and habitats. Thus, any intervention should ensure the preservation of the quality characteristics of the water in the area.

5. For the **lake WR CY_7-2-6_16_L2-HM Paralimni**, the FRMP provides the measure **PRO-C07_01** «Control of outflows of Paralimni Lake" which includes of existing infrastructure for controlled evacuation and exploitation of Paralimni lake waters and a plan of for the controlled regulation of outflows from Lake Paralimni using the evacuation tunnel to ensure protection against flood with return period of 100 years. These interventions should take account of the requirements resulting from the study of WDD on the specific conditions of Lake Paralimni and maintain its characteristics. The controlled adjustment of the effluent will also help to better environmental management of the lake’s water (better control of the quantities which removed and when this is done to ensure and protect the species). Also, the lake is integrated in the Register of Protected Areas under Article 6 of WDF as a Water Body that is related to protected species and habitats. Thus, any intervention should ensure the preservation of the quality of water features.

Finally, mentioned that the design of any other technical intervention in WB should take into account the objectives which set out in the RBMP in accordance with Article 4 of the WFD.

15.2 CONNECTION AND SYNERGY WITH THE DROUGHT MANAGEMENT PLAN

The Drought Management Plan is an integral part of the Management Plan the River Basin of Cyprus. All the measures referred to in the Drought Management Plan is part of the RBMP measures program. The measures for drought management resulting from the revision of the Drought Management Plan include the following categories, depending on the sector in which they focus:

– The water demand management measures
– Measures to increase water availability
– measures to minimize the impact of drought / water shortage

The measures and actions stemming from the Drought Plan include the following:

– Specific action program of measures also serve other purposes of Directive 2000/60 / EC. These measures included the 1st RBMP measures embodied in the actions of the competent bodies involved in water management and are presented in Chapter 7.1
– Additional Measures above solely between actions for the management of drought, which are an integral part of the RBMP measures program

Brief information on these measures and their relationship with the RBMP measures program.

15.2.1 Measures of the RBMP Programme of Measures that have direct cooperation with the management of drought

– These measures include the following:

Measure's Category of Drought Management Plan	
Measures fro demand management	
Measure	Divices / Water saving technologies (domestic consumption)
Correlation/ cooperation with measures of Program of Measures	
The implementation of this measure includes two stages implementing appropriate Pricing and ongoing training and information to users. The measure METRO SB-x-02: Continuation of water conservation awareness in households and schools. View activities done so far and set continuous information on the value and water efficiency falls within this framework. Also in this part of the 1st RBMP measures longer lasting effects and they are introduced to the functioning of the competent bodies and related with measures codes 108, 131, 132, 133, 134, 135, 136 and 137 are a group of measures related to	

<table>
<tr><td colspan="2">information and public awareness and educational activities.
the measure ref. 117: Guide Requirements Syntax and Coding equipment new buildings with low water consumption devices
Finally all the measures of the 1st RBMP applicable to the implementation of cost recovery for the purposes of Article 9 of the Directive forms part of the measure.</td></tr>
<tr><td>Measure</td><td>Counting water consumption</td></tr>
<tr><td colspan="2">Correlation/ cooperation with measures of Program of Measures</td></tr>
<tr><td colspan="2">This measure is implemented by the following measures:
Measure BM-c-04: Reducing irrigation requirements in aquifer level
Measure 1st RBMP with code 110 is an ongoing activity and includes: putting the CAPO database. with the addition of suitable areas for monitoring and issues related to the management of irrigation demand, as part of a strategic partnership of WDD. with CAPO. Moreover the following measures assist those above:
BM-c-01: Examination voluntary recording capacity of the quantities consumed by groundwater through internet by creating specific application and providing information on consumer awareness
BM-e-01: Upgrading the registry of abstraction points of groundwater and its functional integration in new drilling permit procedure
BM-e-02: Complete the registration of real abstraction of groundwater and the finalization of the balance of groundwater systems based on these data and their disclosure on the website of the WDD that already operates.
BM-e-03: The upgrade registry small point of abstraction and its disclosure.
SM-xv-01: Transfer of knowledge and information actions - Training producers through Measure 1 of the RDP 2014 -2020.</td></tr>
<tr><td>Measure</td><td>Reduction of leakage in distribution networks</td></tr>
<tr><td colspan="2">Correlation/ cooperation with measures of Program of Measures</td></tr>
<tr><td colspan="2">Implemented through the measure of the 1st RBMP A/A 109 which relates to the continuation of the measurement system application, recording and reporting losses of Great Governmental Irrigation Works (Editing annual reference reports from the District Offices of the WDD.) And constitutes continuing action to period 2016-2021.</td></tr>
<tr><td>Measure</td><td>New technologies and changing procedures in agriculture (improvement of control and irrigation methods, etc.)</td></tr>
<tr><td colspan="2">Correlation/ cooperation with measures of Progrm of Measures</td></tr>
<tr><td colspan="2">The measure applies to the ΣΜ-x-03: Investments in material assets Measure 4 Status 4.1, 4.3.2 and 4.3.3 (RDP 2014-20) and in particular measures relating to the Status 4.3.3 on on Imlpementation of innovative technologies in irrigation.</td></tr>
<tr><td>Measure</td><td>Reuse of water</td></tr>
<tr><td colspan="2">Correlation/ cooperation with measures of Progrm of Measures</td></tr>
<tr><td colspan="2">Implemented measures.
ΣΜ-x-01: Launching implementation of projects to increase recycled water use in agriculture that may include the construction of winter storage reservoirs and distribution projects and water disposal.
ΣΜ-x-03: Investments in material assets Measure 4 Status 4.1, 4.3.2 and 4.3.3 (RDP 2014-20) and in particular measures relating to the Status 4.3.2 relating to investments in government water infrastructure to use recycled water.</td></tr>
</table>

<table>
<tr><th colspan="2">Measure's Category of Drought Management Plan</th></tr>
<tr><td colspan="2">Measures to increase the water availability</td></tr>
<tr><td>Measure</td><td>Recharge of ground aquifer</td></tr>
<tr><td colspan="2">Correlation/ cooperation with measures of Progrm of Measures</td></tr>
<tr><td colspan="2">Implemented with measures:
ΣM-xiv-01: Investigation of groundwater recharge program
ΣM-xiv-02: Integration of groundwater recharge perspective in designing flood defenses and other related natural water retention projects</td></tr>
<tr><td>Measure</td><td>Use of alternative water sources:
Desalination
Collection of rainwater
Recycling of grey domestic water
Use of alternative water sources in industry
Sustainable Systems of Storm Water DrainageΑειφόρα (SUDS)
Direct and indirect water reuse
Use of alternative water sources for irrigation (see the data above for reuse measures)</td></tr>
<tr><td colspan="2">Correlation/ cooperation with measures of Progrm of Measures</td></tr>
<tr><td colspan="2">Implemented with measures:
ΣM-xi-01: Satisfaction of irrigation projects for the water needs of wider area of Nicosia – Transport pipeline from Basilikos Desalination Unit
ΣM-xii-01: Desalination instruction of Paphos
Also assisted by the BM-h-02 measure: Special Action Programme on the treatment of stormwater basin from residential areas and industrial facilities to protect water
Related with the direct and indirect water use an the use of alternative water resources for irrigation, in relation with the measures mentioned above for water reuse measure</td></tr>
</table>

15.2.2 Measures for the management of drought

- Relating to measures aimed at solely the Management of Drought and Water shortage. These measures are:

– MEASURE 1: For projects of the Southern Conveyor and Paphos dependence of water release from price tamiefmenou volume all the dams at the end of the input period (April). This correlation of abstractions shown in Drought Management Plan should be reviewed regularly. To this extent specified allowable abstraction of water from the dams of the Southern Conveyor Project (Kouris, Yermasogeia, Kalavasos, Dipotamos, Polemidhia Achna inputs from diverting Diarizos (Arminou dam and Ha-

River) and the diversion p. Maron) and the dams of Paphos (Asprokremmos project. Mavrokolymbos and canavas) based on storage dams on 1 April.

- MEASURE 2: "Update the appropriate mechanism for monitoring and management of drought where established indicators for monitoring the intensity and duration of the drought. These indicators are used for the activation of Article 4.4 of the Directive on exemptions.
- MEASURE 3: Correlation of the degree of utilization of desalination plants on the basis of the procedures described in the Drought Management Plan. This measure concerns practically since the 1st RBMP with s / n 119 which is ongoing activity for the period 2016-2021.

Finally, it is noted that the Drought Plan provided guidelines for the long-term creation of appropriate infrastructure as the physical storage in the basin (rivers, lakes, wetlands, aquifers), the construction of small reservoirs and / or reservoirs as well as the transport of water from other , neighboring watersheds Diarizos (and Ha River) to Kouris, Ezousas to Asprokremmos, etc. the planning and design of these facilities should in any case be compatible with WFD objectives and take into account the general and specific guidelines for provisions of project management .

15.3 ASSOCIATION AND COOPERATION WITH THE DIRECTIVE FOR MARINE STRATEGY (DIRECTIVE 2008/56 / EC)

The Fisheries and Marine Research (DFMR) which is the Competent Authority for the implementation of the MSFD in Cyprus, participated in the Steering Committee on the implementation of the Management Plan and Training Programme of Measures.

- In connection with the ongoing implementation of the Directive so far in Cyprus has implemented all the measures required in Articles 8, 9 & 10 of the Directive on Marine Strategy. and in particular:
- Completion of Initial Evaluation of the Marine Environment of Cyprus in accordance with the essential features and characteristics, taking into account the anthropogenic pressures and the consequent impact on it, based on the annexes to the MSFD.
- Completed the Determination of good environmental status based on the characteristics set out in Annex I of MSFD and Decision (2010/477 / EU) Commission on criteria and methodological standards for GES.
- Introduced the Environmental objectives and associated indicators.
- Develop the program of measures to achieve good status is expected to be operational by the end of 2016.

The provisions that will result in the completion of a program for coastal areas and coastal waters should provide additional measures of the 2nd RBMP.

16. NEXT STEPS

This chapter is added as a result of the consultation of the Draft Management, which identified the need to present key actions and activities planned to be implemented on the application of the provisions of the 2nd Management Plan. In this context identified during the consultation the need for a summary of the planning for the following issues:

- Programming implementation of the Road Maps for the quantitative management of surface and the gradual reduction of abstraction for irrigation from groundwater described in the Programme of Measures.
- rationalization of the Water Status Monitor.
- the definition of targeted information / awareness campaigns for farmers in relation to the rational management of water.
- Programming implementation of the Road Maps of actions on managing surface and groundwater

Programming implementation of the road maps specified in the description of the axes of actions included in them and which is set out in sections 13.4.1.5 and 13.4.1.6. Below briefly given this information

A. Roadmap for the quantitative management of surface waters

It includes 4 stages of activities with a time horizon for completion by 2027, and provided for evaluation and possible revision of these in 2021 as part of the next Management Plan. Below is the indicative timetable for implementing the planned actions.

Action 1	Recording of extractable quantities
Timescale of Implementation	
This action has been initiated within the framework of the 1st RBMP, reinforced in the 2nd RBMP Measure BM-e-03 «Upgrading Recording Registry of small point abstractions and disclosure." It refers to continuous action. The Register, which has arisen from the start of recording of water abstraction is updated from the data of the new licensing for new abstractions.	

Action 2	The study of alternative water saving and (especially) Irrigation
Timescale of Implementation	

Includes imlpementation of the following actions:

Imlpementation of Pricing policy

The 1st Management Cycle has already routed with the implementation of article 9 of the Direcitve 2000/60/EC

Recuction of transmission losses of irrigation water

Refers to repair / replace of old closed pipelines. This action is expected to be specialized in the next managament cycleΑφορά στην επισκευή/αντικατάσταση

Specialization of restructuring crops at local level

This action provided in Statute 10.1.5 measure 10 of RDP 2014-20 "Reducing irrigation requirements in aquifer level. Replacement / restructuring water consuming crops''

Use of improved irrigation systems,

This action is provided in Statute 4.1 measure 4 of RDP 2014-20, relating to investments in Agricultural holdings (Improvement Plans), small irrigation systems compatible with article 46 of Regulation 1305/2013, in livestock waste management and infrastructure investments

Increasing desalination use with extensions and possibly the creation of new facilities

Already today 4 units of desalination are in operation with a total capacity of 73 million m^3/year and already planned in the 2nd Management Cycle to Supplementary Measure the desalination contruction of Paphos Measure ΣΜ-xii-01 «Instrtuction of desalination of Paphos».

Increase the use of recycled water for irrigation

Already today 9,9 million m^3/year of recycled water are available in the 2nd Management Plan planned new transportation projects and the water storage which are both provided in the Statute 4.3.2, Acrion A' measure 4 of RDP 2014-20 and measure of Management Plan ΣΜ-x-03 «Investments of material assets - Measure 4. Statute 4.1, 4.3.2 και 4.3.3 (RDP 2014-20)» as well as the measure ΣΜ-xi-01 «Stisfaction Projects of irrigation needs in wider area of Nicosia – Transport Pipeline from desalination unit of Basilikos of 2nd RBMP which is funded by the European Investment Bank»

Action 3	Training for Qusntitative Management Plan
Timescale Imlpementation	

Includesι

Formulation of infrastructure provision or consumption of water (dams, desalination plants, ΣΕΛ producing recycled water, irrigation areas, water supplied towns etc.),

Updating the current and future water needs for drinking, irrigation and the required

environmental benefits and the consequent updating of hydrological study to determine the hydrologic conditions in mid hydrological years of drought (3 alert stages) and a representative wet years, Water balance study in monthly or bimonthly where appropriate step for each self-contained water supply system, eg South Pipeline, Paphos projects etc. To assess the alternative management methods. Shaping of infrastructure already available but required the transfer of such data in a single system. All of these actions can be launched within the current management cycle

–

Action 4	Water Politcal Management Adjustment
Timescale Implementation	
Water political management and quantities which can be taken for water supply or irrigation will be determined in the Quantitive Management Plan avove (Action 3). Special issues will be taken into account when finalizing when approving quantitive abstractions for irrigation concern: The current practice of use of each poristion of abstraction from multiple farmers, and Rotational crops on the same field year after year in non-permanent crops may involve switching water consuming with irrigated cultivation (potato with vetch or barley). This adjustment can be achieved with the completion of Action 3 and it is expected to start after 2021.	

B. Roadmap for the gradual reduction of abstraction for irrigation from groundwater

The main purpose is to reduce the recoverable amounts to less renewable. The Road Map for groundwater includes 4 stages of activities with a time horizon for completion by 2027, and provided for evaluation and possible revision of these in 2021 as part of the next Management Plan. Below is the schedule for the implementation of these actions.

Action 1	Determination of the position and quantites of abstractions
Timescale of Implementation	
The governmental positions of abstractions are known and cotrlloed, while for the private drillings the following are valid: The private drillings have now started (around 100.000 applications), while unregistered (according to law) can be sealed if identified, Their electronic registration in the database is pending, and the review procedure (on the spot) and for this purpose it is included a measure to assignment a private body (for lack of public staff), The drillings should be equipped with water meters, this will be checked on the spot This action is routed by the implementation of 1st RBMP.	

In the 2nd RBMP the actions above are continued with measure BM-c-01 «Examining the possibility of voluntary registration of quantities consumed by groundwater through intenet by creating specific application and relevant consumer awareness» andı BM-e-01 «Upgrading registation record of abstraction points of groundwater and its functional intergration in the authorization procedure for new drillings». This ation is continuing. The Registry resulting from the recording of abstraction is updated from the data of the new licensing for new abstractions.

Action 1	Definition of quantities that should be pumped annually by GWB
Timescale of Implementation	
The quantities that can be derived from each drilling annually, are established with the authorization of drilling, depending on the extent and type of plantations. Specific issues will be taken into account when finalizing when approving quantities withdrawals for irrigation related: the current practice of use each position of abstraction from multiple farmers, the use of each drilling from multiple farmers rotational crops on the same field year after year (rotation) non-permanent crops may involve switching water consuming with irrigated cultivation (potato with vetch or barley). Determination of the annual allowable abstraction from aquifers planned to develop specific hydrogeological studies will include documented estimates of renewable resources - and for this purpose has been included in the Programme of Measures pilot study on BM-c-03 «Design of rational utilization and protection System groundwater CY-19 to prepare a full and comprehensive hydrogeological study, analysis of supply conditions - operation and training documented groundwater balance "in this direction include the Measure BM-e-02 «Completing the registration of real abstraction of groundwater and the finalization of the balance of groundwater systems based on these data and their disclosure on the website of the Department already operates» This action is expected to be completed in 2027	

Action 3	Determination and implementation of possible ways of saving water
Timescale of Imlpementation	
Practically is identified with Action 2 for surface water (see above)	

Action 4	Development of implementation mechanism/initiatives and control mechansim

Timescale of Imlpementation
(α) Implementation mechanism may incude the drilling statement on producer request, The establishment of allowance amounts in multiple compliance creating an obligation complex which is associated with the payment of agricultural aid, The obligation to declare the quantities that were enjoyed in total each year from the drillings, with the owner's responsibility (b) Motivations may be pricing eg. favorable pricing of reasonable quantities and very high price over the reasonable saving water. (c) The mechanism of control may include checks of quantities actually pumped sampling and responding to complaints and sanctions. The WDD is already working with the CAPO to audit abstraction drillings (> 5.000 m^3 / year). Note, however, that the mechanism of control can yield the greatest benefits is the integration of controls of other bodies (such as WDD) on cross-compliance (required issuance of an administrative act. Planning of the above has already routed and is expected to be fully implemented until 2021.

Rasionalising monitoring network

Mainly refers to the monitoring of Priority Substances.

From the monitoring results of the chemical status of bodies follows systematic failure to detect certain substances. This information can be used to streamline the monitoring effort of the state of the country's waters.

In particular, substances which are systematically not detected in Cyprus waters may not monitored operational but may be included in surveillance monitoring which according to Annex V of Directive 2000/60 / EC carried out for a period of one year during the period covered by a River basin Management Plan, where these are related priority list pollutants which are discharged into the river basin or other pollutants discharged in significant quantities in the river basin.

Furthermore, as indicated in Annex V of Directive 2000/60 / EC if the previous surveillance monitoring exercise found that HS is in good condition and there is no evidence from the review of human activities effects that impact on it has changed, then surveillance monitoring carried out once every three Plans River Basin Management.

In this context provided to evaluate the results of the monitoring program as described above so that rationalizing the current program, to save resources (capital and money) the holes can be exploited in other sectors (e.g. measurements in sediments and biota (biota) or and hydromorphological characteristics).

Determination of targeted information / awareness campaigns for farmers in relation to the rational management of water

The farmers related to key users of Cyprus waters which are considered highly sensitive user group for economic and social reasons.

Many of the Measures of 2nd Cyprus River Basin Management Plan focused, directly or indirectly, in rural activities. In addition, a significant amount of the Rural Development Programme - of about € 73 million. - Utilized to achieve the purposes of the Water Directive.

The success of this depends largely on the acceptance by the rural community of Cyprus and for this purpose is considered particularly important to raise awareness and inform farmers about the objectives and the opportunities offered to them by following rational water management practices.

For this purpose, besides the usual information and awareness to the public by the WDD, which is fixed and firm policy, has joined the program of measures specific measure with a budget of 500,000 € and objective information and knowledge transfer to producers in areas such as water management and implementation of environmentally friendly agricultural practices. In this context can be included the following actions:

- Direct conduct of workshops at local level as far as possible (even at the municipal level) to inform farmers about on those measures provided for by the Management Plan and the benefits it can have on them.
- The creation of special information leaflets layman the possibilities given to farmers through existing financial tools and practices for the rational management of water. Such leaflets can be created for the layman presentation relating to agricultural production measures the Management Plan.
- The framing renovation project targeted producers (e.g. potato producers, citrus producers), which utilizing new technological opportunities (e.g. messaging) to periodically useful information on saving and / or rational water use practices (such as using optimal amounts of water depending on weather conditions, etc.)
- The creation of a free telephone line that can give useful information for special applications, practices and / or licensing procedures related to agricultural production and water use.

The above can be specialized in a special information action program for farmers that can be done in cooperation with all stakeholders and which would set out all required for this action.

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ANNEXES

ANNEX A: REMOVABLE WB OF EPHEMERAL FLOW

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Name	Occupy	Character	Code	Area_km^2
Limnarka	NO	E	CY_1-5-a_RE	14,11
Limnarka	NO	E	CY_1-5-b_RE_HM	0,35
Kochinas	NO	E	CY_1-5-c_RE	6,77
Kochinas	NO	E	CY_1-5-d_RE_HM	6,53
Agriokalami	NO	E	CY_1-5-e_RE	11,68
Potamos tou Kambou	YES	E	CY_2-9-e_RE_HM	5,96
Vrountokremni Argakin	NO	E	CY_3-2-e_RE	9,08
Atsas	YES	E	CY_3-4-d_RE_HM	5,27
Galouropniktis Potamos	NO	E	CY_3-5-g_RE	15,35
Xeropotamos	NO	E	CY_3-6-a_RE	5,73
Potami	NO	E	CY_3-6-b_RE	27,37
Komitis	NO	E	CY_3-6-c_RE	25,57
Peristerona	NO	E	CY_3-7-c_RE	5,29
Potamos tou Akakiou	NO	E	CY_3-7-k_RE_HM	25,17
Korivas	NO	E	CY_3-7-L_RE	12,02
Merika	NO	E	CY_3-7-o_RE	66,96
Kokkinitrimithia	NO	E	CY_3-7-p_RE	28,44
Serrakhis	YES	E	CY_3-7-q_RE_HM	55,71
Ovgos	NO	E	CY_3-7-r_RE	63,82
Pedhieos	NO	E	CY_6-1-d_RE_HM	42,22
Pedhieos	NO	E	CY_6-1-e_RE_HM	10,85
Kouphos	NO	E	CY_6-1-g_RE	9,98
Argaki	NO	E	CY_6-1-h_RE	10,55
Klemos	NO	E	CY_6-1-i_RE	2,88
Klemos	NO	E	CY_6-1-j_RE_HM	11,35
Katevas	NO	E	CY_6-1-k_RE_HM	11,05
Kaloyeros	NO	E	CY_6-1-L_RE	29,91

Vathys	NO	E	CY_6-1-m_RE_HM	10,75
Dhrakondias	NO	E	CY_6-1-n_RE_HM	8,39
Vyzakotos	NO	E	CY_6-1-o_RE	9,77
Almyros	NO	E	CY_6-1-p_RE	20,56
Yialias	NO	E	CY_6-5-c_RE	50,40
Liopetri	NO	E	CY_7-2-b_RE	46,33
Liopetri	NO	E	CY_7-2-c_RE_HM	10,88
Avdellero	NO	E	CY_8-1-a_RE	11,25
Avdellero	NO	E	CY_8-1-b_RE_HM	19,44
Aradippou	NO	E	CY_8-2-a_RE	53,66
Aradippou	NO	E	CY_8-2-b_RE_HM	13,21
Ammos & Kalamoulia	NO	E	CY_8-4-a_RE	23,34
Xylias	NO	E	CY_8-4-b_RE	11,63
Tremithos	NO	E	CY_8-4-c_RE_HM	60,84
Tremithos	NO	E	CY_8-4-d_RE_HM	7,35
Ayia Marina	NO	E	CY_8-4-e_RE	14,20
Mosfiloti	NO	E	CY_8-4-f_RE	18,98
Pouzis	NO	E	CY_8-5-b_RE	8,79
Xeropouzos	NO	E	CY_8-5-c_RE	16,89
	NO	E	CY_8-7-h_RE	11,30
Potamos tou Ayiou Mina	NO	E	CY_8-8-d_RE_HM	6,16
Pendakomo	NO	E	CY_9-1-a_RE	15,49
Argaki tou Pyrgou	NO	E	CY_9-1-c_RE	5,41
Argaki tou Pyrgou	NO	E	CY_9-1-d_RE	12,52
Argaki tis Monis	NO	E	CY_9-1-e_RE	16,46
Vathias	NO	E	CY_9-3-a_RE	11,50
Vathias	NO	E	CY_9-3-b_RE_HM	8,57
Vathias	NO	E	CY_9-4-a_RE_HM	14,87
Garyllis	NO	E	CY_9-4-f_RE_HM	3,41
Ypsonas	NO	E	CY_9-5-a_RE	12,74
Batsounis	NO	E	CY_9-6-u_RE	7,74
Tapakhna	NO	E	CY_9-6-v_RE	7,30
Tapakhna	NO	E	CY_9-6-w_RE_HM	0,93
Krommya	NO	E	CY_9-7-a_RE	12,47
Symvoulas	NO	E	CY_9-7-c_RE_HM	13,02
Pantijo	NO	E	CY_9-8-d_RE	14,67
Ayios Thomas	NO	E	CY_9-8-e_RE	14,28
Alekhtora	NO	E	CY_9-9-a_RE	31,53

ANNEX B: FRESHWATER FISH FAUNA OF CYPRUS

According to the WFD 2000/60 / EC, the fish are biological element that must be used to assess and monitor the ecological status of rivers, lakes and transitional waters.

Ichthyology criteria are:

the establishment of fish-communities,

abundance and age distribution (or the size of atoms) of each item.

In small and / or insular Mediterranean basins are poorly implemented integrated projects for developing special ichthyology assessment indicators of the state of inland waters under the WFD requirements.

In this direction took place in Cyprus, the first study on the fish fauna (contracts WDD 49/2010 and YY02 / 2012) that attempts a first approach based on extensive sampling in rivers of the island.

An important knowledge gap remains for the fish fauna because not collected monitoring data (time series data) and yet there are significant gaps in the recording of geographical distributions in rivers and other water bodies. There are still gaps in the range of important traits in fish-concentrations (population densities, a proportionate share of species in the sample, the presence of rare species, etc. species breeding status).

Research standardized sampling in lakes and reservoirs has never been held on the island in WFD implementation framework and the data available in the literature on this topic is incomplete. There are certainly indications that in some lakes and natural wetlands fish have special importance (e.g. Oroklini). Here we refer to the understanding of the status of fish populations in the context of implementation of the WFD and suggested concrete steps for the further implementation of this BQE Island.

THE SPECIAL CASE OF INLAND WATER SPECIES OF CYPRUS

Because of island biogeographic isolation of Cyprus are peculiar conditions that do not exist in countries that have contact with the European continent.

There are few native species of freshwater fish and little historical information available for distribution on the island. Overall, they have confirmed 25 species of fish in inland waters of Cyprus and of these eight are native species (Zogaris et al. 2012a, 2012b, Zogaris et al. In prep 2015). Of the native species only eel (A. Anguilla), the potamosaliara (S. fluviatilis) and Zacharias (A. fasciatus) live for long periods in inland waters. The eel is the most widespread native of Cyprus, a euryhaline fish that makes very large migrations, but they lived for most of his life in inland waters. The other five native species are euryhaline fish introduced for short periods in inland waters of the sea (occurring in inland waters mainly in estuaries, coastal wetlands and lagoons). Of the 17 invasive species which we know is sailer installed, 13 are common in many inland waters on the island, and most of the related reservoirs (Chart B-1).

Table B-1: List of fish species recorded in Cyprus' internal waters

In square brackets [] indicate whether the species is widespread on the island:
[W], confirmed the presence of more than three basins,
[L] with established local presence in fewer than three watersheds on the island.

	Scientific name (common English name)	Presence status NIS=Non-Indigenous species, foreign species Established = Known as installed with self-sustaining populations on the island Native = native species, Native Marine = native marine origin.	Main types of habitat in which it responds to the kind of: reservoirs, river , river-mouths, wetlands.
	Alburnus (common bleak)	NIS ESTABLISED	reservoirs [L]
	Anguilla (eel)	Native	rivers, wetlands, reservoirs [W]
	Aphanius fasciatus (Mediterranean toothcarp)	Native	brackish wetlands, river-mouths [L]
	Atherina boyeri (big-scaled sandsmelt)	Native Marine	wetlands, river-mouths [L]
	Abramis bjoerkna (silver bream)	NIS	reservoirs [L]
	Carassius auratus (common goldfish)	NIS ESTABLISED	reservoirs, rivers [W]
	Carassius gibelio (gibel carp)	NIS ESTABLISED	reservoirs, rivers [L]
	Cyprinus carpio (common carp)	NIS ESTABLISED	reservoirs [W]
	Dicentrarchus labrax (European sea bass)	Native	marine (stocked and escapted from fishfarms)
	Gambusia holbrooki (mosquitofish)	NIS ESTABLISED	rivers, reservoirs, wetlands [W]
	Ictalurus punctatus (channel catfish)	NIS ESTABLISED	reservoirs, rivers [W]
	Lepomis gibosus (pumpkinseed)	NIS ESTABLISED	reservoirs, rivers [W]
	Micropterus salmoides (bigmouth bass)	NIS ESTABLISED	reservoirs, rivers [W]
	Mugil cephalus (striped grey mullet)	Native Marine	river-mouths, wetlands, rivers [W]
	Liza aurata (golden grey mullet)	Native Marine	river-mouths, wetlands, rivers [L]
	Liza ramada (thinlipped grey mullet)	Native Marine	river-mouths, wetlands, rivers [W]
	Oncorhynchus mykiss (rainbow trout)	ESTABLISED	reservoirs, rivers [W]
	Oreochromis aureus (golden tilapia)	ESTABLISED	reservoirs, rivers [W]
	Perca fluviatilis (European	NIS ESTABLISED	reservoirs, rivers [L]

	Scientific name (common English name)	Presence status NIS=Non-Indigenous species, foreign species Established = Known as installed with self-sustaining populations on the island Native = native species, Native Marine = native marine origin.	Main types of habitat in which it responds to the kind of: reservoirs, river , river-mouths, wetlands.
	perch)		
	Rutilus (European roach)	NIS ESTABLISED	reservoirs, rivers [W]
	Salmo trutta (brown trout)	NIS ESTABLISED	rivers reservoirs [W]
	Sander lucioperca (pikepearch)	NIS-ESTABLISHED	reservoirs [L]
	Esox lucius (northern pike)	NIS	reservoirs [L]
	Tinca (tench)	NIS	reservoirs [L]
	Salaria fluviatilis (freshwater blenny)	Native (presumed extinct)	rivers [L]

Source: Zogaris et al. (In prep 2015).

In Cyprus dominated by alien species in inland waters. They come from Europe, Africa and America and have been introduced by humans. Some now abound in reservoirs where mostly carried by and for anglers. Many species have acclimatized and reproduced in nature for decades now. The question of interpretation of the effects of alien species requires special attention and strategic management. Certainly there are invasive invasive species (invasive alien species) is known in other areas of their allonchthonis spread is harmful to the natural ecosystem.

Serious problem is fish-eating exotic fish in Mediterranean countries (e.g. Clavero et al. 2013). Exemplifies the husky bass (Micropterus salmoides) that feeds on native insects, amphibians, fish and reptiles. These populations are considered by many researchers as a form of "biological pollution" and more likely to cause significant adverse effects when invade the indigenous communities of rivers (e.g. devour zoobenthos, the insect and the eggs and fry small vertebrates, changing the composition species in small water bodies) (see. e.g. Copp et al. 2005). This type of course is top concern for recreational fishing and for this reason it is certain that there will be significant interest from large group of fishermen for preservation in several reservoirs. Unfortunately, the practice of arbitrary and stimulate imports for recreational fishing is still almost uncontrollable and the number of alien species appears to be increasing in Cyprus.

Some strange species but fish inhabit rivers and reservoirs without causing appreciable ecological disturbances and there is a view that some alien species can and develop natural ecosystems that have been "lost" natural species populations reason extinction (see. Schlaepfer et al. 2011). The extinctions of natural or man-made causes are much more common on islands, or respectively in small island watersheds (i.e. About the kinds of freshwater basins act as "islands" in the biogeographical sense). At the same time, man has played for millennia important role in the introduction and dispersal of aquatic and terrestrial species on islands. Moreover, many of the terrestrial ecosystems fauna species have been transferred to Cyprus and several islands by humans and many are fully integrated and local ecosystems elements today. Typical is the case of brown trout (Salmo trutta) called that introduced in the mountain rivers of British foresters in 1948. Maybe someday there and native trout species on the island, as it exists even in Sardinia, Corsica and Sicily. Although the island was the brown trout that we see today on mountain rivers then fills a "void" ecological niche. Further, without genetic research all trout populations of the genus Salmo to the island can not exclude the existence of natural indigenous populations because the brown trout is similar morphologically with Mediterranean native trout populations. On the issue of alien species and their integration into there is still controversy aquatic ecosystems, in some island countries (such as Ireland) there is full integration of these "naturalized species" (naturalized species) (Copp et al. 2005, Kelly et al . 2007). This issue requires special attention and research data from the historical ecology and the impact of new species into ecosystems.

Some alien species but fish inhabit rivers and reservoirs without causing appreciable ecological disturbances and there is a view that some alien species can and develop natural ecosystems that have been "lost" natural species populations reason extinction (see. Schlaepfer et al. 2011). The extinctions of natural or man-made causes are much more common on islands, or respectively in small island watersheds (i.e. About the kinds of freshwater basins act as "islands" in the biogeographical sense). At the same time, man has played for millennia important role in the introduction and dispersal of aquatic and terrestrial species on islands. Besides, many of the terrestrial ecosystems fauna species have been transferred to Cyprus and several islands by humans and many are fully integrated and local ecosystems elements today. Typical is the case of brown trout (Salmo trutta) called that introduced in the mountain rivers of British foresters 1948. Maybe someday there and native trout species on the island, as it exists even in Sardinia, Corsica and Sicily. Although the island was the brown trout that we see today on mountain rivers then fills a "void" ecological niche. Maybe someday there and native trout species on the island, as it exists even in Sardinia, Corsica and Sicily. Although the island was the brown trout that we see today on mountain rivers then fills a "void" ecological niche. Further, without genetic research all trout populations of the genus Salmo to the island can not exclude the existence of natural indigenous populations because the brown trout is similar morphologically with Mediterranean native trout populations. On the issue of alien species and their integration into there is still controversy aquatic ecosystems, in some island countries (such as Ireland) there is full integration of these "naturalized species" (naturalized species) (Copp et al. 2005, Kelly et al . 2007). This issue requires special attention and research data from the historical ecology and the impact of new species into ecosystems.

As for the distribution of species widely in river basins of Cyprus have about 32 basins (Figure B - 2). Some basins have most species due to their larger size, the existence of coastal States / wetlands and estuaries favoring euryhaline native species, the existence of reservoirs, and because they have better studied. It is important that in some basins like the Pedieos, Yermasogeia, Kouris and Dry Paphos we have more than 12 species per basin (see. Figure B - 1). This is a relatively large number of resting more in the richness of species in the reservoirs.

Figure B - 1: Summary of existing knowledge of the distribution of fish species in the basin of Cyprus. Displayed and available sampling stations in rivers, classified into three general typological classification ((SOURCE: Project WDD 49/2010 and YY02 / 2012 WDD).

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FISH IN RIVERS WATER BODIES

The fish fauna of the river consists of about 19 species (as shown by the research of WDD in sampling from 2010 to 2012 (Figure B - 2). Only 7 species occurring in more than 5 stations on the island. The Tsironi (Rutilus rutilus) is bantam cyprinids which is the most common fish in rivers - mainly because it conforms well to the riverine environment "continuous flow" near reservoirs. to this species, as allochthonous species, usually appears to have invasive behavior are not fish eating and there is no evidence that it has serious adverse effects on the aquatic ecosystem (also, with few exceptions, the population densities of the species in rivers Cypriot was always relatively low). The most common native species is eel (and therefore the difficulty apprehended by electrofishing believe that his presence is more prevalent on the island by recent recordings). The presence of eel as well as other native species that migrate from the sea was previously much more common in many parts of the island. Obviously the shrinkage of the distribution and population is a result of anthropogenic pressures on rivers.

Figure B - 2: Distribution of fish species per river / flowing water station in all electrofishing sampling (150 stations in 31 river basin in Cyprus) in the inventory project 2010-2012.

Referred articles judged to be significantly invasive species because it is known in other areas have invasive behavior. Some species not identified at the species level is o cyprinids spawn (cyprinid fry) and trout (Salmonid sp.) (Adjustment of Zogaris et al. 2012).

In rivers distinguished generalized 'Community' groupings (communities), through the consistent species composition recorded. The species distribution patterns in Cyprus rivers associated with life-long graduation natural habitat of the river. This follows a downhill gradient then the cold mountain rivers as the semi-plains and estuaries. These three general types of rivers hold characteristic ichthyological fish species assemblages (fish assemblage types in Schmutz et al. 2007 - which practically is a preliminary categorization in fish-communities). Fish gatherings repeated with approximately the same composition at several points river island (a description is given to the first, see. Chart B - 2). While this description is preliminary gatherings easier to define the early stages of the investigation of type-specific reference conditions (or maximum ecological potential) using fish.

Figure B - 1: Initial classification of ichthyology assemblages recorded in Cypriot rivers.

The type of assembly ichthyological (fish assemblage type) resulting from the classification analysis was completed on the project and WDD 49/2010 YY02 / 2012 2012. Here called the main biotic assemblages as types (first column). In the second column indicate the general type of waterway where aggregation occurs. In the third column the number of river sampling sites where the existence of the type of assembly has been confirmed. Finally the key features of assembly.

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The chart above (Chart B - 2) shows that at least three types of ichthyology assemblages dominated by native species, and the brown trout also creates clear aggregation.

FISH IN LAKE WATER BODIES

Chart B - 2: The fish fauna of the lake WB.

Area	Level of significance*	Fish fauna**	Comments on the importance of fish fauna
Main Larnaca Salt Lake	Low	Without fish.	The water body is hypersaline coastal lagoon artificially cut off from the coast of projects (airport, roads). There has been investigated \ existence fish previously.
Lake Larnaca Airport	Low	Without fish. No sampling	Hydromorphological modified coastal lagoon area. The existence of the fish has been investigated in the past.
Lake Soros Larnaca	Low	Without fish. No sampling.	Hydromorphological modified area coastal lagoon, not the existence of fish has been investigated in the past.
Lake Orphani Larnaca	Low	Without fish. No sampling.	Hydromorphological modified area coastal lagoon, not the existence of fish has been investigated in the past.
Akrotiri Salt Lake	Low	*Aphanius fasciatus, Mugil cephalus, Atherina boyeri, Anguilla, Gambusia holbrooki*	Big area with different habitats dominated by large coastal lagoon of "salt lake". Common and locally abundant species Aphanius fasciatus some wetland habitats. This is a foreign Gambusia holbrooki limited to locations with lower salinity waters. Entering eels and very small fish species populations seafood origin. The fish fauna has never been investigated, there is special interest in the fish monitoring by the British base.
Paralimni lake	Low	*Gambusia holbrooki* (possible *Anguilla anguilla*)	Peculiar closed natural basin. This is a foreign species Gambusia holbrooki develops in high concentrations locally and may affect the trophic webs of small semi-artificial 'ponds.' The lake has a peculiar benthic fauna zoobenthos acting as a very large Mediterranean seasonal swamp (Tziortzis et al. 2014). Eels entering the artificial drainage channel, but usually do not survive in the area. The issue of foreign fish fauna has never

Area	Level of significance*	Fish fauna**	Comments on the importance of fish fauna
			researched (Hatziharalambous 2011.
Oroklini Lake	High	*Anguilla anguilla, Mugil cephalus, Liza ramada, Liza sp., Gambusia holbrooki*	Particularly modified lagoon with two artificial drainage channels of communication with the sea. The grooves and elsewhere hold water throughout the year in most years. Important for eel. They observed massive killings of eels and other fish and there is a first description of the fish fauna (Zogaris 2013). Implemented redevelopment projects or habitat recovery within Life project (I.A.CO. Environmental & Water Consultants Ltd., 2012.
reservoir Achnas	Moderate	*Tilapia sp., Cyprinus carpio, Gambusia holbrooki*	Artificial water body created by a low dam in valley dried river-bed of the area. The fish population has not been investigated, probably influences limnological conditions and observed mass killings of Tilapia. The area is very interesting for breeding endangered birds (Zotos 2006) the fish fauna may affect biodiversity.

Notes

* Assessment of fish as an important component of food webs ecosystem of this region and potentially important standard of quality WB element.

** Information from unpublished sources DFMR and autopsies researchers HCMR (2010-2014).

There are no satisfactory data on fish of lake water bodies in Cyprus. The chart above (chart B - 3) refers to the existence of at least eight species in the lake bodies likely to be an underestimation because they have not done extensive sampling.

The existence of fish has not been investigated in the past in coastal lagoons of Alykes Larnaca complex or other similar wetlands of Cyprus. Judging from the existing knowledge that the Akrotiri Salt Lake and Lake Oroklini fish have particular utility in the management of aquatic ecosystems and should be counted in biodiversity conservation measures and water management. The presence of alien species (especially fish eating or invasive species) is a potentially significant burden or pressure on natural food webs in the following formations: Akrotiri Salt Lake, Reservoir Achnas, Oroklini Lake and possibly Lake Paralimni.

The Salt Lake Akrotiri complexes, Alykes Larnaca Oroklini is undoubtedly singular cases. As to the reference conditions of these formulations, it is possible that in some of these fish can be had in the past a significant presence. In Cyprus, this proves the importance of Aphanius fasciatus, eel and some types of seafood origin fish in Aliki Verde and the lake area with the most natural conservation status of hydromorphological side. In other cases altered fitness hydromorphology as at Oroklini, we see a natural penetration seafood species of origin where there is artificial contact with the sea.

There are valid guiding opinions in the fish monitoring as assessment tools of the ecological statusin the singular lacustrine bodies of Cyprus (Polycarp 2013). The fish probably can not function consistently as BQE in lake ecosystems of the island but this does not exclude the need for immediate investigation and monitoring of fish fauna for the optimal management of these ecosystems, especially because it is a protected areas network Natura 2000. One problem is the practice of consistent sampling in singular cases of lake water bodies. Based protocols have been proposed in the WFD for lakes, the nets to be used in lakes, reservoirs and transitional is gill multi-mesh gill nets type, but which can not be used in very shallow bodies (<2 m depth). The standardization of the method in various conditions in coastal lagoons are demanding (see. Perez-Dominguez et al. 2012) and in general the development of ichthyological methods for such systems have not been developed and there are problems with the application of this BQE and other Member States (Reyjol et al. 2014).

FISH AS STANDARD QUALITY DATA IN CYPRUS

The application of fish as biotic quality elements is difficult to monitor WB in Cyprus. The reasons for this are related to the low existing knowledge of fish populations, the prevalence of alien fish species and the lack of practical methods for assessing the ecological status of water bodies under these conditions. There is little information on the existence of fish in the past, but it is certain that before the modern degradation of many rivers were fish in several rivers on the island, at least for the lower reaches of rivers where entering various kinds of sea. Further there is the possibility to have disappeared some species native fish as shown review of past research (e.g. Unger and Kotschy 1865) and recent individual studies (Zogaris et al. 2013). The spatial distribution of fish in inland waters in Cyprus was until very recently little known. Today fish are absent from many natural waterways in Cyprus and because there is insufficient historical data is difficult to interpret whether this is solely due to anthropogenic pressures, physical agents or combination of anthropogenic and natural factors. The problem with the lack of credible documented of the recording of native species in the past exists in other Mediterranean basins and has been the difficulty in developing indicators (see. Benejam et al. 2008). Generally the problem with the use of fish fauna as indicator or tool for assessing the status of inland water in Cyprus is a serious challenge because fish is an important element of many river ecosystems and offered to estimate the anthropogenic fragmentation (river consistency), hydromorphological conditions and the issue of invasion and biotic interaction of alien species in inland water ecosystems. The use of fish as BQE has encountered problems in many Mediterranean countries (e.g. Ferreira et al. 2007, Aparicio et al. 2011) so that Cyprus is no exception to the need for specialization indicators or monitoring tools / methods livable rivers with the use of the fish.

Obviously scarcity and absence of many fish river sections is always a result of their natural spread and in many cases is anthropogenic degradation effect or pressure reflected in water livable. There are insufficient data from the first row ichthyology sampling in Cyprus that offer useful information on the pressure relations - effects on fish (see. Zogaris et al. 2012, Segurado et al. 2014). Comments on key pressures have altered the native fish fauna of the island or have caused substantial variation in assemblage of fish species in inland waters are:

The lack of natural river flow regime of the sea combined with barriers to fish dispersion (i.e. Horizontal barriers in the watercourse as Dimmata, roads, terraces, hydrometric stations and dams) is severe pressure on consistency rivers (river connectivity). Eel and other seafood species origin has substantially suffer from this pressure.

Anthropogenic drying some rivers / river segments (from diversions and drawing of water) is a cause of reduction of fish populations in many River WB. During drought there is complete drying of many river sections and / or local concentration of pollutants and thus disappearing fish stocks (observed massive fish kills).

Other morphological river / wetland alterations may also have degrade natural habitats of eel and other seafood species origin in the rivers and in coastal wetlands (and lake water bodies). In some rivers / streams alignments plains, mounds and degradation of riparian and wetland vegetation has adversely affected the natural habitat of the eel.

In the recent past almost all internal waters of Cyprus received a very considerable pressure from the use of insecticides to combat malaria and mosquitoes on the island. Spraying with DDT in each small the body of water during the summer months from 1946 to 1978 had a serious impact on the distribution of aquatic fauna. Certainly they shrank or some populations of aquatic vertebrates disappeared from many water bodies. At least one native species of fish, the ποταμοσαλιάρα (S. fluviatilis), may have completely disappeared from the island reason anthropogenic habitat alteration, the inland poisoning with DDT or combination of factors rather dominated by anthropogenic pressures (Zogaris et al. 2013) .

Many alien species have expanded into natural rivers and lake bodies, some of them may be natural fish populations competitors. While the issue has not been investigated in Cyprus suspected (why experiences in other areas of the Mediterranean) that at least one species, Aphanius fasciatus can be locally displaced or limited by Gambusia holbrooki.

– There is evidence that fish might be able indicators of quality status of watercourses in Cyprus, especially in certain types of rivers, or more specifically in certain basin areas of the island where native species are found and are acclimated populations of brown trout. Also recent data analyzes show that even the alien species may be useful as markers on the island (Segurado et al. 2014). As for the lake water bodies that issue has not been investigated and there is only one case where a first description of the fish fauna has been published, based on a minimum number of samples, Lake Oroklini (Zogaris 2013).

– Research for the development and / or implementation of Ichthyology indicators requires continuity. So far research has shown that some ichthyological metrics (metrics) can respond to anthropogenic pressures in Cyprus (see. Zogaris et al. 2012b). There are positive indications that the different "tolerance" that show the different types of fish to anthropogenic pressures could support the development of an ichthyological index (eg see. Meador & Carlisle 2007, Segurado et al. 2011). Cyprus already made analyzes existing quantitative data have identified the relevant "tolerance" of the most widespread fish species in anthropogenic pressures on rivers (Segurado et al. 2014). This approach has been promoted in other island countries or areas with a very small number of native species, such as Ireland (Kelly et al. 2007, Champ et al. 2009). Generally, the use of alien fish species extends to many applications WFD (Vandekerkhove J., Cardoso AC 2010) and ichthyological indicators in Mediterranean countries (Hermoso et al. 2009, 2010, Aparicio et al. 2011) as well as pointers to other semiarid regions outside Europe (Kennard et al. 2005).

PROPOSALS FOR THE CONTINUING IMPLEMENTATION OF BQE IN FISH FAUNA IN CYPRUS

The following are key development drivers of the implementation of the fish fauna as BQE in Cyprus.

There are still knowledge gaps on natural spatial species distributions, especially in the lower sections of rivers to reservoirs, lakes and coastal wetlands. Great significance and application of historical ecological research, such as the historical presence of fish in inland waters of the island. The ichthyological research on the island should continue to fuel management in the course of implementing BQE fish. There is evidence that with high level of certainty can develop a tool for assessing the ecological status or ichthyological index utilizing data from standardized monitoring samples.

Fish are important indicators for the inventory and typology of rivers and their presence in a river or river section can present concrete evidence specific hydromorphological conditions should be taken into account in the final determination, demarcation and management of water bodies. Examples of this exist in Cyprus, in areas where a small ephemeralt flow rivers there are sections fed by spring waters which host eels (eg Kidasi Sources, Ekvoli Pouzi, Baths of Afroditi, Evdhimou Area). Particular mention should be made for the management of these areas.

Regular fish tracker is necessary in rivers with standard scientific way and management / utilization of ichthyology data. Sampling should be done with standardized electrofishing method developed in the first ichthyological work of the WDD, which is also compatible with the implementation of the WFD (the IMBRIW 2013) protocol. While areas of very high conductivity waters will fish traps or nets as supplementary fish catching tools should be used. As a priority, the rivers should be monitored where there are significant populations of native species (Tower, Chrysochous, Ezousa, Dhiarizos, Ha River, Yermasogeia) and brown trout (Kouris, Dhiarizos, Xeros (Paphos)) and the areas have been identified which have begun or will begin ecological restoration projects / WFD measures which have highlighted potential existence of fish populations. Especially with respect to the flow regime in natural and heavily modified bodies of the embodiment of the monitoring items such as eel considered significant.

A peculiar anthropogenic pressure and threat to river ecosystems is the expansion of invasive or invasive fish species. At least five species are known as potentially serious invasive species invasive behavior that degrades the natural communities (Micropterus salmoides, Gambusia holbrooki, Lepomis gibbosus, Oreochromis spp., Oncorhynchus mykiss). Some species that are not yet widely available on the island, can later also prove serious invasive species or species that degrade the natural ecosystems condition (eg Carassius spp.). research is needed and develop a strategy to address this threat to biodiversity and the integrity of aquatic ecosystems.

It is important to consider the reintroduction of native fish species in Cyprus because there is objective evidence that these species have fallen reason anthropogenic pressures. A key problem is the potential disappearance of Salaria fluviatilis. If it is determined that the kind actually disappeared is important to consider the case of stimulation of neighboring populations (eg Crete). Also promoting naturalized brown trout populations (instead spread) also requires examination and scientific research with strategic recharges. In coastal wetlands (lake water bodies) importation of ζαχαριά is an important proposal which deserves consideration. Each input project to stimulate population requires scientific impact study.

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ANNEX C: BIOLOGICAL QUALITY MONITORING POINT (BQE) "macrophytes" IN RIVERS OF CYPRUS

MONITORING MACROPHYTES IN RIVERS OF CYPRUS

The macrophytes are plant organisms that live partly or completely watered in river water and is distinct to the eye. They include phanerogams, ferns, bryophytes and macroalgae. The composition of the community of macrophytes in rivers may change due to nutrient concentrations in water or by the presence of contaminants. The macrophytes are not mobile and organizations can not avoid nutrient loads carried by river water, and other problems in the physical or chemical characteristics of water affect their existence in water systems. Therefore they serve as effective indicators of the combination of permanent, seasonal and episodic pressures impacting on the habitat they occupy. The monitoring in the WFD concerns seasonal samplings, emphasizing the warm season of the year in which recognition is easy. For the special conditions of Cyprus (hot and very dry summers) considered that the assessment of the floristic composition should be done every year from mid-March until the end of May. The exact period of sampling depends on the phenology of typical species in each case and may vary depending on the weather, so I needed reconnaissance visits. First sampling period (wet season, amphibian species): March or April. Second sampling period (beginning of the dry season): May or June.

Picture C - 1: Macroprhytes in rivers

Monitoring is required to safeguard the reliability of the assessment of the status of WB. The assessment of the statushas, in turn, maintain the integrity of the classification status of WB. Thereby safeguard at least good status or good potential of water resources in the WFD and ensure financial return management measures proposed. For this reason the proposed WFD and WFD guidance documents specific sampling procedures, evaluation and classification (European Commission, 2003), while one of the critical requisite in any evaluation is the certainty / uncertainty in estimate.

The problem in the rivers of Cyprus concerning the reliability of the assessment with regard to the flow of intermittent rivers (types I and Ih). Specifically, the data of the monitoring of BQE macrophytes in permanent flow rivers of Cyprus used to assess the statuswith IBMR index ((Haury et al., 2006) and tested with success his response to pressures. In contrast, the remaining types rivers of Cyprus, the IBMR found no correlation with pressures and for this reason it was attempted to apply the preliminary MMI index used for R-M5 type rivers in the 2nd phase of Exercise WFD Intercalibration (WDD, 2014) . According to Ferreira et al. (2005), to intermittent or transient flow Mediterranean rivers indicators aquatic macrophytes such as MTR (Holmes et al., 1999; Dawson et al., 1999), IBMR (Haury et al. , 1996) or the Evaluation Index of floristic Quality Swink and Wilhelm (op.cit. López and Fenessy, 2002), is less sensitive. This is due to two factors: a) the ephemeral rivers vegetation dominated by non-aquatic species covering the dry bed for a substantial part of the year, b) at intermittent flow rivers beyond the vegetation covering the dry parts of the bed, the puddles which are aquatic species in conditions without feed, which again form a community very different from flowing rivers (Ferreira et al., 2005). In a study of Dodkins et al. (2012) in Mediterranean rivers in Portugal, most dry rivers of the south had much lower correlation with the state of nutrients in the water. This low correlation was attributed to the low number of species, the plurality of types dependent on the variability of the micro-habitat, and the calculations of the metrics / indicators not adequately attach the cover of the dominant species and rare species.

The sampling of macrophytes in rivers became intermittent flow in the period 2007-2010 and involved 43 points corresponding to 20 WB. The river typology was subsequently, in 2014 (Dörflinger, 2015) and 20 WB corresponding to formulas: P = 2, I = 13, Ih = 4, E = 1. According to the grouping of network stations (current status), the above WB are given for their consideration in formulas P = 2, I = 9, Ih = 7, E = 2, as 4 WB initially type I most valued in accordance with type Ih, and 1 WB initially type Ih currently estimated in accordance with the applicable type E. the identification process 43 20 WB sampling points relative to the pressure made by the public on the unsteady flow rivers and its effects are presented in the following table (Chart C - 1).

Chart C - 1: Pressures and discrimination R-M5 type stations in unaffected and degraded. (Source: WDD, 2012)

Station	Pressure shaft	River	Coordinate	Abbreviated	Altitude [m]	Catchment [km^2]
CY_	-	Diariz	34,699858	32,561025	7	254,5
CY_	-	Diariz	34,863974	32,733005	380	124,6
CY_	-	Syrka	34,879696	33,334561	202	56,1
CY_	-	Diariz	34,708885	32,563718	17	253,7
CY_	-	Diariz	34,749737	32,611892	103	241,0
CY_	-	Tremi	34,941578	33,483295	135	91,2
CY_	-	Syrka	34,878118	33,337597	190	61,0
CY_	-	Syrka	34,876445	33,339253	190	61,9
CY_	-	Elias	35,066014	33,019598	290	81,0
CY_	-	Chrys	35,002380	32,434725	51	178,0
CY_	-	Syrka	34,870107	33,342171	183	65,3
CY_	-	Germ	34,768358	33,101138	100	110,0
CY_	-	Tremi	34,939697	33,486854	129	94,2
CY_	-	Ezous	34,812440	32,528492	157	180,0
CY_	-	Diariz	34,799598	32,706145	252	186,8
CY_	-	Diariz	34,779634	32,671416	191	206,3
CY_	-	Diariz	34,786035	32,687863	218	198,5
CY_	-	Ezous	34,845127	32,544679	204	123,7
CY_	-	Ezous	34,839409	32,544427	197	131,1
CY_	-	Xeros	34,762847	32,578831	83	205,0
CY_	-	Xeros	34,795945	32,598536	133	184,0
CY_	-	Xeros	34,838170	32,646444	221	140,3
CY_	-	Xeros	34,854522	32,663603	254	118,9
CY_	0.26	Kryos	34,780461	32,856057	380	39,7

Station	Pressure shaft	River	Coordinate	Abbreviated	Altitude [m]	Catchment [km^2]
CY_	0.78	Ezous	34,835965	32,542192	191	132,0
CY_	0.92	Germ	34,777058	33,103739	121	108,0
CY_	1.08	Xapot	34,823392	32,808512	620	25,4
CY_	1.27	Chrys	34,958584	32,534984	242	60,0
CY_	1.43	Chrys	34,985451	32,555441	336	30,2
CY_	1.75	Limn	34,785248	32,940211	275	115,0
CY_	1.75	Limn	34,787442	32,945697	282	114,0
CY_	1.75	Xapot	34,734854	32,678967	255	88,1
CY_	1.83	Chrys	34,957249	32,507248	185	78,0
CY_	1.91	Maro	34,819835	33,311487	242	42,0
CY_	1.91	Vasili	34,842348	33,185646	371	27,8
CY_	1.91	Pyrgo	35,102399	32,668798	270	30,6
CY_	2.39	Xapot	34,803383	32,787196	550	38,0
CY_	2.39	Limni	35,083822	32,710680	255	48,0
CY_	2.39	Limni	35,033710	32,698271	477	15,7
CY_	2.39	Pyrgo	35,109332	32,689027	200	38,0
CY_	2.39	Vasili	34,817919	33,241860	195	86,0
CY_	2.39	Ezous	34,941360	32,611671	430	41,0
CY_	2.39	Ezous	34,948026	32,618112	459	39.4

A problem which appears in the selection of channels relates to the fact that degraded stations located exclusively in formulas current Ih flow arrangements (9 stations) and E (2 points), as opposed to the unaffected channels, which include only 2 Ih formula stations and all the eight others are only to type I and P rivers (stations 37 and 38 in Limniti).

MONITORING RESULTS

The monitoring data of macrophytes at unsteady flow rivers of Cyprus since the index MMI transformed calculated and then helped to separate the quality classes of the classification (Figure C - 1). Specifically, the average price index at the MMI unaffected stations set high / health limit. The other boundaries (Good / Medium, Medium / incomplete, incomplete / Bad) set by the isodianomi distances from the previous limit to 0 of MMI index. The results of MMI index proposed for the data of macrophytes at unsteady flow rivers of Cyprus presented per station on the map in Figure C - 3.

Figure C - 1: Box-plot showing the class boundaries between the five ecological classes, in accordance with the index MMI

Figure C - 2: The results of the classification of MMI indicator data of macrophytes at unsteady flow rivers of Cyprus

According to the results of MMI index (Chart C - 2) from 20 sites in rivers of formula Ih R and only 20% was classified in position above the medium, while the corresponding figure in the formulas P and I was 57%.

Chart C- 2: Results of the classification of the macrophyte sampling sites from the MMI index by type and Monitoring Group (pressures)

	Bad	Poor	Moderate	Good	High
P-minor	1	1	2		
P-negligible					2
I-important	2		2	2	2
I-minor		1	1	3	2
I-negligible				1	1
Ih-important	6	2	3		
Ih-minor			2	1	3
E-important	1		1		
E-minor		1			

Another important finding relates to the classification of WB through stations. Of the 20 WB, at 5 WB no difference one quality class and 5 WB no difference two quality classes (Xeros and Khrysokhou). Only in WB types P and I were cases with more sampling points (N> 1) at WB, where there was no divergence in classification.

CONCLUSIONS ON THE FOLLOW-UP TO BQE EFIMEROUS EPEISODIAKIS AND FLOW RIVERS OF CYPRUS

The problem of mismatch between the classification of non-steady flow rivers of Cyprus and pressures to those shown in Figure C - 3, wherein the linear regression between the matched price statuswith that of the pressure on the positions can explain only 44% of the variance.

Figure C - 3: Assignment of status of sampling points of macrophytes with MMI in their classification, the unsteady flow rivers, and the gradient of pressures (R^2 = 0,439).

Figure C - 4: Box-plot status of sampling points according to the MMI index of macrophytes by type of river for the assessment needs (current situation). The classes of state corresponding to 1 = bad, 2 = poor, 3 = moderate, 4 = good, 5 = high

The flow regime in the non-permanent rivers flow, can best explain the variation of the index values (Figure C - 4). According to the non-parametric statistical Kruskal-Wallis test, the difference between different current types rivers of 43 seats and their status (whether grouped the five classes in two: in the upper and lower good) is statistically significant (P = 0.042) with types E stations and Ih be generally worse than good status and types I and P to be generally better moderate condition. Therefore types of rivers of Cyprus do not all potentially the same situation. Notwithstanding the pressures on a river, as dry as the type river the worse will be the statusin accordance with the index of macrophytes MMI. This is a WBong conclusion, as the index should be able to distinguish the statusof WB that responds to pressures on rivers, ie to classify independent types and not vice versa.

In their study the Jacobsen and Terneus (2001) and Warwick and Brock (2003) reported that the intermittent flow rivers dominated communities amphibian plants. Amphibians plants have better regeneration and dispersion capabilities, and successfully grown on water and on land (Nicol & Ganf, 2000. Nicol et al., 2003. Kržič et al., 2004. Šraj-Kržič & Gaberščik 2005). Aquatic macrophytes were very limited as it has to cope with the phase of drying and repeated flooding (Šraj-Kržič et al., 2007). In intermittent flow rivers aquatic macrophytes limited to locations where water remains enough to allow them to complete the cycle of life (Gaberščik et al. 2003). Because of the specificity exhibited by intermittent Mediterranean rivers flow as Ferreira et al. (2005) proposed to Multimetric indicators of macrophytes to investigate the possibility to include the species of the riparian vegetation in order to serve the purpose of verification of the ecological statusin the WFD.

It is therefore proposed not to include the classification of macrophytes in the overall classification of the ecological status of the WB type I Ih rivers and the results are highly uncertain and the proposed indicator does not distinguish the different type-specific conditions for each type.

As the literature shows that, the permanent, flow intermittent and highly intermittent flow rivers are very different, in their floristic composition, it is proposed that future implementation of macrophyte monitoring to take account of existing typology and clustering of assessment the WB be representative in terms of types, covering more WB and classification of both pressures, and of the statusresult from individual analysis by type of river. The variation of the statusof WB represented by more sampling stations, relative to the component "macrophytes" rivers of Cyprus will have to find a way to minimize.

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ANNEX D: EVALUATION OF USE BQE IN EPHMERAL AND EPISODIC FLOW RIVERS OF CYPRUS

THE FRAMEWORK DIRECTIVE FOR WATER 2000/60/EC

The Framework Directive (WFD) 2000/60 / EC sets that status of river water bodies (WB) is assessed by the Member States on the basis of ecological and chemical status. The ecological assessment relates to the biological quality elements (BQE) and physico-chemical and hydromorphological elements supporting the BQE. The WB is the minimum management unit:

- A single and indivisible geographical entity,
- Belongs exclusively to a body category (river, lake, transitional waters, coastal waters);
- With the same or similar degree of intervention in physical characteristics (physical body, heavily modified or artificial body)
- With other common characteristics, for assessment purposes, ie the same type, and
- Same quality status throughout the part.
-

The BQE that WFD sets for rivers include:

- Fish species,

- Benthic macroinvertebrates,

- Phytoplankton,

- Benthic diatoms,

- Macrophytes

Therefore, for each river WB Cyprus, of all types, should take place monitoring of these BQE, to select evaluation indicators for each BQE, to extract the type-specific conditions (the optimal values of the indicators in unaffected conditions by human activities) , to calculate the ecological deviation values and to sort of WB in one of the following classes: high, good, moderate, poor, poor, under the principle of lower status between the assessments of different BQE to determine the biological status WB.

MONITORING BQE IN RIVERS

Monitoring the rivers of Cyprus does not include phytoplankton as this to be demanding special conditions (very large rivers with extensive lowland slow flowing sections) that no river of Cyprus does not. Specifically, in Annex V, 1.1.1, is not explicitly included in the list of quality elements for rivers, but is included as BQE in 1.2.1. In this way could be used as separate BQE if necessary and if suitable, as e.g. τhe very large lowland rivers, but there are in Cyprus.

The cycle of monitoring BQE rivers according to the WFD (Annex V), can be frequency, thinner than 3 years for all residues except BQE phytoplankton. However, monitoring should ensure that the most significant anthropogenic impacts will be covered by seasonal samplings.

The 2nd RBMP available to more results than the first. Cyprus Republic was careful to fill the gaps that existed in the first monitoring (2004-2008). So the National Monitoring Network (2009-2013) rose to BQE stations, from 40 to 61, covering in this way the intermittent flow rivers. Of the 61 posts, 28 were included in the functional shape and monitoring the remaining 33 in the supervisor.

According to the guideline documents No 2 (European Commission, 2003a, p.21) and No. 7 (European Commission, 2003b, p.16), for monitoring, reporting purposes and administrative purposes is legitimate to group WB, where there are sufficient indications or representation by others, provided that the classification of the statuswill take place with an acceptable level of uncertainty. Such grouping took place in the second round of monitoring, in addition to the new National Typology of rivers of Cyprus by the WDDD (Dörflinger, 2015). This grouping was aimed at HS classification unattended on the results of monitoring at WB of the same type and with approximately the same pressure. The available data used for this determination of the pressures at WB and their aggregation, were:

- Population density. Census 2011 (CYSTAT, 2013) in conjunction with class urban settlements in the CORINE land use (Department of the Environment, 2008)
- Annual production of nitrogen load from livestock (Dafra, 2009)
- Areas irrigated, intensive farming of the CORINE (Department of the Environment 2008)
- The quantified data were matched pressures on ecological status of WB (high, good, moderate and worse), summarized in a pressure indicator with three classes and defined for each class of WB or pressure indicator. Regarding the importance of pressure extracted three classes: major (important), small (minor) and negligible (negligible). This way was for each HS Cyprus affiliation of a type and significance (Figure D - 1) on the follow-up (Dörflinger, 2015).

Chart D - 1: River Types of Cyprus under the new National typology system in accordance with the purpose of monitoring. The red arrow focuses on type change (from I to E) which was due to the operation of the dam of Kalavassos in the immediately downstream part of the Basilikos River.

MONITORING RESULTS

The results of monitoring (2009-2013) are shown in summary by type and group pressures for rivers of Cyprus are given in the following table (Chart D - 1).

Chart D - 1: Ecological classification of river WB by type and pressure group, and classification level of uncertainty. Where uncertainty Class: 1 = low, 2 = moderate, 3 = high, 4 = very high. [Play from WDD, 2014]

Type-group	Biological condition/ potential			Physico-chemical condition/ potential			Ecological Condition/ potential	Uncertainty Class
	Number of Station	Condition WB	Uncertainty Class	Number of Station	Condition WB	Uncertainty Class		
E-				6	MODERAT	4	MODERAT	4
E-minor				2	GOOD	4	GOOD	4
E-							GOOD	4
Ih-	1	MODERAT	4	4	GOOD	4	MODERAT	4
Ih-minor	6	MODERAT	2	8	GOOD	2	MODERAT	4
Ih-							GOOD	4
I-	8	MODERAT	2	7	GOOD	2	MODERAT	2
I-minor	13	GOOD	2	11	GOOD	2	GOOD	2
I-	4	GOOD	2	4	HIGH	2	GOOD	2
P-	13	MODERAT	2	8	MODERAT	2	MODERAT	2
P-minor	7	GOOD	2	7	GOOD	3	GOOD	2
P-	6	HIGH	2	5	HIGH	2	HIGH	2

Apparently from the evaluation results (Chart D - 1), the rivers of E-type (transient or episodic flow) could not be taken BQE samples and for this reason ecological classification was based on the physico-chemical state.

EPHEMERAL AND EPISODIC FLOW RIVERS

The ephemeral and episodic flow rivers defined by the WDD as rivers with 325 ± 40 means zero and number of days per year, and 34% profess to along rivers, the control area of the Republic (Dörflinger, 2015). Ephemeral and episodic flow down the rivers that feed the superficial aquifers, but throughout the year as the beds are higher than the level of the surface aquifer (Gordon et al., 1992). Alternatively, in terms of predictability and opposed to intermittent flow rivers that dry up in more or less the time provided, the flow episodic and ephemeral rivers are unpredictable as to the standard of the hydrological regime (Williams, 1996). According to the definition in the Girolamo et al. (2011) the episodic flow rivers, i.e. those who have water only if preceded big rain, and they are excluded from the WFD in monitoring and classification in Italian law (Gazzetta Ufficiale, 2008).

Picture D - 1: River of ephemeral or episodic flow. The picture below is the visit of August 2013 and the picture above is of March 2014.

The ephemeral rivers support the same ecological and hydrological functions with intermittent and permanent flow, carrying water, nutrients, sediments in the basin. When properly operate this type rivers provide hydrological continuity between the basin areas, dissipating the energy of the water during flooding, reduce erosion and improve water quality, enrich the underground aquifer and help the discharging of, storing and transporting aggregates materials, deposit and recycle nutrients, provide habitats of wild fauna and waterways migration support riparian vegetation zones to protect against corrosion, and through riparian zones help maintain soil moisture and the self-cleaning of river water (Levick et al ., 2008). The ephemeral rivers are the largest type of river in Cyprus and contribute significantly to the hydrology, biochemistry and ecological status of the basin, and in many cases connect the mountain constantly flowing rivers to coastal waters. So especially for Cyprus, one without intermediate ephemeral rivers management scheme makes it de facto inapplicable the principle of river basin management, since the statusin the coastal waters, where they do not have river then through discrete WB with upstream catchments , will not be associated with the processes taking place in the respective upstream catchments (pressures impact, discharges pollution loads, etc.).

Unfortunately, despite its enormous importance to the river then the basin with the transfer or retention of pollutant loads to the sea, the link with groundwater and its management attention to the protection of the floods (Flood Risk Management Directive on the Application of Directive 2007/60 / EC), the monitoring of BQE in ephemeral rivers displays insurmountable limitations for now. The ecological status of NB included as a key element the biological state, which in turn comes from tracking the BQE WFD. In water-free conditions, however, cannot be communities BQE organisms. Therefore, the absence BQE monitoring data in ephemeral rivers, can be seen as a result of zero data. However, to reset all metrics and therefore also the condition assessment index will undoubtedly lead to the classification of the ephemeral WB in poor condition. For cases where a river was ephemeral due to anthropogenic interference, e.g. Section of the Basilikos River (NB: CY_8-9-e_RI_HM) downstream of the dam of Kalavassos, this is logical. But what is true for cases where the nature of the WB is ephemeral rivers? The study of Argyroudi et al. (2009) in rivers intermittent and ephemeral flow of Greece, without the presence of anthropogenic activity (reference sites) showed for the ephemeral, that assessment occurs even when eventually acquire water and therefore occur sampling is extremely precarious. The strong variation of just benthic macroinvertebrate community installed resulting from the physical disorder of prolonged drought, outweighs any variations from human activities, resulting in excellent type-specific conditions can not be defined.

Figure Δ - 2: The relationship of the assessment of the statusunaffected rivers ephemeral and intermittent flow during high flow, with the corresponding limits of high / good and good / moderate status indicators.

For the flow of ephemeral (triangle symbols) assessment was only feasible during the high flow rate. The indicators used are the Greek for rivers of North Greece, HES (Artemiadou & Lazaridou, 2005), and different versions of the STAR-ICMi index (Buffagni et al., 2005). ICMi7 is authentic indicator used to exercise IC, ICMi 10 and ICMi11 are modified indicators of the original ICMi7, implemented in Spain. [Fig Modified Argyroudi et al. (2009)]

The assessment of transient flow rivers in Figure D - 2, by virtue of specific indicators, although rivers are unaffected by man and therefore high status, classifies rivers at least good, and in some cases their classification can be presented as moderate status . The managerial implications of this artificial deterioration of the status of river WB mainly in monitoring which on existing indicators will be non-contributory and yield economic measures is highly questionable whether to improve the actual statusof WB.

What could be an environmental objective in ephemeral rivers? In his article Bolton (2014) reported three such targets from Larned et al. (2010).

- Maintain or restore the mosaic of land-water habitats.
- Maintain or restore their physical intermittent.
- Determination of hydrological conditions on the high importance species and processes.
- Bolton ads 3 more (Bolton, 2014).
- Management measures for the spatial arrangement of the ephemeral rivers entire hydrological network.
- Protection of the contribution of ephemeral rivers at local and regional importance aquifers and water quality.
- Identification and determination of ecological succession stages during short periods they have water.

The problem is on the monitor BQE in ephemeral rivers from the agent that specifically for these rivers other ecological processes are much more critical than those occurring in other rivers. Such processes are roughly described by McDonough et al. (2011), and here indicative of benthic macroinvertebrates, the survival liquid reserves and colonization, and the avoidance of diffusion in hydrological network. However, the knowledge that exists about which organizations are waiting to be found in different stages of succession of a community of organisms BQE, in the liquid phase of ephemeral rivers, remains very basic steps. The European project MIRAGE (http://www.emwis.org/initiatives/fol060732/mediterranean-intermittent-river-management), funded with € 5,600,000, lasted four years and involved 9 countries, aimed to provide specialized know-how to improve the assessment of ecological integrity (or the ecological status in WFD) in the Mediterranean non-streaming rivers. Despite considerable effort, basically there was no answer on who index and within what limits the index, will be the classification of ephemeral rivers. The same conclusion applies to EU member states that have finished their Management Plans. In Israel and the areas controlled by the Palestinian Authority, study of Lot et al. (2010) onto the ephemeral rivers Hebron / Besor and Zomar / Alexander showed that the results of the index of benthic macroinvertebrates ASI (assemblage sensitivity index) (Chessman, 1995, 2004) could be interpreted, but this ratio is not compatible with the requirements Directive, and its limits are predetermined and do not exist or are extremely difficult to define type-specific conditions. However, there are indications that the European Commission plans to take measures to improve the situation. Specifically, new registrations for river types are expected to be proposed in order to show the importance of the distinction between natural and anthropogenic causes for the magazine or ephemeral flow regime of rivers. These classifications will help to ensure that the periodic flow rivers of the Mediterranean will be adequately protected and in context with the WFD purposes.

RESULTS OF MONITORING OF BQE IN EPHEMERAL AND EPISODIC FLOW RIVERS

The first problem to be addressed with regard to ephemeral and episodic flow rivers is whether the causes behind this hydrological regime is manmade or natural.

The problem of classification of artificial change of Cyprus rivers into ephemeral or episodic flow is proposed to solve the classification of the ecological status under the zero data derived from monitoring. Ie classified as rivers in poor ecological condition and join the exceptions or heavily modified water bodies (HMWB) (CIS Working Group 2.2 on Heavily Modified Water Bodies, 2003), as important reasons to change their hydromorphological character drive WB not never be able to reach the good condition of the wild type.

Concerning the problem of classification of ecological status of natural ephemeral and episodic rivers flow from:

A. Data generated by the monitoring of rivers of Cyprus in 2008-2013,

B. The quest that faced the other EU member states, and

C. The review of the scientific bibliography

It shows that the ecological classification of these rivers under the BQE is not yet possible because there are no appropriate indicators and can not determine the type-specific conditions. The classification of natural ephemeral rivers which hydrology is more relevant to the intermittent flow of the episodic, is highly uncertain with existing indicators. Therefore proposed not made up of BQE to ephemeral and episodic flow rivers of Cyprus. This does not mean that the River WB of this type should be ignored as they have meaning: the river "continuity" in the basin of what parts ephemeral WB located at the downstream of permanent or periodic rivers flow, to enrich / discharge of surface water tables horizons, and for flood protection at local or watershed level and significant linear green geographical entities in dry Mediterranean landscape.

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ANNEX E: MONITORING OF EPHEMERAL AND EPISODIC FLOW

EPHEMERAL AND EPISODIC FLOW RIVER

The ephemeral and episodic rivers flow defined by the WDD as rivers with 325 ± 40 means zero and number of days per year, and 34% profess to along rivers, the control area of the Republic (Dörflinger, 2015). Ephemeral and episodic flow down the rivers that feed the superficial aquifers, but throughout the year as the beds are higher than the level of the surface aquifer (Gordon et al., 1992). Alternatively, in terms of predictability and opposed to intermittent flow rivers that dry up in more or less the time provided, the flow episodic and ephemeral rivers are unpredictable as to the standard of the hydrological regime (Williams, 1996). For this reason, hydrography those in particularly dry areas are characterized by multiple peaks (Reid et al., 1998), which occur abruptly and followed by rapid humiliation that can last just a few hours (Tal et al., 2010). According to the definition given by Girolamo et al. (2011), the episodic flow rivers, i.e. those who have water only if preceded big rain, excluded from the WFD in monitoring and classification in Italian law (Gazzetta Ufficiale, 2008).

Picture 0-1: River ephemeral or episodic flow. The lower image is the visit of August 2013 and the above image is of March 2014.

The ephemeral rivers support the same ecological and hydrological functions with intermittent and permanent flow, carrying water, nutrients, sediment basin.

When properly operate this type rivers provide hydrological continuity between the basin areas, dissipating the energy of the water during flooding, reduce erosion and improve water quality, enrich the underground aquifer and help in discharging it, storing and transporting aggregates materials, deposit and recycle nutrients, provide habitats of wild fauna and waterways migration support riparian vegetation zones to protect against corrosion, and through riparian zones help maintain soil moisture and the self-cleaning of river water (Levick et al ., 2008). The impact of point pollution to ephemeral and episodic flow rivers differ significantly from those at constantly flowing rivers. The common practice of using these streams addressed all waste nature has resulted in the accumulation of pollution loads and aggregate anthropogenic origin in the dry stream, affecting the quality of groundwater, the morphology of the rivers and on the quality of surface water when flowing (Hassan & Egozi, 2001). Contaminant these loads if not penetrate groundwater accumulate in dry stream will change and later the first strong downpour products of this change will be released to the downstream.

The ephemeral rivers are the largest type of river in Cyprus and contribute significantly to the hydrology, biochemistry and ecological status of the basin, and in many cases connect the mountain constantly flowing rivers to coastal waters. Therefore, one management plan without the ephemeral rivers management scheme makes it de facto inapplicable the principle of river basin management, since the condition of coastal waters will not have the geographical catchment follow the processes occurring in the upstream basin.

Unfortunately, despite its enormous importance to the river then the basin with the transfer or retention of pollutant loads to the sea, the link with groundwater and its management attention to the protection of the floods (Flood Risk Management Directive on the Application of Directive 2007/60 / EC), the monitoring of the ephemeral rivers show some limitations. These restrictions are due to the difficulty of the spatial and temporal variability of the input, the prevalence procedures difficult quantified for incorporation into pollution loads dispersion models (Hudges, 2005), the difficulty in biological monitoring, and the relatively greater impact of the first flooding, as there is a large variation in concentrations of pollutants from point and non-point sources in the flood facilities (Stein & Ackerman, 2007). In practical monitoring difficulties include flexibility in the timing of sampling, as heavy rains do not obey anyone planning, operational readiness sampling workshop, and within hours of the start of the flow will be sampling (Tal et must be completed al., 2010). Neither course is easy to predict what will cause rainfall runoff and what not. Therefore, sampling at regular intervals is not possible. In conclusion, if the practical difficulties in monitoring seem almost insurmountable operational country level, the only feasible solution is automatic physicochemical parameters measurement stations and taking water samples.

The problem that arises in the classification of ephemeral rivers of physicochemical parameters lies in the fact that the raw data can not be used to classify the HS as needed treatment. In Israel and the areas controlled by the Palestinian Authority, studying Tal et al. (2010) onto the ephemeral rivers Hebron / Besor and Zomar / Alexander showed that the results of the physicochemical parameters could be interpreted spatially when reduced loads, and thereby allow comparison between different measurement stations.

The problem is on track to ephemeral rivers from the agent that specifically for these rivers other ecological processes are much more critical than those occurring in other rivers. Such processes are roughly described by McDonough et al. (2011), and here indicative of benthic macroinvertebrates survival liquids shelters and colonization, and the avoidance of diffusion in hydrological network. However, the knowledge that exists about which organizations are standing are at different stages of the succession of a community of organisms BQE within the liquid phase of ephemeral rivers, remains very basic steps. The European project MIRAGE (http://www.emwis.org/initiatives/fol060732/mediterranean-intermittent-river-management), (funded with € 5,600,000, lasted four years and involved 9 countries, aimed to provide specialized know-how to improve the assessment of ecological integrity (or the ecological status in WFD) in the Mediterranean non-streaming rivers. Despite considerable effort, basically there was no answer on who biomarker and within what limits the index, will be the classification of ephemeral rivers. The same conclusion applies to EU member states that have finished their Management Plans. However, there are indications that the European Commission plans to take steps to improve the situation. Specifically, new registrations for river types are expected to be proposed in order to show the importance of the distinction between natural and anthropogenic causes for the magazine or transient flow regime of rivers. These classifications will help to ensure that the periodic flow rivers of the Mediterranean will be adequately protected and in context with the WFD purposes.

CONCLUSIONS TO MONITOR AND TO EPHEMERAL EPISODIC FLOW RIVERS OF CYPRUS

The problem of monitoring ephemeral or episodic flow rivers of Cyprus proposed to investigate as to deal with it, adjusting the monitoring only in hydromorphological (water level, flow, flow, sediment transport) and physicochemical data, mainly with automatic measuring / samplers stations in combination with measurement facilities providing. According to Tal et al. (2010), when they start streaming an ephemeral river the measurement / sampling frequency of water every 15 during the first hour and every two hours afterwards, be able to provide interpretable results. The cost of purchase and installation of such stations is estimated at $ 10,000. The classification of ephemeral rivers flow from hydromorphological and physico-chemical elements can meet the requirements of the WFD, if the choice of the positions of the automated measuring stations done in a way that also allows the monitoring of degraded (E-important) and unaffected plants from anthropogenic activities (E-negligible). So the monitoring network should be adapted accordingly. In this case, it is proposed to investigate whether it is possible to perform the classification with cargo terms rather than concentrations, as a number of variables to be identified for each station, such as: flow incidence, water flow measurements, drought interval (between flows), transportable organic pollution load (BOD5) load transported nutrients (nitrogen and phosphorus), sediment transport sediment. The weighted -for the area of the sub-basin of each station - comparing the expected loads (reference stations) and the measured loads (operating network stations) should include exploring at different time scales (annual, seasonal, monthly, period unit flow). It should be investigated whether the comparison should be based:

- The qualitative characteristics of the transported cargo. B.C. Compared profile of cargoes in time: 0 ', 15', 30 ', 45', 60 ', 180', 300 ', 420' and so on, for each stream event or average profile per month / season / year)
- In purely quantitative part of the transported cargo. B.C. average annual, seasonal and / or per month charge.
- In mathematical modeling of pace and volumes of transported cargo
- Or any combination of the above.

Because it is extremely difficult to identify the high / good / moderate status limits on the BQE proposed setting limits be done using statistical deviation limits from the type-specific conditions. This way the ephemeral and episodic flow rivers of Cyprus will be protected and will ensure the river "continuity" in the basin of what parts ephemeral WB located at the downstream of permanent or periodic rivers flow and will be protected as a significant linear green geographical entities in dry Mediterranean landscape.

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ANNEX F: A COMPARATIVE PRESENTATION STATUSWB 1st and 2nd RBMP

A/A	CODE 2015	CODE 2009	NAME (EN)	HMWB 2009	HMWB 2015	ECOLOGICAL STATUS /POTENTIAL 2009	ECOLOGICAL STATUS /POTENTIAL 2015	CHEMICAL STATUS 2009	CHEMICAL STATUS 2015
1.	CY_1-1-a_RP	CY_1-1-1_R3	Khapotami	NO	NO	M	M	G	G
2.	CY_1-1-b_RI	CY_1-1-1_R3, CY_1-1-4_R3	Khapotami	NO	NO	M	M	G	G
3.	CY_1-1-c_RIh	CY_1-1-4_R3	Khapotami	NO	NO	M	G	G	G
4.	CY_1-1-d_RIh_HM	CY_1-1-4_R3	Khapotami	YES_Prop	YES	M	G P	G	G
5.	CY_1-1-e_RI	CY_1-1-1_R3	Malleta	NO	NO	M	M	G	G
6.	CY_1-2-a_RP	CY_1-2-1_R2	Dhiarizos	NO	NO	G	G	G	G
7.	CY_1-2-b_RP	CY_1-2-1_R2	Dhiarizos	NO	NO	G	G	G	G
8.	CY_1-2-d_RI_HM	CY_1-2-4_R3-HM	Dhiarizos	YES 2005	YES	G	G P	G	G
9.	CY_1-2-e_RI	CY_1-2-1_R2	Tholo Potamos	NO	NO	G	G	G	G
10.	CY_1-2-f_RIh	CY_1-2-53_R3	Yerovasinos Potamos	NO	NO	G	G	G	G
11.	CY_1-3-a_RP	CY_1-3-1_R2, CY_1-3-5_R3	Argaki tis Roudhias	NO	NO	G	H	G	G
12.	CY_1-3-b_RI	CY_1-3-5_R3	Xeros Potamos	NO	NO	M	G	G	G
13.	CY_1-3-c_RIh	CY_1-3-5_R3	Xeros Potamos	NO	YES	M	M	G	G
14.	CY_1-3-e_RE_HM	CY_1-3-9_R3-HM	Xeros Potamos	YES 2005	NO	P	M P	G	U
15.	CY_1-3-f_RI	CY_1-3-1_R2	Argaki Lazaridhaes	NO	NO	G	G	G	G
16.	CY_1-3-g_RIh	CY_1-3-5_R3	Argaki ton Lefkarkon	NO	NO	M	G	G	G
17.	CY_1-4-a_RP	CY_1-4-1_R3	Ayia & Klimadhiou	NO	NO	G	H	G	G
18.	CY_1-4-b_RI	CY_1-4-1_R3	Argaki tis Ayias	NO	NO	G	G	G	G
19.	CY_1-4-d_RI_HM	CY_1-4-3_R3-HM	Potamos tis Ezousas	YES 2005	YES	G	M P	G	G
20.	CY_1-4-e_RIh_HM	CY_1-4-3_R3-HM	Potamos tis Ezousas	YES 2005	YES	G	M P	G	G
21.	CY_1-4-f_RP_HM	CY_1-4-3_R3-HM	Potamos tis Ezousas	YES 2005	YES	G	G P	G	G
22.	CY_1-4-g_RI_HM	CY_1-4-3_R3-HM	Potamos tis Ezousas	YES 2005	YES	G	G P	G	G
23.	CY_1-4-h_RIh_HM	CY_1-4-3_R3-HM	Potamos tis Ezousas	YES 2005	YES	G	G P	G	U
24.	CY_1-4-i_RI	CY_1-4-41_R3	Argaki tou Paleomylou	NO	NO	G	G	G	G
25.	CY_1-4-j_RIh	CY_1-4-51_R3	Argakin tou Ayiou Nepiou	NO	NO	G	M	G	G
26.	CY_1-4-k_RIh	CY_1-4-6_R3	Varkas	NO	NO	G	M	G	G

A/A	CODE 2015	CODE 2009	NAME (EN)	HMWB 2009	HMWB 2015	ECOLOGICAL STATUS /POTENTIAL 2009	ECOLOGICAL STATUS /POTENTIAL 2015	CHEMICAL STATUS 2009	CHEMICAL STATUS 2015
27.	CY_1-4-L_RIh	CY_1-4-52_R3	Milarkou Potamos	NO	NO	G	M	G	G
28.	CY_1-4-m_RIh	CY_1-4-3_R3	Kotchatis	NO	NO	U	M	U	G
29.	CY_1-6-a_RIh	CY_1-6-2_R1	Mavrokolymbos	NO	NO	G	M	G	G
30.	CY_1-6-c_RIh_HM	CY_1-6-1_R2-HM	Mavrokolymbos	YES 2005	YES	M	M P	G	G
31.	CY_1-6-d_RIh	CY_1-6-3_R1	Xeros	NO	NO	U	M	U	G
32.	CY_1-8-a_RIh	CY_1-8-1_R1	Kalamouli (Avgas)	NO	NO	U	G	U	G
33.	CY_1-8-b_RIh	CY_1-8-4_R1	Pevkos Potamos	NO	NO	U	G	U	G
34.	CY_2-1-a_RE	CY_2-1-7_R1	Argaki tou Ayiou Ioanni	NO	NO	U	M	U	G
35.	CY_2-2-a_RIh	CY_2-2-1_R3	Neraidhes & Potamos Ammadhkiou	NO	NO	G	M	G	G
36.	CY_2-2-b_RI	CY_2-2-1_R3	Garillis Potamos	NO	NO	G	M	G	G
37.	CY_2-2-c_RI	CY_2-2-4_R3	Potamos tou Stavrou tis Psokas	NO	NO	G	G	G	G
38.	CY_2-2-d_RI	CY_2-2-4_R3	Potamos tou Stavrou tis Psokas	NO	NO	G	G	G	G
39.	CY_2-2-f_RI_HM	CY_2-2-6_R3-HM	Potamos tou Stavrou tis Psokas	YES 2005	YES	M	M P	G	G
40.	CY_2-2-g_RI_HM	CY_2-2-6_R3-HM	Khrysokhou Potamos	YES 2005	YES	M	M P	G	G
41.	CY_2-2-h_RIh_HM	CY_2-2-6_R3-HM	Khrysokhou Potamos	YES 2005	YES	M	M P	G	G
42.	CY_2-3-a_RIh	CY_2-3-1_R3	Mirmikoph	NO	NO	G	M	G	G
43.	CY_2-3-b_RIh	CY_2-3-2_R3	Argaki tis Limnis	NO	NO	M	M	G	F
44.	CY_2-3-c_RI	CY_2-3-3_R3	Potamos tis Magoundas	NO	NO	G	G	G	G
45.	CY_2-3-d_RIh_HM	CY_2-3-5_R3-HM	Potamos tis Magoundas	YES 2005	YES	M	G P	G	G
46.	CY_2-3-e_RE	CY_2-3-7_R3	Xeropotamos	NO	NO	U	G	U	G
47.	CY_2-3-f_RP	CY_2-3-8_R3	Yialias Potamos	NO	NO	G	G	G	G
48.	CY_2-3-g_RI	CY_2-3-8_R3	Yialias Potamos	NO	NO	G	G	G	G
49.	CY_2-4-a_RIh	CY_2-4-2_R3	Xeros	NO	NO	G	G	G	G
50.	CY_2-4-b_RIh_HM	CY_2-4-2_R3-HM	Xeros	YES 2005	YES	M	G P	G	G
51.	CY_2-4-c_RP	CY_2-4-4_R3	Maroti & Diali	NO	NO	G	H	G	G
52.	CY_2-4-d_RI	CY_2-4-4_R3	Livadhi	NO	NO	G	G	G	G
53.	CY_2-4-e_RIh_HM	CY_2-4-3_R3-HM	Livadhi	YES 2005	YES	M	G P	G	G
54.	CY_2-5-a_RIh	CY_2-5-3_R1	Ayios Theodoros	NO	NO	U	G	U	G

A/A	CODE 2015	CODE 2009	NAME (EN)	HMWB 2009	HMWB 2015	ECOLOGICAL STATUS /POTENTIAL 2009	ECOLOGICAL STATUS /POTENTIAL 2015	CHEMICAL STATUS 2009	CHEMICAL STATUS 2015
55.	CY_2-6-a_RIh	CY_2-6-1_R1	Katouris	NO	NO	G	G	G	G
56.	CY_2-6-b_RIh_HM	CY_2-6-3_R1-HM	Katouris	YES 2005	YES	G	M P	G	G
57.	CY_2-7-a_RI	CY_2-7-1_R1	Potamos tou Pyrgou	NO	NO	G	G	G	G
58.	CY_2-8-a_RP	CY_2-8-1_R3	Potamos tou Limniti	NO	NO	G	G	G	G
59.	CY_2-9-a_RI	NONE	Potamos tou Kambou	NO	NO	DOESN'T MATCH IN WB 1ST RBMP	G	DOESN'T MATCH IN WB 1ST RBMP	G
60.	CY_2-9-b_RP	CY_2-9-1_R1	Potamos tou Kambou	NO	NO	G	M	G	G
61.	CY_2-9-c_RI	CY_2-9-1_R1	Potamos tou Kambou	NO	NO	G	G	G	G
62.	CY_2-9-d_RIh_HM	CY_2-9-4_R1-HM	Potamos tou Kambou	YES 2005	NO	G	G P	G	G
63.	CY_3-1-a_RP	CY_3-1-1_R3	Xeros	NO	NO	G	H	G	G
64.	CY_3-1-b_RI	CY_3-1-1_R3	Xeros	NO	NO	G	G	G	G
65.	CY_3-1-c_RI_HM	CY_3-1-2_R3-HM	Xeros	YES 2005	NO	P	G P	G	G
66.	CY_3-2-a_RP	CY_3-2-1_R2	Marathasa	NO	NO	M	G	G	G
67.	CY_3-2-b_RP_HM	CY_3-2-2_R3-HM, CY_3-2-4_R3-HM	Marathasa	YES 2005	YES	M	G P	G	G
68.	CY_3-2-d_RI	NONE	Rkondas	NO	NO	DOESN'T MATCH	G	DOESN'T MATCH	G
69.	CY_3-3-a_RP	CY_3-3-1_R2	Ayios Nikolaos	NO	NO	M	G	G	G
70.	CY_3-3-b_RP	CY_3-3-1_R2	Karyiotis	NO	NO	M	M	G	G
71.	CY_3-3-c_RI	CY_3-3-4_R3	Karyiotis	NO	YES	M	M	G	U
72.	CY_3-3-d_RP	CY_3-3-1_R2	Argaki tou Karvouna	NO	NO	M	M	G	G
73.	CY_3-3-e_RI	CY_3-3-1_R2	Alykhnos	NO	NO	M	G	G	G
74.	CY_3-4-a_RI	CY_3-4-1_R1	Atsas	NO	NO	G	G	G	G
75.	CY_3-4-b_RIh	CY_3-4-1_R1	Atsas	NO	NO	G	M	G	G
76.	CY_3-4-c_RIh_HM	CY_3-4-3_R1-HM	Atsas	YES 2005	YES	M	M P	G	U
77.	CY_3-5-a_RI	CY_3-5-11_R3	Lagoudhera	NO	NO	G	G	G	G
78.	CY_3-5-c_RI_HM	CY_3-5-1_R3-HM	Lagoudhera	YES 2005	YES	M	M P	G	F
79.	CY_3-5-d_RIh_HM	CY_3-5-1_R3-HM	Potamos tis Elias	YES 2005	YES	M	M P	G	F
80.	CY_3-5-e_RI	CY_3-5-2_R3	Kannavia	NO	NO	G	G	G	G
81.	CY_3-5-f_RI	CY_3-5-3_R3	Asinou	NO	NO	G	G	G	G

A/A	CODE 2015	CODE 2009	NAME (EN)	HMWB 2009	HMWB 2015	ECOLOGICAL STATUS /POTENTIAL 2009	ECOLOGICAL STATUS /POTENTIAL 2015	CHEMICAL STATUS 2009	CHEMICAL STATUS 2015
82.	CY_3-7-a_RI	CY_3-7-11_R3	Peristerona	NO	NO	M	G	G	G
83.	CY_3-7-b_RIh	CY_3-7-11_R3	Peristerona	NO	NO	M	G	G	G
84.	CY_3-7-d_RI	CY_3-7-34_R3	Maroullenas	NO	NO	G	G	G	G
85.	CY_3-7-e_RI	CY_3-7-33_R3	Kambi	NO	NO	G	M	G	G
86.	CY_3-7-f_RI_HM	CY_3-7-3_R3-HM	Maroullenas	YES2005	NO	M	G P	G	G
87.	CY_3-7-g_RI	CY_3-7-32_R3	Pharmakas	NO	YES	M	G	G	G
88.	CY_3-7-h_RI_HM	CY_3-7-3_R3-HM	Pharmakas	YES2005	NO	M	G P	G	G
89.	CY_3-7-j_RIh_HM	CY_3-7-41_R3-HM	Potamos tou Akakiou	YES2005	NO	M	M P	G	U
90.	CY_3-7-m_RE	CY_3-7-2_R3	Likythia	NO	NO	P	G	G	U
91.	CY_3-7-n_RIh	CY_3-7-51_R3	Koutis & Aloupos	NO	NO	M	M	G	G
92.	CY_6-1-a_RIh	CY_6-1-1_R3	Pedhieos & Ayios Onouphrios	NO	NO	M	G	G	G
93.	CY_6-1-c_RIh_HM	CY_6-1-1_R3	Pedhieos	YES2005	YES	M	M P	G	G
94.	CY_6-5-a_RIh	CY_6-5-12_R3	Yialias	NO	NO	G	G	G	G
95.	CY_6-5-b_RI	CY_6-5-12_R3, CY_6-5-2_R3	Yialias	NO	NO	G/M	P	G	G
96.	CY_6-5-e_RIh	CY_6-5-11_R3	Koutsos	NO	NO	G	G	G	G
97.	CY_6-5-f_RIh_HM	CY_6-5-1_R3-HM	Koutsos	YES2005	YES	M	M P	G	G
98.	CY_6-5-g_RE	NONE	Argaki ton Villourkon	NO	NO	DOESN'T MATCH IN WB 1ST RBMP	G	DOESN'T MATCH IN WB 1ST RBMP	G
99.	CY_6-5-h_RE	CY_6-5-2_R3	Alykos	NO	NO	M	M	G	U
100.	CY_6-5-i_RE	CY_6-5-2_R3	Almyros	NO	NO	M	G	G	U
101.	CY_7-2-a_RIh	CY_7-2-6_R3	Vathys	NO	NO	U	M	U	U
102.	CY_8-3-a_RE	NONE	Kalo Chorio	NO	NO	DOESN'T MATCH IN WB 1ST RBMP	M	DOESN'T MATCH IN WB 1ST RBMP	U
103.	CY_8-3-b_RE	NONE		NO	NO	DOESN'T MATCH IN WB 1ST RBMP	M	DOESN'T MATCH IN WB 1ST RBMP	U
104.	CY_8-4-g_RE	CY_8-4-4_R3	Pyrga	NO	NO	M	G	G	G
105.	CY_8-5-a_RIh	CY_8-5-1_R1	Pouzis	NO	NO	M	G	G	G
106.	CY_8-6-a_RIh	CY_8-6-1_R3	Xeropotamos	NO	NO	M	M	G	G
107.	CY_8-7-a_RI	CY_8-7-11_R3	Syrkatis	NO	NO	G	G	G	G

A/A	CODE 2015	CODE 2009	NAME (EN)	HMWB 2009	HMWB 2015	ECOLOGICAL STATUS /POTENTIAL 2009	ECOLOGICAL STATUS /POTENTIAL 2015	CHEMICAL STATUS 2009	CHEMICAL STATUS 2015
108.	CY_8-7-c_RI_HM	CY_8-7-2_R3_HM	Syrkatis	YES 2005	YES	P	M P	G	G
109.	CY_8-7-d_RIh	CY_8-7-3_R3	Argaki tou Mylou	NO	NO	G	G	G	G
110.	CY_8-7-f_RI_HM	CY_8-7-4_R3-HM	Pendaskhinos	YES 2005	YES	M	M P	G	G
111.	CY_8-7-g_RIh_HM	CY_8-7-4_R3-HM	Pendaskhinos	YES2005	YES	M	M P	G	G
112.	CY_8-8-a_RI	CY_8-8-1_R3	Potamos tou Ayiou Mina	NO	NO	G	G	G	G
113.	CY_8-8-b_RIh	CY_8-8-1_R3, CY_8-8-2_R3-HM	Potamos tou Ayiou Mina	NO	NO	G/M	M	G	G
114.	CY_8-8-c_RIh_HM	CY_8-8-2_R3-HM	Potamos tou Ayiou Mina	YES2005	YES	M	M P	G	G
115.	CY_8-9-a_RI	CY_8-9-1_R3	Vasilikos	NO	NO	M	G	G	G
116.	CY_8-9-b_RI_HM	CY_8-9-1_R3-HM	Vasilikos	YES2005	NO	M	G P	G	G
117.	CY_8-9-c_RI	CY_8-9-2_R3	Vasilikos	NO	NO	M	M	BELOW G	G
118.	CY_8-9-e_RI_HM	CY_8-9-5_R3-HM	Vasilikos	YES2005	YES	M	M P	G	U
119.	CY_8-9-f_RIh_HM	CY_8-9-5_R3-HM	Vasilikos	YES2005	YES	M	M P	G	U
120.	CY_8-9-g_RIh	CY_8-9-2_R3	Exovounia	NO	NO	M	M	BELOW G	G
121.	CY_8-9-h_RIh	NONE	Argaki tis Asgatas	NO	NO	DOESN'T MATCH IN WB 1ST RBMP	G	DOESN'T MATCH IN WB 1ST RBMP	U
122.	CY_9-1-b_RIh	CY_9-1-4_R3	Argaki tou Pyrgou	NO	NO	M	M	G	U
123.	CY_9-2-a_RI	CY_9-2-2_R2	Karydhaki	NO	NO	G	G	G	G
124.	CY_9-2-b_RP	NONE	Ayios Pavlos	NO	NO	DOESN'T MATCH IN WB 1ST RBMP	M	DOESN'T MATCH IN WB 1ST RBMP	G
125.	CY_9-2-c_RI	CY_9-2-11_R2	Potamos tis Yermasogeias	NO	NO	M	M	G	G
126.	CY_9-2-d_RI_HM	CY_9-2-1_R2-HM	Potamos tis Yermasogeias	YES2005	YES	M	M P	G	G
127.	CY_9-2-e_RI	CY_9-2-2_R2, CY_9-2-31_R3	Potamos tis Yermasogeias	NO	NO	G/M	G	G	G
128.	CY_9-2-f_RI	CY_9-2-31_R3	Potamos tis Yermasogeias	NO	NO	M	G	G	G
129.	CY_9-2-h_RIh_HM	CY_9-2-5_R3-HM	Potamos tis Yermasogeias	YES2005	YES	M	M P	G	G
130.	CY_9-2-i_RIh	CY_9-2-32_R3		NO	NO	M	M	G	G
131.	CY_9-2-j_RI	CY_9-2-4_R2	Yialiadhes	NO	NO	G	H	G	G
132.	CY_9-2-k_RI	CY_9-2-4_R2	Yialiadhes	NO	NO	G	G	G	G
133.	CY_9-2-L_RI_HM	CY_9-2-4_R3-HM	Yialiadhes	YES2005	NO	G	M P	G	G

A/A	CODE 2015	CODE 2009	NAME (EN)	HMWB 2009	HMWB 2015	ECOLOGICAL STATUS /POTENTIAL 2009	ECOLOGICAL STATUS /POTENTIAL 2015	CHEMICAL STATUS 2009	CHEMICAL STATUS 2015
134.	CY_9-4-b_RI	CY_9-4-1_R3	Garyllis	NO	NO	B	G	BELOW G	G
135.	CY_9-4-c_RI	CY_9-4-1_R3	Garyllis	NO	NO	B	P	BELOW G	F
136.	CY_9-4-e_RIh_HM	CY_9-4-41_R3-HM	Garyllis	YES2005	YES	B	M P	BELOW G	U
137.	CY_9-4-g_RIh	NONE	Phasoula	NO	NO	DOESN'T MATCH IN WB 1ST RBMP	M	DOESN'T MATCH IN WB 1ST RBMP	G
138.	CY_9-6-a_RP	CY_9-6-52_R2	Ayios Ioannis	NO	NO	M	M	G	G
139.	CY_9-6-b_RP	CY_9-6-5_R2, CY_9-6-51_R2, CY_9-6-52_R2	Ambelikos-Agros	NO	NO	M/G	M	G	G
140.	CY_9-6-c_RP	CY_9-6-53_R2		NO	NO	M	G	G	G
141.	CY_9-6-d_RP_HM	CY_9-6-53_R2-HM		YES2005	NO	M	M P	G	G
142.	CY_9-6-e_RP	CY_9-6-5_R2, CY_9-6-72_R3	Ambelikos-Xylourikos	NO	NO	M	M	G	G
143.	CY_9-6-f_RI	CY_9-6-72_R3	Potamos tou Limnati	NO	NO	M	M	G	G
144.	CY_9-6-g_RI	NONE	Pelendri	NO	NO	DOESN'T MATCH IN WB 1ST RBMP	G	DOESN'T MATCH IN WB 1ST RBMP	G
145.	CY_9-6-h_RI	NONE	Ayios Mamas	NO	NO	DOESN'T MATCH IN WB 1ST RBMP	G	DOESN'T MATCH IN WB 1ST RBMP	G
146.	CY_9-6-i_RP	CY_9-6-33_R3	Loumata	NO	NO	M	H	BELOW G	G
147.	CY_9-6-k_RP_HM	CY_9-6-33_R3-HM	Loumata	YES2005	NO	M	G P	F	G
148.	CY_9-6-L_RP	CY_9-6-31_R3	Kouris	NO	NO	M	P	F	F
149.	CY_9-6-m_RP_HM	CY_9-6-4_R3-HM	Kouris	YES2005	NO	M	M P	F	G
150.	CY_9-6-n_RP	CY_9-6-35_R3	Mesapotamos	NO	NO	G	H	G	G
151.	CY_9-6-o_RP	CY_9-6-36_R3	Moniatis	NO	NO	M	M	G	G
152.	CY_9-6-p_RP	CY_9-6-1_R2	Kryos	NO	NO	M	G	G	G
153.	CY_9-6-q_RP_HM	CY_9-6-1_R2-HM, CY_9-6-1_R3-HM	Kryos	YES2005	NO	M	G P	G	G
154.	CY_9-6-r_RI_HM	CY_9-6-1_R3-HM	Kryos	YES2005	YES	M	M P	G	G
155.	CY_9-6-t_RI_HM	CY_9-6-9_R3-HM	Kouris	YES2005	YES	P	M P	G	U
156.	CY_9-7-b_RE	CY_9-7-1_R1	Symvoulas	NO	NO	U	G	U	G

A/A	CODE 2015	CODE 2009	NAME (EN)	HMWB 2009	HMWB 2015	ECOLOGICAL STATUS /POTENTIAL 2009	ECOLOGICAL STATUS /POTENTIAL 2015	CHEMICAL STATUS 2009	CHEMICAL STATUS 2015
157.	CY_9-8-a_RIh	CY_9-8-1_R3	Potamos tou Paramaliou	NO	NO	U	M	U	G
158.	CY_9-8-b_RI	CY_9-8-4_R3	Evdhimou	NO	NO	U	M	U	G
159.	CY_9-8-c_RIh	CY_9-8-4_R3	Evdhimou	NO	NO	U	M	U	G

Ecological Status / Δυναμικό	*H: High*	*G:Good*	*M:Moderate*	*P:Poor*	*B:Bad*	*U: Unknown*
Chemical Status	*G:Good*				*F:Less than good*	