MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT

WATER DEVELOPMENT DEPARTMENT

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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) -

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Table of Contents

Foreword

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- Water Development Department (WDD)
- Environment Department (ED)
- Department of Fisheries and Marine Research (DFMR)
- General State Laboratory (SGL)

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CHAPTER 1. INTRODUCTION

This report is prepared under the Contract signed on 20/08/2013 between the **Water Development Department** and the Consortium "**ENVECO S.A. - I.A.CO Environmental & Water Consultants Ltd**" concerning "**Specialized Consultancy Services for the review and update of Article 5 of Directive 2000/60/EC (water reservoirs) and for the 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**", Contract No.: YY 02/2013. This report is the third deliverable of the Contract and constitutes the **Report on the Classification of Water Status (rivers, natural lakes, water reservoirs)**.

The Contract Scope consists in the Provision of Services for:

a. the **review and update of Article 5.2 of Directive 2000/60/EC for water reservoirs**. This includes the "analysis of characteristics" and the "review of the impact of human activity on the status of surface waters" and does not include rivers, groundwater and the "economic analysis of water use".

b. the **classification of water status** (ecological and chemical) for rivers, natural lakes and water reservoirs, including all related Heavily Modified Water Bodies (HMWB) and Artificial Water Bodies (AWB).

The above two components will form the baseline information and data of the 2nd Cyprus River Basin Management Plan.

The **Report on the Classification of Water Status (rivers, natural lakes, water reservoirs)** contains the following, as per the Terms of Reference of the above Contract:

CHAPTER 1. Introduction

CHAPTER 2. Regulatory framework

CHAPTER 3. Ecological Status of Monitoring Stations for River and Lake Water Bodies

- Rivers (including impounded rivers, i.e. water reservoirs), Lakes
- Data used, methodology, results

CHAPTER 4. Chemical Status of Monitoring Stations for River and Lake Water Bodies

- Rivers (including impounded rivers, i.e. water reservoirs), Lakes
- Data used, methodology, results

CHAPTER 5. Overall Status of River and Lake Water Bodies

CHAPTER 6. Confidence - Precision of the Status of River and Lake Water Bodies

CHAPTER 7. Future recommendations

The report is also completed by the relevant Appendices (Graphs, Data tables, Maps etc) and it is accompanied by all the relevant updated GIS files (shapefiles) including completed attribute tables, stored on appropriate digital storage media. All of the above are analyzed in the chapters of this report.

CHAPTER 2. REGULATORY FRAMEWORK

The Water Framework Directive 2000/60/EC (WFD) was published and entered into force in December 2000 to provide a legislative framework to protect and improve the quality of all water categories - rivers, lakes, transitional, coastal and groundwater -. The WFD introduces for the first time the principle of “ecological quality and importance” of water, independently of any other water use. The WFD aims at the integrated and sustainable management of water resources, establishing common principles and measures for all Member States, with a fundamental objective of achieving "good status" for all waters (including inland surface waters, transitional and coastal waters and groundwater) by the 2015.

The implementation of the WFD involves a wide number of actions and steps that lead eventually to the adoption of the River Basin Management Plan. The key actions that Member States need to take are the following:

- → To identify the individual river basins lying within their national territory and assign them to individual River Basin Districts (RBDs) and identify competent authorities by 2003 (Article 3, Article 24);
- → To characterise river basin districts in terms of pressures, impacts and economics of water uses, including a register of protected areas lying within the river basin district, by 2004 (Article 5, Article 6, Annex II, Annex III);
- → To carry out, jointly and together with the European Commission, the intercalibration of the ecological status classification systems by 2006 (Article 2 (22), Annex V);
- → To make operational the monitoring networks by 2006 (Article 8);
- → Based on sound monitoring and the analysis of the characteristics of the river basin, to identify by 2009 a programme of measures for achieving the environmental objectives of the Water Framework Directive cost-effectively (Article 11, Annex III);
- → To produce and publish River Basin Management Plans (RBMPs) for each River Basin District (RBD)
- → including the designation of heavily modified water bodies, by 2009 (Article 13, Article 4.3);
- → To implement water pricing policies that enhance the sustainability of water resources by 2010 (Article 9);
- → To make the measures of the programme operational by 2012 (Article 11);
- → To implement the programmes of measures and achieve the environmental objectives by 2015 (Article 4).

All the above actions lead to the adoption of the Programme of Measures and the 1st River Basin Management Plan, as well as to the 1st RBMP implementation, revision and renewal in a six-year cycle. After the first six-year implementation period of the RBMP, which expires in 2015, two other six-year planning cycles follow.

Cyprus has been identified as one River Basin District (11015 Km^2). Hydrographically the island of Cyprus is subdivided into 9 hydrological regions made up of 70 watersheds and 387 sub-watersheds.

The competent authority is the Minister of Agriculture, Natural Resources and Environment of the Government of the Republic of Cyprus. The reported competent authority has responsibility over the entire River Basin District.

According to the provisions of Article 1 of Protocol No 10 on Cyprus, the application of the acquis is suspended in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control. Furthermore, the Memorandum of Understanding between the Government of the republic of Cyprus and the Government of the United Kingdom of Great Britain and Northern Ireland concerning responsibility for the implementation of the Protocol on the Sovereign Base Areas of Akrotiri and Dhekelia in Cyprus, provides for the application of the WFD in the Sovereign Base Areas of Akrotiri and Dhekelia in Cyprus. The area under government control contains 47 watersheds.

Cyprus has already completed all the actions and steps that lead to the adoption of the 1st RBMP, which was published on March 2011. At this stage, Cyprus is at the implementation, revision and renewal of the 1st RBMP.

The aim of this Report is the Classification of Water Status for river and lake Water Bodies based on the results of the Monitoring Programme of the period 2009 - 2013.

Determining the quality of each water body is of key importance to the progress of implementation of the Directive. The classification of water status based on the results of the Monitoring Programme is the next step after the analysis of pressures and impacts and links the estimated analyses to the actual situation, as reflected in the monitoring programmes implemented. It is also a necessary step for the proper selection of measures necessary to achieve the environmental objectives of the Directive.

For the surface waters (rivers, lakes, coastal and transitional waters) the overall aim of the WFD is for Member States to achieve “good ecological status” and “good chemical status” in all bodies of surface water by 2015. Some water bodies may not achieve this objective for different reasons. For example, under certain conditions the WFD permits Member States to identify and designate artificial water bodies (AWB) and heavily modified water bodies (HMWB) in accordance with Article 4(3). Instead of "good ecological status", the principal environmental objective for HMWBs and for AWBs is “good ecological potential” (GEP) and “good surface water chemical status”, which has to be achieved by 2015.

In the following chapters of this report the available data, the methodology and the results for the classification of water status for river and lake water bodies are described.

CHAPTER 3. ECOLOGICAL STATUS/ POTENTIAL OF MONITORING STATIONS FOR RIVER AND LAKE WATER BODIES

3.1 INTRODUCTION

The WFD requires that the status of each of the surface waters is determined through the assessment of:

- ecological status or, in the case of artificial and heavily modified water bodies, ecological potential, and
- chemical status.

According to Article 2.21 of the WFD, “Ecological status is an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters, classified in accordance with Annex V”.

WFD Annex V, Table 1.1, explicitly defines the Quality Elements (QE) that must be used for the assessment of ecological status/potential (see Table 3.1 below). Separate lists are provided for rivers (section 1.1.1), lakes (section 1.1.2), transitional waters (section 1.1.3) and coastal waters (section 1.1.4).

Section 1.1.5 specifies that the quality elements for the classification of heavily modified and artificial water bodies are those relevant to whichever of the four surface water categories the heavily modified or artificial water body most closely resembles.

The lists of quality elements for each surface water category are subdivided into 3 groups of ‘elements’:

(1) biological quality elements (BQE),

(2) hydromorphological quality elements supporting the biological elements; and

(3) chemical and physicochemical quality elements supporting the biological elements.

The chemical and physicochemical quality elements supporting the biological elements include:

- General physicochemical quality elements (specified in Annex V, table 1.1 of the WFD);
- Specific non-priority pollutants identified by Member States as being discharged in significant quantities

In the following Table 3.1-1 below, the quality elements that must be used for the assessment of ecological status/potential are described.

Table 3.1-1: Quality elements that must be used for the assessment of ecological status/potential based on the list of WFD Annex V par. 1.1.

Rivers	Lakes
Biological Elements	
▪ Composition and abundance of aquatic flora[1] ▪ Composition and abundance of benthic invertebrate fauna ▪ Composition, abundance and age structure of fish fauna	▪ Composition, abundance and biomass of phytoplankton ▪ Composition and abundance of other aquatic flora[2] ▪ Composition and abundance of benthic invertebrate fauna ▪ Composition, abundance and age structure of fish fauna
Hydromorphological elements supporting the biological elements	
Hydrological regime	
▪ quantity and dynamics of water flow ▪ connection to groundwater bodies ▪ River continuity	▪ quantity and dynamics of water flow ▪ residence time ▪ connection to the groundwater body
Morphological conditions	
▪ river depth and width variation ▪ structure and substrate of the river bed ▪ structure of the riparian zone	▪ lake depth variation ▪ quantity, structure and substrate of the lake bed ▪ structure of the lake shore
Chemical and physico-chemical elements supporting the biological elements	
General	
▪ Thermal conditions ▪ Oxygenation conditions ▪ Salinity ▪ Acidification status ▪ Nutrient conditions	▪ Transparency ▪ Thermal conditions ▪ Oxygenation conditions ▪ Salinity ▪ Acidification status ▪ Nutrient conditions
Specific pollutants	
▪ Pollution by other substances (non priority substances) identified as being discharged in significant quantities into the body of water	▪ Pollution by other substances (non priority substances) identified as being discharged in significant quantities into the body of water

[1] *Phytoplankton is not explicitly included in the list of quality elements for rivers in Annex V, 1.1.1, but is included as a biological element in Annex V, 1.2.1. It should therefore be possible to use phytoplankton as a separate element, if needed and appropriate especially in low land large rivers where phytoplankton may be important. The other aquatic flora specifically referred to in the normative definitions for rivers (Annex V 1.2.1) are macrophytes and phytobenthos.*

[2] *The other aquatic flora specifically referred to in the normative definitions for lakes (Annex V 1.2.2) are macrophytes and phytobenthos.*

The Water Framework Directive defines ecological status in the High, Good, Moderate, Poor and Bad classes for each of the ecological quality element in each of the surface water categories. It indicates the biological, hydromorphological and physicochemical parameters required in the overall ecological assessment. These normative definitions form the basis for the classification of surface waters.

Member States are required to develop classification systems capable of distinguishing between the five status classes – High, Good, Moderate, Poor and Bad - for each of quality elements. The status of each of the quality elements is determined by measuring the extent of the deviation, if any, of the observed condition from the *Reference Condition* established for that water body. Reference conditions are the conditions established for the quality elements in the absence (or the presence of slight) pollution or disturbance.

The results of the monitoring systems are expressed numerically as *Ecological Quality Ratios* (EQR), in order to ensure comparability between the different monitoring elements. The ratio is expressed as a numerical value between zero (worst class) and close to one (best class) and it derives from the ratio of the observed value at a specific water body and the reference value obtained from undisturbed sites of the same type. The EQR scale for the monitoring system for each surface water category is divided into the five classes by assigning a numerical value to each of the boundaries between the classes (Figure 3.1-1).

The limit values between the classes of high and good status, and between good and moderate status are being also established through the EU supported intercalibration exercise. This exercise also ensures comparability of the methods and results of the biological monitoring between different member states.

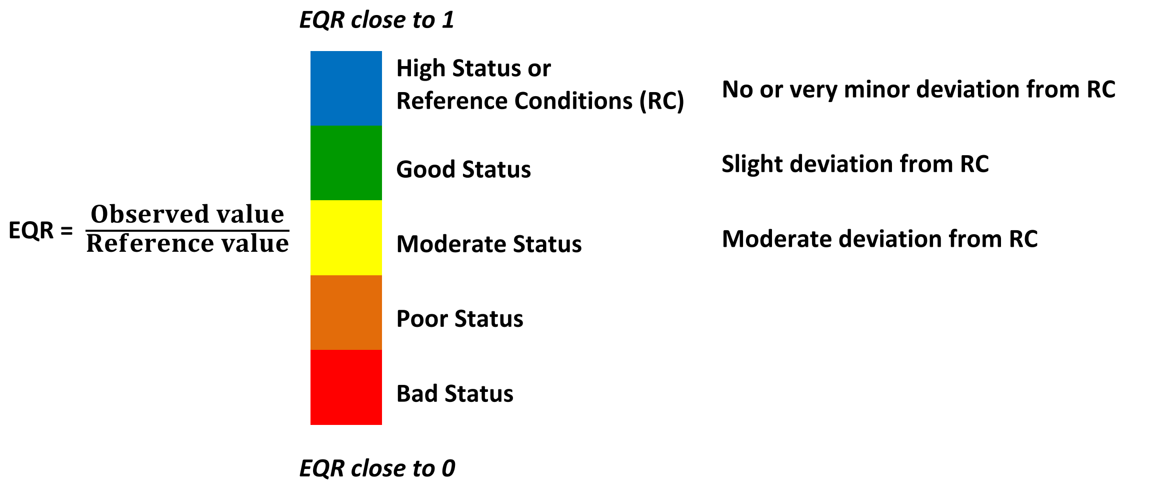


Figure 3.1-1: Determination of the ecological status, basic principle for the calculation of EQR and the five quality categories.

The relationships between the biological, hydromorphological and physicochemical quality elements in status classification are presented in Figure 3.1-2 for all natural water categories and types (Guidance Document No. 13).

Based on Figure 3.1-2 and on Guidance Document No. 13, for the assessment of ecological status:

- Biological Quality Elements are considered for the classification of all 5 quality categories.
- Hydromorphological Quality Elements are considered only when assigning water bodies to the high ecological status class (i.e. for distinguishing between high ecological status and good ecological status). For the other status classes, the hydromorphological elements are required to have "conditions consistent with the achievement of the values specified for the biological quality elements."
- Physicochemical Quality Elements (General component) are considered when assigning water bodies to the high and good ecological status classes (i.e. when distinguishing between high status ecological and good ecological status, as well as between good and moderate ecological status). For the other status classes the physico-chemical elements are required to have "conditions consistent with the achievement of the values specified for the biological quality elements."

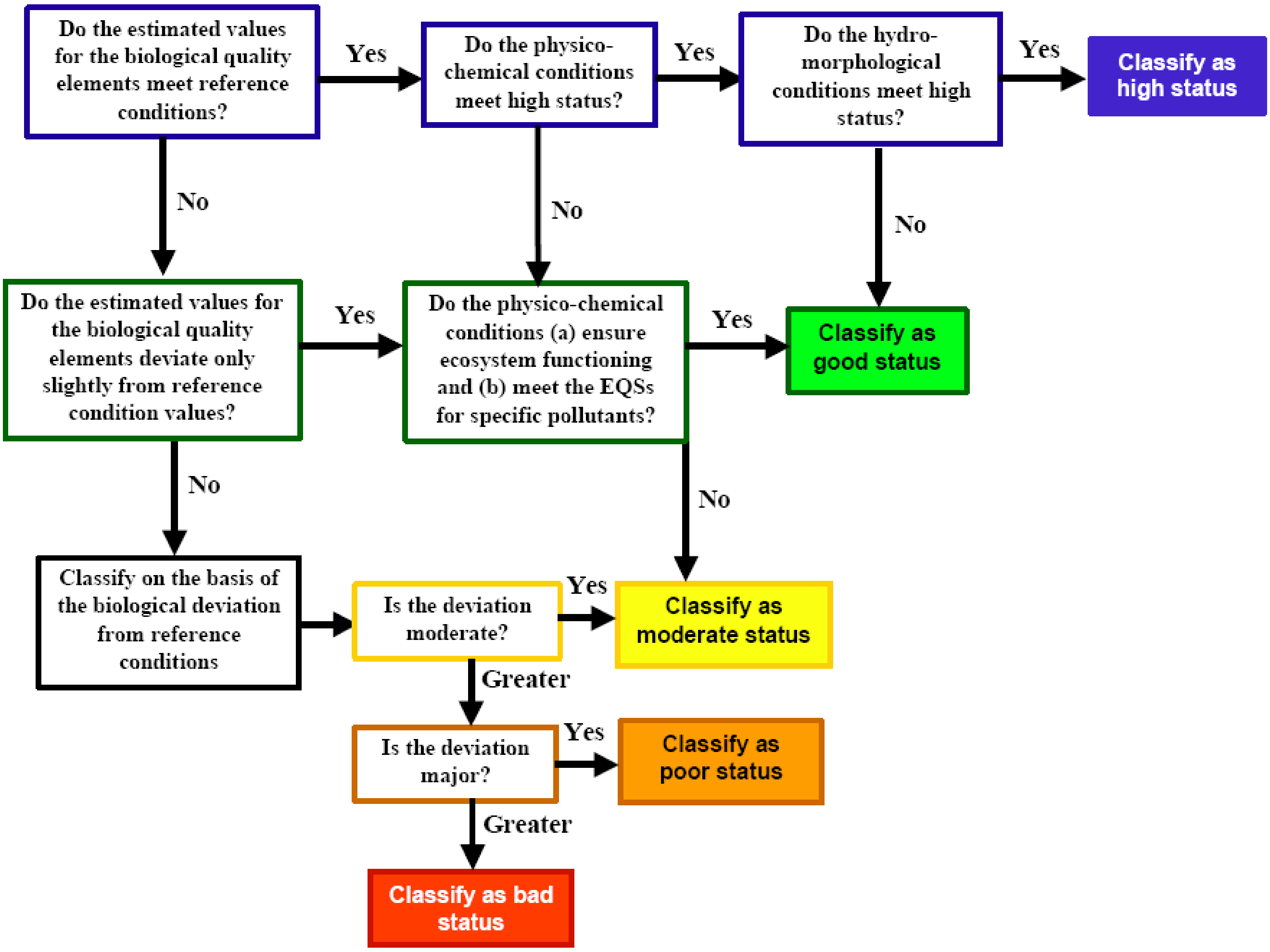


Figure 3.1-2: Indication of the relative roles of biological, hydromorphological and physico-chemical quality elements in ecological status classification according the normative definitions in WFD Annex V:1.2. [WFD CIS Guidance Documents No 13].

After evaluating the above mentioned quality elements, these are then combined according to the principle "one out, all out" to assess the overall ecological status/potential.

3.2 River Water Bodies (excluding impounded rivers)

3.2.1 Available Data

3.2.1.1 Biological Quality Elements

The monitoring of BQE de facto implies that for the evaluation of water quality status, each member state must elaborate national methods for all BQE and for all surface water bodies i.e. rivers, lakes, transitional and coastal waters.

As it is already mentioned, for the assessment of the ecological status in river water bodies, three BQE are defined:

- Benthic macroinvertebrates (Composition and abundance),
- Aquatic flora (Composition and abundance), and
- Fish (Composition and abundance).

It has to be noted though, that aquatic flora refers to two distinct biological groups, phytobenthos (diatoms) and macrophytes. Thus, the total number of monitored BQE's should be realistically considered as four.

As a member state, Cyprus has developed a monitoring programme (since 2006) and relevant national methods for the biological monitoring of rivers. In addition Cyprus successfully participated in both 1st (2004-2008) and 2nd phase (2008-2011) of the Intercalibration Exercise in Mediterranean Geographic Intercalibration Group (MedGIG).

Following the submission of the 1st River Basin Management Plan (RBMP) in 2011, Cyprus expanded the monitoring network according to the proposed programme of measures. In addition, all necessary actions were made to fill in the gaps concerning the BQE methods and monitoring in river water bodies, by testing the applicability of all BQE in Cyprus water bodies that were not available and thus were not included in the status assessments for the 1st RBMP.

≡ **Benthic invertebrates**

For the assessment of ecological status in rivers using **Benthic invertebrates**, Cyprus developed a national method using the STAR Intercalibration Common Metric Index (STAR ICMi, STAR project, 2005). The multimetric index was intensively tested and responded well to a pressure gradient for both of the two intercalibration river types found on the island: R-M4 (Mediterranean mountain streams) and R-M5 (temporary streams). The index successfully participated for river type R-M4 in both phases and for R-M5 type in the 2nd phaseof the IC exercise.

- **Phytobenthos**

Phytobenthos was also found to be applicable in Cyprus rivers. Indice de Pollusensibilité Spécifique - IPS index (Coste in CEMAGREF, 1982) was found as the most suitable and sensitive method for the detection of pressures in the catchments of Cyprus rivers. It is correlated with parameters related to organic pollution, ionic strength and eutrophication and gives complex estimation of water quality. The index was reported as Cyprus national method for both intercalibration river types, R-M4 and R-M5, during the 2nd phase of IC exercise.

- **Aquatic Macrophytes**

Aquatic Macrophytes were also tested for their applicability in Cyprus rivers. In R-M4 type rivers, the Macrophyte Biological Index for Rivers – IBMR (Haury et al. 2006) responded well to a gradient of pressures and was adopted as Cyprus national method. In R-M5 type IBMR showed low correlation with associated pressures and therefore an effort was made to develop a different index for this river type. Multimetric Macrophyte index - MMI was developed and submitted for the 2nd IC phase, but finally the methods for R-M5 type were not intercalibrated. The method developed for macrophytes in intermittent rivers was not considered reliable enough for status evaluation, firstly because the results were not a close fit with the pressures and in addition the method was not intercalibrated. So at this stage, the results obtained for type RM5 were considered unreliable and were not taken into account for the status assessment. In the future, there might be an effort to further adjust this method for Cyprus intermittent rivers.

- **Fish**

Finally the BQE **Fish** was explored under tenders TAY49/2010 and YY02/2012 (Zogaris et al. 2012) launched by WDD, in order to justify whether fish communities can be used as a quality descriptor in riverine waterbodies. The study included:

- review and evaluation of historical data, as well as review of possible previous assessments done for fish in river water bodies,
- interviews with locals and especially elder people in order to construct a knowledge base about the past and current status of fish populations,
- fish sampling and collection of supporting data and
- investigation of possible indices suitable for application in Cyprus rivers quality assessment.

Data collection was extensive covering all possible river stretches that can support fish populations i.e. mountain, middle course and coastal types and especially perennial or formerly perennial rivers. A total of 21 species were observed out of which only 1 species (Eel – *Anguilla anguilla*) is considered native of Cyprus rivers. The native Eel was found to be distributed in approximately six river catchments of the island (Figure 3.2.1.1-1): *Anguilla anguilla* populations were recorded in Pyrgos river mouth (location 1), Chrysochou river (locations 2 and 3), Ezousa river (location 4), Diarizos river (location 5 and 6), Cha-potami river mouth (location 9) and Germasogia river lower part (location 12). However, it has also been documented by locals to be quite widespread on the island and existing in several other locations. In fact it has later-on been recorded in other locations such as the Oroklini coastal wetland, the mouth of the ephemeral Ayia Marina stream,the midreaches of Ezousa river, in the pool of the Baths of Aphrodite and the small stream that connects the pool to the sea.

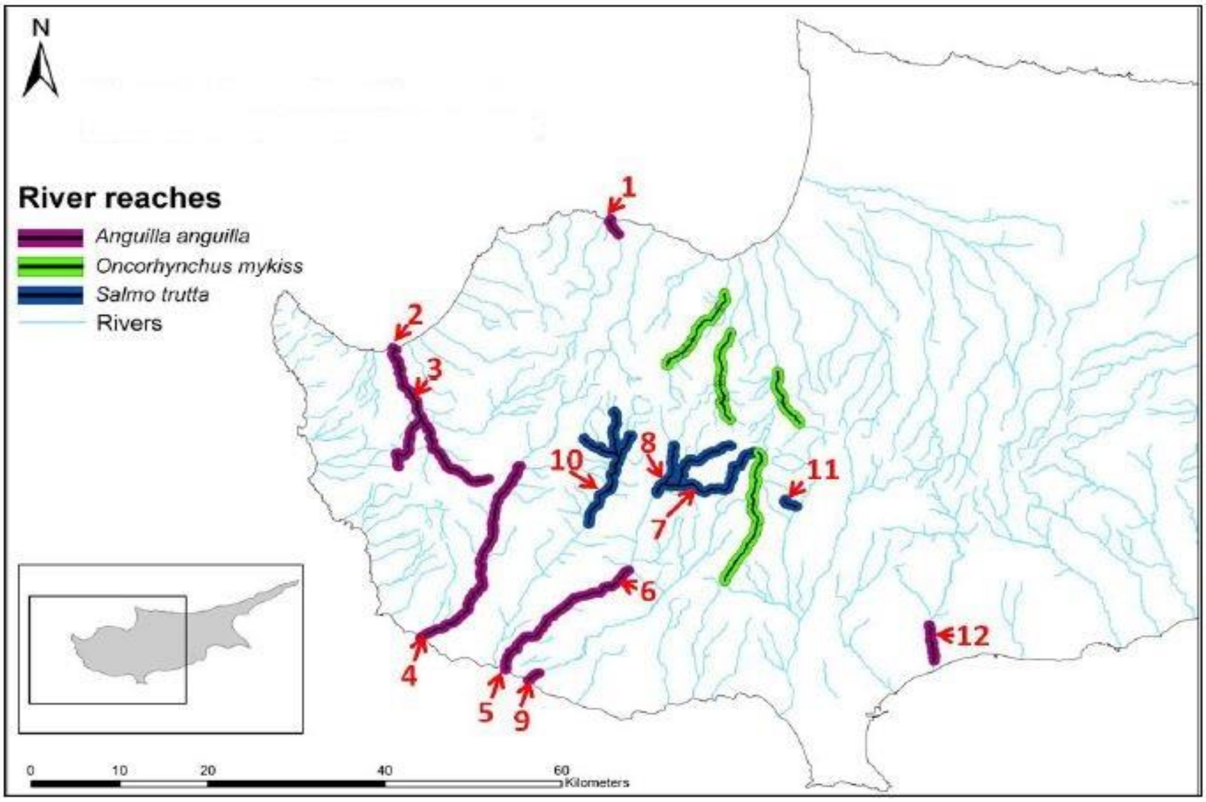


Figure 3.2.1.1-1: River stretches where populations of the native *Anguilla anguilla* and the naturalized species *Oncorynchus mykiss* and *Salmo trutta* have been documented in 2010-2012, during the investigation of Cyprus rivers under the WDD tender. The numbered arrows indicate priority locations where most individuals were observed. *From S.Zogaris et al. 2012*.

A brackish water native species (*Aphanius fasiaticus*) was also reported in a coastal wetland (Akrotiri wetland), as well as five euryhaline fish of marine origin that are only found in the lower reaches of rivers (*Mugil cephalus, Liza ramada, Liza aurata, Dicentrarchus labrax, Atherina boyeri*). According to historical data, native populations of the river blenny *Salaria fluviatilis* had been present on the island at the beginning of the 20th century, but the occurrence of the species has not been verified since, not even during the fish samplings of the WDD project.

Two historically introduced species (Brown trout *Salmo trutta* and Rainbow trout *Oncorynchus mykiss*) found in the upper cold-water stretches of some river catchments, showed indications of spawning and self-sustaining populations. The brown trout, originally stocked in the late 40's, was located in the upper river stretches where minimum disturbance and anthropogenic pressures occur and ecological status was found to be in Good or High quality class in the present study. The river parts where brown trout was found were a very small river stretch (Mesa Potamos) in the upper parts of the Kouris river (location 11), the upper stretches of Dhiarizos river (locations 7 and 8) and the upper parts of Xeros river in Paphos district (location 10). All populations found were characterised by unusual age-class distribution with certain years being prevalent and very few young fish. Individuals of the Rainbow trout were located in the middle and upper stretches of Kryos river, in the upper stretches of Kargotis river, but also in Marathasa and Xeros (Lefka) rivers. These river segments are also characterised by Good quality status with the exception of Kargotis river. It is noted though that these rivers have aquaculture facilities or reservoirs in their catchments, stocked with rainbow trout, but in all cases there is evidence of reproduction and young of the year (YOY) presence.

In addition to the above species, 12 alien species were recorded in the island stream waters of Cyprus, although most of these inhabited short river sections in the immediate vicinity of artificial reservoirs. A few more alien species are confirmed exclusively in reservoirs.

Despite the mass collection of data, the applicability of the BQE fish for WFD status assessment was not confirmed. The unique insular and environmental conditions on the island create serious obstacles to the development and practical application of the fish BQE for Cyprus' rivers. Some of the reasons are:

- Cyprus rivers fish fauna is depauperate and exhibits unusually low population densities and high inter-site variation. Much of this variation remains unexplained by environmental and known anthropogenic pressures.
- Alien warm-water fish are widespread primarily in dams and in several stream reaches particularly in the immediate vicinity of dams. Obviously, fish populations in rivers that are connected to dams originate from stocking or indiscriminate introductions that take place in the dam reservoirs. Generally predictable patterns in the distributions of these species are not obvious and populations could frequently be exterminated by periodic all-out drying of rivers and wetlands.
- Building validated indicators or indices that help assess the river condition in a WFD policy-relevant perspective must be based on an in-depth understanding of river-biota natural history. Through specific research and monitoring, specific fish-based attributes may be shown to be reliable, predictable and relevant signals about the biological effects of human pressures on aquatic ecosystems. These attributes are chosen as metrics when they are shown to reflect specific, predictable responses to changes in river health, or river status. In Cyprus the current understanding of fish-based attributes and their relation to environmental and anthropogenic stresses is still poor and strong spatio-temporal variation creates difficulty in using fishes as bio-indicators. According to the results of projects TAY49/2010 and YY02/2012 *"in Cyprus, fish are shown that they are not easily used as an unambiguous, scientifically sound measurement of pressures, degradation states or sources of anthropogenic stress*.''

Still, the use of specific metrics as a supplementary tool for the evaluation of the rivers status may become possible in the future. The use of eel populations for the evaluation of connectivity between river stretches but also between the river and the sea could provide a hydromorphological assessment tool. Their presence indicate a definite longitudinal connectivity down to the sea, the presence and habitat quality of refugia during drought, the longitudinal integrity of river continuity upstream and the persistence of aquatic environments inland for many years, since Eels are long-lived species. In this sense, just the presence, abundance of adults and/or the occurrence of in-coming juvenile Eels are significant elements for assessing the ecological integrity of aquatic systems. Additionally a possible recovery of eel populations in river stretches after the implementation of management measures, such as hydromorphological restoration could be considered as an important signal for successful practises. Likewise the presence for many decades of self-sustained populations of the Brown trout and possibly of the Rainbow trout, despite the drought incidents through the years, could also be conceived as a confirmation of good ecological integrity as well as indicators of hydrological connectivity. In general, the presence of reproductive fish populations is nonetheless an important indicator of water permanence, suitable conditions and existence of fish related habitats, and of an overall good ecological integrity.

For the development of national indices, a boundary setting procedure was applied during the elaboration of each assessment method and was validated during both phases of the Intercalibration Exercise. The EQR class boundary values for each index are presented in Table 3.2.1.1-1.

Table 3.2.1.1-1: Ecological class boundary values for BQE's monitored in Cyprus rivers

			HIGH	GOOD	MODERATE	POOR	BAD
Benthic invertebrates	R-M4	STAR ICMi	0.972	0.729	0.486	0.243	
	R-M5	STAR ICMi	0.982	0.737	0.491	0.249	
Diatoms	R-M4	IPS	0.91	0.68	0.46	0.23	
	R-M5	IPS	0.96	0.72	0.48	0.24	
Aquatic macrophytes	R-M4	IBMR	0.795	0.596	0.397	0.198	

After the submission of the 1st RBMP, the Cyprus rivers' monitoring programme was revised, in order mainly to implement operational monitoring in WB that failed to achieve Good ecological status. Also, the monitoring network for BQEs was expanded and included more stations in order to cover more Cyprus rivers. As a result, an updated monitoring scheme was implemented with 61 monitoring stations compared to 42 in the 1st RBMP:

- 28 stations were included in the operational monitoring scheme and
- 33 stations were included in the surveillance monitoring scheme.

On the implementation of the biological monitoring programme of 2009-2013 in Cyprus rivers, a significant amount of data was collected. A total of:

- 201 samples of benthic macroinvertebrates,
- 141 samples of benthic diatoms,
- 27 samples of aquatic macrophytes,
- 170 sampling attempts of fish (98 of which resulted in fish captures, while the rest of the sites were fishless)

were collected and analysed. For each sample collected, the suitable national index was applied for the calculation of EQR and the corresponding status was calculated. In the frame of this Contract, the results were made available to the contractor by the Water Development Department for the overall evaluation of the status of river water bodies. As it is already mentioned, fish sampling results and macrophytes sampling results from RM5 river type were not included in the present evaluation of river status.

3.2.1.2 Chemical - Physicochemical Quality Elements

All available data from the Surface Water Monitoring Programme under WFD Article 8 were provided by the Division of Hydrometry of Water Development Department (WDD) for the evaluation of Chemical – Physicochemical status .

Data from 63 monitoring stations were analysed.

The parameters used for the quality categories are explained in detail in paragraph 3.2.2.2 of this report. The chronological range of available data for each parameter is presented in Table 3.2.1.2-1.

Table 3.2.1.2-1: Chronological Range of available data for Chemical - Physicochemical Quality Elements at river monitoring stations (excluding impounded rivers)

Chemical - Physicochemical Quality Element	Chronological Range of available data	
	Starts at	Ends at
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
NO_3^-	6/2009	5/2013
PO_4^{-3}	6/2009	5/2013
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
Cu	11/2009	5/2013
B	6/2009	5/2013
Zn	1/2010	5/2013

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. Data for water hardness at river (excluding impounded rivers) monitoring stations chronologically range from 6/2009 to 5/2013.

From the data presented in Table 3.2.1.2-1, some NH_4^+ values were not taken into account, because data from a private laboratory show continuously higher NH_4^+levels for the period March 2010 to

February 2011. This does not correspond to the real situation, since all other values were much lower for the rest of the sampling period. Therefore, NH_4^+results for the above mentioned period, from the specific laboratory were not taken into account for the average value per station for the NH_4^+.

3.2.1.3 Hydromorphological Quality Elements

Data on hydromorphological assessment for rivers was made available by WDD. The assessment was conducted using CARAVAGGIO (Buffagni et al., 2005), a method originally based on River Habitat Survey (RHS), but with several modifications and additions in order to be used for the characterization of hydromorphological and habitat features in rivers of southern Europe.

A total of 68 Caravaggio applications were available for the period 2009-2013 covering a wide range of the river network of Cyprus (Table 3.2.1.3-1). Datasets were collected from reference and non-reference sites of both perennial (R-M4) and intermittent (R-M5) river types and in several cases, more than once on the same water body. The output of Caravaggio method is a set of indices describing the hydromorphological and habitat features of the studied river stretch. These indices are: the Lentic-Lotic River Descriptor (LRD), the Habitat Quality Assessment index (HQA, Raven et al. 1998), the Habitat Modification Score (HMS, Raven et al. 1998) and the Land Use Index at river stretch scale (LUI, Demartini et al., in press).

The **Lentic-lotic River Descriptor** (**LRD**) allows to characterise streams by their lentic-lotic character and to quantify the hydrological impact (Buffagni et al., 2009). This descriptor varies from extreme negative values corresponding to lotic condition (e.g. turbulent flows, coarse substrate, etc.) to extreme positive values corresponding to lentic ones (e.g. laminar or not perceptible flows, fine substrate, extensive macrophyte cover, etc.).

The **Habitat Quality Assessment index** (**HQA**; Raven et al., 1998) assesses the ecological quality and diversity of the site through the habitat richness evaluated on the basis of the extent and variety of natural features recorded. High index values indicate high habitat quality.

The **Habitat Modification Score** (**HMS**; Raven et al., 1998) is an index based on the data regarding morphological modification of river channels due to human activities (e.g., bank reinforcement, channel re-sectioning, culverting, number of weirs, etc.) recorded in the CARAVAGGIO method. Different scores are given to each type of modification, according to the severity and extent of the impact. HMS is thus the sum of all the individual scores. The higher the score, the more heavily modified the site is.

Another important feature to be considered for the quantification of pressures is land-use. To quantify land-use pressure the **Land Use Index** (**LUI**; Demartini et al., in press) at river stretch scale was calculated. Land use categories recorded with CARAVAGGIO and including natural, agricultural and urban land-uses, are considered for the calculation. The scoring system is partially based on Feld (2004). According to land use pressures high scores in LUI correspond to high anthropic land uses.

Each index values were provided by WDD as shown on Table 3.2.1.3-1.

Table 3.2.1.3-1: Hydromorphological data collected in Cyprus, using the CARAVAGGIO method.

Station code	IC Type	River name	Site name	Ref	Date	HQA	HMS	LUI	LRD
r1-2-4-25	RM4	Dhiarizos	u/s Arminou Dam		04/06/2012	60	0	0	-26.2
r1-3-5-05	RM4	Xeros	near Lazarides	R	03/06/2012	41	2	0	-18.8
r1-4-5-73	RM4	Ezousa	Pitharkou		29/04/2011	66	12	0	21.8
r1-4-7-10	RM4	Ezousa	Moro Nero		26/02/2011	35	22	4.85	10.73
r2-8-3-10	RM4	Limnitis	Saw Mill Ref weir	R	24/02/2011	51	3	0	-25.4
r2-8-3-10	RM4	Limnitis	Milani Ref	R	28/04/2011	67	0	0	-17.8
r2-8-3-10	RM4	Limnitis	Saw Mill Ref weir	R	30/05/2012	59	3	0	-21.5
r2-9-2-50	RM4	Kambos	Ag. Varvara		28/04/2011	49	22	8	10
r3-2-1-85	RM4	Maroni	Choirokoitia Up Weir		21/02/2011	54	13	4.27	-7.5
r3-2-1-85	RM4	Maroni	Choirokoitia u/s		25/04/2011	51	10	1.7	14.5
r3-2-1-85	RM4	Marathasa	u/s Kalopanagiotis Dam		31/05/2012	40	45	6	-17.3
r3-3-1-60	RM4	Kargotis	Agios Nikolaos u/s Fish Farm	R	05/06/2012	43	0	0	-47.6
r9-6-1-44	RM4	Kryos	u/s Myllomeris Waterfall		31/05/2012	50	2	2.9	-20.8
r9-6-1-44	RM4	Kryos	Koilani d/s seawage outfall		31/05/2012	52	41	9.9	-24.5
r9-6-4-92	RM4	Kouris	Alassa New Weir		27/02/2011	45	11	3.96	-9.75
r9-6-4-92	RM4	Kouris	Alassa new weir d/s bridge		30/04/2011	43	29	0.5	-22.9
r9-6-6-32	RM4	Limnatis	u/s Kouris Dam Ag. Mama		01/06/2012	48	0	0	-30.8
r1-1-3-95	RM5	Cha Potami	Kissousa		27/02/2011	42	28	1.76	9
r1-1-3-95	RM5	Cha Potami	Kissousa village		30/04/2011	68	21	3.4	-41.6
r1-1-3-95	RM5	Chapotami	Kato Archimandrita		01/06/2012	41	2	0.9	16.1
r1-3-8-60	RM5	Xeros	Phinikas		26/02/2011	40	10	0.88	-9.46
r1-3-8-60	RM5	Xeros	Phinikas u/s		30/04/2011	52	21	3.8	-27.3
r1-4-3-35	RM5	Ayia	u/s Kannaviou Dam Ref	R	28/02/2011	53	2	0	-28.8
r1-4-3-35	RM5	Ayia	Kannaviou Dam Ref u/s	R	01/05/2011	54	2	0	-17
r1-4-3-35	RM5	Ayia	u/s Kannaviou Dam Ref	R	02/06/2012	52	2	0	-11.2
r2-2-3-95	RM5	Chrysochou	Skoulli		26/02/2011	39	40	9.75	19.39
r2-2-3-95	RM5	Chrysochou	Skoulli u/s bridge		29/04/2011	45	21	5.9	50.2
r2-2-5-02	RM5	Stavros	Ref Gorges	R	27/02/2011	45	3	0	-25.7
r2-2-5-02	RM5	Stavros	Ref gorges d/s	R	30/04/2011	48	9	0.2	-12.5
r2-2-5-75	RM5	Stavros tis Psokas	Rizokremmos		27/02/2011	41	7	0.27	-19.5
r2-2-6-24	RM5	Stavros tis Psokas	culvert		30/04/2011	42	14	4.6	-2.4
r2-4-6-65	RM5	Leivadi	Ref Weir	R	26/02/2011	57	2	0	-8
r2-4-6-65	RM5	Leivadi	Ref weir u/s	R	29/04/2011	52	9	0	-7.6
r2-7-2-75	RM5	Pyrgos	Phleva	R	24/02/2011	42	2	0	-23.8

Station code	IC Type	River name	Site name	Ref	Date	HQA	HMS	LUI	LRD
r2-7-2-75	RM5	Pyrgos	Ref Down Weir	R	24/02/2011	49	7	0.15	-18.9
r2-7-2-75	RM5	Pyrgos	Phleva Ref	R	28/04/2011	44	2	0	-8
r2-7-2-75	RM5	Pyrgos	Phleva ref	R	29/05/2012	44	2	0	-17.1
r3-1-2-30	RM5	Xeros	U/S Kafizes Dam	R	23/02/2011	57	0	0	-20.2
r3-1-2-30	RM5	Xeros	Kafizes Dam Ref u/s	R	27/04/2011	58	2	0	-26
r3-5-1-50	RM5	Lagoudera	Lagoudera Up Dam-Weir		23/02/2011	55	8	1.84	-12.3
r3-5-1-50	RM5	Lagoudera	Down Weir		26/04/2011	58	6	0	-11.9
r3-5-4-40	RM5	Elea	Vizakia		23/02/2011	53	31	4.66	11.58
r3-5-4-40	RM5	Garyllis	u/s Polemidia Dam		01/03/2011	48	13	0.96	14.36
r3-5-4-40	RM5	Elea	Vizakia u/s weir		27/04/2011	48	30	5.2	-2.1
r3-7-1-50	RM5	Peristerona	Panagia		28/05/2012	42	2	1.4	-13.3
r3-7-1-55	RM5	Peristerona	Siphilos		23/02/2011	43	20	1.2	-24
r3-7-1-55	RM5	Peristerona	Siphilos d/s farm		26/04/2011	54	22	2.9	-4.5
r3-7-3-71	RM5	Akaki	u/s Akaki-Malounta Dam		22/02/2011	43	6	0	-12.8
r3-7-3-71	RM5	Akaki	Malounta Dam d/s Bridge		26/04/2011	56	12	2.4	-11
r6-1-1-48	RM5	Ag. Ounofrios	Ref upstream	R	02/02/2011	43	0	0	-29.3
r6-1-1-48	RM5	Ag. Ounofrios	Ref d/s	R	26/04/2011	49	0	0.5	-2.8
r6-1-1-72	RM5	Pediaeos River	Philani		26/04/2011	46	0	0	11.1
r6-1-2-90	RM5	Pedhiaios	Lefkosia		28/05/2012	35	55	14	36.8
r6-5-1-85	RM5	Gialias	Kotsiatis		22/02/2011	38	25	4.87	28.5
r6-5-1-85	RM5	Gialias	Kotsiatis u/s ford		25/04/2011	32	17	4.5	34
r8-4-3-40	RM5	Treminthos	Ag. Anna		25/04/2011	52	24	3	32.6
r8-7-1-65	RM5	Syrgatis	Kyprovasa Ref		21/02/2011	50	6	0.45	-4
r8-7-1-65	RM5	Syrgatis	Kyprovasa Ref d/s		25/04/2011	55	3	0	7
r8-7-2-60	RM5	Syrgatis	Pano Lefkara		21/02/2011	47	8	0.3	44.5
r8-7-2-60	RM5	Syrgatis	Pano Lefkara d/s		25/04/2011	40	14	1.4	36.5
r8-9-5-40	RM5	Vasilikos	Layia Up Weir		28/02/2011	54	4	0	3.92
r9-2-3-05	RM5	Germasogia	Dierona		06/06/2012	48	26	9.6	3.4
r9-2-3-29	RM5	Germasogia	Prasteio		06/06/2012	49	4	0	-5.9
r9-2-3-85	RM5	Germasogeia	Phinikaria		01/03/2011	54	2	0	-8.83
r9-2-3-85	RM5	Germasogeia	Phinikaria d/s measuring station		01/05/2011	55	12	0	-5.3
r9-6-2-60	RM5	Kryos	U/S Tunnel Outlet		27/02/2011	39	11	0.24	-4.25
r9-6-7-70	RM5	Limnatis	Kouris U/S Dam		01/03/2011	49	15	0	-19.1
r9-6-7-70	RM5	Limnatis	Kouris Dam u/s bridge		01/05/2011	55	10	0.3	-16.6

3.2.2 Methodology

3.2.2.1 Biological Quality Elements

As it is already mentioned, for the assessment of the ecological status in river water bodies, four BQE are defined:

- Benthic macroinvertebrates (Composition and abundance),
- Phytobenthos (diatoms) (Composition and abundance),
- Macrophytes (Composition and abundance), and
- Fish (Composition and abundance).

For each quality element monitored, an EQR is calculated as indicated in chapter 3.1 of this report and it is assigned in an ecological status class. Each class is characterised by a colour code, representing a spectrum of quality status ranging from HIGH to BAD.

During the analysis of all the available data, a quality check was performed, in order to avoid possible pitfalls from data inconsistency. Several clarifications were given by the Contracting Authority and some issues were discussed concerning the methodology. It was decided that all invertebrate EQR's would be recalculated using reference sites (and thus reference values) only from the samples taken after 2009, after checking and confirming that the reference sites still fulfil reference criteria. This approach was considered more realistic and accurate, since it encompasses possible natural pressures i.e. droughts, and generally natural conditions that might have occurred during the assessment period. In this way, over- or under- estimation of the community status and thus the water quality due to natural processes is minimized. During the recalculation of EQR's, the data were handled according to the typology of each waterbody - monitoring station, i.e. perennial R-M4 rivers were assessed separately from intermittent R-M5 streams, since different reference sites and reference values apply for the calculation of EQR's.

At each monitoring station, several samples from different BQEs were collected and analysed. The biological status derived at the station level, was calculated as follows (Figure 3.2.2.1-1):

If a sampling station has been surveyed only once in a monitoring cycle, the EQR calculated will represent the EQR of the station. However, in most cases, several samples of a BQE are obtained from one monitoring station during the period examined (2009-2012). In such cases, the EQR was calculated for each monitoring station as the average of all the samples of the same BQE obtained (Figure 3.2.2.1-1, Step 1). This was applied to every BQE separately.

Finally, the overall biological status is determined by applying the principle of "one out, all out". The lowest quality class between all BQE's is assigned to the sampling station in order to obtain the final biological status (Figure 3.2.2.1-1, Step 2).

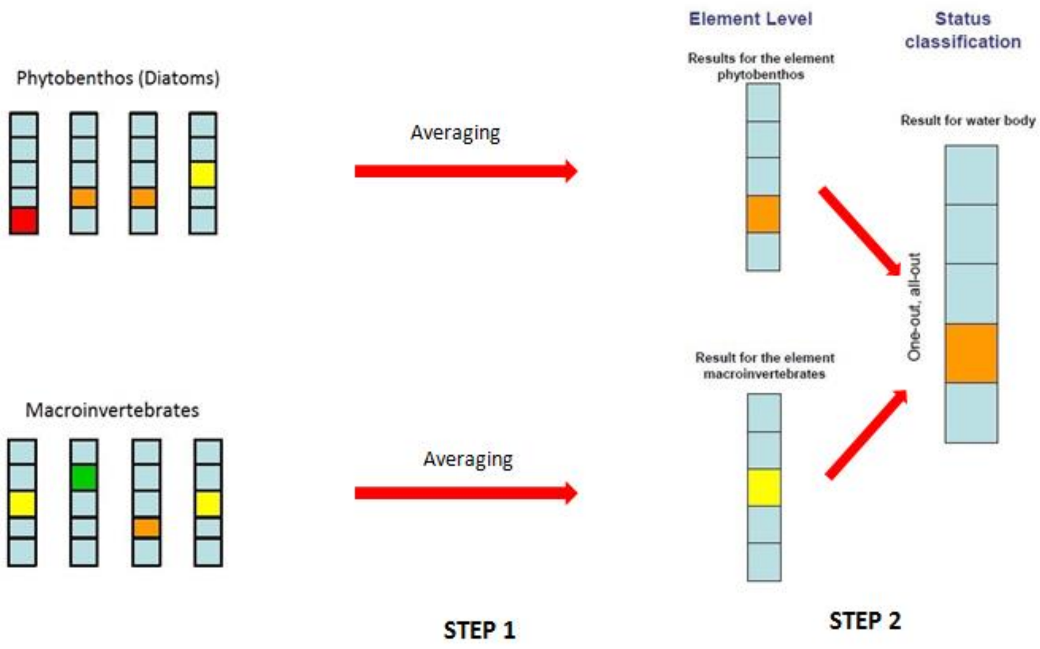


Figure 3.2.2.1-1: An example of how BQE's results are combined in order to estimate the biological status. In the same BQE, EQR's are averaged to obtain the status of each BQE (Step 1). The one out, all out principle between different BQE's is then applied in order to obtain the biological status (Step 2).

3.2.2.2 Chemical - Physicochemical Quality Elements

For the evaluation of the Chemical - Physicochemical Quality Elements, the assessment method used in the 1st RBMP (applied in the contract TAY54/2009: Evaluation of WFD Art. 8 monitoring results for surface waters, 2009, Karavokyris - Kaimaki; "System for the Assessment of the Chemical and Physicochemical condition of Cyprus Rivers and Streams") was reviewed in order to examine if an adjustment - improvement can be made. The assessment system as applied in contract TAY54/2009, was not based on Cyprus data because in 2009 not enough data was available to adjust it to local conditions. However, because a significant amount of data has become available since 2009, the review and possible adjustment was considered feasible for the purpose of the 2nd RBMP.

To this end, the monitoring results for physicochemical parameters in relation to the corresponding results of the biological quality elements were analysed and in order to determine whether the limit values of the physicochemical parameters correspond to the status of the biological quality elements.

For this purpose, physicochemical and corresponding biological data (diatoms and macroinvertebrates) for 344 samples in total were analysed, i.e. samples that included both biological (macroinvertebrates and/or diatoms) and physicochemical data. These samples correspond to 288 macroinvertebrates samples and 226 diatom samples. In addition, these data include 116 samples for the perennial RM4 type and 228 samples for the intermittent RM5 type. It also must be noted that not all samples include all the physicochemical parameters.

For the analysis of these data, the final milestone reports of the WFD-CIS Intercalibration Exercise (2nd phase) for Mediterranean Rivers was consulted as well as reporting documents from other Member States, which include references to the response of BQEs to physicochemical pressures.

Based on all the above, the data were analysed using descriptive statistics, in means of box plots. Using box plots is a convenient way of graphically depicting groups (i.e. 5 different quality classes based on BQE status) of numerical data through their quartiles. Box plots could display potential differences in physicochemical parameters' values between the 5 different quality classes based on BQE status without making any assumptions of the underlying statistical distribution: they are non-parametric.

Appendix 1 includes the box plots for the various general physicochemical parameters for the data set that includes both RM4 and RM5 river types.

According to the above analyses, it was concluded that no reliable limit setting in the different quality classes can be made for the general physicochemical parameters, based on the available dataset. Also, the assessment system as applied in contract TAY54/2009 and in the 1st RBMP seems to be in line with the Cyprus physicochemical data. Therefore, it was decided to continue with the same assessment system for the physicochemical data in the 2nd RBMP. In the following paragraphs, the methodology of the physicochemical data assessment system is described.

According to WFD, for evaluating the Chemical – Physicochemical status of surface waters, the Chemical – Physicochemical elements are used that support the Biological Elements (i.e. Thermal conditions, Oxygenation conditions, Salinity, Acidification status, Nutrient conditions and Specific pollutants). For the case of Cyprus the Chemical – Physicochemical elements that were used, are: Dissolved Oxygen, BOD_5, nutrients, electric conductivity, SAR and some specific pollutants. The physicochemical parameters -supporting biological quality elements- that were finally used for the assessment of river water bodies (apart from impounded rivers) in Cyprus, based on local conditions, are as presented in the following Table 3.2.2.2-1.

Table 3.2.2.2-1: Physicochemical parameters -supporting biological quality elements- used for the assessment of river water bodies in Cyprus

Chemical – Physicochemical Category	Parameters
Thermal Conditions	-
Organic Load	BOD_5, DO, NH_4^+, NO_2^-, TP
Acidification status	-
Chemical Load	NO_3^-, PO_4^{-3}
Salinity	EC, SAR
Specific pollutants	Cu, B, Zn

For the assessment of the chemical - physicochemical status of Cyprus 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 pressure types that apply in Cyprus watersheds and the corresponding **groups of water quality parameters** are the following:

1] Organic Load: It is caused by urban wastewater, animal husbandry and industry facilities with wastewater of high organic load. The following parameters were selected for contributing in organic load: dissolved oxygen, ammonium, nitrites, total phosphorous and BOD_5.

2] Chemical Load: Chemical load is divided in:

a. Load by nutrients that cause eutrophication. The following parameters were selected for contributing in this chemical load category: nitrates and phosphates.

b. Load by specific pollutants or other substances that are discharged in significant quantity into the environment. The following parameters were selected for contributing in this chemical load category: specific pollutants included in the monitoring system, copper, boron and zinc.

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 3.2.2.2-2.

Table 3.2.2.2-2: Classification systems for the Chemical – Physicochemical elements at river monitoring stations (excluding impounded rivers)

Classification system per parameter	Groups of Water Quality Parameters	Unit	High	Good	Moderate	Poor	Bad
Norway criteria for DO	Organic Load	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	Organic Load	mg/l	<0,5	0,5-2,0	2,1-3,5	3,5-5,0	>5,0
NCS[3] for $N\text{-}NH_4^+$	Chemical Load - eutrophication	mg/l	<0,024	0,024-0,060	0,061-0,200	0,210-0,500	>0,500
NCS revised for $N\text{-}NO_2^-$	Chemical Load - eutrophication	μg/l	<3,0	3,0-8,0	8,1-30,0	30,1-70,0	>70,0
NCS revised for TP	Chemical Load - eutrophication	μg/l	<85	86-165	166-220	221-405	>405
NCS revised for $P\text{-}PO_4^{-3}$	Chemical Load - eutrophication	μg/l	<30	30-105	106-165	166-340	>340
NCS for $N\text{-}NO_3^-$	Chemical Load - eutrophication	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	Salination	μS/cm	<250	250-750	750-2000	2001-3000	>3000

[3] *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.*

Classification system per parameter	Groups of Water Quality Parameters	Unit	High	Good	Moderate	Poor	Bad
Xerothermic area criteria (Messara. Crete) for SAR	Salination		<3	3-5	5,1-10	10-15	>15

Norway's criteria for **dissolved oxygen** were applied for the classification of the monitoring stations into water quality categories. Norway's criteria for dissolved oxygen were found to be of the strictest applied for this purpose.

The classification system selected for **BOD_5**, is the one based on the Provisional Article 5 Report (pursuant to the WFD) for Odense (Denmark) Pilot River Basin in 2003. This classification system is one of the strictest, especially considering the guideline limit values for this element in salmonid and cyprinid waters according to Directive 2006/44/EC.

As it concerns the parameters **$N\text{-}NH_4^+$, $N\text{-}NO_2^-$, TP, $P\text{-}PO_4^{-3}$ and $N\text{-}NO_3^-$**, the classification system used is the Nutrient Classification System that was developed for small to middle size river basins (10-1000km^2). Cyprus river basins fall into this range; consequently this system is ideal to be applied for the quality classification according to nutrients. The classification limit values range for $P\text{-}PO_4^{-3}$, TP and $N\text{-}NO_x$ are revised from the first NCS.

In xerothermic conditions and high levels of water consumption for irrigation, soils and water are endangered by "secondary salination". Aquatic macroinvertebrates are the most sensitive organisms to salinity increase. Since no salinity limit values exist for the welfare of these organisms, the limit values used are those from land crops, using **Electric Conductivity** and **SAR** as parameters indicative of salinity. The limit values set need to relate to the climate and geologic conditions of each region they are applied to. In Cyprus, organisms have adapted to the xerothermic conditions of the area, so the limit value between good and moderate is expected to be higher than in other areas. For the classification of water quality according to salinity, the limits' ranges applied were the same as in another xerothermic area in Messara valley in Crete[4]. SAR is calculated through the following equation, where concentrations of Na^+, Ca^{+2} and Mg^{+2} are in meq/l[5]:

$$SAR=\frac{Na^+}{\sqrt{\frac{Ca^{+2}+Mg^{+2}}{2}}}$$

For **Copper** and **Zinc**, the criteria used are according to the Directive 2006/44/EC on the quality of fresh waters needing protection or improvement in order to support fish life, adjusted at the average water hardness per monitoring station. Drinking water quality Directive 98/83/EC on the quality of water intended for human consumption sets limit values on **Boron** levels which do not differ much from the limits set by Ayers & Westcot (1985) for irrigation water quality.

[4] *Nikolaos Th. Skoulikidis, 2008, Defining chemical status of a temporary Mediterranean River. Journal of Environmental Monitoring, pp 842 - 852.*

[5] *D. James, R. Hanks and J. Jurinak, Modern Irrigated Soils, Wiley, New York, 1982.*

In case a monitoring station has average concentrations below the limit values set in Table 3.2.2.2-3, then the water quality is classified as high or good, while if it has average concentrations above the limit values, then it is classified as moderate or worse.

Table 3.2.2.2-3: Classification limit values for Specific Pollutants at river monitoring stations (excluding impounded rivers)

Specific Pollutant →	Zn for Cyprinid waters		Dissolved Cu		Boron
Water Hardness (mg/l $CaCO_3$)	>100	>500	>100	>300	
Specific Pollutant Concentration Limit (mg/l)	1,0	2,0	0,04	0,112	1,0

By applying all of the above mentioned limit values' ranges for all the parameters, the overall assessment system presented in Table 3.2.2.2-4 is applied in order for all the groups of water quality parameters to 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", i.e. based on the worst rate between all the corresponding groups of water quality parameters.

Table 3.2.2.2-4: Assessment system for the water quality parameters and groups of water quality parameters

Class	Rating range	Mean value for the rating range	
H (**H**igh)	>4-5	(4,1+5)/2=	4,55
G (**G**ood)	>3-4	(3,1+4)/2=	3,55
M (**M**oderate)	>2-3	(2,1+3)/2=	2,55
P (**P**oor)	>1-2	(1,1+2)/2=	1,55
B (**B**ad)	<1	1/2=	0,5

3.2.2.3 Hydromorphological Quality Elements

As already stated in paragraph 3.1 and according to the Guidance Document No.13, Hydromorphological Quality Elements are considered only when assigning water bodies to the high ecological status class (i.e. for distinguishing between high ecological status and good ecological status) (Figure 3.1.2). Therefore, in order to be able to evaluate the Caravaggio results, the data had to be analysed and processed in such a way that would become comparable with the biological status i.e to correspond to quality classes. Since hydromorphology is used for the discrimination between High and Good ecological status, the relevant boundary was set for hydromorphological status.

In order to define this H-G boundary in a numerical range between 0 and 1, data had to be treated in way that would result in a unique index. The approach used involved the combination of the three out of four CARAVAGGIO indices that express hydromorphological and habitat pressures (HQA, HMS, LUI) into an integrated hydromorphological pressure index. In order to achieve this, each index value had to be normalized in order to range between 0 and 1, since the indices values are not of the same scale.

The normalization was accomplished by calculating the highest values observed for each index. Then, the value of HQA index at each station was divided by $HQA_{max.}$ For HMS and LUI an additional step was applied since high values correspond to degraded habitat features. In this case the index value of each station was first subtracted from the maximum observed value and then divided by the maximum observed value. After the normalization procedure, the mean value of all three normalised indices was calculated at each station. The result corresponds to the Integrated Pressure Index (IPI), ranging between 0-1.

After the calculation of the integrated pressure index for each station, samples were separated into reference and non-reference sites (as were characterised for the biological monitoring). A box-plot diagram confirmed the sensitivity of the integrated index to pressures since reference sites were distinguished from non-reference sites (Figure 3.2.2.3-1).

The High/Good boundary was then set to 0.855, by calculating the 5th percentile of the index value in reference sites (Table 3.2.2.3-1).

Table 3.2.2.3-1: Boundary set for hydromorphological status. The boundary value equals to the 5th percentile of the reference sites IPI score.

HIGH	GOOD OR BELOW

0.855

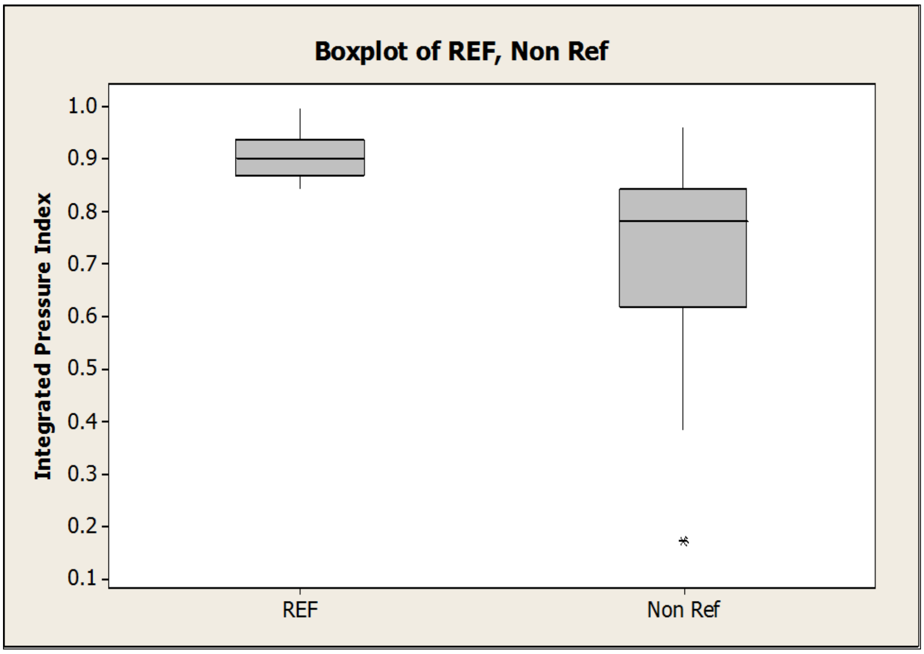


Figure 3.2.2.3-1: Box-plot illustration of Integrated pressure Index in reference and non-reference sites. Note the higher values and the low variability of the index in reference sites, compared to the index values and variability in non-reference sites

3.2.3 Results

3.2.3.1 Biological Quality Elements

The results obtained from the monitoring program of each biological element in the years 2009-2013 are presented below. A total of 61 stations were monitored and at least one sample was collected from each station during this period. In most stations samples of macroinvertebrates and diatoms were collected on the same day, in order to achieve more accurate evaluations of the river status. In 3 stations, data are available for all three BQE's (invertebrates, diatoms and macrophytes) monitored during 2009-2013, while 43 stations have been sampled for both benthic invertebrates and diatoms.

Benthic invertebrates were the most intensively monitored BQE with an average of 4 samplings per station (Table 3.2.3.1-1). According to the invertebrates results, 41 out of 59 sampling stations were classified above as Good biological status (12 stations in High status and 29 in Good status), while 18 stations were evaluated as Moderate (12 stations) or Poor status (6 stations). No station was classified in Bad status.

Phytobenthos (Benthic diatoms) showed in general a higher quality trend (Table 3.2.3.1-2). After the analysis of 143 samples from 44 monitoring stations, only 3 stations were found to fail achieving Good status or above (2 stations in Moderate status and 1 in Poor status). Out of 41 stations assigned in Good or above status, 14 were classified as High status and 27 as Good status.

Finally, for Aquatic Macrophytes the samples used were limited in numbers (Table 3.2.3.1-3). Only five samples were used for the classification of five R-M4 river type stations. The results were diverse: 3 stations were classified in High quality class, 1 in Moderate and 1 in Poor status class.

The differences in the evaluation of water quality by the different biological elements are somewhat expected, since each group has different sensitivity to pressures, and responds at different rates and levels. For instance benthic invertebrate communities are considered excellent indicators of organic enrichment and habitats modification, while diatoms are strongly influenced by nutrient pulses and light availability (Griffin and Gordon, 2012). Macrophytes show strong correlation to additional pressures such as channel engineering, water abstraction, flow impoundment or acidification (UKTAG 2008).

In order to assess the overall biological status of the rivers of Cyprus, the "one out, all out" principle was applied in order to aggregate all BQE's results. The biological status evaluation is presented in Table 3.2.3.1-4. Out of a total of 61 stations, in only 3 stations the outcome was the result of all three BQE's, due to the low number of macrophyte samples.

Overall, 9 stations were evaluated in High status -of which 2 are reference sites-, 32 sites were assigned in Good status, 13 in Moderate status and 7 in Poor status. No stations were found to be in Bad status.

In most cases where data were available, all BQE's provided the same quality class evaluation. Especially in the case of invertebrates and diatoms for which data is more abundant, in 24 out of 44 monitoring stations, which equals to a percentage of 55%, the same quality class was attributed by both elements. In 5 stations (34%), invertebrates had the lowest evaluation and were the determinant factor for the overall status, while diatoms had lower quality class that macroinvertebrates in 5 stations (11%). Macrophytes determined the final quality class in only 1 station (r-3-3-3-95). Still the limited number of macrophyte samples, generates high uncertainty for the evaluation, and this has to be further tested in the future.

Comparing the Biological Status results of the 1st RBMP to this evaluation, firstly the monitoring network was significantly expanded. A sum of 61 stations was sampled at least once, compared to 42 stations in the 1st RBMP. In addition, monitoring was more intensive, thus increasing the confidence of the results. Concerning the monitoring results, a significant improvement was recorded in biological status. A total of 13 stations showed higher quality status compared to the results of 1st RBMP, while in 5 stations quality status was downgraded (not however from the good to the moderate boundary). The latter were: r1-3-6-53 (Xeros Rotsos ton laoudion), r3-1-2-30 (Xeros u/s Kafizides dam), r3-3-3-95 (Kargotis Evrychou), r9-6-3-36 (Kouris Kato Amiantos) and r6-5-1-85 (Gialias Kotsiatis). In all cases, the changes in ecological class are attributed mainly to the small number of samples available from each BQE for ecological evaluation during the 1st RBMP and the subsequent low confidence level.

In Chapter 3.2.3.4 of this report, the analyses of the overall Ecological Status and the comparison with the 1st RBMP are further presented.

Table 3.2.3.1-1: Monitoring results and biological status for the BQE Benthic Macroinvertebrates.

Station code	IC Type	River name	Site name	Ref site	Year															Status	# samples
					2009	2010						2011			2012				2013		
r1-1-3-95	RM5	Cha Potami	Kissousa weir	N			0,694		0,541			0,616	0,617							**0,617**	4
r1-2-4-25	RM4	Dhiarizos	u/s Arminou Dam	N			1,11		1,198				0,859		0,962					**1,032**	4
r1-3-5-05	RM4	Xeros	Lazaridhes	Y			1,085		0,785				1,075		1,038					**0,996**	4
r1-3-6-53	RM5	Xeros	Rotsos twn Laoudiwn	Y			0,934		1,125			1,052	1,17							**1,07**	4
r1-3-8-60	RM5	Xeros	Phinikas	N			0,655		0,832			0,588	0,701							**0,694**	4
r1-4-3-35	RM5	Ayia	u/s Kannaviou Dam	Y			0,97		1,023			0,884	0,889	0,999	1,074					**0,973**	6
r1-4-5-73	RM4	Ezousa	Pitharkou	N									0,781							**0,781**	1
r1-4-7-10	RM4	Ezousa	Moro nero	N			0,698		0,904			0,779								**0,794**	3
r2-2-3-95	RM5	Chrysochou	skoulloi	N			0,453		0,527			0,442	0,646							**0,517**	4
r2-2-5-02	RM5	Stavros tis Psokas	Gorges	Y								0,857	0,746	0,778						**0,794**	3
r2-2-5-75	RM5	Stavros tis Psokas	Rizokremmos	N			0,921		0,811			0,839								**0,857**	3
r2-2-6-24	RM5	Stavros tis Psokas	coulvert	N									0,82							**0,82**	1
r2-3-8-48	RM4	Gialia	Pochalandra	Y			1,095		1,16			1,038	0,958							**1,063**	4
r2-4-6-65	RM5	Leivadi	u/s weir	Y								1,07	0,899	1,075						**1,015**	3
r2-7-2-75	RM5	Pyrgos	Phleva	Y			0,963		1,041			0,618	0,848	0,861	1,06					**0,899**	6
r2-8-3-10	RM4	Limnitis	Saw Mill	Y	1,096	1,23	1,1	1,012	1,098	1,143	1,145	0,99	0,902	0,814	1,067					**1,054**	11
r2-9-2-50	RM4	Kambos	Ag. Varvara	N			1,034		0,961			0,742	0,9							**0,909**	4
r3-1-2-30	RM5	Xeros	u/s Kafizes Dam	Y			1,044		1,079			1,016	1,089	1,085						**1,063**	5
r3-2-1-85	RM4	Marathasa	u/s Kalopanagiotis Dam	N			1,053		0,614			0,965	0,812							**0,861**	4
r3-3-1-60	RM4	Agios Nikolaos	u/s Fish Farm	Y			0,565		0,827			0,742	0,828		0,845					**0,761**	5
r3-3-3-95	RM4	Kargotis	Evrychou	N			0,535		0,508				0,457							**0,5**	3
r3-5-1-50	RM5	Lagoudera	bridge weir	N			0,882		0,869			1,061	0,922							**0,934**	4
r3-5-4-40	RM5	Elea	Vizakia	N			0,698		0,582			1,044	0,533							**0,714**	4
r3-7-1-55	RM5	Peristerona	Sifilos	N			0,914		0,768			0,701	0,804							**0,797**	4
r3-7-3-71	RM5	Akaki	u/s Akaki-Malounta Dam	N			0,719		0,693			0,987	0,839							**0,81**	4
r6-1-1-48	RM5	Pediaios	Agios Onoufrios	Y								0,582	0,914							**0,748**	2
r6-1-1-72	RM5	Pedhiaios	Filani	N			0,897					0,887								**0,892**	2
r6-5-1-85	RM5	Gialias	Kotsiatis	N			0,303		0,595			0,55	0,463							**0,478**	4
r8-7-1-65	RM5	Syrgatis	Kyprovasa	N			1,011		0,836			0,937	0,771	0,93						**0,897**	5
r8-7-2-60	RM5	Syrgatis	Pano Lefkara	N			0,764		0,485			0,687	0,55							**0,622**	4
r8-8-2-95	RM5	Maroni	Choirokoitia u/s weir	N			0,916		0,642			0,448	0,515							**0,63**	4
r8-9-5-40	RM5	Vasilikos	Layia u/s weir	N			0,766		0,978			0,861								**0,868**	3
r9-2-3-05	RM5	Germasogeia	Dierona	N			0,801					0,748	0,718							**0,756**	3

Station code	IC Type	River name	Site name	Ref site	Year															Status	# samples
					2009	2010						2011			2012				2013		
r9-2-3-29	RM5	Germasogeia	Prasteio	N					0,911											**0,911**	1
r9-2-3-85	RM5	Germasogeia	Phinikaria	N			0,926		0,988			1,072	0,707							**0,923**	4
r9-2-4-27	RM5	Germasogeia	Argaki tou monastiriou	N															1,018	**1,018**	1
r9-4-1-38	RM5	Garyllis	d/s Ayia Paraskevi	N											1,017	0,631				**0,824**	2
r9-4-1-63	RM5	Garyllis	u/s Gerasa	N											0,796	1,262				**1,029**	2
r9-4-1-93	RM5	Garyllis	d/s Gerasa	N											0,375	0,54				**0,458**	2
r9-4-3-80	RM5	Garyllis	u/s Polemidia Dam weir (Ayia Eirini)	N			0,443					0,147			0,212	0,727				**0,382**	4
r9-4-3-89	RM5	Garyllis	Polemidia dam u/s	N												0,445				**0,445**	1
r9-4-3-94	RM5	Garyllis	Polemidia dam	N									0,295		0,485	0,561				**0,447**	3
r9-6-1-44	RM4	Kryos	u/s Myllomeris Waterfall	N			0,878		0,824			0,862	1,034							**0,9**	4
r9-6-1-87	RM4	Kryos	Koilani	N			1		0,811			0,803								**0,871**	3
r9-6-2-60	RM5	Kryos	u/s Tunnel Outlet	N			0,744		0,828			0,62								**0,731**	3
r9-6-3-15	RM4	Kouris	Amiantos loumata	N															1,08	**1,08**	1
r9-6-3-36	RM4	Kouris	Kato Amiantos	N			0,359		0,804			0,259								**0,474**	3
r9-6-4-92	RM4	Kouris	Alassa new weir	N			0,822		0,858			0,963	0,96							**0,901**	4
r-9-6-5-17	RM4	Ambelikos	Kyperounta	N											0,326	0,766				**0,546**	2
r-9-6-5-53	RM4	Ampelikos	Potamitissa	N											0,936	0,575				**0,756**	2
r9-6-5-57	RM4	Agros	Agros	N											0,469	0,697				**0,583**	2
r9-6-5-62	RM4	Agros	near Kato Milos reservoir	N											0,603	0,464				**0,534**	2
r9-6-5-66	RM4	Ayios Ioannis	Ayios Ioannis	N												0,849				**0,849**	1
r9-6-5-67	RM4	Ayios Ioannis	near Ayios Ioannis	N											0,886	0,739	0,757			**0,794**	3
r9-6-5-69	RM4	Agros	Kato Milos bridge	N											0,865	0,474				**0,67**	2
r9-6-6-32	RM4	Limnatis	Ag. Mamas	N			0,736		0,925			0,959	0,731		0,642	0,901	0,862	0,949		**0,838**	8
r9-6-6-93	RM4	Limnatis	Kapilio	N											0,976	0,99				**0,983**	2
r9-6-7-29	RM5	Limnatis	Limnatis village	N											0,991	0,96				**0,976**	8
r9-6-7-70	RM5	Limnatis	u/s Kouris Dam	N			0,677		0,805			0,97	0,82		0,683	0,842	0,979	1,036		**0,852**	8

Table 3.2.3.1-2: Monitoring results and biological status for the BQE Aquatic Flora (Phytobenthos).

Station code	River	Site	River Type	Ref	2009	2010						2011		2012	2013		STATUS	# samples
r1-1-3-95	Chapotami	Kissousa	RM5	N	0,828	0,773				0,945		0,925	0,973				0,889	5
r1-2-4-25	Diarizos	u/s Arminou dam	RM4	N		0,988				1,018				0,956			0,987	3
r1-3-5-05	Xeros	Lazaridhes	RM4	Y		1,062				1,021		1,097		0,95			1,032	4
r1-3-6-53	Xeros	Rotsos twn Laoudiwn	RM5	Y		0,828				0,753		0,815	0,71				0,777	4
r1-3-8-60	Xeros	Phinikas	RM5	N		0,798				0,84							0,819	2
r1-4-3-35	Ezousa	Ayia u/s Kannaviou Dam	RM5	Y		0,76				0,955			0,79	0,845			0,838	4
r1-4-5-73	Ezousa	Pitharkou	RM4	N									1,047				1,047	1
r1-4-7-10	Ezousa	Moro-Nero Episkopi	RM4	N		0,962				0,971		0,915					0,949	3
r2-2-3-95	Chrysochou	skoulloi	RM5	N		1,015				1,01		0,93	0,873				0,957	4
r2-2-5-02	Stavros tis psokas	Gorges	RM5	Y									1,045				1,045	1
r2-2-5-75	Stavros tis Psokas	Rizokremos	RM5	N		0,923				0,738		1,003					0,888	3
r2-2-6-24	Stavros tis Psokas	coulvert	RM5	N									0,905				0,905	1
r2-3-8-48	Gialia	Pochalandra	RM4	Y		0,877				0,853		0,856					0,862	3
r2-4-6-65	Leivadi	u/s weir	RM5	Y									0,738				0,738	1
r2-7-2-75	Pyrgos	Phleva	RM5	Y		0,915				0,795			1,03	0,9601			0,925	4
r2-8-3-10	Limnitis	Saw Mill	RM4	Y	1,003	1,056	0,93	1,235	1,214	0,83	0,883		1,073	1,141			1,041	9
r2-9-2-50	Kampos	Ag. Varvara	RM4	N		0,546				0,856		0,915	0,859				0,794	4
r3-1-2-30	Xeros	u/s Kafizes Dam	RM5	Y		0,688				0,865			0,803				0,785	3
r3-2-1-85	Marathasa	u/s Kalopanagiotis Dam	RM4	N		0,804				0,845		1,144	0,956				0,937	4
r3-3-1-60	Kargotis	Agios Nikolaos u/s Fish Farm	RM4	Y		1,205				1,211	1,085	1,226	1,167	1,108			1,167	6
r3-3-3-95	Kargotis	Evrychou	RM4	N		0,833				0,821			0,815				0,823	3
r3-5-1-50	Lagoudera	bridge weir	RM5	N		0,688				0,993		0,94	1,02				0,91	4
r3-5-4-40	Elea	Vizakia	RM5	N		0,76				0,343		1,005	0,673				0,695	4
r3-7-1-55	Peristerona	Sifilos	RM5	N		0,798				0,748		0,785	0,938				0,817	4
r3-7-3-71	Akaki	u/s Akaki-Malounta Dam	RM5	N		0,735				0,8		0,92	0,843				0,825	4
r6-1-1-72	Pediaios	Foilani	RM5	N		1						0,828					0,914	2
r6-5-1-85	Gialias	Kotsiatis	RM5	N		0,533				0,978		0,938	0,698				0,786	4
r8-7-1-65	Syrkatis	Kyprovasa	RM5	N		1,028				1,035		0,673	1,023				0,94	4
r8-7-2-60	Syrgatis	Pano Lefkara	RM5	N		0,705				0,94		0,938					0,861	3
r8-8-2-95	Maroni	Choirokoitia u/s weir	RM5	N		1,028				1,023		1,018	0,963				1,008	4
r8-9-5-40	Vasilikos	Layia u/s weir	RM5	N		0,763				0,838		1,033					0,878	3
r9-2-3-05	Germasogia	Dierona	RM5	N		0,783						0,803	0,753				0,779	3
r9-2-3-29	Germasogia	Prasteio	RM5	N						0,718							0,718	1

Station code	River	Site	River Type	Ref	2009	2010						2011		2012	2013		STATUS	# samples
r9-2-3-85	Germasogeia	Phinikaria	RM5	N		0,745				0,84		0,7201					**0,768**	3
r9-2-4-27	Germasogeia	Argaki tou Monastiriou	RM5	N											1,02		**1,02**	1
r9-4-3-80	Garyllis	u/s Polemidia Dam weir (Ayia Eirini)	RM5	N		0,53						0,193					**0,361**	2
r9-6-1-44	Kryos	u/s Myllomeris Waterfall	RM4	N		0,982				0,962		1,073	0,842				**0,965**	4
r9-6-1-87	Kryos	Koilani	RM4	N		1,076				1,003		1,103					**1,061**	3
r9-6-2-60	Kryos	u/s Tunnel Outlet	RM5	N		0,875				0,79		0,953					**0,873**	3
r9-6-3-15	Kouris	Amiantos loumata	RM4	N											1,111		**1,111**	1
r9-6-3-36	Kouris	Kato Amiantos	RM4	N		0,713				0,965		1,044					**0,907**	3
r9-6-4-92	Kouris	Alassa new weir	RM4	N		0,953				1,035		0,833	0,909				**0,933**	4
r9-6-6-32	Limnatis	Ag. Mamas	RM4	N		0,768				0,935		0,871	0,862				**0,859**	4
r9-6-7-70	Limnatis	u/s Kouris Dam	RM5	N		0,853				0,703		0,748					**0,768**	3

Table 3.2.3.1-3: Monitoring results and biological status for the BQE Aquatic Flora (Macrophytes)

Station code	River Type	River name	Site name	Reference site	Year 2010	STATUS	# samples
r1-3-5-91	RM4	Xeros	Roudias	N	0.971	0.971	1
r1-3-6-53	RM4	Xeros	Rotsos ton laoudion	Y	0.840	0.840	1
r3-3-1-60	RM4	Kargwtis	u/s Fish Farm	Y	0.990	0.990	1
r3-3-3-27	RM4	Kargwtis	Galata	N	0.449	0.449	1
r3-3-3-95	RM4	Kargwtis	Evrychou	N	0.362	0.362	1

3.2.3.1-4: Biological status of sampling stations in Cyprus rivers according to all BQE's monitored.

Station code	IC Type	River name	Site name	Ref site	INV Status	DIA Status	MPH Status	STATUS
r1-3-5-91	RM4	Xeros	Roudias bridge	N			0,971	**H**
r1-1-3-95	RM5	Cha Potami	Kissousa weir	N	0,617	0,889		**M**
r1-2-4-25	RM4	Dhiarizos	u/s Arminou Dam	N	1,032	0,987		**H**
r1-3-5-05	RM4	Xeros	Lazaridhes	Y	0,996	1,032		**H**
r1-3-6-53	RM5	Xeros	Rotsos twn Laoudiwn	Y	1,07	0,777		**G**
r1-3-8-60	RM5	Xeros	Phinikas	N	0,694	0,819		**M**
r1-4-3-35	RM5	Ayia	u/s Kannaviou Dam	Y	0,973	0,838		**G**
r1-4-5-73	RM4	Ezousa	Pitharkou	N	0,781	1,047		**G**
r1-4-7-10	RM4	Ezousa	Moro nero	N	0,794	0,949		**G**
r2-2-3-95	RM5	Chrysochou	skoulloi	N	0,517	0,957		**M**
r2-2-5-02	RM5	Stavros tis Psokas	Gorges	Y	0,794	1,045		**G**
r2-2-5-75	RM5	Stavros tis Psokas	Rizokremmos	N	0,857	0,888		**G**
r2-2-6-24	RM5	Stavros tis Psokas	coulvert	N	0,82	0,905		**G**
r2-3-8-48	RM4	Gialia	Pochalandra	Y	1,054	0,862		**G**
r2-4-6-65	RM5	Leivadi	u/s weir	Y	1,015	0,738		**G**
r2-7-2-75	RM5	Pyrgos	Phleva	Y	0,899	0,925		**G**
r2-8-3-10	RM4	Limnitis	Saw Mill	Y	1,063	1,041		**H**
r2-9-2-50	RM4	Kambos	Ag. Varvara	N	0,909	0,794		**G**
r3-1-2-30	RM5	Xeros	u/s Kafizes Dam	Y	1,063	0,785		**G**
r3-2-1-85	RM4	Marathasa	u/s Kalopanagiotis Dam	N	0,861	0,937		**G**

Station code	IC Type	River name	Site name	Ref site	INV Status	DIA Status	MPH Status	STATUS
r3-3-1-60	RM4	Agios Nikolaos	u/s Fish Farm	Y	0,761	1,167	0,99	G
r3-3-3-27	RM4	Kargwtis	Galata	N			0,449	M
r3-3-3-95	RM4	Kargotis	Evrychou	N	0,5	0,823	0,362	P
r3-5-1-50	RM5	Lagoudera	bridge weir	N	0,934	0,91		G
r3-5-4-40	RM5	Elea	Vizakia	N	0,714	0,695		M
r3-7-1-55	RM5	Peristerona	Sifilos	N	0,797	0,817		G
r3-7-3-71	RM5	Akaki	u/s Akaki-Malounta Dam	N	0,81	0,825		G
r6-1-1-48	RM5	Pediaios	Agios Onoufrios	Y	0,748			G
r6-1-1-72	RM5	Pedhiaios	Filani	N	0,892	0,914		G
r6-5-1-85	RM5	Gialias	Kotsiatis	N	0,478	0,786		P
r8-7-1-65	RM5	Syrgatis	Kyprovasa	N	0,897	0,94		G
r8-7-2-60	RM5	Syrgatis	Pano Lefkara	N	0,622	0,861		M
r8-8-2-95	RM5	Maroni	Choirokoitia u/s weir	N	0,63	1,008		M
r8-9-5-40	RM5	Vasilikos	Layia u/s weir	N	0,868	0,878		G
r9-2-3-05	RM5	Germasogeia	Dierona	N	0,756	0,779		G
r9-2-3-29	RM5	Germasogeia	Prasteio	N	0,911	0,718		M
r9-2-3-85	RM5	Germasogeia	Phinikaria	N	0,923	0,768		G
r9-2-4-27	RM5	Germasogeia	Argaki tou monastiriou	N	1,018	1,02		H
r9-4-1-38	RM5	Garyllis	d/s Ayia Paraskevi	N	0,824			G
r9-4-1-63	RM5	Garyllis	u/s Gerasa	N	1,029			H
r9-4-1-93	RM5	Garyllis	d/s Gerasa	N	0,458			P

Station code	IC Type	River name	Site name	Ref site	INV Status	DIA Status	MPH Status	STATUS
r9-4-3-80	RM5	Garyllis	u/s Polemidia Dam weir (Ayia Eirini)	N	0,382	0,361		**P**
r9-4-3-89	RM5	Garyllis	Polemidia dam u/s	N	0,445			**P**
r9-4-3-94	RM5	Garyllis	Polemidia dam	N	0,447			**P**
r9-6-1-44	RM4	Kryos	u/s Myllomeris Waterfall	N	0,9	0,965		**G**
r9-6-1-87	RM4	Kryos	Koilani	N	0,871	1,061		**G**
r9-6-2-60	RM5	Kryos	u/s Tunnel Outlet	N	0,731	0,873		**M**
r9-6-3-15	RM4	Kouris	Amiantos loumata	N	1,08	1,111		**H**
r9-6-3-36	RM4	Kouris	Kato Amiantos	N	0,474	0,907		**P**
r9-6-4-92	RM4	Kouris	Alassa new weir	N	0,901	0,933		**G**
r-9-6-5-17	RM4	Ambelikos	Kyperounta	N	0,546			**M**
r-9-6-5-53	RM4	Ampelikos	Potamitissa	N	0,756			**G**
r9-6-5-57	RM4	Agros	Agros	N	0,583			**M**
r9-6-5-62	RM4	Agros	near Kato Milos reservoir	N	0,534			**M**
r9-6-5-66	RM4	Ayios Ioannis	Ayios Ioannis	N	0,849			**G**
r9-6-5-67	RM4	Ayios Ioannis	near Ayios Ioannis	N	0,794			**G**
r9-6-5-69	RM4	Agros	Kato Milos bridge	N	0,67			**M**
r9-6-6-32	RM4	Limnatis	Ag. Mamas	N	0,838	0,859		**G**
r9-6-6-93	RM4	Limnatis	Kapilio	N	0,983			**H**
r9-6-7-29	RM5	Limnatis	Limnatis village	N	0,976			**H**
r9-6-7-70	RM5	Limnatis	u/s Kouris Dam	N	0,852	0,768		**G**

3.2.3.2 Chemical - Physicochemical Quality Elements

The results for the evaluation of the Chemical – Physicochemical status of the rivers monitoring stations (excluding impounded rivers) are presented in Table 3.2.3.2-1.

Concerning the Organic Load, only four river monitoring stations fall below Good Status, Vathys (failing parameters: NH_4-N, NO_2-N, TP) and Agros (failing parameters: NO_2-N, TP) into Moderate Status, Garyllis (failing parameters: BOD_5, NH_4-N, NO_2-N, TP) into Poor Status and Agios Ioannis (failing parameters: DO, BOD_5, NH_4-N, NO_2-N, TP) into Bad Status. A percentage of 93,7% of the monitoring stations fall into Good or High Status. Argaki tou Monastiriou near Amyrou Monastery and Loumata U/S Amiandos Pond indicate high BOD_5 concentration. This is due to the fact that the analysis method for BOD5 at these stations was not sufficiently sensitive. Results were below LOQ which was 5, a value too high for monitoring stations with no apparent pressures. The results were replaced with 50% of the LOQ but still, the final classification of Chemical/ Physico-chemical status for these monitoring stations does not consider the BOD_5 concentration for the rating of the Organic Load group.

Concerning Chemical Load by nutrients causing eutrophication, 69,8% of the monitoring stations fall into Good or High Status, while 23,8% fall into Moderate Status, mainly due to NO_3-N. Three stations fall into Poor Status due to high values on both PO_4-P and NO_3-N (Vathys, Agros and Agios Ioannis) and one in Bad Status due to high values on both PO_4-P and NO_3-N (Garyllis).

For Salinity, the percentage of monitoring stations falling into Good or High Status is 88,5%, while 8,1% of stations fall into Moderate Status and 2 stations fall into Poor Status (Ezousa and Vathys). Ezousa (@ Pitargou & near Moro Nero) and Chrysochou-Skoulloi have high electric conductivity values. This is due to natural reasons, because of SO^{+4} from Gypsum formations. Therefore, the final classification of Chemical / Physico-chemical status for these monitoring stations does not consider the high electric conductivity values and the rating of the Salinity group.

For Specific Pollutants, the results show that all the monitoring stations are above Good apart from only one monitoring station which is evaluated as below Moderate (Pelathousa R), which is due to elevated Boron levels.

According to Table 3.2.3.2-1, the overall Chemical – Physicochemical status of the total 63 river monitoring stations (excluding impounded rivers) is as follows:

- 10 monitoring stations are in High Status (Xeros near Lazarides, Ayia u/s Kannaviou Reservoir, Ezousa @ Pitargou, Stavros Tis Psokas R. @ Rizokremmos, Pyrgos near Fleva, Pediaios R. @ Philani, Syriatis R. @ Kyprovasa, Argaki tou Monastiriou near Amyrou Monastery, Kryos R. U/S Myllomeris Waterfall, Loumata U/S Amiandos Pond)
- 31 monitoring stations are in Good Status
- 18 monitoring stations are in Moderate Status
- 2 monitoring station is in Poor Status (Vathys @ Athalassa Park, Agros River Near Ag. Ioannis)

- 2 monitoring stations are in Bad Status (Garyllis U/S Polemidia Dam and Ag. Ioannis River Near Ag. Ioannis)

Table 3.2.3.2-1: Chemical – Physicochemical Classification of river monitoring stations (except impounded rivers) of Cyprus according to the three index groups that represent a different type of pressure

Monitoring Station Code	River - Site Name	ORGANIC LOAD (O.L.)						CHEMICAL LOAD (C.L.)			SALINATION (S.)			OTHER SUBSTANCES			Chemical / Physico-chemical Classification
		BOD_5	DO	NH_4-N	NO_2-N	TP	O.L.	PO_4-P	NO_3-N	C.L.	EC	SAR	S.	Cu	B	Zn	
		mg/l	mg/l	mg/l	mg/l	mg/l		mg/l	mg/l		μS/cm			mg/l	μg/l	mg/l	
r1-1-3-95	Chapotami near Kissousa	1,18	8,81	0,111	0,003	0,040	**3,55**	0,009	1,101	**3,55**	712	0,881	**4,05**	2,50	43,99	12,50	**3,55**
r1-1-6-65	Chapotami near Kato Archimandrita	1,33	11,40	0,131	0,007	0,018	**3,75**	0,013	0,848	**3,55**	776	0,9471	**3,55**		69,58		**3,55**
r1-2-4-25	Diarizos U/S Arminou Dam	1,08	10,17	0,024	0,006	0,028	**4,15**	0,030	0,239	**3,55**	503	0,8768	**4,05**		32,27		**3,55**
r1-2-6-89	Diarizos @ Mamonia	0,63	10,32	0,058	0,004	0,003	**3,95**	0,015	0,870	**3,55**	686	1,1276	**4,05**	2,50	109,00	12,50	**3,55**
r1-3-5-05	Xeros near Lazarides	0,93	9,87	0,017	0,002	0,004	**4,35**	0,008	0,056	**4,55**	414	0,9988	**4,05**	2,50	31,64		**4,05**
r1-3-6-53	Xeros @ Rotsos Ton Laoudion	1,50	11,67	0,003	0,124	0,003	**3,54**	0,004	0,029	**4,55**	687		**3,55**		266,00		**3,54**
r1-3-8-60	Xeros near Foinikas	1,66	9,97	0,029	0,008	0,006	**3,95**	0,009	0,598	**4,05**	709	1,5009	**4,05**		111,09		**3,95**
r1-4-3-35	Ayia u/s Kannaviou Reservoir	0,97	9,82	0,020	0,002	0,003	**4,35**	0,009	0,117	**4,55**	559	1,0177	**4,05**	2,50	47,82	168,00	**4,05**
r1-4-5-73	Ezousa @ Pitargou	0,50	9,17	0,003	0,000	0,001	**4,35**	0,003	0,002	**4,55**	*2170*		***1,55***		272,00		***4,35*** *
r1-4-7-10	Ezousas near Moro Nero	1,48	9,38	0,057	0,007	0,021	**3,95**	0,020	0,546	**4,05**	*1917*	1,2676	***3,55***		203,63		***3,95*** *
r2-2-3-95	Chrysochou near Skoulli	1,19	8,66	0,108	0,006	0,006	**3,55**	0,012	0,804	**3,55**	*3013*	1,9939	***2,53***	2,69	372,16	14,96	***3,55*** *
r2-2-5-02	Stavros tis Psokas @ Pitieri	1,75	7,88	0,003	0,000	0,001	**4,15**	0,003	0,002	**4,55**	732		**3,55**		91,00		**3,55**
r2-2-5-75	Stavros Tis Psokas R. @ Rizokremmos	1,10	9,30	0,024	0,002	0,005	**4,35**	0,009	0,096	**4,55**	680	0,9151	**4,05**	2,50	32,69	14,57	**4,05**
r2-3-2-96	Pelathousa R. (Argaki tis Limnis) @ Polis-Argaka Rd.	1,50	8,91	0,100	0,004	0,003	**3,55**	0,015	1,008	**3,55**	3393	2,5953	**2,53**	8,97	1132,20	77,43	**2,53**
r2-3-4-80	Makounta U/S Argaka Dam	2,10	9,39	0,028	0,004	0,003	**3,75**	0,015	0,344	**4,05**	707	1,4025	**4,05**	2,50	32,50	12,50	**3,75**
r2-3-8-48	Gialia @ Pochalandra	1,50	8,47	0,003	0,000	0,001	**4,15**	0,003	0,003	**4,55**	658		**3,55**		50,00		**3,55**
r2-4-6-68	Leivadi u/s weir	1,24	7,75	0,003	0,000	0,001	**4,15**	0,003	0,002	**4,55**	741		**3,55**		64,33		**3,55**
r2-7-2-75	Pyrgos near Fleva	0,93	8,85	0,018	0,002	0,008	**4,15**	0,012	0,085	**4,55**	584	1,0295	**4,05**		27,56		**4,05**
r2-8-3-10	Limnitis Saw Mill	1,19	8,51	0,015	0,003	0,007	**3,95**	0,009	0,087	**4,55**	577	0,892	**4,05**		25,93		**3,95**
r2-9-2-50	Kambos R. Near Ag. Varvara	1,39	8,64	0,025	0,003	0,011	**3,75**	0,009	3,232	**2,53**	603	0,9256	**4,05**	2,50	25,45	12,50	**2,53**
r3-1-2-30	Xeros R. U/S Kafizes Dam	1,16	9,41	0,010	0,011	0,018	**3,95**	0,007	0,082	**4,55**	450	0,7687	**4,05**		26,16		**3,95**

Monitoring Station Code	River - Site Name	ORGANIC LOAD (O.L.)						CHEMICAL LOAD (C.L.)			SALINATION (S.)			OTHER SUBSTANCES			Chemical / Physico-chemical Classification
		BOD_5	DO	NH_4-N	NO_2-N	TP	O.L.	PO_4-P	NO_3-N	C.L.	EC	SAR	S.	Cu	B	Zn	
		mg/l	mg/l	mg/l	mg/l	mg/l		mg/l	mg/l		μS/cm			mg/l	μg/l	mg/l	
r3-2-1-85	Marathasa U/S Kalopanagiotis Dam	1,52	9,36	0,044	0,004	0,028	3,95	0,014	1,178	3,55	546	0,9072	4,05	2,50	32,07	12,50	3,55
r3-3-1-60	Agios Nikolaos U/S Fish Farm	1,49	9,30	0,033	0,003	0,007	3,95	0,009	0,116	4,55	494	0,449	4,05	2,50	89,73	12,50	3,95
r3-3-3-95	Kargotis near Evrychou	1,56	9,01	0,026	0,012	0,023	3,75	0,013	2,159	2,53	798	0,8917	3,55	2,50	116,96	13,48	2,53
r3-4-2-90	Atsas near Evrychou	0,67	10,08	0,043	0,004	0,006	3,95	0,015	1,007	3,55	1085		2,55	2,50	114,77	12,50	2,55
r3-5-1-50	Lagoudera near Lagoudera Br.	2,35	10,66	0,023	0,003	0,009	3,95	0,008	0,378	4,05	465	0,8006	4,05		18,31		3,95
r3-5-4-40	Elia near Vyzakia	1,71	8,85	0,037	0,005	0,006	3,75	0,009	0,668	3,55	1000	1,3444	3,55	7,54	63,50	42,54	3,55
r3-7-1-55	Peristerona R. @ Siphilos	1,24	10,69	0,016	0,013	0,039	3,95	0,014	0,652	3,55	429	0,7077	4,05	2,38	32,30	14,03	3,55
r3-7-1-84	Peristerona @ Peristerona	0,87	18,86	0,011	0,001	0,034	4,35	0,012	0,938	3,55	432	0,7109	4,05	2,96	24,00	12,50	3,55
r3-7-3-71	Akaki U/S Akaki-Malounta Dam	1,66	12,38	0,016	0,003	0,010	4,35	0,009	0,951	3,55	537	0,8183	4,05	2,62	27,05	14,16	3,55
r6-1-1-48	Ay. Onouphrios @ Ay. Onouphrios Church	0,50	10,47	0,003	0,000	0,002	4,35	0,003	0,079	4,55	369		3,55		10,15		3,55
r6-1-1-72	Pediaios R. @ Philani	0,98	10,29	0,015	0,002	0,009	4,35	0,007	0,356	4,05	418	0,7108	4,05	2,50	16,74	16,92	4,05
r6-1-1-80	Agios Onoufrios near Kampia	1,00	10,88	0,031	0,005	0,008	3,95	0,015	0,203	4,55	442		3,55	2,50	32,50	12,50	3,55
r6-1-2-38	Pediaios near Kato Deftera	1,50	10,41	0,004	0,009	0,015	3,95	0,009	0,757	3,55	558	1,0796	4,05	2,50	43,33	23,75	3,55
r6-1-2-90	Pediaios near Lefkosia	3,50	8,51	0,010	0,084	0,059	3,14	0,015	1,911	2,53	1580	3,1866	3,05	2,50	279,00	12,50	2,53
r6-1-5-52	Vathys @ Athalassa Park	0,50	7,78	0,191	0,029	0,346	2,75	0,258	3,134	1,03	3750	13,878	1,53	2,50	646,00	12,50	1,03
r6-5-1-85	Gialias near Kotsiati	1,63	7,66	0,063	0,017	0,036	3,35	0,018	2,025	2,53	1118	1,9528	3,55		156,28		2,53
r6-5-3-15	Gialias near Nisou	1,01	9,50	0,060	0,021	0,028	3,55	0,008	1,918	2,53	874	1,4406	3,55	2,50	104,25	12,50	2,53
r6-5-3-50	Gialias near Potamia	0,85	9,41	0,003	0,016	0,023	3,95	0,015	2,436	2,53	1168	1,4492	3,55	2,50	102,33	12,50	2,53
r8-4-3-40	Treminthos near Agia Anna	1,45	9,64	0,036	0,024	0,039	3,75	0,025	5,195	2,53	1474	2,1367	3,55	3,41	222,07	14,08	2,53
r8-4-5-30	Treminthos near Klavdia	2,15	9,00	0,028	0,032	0,039	3,15	0,011	6,203	2,53	1346	2,0787	3,55	5,02	198,20	12,50	2,53
r8-7-1-65	Syriatis R. @ Kyprovasa	1,18	9,01	0,008	0,002	0,003	4,35	0,007	0,213	4,55	671	0,6495	4,05	5,33	23,48	12,50	4,05
r8-7-2-60	Syriatis near Pano Lefkara	1,24	8,23	0,029	0,003	0,015	3,95	0,017	0,512	4,05	1234	1,3711	3,55	2,50	117,72	12,50	3,55
r8-8-2-95	Maroni near Choirokoitia	1,74	9,74	0,021	0,003	0,007	4,15	0,009	0,379	4,05	791	1,22	3,55		69,94		3,55
r8-9-5-40	Vasilikos near Lageia	1,33	40,34	0,026	0,009	0,045	3,75	0,036	1,631	2,55	1180	0,9544	3,55	2,50	69,17	12,50	2,55

Monitoring Station Code	River - Site Name	ORGANIC LOAD (O.L.)						CHEMICAL LOAD (C.L.)			SALINATION (S.)			OTHER SUBSTANCES			Chemical / Physico-chemical Classification
		BOD_5	DO	NH_4-N	NO_2-N	TP	O.L.	PO_4-P	NO_3-N	C.L.	EC	SAR	S.	Cu	B	Zn	
		mg/l	mg/l	mg/l	mg/l	mg/l		mg/l	mg/l		μS/cm			mg/l	μg/l	mg/l	
r9-2-3-05	Germasogeia R. @ Dierona	1,57	8,80	0,039	0,019	0,035	**3,55**	0,022	1,361	**3,05**	746	0,6769	**3,55**	2,50	33,48	12,50	**3,05**
r9-2-3-85	Germasogeia near Foinikaria	1,20	9,33	0,051	0,004	0,008	**3,95**	0,011	1,325	**3,05**	875	0,6786	**3,55**	2,50	35,80	12,50	**3,05**
r9-2-4-27	Argaki tou Monastiriou near Amyrou Monastery			0,010	0,004	0,003	**4,21**	0,015	0,020	**4,55**					32,50		***4,21*** **
r9-2-4-95	Gialiades (Akrounta) U/S Germasogeia Dam	2,20	10,41	0,061	0,007	0,008	**3,55**	0,015	1,510	**3,05**	1104		**2,55**	2,50	119,00	12,50	**2,55**
r9-4-3-41	Garyllis R. @ Paramytha	0,50	11,16	0,066	0,009	0,007	**3,55**	0,015	0,990	**3,55**	868	0,8295	**3,55**	2,50	70,73	12,50	**3,55**
r9-4-3-80	Garyllis U/S Polemidia Dam	10,12	7,93	2,941	0,568	0,694	**1,11**	0,438	9,362	**0,50**	2649	5,3285	**2,05**	4,08	418,92	12,50	**0,5**
r9-6-1-44	Kryos R. U/S Myllomeris Waterfall	1,66	9,81	0,016	0,002	0,009	**4,35**	0,008	0,144	**4,55**	490	0,3106	**4,05**	2,50	23,38	12,50	**4,05**
r9-6-1-87	Kryos @ Koilani	1,91	9,57	0,045	0,003	0,044	**4,15**	0,037	0,328	**3,55**	617	0,6307	**4,05**	2,50	73,35	12,50	**3,55**
r9-6-2-60	Kryos U/S Tunnel Outlet	0,85	8,92	0,032	0,003	0,005	**3,95**	0,010	0,559	**4,05**	633	0,6846	**4,05**		40,24		**3,95**
r9-6-3-15	Loumata U/S Amiandos Pond			0,010	0,004	0,003	**4,21**	0,015	0,120	**4,55**					173,00		***4,21*** **
r9-6-3-36	Kouris near Kato Amiantos	1,81	9,26	0,051	0,014	0,013	**3,75**	0,010	3,070	**2,53**	1301	3,062	**3,05**	2,50	451,48	12,50	**2,53**
r9-6-4-92	Kouris @ Alassa New Weir	1,65	9,76	0,034	0,005	0,009	**3,95**	0,008	2,179	**2,53**	1123	2,2346	**3,55**	2,50	331,27	12,50	**2,53**
r9-6-5-62	Agros River Near Ag. Ioannis	1,50	7,30	0,021	0,049	0,511	**2,74**	0,282	4,312	**1,03**	660		**3,55**		24,94		**1,03**
r9-6-5-67	Ag. Ioannis River Near Ag. Ioannis	8,75	5,18	2,089	0,175	0,782	**0,91**	0,316	1,689	**1,55**	522		**3,55**		31,93		**0,91**
r9-6-5-74	Ambelikos River Near Kato Mylos	1,91	7,95	0,030	0,006	0,258	**3,15**	0,042	2,782	**2,03**	671		**3,55**		36,19		**2,03**
r9-6-5-75	Agros River Near Kato Mylos	1,91	7,97	0,039	0,007	0,246	**3,15**	0,086	2,141	**2,03**	535		**3,55**		23,48		**2,03**
r9-6-6-32	Limnatis R. Near Ag. Mamas	1,96	9,24	0,029	0,010	0,135	**3,55**	0,063	3,619	**2,03**	611	1,1458	**4,05**	2,50	46,40	12,50	**2,03**
r9-6-7-70	Limnatis (Zygos) U/S Kouris Dam	1,40	9,90	0,033	0,009	0,062	**3,75**	0,038	3,350	**2,03**	689	1,2183	**4,05**		45,30		**2,03**

** Ezousa (@ Pitargou & near Moro Nero) and Chrysochou-Skoulloi have high electric conductivity values. This is due to natural reasons, because of SO^{+4} from Gypsum formations. Therefore, the final classification of Chemical / Physico-chemical status for these monitoring stations does not consider the high electric conductivity values and the rating of the Salinity group.*

3.2.3.3 Hydromorphological Quality Elements

The assessment of hydromorphological features and the calculation of the Integrated Pressure Index (IPI) provided the results given in Table 3.2.3.3-1. The hydromorphological assessment will be used as supporting element to the biological assessment as specified by WFD.

Deriving of a total of 68 assessments, 31 sites were found to be in High hydromorphological status. 19 out of these 31 sites that achieved High status correspond to hydromorphological evaluations conducted at reference sites.

Table 1.2.3.3-1: Hydromorphological assessment results after the application of CARAVAGGIO method and the calculation of Integrated Pressure Index (IPI). Blue colour corresponds to High hydromorphological status and green colour corresponds to Good or below status

Station code	IC Type	River name	Site name	Ref	Date	IPI
r1-1-3-95	RM5	Cha Potami	Kissousa		27/2/2011	0.661
r1-1-3-95	RM5	Cha Potami	Kissousa village		30/4/2011	0.792
r1-1-3-95	RM5	Chapotami	Kato Archimandrita		1/6/2012	0.834
r1-2-4-25	RM4	Dhiarizos	u/s Arminou Dam		4/6/2012	0.961
r1-3-5-05	RM4	Xeros	near Lazarides	R	3/6/2012	0.856
r1-3-8-60	RM5	Xeros	Phinikas		26/2/2011	0.781
r1-3-8-60	RM5	Xeros	Phinikas u/s		30/4/2011	0.704
r1-4-3-35	RM5	Ayia	u/s Kannaviou Dam Ref	R	28/2/2011	0.914
r1-4-3-35	RM5	Ayia	Kannaviou Dam Ref u/s	R	1/5/2011	0.919
r1-4-3-35	RM5	Ayia	u/s Kannaviou Dam ref	R	2/6/2012	0.909
r1-4-5-73	RM4	Ezousa	Pitharkou		29/4/2011	0.917
r1-4-7-10	RM4	Ezousa	Moro Nero		26/2/2011	0.589
r2-2-3-95	RM5	Chrysochou	Skoulli		26/2/2011	0.383
r2-2-3-95	RM5	Chrysochou	Skoulli u/s bridge		29/4/2011	0.620
r2-2-5-02	RM5	Stavros	Ref Gorges	R	27/2/2011	0.869
r2-2-5-02	RM5	Stavros	Ref gorges d/s	R	30/4/2011	0.843
r2-2-5-75	RM5	Stavros tis Psokas	Rizokremmos		27/2/2011	0.819
r2-2-6-24	RM5	Stavros tis Psokas	culvert		30/4/2011	0.678
r2-4-6-65	RM5	Leivadi	Ref Weir	R	26/2/2011	0.934
r2-4-6-65	RM5	Leivadi	Ref weir u/s	R	29/4/2011	0.867
r2-7-2-75	RM5	Pyrgos	Phleva	R	24/2/2011	0.860
r2-7-2-75	RM5	Pyrgos	Ref Down Weir	R	24/2/2011	0.861
r2-7-2-75	RM5	Pyrgos	Phleva Ref	R	28/4/2011	0.870
r2-7-2-75	RM5	Pyrgos	Phleva ref	R	29/5/2012	0.870

Station code	IC Type	River name	Site name	Ref	Date	IPI
r2-8-3-10	RM4	Limnitis	Saw Mill Ref weir	R	24/2/2011	0.898
r2-8-3-10	RM4	Limnitis	Milani Ref	R	28/4/2011	0.995
r2-8-3-10	RM4	Limnitis	Saw Mill ref weir	R	30/5/2012	0.938
r2-9-2-50	RM4	Kambos	Ag. Varvara		28/4/2011	0.583
r3-1-2-30	RM5	Xeros	u/s Kafizes Dam	R	23/2/2011	0.946
r3-1-2-30	RM5	Xeros	Kafizes Dam Ref u/s	R	27/4/2011	0.939
r3-2-1-85	RM4	Maroni	Choirokoitia u/s Weir		21/2/2011	0.751
r3-2-1-85	RM4	Maroni	Choirokoitia u/s		25/4/2011	0.816
r3-2-1-85	RM4	Marathasa	u/s Kalopanagiotis Dam		31/5/2012	0.447
r3-3-1-60	RM4	Kargotis	Agios Nikolaos u/s Fish Farm	R	5/6/2012	0.877
r3-5-1-50	RM5	Lagoudera	bridge weir		23/2/2011	0.844
r3-5-1-50	RM5	Lagoudera	d/s weir		26/4/2011	0.915
r3-5-4-40	RM5	Elea	Vizakia		23/2/2011	0.628
r3-5-4-40	RM5	Garyllis	u/s Polemidia Dam		1/3/2011	0.800
r3-5-4-40	RM5	Elea	Vizakia u/s weir		27/4/2011	0.596
r3-7-1-50	RM5	Peristerona	Panagia		28/5/2012	0.827
r3-7-1-55	RM5	Peristerona	Siphilos		23/2/2011	0.728
r3-7-1-55	RM5	Peristerona	Siphilos d/s farm		26/4/2011	0.729
r3-7-3-71	RM5	Akaki	u/s Akaki-Malounta Dam		22/2/2011	0.841
r3-7-3-71	RM5	Akaki	Malounta Dam d/s Bridge		26/4/2011	0.811
r6-1-1-48	RM5	Ag. Ounofrios	Ref upstream	R	2/2/2011	0.877
r6-1-1-48	RM5	Ag. Ounofrios	Ref d/s	R	26/4/2011	0.895
r6-1-1-72	RM5	Pediaeos River	Philani		26/4/2011	0.892
r6-1-2-90	RM5	Pedhiaios	Lefkosia		28/5/2012	0.172
r6-5-1-85	RM5	Gialias	Kotsiatis		22/2/2011	0.585
r6-5-1-85	RM5	Gialias	Kotsiatis u/s ford		25/4/2011	0.613
r8-4-3-40	RM5	Treminthos	Ag. Anna		25/4/2011	0.705
r8-7-1-65	RM5	Syrgatis	Kyprovasa Ref		21/2/2011	0.865
r8-7-1-65	RM5	Syrgatis	Kyprovasa Ref d/s		25/4/2011	0.918
r8-7-2-60	RM5	Syrgatis	Pano Lefkara		21/2/2011	0.841
r8-7-2-60	RM5	Syrgatis	Pano Lefkara d/s		25/4/2011	0.745
r8-9-5-40	RM5	Vasilikos	Layia u/s Weir		28/2/2011	0.907
r9-2-3-05	RM5	Germasogia	Dierona		6/6/2012	0.516
r9-2-3-29	RM5	Germasogia	Prasteio		6/6/2012	0.883
r9-2-3-85	RM5	Germasogeia	Phinikaria		1/3/2011	0.919

Station code	IC Type	River name	Site name	Ref	Date	IPI
r9-2-3-85	RM5	Germasogeia	Phinikaria d/s measuring station		1/5/2011	0.864
r9-6-1-44	RM4	Kryos	u/s Myllomeris Waterfall		31/5/2012	0.831
r9-6-1-44	RM4	Kryos	Koilani d/s seawage outfall		31/5/2012	0.437
r9-6-2-60	RM5	Kryos	u/s Tunnel Outlet		27/2/2011	0.785
r9-6-4-92	RM4	Kouris	Alassa new weir		27/2/2011	0.726
r9-6-4-92	RM4	Kouris	Alassa new weir d/s bridge		30/4/2011	0.690
r9-6-6-32	RM4	Limnatis	u/s Kouris Dam Ag. Mama		1/6/2012	0.902
r9-6-7-70	RM5	Limnatis	Kouris u/s Dam		1/3/2011	0.816
r9-6-7-70	RM5	Limnatis	Kouris Dam u/s bridge		1/5/2011	0.869

3.2.3.4 Overall Ecological Status

The overall Ecological Status or the rivers monitoring stations (excluding impounded rivers) is presented in Table 3.2.3.4-1. The principles and the methodology for the assessment of the overall Ecological Status are described in Chapters 3.1 and 3.2.2 respectively.

Overall, out of the **79 monitoring stations** (Figure 3.2.3.4-1):

- **7** monitoring stations (9%) are in **HIGH** Ecological Status
- **35** monitoring stations (44%) are in **GOOD** Ecological Status
- **30** monitoring stations (38%) are in **MODERATE** Ecological Status
- **7** monitoring stations (9%) are in **POOR** Ecological Status
- No monitoring station is in BAD Ecological Status

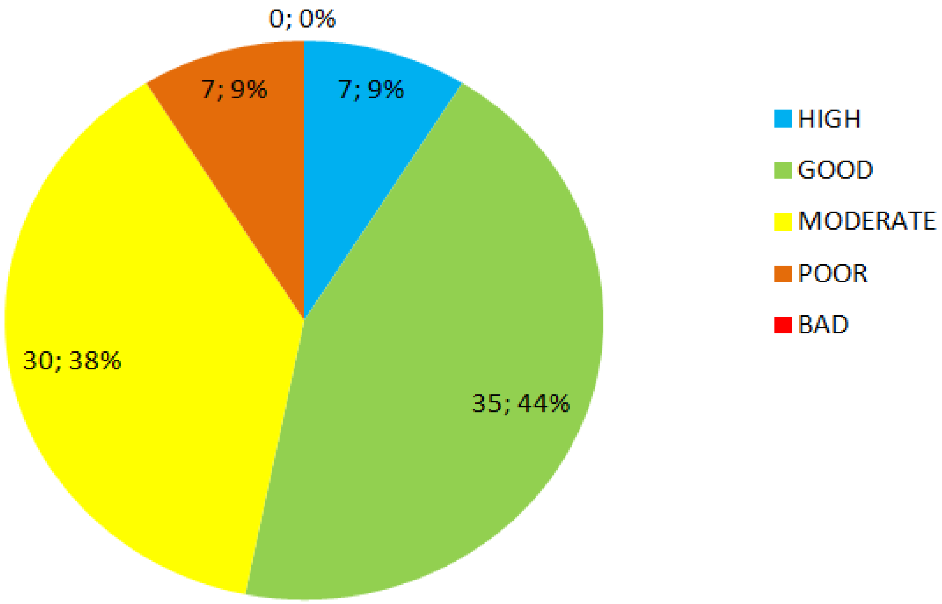


Figure 3.2.3.4-1: Overall Ecological Status (number & %) of River WB Monitoring Stations (excluding impounded rivers)

Out of these **79 monitoring stations**:

- **61** stations were monitored for **BQEs** (16 monitoring stations included only BQE monitoring)
- **63** stations were monitored for **Chemical-Physicochemical QEs** (16 monitoring stations included only Chemical-Physicochemical monitoring)
- **39** stations were monitored for **Hydromorphological QEs**

In **17** monitoring stations the **limiting factor** for the ecological status were the **BQEs** (out of which 7 at the G/M boundary), in **9** monitoring stations the **limiting factor** for the ecological status were the **Chemical Physicochemical QEs** (out of which 6 at the G/M boundary) and in **19** stations the **status** based on BQEs and Chemical-Physicochemical QEs was the **same**. The Hydromorphological QEs did not downgrade any monitoring station from High to Good Status.

Finally, in comparison with the 1st RBMP, the number of monitoring stations increased **from 42 (1st RBMP) to 79 (2nd RBMP) (37 additional monitoring stations)**. However, it must be noted that not all 79 monitoring stations are monitored systematically, i.e. some were part of an investigative monitoring. Out of the **42 monitoring stations in the 1st RBMP**:

☹ **4 downgraded** quality class (1 from G to M boundary):

Station Code	River Name	Site Name	1st RBMP Ecological Status	1st RBMP Ecological Status
r2-9-2-50	Kambos	Ag. Varvara	**G**	**M**
r3-3-3-95	Kargotis	Evrychou	M	P
r6-5-1-85	Gialias	Kotsiatis	M	P
r9-6-3-36	Kouris	Kato Amiantos	M	P

☺ **13 upgraded** quality class (7 from M to G boundary):

Station Code	River Name	Site Name	1st RBMP Ecological Status	1st RBMP Ecological Status
r1-1-3-95	Cha Potami	Kissousa weir	P	M
r1-1-6-65	Cha Potami	near Kato Archimandrita	**M**	**G**
r1-3-5-05	Xeros	Lazaridhes	G	H
r3-2-1-85	Marathasa	u/s Kalopanagiotis Dam	**M**	**G**
r3-5-1-50	Lagoudera	bridge weir	**M**	**G**
r3-7-3-71	Akaki	u/s Akaki-Malounta Dam	**M**	**GOOD & ABOVE P.**
r6-1-2-90	Pediaios	near Lefkosia	P	MP
r8-4-3-40	Tremithos	near Agia Anna	P	MP
r8-7-2-60	Syrgatis	Pano Lefkara	B	MP
r9-2-3-85	Germasogeia	Phinikaria	**M**	**G**
r9-4-3-80	Garyllis	u/s Polemidia Dam weir	B	P
r9-6-1-44	Kryos	u/s Myllomeris Waterfall	**M**	**G**
r9-6-1-87	Kryos	Koilani	**P**	**GOOD & ABOVE P.**

- 😐 **19** are in the **same quality class** and 6 are not monitored anymore.

It is also important to note that in the 2nd RBMP there is more confidence in the monitoring results mainly due to more samples per monitoring station (see also Chapter 6 of this Report).

Table 3.2.3.4-1: Overall Ecological Status of the rivers monitoring stations (excluding impounded rivers) of Cyprus

H	High Ecological Status	MEP	Maximum Ecological Potential
G	Good Ecological Status	GOOD & ABOVE P.	Good and Above Ecological Potential
M	Moderate Ecological Status	MP	Moderate Ecological Potential
P	Poor Ecological Status		
B	Bad Ecological Status		

IC: Intercalibration, Ref site: Reference site, HMWB: Heavily Modified Water Body, INV: Macroinvertebrates, DIA: Diatoms, MPH: Macrophytes

Station code	River name	Site name	IC Type	National type	Ref site	HMWB	INV Status	DIA Status	MPH Status	BIOLOGICAL STATUS/ POTENTIAL	CHEMICAL / PHYSICOCHEMICAL STATUS/ POTENTIAL	HYDRO-MORPHOLOGICAL STATUS/ POTENTIAL	ECOLOGICAL STATUS/ POTENTIAL	Justification in cases where there are samples only from one element category
r1-1-3-95	Cha Potami	Kissousa weir	RM5	I	N	WB	0,617	0,889		M	GOOD & ABOVE	GOOD & BELOW	M	
r1-1-6-65	Cha Potami	near Kato Archimandrita	RM5	Ih	N	WB					G		G	-
r1-2-4-25	Diarizos	u/s Arminou Dam	RM4	P	N	WB	1,032	0,987		H	G	H	G	
r1-2-6-89	Diarizos	at Mamonia	RM5	I	N	HMWB					GEP		GOOD & ABOVE P.	-
r1-3-5-05	Xeros	Lazaridhes	RM4	P	Y	WB	0,996	1,032		H	H	H	H	
r1-3-5-91	Xeros	Roudhias Bridge	RM4	P	N	WB			0,971	H			H	only macrophytes
r1-3-6-53	Xeros	Rotsos twn Laoudiwn	RM5	I	Y	WB	1,07	0,777		G	G		G	
r1-3-8-60	Xeros	Phinikas	RM5	Ih	N	WB	0,694	0,819		M	G	GOOD & BELOW	M	
r1-4-3-35	Ayia	u/s Kannaviou Dam	RM5	I	Y	WB	0,973	0,838		G	H	H	G	
r1-4-5-73	Ezousa	Pitharkou	RM4	P	N	HMWB	0,781	1,047		GEP	MEP	MEP	GOOD & ABOVE P.	
r1-4-7-10	Ezousa	Moro nero	RM4	P	N	HMWB	0,794	0,949		GEP	GEP	GOOD & BELOW	GOOD & ABOVE P.	
r2-2-3-95	Chrysochou	skoulloi	RM5	I	N	WB	0,517	0,957		M	G	GOOD & BELOW	M	
r2-2-5-02	Stavros tis Psokas	Pitieri (Gorges)	RM5	I	Y	WB	0,794	1,045		G	G	H	G	
r2-2-5-75	Stavros tis Psokas	Rizokremmos	RM5	I	N	WB	0,857	0,888		G	H	GOOD & BELOW	G	
r2-2-6-24	Stavros tis Psokas	coulvert	RM5	I	N	WB	0,82	0,905		G		GOOD & BELOW	G	-
r2-3-2-96	Pelathousa R. (Argaki tis Limnis)	at Polis-Argaka Rd.	RM5	Ih	N	WB					M		M	new monitoring station
r2-3-4-80	Makounda	U/S Argaka Dam	RM5	I	N	WB					G		G	new monitoring station
r2-3-8-48	Gialia	Pochalandra	RM4	P	Y	WB	1,054	0,862		G	G		G	
r2-4-6-68	Leivadi	u/s weir	RM5	I	Y	WB	1,015	0,738		G	G	H	G	
r2-7-2-75	Pyrgos	Phleva	RM5	I	Y	WB	0,899	0,925		G	H	H	G	
r2-8-3-10	Limnitis	Saw Mill	RM4	P	Y	WB	1,063	1,041		H	G	H	G	
r2-9-2-50	Kambos	Ag. Varvara	RM4	P	N	WB	0,909	0,794		G	M	GOOD & BELOW	M	
r3-1-2-30	Xeros	u/s Kafizes Dam	RM5	I	Y	WB	1,063	0,785		G	G	H	G	
r3-2-1-85	Marathasa	u/s Kalopanagiotis Dam	RM4	P	N	WB	0,861	0,937		G	G	GOOD & BELOW	G	
r3-3-1-60	Agios Nikolaos	u/s Fish Farm	RM4	P	Y	WB	0,761	1,167	0,99	G	G	H	G	
r3-3-3-27	Kargwtis	Galata	RM4	P	N	WB			0,449	M			M	only macrophytes
r3-3-3-95	Kargotis	Evrychou	RM4	P	N	WB	0,5	0,823	0,362	P	M		P	
r3-4-2-90	Atsas	near Evrychou	RM5	Ih	N	WB					M		M	-
r3-5-1-50	Lagoudera	bridge weir	RM5	I	N	WB	0,934	0,91		G	G	H	G	
r3-5-4-40	Elea	Vizakia	RM5	I	N	HMWB	0,714	0,695		MP	GEP	GOOD & BELOW	MP	
r3-7-1-55	Peristerona	Sifilos	RM5	I	N	WB	0,797	0,817		G	G	GOOD & BELOW	G	
r3-7-1-84	Peristerona	Peristerona	RM5	E	N	WB					G		G	ephemeral, no biomonitoring is

Station code	River name	Site name	IC Type	National type	Ref site	HMWB	INV Status	DIA Status	MPH Status	BIOLOGICAL STATUS/ POTENTIAL	CHEMICAL / PHYSICOCHEMICAL STATUS/ POTENTIAL	HYDRO-MORPHOLOGICAL STATUS/ POTENTIAL	ECOLOGICAL STATUS/ POTENTIAL	Justification in cases where there are samples only from one element category
														possible
r3-7-2-93	Lykithia	Akaki	RM5	E	N	WB	ND	ND	ND	ND	ND	ND	ND	Not enough flow for sampling - no data
r3-7-3-71	Akaki	u/s Akaki-Malounta Dam	RM5	I	N	HMWB	0,81	0,825		GEP	GEP	GOOD & BELOW	GOOD & ABOVE P.	
r6-1-1-48	Pediaios	Agios Onoufrios	RM5	Ih	Y	WB	0,748			G	G	H	G	
r6-1-1-72	Pedhiaios	Filani	RM5	Ih	N	WB	0,892	0,914		G	H	H	G	
r6-1-1-80	Agios Onoufrios	near Kampia	RM5	Ih	N	WB					G		G	-
r6-1-2-38	Pediaios	near Kato Deftera	RM5	E	N	HMWB					GEP		GOOD & ABOVE P.	ephemeral, no biomonitoring is possible
r6-1-2-90	Pediaios	near Lefkosia	RM5	E	N	HMWB					MP	GOOD & BELOW	MP	-
r6-1-5-52	Vathys	at Athalassa Park	RM5	E	N	WB					P		M	-
r6-5-1-85	Gialias	Kotsiatis	RM5	I	N	WB	0,478	0,786		P	M	GOOD & BELOW	P	
r6-5-3-15	Gialias	near Nisou	RM5	E	N	WB					M		M	ephemeral, no biomonitoring is possible
r6-5-3-50	Gialias	near Potamia	RM5	E	N	WB					M		M	ephemeral, no biomonitoring is possible
r8-4-3-40	Tremithos	near Agia Anna	RM5	E	N	HMWB					MP	GOOD & BELOW	MP	ephemeral, no biomonitoring is possible
r8-4-5-30	Tremithos	near Klavdia	RM5	E	N	HMWB					MP		MP	ephemeral, no biomonitoring is possible
r8-7-1-65	Syrgatis	Kyprovasa	RM5	I	N	WB	0,897	0,94		G	H	H	G	
r8-7-2-60	Syrgatis	Pano Lefkara	RM5	I	N	HMWB	0,622	0,861		MP	GEP	GOOD & BELOW	MP	
r8-8-2-95	Maroni	Choirokoitia u/s weir	RM5	Ih	N	HMWB	0,63	1,008		MP	GEP		MP	
r8-9-5-40	Vasilikos	Layia u/s weir	RM5	I	N	WB	0,868	0,878		G	M	H	M	
r9-2-3-05	Germasogeia	Dierona	RM5	I	N	WB	0,756	0,779		G	G	GOOD & BELOW	G	
r9-2-3-29	Germasogeia	Prasteio	RM5	I	N	WB	0,911	0,718		M		H	M	-
r9-2-3-85	Germasogeia	Phinikaria	RM5	I	N	WB	0,923	0,768		G	G	H	G	
r9-2-4-27	Germasogeia	Argaki tou monastiriou	RM5	I	N	WB	1,018	1,02		H	H		H	
r9-2-4-95	Gialiades (Akrounda)	U/S Germasogeia Dam	RM5	I	N	HMWB					MP		MP	
r9-4-1-38	Garyllis	d/s Ayia Paraskevi	RM5	I	N	WB	0,824			G			G	ADAQUA project - P/C data not considered reliable
r9-4-1-63	Garyllis	u/s Gerasa	RM5	I	N	WB	1,029			H			H	ADAQUA project - P/C data not considered reliable
r9-4-1-93	Garyllis	d/s Gerasa	RM5	I	N	WB	0,458			P			P	ADAQUA project - P/C data not considered reliable
r9-4-3-41	Garyllis	Paramytha	RM5	I	N	WB					G		G	new monitoring station
r9-4-3-80	Garyllis	u/s Polemidia Dam weir (Ayia Eirini)	RM5	I	N	WB	0,382	0,361		P	B		P	
r9-4-3-89	Garyllis	Polemidia dam u/s	RM5	I	N	WB	0,445			P			P	ADAQUA project - P/C data not considered reliable
r9-4-3-94	Garyllis	Polemidia dam	RM5	I	N	WB	0,447			P			P	ADAQUA project - P/C data not considered reliable
r9-6-1-44	Kryos	u/s Myllomeris Waterfall	RM4	P	N	WB	0,9	0,965		G	H	GOOD & BELOW	G	
r9-6-1-87	Kryos	Koilani	RM4	P	N	HMWB	0,871	1,061		GEP	GEP	GOOD & BELOW	GOOD & ABOVE P.	
r9-6-2-60	Kryos	u/s Tunnel Outlet	RM5	I	N	HMWB	0,731	0,873		MP	GEP	GOOD & BELOW	MP	

Station code	River name	Site name	IC Type	National type	Ref site	HMWB	INV Status	DIA Status	MPH Status	BIOLOGICAL STATUS/ POTENTIAL	CHEMICAL / PHYSICOCHEMICAL STATUS/ POTENTIAL	HYDRO-MORPHOLOGICAL STATUS/ POTENTIAL	ECOLOGICAL STATUS/ POTENTIAL	Justification in cases where there are samples only from one element category
r9-6-3-15	Kouris	Amiantos loumata	RM4	P	N	WB	1,08	1,111		H	H		H	
r9-6-3-36	Kouris	Kato Amiantos	RM4	P	N	WB	0,474	0,907		P	M		P	
r9-6-4-92	Kouris	Alassa new weir	RM4	P	N	HMWB	0,901	0,933		GEP	MP	GOOD & BELOW	MP	
r9-6-5-17	Ambelikos	Kyperounta	RM4	P	N	WB	0,546			M			M	ADAQUA project - P/C data not considered reliable
r9-6-5-53	Ambelikos	Potamitissa	RM4	P	N	WB	0,756			G			G	ADAQUA project - P/C data not considered reliable
r9-6-5-57	Agros	Agros	RM4	P	N	WB	0,583			M			M	ADAQUA project - P/C data not considered reliable
r9-6-5-62	Agros	near Kato Milos reservoir	RM4	P	N	WB	0,534			M	P		M	
r9-6-5-66	Ayios Ioannis	Ayios Ioannis	RM4	P	N	WB	0,849			G			G	ADAQUA project - P/C data not considered reliable
r9-6-5-67	Ayios Ioannis	near Ayios Ioannis	RM4	P	N	WB	0,794			G	B		M	
r9-6-5-69	Agros	Kato Milos bridge	RM4	P	N	WB	0,67			M			M	ADAQUA project - P/C data not considered reliable
r9-6-5-74	Ambelikos	Near Kato Mylos	RM4	P	N	WB					M		M	part of investigative monitoring - only P/C
r9-6-5-75	Agros	Near Kato Mylos	RM4	P	N	WB					M		M	part of investigative monitoring - only P/C
r9-6-6-32	Limnatis	Ag. Mamas	RM4	P	N	WB	0,838	0,859		G	M	H	M	
r9-6-6-93	Limnatis	Kapilio	RM4	P	N	WB	0,983			H			H	ADAQUA project - P/C data not considered reliable
r9-6-7-29	Limnatis	Limnatis village	RM5	I	N	WB	0,976			H			H	ADAQUA project - P/C data not considered reliable
r9-6-7-70	Limnatis	u/s Kouris Dam	RM5	I	N	WB	0,852	0,768		G	M	GOOD & BELOW	M	

3.3 IMPOUNDED RIVER WATER BODIES (WATER RESERVOIRS)

In the first River Basin Management Plan of Cyprus the water reservoirs (impounded rivers) were characterised as heavily modified lake water bodies and they were assigned a typology. However, in the «Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans, Member State: Cyprus» it was stated that «*Reservoirs have been reported as heavily modified lakes, not as heavily modified rivers, as recommended. This limits the comparability with information from other Member States*». For that reason, it was finally decided that the water reservoirs will not be characterised as heavily modified lake water bodies, but they are assigned as heavily modified river water bodies.

These water reservoirs are characterised as river HMWBs, since this is the initial water category of these water bodies before the physical alterations by human activity occurred. However, the closest comparable natural water category to these HMWBs in the present situation is a lake. According to Annex II par. 1.1 V of the WFD "for artificial and heavily modified surface water bodies the differentiation shall be undertaken in accordance with the descriptors for whichever of the surface water categories most closely resembles the heavily modified or artificial water body concerned".

Thus, according to the review and update of WFD Article 5, Cyprus has identified 15 HMWB that concern impounded rivers (water reservoirs), adding 4 new water bodies compared to the 1st RBMP (Table 3.3-1). Operational monitoring was implemented in 1 reservoir (CY_9-4-3_26_ R-I-HM, Polemidia reservoir), which during the 1st RBMP was classified as Bad status, while surveillance monitoring was applied in 11 reservoirs. Each reservoir was sampled in one station, at the deepest lake point (DLP). For the new reservoirs Akaki - Malounda and Tamassos, the monitoring programme will be implemented from 2014 onwards and the results will be reported in the next WFD Management Cycle.

Table 2.3-1: Characteristics of impounded rivers (water reservoirs) water bodies (HMWBs) and their monitoring regime. S: surveillance, O: operational

Water body code	Sub-watershed	Name	Area at overflow level (ha)	Mean depth (m)	Modified	Monitoring type
CY_1-2-c_RP_HM_IR	1-2-4	Arminou	35.6	26	HM	S
CY_1-3-d_RIh_HM_IR	1-3-9	Asprokremmos	225.4	23	HM	S
CY_1-4-c_RI_HM_IR	1-4-3	Kannaviou	92.6	35	HM	S
CY_1-6-b_RIh_HM_IR	1-6-1	Mavrokolympos	18.2	18	HM	S
CY_2-2-e_RI_HM_IR	2-2-6	Evretou	113.8	22	HM	S
CY_3-5-b_RI_HM_IR	3-5-1	Xyliatos	5.3	21	HM	S
CY_3-7-i_RI_HM_IR	3-7-3	Akaki-Malounda	18.2	28	HM	S
CY_6-1-b_RIh_HM_IR	6-1-2	Tamassos	35.9	18	HM	S
CY_8-7-b_RI_HM_IR	8-7-2	Lefkara	45.2	21	HM	S

Water body code	Sub-watershed	Name	Area at overflow level (ha)	Mean depth (m)	Modified	Monitoring type
CY_8-7-e_RI_HM_IR	8-7-4	Dipotamos	91.8	12	HM	S
CY_8-9-d_RI_HM_IR	8-9-5	Kalavasos	87.0	16	HM	S
CY_9-2-g_RI_HM_IR	9-2-5	Germasogia	68.1	11	HM	S
CY_9-4-d_RI_HM_IR	9-4-3	Polemidia	16.9	11	HM	O
CY_9-6-j_RP_HM_IR	9-6-3	Pano Platres	2.7	n.a.	HM	S
CY_9-6-s_RP_HM_IR	9-6-9	Kouris	332.3	36	HM	S

3.3.1 Available Data

3.3.1.1 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).

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 reservoirs.

3.3.1.2 Chemical - Physicochemical Quality Elements

All the available data from the Surface Water Monitoring Programme under WFD Article 8 were provided by the Division of Hydrometry of Water Development Department (WDD) for the evaluation of Chemical – Physicochemical potential.

The elements used for the quality categories are explained in detail in paragraph 3.3.2.2 of this report. The chronological range of available data for each element, are as presented in Table 3.3.1.2-1.

Table 3.3.1.2-1: Chronological Range of available data for Chemical - Physicochemical Quality Elements at impounded river (water reservoir) monitoring stations

Chemical - Physicochemical Quality Element	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

Chemical - Physicochemical Quality Element	Chronological Range of available data	
	Starts at	Ends at
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

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. Data for water hardness at impounded rivers monitoring stations chronologically range from 06/2009 to 06/2013.

3.3.2 Methodology

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 3.3.2.1-1).

Table 3.3.2.1-1: 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	

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 where 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 $NMASRP_{EQR,}$ 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 $NMASRP_{EQR}$, 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 $NMASRP_{EQR}$ was calculated for each reservoir.

3.3.2.1 Chemical - Physicochemical Quality Elements

For the evaluation of the Chemical - Physicochemical Quality Elements, the assessment method used in the 1st RBMP (applied in the contract TAY54/2009: Evaluation of WFD Art. 8 monitoring results for surface waters, 2009, Karavokyris - Kaimaki) was reviewed in order to examine if an adjustment - improvement can be made. The assessment system as applied in contract TAY54/2009, was not based on Cyprus data because in 2009 not enough data was available to adjust it to local conditions. However, because a significant amount of data has become available since 2009, the review and possible adjustment was considered feasible for the purpose of the 2nd RBMP.

To this end, the monitoring results for physicochemical parameters in relation to the corresponding results of the biological quality elements were analysed and in order to determine whether the limit values of the physicochemical parameters correspond to the status of the biological quality elements.

For this purpose, physicochemical and corresponding biological data for 163 samples in total were analysed, i.e. samples that included both biological (phytoplankton) and physicochemical data. Not all samples include all the physicochemical parameters.

For the analysis of all these data, the final milestone reports of the WFD-CIS Intercalibration Exercise (2nd phase) for Mediterranean reservoirs for the BQE phytoplankton Rivers and the 2014 JRC Intercalibration Technical Report - Mediterranean Lake Phytoplankton ecological assessment methods were consulted, as well as reporting documents from other Member States, which include references to the response of the BQE to physicochemical pressures.

Based on all the above, these data were analysed using descriptive statistics, in means of box plots. Using box plots is a convenient way of graphically depicting groups (i.e. different quality classes based on BQE status) of numerical data through their quartiles. Box plots could display potential differences in physicochemical parameters' values between the 5 different quality classes based on BQE status without making any assumptions of the underlying statistical distribution: they are non-parametric.

Figure 3.3.2.2-1 represents a selection of these box plots for various general physicochemical parameters for the data set. A more detailed depiction of these graphs is on Appendix 1 of this report, where also the number of samples used for each graph is indicated.

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 (NH_4^+). Therefore, it was decided to continue with the same assessment system for the physicochemical data in the 2nd RBMP, apart from Electric Conductivity (EC) and Ammonium (NH_4^+) where the limit values were adjusted (lowered) based on the box plot analysis. In addition, based on the distribution of the data for Total Coliforms, limit values for this parameter were also set.

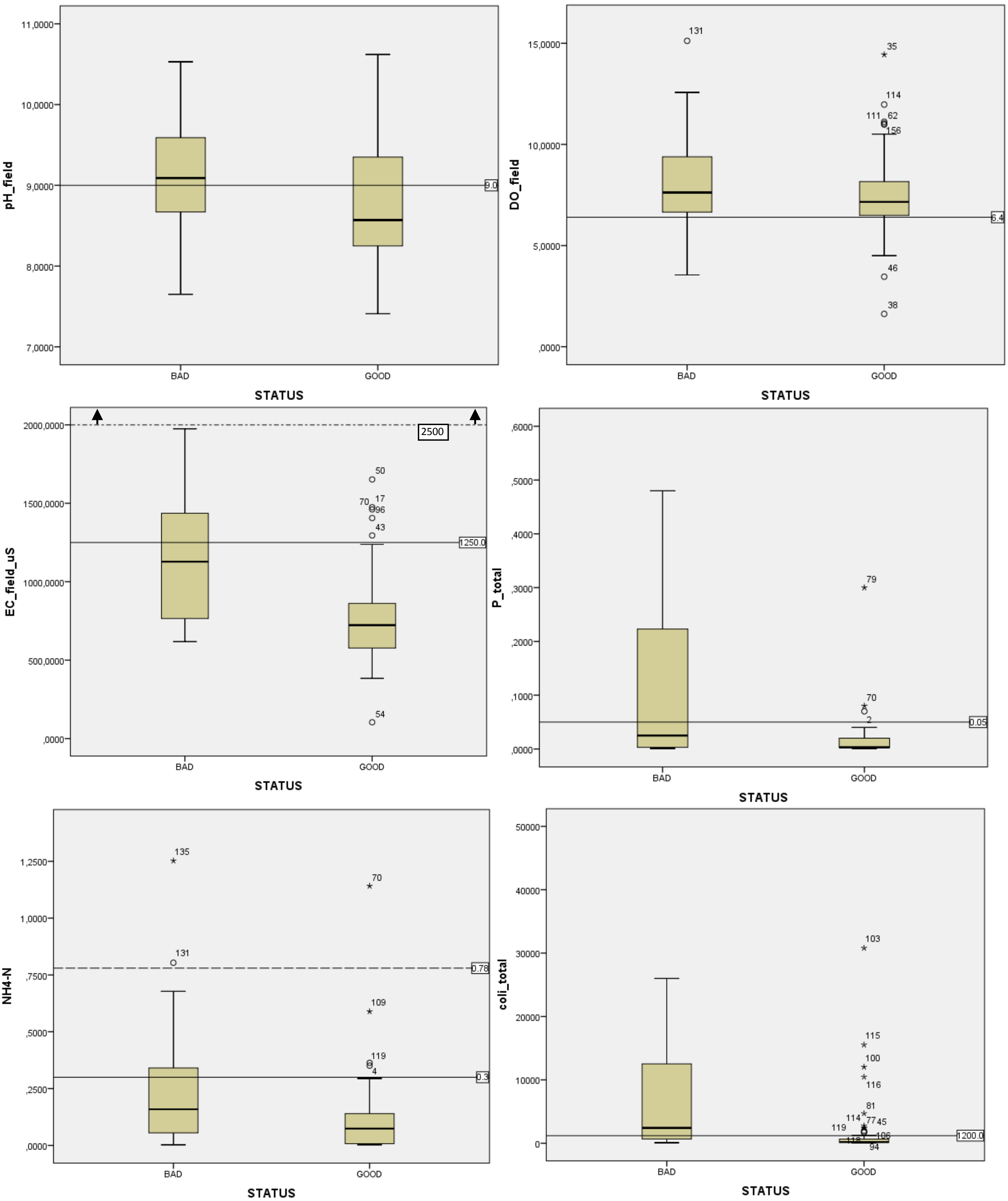


Figure 3.3.2.2-1: Box plots of the values of various general physicochemical parameters between the 2 different quality classes (above Good/below Good) based on Phytoplankton potential in impounded rivers (water reservoirs). The solid line represents the limit between Good/ below Good status, as it is currently used for Cyprus impounded rivers (water reservoirs). The dotted line represents the limit between Good/ below Good status, as it is was used in the 1st RBMP.

In the following paragraphs, the methodology of the physicochemical data assessment system is described.

According to WFD, for evaluating the Chemical – Physicochemical status of surface waters, the Chemical – Physicochemical elements are used that support the Biological Elements (i.e. Transparency, Thermal conditions, Oxygenation conditions, Salinity, Acidification status, Nutrient conditions and Specific pollutants). For the case of Cyprus the Chemical – Physicochemical elements that were used, are: pH, Dissolved Oxygen, nutrients, electric conductivity, Total Coliforms and some specific pollutants.

The water reservoirs in Cyprus are used for drinking and/or irrigational water 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 3.3.2.2-1.

Table 3.3.2.2-1: Physicochemical parameters -supporting biological quality elements- used for the assessment of impounded river water bodies (water reservoirs) in Cyprus

Chemical – Physicochemical Category	Parameters
Transparency	-
Thermal Conditions	-
Oxygenation conditions	DO
Salinity	EC
Acidification status	pH
Nutrient conditions	NH_4^+, TP, PO_4^{-3}
Specific pollutants	Cr, Cu, As, B, Fe, Zn

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 classes 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, see Table 3.3.2.2-3) 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 3.3.2.2-2 and analysed further in the following paragraphs.

Table 3.3.2.2-2: Classification systems for the Chemical – Physicochemical elements at impounded river monitoring stations (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]	μg/l	50	
As [National Legislation for Drinking Waters, L.87.I.2001]	μg/l	10	
Cu [Directive 2006/44/EC]	μg/l	40 μg/l (water hardness between 100 - 300 mg/l $CaCO_3$) 112 μg/l (water hardness greater than 300 mg/l $CaCO_3$)	
B [National Legislation for Drinking Waters, L.87.I.2001]	μg/l	1000	
Fe [Directive 75/440/EEC & UKTAG]	μg/l	1000	
Zn [Directive 2006/44/EC]	μg/l	1000 μg/l (water hardness between 100 - 500 mg/l $CaCO_3$) 2000 μg/l for water hardness greater than 300 mg/l $CaCO_3$)	

1. **pH**

The limit values used for pH are those set in Directive 2006/44/EC "on the quality of fresh waters needing protection or improvement in order to support fish life" and these are compared with the average of all the samples from 2009-2013 in each monitoring station. These are the same limit values as those used in the 1st RBMP.

	6	9
Moderate	**Good**	**Moderate**

2. **Dissolved Oxygen (DO)**

The limit values used for DO are those set in Norway[6] and these are compared with the average of all the samples from 2009-2013 in each monitoring station. These are the same limit values as those used in the 1st RBMP.

	9 mg/l	6.4 mg/l	4 mg/l	2 mg/l
HIGH	**GOOD**	**MODERATE**	**POOR**	**BAD**

[6] *Cardoso, A.C., Duchemin, J., Magoarou, P. and Premazzi, G. (2001),Criteria for the identification of freshwater subject to eutrophication. Their use for the implementation of the "Nitrates" and Urban Waste Water Directives. EUR 19810 EN, EU - JRC, 87.*

3. Electrical Conductivity (EC)

In the 1st RBMP the limit values used for EC were those set in Directive 98/83/EC "on the quality of water intended for human consumption". However, based on the analysis of the EC values compared to phytoplankton values for the Cyprus data set, the limit value of 2500 mS/cm is too high for the local conditions (see Figure 3.3.2.2-2). Thus, it was decided to lower the limit value to 1250 mS/cm to correspond to Cyprus conditions. This limit value is compared with the average of all the samples from 2009-2013 in each monitoring station.

1250 mS/cm

Moderate	Good

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	STATUS	N	Percent	N	Percent	N	Percent
EC_field_uS	BAD	40	100,0%	0	0,0%	40	100,0%
	GOOD	121	99,2%	1	0,8%	122	100,0%

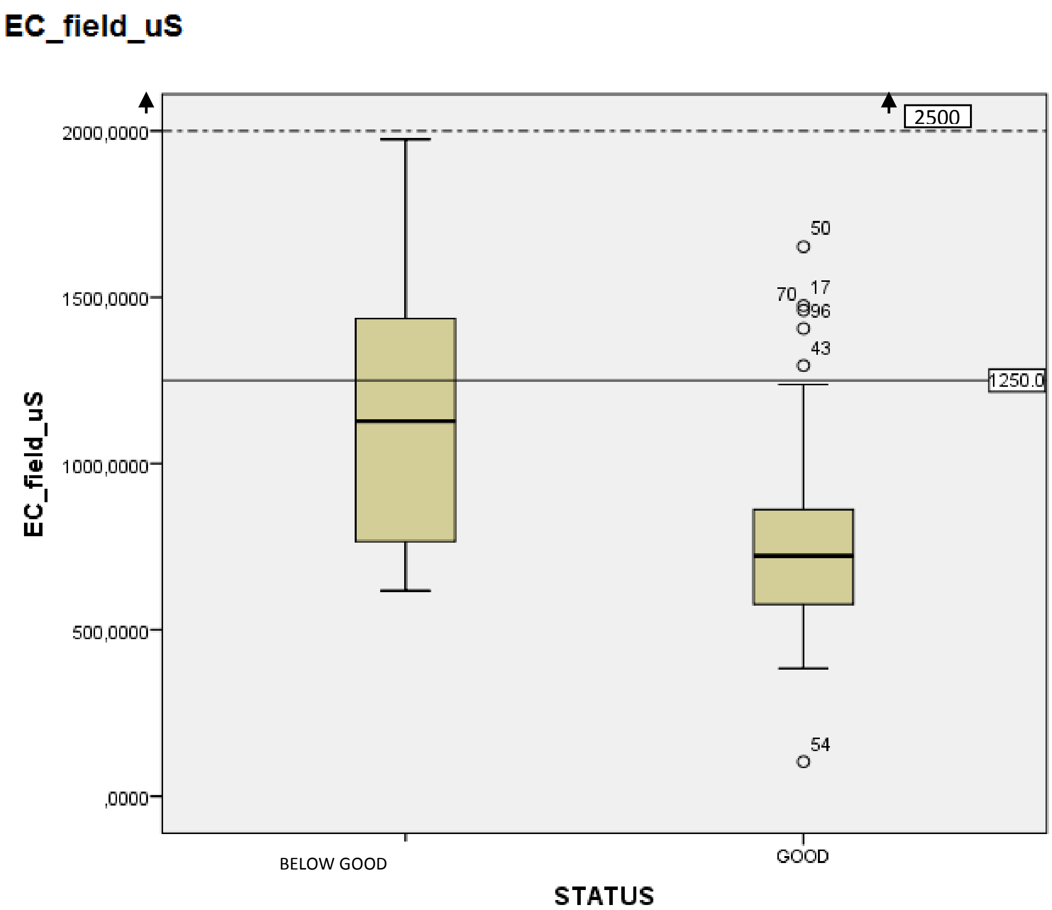


Figure 3.3.2.2-2: Box plot of Electric Conductivity (EC) values between the 2 different quality classes (above Good/below Good) based on Phytoplankton potential in impounded rivers (water reservoirs). The solid line represents the limit between Good/ below Good potential, as it is currently used for Cyprus impounded rivers (water reservoirs). The dotted line represents the limit between Good/ below Good potential, as it is was used in the 1st RBMP.

4. Total Phosphorus (TP)

The limit values used for TP are the same limit values as those used in the 1st RBMP. These were set on the framework of the 1st RBMP and relevant study (contract TAY54/2009: Evaluation of WFD Art. 8 monitoring results for surface waters, 2009, Karavokyris - Kaimaki) based on Cyprus water reservoirs data. According to the box plots analyses (Figure 3.2.2.2.2-1 and Appendix 1), it is evident that the limit value continues to apply well to the Cyprus data. This limit value is compared with the average of all the samples from 2009-2013 in each monitoring station.

0.031 mg/l	0.050 mg/l	0.099 mg/l	0.199 mg/l	
HIGH	GOOD	MODERATE	POOR	BAD

5. Ammonium (NH_4^+)

In the 1st RBMP the limit values used for NH_4^+ were those set in Directive 2006/44/EC “on the quality of fresh waters needing protection or improvement in order to support fish life”. However, based on the analysis of the NH_4^+ values compared to phytoplankton values for the Cyprus data set, the limit value of 0.78 mg/l is too high for the local conditions (see Figure 3.3.2.2-3). Thus, it was decided to lower the limit value to 0.3 mg/l to correspond to Cyprus conditions. This limit value is compared with the average of all the samples from 2009-2013 in each monitoring station.

0.3 mg/l	
Moderate	Good

Case Processing Summary

	STATUS	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
NH4-N	BAD	40	100,0%	0	0,0%	40	100,0%
	GOOD	121	99,2%	1	0,8%	122	100,0%

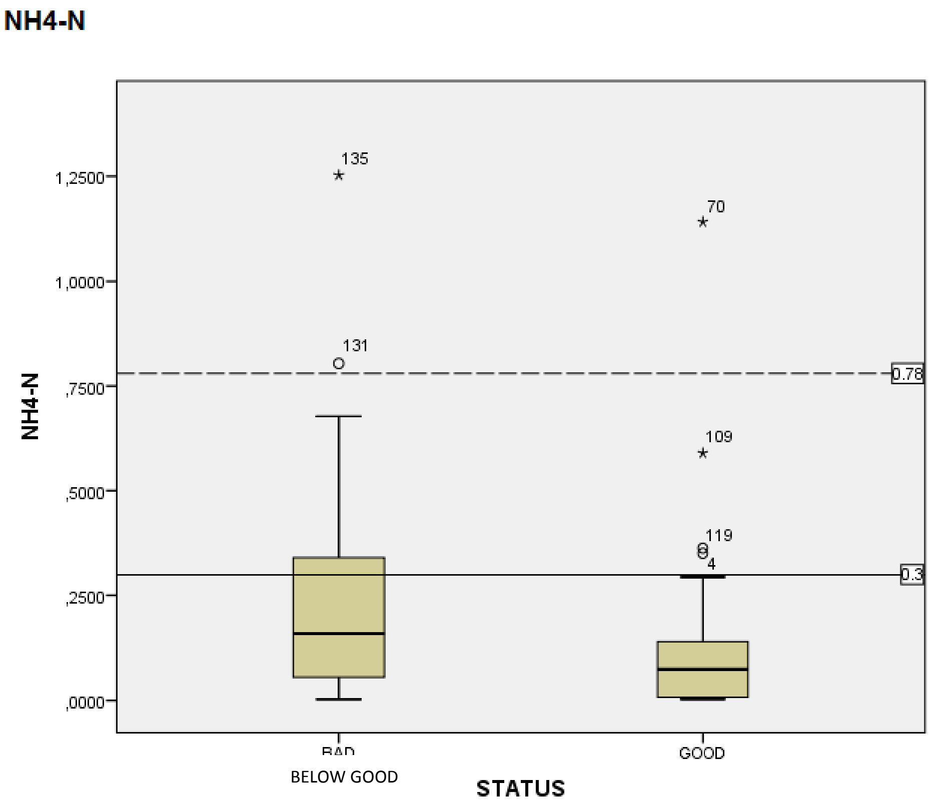


Figure 3.3.2.2-3: Box plot of NH4-N values between the 2 different quality classes (above Good/below Good) based on Phytoplankton potential in impounded rivers. The solid line represents the limit between Good/ below Good potential, as it is currently used for Cyprus impounded rivers (water reservoirs). The dotted line represents the limit between Good/ below Good potential, as it is was used in the 1st RBMP.

6. Total Coliforms

In the 1st RBMP, Total Coliforms were not considered as a parameter for the physicochemical potential of the water reservoirs (impounded rivers). Instead, Faecal Coliforms were assessed. In the frame of this Contract no monitoring data was provided for Faecal Coliforms. It was decided to use data for Total Coliforms since they provide a good indication for the quality of water reservoirs and because based on the analysis of Cyprus dataset, it was possible to set limit values (Figure 3.3.2.2-4). This limit value is compared with the average of all the samples from 2009-2013 in each monitoring station.

1200 /100ml

Moderate	Good

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	STATUS	N	Percent	N	Percent	N	Percent
coli_total	BAD	24	60,0%	16	40,0%	40	100,0%
	GOOD	78	63,9%	44	36,1%	122	100,0%

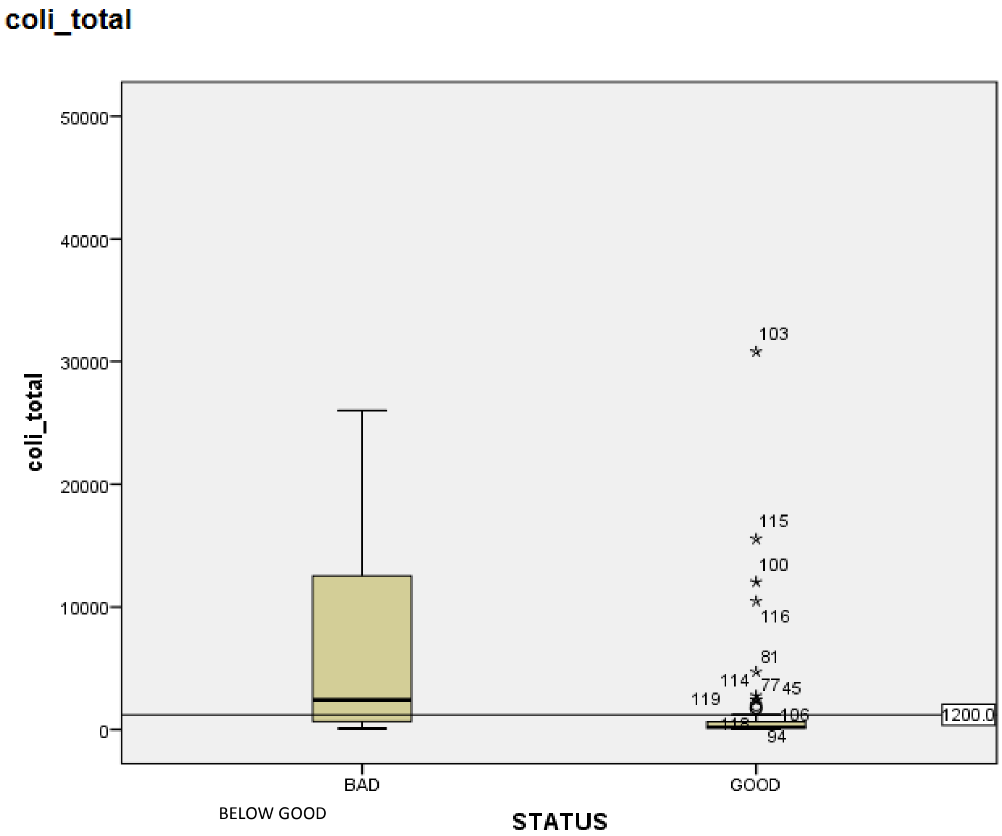


Figure 3.3.2.2-4:: Box plot of Total Coliforms values between the 2 different quality classes (above Good/below Good) based on Phytoplankton potential in impounded rivers (water reservoirs). The line represents the limit between Good/ below Good potential, as it is currently used for Cyprus impounded rivers (water reservoirs).

7. Chromium (Cr)

The limit value used for Cr is 50 μg/l. This value is based on the National Legislation (Law 87.I.2001 on drinking water quality). This is the same limit value as the one used in the 1st RBMP and is also the limit value set in the older version of the drinking water Directive 75/440/EEC "concerning the quality of water intended for abstraction of drinking water in the Member States", which has been carried over into Directive 98/83/EC on the quality of water intended for human consumption. This limit value is compared with the average of all the samples from 2009-2013 in each monitoring station.

50 μg/l

Moderate	Good

8. Arsenic (As)

The limit value used for As is 10 μg/l. This value is based on the National Legislation (Law 87.I.2001 on drinking water quality) and corresponds to the limit value of Directive 98/83/EC on the quality of water intended for human consumption. In the 1st RBMP the limit values used for As were those set in the older version of the drinking water Directive 75/440/EEC "concerning the quality of water intended for abstraction of drinking water in the Member States", i.e 50 μg/l. In the frame of this Contract, it was decided to follow the stricter limit value of the national legislation and Directive 98/83/EC. This limit value is compared with the average of all the samples from 2009-2013 in each monitoring station.

10 μg/l

Moderate	Good

9. Copper (Cu)

The limit values used for Cu are those set in Directive 2006/44/EC "on the quality of fresh waters needing protection or improvement in order to support fish life". The Directive 2006/44/EC (Annex II) sets limit values for Copper concentrations for different water hardness values between 10 and 300 mg/l $CaCO_3$. Based on this, the limit values used for the Copper are: 40 μg/l for water hardness between 100 and 300 mg/l $CaCO_3$ and 112 μg/l for water hardness greater than 300 mg/l $CaCO_3$. It is noted that the water hardness of all the examined water bodies is greater than 100 mg/l $CaCO_3$. These limit values are compared with the average of all the samples from 2009-2013 in each monitoring station.

40 μg/l (water hardness between 100 - 300 mg/l $CaCO_3$)
112 μg/l (water hardness greater than 300 mg/l $CaCO_3$)

Moderate	Good

10. Boron (B)

The limit value used for B is 1000 μg/l. This value in based on the National Legislation (Law 87.I.2001 on drinking water quality). This is the same limit value as the one used in the 1st RBMP and is also the limit value set in the older version of the drinking water Directive 75/440/EEC "concerning the quality of water intended for abstraction of drinking water in the Member States", which has been carried over into Directive 98/83/EC on the quality of water intended for human consumption. This limit value is compared with the average of all the samples from 2009-2013 in each monitoring station.

1000 μg/l

Moderate	Good

11. Iron (Fe)

The proposed limit value for Fe is 1000 μg/l. The Directive 75/440/EEC sets the limit value of 0,3 mg/l for the categories A1 and A2. The value of 1 mg/l (1000 μg/l) is proposed as the desired limit for the category A3. Furthermore, the value of 1 mg/l is set from the UK Technical Advisory Group (UKTAG) on the Water Framework Directive as Environmental Quality Standard of iron in Freshwater (long-term exposure). This is the same limit value as the one used in the 1st RBMP. This limit value is compared with the average of all the samples from 2009-2013 in each monitoring station.

	1000 μg/l	
Moderate		**Good**

12. Zinc (Zn)

The limit values used for Zn are those set in Directive 2006/44/EC "on the quality of fresh waters needing protection or improvement in order to support fish life". The Directive 2006/44/EC (Annex II) sets limit values for Zn concentrations for different water hardness values between 10 and 500 mg/l $CaCO_3$. Based on this, the limit values used for the Zn are: 1000 μg/l for water hardness between 100 and 500 mg/l $CaCO_3$ and 2000 μg/l for water hardness greater than 500 mg/l $CaCO_3$. It is noted that the water hardness of all the examined water bodies is greater than 100 mg/l $CaCO_3$. These limit values are compared with the average of all the samples from 2009-2013 in each monitoring station.

	1000 μg/l (water hardness between 100 - 500 mg/l $CaCO_3$) 2000 μg/l (water hardness greater than 500 mg/l $CaCO_3$)	
Moderate		**Good**

As it is already mentioned, 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 classes of each parameter, by averaging the values of all the samples for each parameter and comparing them to the parameter limit values. Then, the assessment system presented in Table 3.3.2.2-3 is applied in order for all the quality parameters to be comparable. Finally, the total chemical - physicochemical potential of each monitoring station is classified by averaging the individual quality classes (rating ranges) of each parameter.

Table 3.3.2.2-3: Assessment system for the water quality parameters and overall chemical - physicochemical potential

Potential	Rating range	Mean value for the rating range	
H (**H**igh)	>4-5	(4,1+5)/2=	4,55
G (**G**ood)	>3-4	(3,1+4)/2=	3,55
M (**M**oderate)	>2-3	(2,1+3)/2=	2,55
P (**P**oor)	>1-2	(1,1+2)/2=	1,55
B (**B**ad)	<1	1/2=	0,5

3.3.3 Results

3.3.3.1 Biological Quality Elements

In Table 3.3.3.1-1 the assessment of the Biological Potential of impounded rivers (water reservoirs) is presented.

Out of the 13 impounded rivers evaluated, 11 were classified in Good and Above Biological Potential, while 2 (Germasogia and Polemidia) are below Good Biological Potential. Germasogia reservoir was classified in Moderate potential and Polemidia in Bad potential.

Compared to the 1st RBMP, 4 water bodies were added to the monitoring network of impounded rivers. These were Arminou, Kannaviou, Xyliatos and Pano Platres reservoirs. All new reservoirs were classified in Good and above quality class. Concerning the water bodies monitored in both RBMP, all reservoirs showed no alteration in their status, apart from Germasogia reservoir. The latter was downgraded from Good and above potential to Moderate potential. It has to be noted though that the NMASRP index value and the corresponding evaluation of Germasogia reservoir was only marginally below the Good and above/Moderate boundary (0,51). On the other hand, all reservoirs classified in Good and above potential, showed relatively high values, much higher than the Good and above/Moderate boundary.

Table 3.3.3.1-1: Annual biological potential of impounded rivers (water reservoirs) during 2009-2012 and overall biological potential. Colour coding represents the corresponding quality potential according to WFD guidelines.

Monitoring Station Code	Monitoring Station Name	2009	2010	2011	2012	2013	OVERALL BIOLOGICAL POTENTIAL	
d1-2-4-61	**Arminou**	0,93	0,84	0,84	0,70		0,83	GOOD AND ABOVE
d1-3-9-50	**Asprokremmos**	0,94	0,63	0,86	0,65		0,77	GOOD AND ABOVE
d1-4-3-95	**Kannaviou**	0,86	0,98	0,99	0,85	1,00	0,93	GOOD AND ABOVE
d1-6-2-63	**Mavrokolympos**			0,75	0,76		0,75	GOOD AND ABOVE
d2-2-6-91	**Evretou**	0,92	0,64	0,89	0,91		0,84	GOOD AND ABOVE
d3-5-1-65	**Xyliatos**			0,99	0,85		0,92	GOOD AND ABOVE
d8-7-2-05	**Leukara**	1,00	0,90	0,97	1,00		0,97	GOOD AND ABOVE
d8-7-4-05	**Dipotamos**	0,33	0,75	0,66	0,77		0,63	GOOD AND ABOVE
d8-9-5-60	**Kalavasos**	0,65	0,76	0,95	0,79		0,79	GOOD AND ABOVE
d9-2-5-20	**Germasogeia**	0,44	0,37	0,57	0,67		0,51	MODERATE
d9-4-3-95	**Polemidia**	0,02	0,16	0,12	0,17		0,12	BAD
d9-6-9-10	**Kouris**	0,58	0,57	0,77	0,66		0,65	GOOD AND ABOVE
d9-6-3-17	**Pano Platres**					1,00	1,00	GOOD AND ABOVE

3.3.3.2 Chemical - Physicochemical Quality Elements

The results for the evaluation of the Chemical – Physicochemical potential of the impounded rivers (water reservoirs) monitoring stations are presented in Table 3.3.3.2-1.

According to the results, there are high values for pH in many water bodies, which are due to natural conditions, i.e. geology and geochemistry. In most cases the high values of pH are explained by the basic and ultrabasic character of the geological formation of Ophiolite Complex of Troodos (Pillow Lavas, Diabase, Gabbro, etc.).

Out of 13 monitoring stations that were evaluated, only Polemidia has a Moderate Potential, whereas Germasogia, although is classified as Above Good, its grade is closer to Above Good/Moderate boundary than the other water bodies.

Table 3.3.3.2-1: Chemical – Physicochemical Classification of impounded river (reservoirs) monitoring stations of Cyprus

Monitoring Station Code	Monitoring Station Name	pH	DO	EC	NH4-N	TP	Total Coliforms	As	B	Cr	Cu	Fe	Zn	Overall Physicochemical Potential	
d1-2-4-61	Arminou	BELOW GOOD	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,55**	**GOOD & ABOVE**
d1-3-9-50	Asprokremmos	BELOW GOOD	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,55**	**GOOD & ABOVE**
d1-4-3-95	Kannaviou	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,72**	**GOOD & ABOVE**
d1-6-2-63	Mavrokolympos	GOOD & ABOVE	MODERATE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,55**	**GOOD & ABOVE**
d2-2-6-91	Evretou	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,72**	**GOOD & ABOVE**
d3-5-1-65	Xyliatos	BELOW GOOD	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,55**	**GOOD & ABOVE**
d8-7-2-05	Leukara	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,72**	**GOOD & ABOVE**
d8-7-4-05	Dipotamos	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	BELOW GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,55**	**GOOD & ABOVE**
d8-9-5-60	Kalavasos	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	BELOW GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,55**	**GOOD & ABOVE**
d9-2-5-20	Germasogia	BELOW GOOD	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	MODERATE	BELOW GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,05**	**GOOD & ABOVE**
d9-4-3-95	Polemidia	BELOW GOOD	GOOD & ABOVE	BELOW GOOD	GOOD & ABOVE	POOR	BELOW GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**2,72**	**MODERATE**
d9-6-3-17	Pano Platres	BELOW GOOD	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,55**	**GOOD & ABOVE**
d9-6-9-10	Kouris	BELOW GOOD	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD & ABOVE	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	**3,55**	**GOOD & ABOVE**

3.3.3.3 Overall Ecological Potential

The overall Ecological Potential for the impounded rivers (water reservoirs) monitoring stations is presented in Table 3.3.3.3-1. The principles and the methodology for the assessment of the overall Ecological Potential are described in Chapters 3.1 and 3.3.2 respectively.

Out of the 13 impounded rivers evaluated, 11 were classified in Good and Above Ecological Potential, while 2 (Germasogia and Polemidia reservoirs) are below Good Ecological Potential. Germasogia reservoir was classified as Moderate and Polemidia as Bad. The limiting factor was the Biological Quality Elements in both cases.

Compared to the 1st RBMP, 4 water bodies were added to the monitoring network of impounded rivers. These were Arminou, Kannaviou, Xyliatos and Pano Platres reservoirs. All new reservoirs were classified in Good and above Ecological Potential. Concerning the water bodies monitored in both RBMPs, none of the reservoirs showed alteration in their status, apart from Germasogia reservoir. The latter was downgraded from Good and above ecological potential to Moderate ecological potential.

Table 3.3.3.3-1: Overall Ecological Potential of the impounded rivers (water reservoirs) monitoring stations of Cyprus

Monitoring Station Code	Monitoring Station Name	BIOLOGICAL QUALITY	CHEMICAL - PHYSICOCHEMICAL QUALITY	OVERALL ECOLOGICAL POTENTIAL
d1-2-4-61	Arminou	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d1-3-9-50	Asprokremmos	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d1-4-3-95	Kannaviou	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d1-6-2-63	Mavrokolympos	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d2-2-6-91	Evretou	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d3-5-1-65	Xyliatos	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d8-7-2-05	Leukara	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d8-7-4-05	Dipotamos	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d8-9-5-60	Kalavasos	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d9-2-5-20	Germasogia	MODERATE	GOOD AND ABOVE	**MODERATE**
d9-4-3-95	Polemidia	BAD	MODERATE	**BAD**
d9-6-3-17	Pano Platres	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**
d9-6-9-10	Kouris	GOOD AND ABOVE	GOOD AND ABOVE	**GOOD AND ABOVE**

3.4 LAKE WATER BODIES

As it is already mentioned in Chapter 3.3 of this report, in the first River Basin Management Plan of Cyprus the water reservoirs (impounded rivers) were characterised as heavily modified lake water bodies and they were assigned a typology. However, in the «Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans, Member State: Cyprus» it was stated that «*Reservoirs have been reported as heavily modified lakes, not as heavily modified rivers, as recommended. This limits the comparability with information from other Member States*». For that reason, it was finally decided that the water reservoirs will not be characterised as heavily modified lake water bodies, but they are assigned as heavily modified river water bodies.

Thus, according to the review and update of WFD Article 5, the lake water bodies of Cyprus now include six (6) natural lakes which are brackish or salt and (1) storage basin, which is an Artificial Water Body (Table 3.4-1).

These water bodies are highly diverse and therefore account to different typology (Table 3.4-1). One water body is characterised as salt lake due to the high values of salinity, 5 are characterized as brackish lakes with a wide range of salinity and one water body is a freshwater storage basin.

Paralimni lake has been classified as HMWB due to the significant modifications on the hydrology of the lake. In addition Achna storage basin has been classified as an AWB, since it is a manmade storage basin, created for agriculture purposes. Achna storage basin can sometime dry out, since it is structured with the objective to provide water for irrigation.

As already mentioned, the lake water bodies of Cyprus are highly diverse by means of ecological and hydrological characteristics. The dry climate of Cyprus and the characteristics of the lakes themselves, result in the creation of very dynamic ecosystems that transform through the year, but also through different years. With the exception of Achna storage basin, all lakes present a temporal character, with water available only for a few months each year, depending on precipitation. The saline and brackish character of the lakes combined with the gradual drying up of the lakes during the summer period and the following recharge in the winter season, results in continuous changes in the levels of physicochemical and chemical parameters. The constant variation of these parameters due to natural processes is not common in other lakes and therefore distinguishes these water bodies from other lakes monitored in other countries. These changes driven by natural processes generate harsh conditions for living organisms and therefore, only a limited number of species adapted to these conditions can be found in such ecosystems. These taxa are in general characterized by high salinity tolerance, short life cycles and the ability to create cysts, seeds, or zygotes that ensure the survival of the species in the highly saline and dry conditions that usually prevail in summer and autumn.

This type of lakes is not common in other countries and therefore they have not been included in the intercalibration exercise. As a result, no assessment system has been created at European scale and such an attempt is quite difficult due to the high variability of physicochemical parameters and the harsh conditions that this creates. The absence of lakes of the same type, induces the difficulty in assessing these lakes in Cyprus, since no reference sites exist and at the same time no historical data are available.

Taking into account all the above, a Contract has been recently awarded by the WDD to external consultants, for the determination of reference conditions in the lake water bodies of Cyprus and in Achna artificial water body. This includes excessive monitoring of biological and physicochemical elements and based on the results, suitable reference conditions will be proposed. The results of this project will provide the appropriate framework and basis for the future assessment of the natural lakes of Cyprus.

Table 3.4-1: Lake water bodies of Cyprus identified according to the review and update of WFD Article 5 for the 2nd RBMP. ***HM =Heavily modified, A =Artificial, - =natural water body. 1=saline lake, 2=brackish lake, 3= freshwater storage basin***

Water body code	Water body name	Area at overflow level (ha)	Mean depth (m)	WFD-type	Modified
CY_8-3-2_11_L1	Larnaka main salt lake	477.7	0,42	1	-
CY_8-3-2_17_L2	Larnaka Limni aerodromiou	3.9	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	HM
CY_7-1-2_34_L3-A	Achna	66.5	2	3	A

3.4.1 Available Data

Due to the lack of a biological assessment method, no **biological data** were collected in 2009-2013 from 6 out of 7 lakes of Cyprus. The only available data was Chlorophyll concentration from Larnaka main salt lake and Larnaka limni Orfani. In general, data concerning BQEs in the natural lakes of Cyprus are scarce and have been collected in a non-systematic way, mainly through research projects. Macrophytes (*Althenia filiformis, Ruppia maritima, Lamprothamnium papulosum, Chara spp., Zannichellia pallustris, Najas marina*), macroinvertebrates (such as *Phallocryptus spinosa, Artemia salina, Triops cancriformis cancriformis, Daphnia magna*, Baetis spp.) and limited species of fish such as *Aphanius fasciatus* (Akrotiri lake) and *Gambusia holbrooki* (Akrotiri lake) seem to have adapted to the harsh environment of some of these lakes and have been observed and reported (Table 3.4.1-1). On the other hand, there are no published data concerning phytoplankton and diatoms. In the case of Lake Paralimni, there is no published data or data from any research project referring to any group of BQE.

Biological monitoring was implemented only in the artificial lake of Achna despite the fact that it has been classified as a different type of its own. 6 samples of phytoplankton were collected by WDD (period 2009-2012) according to the methodology applied for the implementation of NMASRP (which is also implemented in impounded rivers as described in Chapter 3.3.1.1 and 3.3.2.1).

Table 3.4.1-1: Biological quality elements reported in Cyprus natural lakes in recent research projects

WB name	BQE reported	Reference
Larnaka main salt lake	Macrophytes	Manolaki & Giannouris 2011
	Macroinvertebrates	Hadjichristoforou, 2005
Larnaka Limni aerodromiou	Macrophytes	Manolaki & Giannouris 2011, Tziortzis, 2008
	Macroinvertebrates	Hadjichristoforou, 2005
Larnaka Limni Soros (Glossa)	Macrophytes	Tziortzis, 2008
	Macroinvertebrates	Hadjichristoforou, 2005
Larnaka Limni Orfani	Macrophytes	Tziortzis, 2008
	Macroinvertebrates	Hadjichristoforou, 2005
Akrotiri lake	Macrophytes	Christia et al. 2011, Tziortzis, 2008
	Macroinvertebrates	Tziortzis 2012, Chimenez 2012, Hadjichristoforou 2005
	Fish	Zogaris et al. 2012

Chemical - physicochemical data were collected from WDD for Achna lake, while DFMR collected data from Larnaka salt lakes complex and Akrotiri lake. No data were collected from Paralimni lake.

Sampling in Achna storage basin 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. No other data was available.

3.4.2 Methodology

3.4.2.1 Achna Artificial Water Body

A total of 6 phytoplankton samples were collected from Achna storage basin 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 storage basin 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.

3.4.2.1 Salt - Brackish lakes

For the rest of the lake water bodies (salt and brackish lakes), there is no straight forward methodology for the determination of Ecological Status. At this stage all the available data is presented and analysed and an indicative estimation is based on expert judgement. It is hoped that 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.

3.4.3 Results

3.4.3.1 Achna Artificial Water Body

The results of the analysis of phytoplankton samples collected from Achna artificial lake are given in Table 3.4.3.1-1. As presented on the table, Achna storage basin was consistently evaluated below good biological potential during the whole sampling period. As an overall evaluation for 2009-2012, Achna storage basin has been classified in Moderate status. However, the applicability of the NMASRP method has not been tested for artificial storage basins (much shallower than reservoirs and not connected to rivers), but only for impounded rivers, and therefore the assessment result cannot be adopted.

Table 3.4.3.1-1: Evaluation of biological quality in Achna artificial lake, using phytoplankton and the NMASRP index

Reservoir Code	Reservoir Name	2009	2010	2011	2012	OVERALL STATUS	
CY_7-1-2_34_L3-A	Achna	0.52	0.36	0.51	0.48	**0.47**	**MODERATE**

On Table 3.4.3.1-2 the results of the chemical -physicochemical assessment of Achna storage basin is presented. According to these results, the chemical -physicochemical quality of Achna storage basin can be characterised as Above Good.

Table 3.4.3.1-2: Evaluation of chemical -physicochemical quality in Achna artificial lake

Monitoring Station Code	Name	pH	DO	EC	NH4-N	TP	Total Coliforms	As	B	Cr	Cu	Fe	Zn	Overall Physico-chemical Status	
d1-2-4-61	Achna	BELOW GOOD	ABOVE GOOD	ABOVE GOOD	ABOVE GOOD	ABOVE GOOD	ABOVE GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	3,55	ABOVE GOOD

Since Achna Artificial Storage Basin is the only water body of this type in Cyprus, there is no overall assessment of the ecological potential of this water body. The above described results give an indication of the quality status, but at this stage they cannot be used for a reliable assessment of the overall ecological potential of the water body. Thus, it was decided that the ecological potential of Achna storage basin at this stage will be set as unknown.

It is expected that the results of the WDD project for the determination of reference conditions in the lake water bodies of Cyprus and in Achna artificial water body will provide the appropriate framework and basis for the future assessment of Achna lake.

3.4.3.2 Salt - Brackish lakes

3.4.3.2.1 Larnaka main salt lake

The analysis of the physicochemical data in Larnaka salt lake complex, as presented in Figures 3.4.3.2-1 to -7, clearly shows the well-established variability pattern known in temporary saline and brackish lakes. The inflow of freshwater from the drainage area of the lake during winter, increases water depth and reduces salinity values. This inverse correlation pattern is constant during the dry periods of the year. The raise of temperature and the reduction of freshwater inflows, leads to the evaporation of water, the lowering of water level and the consequent rapid increase of salinity values.

The high seasonal variability of hydrological and physicochemical parameters creates a unique and quite hostile environment for biological communities and this is also made obvious from the data analysis. In Figure 3.4.3.2-1 the monitoring results from monitoring station 3 in Larnaka main salt lake are presented. This monitoring station presents the lowest water level of all monitored stations and therefore a more complete data series was available. According to the results, water depth ranged from 0 to 102 cm (March 2012), while temperature ranged between 7.9°C and 35.9 °C. These variations resulted in an inverse variation of salinity. The lowest salinity value was 38‰ recorded on December 2009 and the highest 360‰ on August 2012.

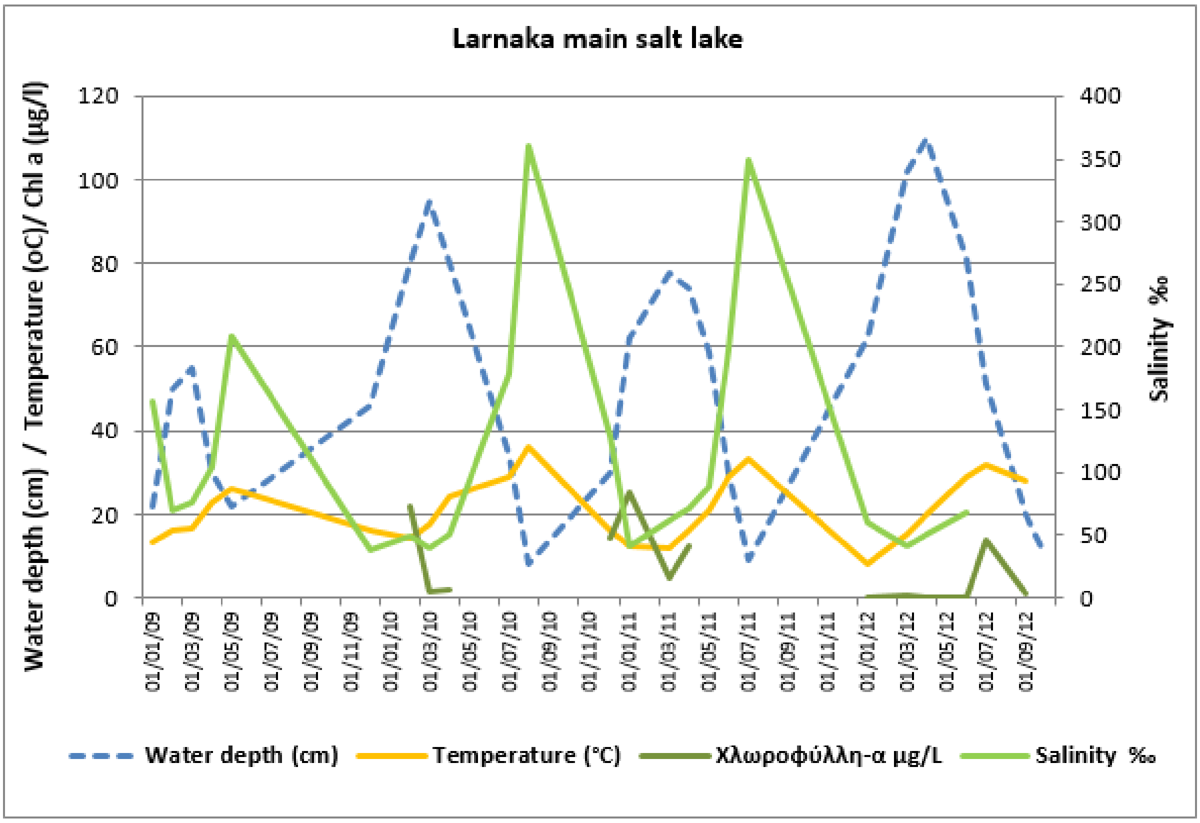


Figure 3.4.3.2-1: The relationship between water availability (depth), temperature, Chl a concentration and salinity in Larnaka main salt lake (Station 3). The main characteristic is the temporal pattern of inverse variation between water depth and temperature/salinity. Dry periods are not shown in the graph.

Nutrient concentration levels were also monitored in Larnaka main salt lake (Figures 3.4.3.2-2 to 3.4.3.2-6).

A negative trend in nutrient concentration was recorded, with gradually decreasing values in all parameters. This is made obvious in the following figures for both phosphorus and nitrogen. High concentrations of ammonium (up to 41.93μmole/l) were recorded, especially in 2009 and 2010, a possible indication of sewage disposal into the lake. Similarly high values of nitrates were recorded at the same period. In general, all nutrients showed higher values in 2009 and gradually decreased in the following years (see regression lines in figures).

Chl a values reached high values in certain occasions, indicating that that the main salt lake is a highly productive ecosystem. No correlation was obvious with any parameter although some correlation seems to exist with nutrients. This was only slightly expected since the time series on Chlorophyll-a data were quite limited. Primary productivity depends on a number of parameters and extended data on light intensity, nutrients concentration and Chl-a concentration is needed in order to draw reliable conclusions.

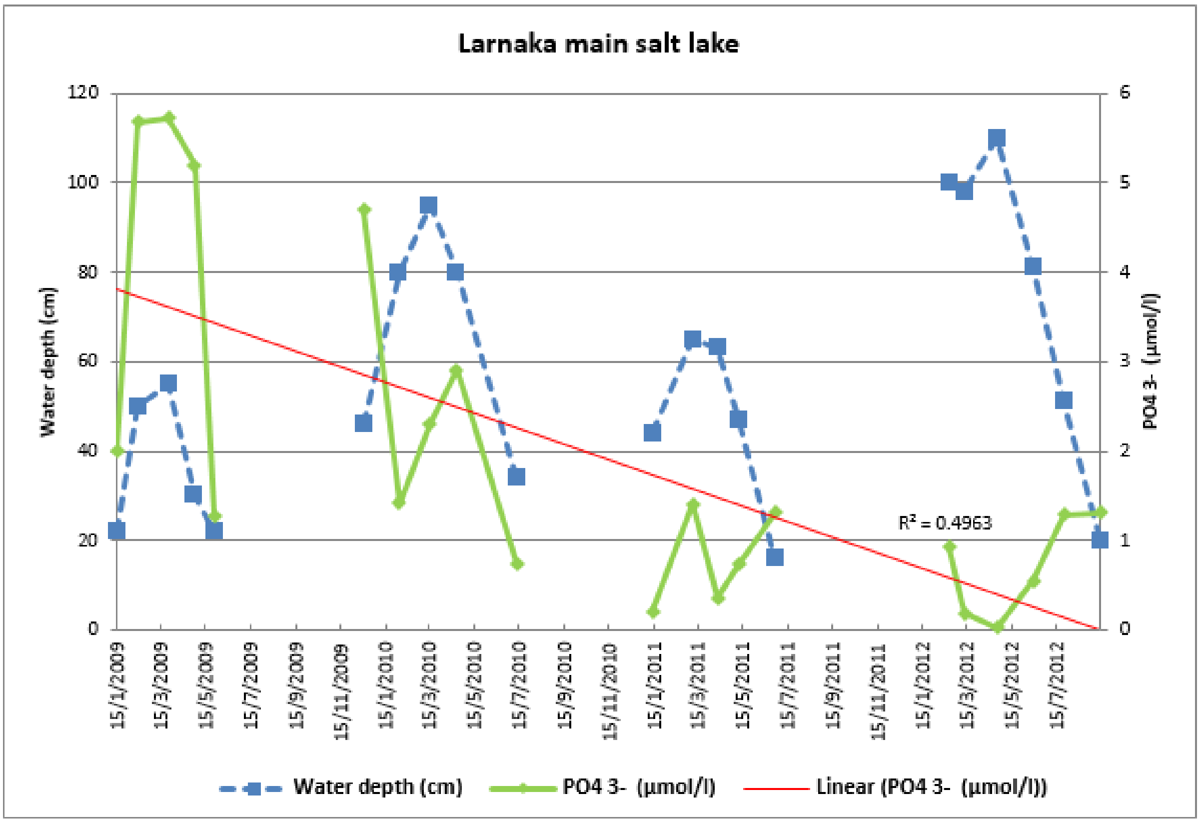


Figure 3.4.3.2-2: Phosphate values in relation to water level in Larnaka main salt lake. Red line represents the linear regression of data. R^2 is also provided.

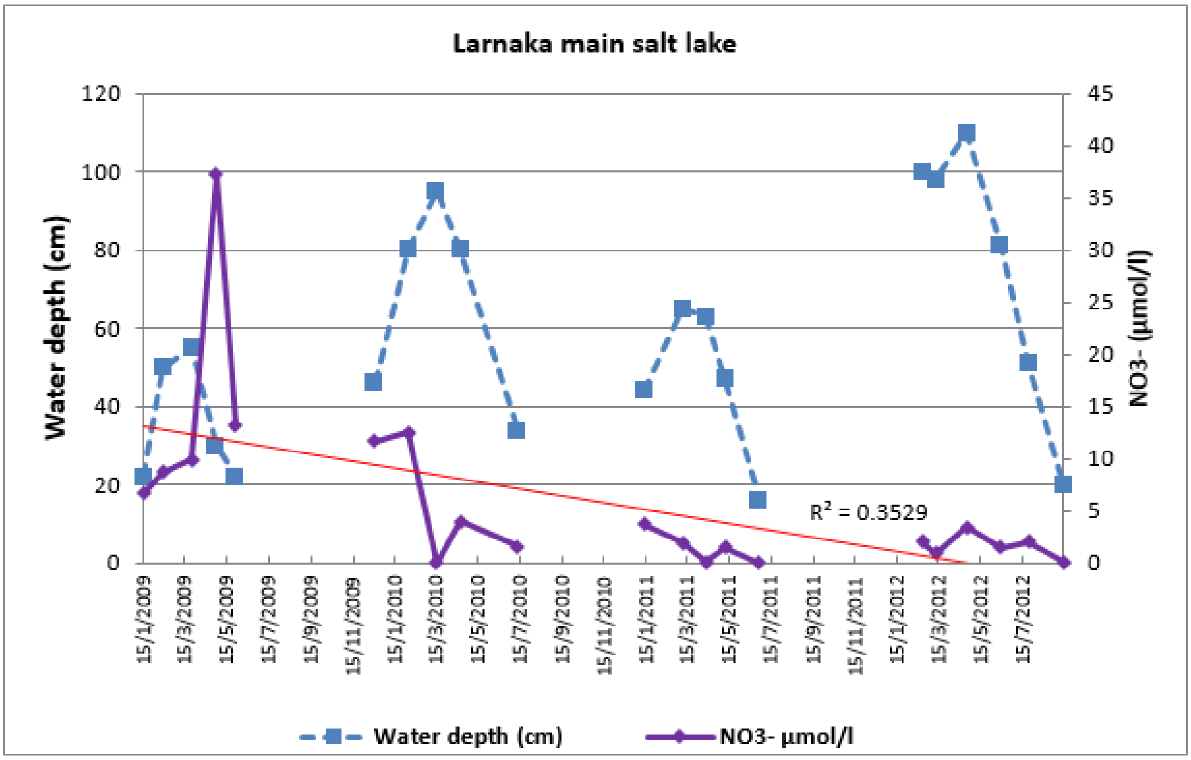


Figure 3.4.3.2-3: Nitrate values in relation to water level in Larnaka main salt lake. Red line represents the linear regression of data. R^2 is also provided.

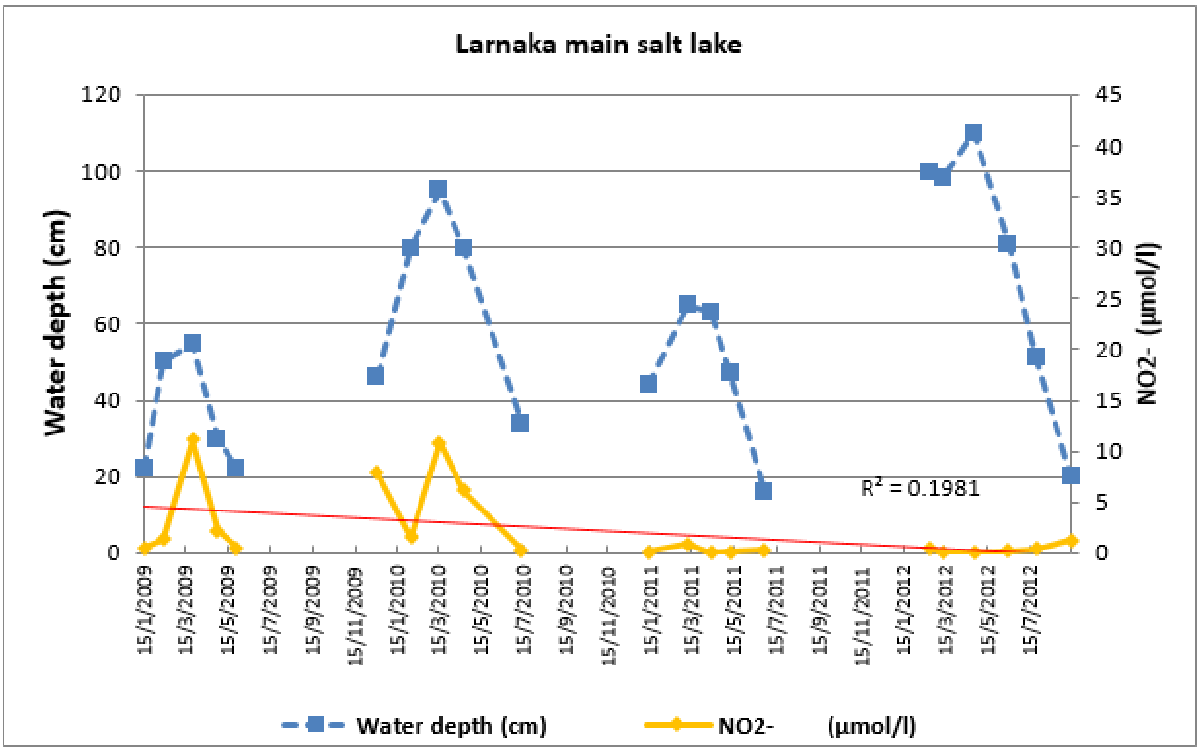


Figure 3.4.3.2-4: Nitrite values in relation to water level in Larnaka main salt lake. Red line represents the linear regression of data. R^2 is also provided.

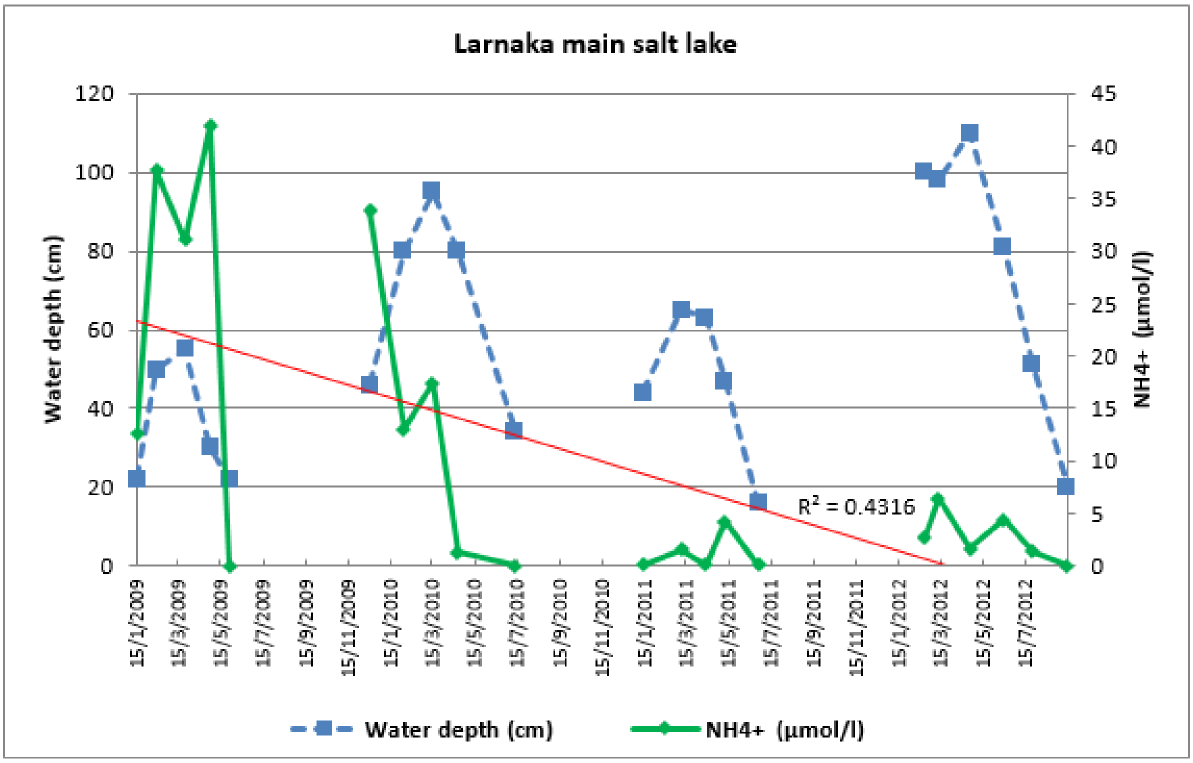


Figure 3.4.3.2-5: Ammonium values in relation to water level in Larnaka main salt lake. Red line represents the linear regression of data. R^2 is also provided.

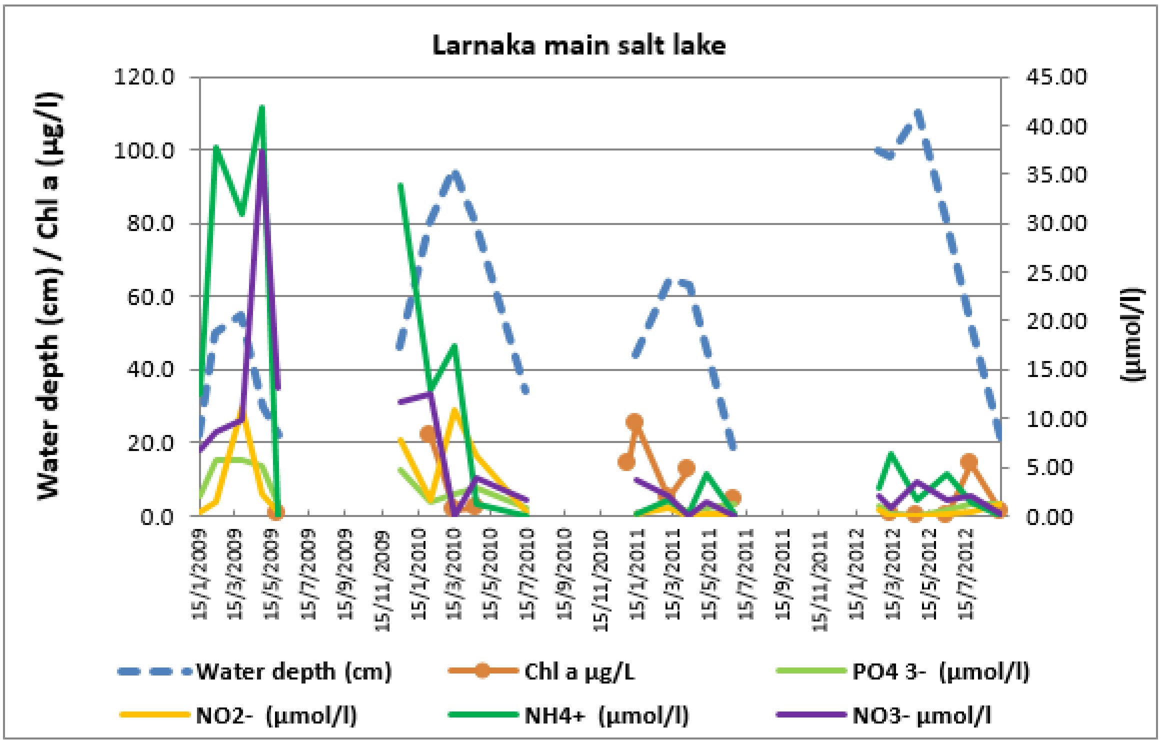


Figure 3.4.3.2-6: Overview of nutrient concentrations and Chlorophyll a in Larnaka main salt lake

Finally, the analysis of pH values confirmed the alkaline character of the lake since pH ranged between 6.8 to 10. The pH values were systematically consistent with water level variation (Figure 3.4.3.2.1-7). Higher pH values were recorded during high water level, while low pH values were recorded during dry periods. This is assumed to occur due to dissolution of carbonate salts such as Na_2CO_3 and $CaCO_3$ during freshwater inflows into the lake and the consequent release of OH^-.

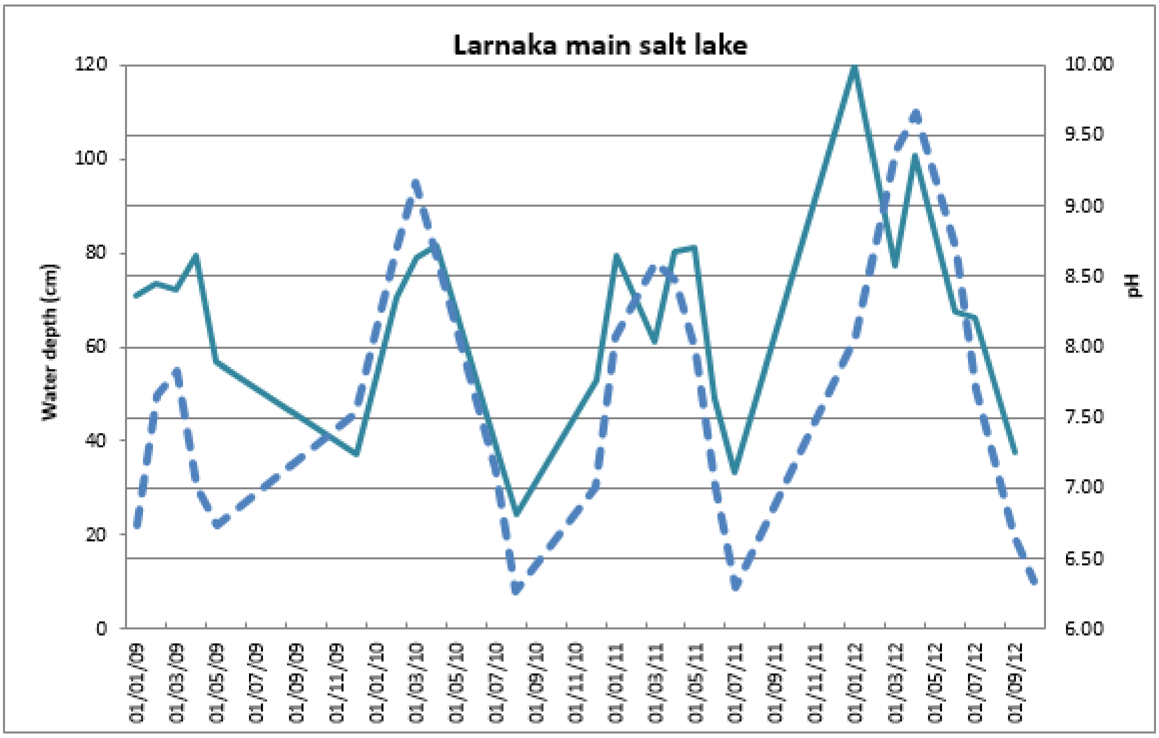


Figure 3.4.3.2-7: pH variation in relation to water level in Larnaka main salt lake.

3.4.3.2.2 *Larnaka limni Orfani*

The same seasonal pattern of water depth and salinity variation was observed in Orfani lake. Salinity was generally lower and therefore the lake is considered brackish (Figure 3.4.3.2-8). Water depth ranged from 0 to 82cm in February 2010, while salinity was significantly lower than the adjacent Larnaka main salt lake with values ranging between 10‰ and 144‰.

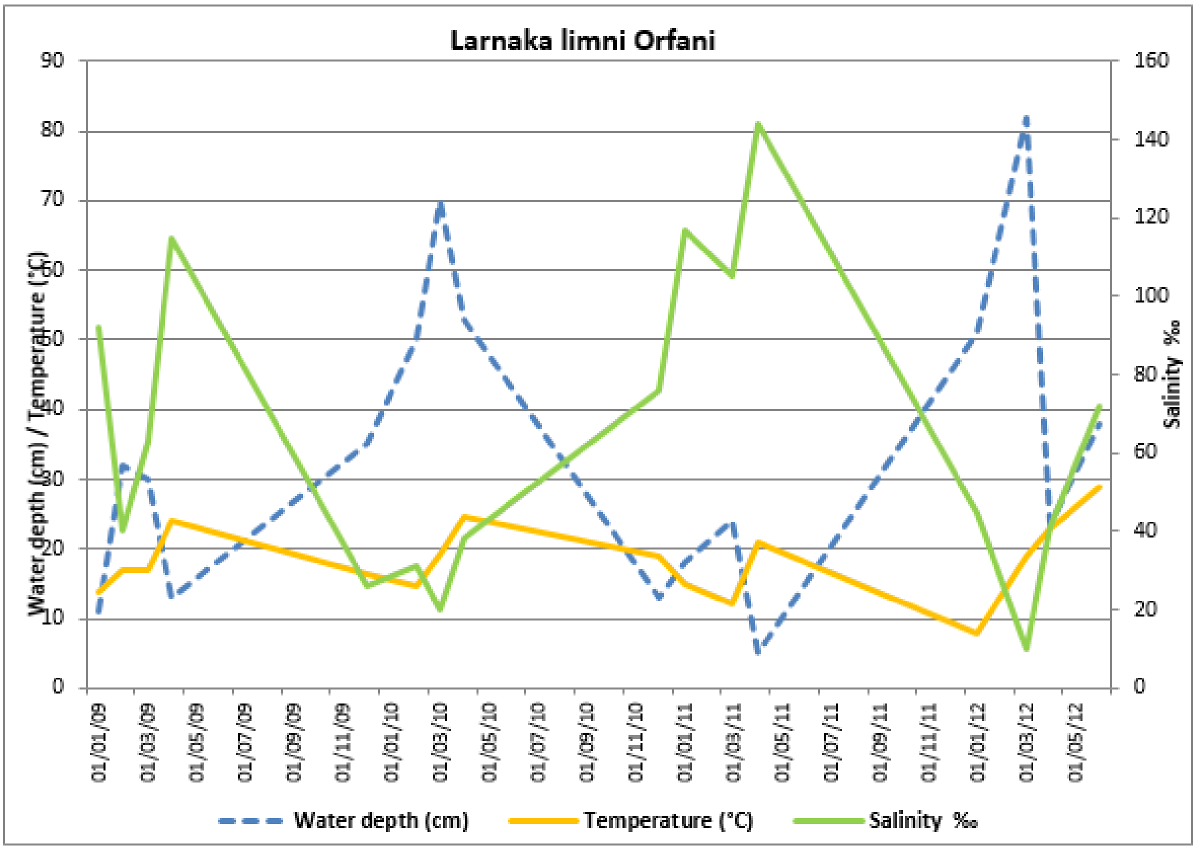


Figure 3.4.3.2-8: The relationship between water availability (depth), temperature and salinity in Larnaka limni Orfani. Dry periods are not shown in the graph.

Nutrient levels were also investigated in Orfani lake (Figures 3.4.3.2-9, -13). The same pattern of high nutrient levels in 2009 and 2010, especially for ammonium and nitrates was observed, while the following years concentrations were lower. As in the main salt lake, ammonium was the dominant form of nitrogen in Orfani lake too. Chlorophyll-a data was scarce and conclusions cannot be extracted by such a small data series. Concentration of Chl-a was very low although in some occasions high values were recorded (December 2010).

In general, it is assumed that ammonium is the main source of nitrogen inflow in both lakes since it seems to increase in cases of freshwater inflow in the lakes. In addition, nitrogen levels seem to increase upon ammonium decrease, implying that a significant amount of nitrates occurring in the lake, are produced by the oxidation of ammonium, a process known as nitrification. The abovementioned observations confirm the need of managing the quality of inflows into the whole Larnaka lake complex and especially detect illegal sewage disposals into the lakes.

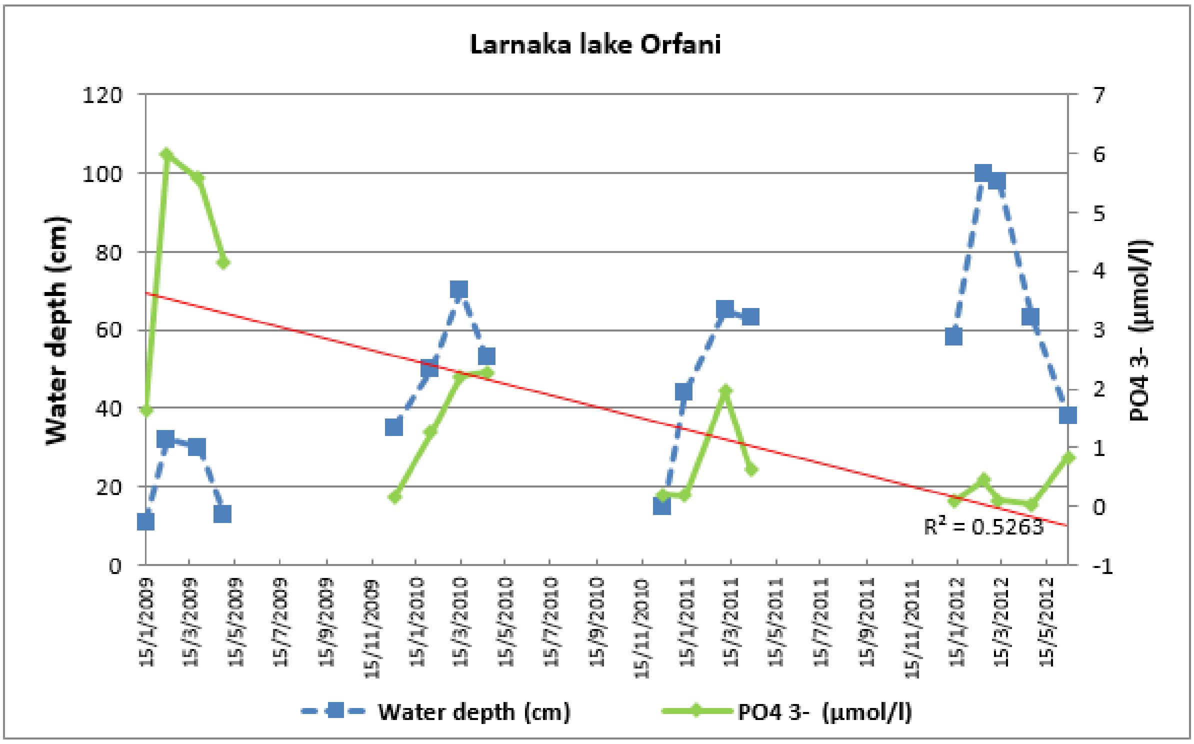


Figure 3.4.3.2-9: Phosphates values in relation to water level in Orfani lake. Red line represents the linear regression of data. R^2 is also provided.

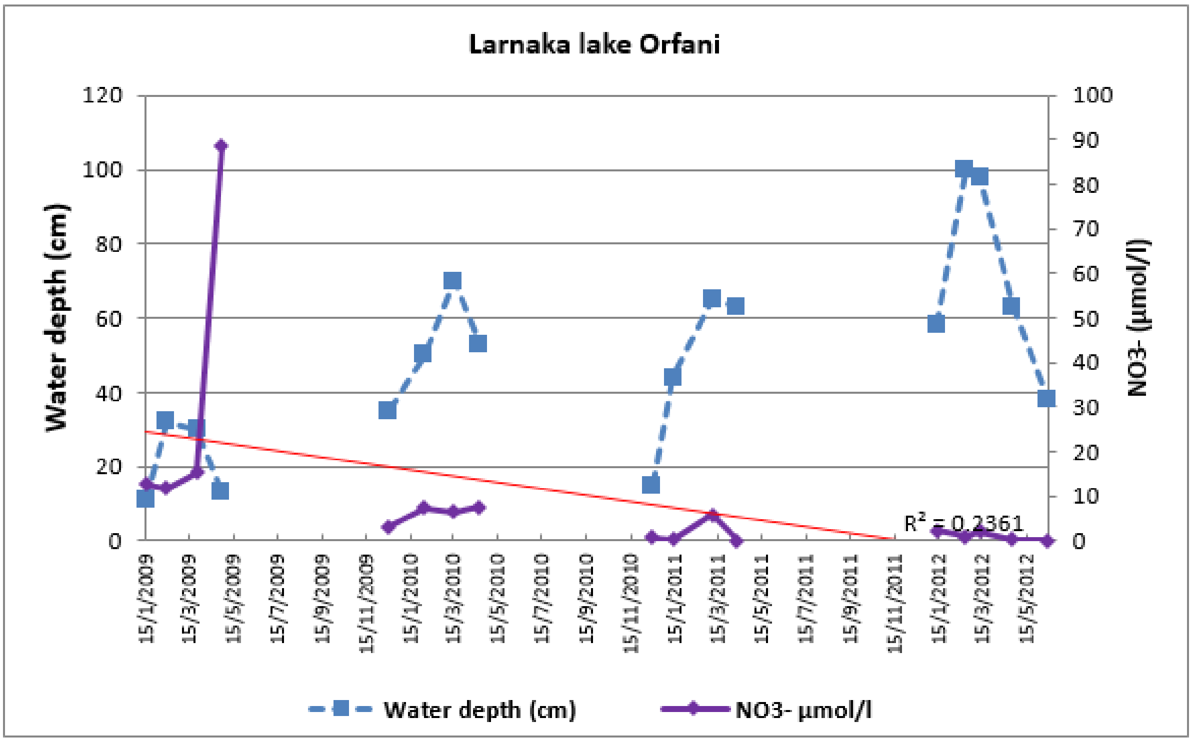


Figure 3.4.3.2-10: Nitrate values in relation to water level in Orfani lake. Red line represents the linear regression of data. R^2 is also provided.

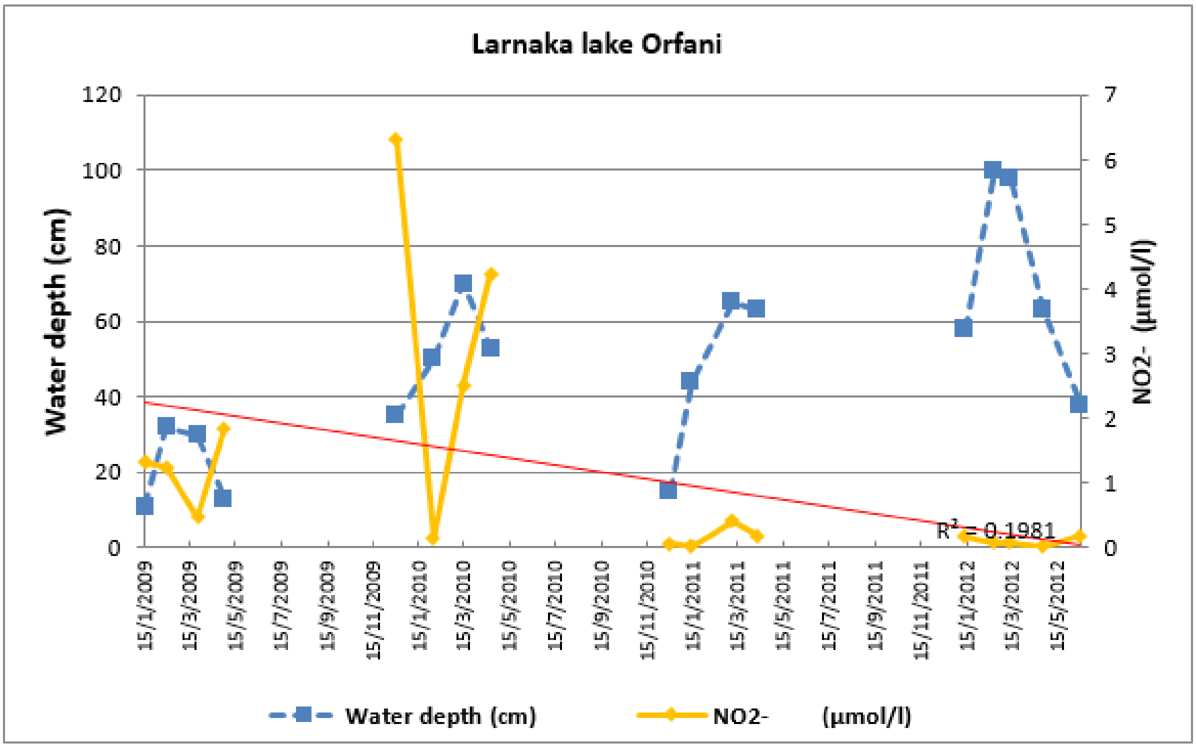


Figure 3.4.3.2-11: Nitrite values in relation to water level in Orfani lake. Red line represents the linear regression of data. R^2 is also provided.

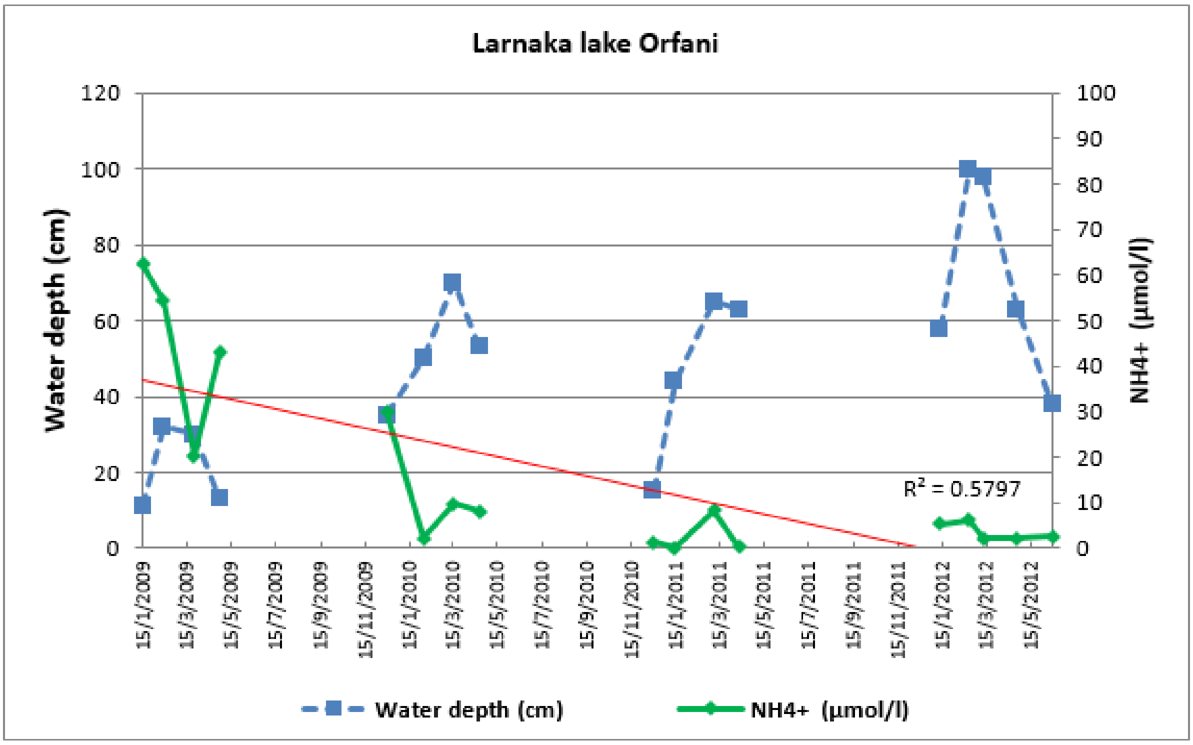


Figure 3.4.3.2-12: Ammonium values in relation to water level in Orfani lake. Red line represents the linear regression of data. R^2 is also provided.

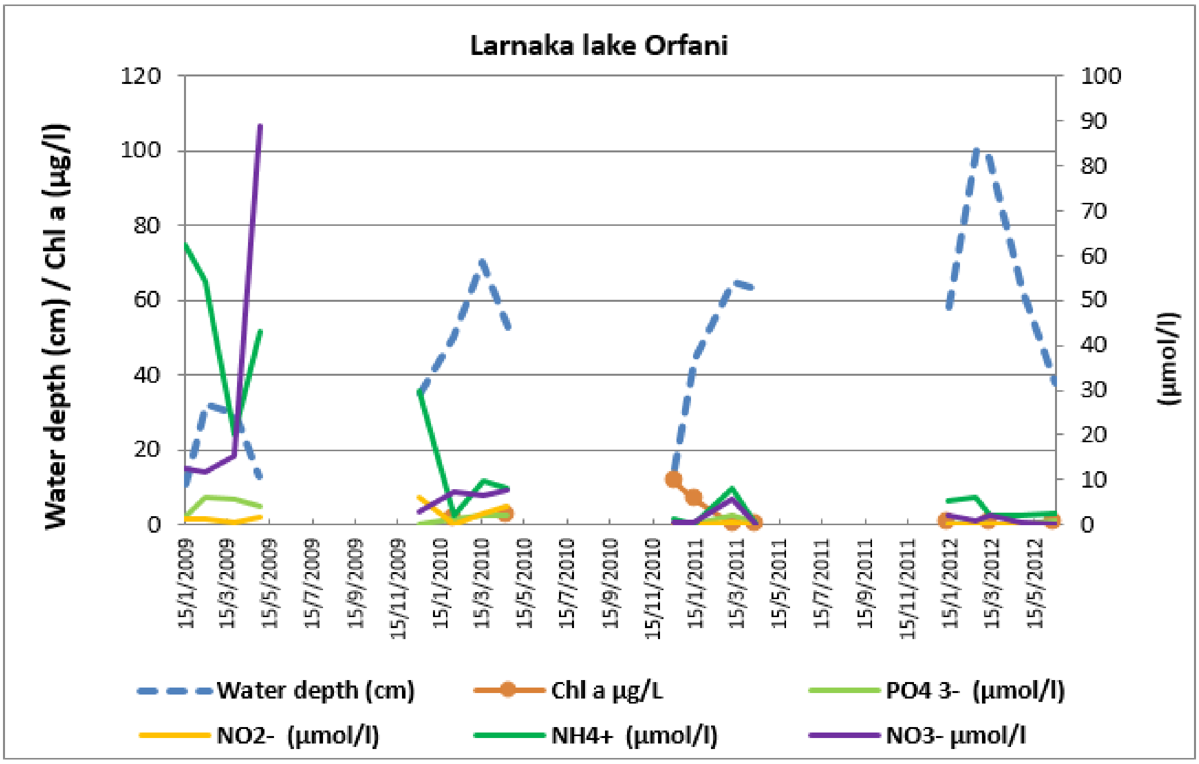


Figure 3.4.3.2-13: Overview of nutrient and Chlorophyll-a concentration in Orfani lake.

In addition, pH values in Orfani lake also showed consistency with water level variation, although some differentiation was observed. Values ranged mostly above 7, confirming the lake's alkaline character (Figure 3.4.3.2-14).

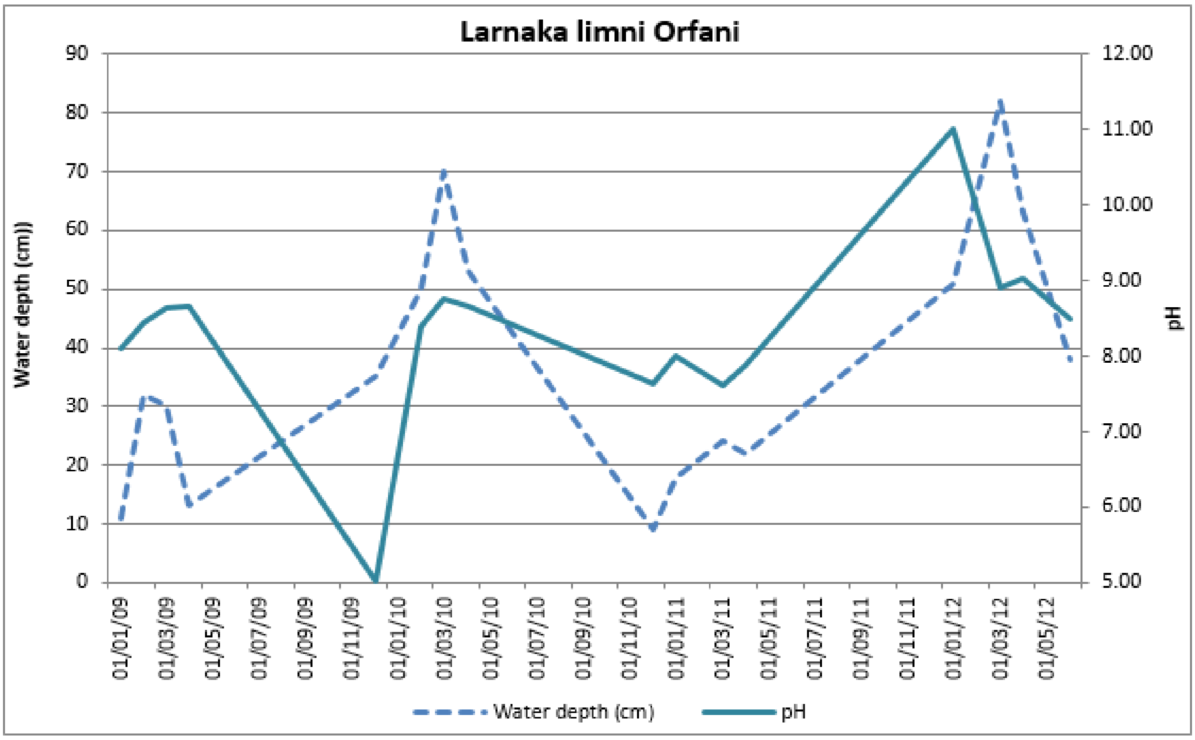


Figure 3.4.3.2-14: pH variation in relation to water level in the alkaline Orfani lake.

Finally, the variation of temperature and water depth in conjunction with salinity was monitored in lakes Limni aerodromiou and Limni Soros (Figures 3.4.3.2-15, -16). Both lakes present the typical variation of water availability and salinity with high water level and low salinity values during the wet period of the year, while during the dry season high salinity and low water depth are observed.

In Limni Aerodromiou, a high variation of salinity was recorded ranging from 12‰ to 261‰. The high salinity values can be attributed to the lake's proximity and communication with the main salt lake. Water depth was low compared to other lakes reaching a maximum of only 45cm.

On the other hand the conditions in lake Soros are highly relevant with the adjacent lake Orfani. Salinity values were lower, ranging from 20‰ to 160‰, while depth reached 102 cm in March 2012.

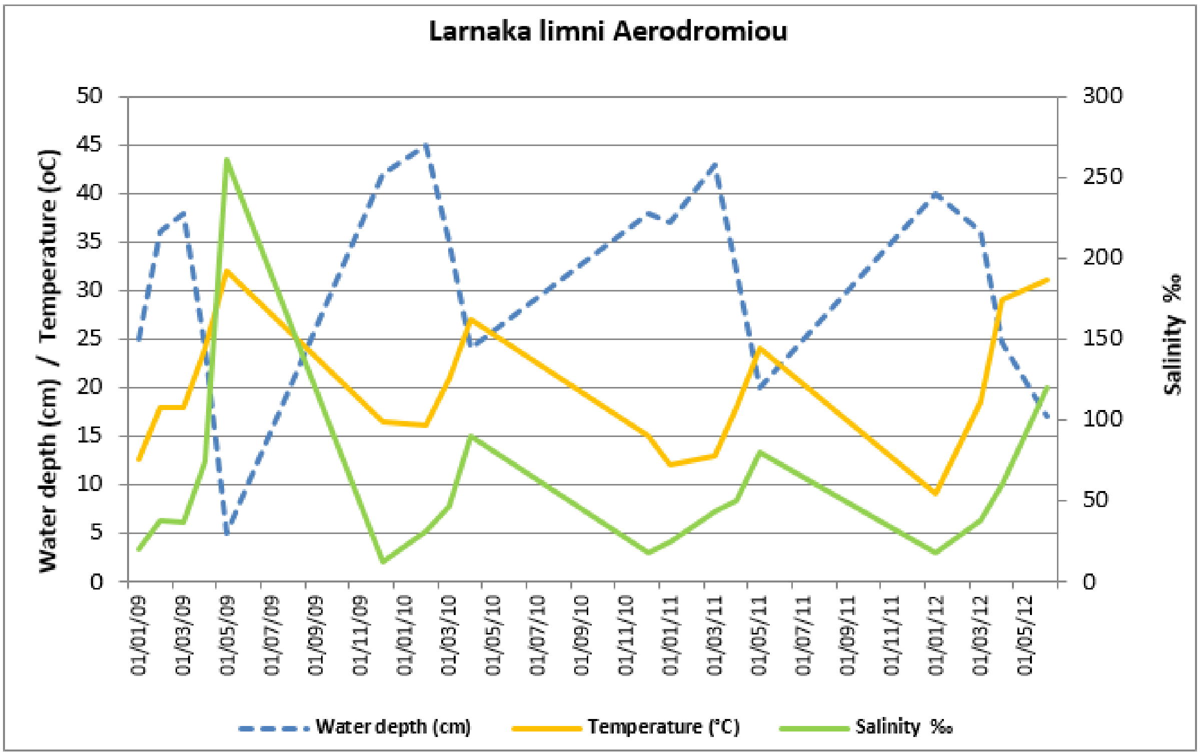
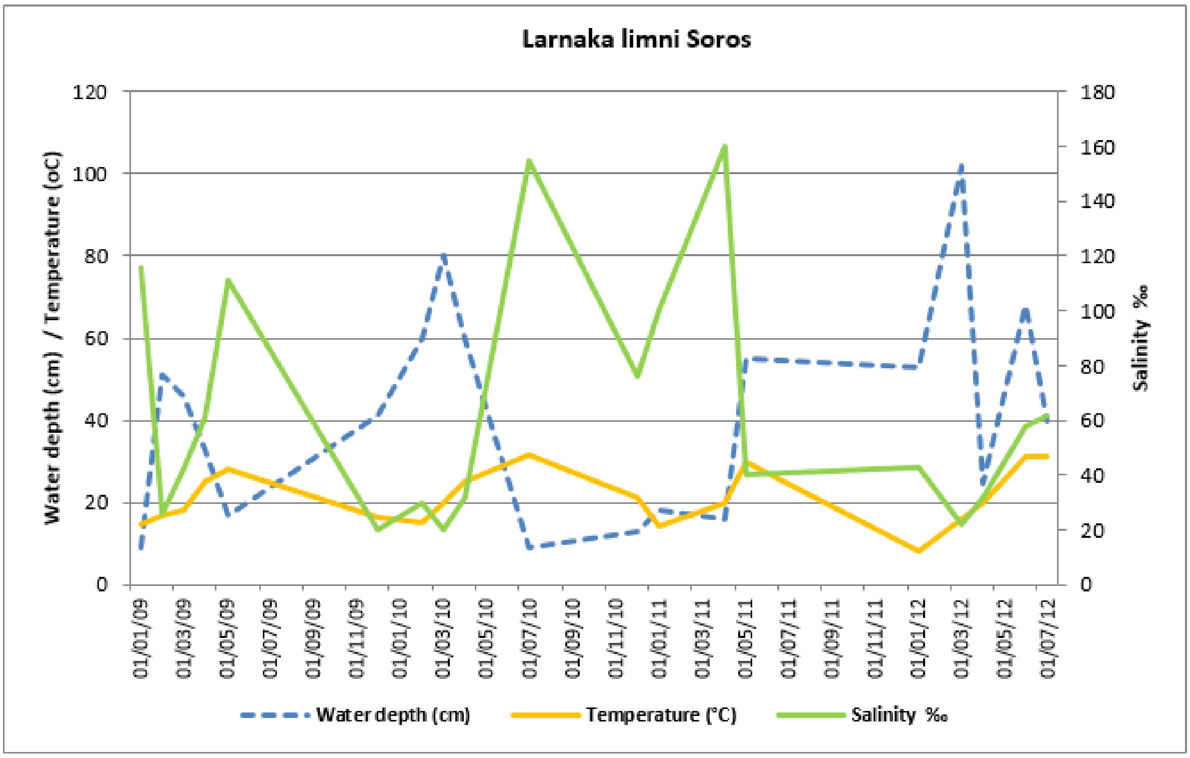


Figure 3.4.3.2-15: The relationship between water depth, temperature and salinity in Larnaka limni Aerodromiou.



<u>Figure 3.4.3.2-16: The relationship between water availability (depth), temperature and salinity in Larnaka limni Soros.</u>

Based on the presentation and analysis of the available data, the brackish and salt lakes in Larnaka salt lake complex represent a highly variable environment, with constantly changing conditions that create inappropriate conditions for the survival of most species. The remarkable shifts in salinity, temperature and water availability in a restricted timeframe, creates a hostile but also unique environment, difficult to be monitored and assess using conventional methodologies.

Akrotiri lake shows similar characteristics to lakes Orfani and Soros (Figure 3.4.3.2-17). High salinity values up to 80‰ and low water level. Salinity gradient responds to water inflow as observed in all monitored lakes in Cyprus.

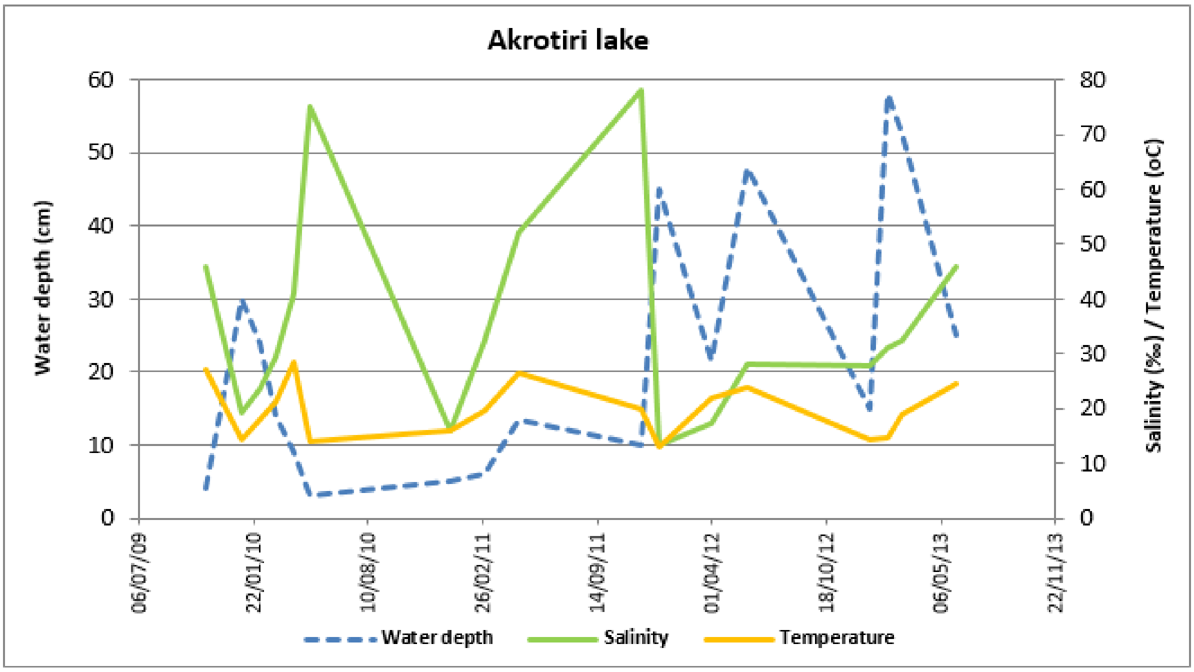


Figure 3.4.3.2-17: The relationship between water availability (depth), temperature and salinity in Akrotiri lake.

3.4.4 Overall Ecological Assessment

The absence of a methodology for the biological monitoring of natural lakes in Cyprus, in addition to the absence of biological data, as well as the limited data concerning physicochemical parameters, render at this stage the assessment of ecological status impossible. The absence of a national methodology is of course a result of the unique nature of Cyprus salt and brackish lakes, which as seen by the available data presented above, clearly differentiate them from natural freshwater lakes or impounded rivers. In the light of the above and the absence of historical data, the assessment of the natural lakes of Cyprus at this stage can only be based on experts' judgment.

All natural lakes in Cyprus are facing various types of pressures such as:

- Fragmentations due to the creation of infrastructure (i.e airport in Larnaka salt lake complex, roads, harbours,)
- Intensive and extensive agriculture - extensive use of pesticides
- Trespassing
- Hydrological alterations such as water abstraction
- Water pollution due to agricultural, urban and industrial runoff
- Landfills in adjacent areas
- Rapid urban expansion
- Damage in aquatic habitats

All of the above have negative effects for the water quality, habitats quality and the ecosystem health. Threats on habitats are obvious and therefore management measures are needed in order to protect and preserve these water bodies. Water level management is the main priority in some water bodies i.e. Paralimni lake, while control of pollution sources such as household sewage disposal and urban wastewater seems to be crucial for Larnaka main salt lake, Larnaka Orfani lake, and Akrotiri lake.

Therefore, since there are identified pressures in all the salt and brackish lakes and management measures are considered a priority, the salt and brackish lakes of Cyprus have been classified in Moderate status, apart from Paralimni where there is no monitoring data at all and therefore its status was set to unknown.

In any case, intensive monitoring is needed in all water bodies and the elaboration of assessment methods compliant with the water bodies' characteristics is also a priority. The WDD Contract for the determination of reference conditions in the lake water bodies of Cyprus will provide a tool for the accomplishment of this target.

CHAPTER 4. CHEMICAL STATUS OF MONITORING STATIONS FOR RIVER AND LAKE WATER BODIES

4.1 RIVER WATER BODIES (INCLUDING IMPOUNDED RIVERS)

4.1.1 Available Data

The available data from the Surface Water Monitoring Programme established under WFD Article 8 was provided by the Division of Hydrometry of Water Development Department (WDD). The available data for priority substances at river water bodies chronologically range between 11/11/2009 and 23/05/2013. The respective chronological range for the impounded rivers is between 16/2/2010 and 26/03/2013. The substances that are being monitored per station are given in Tables 4.1.1-1 and 4.1.1-2.

Substances not monitored through the Surface Water Monitoring Programme are:

- Brominated diphenylether
- C10-13 Chloroalkanes
- Isodrin (from Cyclodiene pesticides)
- Nonylphenol (4 Nonylphenol)
- Octylphenol (4-(1,1’, 3, 3’-tetramethylbutyl)-phenol)
- Pentachloro-benzene
- Pentachloro-phenol
- Tributyltin compounds (Tributyltin-cation)

Auxiliary data concerning the water hardness per station was provided by WDD for the above mentioned period, in order to estimate the Hardness Class per monitoring station (note 6, Annex I, Dir. 2008/105/EC), and consequently set the proper AA-EQS and MAC-EQS for each monitoring station. Data for water hardness at river (excluding impounded rivers) monitoring stations chronologically range from 9/6/2009 to 23/5/2013.

“DDT total” is the sum of 4,4-DDT, 2,4-DDT, 4,4-DDE and 4,4-DDD, according to note 8, Annex I, Dir. 2008/105/EC. Analyses for all these four substances are being performed that give separate result values per station and date.

“Endosulfan” according to the CAS number in Annex I, Dir. 2008/105/EC, constitutes from the isomers a- Endosulfan and b- Endosulfan. The available data from WDD included one value expressing the sum of a- Endosulfan and b- Endosulfan.

“DEHP” analyses are being performed, but the data were not provided by WDD due to the fact that the LOQ of the method is much greater than the EQS set for this substance.

“Hexachloro-cyclohexane” according to the CAS number in Annex I, Dir. 2008/105/EC, is technical-hexachloro-cyclohexane (t-HCH) constitutes from isomers (primarily the α, β, γ, δ, and ε isomers). Through the Surface Water Monitoring System, tests are being performed for isomers α, β and γ, so the value for t-HCH is calculated as the sum of these three.

"Trichlorobenzenes" according to the CAS number in Annex I, Dir. 2008/105/EC, constitute from the isomers 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene and 1,3,5-trichlorobenzene. Through the Surface Water Monitoring Programme, analyses are being performed for isomers 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene, so the value for Trichlorobenzenes is calculated as the sum of these two.

Table 4.1.1-1: Priority substances monitored per river monitoring station (excluding impounded rivers).

Priority Substance according Annex I of Dir. 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
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
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
29b	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

Table 4.1.1-2: Priority substances monitored per impounded river monitoring station (water reservoirs).

Priority Substance according Annex I of Dir. 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
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

Priority Substance according Annex I of Dir. 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
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

4.1.2 Methodology

The methodology for the data assessment primarily involved the evaluation of the parameter values for which the method's LOQ was greater than the EQS. Secondarily it involved the calculation of the annual averages per year, per substance and per station.

Before these data assessment primary steps, there were some other data processing issues as follows:

- In the available data for impounded rivers, the sampling points for each reservoir were two. One at the reservoir's deepest point and one at a reservoir's bank side point; the latter is being sampled only when boat access to the reservoir's deepest point is not possible. Both sites were used in the analyses and were regarded as one monitoring station.
- For selecting the Cadmium EQS per station, data for the water hardness per station and per date was used. For estimating the water Hardness Class, for each monitoring station the average of all the hardness values for the whole time series was calculated. In this way, most of the monitoring stations were found to fall into the range of Hardness Class 5, with just a few falling into the range of Hardness Class 4. The AA-EQS and the MAC-EQS is set to 0,15 and 0,9 respectively for Hardness Class 4 and to 0,25 and 1,5 for Hardness Class 5. The Hardness Class for the monitoring stations is as shown in Tables 4.1.2-1 and 4.1.2-2.

Table 4.1.2-1: Hardness Class for setting Cadmium EQS for river monitoring stations

Monitoring Station	Hardness Class	Monitoring Station	Hardness Class	Monitoring Station	Hardness Class	Monitoring Station	Hardness Class
r1-1-3-95	Class 5	r2-8-3-10	Class 5	r6-1-1-80	*Class 4*	r8-8-2-95	Class 5
r1-1-6-65	Class 5	r2-9-2-50	Class 5	r6-1-2-38	Class 5	r8-9-5-40	Class 5
r1-2-4-25	Class 5	r3-1-2-30	*Class 4*	r6-1-2-90	Class 5	r9-2-3-05	Class 5
r1-2-6-89	Class 5	r3-2-1-85	Class 5	r6-1-5-52	Class 5	r9-2-3-85	Class 5
r1-3-5-05	*Class 4*	r3-3-1-60	Class 5	r6-5-1-85	Class 5	r9-2-4-95	Class 5
r1-3-8-60	Class 5	r3-3-3-95	Class 5	r6-5-3-15	Class 5	r9-4-3-41	Class 5
r1-4-3-35	Class 5	r3-4-2-90	Class 5	r6-5-3-50	Class 5	r9-4-3-80	Class 5

Monitoring Station	Hardness Class	Monitoring Station	Hardness Class	Monitoring Station	Hardness Class	Monitoring Station	Hardness Class
r1-4-7-10	Class 5	r3-5-1-50	*Class 4*	r8-4-1-37	Class 5	r9-6-1-44	Class 5
r2-2-3-95	Class 5	r3-5-4-40	Class 5	r8-4-1-52	Class 5	r9-6-1-87	Class 5
r2-2-5-75	Class 5	r3-7-1-55	*Class 4*	r8-4-3-40	Class 5	r9-6-2-60	Class 5
r2-3-2-96	Class 5	r3-7-1-84	*Class 4*	r8-4-5-30	Class 5	r9-6-3-36	Class 5
r2-3-4-80	Class 5	r3-7-3-71	Class 5	r8-7-1-65	Class 5	r9-6-4-92	Class 5
r2-7-2-75	Class 5	r6-1-1-72	*Class 4*	r8-7-2-60	Class 5	r9-6-6-32	Class 5
						r9-6-7-70	Class 5

Table 4.1.2-2: Hardness Class for setting Cadmium EQS for impounded river monitoring stations.

Monitoring Station	Hardness Class	Monitoring Station	Hardness Class
d1-2-4-61	Class5	d8-7-2-05	Class5
d1-3-9-50	Class4	d8-7-4-05	Class5
d1-4-3-95	Class4	d8-9-5-60	Class5
d1-6-2-63	Class5	d9-2-5-20	Class5
d2-2-6-91	Class5	d9-4-3-95	Class5
d3-5-1-65	Class4	d9-6-3-17	Class5
d9-6-9-10	Class5		

- For parameters for which the values were below the method's LOQ, the value was replaced with 50% of LOQ, as specified by Directive 2009/90/EC about the technical specifications for chemical analysis and monitoring of water status.
- In case of parameters for which the final value is obtained from the sum of several other individual parameters values, for those individual values that are below the method's LOQ, the value was replaced with zero, as defined by Directive 2009/90/EC. This applies for the following substances:
    - Cyclodiene pesticides (Aldrin, Dieldrin and Endrin)
    - DDT total (4,4-DDT, 2,4-DDT, 4,4-DDE and 4,4-DDD)
    - Hexachloro-cyclohexane (α-HCH, β-HCH and γ-HCH)
    - Trichloro-benzenes (1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene).
- Finally, all the LOQs were assessed, and in the case that an LOQ was above the AA-EQS, while the result value was below the LOQ, the value was not taken into account for the final evaluation. On this issue there have been some exceptions, as agreed with WDD, which are explained as follows.
    - The LOQ of the method for Trifluralin and Chlorpyrifos analysis was 0,045 for the years 2010 to 2012, while the AA-EQS for these two substances is set to 0,03. Nevertheless, the values of these substances were taken into account in the evaluation of chemical status,

due to the fact that the method's LOQ is very close to the AA-EQS, resulting in the 50% of the LOQ being ultimately below the AA-EQS. If the 2010 to 2012 values were excluded from the evaluation, then the number of available data would be very low and the result would not be representative.

- This reasoning also applies for Cd values, for the years 2011 and 2012 for which the method's LOQ was 0,3 while the AA-EQS was set at 0,25 (for most of the monitoring stations according to the Hardness Class).
- The LOQ of the method for Hg analysis was 0,2 for the years 2011 to 2013, while the AA-EQS is set to 0,05. Nevertheless, the values of Hg were taken into account in the evaluation of chemical status, due to the fact that the 50% of the LOQ is very close to the AA-EQS. If the 2011 to 2013 values were excluded from the evaluation, then the number of available data would be very low and the result would not be representative.
- It must be noted that the values which were taken into account for the final evaluation of Trifluralin, Chlorpyrifos and Cd were all values below LOQ. These values are useful in providing an indication that there is no trend of contamination whatsoever.

- All the cases of exceedances were examined per case, and if the exceedances were due to only one extreme value with subsequent results without indication of pollution, the overall status was not set as "Failing to achieve good". These cases are indicated in the Results (par. 4.1.3).

Considering all the above data assessment and evaluation assumptions, the numbers of measurements that are excluded from the chemical status evaluation are shown in Table 4.1.2-3.

Table 4.1.2-3: Substances monitored at river monitoring stations and numbers of values not taken into account for evaluation

Priority Substance according Annex I of Dir. 2008/105/EC		CAS Number	Rivers (excluding impounded rivers)		Impounded Rivers (water reservoirs)	
			Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ	Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ
1	Alachlor	15972-60-8	●		●	
2	Anthracene	120-12-7	●	● (333 of 333)	●	● (16 of 142)
3	Atrazine	1912-24-9	●		●	
4	Benzene	71-43-2	●		●	
5	Brominated diphenylethere	32534-81-9				
6	Cadmium	7440-43-9	●	● (133 of 504)	●	● (61 of 155)
6a	Carbon tetrachloride	56-23-5	●		●	
7	C10-C13 Chloroalkanes	85535-84-8				
8	Chlorfenvinphos	470-90-6	●		●	
9	Chlorpyrifos (Chlorpyrifos-ethyl)	2921-88-2	●		●	
9a	Cyclodiene pesticides					
	Aldrin	309-00-2	●		●	
	Dieldrin	60-57-1	●		●	
	Endrin	72-20-8	●		●	
	Isodrin	465-73-6				
9b	DDT Total	N/A	●		●	
	para-para-DDT	50-29-3	●		●	
10	1,2-Dichloroethane	107-06-2	●		●	
11	Dichloromethane	75-09-2	●		●	

Priority Substance according Annex I of Dir. 2008/105/EC		CAS Number	Rivers (excluding impounded rivers)		Impounded Rivers (water reservoirs)	
			Monitored	**Not taken into account for evaluation due to LOQ>AA & Value<LOQ**	**Monitored**	**Not taken into account for evaluation due to LOQ>AA & Value<LOQ**
12	DEHP	117-81-7	●	● (All values)	●	● (All values)
13	Diuron	330-54-1	●		●	
14	Endosulfan	115-29-7	●		●	
15	Fluoranthene	206-44-0	●	● (333 of 333)	●	● (16 of 142)
16	Hexachloro-benzene	118-74-1	●	● (23 of 335)	●	● (15 of 142)
17	Hexachloro-butadiene	87-68-3	●	● (341 of 341)	●	● (143 of 143)
18	Hexachloro-cyclohexane	608-73-1	●		●	
19	Isoproturon	34123-59-6	●		●	
20	Lead	7439-92-1	●		●	
21	Mercury	7439-97-6	●	● (179 of 495)	●	● (37 of 151)
22	Naphthalene	91-20-3	●	● (3 of 341)	●	
23	Nickel	7440-02-0	●		●	
24	Nonylphenol (4-Nonylphenol)	104-40-5				
25	Octylphenol (4-(1,1′,3,3′-tetramethylbutyl)-phenol)	140-66-9				
26	Pentachloro-benzene	608-93-5				
27	Pentachloro-phenol	87-86-5				
28	Polyaromatic hydrocarbons (PAH)	N/A				
	Benzo(a)pyrene	50-32-8	●	● (333 of 333)	●	● (16 of 142)
	Benzo(b)fluor-anthene & Benzo(k)fluor-anthene	205-99-2	●	● (666 of 666)	●	● (32 of 284)

Priority Substance according Annex I of Dir. 2008/105/EC		CAS Number	Rivers (excluding impounded rivers)		Impounded Rivers (water reservoirs)	
			Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ	Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ
	Benzo(g,h,i)-perylene & Indeno(1,2,3-cd)-pyrene	191-24-2	●	● (666 of 666)	●	● (284 of 284)
29	Simazine	122-34-9	●		●	
29a	Tetrachloro-ethylene	127-18-4	●		●	
29b	Trichloro-ethylene	79-01-6	●		●	
30	Tributyltin compounds (Tributhyltin-cation)	36643-28-4				
31	Trichloro-benzenes	12002-48-1	●	● (3 of 676)	●	● (2 of 286)
32	Trichloro-methane	67-66-3	●		●	
33	Trifluralin	1582-09-8	●		●	

4.1.3 Results

4.1.3.1 River monitoring stations (excluding impounded rivers)

Out of the 41 river monitoring stations shown in Table 4.1.1-1 and 4.1.3.1-1, the results show exceedances of the EQS only in 7 monitoring stations. Exceedances at these seven monitoring stations concern the substances: Cadmium, Mercury, Nickel, Trifluralin and Lead. The overall results for the river monitoring stations (excluding impounded rivers) are shown in Table 4.1.3.1-1.

Table 4.1.3.1-1: Chemical Status per River Monitoring Station

Monitoring Station	Monitoring Station name	Chemical Status	Comments
r1-1-3-95	Chapotami near Kissousa	GOOD	
r1-2-6-89	Diarizos @ Mamonia	GOOD	
r1-3-5-05	Xeros near Lazarides	GOOD	
r1-4-3-35	Ayia u/s Kannaviou Reservoir	GOOD	
r2-2-3-95	Chrysochou near Skoulli	GOOD	
r2-2-5-75	Stavros Tis Psokas R. @ Rizokremmos	GOOD	
r2-3-2-96	Pelathousa R. (Argaki tis Limnis) @ Polis-Argaka Rd.	FAILING TO ACHIEVE GOOD	Exceedance of **Cd** due to AA-2013 (4 values) & Total AA (4 values)
r2-3-4-80	Makounta U/S Argaka Dam	GOOD	
r2-9-2-50	Kambos R. Near Ag. Varvara	GOOD	
r3-2-1-85	Marathasa U/S Kalopanagiotis Dam	GOOD	-
r3-3-1-60	Agios Nikolaos U/S Fish Farm	GOOD	
r3-3-3-95	Kargotis near Evrychou	GOOD	
r3-4-2-90	Atsas near Evrychou	GOOD	
r3-5-4-40	Elia near Vyzakia	FAILING TO ACHIEVE GOOD	Exceedance of **Cd** due to AA 2010 (5 values), & Total AA (20 values)
r3-7-1-55	Peristerona R. @ Siphilos	GOOD	* See detailed results following per river monitoring station
r3-7-1-84	Peristerona @ Peristerona	GOOD	* See detailed results following per river monitoring station
r3-7-3-71	Akaki U/S Akaki-Malounta Dam	GOOD	
r6-1-1-72	Pediaios R. @ Philani	GOOD	
r6-1-1-80	Agios Onoufrios near Kampia	GOOD	
r6-1-2-38	Pediaios near Kato Deftera	GOOD	
r6-1-2-90	Pediaios near Lefkosia	GOOD	
r6-1-5-52	Vathys @ Athalassa Park	FAILING TO ACHIEVE GOOD	Exceedance of **Hg** due to AA-2011 (1 value), Total AA (2 values) & 1 MAC in 2011
r6-5-3-15	Gialias near Nisou	GOOD	

Monitoring Station	Monitoring Station name	Chemical Status	Comments
r6-5-3-50	Gialias near Potamia	GOOD	
r8-4-1-37	Xylias River @ quarry bridge	FAILING TO ACHIEVE GOOD	Exceedance of **Cd** due to AA-2013 (1 value), Total AA (1 value) & 1 MAC in 2013 Exceedance of **Pb** due to AA-2013 (1 value) & Total AA (1 value) Exceedance of **Ni** due to AA-2013 (1 value) & Total AA (1 value)
r8-4-1-52	Xylias River d/s Sia graveyard	FAILING TO ACHIEVE GOOD	Exceedance of **Cd** due to AA-2013 (1 value), Total AA (1 value) & 1 MAC in 2013 Exceedance of **Pb** due to AA-2013 (1 value) & Total AA (1 value) Exceedance of **Ni** due to AA-2013 (1 value) & Total AA (1 value)
r8-4-3-40	Treminthos near Agia Anna	GOOD	
r8-4-5-30	Treminthos near Klavdia	GOOD	
r8-7-1-65	Syriatis R. @ Kyprovasa	GOOD	
r8-7-2-60	Syriatis near Pano Lefkara	GOOD	
r8-9-5-40	Vasilikos near Lageia	GOOD	
r9-2-3-05	Germasogeia R. @ Dierona	GOOD	
r9-2-3-85	Germasogeia near Foinikaria	GOOD	
r9-2-4-95	Gialiades (Akrounta) U/S Germasogeia Dam	GOOD	
r9-4-3-41	Garyllis R. @ Paramytha	GOOD	
r9-4-3-80	Garyllis U/S Polemidia Dam	FAILING TO ACHIEVE GOOD	Exceedance of **Hg** due to AA-2010 (1 value), Total AA (16) & 1 MAC in 2010 Exceedance of **Ni** due to AA-2010 (6 values) Exceedance of **Trifluralin** due to AA-2011 (7 values)
r9-6-1-44	Kryos R. U/S Myllomeris Waterfall	GOOD	
r9-6-1-87	Kryos @ Koilani	GOOD	
r9-6-3-36	Kouris near Kato Amiantos	FAILING TO ACHIEVE GOOD	Exceedance of **Ni** due to AA-2010 (7 values)
r9-6-4-92	Kouris @ Alassa New Weir	GOOD	
r9-6-6-32	Limnatis R. Near Ag. Mamas	GOOD	

The exceedances for each monitoring station are shown in the following Tables 4.1.3.1-2 to 4.1.3.1-10. The fluctuation of values for each substance per station for the assessed timeseries is presented graphically in Appendix 2, along with the corresponding EQS and the river flow for each date.

- **r2-3-2-96: Pelathousa R. (Argaki tis Limnis) @ Polis-Argaka Rd.**

Table 4.1.3.1-2: Exceedances at river monitoring station r2-3-2-96

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2013	0,365	0,25	4
Cadmium	AA	Total Annual Average	0,365	0,25	4

- **r3-5-4-40: Elia near Vyzakia**

Table 4.1.3.1-3: Exceedances at river monitoring station r3-5-4-40

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2010	0,516	0,25	5
Cadmium	AA	Total Annual Average	0,263	0,25	20

- **r3-7-1-55: Peristerona R. @ Siphilos**

Table 4.1.3.1-4: Exceedances at river monitoring station r3-7-1-55

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2010	0,460	0,25	2

This exceedance is due to only one high value on 21/10/2010 (0,82 μg/l), which affects the average of the two values in 2010. It was decided that the chemical status of this monitoring station was not going to be based on only one high value, considering that all the other values up to 2013 were below the EQS and the analytical method in the following years improved by lowering the LOQ and no further exceedances were detected.

- **r3-7-1-84: Peristerona @ Peristerona**

Table 4.1.3.1-5: Exceedances at river monitoring station r3-7-1-84

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2010	0,460	0,25	1

This exceedance is due to only one high value on 11/02/2010 (0,46 μg/l). As in the previous case, it was decided that the chemical status of this monitoring station was not going to be based on only one high value, considering that all the other values up to 2013 were below the EQS and the analytical method in the following years improved by lowering the LOQ and no further exceedances were detected.

- **r6-1-5-52: Vathys @ Athalassa Park**

Table 4.1.3.1-6: Exceedances at river monitoring station r6-1-5-52

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Mercury	AA	2011	0,190	0,05	1
Mercury	AA	Total Annual Average	0,100	0,05	2
Mercury	MAC	7/4/2011	0,19	0,07	-

Potential pollution sources (e.g. an industrial area) are located in the river catchment and priority substances continued to be detected after 2013.

- **r8-4-1-37: Xylias River @ quarry bridge**

Table 4.1.3.1-7: Exceedances at river monitoring station r8-4-1-37

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2013	54,25	0,25	1
Cadmium	AA	Total Annual Average	54,25	0,25	1
Cadmium	MAC	21/1/2013	54,25	1,5	-
Lead	AA	2013	142,17	7,2	1
Lead	AA	Total Annual Average	142,17	7,2	1
Nickel	AA	2013	158,29	20	1
Nickel	AA	Total Annual Average	158,29	20	1

This exceedance is due to only one high value per parameter on the 21/1/2013. The sampling was performed in order to investigate the possible pollution originating from a mine that is upstream of the sampling station. There is only one measurement at this monitoring station, since over the following months in 2013 there was no stream flow for follow up monitoring. However, the stream was included in the regular monitoring in subsequent years and the results confirmed the exceedances in the table above.

- **r8-4-1-52: Xylias River d/s Sia graveyard**

- **Table 4.1.3.1-8: Exceedances at river monitoring station r8-4-1-52**

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2013	51,59	0,25	1
Cadmium	AA	Total Annual	51,59	0,25	1

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
		Average			
Cadmium	MAC	21/1/2013	51,59	1,5	-
Lead	AA	2013	26,63	7,2	1
Lead	AA	Total Annual Average	26,63	7,2	1
Nickel	AA	2013	95,18	20	1
Nickel	AA	Total Annual Average	95,18	20	1

This exceedance is due to only one high value per parameter on the 21/1/2013. Likewise sampling station r8-4-1-37, the sampling was performed in order to investigate the possible pollution originating from a mine that is upstream the sampling station. There is only one measurement at this monitoring station, since in the following months of 2013 there was no stream flow for follow up monitoring. However, the stream was included in the regular monitoring in subsequent years and the results confirmed the exceedances in the table above.

- **r9-4-3-80: Garyllis U/S Polemidia Dam**

Table 4.1.3.1-9: Exceedances at river monitoring station r9-4-3-80

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Mercury	AA	2010	0,680	0,05	1
Mercury	AA	Total Annual Average	0,055	0,05	16
Mercury	MAC	15/12/2010	0,680	0,07	-
Nickel	AA	2010	26,813	20	6
Trifluralin	AA	2011	0,052	0,03	7

- **r9-6-3-36: Kouris near Kato Amiantos**

Table 4.1.3.1-10: Exceedances at river monitoring station r9-6-3-36

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Nickel	AA	2010	27,723	20	7

4.1.3.2 Impounded river monitoring stations

For the 13 impounded river monitoring stations shown in Table 4.1.1-2, the results from the data analyses show exceedances of the EQS only in two monitoring stations (Germasogia and Polemidia).

Exceedances at these two monitoring stations concern the substances: Cadmium, Mercury, Chlorpyrifos and Lead. The overall results for the impounded rivers monitoring stations are shown in Table 4.1.3.2-1.

Table 4.1.3.2-1: Chemical Status per Impounded River monitoring station

Monitoring Station	Monitoring Station name	Chemical Status	Comments
d1-2-4-61	Arminou Res.	GOOD	
d1-3-9-50	Asprokremmos Res.	GOOD	
d1-4-3-95	Kannaviou Res.	GOOD	
d1-6-2-63	Mavrokolympos Res.	GOOD	
d2-2-6-91	Evretou Res.	GOOD	
d3-5-1-65	Xyliatos Res.	GOOD	
d8-7-2-05	Lefkara Res.	GOOD	
d8-7-4-05	Dipotamos Res.	GOOD	
d8-9-5-60	Kalavasos Res.	GOOD	
d9-2-5-20	Germasogeia Res.	FAILING TO ACHIEVE GOOD	Exceedance of **Pb** due to AA-2012 (6 values)
d9-4-3-95	Polemidia Res.	FAILING TO ACHIEVE GOOD	Exceedance of **Cd** due to AA-2010 (2 values) Exceedance of **Chlorpyrifos** due to AA-2011 (6 values) & 1 MAC in 2011 Exceedance of **Hg** due to AA-2012 (6 values) & 1 MAC in 2012 Exceedance of **Pb** due to AA-2011 (6 values)
d9-6-3-17	Pano Platres Res.	GOOD	
d9-6-9-10	Kouris Res.	GOOD	

The exceedances per station are shown in the following Tables 4.1.3.2-2 and 4.1.3.2-3. The fluctuation of values for each substance per station for the assessed timeseries is presented graphically in Appendix 2, along with the corresponding EQS and the water level for each date.

- **d9-2-5-20: Germasogeia Res.**

Table 4.1.3.2-2: Exceedances at impounded river monitoring station d9-2-5-20

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Lead	AA	2012	7,677	7,2	6

- **d9-4-3-95: Polemidia Res.**

Table 4.1.3.2-3: Exceedances at impounded river monitoring station d9-4-3-95

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2010	0,375	0,25	2

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Chlorpyrifos	AA	2011	0,040	0,03	6
Chlorpyrifos	MAC	16/2/2011	0,125	0,1	-
Mercury	AA	2012	0,067	0,05	6
Mercury	MAC	4/9/2012	0,35	0,007	-
Lead	AA	2011	8,193	7,2	6

4.2 LAKE WATER BODIES

4.2.1 Available Data

Lake water bodies include Larnaka main salt lake, Larnaka Limni aerodromiou, Larnaka Limni Soros (Glossa), Larnaka Limni Orfani, Akrotiri salt lake, Paralimni storage basin and Achna storage basin. For the above seven (7) lake water bodies, data was provided only for three: Larnaka main salt lake, Larnaka Limni Orfani and Achna. For the rest, no priority substances monitoring is performed.

The available data on Achna storage basin was provided by the Division of Hydrometry of WDD based on the Surface Water Monitoring Programme under WFD Article 8. These data included analyses' results only on one date, 28/3/2013.

The available data on Larnaka main salt lake and Larnaka Limni Orfani was provided by the Marine Environment Division of the Department of Fisheries and Marine Research (DFMR) through the Surface Water Monitoring Programme under WFD Article 8. These data chronologically range from 31/1/2009 to 10/7/2013. The respective chronological range for Larnaka Limni Orfani is between 31/1/2009 and 14/5/2013.

The substances that were monitored at each lake water body are presented in Table 4.2.1-1.

Table 4.2.1-1: Priority substances monitored per lake water body monitoring station (excluding impounded rivers)

Priority Substance according Annex I of Dir. 2008/105/EC		CAS Number	Achna storage basin	Larnaka main salt lake	Larnaka Limni Orfani
1	Alachlor	15972-60-8	V	V	V
2	Anthracene	120-12-7	V	V	V
3	Atrazine	1912-24-9	V	V	V
4	Benzene	71-43-2	V	V	V
6	Cadmium	7440-43-9	V	V	V
6a	Carbon tetrachloride	56-23-5	V	V	V
8	Chlorfenvinphos	470-90-6	V	V	V

Priority Substance according Annex I of Dir. 2008/105/EC		CAS Number	Achna storage basin	Larnaka main salt lake	Larnaka Limni Orfani
9	Chlorpyrifos (Chlorpyrifos-ethyl)	2921-88-2	V	V	V
9a	Aldrin	309-00-2	V	V	V
9a	Dieldrin	60-57-1	V	V	V
9a	Endrin	72-20-8	V	V	V
9b	DDT Total	not applicable	V	V	V
9b	para-para-DDT	50-29-3	V	V	V
10	1,2-Dichloroethane	107-06-2	V	V	V
11	Dichloromethane	75-09-2	V	V	V
12	DEHP	117-81-7	V	V	V
13	Diuron	330-54-1	V	V	V
14	Endosulfan	115-29-7	V	V	V
15	Fluoranthene	206-44-0	V	V	V
16	Hexachloro-benzene	118-74-1	V	V	V
17	Hexachloro-butadiene	87-68-3	V	V	V
18	Hexachloro-cyclohexane	608-73-1	V	V	V
19	Isoproturon	34123-59-6	V	V	V
20	Lead	7439-92-1	V	V	V
21	Mercury	7439-97-6	V	V	V
22	Naphthalene	91-20-3	V	V	V
23	Nickel	7440-02-0	V	V	V
28	Benzo(a)pyrene	50-32-8	V	V	V
28	Benzo(b)fluor-anthene & Benzo(k)fluor-anthene	205-99-2	V	V	V
28	Benzo(g,h,i)-perylene & Indeno(1,2,3-cd)-pyrene	191-24-2	V	V	V
29	Simazine	122-34-9	V	V	V
29a	Tetrachloro-ethylene	127-18-4	V	V	V
29b	Trichloro-ethylene	79-01-6	V	V	V
31	Trichloro-benzenes	12002-48-1	V	V	V
32	Trichloro-methane	67-66-3	V	V	V
33	Trifluralin	1582-09-8	V	V	V

Substances not monitored through the Surface Water Monitoring System are:

- Brominated diphenylether
- C10-13 Chloroalkanes
- Isodrin (from Cyclodiene pesticides)
- Nonylphenol (4 Nonylphenol)
- Octylphenol (4-(1,1’, 3, 3’-tetramethylbutyl)-phenol)
- Pentachloro-benzene
- Pentachloro-phenol

- Tributyltin compounds (Tributyltin-cation)

Auxiliary data concerning the water hardness for Achna storage basin was provided by WDD for the above mentioned period, in order to estimate the Hardness Class for the monitoring station (note 6, Annex I, Dir. 2008/105/EC), and consequently set the proper AA-EQS and MAC-EQS. For Larnaka main salt lake and Larnaka Limni Orfani, the water hardness was provided by DFMR.

"DDT total" is the sum of 4,4-DDT, 2,4-DDT, 4,4-DDE and 4,4-DDD, according to note 8, Annex I, Dir. 2008/105/EC. Analyses for all these four substances are being performed to give separate result values per station and date.

"DEHP" analyses are being performed, but the data were not provided by WDD due to the fact that the LOQ of the method is much greater than the EQS set for this substance.

"Endosulfan" according to the CAS number in Annex I, Dir. 2008/105/EC, constitutes from the isomers a- Endosulfan and b- Endosulfan. The available data from DFMR included one value expressing the sum of a- Endosulfan and b- Endosulfan.

"Hexachloro-cyclohexane" according to the CAS number in Annex I, Dir. 2008/105/EC, is technical-hexachloro-cyclohexane (t-HCH) constitutes from isomers (primarily the α, β, γ, δ, and ε isomers). Through the Surface Water Monitoring Programme, analyses are being performed for isomers α, β and γ, so the value for t-HCH is calculated as the sum of these three.

"Trichlorobenzenes" according to the CAS number in Annex I, Dir. 2008/105/EC, constitute from the isomers 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene and 1,3,5-trichlorobenzene. Through the Surface Water Monitoring Programme, analyses are being performed for isomers 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene, so the value for Trichlorobenzenes is calculated as the sum of these two.

4.2.2 Methodology

The methodology for the data assessment primarily involved the evaluation of the parameter values for which the method's LOQ was greater than the EQS. Secondarily it involved the calculation of the annual averages per year, per substance and per station.

Before these data assessment primary steps, there were some other data processing issues as follows:

- For selecting the Cadmium EQS for Achna storage basin, the hardness data was utilised. For estimating the water Hardness Class, the average of all hardness values for the whole time series was calculated. In this way, Achna storage basin monitoring station was found to fall into the range of Hardness Class 5. The AA-EQS and the MAC-EQS for Hardness Class 5 is set to 0,25 and 1,5 respectively. For the two salt lake water bodies, according to DFMR the EQS was calculated based on Hardness Class 5, so ultimately the AA-EQS and the MAC-EQS for Larnaka main salt lake and Larnaka Limni Orfani is also set to 0,25 and 1,5 respectively.

- For parameters for which the values were below the method's LOQ, the value was replaced with 50% of LOQ, as specified by Directive 2009/90/EC about the technical specifications for chemical analysis and monitoring of water status.
- In case of parameters for which the final value is obtained from the sum of several other individual parameters' values, for those individual values that are below the method's LOQ, the value was replaced with zero, as defined by Directive 2009/90/EC. This applies for the following substances:
    - Cyclodiene pesticides (Aldrin, Dieldrin and Endrin)
    - DDT total (4,4-DDT, 2,4-DDT, 4,4-DDE and 4,4-DDD)
    - Hexachloro-cyclohexane (α-HCH, β-HCH and γ-HCH)
    - Trichloro-benzenes (1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene).
- Finally, all the LOQs were assessed, and in the case that a LOQ was above the AA-EQS, while the result value was below the LOQ, the value was not taken into account for the final evaluation. In the case of Mercury (Hg), where many exceedances were observed, the measurements for which 50% of the method's LOQ was equal to AA-EQS, were taken into account even though the result was below LOQ. This was decided because if all these values were not considered, then the number of values to be evaluated for the estimation of the Annual Average would be very small. This is explained in more detail in Chapter 4.2.3.
- For salt lakes, the LOQ of b-Endosulfan was slightly higher than the AA-EQS. Since Endosulfan data includes one value expressing the sum of a- Endosulfan and b- Endosulfan and the LOQ of b-Endosulfan is slightly higher than the AA-EQS, these values were not considered in the overall evaluation. It is emphasized though, that for all the analyses performed, there was no detection of the substance.

Considering all the above data assessment and evaluation assumptions, the numbers of measurements that are excluded from the chemical status evaluation are shown in Table 4.2.2-1.

Table 4.2.2-1: Substances monitored at lake monitoring stations and numbers of values not taken into account for evaluation

Annex I, Dir. 2008/105/EC No	Priority Substance	CAS Number	d7-1-2-70 Achna storage basin		Larnaka main salt lake		Larnaka Limni Orfani	
			Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ	Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ	Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ
1	Alachlor	15972-60-8	●		●		●	
2	Anthracene	120-12-7	●	● (1 of 1)	●		●	
3	Atrazine	1912-24-9	●		●		●	
4	Benzene	71-43-2	●					
5	Brominated diphenylethere	7440-43-9						
6	Cadmium	56-23-5	●		●	● (2 of 23)	●	● (1 of 19)
6a	Carbon tetrachloride	470-90-6	●		●		●	
7	C10-C13 Chloroalkanes	2921-88-2						
8	Chlorfenvinphos	309-00-2	●		●		●	
9	Chlorpyrifos (Chlorpyrifos-ethyl)	60-57-1	●		●		●	
9a	Cyclodiene pesticides	72-20-8						
	Aldrin	not applicable	●		●		●	
	Dieldrin	50-29-3	●		●		●	
	Endrin	107-06-2	●		●		●	
	Isodrin	75-09-2						
9b	DDT Total	117-81-7	●		●		●	

Annex I, Dir. 2008/105/EC No	Priority Substance	CAS Number	d7-1-2-70 Achna storage basin		Larnaka main salt lake		Larnaka Limni Orfani	
			Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ	Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ	Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ
	para-para-DDT	330-54-1	●		●		●	
10	1,2-Dichloroethane	115-29-7	●		●		●	
11	Dichloromethane	206-44-0	●		●		●	
12	DEHP	118-74-1	●	●				
13	Diuron	87-68-3	●		●		●	
14	Endosulfan	608-73-1	●		●	● (22 of 22)	●	● (21 of 21)
15	Fluoranthene	34123-59-6	●	● (1 of 1)	●		●	
16	Hexachloro-benzene	7439-92-1	●		●		●	
17	Hexachloro-butadiene	7439-97-6	●	● (1 of 1)	●	● (23 of 23)	●	● (21 of 21)
18	Hexachloro-cyclohexane	91-20-3	●		●		●	
19	Isoproturon	7440-02-0	●		●		●	
20	Lead	50-32-8	●		●		●	
21	Mercury	205-99-2	●		●	● (1 of 21)	●	● (1 of 17)
22	Naphthalene	191-24-2	●		●		●	
23	Nickel	122-34-9	●		●		●	
24	Nonylphenol (4-Nonylphenol)	127-18-4						
25	Octylphenol (4-(1,1′,3,3′-tetramethylbutyl)-	79-01-6						

Annex I, Dir. 2008/105/EC No	Priority Substance	CAS Number	d7-1-2-70 Achna storage basin		Larnaka main salt lake		Larnaka Limni Orfani	
			Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ	Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ	Monitored	Not taken into account for evaluation due to LOQ>AA & Value<LOQ
	phenol)							
26	Pentachloro-benzene	12002-48-1						
27	Pentachloro-phenol	67-66-3						
28	Polyaromatic hydrocarbons (PAH)	1582-09-8						
	Benzo(a)pyrene	15972-60-8	●	● (1 of 1)	●		●	
	Benzo(b)fluor-anthene & Benzo(k)fluor-anthene	120-12-7	●	● (2 of 2)	●		●	
	Benzo(g,h,i)-perylene & Indeno(1,2,3-cd)-pyrene	1912-24-9	●	● (2 of 2)	●		●	
29	Simazine	71-43-2	●		●		●	
29a	Tetrachloro-ethylene	7440-43-9	●		●		●	
29b	Trichloro-ethylene	56-23-5	●		●		●	
30	Tributyltin compounds (Tributhyltin-cation)	470-90-6						
31	Trichloro-benzenes	2921-88-2	●		●		●	
32	Trichloro-methane	309-00-2	●		●		●	
33	Trifluralin	60-57-1	●		●		●	

4.2.3 Results

For the 3 lake water body monitoring stations shown in Tables 4.2.1-1 and 4.2.3-1, the results show exceedances of the EQS for the two salt lakes. The overall results of the chemical status of lake monitoring stations is shown in Table 4.2.3-1.

Table 4.2.3-1: Chemical Status per Lake monitoring station

Monitoring Station name	Chemical Status	Comments
Achna storage basin d7-1-2-70	**GOOD**	
Larnaca Salt Lake	**UNKNOWN**	Exceedance of **Cd** due to AA-2009 (4 values), AA-2013 (4 values), Total AA (21 values) & 4 MAC in 2013 Exceedance of **Hg** due to AA-2009 (1 values), AA-2010 (4 values), AA-2011 (3 values), AA-2012 (6 values), AA-2013 (6 values), Total AA (20 values), & 10 MAC through the data time range
Orfani Salt Lake	**UNKNOWN**	Exceedance of **Cd** due to AA-2009 (4 values), AA-2012 (4 values), AA-2013 (4 values), Total AA (18 values), 1 MAC in 2012 & 2 MAC in 2013 Exceedance of **Hg** due to AA-2009 (1 value), AA-2010 (3 values), AA-2011 (3 value), A-2012 (4 values), AA-2013 (5 value), Total AA (16 values), & 8 MAC through the data time range

As it is observed from Table 4.2.3-1, exceedances concern only two priority substances.

In the Directive for Cadmium, the EQS values for inland surface waters (freshwater) vary depending on the hardness of the water as specified in five class categories (Class 1: EQS ≤ 0,08 for < 40 mg $CaCO_3$/l, Class 2: EQS= 0,08 for 40 to < 50 mg $CaCO_3$/l, Class 3: EQS= 0,09 for 50 to < 100 mg $CaCO_3$/l, Class 4: EQS= 0,15 for 100 to < 200 mg $CaCO_3$/l and Class 5: EQS= 0,25 for ≥ 200 mg $CaCO_3$/l). For other surface waters with hardness ≥ 200 mg $CaCO_3$/l (transitional and coastal) the EQS value is set at 0,2. Water hardness is proportional to the conductivity - salinity and thus it is not certain whether the Cd EQS can be applied in the case of Cyprus salt and brackish water lakes, where salinity is very high (up to ten times higher that seawater) and also greatly varies during the year (salinity ranges between 20 – 360 ‰ based on the water accumulation). Although the higher EQS value - water hardness is used for evaluation purposes of Cd in salt - brackish lakes (Class 5: EQS= 0,25 for ≥ 200 mg $CaCO_3$/l), the exceedances on Annual Averages that arise from the data available, must be treated with some caution. Indicatively it is mentioned that according to National Recommended Water Quality Criteria for Aquatic Life by US Environmental Protection Agency (EPA[6]), saltwater threshold for Cadmium is 8,8 μg/l (see below). Also, according to Kim K. T. et al. (2010) and Khoshgoftarmensh A. H. et al. (2002), it is reported clearly that Cd concentration is increased proportionally to salinity and especially to NaCl concentration. So in the specific area of Cyprus salt and brackish water lakes, during the period of water concentration, Cd release from the soil should be very high, thus increasing the total dissolved (Cd_T) concentration. It seems to be a very much different system to what the Directive can apply on, and especially for Cd, other methods than dissolved concentration measurement might describe better the chemical status of it.

As also explained in Chapter 4.2.2, for the Mercury data if the measurements for which the method's LOQ was higher than the EQS were not taken into account, then the number of values left would be very small and even in some cases the Annual Average would result only from one value. This would not be statistically reliable. For this reason, it was decided to take into account the values that were below the LOQ while the method's 50% LOQ was equal or less than the AA-EQS. It must be noted that exceedances were noted in both cases (i.e. (a) if these values were not taken into account and (b) if these values are taken into account) for the same years. The difference was that the value of the Annual Average was lower than the one when calculated from fewer measurement results. Unlike Cadmium, Mercury's EQS is not dependent on the water hardness according to Directive 2008/105/EC. However, due to the very high salinity conditions of these salt - brackish lakes, these exceedances again must be treated with some caution.

According to National Recommended Water Quality Criteria for Aquatic Life by US Environmental Protection Agency (EPA[7]), saltwater threshold for Cadmium and Mercury are as follows:

	Criteria Maximum Concentration	**Criterion Continuous Concentration**
Cadmium:	40 μg/l	8,8 μg/l
Mercury:	1,8 μg/l	0,94 μg/l

If the EPA thresholds were applied instead of the EQS set by Directive 2008/105/EC, then the results would be much different. For Cadmium there would be only one Continuous Concentration exceedance for Larnaka Limni Orfani in the year 2013, and no exceedance for Maximum Concentration threshold. For Mercury, there would be no exceedance of Continuous Concentration, and only one exceedance for Maximum Concentration threshold on the same date (11/5/2012) for both Larnaka main salt lake and Larnaka Limni Orfani.

Thus although the exceedances are described according to Directive 2008/105/EC EQS, they must be treated with caution, due to the very high salinity conditions of these salt - brackish lakes. In fact, taking into consideration the above mentioned references, which showed that Cd concentrations are increasing with increased salinity and Hg threshold limits are higher in high salinity aquatic environments, it is likely to be inferred that the EQS set by the Directive 2008/105/EC cannot be applied to aquatic environments with high salinity regime i.e. coastal waters and salt lakes. This is the reason that the status of these lake water bodies was set as unknown. A different assessment method must be examined for these water bodies.

The exceedances per station according to Directive 2008/105/EC EQS are shown in Tables 4.2.3-2 and 4.2.3-3 that follow.

[7] *http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm*

- **Larnaka main salt lake**

Table 4.2.3-2: Exceedances at Larnaka main salt lake monitoring station

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2009	0,32	0,25	4
Cadmium	AA	2013*	6,82	0,25	4
Cadmium	AA	Total Average	1,42	0,25	21
Cadmium	MAC	15/1/2013*	12,2	1,5	-
Cadmium	MAC	11/2/2013*	3,6	1,5	-
Cadmium	MAC	14/3/2013*	4,2	1,5	-
Cadmium	MAC	24/4/2013*	7,3	1,5	-
Mercury	AA	2009*	0,40	0,05	1
Mercury	AA	2010*	0,52	0,05	4
Mercury	AA	2011**	0,10	0,05	3
Mercury	AA	2012**	0,46	0,05	6
Mercury	AA	2013**	0,14	0,05	6
Mercury	AA	Total Average**	0,32	0,05	20
Mercury	MAC	16/12/2009*	0,4	0,07	-
Mercury	MAC	3/2/2010*	0,6	0,07	-
Mercury	MAC	17/3/2010*	0,5	0,07	-
Mercury	MAC	21/4/2010*	0,3	0,07	-
Mercury	MAC	13/7/2010*	0,7	0,07	-
Mercury	MAC	13/1/2011*	0,2	0,07	-
Mercury	MAC	19/3/2012*	0,4	0,07	-
Mercury	MAC	11/5/2012*	2,0	0,07	-
Mercury	MAC	25/6/2012*	0,2	0,07	-
Mercury	MAC	14/5/2013*	0,6	0,07	-

* The LOQ of the method for these measurements was above the EQS. Nevertheless, the value was higher than the LOQ, consequently it was taken into account for evaluation.

** The LOQ of the method for some of these measurements was above the EQS, nevertheless, the value was higher than the LOQ, and consequently it was taken into account for evaluation. The LOQ of the method for some of these measurements was above the EQS (50% LOQ=AA-EQS).

- **Larnaka Limni Orfani**

Table 4.2.3-3: Exceedances at Larnaka Limni Orfani monitoring station

Priority Substance	Exceedance (AA/MAC)	Year/Date	Value	EQS	Count of results
Cadmium	AA	2009	0,35	0,25	4
Cadmium	AA	2012	1,30	0,25	4
Cadmium	AA	2013*	10,47	0,25	4
Cadmium	AA	Total Average	2,76	0,25	18
Cadmium	MAC	19/3/2012	5,00	1,5	-
Cadmium	MAC	15/1/2013*	1,90	1,5	-
Cadmium	MAC	24/4/2013*	37,90	1,5	-
Mercury	AA	2009*	0,40	0,05	1
Mercury	AA	2010*	0,40	0,05	3
Mercury	AA	2011**	0,10	0,05	3
Mercury	AA	2012**	0,65	0,05	4
Mercury	AA	2013**	0,16	0,05	5
Mercury	AA	Total Average**	0,33	0,05	16
Mercury	MAC	16/12/2009*	0,4	0,07	-
Mercury	MAC	3/2/2010*	0,5	0,07	-
Mercury	MAC	17/3/2010*	0,3	0,07	-
Mercury	MAC	21/4/2010*	0,4	0,07	-
Mercury	MAC	13/1/2011*	0,2	0,07	-
Mercury	MAC	11/5/2012*	2,0	0,07	-
Mercury	MAC	25/6/2012*	0,5	0,07	-
Mercury	MAC	14/5/2013*	0,6	0,07	-

* The LOQ of the method for these measurements was above the EQS. Nevertheless, the value was higher than the LOQ, consequently it was taken into account for evaluation.

** The LOQ of the method for some of these measurements was above the EQS, nevertheless, the value was higher than the LOQ, and consequently it was taken into account for evaluation. The LOQ of the method for some of these measurements was above the EQS (50% LOQ=AA-EQS).

The high levels of these two heavy metals in the salt lakes can be due to various factors such as:

1) There is a doubt - as it is already mentioned- if the Directive 2008/105/EC EQS correspond to the high salinity conditions of these salt - brackish lakes according to literature and to the special weather conditions of the area and therefore these exceedances must be treated with some caution.
2) Exceedances might also be due to the low level of the water column during the sampling. The turbulence during the sampling causes the stirring up of the sediment that eventually dissolves

more deeply than only the surface Cd and Hg, and ends up being included in the water sample taken for analysis. It is noted that the minimum water level set by DFMR for sampling is 15 cm.

3) There are some pressures around these water bodies that can justify the presence of these pollutants, such as agriculture (stabilizers of fertilizers), landfill, rainwater runoff from the airport facilities and small streams passing through neighboring industrial areas.

The level fluctuation for each substance per station for the assessed time series is presented graphically in Appendix 2, along with the corresponding EQS and the water level for each date.

CHAPTER 5. OVERALL ECOLOGICAL & CHEMICAL STATUS OF RIVER AND LAKE WATER BODIES

5.1 RIVER WATER BODIES

5.1.1 Review and update of the river water body network - rivers

The text of this chapter was prepared by Mr. Gerald Dörflinger, Hydrologist at the Water Development Department.

The river typology and the river water bodies that had been used for the 1st RBMP and the 1st management cycle of the Water Framework Directive revealed significant shortcomings during the practical implementation of the Directive. The lack of knowledge about the different types of temporary rivers and their spatial extent, which are crucial for the selection of the quality elements to be used for status assessment, was identified as a major problem. Another identified shortcoming was the fact that the delineation of the management units, i.e. of the river water bodies, did not correspond sufficiently to the pressures acting on the water bodies. In light of the abovementioned shortcomings, it was decided to rectify these deficiencies by establishing a new river water body network with a new river typology.

The new WFD river water bodies are based on a stream network that has been purposely created by computer-assisted stream definition from a Digital Elevation Model. From the inital dense stream network, the watercourses to become WFD water bodies were selected through application of consistent quantitative criteria (e.g. minimum catchment area 10km^2). The resulting stream network includes 60 streams and differs from the one used for the 1st RBMP and management period as follows:

- Six rivers with a total catchment area of 104.9km^2 and a total stream length of 40.9km were added.
- 25 very small streams were removed, corresponding to a total catchment area of 83km^2; these streams have a mean catchment area of 3.4km^2.

The new river types were elaborated based on the different flow regimes present on the island by applying the Temporary Stream Regime Tool (TSR-Tool) described by (Gallart et al. 2012) to stream flow time series from 29 flow gauging stations without major impact on hydrology for the period 1985/86-2004/05 (20 years). The application of the TSR-Tool yielded the definition of the following four river types for Cyprus:

Type	Type name
P	Perennial mountain streams
I	Intermittent streams
Ih	Harsh intermittent streams
E	Ephemeral / episodic streams

It is important to highlight that the new types fit seamlessly with the results of the Intercalibration Exercise for Cyprus. In fact, there are direct relationships between the old national types, the IC types and the new national types:

Old national type (1st RBMP)	IC type	New national type (2nd RBMP)
R2 (perennial)	R-M4	P
R1, R3 (temporary)	R-M5	I (Ih streams in years when flow period allows assessment of these streams)

An essential fact in this context is that each of the old temporary types R1 and R3 included both intermittent and ephemeral rivers; obviously, only the intermittent types correspond to the R-M5 IC type because in ephemeral rivers WFD BQEs are not applicable. Another important fact is that in the Cyprus dataset that had been used for a) the determination of the national assessment systems and b) the participation in the IC exercise, there was no distinction between type R1 and type R3. On the contrary, all temporary Cyprus rivers that can be monitored for WFD BQEs were always treated together as R-M5 type and consequently, the assessment systems (boundaries, EQRs) were derived without any distinction into types R1 and R3. For Cyprus perennial rivers, the dataset that had been used for the R2 type is congruent with the streams of the new P type, because there was always good knowledge of the spatial extent of perennial rivers in Cyprus, due to the importance of these rivers for various uses from ancient times.

After the four new river types had been elaborated, they were applied to the new stream network as follows:

The working units were the historic Cyprus subcatchments that correspond to river reaches, i.e. subcatchments being ordered from the headwaters to the rivermouth without overlaps. In reaches with sufficient stream flow data for determination of the Temporary Stream Regime (TSR), their flow regime was calculated from the stream flow data and assigned directly. In ungauged reaches, their catchment characteristics were used as proxies to determine their flow regime. To this end, relationships between TSR types and several catchment characteristics were investigated in gauged catchments. Suitable criteria and thresholds were established and these, in turn, allowed assigning TSR types to ungauged stream reaches based on catchment characteristics. Catchment characteristics used were mean catchment elevation, precipitation, catchment slope, stream slope and catchment geology. The above approach was applied in a tiered procedure, assigning stream types using the most reliable and certain criteria first, in all reaches possible, and then proceeding to apply criteria with increasing uncertainty, until all reaches are classified. As final step, comprehensive inspections of the assigned stream types were undertaken. Stream type assignments were checked for their “correct” u/s to d/s succession of flow regimes, a number of experts with local knowledge were consulted for their experience regarding flow regimes in specific rivers and stream type transitions were adjusted taking into account local geology, vegetation patterns, topography, etc. The result of this component of the work were typified river reaches of the WFD river network, each reach corresponding to a single river type; the typified river reaches correspond to the Cyprus river network under near-natural hydrological conditions.

The typified river reaches were subsequently transformed into water bodies by splitting reaches where appropriate. To this end, the recommendations included in Guidance Document No. 2

(European Commission 2003) regarding iterative verification and refinement of the delineated water bodies was followed by implementing a procedure of loops, where each loop represents inspections of all catchments corresponding to WFD streams. The loops that were applied consecutively are:

i. Consideration of recommendations included in the 1st RBMP
ii. Consideration of pressures and monitoring data
iii. Checks for difference in status, using draft results from the present study
iv. Consideration of protected areas:
v. Identification of HMWBs; the 49 HMWBs designated in the 1st RBMP were again identified as HMWBs without any re-evaluation of their identificatgion criteria. In addition, HMWBs were proposed for designation in streams added to the WFD river network by this study and also in natural WBs of the 1st RBMP in cases where the WBs were provisionally found to be substantially changed in character according to Article 2.9 of the WFD.

With respect to the water bodies that cross the so-called Green Line into those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control, no splitting or else was applied at the Green Line. According to the provisions of Article 1 of Protocol No 10 on Cyprus, attached to the Treaty of Accession to the EU, the application of the acquis is suspended in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control.

The above procedure yielded the new river water body network. The final number of river water bodies is 245, including 15 impounded river HMWBs i.e. water reservoirs (see chapter 5.1.2 below). The number of water bodies in each new river type is given in the table below:

River type	River type name	no. of water bodies*
P	Perennial mountain streams	33 (3)
I	Intermittent streams	73 (9)
Ih	Harsh intermittent streams	60 (3)
E	Ephemeral / episodic streams	76 (0)
No type	No type assigned due to lack of data**	3 (0)
	Total	**245 (15)**

*) the number of impounded rivers (HMWBs water reservoirs) included in the no. of water bodies is given in parentheses.

**) these three water bodies are located entirely in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control. According to the provisions of Article 1 of Protocol No 10 on Cyprus, attached to the Treaty of Accession to the EU, the application of the acquis is suspended in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control.

New water body codes were assigned to the water bodies for their unambiguous identification and in order to avoid any mix-ups with the codes of the water bodies delineated for the 1st RBMP. The new coding system for Cyprus' river water bodies covers impounded rivers (i.e. water reservoirs) too, as these are being considered as HMWB rivers for the 2nd RBMP. The water body code consists of the concatenation of:

- Country code "CY"
- Catchment code e.g. "1-1", "1-2", etc.
- A letter, starting in each catchment with "a" and being assigned according to a defined procedure to all water bodies within a catchment
- The river type following the letter "R" for "River" (RP, RI, RIh, RE)
- Indication of a HMWB by "HM", where this applies
- Indication of an Impounded River by "IR", where this applies

All new river water bodies, except the 15 impounded river HMWBs, are presented in Table 5.1.1-1 below.

Table 5.1.1-1: River water bodies of the 2nd RBMP. The table does not include impounded rivers (i.e. water reservoirs).

AA	Water Body code	River name	River type	Occupied**	HMWB	Length [km]
1	CY_1-1-a_RP	Khapotami	P	NO	NO	5.9
2	CY_1-1-b_RI	Khapotami	I	NO	NO	17.2
3	CY_1-1-c_RIh	Khapotami	Ih	NO	NO	19.3
4	CY_1-1-d_RIh_HM	Khapotami	Ih	NO	YES*	4.8
5	CY_1-1-e_RI	Malleta	I	NO	NO	9.6
6	CY_1-2-a_RP	Dhiarizos	P	NO	NO	38.6
7	CY_1-2-b_RP	Dhiarizos	P	NO	NO	20.1
8	CY_1-2-d_RI_HM	Dhiarizos	I	NO	YES	31.3
9	CY_1-2-e_RI	Tholo Potamos	I	NO	NO	7.5
10	CY_1-2-f_RIh	Yerovasinos Potamos	Ih	NO	NO	11.2
11	CY_1-3-a_RP	Argaki tis Roudhias	P	NO	NO	42.0
12	CY_1-3-b_RI	Xeros Potamos	I	NO	NO	6.4
13	CY_1-3-c_RIh	Xeros Potamos	Ih	NO	NO	11.7
14	CY_1-3-e_RE_HM	Xeros Potamos	E	NO	YES	3.9
15	CY_1-3-f_RI	Argaki Lazaridhaes	I	NO	NO	6.5
16	CY_1-3-g_RIh	Argaki ton Lefkarkon	Ih	NO	NO	8.2
17	CY_1-4-a_RP	Ayia & Klimadhiou	P	NO	NO	13.6
18	CY_1-4-b_RI	Argaki tis Ayias	I	NO	NO	7.5
19	CY_1-4-d_RI_HM	Potamos tis Ezousas	I	NO	YES	7.4
20	CY_1-4-e_RIh_HM	Potamos tis Ezousas	Ih	NO	YES	4.8
21	CY_1-4-f_RP_HM	Potamos tis Ezousas	P	NO	YES	5.2
22	CY_1-4-g_RI_HM	Potamos tis Ezousas	I	NO	YES	5.9
23	CY_1-4-h_RIh_HM	Potamos tis Ezousas	Ih	NO	YES	8.1
24	CY_1-4-i_RI	Argaki tou Paleomylou	I	NO	NO	5.6
25	CY_1-4-j_RIh	Argakin tou Ayiou Nepiou	Ih	NO	NO	7.1
26	CY_1-4-k_RIh	Varkas	Ih	NO	NO	14.1

AA	Water Body code	River name	River type	Occupied**	HMWB	Length [km]
27	CY_1-4-L_RIh	Milarkou Potamos	Ih	NO	NO	12.9
28	CY_1-4-m_RIh	Kochatis	Ih	NO	NO	13.2
29	CY_1-5-a_RE	Limnarka	E	NO	NO	12.0
30	CY_1-5-b_RE_HM	Limnarka	E	NO	YES	1.5
31	CY_1-5-c_RE	Kochinas	E	NO	NO	7.7
32	CY_1-5-d_RE_HM	Kochinas	E	NO	YES	3.0
33	CY_1-5-e_RE	Agriokalami	E	NO	NO	7.2
34	CY_1-6-a_RIh	Mavrokolymbos	Ih	NO	NO	11.9
35	CY_1-6-c_RIh_HM	Mavrokolymbos	Ih	NO	YES	2.7
36	CY_1-6-d_RIh	Xeros	Ih	NO	NO	17.1
37	CY_1-8-a_RIh	Kalamouli (Avgas)	Ih	NO	NO	18.3
38	CY_1-8-b_RIh	Pevkos Potamos	Ih	NO	NO	15.3
39	CY_2-1-a_RE	Argaki tou Ayiou Ioanni	E	NO	NO	12.8
40	CY_2-2-a_RIh	Neraidhes & Potamos Ammadhkiou	Ih	NO	NO	21.0
41	CY_2-2-b_RI	Garillis Potamos	I	NO	NO	6.2
42	CY_2-2-c_RI	Potamos tou Stavrou tis Psokas	I	NO	NO	36.6
43	CY_2-2-d_RI	Potamos tou Stavrou tis Psokas	I	NO	NO	5.8
44	CY_2-2-f_RI_HM	Potamos tou Stavrou tis Psokas	I	NO	YES	2.7
45	CY_2-2-g_RI_HM	Khrysokhou Potamos	I	NO	YES	2.8
46	CY_2-2-h_RIh_HM	Khrysokhou Potamos	Ih	NO	YES	6.8
47	CY_2-3-a_RIh	Mirmikoph	Ih	NO	NO	15.0
48	CY_2-3-b_RIh	Argaki tis Limnis	Ih	NO	NO	8.5
49	CY_2-3-c_RI	Potamos tis Magoundas	I	NO	NO	24.7
50	CY_2-3-d_RIh_HM	Potamos tis Magoundas	Ih	NO	YES	4.0
51	CY_2-3-e_RE	Xeropotamos	E	NO	NO	7.6
52	CY_2-3-f_RP	Yialias Potamos	P	NO	NO	10.9
53	CY_2-3-g_RI	Yialias Potamos	I	NO	NO	1.1
54	CY_2-4-a_RIh	Xeros	Ih	NO	NO	4.2
55	CY_2-4-b_RIh_HM	Xeros	Ih	NO	YES	2.9
56	CY_2-4-c_RP	Maroti & Diali	P	NO	NO	6.1
57	CY_2-4-d_RI	Livadhi	I	NO	NO	8.7
58	CY_2-4-e_RIh_HM	Livadhi	Ih	NO	YES	4.0
59	CY_2-5-a_RIh	Ayios Theodoros	Ih	NO	NO	9.6
60	CY_2-6-a_RIh	Katouris	Ih	NO	NO	9.9
61	CY_2-6-b_RIh_HM	Katouris	Ih	NO	YES	5.3
62	CY_2-7-a_RI	Potamos tou Pyrgou	I	NO	NO	30.2
63	CY_2-8-a_RP	Potamos tou Limniti	P	NO	NO	33.2
64	CY_2-8-b_RI	Potamos tou Limniti	I	YES	NO	4.2
65	CY_2-9-a_RI	Potamos tou Kambou	I	NO	NO	2.4
66	CY_2-9-b_RP	Potamos tou Kambou	P	NO	NO	7.3
67	CY_2-9-c_RI	Potamos tou Kambou	I	NO	NO	2.6
68	CY_2-9-d_RIh_HM	Potamos tou Kambou	Ih	NO	YES	3.0

AA	Water Body code	River name	River type	Occupied**	HMWB	Length [km]
69	CY_2-9-e_RE_HM	Potamos tou Kambou	E	YES	YES	3.7
70	CY_3-1-a_RP	Xeros	P	NO	NO	9.9
71	CY_3-1-b_RI	Xeros	I	NO	NO	2.5
72	CY_3-1-c_RI_HM	Xeros	I	NO	YES	9.5
73	CY_3-1-d_RIh_HM	Xeros	Ih	YES	YES	4.0
74	CY_3-2-a_RP	Marathasa	P	NO	NO	15.8
75	CY_3-2-b_RP_HM	Marathasa	P	NO	YES	12.1
76	CY_3-2-c_RI_HM	Setrakhos	I	YES	YES	6.0
77	CY_3-2-d_RI	Rkondas	I	NO	NO	5.8
78	CY_3-2-e_RE	Vrountokremni Argakin	E	NO	NO	12.8
79	CY_3-3-a_RP	Ayios Nikolaos	P	NO	NO	14.8
80	CY_3-3-b_RP	Karyiotis	P	NO	NO	13.4
81	CY_3-3-c_RI	Karyiotis	I	NO	NO	11.4
82	CY_3-3-d_RP	Argaki tou Karvouna	P	NO	NO	12.6
83	CY_3-3-e_RI	Alykhnos	I	NO	NO	6.1
84	CY_3-4-a_RI	Atsas	I	NO	NO	15.3
85	CY_3-4-b_RIh	Atsas	Ih	NO	NO	2.1
86	CY_3-4-c_RIh_HM	Atsas	Ih	NO	YES	6.0
87	CY_3-4-d_RE_HM	Atsas	E	YES	YES	6.5
88	CY_3-5-a_RI	Lagoudhera	I	NO	NO	11.8
89	CY_3-5-c_RI_HM	Lagoudhera	I	NO	YES	12.6
90	CY_3-5-d_RIh_HM	Potamos tis Elias	Ih	NO	YES	13.3
91	CY_3-5-e_RI	Kannavia	I	NO	NO	15.4
92	CY_3-5-f_RI	Asinou	I	NO	NO	15.3
93	CY_3-5-g_RE	Galouropniktis Potamos	E	NO	NO	13.1
94	CY_3-6-a_RE	Xeropotamos	E	NO	NO	12.8
95	CY_3-6-b_RE	Potami	E	NO	NO	18.1
96	CY_3-6-c_RE	Komitis	E	NO	NO	19.6
97	CY_3-7-a_RI	Peristerona	I	NO	NO	53.2
98	CY_3-7-b_RIh	Peristerona	Ih	NO	NO	6.7
99	CY_3-7-c_RE	Peristerona	E	NO	NO	8.0
100	CY_3-7-d_RI	Maroullenas	I	NO	NO	12.6
101	CY_3-7-e_RI	Kambi	I	NO	NO	7.5
102	CY_3-7-f_RI_HM	Maroullenas	I	NO	YES	13.4
103	CY_3-7-g_RI	Pharmakas	I	NO	NO	13.2
104	CY_3-7-h_RI_HM	Pharmakas	I	NO	YES	3.0
105	CY_3-7-j_RIh_HM	Potamos tou Akakiou	Ih	NO	YES	4.5
106	CY_3-7-k_RE_HM	Potamos tou Akakiou	E	NO	YES	16.9
107	CY_3-7-L_RE	Korivas	E	NO	NO	10.3
108	CY_3-7-m_RE	Likythia	E	NO	NO	32.2
109	CY_3-7-n_RIh	Koutis & Aloupos	Ih	NO	NO	22.4
110	CY_3-7-o_RE	Merika	E	NO	NO	24.8

AA	Water Body code	River name	River type	Occupied**	HMWB	Length [km]
111	CY_3-7-p_RE	Kokkinitrimithia	E	NO	NO	13.6
112	CY_3-7-q_RE_HM	Serrakhis	E	YES	YES	19.3
113	CY_3-7-r_RE	Ovgos	E	NO	NO	27.7
114	CY_3-7-s_R	Ovgos	NoDat	YES	NO	37.5
115	CY_6-1-a_RIh	Pedhieos & Ayios Onouphrios	Ih	NO	NO	30.0
116	CY_6-1-c_RIh_HM	Pedhieos	Ih	NO	YES	1.0
117	CY_6-1-d_RE_HM	Pedhieos	E	NO	YES	20.3
118	CY_6-1-e_RE_HM	Pedhieos	E	NO	YES	9.1
119	CY_6-1-f_R	Pedhieos	NoDat	YES	NO	82.0
120	CY_6-1-g_RE	Kouphos	E	NO	NO	6.9
121	CY_6-1-h_RE	Argaki	E	NO	NO	9.9
122	CY_6-1-i_RE	Klemos	E	NO	NO	4.5
123	CY_6-1-j_RE_HM	Klemos	E	NO	YES*	8.6
124	CY_6-1-k_RE_HM	Katevas	E	NO	YES*	10.3
125	CY_6-1-L_RE	Kaloyeros	E	NO	NO	15.6
126	CY_6-1-m_RE_HM	Vathys	E	NO	YES	13.1
127	CY_6-1-n_RE_HM	Dhrakondias	E	NO	YES*	6.9
128	CY_6-1-o_RE	Vyzakotos	E	NO	NO	4.2
129	CY_6-1-p_RE	Almyros	E	NO	NO	24.3
130	CY_6-5-a_RIh	Yialias	Ih	NO	NO	13.0
131	CY_6-5-b_RI	Yialias	I	NO	NO	12.8
132	CY_6-5-c_RE	Yialias	E	NO	NO	18.6
133	CY_6-5-d_R	Yialias	NoDat	YES	NO	40.7
134	CY_6-5-e_RIh	Koutsos	Ih	NO	NO	8.6
135	CY_6-5-f_RIh_HM	Koutsos	Ih	NO	YES	6.2
136	CY_6-5-g_RE	Argaki ton Villourkon	E	NO	NO	9.5
137	CY_6-5-h_RE	Alykos	E	NO	NO	31.2
138	CY_6-5-i_RE	Almyros	E	NO	NO	20.9
139	CY_7-2-a_RIh	Vathys	Ih	NO	NO	6.6
140	CY_7-2-b_RE	Liopetri	E	NO	NO	5.7
141	CY_7-2-c_RE_HM	Liopetri	E	NO	YES	2.5
142	CY_8-1-a_RE	Avdellero	E	NO	NO	6.7
143	CY_8-1-b_RE_HM	Avdellero	E	NO	YES	6.8
144	CY_8-2-a_RE	Aradippou	E	NO	NO	32.6
145	CY_8-2-b_RE_HM	Aradippou	E	NO	YES*	5.2
146	CY_8-3-a_RE	Kalo Chorio	E	NO	NO	7.4
147	CY_8-3-b_RE		E	NO	NO	3.7
148	CY_8-4-a_RE	Ammos & Kalamoulia	E	NO	NO	19.4
149	CY_8-4-b_RE	Xylias	E	NO	NO	8.6
150	CY_8-4-c_RE_HM	Tremithos	E	NO	YES	24.3
151	CY_8-4-d_RE_HM	Tremithos	E	NO	YES	6.8
152	CY_8-4-e_RE	Ayia Marina	E	NO	NO	2.2

AA	Water Body code	River name	River type	Occupied**	HMWB	Length [km]
153	CY_8-4-f_RE	Mosfiloti	E	NO	NO	11.6
154	CY_8-4-g_RE	Ayios Ioannis	E	NO	NO	15.2
155	CY_8-5-a_RIh	Pouzis	Ih	NO	NO	16.1
156	CY_8-5-b_RE	Pouzis	E	NO	NO	8.2
157	CY_8-5-c_RE	Xeropouzos	E	NO	NO	13.3
158	CY_8-6-a_RIh	Xeropotamos	Ih	NO	NO	18.9
159	CY_8-7-a_RI	Syrkatis	I	NO	NO	20.0
160	CY_8-7-c_RI_HM	Syrkatis	I	NO	YES	6.7
161	CY_8-7-d_RIh	Argaki tou Mylou	Ih	NO	NO	16.9
162	CY_8-7-f_RI_HM	Pendaskhinos	I	NO	YES	7.3
163	CY_8-7-g_RIh_HM	Pendaskhinos	Ih	NO	YES	9.5
164	CY_8-7-h_RE		E	NO	NO	10.5
165	CY_8-8-a_RI	Potamos tou Ayiou Mina	I	NO	NO	16.8
166	CY_8-8-b_RIh	Potamos tou Ayiou Mina	Ih	NO	NO	2.9
167	CY_8-8-c_RIh_HM	Potamos tou Ayiou Mina	Ih	NO	YES	8.1
168	CY_8-8-d_RE_HM	Potamos tou Ayiou Mina	E	NO	YES	7.4
169	CY_8-9-a_RI	Vasilikos	I	NO	NO	5.5
170	CY_8-9-b_RI_HM	Vasilikos	I	NO	YES	2.1
171	CY_8-9-c_RI	Vasilikos	I	NO	NO	33.0
172	CY_8-9-e_RI_HM	Vasilikos	I	NO	YES	9.0
173	CY_8-9-f_RIh_HM	Vasilikos	Ih	NO	YES	4.5
174	CY_8-9-g_RIh	Exovounia	Ih	NO	NO	9.7
175	CY_8-9-h_RIh	Argaki tis Asgatas	Ih	NO	NO	13.1
176	CY_9-1-a_RE	Pendakomo	E	NO	NO	7.9
177	CY_9-1-b_RIh	Argaki tou Pyrgou	Ih	NO	NO	11.0
178	CY_9-1-c_RE	Argaki tou Pyrgou	E	NO	NO	3.7
179	CY_9-1-d_RE	Argaki tou Pyrgou	E	NO	NO	2.9
180	CY_9-1-e_RE	Argaki tis Monis	E	NO	NO	10.1
181	CY_9-2-a_RI	Karydhaki	I	NO	NO	17.6
182	CY_9-2-b_RP	Ayios Pavlos	P	NO	NO	6.5
183	CY_9-2-c_RI	Potamos tis Yermasogeias	I	NO	NO	5.2
184	CY_9-2-d_RI_HM	Potamos tis Yermasogeias	I	NO	YES	2.6
185	CY_9-2-e_RI	Potamos tis Yermasogeias	I	NO	NO	5.7
186	CY_9-2-f_RI	Potamos tis Yermasogeias	I	NO	NO	9.1
187	CY_9-2-h_RIh_HM	Potamos tis Yermasogeias	Ih	NO	YES	6.4
188	CY_9-2-i_RIh		Ih	NO	NO	7.6
189	CY_9-2-j_RI	Yialiadhes	I	NO	NO	9.1
190	CY_9-2-k_RI	Yialiadhes	I	NO	NO	4.3
191	CY_9-2-L_RI_HM	Yialiadhes	I	NO	YES	2.1
192	CY_9-3-a_RE	Vathias (Ag. Athanasios)	E	NO	NO	6.9
193	CY_9-3-b_RE_HM	Vathias (Ag. Athanasios)	E	NO	YES*	5.0
194	CY_9-4-a_RE_HM	Vathias	E	NO	YES*	5.6

AA	Water Body code	River name	River type	Occupied**	HMWB	Length [km]
195	CY_9-4-b_RI	Garyllis	I	NO	NO	24.2
196	CY_9-4-c_RI	Garyllis	I	NO	NO	3.9
197	CY_9-4-e_RIh_HM	Garyllis	Ih	NO	YES	3.8
198	CY_9-4-f_RE_HM	Garyllis	E	NO	YES	4.4
199	CY_9-4-g_RIh	Phasoula	Ih	NO	NO	7.8
200	CY_9-5-a_RE	Ypsonas	E	NO	NO	13.0
201	CY_9-6-a_RP	Ayios Ioannis	P	NO	NO	5.3
202	CY_9-6-b_RP	Ambelikos-Agros	P	NO	NO	17.6
203	CY_9-6-c_RP		P	NO	NO	0.3
204	CY_9-6-d_RP_HM		P	NO	YES	1.4
205	CY_9-6-e_RP	Ambelikos-Xylourikos	P	NO	NO	11.4
206	CY_9-6-f_RI	Potamos tou Limnati	I	NO	NO	7.0
207	CY_9-6-g_RI	Pelendri	I	NO	NO	6.2
208	CY_9-6-h_RI	Ayios Mamas	I	NO	NO	5.9
209	CY_9-6-i_RP	Loumata	P	NO	NO	3.1
210	CY_9-6-k_RP_HM	Loumata	P	NO	YES	2.9
211	CY_9-6-L_RP	Kouris	P	NO	NO	19.5
212	CY_9-6-m_RP_HM	Kouris	P	NO	YES	13.1
213	CY_9-6-n_RP	Mesapotamos	P	NO	NO	6.5
214	CY_9-6-o_RP	Moniatis	P	NO	NO	5.9
215	CY_9-6-p_RP	Kryos	P	NO	NO	8.0
216	CY_9-6-q_RP_HM	Kryos	P	NO	YES	6.0
217	CY_9-6-r_RI_HM	Kryos	I	NO	YES	15.0
218	CY_9-6-t_RI_HM	Kouris	I	NO	YES	11.4
219	CY_9-6-u_RE	Batsounis	E	NO	NO	5.9
220	CY_9-6-v_RE	Tapakhna	E	NO	NO	5.5
221	CY_9-6-w_RE_HM	Tapakhna	E	NO	YES	1.6
222	CY_9-7-a_RE	Krommya	E	NO	NO	9.8
223	CY_9-7-b_RE	Symvoulas	E	NO	NO	7.8
224	CY_9-7-c_RE_HM	Symvoulas	E	NO	YES	5.0
225	CY_9-8-a_RIh	Potamos tou Paramaliou	Ih	NO	NO	28.0
226	CY_9-8-b_RI	Evdhimou	I	NO	NO	11.3
227	CY_9-8-c_RIh	Evdhimou	Ih	NO	NO	4.2
228	CY_9-8-d_RE	Pantijo	E	NO	NO	6.3
229	CY_9-8-e_RE	Ayios Thomas	E	NO	NO	5.3
230	CY_9-9-a_RE	Alekhtora	E	NO	NO	11.7

**) WBs proposed for identification as HMWB or not, in the course of the preparation of the 2nd RBMP*

***) The water bodies characterized as "occupied" (i.e. "YES" in column "Occupied") are located entirely in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control. According to the provisions of Article 1 of Protocol No 10 on Cyprus, attached to the Treaty of Accession to the EU, the application of the acquis is suspended in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control. Water bodies that cross the Green Line are not characterized as "occupied" in this table.*

In comparison to the water body network of the 1st RBMP, a total of 67 water bodies of the 1st RBMP were removed; 25 of those correspond to entire streams while the remaining 42 correspond to tributaries that did not fulfil the criteria applied for the selection of WFD streams. The 25 removed streams have a total catchment area of 83km2 corresponding to 0.9% of the terrestrial area of the Cyprus RBD which has an area of 9250km2. Furthermore, the 83km2 correspond to 1.3% of the total catchment area of the river water body network proposed in this study i.e. for the 2nd RBMP.

5.1.2 Review and update of the river water body network – impounded rivers (water reservoirs)

An additional change -based on the the review and update of WFD Article 5- concerns the water reservoirs (impounded rivers). As it is already mentioned in Paragraph 3.3 of this Report, in the first River Basin Management Plan of Cyprus the water reservoirs (impounded rivers) were characterised as heavily modified lake water bodies and they were assigned a typology. However, for comparability reasons with information from other Member States in the 2nd RBMP it was decided that the water reservoirs will not be characterised as heavily modified lake water bodies, but they are assigned as heavily modified river water bodies.

These water reservoirs are characterised as river HMWBs, since this is the initial water category of these water bodies before the hydromorphological alterations by human activity occurred. However, the closest comparable natural water category to these HMWBs in the present situation is a lake and thus the descriptors used for the evaluation of quality status are those suitable for lake WBs.

In addition, 4 new water bodies (impounded rivers) have been identified compared to the 1st RBMP, making a total of 15 HMWB that concern impounded rivers (water reservoirs).

In the following Table 5.1.2-1 the impounded river water bodies (water reservoirs) and their characteristics are depicted.

Table 5.1.2-1: Characteristics of impounded river water bodies (HMWBs)

Water body code	Sub-watershed	Name	Area at overflow level (ha)	Mean depth (m)	Modified
CY_1-2-c_RP_HM_IR	1-2-4	Arminou	35.6	26	HM
CY_1-3-d_RIh_HM_IR	1-3-9	Asprokremmos	225.4	23	HM
CY_1-4-c_RI_HM_IR	1-4-3	Kannaviou	92.6	35	HM
CY_1-6-b_RIh_HM_IR	1-6-1	Mavrokolympos	18.2	18	HM
CY_2-2-e_RI_HM_IR	2-2-6	Evretou	113.8	22	HM
CY_3-5-b_RI_HM_IR	3-5-1	Xyliatos	5.3	21	HM
CY_3-7-i_RI_HM_IR	3-7-3	Akaki-Malounda	18.2	28	HM
CY_6-1-b_RIh_HM_IR	6-1-2	Tamassos	35.9	18	HM
CY_8-7-b_RI_HM_IR	8-7-2	Lefkara	45.2	21	HM
CY_8-7-e_RI_HM_IR	8-7-4	Dipotamos	91.8	12	HM

Water body code	Sub-watershed	Name	Area at overflow level (ha)	Mean depth (m)	Modified
CY_8-9-d_RI_HM_IR	8-9-5	Kalavasos	87.0	16	HM
CY_9-2-g_RI_HM_IR	9-2-5	Germasogia	68.1	11	HM
CY_9-4-d_RI_HM_IR	9-4-3	Polemidia	16.9	11	HM
CY_9-6-j_RP_HM_IR	9-6-3	Pano Platres	2.7	n.a.	HM
CY_9-6-s_RP_HM_IR	9-6-9	Kouris	332.3	36	HM

5.1.3 Grouping of river water bodies

The text of this chapter was prepared by Mr. Gerald Dörflinger, Hydrologist at the Water Development Department.

According to WFD CIS Guidance Documents no. 2 (European Commission 2003a, p.21) and no. 7 (European Commission 2003c, p.16), water bodies may be "grouped for monitoring, reporting and management purposes where monitoring sufficient indicative or representative water bodies in the sub-groups ... provides for an acceptable level of confidence and precision in the results of monitoring, and in particular the classification of water body status". Since a completely new river typology and river water body network will be used for the 2nd RBMP, a grouping exercise was necessary to establish groups of water bodies for the purpose of assessment of status for the 2nd RBMP.

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 the 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 would yield 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.

As first step, the pressures to be considered were identified. To this end, the available monitoring and water status data was examined in order to identify the quality elements (QEs) leading to failure to achieve good status. The analysis of the draft final status assessment results of the present contract showed that with respect to biological quality elements, the great majority of failures to achieve good status was owed to benthic macroinvertebrates, indicating the importance of organic pollution but also of other pressure detected by the assessment method used in Cyprus like e.g. catchment land use, general degradation, habitat destruction, hydromorphological degradation and riparian habitat alteration. With respect to physico-chemical parameters, the great majority of failures to achieve good status was due to elevated nitrate concentrations, hinting at fertilizers as an important pressure.

Subsequently, a search for available data or suitable substitute data (proxies) for the potentially important pressures identified above was undertaken 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 three pressure characteristics were determined for all water bodies; this was done on either the water body catchment or the water body buffer level, depending on which spatial level yielded the better relationship between the ecological status and the pressure characteristic.

For the water bodies with available monitoring data, the pressure characteristics were then related to the water bodies' ecological status (draft final status assessment results of the present contract) and graphically represented on box plots. The ecological status' responses to 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 judgement 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 "combined pressure indicator"was then plotted on box 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 and E type, 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 and E). 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 drawn together according to the water body group to which their respective water body belongs. This yielded 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 5.1.3-1: 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

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km) per Group
E-Important	CY_2-1-a_RE	Argaki tou Ayiou Ioanni		23 WBs 6 MON.ST.	270
	CY_3-6-c_RE	Komitis			
	CY_3-7-k_RE_HM	Potamos tou Akakiou			
	CY_6-1-e_RE_HM	Pedhieos	r6-1-2-90		
	CY_6-1-j_RE_HM	Klemos			
	CY_6-1-k_RE_HM	Katevas			
	CY_6-1-L_RE	Kaloyeros	r6-1-5-52		
	CY_6-5-c_RE	Yialias	r6-5-3-15, r6-5-3-50		
	CY_6-5-h_RE	Alykos			
	CY_8-1-b_RE_HM	Avdellero			
	CY_8-2-a_RE	Aradippou			
	CY_8-2-b_RE_HM	Aradippou			
	CY_8-3-b_RE				
	CY_8-4-c_RE_HM	Tremithos	r8-4-3-40, r8-4-5-30		
	CY_8-7-g_RIh_HM	Pendaskhinos			
	CY_8-9-f_RIh_HM	Vasilikos			
	CY_9-1-e_RE	Argaki tis Monis			
	CY_9-3-b_RE_HM	Vathias			

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km) per Group
	CY_9-4-a_RE_HM	Vathias			
	CY_9-4-e_RIh_HM	Garyllis			
	CY_9-4-f_RE_HM	Garyllis			
	CY_9-6-u_RE	Batsounis			
	CY_9-8-d_RE	Pantijo			
E-Minor	CY_1-3-e_RE_HM	Xeros Potamos		59 WBs 3 MON.ST.	570
	CY_1-4-h_RIh_HM	Potamos tis Ezousas			
	CY_1-5-a_RE	Limnarka			
	CY_1-5-b_RE_HM	Limnarka			
	CY_1-5-c_RE	Kochinas			
	CY_1-5-d_RE_HM	Kochinas			
	CY_1-5-e_RE	Agriokalami			
	CY_1-6-c_RIh_HM	Mavrokolymbos			
	CY_2-2-h_RIh_HM	Khrysokhou Potamos			
	CY_2-3-d_RIh_HM	Potamos tis Magoundas			
	CY_2-3-e_RE	Xeropotamos			
	CY_2-4-b_RIh_HM	Xeros			
	CY_3-5-g_RE	Galouropniktis Potamos			
	CY_3-6-a_RE	Xeropotamos			
	CY_3-6-b_RE	Potami			
	CY_3-7-c_RE	Peristerona	r3-7-1-84		
	CY_3-7-L_RE	Korivas			
	CY_3-7-m_RE	Likythia	r3-7-2-93 (No data, due to no flow)		
	CY_3-7-o_RE	Merika			
	CY_3-7-p_RE	Kokkinotrimithia			
	CY_3-7-r_RE	Ovgos			
	CY_6-1-d_RE_HM	Pedhieos	r6-1-2-38		
	CY_6-1-g_RE	Kouphos			
	CY_6-1-h_RE	Argaki			
	CY_6-1-i_RE	Klemos			
	CY_6-1-m_RE_HM	Vathys			

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km) per Group
	CY_6-1-n_RE_HM	Dhrakondias			
	CY_6-1-o_RE	Vyzakotos			
	CY_6-1-p_RE	Almyros			
	CY_6-5-g_RE	Argaki ton Villourkon			
	CY_6-5-i_RE	Almyros			
	CY_7-2-b_RE	Liopetri			
	CY_7-2-c_RE_HM	Liopetri			
	CY_8-1-a_RE	Avdellero			
	CY_8-3-a_RE	Kalo Chorio			
	CY_8-4-a_RE	Ammos & Kalamoulia			
	CY_8-4-b_RE	Xylias			
	CY_8-4-d_RE_HM	Tremithos			
	CY_8-4-e_RE	Ayia Marina			
	CY_8-4-f_RE	Mosfiloti			
	CY_8-4-g_RE	Pyrga			
	CY_8-5-b_RE	Pouzis			
	CY_8-5-c_RE	Xeropouzos			
	CY_8-7-f_RI_HM	Pendaskhinos			
	CY_8-7-h_RE				
	CY_8-8-d_RE_HM	Potamos tou Ayiou Mina			
	CY_8-9-e_RI_HM	Vasilikos			
	CY_9-1-a_RE	Pendakomo			
	CY_9-1-c_RE	Argaki tou Pyrgou			
	CY_9-1-d_RE	Argaki tou Pyrgou			
	CY_9-3-a_RE	Vathias			
	CY_9-5-a_RE	Ypsonas			
	CY_9-6-v_RE	Tapakhna			
	CY_9-6-w_RE_HM	Tapakhna			
	CY_9-7-a_RE	Krommya			
	CY_9-7-b_RE	Symvoulas			
	CY_9-7-c_RE_HM	Symvoulas			
	CY_9-8-e_RE	Ayios Thomas			

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km) per Group
	CY_9-9-a_RE	Alekhtora			
E-Negligible	CY_1-1-d_RIh_HM	Khapotami		2 WBs 0 MON.ST.	18
	CY_3-2-e_RE	Vrountokremni Argakin			
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	Potamos tis Ezousas			
	CY_1-4-e_RIh_HM	Potamos tis Ezousas			
	CY_1-4-j_RIh	Argakin tou Ayiou Nepiou			
	CY_1-4-k_RIh	Varkas			
	CY_1-4-m_RIh	Kotchatis			
	CY_2-2-a_RIh	Neraidhes & Potamos Ammadhkiou			
	CY_2-2-f_RI_HM	Potamos tou Stavrou 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	Potamos tis Elias			
	CY_3-7-b_RIh	Peristerona			
	CY_3-7-j_RIh_HM	Potamos tou Akakiou			
	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	Argaki tou Pyrgou			
	CY_9-2-i_RIh				
	CY_9-4-g_RIh	Phasoula			
	CY_9-6-t_RI_HM	Kouris			
	CY_9-8-a_RIh	Potamos tou Paramaliou			
	CY_9-8-c_RIh	Evdhimou			
Ih-Minor	CY_1-1-c_RIh	Khapotami	r1-1-6-65	25 WBs 8 MON.ST.	315
	CY_1-2-f_RIh	Yerovasinos Potamos			
	CY_1-3-c_RIh	Xeros Potamos	r1-3-8-60		

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km) per Group
	CY_1-3-g_RIh	Argaki ton Lefkarkon			
	CY_1-4-L_RIh	Milarkou Potamos			
	CY_1-6-a_RIh	Mavrokolymbos			
	CY_1-6-d_RIh	Xeros			
	CY_1-8-a_RIh	Kalamouli (Avgas)			
	CY_1-8-b_RIh	Pevkos Potamos			
	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	Potamos tou Ayiou Mina			
	CY_8-8-c_RIh_HM	Potamos tou Ayiou Mina	r8-8-2-95		
	CY_8-9-h_RIh	Argaki tis Asgatas			
	CY_9-2-h_RIh_HM	Potamos tis Yermasogeias			
	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	Potamos tou Kambou			
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	Garillis Potamos	r2-2-3-95		
	CY_2-2-d_RI	Potamos tou Stavrou tis Psokas	r2-2-6-24		
	CY_2-2-g_RI_HM	Khrysokhou Potamos			
	CY_3-3-c_RI	Karyiotis			
	CY_3-7-e_RI	Kambi			

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km) per Group
	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	Potamos tis Yermasogeias			
	CY_9-2-d_RI_HM	Potamos tis Yermasogeias			
	CY_9-2-e_RI	Potamos tis Yermasogeias	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 (These monitoring stations are not representative of the group. They are used only for the WB assessment)		
	CY_9-6-f_RI	Potamos tou Limnati	r9-6-7-29, r9-6-7-70		
	CY_9-8-b_RI	Evdhimou			
I-Minor	CY_1-2-e_RI	Tholo Potamos		30 WBs 15 MON.ST.	396
	CY_1-3-b_RI	Xeros Potamos	r1-3-6-53		
	CY_1-4-g_RI_HM	Potamos tis Ezousas			
	CY_1-4-i_RI	Argaki tou Paleomylou			
	CY_2-2-c_RI	Potamos tou Stavrou tis Psokas	r2-2-5-02, r2-2-5-75		
	CY_2-3-c_RI	Potamos tis Magoundas	r2-3-4-80		
	CY_2-3-g_RI	Yialias Potamos			
	CY_2-7-a_RI	Potamos tou Pyrgou	r2-7-2-75		
	CY_2-9-a_RI	Potamos tou Kambou			
	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			

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km) per Group
	CY_3-7-h_RI_HM	Pharmakas			
	CY_8-7-a_RI	Syrkatis	r8-7-1-65		
	CY_8-8-a_RI	Potamos tou 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	Potamos tis Yermasogeias	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	Argaki Lazaridhaes		7 WBs 4 MON.ST.	46
	CY_1-4-b_RI	Argaki tis Ayias	r1-4-3-35		
	CY_2-4-d_RI	Livadhi	r2-4-6-68		
	CY_2-9-c_RI	Potamos tou Kambou			
	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			

Assessment Group	Water Body Code	Water Body Name	Monitoring Station(s)	Number of Monitoring Stations/ Water Bodies per Group	Water Bodies Total Length (km) per Group
	CY_1-4-f_RP_HM	Potamos tis Ezousas	r1-4-5-73, r1-4-7-10		
	CY_2-3-f_RP	Yialias Potamos	r2-3-8-48 (This station is in the upper part of the WB with negligible pressures, and will thus be used for the “P-negligible” group (and not for this group)		
	CY_2-9-b_RP	Potamos tou Kambou	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	Argaki tis 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	Potamos tou Limniti	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			

Note: The following 9 occupied WBs will not be assessed: CY_2-8-b_RI Potamos tou Limniti, CY_2-9-e_RE_HM Potamos tou Kambou, CY_3-1-d_RIh_HM Xeros, CY_3-2-c_RI_HM Setrakhos, CY_3-4-d_RE_HM Atsas, CY_3-7-q_RE_HM Serrakhis, CY_3-7-s_R Ovgos, CY_6-1-f_R Pedhieos, CY_6-5-d_R Yialias.

5.1.4 River Water Bodies (excluding impounded rivers)

For the **assessement of the ecological status of river water bodies**, the following methodological approach and assumptions were used:

- For water bodies where there is one monitoring station, then their status/potential is the same as status/potential of monitoring station (applies in 42 WBs).
- For water bodies where there is more than one monitoring station, then their status/potential is the average of all individual measurements of their monitoring stations (applies in 14 WBs).
- For Water Bodies where there are no monitoring stations, then their status/potential equals the status of the Assessment Group in which they belong. The status of the group is the average of all measurements from all monitoring stations belonging to the specific group. In the two groups where there are no monitoring stations, their status was set as "Good", since the pressures were considered negligible. The status of each group is depicted in Table 5.1.4-1 (for explanation of the Uncertainty Index see Chapter 6).
- For some water bodies in the group Ih-Minor, expert judgment was used for their ecological status/potential and moderate status/potential was changed to good status/potential where there were no significant pressures. This is because the flow regime in this group allows only marginally the monitoring of biological elements and thus there is high uncertainty in the status of water bodies, based on biological QEs. The restricted time window available for conducting samplings in this type of water bodies was evident by the results obtained in the representative stations of this group, where high variability occurred, depending of the period of sampling.
- For some water bodies, which are mainly affected by Hydromorphological pressures, expert judgment was used for their ecological status/potential. In most cases good ecological status/potential was downgraded to moderate ecological status/potential.

The water bodies which their status was determined by expert judgement, are indicated in the attribute table of the relevant Rivers Ecological Status GIS file (shapefile) that accompanies this report.

From the following table, it can be concluded that grouping applies very well to Perennial (P type) and Intermittent (I type) water bodies, i.e. the monitoring results reflect very well the intensity of pressures. For Harsh Intermittent Water Bodies, the biological QEs can only marginally be monitored due to flow regime and this is reflected on the results and their degree of applicability on this type of river water bodies. Harsh Intermittent Water Bodies in groups of important, as well as minor pressures, result in moderate status due to biological elements with a high uncertainty degree.

Table 5.1.4-1: Ecological Status and uncertainty (see Chapter 6) for each river WB Assessment Group

Uncertainty Class:
1 = Low
2 = Medium
3 = High
4 = Very High

ASSESSMENT GROUP	BIOLOGICAL STATUS/ POTENTIAL				PHYSICOCHEMICAL STATUS/ POTENTIAL				OVERALL ECOLOGICAL STATUS/ POTENTIAL	UNCERTAINTY CLASS
	# stations per GROUP	WB status	Uncertainty Index	Uncertainty Class	# 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

For the **assessment of the chemical status of river water bodies**, the following methodological approach and assumption were made:

- For water bodies where there is one or more monitoring station(s), then their status is the same as the status of the monitoring station(s) (37 WBs).
- 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 in the monitoring results.
- 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". This rule applied up to:
    - a dam that overflows only very rarely and
    - a water body with a monitoring station with good chemical status
- Water Bodies in Assessment Groups of negligible or minor pressures (please refer to Section 5.1.3 on Grouping) were given Good Chemical Status only after evaluating also point pressures such as mines, industrial facilities and industrial areas.
- Case by case, water bodies that belong in groups with important pressures, were given Good Chemical Status only after evaluating pressures such as mines, industrial facilities and industrial areas and significant urban areas. Based on the monitoring results, in Cyprus agricultural activity is not a major source of priority substances in surface water bodies, although it might be the source for high values of NO_3.
- Water Bodies that could not be assigned a status according to the above criteria, these were set to Unknown Chemical Status.

The water bodies which their status was determined by expert judgement, are indicated in the attribute table of the relevant Rivers Chemical Status GIS file (shapefile) that accompanies this report.

In the following Table 5.1.4-2, the Ecological and Chemical Status and their respective confidence level (refer to Chapter 6 on confidence and precision) of all River Water Bodies (apart from the Impounded Rivers) are presented. In addition, on Maps 5.3-1 and 5.3-2 and on the detailed maps in Appendix 4, the Ecological Status/Potential and Chemical Status of all inland Surface Water bodies are presented.

The total number of river water bodies is 230, but 9 are in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control. According to the provisions of Article 1 of Protocol No 10 on Cyprus, attached to the Treaty of Accession to the EU, the application of the acquis is suspended in those areas of the Republic of Cyprus in which the Government of the Republic of Cyprus does not exercise effective control. Thus, the evaluation and all the analyses in the following paragraphs are made for the 221 river water bodies.

Table 5.1.4-2: Classification of River Water Bodies (apart from impounded rivers) and the 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_Prop	Ih	E-negligible	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
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	YES2005	I	Ih-important	GOOD & ABOVE P	4	GOOD	1	GOOD & ABOVE P
9	CY_1-2-e_RI	Tholo Potamos	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
10	CY_1-2-f_RIh	Yerovasinos Potamos	NO	Ih	Ih-minor	GOOD	4	GOOD	2	GOOD
11	CY_1-3-a_RP	Argaki tis 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	NO	Ih	Ih-minor	MODERATE	1	GOOD	4	MODERATE
14	CY_1-3-e_RE_HM	Xeros Potamos	YES2005	E	E-minor	MODERATE P	4	UNKNOWN	0	MODERATE P
15	CY_1-3-f_RI	Argaki Lazaridhaes	NO	I	I-negligible	GOOD	2	GOOD	4	GOOD
16	CY_1-3-g_RIh	Argaki ton 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	Argaki tis Ayias	NO	I	I-negligible	GOOD	1	GOOD	3	GOOD
19	CY_1-4-d_RI_HM	Potamos tis Ezousas	YES2005	I	Ih-important	MODERATE P	4	GOOD	4	MODERATE P
20	CY_1-4-e_RIh_HM	Potamos tis Ezousas	YES2005	Ih	Ih-important	MODERATE P	4	GOOD	4	MODERATE P
21	CY_1-4-f_RP_HM	Potamos tis Ezousas	YES2005	P	P-minor	GOOD & ABOVE P	1	GOOD	4	GOOD & ABOVE P
22	CY_1-4-g_RI_HM	Potamos tis Ezousas	YES2005	I	I-minor	GOOD & ABOVE P	2	GOOD	4	GOOD & ABOVE P
23	CY_1-4-h_RIh_HM	Potamos tis Ezousas	YES2005	Ih	E-minor	GOOD & ABOVE P	4	UNKNOWN	0	GOOD & ABOVE P
24	CY_1-4-i_RI	Argaki tou Paleomylou	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
25	CY_1-4-j_RIh	Argakin tou Ayiou Nepiou	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 Potamos	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
28	CY_1-4-m_RIh	Kotchatis	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
29	CY_1-5-a_RE	Limnarka	NO	E	E-minor	MODERATE	4	GOOD	4	MODERATE
30	CY_1-5-b_RE_HM	Limnarka	YES2005	E	E-minor	MODERATE P	4	GOOD	4	MODERATE P
31	CY_1-5-c_RE	Kochinas	NO	E	E-minor	MODERATE	4	UNKNOWN	0	MODERATE

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
32	CY_1-5-d_RE_HM	Kochinas	YES2005	E	E-minor	MODERATE P	4	UNKNOWN	0	MODERATE P
33	CY_1-5-e_RE	Agriokalami	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
34	CY_1-6-a_RIh	Mavrokolymbos	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
35	CY_1-6-c_RIh_HM	Mavrokolymbos	YES2005	Ih	E-minor	MODERATE P	4	GOOD	4	MODERATE P
36	CY_1-6-d_RIh	Xeros	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
37	CY_1-8-a_RIh	Kalamouli (Avgas)	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
38	CY_1-8-b_RIh	Pevkos Potamos	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
39	CY_2-1-a_RE	Argaki tou Ayiou Ioanni	NO	E	E-important	MODERATE	4	GOOD	4	MODERATE
40	CY_2-2-a_RIh	Neraidhes & Potamos Ammadhkiou	NO	Ih	Ih-important	MODERATE	4	GOOD	2	MODERATE
41	CY_2-2-b_RI	Garillis Potamos	NO	I	I-important	MODERATE	1	GOOD	1	MODERATE
42	CY_2-2-c_RI	Potamos tou Stavrou tis Psokas	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
43	CY_2-2-d_RI	Potamos tou Stavrou tis Psokas	NO	I	I-important	GOOD	3	GOOD	4	GOOD
44	CY_2-2-f_RI_HM	Potamos tou Stavrou tis Psokas	YES2005	I	Ih-important	MODERATE P	4	GOOD	4	MODERATE P
45	CY_2-2-g_RI_HM	Khrysokhou Potamos	YES2005	I	I-important	MODERATE P	2	GOOD	4	MODERATE P
46	CY_2-2-h_RIh_HM	Khrysokhou Potamos	YES2005	Ih	E-minor	MODERATE P	4	GOOD	4	MODERATE P
47	CY_2-3-a_RIh	Mirmikoph	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
48	CY_2-3-b_RIh	Argaki tis Limnis	NO	Ih	Ih-important	MODERATE	1	FAILING TO ACHIEVE GOOD	3	MODERATE
49	CY_2-3-c_RI	Potamos tis Magoundas	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
50	CY_2-3-d_RIh_HM	Potamos tis Magoundas	YES2005	Ih	E-minor	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
51	CY_2-3-e_RE	Xeropotamos	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
52	CY_2-3-f_RP	Yialias Potamos	NO	P	P-minor	GOOD	1	GOOD	4	GOOD
53	CY_2-3-g_RI	Yialias Potamos	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
54	CY_2-4-a_RIh	Xeros	NO	Ih	Ih-negligible	GOOD	4	GOOD	4	GOOD
55	CY_2-4-b_RIh_HM	Xeros	YES2005	Ih	E-minor	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
56	CY_2-4-c_RP	Maroti & Diali	NO	P	P-negligible	HIGH	2	GOOD	4	HIGH
57	CY_2-4-d_RI	Livadhi	NO	I	I-negligible	GOOD	1	GOOD	4	GOOD
58	CY_2-4-e_RIh_HM	Livadhi	YES2005	Ih	Ih-minor	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
59	CY_2-5-a_RIh	Ayios Theodoros	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
60	CY_2-6-a_RIh	Katouris	NO	Ih	Ih-negligible	GOOD	4	GOOD	4	GOOD
61	CY_2-6-b_RIh_HM	Katouris	YES2005	Ih	Ih-minor	MODERATE P	3	GOOD	4	MODERATE P
62	CY_2-7-a_RI	Potamos tou Pyrgou	NO	I	I-minor	GOOD	1	GOOD	4	GOOD
63	CY_2-8-a_RP	Potamos tou Limniti	NO	P	P-negligible	GOOD	1	GOOD	4	GOOD
64	CY_2-8-b_RI	Potamos tou Limniti	NO	I	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
65	CY_2-9-a_RI	Potamos tou Kambou	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
66	CY_2-9-b_RP	Potamos tou Kambou	NO	P	P-minor	MODERATE	1	GOOD	1	MODERATE

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
67	CY_2-9-c_RI	Potamos tou Kambou	NO	I	I-negligible	GOOD	2	GOOD	4	GOOD
68	CY_2-9-d_RIh_HM	Potamos tou Kambou	YES2005	Ih	Ih-negligible	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
69	CY_2-9-e_RE_HM	Potamos tou Kambou	YES2005	E	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
70	CY_3-1-a_RP	Xeros	NO	P	P-negligible	HIGH	2	GOOD	4	HIGH
71	CY_3-1-b_RI	Xeros	NO	I	I-negligible	GOOD	1	GOOD	4	GOOD
72	CY_3-1-c_RI_HM	Xeros	YES2005	I	I-negligible	GOOD & ABOVE P	2	GOOD	4	GOOD & ABOVE P
73	CY_3-1-d_RIh_HM	Xeros	YES2005	Ih	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
74	CY_3-2-a_RP	Marathasa	NO	P	P-minor	GOOD	1	GOOD	1	GOOD
75	CY_3-2-b_RP_HM	Marathasa	YES2005	P	P-minor	GOOD & ABOVE P	2	GOOD	4	GOOD & ABOVE P
76	CY_3-2-c_RI_HM	Setrakhos	YES2005	I	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
77	CY_3-2-d_RI	Rkondas	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
78	CY_3-2-e_RE	Vrountokremni Argakin	NO	E	E-negligible	GOOD	4	GOOD	4	GOOD
79	CY_3-3-a_RP	Ayios Nikolaos	NO	P	P-negligible	GOOD	1	GOOD	1	GOOD
80	CY_3-3-b_RP	Karyiotis	NO	P	P-important	MODERATE	1	GOOD	1	MODERATE
81	CY_3-3-c_RI	Karyiotis	NO	I	I-important	MODERATE	2	UNKNOWN	0	MODERATE
82	CY_3-3-d_RP	Argaki tou Karvouna	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
83	CY_3-3-e_RI	Alykhnos	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
84	CY_3-4-a_RI	Atsas	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
85	CY_3-4-b_RIh	Atsas	NO	Ih	Ih-important	MODERATE	3	GOOD	1	MODERATE
86	CY_3-4-c_RIh_HM	Atsas	YES2005	Ih	Ih-important	MODERATE P	4	UNKNOWN	0	MODERATE P
87	CY_3-4-d_RE_HM	Atsas	YES2005	E	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
88	CY_3-5-a_RI	Lagoudhera	NO	I	I-minor	GOOD	1	GOOD	4	GOOD
89	CY_3-5-c_RI_HM	Lagoudhera	YES2005	I	Ih-minor	MODERATE P	1	FAILING TO ACHIEVE GOOD	1	MODERATE P
90	CY_3-5-d_RIh_HM	Potamos tis Elias	YES2005	Ih	Ih-important	MODERATE P	4	FAILING TO ACHIEVE GOOD	4	MODERATE P
91	CY_3-5-e_RI	Kannavia	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
92	CY_3-5-f_RI	Asinou	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
93	CY_3-5-g_RE	Galouropniktis Potamos	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
94	CY_3-6-a_RE	Xeropotamos	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
95	CY_3-6-b_RE	Potami	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
96	CY_3-6-c_RE	Komitis	NO	E	E-important	MODERATE	4	UNKNOWN	0	MODERATE
97	CY_3-7-a_RI	Peristerona	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
98	CY_3-7-b_RIh	Peristerona	NO	Ih	Ih-important	GOOD	4	GOOD	3	GOOD
99	CY_3-7-c_RE	Peristerona	NO	E	E-minor	GOOD	3	GOOD	2	GOOD
100	CY_3-7-d_RI	Maroullenas	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
101	CY_3-7-e_RI	Kambi	NO	I	I-important	MODERATE	2	GOOD	2	MODERATE

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
102	CY_3-7-f_RI_HM	Maroullenas	YES2005	I	I-minor	GOOD & ABOVE P	1	GOOD	1	GOOD & ABOVE P
103	CY_3-7-g_RI	Pharmakas	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
104	CY_3-7-h_RI_HM	Pharmakas	YES2005	I	I-minor	GOOD & ABOVE P	2	GOOD	2	GOOD & ABOVE P
105	CY_3-7-j_RIh_HM	Potamos tou Akakiou	YES2005	Ih	Ih-important	MODERATE P	4	UNKNOWN	0	MODERATE P
106	CY_3-7-k_RE_HM	Potamos tou Akakiou	YES2005	E	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
107	CY_3-7-L_RE	Korivas	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
108	CY_3-7-m_RE	Likythia	NO	E	E-minor	GOOD	3	UNKNOWN	0	GOOD
109	CY_3-7-n_RIh	Koutis & Aloupos	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
110	CY_3-7-o_RE	Merika	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
111	CY_3-7-p_RE	Kokkinotrimithia	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
112	CY_3-7-q_RE_HM	Serrakhis	YES2005	E	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
113	CY_3-7-r_RE	Ovgos	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
114	CY_3-7-s_R	Ovgos	NO	NoDat	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
115	CY_6-1-a_RIh	Pedhieos & Ayios Onouphrios	NO	Ih	Ih-minor	GOOD	1	GOOD	2	GOOD
116	CY_6-1-c_RIh_HM	Pedhieos	YES2005	Ih	Ih-important	MODERATE P	4	GOOD	3	MODERATE P
117	CY_6-1-d_RE_HM	Pedhieos	YES2005	E	E-minor	GOOD & ABOVE P	3	GOOD	2	GOOD & ABOVE P
118	CY_6-1-e_RE_HM	Pedhieos	YES2005	E	E-important	MODERATE P	3	GOOD	3	MODERATE P
119	CY_6-1-f_R	Pedhieos	NO	NoDat	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
120	CY_6-1-g_RE	Kouphos	NO	E	E-minor	GOOD	4	GOOD	3	GOOD
121	CY_6-1-h_RE	Argaki	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
122	CY_6-1-i_RE	Klemos	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
123	CY_6-1-j_RE_HM	Klemos	YES_Prop	E	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
124	CY_6-1-k_RE_HM	Katevas	YES_Prop	E	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
125	CY_6-1-L_RE	Kaloyeros	NO	E	E-important	MODERATE	4	FAILING TO ACHIEVE GOOD	4	MODERATE
126	CY_6-1-m_RE_HM	Vathys	YES2005	E	E-minor	GOOD & ABOVE P	4	UNKNOWN	0	GOOD & ABOVE P
127	CY_6-1-n_RE_HM	Dhrakondias	YES_Prop	E	E-minor	GOOD & ABOVE P	4	UNKNOWN	0	GOOD & ABOVE P
128	CY_6-1-o_RE	Vyzakotos	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
129	CY_6-1-p_RE	Almyros	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
130	CY_6-5-a_RIh	Yialias	NO	Ih	Ih-minor	GOOD	4	GOOD	3	GOOD
131	CY_6-5-b_RI	Yialias	NO	I	I-important	POOR	1	GOOD	3	POOR
132	CY_6-5-c_RE	Yialias	NO	E	E-important	MODERATE	1	GOOD	2	MODERATE
133	CY_6-5-d_R	Yialias	NO	NoDat	None-occupied	UNKNOWN	0	UNKNOWN	0	UNKNOWN
134	CY_6-5-e_RIh	Koutsos	NO	Ih	Ih-minor	GOOD	4	GOOD	3	GOOD
135	CY_6-5-f_RIh_HM	Koutsos	YES2005	Ih	Ih-important	MODERATE P	4	GOOD	3	MODERATE P
136	CY_6-5-g_RE	Argaki ton Villourkon	NO	E	E-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
137	CY_6-5-h_RE	Alykos	NO	E	E-important	MODERATE	4	UNKNOWN	0	MODERATE
138	CY_6-5-i_RE	Almyros	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
139	CY_7-2-a_RIh	Vathys	NO	Ih	Ih-minor	MODERATE	3	UNKNOWN	0	MODERATE
140	CY_7-2-b_RE	Liopetri	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
141	CY_7-2-c_RE_HM	Liopetri	YES2005	E	E-minor	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
142	CY_8-1-a_RE	Avdellero	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
143	CY_8-1-b_RE_HM	Avdellero	YES2005	E	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
144	CY_8-2-a_RE	Aradippou	NO	E	E-important	MODERATE	4	UNKNOWN	0	MODERATE
145	CY_8-2-b_RE_HM	Aradippou	YES_Prop	E	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
146	CY_8-3-a_RE	Kalo Chorio	NO	E	E-minor	MODERATE	4	UNKNOWN	0	MODERATE
147	CY_8-3-b_RE		NO	E	E-important	MODERATE	4	UNKNOWN	0	MODERATE
148	CY_8-4-a_RE	Ammos & Kalamoulia	NO	E	E-minor	GOOD	4	GOOD	2	GOOD
149	CY_8-4-b_RE	Xylias	NO	E	E-minor	GOOD	4	FAILING TO ACHIEVE GOOD	3	MODERATE
150	CY_8-4-c_RE_HM	Tremithos	YES2005	E	E-important	MODERATE P	1	GOOD	1	MODERATE P
151	CY_8-4-d_RE_HM	Tremithos	YES2005	E	E-minor	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
152	CY_8-4-e_RE	Ayia Marina	NO	E	E-minor	GOOD	4	GOOD	2	GOOD
153	CY_8-4-f_RE	Mosfiloti	NO	E	E-minor	GOOD	4	GOOD	2	GOOD
154	CY_8-4-g_RE	Pyrga	NO	E	E-minor	GOOD	4	GOOD	2	GOOD
155	CY_8-5-a_RIh	Pouzis	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
156	CY_8-5-b_RE	Pouzis	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
157	CY_8-5-c_RE	Xeropouzos	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
158	CY_8-6-a_RIh	Xeropotamos	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
159	CY_8-7-a_RI	Syrkatis	NO	I	I-minor	GOOD	1	GOOD	3	GOOD
160	CY_8-7-c_RI_HM	Syrkatis	YES2005	I	Ih-important	MODERATE P	1	GOOD	3	MODERATE P
161	CY_8-7-d_RIh	Argaki tou Mylou	NO	Ih	Ih-minor	GOOD	4	GOOD	4	GOOD
162	CY_8-7-f_RI_HM	Pendaskhinos	YES2005	I	E-minor	MODERATE P	4	GOOD	4	MODERATE P
163	CY_8-7-g_RIh_HM	Pendaskhinos	YES2005	Ih	E-important	MODERATE P	4	GOOD	4	MODERATE P
164	CY_8-7-h_RE		NO	E	E-minor	GOOD	4	GOOD	4	GOOD
165	CY_8-8-a_RI	Potamos tou Ayiou Mina	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
166	CY_8-8-b_RIh	Potamos tou Ayiou Mina	NO	Ih	Ih-minor	MODERATE	3	GOOD	4	MODERATE
167	CY_8-8-c_RIh_HM	Potamos tou Ayiou Mina	YES2005	Ih	Ih-minor	MODERATE P	1	GOOD	4	MODERATE P
168	CY_8-8-d_RE_HM	Potamos tou Ayiou Mina	YES2005	E	E-minor	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
169	CY_8-9-a_RI	Vasilikos	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
170	CY_8-9-b_RI_HM	Vasilikos	YES2005	I	I-minor	GOOD & ABOVE P	2	GOOD	2	GOOD & ABOVE P
171	CY_8-9-c_RI	Vasilikos	NO	I	I-important	MODERATE	2	GOOD	1	MODERATE

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
172	CY_8-9-e_RI_HM	Vasilikos	YES2005	I	E-minor	MODERATE P	4	UNKNOWN	0	MODERATE P
173	CY_8-9-f_RIh_HM	Vasilikos	YES2005	Ih	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
174	CY_8-9-g_RIh	Exovounia	NO	Ih	Ih-important	MODERATE	4	GOOD	2	MODERATE
175	CY_8-9-h_RIh	Argaki tis Asgatas	NO	Ih	Ih-minor	GOOD	4	UNKNOWN	0	GOOD
176	CY_9-1-a_RE	Pendakomo	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
177	CY_9-1-b_RIh	Argaki tou Pyrgou	NO	Ih	Ih-important	MODERATE	4	UNKNOWN	0	MODERATE
178	CY_9-1-c_RE	Argaki tou Pyrgou	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
179	CY_9-1-d_RE	Argaki tou Pyrgou	NO	E	E-minor	GOOD	4	UNKNOWN	0	GOOD
180	CY_9-1-e_RE	Argaki tis Monis	NO	E	E-important	MODERATE	4	UNKNOWN	0	MODERATE
181	CY_9-2-a_RI	Karydhaki	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
182	CY_9-2-b_RP	Ayios Pavlos	NO	P	P-important	MODERATE	2	GOOD	4	MODERATE
183	CY_9-2-c_RI	Potamos tis Yermasogeias	NO	I	I-important	MODERATE	2	GOOD	4	MODERATE
184	CY_9-2-d_RI_HM	Potamos tis Yermasogeias	YES2005	I	I-important	MODERATE P	2	GOOD	4	MODERATE P
185	CY_9-2-e_RI	Potamos tis Yermasogeias	NO	I	I-important	GOOD	1	GOOD	3	GOOD
186	CY_9-2-f_RI	Potamos tis Yermasogeias	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
187	CY_9-2-h_RIh_HM	Potamos tis Yermasogeias	YES2005	Ih	Ih-minor	MODERATE P	3	GOOD	4	MODERATE P
188	CY_9-2-i_RIh		NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
189	CY_9-2-j_RI	Yialiadhes	NO	I	I-negligible	HIGH	3	GOOD	2	HIGH
190	CY_9-2-k_RI	Yialiadhes	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
191	CY_9-2-L_RI_HM	Yialiadhes	YES2005	I	I-important	MODERATE P	1	GOOD	1	MODERATE P
192	CY_9-3-a_RE	Vathias	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
193	CY_9-3-b_RE_HM	Vathias	YES_Prop	E	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
194	CY_9-4-a_RE_HM	Vathias	YES_Prop	E	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
195	CY_9-4-b_RI	Garyllis	NO	I	I-minor	GOOD	1	GOOD	1	GOOD
196	CY_9-4-c_RI	Garyllis	NO	I	I-important	POOR	2	FAILING TO ACHIEVE GOOD	1	POOR
197	CY_9-4-e_RIh_HM	Garyllis	YES2005	Ih	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
198	CY_9-4-f_RE_HM	Garyllis	YES2005	E	E-important	MODERATE P	4	UNKNOWN	0	MODERATE P
199	CY_9-4-g_RIh	Phasoula	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
200	CY_9-5-a_RE	Ypsonas	NO	E	E-minor	MODERATE	4	UNKNOWN	0	MODERATE
201	CY_9-6-a_RP	Ayios Ioannis	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
202	CY_9-6-b_RP	Ambelikos-Agros	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
203	CY_9-6-c_RP		NO	P	P-minor	GOOD	2	GOOD	2	GOOD
204	CY_9-6-d_RP_HM		YES2005	P	P-minor	MODERATE P	2	GOOD	2	MODERATE P
205	CY_9-6-e_RP	Ambelikos-Xylourikos	NO	P	P-important	MODERATE	1	GOOD	1	MODERATE
206	CY_9-6-f_RI	Potamos tou Limnati	NO	I	I-important	MODERATE	1	GOOD	4	MODERATE

NO	WB_CODE	WB_NAME/River name	HMWB	TYPE	ASSESSMENT GROUP	ECOLOGICAL STATUS/POTENTIAL	UNCERTAINTY CLASS	CHEMICAL STATUS	UNCERTAINTY CLASS	OVERALL STATUS
207	CY_9-6-g_RI	Pelendri	NO	I	I-minor	GOOD	2	GOOD	2	GOOD
208	CY_9-6-h_RI	Ayios Mamas	NO	I	I-minor	GOOD	2	GOOD	4	GOOD
209	CY_9-6-i_RP	Loumata	NO	P	P-negligible	HIGH	3	GOOD	4	HIGH
210	CY_9-6-k_RP_HM	Loumata	YES2005	P	P-negligible	GOOD & ABOVE P	2	GOOD	4	GOOD & ABOVE P
211	CY_9-6-L_RP	Kouris	NO	P	P-important	POOR	2	FAILING TO ACHIEVE GOOD	2	POOR
212	CY_9-6-m_RP_HM	Kouris	YES2005	P	P-important	MODERATE P	1	GOOD	1	MODERATE P
213	CY_9-6-n_RP	Mesapotamos	NO	P	P-negligible	HIGH	2	GOOD	4	HIGH
214	CY_9-6-o_RP	Moniatis	NO	P	P-important	MODERATE	2	GOOD	2	MODERATE
215	CY_9-6-p_RP	Kryos	NO	P	P-minor	GOOD	1	GOOD	1	GOOD
216	CY_9-6-q_RP_HM	Kryos	YES2005	P	P-minor	GOOD & ABOVE P	1	GOOD	1	GOOD & ABOVE P
217	CY_9-6-r_RI_HM	Kryos	YES2005	I	Ih-minor	MODERATE P	1	GOOD	4	MODERATE P
218	CY_9-6-t_RI_HM	Kouris	YES2005	I	Ih-important	MODERATE P	4	UNKNOWN	0	MODERATE P
219	CY_9-6-u_RE	Batsounis	NO	E	E-important	MODERATE	4	UNKNOWN	0	MODERATE
220	CY_9-6-v_RE	Tapakhna	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
221	CY_9-6-w_RE_HM	Tapakhna	YES2005	E	E-minor	GOOD & ABOVE P	4	UNKNOWN	0	GOOD & ABOVE P
222	CY_9-7-a_RE	Krommya	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
223	CY_9-7-b_RE	Symvoulas	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
224	CY_9-7-c_RE_HM	Symvoulas	YES2005	E	E-minor	GOOD & ABOVE P	4	GOOD	4	GOOD & ABOVE P
225	CY_9-8-a_RIh	Potamos tou Paramaliou	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
226	CY_9-8-b_RI	Evdhimou	NO	I	I-important	MODERATE	2	GOOD	4	MODERATE
227	CY_9-8-c_RIh	Evdhimou	NO	Ih	Ih-important	MODERATE	4	GOOD	4	MODERATE
228	CY_9-8-d_RE	Pantijo	NO	E	E-important	MODERATE	4	GOOD	4	MODERATE
229	CY_9-8-e_RE	Ayios Thomas	NO	E	E-minor	GOOD	4	GOOD	4	GOOD
230	CY_9-9-a_RE	Alekhtora	NO	E	E-minor	GOOD	4	GOOD	4	GOOD

Concerning the **Ecological Status/Potential** (Figure 5.1.4-1 and 5.1.4-2), out of the **221 river water bodies**:

- **7 (4.5%)** are in **high** ecological status
- **118 (53.4%)** are in **good** ecological status
- **93 (42.1%)** are in **moderate** ecological status
- **3 (1.4%)** are in **poor** ecological status
- **No WBs** are in **bad** ecological status

Table 5.1.4-3: Ecological Status/Potential of River Water Bodies (apart from Impounded Rivers)

	Number of River Water Bodies with Ecological Status / Potential:					Total
Status/Potential	**HIGH**	**GOOD**	**MODERATE**	**POOR**	**BAD**	
Water Bodies	7	94	53	3	0	157
Heavily Modified Water Bodies	0	24	40	0	0	64
Total	7	118	93	3	0	221
	Percentage (%) of Water Bodies with Ecological Status / Potential:					
Water Bodies	4,5	59,9	33,8	1,9	0,0	100,0
Heavily Modified Water Bodies	0,0	37,5	62,5	0,0	0,0	100,0
Total	3,2	53,4	42,1	1,4	0,0	100,0
	Length (Km) of Water Bodies with Ecological Status / Potential:					
Water Bodies	90,1	1185,1	644,1	36,2	0,0	1955,5
Heavily Modified Water Bodies	0,0	181,8	281,7	0,0	0,0	463,5
Total	90,1	1366,9	925,8	36,2	0,0	2419,0
	Percentage (%) of Length of Water Bodies with Ecological Status / Potential:					
Water Bodies	4,6	60,6	32,9	1,9	0,0	100,0
Heavily Modified Water Bodies	0,0	39,2	60,8	0,0	0,0	100,0
Total	3,7	56,5	38,3	1,5	0,0	100,0

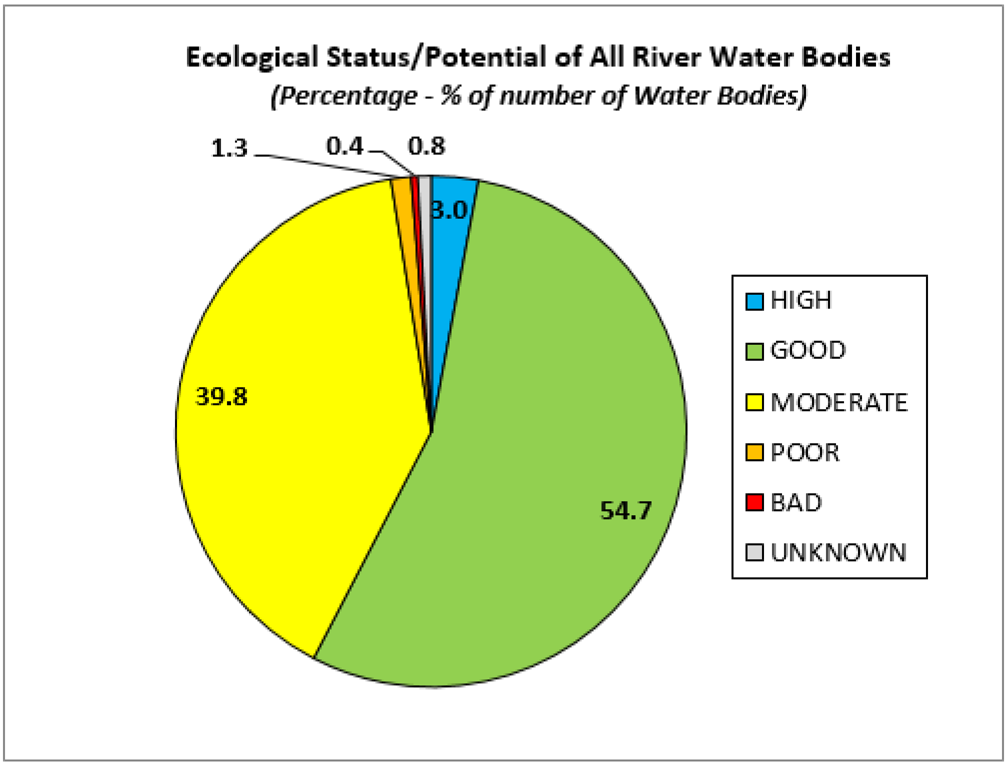


Figure 5.1.4-1: Ecological Status/Potential in River Water Bodies (apart from Impounded Rivers) –Percentage of number of WBs

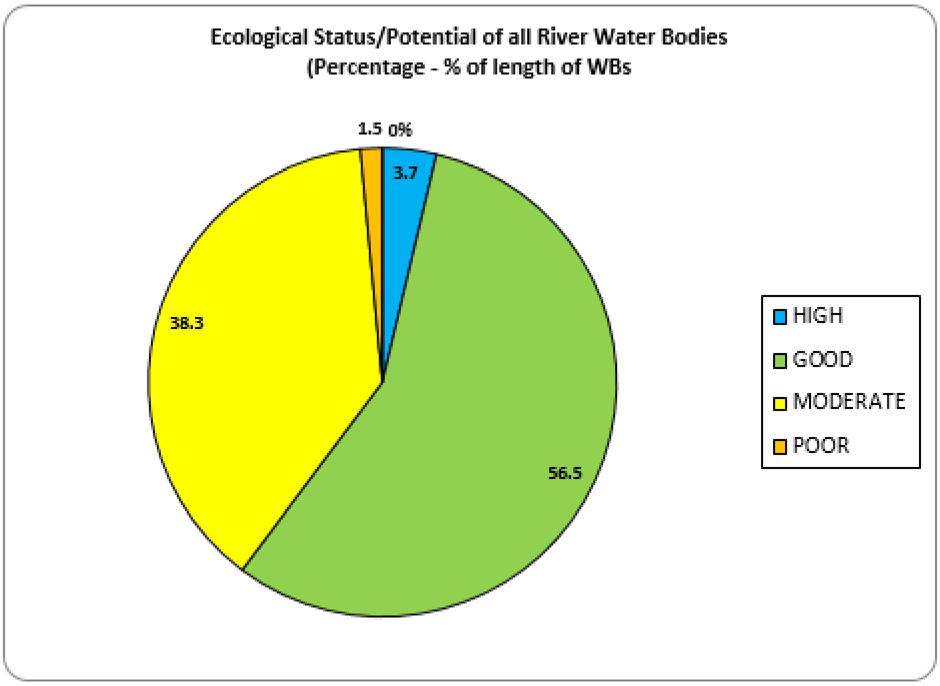


Figure 5.1.4-2: Ecological Status/Potential in River Water Bodies (apart from Impounded Rivers) Percentage of length of WBs

In **comparison** with the **Ecological Status/ Potential** of the **1st RBMP**, out of the **221 river water bodies**:

- in **65** WBs their status was **upgraded**
- in **16** WBs their status was **downgraded**
- in **79** WBs their status stayed the **same**
- in **31** WBs there was **no exact correspondence** to a WB of the 1st RBMP
- in **30** WBs which their status was unknown, they now **have a status**

The detailed comparative analysis per water body is presented in Appendix 3 of the report.

In addition, Table 5.1.4-4 presents the comparison of the total WBs length (km) in each Ecological Status/ Potential class between the 1st RBMP and the results in this contract.

Table 5.1.4-4: Comparison of the total and % WBs length (km) in each Ecological Status/ Potential class between the 1st RBMP and the results in this contract

	1ST RBMP		2ND RBMP	
	Length of WBs (km)	% Length	Length of WBs (km)	% Length
HIGH	0,00	0,0	90,13	3,7
GOOD	841,90	32,7	1185,1	56,5
MODERATE	1077,10	41,8	644,1	38,3
POOR	216,60	8,4	36,23	1,5
BAD	40,90	1,6	0,00	0,0
UNKNOWN	401,80	15,6	0,00	0,0

Concerning the **Chemical Status** (Figure 5.1.4-3 and 5.1.4-4), out of the **221 river water bodies**:

- **171 (74,4%)** are in **good** chemical status
- **7 (3,2%)** are **failing to achieve good** chemical status
- **43 (23%)** WBs have **unknown** chemical status.

Table 5.1.4-5: Chemical Status/Potential of River Water Bodies (apart from Impounded Rivers)

	Number of River Water Bodies with Chemical Status:			Total
Status/Potential	**GOOD**	**FAILING TO ACHIEVE GOOD**	**UNKNOWN**	
Water Bodies	129	5	23	157
Heavily Modified Water Bodies	42	2	20	64
Total	171	7	43	221
	Percentage (%) of Water Bodies with Chemical Status:			
Water Bodies	82,2	3,2	14,6	100,0
Heavily Modified Water Bodies	65,6	3,1	31,3	100,0
Total	77,4	3,2	19,5	100,0
	Length (Km) of Water Bodies with Chemical Status:			
Water Bodies	1567,2	56,0	332,4	1955,6
Heavily Modified Water Bodies	298,8	25,9	138,7	463,4
Total	1866,0	81,9	471,1	2419,0
	Percentage (%) of Length of Water Bodies with Chemical Status:			
Water Bodies	80,1	2,9	17,0	100,0
Heavily Modified Water Bodies	64,5	5,6	29,9	100,0
Total	77,1	3,4	19,5	100,0

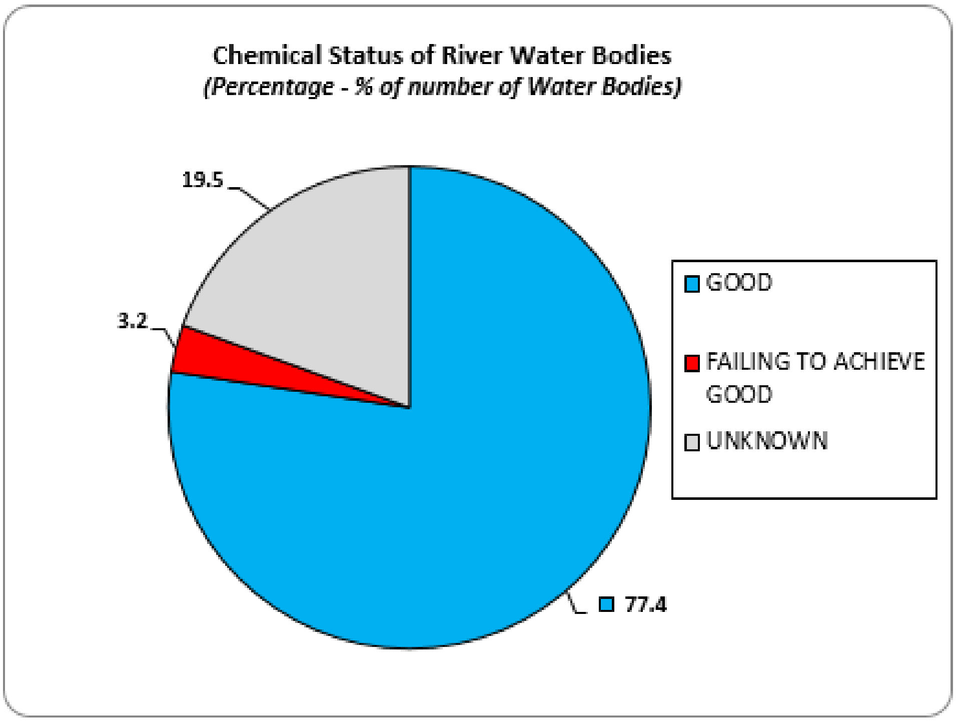


Figure 5.1.4-3: Chemical Status/Potential in River Water Bodies (apart from Impounded Rivers) –Percentage of number of WBs

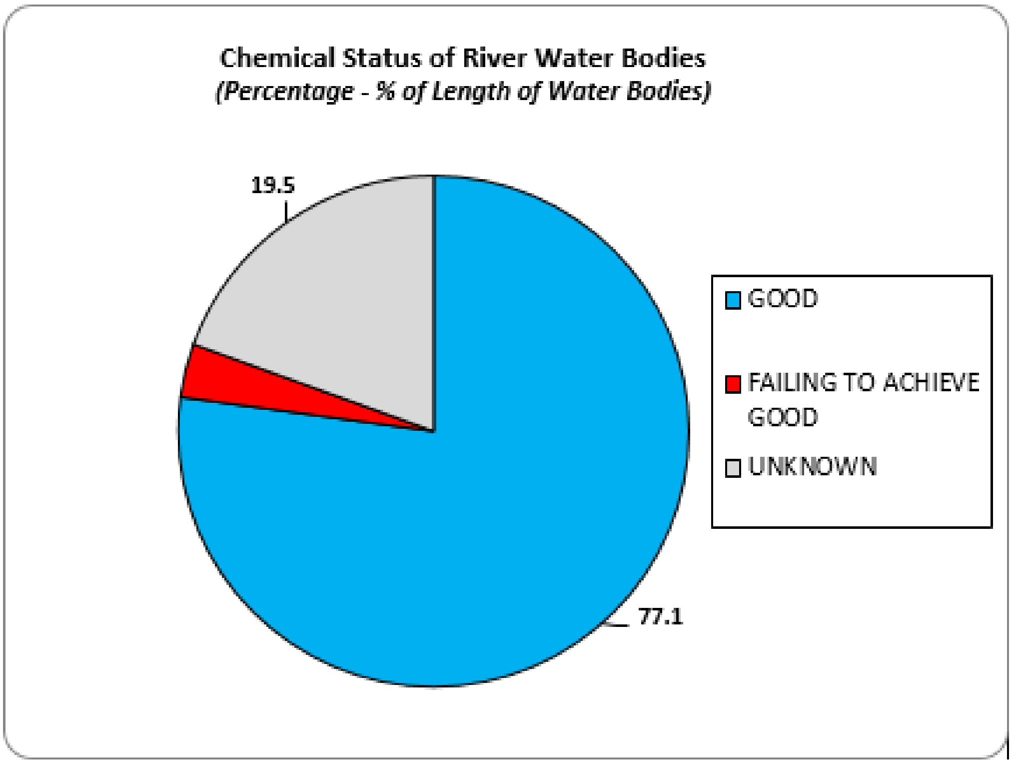


Figure 5.1.4-4: Chemical Status/Potential in River Water Bodies (apart from Impounded Rivers) Percentage of length of WBs

In **comparison** with the **Chemical Status** of the **1st RBMP**, out of the **221 river water bodies**:

- in **6** WBs **(3%)** their status was **upgraded**
- in **5** WBs **(2%)** their status was **downgraded**
- in **138** WBs **(60%)** their status stayed the **same**
- in **27** WBs **(12%)** there was **no exact correspondence** to a WB of the 1st RBMP
- in **21** WBs **(9%)** which their status was unknown, they now **have a status**
- in **24** WBs **(14%)** which their status was known, it is now **unknown**

These last 24 WBs which their chemical status was known in the 1st RBMP and now it is unknown concern mainly water bodies that are downstream of dams with identified potential pressures, and are water bodies that could not be assigned a status according to the used criteria, as they are described above.

The detailed comparative analysis per water body is presented in Appendix 3 of the report.

In addition, Table 5.1.4-6 presents the comparison of the total WBs length (km) in each Chemical Status class between the 1st RBMP and the results in this contract.

Table 5.1.4-6: Comparison of the total and % WBs length (km) in each Chemical Status class between the 1st RBMP and the results in this contract

	1ST RBMP		2ND RBMP	
	Length of WBs (km)	% Length	Length of WBs (km)	% Length
GOOD	2056,8	79,8	1866,2	77,1
FAILING TO ACHIEVE GOOD	120,3	4,7	81,9	3,4
UNKNOWN	401,9	15,6	471,1	19,5

5.1.5 Impounded river water bodies

The overall status of the impounded river water bodies is presented in Table 5.1.5-1. Out of the 13 impounded river water bodies that were evaluated, 11 were classified in the Good and Above Status, while 2 (Germasogia and Polemidia reservoirs) are below Good Status, which is attributed to both ecological potential and chemical status. Germasogia reservoir was classified as Moderate and Polemidia as Bad. Two water bodies (Akaki - Malounda & Tamassos) were not evaluated since they are new water bodies and the monitoring program will be implemented in the next WFD management cycle.

Compared to the 1st RBMP, Germasogia and Polemidia remained in the same ecological class and Lefkara, which was classified in moderate status due to the "Failing to achieve good" chemical status in the 1st RBMP, has improved to Good Status.

Table 5.1.5-1: Overall Status of the impounded river water bodies

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 AND ABOVE	1	GOOD	1	GOOD AND ABOVE
CY_1-3-d_RIh_HM_IR	Asprokremmos	GOOD AND ABOVE	1	GOOD	3	GOOD AND ABOVE
CY_1-4-c_RI_HM_IR	Kannaviou	GOOD AND ABOVE	1	GOOD	3	GOOD AND ABOVE
CY_1-6-b_RIh_HM_IR	Mavrokolympos	GOOD AND ABOVE	1	GOOD	2	GOOD AND ABOVE
CY_2-2-e_RI_HM_IR	Evretou	GOOD AND ABOVE	1	GOOD	2	GOOD AND ABOVE
CY_3-5-b_RI_HM_IR	Xyliatos	GOOD AND ABOVE	1	GOOD	2	GOOD AND ABOVE
CY_3-7-i_RI_HM_IR	Akaki-Malounda	Unknown*	-	Unknown*	-	Unknown*
CY_6-1-b_RIh_HM_IR	Tamassos	Unknown*	-	Unknown*	-	Unknown*
CY_8-7-b_RI_HM_IR	Leukara	GOOD AND ABOVE	1	GOOD	3	GOOD AND ABOVE
CY_8-7-e_RI_HM_IR	Dipotamos	GOOD AND ABOVE	1	GOOD	3	GOOD AND ABOVE
CY_8-9-d_RI_HM_IR	Kalavasos	GOOD AND ABOVE	1	GOOD	1	GOOD AND ABOVE
CY_9-2-g_RI_HM_IR	Germasogia	MODERATE	1	FAILING TO ACHIEVE GOOD	1	MODERATE
CY_9-4-d_RI_HM_IR	Polemidia	BAD	2	FAILING TO ACHIEVE GOOD	1	BAD
CY_9-6-j_RP_HM_IR	Pano Platres	GOOD AND ABOVE	4	GOOD	3	GOOD AND ABOVE
CY_9-6-s_RP_HM_IR	Kouris	GOOD AND ABOVE	1	GOOD	3	GOOD AND ABOVE

** These are new water bodies and the monitoring program will be implemented in the next WFD management cycle.*

Concerning the **Ecological Potential** (Figure 5.1.5-1 and 5.1.5-2), out of the **15 impounded river water bodies**:

- **11 (73%)** are in **good** ecological potential
- **1 (7%)** is in **moderate** ecological potential
- **1 (7%)** is in **bad** ecological potential
- **2 (13%)** have **unknown** ecological potential.

Table 5.1.5-2: Ecological Potential of Impounded River Water Bodies

Number of Impounded River Water Bodies with Ecological Potential:						Total
HIGH	GOOD	MODERATE	POOR	BAD	UNKNOWN	
0	11	1	0	1	2	15
Percentage (%) of Impounded Water Bodies with Ecological Potential:						
0	73,3	6,7	0,0	6,7	13,3	100
Area (Km^2) of Impounded Water Bodies with Ecological Potential:						
0	10,5	0,7	0,0	0,2	0,6	11,9
Percentage (%) of Area of Impounded Water Bodies with Ecological Potential:						
0	88,1	5,9	0,0	1,4	4,6	100

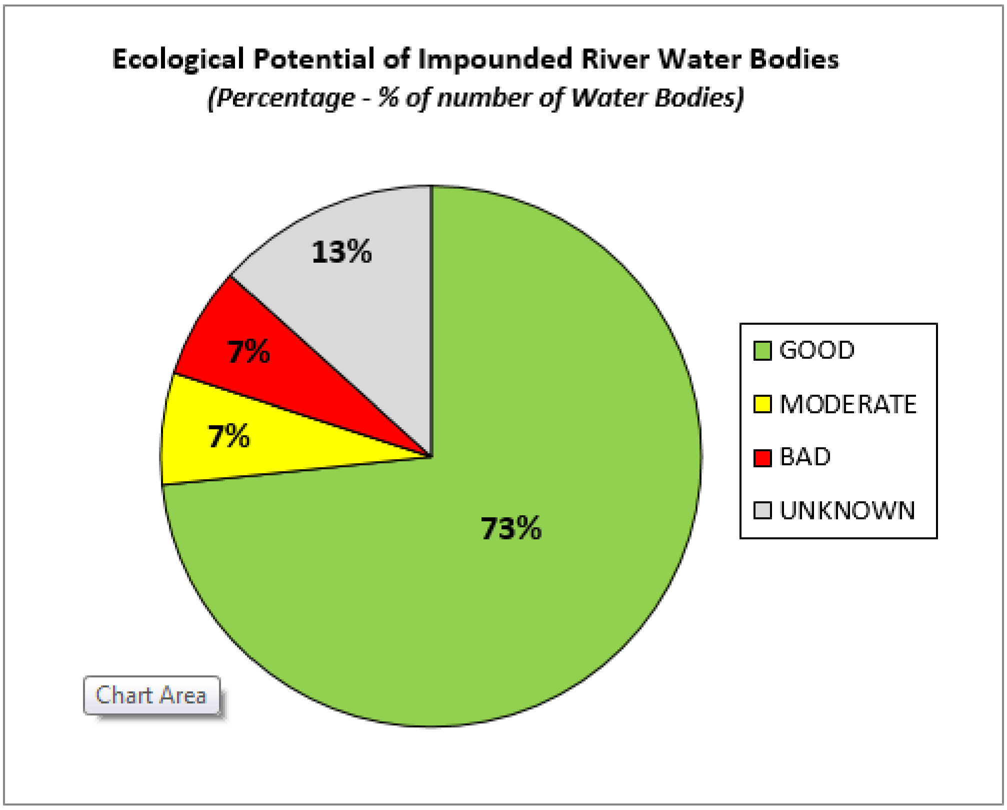


Figure 5.1.5-1: Ecological Potential in Impounded River Water Bodies – Percentage of number of WBs

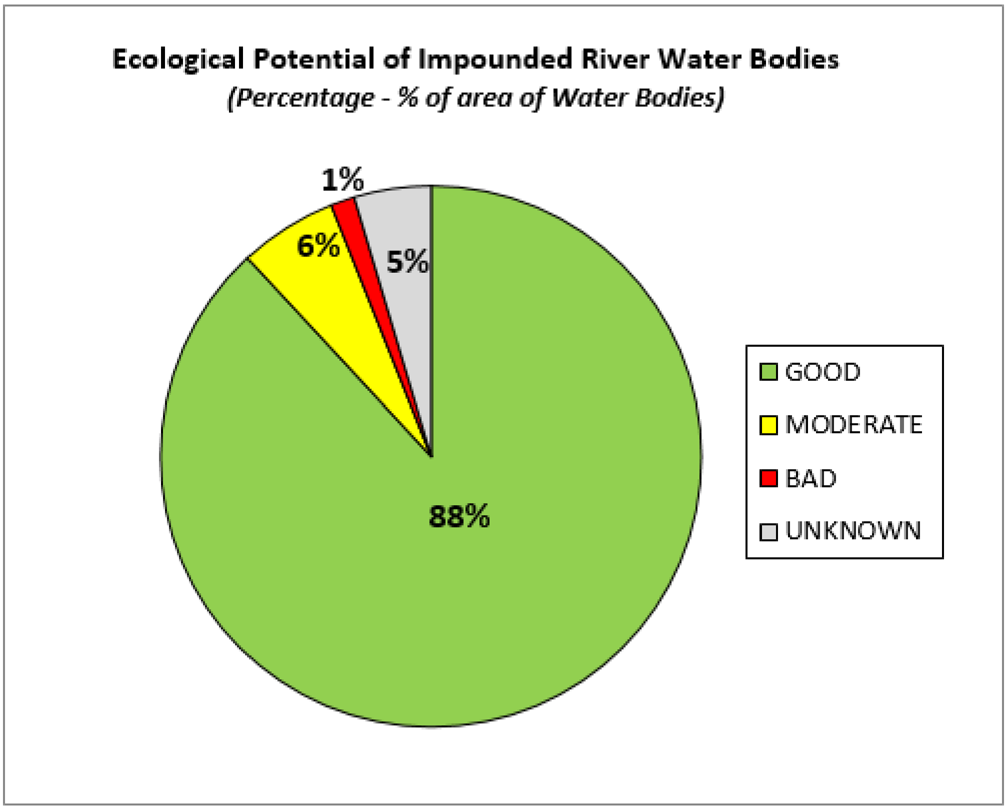


Figure 5.1.5-2: Ecological Potential in Impounded River Water Bodies – Percentage of area of WBs

Concerning the **Chemical Status** (Figure 5.1.5-3 and 5.1.5-4), out of the **15 impounded river water bodies**:

- **11 (73%)** are in **good** chemical status
- **2 (13%)** are **failing to achieve good** chemical status
- **2 (13%)** have **unknown** chemical status.

Table 5.1.5-3: Chemical Status of Impounded River Water Bodies

Number of Impounded River Water Bodies with Chemical Status:			Total
GOOD	FAILING TO ACHIEVE GOOD	UNKNOWN	
11	2	2	15
Percentage (%) of Impounded Water Bodies with Chemical Status:			
73,3	13,3	13,3	100
Area (Km^2) of Impounded Water Bodies with Chemical Status:			
10,5	0,8	0,5	11,8
Percentage (%) of Area of Impounded Water Bodies with Chemical Status:			
89	6,8	4,2	100

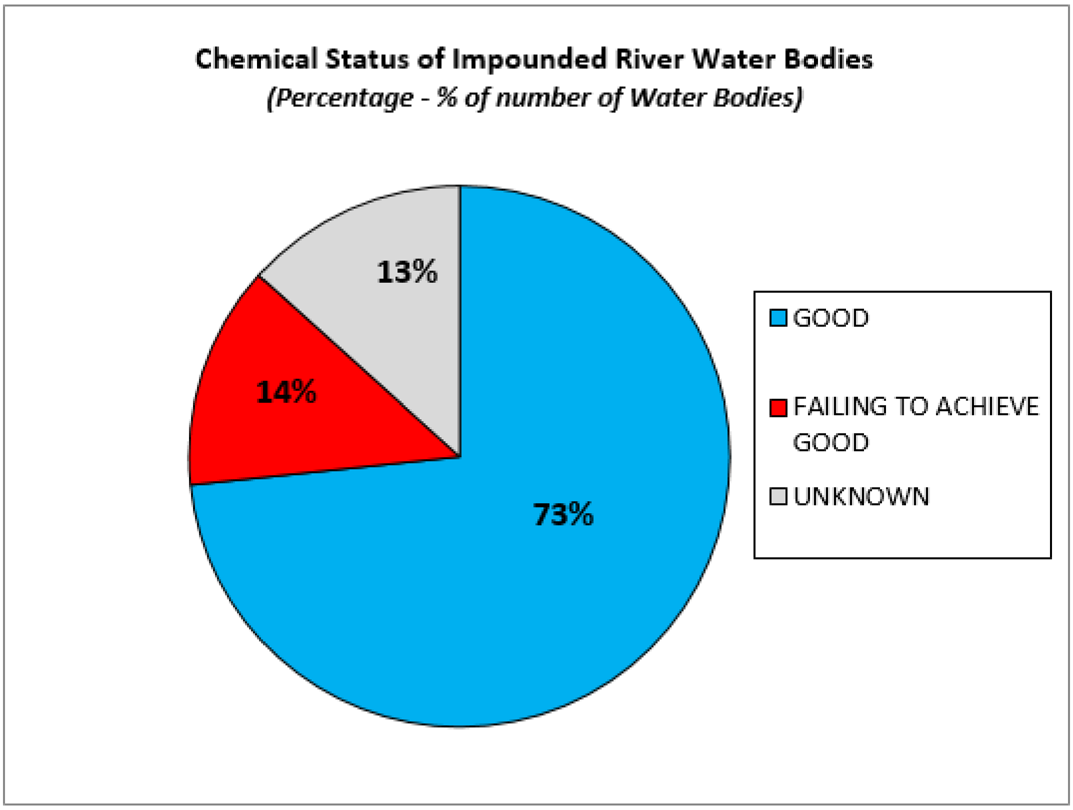


Figure 5.1.3-3: Chemical Status in Impounded River Water Bodies – Percentage of number of WBs

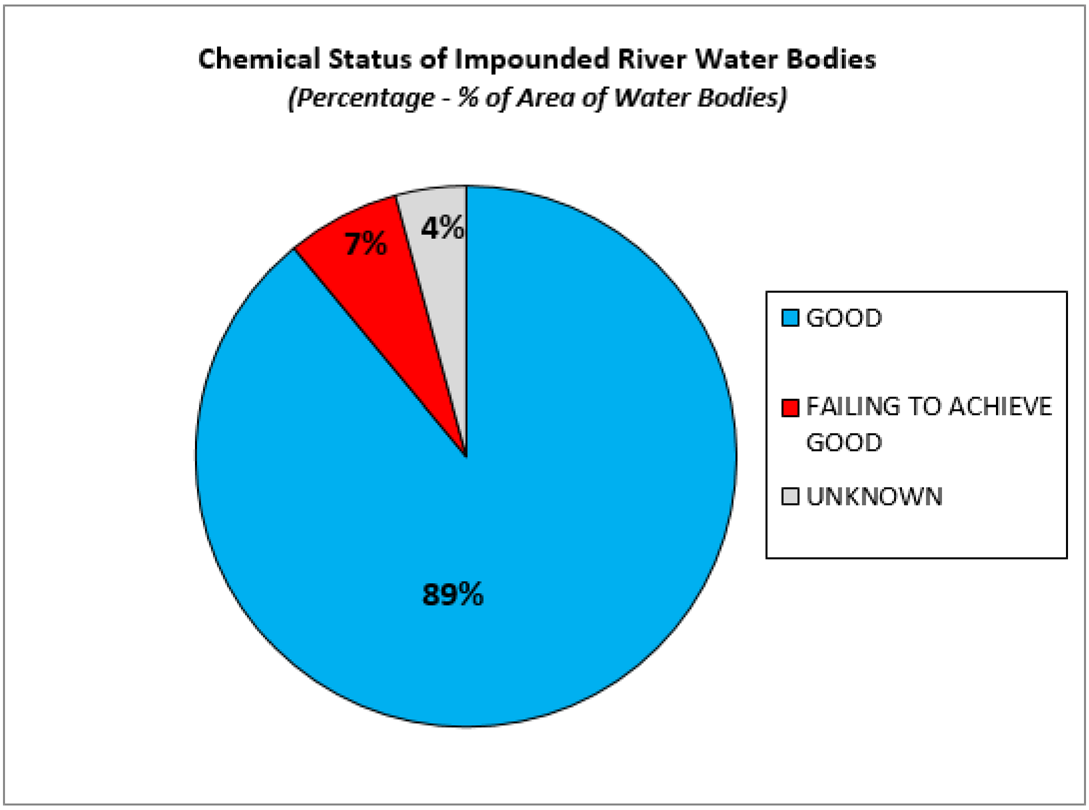


Figure 5.1.3-4: Chemical Status in Impounded River Water Bodies – Percentage of area of WBs

5.1.6 Overall Status for all River Water bodies

Concerning the **Ecological Status/Potential** (Figure 5.1.4-1), out of all the **236 river water bodies**:

- **7 (3%)** are in **high** ecological status/potential
- **129 (54,7%)** are in **good** ecological status/potential
- **94 (39,8%)** are in **moderate** ecological potential
- **3 (1,3%)** are in **poor** ecological potential
- **1 (0,4%)** is in **bad** ecological potential
- **2 (0,8%)** are in **unknown** ecological potential

Table 5.1.6-1: Ecological Status/ Potential of All River Water Bodies

	Number of All River Water Bodies with Ecological Status / Potential:						Total
Status/Potential	**HIGH**	**GOOD**	**MODERATE**	**POOR**	**BAD**	**UNKNOWN**	
Water Bodies	7	94	53	3	0	0	157
Heavily Modified Water Bodies	0	35	41	0	1	2	79
Total	7	129	94	3	1	2	236
	Percentage (%) of All Water Bodies with Ecological Status / Potential:						
Water Bodies	4,5	59,9	33,8	1,9	0	0	100
Heavily Modified Water Bodies	0	44,3	51,9	0	1,3	2,5	100
Total	3	54,7	39,8	1,3	0,4	0,8	100

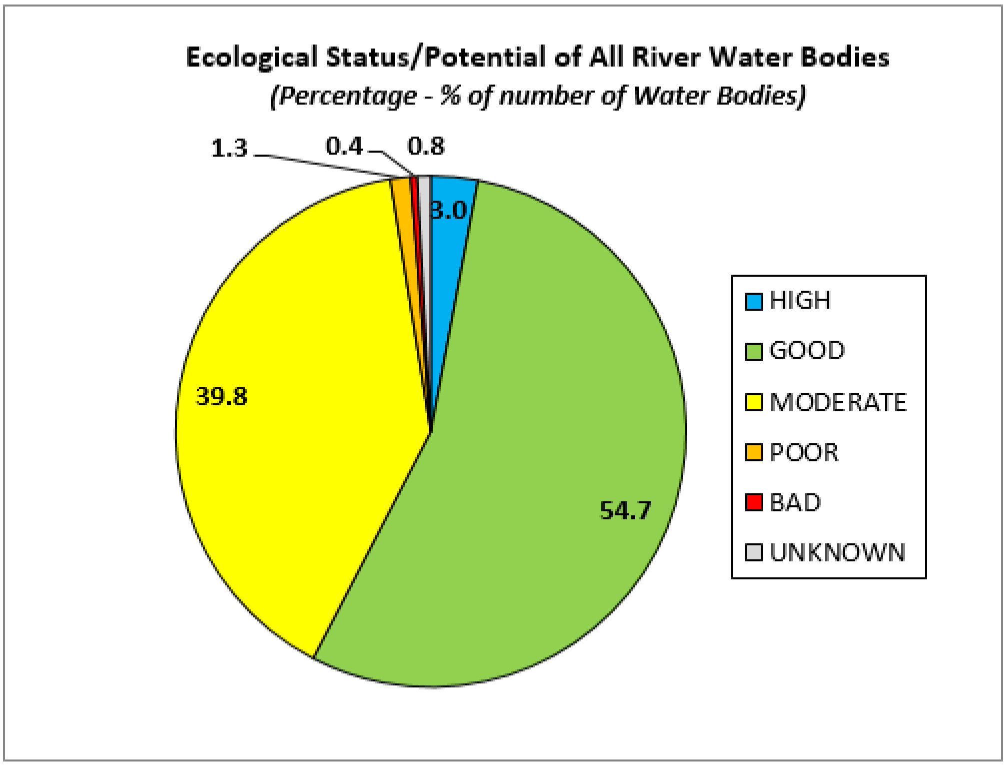


Figure 5.1.6-1: Ecological Status/Potential in All River Water Bodies – Percentage of number of WBs

Concerning the **Chemical Status** (Figure 5.1.6-2), out of all the **236 river water bodies**:

- **182 (77%)** are in **good** chemical status
- **9 (4%)** are in **failing to achieve good** chemical status
- **45 (19%)** are in **unknown** chemical status

Table 5.1.6-2: Chemical Status of All River Water Bodies

	Number of All River Water Bodies with Chemical Status:			Total
Status/Potential	GOOD	FAILING TO ACHIEVE GOOD	UNKNOWN	
Water Bodies	129	5	23	157
Heavily Modified Water Bodies	53	4	22	79
Total	182	9	45	236
	Percentage (%) of All Water Bodies with Chemical Status:			
Water Bodies	82,2	3,2	14,6	100
Heavily Modified Water Bodies	67,1	5,1	27,8	100
Total	77,1	3,8	19,1	100

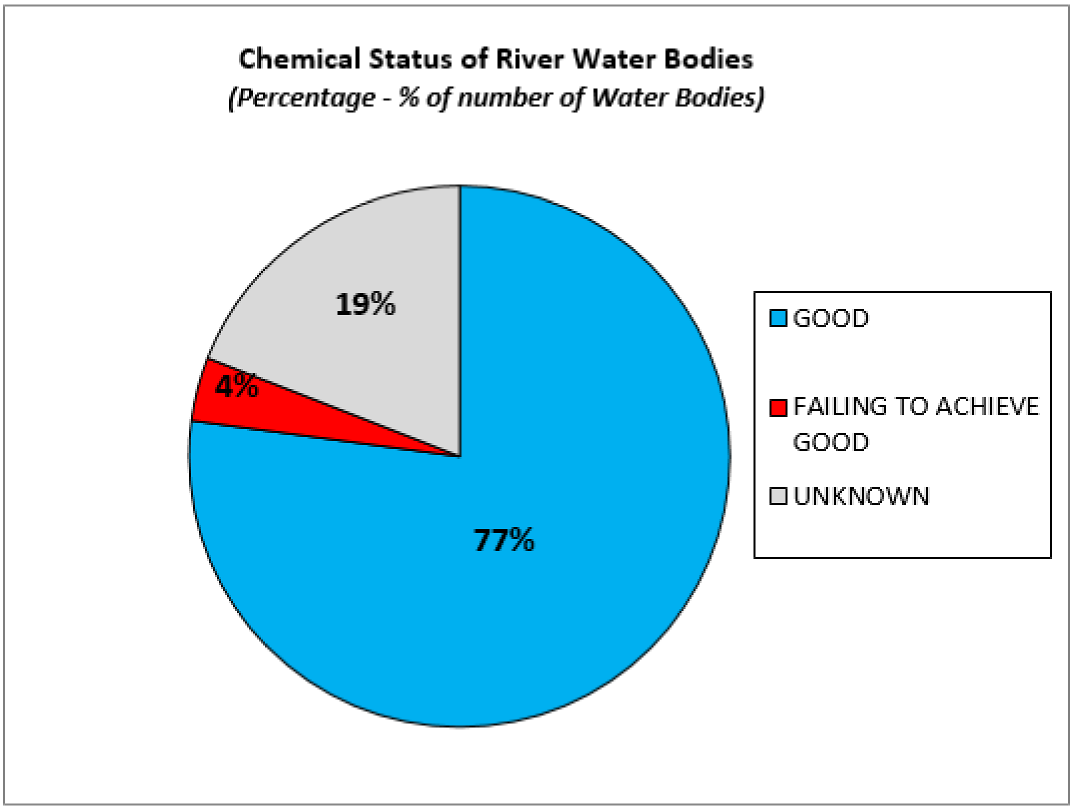


Figure 5.1.6-2: Chemical Status in All River Water Bodies – Percentage of number of WBs

5.2 LAKE WATER BODIES

The overall status/ Potential of the lake water bodies is presented in Table 5.2-1.

Concerning the Ecological Status, as already mentioned due to absence of a methodology for the biological monitoring of natural lakes in Cyprus, in addition to the absence of biological data, as well as the limited data concerning physicochemical parameters, render at this stage the assessment of ecological status impossible. The absence of a national methodology is of course a result of the unique nature of Cyprus salt and brackish lakes, which as seen by the available data presented above, clearly differentiate them from natural freshwater lakes or impounded rivers. In the light of the above and the absence of historical data, the assessment of the natural lakes of Cyprus at this stage was based on experts' judgment.

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 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 storage basin will be of Unknown status also despite the assessment that was made with the methodology applied for impounded rivers. In the 1st RBMP, Achna storage basin 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.

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 (refer to paragraph 4.2.3 of this report). In the 1st RBMP, all salt/ brackish lakes were classified as Good Chemical Status (apart from Paralimni which was unknown). Due to the exceedances that were observed, in the frame of this Contract the status was set as unknown. Achna storage basin was classified in Good Chemical Status, an improvement in relation to the 1st RBMP where its status was unknown.

Table 5.2-1: Overall Status/ Potential of lake water bodies

Uncertainty Class: **1 = Low**
2 = Medium
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

* *Expert judgment*
** *Unknown due to no data*
*** *Unknown due to no classification system developed*
**** *Although there are some exceedances in priority substances, these need to be further investigated*

Concerning the **Ecological Status/Potential** (Figure 5.2-1 and Figure 5.2-2), out of all the **7 lake water bodies**:

- **5 (71,4%)** are in **moderate** ecological status/potential
- **2 (28,6%)** are in **unknown** ecological status/potential.

Table 5.1.4-1: Ecological Status/ Potential of Lake Water Bodies

Number of Lake Water Bodies with Ecological Status / Potential:							Total
Status/Potential	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	2	2
Total	0	0	5	0	0	2	7
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	71,4	0	0	28,6	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	3,3	3,3
Total	0	0	16,6	0	0	3,3	19,9
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	83,4	0	0	16,6	100

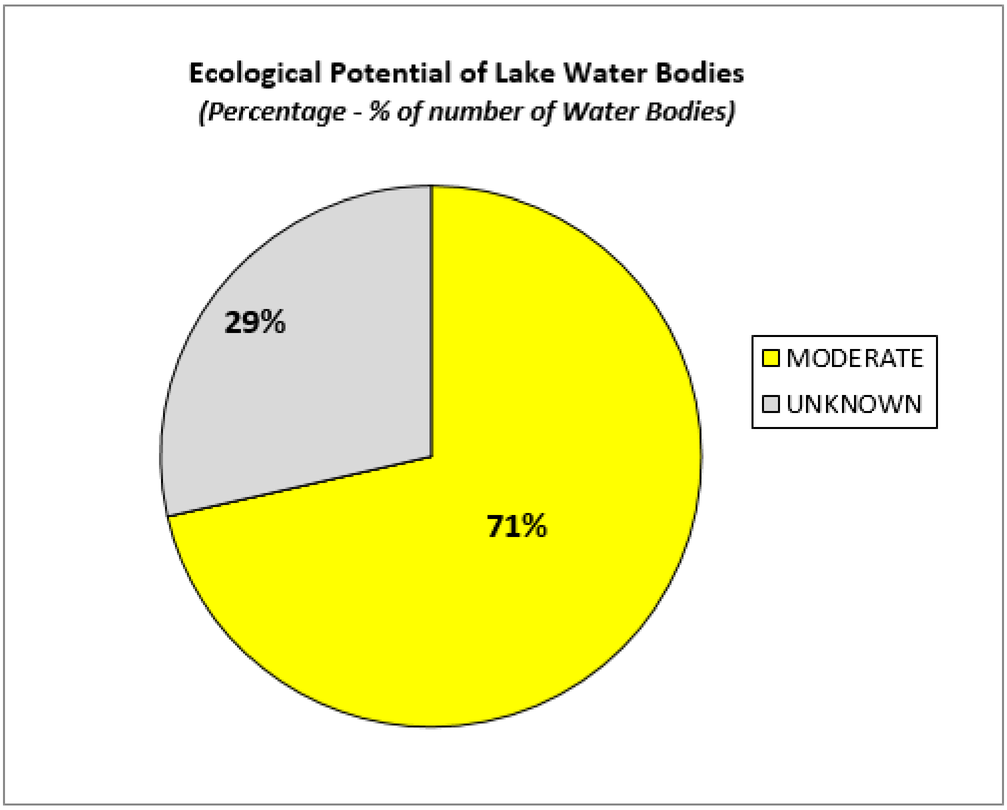


Figure 5.2-1: Ecological Status/ Potential in Lake Water Bodies – Percentage of number of WBs

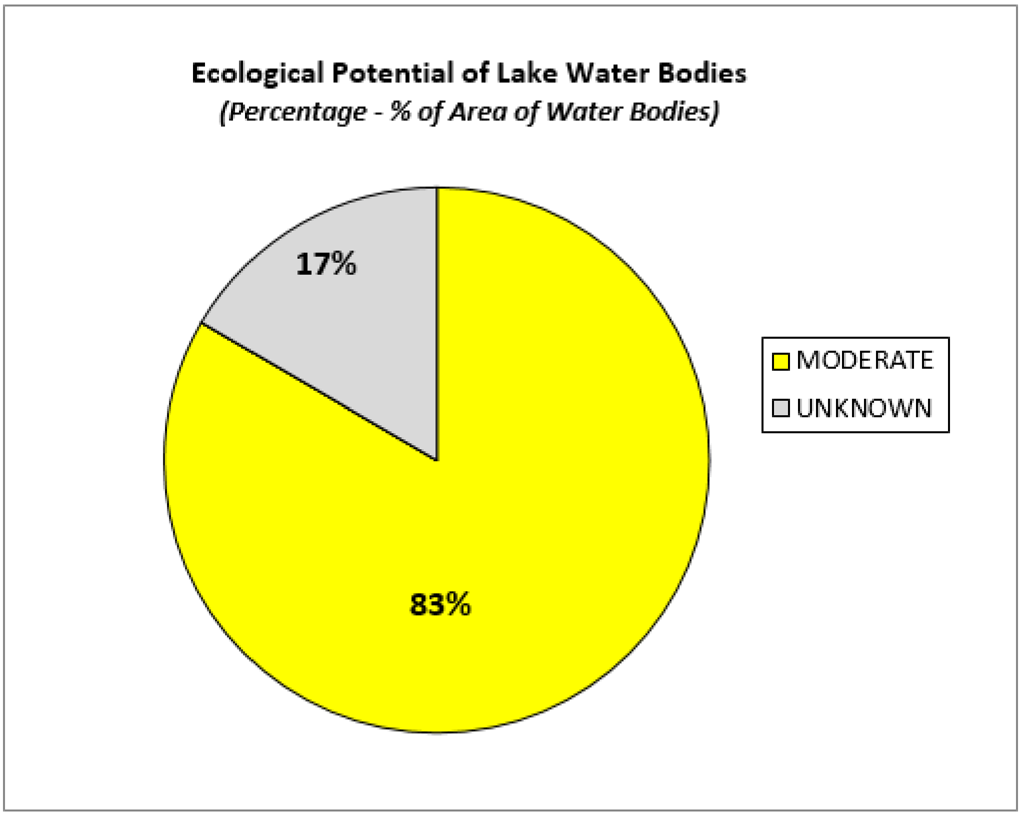


Figure 5.2-2: Ecological Status/ Potential in Lake Water Bodies – Percentage of area of WBs

Concerning the **Chemical Status** (Figure 5.2-3 and Figure 5.2-4), out of all the **7 lake water bodies**:

- **1 (14,3%)** are in **good** chemical status
- **2 (28,6%)** are in **unknown** chemical status.

Table 5.1.4-1: Chemical Status of Lake Water Bodies

Number of Lakes River Water Bodies with Chemical Status:				Total
Status/Potential	GOOD	FAILING TO ACHIEVE GOOD	UNKNOWN	
Water Bodies	0	0	5	5
Heavily Modified/Artificial Water Bodies	1	0	1	2
Total	1	0	6	7
Percentage (%) of Lakes Water Bodies with Chemical Status:				
Water Bodies	0	0	100	100
Heavily Modified/Artificial Water Bodies	50	0	50	100
Total	14,3	0	85,7	100
Area (Km^2) of Lakes Water Bodies with Chemical Status:				
Water Bodies	0	0	16,5	16,5
Heavily Modified/Artificial Water Bodies	0,7	0	2,9	3,6
Total	0,7	0	19,4	20,1
Percentage (%) of Area of Lakes Water Bodies with Chemical Status:				
Water Bodies	0	0	100	100
Heavily Modified/Artificial Water Bodies	19,4	0	80,6	100
Total	3,5	0	96,5	100

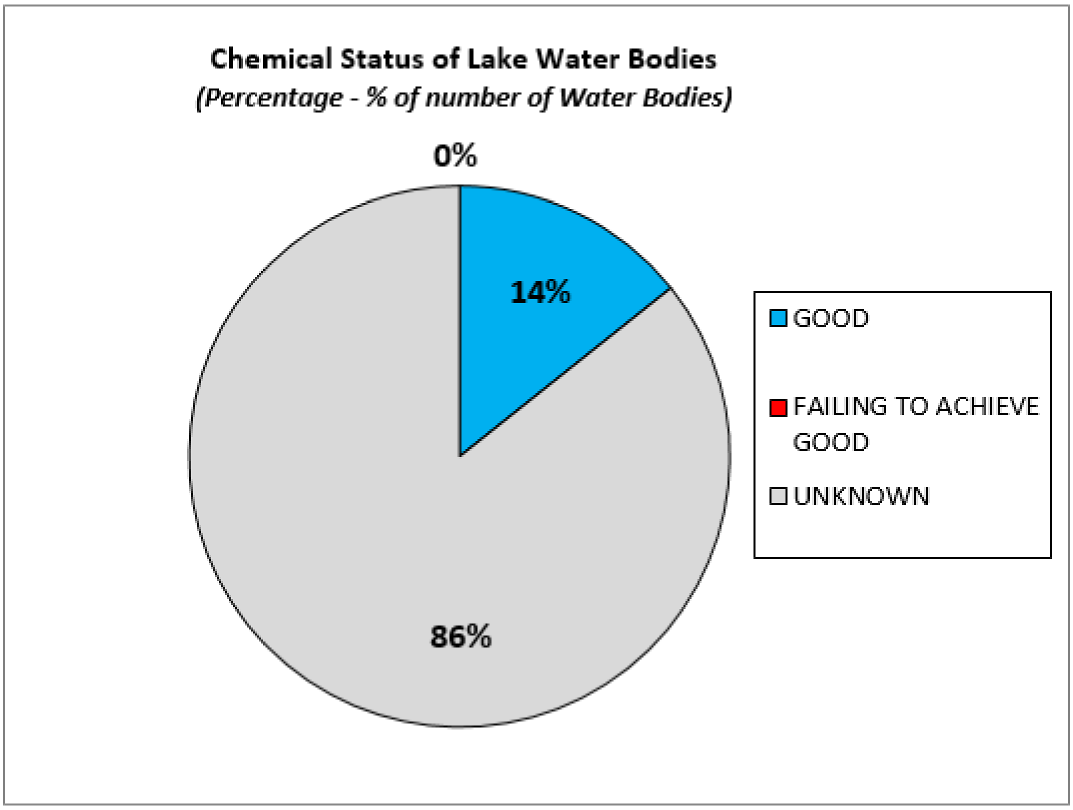


Figure 5.2-3: Chemical Status in Lake Water Bodies – Percentage of number of WBs

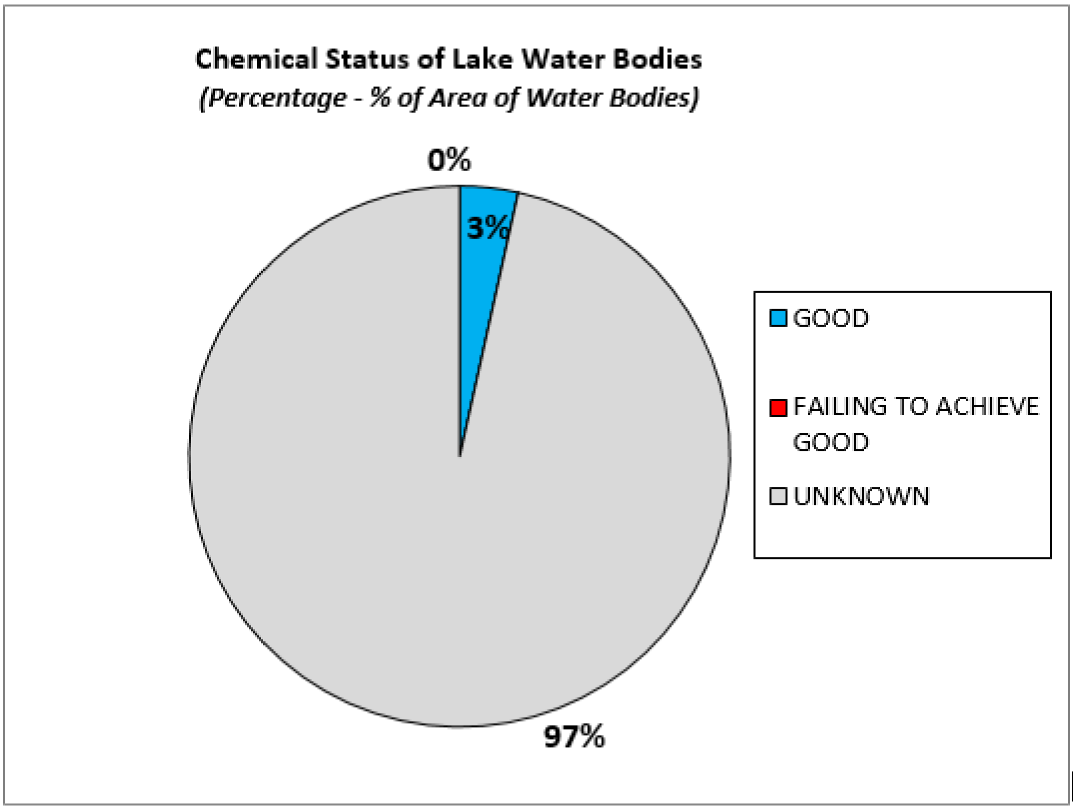
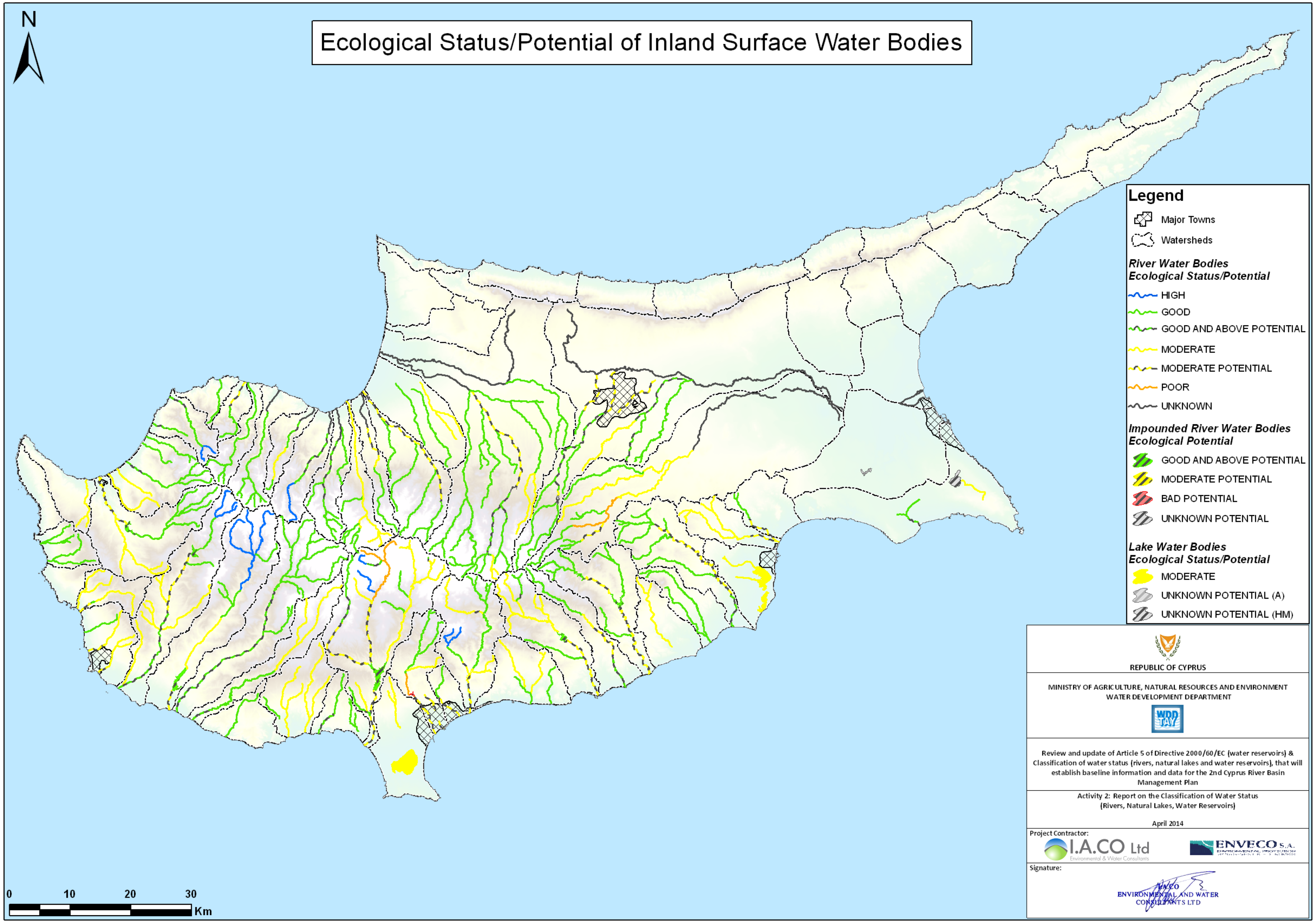


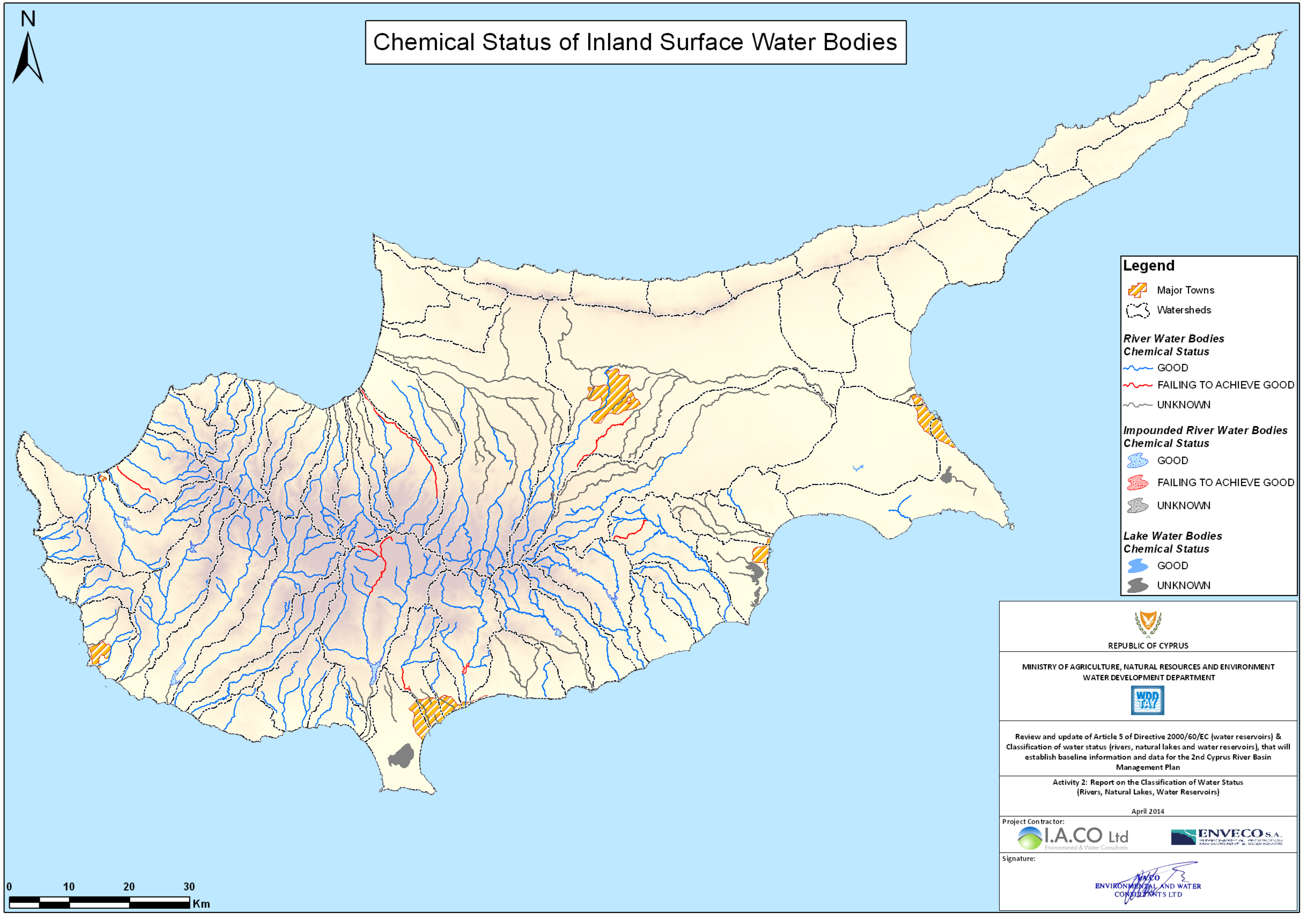
Figure 5.2-4: Chemical Status in Lake Water Bodies – Percentage of area of WBs

5.3 MAPS OF ECOLOGICAL & CHEMICAL STATUS FOR ALL INLAND SURFACE WATER BODIES

In the following Maps 5.3-1 and 5.3-2, the Ecological Status/Potential and Chemical Status of all inland Surface Water bodies are presented.



Map 5.3-1: Ecological Status/ Potential of Inland Surface Waters



Map 5.3-2: Chemical Status of Inland Surface Waters

CHAPTER 6. CONFIDENCE - PRECISION OF THE CHEMICAL AND ECOLOGICAL STATUS OF RIVER AND LAKE WATER BODIES

The classification of the water bodies' status includes sources of uncertainty. An estimate of the confidence and precision provided by the methods used in monitoring is necessary for assessing the confidence in the results of monitoring and the confidence that the class assigned to a water body is the true class. The methodology for the estimation of uncertainty in the monitoring results and WBs status classification is similar to the one used in 1st RBMP, but there are also significant differences in some assumptions, mainly due to the existence of more data and deeper knowledge of the WBs. The methodology and results of the estimation of uncertainty in the classification of water bodies are described in the following paragraphs.

6.1 CONFIDENCE AND PRECISION IN RIVER WBS STATUS CLASSIFICATION

6.1.1 Ecological Status/Potential

6.1.1.1 Biological Quality Elements

Uncertainty in BQEs results was considered as a function of the number of measurements (n) and the relative standard deviation [%RStDev = 100*(StDev/average of measurements]:

$$Uncertainty\ Index = \%RStDev \div n$$

This calculation was used for each Quality Element (i.e. Macroinvertebrates, Diatoms and Macrophytes) at each monitoring station. This resulted in a range of Uncertainty Index values that were categorized as follows:

Uncertainty Index values	Uncertainty	Uncertainty Class
0 - 10	LOW	1
10 - 20	MEDIUM	2
20 - 30	HIGH	3
> 30	VERY HIGH	4

If there was only one measurement, then the uncertainty index was set by default as high (class = 3).

Then the total biological uncertainty was calculated as follows:

- if biological status of a monitoring station is determined by more than one BQE, and there is difference in the status, then the uncertainty of the overall status equals to the determining BQE uncertainty value.
- if biological status of a monitoring station is determined by more than one BQE, and there is no difference in the status, then the uncertainty of the overall status equals to the average of the BQEs uncertainties.

- If biological status of a monitoring station is determined by only one BQE, then the uncertainty of the overall status equals to this BQE uncertainty value.

The results are presented in the following Table.

Table 6.1.1.1-1: Uncertainty Index (U.I.) for Biological QEs at each river monitoring station

Station code	River name	Site name	Macroinvertebrates				Diatoms				Macrophytes			OVERALL STATUS	overall uncertainty index %Rsd/n	overall uncertainty class
			Status	# samples	stdevp	uncertainty index %Rsd/n	STATUS	# samples	stdevp	uncertainty index %Rsd/n	Status	# samples	uncertainty index %Rsd/n			
r1-1-3-95	Cha Potami	Kissousa weir	0,617	4	5	2,19	0,889	5	8	1,7				M	2,19	1
r1-2-4-25	Dhiarizos	u/s Arminou Dam	1,032	4	0,13	3,17	0,987	3	3	0,85				H	0,85	1
r1-3-5-05	Xeros	Lazaridhes	0,996	4	0,12	3,09	1,032	4	5	1,33				H	1,33	1
r1-3-5-91	Xeros	Roudhias Bridge									0,971	1	25	H	25	3
r1-3-6-53	Xeros	Rotsos twn Laoudiwn	1,07	4	9	2,08	0,777	4	5	1,54				G	1,54	1
r1-3-8-60	Xeros	Phinikas	0,694	4	9	3,21	0,819	2	2	1,28				M	3,21	1
r1-4-3-35	Ayia	u/s Kannaviou Dam	0,973	6	7	1,18	0,838	4	7	2,22				G	1,18	1
r1-4-5-73	Ezousa	Pitharkou	0,781	1	0	25	1,047	1	0	25				G	25	3
r1-4-7-10	Ezousa	Moro nero	0,794	3	8	3,56	0,949	3	2	0,86				G	3,56	1
r2-2-3-95	Chrysochou	skoulloi	0,517	4	8	3,93	0,957	4	6	1,54				M	3,93	1
r2-2-5-02	Stavros tis Psokas	Gorges	0,794	3	5	1,96	1,045	1	0	25				G	1,96	1
r2-2-5-75	Stavros tis Psokas	Rizokremmos	0,857	3	5	1,82	0,888	3	0,11	4,17				G	1,82	1
r2-2-6-24	Stavros tis Psokas	coulvert	0,82	1	0	25	0,905	1	0	25				G	25	3
r2-3-8-48	Gialia	Pochalandra	1,063	4	7	1,75	0,862	3	1	0,41				G	0,41	1
r2-4-6-65	Leivadi	u/s weir	1,015	3	8	2,69	0,738	1	0	25				G	25	3
r2-7-2-75	Pyrgos	Phleva	0,899	6	0,15	2,76	0,925	4	9	2,31				G	2,31	1
r2-8-3-10	Limnitis	Saw Mill	1,054	11	0,11	0,97	1,041	9	0,13	1,43				H	0,97	1
r2-9-2-50	Kambos	Ag. Varvara	0,909	4	0,11	2,96	0,794	4	0,15	4,57				G	2,96	1
r3-1-2-30	Xeros	u/s Kafizes Dam	1,063	5	3	0,53	0,785	3	7	3,11				G	3,11	1
r3-2-1-85	Marathasa	u/s Kalopanagiotis Dam	0,861	4	0,17	4,84	0,937	4	0,13	3,51				G	4,84	1
r3-3-1-60	Agios Nikolaos	u/s Fish Farm	0,761	5	0,1	2,75	1,167	6	5	0,76	0,99	1	25	G	2,75	1
r3-3-3-27	Kargwtis	Galata									0,449	1	25	M	25	3
r3-3-3-95	Kargotis	Evrychou	0,5	3	3	2,16	0,823	3	1	0,3	0,362	1	25	P	25	3
r3-5-1-50	Lagoudera	bridge weir	0,934	4	8	2,04	0,91	4	0,13	3,61				G	2,04	1
r3-5-4-40	Elea	Vizakia	0,714	4	0,2	6,99	0,695	4	0,24	8,53				M	6,99	1
r3-7-1-55	Peristerona	Sifilos	0,797	4	8	2,42	0,817	4	7	2,21				G	2,21	1
r3-7-3-71	Akaki	u/s Akaki-Malounta Dam	0,81	4	0,12	3,59	0,825	4	7	2,04				G	2,04	1
r6-1-1-48	Pediaios	Agios Onoufrios	0,748	2	0,17	11,1								G	11,1	2
r6-1-1-72	Pedhiaios	Filani	0,892	2	1	0,28	0,914	2	9	4,7				G	0,28	1
r6-5-1-85	Gialias	Kotsiatis	0,478	4	0,11	5,83	0,786	4	0,18	5,77				P	5,83	1
r8-7-1-65	Syrgatis	Kyprovasa	0,897	5	8	1,87	0,94	4	0,15	4,1				G	1,87	1

Station code	River name	Site name	Macroinvertebrates				Diatoms				Macrophytes			OVERALL STATUS	overall uncertainty index %Rsd/n	overall uncertainty class
			Status	# samples	stdevp	uncertainty index %Rsd/n	STATUS	# samples	stdevp	uncertainty index %Rsd/n	Status	# samples	uncertainty index %Rsd/n			
r8-7-2-60	Syrgatis	Pano Lefkara	0,622	4	0,11	4,42	0,861	3	0,11	4,27				M	4,42	1
r8-8-2-95	Maroni	Choirokoitia u/s weir	0,63	4	0,18	7,11	1,008	4	3	0,65				M	7,11	1
r8-9-5-40	Vasilikos	Layia u/s weir	0,868	3	9	3,33	0,878	3	0,11	4,32				G	3,33	1
r9-2-3-05	Germasogeia	Dierona	0,756	3	3	1,51	0,779	3	2	0,88				G	0,88	1
r9-2-3-29	Germasogeia	Prasteio	0,911	1	0	25	0,718	1	0	25				M	25	3
r9-2-3-85	Germasogeia	Phinikaria	0,923	4	0,14	3,66	0,768	3	5	2,24				G	2,24	1
r9-2-4-27	Germasogeia	Argaki tou monastiriou	1,018	1	0	25	1,02	1	0	25				H	25	3
r9-4-1-38	Garyllis	d/s Ayia Paraskevi	0,824	2	0,19	11,71								G	11,71	2
r9-4-1-63	Garyllis	u/s Gerasa	1,029	2	0,23	11,32								H	11,32	2
r9-4-1-93	Garyllis	d/s Gerasa	0,458	2	8	9,01								P	9,01	1
r9-4-3-80	Garyllis	u/s Polemidia Dam weir (Ayia Eirini)	0,382	4	0,23	14,88	0,361	2	0,17	23,34				P	14,88	2
r9-4-3-89	Garyllis	Polemidia dam u/s	0,445	1	0	25								P	25	3
r9-4-3-94	Garyllis	Polemidia dam	0,447	3	0,11	8,34								P	8,34	1
r9-6-1-44	Kryos	u/s Myllomeris Waterfall	0,9	4	8	2,22	0,965	4	8	2,13				G	2,22	1
r9-6-1-87	Kryos	Koilani	0,871	3	9	3,48	1,061	3	4	1,33				G	3,48	1
r9-6-2-60	Kryos	u/s Tunnel Outlet	0,731	3	9	3,9	0,873	3	7	2,54				M	3,9	1
r9-6-3-15	Kouris	Amiantos loumata	1,08	1	0	25	1,111	1	0	25				H	25	3
r9-6-3-36	Kouris	Kato Amiantos	0,474	3	0,24	16,66	0,907	3	0,14	5,19				P	16,66	2
r9-6-4-92	Kouris	Alassa new weir	0,901	4	6	1,72	0,933	4	7	1,96				G	1,72	1
r-9-6-5-17	Ambelikos	Kyperounta	0,546	2	0,22	20,15								M	20,15	3
r-9-6-5-53	Ampelikos	Potamitissa	0,756	2	0,18	11,94								G	11,94	2
r9-6-5-57	Agros	Agros	0,583	2	0,11	9,78								M	9,78	1
r9-6-5-62	Agros	near Kato Milos reservoir	0,534	2	7	6,51								M	6,51	1
r9-6-5-66	Ayios Ioannis	Ayios Ioannis	0,849	1	0	25								G	25	3
r9-6-5-67	Ayios Ioannis	near Ayios Ioannis	0,794	3	7	2,75								G	2,75	1
r9-6-5-69	Agros	Kato Milos bridge	0,67	2	0,2	14,59								M	14,59	2
r9-6-6-32	Limnatis	Ag. Mamas	0,838	8	0,11	1,66	0,859	4	6	1,73				G	1,66	1
r9-6-6-93	Limnatis	Kapilio	0,983	2	1	0,36								H	0,36	1
r9-6-7-29	Limnatis	Limnatis village	0,976	8	2	0,2								H	0,2	1
r9-6-7-70	Limnatis	u/s Kouris Dam	0,852	8	0,13	1,84	0,768	3	6	2,73				G	1,84	1

6.1.1.2 Chemical/ Physicochemical Quality Elements

Uncertainty in Chemical/ Physicochemical monitoring results was considered as well as a function of the number of measurements (n) and the relative standard deviation [%RStDev = 100*(StDev/average of measurements]:

$$Uncertainty\ Index = \%RStDev \div n$$

This calculation was used for each parameter (i.e. BOD, DO, EC, NO_3, etc) at each monitoring station. If there was only one measurement, then the uncertainty index was set by default as high. Then the Uncertainty Index for each Group that represents a different type of pressure (Organic Load, Chemical Load, Salination, Other Substances) was calculated by using the following formula:

$$\frac{\sqrt{\sum_{i=1}^{n}(x_1)^2} + (x_2)^2 + \ldots + (x_n)^2}{n-1}$$

where n is number of parameters

Then the total Chemical/ Physicochemical Uncertainty Index for each monitoring station equals the uncertainty of the status determining Group. This resulted in a range of Uncertainty Index values that were also categorized as follows:

Uncertainty Index values	Uncertainty	Uncertainty Class
0 - 10	LOW	1
10 - 20	MEDIUM	2
20 - 30	HIGH	3
> 30	VERY HIGH	4

The results are presented in the following Table.

Table 6.1.1.2-1: Uncertainty Index (U.I.) for Chemical - Physicochemical QEs at each river monitoring station

MONITORING STATION CODE	MONITORING STATION NAME	ORGANIC LOAD (O.L.)						CHEMICAL LOAD (C.L.)			SALINATION (S.)			OTHER SUBSTANCES			OVERALL U.I.	UNCERTAINTY CLASS
		BOD_5	DO	NH_4-N	NO_2-N	TP	O.L.	PO_4-P	NO_3-N	C.L.	EC	SAR	S.	Cu	B	Zn		
		U.I.						U.I.			U.I.			U.I.				
r1-1-3-95	Chapotami near Kissousa	6,10	0,42	12,51	3,60	13,46	4,92	2,90	2,56	3,86	0,27	0,93	0,97	00	2,14	00	4,92	1
r1-1-6-65	Chapotami near Kato Archimandrita	7,45	0,80	18,17	15,41	6,80	6,47	5,86	3,46	6,81	0,56	1,56	1,66		3,40		6,81	1
r1-2-4-25	Diarizos U/S Arminou Dam	3,27	0,29	3,90	10,92	13,30	4,49	11,97	3,04	12,35	0,21	1,04	1,06		2,51		12,35	2
r1-2-6-89	Diarizos @ Mamonia	8,66	1,01	8,18	00	00	2,99	00	30,34	30,34	0,55	11,99	12,00	00	2,84	00	30,34	4
r1-3-5-05	Xeros near Lazarides	2,83	0,27	3,60	3,05	4,01	1,70	2,17	4,24	4,76	0,17	1,08	1,09	00	2,14		1,09	1
r1-3-6-53	Xeros @ Rotsos Ton Laoudion	16,67	4,17	00	42,48	20,41	12,54	5,00	31,24	31,64	0,23		0,23		23,87		12,54	2
r1-3-8-60	Xeros near Foinikas	5,89	0,81	6,63	12,10	10,54	4,59	3,86	2,38	4,54	0,55	1,06	1,20		2,43		4,59	1
r1-4-3-35	Ayia u/s Kannaviou Reservoir	4,48	0,53	5,20	2,98	2,95	2,01	2,90	5,56	6,27	0,40	1,36	1,42	00	8,39	00	1,42	1
r1-4-5-73	Ezousa @ Pitargou	00	00	00	00	00	00	00	00	00	00		00		00		25,00	3
r1-4-7-10	Ezousas near Moro Nero	4,32	0,50	7,07	7,73	9,30	3,67	9,13	2,96	9,60	0,38	0,76	0,85		1,14		3,67	1
r2-2-3-95	Chrysochou near Skoulli	5,54	0,80	16,99	9,05	8,70	5,46	4,54	3,02	5,45	0,55	1,66	1,75	1,56	2,56	3,58	5,46	1
r2-2-5-02	Stavros tis Psokas @ Pitieri	35,71	3,68	00	300	00	11,70	00	00	00	2,87		2,87		00		2,87	1
r2-2-5-75	Stavros Tis Psokas R. @ Rizokremmos	6,05	1,15	8,45	4,09	9,14	3,62	4,05	7,03	8,11	0,71	0,66	0,97	00	3,01	3,55	0,97	1
r2-3-2-96	Pelathousa R. (Argaki tis Limnis) @ Polis-Argaka Rd.	16,33	2,20	6,46	8,18	00	4,87	00	6,91	6,91	5,13	3,41	6,15	15,41	2,68	24,59	6,15	1
r2-3-4-80	Makounta U/S Argaka Dam	20,73	1,03	11,11	00	00	5,89	00	3,63	3,63	0,57	2,85	2,91	00	00	00	5,89	1
r2-3-8-48	Gialia @ Pochalandra	00	0,68	00	00	00	0,17	00	22,58	22,58	0,23		0,23		6,00		0,23	1
r2-4-6-68	Leivadi u/s weir	6,26	2,80	3,20	7,06	00	2,59	00	9,91	9,91	3,83		3,83		13,78		3,83	1
r2-7-2-75	Pyrgos near Fleva	4,60	0,48	4,59	3,76	7,13	2,59	4,29	5,05	6,62	1,01	1,35	1,69		2,30		1,69	1
r2-8-3-10	Limnitis Saw Mill	3,86	0,59	5,13	7,19	6,00	2,84	2,77	5,01	5,72	0,99	1,05	1,44		2,21		2,84	1
r2-9-2-50	Kambos R. Near Ag. Varvara	3,39	0,41	4,57	2,68	3,72	1,83	2,12	1,74	2,74	0,18	1,16	1,18	00	1,65	00	2,74	1
r3-1-2-30	Xeros R. U/S Kafizes Dam	6,88	0,91	8,25	20,13	19,80	7,56	5,11	9,35	10,66	0,51	1,38	1,47		2,54		7,56	1
r3-2-1-85	Marathasa U/S Kalopanagiotis Dam	2,72	0,36	13,92	3,21	2,14	3,67	3,23	1,82	3,71	0,30	1,00	1,04	00	1,73	00	3,71	1
r3-3-1-60	Agios Nikolaos U/S Fish Farm	2,94	0,28	9,85	4,48	3,30	2,92	2,17	3,85	4,42	0,10	1,17	1,18	00	1,57	00	2,92	1
r3-3-3-95	Kargotis near Evrychou	4,04	0,36	6,25	5,65	1,96	2,39	2,45	2,01	3,18	0,41	0,89	0,98	00	1,49	1,42	3,18	1
r3-4-2-90	Atsas near Evrychou	11,79	1,69	19,71	00	23,57	8,24	00	20,72	20,72	1,22		1,22	00	12,67	00	1,22	1
r3-5-1-50	Lagoudera near Lagoudera Br.	6,72	2,42	8,51	8,94	5,13	3,79	4,04	3,74	5,50	0,84	1,36	1,60		4,13		3,79	1
r3-5-4-40	Elia near Vyzakia	5,28	0,47	6,42	5,84	4,49	2,78	2,73	4,78	5,50	0,68	1,18	1,36	5,43	2,40	5,67	5,50	1
r3-7-1-55	Peristerona R. @ Siphilos	4,25	0,56	7,61	12,36	5,47	4,02	4,18	3,35	5,36	0,66	1,33	1,48	1,16	4,28	2,57	5,36	1
r3-7-1-84	Peristerona @ Peristerona	8,53	13,78	20,29	12,07	5,67	7,30	15,47	12,79	207	1,50	1,87	2,40	5,77	4,37	00	207	3
r3-7-3-71	Akaki U/S Akaki-Malounta Dam	6,04	3,71	5,52	4,50	6,95	3,05	2,83	2,94	4,08	0,83	1,13	1,41	0,97	1,78	2,44	4,08	1
r6-1-1-48	Ay. Onouphrios @ Ay. Onouphrios Church	00	5,83	00	00	25,00	6,42	00	48,92	48,92	2,96		2,96		28,82		2,96	1
r6-1-1-72	Pediaios R. @ Philani	7,41	0,50	10,66	10,88	10,21	4,95	7,47	4,32	8,62	1,34	3,60	3,85	00	5,95	9,73	3,85	1

MONITORING STATION CODE	MONITORING STATION NAME	ORGANIC LOAD (O.L.)						CHEMICAL LOAD (C.L.)			SALINATION (S.)			OTHER SUBSTANCES			OVERALL U.I.	UNCERTAINTY CLASS
		BOD_5	DO	NH_4-N	NO_2-N	TP	O.L.	PO_4-P	NO_3-N	C.L.	EC	SAR	S.	Cu	B	Zn		
		U.I.						U.I.			U.I.			U.I.				
r6-1-1-80	Agios Onoufrios near Kampia	23,57	1,49	20,67	11,79	28,69	11,03	00	11,38	11,38	1,54		1,54	00	00	00	1,54	1
r6-1-2-38	Pediaios near Kato Deftera	23,48	2,43	13,70	28,61	16,27	10,69	23,18	8,90	24,83	4,84	2,17	5,30	00	6,32	20,51	24,83	3
r6-1-2-90	Pediaios near Lefkosia	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	25,00	3
r6-1-5-52	Vathys @ Athalassa Park	00	2,38	41,94	17,73	26,58	13,19	38,42	10,41	39,81	11,80	14,86	18,98	00	9,37	00	39,81	4
r6-5-1-85	Gialias near Kotsiati	4,38	0,86	4,98	3,72	4,33	2,20	7,35	3,20	8,02	0,91	1,58	1,82		2,27		8,02	1
r6-5-3-15	Gialias near Nisou	10,24	2,33	32,44	14,15	6,53	9,37	13,55	6,87	15,20	2,47	1,98	3,16	00	2,12	00	15,20	2
r6-5-3-50	Gialias near Potamia	17,83	1,30	1,68	12,22	13,99	6,46	208	2,55	20,24	5,65	4,95	7,51	00	3,20	00	20,24	3
r8-4-3-40	Treminthos near Agia Anna	6,87	0,82	7,98	4,27	5,49	3,16	8,05	2,28	8,37	0,52	1,03	1,16	2,84	1,10	2,44	8,37	1
r8-4-5-30	Treminthos near Klavdia	15,58	2,04	14,13	9,36	8,23	6,13	12,11	3,10	12,50	0,99	2,74	2,91	7,49	2,71	00	12,50	2
r8-7-1-65	Syriatis R. @ Kyprovasa	6,36	0,48	9,74	7,38	3,40	3,55	5,77	5,92	8,26	0,38	1,03	1,09	15,27	3,94	00	1,09	1
r8-7-2-60	Syriatis near Pano Lefkara	5,07	1,08	6,22	3,99	12,52	3,86	10,28	4,02	11,04	0,37	0,69	0,78	00	3,56	00	0,78	1
r8-8-2-95	Maroni near Choirokoitia	7,63	0,62	8,02	5,68	7,07	3,58	4,68	5,43	7,17	0,87	1,42	1,67				1,67	1
r8-9-5-40	Vasilikos near Lageia	4,08	12,59	4,29	7,99	13,26	5,20	14,23	2,50	14,45	0,56	0,82	0,99				14,45	2
r9-2-3-05	Germasogeia R. @ Dierona	4,13	0,35	5,14	8,37	4,08	2,85	4,11	1,56	4,40	0,37	1,02	1,08				4,40	1
r9-2-3-85	Germasogeia near Foinikaria	4,83	0,31	6,84	3,59	4,74	2,57	2,62	2,04	3,32	0,26	1,34	1,36				3,32	1
r9-2-4-27	Argaki tou Monastiriou near Amyrou Monastery	00		00	00	00	00	00	00	00							25,00	3
r9-2-4-95	Gialiades (Akrounta) U/S Germasogeia Dam	13,05	0,77	7,65	9,81	16,88	6,18	00	2,56	2,56	0,53		0,53				0,53	1
r9-4-3-41	Garyllis R. @ Paramytha	00	2,27	12,78	18,63	23,32	8,14	00	6,89	6,89	0,42	0,93	1,02				8,14	1
r9-4-3-80	Garyllis U/S Polemidia Dam	4,14	0,54	7,81	3,82	3,31	2,55	4,92	3,65	6,12	0,82	2,49	2,62				6,12	1
r9-6-1-44	Kryos R. U/S Myllomeris Waterfall	3,19	0,37	5,53	3,43	3,03	1,97	2,87	3,64	4,64	0,20	2,04	2,05				2,05	1
r9-6-1-87	Kryos @ Koilani	2,96	0,29	5,08	2,64	9,67	2,91	11,62	2,40	11,86	0,28	0,69	0,75				11,86	2
r9-6-2-60	Kryos U/S Tunnel Outlet	3,77	0,33	7,04	4,01	4,89	2,55	3,25	6,11	6,92	0,18	0,54	0,57				2,55	1
r9-6-3-15	Loumata U/S Amiandos Pond	00		00	00	00	00	00	00	00							25,00	3
r9-6-3-36	Kouris near Kato Amiantos	1,57	0,22	7,12	10,83	6,24	3,62	2,40	0,62	2,48	0,17	0,77	0,79				2,48	1
r9-6-4-92	Kouris @ Alassa New Weir	5,51	0,17	4,84	2,25	7,28	2,65	2,18	1,21	2,49	0,24	0,68	0,72				2,49	1
r9-6-5-62	Agros River Near Ag. Ioannis	8,33	3,67	9,88	16,00	2,63	5,26	8,89	7,57	11,68	0,82		0,82				11,68	2
r9-6-5-67	Ag. Ioannis River Near Ag. Ioannis	9,60	4,29	6,80	8,79	7,25	4,23	8,31	8,23	11,69	1,95		1,95				4,23	1
r9-6-5-74	Ambelikos River Near Kato Mylos	11,43	1,85	8,97	5,27	9,71	4,59	6,18	5,06	7,99	1,13		1,13				7,99	1
r9-6-5-75	Agros River Near Kato Mylos	13,03	1,60	6,56	7,79	3,08	4,22	5,69	5,49	7,91	1,70		1,70				7,91	1
r9-6-6-32	Limnatis R. Near Ag. Mamas	3,71	0,20	2,83	1,83	2,96	1,46	2,74	1,08	2,94	0,18	0,46	0,49				2,94	1
r9-6-7-70	Limnatis (Zygos) U/S Kouris Dam	3,83	0,26	4,62	2,18	3,70	1,85	4,68	1,13	4,82	0,28	0,66	0,72				4,82	1

6.1.1.3 Overall Confidence in Ecological Status of River Monitoring Stations

The overall uncertainty in the Ecological Status of each monitoring station equals the uncertainty value of the determining QE category status. If there is no difference in the status, then the uncertainty of the overall status equals to the average of the QEs categories' uncertainties. Expert judgment was used in a few cases, where there were significant differences in the results between chemical/physicochemical QEs and biological QEs where uncertainty was set in higher class.

The results of uncertainty estimation per monitoring station and per Quality Element category are presented in the following Table 6.1.1.3-1.

Table 6.1.1.3-1: Overall uncertainty (uncertainty Index U.I. and Class) in the Ecological Status of each river monitoring station

Station code	River name	Site name	BIOLOGICAL STATUS/ POTENTIAL	Uncertainty Index	Uncertainty Class	CHEMICAL / PHYSICOCHEMICAL STATUS/ POTENTIAL	Uncertainty Index	Uncertainty Class	HYDRO-MORPHOLOGICAL STATUS/ POTENTIAL	ECOLOGICAL STATUS/ POTENTIAL	Uncertainty Class
r1-1-3-95	Cha Potami	Kissousa weir	M	2,19	1	GOOD & ABOVE	4,92	1	GOOD & BELOW	M	1
r1-1-6-65	Cha Potami	near Kato Archimandrita				G	6,81	1		G	1
r1-2-4-25	Diarizos	u/s Arminou Dam	H	0,85	1	G	12,35	2	H	G	2
r1-2-6-89	Diarizos	at Mamonia				GEP	30,34	4		GOOD & ABOVE P.	4
r1-3-5-05	Xeros	Lazaridhes	H	1,33	1	H	1,09	1	H	H	1
r1-3-5-91	Xeros	Roudhias Bridge	H	25	3					H	3
r1-3-6-53	Xeros	Rotsos twn Laoudiwn	G	1,54	1	G	12,54	2		G	1
r1-3-8-60	Xeros	Phinikas	M	3,21	1	G	4,59	1	GOOD & BELOW	M	1
r1-4-3-35	Ayia	u/s Kannaviou Dam	G	1,18	1	H	1,42	1	H	G	1
r1-4-5-73	Ezousa	Pitharkou	GEP	25	3	MEP	25	3	MEP	GOOD & ABOVE P.	3
r1-4-7-10	Ezousa	Moro nero	GEP	3,56	1	GEP	3,67	1	GOOD & BELOW	GOOD & ABOVE P.	1
r2-2-3-95	Chrysochou	skoulloi	M	3,93	1	G	5,46	1	GOOD & BELOW	M	1
r2-2-5-02	Stavros tis Psokas	Gorges	G	1,96	1	G	2,87	1	H	G	1
r2-2-5-75	Stavros tis Psokas	Rizokremmos	G	1,82	1	H	0,97	1	GOOD & BELOW	G	1
r2-2-6-24	Stavros tis Psokas	coulvert	G	25	3				GOOD & BELOW	G	3
r2-3-2-96	Pelathousa R. (Argaki tis Limnis)	at Polis-Argaka Rd.				M	6,15	1		M	1
r2-3-4-80	Makounda	U/S Argaka Dam				G	5,89	1		G	1
r2-3-8-48	Gialia	Pochalandra	G	0,41	1	G	0,23	1		G	1
r2-4-6-65	Leivadi	u/s weir	G	25	3	G	3,83	1	H	G	2
r2-7-2-75	Pyrgos	Phleva	G	2,31	1	H	1,69	1	H	G	1
r2-8-3-10	Limnitis	Saw Mill	H	0,97	1	G	2,84	1	H	G	1
r2-9-2-50	Kambos	Ag. Varvara	G	2,96	1	M	2,74	1	GOOD & BELOW	M	1
r3-1-2-30	Xeros	u/s Kafizes Dam	G	3,11	1	G	7,56	1	H	G	1
r3-2-1-85	Marathasa	u/s Kalopanagiotis Dam	G	4,84	1	G	3,71	1	GOOD & BELOW	G	1
r3-3-1-60	Agios Nikolaos	u/s Fish Farm	G	2,75	1	G	2,92	1	H	G	1
r3-3-3-27	Kargwtis	Galata	M	25	3					M	3
r3-3-3-95	Kargotis	Evrychou	P	25	3	M	3,18	1		P	3
r3-4-2-90	Atsas	near Evrychou				M	1,22	1		M	1
r3-5-1-50	Lagoudera	bridge weir	G	2,04	1	G	3,79	1	H	G	1
r3-5-4-40	Elea	Vizakia	MP	6,99	1	GEP	5,5	1	GOOD & BELOW	MP	2
r3-7-1-55	Peristerona	Sifilos	G	2,21	1	G	5,36	1	GOOD & BELOW	G	1

Station code	River name	Site name	BIOLOGICAL STATUS/ POTENTIAL	Uncertainty Index	Uncertainty Class	CHEMICAL / PHYSICOCHEMICAL STATUS/ POTENTIAL	Uncertainty Index	Uncertainty Class	HYDRO-MORPHOLOGICAL STATUS/ POTENTIAL	ECOLOGICAL STATUS/ POTENTIAL	Uncertainty Class
r3-7-1-84	Peristerona	Peristerona				G	207	3		G	3
r3-7-2-93	Lykithia	Akaki	ND			ND			ND	ND	ND
r3-7-3-71	Akaki	u/s Akaki-Malounta Dam	GEP	2,04	1	GEP	4,08	1	GOOD & BELOW	GOOD & ABOVE P.	1
r6-1-1-48	Pediaios	Agios Onoufrios	G	11,1	2	G	2,96	1	H	G	1
r6-1-1-72	Pedhiaios	Filani	G	0,28	1	H	3,85	1	H	G	1
r6-1-1-80	Agios Onoufrios	near Kampia				G	1,54	1		G	1
r6-1-2-38	Pediaios	near Kato Deftera				GEP	24,83	3		GOOD & ABOVE P.	3
r6-1-2-90	Pediaios	near Lefkosia				MP	25	3	GOOD & BELOW	MP	3
r6-1-5-52	Vathys	at Athalassa Park				P	39,81	4		M	4
r6-5-1-85	Gialias	Kotsiatis	P	5,83	1	M	8,02	1	GOOD & BELOW	P	1
r6-5-3-15	Gialias	near Nisou				M	15,2	2		M	2
r6-5-3-50	Gialias	near Potamia				M	20,24	3		M	3
r8-4-3-40	Tremithos	near Agia Anna				MP	8,37	1	GOOD & BELOW	MP	1
r8-4-5-30	Tremithos	near Klavdia				MP	12,5	2		MP	2
r8-7-1-65	Syrgatis	Kyprovasa	G	1,87	1	H	1,09	1	H	G	1
r8-7-2-60	Syrgatis	Pano Lefkara	MP	4,42	1	GEP	0,78	1	GOOD & BELOW	MP	1
r8-8-2-95	Maroni	Choirokoitia u/s weir	MP	7,11	1	GEP	1,67	1		MP	1
r8-9-5-40	Vasilikos	Layia u/s weir	G	3,33	1	M	14,45	2	H	M	2
r9-2-3-05	Germasogeia	Dierona	G	0,88	1	G	4,4	1	GOOD & BELOW	G	1
r9-2-3-29	Germasogeia	Prasteio	M	25	3				H	M	3
r9-2-3-85	Germasogeia	Phinikaria	G	2,24	1	G	3,32	1	H	G	1
r9-2-4-27	Germasogeia	Argaki tou monastiriou	H	25	3	H	25	3		H	2
r9-2-4-95	Gialiades (Akrounda)	U/S Germasogeia Dam				MP	0,53	1		MP	1
r9-4-1-38	Garyllis	d/s Ayia Paraskevi	G	11,71	2					G	2
r9-4-1-63	Garyllis	u/s Gerasa	H	11,32	2					H	2
r9-4-1-93	Garyllis	d/s Gerasa	P	9,01	1					P	1
r9-4-3-41	Garyllis	Paramytha				G	8,14	1		G	1
r9-4-3-80	Garyllis	u/s Polemidia Dam weir (Ayia Eirini)	P	14,88	2	B	6,12	1		P	3
r9-4-3-89	Garyllis	Polemidia dam u/s	P	25	3					P	3
r9-4-3-94	Garyllis	Polemidia dam	P	8,34	1					P	1
r9-6-1-44	Kryos	u/s Myllomeris Waterfall	G	2,22	1	H	2,05	1	GOOD & BELOW	G	1
r9-6-1-87	Kryos	Koilani	GEP	3,48	1	GEP	11,86	2	GOOD & BELOW	GOOD & ABOVE P.	1
r9-6-2-60	Kryos	u/s Tunnel Outlet	MP	3,9	1	GEP	2,55	1	GOOD & BELOW	MP	1

Station code	River name	Site name	BIOLOGICAL STATUS/ POTENTIAL	Uncertainty Index	Uncertainty Class	CHEMICAL / PHYSICOCHEMICAL STATUS/ POTENTIAL	Uncertainty Index	Uncertainty Class	HYDRO-MORPHOLOGICAL STATUS/ POTENTIAL	ECOLOGICAL STATUS/ POTENTIAL	Uncertainty Class
r9-6-3-15	Kouris	Amiantos loumata	H	25	3	H	25	3		H	3
r9-6-3-36	Kouris	Kato Amiantos	P	16,66	2	M	2,48	1		P	2
r9-6-4-92	Kouris	Alassa new weir	GEP	1,72	1	MP	2,49	1	GOOD & BELOW	MP	1
r9-6-5-17	Ambelikos	Kyperounta	M	20,15	3					M	3
r9-6-5-53	Ampelikos	Potamitissa	G	11,94	2					G	2
r9-6-5-57	Agros	Agros	M	9,78	1					M	1
r9-6-5-62	Agros	near Kato Milos reservoir	M	6,51	1	P	11,68	2		M	1
r9-6-5-66	Ayios Ioannis	Ayios Ioannis	G	25	3					G	3
r9-6-5-67	Ayios Ioannis	near Ayios Ioannis	G	2,75	1	B	4,23	1		M	2
r9-6-5-69	Agros	Kato Milos bridge	M	14,59	2					M	2
r9-6-5-74	Ambelikos	Near Kato Mylos				M	7,99	1		M	1
r9-6-5-75	Agros	Near Kato Mylos				M	7,91	1		M	1
r9-6-6-32	Limnatis	Ag. Mamas	G	1,66	1	M	2,94	1	H	M	1
r9-6-6-93	Limnatis	Kapilio	H	0,36	1					H	1
r9-6-7-29	Limnatis	Limnatis village	H	0,2	1					H	1
r9-6-7-70	Limnatis	u/s Kouris Dam	G	1,84	1	M	4,82	1	GOOD & BELOW	M	1

6.1.1.4 Overall Confidence in Ecological Status of River Water Bodies

To determine the overall Confidence in the Ecological Status/Potential of River Water Bodies, the following assumptions were made:

- For water bodies where there is one monitoring station, then their status/potential is the same as status/potential of monitoring station. Thus, the uncertainty class of the water body equals the uncertainty class of the monitoring station.
- For water bodies where there is more than one monitoring station, then their status/potential is the average of all measurements. Thus, the uncertainty class of the water body equals the uncertainty class of the determining QE.
- For Water Bodies where there are no monitoring stations, then their status/potential equals the status of the Assessment Group in which they belong. Thus, the uncertainty class of the water body equals the uncertainty class of the Assessment Group in which it belongs.

To calculate the uncertainty of each Assessment Group, the same principles are used as described in paragraphs 6.1.1.1 to 6.1.1.3 of this report. However, the range of Uncertainty Index values was categorized as follows:

Uncertainty Index values	Uncertainty	Uncertainty Class
0 - 1	MEDIUM	1
1 - 2	MEDIUM	2
2 - 3	HIGH	3
> 3	VERY HIGH	4

In the case of Assessment Groups, it was assumed that all water bodies to which their status is assigned based on the group status will have at least medium uncertainty. This is the reason that all Uncertainty Index values from 0-2 are classified as medium.

In addition for the Ephemeral and Harsh Intermittent Negligible Groups where there are no monitoring stations, the uncertainty was set as very high. Also, in the case of Harsh Intermittent Minor Group, the uncertainty was set as very high by expert judgment since, as was already mentioned, the biological QEs can only marginally be monitored due to flow regime and this is reflected on the variability of results and the degree of applicability of BQEs on this type of river water bodies.

The Overall uncertainty in the Ecological Status of each Assessment Group based on all the above is presented in Table 6.1.1.4-1.

Table 6.1.1.4-1: Overall uncertainty (uncertainty Index U.I. and Class) in the Ecological Status of each Assessment Group

GROUP	BIOLOGICAL STATUS/ POTENTIAL				PHYSICOCHEMICAL STATUS/ POTENTIAL				OVERALL ECOLOGICAL STATUS/ POTENTIAL	UNCERTAINTY CLASS
	# stations per GROUP	WB status	Uncertainty Index	Uncertainty Class	# 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

Apart from the above, for some water bodies in the group Ih-Minor, expert judgment was used for their ecological status/potential and moderate status/potential was changed to good status/potential where there were no significant pressures. This is because the flow regime in this group allows only marginally the monitoring of biological elements and thus there is high uncertainty in the status of water bodies, based on biological QEs. Also for some water bodies, which are mainly affected by Hydromorphological pressures, expert judgment was used for their ecological status/potential. In most cases good ecological status/potential was downgraded to moderate ecological status/potential. The uncertainty for the status of all these WBs was set as very high (class = 4).

The overall results of uncertainty per water body are already presented in the Table 5.1.2-2 of this report. Out of the **230 river water bodies**:

- **41** are classified with **low** uncertainty (compared to 21 WBs in the 1st RBMP)
- **49** are classified with **medium** uncertainty (compared to 36 WBs in the 1st RBMP)
- **16** are classified with **high** uncertainty (compared to 19 WBs in the 1st RBMP)
- **115** are classified with **very high** uncertainty (compared to 87 WBs in the 1st RBMP)
- **9** are **not classified** (occupied) (compared to 53 WBs in the 1st RBMP)

These 115 river water bodies with very high uncertainty concern mainly the ephemeral and harsh intermittent water bodies where there is truly high variability of results and less available data.

Although a comparison of the uncertainty classes' numbers with the 1st RBMP is indicated, there are differences in the methodology and assumptions of uncertainty estimation between the present Contract and the 1st RBMP. This should be taken under consideration at the interpretation of the comparative values.

6.1.2 Chemical Status

Uncertainty in Chemical monitoring results was considered as well as a function of the number of measurements (n) and the relative standard deviation [%RStDev = 100*(StDev/average of measurements]:

$$Uncertainty\ Index = \%RStDev \div n$$

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 exceedances

This resulted in a range of Uncertainty Index values that were also categorized as follows:

Uncertainty Index values	Uncertainty	Uncertainty Class
0 - 10	LOW	1
10 - 20	MEDIUM	2
20 - 30	HIGH	3
> 30	VERY HIGH	4

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 5.1.2-2 of this report. Out of the **230 river water bodies**:

- **23** are classified with **low** uncertainty (compared to 11 WBs in the 1st RBMP)
- **32** are classified with **medium** uncertainty (compared to 57 WBs in the 1st RBMP)
- **16** are classified with **high** uncertainty (compared to 41 WBs in the 1st RBMP)
- **107** are classified with **very high** uncertainty (compared to 54 WBs in the 1st RBMP)
- **52** are **not classified** (compared to 53 WBs in the 1st RBMP)

Although a comparison of the uncertainty classes' numbers with the 1st RBMP is indicated, there are differences in the methodology and assumptions of uncertainty estimation between the present Contract and the 1st RBMP. This should be taken under consideration at the interpretation of the comparative values.

6.2 Confidence and Precision in Impounded River WBs Status Classification

6.2.1 Ecological Status/Potential

6.2.1.1 Biological Quality Elements

Uncertainty in BQEs results was considered as a function of the number of measurements (n) and the relative standard deviation [%RStDev = 100*(StDev/average of measurements]:

$$Uncertainty\ Index = \%RStDev \div n$$

This calculation was used for each Phytoplankton yearly average value at each monitoring station. This resulted in a range of Uncertainty Index values that were categorized as follows:

Uncertainty Index values	Uncertainty	Uncertainty Class
0 - 10	LOW	1
10 - 20	MEDIUM	2
20 - 30	HIGH	3
> 30	VERY HIGH	4

If there was only one measurement (Pano Platres), then the uncertainty index was set by default as high (class = 3).

6.2.1.2 Chemical/ Physicochemical Quality Elements

Uncertainty in Chemical/ Physicochemical monitoring results was considered as well as a function of the number of measurements (n) and the relative standard deviation [%RStDev = 100*(StDev/average of measurements]:

$$Uncertainty\ Index = \%RStDev \div n$$

This calculation was used for each parameter (i.e. DO, EC, pH etc) at each monitoring station. If there was only one measurement, then the uncertainty index was set by default as high. Then the total Chemical/ Physicochemical Uncertainty Index for each monitoring station was calculated by using the following formula:

$$\frac{\sqrt{\sum_{i=1}^{n}(x_1)^2+(x_2)^2+\ldots+(x_n)^2}}{n-1}$$

where n is number of parameters

This resulted in a range of Uncertainty Index values that were also categorized as follows:

Uncertainty Index values	Uncertainty	Uncertainty Class
0 - 10	LOW	1
10 - 20	MEDIUM	2
20 - 30	HIGH	3
> 30	VERY HIGH	4

6.2.1.3 Overall Confidence in Ecological Status of Impounded River Monitoring Stations

The overall uncertainty in the Ecological Status of each impounded river monitoring station/ water body equals the uncertainty value of the determining QE category status. If there is no difference in the status, then the uncertainty of the overall status equals to the average of the QEs categories' uncertainties.

The results of uncertainty estimation per monitoring station and per Quality Element category are presented in the following Table 6.2.1.3-1.

Table 6.2.1.3-1: Overall uncertainty (uncertainty Index U.I. and Class) in the Ecological Status of each Impounded River (water reservoir) monitoring station

Monitoring Station Code	Name	BIOLOGICAL QUALITY	Uncertainty Index	Uncertainty Class	CHEMICAL - PHYSICOCHEMICAL QUALITY	Uncertainty Index	Uncertainty Class	OVERALL ECOLOGICAL POTENTIAL	Uncertainty Class
CY_1-2-c_RP_HM_IR	Arminou	GOOD AND ABOVE	2,48	1	GOOD AND ABOVE	4,38	1	GOOD AND ABOVE	1
CY_1-3-d_RIh_HM_IR	Asprokremmos	GOOD AND ABOVE	4,39	1	GOOD AND ABOVE	2,70	1	GOOD AND ABOVE	1
CY_1-4-c_RI_HM_IR	Kannaviou	GOOD AND ABOVE	1,46	1	GOOD AND ABOVE	3,92	1	GOOD AND ABOVE	1
CY_1-6-b_RIh_HM_IR	Mavrokolympos	GOOD AND ABOVE	0,28	1	GOOD AND ABOVE	6,36	1	GOOD AND ABOVE	1
CY_2-2-e_RI_HM_IR	Evretou	GOOD AND ABOVE	3,46	1	GOOD AND ABOVE	3,41	1	GOOD AND ABOVE	1
CY_3-5-b_RI_HM_IR	Xyliatos	GOOD AND ABOVE	3,91	1	GOOD AND ABOVE	7,31	1	GOOD AND ABOVE	1
CY_8-7-b_RI_HM_IR	Leukara	GOOD AND ABOVE	1,02	1	GOOD AND ABOVE	6,70	1	GOOD AND ABOVE	1
CY_8-7-e_RI_HM_IR	Dipotamos	GOOD AND ABOVE	7,11	1	GOOD AND ABOVE	5,39	1	GOOD AND ABOVE	1
CY_8-9-d_RI_HM_IR	Kalavasos	GOOD AND ABOVE	3,40	1	GOOD AND ABOVE	5,39	1	GOOD AND ABOVE	1
CY_9-2-g_RI_HM_IR	Germasogia	MODERATE	5,61	1	GOOD AND ABOVE	8,35	1	MODERATE	1
CY_9-4-d_RI_HM_IR	Polemidia	BAD	13,11	2	MODERATE	2,80	1	BAD	2
CY_9-6-j_RP_HM_IR	Pano Platres	GOOD AND ABOVE	31,00	4	GOOD AND ABOVE	6,29	1	GOOD AND ABOVE	4
CY_9-6-s_RP_HM_IR	Kouris	GOOD AND ABOVE	3,05	1	GOOD AND ABOVE	3,50	1	GOOD AND ABOVE	1

6.2.2 Chemical Status

The methodology for the estimation of uncertainty in Chemical monitoring results for impounded river WBs is similar to the methodology described in paragraph 6.1.2 for river WBs. Uncertainty was considered as well as a function of the number of measurements (n) and the relative standard deviation [%RStDev = 100*(StDev/average of measurements]:

$$Uncertainty\ Index = \%RStDev \div n$$

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 exceedances

This resulted in a range of Uncertainty Index values that were also categorized as follows:

Uncertainty Index values	Uncertainty	Uncertainty Class
0 - 10	LOW	1
10 - 20	MEDIUM	2
20 - 30	HIGH	3
> 30	VERY HIGH	4

The overall results of uncertainty per water body are already presented in the Table 5.1.3-1 of this report.

6.3 CONFIDENCE AND PRECISION IN LAKE WBS STATUS CLASSIFICATION

In Lake WBs both ecological and chemical status, contain many sources of uncertainty. As it is already mentioned there is absence of a methodology for monitoring (parameters, evaluation, limit values etc) of natural lakes in Cyprus, as well as absence of data.

The WDD Contract for the determination of reference conditions in the lake water bodies of Cyprus will provide an initial tool for resolving these issues.

Therefore, in lake WBs where their status is set based on expert judgement, the uncertainty was set as very high. In the case of Achna storage basin where the chemical status is set as Good, the uncertainty is set as very high, since Achna storage basin is a type of its own and there is uncertainty whether the EQS set in the Directive apply to this water body.

CHAPTER 7. FUTURE RECOMMENDATIONS

In the timeframe from the 1st RBMP to present, Cyprus has managed to collect significantly more data through the WFD monitoring programme. This has led to a deeper knowledge of the local conditions and the important management issues. In addition, through the last years of WFD implementation, there is now a better understanding of the WFD requirements and results. Therefore, the data, methodologies and results of this Contract which are based on the above, provide a sound basis for a much more informative analysis useful in the WFD monitoring program revision and implementation of targeted needs for measures.

In the following paragraphs, based on the analyses made through this Contract, various issues that need further examination in the future are indicated:

- **Monitoring network**

A substantial quantitative and qualitative improvement in the monitoring network of rivers has been made compared to the first RBMP. The increased number of samples for each BQE, the addition of new stations in the monitoring network and the use of tested and intercalibrated national methods, resulted in a wider coverage of the hydrological network of Cyprus and at the same time provided more consistent results and lower uncertainty values. Nevertheless, the monitoring network of biological and physicochemical components needs to be further expanded in order to attain more data on WB's that were not monitored for the purposes of the current assessment. This will provide a better understanding of the status of WB's not investigated and furthermore with the update of Article 5 and the subsequent review of river WB's, new monitoring stations are considered necessary.

- **Monitoring of Ephemeral and Harsh Intermittent River Water Bodies**

In Cyprus around 60% of the total length of river WBs belongs to the ephemeral and harsh intermittent types. Ephemeral rivers cannot be monitored for BQEs due to the restricted time and amount of water flow, which is limited to only a few hours up to few weeks but there may also be no flow over a whole year or longer. Similarly, the flow regime in harsh intermittent rivers allows only marginally the monitoring of biological elements. The restricted time window available for conducting samplings in this type of water bodies was evident by the results obtained in the representative stations of this group, where high variability occurred, depending of the period of sampling. In addition, most of these water bodies are subjected to hydromorphological pressures and/or potential pollution sources. Thus the status of these water bodies includes a high degree of uncertainty.

All of the above create obstacles for the extraction of reliable results by using the current assessment methods. Therefore, an innovative methodology needs to be developed and applied for the monitoring of ephemeral water bodies, probably different than the conventional methods used for the assessment of other types. Such methods could mainly be based on hydromorphological or habitat features and will allow the appropriate evaluation of the ecological status.

On the other hand, harsh intermittent rivers provide opportunities for their monitoring of BQE's using the current national methods of Cyprus, but attention must be given to the period of sampling.

The available results indicate that late spring biological samplings tend to underestimate the actual status of the harsh intermittent water bodies and therefore monitoring must take place earlier, in a very specific time window in order to attain representative samples and therefore reduce the variability in results caused by natural desiccation processes.

- **Priority substances**

Based on the results of this Contract, as well as the Department of Environment project "Preparation of an Inventory of Emissions, Discharges and Losses of Priority and Priority Hazardous Substances", [Contract Number 14/2012 (07 - 12 /2012) by I.A.CO Environmental and Water Consultants Ltd], an update of the monitoring program of priority substances needs to be made, so that it is more targeted and informative. Data that is now available through the last years monitoring, allows choosing more wisely where to focus monitoring for assessing the chemical status. Some substances that are not considered to be relevant in Cyprus RBD according to the above mentioned project (Contract Number 14/2012), can be discarded from the monitoring program, whereas an investigative monitoring in existing monitoring stations for other priority substances than those already monitored can be made for the substances found to be relevant. In addition new WB must be explored for their chemical status in order to reduce the percentage of WB with unknown chemical status.

- **Lakes - Ecological Status**

For lake water bodies, although some data have been collected for some of them, no assessment methodology has been developed, while for some others there is no data at all. The lack of an assessment method due to the complex and peculiar nature of natural lakes in Cyprus complicates any attempt for the assessment of their ecological status. Natural pressures, mainly salinity, but also temperature and water depth high fluctuations, play a key role in the BQE community structure and overlap with degradation from human pressures. The presence of especially adapted BQE has been confirmed in these ecosystems and therefore, in our opinion, an innovative method must be elaborated in order to be able to evaluate the aquatic ecosystems health in an efficient and reliable way.

Such a method could examine the presence/absence and coverage of macrophyte species in terms of quality and quantity, in close relationship with salinity values i.e salinity classes, since the variation of this parameter is a key factor for macrophyte community structure in hypersaline and brackish ecosystems. This could be achieved by setting salinity ranges and examining macrophyte communities within each range, in order to overcome the obstacles created by salinity variation during the assessment process. In addition, this could help avoiding the over- or under- estimation of status due to natural pressures.

In addition, some BQE have not yet been tested for their applicability in these lakes. Phytoplankton taxa such as *Dunaliella salina* and cyanobacteria seem to thrive even in hypersaline conditions. This also applies for diatoms (Bacillariophyta), a group that according to Hammer (1986) contains several species that tolerate salinity values greater than 100‰ (Table 7-1). These values are met in Larnaka main salt lake and occasionally in the lakes Orphani, Limni aerodromiou and Akrotiri. According to Hammer, Chlorophyta which represent phytoplankton and aquatic macrophyte species, also include salinity tolerant species. Therefore, the possibility of developing an assessment method focused in these highly tolerant species, should be investigated. Species well adapted in such harsh environments have already been recorded in Cyprus lakes i.e the invertebrate anostacans *Artemia salina*, *Phallocryptus spinosa* and notostracan *Triops cancriformis cancriformis*, macrophyte taxa *Althenia filiformis, Ruppia maritima* and Charophytes as well as the phytoplanktonic chlorophyte *Dunaliella salina*. The population dynamics of these species, as well as other species that might occur in the lakes, could prove to be an important tool for the evaluation of biological status. Finally, a different approach could be tested using a holistic approach to examine the ecosystem health in a more integrated way. Parameters such as the area covered by the water surface, the relevant and important habitats coverage, land use and acting pressures in the water basin of the lakes, could be aggregated in order monitor the changes and the perspectives of the ecosystem.

Table 7-1: Number of species of major groups of animals and plants found in different levels of salinity in world athalassic saline lakes (data from Hammer 1986)

	Salinity (‰)								
Group	30	40	50	60	70	80	90	100	100+
Bacillariophyta	23	-	14	-	-	-	-	14	12
Chlorophyta	19	-	14	-	-	-	-	13	5
Chrysophyta	1	-	1	-	-	-	-	0	0
Cryptophyta	0	-	1	-	-	-	-	0	0
Cyanophyta	19		10	-	-	-	-	5	4
Euglenophyta	1	-	0	-	-	-	-	0	0
Pyrrophyta	3	-	3	-	-	-	-	1	0
Rotifera	20	8	6	4	3	2	2	0	
Anostraca	15	11	7	5	5	5	5	5	
Cladocera	14	11	6	5	3	1	1	1	
Copepoda	26	20	19	19	14	11	10	8	
Protozoa	48	-	30	-	-	-	-	26	
Insecta	14	7	7	6	5	4	2	2	
Mollusca	2	2	2	2	2	2	1	1	
Ostracoda	28	22	18	18	17	14	14	13	

- **Salt - Brackish Lakes - Chemical Status**

There are meaningful doubts whether monitoring of priority substances in the water column of salt-brackish lakes and the relevant thresholds set by Directive 2008/105/EC, actually apply for these types of WBs with such extreme values of salinity. This has to be further investigated. An assessment system for priority substances must be elaborated and thresholds reflecting the chemical status must be set, taking into account the high levels of salinity in the above mentioned WB's. Sampling of substrate for example might provide more reliable results. The publishing by Department of Fisheries and Marine Research (DFMR) of a Call for Tenders conserning the "Establishment of Environmental Quality Standards (EQS) in natural lakes, Achna storage basin, Paralimni lake and coastal waters" will provide a new approach for the assessment of chemical status in salt – brackish lakes. The outcomes of the project are expected to provide a methodology for setting EQS for priority substances in the sediment of these WBs and shall offer at least the same level of protection as the EQS for water set out in Part A of Annex I of Directive 2008/105/EC.

CHAPTER 8. REFERENCES

Buffagni, A. Ciampittiello M., Erba S. 2005. Il River Habitat Survey Sud Europeo: Principi e schede di applicazione. Notiziario dei Metodi Analitici Ist. Ric. Acque. Dicembre 2005

Caridad de Hoyos, Jordi Catalan, Gerald Dörflinger, João Ferreira, Dimitra Kemitzoglou, Christophe Laplace-Treyture, José Pahissa López, Aldo Marchetto, Otilia Mihail, Giuseppe Morabito, Polina Polykarpou, Filipe Romão, Vasiliki Tsiaoussi. Edited by Sandra Poikane, 2014. Water Framework Directive Intercalibration Technical Report - Mediterranean Lake Phytoplankton ecological assessment methods. JRC Technical Reports.

CEMAGREF, 1982. Etude des méthodes biologiques d'appréciation quantitavive de la qualité des eaux. Rapport QE Lyon Bassin Rhône-Méditerranée-Corse.

Chimenez 2012. In Hydrological Study & Further Studies to be incorporated in the Akrotiri Peninsula Management Plan. A.P Marine Environmental Consultancy. Pp:241

Chrysoula Christia, Iakovos Tziortzis, Georgios Fyttis, Lefter Kashta and Eva Papastergiadou, 2011. A survey of the benthic aquatic flora in transitional water systems of Greece and Cyprus (Mediterranean Sea). Botanica Marina 54(2). 169-178

Common Implementation Strategy for the Water Framework Directive (2000/60/EC), Guidance Document No 2: Identification of Water Bodies, EC 2003

Common Implementation Strategy for the Water Framework Directive (2000/60/EC), Guidance Document No 3: Analysis of Pressures and Impacts, EC 2003

Common Implementation Strategy for the Water Framework Directive (2000/60/EC), Guidance Document No 4: Identification and Designation of Heavily Modified and Artificial Water Bodies, EC 2003

Cyprus Pollutant Release and Transfer Register (PRTR) http://www.prtr.dli.mlsi.gov.cy/prtr/iweb.nsf/ContentDocsByCountry/English

D. James, R. Hanks and J. Jurinak, Modern Irrigated Soils, Wiley, New York, 1982.

Demartini D., Erba S., Armanini D.G., Di Pasquale D., Buffagni A., in press. Uso del territorio e metodo CARAVAGGIO: il descrittore LUIcara (Land Use Index). Quaderno dell'Istituto di Ricerca sulle Acque. Implementazione della Direttiva Quadro sulle Acque: Habitat fluviali e caratteristiche idromorfologiche locali.

EC, 2000. Directive of the European parliament and of the Council 2000/60/EC establishing a framework for community action in the field of Water Policy. PE-CONS 3639/1/00.

ENVECO A.E. - I.A.CO Environmental & Water Consultants Ltd (2011) Καταγραφή και αξιολόγηση των υφιστάμενων και των κλειστών ή/και εγκαταλελειμμένων εγκαταστάσεων εξορυκτικών αποβλήτων Αρ. Σύμβασης Τμ. Περ. 6/2010. Τμήμα Περιβάλλοντος.

ENVIROPLAN A.E - GEOtest BRNO, Παροχή Συμβουλευτικών Υπηρεσιών για την Ετοιμασία Στρατηγικού Σχεδίου, Περιβαλλοντικής, Τεχνικοκοικονομικής Μελέτης και εγγράφων προσφορών για την Αποκατάσταση και Μετέπειτα Φροντίδα των Χώρων Ανεξέλεγκτης Απόρριψης Απορριμμάτων στην Κύπρο – Σύμβαση 10/2004, Υπουργείο Εσωτερικών

European Commission. (2003). Guidance Document No 2. Identification of Water Bodies. Luxembourg: Office for Official Publications of the European Communities.

Feld C. K., 2004. Identification and measure of hydromorphological degradation in Central European lowland streams. In: D. Hering, P.F.M. Verdonschot, O. Moog & L. Sandin (eds), Integrated Assessment of Running Waters in Europe.Kluwer Academic Publishers. Printed in the Netherlands. Hydrobiologia, 516: 69–90

Gallart, F. et al. (2012). A novel approach to analysing the regimes of temporary streams in relation to their controls on the composition and structure of aquatic biota. Hydrology and Earth System Sciences, 16(9), pp.3165–3182.

GEOINVEST LTD (2005) Γεωγραφική Βάση Δεδομένων Δυνητικών Πηγών Ρύπανσης του Εδάφους στην Κύπρο, Ινστιτούτο Γεωλογικών & Μεταλλευτικών Ερευνών , Σύμβαση Ινστιτούτου Γεωλογικών Ερευνών 5/2004.

Griffin NJ and Gordon AK (2012). Comparative biomonitoring of rivers and streams using diatoms and invertebrates. Water Institute of Southern Africa (WISA) conference, Cape Town International Conference Centre (CTICC), 6-9 May 2012

Hajdichristophorou M., 2005. The Larnaka Salt Lakes. Information leaflet of the Department of Fisheries and Marine Research.

Hammer, U. T. 1986. Saline Lake Ecosystems of the World. Dr. W. Junk Publishers. Dordrecht, The Netherlands.

Haury et al., 2006. A new method to assess water trophy and organic pollution. The macrophyte Biological Index for rivers (IBMR): its application to different types of river and pollution. Hydrobiologia 570: 153-158

I.A.CO Environmental & Water Consultants Ltd. 2012. Παροχή υπηρεσιών για την «Ετοιμασία καταλόγου εκπομπών, απορρίψεων και διαρροών για όλες τις ουσίες προτεραιότητας και όλους τους ρύπους που εκτίθενται στο Μέρος Α του Παραρτήματος της Κ.Δ.Π. 500/2010, συμπεριλαμβανομένου του αρσενικού, τριχλωροαιθυλένιου, τετραχλωροαιθυλένιου και αμμωνίου», Αρ. Σύμβασης 14/2012. Τμήμα Περιβάλλοντος.

Khoshgoftarmensh A.H., B. Jaafari & H. Shariatmadari. Effect of salinity on Cd and Zn availability. 17th World Congress of Soil Science, 14-21 August 2002, Thailand.

Kim K. T., E.S. Kim, S.R. Cho, J.K. Park, K.T. Ra and J.M. Lee. 2010. Distribution of heavy metals in the environmental samples of the Saemangeum coastal area, Korea. In: *Coastal Environmental and Ecosystem Issues of the East China Sea*. Eds., A. Ishimatsu and H.-J. Lie. pp:71-90.

Manolaki & Giannouris. 2011. Deliverable 1: Ecology monitoring data. In LIFE+ WATER: Strengthening the scientific foundation of water quality programs (LIFE08 ENV / CY / 000460). pp:74

MEDGIG Lakes, 2nd phase of the IC exercise, Final milestone report. 2011.

MEDGIG Rivers- Benthic Invertebrates, 2nd phase of the IC exercise, Final milestone report. 2011.

N. Th. Skoulikidis. 2008, Defining chemical status of a temporary Mediterranean River. Journal of Environmental Monitoring, pp 842 - 852.

Raven, P. J., N. T. H. Holmes, F. D. Dawson, P. J. A. Fox, M. Everard, I. R. Fozzard, & K. J. Rouen, 1998. River Habitat Quality: the physical character of rivers and streams in the UK and Isle of Man. Environment Agency, Bristol.

Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans, Member State: Cyprus (2012)

Reports from the Project: "Provision of services for the establishment of Reservoir Protection Zones for the reservoirs used for the abstraction of drinking water", No.: YY&Y 1/2012Δ of the Water Development Department (WDD) of the Ministry of Agriculture, Natural Resources and Environment.

Republic of Cyprus, Ministry of Agriculture, Natural Resources and Environment, (2005) Water Framework Directive (2000/60/EC) EU-summary report Articles 5 & 6, Contract No 39/03/61.

S. Zogaris, Y. Chatzinikolaou, N. Koutsikos, E. Oikonomou, S. Giakoumi, A.N. Economou, L. Vardakas, P. Segurado & M.T. Ferreira, 2012. Assessment of fish assemblages in Cyprus Rivers for the implementation of Directive 2000/60/EC. Specialized Consultancy Services for the Assessment of Fish Assemblages in Cyprus Rivers – Implementation of the Directive 2000/60/EC. Final Report of Second Phase of the Project. Hellenic Center for Marine Research - Institute of Marine Biological Resources and Inland Waters / Instituto Superior de Agronomia, Universidade Técnica de Lisboa, Pp. 205.

STAR project, 2005. Standardisation of River Classifications: Framework method for calibrating different biological survey results against ecological quality classifications to be developed for the Water Framework Directive

Tziortzis I., 2008. Monitoring of ecological quality of coastal ecosystems in Greece and Cyprus, within the framework of the 2000/60/EC Water Directive: Kotychi and Prokopos lagoons, Larnaca complex and Akrotiri salt marshes (In Greek).

Tziortzis I., 2012. Aquatic biotic components. In Hydrological Study & Further Studies to be incorporated in the Akrotiri Peninsula Management Plan. A.P Marine Environmental Consultancy. Pp:241

Tziortzis I., Zogaris S., Papatheodoulou A. & Marrone F., 2014. The tadpole shrimp *Triops cancriformis cancriformis* (Notostraca) and its habitat in Cyprus. *Manuscript in preparation.*

WL | Delft Hydraulics, ENVECO S.A., D. Argyropoulos & associates (2004), Volume 1. Characterisation of surface water body types. WDD, Contract No 39/03/61.

WL | Delft Hydraulics, ENVECO S.A., D. Argyropoulos & associates (2004), Volume 2. Establishment of type-specific reference conditions for surface water body types. WDD, Contract No 39/03/61.

WL | Delft Hydraulics, ENVECO S.A., D. Argyropoulos & associates (2004), Volume 3. Analysis of Pressures. WDD, Contract No 39/03/61.

WL | Delft Hydraulics, ENVECO S.A., D. Argyropoulos & associates (2004), Volume 4. Analysis of Impacts. WDD, Contract No 39/03/61.

WL | Delft Hydraulics, ENVECO S.A., D. Argyropoulos & associates (2004). Volume 15 Protected areas. WDD, Contract No 39/03/61.

www.UKTAG.com

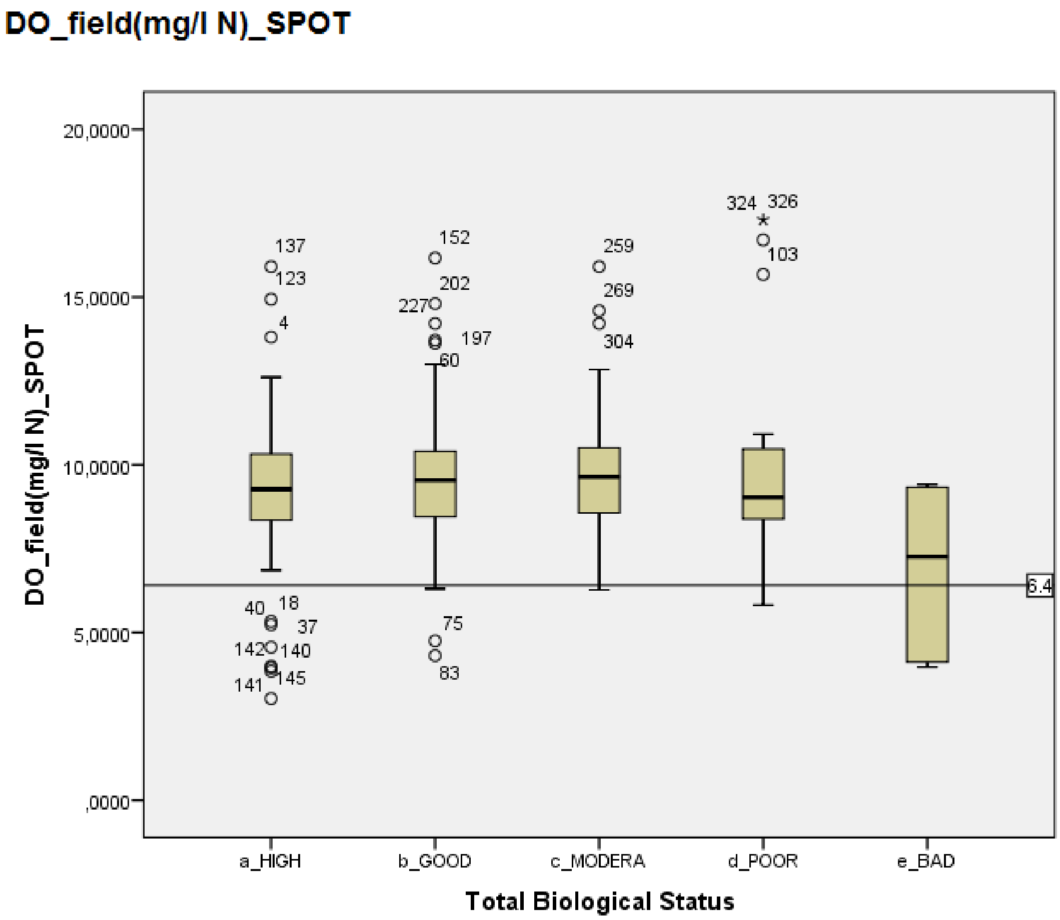
Γ. ΚΑΡΑΒΟΚΥΡΗΣ & ΣΥΝΕΡΓΑΤΕΣ ΣΥΜΒΟΥΛΟΙ ΜΗΧΑΝΙΚΟΙ Α.Ε. - ΠΑΝΑΓΙΩΤΑ ΣΤΥΛΙΑΝΗ ΚΑΪΜΑΚΗ (2009) Παροχή Συμβουλευτικών Υπηρεσιών για Αξιολόγηση των Αποτελεσμάτων των Προγραμμάτων Παρακολούθησης για τα Επιφανειακά Ύδατα στα Πλαίσια του Άρθρου 8 της Οδηγίας 2000/60/ΕΚ, Σύμβαση ΤΑΥ 54/2009, Τμήμα Αναπτύξεως Υδάτων

Γ. ΚΑΡΑΒΟΚΥΡΗΣ & ΣΥΝΕΡΓΑΤΕΣ ΣΥΜΒΟΥΛΟΙ ΜΗΧΑΝΙΚΟΙ Α.Ε. - ΠΑΝΑΓΙΩΤΑ ΣΤΥΛΙΑΝΗ ΚΑΪΜΑΚΗ (2011) Εφαρμογή των Άρθρων 11,13 και 15 της Οδηγίας Πλαίσιο περί Υδάτων (200/60/ΕΚ) στην Κύπρο. Κυπριακή Δημοκρατία, Σύμβαση ΤΑΥ 97/2007, Τμήμα Αναπτύξεως Υδάτων

APPENDIX 1: Box Plots of physicochemical data in river water bodies compared to biological data

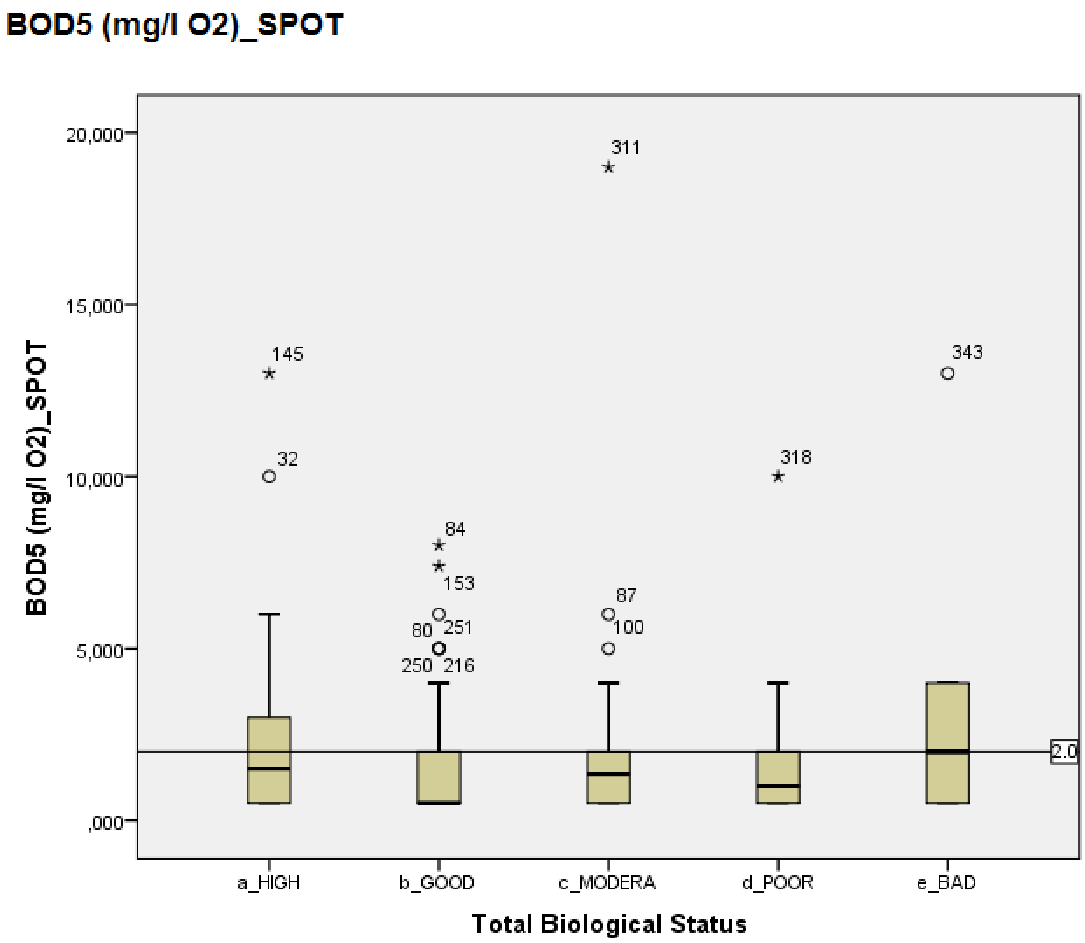
RIVER WATER BODIES (EXCEPT FROM IMPOUNDED RIVERS)

		Cases					
		Valid		Missing		Total	
	Total Biological Status	N	Percent	N	Percent	N	Percent
DO_field(mg/l N)_SPOT	a_HIGH	68	93,2%	5	6,8%	73	100,0%
	b_GOOD	140	94,6%	8	5,4%	148	100,0%
	c_MODERA	74	92,5%	6	7,5%	80	100,0%
	d_POOR	31	86,1%	5	13,9%	36	100,0%
	e_BAD	6	85,7%	1	14,3%	7	100,0%



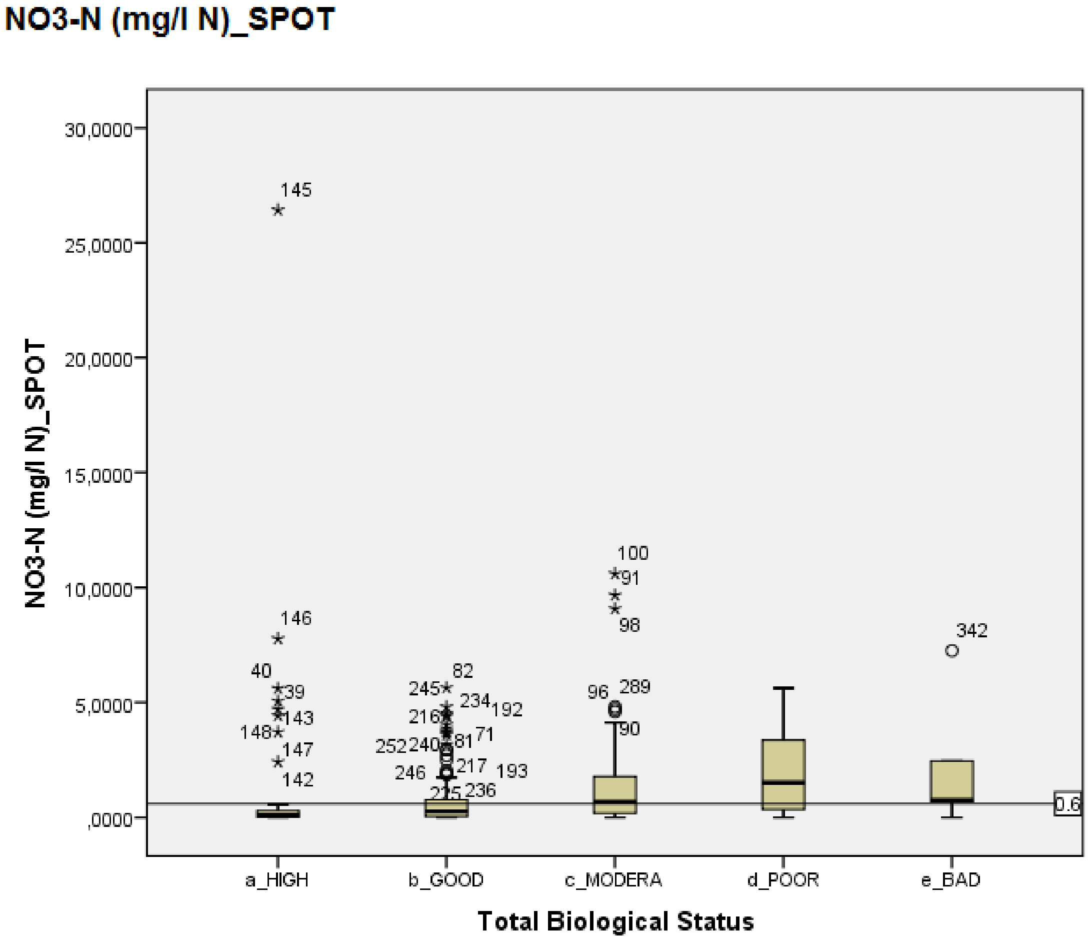
Ap. 1-1: Box plot of Dissolved Oxygen values between the 5 different quality classes based on BQE status in river water bodies (excluding impounded rivers). The line represents the limit between good/moderate status as it is currently used for Cyprus rivers.

		Cases					
		Valid		Missing		Total	
	Total Biological Status	N	Percent	N	Percent	N	Percent
BOD5 (mg/l O2)_SPOT	a_HIGH	46	63,0%	27	37,0%	73	100,0%
	b_GOOD	108	73,0%	40	27,0%	148	100,0%
	c_MODERA	60	75,0%	20	25,0%	80	100,0%
	d_POOR	25	69,4%	11	30,6%	36	100,0%
	e_BAD	5	71,4%	2	28,6%	7	100,0%



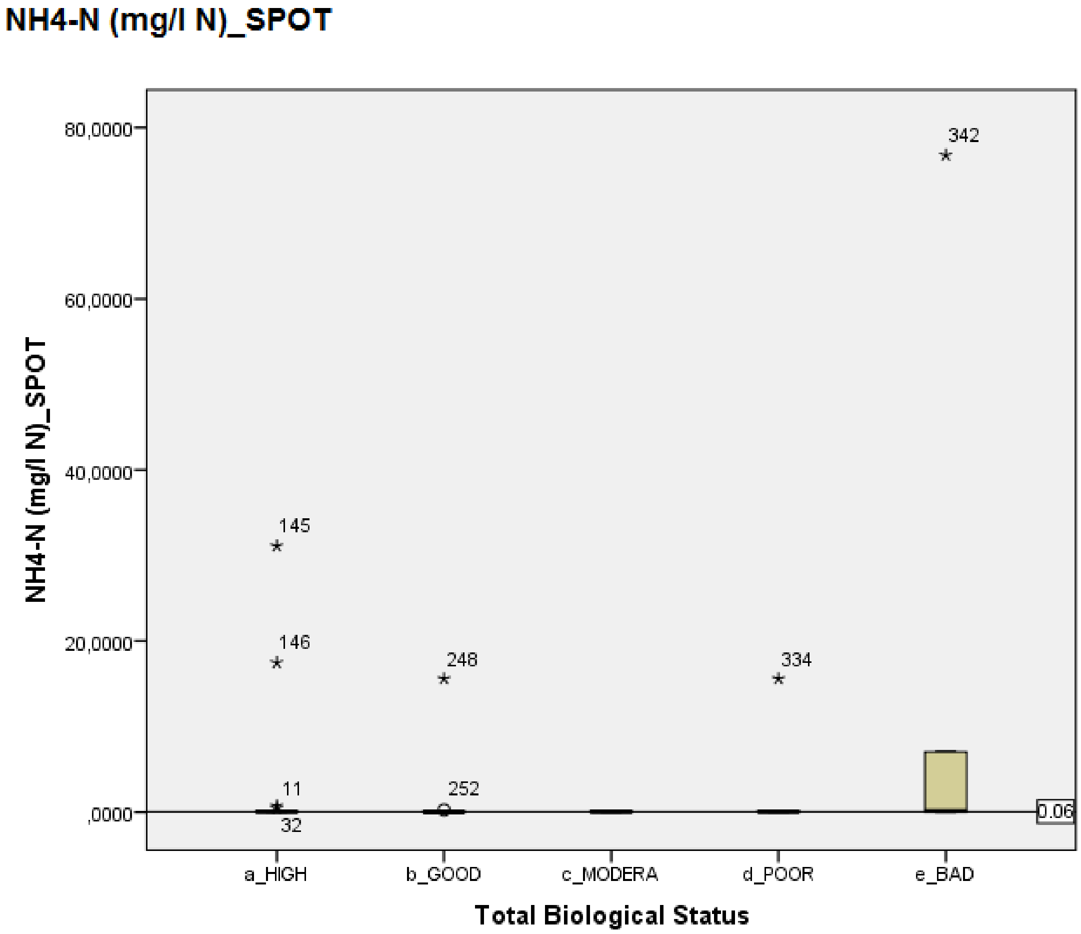
Ap. 1-2: Box plot of Biochemical Oxygen Demand (BOD) values between the 5 different quality classes based on BQE status in river water bodies (excluding impounded rivers). The line represents the limit between good/moderate status as it is currently used for Cyprus rivers.

		Cases					
		Valid		Missing		Total	
	Total Biological Status	N	Percent	N	Percent	N	Percent
NO3-N (mg/l N)_SPOT	a_HIGH	63	86,3%	10	13,7%	73	100,0%
	b_GOOD	128	86,5%	20	13,5%	148	100,0%
	c_MODERA	66	82,5%	14	17,5%	80	100,0%
	d_POOR	30	83,3%	6	16,7%	36	100,0%
	e_BAD	5	71,4%	2	28,6%	7	100,0%



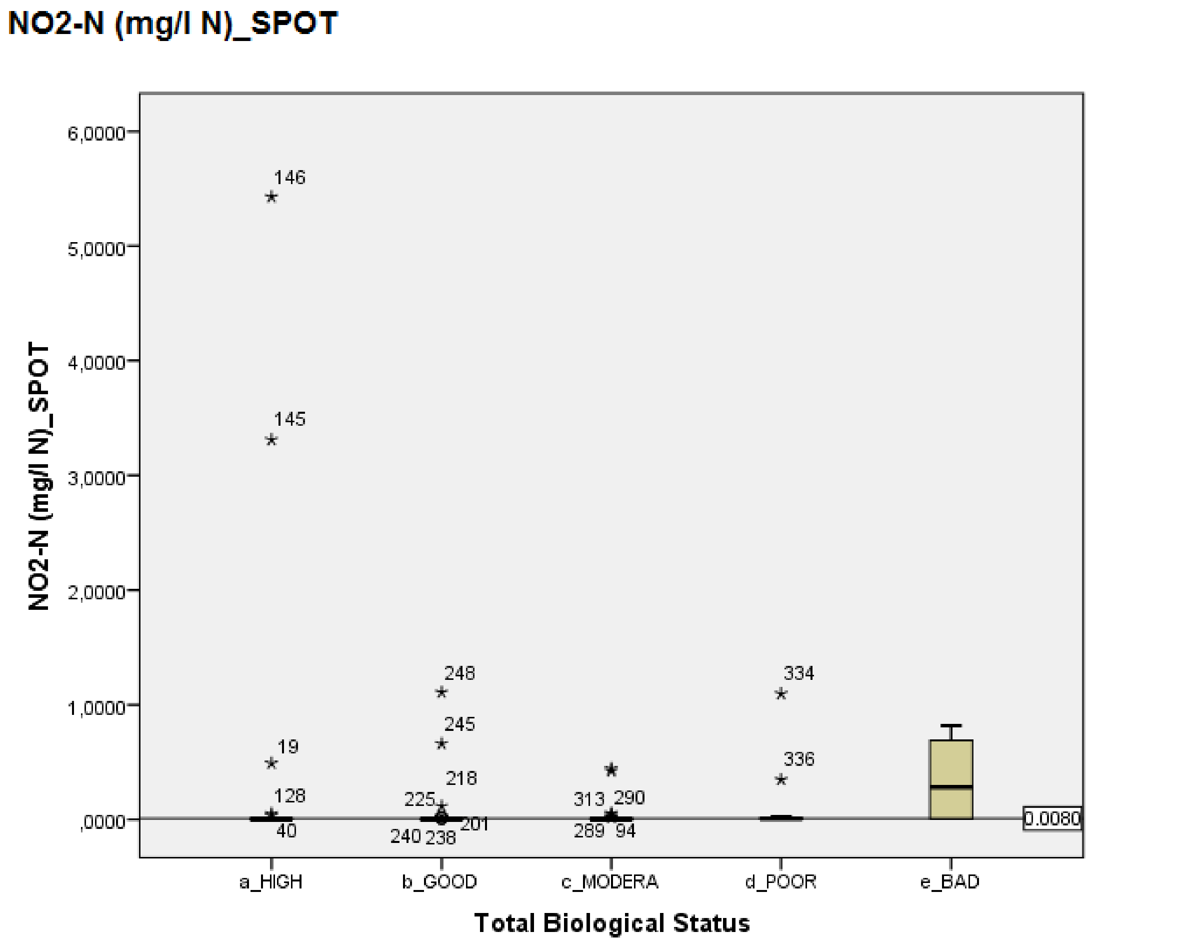
Ap. 1-3: Box plot of Nitrates (NO_3) values between the 5 different quality classes based on BQE status in river water bodies (excluding impounded rivers). The line represents the limit between good/moderate status as it is currently used for Cyprus rivers.

		Cases					
		Valid		Missing		Total	
	Total Biological Status	N	Percent	N	Percent	N	Percent
NH4-N (mg/l N)_SPOT	a_HIGH	59	80,8%	14	19,2%	73	100,0%
	b_GOOD	119	80,4%	29	19,6%	148	100,0%
	c_MODERA	63	78,8%	17	21,2%	80	100,0%
	d_POOR	29	80,6%	7	19,4%	36	100,0%
	e_BAD	5	71,4%	2	28,6%	7	100,0%



Ap. 1-4: Box plot of Ammonium (NH_4) values between the 5 different quality classes based on BQE status in river water bodies (excluding impounded rivers). The line represents the limit between good/moderate status as it is currently used for Cyprus rivers.

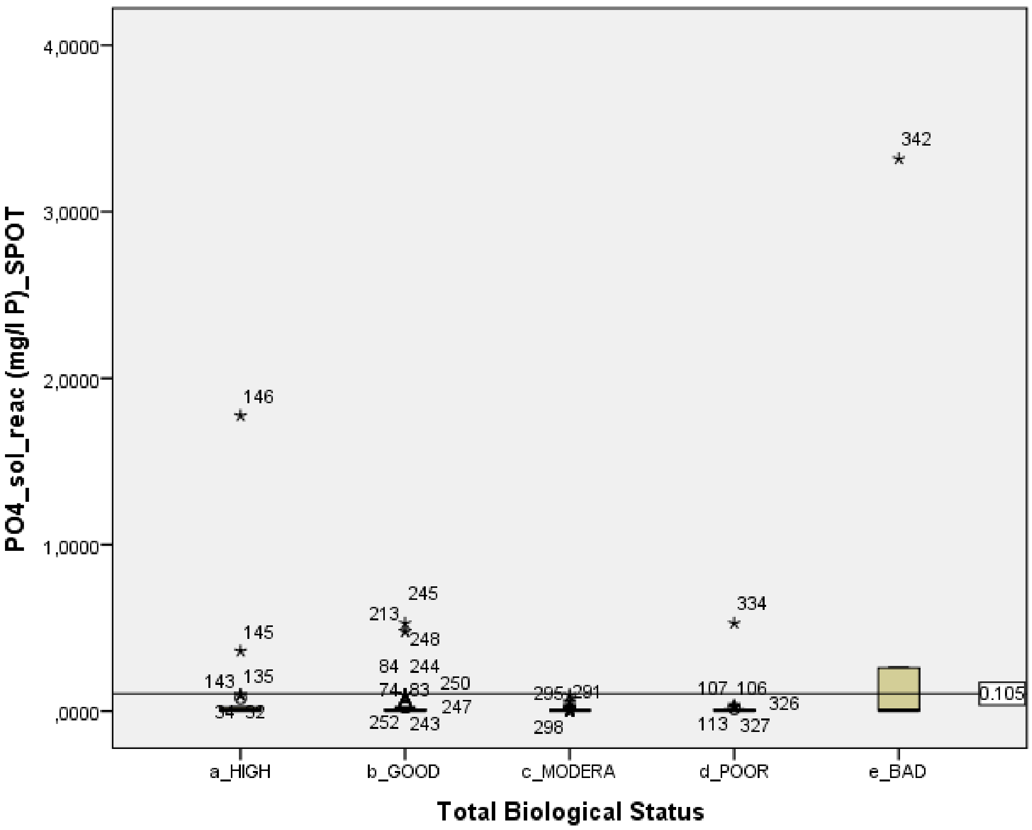
		Cases					
		Valid		Missing		Total	
	Total Biological Status	N	Percent	N	Percent	N	Percent
NO2-N (mg/l N)_SPOT	a_HIGH	49	67,1%	24	32,9%	73	100,0%
	b_GOOD	110	74,3%	38	25,7%	148	100,0%
	c_MODERA	59	73,8%	21	26,2%	80	100,0%
	d_POOR	27	75,0%	9	25,0%	36	100,0%
	e_BAD	4	57,1%	3	42,9%	7	100,0%



Ap. 1-5: Box plot of NO_2 values between the 5 different quality classes based on BQE status in river water bodies (excluding impounded rivers). The line represents the limit between good/moderate status as it is currently used for Cyprus rivers.

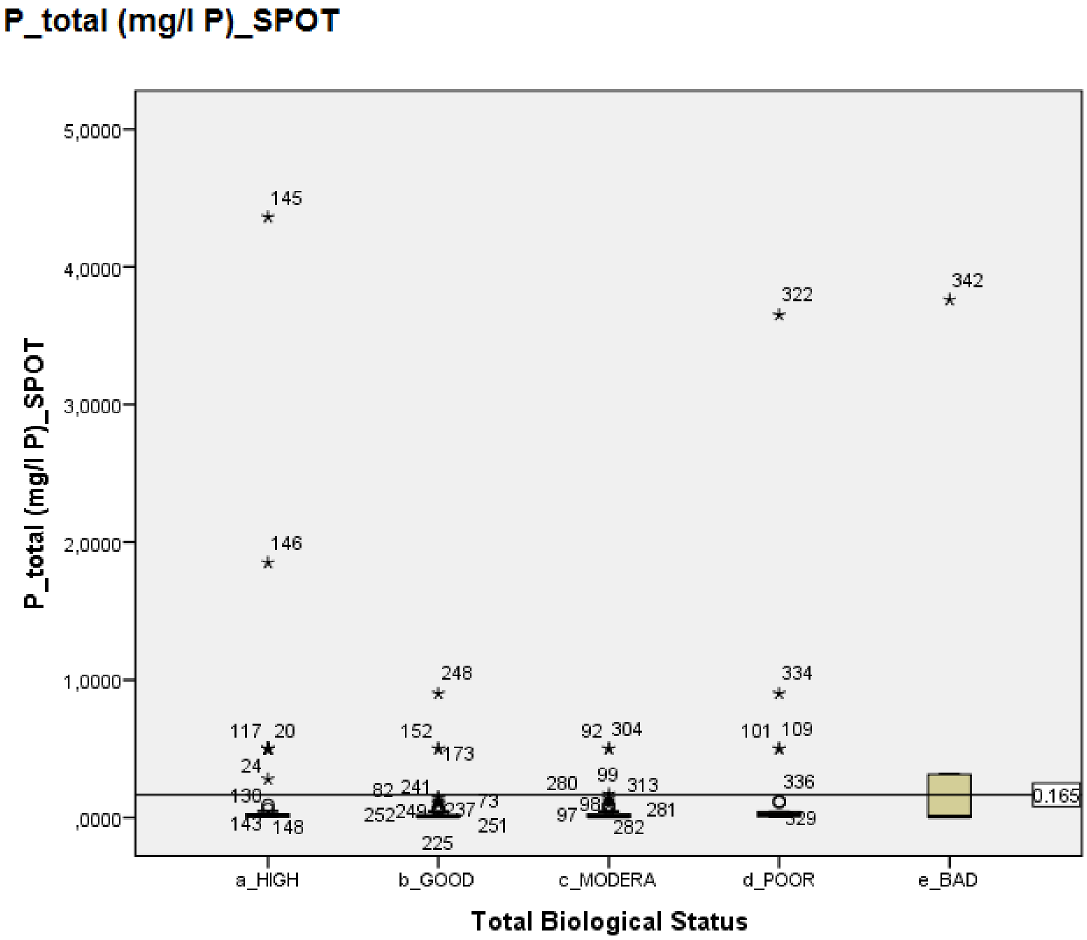
		Cases					
		Valid		Missing		Total	
	Total Biological Status	N	Percent	N	Percent	N	Percent
PO4_sol_reac (mg/l P) _SPOT	a_HIGH	55	75,3%	18	24,7%	73	100,0%
	b_GOOD	119	80,4%	29	19,6%	148	100,0%
	c_MODERA	57	71,2%	23	28,7%	80	100,0%
	d_POOR	28	77,8%	8	22,2%	36	100,0%
	e_BAD	5	71,4%	2	28,6%	7	100,0%

PO4_sol_reac (mg/l P)_SPOT



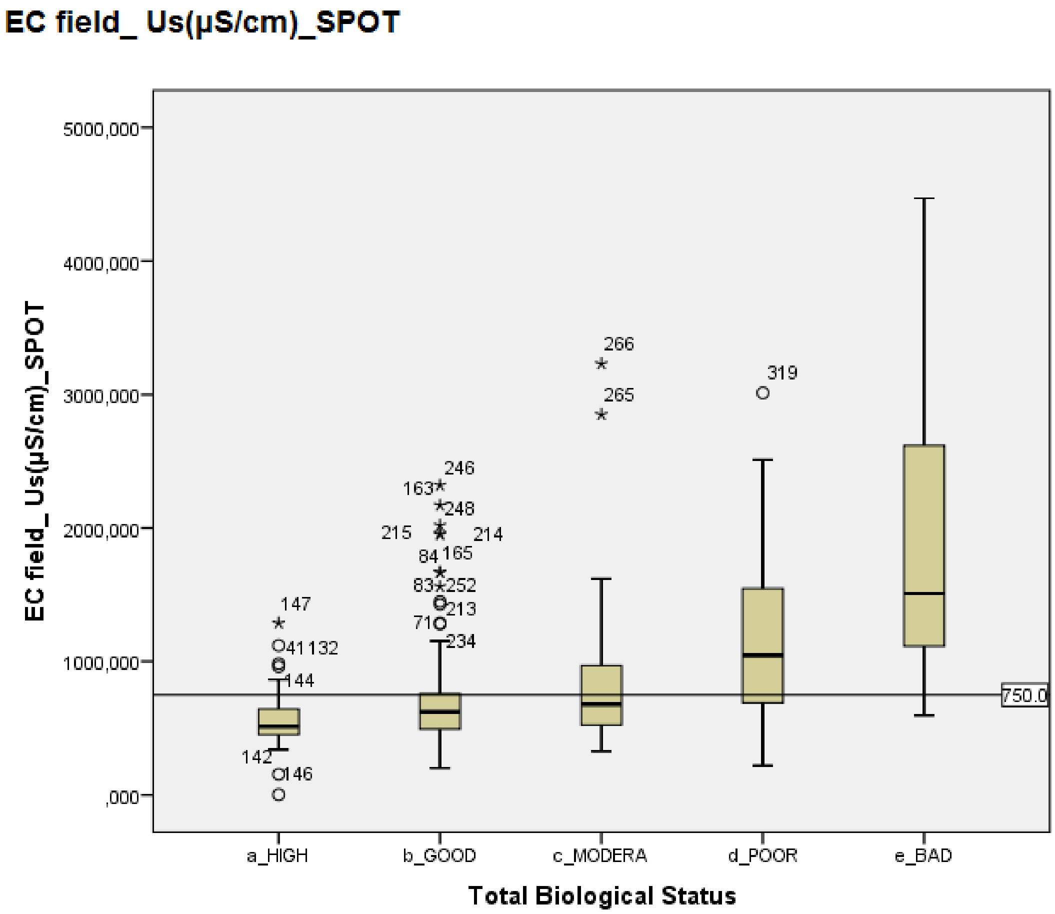
Ap. 1-6: Box plot of Phosphate (PO_4) values between the 5 different quality classes based on BQE status in river water bodies (excluding impounded rivers). The line represents the limit between good/moderate status as it is currently used for Cyprus rivers.

		Cases					
		Valid		Missing		Total	
	Total Biological Status	N	Percent	N	Percent	N	Percent
P_total (mg/l P)_SPOT	a_HIGH	64	87,7%	9	12,3%	73	100,0%
	b_GOOD	125	84,5%	23	15,5%	148	100,0%
	c_MODERA	64	80,0%	16	20,0%	80	100,0%
	d_POOR	30	83,3%	6	16,7%	36	100,0%
	e_BAD	6	85,7%	1	14,3%	7	100,0%



Ap. 1-7: Box plot of Total Phosphorus (TP) values between the 5 different quality classes based on BQE status in river water bodies (excluding impounded rivers). The line represents the limit between good/moderate status as it is currently used for Cyprus rivers.

		Cases					
		Valid		Missing		Total	
	Total Biological Status	N	Percent	N	Percent	N	Percent
EC field_ Us(μS/cm) _SPOT	a_HIGH	69	94,5%	4	5,5%	73	100,0%
	b_GOOD	144	97,3%	4	2,7%	148	100,0%
	c_MODERA	78	97,5%	2	2,5%	80	100,0%
	d_POOR	34	94,4%	2	5,6%	36	100,0%
	e_BAD	7	100,0%	0	0,0%	7	100,0%



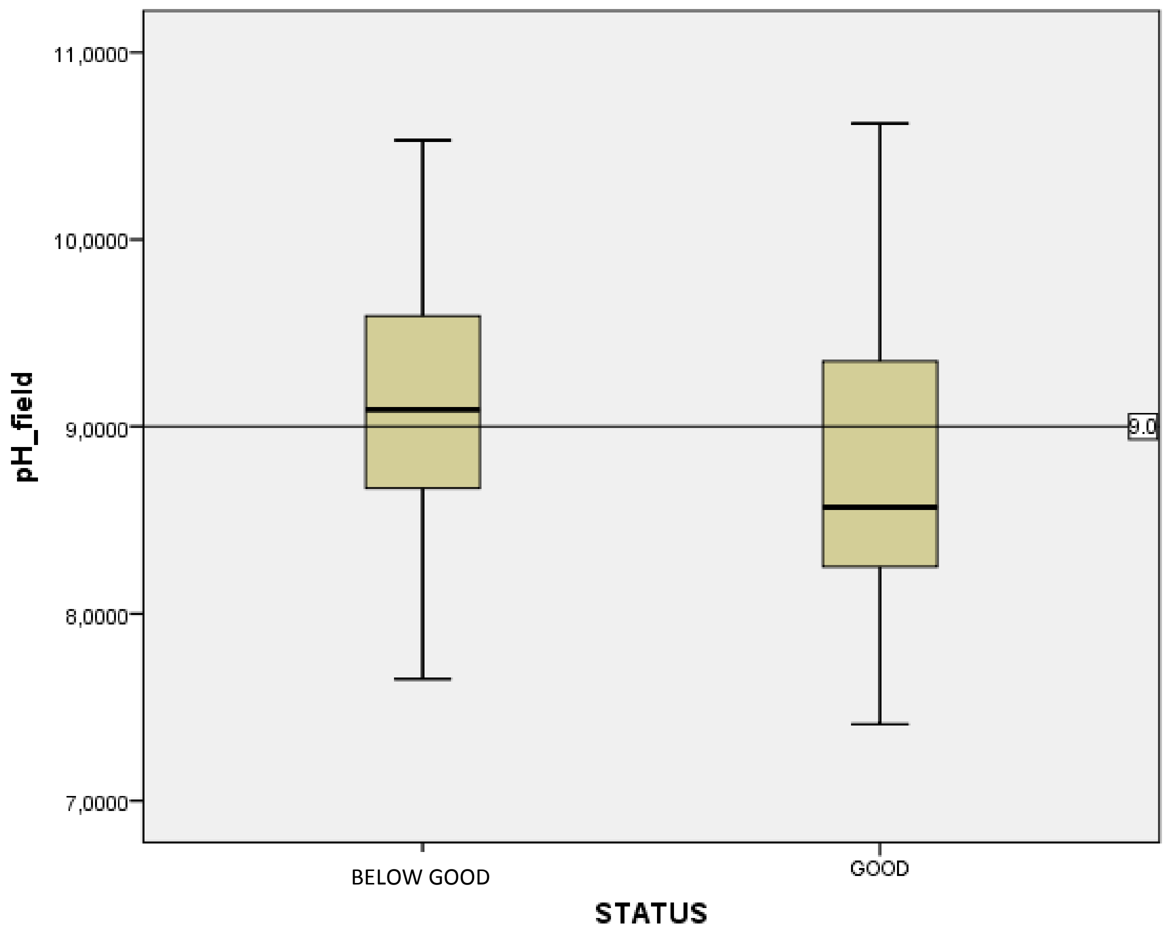
Ap. 1-8: Box plot of Electric Conductivity (EC) values between the 5 different quality classes based on BQE status in river water bodies (excluding impounded rivers). The line represents the limit between good/moderate status as it is currently used for Cyprus rivers.

IMPOUNDED RIVERS

Case Processing Summary

	STATUS	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
pH_field	BAD	40	100,0%	0	0,0%	40	100,0%
	GOOD	121	99,2%	1	0,8%	122	100,0%

pH_field

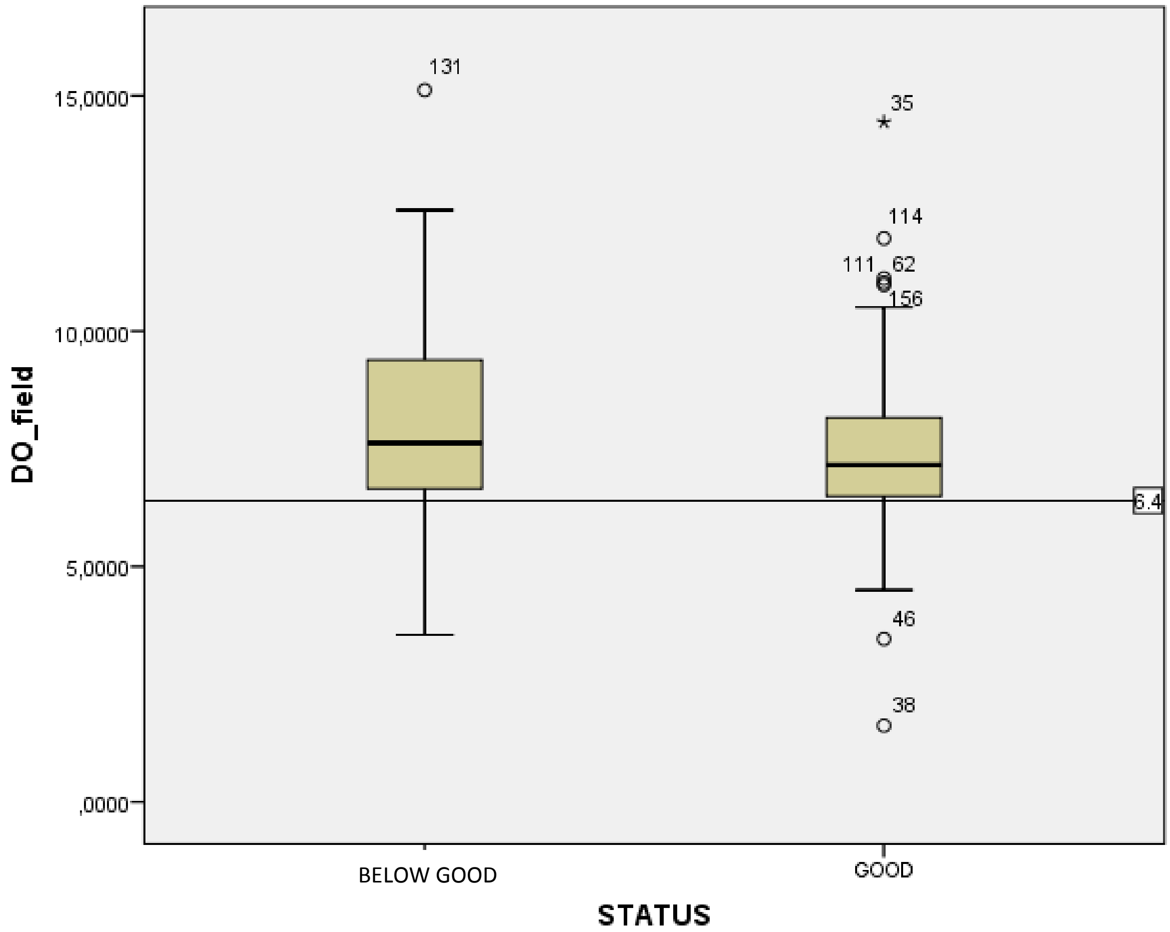


Ap. 1-9: Box plot of pH values between the 2 different quality classes (above Good/below Good) based on Phytoplankton status in impounded rivers (water reservoirs). The line represents the limit between Good/ below Good status, as it is currently used for Cyprus impounded rivers (water reservoirs).

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	STATUS	N	Percent	N	Percent	N	Percent
DO_field	BAD	40	100,0%	0	0,0%	40	100,0%
	GOOD	121	99,2%	1	0,8%	122	100,0%

DO_field

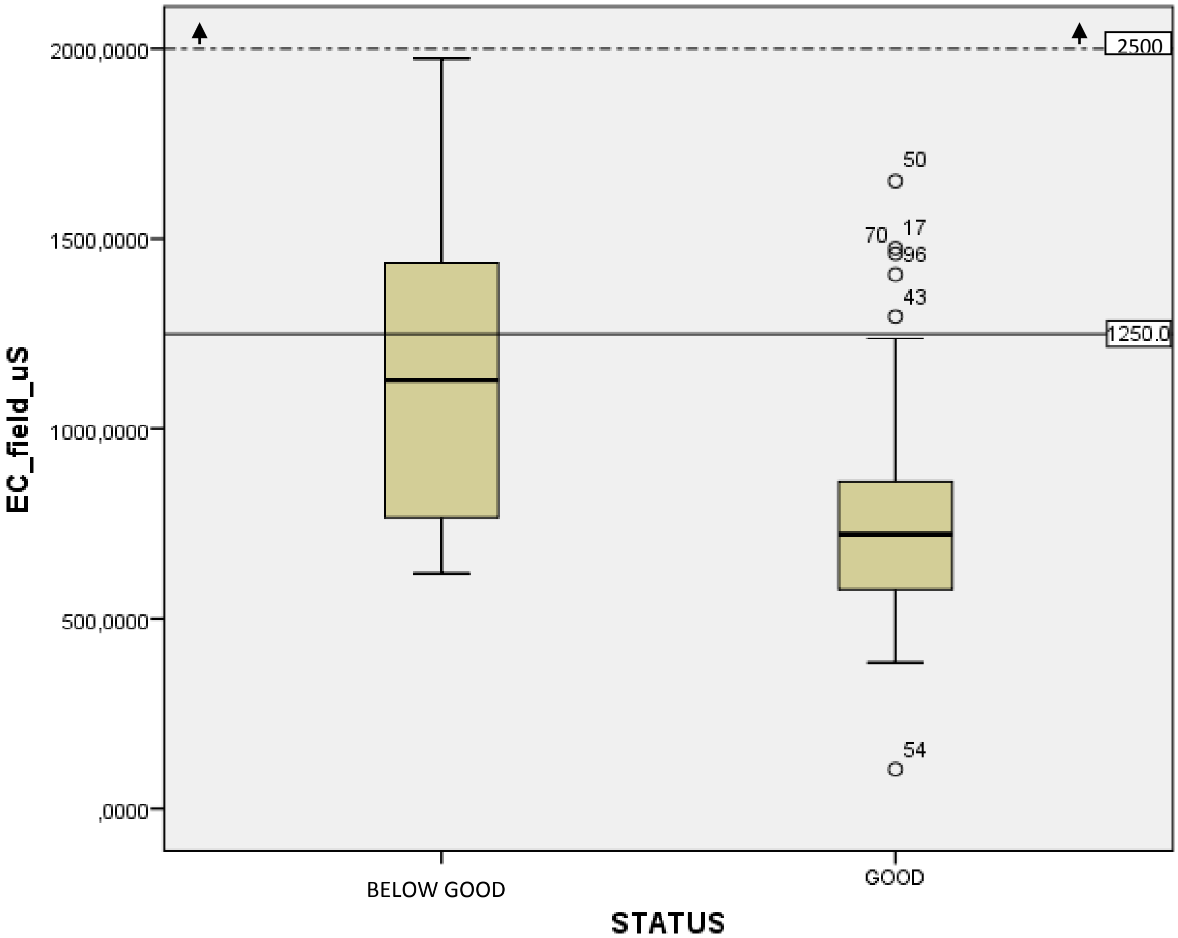


Ap. 1-10: Box plot of Dissolved Oxygen (DO) values between the 2 different quality classes (above Good/below Good) based on Phytoplankton status in impounded rivers (water reservoirs). The line represents the limit between Good/ below Good status, as it is currently used for Cyprus impounded rivers (water reservoirs).

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	STATUS	N	Percent	N	Percent	N	Percent
EC_field_uS	BAD	40	100,0%	0	0,0%	40	100,0%
	GOOD	121	99,2%	1	0,8%	122	100,0%

EC_field_uS

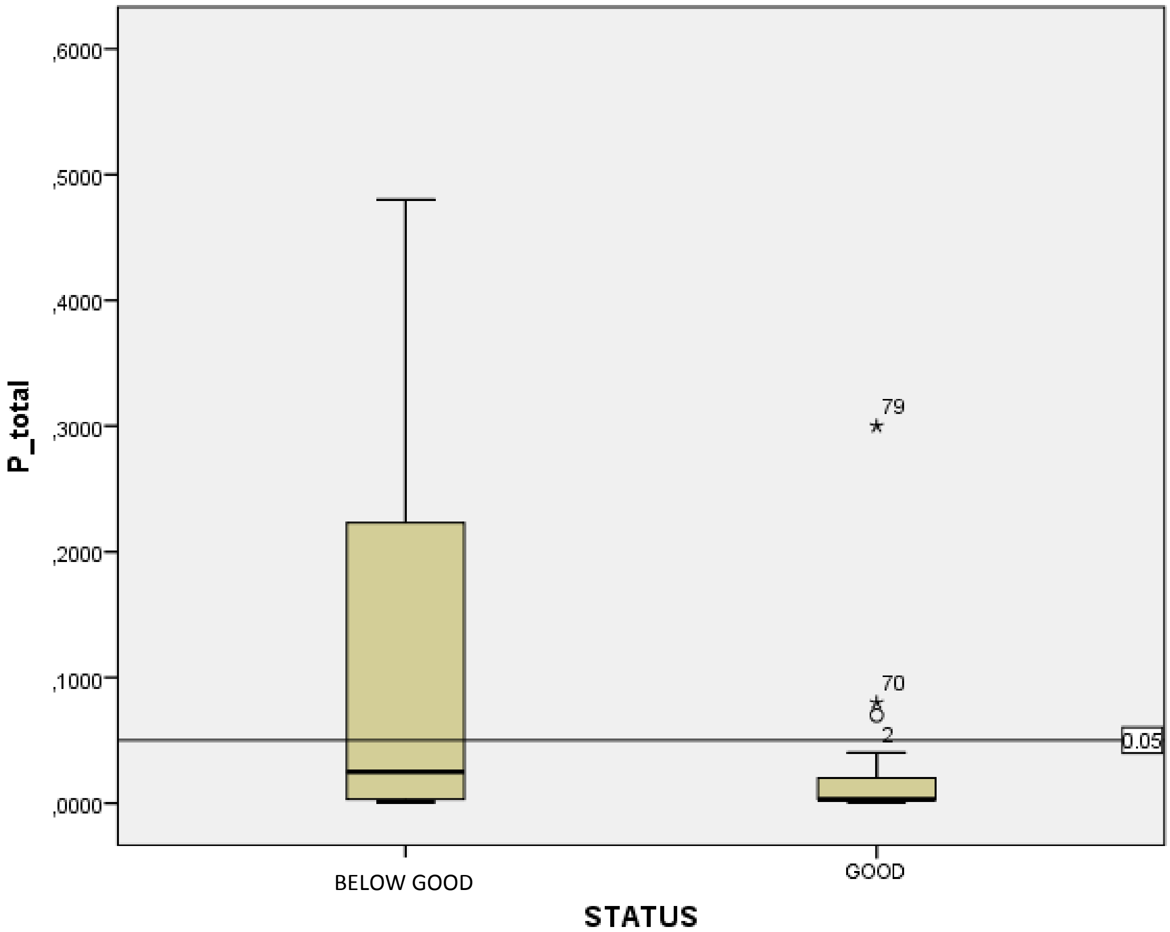


Ap. 1-11: Box plot of Electric Conductivity (EC) values between the 2 different quality classes (above Good/below Good) based on Phytoplankton status in impounded rivers (water reservoirs). The solid line represents the limit between Good/ below Good status, as it is currently used for Cyprus impounded rivers (water reservoirs). The dotted line represents the limit between Good/ below Good status, as it is was used in the 1st RBMP.

Case Processing Summary

	STATUS	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
P_total	BAD	40	100,0%	0	0,0%	40	100,0%
	GOOD	121	99,2%	1	0,8%	122	100,0%

P_total

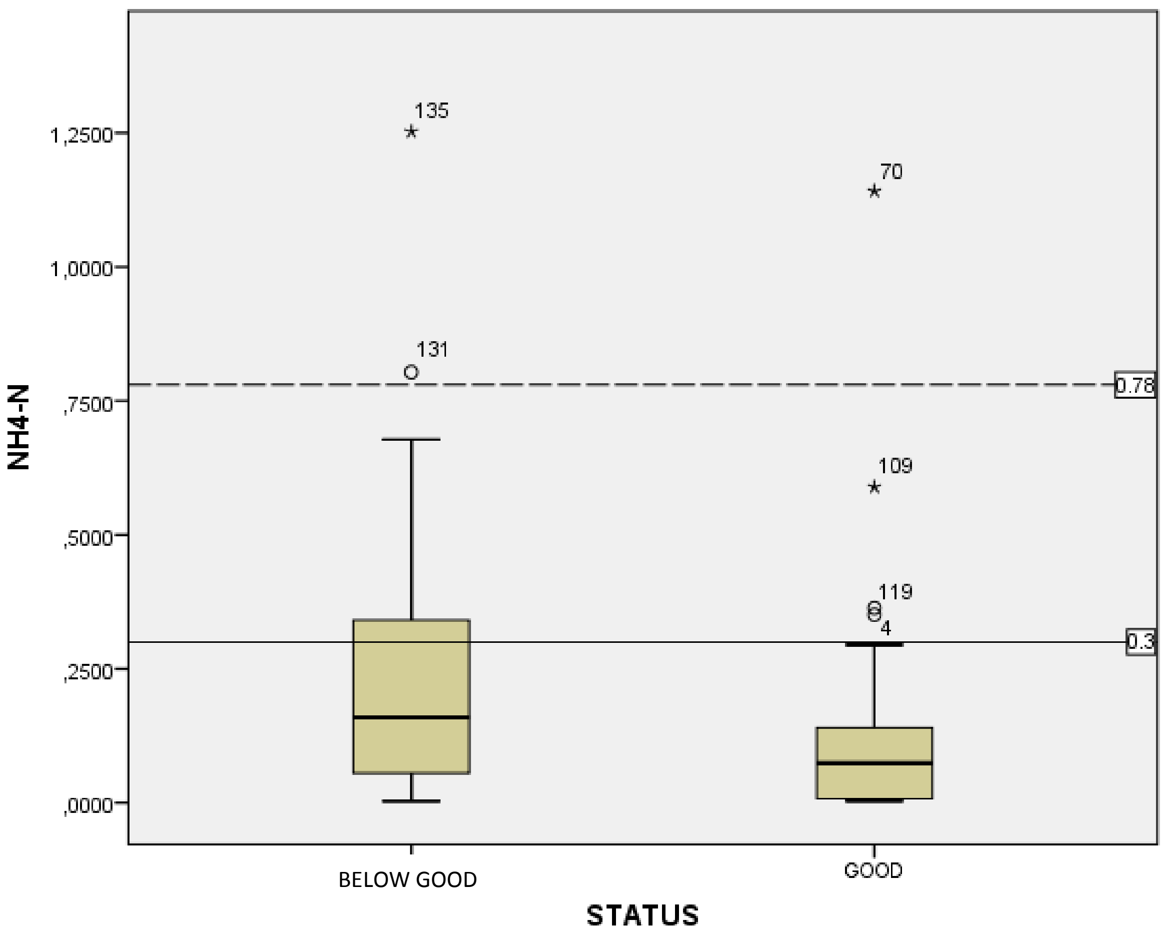


Ap. 1-12: Box plot of Total Phosphorus (TP) values between the 2 different quality classes (above Good/below Good) based on Phytoplankton status in impounded rivers (water reservoirs). The line represents the limit between Good/ below Good status, as it is currently used for Cyprus impounded rivers (water reservoirs).

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	STATUS	N	Percent	N	Percent	N	Percent
NH4-N	BAD	40	100,0%	0	0,0%	40	100,0%
	GOOD	121	99,2%	1	0,8%	122	100,0%

NH4-N

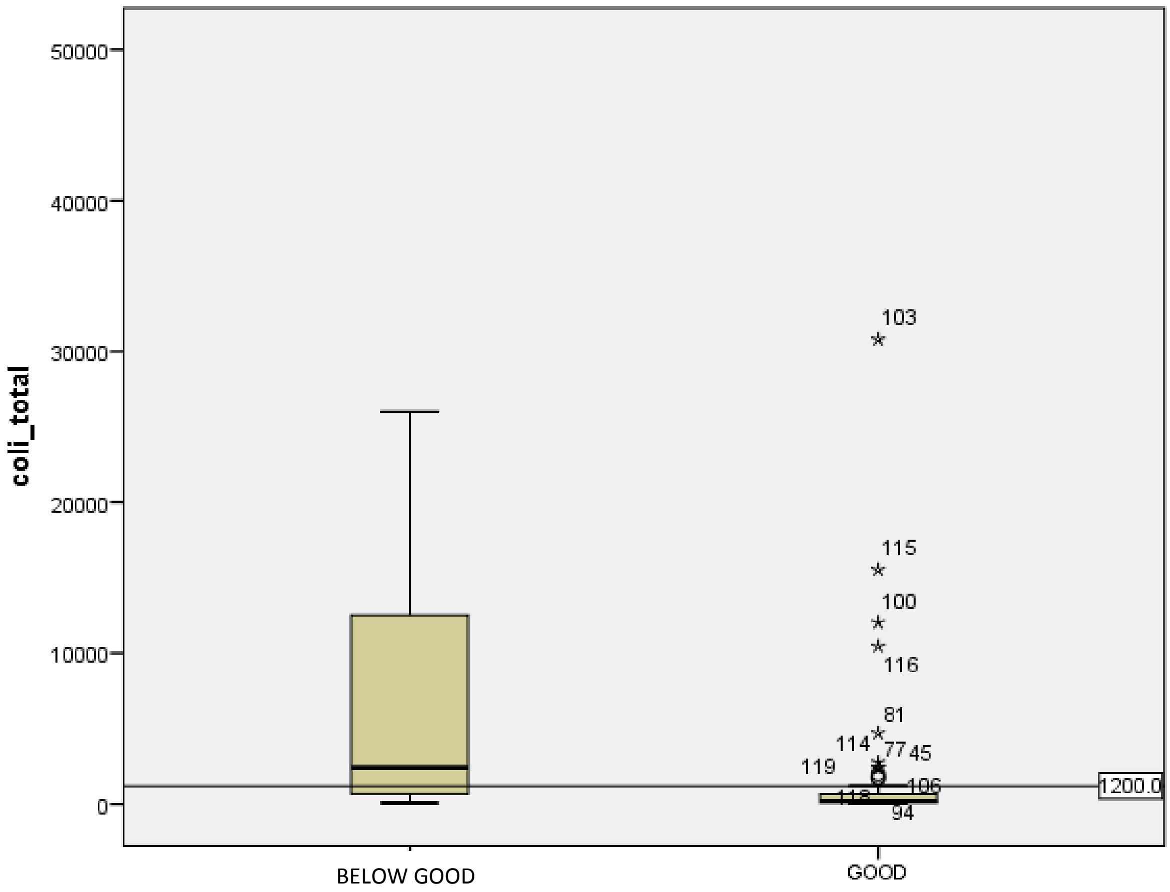


Ap. 1-13: Box plot of NH4-N values between the 2 different quality classes (above Good/below Good) based on Phytoplankton status in impounded rivers (water reservoirs). The solid line represents the limit between Good/ below Good status, as it is currently used for Cyprus impounded rivers (water reservoirs). The dotted line represents the limit between Good/ below Good status, as it is was used in the 1st RBMP.

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	STATUS	N	Percent	N	Percent	N	Percent
coli_total	BAD	24	60,0%	16	40,0%	40	100,0%
	GOOD	78	63,9%	44	36,1%	122	100,0%

coli_total



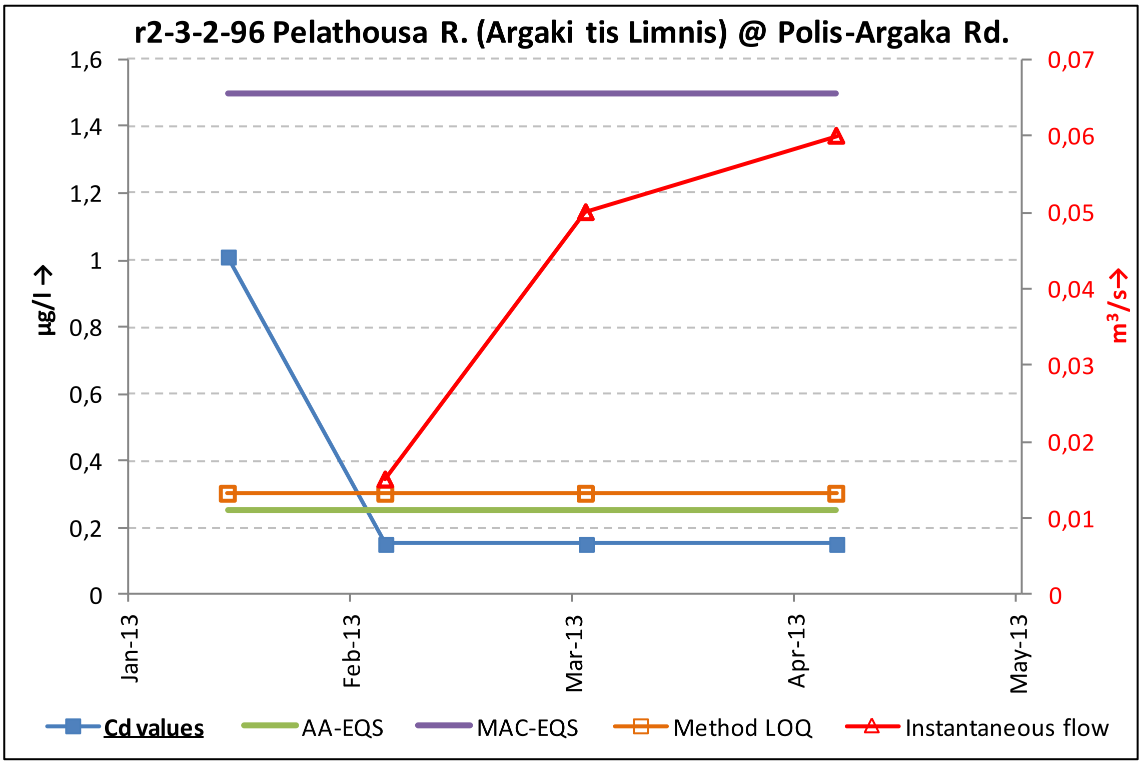
Ap. 1-14: Box plot of Total Coliforms values between the 2 different quality classes (above Good/below Good) based on Phytoplankton status in impounded rivers (water reservoirs). The line represents the limit between Good/ below Good status, as it is currently used for Cyprus impounded rivers (water reservoirs).

APPENDIX 2: Exceedances concerning the chemical status at monitoring stations of river and lake water bodies

R2-3-2-96: PELATHOUSA R. (ARGAKI TIS LIMNIS) @ POLIS-ARGAKA RD.

Table Ap. 2-1: Cadmium daily and mean values at river monitoring station r2-3-2-96

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
15/1/2013		1,01	0,3			1,5
6/2/2013	015	0,15	0,3	09		1,5
6/3/2013	05	0,15	0,3	09		1,5
10/4/2013	06	0,15	0,3	09		1,5
Mean 2013		**0,365**			0,25	
Total Mean		**0,365**			0,25	



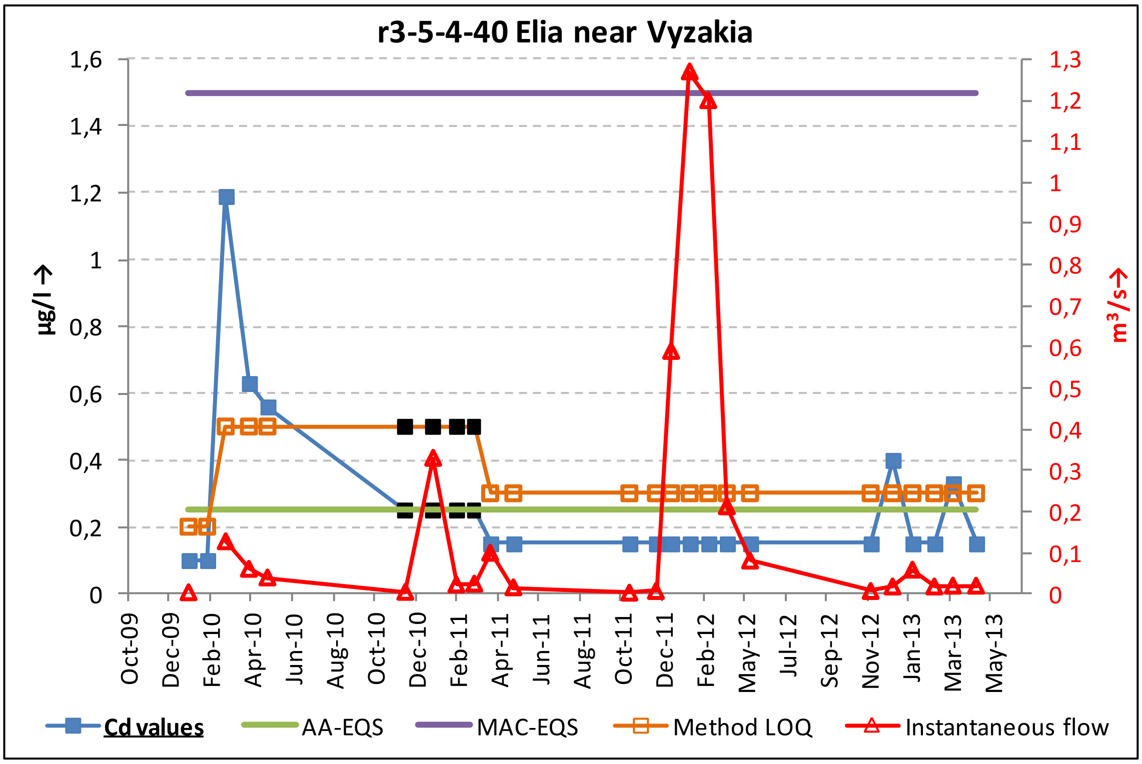
Ap.2-1: Fluctuation of Cadmium daily values at river monitoring station r2-3-2-96

R3-5-4-40: ELIA NEAR VYZAKIA

Table Ap. 2-2: Cadmium daily and mean values at river monitoring station r3-5-4-40

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
14/1/2010	003	0,1	0,2	0,6		1,5
11/2/2010		0,1	0,2	0,6		1,5
11/3/2010	0,127	1,19	0,5			1,5
15/4/2010	0,6	0,63	0,5			1,5
13/5/2010	039	0,56	0,5			1,5
7/12/2010	*004*	*0,25*	*0,5*	*0,15*		*1,5*
18/1/2011	*0,33*	*0,25*	*0,5*			*1,5*
22/2/2011	*022*	*0,25*	*0,5*	*0,15*		*1,5*
21/3/2011	*024*	*0,25*	*0,5*	*0,15*		*1,5*
14/4/2011	0,99	0,15	0,3			1,5
19/5/2011	015	0,15	0,3	0,9		1,5
10/11/2011	002	0,15	0,3	0,9		1,5
20/12/2011	00,6	0,15	0,3	0,9		1,5
12/1/2012	0,59	0,15	0,3	0,9		1,5
9/2/2012	1,27	0,15	0,3	0,9		1,5
8/3/2012	1,2	0,15	0,3	0,9		1,5
5/4/2012	0,212	0,15	0,3	0,9		1,5
10/5/2012	08	0,15	0,3	0,9		1,5
8/11/2012	00,6	0,15	0,3	0,9		1,5
11/12/2012	017	0,4	0,3			1,5
10/1/2013	058	0,15	0,3			1,5
12/2/2013	017	0,15	0,3			1,5
12/3/2013	019	0,33	0,3			1,5
16/4/2013	019	0,15	0,3	0,9		1,5
Mean 2010		**0,516**			0,25	
Mean 2011		0,150			0,25	
Mean 2012		0,186			0,25	
Mean 2013		0,195			0,25	
Total Mean		**0,263**			0,25	

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.



Ap.2-2: Fluctuation of Cadmium daily values at river monitoring station r3-5-4-40

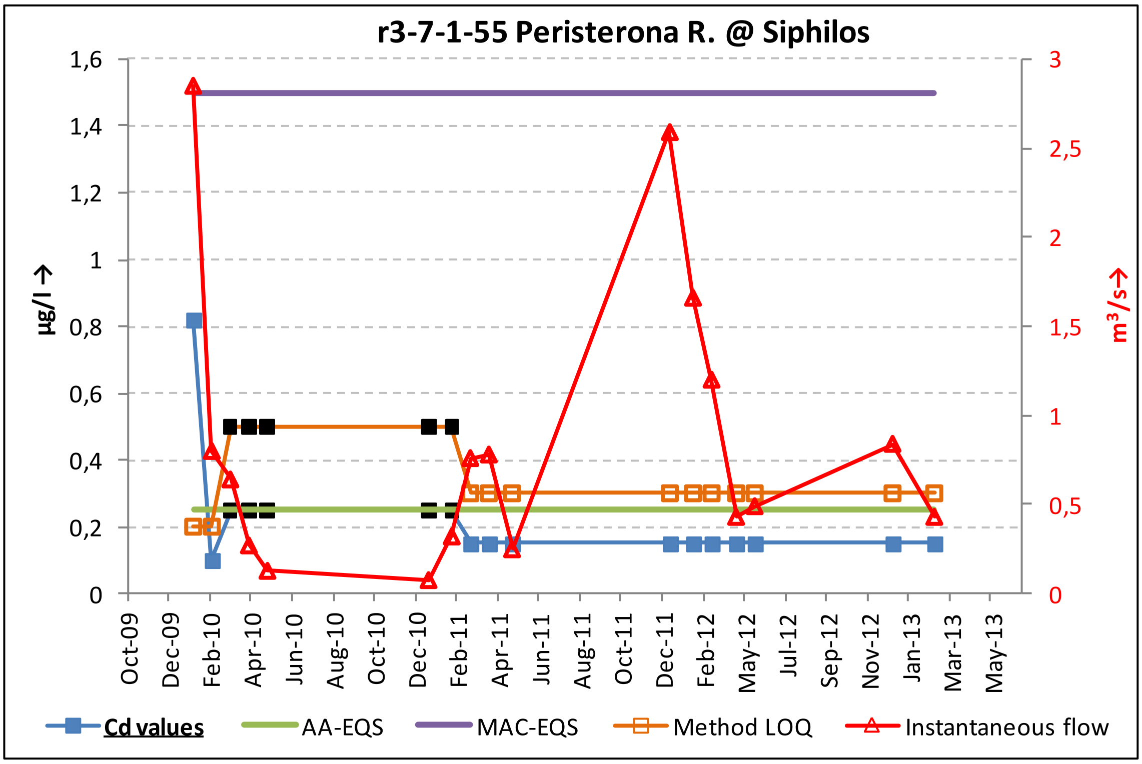
Values shown in black square points are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.

R3-7-1-55: PERISTERONA R. @ SIPHILOS

Table Ap. 2-3: Cadmium daily and mean values at river monitoring station r3-7-1-55

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
21/1/2010	2,85	0,82	0,2			1,5
18/2/2010	0,8	0,1	0,2	0,6		1,5
18/3/2010	*0,64*	*0,25*	*0,5*	*0,15*		*1,5*
15/4/2010	*0,27*	*0,25*	*0,5*	*0,15*		*1,5*
13/5/2010	*0,127*	*0,25*	*0,5*	*0,15*		*1,5*
11/1/2011	*075*	*0,25*	*0,5*	*0,15*		*1,5*
15/2/2011	*0,32*	*0,25*	*0,5*	*0,15*		*1,5*
15/3/2011	0,76	0,15	0,3	0,9		1,5
12/4/2011	0,78	0,15	0,3	0,9		1,5
17/5/2011	0,248	0,15	0,3	0,9		1,5
10/1/2012	2,59	0,15	0,3	0,9		1,5
14/2/2012	1,66	0,15	0,3	0,9		1,5
13/3/2012	1,2	0,15	0,3	0,9		1,5
19/4/2012	0,43	0,15	0,3	0,9		1,5
17/5/2012	0,49	0,15	0,3	0,9		1,5
11/12/2012	0,84	0,15	0,3	0,9		1,5
12/2/2013	0,43	0,15	0,3	0,9		1,5
Mean 2010		**0,460**			0,25	
Mean 2011		0,150			0,25	
Mean 2012		0,150			0,25	
Mean 2013		0,150			0,25	
Total Mean		0,202			0,25	

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.



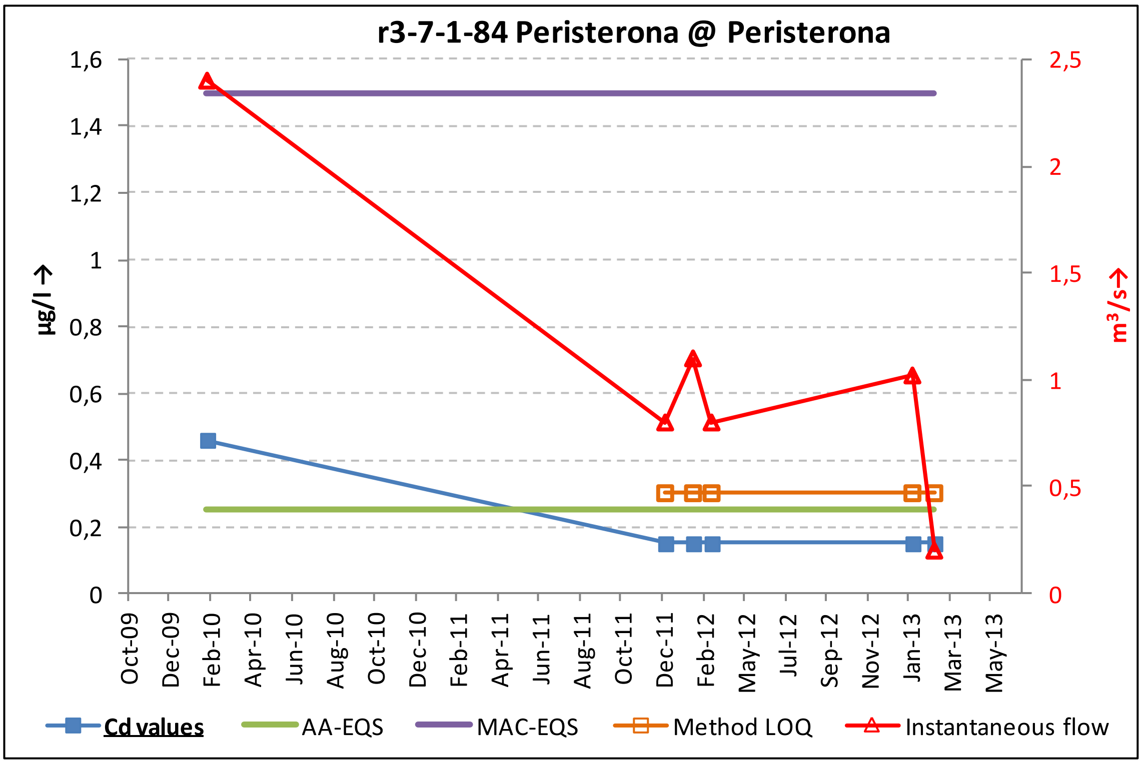
Ap.2-3: Fluctuation of Cadmium daily values at river monitoring station r3-7-1-55

Values shown in black square points are values that were not taken into account due to the fact that the method’s LOQ was greater than the AA-EQS.

R3-7-1-84: PERISTERONA @ PERISTERONA

Table Ap.2-4: Cadmium daily and mean values at river monitoring station r3-7-1-84

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
11/2/2010	2,4	0,46				1,5
3/1/2012	0,8	0,15	0,3	0,9		1,5
14/2/2012	1,1	0,15	0,3	0,9		1,5
13/3/2012	0,8	0,15	0,3	0,9		1,5
10/1/2013	1,02	0,15	0,3	0,9		1,5
12/2/2013	0,2	0,15	0,3	0,9		1,5
Mean 2010		**0,460**			0,25	
Mean 2012		0,150			0,25	
Mean 2013		0,150			0,25	
Total Mean		0,202			0,25	



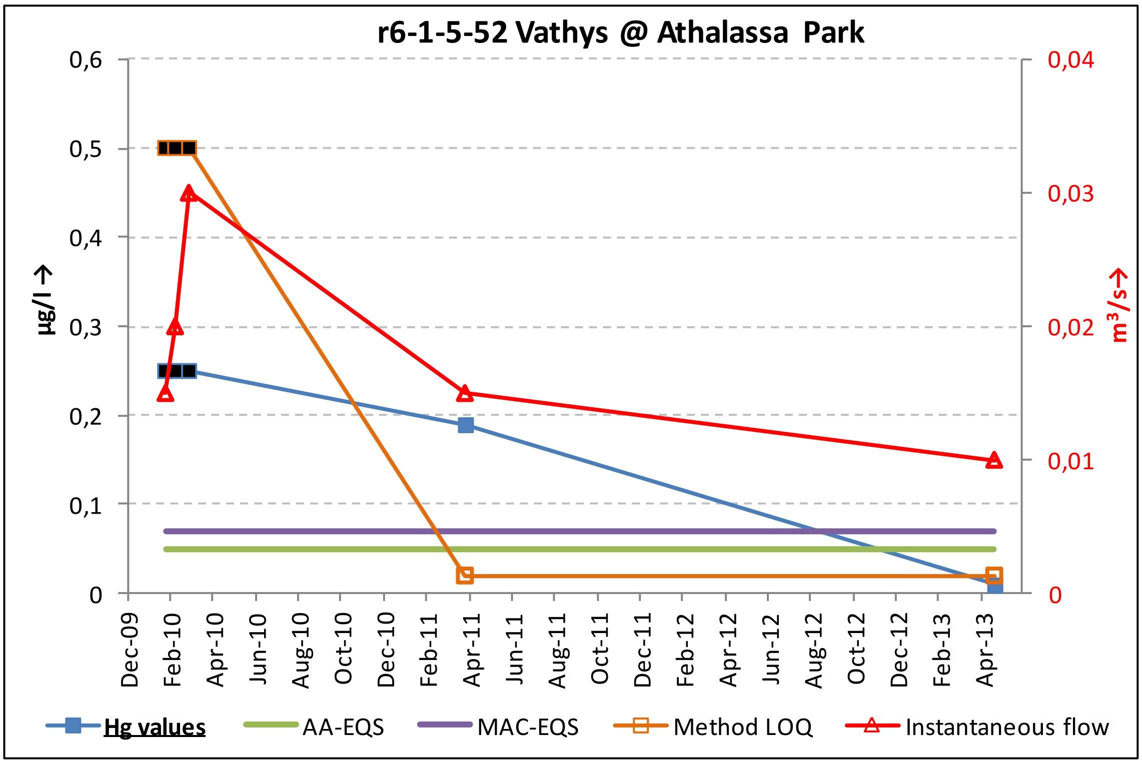
Ap.2-4: Fluctuation of Cadmium daily values at river monitoring station r3-7-1-84

R6-1-5-52: VATHYS @ ATHALASSA PARK

Table Ap.2-5: Mercury daily and mean values at river monitoring station r6-1-5-52

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
27/01/2010	*0,15*	*0,25*	*0,5*	*0,2*		*0,7*
10/02/2010	*0,2*	*0,25*	*0,5*	*0,2*		*0,7*
02/03/2010	*0,3*	*0,25*	*0,5*	*0,2*		*0,7*
7/4/2011	0,15	0,19	0,2			0,7
15/5/2013	0,1	0,1	0,2	0,06		0,7
Mean 2010		*0,25*			*0,5*	
Mean 2011		0,190			0,5	
Mean 2013		010			0,5	
Total Mean		0,100			0,5	

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.



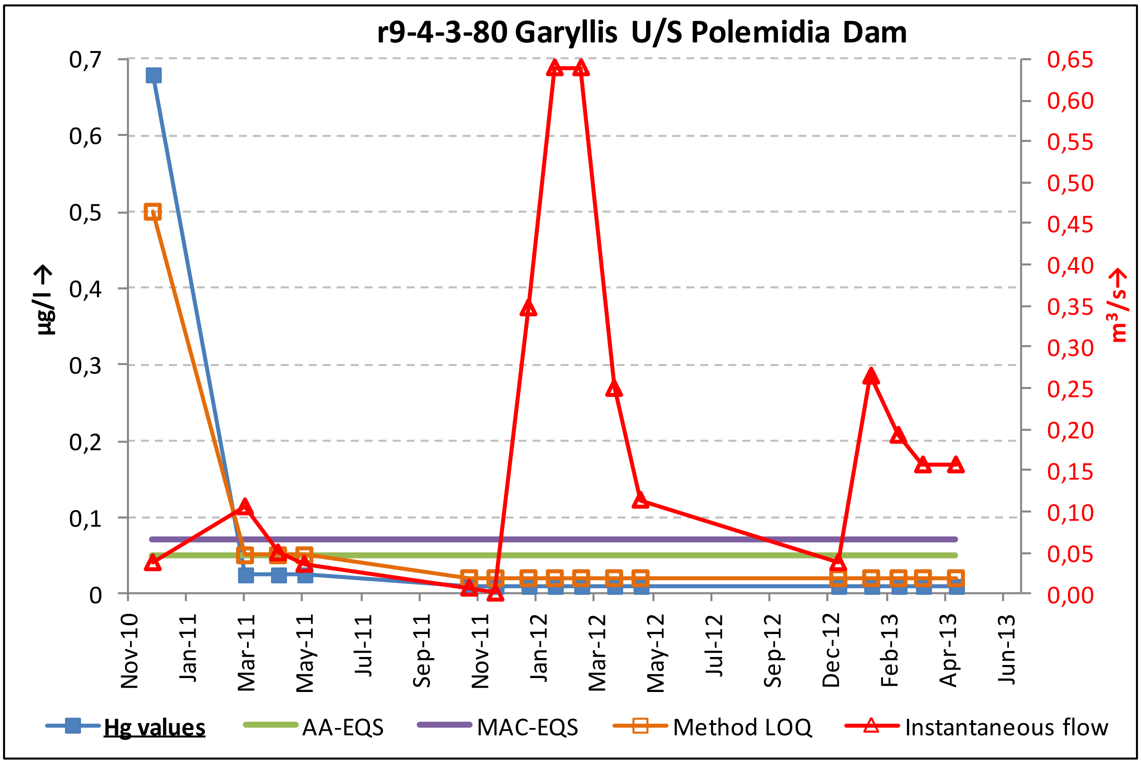
Ap.2-5: Fluctuation of Mercury daily values at river monitoring station r6-1-5-52

Values shown in black square points are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.

R9-4-3-80: GARYLLIS U/S POLEMIDIA DAM

Table Ap.2-6: Mercury daily and mean values at river monitoring station r9-4-3-80

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
15/12/2010	038 (value for 12/12/2010)	**0,68**	0,5			0,7
23/3/2011	0,106	0,25	0,5	0,15		0,7
27/4/2011	05	0,25	0,5	0,15		0,7
25/5/2011	036	0,25	0,5	0,15		0,7
16/11/2011	007	0,1	0,2	0,06		0,7
14/12/2011	001	0,1	0,2	0,06		0,7
18/1/2012	0,348	0,1	0,2	0,06		0,7
15/2/2012	0,64	0,1	0,2	0,06		0,7
14/3/2012	0,64	0,1	0,2	0,06		0,7
18/4/2012	0,25	0,1	0,2	0,06		0,7
16/5/2012	0,114	0,1	0,2	0,06		0,7
12/12/2012	038	0,1	0,2	0,06		0,7
16/1/2013	0,265	0,1	0,2	0,06		0,7
14/2/2013	0,193	0,1	0,2	0,06		0,7
12/3/2013	0,157	0,1	0,2	0,06		0,7
16/4/2013	0,157	0,1	0,2	0,06		0,7
Mean 2010		**0,680**			0,5	
Mean 2011		0,19			0,5	
Mean 2012		0,10			0,5	
Mean 2013		0,10			0,5	
Total Mean		**0,55**			0,5	

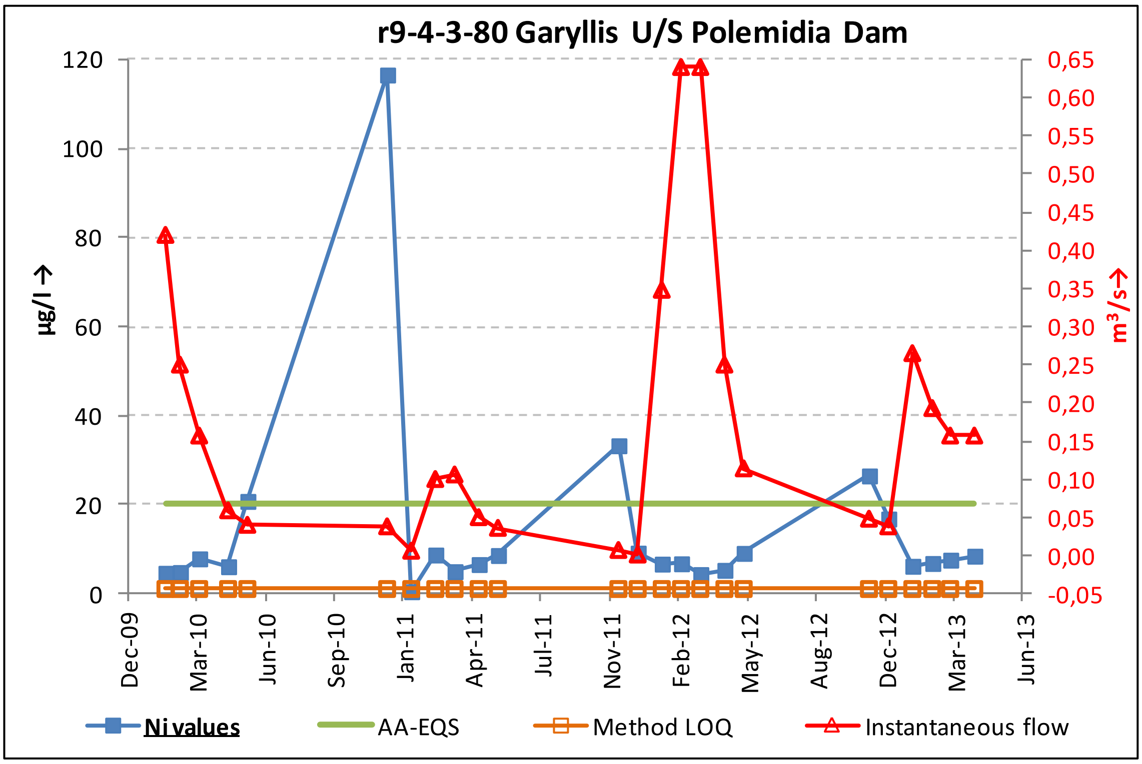


Ap.2-6: Fluctuation of Mercury daily values at river monitoring station r9-4-3-80

Table Ap.2-7: Nickel daily and mean values at river monitoring station r9-4-3-80

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m³/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
27/1/2010	0,42	4,65	1			-
17/2/2010	0,25	4,82	1			-
17/3/2010	0,157	7,89	1			-
28/4/2010	059	6,12	1			-
26/5/2010	04	20,8	1			-
15/12/2010	038 (value for 12/12/2010)	116,6	1			-
19/1/2011	006	0,5	1	0,3		-
23/2/2011	0,1	8,75	1			-
23/3/2011	0,106	5,01	1			-
27/4/2011	05	6,61	1			-
25/5/2011	036	8,64	1			-
16/11/2011	007	33,3	1			-
14/12/2011	001	9,18	1			-
18/1/2012	0,348	6,71	1			-
15/2/2012	0,64	6,78	1			-

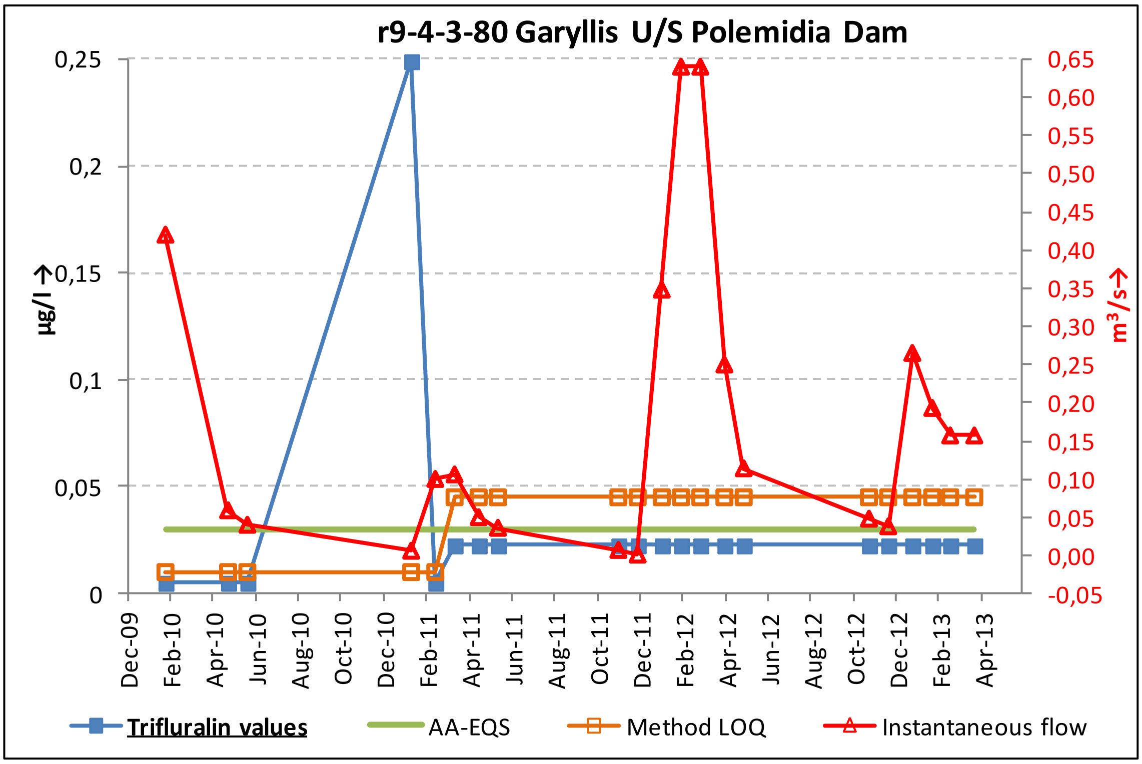
Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
14/3/2012	0,64	4,36	1			-
18/4/2012	0,25	5,31	1			-
16/5/2012	0,114	9,12	1			-
14/11/2012	048	26,52	1			-
12/12/2012	038	16,84	1			-
16/1/2013	0,265	6,22	1			-
14/2/2013	0,193	6,85	1			-
12/3/2013	0,157	7,6	1			-
16/4/2013	0,157	8,49	1			-
Mean 2010		**26,813**			20	
Mean 2011		10,284			20	
Mean 2012		10,806			20	
Mean 2013		7,290			20	
Total Mean		14,070			20	



Ap.2-7: Fluctuation of Nickel daily values at river monitoring station r9-4-3-80

Table Ap.2-8: Trifluralin daily and mean values at river monitoring station r9-4-3-80

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
27/1/2010	0,42	0,05	0,1	0,05		-
28/4/2010	059	0,05	0,1	0,05		-
26/5/2010	04	0,05	0,1	0,05		-
19/1/2011	006	0,249	0,1			-
23/2/2011	0,1	0,05	0,1	0,05		-
23/3/2011	0,106	0,225	0,45	0,15		-
27/4/2011	05	0,225	0,45	0,15		-
25/5/2011	036	0,225	0,45	0,15		-
16/11/2011	007	0,225	0,45	0,15		-
14/12/2011	001	0,225	0,45	0,15		-
18/1/2012	0,348	0,225	0,45	0,15		-
15/2/2012	0,64	0,225	0,45	0,15		-
14/3/2012	0,64	0,225	0,45	0,15		-
18/4/2012	0,25	0,225	0,45	0,15		-
16/5/2012	0,114	0,225	0,45	0,15		-
14/11/2012	048	0,225	0,45	0,15		-
12/12/2012	038	0,225	0,45	0,15		-
16/1/2013	0,265	0,225	0,45	0,15		-
14/2/2013	0,193	0,225	0,45	0,15		-
12/3/2013	0,157	0,225	0,45	0,15		-
16/4/2013	0,157	0,225	0,45	0,15		-
Mean 2010		0,05			0,3	
Mean 2011		**0,52**			0,3	
Mean 2012		0,23			0,3	
Mean 2013		0,23			0,3	
Total Mean		0,30			0,3	

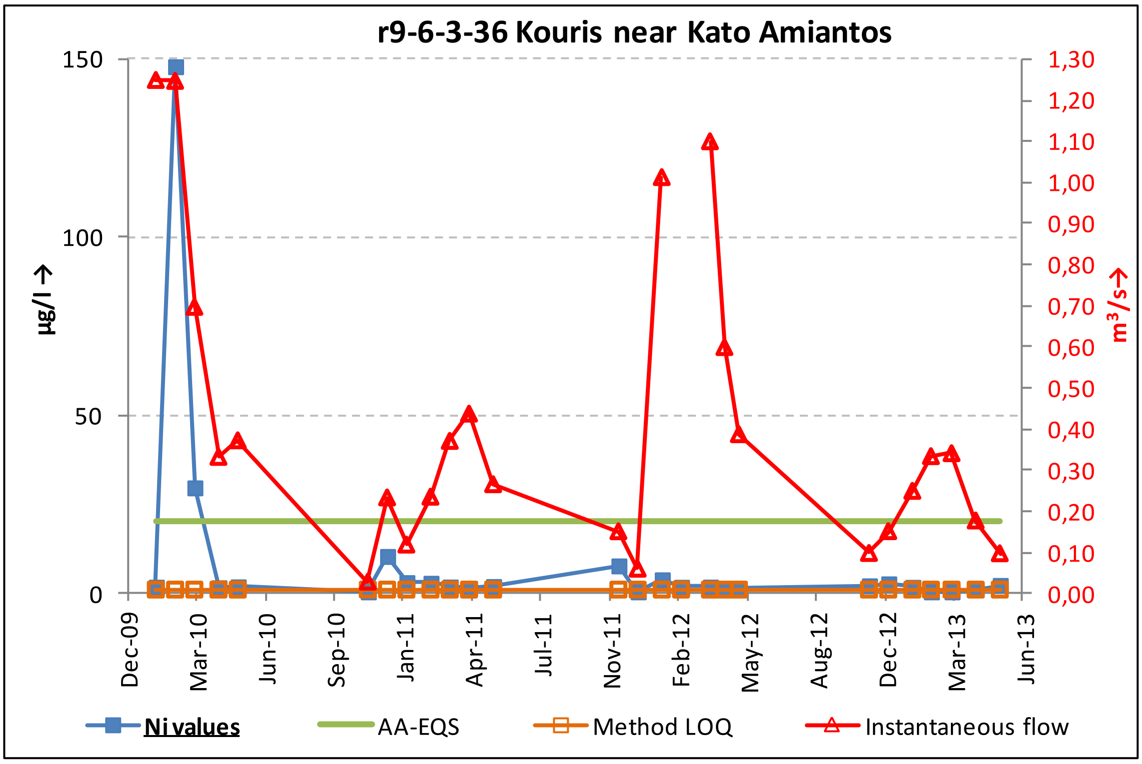


Ap.2-8: Fluctuation of Trifluralin daily values at river monitoring station r9-4-3-80

R9-6-3-36: KOURIS NEAR KATO AMIANTOS

Table Ap.2-9: Nickel daily and mean values at river monitoring station r9-6-3-36

Measurement Date/ Mean per Year/ Total Mean	Instantaneous observed flow (m^3/s)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
13/1/2010	1,2492 (value for 20/1/2010)	1,83	1			-
10/2/2010	1,247	148	1			-
10/3/2010	0,697	29,71	1			-
14/4/2010	0,3317	1,66	1			-
12/5/2010	0,372	1,91	1			-
17/11/2010	028	0,5	1			-
15/12/2010	0,233	10,45	1			-
12/1/2011	0,1182	3,1	1			-
16/2/2011	0,2348	2,92	1			-
16/3/2011	0,3706	1,87	1			-
13/4/2011	0,437	1,49	1			-
18/5/2011	0,2652	2	1			-
16/11/2011	0,1507	7,79	1			-
14/12/2011	0595	0,5	1			-
18/1/2012	1,0127	3,89	1			-
15/2/2012		1,8	1			-
28/3/2012	1,1	1,85	1			-
18/4/2012	0,599	1,12	1			-
9/5/2012	0,3869	1,39	1			-
14/11/2012	0978	2,2	1			-
12/12/2012	0,1509	2,75	1			-
16/1/2013	0,249	1,78	1			-
12/2/2013	0,3335	0,5	1			-
14/3/2013	0,3407	0,5	1			-
18/4/2013	0,1769	1,15	1			-
23/5/2013	0971	2,31	1			-
Mean 2010		**27,723**			20	
Mean 2011		2,810			20	
Mean 2012		2,143			20	
Mean 2013		1,248			20	
Total Mean		9,037			20	

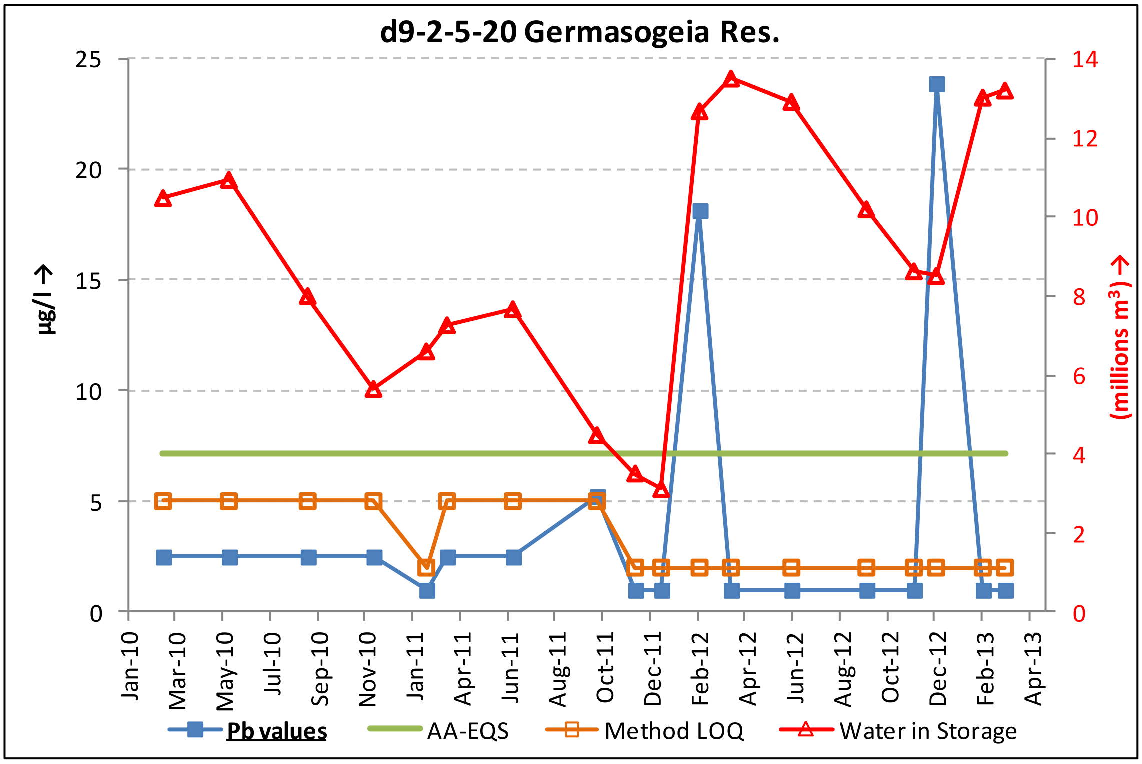


Ap.2-9: Fluctuation of Nickel daily values at river monitoring station r9-6-3-36

D9-2-5-20: GERMASOGEIA RES.

Table Ap.2-10: Lead daily and mean values at impounded river monitoring station d9-2-5-20

Measurement Date/ Mean per Year/ Total Mean	Water in Storage (millions m^3)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
9/3/2010	10,4724	2,5	5	1,51		-
3/6/2010	10,9358	2,5	5	1,51		-
14/9/2010	7,9932	2,5	5	1,51		-
9/12/2010	5,6422	2,5	5	1,51		-
16/2/2011	6,5931	1	2	0,61		-
15/3/2011	7,254	2,5	5	1,5		-
9/6/2011	7,6591	2,5	5	1,5		-
27/9/2011	4,4708	5,23	5			-
16/11/2011	3,5022	1	2	0,61		-
20/12/2011	3,107	1	2	0,61		-
8/2/2012	12,67	18,16	2			-
20/3/2012	13,5	1	2	0,6		-
7/6/2012	12,91	1	2	0,6		-
13/9/2012	10,19	1	2	0,6		-
14/11/2012	8,62	1	2	0,6		-
13/12/2012	8,5	23,9	2			-
12/2/2013	13,017	1	2	0,6		-
13/3/2013	13,197	1	2	0,6		-
Mean 2010		2,500			7,2	
Mean 2011		2,205			7,2	
Mean 2012		**7,677**			7,2	
Mean 2013		1,000			7,2	
Total Mean		3,961			7,2	

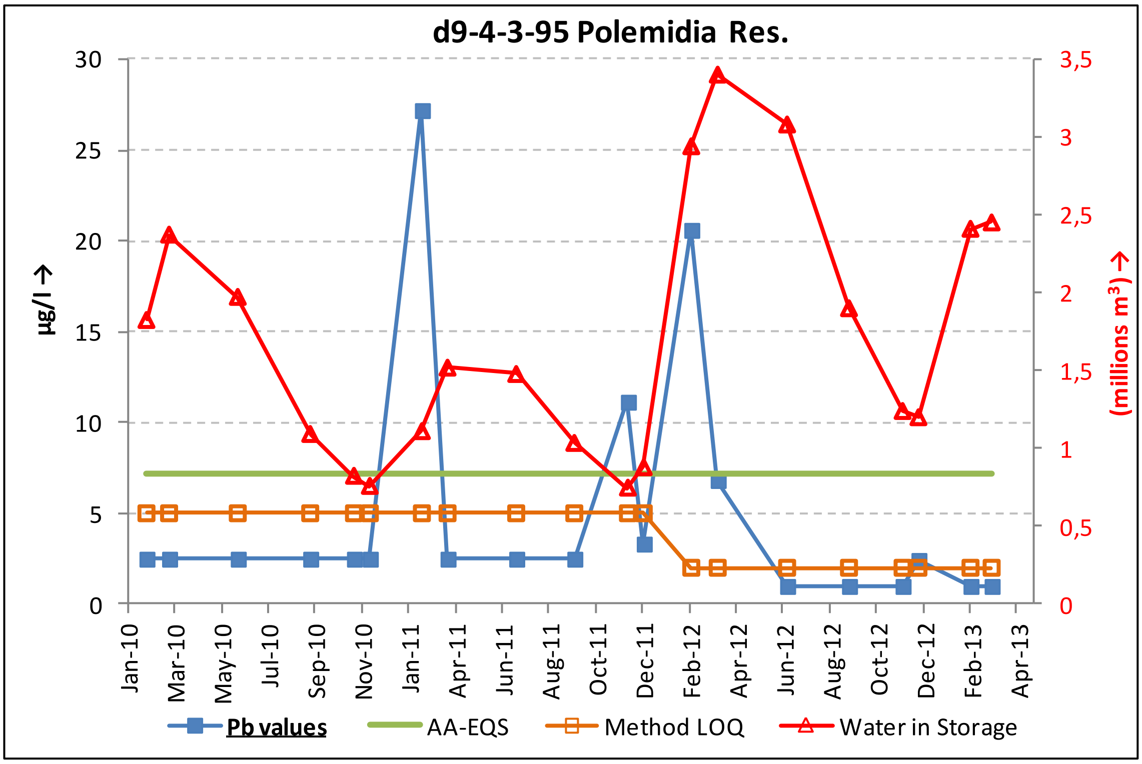


Ap.2-10: Fluctuation of Lead daily values at impounded river monitoring station d9-2-5-20

D9-4-3-95: POLEMIDIA RES.

Table Ap.2-11: Lead daily and mean values at impounded river monitoring station d9-4-3-95

Measurement Date/ Mean per Year/ Total Mean	Water in Storage (millions m^3)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
16/2/2010	1,8243	2,5	5			-
18/3/2010	2,3726	2,5	5			-
17/6/2010	1,9728	2,5	5			-
21/9/2010	1,0925	2,5	5			-
18/11/2010	0,824	2,5	5	1,51		-
9/12/2010	0,7589	2,5	5	1,51		-
16/2/2011	1,1106	27,19	5			-
22/3/2011	1,5184	2,5	5			-
21/6/2011	1,4777	2,5	5			-
6/9/2011	1,035	2,5	5			-
16/11/2011	0,7478	11,14	5			-
7/12/2011	0,8788	3,33	5			-
8/2/2012	2,94	20,6	2			-
14/3/2012	3,4	6,83	2			-
14/6/2012	3,08	1	2			-
4/9/2012	1,9	1	2	0,6		-
14/11/2012	1,24	1	2	0,6		-
5/12/2012	1,2	2,43	2			-
12/2/2013	2,41	1	2	0,6		-
12/3/2013	2,451	1	2	0,6		-
Mean 2010		2,500			7,2	
Mean 2011		**8,193**			7,2	
Mean 2012		5,477			7,2	
Mean 2013		1,000			7,2	
Total Mean		4,951			7,2	



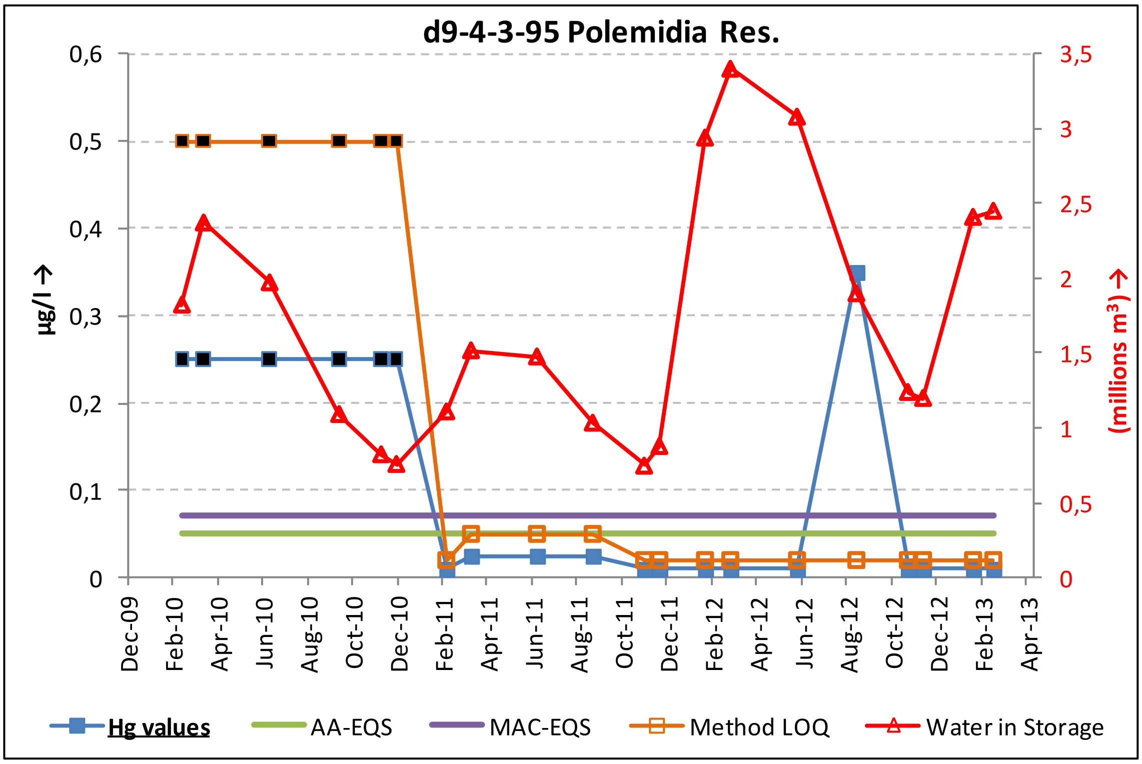
Ap.2-11: Fluctuation of Lead daily values at impounded river monitoring station d9-4-3-95

Table Ap.2-12: Mercury daily and mean values at impounded river monitoring station d9-4-3-95

Measurement Date/ Mean per Year/ Total Mean	Water in Storage (millions m³)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
16/2/2010	*1,8243*	*0,25*	*0,5*	*0,2*		*0,7*
18/3/2010	*2,3726*	*0,25*	*0,5*	*0,2*		*0,7*
17/6/2010	*1,9728*	*0,25*	*0,5*	*0,2*		*0,7*
21/9/2010	*1,0925*	*0,25*	*0,5*	*0,2*		*0,7*
18/11/2010	*0,824*	*0,25*	*0,5*	*0,2*		*0,7*
9/12/2010	*0,7589*	*0,25*	*0,5*	*0,2*		*0,7*
16/2/2011	1,1106	0,1	0,2	0,06		0,7
22/3/2011	1,5184	0,25	0,5	0,15		0,7
21/6/2011	1,4777	0,25	0,5	0,15		0,7
6/9/2011	1,035	0,25	0,5	0,15		0,7
16/11/2011	0,7478	0,1	0,2	0,06		0,7
7/12/2011	0,8788	0,1	0,2	0,06		0,7
8/2/2012	2,94	0,1	0,2	0,06		0,7
14/3/2012	3,4	0,1	0,2	0,06		0,7
14/6/2012	3,08	0,1	0,2	0,06		0,7
4/9/2012	1,9	**0,35**	0,2			0,7

Measurement Date/ Mean per Year/ Total Mean	Water in Storage (millions m³)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
14/11/2012	1,24	0,1	0,2	0,06		0,7
5/12/2012	1,2	0,1	0,2	0,06		0,7
12/2/2013	2,41	0,1	0,2	0,06		0,7
12/3/2013	2,451	0,1	0,2	0,06		0,7
Mean 2010		*0,25*			*0,5*	
Mean 2011		0,18			0,5	
Mean 2012		**0,67**			0,5	
Mean 2013		0,10			0,5	
Total Mean		0,38			0,5	

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.



Ap.2-12: Fluctuation of Mercury daily values at impounded river monitoring station d9-4-3-95

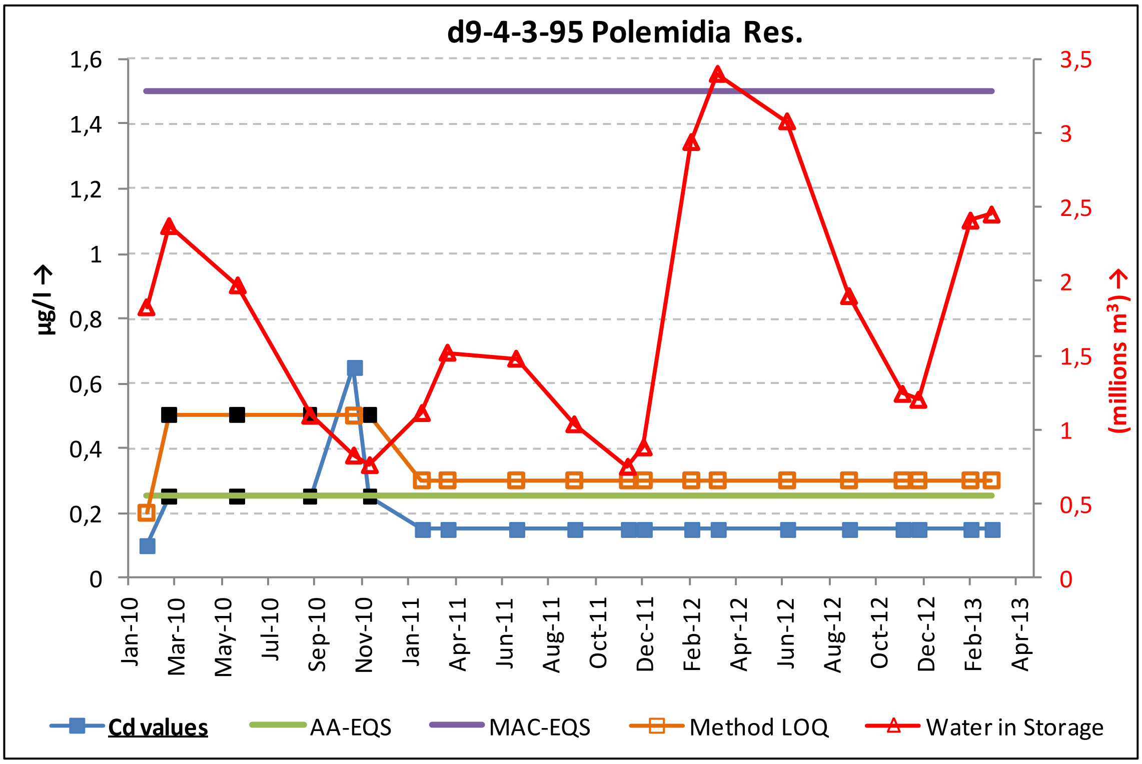
Values shown in black square points are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.

Table Ap.2-13: Cadmium daily and mean values at impounded river monitoring station d9-4-3-95

Measurement Date/ Mean per Year/ Total Mean	Water in Storage (millions m³)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
16/2/2010	129,83	0,1	0,2	06		1,5
18/3/2010	*132,43*	*0,25*	*0,5*	*0,15*		*1,5*
17/6/2010	*130,58*	*0,25*	*0,5*	*0,15*		*1,5*
21/9/2010	*125,4*	*0,25*	*0,5*	*0,15*		*1,5*
18/11/2010	123,3	0,65	0,5			1,5
9/12/2010	*122,73*	*0,25*	*0,5*	*0,15*		*1,5*
16/2/2011	125,53	0,15	0,3	0,9		1,5
22/3/2011	128,15	0,15	0,3	0,9		1,5
21/6/2011	127,91	0,15	0,3	0,9		1,5
6/9/2011	124,98	0,15	0,3	0,9		1,5
16/11/2011	122,63	0,15	0,3	0,9		1,5
7/12/2011	123,76	0,15	0,3	0,9		1,5

Measurement Date/ Mean per Year/ Total Mean	Water in Storage (millions m^3)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
8/2/2012	134,73	0,15	0,3	0,9		1,5
14/3/2012	136,42	0,15	0,3	0,9		1,5
14/6/2012	135,26	0,15	0,3	0,9		1,5
4/9/2012	130,2	0,15	0,3	0,9		1,5
14/11/2012	126,4	0,15	0,3	0,9		1,5
5/12/2012	126,16	0,15	0,3	0,9		1,5
12/2/2013	2,41	0,15	0,3	0,9		1,5
12/3/2013	2,451	0,15	0,3	0,9		1,5
Mean 2010		***0,292***			*0,25*	
Mean 2010		**0,375**			0,25	
Mean 2011		0,150			0,25	
Mean 2012		0,150			0,25	
Mean 2013		0,150			0,25	
Total Mean		0,178			0,25	

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.

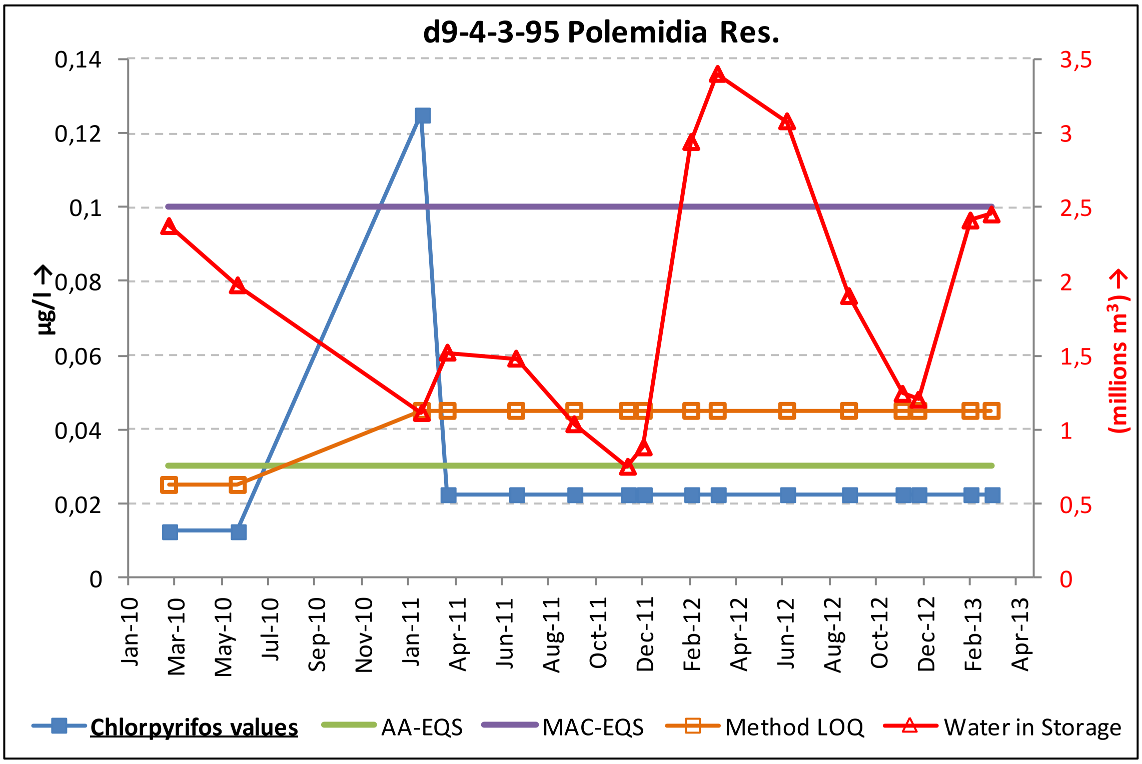


Ap.2-13: Fluctuation of Cadmium daily values at impounded river monitoring station d9-4-3-95

Values shown in black square points are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.

Table Ap.2-14: Chlorpyrifos daily and mean values at impounded river monitoring station d9-4-3-95

Measurement Date/ Mean per Year/ Total Mean	Water in Storage (millions m³)	Value	LOQ	LOD	AA-EQS	MAC-EQS
		(μg/l)				
18/3/2010	2,3726	0,125	0,25	0,12		0,1
17/6/2010	1,9728	0,125	0,25	0,12		0,1
16/2/2011	1,1106	0,125	0,45			0,1
22/3/2011	1,5184	0,225	0,45	0,15		0,1
21/6/2011	1,4777	0,225	0,45	0,15		0,1
6/9/2011	1,035	0,225	0,45	0,15		0,1
16/11/2011	0,7478	0,225	0,45	0,15		0,1
7/12/2011	0,8788	0,225	0,45	0,15		0,1
8/2/2012	2,94	0,225	0,45	0,15		0,1
14/3/2012	3,4	0,225	0,45	0,15		0,1
14/6/2012	3,08	0,225	0,45	0,15		0,1
4/9/2012	1,9	0,225	0,45	0,15		0,1
14/11/2012	1,24	0,225	0,45	0,15		0,1
5/12/2012	1,2	0,225	0,45	0,15		0,1
12/2/2013	2,41	0,225	0,45	0,15		0,1
12/3/2013	2,451	0,225	0,45	0,15		0,1
Mean 2010		0,13			0,3	
Mean 2011		0,40			0,3	
Mean 2012		0,23			0,3	
Mean 2013		0,23			0,3	
Total Mean		0,28			0,3	



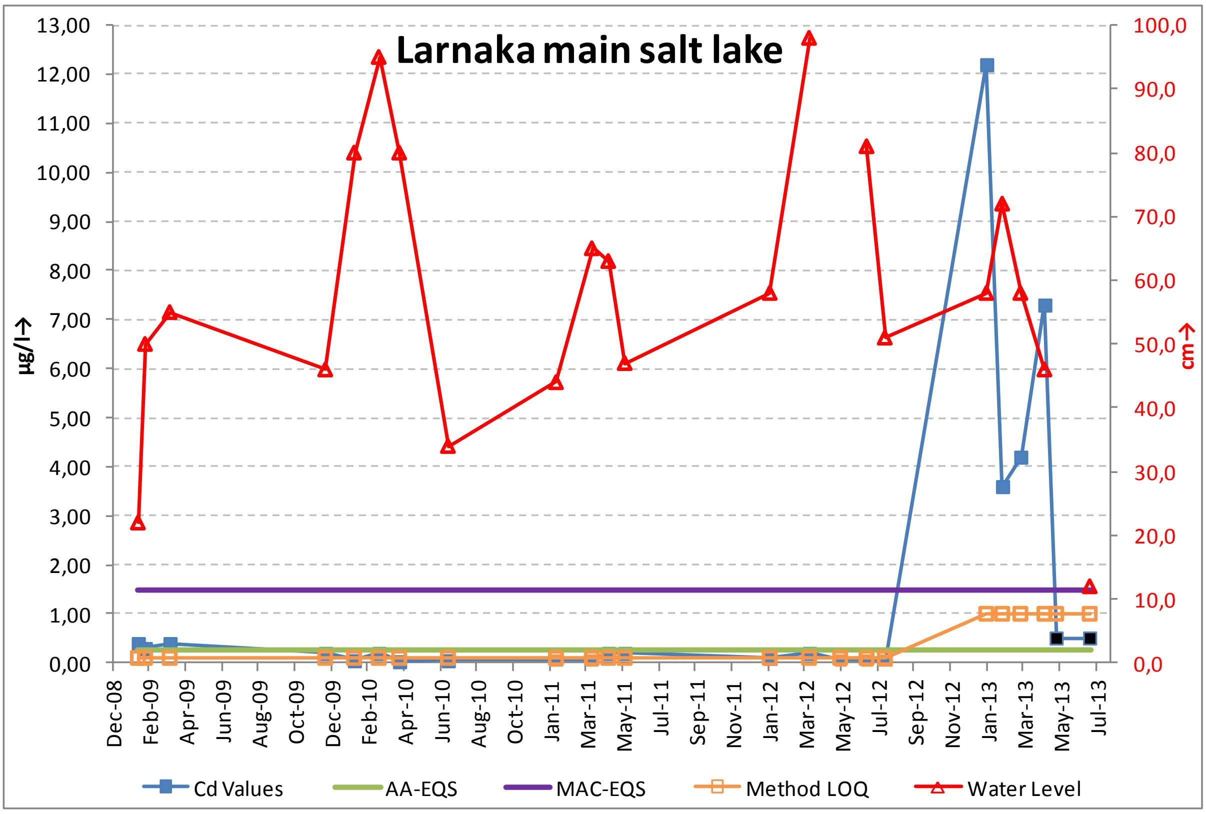
Ap.2-13: Fluctuation of Chlorpyrifos daily values at impounded river monitoring station d9-4-3-95

LARNAKA MAIN SALT LAKE

Table Ap.2-15: Cadmium daily and mean values at Larnaka main salt lake monitoring station

Measurement Date/ Mean per Year/ Total Mean	Water level (cm)	Value	LOQ	AA-EQS	MAC-EQS
		(μg/l)			
31/1/2009	22,0	0,40	0,1		1,5
12/2/2009	50	0,30	0,1		1,5
26/3/2009	55,0	0,40	0,1		1,5
16/12/2009	46,0	0,20	0,1		1,5
3/2/2010	80	0,5	0,1		1,5
17/3/2010	95,0	0,20	0,1		1,5
21/4/2010	80	0,3	0,1		1,5
13/7/2010	34,0	0,5	0,1		1,5
13/1/2011	44,0	0,5	0,1		1,5
15/3/2011	65,0	0,5	0,1		1,5
12/4/2011	63,0	0,20	0,1		1,5
10/5/2011	47,0	0,20	0,1		1,5
12/1/2012	58,0	0,10	0,1		1,5
19/3/2012	98,0	0,20	0,1		1,5
11/5/2012		0,5	0,1		1,5
25/6/2012	81,0	0,5	0,1		1,5
26/7/2012	51,0	0,5	0,1		1,5
15/1/2013	58,0	**12,20**	1		1,5
11/2/2013	72,0	**3,60**	1		1,5
14/3/2013	58,0	**4,20**	1		1,5
24/4/2013	46,0	**7,30**	1		1,5
14/5/2013		*0,50*	*1*		*1,5*
10/7/2013	*12,0*	*0,50*	*1*		*1,5*
Mean 2009		**0,32**		*0,25*	
Mean 2010		0,8		*0,25*	
Mean 2011		**0,12**		*0,25*	
Mean 2012		09		*0,25*	
Mean 2013		**6,82**		*0,25*	
Total Average		**1,42**		*0,25*	

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method's 50% LOQ was greater than the AA-EQS.



Ap.2-15: Fluctuation of Cadmium daily values at Larnaka main salt lake monitoring station

Values shown in black square points are values that were not taken into account due to the fact that the method's 50% LOQ was greater than the AA-EQS.

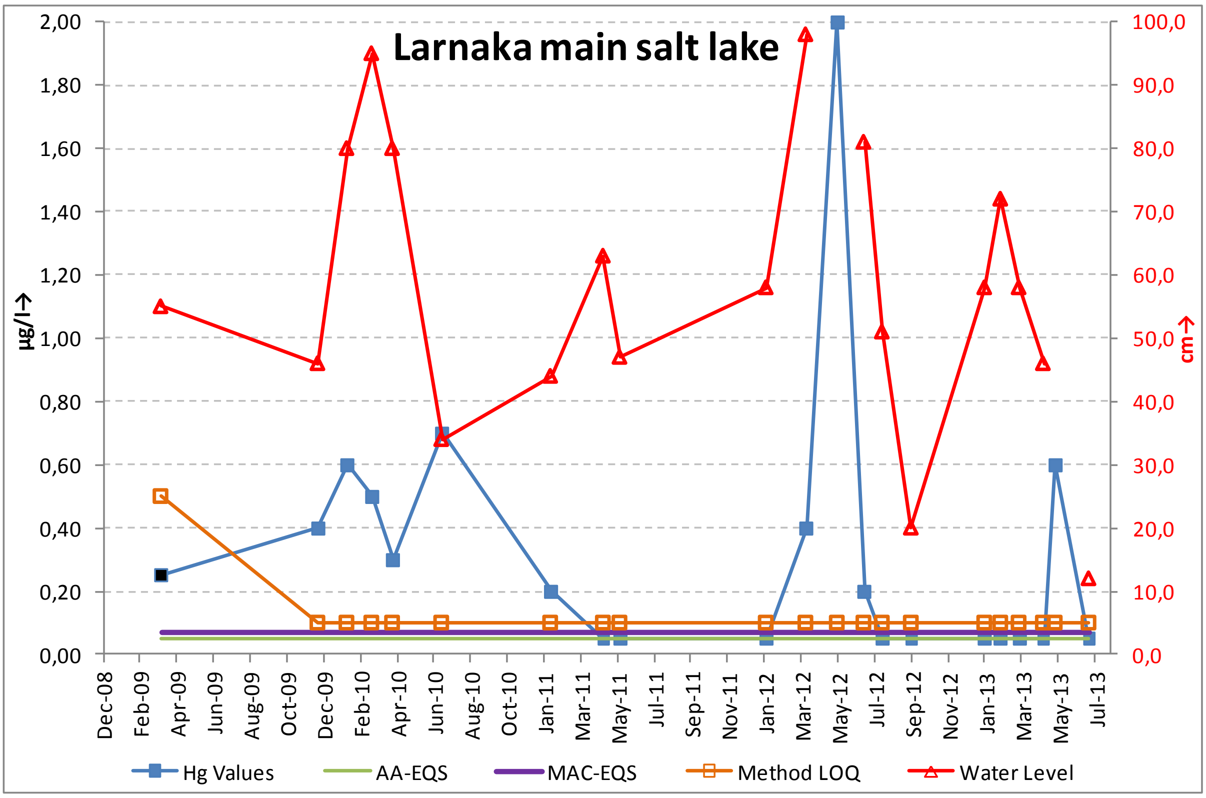
Table Ap.2-16: Mercury daily and mean values at Larnaka main salt lake monitoring station

Measurement Date/ Mean per Year/ Total Mean	Water level (cm)	Value	LOQ	AA-EQS	MAC-EQS
		(μg/l)			
26/3/2009	*55,0*	***0,25***	*0,5*		*0,7*
16/12/2009	46,0	**0,40**	0,1		0,7
3/2/2010	80	**0,60**	0,1		0,7
17/3/2010	95,0	**0,50**	0,1		0,7
21/4/2010	80	**0,30**	0,1		0,7
13/7/2010	34,0	**0,70**	0,1		0,7
13/1/2011	44,0	**0,20**	0,1		0,7
12/4/2011	*63,0*	*0,5*	*0,1*		*0,7*
10/5/2011	*47,0*	*0,5*	*0,1*		*0,7*
12/1/2012	*58,0*	*0,5*	*0,1*		*0,7*
19/3/2012	98,0	**0,40**	0,1		0,7
11/5/2012		**2,00**	0,1		0,7
25/6/2012	81,0	**0,20**	0,1		0,7
26/7/2012	*51,0*	*0,5*	*0,1*		*0,7*

Measurement Date/ Mean per Year/ Total Mean	Water level (cm)	Value	LOQ	AA-EQS	MAC-EQS
		(μg/l)			
13/9/2012	*20*	*0,5*	*0,1*		*0,7*
15/1/2013	*58,0*	*0,5*	*0,1*		*0,7*
11/2/2013	*72,0*	*0,5*	*0,1*		*0,7*
14/3/2013	*58,0*	*0,5*	*0,1*		*0,7*
24/4/2013	*46,0*	*0,5*	*0,1*		*0,7*
14/5/2013		**0,60**	0,1		0,7
10/7/2013	*12,0*	*0,5*	*0,1*		*0,7*
Mean 2009		**0,40**		*0,5*	
Mean 2010		**0,52**		*0,5*	
Mean 2011		**0,10**		*0,5*	
Mean 2012		**0,46**		*0,5*	
Mean 2013		**0,14**		*0,5*	
Total Average		**0,32**		*0,5*	

Values shown in *italic* are values that were taken into account even though the method's LOQ was greater than the AA-EQS (50%LOQ=AA-EQS).

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method's LOQ was greater than the AA-EQS.



Ap.2-16: Fluctuation of Mercury daily values at Larnaka main salt lake monitoring station

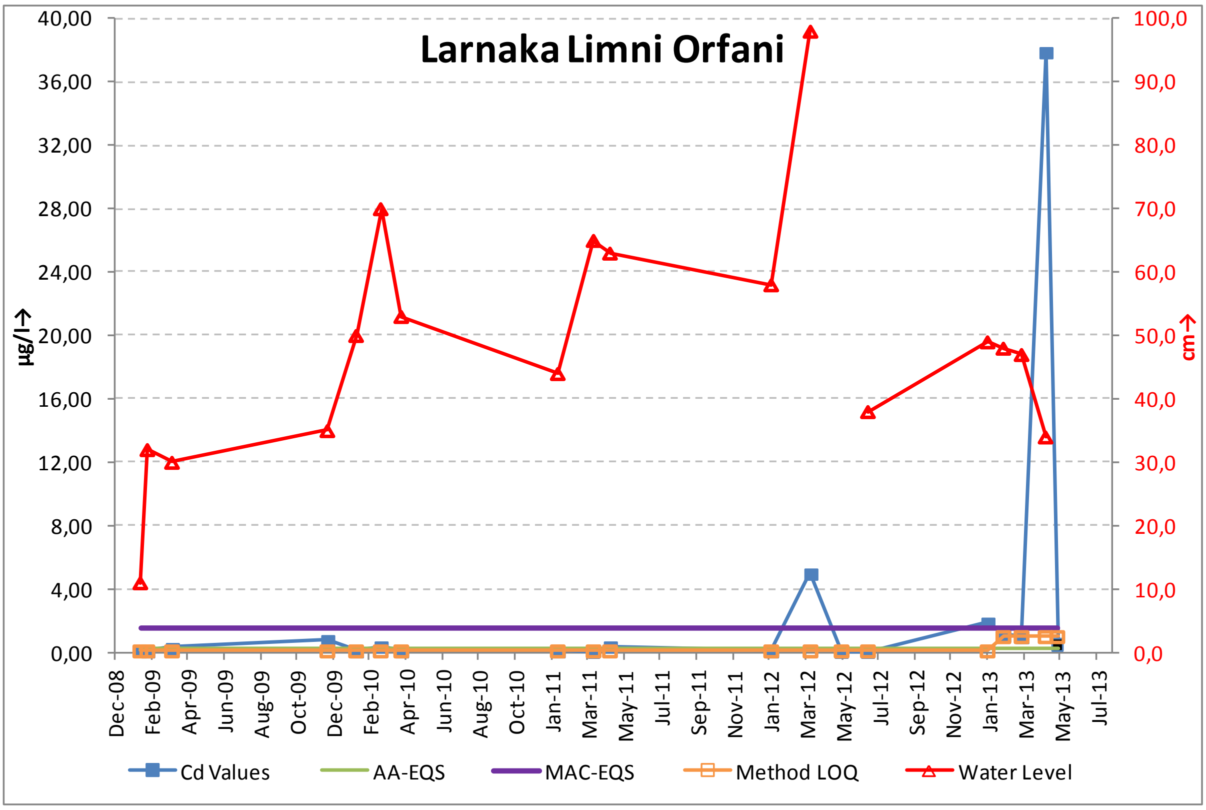
Values shown in black square points are values that were not taken into account due to the fact that the method’s 50% LOQ was greater than the AA-EQS.

LARNAKA LIMNI ORFANI

Table Ap.2-17: Cadmium daily and mean values at Larnaka Limni Orfani monitoring station

Measurement Date/ Mean per Year/ Total Mean	Water level (cm)	Value	LOQ	AA-EQS	MAC-EQS
		(μg/l)			
31/1/2009	11,0	0,20	0,1		1,5
12/2/2009	32,0	0,10	0,1		1,5
26/3/2009	30	0,30	0,1		1,5
16/12/2009	35,0	0,80	0,1		1,5
3/2/2010	50	0,10	0,1		1,5
17/3/2010	70	0,40	0,1		1,5
21/4/2010	53,0	0,10	0,1		1,5
13/1/2011	44,0	0,10	0,1		1,5
15/3/2011	65,0	0,5	0,1		1,5
12/4/2011	63,0	0,4	0,1		1,5
12/1/2012	58,0	0,1	0,1		1,5
19/3/2012	98,0	**5,0**	0,1		1,5
11/5/2012		0,5	0,1		1,5
25/6/2012	38,0	05	0,1		1,5
15/1/2013	49,0	**1,90**	1		1,5
11/2/2013	48,0	1,10	1		1,5
14/3/2013	47,0	1,00	1		1,5
24/4/2013	34,0	**37,90**	1		1,5
14/5/2013		*0,50*	*1*		*1,5*
Mean 2009		**0,35**		*0,25*	
Mean 2010		**0,20**		*0,25*	
Mean 2011		0,18		*0,25*	
Mean 2012		**1,30**		*0,25*	
Mean 2013		**10,47**		*0,25*	
Total Average		**2,76**		*0,25*	

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method’s 50% LOQ was greater than the AA-EQS.



Ap.2-17: Fluctuation of Cadmium daily values at Larnaka Limni Orfani monitoring station

Values shown in black square points are values that were not taken into account due to the fact that the method's 50% LOQ was greater than the AA-EQS.

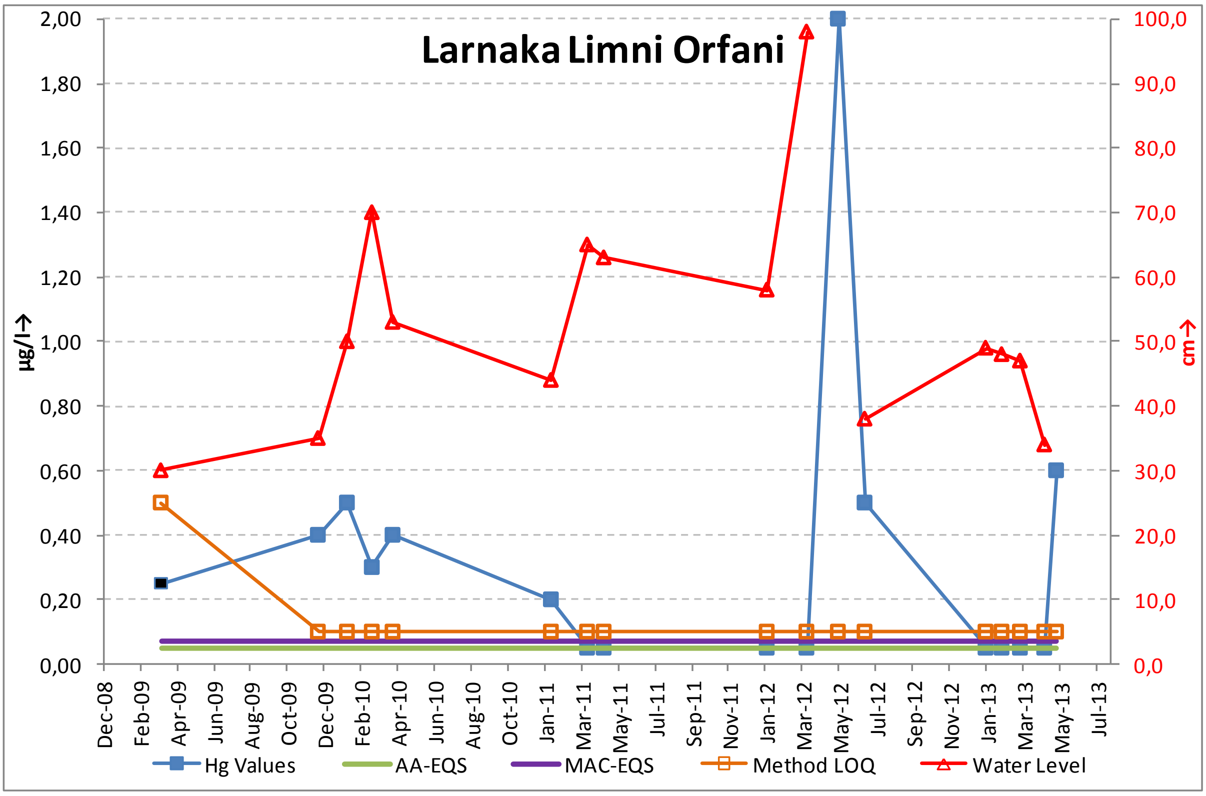
Table Ap.2-18: Mercury daily and mean values at Larnaka Limni Orfani monitoring station

Measurement Date/ Mean per Year/ Total Mean	Water level (cm)	Value	LOQ	AA-EQS	MAC-EQS
		(μg/l)			
26/3/2009	*30*	***0,25***	*0,5*		*0,7*
16/12/2009	35,0	**0,40**	0,1		0,7
3/2/2010	50	**0,50**	0,1		0,7
17/3/2010	70	**0,30**	0,1		0,7
21/4/2010	53,0	**0,40**	0,1		0,7
13/1/2011	44,0	**0,20**	0,1		0,7
15/3/2011	*65,0*	*0,5*	*0,1*		*0,7*
12/4/2011	*63,0*	*0,5*	*0,1*		*0,7*
12/1/2012	*58,0*	*0,5*	*0,1*		*0,7*
19/3/2012	*98,0*	*0,5*	*0,1*		*0,7*
11/5/2012		**2,00**	0,1		0,7
25/6/2012	38,0	**0,50**	0,1		0,7
15/1/2013	*49,0*	*0,5*	*0,1*		*0,7*

Measurement Date/ Mean per Year/ Total Mean	Water level (cm)	Value	LOQ	AA-EQS	MAC-EQS
		(μg/l)			
11/2/2013	*48,0*	*0,5*	*0,1*		*0,7*
14/3/2013	*47,0*	*0,5*	*0,1*		*0,7*
24/4/2013	*34,0*	*0,5*	*0,1*		*0,7*
14/5/2013		**0,60**	0,1		0,7
Mean 2009		**0,40**		0,5	
Mean 2010		**0,40**		0,5	
Mean 2011		**0,10**		0,5	
Mean 2012		**0,65**		0,5	
Mean 2013		**0,60**		0,5	
Total Average		**0,33**		0,5	

Values shown in *italic* are values that were taken into account even though the method's LOQ was greater than the AA-EQS (50%LOQ=AA-EQS).

Values shown in *italic and fade colour* are values that were not taken into account due to the fact that the method's 50% LOQ was greater than the AA-EQS.



Ap.2-18: Fluctuation of Mercury daily values at Larnaka Limni Orfani monitoring station

Values shown in black square points are values that were not taken into account due to the fact that the method's 50% LOQ was greater than the AA-EQS.

APPENDIX 3: Comparison of ecological and chemical status with 1st RBMP

NO	WB_CODE	WB_NAME	WB_CODE_2005	HMWB	TYPE	GROUP	ECOLOGICAL STATUS/POTENTIAL 2009	ECOLOGICAL STATUS/POTENTIAL 2013	CHEMICAL STATUS 2009	CHEMICAL STATUS 2013
1	CY_1-1-a_RP	Khapotami	CY_1-1-1_R3	NO	P	P-important	MODERATE	MODERATE	GOOD	GOOD
2	CY_1-1-b_RI	Khapotami	CY_1-1-1_R3, CY_1-1-4_R3	NO	I	I-important	MODERATE	MODERATE	GOOD	GOOD
3	CY_1-1-c_RIh	Khapotami	CY_1-1-4_R3	NO	Ih	Ih-minor	MODERATE	GOOD	GOOD	GOOD
4	CY_1-1-d_RIh_HM	Khapotami	CY_1-1-4_R3	YES_Prop	Ih	E-negligible	MODERATE	GOOD & ABOVE P	GOOD	GOOD
5	CY_1-1-e_RI	Malleta	CY_1-1-1_R3	NO	I	I-important	MODERATE	MODERATE	GOOD	GOOD
6	CY_1-2-a_RP	Dhiarizos	CY_1-2-1_R2	NO	P	P-minor	GOOD	GOOD	GOOD	GOOD
7	CY_1-2-b_RP	Dhiarizos	CY_1-2-1_R2	NO	P	P-minor	GOOD	GOOD	GOOD	GOOD
8	CY_1-2-d_RI_HM	Dhiarizos	CY_1-2-4_R3-HM	YES2005	I	Ih-important	GOOD	GOOD & ABOVE P	GOOD	GOOD
9	CY_1-2-e_RI	Tholo Potamos	CY_1-2-1_R2	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
10	CY_1-2-f_RIh	Yerovasinos Potamos	CY_1-2-53_R3	NO	Ih	Ih-minor	GOOD	GOOD	GOOD	GOOD
11	CY_1-3-a_RP	Argaki tis Roudhias	CY_1-3-1_R2, CY_1-3-5_R3	NO	P	P-negligible	GOOD	HIGH	GOOD	GOOD
12	CY_1-3-b_RI	Xeros Potamos	CY_1-3-5_R3	NO	I	I-minor	MODERATE	GOOD	GOOD	GOOD
13	CY_1-3-c_RIh	Xeros Potamos	CY_1-3-5_R3	NO	Ih	Ih-minor	MODERATE	MODERATE	GOOD	GOOD
14	CY_1-3-e_RE_HM	Xeros Potamos	CY_1-3-9_R3-HM	YES2005	E	E-minor	POOR	MODERATE P	GOOD	UNKNOWN
15	CY_1-3-f_RI	Argaki Lazaridhaes	CY_1-3-1_R2	NO	I	I-negligible	GOOD	GOOD	GOOD	GOOD
16	CY_1-3-g_RIh	Argaki ton Lefkarkon	CY_1-3-5_R3	NO	Ih	Ih-minor	MODERATE	GOOD	GOOD	GOOD
17	CY_1-4-a_RP	Ayia & Klimadhiou	CY_1-4-1_R3	NO	P	P-negligible	GOOD	HIGH	GOOD	GOOD
18	CY_1-4-b_RI	Argaki tis Ayias	CY_1-4-1_R3	NO	I	I-negligible	GOOD	GOOD	GOOD	GOOD
19	CY_1-4-d_RI_HM	Potamos tis Ezousas	CY_1-4-3_R3-HM	YES2005	I	Ih-important	GOOD	MODERATE P	GOOD	GOOD
20	CY_1-4-e_RIh_HM	Potamos tis Ezousas	CY_1-4-3_R3-HM	YES2005	Ih	Ih-important	GOOD	MODERATE P	GOOD	GOOD
21	CY_1-4-f_RP_HM	Potamos tis Ezousas	CY_1-4-3_R3-HM	YES2005	P	P-minor	GOOD	GOOD & ABOVE P	GOOD	GOOD
22	CY_1-4-g_RI_HM	Potamos tis Ezousas	CY_1-4-3_R3-HM	YES2005	I	I-minor	GOOD	GOOD & ABOVE P	GOOD	GOOD
23	CY_1-4-h_RIh_HM	Potamos tis Ezousas	CY_1-4-3_R3-HM	YES2005	Ih	E-minor	GOOD	GOOD & ABOVE P	GOOD	UNKNOWN
24	CY_1-4-i_RI	Argaki tou Paleomylou	CY_1-4-41_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
25	CY_1-4-j_RIh	Argakin tou Ayiou Nepiou	CY_1-4-51_R3	NO	Ih	Ih-important	GOOD	MODERATE	GOOD	GOOD
26	CY_1-4-k_RIh	Varkas	CY_1-4-6_R3	NO	Ih	Ih-important	GOOD	MODERATE	GOOD	GOOD
27	CY_1-4-L_RIh	Milarkou Potamos	CY_1-4-52_R3	NO	Ih	Ih-minor	GOOD	MODERATE	GOOD	GOOD
28	CY_1-4-m_RIh	Kotchatis	CY_1-4-3_R3	NO	Ih	Ih-important	UNKNOWN	MODERATE	UNKNOWN	GOOD
29	CY_1-5-a_RE	Limnarka	CY_1-5-2_R3	NO	E	E-minor	UNKNOWN	MODERATE	UNKNOWN	GOOD
30	CY_1-5-b_RE_HM	Limnarka	CY_1-5-2_R3-HM	YES2005	E	E-minor	UNKNOWN	MODERATE P	UNKNOWN	GOOD
31	CY_1-5-c_RE	Kochinas	CY_1-5-5_R3	NO	E	E-minor	UNKNOWN	MODERATE	UNKNOWN	UNKNOWN
32	CY_1-5-d_RE_HM	Kochinas	CY_1-5-5_R3-HM, CY_1-5-51_R3	YES2005	E	E-minor	UNKNOWN	MODERATE P	UNKNOWN	UNKNOWN
33	CY_1-5-e_RE	Agriokalami	CY_1-5-7_R3	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
34	CY_1-6-a_RIh	Mavrokolymbos	CY_1-6-2_R1	NO	Ih	Ih-minor	GOOD	MODERATE	GOOD	GOOD
35	CY_1-6-c_RIh_HM	Mavrokolymbos	CY_1-6-1_R2-HM	YES2005	Ih	E-minor	MODERATE	MODERATE P	GOOD	GOOD
36	CY_1-6-d_RIh	Xeros	CY_1-6-3_R1	NO	Ih	Ih-minor	UNKNOWN	MODERATE	UNKNOWN	GOOD
37	CY_1-8-a_RIh	Kalamouli (Avgas)	CY_1-8-1_R1	NO	Ih	Ih-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
38	CY_1-8-b_RIh	Pevkos Potamos	CY_1-8-4_R1	NO	Ih	Ih-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
39	CY_2-1-a_RE	Argaki tou Ayiou Ioanni	CY_2-1-7_R1	NO	E	E-important	UNKNOWN	MODERATE	UNKNOWN	GOOD
40	CY_2-2-a_RIh	Neraidhes & Potamos Ammadhkiou	CY_2-2-1_R3	NO	Ih	Ih-important	GOOD	MODERATE	GOOD	GOOD
41	CY_2-2-b_RI	Garillis Potamos	CY_2-2-1_R3	NO	I	I-important	GOOD	MODERATE	GOOD	GOOD

NO	WB_CODE	WB_NAME	WB_CODE_2005	HMWB	TYPE	GROUP	ECOLOGICAL STATUS/POTENTIAL 2009	ECOLOGICAL STATUS/POTENTIAL 2013	CHEMICAL STATUS 2009	CHEMICAL STATUS 2013
42	CY_2-2-c_RI	Potamos tou Stavrou tis Psokas	CY_2-2-4_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
43	CY_2-2-d_RI	Potamos tou Stavrou tis Psokas	CY_2-2-4_R3	NO	I	I-important	GOOD	GOOD	GOOD	GOOD
44	CY_2-2-f_RI_HM	Potamos tou Stavrou tis Psokas	CY_2-2-6_R3-HM	YES2005	I	Ih-important	MODERATE	MODERATE P	GOOD	GOOD
45	CY_2-2-g_RI_HM	Khrysokhou Potamos	CY_2-2-6_R3-HM	YES2005	I	I-important	MODERATE	MODERATE P	GOOD	GOOD
46	CY_2-2-h_RIh_HM	Khrysokhou Potamos	CY_2-2-6_R3-HM	YES2005	Ih	E-minor	MODERATE	MODERATE P	GOOD	GOOD
47	CY_2-3-a_RIh	Mirmikoph	CY_2-3-1_R3	NO	Ih	Ih-important	GOOD	MODERATE	GOOD	GOOD
48	CY_2-3-b_RIh	Argaki tis Limnis	CY_2-3-2_R3	NO	Ih	Ih-important	MODERATE	MODERATE	GOOD	FAILING TO ACHIEVE GOOD
49	CY_2-3-c_RI	Potamos tis Magoundas	CY_2-3-3_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
50	CY_2-3-d_RIh_HM	Potamos tis Magoundas	CY_2-3-5_R3-HM	YES2005	Ih	E-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
51	CY_2-3-e_RE	Xeropotamos	CY_2-3-7_R3	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
52	CY_2-3-f_RP	Yialias Potamos	CY_2-3-8_R3	NO	P	P-minor	GOOD	GOOD	GOOD	GOOD
53	CY_2-3-g_RI	Yialias Potamos	CY_2-3-8_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
54	CY_2-4-a_RIh	Xeros	CY_2-4-2_R3	NO	Ih	Ih-negligible	GOOD	GOOD	GOOD	GOOD
55	CY_2-4-b_RIh_HM	Xeros	CY_2-4-2_R3-HM	YES2005	Ih	E-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
56	CY_2-4-c_RP	Maroti & Diali	CY_2-4-4_R3	NO	P	P-negligible	GOOD	HIGH	GOOD	GOOD
57	CY_2-4-d_RI	Livadhi	CY_2-4-4_R3	NO	I	I-negligible	GOOD	GOOD	GOOD	GOOD
58	CY_2-4-e_RIh_HM	Livadhi	CY_2-4-3_R3-HM	YES2005	Ih	Ih-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
59	CY_2-5-a_RIh	Ayios Theodoros	CY_2-5-3_R1	NO	Ih	Ih-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
60	CY_2-6-a_RIh	Katouris	CY_2-6-1_R1	NO	Ih	Ih-negligible	GOOD	GOOD	GOOD	GOOD
61	CY_2-6-b_RIh_HM	Katouris	CY_2-6-3_R1-HM	YES2005	Ih	Ih-minor	GOOD	MODERATE P	GOOD	GOOD
62	CY_2-7-a_RI	Potamos tou Pyrgou	CY_2-7-1_R1	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
63	CY_2-8-a_RP	Potamos tou Limniti	CY_2-8-1_R3	NO	P	P-negligible	GOOD	GOOD	GOOD	GOOD
64	CY_2-8-b_RI	Potamos tou Limniti	CY_2-8-1_R3	NO	I	None-occupied	GOOD	UNKNOWN	GOOD	UNKNOWN
65	CY_2-9-a_RI	Potamos tou Kambou	NONE	NO	I	I-minor		GOOD	NO CORRESPONDENCE	GOOD
66	CY_2-9-b_RP	Potamos tou Kambou	CY_2-9-1_R1	NO	P	P-minor	GOOD	MODERATE	GOOD	GOOD
67	CY_2-9-c_RI	Potamos tou Kambou	CY_2-9-1_R1	NO	I	I-negligible	GOOD	GOOD	GOOD	GOOD
68	CY_2-9-d_RIh_HM	Potamos tou Kambou	CY_2-9-4_R1-HM	YES2005	Ih	Ih-negligible	GOOD	GOOD & ABOVE P	GOOD	GOOD
69	CY_2-9-e_RE_HM	Potamos tou Kambou	CY_2-9-4_R1-HM	YES2005	E	None-occupied	GOOD	UNKNOWN	GOOD	UNKNOWN
70	CY_3-1-a_RP	Xeros	CY_3-1-1_R3	NO	P	P-negligible	GOOD	HIGH	GOOD	GOOD
71	CY_3-1-b_RI	Xeros	CY_3-1-1_R3	NO	I	I-negligible	GOOD	GOOD	GOOD	GOOD
72	CY_3-1-c_RI_HM	Xeros	CY_3-1-2_R3-HM	YES2005	I	I-negligible	POOR	GOOD & ABOVE P	GOOD	GOOD
73	CY_3-1-d_RIh_HM	Xeros	CY_3-1-2_R3-HM	YES2005	Ih	None-occupied	POOR	UNKNOWN	GOOD	UNKNOWN
74	CY_3-2-a_RP	Marathasa	CY_3-2-1_R2	NO	P	P-minor	MODERATE	GOOD	GOOD	GOOD
75	CY_3-2-b_RP_HM	Marathasa	CY_3-2-2_R3-HM, CY_3-2-4_R3-HM	YES2005	P	P-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
76	CY_3-2-c_RI_HM	Setrakhos	CY_3-2-4_R3-HM	YES2005	I	None-occupied	MODERATE	UNKNOWN	GOOD	UNKNOWN
77	CY_3-2-d_RI	Rkondas	NONE	NO	I	I-minor		GOOD	NO CORRESPONDENCE	GOOD
78	CY_3-2-e_RE	Vrountokremni Argakin	CY_3-2-3_R3	NO	E	E-negligible	MODERATE	GOOD	GOOD	GOOD
79	CY_3-3-a_RP	Ayios Nikolaos	CY_3-3-1_R2	NO	P	P-negligible	MODERATE	GOOD	GOOD	GOOD
80	CY_3-3-b_RP	Karyiotis	CY_3-3-1_R2	NO	P	P-important	MODERATE	MODERATE	GOOD	GOOD
81	CY_3-3-c_RI	Karyiotis	CY_3-3-4_R3	NO	I	I-important	MODERATE	MODERATE	GOOD	UNKNOWN

NO	WB_CODE	WB_NAME	WB_CODE_2005	HMWB	TYPE	GROUP	ECOLOGICAL STATUS/POTENTIAL 2009	ECOLOGICAL STATUS/POTENTIAL 2013	CHEMICAL STATUS 2009	CHEMICAL STATUS 2013
82	CY_3-3-d_RP	Argaki tou Karvouna	CY_3-3-1_R2	NO	P	P-important	MODERATE	MODERATE	GOOD	GOOD
83	CY_3-3-e_RI	Alykhnos	CY_3-3-1_R2	NO	I	I-minor	MODERATE	GOOD	GOOD	GOOD
84	CY_3-4-a_RI	Atsas	CY_3-4-1_R1	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
85	CY_3-4-b_RIh	Atsas	CY_3-4-1_R1	NO	Ih	Ih-important	GOOD	MODERATE	GOOD	GOOD
86	CY_3-4-c_RIh_HM	Atsas	CY_3-4-3_R1-HM	YES2005	Ih	Ih-important	MODERATE	MODERATE P	GOOD	UNKNOWN
87	CY_3-4-d_RE_HM	Atsas	CY_3-4-3_R1-HM	YES2005	E	None-occupied	MODERATE	UNKNOWN	GOOD	UNKNOWN
88	CY_3-5-a_RI	Lagoudhera	CY_3-5-11_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
89	CY_3-5-c_RI_HM	Lagoudhera	CY_3-5-1_R3-HM	YES2005	I	Ih-minor	MODERATE	MODERATE P	GOOD	FAILING TO ACHIEVE GOOD
90	CY_3-5-d_RIh_HM	Potamos tis Elias	CY_3-5-1_R3-HM	YES2005	Ih	Ih-important	MODERATE	MODERATE P	GOOD	FAILING TO ACHIEVE GOOD
91	CY_3-5-e_RI	Kannavia	CY_3-5-2_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
92	CY_3-5-f_RI	Asinou	CY_3-5-3_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
93	CY_3-5-g_RE	Galouropniktis Potamos	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
94	CY_3-6-a_RE	Xeropotamos	CY_3-6-1_R3	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
95	CY_3-6-b_RE	Potami	CY_3-6-2_R3	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
96	CY_3-6-c_RE	Komitis	CY_3-6-3_R3	NO	E	E-important	UNKNOWN	MODERATE	UNKNOWN	UNKNOWN
97	CY_3-7-a_RI	Peristerona	CY_3-7-11_R3	NO	I	I-minor	MODERATE	GOOD	GOOD	GOOD
98	CY_3-7-b_RIh	Peristerona	CY_3-7-11_R3	NO	Ih	Ih-important	MODERATE	GOOD	GOOD	GOOD
99	CY_3-7-c_RE	Peristerona	CY_3-7-11_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	GOOD
100	CY_3-7-d_RI	Maroullenas	CY_3-7-34_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
101	CY_3-7-e_RI	Kambi	CY_3-7-33_R3	NO	I	I-important	GOOD	MODERATE	GOOD	GOOD
102	CY_3-7-f_RI_HM	Maroullenas	CY_3-7-3_R3-HM	YES2005	I	I-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
103	CY_3-7-g_RI	Pharmakas	CY_3-7-32_R3	NO	I	I-minor	MODERATE	GOOD	GOOD	GOOD
104	CY_3-7-h_RI_HM	Pharmakas	CY_3-7-3_R3-HM	YES2005	I	I-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
105	CY_3-7-j_RIh_HM	Potamos tou Akakiou	CY_3-7-41_R3-HM	YES2005	Ih	Ih-important	MODERATE	MODERATE P	GOOD	UNKNOWN
106	CY_3-7-k_RE_HM	Potamos tou Akakiou	CY_3-7-41_R3-HM, CY_3-7-42_R3-HM	YES2005	E	E-important	MODERATE/POOR	MODERATE P	GOOD	UNKNOWN
107	CY_3-7-L_RE	Korivas	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
108	CY_3-7-m_RE	Likythia	CY_3-7-2_R3	NO	E	E-minor	POOR	GOOD	GOOD	UNKNOWN
109	CY_3-7-n_RIh	Koutis & Aloupos	CY_3-7-51_R3	NO	Ih	Ih-minor	MODERATE	MODERATE	GOOD	GOOD
110	CY_3-7-o_RE	Merika	CY_3-7-51_R3, CY_3-7-52_R3	NO	E	E-minor	MODERATE/POOR	GOOD	GOOD	UNKNOWN
111	CY_3-7-p_RE	Kokkinotrimithia	CY_3-7-52_R3	NO	E	E-minor	POOR	GOOD	GOOD	UNKNOWN
112	CY_3-7-q_RE_HM	Serrakhis	CY_3-7-42_R3-HM	YES2005	E	None-occupied	POOR	UNKNOWN	GOOD	UNKNOWN
113	CY_3-7-r_RE	Ovgos	CY_3-7-6_R3	NO	E	E-minor	POOR	GOOD	GOOD	UNKNOWN
114	CY_3-7-s_R	Ovgos	CY_3-7-6_R3	NO	NoDat	None-occupied	POOR	UNKNOWN	GOOD	UNKNOWN
115	CY_6-1-a_RIh	Pedhieos & Ayios Onouphrios	CY_6-1-1_R3	NO	Ih	Ih-minor	MODERATE	GOOD	GOOD	GOOD
116	CY_6-1-c_RIh_HM	Pedhieos	CY_6-1-1_R3	YES2005	Ih	Ih-important	MODERATE	MODERATE P	GOOD	GOOD
117	CY_6-1-d_RE_HM	Pedhieos	CY_6-1-21_R3	YES2005	E	E-minor	POOR	GOOD & ABOVE P	GOOD	GOOD
118	CY_6-1-e_RE_HM	Pedhieos	CY_6-1-2_R3-HM	YES2005	E	E-important	POOR	MODERATE P	GOOD	GOOD
119	CY_6-1-f_R	Pedhieos	CY_6-1-4_R3	NO	NoDat	None-occupied	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
120	CY_6-1-g_RE	Kouphos	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD

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121	CY_6-1-h_RE	Argaki	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
122	CY_6-1-i_RE	Klemos	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	UNKNOWN
123	CY_6-1-j_RE_HM	Klemos	NONE	YES_Prop	E	E-important		MODERATE P	NO CORRESPONDENCE	UNKNOWN
124	CY_6-1-k_RE_HM	Katevas	NONE	YES_Prop	E	E-important		MODERATE P	NO CORRESPONDENCE	UNKNOWN
125	CY_6-1-L_RE	Kaloyeros	CY_6-1-51_R3	NO	E	E-important	POOR	MODERATE	GOOD	FAILING TO ACHIEVE GOOD
126	CY_6-1-m_RE_HM	Vathys	CY_6-1-5_R3-HM	YES2005	E	E-minor	POOR	GOOD & ABOVE P	GOOD	UNKNOWN
127	CY_6-1-n_RE_HM	Dhrakondias	NONE	YES_Prop	E	E-minor		GOOD & ABOVE P	NO CORRESPONDENCE	UNKNOWN
128	CY_6-1-o_RE	Vyzakotos	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	UNKNOWN
129	CY_6-1-p_RE	Almyros	CY_6-1-52_R3	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	UNKNOWN
130	CY_6-5-a_RIh	Yialias	CY_6-5-12_R3	NO	Ih	Ih-minor	GOOD	GOOD	GOOD	GOOD
131	CY_6-5-b_RI	Yialias	CY_6-5-12_R3, CY_6-5-2_R3	NO	I	I-important	GOOD/MODERATE	POOR	GOOD	GOOD
132	CY_6-5-c_RE	Yialias	CY_6-5-2_R3	NO	E	E-important	MODERATE	MODERATE	GOOD	GOOD
133	CY_6-5-d_R	Yialias	NONE	NO	NoDat	None-occupied		UNKNOWN	NO CORRESPONDENCE	UNKNOWN
134	CY_6-5-e_RIh	Koutsos	CY_6-5-11_R3	NO	Ih	Ih-minor	GOOD	GOOD	GOOD	GOOD
135	CY_6-5-f_RIh_HM	Koutsos	CY_6-5-1_R3-HM	YES2005	Ih	Ih-important	MODERATE	MODERATE P	GOOD	GOOD
136	CY_6-5-g_RE	Argaki ton Villourkon	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
137	CY_6-5-h_RE	Alykos	CY_6-5-2_R3	NO	E	E-important	MODERATE	MODERATE	GOOD	UNKNOWN
138	CY_6-5-i_RE	Almyros	CY_6-5-2_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	UNKNOWN
139	CY_7-2-a_RIh	Vathys	CY_7-2-6_R3	NO	Ih	Ih-minor	UNKNOWN	MODERATE	UNKNOWN	UNKNOWN
140	CY_7-2-b_RE	Liopetri	CY_7-2-3_R3	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
141	CY_7-2-c_RE_HM	Liopetri	CY_7-2-3_R3-HM	YES2005	E	E-minor	UNKNOWN	GOOD & ABOVE P	UNKNOWN	GOOD
142	CY_8-1-a_RE	Avdellero	CY_8-1-2_R1	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
143	CY_8-1-b_RE_HM	Avdellero	CY_8-1-2_R1-HM	YES2005	E	E-important	UNKNOWN	MODERATE P	UNKNOWN	UNKNOWN
144	CY_8-2-a_RE	Aradippou	CY_8-2-1_R1	NO	E	E-important	UNKNOWN	MODERATE	UNKNOWN	UNKNOWN
145	CY_8-2-b_RE_HM	Aradippou	CY_8-2-1_R1	YES_Prop	E	E-important	UNKNOWN	MODERATE P	UNKNOWN	UNKNOWN
146	CY_8-3-a_RE	Kalo Chorio	NONE	NO	E	E-minor		MODERATE	NO CORRESPONDENCE	UNKNOWN
147	CY_8-3-b_RE		NONE	NO	E	E-important		MODERATE	NO CORRESPONDENCE	UNKNOWN
148	CY_8-4-a_RE	Ammos & Kalamoulia	CY_8-4-11_R3, CY_8-4-12_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	GOOD
149	CY_8-4-b_RE	Xylias	CY_8-4-13_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	FAILING TO ACHIEVE GOOD
150	CY_8-4-c_RE_HM	Tremithos	CY_8-4-1_R3-HM	YES2005	E	E-important	MODERATE	MODERATE P	GOOD	GOOD
151	CY_8-4-d_RE_HM	Tremithos	CY_8-4-5_R3-HM	YES2005	E	E-minor	POOR	GOOD & ABOVE P	GOOD	GOOD
152	CY_8-4-e_RE	Ayia Marina	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
153	CY_8-4-f_RE	Mosfiloti	CY_8-4-2_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	GOOD
154	CY_8-4-g_RE	Pyrga	CY_8-4-4_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	GOOD
155	CY_8-5-a_RIh	Pouzis	CY_8-5-1_R1	NO	Ih	Ih-minor	MODERATE	GOOD	GOOD	GOOD
156	CY_8-5-b_RE	Pouzis	CY_8-5-1_R1	NO	E	E-minor	MODERATE	GOOD	GOOD	GOOD
157	CY_8-5-c_RE	Xeropouzos	CY_8-5-1_R1	NO	E	E-minor	MODERATE	GOOD	GOOD	GOOD
158	CY_8-6-a_RIh	Xeropotamos	CY_8-6-1_R3	NO	Ih	Ih-important	MODERATE	MODERATE	GOOD	GOOD
159	CY_8-7-a_RI	Syrkatis	CY_8-7-11_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
160	CY_8-7-c_RI_HM	Syrkatis	CY_8-7-2_R3_HM	YES2005	I	Ih-important	POOR	MODERATE P	GOOD	GOOD
161	CY_8-7-d_RIh	Argaki tou Mylou	CY_8-7-3_R3	NO	Ih	Ih-minor	GOOD	GOOD	GOOD	GOOD

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162	CY_8-7-f_RI_HM	Pendaskhinos	CY_8-7-4_R3-HM	YES2005	I	E-minor	MODERATE	MODERATE P	GOOD	GOOD
163	CY_8-7-g_RIh_HM	Pendaskhinos	CY_8-7-4_R3-HM	YES2005	Ih	E-important	MODERATE	MODERATE P	GOOD	GOOD
164	CY_8-7-h_RE		CY_8-7-5_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	GOOD
165	CY_8-8-a_RI	Potamos tou Ayiou Mina	CY_8-8-1_R3	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
166	CY_8-8-b_RIh	Potamos tou Ayiou Mina	CY_8-8-1_R3, CY_8-8-2_R3-HM	NO	Ih	Ih-minor	GOOD/MODERATE	MODERATE	GOOD	GOOD
167	CY_8-8-c_RIh_HM	Potamos tou Ayiou Mina	CY_8-8-2_R3-HM	YES2005	Ih	Ih-minor	MODERATE	MODERATE P	GOOD	GOOD
168	CY_8-8-d_RE_HM	Potamos tou Ayiou Mina	CY_8-8-2_R3-HM	YES2005	E	E-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
169	CY_8-9-a_RI	Vasilikos	CY_8-9-1_R3	NO	I	I-minor	MODERATE	GOOD	GOOD	GOOD
170	CY_8-9-b_RI_HM	Vasilikos	CY_8-9-1_R3-HM	YES2005	I	I-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
171	CY_8-9-c_RI	Vasilikos	CY_8-9-2_R3	NO	I	I-important	MODERATE	MODERATE	BELOW GOOD	GOOD
172	CY_8-9-e_RI_HM	Vasilikos	CY_8-9-5_R3-HM	YES2005	I	E-minor	MODERATE	MODERATE P	GOOD	UNKNOWN
173	CY_8-9-f_RIh_HM	Vasilikos	CY_8-9-5_R3-HM	YES2005	Ih	E-important	MODERATE	MODERATE P	GOOD	UNKNOWN
174	CY_8-9-g_RIh	Exovounia	CY_8-9-2_R3	NO	Ih	Ih-important	MODERATE	MODERATE	BELOW GOOD	GOOD
175	CY_8-9-h_RIh	Argaki tis Asgatas	NONE	NO	Ih	Ih-minor		GOOD	NO CORRESPONDENCE	UNKNOWN
176	CY_9-1-a_RE	Pendakomo	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
177	CY_9-1-b_RIh	Argaki tou Pyrgou	CY_9-1-4_R3	NO	Ih	Ih-important	MODERATE	MODERATE	GOOD	UNKNOWN
178	CY_9-1-c_RE	Argaki tou Pyrgou	CY_9-1-4_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	UNKNOWN
179	CY_9-1-d_RE	Argaki tou Pyrgou	CY_9-1-4_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	UNKNOWN
180	CY_9-1-e_RE	Argaki tis Monis	NONE	NO	E	E-important		MODERATE	NO CORRESPONDENCE	UNKNOWN
181	CY_9-2-a_RI	Karydhaki	CY_9-2-2_R2	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
182	CY_9-2-b_RP	Ayios Pavlos	NONE	NO	P	P-important		MODERATE	NO CORRESPONDENCE	GOOD
183	CY_9-2-c_RI	Potamos tis Yermasogeias	CY_9-2-11_R2	NO	I	I-important	MODERATE	MODERATE	GOOD	GOOD
184	CY_9-2-d_RI_HM	Potamos tis Yermasogeias	CY_9-2-1_R2-HM	YES2005	I	I-important	MODERATE	MODERATE P	GOOD	GOOD
185	CY_9-2-e_RI	Potamos tis Yermasogeias	CY_9-2-2_R2, CY_9-2-31_R3	NO	I	I-important	GOOD/MODERATE	GOOD	GOOD	GOOD
186	CY_9-2-f_RI	Potamos tis Yermasogeias	CY_9-2-31_R3	NO	I	I-minor	MODERATE	GOOD	GOOD	GOOD
187	CY_9-2-h_RIh_HM	Potamos tis Yermasogeias	CY_9-2-5_R3-HM	YES2005	Ih	Ih-minor	MODERATE	MODERATE P	GOOD	GOOD
188	CY_9-2-i_RIh		CY_9-2-32_R3	NO	Ih	Ih-important	MODERATE	MODERATE	GOOD	GOOD
189	CY_9-2-j_RI	Yialiadhes	CY_9-2-4_R2	NO	I	I-negligible	GOOD	HIGH	GOOD	GOOD
190	CY_9-2-k_RI	Yialiadhes	CY_9-2-4_R2	NO	I	I-minor	GOOD	GOOD	GOOD	GOOD
191	CY_9-2-L_RI_HM	Yialiadhes	CY_9-2-4_R3-HM	YES2005	I	I-important	GOOD	MODERATE P	GOOD	GOOD
192	CY_9-3-a_RE	Vathias	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
193	CY_9-3-b_RE_HM	Vathias	NONE	YES_Prop	E	E-important		MODERATE P	NO CORRESPONDENCE	UNKNOWN
194	CY_9-4-a_RE_HM	Vathias	CY_9-4-42_R3-HM	YES_Prop	E	E-important	BAD	MODERATE P	BELOW GOOD	UNKNOWN
195	CY_9-4-b_RI	Garyllis	CY_9-4-1_R3	NO	I	I-minor	BAD	GOOD	BELOW GOOD	GOOD
196	CY_9-4-c_RI	Garyllis	CY_9-4-1_R3	NO	I	I-important	BAD	POOR	BELOW GOOD	FAILING TO ACHIEVE GOOD
197	CY_9-4-e_RIh_HM	Garyllis	CY_9-4-41_R3-HM	YES2005	Ih	E-important	BAD	MODERATE P	BELOW GOOD	UNKNOWN
198	CY_9-4-f_RE_HM	Garyllis	CY_9-4-42_R3-HM	YES2005	E	E-important	BAD	MODERATE P	BELOW GOOD	UNKNOWN
199	CY_9-4-g_RIh	Phasoula	NONE	NO	Ih	Ih-important		MODERATE	NO CORRESPONDENCE	GOOD
200	CY_9-5-a_RE	Ypsonas	CY_9-5-1_R3	NO	E	E-minor	UNKNOWN	MODERATE	UNKNOWN	UNKNOWN
201	CY_9-6-a_RP	Ayios Ioannis	CY_9-6-52_R2	NO	P	P-important	MODERATE	MODERATE	GOOD	GOOD
202	CY_9-6-b_RP	Ambelikos-Agros	CY_9-6-5_R2, CY_9-6-51_R2, CY_9-6-52_R2	NO	P	P-important	MODERATE/GOOD	MODERATE	GOOD	GOOD
203	CY_9-6-c_RP		CY_9-6-53_R2	NO	P	P-minor	MODERATE	GOOD	GOOD	GOOD

NO	WB_CODE	WB_NAME	WB_CODE_2005	HMWB	TYPE	GROUP	ECOLOGICAL STATUS/POTENTIAL 2009	ECOLOGICAL STATUS/POTENTIAL 2013	CHEMICAL STATUS 2009	CHEMICAL STATUS 2013
204	CY_9-6-d_RP_HM		CY_9-6-53_R2-HM	YES2005	P	P-minor	MODERATE	MODERATE P	GOOD	GOOD
205	CY_9-6-e_RP	Ambelikos-Xylourikos	CY_9-6-5_R2, CY_9-6-72_R3	NO	P	P-important	MODERATE	MODERATE	GOOD	GOOD
206	CY_9-6-f_RI	Potamos tou Limnati	CY_9-6-72_R3	NO	I	I-important	MODERATE	MODERATE	GOOD	GOOD
207	CY_9-6-g_RI	Pelendri	NONE	NO	I	I-minor		GOOD	NO CORRESPONDENCE	GOOD
208	CY_9-6-h_RI	Ayios Mamas	NONE	NO	I	I-minor		GOOD	NO CORRESPONDENCE	GOOD
209	CY_9-6-i_RP	Loumata	CY_9-6-33_R3	NO	P	P-negligible	MODERATE	HIGH	BELOW GOOD	GOOD
210	CY_9-6-k_RP_HM	Loumata	CY_9-6-33_R3-HM	YES2005	P	P-negligible	MODERATE	GOOD & ABOVE P	BELOW GOOD	GOOD
211	CY_9-6-L_RP	Kouris	CY_9-6-31_R3	NO	P	P-important	MODERATE	POOR	BELOW GOOD	FAILING TO ACHIEVE GOOD
212	CY_9-6-m_RP_HM	Kouris	CY_9-6-4_R3-HM	YES2005	P	P-important	MODERATE	MODERATE P	BELOW GOOD	GOOD
213	CY_9-6-n_RP	Mesapotamos	CY_9-6-35_R3	NO	P	P-negligible	GOOD	HIGH	GOOD	GOOD
214	CY_9-6-o_RP	Moniatis	CY_9-6-36_R3	NO	P	P-important	MODERATE	MODERATE	GOOD	GOOD
215	CY_9-6-p_RP	Kryos	CY_9-6-1_R2	NO	P	P-minor	MODERATE	GOOD	GOOD	GOOD
216	CY_9-6-q_RP_HM	Kryos	CY_9-6-1_R2-HM, CY_9-6-1_R3-HM	YES2005	P	P-minor	MODERATE	GOOD & ABOVE P	GOOD	GOOD
217	CY_9-6-r_RI_HM	Kryos	CY_9-6-1_R3-HM	YES2005	I	Ih-minor	MODERATE	MODERATE P	GOOD	GOOD
218	CY_9-6-t_RI_HM	Kouris	CY_9-6-9_R3-HM	YES2005	I	Ih-important	POOR	MODERATE P	GOOD	UNKNOWN
219	CY_9-6-u_RE	Batsounis	CY_9-6-81_R3	NO	E	E-important	MODERATE	MODERATE	GOOD	UNKNOWN
220	CY_9-6-v_RE	Tapakhna	CY_9-6-82_R3	NO	E	E-minor	MODERATE	GOOD	GOOD	GOOD
221	CY_9-6-w_RE_HM	Tapakhna	CY_9-6-8_R3-HM	YES2005	E	E-minor	MODERATE	GOOD & ABOVE P	GOOD	UNKNOWN
222	CY_9-7-a_RE	Krommya	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
223	CY_9-7-b_RE	Symvoulas	CY_9-7-1_R1	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	GOOD
224	CY_9-7-c_RE_HM	Symvoulas	CY_9-7-2_R1-HM	YES2005	E	E-minor	UNKNOWN	GOOD & ABOVE P	UNKNOWN	GOOD
225	CY_9-8-a_RIh	Potamos tou Paramaliou	CY_9-8-1_R3	NO	Ih	Ih-important	UNKNOWN	MODERATE	UNKNOWN	GOOD
226	CY_9-8-b_RI	Evdhimou	CY_9-8-4_R3	NO	I	I-important	UNKNOWN	MODERATE	UNKNOWN	GOOD
227	CY_9-8-c_RIh	Evdhimou	CY_9-8-4_R3	NO	Ih	Ih-important	UNKNOWN	MODERATE	UNKNOWN	GOOD
228	CY_9-8-d_RE	Pantijo	NONE	NO	E	E-important		MODERATE	NO CORRESPONDENCE	GOOD
229	CY_9-8-e_RE	Ayios Thomas	NONE	NO	E	E-minor		GOOD	NO CORRESPONDENCE	GOOD
230	CY_9-9-a_RE	Alekhtora	CY_9-9-3_R1	NO	E	E-minor	UNKNOWN	GOOD	UNKNOWN	GOOD