

**PC-EU TRAINING COURSE + CONFERENCE + COORDINATION MEETING**

*“Scientific and Practical Conference on Biological Estimation of the Water Quality”*  
Athens, Greece, 06<sup>th</sup> – 19<sup>th</sup> May 2018

**Organizer:** National and Kapodistrian University of Athens (NKUA)

**Convener:** Prof. Em. Dr. Athena ECONOMOU-AMILLI

**Venue:** Athens Municipality Cultural Centre, Amphitheater ‘Antonis Tritsis’

**MINUTES****ATTENDEES**

1. Prof. Em. Dr. Athena ECONOMOU-AMILLI, Faculty of Biology, Department of Ecology & Systematics, National & Kapodistrian University of Athens (NKUA), Greece (Scientific Responsible of the Project in the University of Athens-Greece (NKUA), and Convener of the Athens Meeting)–  
**Official Opening Greetings and Scope of the Meeting**
2. Prof. Em. Dr. Edgar WAGNER, Institute of Biology, Albert-Ludwig University of Freiburg (ALU), Germany (Acting Project Coordinator)–  
**Official Opening Greetings**
3. Dr. Dr.hc Galina V. TELEGINA, Director of Regional Institute for International Co-operation, Tyumen State University (TyUSU), Russia (Project Coordinator for the Partner Countries)–  
**Official Opening Lecture**

***Greek Scientists of the Athens University, involved at certain periods in the Project***

4. Dr. Vasiliki LAMRINOY, Faculty of Biology, Department of Ecology & Systematics, National & Kapodistrian University of Athens (NKUA), Greece– **Lecture No.12**
5. Dr. Ioannis TZOVENIS, Faculty of Biology, Department of Ecology & Systematics, National & Kapodistrian University of Athens (NKUA), Greece– **Lecture No.15**
6. Dr. Georgia PAPANTONIOY, Faculty of Biology, Department of Ecology & Systematics, National & Kapodistrian University of Athens (NKUA), Greece– **Lecture No.14**
7. PhD Cand. Xanthi CHANTZISTROUNTSIOY, Faculty of Biology, Department of Ecology & Systematics, National & Kapodistrian University of Athens (NKUA), Greece– **Lecture No.16**
8. Dr. Ioanna LOUVROU, Faculty of Biology, Department of Ecology & Systematics, National & Kapodistrian University of Athens (NKUA), Greece– **Lecture No.13**

***Greek Scientists of the Thessaloniki University, involved in the Project***

9. Assoc. Prof. Dr. Elpida KOLOKHUYTA, Division of Hydraulics and Environmental Engineering, Aristotle University of Thessaloniki (AUTH), Greece– **Lecture No.4**
10. Dr. Charalampos SKOULIKARIS, UNESCO Chair/ International Network of Water-Environment Centres for the Balkans - INWEB, School of Civil Engineering, Aristotle University of Thessaloniki (AUTH), Greece– **Lecture No.5**

***British Scientists of the Wolverhampton University, involved in the Project***

11. Dr. Brian SHIPLEE, Senior Lecturer, Faculty of Science and Engineering, School of architecture and Build Environment, University of Wolverhampton, (UK)– **Lecture No.7**
12. Dr. Cathernine TOBIN, Senior Lecturer, Faculty of Science and Engineering, School of Sciences, University of Wolverhampton, UK– **Lecture No.6**
13. Prof. Dr. Craig WILLIAMS, Faculty of Science and Engineering, School of Sciences, University of Wolverhampton, UK– **Plenary Lecture No.2**

***Scientists from Kazakhstan (Eurasian National University), involved in the Project***

14. Assoc. Prof. Dr. Lyailya AKBAYEVA, Environmental Management and Engineering Department of L.N. Gumilyov Eurasian National University (ENU), Kazakhstan
15. Dr. Raikhan BEISENOVA, Head of the Environmental Management and Engineering, Department of L.N.Gumilyov Eurasian National University (ENU), Kazakhstan
16. Assoc. Prof. Dr. Amanbek ZANDYBAY, Environmental Management & Engineering Department of L.N. Gumilyov Eurasian National University, (ENU), Kazakhstan
17. Assoc. Prof. Dr. Aizhan ZHAMANGARA, International Department of Management and Engineering in environmental protection, Faculty of Natural Sciences, L.N. Gumilyov Eurasian National University (ENU), Kazakhstan

***Scientists from Russia (Tyumen, Yugra, Altai, and Tomsk State Universities), involved in the Project***

18. Prof. Dr. Natalia LARINA, Department of Organic and Ecological Chemistry, Tyumen State University (TyuSU), Russia
19. Dr. Elena PINIGINA, Senior Lecturer, Department of Geo-ecology, Tyumen State University (TyuSU), Russia
20. Dr. Ivan KAMELSKIKH, Press Office Chief, Tyumen Vodokanal (LLCTV), Russia
21. Dr. Anton KARMINSKIY, Director of the Center for Continuous and International Education, Yugra State University (YuSU), Russia
22. Dr. Sergii KVACH, Director of the Institute for Additional Education, Yugra State University (YuSU), Russia
23. Prof. Dr. Gennady BARYSHNIKOV, Head of Natural Management and Geo-Ecology Department, Altai State University (ASU), Russia
24. Dr. Olya DENISENKO, Senior Lecturer, Natural Management and Geo-ecology Department, Altai State University (ASU), RUSSIA
25. Dr. Vladimir PAROMOV, Hydrology Department, Faculty of Geology & Geography, Tomsk State University (TSU), Russia
26. Assoc. Prof. Dr. Dmitry VERSHININ, Hydrology Department, Tomsk State University (TSU), Russia– **Lecture No.8**

***Invited Speakers not participating to the Project:***

27. Prof. Dr. Uhlrich SOMMER, GEOMAR Helmholtz Zentrum für Ozeanforschung Kiel, Germany– **Plenary Lecture No.1**
28. Assoc. Prof. Dr. Eva PARASTERGIADOU, Department of Biology, University of Patras, Greece– **Lecture No.9**

Институциональное партнерство в целях устойчивости трансграничного водопользования:  
Россия и Казахстан»

29. Dr. Elias DIMITRIOU, Institute of Hellenic Marine Biological Resources & Inland Waters (HCMR), Greece– **Lecture No.10**
30. Dr. Eleni KALOGIANNI, Institute of Hellenic Marine Biological Resources & Inland Waters (HCMR), Greece– **Lecture No.3**
31. Dr. Nikolaos SKOULIKIDIS, Institute of Hellenic Marine Biological Resources & Inland Waters (HCMR), Greece– **Lecture No.2**
32. Dr. Maria STOUMPOUDI, Institute of Hellenic Marine Biological Resources & Inland Waters (HCMR), Greece– **Lecture No.1**
33. Dr. Amerssa TSIRIGOTI, Faculty of Biology, Department of Ecology & Systematics, National & Kapodistrian University of Athens (NKUA), Greece– **Lecture No.17**
34. Dr. Sofia KALARONI, Faculty of Biology, Department of Ecology & Systematics, National & Kapodistrian University of Athens (NKUA), Greece– **Lecture No.11**

***Invited Speakers for information on EU Erasmus+ and other programs implemented in Greece:***

35. Dr. Fotini FRYDA, Head of the Department of European and International Relations, National & Kapodistrian University of Athens (NKUA)– **Official Opening Lecture**
36. Assoc. Prof. Rania TSITSILONI, vice-President of the Faculty of Biology, National & Kapodistrian University of Athens (NKUA), Greece–

**Official Opening Greeting-  
Lecture on the Activities of the Faculty of Biology (NKUA) in recent years**

## PURPOSE OF THE ATHENS CONFERENCE

**The general aim of the International Scientific and Practical Conference held in Athens (6<sup>th</sup> to 19<sup>th</sup> May 2018) is the enhancement of the teaching and knowledge potential in order to develop successful partnerships between Universities and the Social Sector, by introducing new courses with supporting teaching material based on the ECTs introduced in professional training of specialists. In this way, the strategic mission of universities is fostered, and a closer connection between education, research and innovation aspects is provided.**

The specific purpose of the conference held in Athens (06<sup>th</sup> – 19<sup>th</sup> May 2018) was to:

### **PART I**

- deliver for the Partner Countries (PC) staff a series of 72h training courses on the biological estimation of the Inland Water Quality

***It is noted here that the history and development of biological water quality assessment in Europe is using various indices (based on algae and mainly diatoms, macroinvertebrates and fishes). Most modern biotic index and score systems have evolved through a series of refinements and adaptations. The results of these techniques are now influencing policy decisions concerning surface water management in Europe, where community assessment is being used as a planning tool for managing water uses, for ambient monitoring, and for evaluating the effectiveness of pollution control measures.***

### **PART II**

- advise on modernization of the teaching environment at PC countries by

- **contribution to the modules of demand-driven courses in Applied Hydrobiology, and in the system of continuing education in the Russia Federation (RF) and Kazakhstan (KZ) according to the European Qualifications Framework,**
  - **contribution to the formation of graduate and post-graduate programs enriched with WTRM modules,**
  - **contribution to new curricula for professional re-training,**
  - **help in developing modules adapted for distance learning,**
  - **co-operation agreements to be signed.**
- inform the attendees on EU Erasmus+ and other programs implemented in Greece

**All the above would help in Sustainable Management of Transboundary Water Resources.**

## **PART I**

### **THE COURSES DELIVERED – (summaries)**

#### ✓ Plenary Lectures

Ulrich SOMMER – Plenary Lecture No.1

Title: “*On plankton seasonal patterns: the PEG-model and beyond*”

The PEG-model (Sommer et al. 1986) is the most highly cited conceptual model explaining the seasonal patterns of phytoplankton and zooplankton, initially elaborated for the temperate and boreal zone, while extension to Mediterranean climate requested several modifications. Further extensions of the original PEG-model will lead to a useful tool for predicting the seasonal biomass trajectories of phyto- and zooplankton.

Craig WILLIAMS – Plenary Lecture No.2

Title: “*Thames Valley Water Management*”

An overview of the Thames river basin management plan is presented. The plan provides a framework for action and future regulation. It summarises the existing mechanisms, both statutory and voluntary, that are used to manage the quality of the water environment. It also summarises the types of action and who needs to do this, to achieve the statutory objectives.

#### ✓ Abiotic Factors affecting Freshwater Ecosystems

Nikolaos SKOULIKIDIS– Lecture No.2

Title:” *The state of Greek rivers- Research, management and Conservation*”

Greece is rich in surface water, but it is unevenly distributed, both geographically and seasonally. The identity of Greek rivers concerning research, management and conservation along with a historical reference of water management is presented.

Elias DIMITRIOU – Lecture No.10

Title: “*Hydrometeorologic and hydroecological Studies in the Greek Inland Waters*”

A presentation on different practices for estimation of Ecological flows in Greek mountainous rivers is given. River–sea interactions in a shallow coastal Mediterranean area and Operational water resources forecasting systems are also presented.

## ✓ Biodiversity – Conservation

Vasiliki LAMPRINOI – Lecture No.12

Title: “*Cyanobacteria in freshwater ecosystems – Toxic blooms and control strategies*”

Some cyanobacterial species currently form massive surface growths or ‘blooms’ that produce toxins causing a major threat to drinking and irrigation water supplies worldwide. Different strategies based on physical, chemical, and biological manipulations in order to reduce cyanobacterial biomass, and limit health risks are presented.

Xanthi CHANTZISTROUNTSIOU - Lecture No.16

Title: “*The microalgae strain bank ATHU-AL/CY of the Athens University (NKUA)*”

The infrastructure and activities around the wider framework of the phytoplankton microalgae culture collection ATHU –AL/CY (Athens University Algae and Cyanobacteria Collection) housed in the Department of Ecology and Systematics (Faculty of Biology, NKUA) under the supervision of Prof. Dr. Athena Economou-Amilli) are presented. This microalgae bank can be exploited for purely research activities (taxonomy, biodiversity) but also for applied studies (exploitation for industrial purposes).

Sofia KALARONI - Lecture No.11

Title: “*Modeling of aquatic ecosystems*”

Ecosystem modeling increasingly plays an important role in decision-making for the management of aquatic ecosystems. Mathematical models might serve as valuable tools to organize and quantify ecological knowledge. A generic biogeochemical model is presented herein based on the European Seas Ecosystem Model (ERSEM) that is currently coupled with the Mediterranean basin scale hydrodynamic model of the operational "POSEIDON" forecasting system. After a few modifications of the model code and parameterizations, the presented model could potentially be applied for both freshwater and marine environments.

Maria STOUMPOUDI - Lecture No.1

Title: “*Freshwater and fisheries Research ion the Hellenic Centre for Marine Research, Greece*”

A review of the aims and mission of Hellenic Centre for Marine Research (HCMR) with special focus on the Institute of Marine Biological Resources and Inland Waters (IMBRIW), and its research, is presented.

Eleni KALOGIANNI - Lecture No.3

Title: “*Fish Biodiversity in Greek Inland Waters – Conservation, Applications*”

Greek fish fauna is highly endemic and threatened. In this lecture scientific research and application for

*Visit to the Exhibition “Attica Landscape and Environment” housed in the Botanical Museum  
(Faculty of Biology, NKUA)*

the conservation of the Corfu killifish (an endangered species of Greece) is presented.

## ✓ Indices – Water Quality Assessment

Cathrin TOBIN – Lecture No.6

Title: “*Current UK Methods for River Quality Assessment Using Macroinvertebrates*”

Recent developments in the river water quality assessment methods, based on benthic macroinvertebrates that are used in the UK to meet the requirements of the Water Framework Directive (WFD), are mentioned. The modification of the original BMWP scoring system into the more recent WHPT score, as well as mechanisms for comparing these scores against reference conditions using the River Invertebrate Classification Tool (RICT) and assigning status, are explored. Other indices used by the Environment Agency for a range of WFD pressures, are described.

Eva PAPASTERGIADOU – Lecture No.9

Title: “*Ecological Quality Classification of Greek Rivers for the Implementation of WFD 2000/60/EE: Establishing a National Monitoring Network of aquatic macrophyte assessment*”

Aquatic macrophytes belong to the Biological Quality Elements in the WFD 2000/60 for which status assessments must be defined in whole EU territory. Current research on the potential development and application of a macrophyte based index [IBMR\_medgig] for the assessment and ecological quality classification of freshwaters in Greece is presented. The up-to-date results indicate that a macrophyte IBMR index could be useful for identifying differences in environmental condition of highly seasonal rivers attributed to human-induced stress gradients.

Ioanna LOUVROU – Lecture No.13

Title: “*Diatoms as biological indicators of the quality of inland waters*”

Diatoms are of the most useful bio-indicators in monitoring running waters but there are also drawbacks in their use (need for expert identification - high taxonomic skills, presence of endemism & cryptic species, time consuming). Water quality assessment using Diatoms can be done by using autoecological indices to meet the requirements of the Water Framework Directive (WFD) and Diatom growth forms and the consequent Guild affiliation.

Georgia PAPANTONIOU – Lecture No.14

Title: “*Zooplankton: a neglected bio-indicator*”

Zooplankton has a strong indicator value of the trophic state and the ecological quality of lakes because

*Related whole-day Field Trip: Botanical Garden of the Athens University (NKUA)*

it is a key structure and functioning component of pelagic food webs (link between planktonic primary production and top consumers, pivotal role on nutrient recycling and the export of particulate matter). Size structure of zooplankton and their resting eggs, the proportion of large zooplankton, cladoceran size and the Zoo: Phyto ratio can indicate ‘top-down’ processes. Combination of ‘top-down’ and ‘bottom-up’ indicator metrics might contribute greatly towards a more solid assessment of trophic conditions in lakes.

## ✓ Environmental Impact/Pollution

Dmitrii VERSHININ– Lecture No.8

Title:” *Impact of the Upper Irtysh cascade of reservoirs on the water regime of the transboundary Irtysh River*”

The change in the Irtysh water regime as a result of the cascade flow regulation of the hydroelectric power stations and increased water consumption has led to a decrease in the natural potential of the river ecosystem and to significant changes in the quantitative indicators of river flow. Reducing the frequency, duration and depth of flooding of the Irtysh floodplain against the background of increasing aridity in the region adversely affects agricultural activities. Investigation of changes in natural and anthropogenic origin in the regime of water flow of the rivers Black Irtysh and Irtysh within the Republic of Kazakhstan for the period 1903-2010 and assessment of its current state in conditions of intensification of water use and modern climate changes are presented.

Brian SHIPLEE– Lecture No.7

Title: “*Fracking and its potential to impact on water resources*”

Fracking allows drilling firms to access previously difficult-to-reach resources of oil and gas. While offering economic and energy security benefits, UG production presents considerable environmental risks: Water resources – water quantity & water quality, Air Quality, Radioactivity, Earthquakes. Especially the risks to the water environment from fracking are associated with Water Acquisition phase, Chemical Mixing phase, Well Injection phase, Produced Water Handling phase, and Wastewater Disposal & Reuse phase.

## ✓ Application and exploitation of water resources

Ioannis TZOVENIS – Lecture No.15

Title: “*Bio-remediation of inland waters using algae*”

A review of the use of algae as a bio-remediation strategy for polluted inland waters. The problem of inland water pollution (municipal, industrial discharges, agriculture, introduction of harmful pollutants in groundwater or back to agriculture is currently addressed by one or three step approaches (containment, separation, degradation of pollutants) carried out via chemical, physical or bio-treatment methodology.

Amerssa TSIRIGOTI – Lecture No.17

Title: “*Growing marine autotrophic dinoflagellates on Twin-Layer porous substrate bioreactors with emphasis on EPA/DHA productivity*”

A new method (applied in the Department of Ecology & Systematics of the Athens University in collaboration with the Koln University, Germany) is described on the growth of the dinoflagellate *Symbiodinium voratum* in Twin-Layer Porous Substrate Photobioreactors (TL-PSBRs) with special emphasis on their eicosapentaenoic acid (EPA)/docosahexaenoic acid (DHA) content.

## ✓ Water Management

Elpida KOLOKYTHA- Lecture No.4

Title: “SDGs and Transboundary Water Cooperation. Managing and protecting freshwater resources and the well-being of people – SDG6 in relation to TWC”

Transboundary Water Cooperation as it is reflected in the SDGs and the need for a holistic interpretation and implementation of the SDGs understood as a whole is presented. In particular, effective cooperation, good governance and, ultimately, sustainable development require a focus only on the water SDG (SDG 6), but also on the synergies with other related SDGs to enhance international cooperation.

Haris SKOULIKARIS - Lecture No.5

Title: "*Environmental flow and climate change*"

A regulatory - compromise situation between human and ecological needs in order to maintain the good ecological status of available water resources is required. Strategies for adaptation to climate change are important tools for the rational management of water resources, but also for maintaining the environmental flow.

*Related whole day field trip: Psytalleia sewage treatment/Aspropyrgos cleaning water*  
*Related whole day field trip: Marathon Lake and dam*

*Visit to the ‘Algae Culture Collections’  
In the Department of Ecology & Systematics (Faculty of Biology, NKUA)*

### CULTURAL FIELD TRIPS/EVENTS

✓ ‘Acropolis’ archaeological sites and surrounding areas



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- ✓ **‘Stavros Niarchos’ Foundation**
- ✓ **The Unesco Monument ‘Daphne Monastery’**
- ✓ **Music Performance at Megaron Mousikis**
- ✓ **‘Cape Sounio’ and ‘Lavrio’ archaeological sites**
- ✓ **Marathon ‘Olympic Games Museum’**

**PART II –  
MORDENIZATION OF THE TEACHING ENVIRONMENT**

A summary of the project development at the PC institutions in Russia and Kazakhstan was presented by Dr. Galina V. Telegina (TyuSU, Russia).

Main motions.

The following resolution was adopted:

- 1) Ratify the proposed education programs, teaching and learning materials in each educational institution (PC) for implementing the developed training program;
- 2) Provide training on specific water resource management topics in each educational institution (PC);
- 3) Work out and sign a mutual cooperation agreement to facilitate networking between PC for the completion and implementation of the training program that involves units devised by academic staff of different PC universities;
- 4) Training program implementation will involve the participation of one or several PC universities through networking, cooperation and partnership;
- 5) Ensure telecommuting capacity through the principal platform... (MOODLE);
- 6) Units and modules designed by one of the PC universities can be implemented as autonomous programs for research and educational purposes.