

Lakes: The Mirrors of the Earth

BALANCING ECOSYSTEM INTEGRITY AND HUMAN WELLBEING

FINAL REPORT

WILG15
PERUGIA2014

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1 Introduction

The 15th Edition of the World Lake Conference (WLC15) “Lakes: The Mirrors of the Earth, Balancing Ecosystem Integrity and Human Wellbeing” was held in Perugia, Italy, from the 1st to the 5th of September 2014. The WLC15 was organized by the International Lake Environment Committee Foundation (ILEC) and the Umbria Scientific Meeting Association 2007 (USMA2007) in collaboration with the University of Perugia and the University of Foreigners of Perugia, Fine Arts Academy of Perugia and Board of Engineers of Perugia. The WLC15 attracted over 3000 people from over 40 countries who were involved in scientific sessions and many other side events, including different kinds of stakeholders interested in the management and protection of Lake environment as: Scholars, Governmental delegations, Local Institutions, Practitioners, Students, NGOs, Journalists and Civil Society.

This Report aims to record the outcomes of the WLC15 in terms of: i) People involved, ii) Scientific contributions, exchange of knowledge and capacity, iii) Cultural event.

2 Perugia Declaration

During the closing ceremony of WLC15, The Scientific Committee of ILEC with the presence of the Rector of UNESCO-IHE András Szöllösi-Nagy, the Rectors of University of Perugia and University of Foreigners of Perugia, the Indonesian Minister of Environment Balthasar Kambuaya and other Indonesian delegation, local authorities of Perugia, authorities of the Umbria Region, NGOs and all the conference participants has developed, discussed and approved the following recommendations:

September 16, 2014 - Perugia Declaration

Lakes, whether natural or artificial, fresh or saline, are important and dramatic features of our global landscape. They have been centres of cultural development in Italy and throughout the world over many centuries. In addition to providing their services in terms of increased food supply, safe drinking water and satisfying other water needs for human health and wellbeing, these ecosystems are symbols of inspiration, creativity and spiritual manifestations that constitute the ‘heartware’ that enriches and elevates human existence. Thus, lakes are a global heritage that must be restored and protected to enhance their life-supporting ecosystem services, including those associated with their linkages to other aquatic ecosystems. These linkages also have important scientific and governance implications in meeting human and ecosystem water needs. Along with many other lakes in our world, Lake Trasimeno provides a perfect example of the enriching role that lakes can have in stimulating the cultural evolution of humanity, as highlighted in the discussions of the 15th World Lake Conference held in this beautiful city of Perugia during 1 to 5 September, 2014.

With this perspective, the Conference participants manifest this declaration of Perugia, and hereby:

Acknowledge that freshwater is fundamental for all life, finite in quantity, extremely vulnerable to human activities, and irreplaceable in its many uses;

Are aware that lakes contain more than 90% of the liquid freshwater on the surface of our planet at any given instant, and that they also provide the widest range of water-based ecosystem services to humanity;

Are conscious that lakes mirror the general living standards of human societies, and that their ecological condition reflects the cumulative impacts of the human activities taking place within and even outside their basins;

Recognize that lakes are not isolated water bodies, but rather are part of an encompassing global water system interconnected in many ways, such that degradation and destruction of lakes can have effects far beyond their physical boundaries;

Are deeply concerned about the increasingly consumptive attitude of civil society throughout the world, and the impacts this trend can exert globally on the integrity of the water-related ecosystem services that support and enrich human culture and livelihoods;

Are aware that the deliberative nature of the political process means the development of governmental actions to address significant environmental problems and their causes often lags behind their initial perception by scientists and civil society;

Are conscious that, in spite of noteworthy progress made over recent decades to address human and ecosystem water needs, achievement of effective governance, technical capacity and a financial base adequate to ensure sustainable ecosystem services of lakes and other standing water systems remains an elusive goal of civil society and its governments.

Therefore, the Participants recommend:

That achievement of sustainable lake ecosystem services must be emphasized and ensured as main assessment and management goals by governments, local communities, NGOs, civil society, industry, agriculture and academia now and into the future, as a major effort to counteract the deterioration of lakes that parallels a general loss of natural and cultural heritage, and reduces the possibility of further and sustainable human socioeconomic development and cultural advance;

That the importance of lake systems in regard to cultural heritage and values, human well-being and ecosystem biodiversity be a fundamental consideration in all lake management efforts. Education, awareness and outreach efforts, and the development of capacities directed to preserving the history and the continuing evolution of the cultural ties that exist between healthy lakes and healthy human societies must be significantly enhanced, noting the importance of the interactions between lake integrity and human cultural development is poorly appreciated by governments, civil society and other water-related stakeholders.

That the role of linkages between lakes, and the aquatic systems that drain into and out of them, be explicitly recognized as fundamental components of all lake management efforts directed to achieving sustainable ecosystem services. They must be assessed and managed as interacting components that fundamentally influence each other, consistent with the message conveyed in the RIO+20 output document, "The Future We Want," and with Goal 6.6 ("...by 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes") highlighted among the United Nations Open Working Group on Sustainable Development Goals.

That greater attention be given to the role of lakes as barometers of climate change impacts and the risks related to climate uncertainties, including water scarcity, major floods and extreme weather events associated with predicted hydrologic cycle alterations. This consideration may result in greater reliance on water storage capacity, requiring increased attention to the potential environmental impacts associated with such efforts. The risks from natural disasters attributable to climate change, and intensifying competition for water among sectors, must be recognized as important components of lake basin

management. The promising role of ecohydrology in facilitating sustainable freshwater systems also merits increased attention.

That an integrated management approach that collectively encompasses the physical, cultural, governance and socio-economic components of linked freshwater systems must be considered a critical goal by all water-related stakeholders. Although many water resources management frameworks currently exist, none sufficiently address the important goal of ensuring the sustainable ecosystem services provided by lentic waters. Accordingly, the ILEC approach of Integrated Lake Basin Management (ILBM), which addresses the linkages and balances between lakes, their associated river basins, and the human systems they sustain, facilitates an integrating synthesis of the condition of freshwater basins, and should be recognized as a major advance to achieve sustainable ecosystem services.

3 WLC15 Statistics

The following tables and graphs analyze the distribution of the participants by continent, country and category. The scientific impact of the event is described in terms of performed scientific sessions and presented contributions.

3.1 Number of participants

The total number of the participants was 860, distributed as indicated in the following tables

Scientific Sessions Participants (checked in)	total 465
Standard Participants	235
Students and Young Researchers	98
Standard Participants (Developing Countries)	68
Students and Young Researchers (Developing Countries)	15
Grants	18
Professionals of the Engineers Organization	20
Accompanying Person	11

Side Events (participants and speakers)*	total 860
International Policy Forum	80
Local Policy Forum	60
TWAP Consultative Open Forum	30
Freshwater and Sustainable Healthy Food	80
"Coda della Cometa" Workshop	40
Legal Workshop	60
Scientific Journalism Event	120
Ibaraki Kasumigaura Prize	240
The Environmental Protection Agency for Research Promotion	40
Award Ceremonies at CERP (Lake DOC, ABA, BP4L) 01/09/2014	100
Exhibitors (6 booths)	10

*including both registered participants (464) and guest participants invited to single events(396)

Public Events	total 253
Opening Ceremony	148
Closing Ceremony	105

Social Events		total 669
Japanese Reception		80
Lago Trasimeno and Cascata delle Marmore Field Trips		109
Social Dinner		242
Cultural Event "The Seasons of Love"		238

Exhibitions at CERP Hall from Aug. 27 to Sep. 26		total 2150
Around the World in a Shell, LakeDoc, ABA, ALLI, BP4L, etc.		2150

3.2 Scientific Impact of the Conference

Scientific Impacts	
Plenary Lectures	1
Keynote Lectures	6
Mainstream Sessions	8
Technical Sessions	23
Special Sessions	10
Workshops	3
Poster Sessions	1
Abstracts submitted	558
Extended abstracts submitted	126
Oral presentations at scientific sessions	445
Poster presented at poster session	113
Total Login at website	1,480
Total website accesses (Administrators excluded)	18758

3.3 Statistics of Scientific Sessions Participants

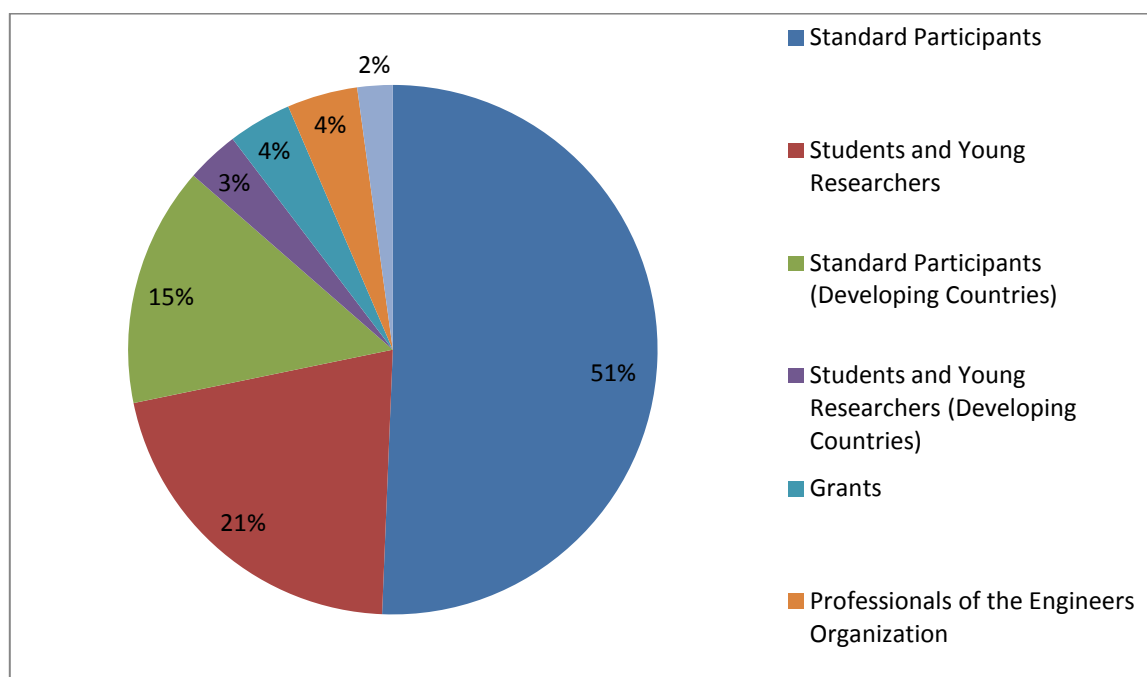


Figure 1. WLC15 attendees to Scientific Sessions for Registration Type

Scientific sessions participants per country							
Country	n°	Country	n°	Country	n°	Country	n°
Italy	171	Afghanistan	6	Lebanon	2	Jordan	1
India	48	Brazil	5	United Kingdom	2	Ghana	1
Japan	32	France	5	Kazakhstan	2	Portugal	1
Russia	21	Netherlands	5	Finland	2	Puerto Rico	1
Philippines	14	Germany	4	Hungary	2	Sri Lanka	1
United States	13	Switzerland	4	New Zealand	2	Albania	1
Turkey	11	Spain	3	Austria	2	Azerbaijan	1
Greece	9	South Africa	3	Vietnam	1	Colombia	1
Poland	9	Armenia	3	Bangladesh	1	Slovenia	1
China	9	Canada	3	Nigeria	1	Ukraine	1
Indonesia	9	Romania	3	Zimbabwe	1	Malawi	1
Malaysia	8	Pakistan	2	Senegal	1	Cameroon	1
Kenya	7	Thailand	2	Uganda	1	Belgium	1
Nepal	7	Australia	2	Guatemala	1	Denmark	1
Mexico	7	Estonia	2	Congo, The Democratic Republic of The	1	Lithuania	1
						Latvia	1

Table 1. WLC15 Countries involved and participants

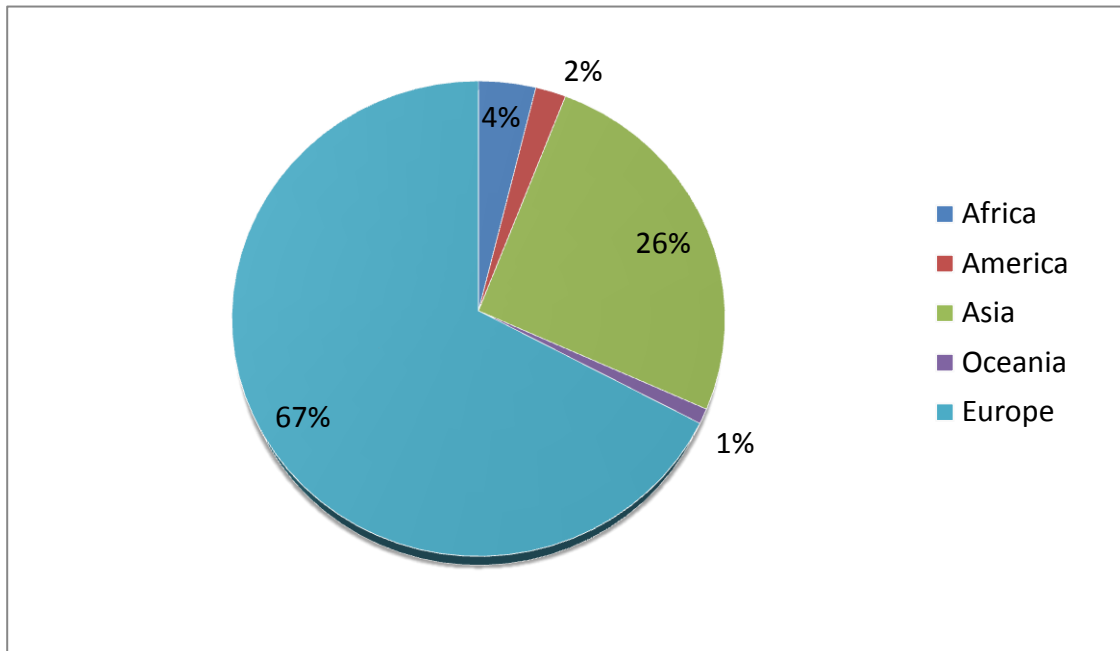


Figure 2. WLC15 attendees to Scientific Sessions per Continents

4 Scientific Sessions

During the five days of the Conference, participants discussed various aspects related to Lake Protection and Management in **36 Scientific Sessions** structured in **8 Mainstream sessions** on the basis of a multidisciplinary approach, which took place in the **School of Law** of the **University of Perugia**.

In addition to the 23 Technical Sessions, a Call for Special Session took place from November 2013 to January 2014 and **10 Special sessions and 3 Workshops** had been selected.

The following paragraphs provide an outline of the 8 Mainstream Sessions and a brief overview on the related Special Sessions.

Thematic sessions and chairmen of each mainstream are shown in the following tables.

MS01 Ecology and Biology of Lakes & Inland Waters		
SESSION	CHAIRMAN	
	NAME	AFFILIATION
MS01-01 Water quality and pollution control	Richard Robarts	World Water and Climate Foundation, Canada
	Daniel Olago	University of Nairobi, Kenya
	Walter Rast	Texas State University, USA
MS01 -02 Biological Aspects and Biomonitoring	Salif Diop	University CAD - Dakar - Senegal
MS01-03 Lake ecosystem and biodiversity assessment and conservation	Zhengyu Hu	Institute of Hydrobiology, Chinese Academy of Sciences, China
MS01-04 Brackish and saline inland waters	Nikolai Aladin	Russian Academy of Science, Russia
MS01-05S Special Session - Alien species: an increasing threat to freshwater ecosystems?	Angela Boggero	CNR-ISE, Italia
	Elena Tricarico	University of Florence, Italy
MS01-07 Eutrophication problems	Sandra Azevedo	Institute of Biophysics Carlos Chagas Filho, Brazil
	Jeffrey A Thorton	International Environmental Management Services Ltd, USA
MS01-08 Harmful algal blooms (HABs)	Luigi Naselli Flores	University of Palermo, Italy

Table 2: Mainstream Session 01 Ecology and Biology Lakes and Inland Waters

MS02 Lake Processes and Dynamics		
SESSION	CHAIRMAN	
	NAME	AFFILIATION
MS02-01 Chemical and physical processes	Alexandra Rizhinashvili	St. Petersburg State University, Russia
MS02-02S Special Session - Hydrology issues in water storage systems	Fabio Russo	Sapienza University of Roma, Italy
MS02-03S Special Session - Challenging Global and Local Changes in Coastal Lagoons and their Watersheds	Masumi Yamamuro	Graduate School of Frontier Sciences, The University of Tokyo, Japan

Table 3: Mainstream Session 2 Lake Processes and Dynamics

MS03 Inland System and Global Change		
SESSION	CHAIRMAN	
	NAME	AFFILIATION
MS03-01 Climate change trends and adaptation	Walter Dragoni	University of Perugia, Italy
MS03-02 Climate driven impacts	Giuseppe Arduino	UNESCO-IHP
MS03-03S Special Session - Climate Change: lakes and water resources in Mountain Regions	Riccardo De Bernardi	Italian Institute of Hydrobiology and Institute for the Study of Ecosystem, Italy

Table 4 Mainstream Session 3 Inland System and Global Change

MS04 Informatics, Mapping and Monitoring		
SESSION	CHAIRMAN	
	NAME	AFFILIATION
MS04-01 Advances in ecosystem monitoring and measuring technologies	Stephen Maberly	NERC-Centre for Ecology and Hydrology, UK
MS04-02S Special Session - Hydrological monitoring of the world large lakes and reservoirs	Valerii Vuglinskii	HYDROLARE, Russia
MS04-03S Special Session - Earth Observation of Inland and Near-Coastal Waters	Arnold Dekker	CSIRO, Australia
	Claudia Giardino	National Research Council - CNR IREA, Italy
	Blake Schaeffer	U.S. Environmental Protection Agency, USA
MS04-04S Special Session - GIS-based modelling and mapping in limnology and hydrology	Fernando Nardi	University for foreigners Perugia, Italy
	Salvatore Grimaldi	University of Tuscia, Italy

Table 5 Mainstream session 4 Informatics, Mapping and Monitoring

MS05 Lake and Human Connection		
SESSION	CHAIRMAN	
	NAME	AFFILIATION
MS05-02 Lake Basin Heartware	Adelina Santos-Borja	Laguna Lake Development Authority, Philippines
MS05-03 Lakescapes and water architecture	Orazio Carpinzano	Sapienza University of Roma, Italy
MS05-04 Human impact management	Ajit Pattnaik	Chilika Development Authority, India
MS05-05 Lake and archeology	Walter Dragoni	University of Perugia, Italy

Table 6 Mainstream session 5 Lake and Human Connection

MS06 Lake Basin Management Experiences and Challenges		
SESSION	CHAIRMAN	
	NAME	AFFILIATION
MS06-01 European alpine and subalpine lakes	Giuseppe Morabito	CNR Institute for Ecosystem Study, Italy
	Monica Tolotti	Edmund Mach Foundation, Italy
MS06-02 Lakes by regions (North & South America; Africa; Europe; Asia)	Nico Salmaso	Research and Innovation Centre, Fondazione Edmund Mach, Italy
MS06-03 Urban lakes	Juan Skinner	Lake Atitlán Basin Authority, Guatemala
MS06-04S Special Session - Lake Trasimeno	Alessandro Ludovisi	University of Perugia, Italy

Table 7 Mainstream session 6 Lake Basin Management Experiences and Challenges

MS07 Governance and Management: Participation and Challenges		
SESSION	CHAIRMAN	
	NAME	AFFILIATION
MS07-01 ILBM	Masahisa Nakamura	Shiga University, Italy
MS07-02 Special Session - Best Practices for Lakes	Chiara Biscarini	University for foreigners Perugia, Italy
MS07-03 Water governance and cooperation for the quality of lentic-lotic-ground water systems	Gautam	
MS07-04 Citizen participation in lake basin management	Sandeep Joshi	Shrishti Environment & Sustainability Society, India
MS07-05 Special Session - Research, sustainability and governance - How to practice on ILBM	Francesca Alvisi	Italian National Research Council (NRC) Institute of Marine Sciences of Bologna, Italy

Table 8 Mainstream session 7 Governance and Management: Participation and Challenges

MS08 Lake Basin Best Management Practices		
SESSION	CHAIRMAN	
	NAME	AFFILIATION
MS08-01 Converting Policy into Action for Successful Lake Management	Antonio Boggia	University of Perugia, Perugia, Italy
	Giancarlo Gusmaroli	Studio Ecoingegno, Italy
	Maurizio Bacci	IRIS Ambiente, Italy
MS08-02 Workshop - Water Framework Directive environmental quality assessment of lake water bodies in Europe	Angiolo Martinelli	ARPA Lazio, Italy
MS08-03S Special Session - Ecotechnology and Ecohydrology for remediation and restoring the quality of contaminated lentic-lotic water systems	Joshi Sayali	Shrishti Eco-Research Institute (SERI), India
MS08-04S Special Session - Lake Habitat Preservation and New Opportunities for Sustainable Development	Franco Cotana	University of Perugia, Italy
	Anna Laura Pisello	University of Perugia, Italy

Table 9 Mainstream session 8 Lake Basin Best Management Practices

4.1 Special Session Topics

MS01-05S Special Session - Alien species: an increasing threat to freshwater ecosystems?

LifeWatch, a European e-Science infrastructure on biodiversity and ecosystems, has the objective of strengthening the scientific research on biodiversity, making available to scientists online laboratories fully equipped with data resources, standardization and integration tools, data analysis, modelling and visualization services and high performance computation capacity to run their frontier research projects. LifeWatch construction is at its starting face and show cases have been built at the European level to demonstrate the functionality of the infrastructure. Italy coordinated the Monitoring Alien Species show case to assess the ecosystem vulnerability to alien species. Due to the strict link with human activities, freshwaters are subject since centuries to even more widespread invasions than terrestrial systems. As a consequence, they are today suffering rates of biodiversity loss greater than those recorded in the most affected terrestrial biomes. IAS are extremely difficult to be managed after their establishment, so much scientific effort should be directed to understand the mechanisms that cause their success and to find appropriate means for their prevention. Several papers analyzed the drivers of their occurrence, the role of climate change in facilitating their arrival and spread, or the impacts they caused at ecosystem level. These are some of the issues this session has addressed to better understand the process of biological invasions in order to reduce their increase and to apply more effective biodiversity conservation measures.

MS02-02S Special Session - Hydrology issues in water storage systems

The hydrological study of lakes and reservoir could be linked to the common definition of “water storage system”, generally related to:

- Natural or artificial water bodies of different size;
- Groundwater reservoir capability and the effect on subsurface and baseflow;
- Artificial riverine impoundments and reservoirs impounded.

The storage systems could be studied both on the natural hydrological topics (low flows, aquifer balance, **basin hydrological response, upstream and downstream effects, management of urban and natural storage** system, lamination properties and flood control) and also from the hydraulic construction view (dams and levees project, impacts and stability, dam breaking effects and related risk assessment, hydropower, detention basins design).

Secondly, problems related to the hydraulic of lakes and reservoir could be generally individuated in the factors that reduce or impair the storage capacity of the lake as the sediment load, due to the low velocity; on the other side some phenomena such as emptying of reservoirs can move sediments and become sources of pollution.

In addition, the management and protection of lakes and reservoirs are essential to many human activities, from abstraction for drinking purposes to productive tasks such as agriculture and industry. And so it is essential to understand and formulating appropriate actions for sustainable management of lakes and reservoirs. All this topics represent an important and challenging effort for modern hydrology.

MS02-03S Special Session - Challenging Global and Local Changes in Coastal Lagoons and their Watersheds

Due to the location along the coast, lagoons are under natural disturbance from terrestrial runoff and sea influence. Furthermore, they suffer from strong anthropogenic pressures, due to the increasing coastal urbanization. Local pressures can be greatly amplified by climate changes, especially by extreme meteorological and hydrological events. Expected changes in physical and ecological characteristics span from freshwater inputs, sea level rise and saline wedge influence, flushing regime, water contamination, biodiversity loss and alien species invasion, exploitation of alien resources and urbanization,. In this context decision making and management are critical issues. Moreover, the awareness of coastal lagoon fragility is essential to face changes and take mitigation and adaptation measures. This special session will establish the state-of-the-art in the coastal lagoon science as a support for policy and decision making, and develop a roadmap for required future research and applications. We especially invite proposals from members of coastal lagoon networks and projects engaged in the coastal lagoon research, scientific support to decision and education to explore synergies and build the community of practice. Suggested topics are: integrated planning and management of coastal lagoons and their watershed, DPSIR approach to assessment and policy making, the human dimension of coastal lagoons, adaptation to changes, ecological and social resilience, education as a tool to enhance awareness.

MS03-03S Special Session - Climate Change: lakes and water resources in Mountain Regions

Mountain ecosystems are strongly sensible to climate change. The environmental changes that occur at high altitudes have direct and indirect impacts on water quantity and quality, on their biodiversity and on the structure and function of freshwater ecosystems as a whole. High altitude freshwater ecosystems may possibly acquire increasing importance for water management in the future, since they serve as multifunctional tools in the regulation of the water balance and they may represent a secondary source of pollution to ecosystems at lower altitudes, with important implications for water quality and usage.

MS04-03S Special Session - Earth Observation of Inland and Near-Coastal Waters

Earth Observation increasingly is being recognized as suitable technique for large-scale detection, assessment and monitoring of inland and coastal water quality. Remote sensing provides a synoptic view of the temporal-spatial distribution of the different biological, chemical and physical properties of both the water column and if visible, the substrate. This knowledge of the distribution is essential in environmental water studies as well as for resource management. Use of “water colour remote sensing” for the determination of optical water quality parameters is now feasible as methods exist to estimate phytoplankton and its breakdown product, dissolved organic matter, dead particulate organic matter and particulate inorganic matter. Many inland and coastal waters are highly affected by anthropogenic influences.

A challenge that remains is to transform earth observation from just an observational tool in the hands of remote sensing scientists to a water quality management support system that is characterised by timely delivery to managers of a suite of water quality products of known accuracies and agreed interpretation. Within the GEO Water Task a working group was established in 2007 on Inland and Near-shore Coastal Water Quality. Through the past 7 years several large national and international projects focused on maturing this field of research and applications. This special session will establish the state-of-the-art in

earth observation of aquatic ecosystems; inform the global lakes scientific user community and develop a roadmap for required future research and applications

MS04-04S Special Session - GIS-based modelling and mapping in limnology and hydrology

Remote sensing of the Earth provides an incredible wealth of information on spatio-temporal patterns of the land surface. It captures globally hydrologic, geomorphologic and vegetation properties and environmental variables.

This increasing availability and quality of digital earth data is paving the way to the use of GIS terrain analysis models for accurately representing and mimicking river and lake basin physical processes and morphologic features from the global to small scales.

Geomorphologists, limnologists and hydrologists currently implement terrain analysis techniques and tools, applying the theoretical framework of the well know interaction between the hydrologic forcing and the topographic control that govern landscape evolution dynamics, for modelling and mapping terrestrial landforms (e.g. river networks, hillslopes, floodplains). Emerging fields such as ecohydrology, ecomorphology and biogeomorphology combine the diverse processes that interplay in water-dominated environments.

Moreover, the latest high-resolution terrain technologies (e.g. lidar, laser scanner, UAV, etc) are able to scan the land surface gathering high resolution information at the micro scale. GIS plays a major role in sharing and interlinking geospatial information in multidisciplinary projects across multiple scales.

This session welcomes contributions from researches on case studies that extensively use digital earth data, GIS terrain analysis geospatial modelling and mapping

MS06-04S Special Session - Lake Trasimeno

Lake Trasimeno is the largest lake of the Peninsular Italy and a site of a remarkable naturalistic importance (Natura 2000 site, S.C.I., S.P.Z. and Regional Park). Despite its large extension, the lake is very shallow and the strict dependence of the water balance on meteorological conditions has caused dramatic floods and droughts over the centuries. Human interventions have been made since Etruscan or Roman times in order to regulate the lake level. The outlet restructuring completed at the end of the 19th century, gave inception to a progressive lowering of the lake level which led to a dramatic crisis of the 1950s. The enlargement of the catchment basin performed in 1957-60, allowed the lake to rapidly recover from drought, but seems insufficient to ensure high water levels in the current phase of climate change. The rapid sequence of changes in the water level, in combination with a number of other human impacts caused by exploitation and management practices, have produced significant effects on the water quality as well as on the biocoenosis of the lake, making also it more prone to biological invasion. This session is intended to collect the results of various studies performed on Lake Trasimeno in the last decades, in order to depict an integrated picture of the environmental and biological condition of the lake, as well as their variations in response to human impact. The sharing of the acquired knowledge is also a prerequisite for improving social awareness and settling proper management policies.

MS07-02 Special Session - Best Practices for Lakes

Workshop purpose: One of the ways of improving public organizations is to identify, communicate and facilitate the transfer of practices that seem to work successfully somewhere else. The purpose of the

workshop is to explore outcomes and share lessons learned from the best practices applied in the sustainable management of lake areas by local authorities. The primary goal is the selective observation of a set of exemplars across different contexts to derive more generalizable principles and theories of proper lake area management. The workshop aims to enhance knowledge and capacity exchange, involving different kind of stakeholders: researchers, environmental practitioners, local authorities, private actors and civil society. Workshop description: The workshop will be organized in the framework of the award “Best Practices for Lakes” promoted by the Italian Ministry of Environment, the Italian High Institute for Environmental Protection and the Institute for Environmental Protection and Research - ISPRA, La Sapienza University of Rome, and the University for Foreigners of Perugia. This aims to select projects on a public announcement will be awarded for the best practices in sustainable management of lake environment. The best practices should make an outstanding contribution to the environmental conservancy of lake areas, integrated into the social and economic development on a sustainable basis. Moreover, these practices should be transferable and flexible. These can focus on a variety of sectors such as: urban planning, energy, engineering and hydraulic works, waste management, landscape conservancy, tourism and culture heritage, integrated and inclusive strategies. The workshop will introduce findings from selected projects which will be inserted into the ISPRA database, named GELSO - Local Management for the Environmental Sustainability (European database on the good practices for local sustainability) in order to create a "network" of information exchange among local authorities. Moreover, a specific poster session will be organized and will host posters of the selected projects

MS07-05 Special Session - Research, sustainability and governance - How to practice on ILBM

ILBM is a way of thinking about water management that is based on six pillars. Two of these are the Participation (of stakeholders but also of citizenship as stakeholders) and the Information (to stakeholders and thus to citizens). These concepts are strongly present in the approach we want to pursue to bring together scientific research approach, strategy and results, and public opinion and stakeholder participation through a governance exercise on sustainability issues. We like to discuss the importance of information and knowledge for a qualified and pro-active participation as well as reflect on our individual and collective responsibility as citizens in ILBM projects. To achieve these goals, three working groups will be organized:

1. Active vs. Scientific citizenship - This working group will discuss and share experience about topics like: Why Scientific Information is important? What kind of Information Needs for Lake Basin Management? Which consequences of a “Non-use” of Science? How and where can we share information? How much information is “enough”?
2. Participative democracy - We plan to work on the responsibility/action axis mediated by the contribution of scientific approach: evaluate the individual vs. collective responsibilities, allowing to assess the impact of actions and possible solutions in terms of cost/benefit, promotes the critical analysis of the information available today.
3. Participatory planning - This working group will experience a process of participatory planning in order to practice on the ILBM issues by analyzing case studies taken from the past and possibly practising on present situations.

MS08-02 Workshop - Water Framework Directive environmental quality assessment of lake water bodies in Europe

European Union member states released the first cycle of lacustrine water bodies monitoring and classification in the last years, adopting new methodologies defined according to Water Framework Directive WFD2000/60CE and composed of several quality elements of aquatic ecosystem. The new assessment system, made of an articulate and still un-complete pathway, has permitted to better analyse lake systems in their complexity, to enhance the knowledge of animal and vegetal communities, clarifying the relationships between quality factors involved into environmental conditions variability. The elaboration of all collected data, at regional, river basin district or national scale, permit to evaluate the lake water bodies ecological and chemical status, creating the basis to enhance measures for water protection and restoration plans. The workshop can be an important moment to evaluate the state of the art of WFD implementation process involving, at different level, institutions, environment agencies and research centres, focusing on: - monitoring strategies and results; - emerging operational criticalities; - classification criteria effectiveness; - significance and reliability of ecological assessments.

MS08-03S Special Session - Ecotechnology and Ecohydrology for remediation and restoring the quality of contaminated lentic-lotic water systems

Ecotechnology is an application of knowledge and skills of harnessing ecological processes that helps in fulfilling human needs by remediating ecological disruption of water bodies and restoring aquatic ecosystems. It's an integration of ecological techniques to facilitate the restoration of ecological health of the water body by improving self-purification capacity and nutrient-energy cycles. All sustainable engineering that can reduce damage to ecosystems, adopt ecology as an original foundation, and ensure the conservation of biodiversity with sustainable development. Ecotechnology is essentially the discipline of sustainable management of lentic - lotic water quality which can facilitate preservation of the environment health for the survival, development and economy of society. It operates within the boundaries of ecosystem rather than flouting or overwhelming it. Therefore it boasts non-conventional design considerations, parameters and scale ups. Ecological engineering and eco-technologies are dependent on the self-designing, resilient abilities of ecosystems and their natural biotic and abiotic forces. Natural systems have ability to reorganize and balance biogeochemical cycles and food chains distressed due to external inputs. A new dynamic order eventually emerges suitable to the changes in order to restore ecological equilibrium.

MS08-04S Special Session - Lake Habitat Preservation and New Opportunities for Sustainable Development

The session is an occasion to share multidisciplinary research related to water and lake, as source of new opportunities for sustainable development. Lake represents both passive and active main character for determining global and local climate. It can contribute to sustainable development, due to its carbon sequestration potential and its inner energy source. Lake is also an excellent memory custodian of global climate change, thanks to its ability to store heat in their hypolimnetic water and through the traces left in sediments. Green power from water is one of the cleaner and more efficient renewable energy source. Large dams hold water used to provide electricity. Wave power is also harnessed in various ways.

Hydropower and Micro-Hydropower has 90% of efficiency and new hydroelectric power plants can help both the creation and the restoration of new and ancient habitats for plants and animals, together with the re-creation of new economies. Moreover, lakes' water can be used as energy storage or as source for hydrothermal energy. In this perspective, this symposium responds to the necessity of rehabilitating lacustrine habitat, through appreciating its value in terms of sustainable development opportunities. Micro/meso-climate influenced by lakes is able to influence both environment resources and buildings. Therefore, also thermal-energy performance of the built environment is affected by lakes' presence, and the environmental impact of built areas is investigated in this view. All in all, the opportunity of this first symposium allows to evaluate hydrodynamics, human and climate impact and energy implications of lakes and water sources.

4.2 Keynote Lectures

Pierluigi Viaroli, University of Parma

Quarry lakes and reservoirs in the floodplains: monitoring, research and design of aquatic environments for water quality management and riverscape restoration

Clay, sand and gravel extraction in the floodplains has led to the formation of a number of small and generally shallow lakes and reservoirs, which are often eutrophic due to the pressures from farmland and urban areas. These newly formed water bodies provide a unique opportunity for studying the early colonization phases and the evolution of lake communities, to analyze biological interactions, and to evaluate the ecosystem metabolism and its effects on oxygen budgets and biogeochemical processes. The assessment of ecosystem services this kind of lakes can provide in terms of water and ecological quality is a challenging task. Study cases from the Po river, whose watershed hosts some hundreds of lakes accounting for ~15 km² total water surface, are presented. The comparison of lakes with different ages (from still in formation to 40 years) allows to evaluate their trophic state evolution in relation to hydrological connectivity, external pressures, internal buffering processes, onset and persistence of hypolimnetic anoxia. Guidelines for designing lakes aimed at achieving good ecological conditions have been implemented as a scientific support to the quarry exploitation. Furthermore, the ecosystem services provided by quarry lakes have been suggested as potential tools for restoring the riverscape in the lowland areas, where the river margins are for the most part deteriorated and heavily exploited for agriculture, infrastructures and human settlements. In this context, quarry lakes can be used as substitutes of formely existing oxbow and riverine lakes and to reconnect, at least partially, the river channel with its floodplain.

Alberto Basset, University of the Salento

Biodiversity and Ecosystem e-Science: opportunities and challenges

Biodiversity and ecosystems, the management and conservation of their related services, have gained in the last decades a high priority in the international political agenda inspiring large-scale initiatives and resulting in the implementation of the environmental policy issues through monitoring plans at national and international scales. A positive cascading effect have been increasingly growing data collections on all components of biodiversity and ecosystems providing an unprecedented opportunity to test new ideas and produce new knowledge capitalising existing data resources. Taking advantage of this opportunity, the fast development of biodiversity and eco-informatics is offering the tools and facilities to deploy data. These include capabilities to mine existing data from different sources, standardise, integrate, analyse and model data. Biodiversity and eco-informatics is also offering increasingly accurate facilities to integrate data from very sources, from metabolomics to remote sensing. e-Science research infrastructures, as LifeWatch in Europe, are building the new global research centres where scientists can find, integrate and use in a near future data on biodiversity and ecosystems coming from equipment as different as DNA sequencer and new Sentinel mission satellites. Global scale modelling has already started and will be strongly boosted from these new infrastructures and methodological developments. However, integrating data, tools into

such new capabilities requires major guiding scientific goals that represent intellectual frontiers and challenges for biodiversity research. I see two major challenges for ecological sciences in the next few years to convert the opportunities offered by the innovative technologies into deeper understanding and new knowledge on biodiversity and ecosystems: critically revising milestone concepts in ecology, as the ecosystem concept, producing clear and shared ontologies and cascading data standardisation; and, addressing the architectural layer of biodiversity and ecosystems decoding organisation into the underlying mechanisms and related drivers.

Aharon Oren, The Hebrew University of Jerusalem

Two and a half thousand years of navigation on the Dead Sea

The only ship on the Dead Sea today is a research vessel for scientific exploration. In earlier periods many kinds of boats sailed the waves of the saltiest of all lakes. Anchors found on newly exposed shore of the shrinking lake and remnants of a 1st century B.C.E. shipyard are witnesses of extensive navigation in antiquity. A naval battle was fought on the lake in 312 B.C.E and there exists a letter from 134 C.E. mentioning a ship loaded with fruit anchoring near Ein Gedi. A 6th century mosaic map depicts two sailing boats on the lake. Legal deeds from crusader times period prove that a cargo ship was operated by the Knights Hospitaller of Jerusalem. The 1848 Dead Sea exploration by Lt. William Lynch (US Navy) and earlier unsuccessful ventures by Costigan (1835) and Molyneux (1847) used small rowing boats, but the French expedition of the Duc de Luynes in 1864 brought a custom-built luxury sailing yacht. In the middle of the 19th century a navigation route to India via the Dead Sea was considered as an alternative to the Suez Canal. The first motor ship appeared in 1908, and later a large fleet connected between the operations of the Palestine Potash Company at both ends of the lake. Among the unusual crafts seen on the Dead Sea were a Martinsyde bomber plane equipped with floats instead of wings used as a weapon during World War I, BOAC hydroplanes that landed on the lake in the 1940s on their way to Australia, and the yellow submarine that in 1999 explored the bottom in search for the biblical cities of Sodom and Gomorrah.

Aharon Oren, The Hebrew University of Jerusalem

The microbiology of the Dead Sea: changing microbial communities in a rapidly changing environment

Today the Dead Sea (total salt concentration ~350 g/l with ~2 M Mg²⁺, ~1.4 M Na⁺, ~0.5 M Ca²⁺, ~0.2 M K⁺ and Cl⁻ as the main anion) supports very little microbial life. Biological monitoring of lake's water column since 1980 has shown that blooms of the unicellular green alga *Dunaliella* and halophilic Archaea of the family Halobacteriaceae only develop following significant dilution of the upper water layers after exceptionally rainy winters. Such events occurred in 1980 and even more dramatically in 1992, when up to 3.5x10⁷ Archaea per ml in the diluted upper 5-10 meters of the water column colored the lake red. Archaeal blooms were preceded by blooms of *Dunaliella* (up to 8,800 and 15,000 cells/ml, respectively). From 1996 onwards *Dunaliella* was no longer observed and prokaryote numbers remained low. In spite of the increasingly extreme conditions, a small but diverse community of halophilic Archaea still survives in the lake, as shown by culture-independent, 16S rRNA gene-based molecular techniques. The community structure of the Archaea present in 2007 was very different from that in 1992, showing that even in this extreme environment the microbial communities are dynamic, showing changes in species composition as conditions become increasingly adverse. To examine the possible effects of the implementation of the planned Red Sea – Dead Sea conduit on the Dead Sea as an ecosystem, simulation experiments were performed in which Dead Sea water was diluted with Red Sea water, both in the laboratory and under field conditions in experimental ponds at Sedom. The extent of biological development (*Dunaliella* blooms, accompanied by halophilic Archaea imparting a brown-red coloration to the brines) depended on the extent of dilution and on phosphate availability.

5 Public Events

5.1 Opening Ceremony

The Opening Ceremony of the 15th World Lake Conference took place on the 1st of September in the Main Hall “Aula Magna” of the University of Perugia. The event was opened by the Master of Ceremonies Paola Pigni, Olympic athlete and women’s 1500m record holder, who introduced the Panel of Local authorities, academics, and International delegations:

Lucio Ubertini (Chair of LOC), Masahisa Nakamura (Chair of SciCom), Hironori Hamanaka (DG ILEC), Silvano Rometti (Environmental Commissioner of the Umbria Region), Maria Teresa Severini (Commissioner for Culture of the Municipality of Perugia), Giovanni Paciullo (Rector of the University for Foreigners of Perugia), Franco Moriconi (Rector of the University of Perugia), Massimo Mariani (Member of the Italian National Council of Engineers), Marco Guasticchi (President of Province of Perugia), Taizo Mikazuki (Governor of Shiga Prefecture).

The Rector of UNESCO -IHE Institute for Water Education András Szöllösi-Nagy opened the Scientific Program of the Conference with a Plenary Keynote titled “*Water: The Key to Sustainable Development – The Challenge of the Century?*”. The abstract of the Keynote follows:

The presentation will overview the current global perspective on water resources with an attempt to identify major likely future challenges along with an outline of potential opportunities for solutions. There is a growing consensus in international environmental politics that water is going to be one of the main issues of the 21st Century. Given the projected demands for water supply, food security, and the likely impacts of climate variability and change, the present water use practices are clearly not sustainable. The presentation will attempt to identify the water security challenges that need to be addressed to establish sustainable water development and management practices for the future, with particular attention to the context of lakes and reservoirs. It will also look into the hydrological impacts of various global change drivers, such as climatic variability and change as well as changes in population patterns and related changes, such as land use change, migration from rural to urban areas. All these changes imply strong non-stationarity. It will be argued that the design methodologies, developed under the hypothesis of stationary hydrological processes, need to be revisited and updated. Mitigation and adaptation measures will shortly be outlined. Of the non-structural measures governance reforms will also be discussed. Recent advances within the United Nations in the area of identifying the Sustainable Development Goals will be reviewed.



Figure 1 Hironori Hamanaka's speech during the WLC15 Opening Ceremony



5.2 Closing Ceremony

The Closing Ceremony was hosted by the School of Law of the University of Perugia on the 5th of September, with the participation of the State Minister of Environment of Indonesia Balthasar Kambuaya and the governmental delegation.



Figure 2 The WLC15 Closing Ceremony Panel



The Ceremony started at 15:00 with a welcoming address by Lucio Ubertini and Masahisa Nakamura, who opened the reviewing process of the Draft Perugia Declaration through the contributions from the audience. The outcomes of the reviewing is presented in the first part of this Report (1.2).

The event concluded with the WLC16 Invitation by The Indonesian Minister Balthasa Kambuaya, and the award ceremony.





Figure 3 Award Ceremony



Figure 4 The WLC15 Team

6 Side Events

6.1 International Policy Forum

“Lakes: A Critical Missing Link in the Global Water Framework”

Time: 2nd September 2014, 09:00 to 13:00

Venue: Law School Graduation Room, University of Perugia, Perugia, Italy

Chair: Andras Szollosi-Nagy, Rector of UNESCO-IHE, Institute for Water Education

Theme: The water contained in natural and manmade lakes, wetlands, ponds and other pooled waters and ecosystems, collectively called lentic (standing or static) systems, represents more than 90% of the readily-available liquid freshwater on the surface of our planet. These lentic water systems are especially important to humanity, being used for a wider range of life-supporting ecosystem services than other water bodies. These waters and their ecosystems, which are highly interlinked with inflowing and outflowing surface and underground lotic (flowing) waters, also are extremely sensitive and vulnerable to external and particularly human-induced disturbances. Historically, therefore, people had to develop a variety of management approaches, either explicitly (e.g., with legal, institutional and engineering elements) or implicitly (e.g., with cultural and other community shared-value elements), to meet the challenges of sustainable management and use of their overall ecosystem service values. Unfortunately, however, the global water debate has not yet successfully captured the conceptual or practical accomplishments and challenges faced by these important water ecosystems as part of the global water debates.

Panelists from Overseas

1. Gladys Wekesa, Head, Transboundary Waters, Ministry of Environment, Water and Natural Resources, Kenya
2. Arief Yuwono, Deputy Minister for Environmental Degradation Control and Climate Change, Indonesia
3. Takashi Ohmura, Head, Water Environment Division, Ministry of Environment, Japan
4. Hironori Hamanaka, Director General, ILEC, Japan
5. Alejandro Juárez Aguilar, Corazón de la Tierra, Lake Chapala, Mexico
6. Ajit Patnaik, Chilika Development Authority, India

Panelists from Italy

7. Pierluigi Claps – President, Italian Hydraulic Group
8. Francesco Allegrucci – Delegate for Water Issues, International Relations, Province of Perugia
9. Stefano Burchi – President, International Association for Water Law
10. Michela Miletto – Coordinator, United Nations World Water Assessment Programme (WWAP), UNESCO
11. Fernando Nardi – UNESCO Chair, Water Resources Management and Culture

Forum Coordinators

12. Masahisa Nakamura –Chairman of the Scientific Committee, ILEC, Japan
13. Walter Rast – Vice Chairman of the Scientific Committee, ILEC, Japan
14. Luigi Naselli-Flores – Member of Scientific Committee, ILEC, Japan

09:00 – 09:10 Welcome inaugural remarks

(Chair) We are going to discuss three main issue domains (1) ecosystem services, or the “hardware” theme to be introduced by L. Naselli-Flores, (2) Integrated Lake Basin Management (ILBM), or the “software” theme, to be introduced by W. Rast, and (3) the heartware-theme to be introduced by M. Nakamura.

09:10 – 09:25 Guiding Remarks

(L. Naselli-Flores) We need to recognize the need of sustainable use of ecosystem services provided by “lakes” and other lentic water systems on the global scale. One key direction is to increase both citizens’ and politicians’ awareness.

(Chair) How do you recognize the importance of ecosystem services? How do you translate that importance into policy design?

(W. Rast) We should recognize ILBM as an important complementary concept of Integrated Water Resources Management (IWRM) and Integrated River Basin Management (IRBM) for sustainable management of “lentic” water systems. A missing management perspective is the linkage among lotic and lentic water systems. This linkage is an important element for effective governance in water resources management.

(Chair) What are the specific issues of the lentic water systems that are different from those for the lotic water systems? Perhaps some technical aspects include (1) low velocity of water flows, (2) complicated ecological interactions, and (3) pollution loading sinks.

(M. Nakamura) We need to explore “heartware” approaches to greatly enhance the cultural and other historically fostered shared-values for water governance. Such approaches should address the stress of lake basins.

09:25 – 09:30 Summarizing remarks by the Chair

The objective of this forum is to deliver the important messages from the international community to the water policy debate. What is the current state of the water resources in the globe? What are the policy instruments which could improve the current state? A World Water Heritage has been established for addressing these issues. We would like you to present your strong messages regarding what is not working and what should be done for managing water resources for sustainable development?

9:30 – 10:25 Brief remarks from the Panel and Floor

Gladys Wekesa, Head, Transboundary Waters, Ministry of Environment, Water and Natural Resources, Kenya

I would like to share a general overview of the policy and legal frameworks that exist in my country Kenya in relation to management of our water resources, with specific reference to our lakes. I shall introduce some achievements and the significant challenges in the implementation of these frameworks. Whereas we have had great accomplishment, the challenge resides in participation of diverse stakeholders including especially local communities.

Arief Yuwono, Deputy Minister for Environmental Degradation Control and Climate Change, Indonesia

There are three essential elements in lake management in Indonesia, including (1) upstream, (2) water body and (3) riparian. The challenge is to recognize the diverse characteristics of different lakes and to make connection in management. It is important to incorporate the management with cultural and social contexts. We perceive lake management beyond the water resources management but also the socio-economic development.

Hironori Hamanaka, Director General, International Lake Environment Committee, Japan

I wish to provide some views regarding climate change during the discussions later.

Takashi Ohmura, Head, Water Environment Division, Ministry of Environment, Japan

I wish to introduce two subjects, including the Basic Act on Water Cycle Policy, and impacts of Fukushima Nuclear Power Plant Accidents on lakes and rivers.

(Chair) Japan is the first country which has enacted a law on the integrity of the water cycle. I believe that this is a difficult task. As such a law has to balance the feasibility of technology with the sophistication of the social and legal systems.

Ajit Patnaik, Chilika Development Authority, India

The challenge in lake management is in decision-making in related aspects. We have developed a good governance structure to implement an integrated wetland management.

Alejandro Juárez Aguilar, Corazón de la Tierra, Lake Chapala, Mexico

Mexico's experiences reveal the importance of stakeholder participation and strengthening of governance as essential elements in lake basin management.

(Chair) Some of the other aspects that are not discussed yet include (1) biological engineering and (2) closed lakes. I shall invite experts from the floor later on to provide their insights.

(F. Nardi) I believe that both science and culture are important for water resources management. In particular, it is important to notice and incorporate the perspectives of citizens who may not have technical knowledge.

(S. Diop) In water governance, it is important to consider the daily practices of local communities, and the interactions between different policy systems in regard to how they work and do not work together, either top-down or bottom-up.

(P. Claps) I would like to convey the perspectives of water resources management in Italy. We have a long history of water regulation in Italy, not only in law making but in implementing the policies. European Union has motivated us to better manage our water resources, including balancing the surface water stored in reservoirs and lakes as well as groundwater. In particular, effective management is expected as it has a significant impact on the tourism sector of the country. We have more than 500 nationally important reservoirs which are an important part of the management framework.

(Chair) Reservoirs are man-made structures which often are considered as a part of the beautiful engineering landscape. How to protect and confront possible transformation is an important issue.

(P. Claps) There are many challenges in lake management in Italy. I believe that exchanges with experts could bring helpful contribution.

(S. Burchi) I would be pleased to share some legal aspects in lake management as well as transboundary water management.

(Chair) The United Nations initiated a few discussions on transboundary waters in 1970 and 1977. However, there have been few conventions which are adopted in Europe. How to share waters, how to use water a cooperation? I would like to invite the perspectives from Africa.

(G. Wekesa) In Kenya, water is also an element of our happiness. We are forming a commission via MoU to develop partnerships with countries such as Tanzania. United Nations Environment Programme (UNEP) has played a facilitating role in collaboration between Kenya and Tanzania for managing the transboundary Lake Turkana.

(W. Rast) How do you accomplish such cooperation in terms of participation?

(G. Wekesa) We perceive cooperation as the only option, acknowledging the difficulty of reaching specific agreements.

(Chair) What is the institutional mechanism in protecting lakes and sustaining economic development in Indonesia?

(A. Yuwono) We have a great population in Indonesia. Sanitation is a great challenge. In the populous Java, we considered the local capacity of infrastructure and the unique characteristics of the lakes to design appropriate policies.

(Chair) Forest logging is often a negative element in lake basin management. But it is also a viable option for supporting livelihoods in the poor communities in Indonesia. After coffee break, I would like to invite discussions on impacts of various elements, including climate change, on lake management.

10:25 – 10:50 Coffee Break

10:50 – 10:55 Guiding remarks by Chair

In this session, we will discuss the general framework of ILBM.

10:55 – 11:10 Short Presentation on ILBM by Prof. W. Rast

We identified six pillars for ILBM. Using ILBM, we found 16 types of lake problems. We distinguish standing waters (lentic) from moving waters (lotic). ILBM platform is developed for micro, meso and macro scales. Ecosystem services is an important element of the ILBM approach.

11:10 – 12:55 Invitations for Participation from the Floor

(Chair) I would like to invite Prof. Hamanaka from ILEC to introduce his perspectives in regard to the latest IPCC assessment.

Hironori Hamanaka, Director General, International Lake Environment Committee, Japan

I would like to share some latest information from the IPCC. The IPCC has completed the fifth assessment and will release the assessment results next month, October 2014. The key insights incorporated in the assessment related to impacts on water resources include (1) sanitation and other stress continues to a challenge, (2) water disaster increases and requires more attention, and (3) scientific knowledge is required for adaptation to climate change. ILBM is an important tool in addressing these challenges and meeting the needs.

(Chair) One important aspect in advancing scientific knowledge to support practices in water resources under the impacts of climate change. I would like to invite Mr. Ohmura from Japan to introduce how Japan has been able to initiate a Water Cycle Law.

Takashi Ohmura, Head, Water Environment Division, Ministry of Environment, Japan

The new legislation provides fundamental principles about how to utilize and conserve water to achieve the sound water cycle and sets a strong basis to harmonize the governing system of the water cycle. An example including the change on property rights on groundwater. Before the Law, groundwater was recognized as an asset for private corporations. The Law required a fundamental change. In addition, new committees and plans are being established and developed to support implementation.

(Chair) How to coordinate the implementation of a new water law? I would like to invite Prof. Stefano Burchi to share his insights.

(S. Burchi) The hydrological cycle is an important input for the contemporary regulations on water resources, especially that groundwater is a sensitive and political aspect in the overall framework. In addition, the physical and geographical aspects are crucial for supporting the effective implementation of such a new law. Whereas it takes time to conceptualize a new policy within the circle of policy makers, in actual implementation, it would be even more challenging to engage the public who are water users. When the Water Law in Mexico was implemented in 1992, many realistic aspects emerged and revealed that the preparation was not ready.

(Chair) I would like to invite our expert from Mexico to share some insights on this regard.

(A Juarez Aguilar) The National Water Law established that the unit for management is basin. The problem is that water authorities can manage water but not basins. There have been a series of conflicts among states and within states. Although some new institutional units were established, a common problem existed that participation was too slow. Municipalities have developed networks to cope with the situation. Since 2001, a complementary law has been discussed to support the implementation of the 1992 law.

(Chair) How is the situation in India?

(A Pattnaik) In wetland management, our challenge is the balancing of livelihood and biodiversity. We have adopted approaches of incorporating the concerns of ecosystem management and equity. In some cases, we take into account of bird migration and bird watching as well as livelihood need of local communities. We also try to integrate scientific knowledge with indigenous insights. We have been able to translate scientific findings into practices via developing some management guidelines and engaging with local stakeholders as an approach of capacity building. In the individual level, people in India believe that investment in lands is meaningful and are willing to participate in the process. Legislation was behind the guideline development but has been catching up.

(Chair) How to motivate citizens to participate in management? I would like to invite an expert from Pune to share his insights.

(V. Bodhankar) My city Pune has been taking freshwater from a nearby lake. Recently the water quality has degraded and the water is not suitable for drinking. Over the past two years, a program has been initiated among children. Children are motivated to take water from their homes to schools. This bottom-up program has been adopted by some other cities.

(Chair) Would similar education approaches be applicable to Africa? I would like to invite Prof. Salif Diop to share his insights.

(S. Diop) The essence is capacity building and effective communication among different stakeholders, including children, fishermen and farmers. Effective communication would require not only a bottom-up fashion but also the languages understandable by different stakeholders.

(Chair) In terms of communication, politicians do pay attention to the voice of the public. For example, in South Africa, water is considered as a human right and relevant programs are developed to incorporate education and training. Culture is an essential element in these programs.

(F. Nardi) It is an important question to consider whether we should consider cultural perception as part of the scientific communication for water resources management.

(Chair) This touches the perceptive of hardware-software-heartware for water resources management. In Africa, the historical context is important for understanding different perspectives regarding water. On the other hand, without structure, it is difficult to manage resources.

(P. Claps) We respect a structure for water resource management. As there are many water users, we build structures with concerns for environmental sensitivity. A built environment can contribute to the overall social architecture if structures could allow users to feel accustomed.

(Chair) This touches a few important historical and social concerns in developed countries. For a time, engineering structures were a need for development. In 1990s, the importance of ecosystems was recognized. So has been the connections among many elements in the ecosystems, including water, energy and food. I would like to invite Mr. Michela Miletto from UNESCO to share his perspectives.

(M. Miletto) The United Nations World Water Assessment Programme (WWAP) was established in 2000, financed by the Japanese Government for 6 years and moved to Italy in 2006. This year, water security has become a new emphasis within WWAP. Management of groundwater and lakes could be considered as part of the eco-hydrological cycle. An important element would be education.

(Chair) I would like to invite contributions from Dr. Nick Aladin to share his perspectives.

(N. Aladin) I would like to send important messages from Central Asia. A few largest lakes on this planet are located in Central Asia, including Caspian Sea and Aral Sea. Over years, people at this region have been endeavoring to protect these lakes with joint efforts from UNESCO, UNEP, UNDP, World Bank, as well as local organizations. I believe that whereas the disasters are generated by the hands of men, the recovery from disasters could also be achieved, if not fully, by the hands of men.

(Chair) The Aral Sea case reminds us of how societies are coping with disaster. I would like to invite Mr. Takashi Ohmura to share his insights on Fukushima.

(T. Ohmura) We have been working on recovery from Fukushima and monitoring the impacts. We found that radioactive materials (Cesium) are not detected in the water at most water bodies. The concentration in sediments are staying at low levels or decreasing with some variations at most sampling points, but still high at some points. Overall, it is difficult to justify the clean-up works. The challenge is that people are not willing to drink water locally available even though there is little impact on human health. Continuing monitoring on the site and dialogues among stakeholders are necessary.

(W. Rast) How are you communicating with people who have concerns regarding the water quality?

(T. Ohmura) We have been trying to use scientific indicators but people prefer zero risks since they seem to have lost trust on the government.

(L. Naselli-Flores) Citizens would do monitoring themselves when they do not fully trust the local governments, such as the Italian and Japanese citizens living around lakes.

(Chair) I would like to invite some remarks from the Floor.

(Mangesh Kashyap from India) Credibility of not only governmental authorities but also NGOs is very important for lake basin management. Microeconomics, social economics and ecological economics are equally important for lake basin management in developing countries. Politicians are not directly affected by the problems in lake management but citizens are.

(Sandeep Joshi from India) Institutions are important. Institutions can be considered with four elements, including governance, management, science and engineering. Infrastructure connected with science and engineering has been emphasized but processes connected with governance and management is not well recognized.

(A Juarez Aguilar) Innovative participation is as important as effective communication in lake management.

12:55 – 13:00 Closing Remarks by the Chair

Technology opens new avenues for social communication and new opportunities for participation and cooperation.



Figure 5 The International Policy Forum

WLC15 PERUGIA2014

INTERNATIONAL POLICY FORUM Lakes: A Critical Missing Link in the Global Water Framework

15th Lake International Conference
LAKES: THE MIRRORS OF THE EARTH BALANCING ECOSYSTEM INTEGRITY AND HUMAN WELLBEING

Law School University of Perugia - Room Falcone and Borsellino
9:00 – 11:30 Tuesday, September 2nd

PROGRAM

CHAIRMAN:

Prof. András **Szöllösi-Nagy** – Rector of UNESCO-IHE, Institute for Water Education

PANELISTS:

Mrs. Gladys **Wekesa** - Head, Transboundary Waters, Ministry of Environment, Water and Natural Resources, Kenya

Mr. Arief **Yuwono** - Deputy Minister for Environmental Degradation Control and Climate Change, Indonesia

Mr. Takashi **Ohmura** - Head, Water Environment Division, Ministry of Environment, Japan

Mr. Alejandro **Juárez Aguilar** - Corazón de la Tierra, Lake Chapala, Mexico

Dr. Ajit **Patnaik - Chilika** - Development Authority, India

Prof. Pierluigi **Clapps** - President of the Italian Hydraulic Group, Italy

Dr. Francesco **Allegrucci** - Delegate of Province of Perugia for Water Issue, Italy

Dr. Stefano **Burchi** - President of International Association for Water Law, Italy

Dr. Michela **Miletto** - Coordinator of United Nations World Water Assessment Programme, Italy

Dr. Nicola **Pirrone** - Director, Institute for Atmospheric Pollution of National Research Council of Italy

FORUM COORDINATORS:

Prof. Masahisa **Nakamura** - ILEC, Chairman of the Scientific Committee

Prof. Walter **Rast** – ILEC, Vice Chairman of the Scientific Committee

Prof. Luigi **Naselli-Flores** – ILEC, Scientific Committee

6.2 Local Policy Forum

The Local Policy Forum focused on “Citizen Involvement in Environmental Management – Lake Trasimeno meets Lake Biwa” was held on September the 1st. The Local Policy Forum was chaired by Lorena Pesaresi, Former Environment Councilor of the Municipality of Perugia and involved members from local authorities, civil society, environmental organizations from Umbria region and Shiga Prefecture, as:

Roberto Pippi, Vice Mayor of the Municipality of Castiglione del Lago;
Dino Mengucci , President of the Passignano Research Centre for Environment and Energy “Panta Rei”;
Louis Montagnoli, Comunità Montana Colli Trasimeno;
Alessandra Paciotto, President Legambiente Umbria;
Antonella Pulci, WWF Umbria;
Aurelio Chiocchini, President of the Fishermen Association of Lake Trasimeno;
Satoru Yamakawa, Former Chairperson of the Committee of Harie Shozu Village;
Shoichi Nakajima , Board Member of Akanoi-Biwako Environmental Citizens’ Initiative;
Michio Furukawa , Board Member of Akanoi-Biwako Environmental Citizens’ Initiative;
Katsura Nakano, Responsible of the Heartware Project Team, Shiga University;
Yohei Ueda - Assistant Professor, University of Shiga Prefecture.



Figure 6 Local Policy Forum

WLC15 PERUGIA2014

LOCAL POLICY FORUM

Citizen Involvement in Environmental Management
Lake Trasimeno Meets Lake Biwa

15th Lake International Conference

LAKES: THE MIRRORS OF THE EARTH BALANCING ECOSYSTEM INTEGRITY AND HUMAN WELLBEING

Law School University of Perugia September - Room 7
September 1, 2014 at 17:00

PROGRAM

CHAIRMAN:

Mrs Lorena **Pesaresi** - Former Environment Councillor of the Perugia Municipality

PARTICIPANTS:

Mr. Roberto **Pippi** - Vice Mayor of the Municipality of Castiglione del Lago

Mr. Dino **Mengucci** – President of the Passignano Research Centre for Environment and Energy “Panta Rei”

Mr. Louis **Montagnoli** - Comunità Montana Colli Trasimeno

Mrs Alessandra **Paciotto** – President Legambiente Umbria

Mrs Antonella **Pulci** - WWF Umbria

Mr. Aurelio **Chiocchini** – President of the Fishermen Association of Lake Trasimeno

Mr. Satoru **Yamakawa** – Former Chairperson of the Committee of Harie Shozu Village

Mr. Shoichi **Nakajima** - Board Member of Akanoi-Biwako Environmental Citizens’ Initiative
(To be accompanied by Mrs. Sanae Nakajima)

Mr. Michio **Furukawa** - Board Member of Akanoi-Biwako Environmental Citizens’ Initiative

Prof. Katsura **Nakano** – Responsible of the Heartware Project Team, Shiga University

Dr. Yohei **Ueda** - Assistant Professor, University of Shiga Prefecture

6.3 LakeDoc, Visual Storytelling Award

The International competition “*LakeDoc Visual Storytelling Award*” was launched in February 2014 to invite participants to submit videos, short documentaries or photo albums on specific lake areas portrayed through the lens of: scenery, environment, natural sciences, anthropology, culture, biology, botany, ichthyology, technology, social sciences, history, ethnicity, mythology, epic poetry, religion, philosophy, literature, poetry; and to foster water culture through visual storytelling.

The project was organized by the WLC15’s Organizing Committee, Voxteca and UniFactory – University for Foreigners of Perugia, UNESCO Chair in Water Resources Management and Culture, and Pietro Vannucci Fine Arts Academy of Perugia.



**Vincitori
LAKEDOC 2014
Visual Storytelling Award**

Cerimonia di Premiazione: Lunedì 1 settembre ore 16,00
Rocca Paolina (Centro Espositivo –CERP) Perugia - Piazza Italia

Categoria opera fotografica (ex aequo)
Maurizio Leoni “Lake Trasimeno”
Mikhail Naumenko “Heaven and Waters of Lake Ladoga”
Giuseppe Costantini “Sguardi nel lago”
Claudio Bianconi “Lagomagia”
Teresa Severini “Life from the lake”

Categoria videoclip
Justin Bolduc Turpin “Blue Darkness – Interiors”

Categoria documentario
Giuseppe Farè “Lago di Brinzio... Specchio del parco”

Categoria reportage giornalistico
Mario Scarpanti “Sunsets and Seagulls”

Categoria short video
Giorgio Giorgini “Al Trasimeno”

Menzione speciale della Giuria
Martina Solimano
Franco Balestra

www.wlc15perugia.com

Figura 1 LakeDoc's winners

Works from all over the World have been submitted during the months before the WLC15. The Organizers selected for the various categories the following winners :

Photos: Maurizio Leoni “*Lake Trasimeno*”; Mikhail Naumenko “*Heaven and Waters of Lake Ladoga*”; Giuseppe Costantini “*Sguardi nel lago*”; Claudio Bianconi “*Lagomagia*” e Teresa Severini “*Life from the lake*”;

Videos: Justin Bolduc Turpin “*Blue Darkness – Interiors*”; Giuseppe Farè “*Lago di Brinzio... Specchio del parco*”; Mario Scarpanti “*Sunsets and Seagulls*”; Giorgio Giorgini “*Al Trasimeno*”; Martina Solimano “*Sorapis e Coldai*”.

Special mention: Rolando Marini “*Acque interiori*”, and Antonio Batinti, Scientific Responsible for ALLI Project (Italian Lake Linguistics Atlas).

The Award Ceremony took place on the 1st of September at the Exhibition Center of Rocca Paolina (CERP) and the works were exhibited at (CERP) from the 29th of August to the 29th of September, recording a large number of visitors.

6.4 The Environmental Protection Agency for Research Promotion

The main volume of superficial fresh water is contained in lakes. Therefore, lakes are essential for drinkable purposes, irrigation, navigation and fishing, tourism and recreational activities. They are often the expression of historical, religious and aesthetic values. The Agencies for Environmental Protection are focused on the development of new strategies and techniques for environmental monitoring system, trying to gather further information. Planning and construction of the water robot GALILEO are related with the tasks of environmental monitoring for a safe management of Umbrian lakes.

The Workshop was coordinated by Svedo Piccioni, General Director of ARPA Umbra, and Giorgio Belloni, Siralab Robotics President.

6.5 Freshwater and Sustainable Healthy Food

On September 4th, the 1st International Symposium on Freshwater and Sustainable Healthy Food was held.

Lucio Ubertini, President of WLC15 Local Organizing Committee;

Massimo Alberti, Delegate of Perugia, Accademia Italiana della Cucina;

Giuseppe Fatati, President of ADI Foundation and Member of Territorial Studies Center, Accademia Italiana della Cucina;

Barbara Paolini, Coordinator of UOSA Medical Dietetics, Santa Maria alle Scotte Hospital, Siena;

Sergio Leotta, Director of U.O.C. Dietology, Diabetology and Metabolic Diseases, S. Pertini Hospital, ASL RMB Rome;

Isabella Dalla Ragione, President of Arboreal Archaeology NPO Foundation Città di Castello Perugia;

Antonella Santucci, M.D UslUmbria1, Perugia;

Daniela Capezzali Dietitian, Silvestrini S.Maria della Misericordia Hospital, Perugia;

Gabriele Perriello, M.D. Coordinator of the Clinical Nutrition Center, University Hospital of Perugia;

Daniele Nucci, RD. Department of Internal Medicine, Endocrine and Metabolic Sciences, University of Perugia;

Paolo Petroni, Secretary General of Accademia Italiana della Cucina



WLC15 PERUGIA2014



Freshwater and Sustainable Healthy Food

15th Lake International Conference

LAKES: THE MIRRORS OF THE EARTH BALANCING ECOSYSTEM INTEGRITY AND HUMAN WELLBEING

Room "Falcone Borsellino" School of Law

September 4th 2014 at 10:00

PROGRAM

10:00 General Introductions

Lucio Ubertini, President of WLC15 Local Organizing Committee Presidente Comitato Organizzatore WLC15

Massimo Alberti, Delegate of Perugia, Accademia Italiana della Cucina and Delegato di Perugia, Accademia Italiana della Cucina

Invited speakers:

10:20 Sustainable Healthy Food Giuseppe Fatati, President of ADI Foundation and Member of Territorial Studies Center, Accademia Italiana della Cucina
Presidente Fondazione ADI e Membro Centro Studi Territoriali, Accademia Italiana della Cucina

10:40 – 11:00 Coffee Break

11:00 The freshwater fish and the cuisine of Catherine de Medici Il pesce d'acqua dolce alla cucina di Caterina dei Medici

Barbara Paolini, Coordinator of UOSA Medical Dietetics, Santa Maria alle Scotte Hospital, Siena
Responsabile UOSA Dietetica Medica, Azienda Ospedaliera Universitaria Senese, Policlinico Santa Maria alle Scotte, Siena

11:20 Contemporary Food: not only sea fish Alimentazione moderna: non solo pesce di mare

Sergio Leotta, Director of U.O.C. Dietology, Diabetology and Metabolic Diseases, S. Pertini Hospital, ASL RMB Rome
Direttore U.O.C. Dietologia, Diabetologia e M. Metaboliche Osp. S. Pertini, ASL RMB Roma

11:40 Lakeside Arboreal Archaeology for a sustainable diet Archeologia Arborea in riva ai laghi per una alimentazione sostenibile

Isabella Dalla Ragione, President of Arboreal Archaeology NPO Foundation Città di Castello Perugia
Presidente Fondazione Archeologia Arborea onlus Città di Castello Perugia

12:00: Invitation for Participation from the Floor:

Still water...from a different point of view

Antonella Santucci, M.D UslUmbria1, Perugia

Daniela Capezali Dietitian, Silvestrini S.Maria della Misericordia Hospital, Perugia
Dietista. Azienda Ospedaliera Silvestrini S.Maria della Misericordia, Perugia

Health benefits and features of the Mediterranean Diet

Gabriele Perriello, M.D. Coordinator of the Clinical Nutrition Center, University Hospital of Perugia
M.D. Responsabile Centro Nutrizione Clinica, Azienda Ospedaliera, Università di Perugia

Fagiolina del Trasimeno (vigna uniuiculata (L.) Walp. Ssp. Unguiculata) a great resource for lake area and health

Daniele Nucci, RD. Department of Internal Medicine, Endocrine and Metabolic Sciences, University of Perugia
RD. Dipartimento di Medicina Interna Scienze Endocrine e Metaboliche-Università degli Studi di Perugia

12:30 Conclusions

Paolo Petroni, Secretary General of Accademia Italiana della Cucina
Segretario Generale Accademia Italiana della Cucina

6.6 Best Practices for Lake

The workshop “Best Practices for Lake” took place on the 4th of September in the framework of the national-level Project Best Practices for Lake, jointly organized by UNESCO Chair in Water Resources Management and Culture, Italian Ministry for the Environment and Protection of Land and Sea, Italian National Institute for Environmental Protection and Research (ISPRA), and the Italian Hydrotechnics Association. The project was aimed to Identify and select good practices that can ensure the long-term sustainable management of lake areas, and to foster information, data and knowledge sharing among stakeholders on management of lake areas, through an award of practices that make an outstanding contribution to the environmental conservancy of lake areas, integrated into the social and economic development on a sustainable basis; the repository of the practices awarded in ISPRA GELSO National database on good practices on local sustainability; and the workshop “Best Practices for Lake” organized by Chiara Biscarini to explore outcomes and share lessons learned from the best practices awarded.

The winning projects of the 1st edition of the Best Practices for Lake were:

Echogreen, Fondazione Fabbroni; *LakeAdmin*, Finnish Environment Institute and Province of Rieti;
Borgo dei Pescatori of Castiglione del Lago, ARBIT Association;
BioEnergy Reed, Rosselli Rasetti High School;
Esploriamo insieme i colori del Lago di Idro, Municipality of Idro and Eridio Sub Association.

The award ceremony took place on the 1st September at the Exhibition Center of Rocca Paolina(CERP).

WLC15 PERUGIA2014



Best Practices for Lake

15th Lake International Conference

LAKES: THE MIRRORS OF THE EARTH BALANCING ECOSYSTEM INTEGRITY AND HUMAN WELLBEING

AWARDING CEREMONY - CERP Rocca Paolina Perugia September 1st at 17:00

WORKSHOP - Law School University of Perugia September 4th at 15.

STRATEGIE PARTECIPATE E INTEGRATE (*Inclusive and Integrated management Strategies*):

Winners:

Echogreen - Fondazione Fabbroni

LakeAdmin (Regional administration of lake restoration initiatives) - Finnish Environment Institute, Provincia di Rieti

Special Mention

Yo soy Atilya - Africa 70

ARCHITETTURA, TERRITORIO E PAESAGGIO, INGEGNERIA (*Architecture, Engineering, Landscape and Territory Protection*)

Winners:

Borgo di Pescatori Castiglione del Lago Perugia - ARBIT (Associazione Recupero Barche Interne Tradizionali)

Special Mention

IL processo lento ma continuo per il recupero ambientale del lago di Molveno - Comune Di Molveno

Biolago Lucignano - Luciani giardini

La "Colonia" di Germignaga: storia di un paese che entrò nel lago - Comune di Germignaga (VA)

Pedaladda – Pista ciclabile lungo il lago di Garlate - Comune di Lecco

ENERGIA E AMBIENTE (*Environmental and Energy*):

Winners:

BioEnergy Reed - Istituto Omnicomprensivo Rosselli Rasetti – Castiglione del Lago (PG)

Esploriamo "insieme" i colori del Lago d'Idro - COMUNE DI IDRO ASSOCIAZIONE ERIDIO SUB

UNESCO Chair Water management and Culture - Università per Stranieri di Perugia



United Nations
Educational, Scientific
and
Cultural Organization



UNESCO Chair in
Water Resources
Management and
Culture



University for
Foreigners of Perugia
H2CU – Sapienza
University of Rome

Ing. Chiara Biscarini,
Ing. Fernando Nardi,
Dr. Valentina Abete

Associazione Idrotecnica Italiana



Prof. Ing. Marcello **Benedini**
Ing. Manuele **Mazzetti di Pietralata**

ISPRA (Istituto Superiore per la Protezione e Ricerca Ambientale)
Settore Progetto GELSO sito web e banca dati sulle buone pratiche di sostenibilità locale
Dipartimento stato dell'ambiente e metrologia ambientale



Arch. Patrizia **Franchini**,
Dott. Ilaria **Leoni**,
Dott. Stefania **Viti**,
Sig. Letizia **Giacchetti**

Ministero Ambiente e tutela del territorio. Direzione Difesa Suolo



Arch. Eliana **Venditti**

6.7 Coda della Cometa, Project for the city of Rome

The CODA DELLA COMETA, a multidisciplinary experiment for sustainable and resilient urban and landscape planning of the Tiber river coastal area, that refers to the urban plan of the coastal area of the city of Rome, has been the subject of a very successful side event jointly organized and hosted by the Academy of Fine Arts of Perugia (ABA), the WLC15 Organizing Committee and the Sapienza University of Rome Faculty of Architecture. The workshop was chaired by Orazio Carpenzano (Sapienza University of Rome), Fernando Nardi (University for Foreigners of Perugia) and Paolo Belardi (University of Perugia and ABA Director) and included prestigious invited lectures by Piero Ostilio Rossi (Sapienza University of Rome) presenting on “Re-Cycling Water Architecture. Architectural and Landscape regeneration of Ostia Land Reclamation works (Rome)”, and by architecture and engineering students and faculties with different multidisciplinary perspectives and background dealing with coastal urban and land planning for the city of Rome. The side event also included a special visit to the ABA plaster casts gallery. Here below some pictures from the library of the ABA where the workshop took place.

6.8 TWAP Consultative Open Forum

Transboundary Waters Assessment Program (TWAP) Lakes Working Group

Open Forum: 4th September 2014, 17:00-18:30 - University of Perugia, Perugia, Italy

Chairs: Prof. Masahisa Nakamura and Prof. Walter Rast

Secretary: Dr. Hebin Lin

I. Introduction of Experts

Prof. M. Nakamura

The experts who have assisted in the TWAP-Lake questionnaire survey in East Africa and South America included Mr. Jackson Raini, Prof. Daniel Olago, Dr. Obiero Onganga, and Dr. Godfrey Ogonda, and Prof. Sandra Azevedo, respectively.

II. Review of the Progress of TWAP-Lake

Prof. W. Rast

1. Overview of TWAP: Five transboundary water systems and working groups

- 210 lakes/reservoirs (ILEC)
- 276 rivers (DHI, UNEP Coordinating Center)
- 445 groundwater basins (UNESCO/NOAA)
- 55 large marine ecosystems
- 70% of the surface of the open oceans

2. Activities completed to date for TWAP-Lake

- Delineation of 164 transboundary lakes
- Overlay maps
- Expert Group Meetings and Consultative Meetings
- Questionnaire design, implementation and analysis

3. Current activities for TWAP-Lake

- (1) Three major units: ILEC, Texas State University, RCSE Shiga University
- (2) Project elements

- Basic prioritization

- Prioritization concept
- Lentic-lotic linkages and typology
- IL2BM
- Transboundary Diagnostic Analysis (TDA)

(3) Lake basin ranking considerations

- Which indicators
- How to express rankings
- Quantitative vs qualitative information

III. Methodology Development for TWAP Lake

Prof. M. Nakamura

It is a challenge to conceptualize prioritization when there is limited information for transboundary lakes. We have conducted the following activities: (1) data preparation, (2) weighting and analysis, and (3) scenario development for decision-making.

IV. Current Assessment for TWAP Lake

Prof. M. Nakamura

We developed a master data file for the overall 207 transboundary lakes and the 64 focal transboundary lakes. We have utilized an article and its supplementary information published in NATURE "Global Threats to Human Water Security and River Biodiversity" as well as the relevant GIS data downloadable online.

(1) Two main threats

- Threats to Human Water Security (HWS)
- Threats to Biodiversity (BD)

(2) Four themes and 23 drivers and their respective relative weights for the two threats evaluated by eight experts

- Theme 1: Catchment Disturbance
- Theme 2: Pollution
- Theme 3: Water Resource Development
- Theme 4: Biotic Factors

(3) Some common indicators of stress among the 23 drivers

- Driver 2: Impervious Surfaces
- Driver 9: Pesticide Loading
- Driver 15: River Fragmentation
- Driver 19: Flow Disruption
- Driver 20: Non-Native Fishes (%)

(4) A key logic in assessment

- Investment Benefits Factor: a proxy for the degree to which threats to human water security have been alleviated by technological or engineering approaches
- Incident threats
- Adjusted threats

(5) Some key results

- Relative weights of the four themes on HWS and BD
- Relative weights of 23 drivers on HWS and BD

V. Closing Remark

Prof. M. Nakamura

We applied a similar approach to assessing lake basins. We are continuing to carry out the analysis.

6.9 Ibaraki Kasumigaura Prize

The **8th Ibaraki Kasumigaura Prize** was supported by the Ibaraki Prefectural Government, Japan and awarded to two distinguished authors from developing countries supporting their researches and participation in the 15th World Lake Conference.

The 8th edition winners were:

Chyntia Henny from Indonesia who submitted the work entitled *“Urban Lake Management Strategy: Effect of distinct types of lake surrounding and shoreline landscape development on water quality of urban lakes in Megacity Jakarta”*;

Ramon Pedro Planas Paterno from Philippines who submitted the work titled *“The Yaman ng Lawa (Blessings of the Lake) Initiative in Santa Rosa City, Laguna, Philippines: An inclusive, participatory approach to publicpolicy development”*.

The award ceremony took place during the WLC15 Social dinner held in the suggestive location of Corbara Lake.



Figure 7 The Winners of the 8th Ibaraki Kasumigaura Prize

6.10 Legal Workshop

The Legal Workshop took place at “Falcone Borsellino” Room of the School of Law of University of Perugia on September 5th.

Legal Workshop Theme:

Water protection is indeed one of the major challenges facing the International Community in the new millennium. Several multilateral conventions address the issue and need to be implemented, in order to develop the most cost-effective, innovative and competitive ways of managing water resources whilst mitigating the effects of climate change. Water protection is also a key aim of EU legislation. The legal Workshop intends to discuss the legal tools for transboundary lake water resources management available at the International and European level, with specific regard to environmental protection of lacustrine habitats, water resource utilization for drinking, irrigation and industrial uses, landscape preservation and water transportation systems.

The program of the Legal workshop was structured as follows:

Welcome address by Masahisa **NAKAMURA** Chairman, ILEC Scientific Committee, Professor by Special Appointment Shiga University Research Center for Sustainability and Environment;

Fabrizio **FIGORILLI** Vice Rector of the University of Perugia, Professor of Administrative Law;

Giovanni **MARINI** Director of the Department of Law, Professor of Private Comparative Law, University of Perugia;

Part 1: The Legal Framework:

Opening Remarks by Alessandra **LANCIOTTI** Professor of International Law, Department of Law, University of Perugia;

The contribution of the UNECE Water Convention to the prevention and resolution of transboundary water disputes by Cristina **CONTARTESE** Ph.D. in EU Law, Senior Researcher (post-doc), University of Luxemburg;

The European Regulations on Water by Fabio **RASPADORI** Professor of EU Law, Faculty of Political Sciences, University of Perugia;

The role of biodiversity-related Multilateral Environmental Agreements: Providing another layer of international legal protection of to lakes and their natural resources? By Marco **CITELLI** Ph.D. in International Law and Economics, Università Commerciale L. Bocconi (Milan).

Part 2: Specific Situation

Transfrontier management of lakes: the project for the establishment of a Transboundary Park at Scadar Lake by Giovannella **D'ANDREA** International Lawyer, Advisor to EU neighbouring Countries on their process of approximation to the EU *acquis* on energy and environment;

Environmental security and sustainable development of the Caspian Sea by Vüqar **HACIYEV** Counsellor of the Embassy of the Republic of Azerbaijan to Italy and Ph.D. Candidate, ‘Sapienza’-University of Rome.

WLC15 PERUGIA2014

Legal Workshop

15th Lake International Conference

LAKES: THE MIRRORS OF THE EARTH BALANCING ECOSYSTEM INTEGRITY AND HUMAN WELLBEING

Room "Falcone Borsellino" School of Law

September 5th 2014 at 9

Water protection is indeed one of the major challenges facing the International Community in the new millennium. Several multilateral conventions address the issue and need to be implemented, in order to develop the most cost-effective, innovative and competitive ways of managing water resources whilst mitigating the effects of climate change. Water protection is also a key aim of EU legislation. The legal Workshop intends to discuss the legal tools for transboundary lake water resources management available at the International and European level, with specific regard to environmental protection of lacustral habitats, water resource utilization for drinking, irrigation and industrial uses, landscape preservation and water transportation systems.

PROGRAM

WELCOME ADDRESS:

9:00

Masahisa **NAKAMURA** Chairman, ILEC Scientific Committee, Professor by Special Appointment Shiga University Research Center for Sustainability and Environment

Fabrizio **FIGORILLI** Vice Rector of the University of Perugia, Professor of Administrative Law

Giovanni **MARINI** Director of the Department of Law, Professor of Private Comparative Law, University of Perugia

PART ONE: THE LEGAL FRAMEWORK

9:20 Opening remarks

Alessandra **LANCIOTTI** Professor of International Law, Department of Law, University of Perugia

9:35 The contribution of the UNECE Water Convention to the prevention and resolution of transboundary water disputes

Cristina **CONTARTESE** Ph.D. in EU Law, Senior Researcher (post-doc), University of Luxemburg

9:55 The European Regulations on Water

Fabio **RASPADORI** Professor of EU Law, Faculty of Political Sciences, University of Perugia

10:15 The role of biodiversity-related Multilateral Environmental Agreements: Providing another layer of international legal protection of to lakes and their natural resources?

Marco **CITELLI** Ph.D. in International Law and Economics, Università Commerciale L. Bocconi (Milan)

PART TWO: SPECIFIC SITUATIONS

10:45 Transfrontier management of lakes: the project for the establishment of a Transboundary Park at Scadar Lake

Giovanella **D'ANDREA** International Lawyer, Advisor to EU neighbouring Countries on their process of approximation to the EU *acquis* on energy and environment

11:05 Environmental security and sustainable development of the Caspian Sea

Vüqar **HACIYEV** Counsellor of the Embassy of the Republic of Azerbaijan to Italy and Ph.D. Candidate, 'Sapienza'-University of Rome

11:25 Interventions and debate

6.11 Scientific Journalism Event

"Communicating Science: Language, case studies and methods", organized by the University for foreigners of Perugia and the Umbria National Board of Journalists, was held on the 5th of September at palazzo Gallenga.

The continuing education of journalists seminar, addressed the complexity and the methods of processes of communication of science and technology through the experiences and testimonies of invited experts. 128 journalists from Umbria, Tuscany and Lazio Italian regions attended the seminar. The seminar got started with a welcome address by Giovanni Paciullo, the Rector of the University for Foreigners of Perugia and introduced by Antonello Lamanna, Head of Communication of WLC15. Chaired by Dante Ciliani, President of the Board of Journalists of Umbria. With contributions of: Antonio Brunori, head of international relations UNAGA (National Union of Environmental Journalists Associations); Emanuele Perugini, Director of Pianetascienza.it; Leonardo Alfonsi, President EUSEA (European Science Events Association); Claudia Di Giorgio, chief editor of Le Scienze (L'Espresso Editorial Group).



Figure 8 Scientific Journalism Event Panel

6.12 Professional and Vocational Training for Italian Engineers

The Italian legislation provides that Engineers must constantly update their professional training, achieving every year, at least 30 Professional Credits (CFP).

The CNI (National Council of Engineers) has recognized the WLC15 high technical and scientific value useful for the vocational training of Engineers and has awarded 2 Professional Credits for each session attended up to a maximum of 9 CFP. The LOC has authorized the participation of Engineers to WLC15 upon registration and took care of the administrative aspects for the certification of attendance without any financial charge.

6.13 Academy of Fine Arts “Pietro Vannucci” Prize

Art has always celebrated the environment and the nature of the lakes in all its forms. The LOC, together with the Academy of Fine Arts, wanted to promote this awareness among the students of the courses of Graphic Art, Engraving and Woodcut Techniques by organizing a competition on the main theme of the WLC15: "Lakes: the mirrors of the earth."

The technical and artistic support was coordinated by Marilena Scavissi and Stefano Mosena. The LOC awarded the best three works with a symbolic prize in cash (€ 300.00). All the works of the students who participated in the contest have been reproduced at the Typography Grifani Donati of Città di Castello (1799) and donated, as a souvenir of the initiative, to the participants of WLC15.



Figure 9 The ABA prize winners

6.14 Exhibition

The exhibitions was hosted by the School of Law of the University of Perugia.



Figure 10 Exhibition boots at School of Law

The Exhibitors:

Institutions and Companies participating in the Exhibition:

	<p>Agenzia Regionale per la Protezione Ambientale Umbria Web: www.arpa.umbria.it</p>	
	<p>Siralab Robotics Web: www.siralab.com Also exhibiting the Trasibot (Unmanned Surface Vessel)</p>	
	<p>Springer-Verlag GmbH Web: www.springer.com</p>	
	<p>International Lake Environment Committee Foundation Web: www.ilec.or.jp</p>	
	<p>Overseas Environmental Cooperation Center, Japan Web: www.oecc.or.jp</p>	
		

6.15 Art Exhibitions

con il contributo di



Perugia
Officina per la
Scienza e la
Tecnologia





Camera di Commercio
Perugia




Regione Umbria

Nell'ambito di
Lakes:
The Mirrors of the Earth
15th World Lake Conference
1-5 settembre 2014 Perugia

Il Centro della Scienza POST, in collaborazione con l'Associazione Malakos, presenta:



IL GIRO del MONDO IN UNA CONCHIGLIA

Un affascinante viaggio di conchiglia in conchiglia per osservare esemplari di acqua dolce provenienti da tutto il mondo

29 agosto - 21 settembre 2014
CERP - Centro Espositivo Rocca Paolina, 10.00 / 19.00 - Ingresso gratuito
Inaugurazione 29 agosto ore 17.30

insieme a... mostre, proiezioni e premiazioni

<p>1 settembre ore 18.00 proiezione lungometraggio "la parete liscia - il sogno di Claudia" <i>regia di Federico Menichelli,</i> <i>realizzato con i ragazzi del liceo scientifico</i> <i>"G. Alessi" di Perugia</i></p>	<p>29 agosto - 21 settembre LAKEDOC <i>mostra fotografica nell'ambito del concorso</i> <i>Lakedoc Visual Storytelling Award</i></p> <p>CULTURA E CIVILTÀ DELLE ACQUE INTERNE <i>mostra nell'ambito del progetto</i> <i>ALLI (Atlante Linguistico dei Laghi Italiani)</i> <i>a cura di Antonio Batinti, Ermanno Gambini,</i> <i>Antonello Lamanna</i></p>	<p>ACQUE INTERIORI <i>mostra fotografica di Rolando Marini</i></p> <p>Premio ABA <i>concorso dedicato agli studenti</i> <i>dell'Accademia di Belle Arti di Perugia</i></p> <p>Premio: BEST PRACTICES FOR LAKE <i>presentazione dei lavori selezionati nell'ambito</i> <i>del workshop BEST PRACTICES FOR LAKE</i></p>
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Info: Centro della Scienza POST - 075.5736501
www.perugiapost.it

Figure 11 CERP Exhibition poster

Aug.29 - Sept.21.2014, Exhibition Center of Rocca Paolina, Perugia (CERP Hall)

Lakedoc. Visual Storytelling Awards

Photographic exhibitions, awards, video projections and installations dedicated to the lakes

Art, research and exhibitions dedicated to lakes. Professional photographers, scholars, researchers and enthusiasts describe the lake from their point of view. A selection of photos and videos of lakes that had participated in LakeDoc contest including the winners, was exhibited. An initiative meant to promote the culture of water and lake areas.



Figure 12 LakeDoc exhibition

Around the world in a shell

An exhibition by "Science and Technology Center of Perugia" (POST)

It was a fascinating journey of a shell in shell to show rare kinds of shells from all over the world. The exhibition, organized by (POST), Science and Technology Center of Perugia, with the collaboration of the 'Italian Association of Oceanology and Limnology (AIOL), which is a scientific society founded in 1972 to promote the collaboration between researchers that study about different disciplines of aquatic (both continental and marine) ecosystems.



Figure 13 Around the world in a shell

Internal Waters

Photographic project by Rolando Marini

The images of "internal waters" inquire the immaterial dimension of the lake landscape, far away from intent or descriptive documentation. The alternation between the two techniques (high-contrast black and white and coloured tissue paper) wants to create a tension between two ways of interpreting the landscape, to push the viewer to a meditative attitude, able to capture the path of abstraction expressed in the works.



Figure 14 Exhibition and Internal Water by Rolando Marini

Best Practices for Lake

The best projects, best management practices for lakes

"Best Practices for Lake" aims to identify and spread best practices for sustainable management of lake areas, involving public authorities, professionals and other public and private entities that have made a tangible contribution to environmental protection in perspective sustainability through projects, strategies, governance and scientific know-how in the lake environment.

Linguistic Atlas of the Italian Lakes (ALLI)

Exhibition of scientific research project by Antonio Batinti, Ermanno Gambini, Antonello Lamanna

A geolinguistics and ethno linguistics project that collects, documents and studies the life, history and language of the communities living by the Italian lakesides. A scientific journey that in more than 30 years of research, has produced 50 publications opening new directions of interdisciplinary studies.

ABA Fine Arts Academy of Perugia

The artworks of the students of the Academy

The exhibition features the artworks of the students of Pietro Vannucci Fine Arts Academy of Perugia to represent the Lakes through the artistic techniques of relief printing. The best works were awarded by the Local Organizing Committee on the recommendation of the ABA artistic jury.



Figure 15 ABA Exhibitions

6.16 Social Events

The Field trips to Lake Trasimeno and Marmore Falls was held on the 3rd of September

Trasimeno:

10:00 Visit of the "Oasi Naturalistica La Valle" in S. Savino and the Ichthyogenic Center in S. Arcangelo

12:40 Arrival in San Feliciano and boarding on the boat to the Polvese Island

13:00 - 15:30 Lunch and visit of the island

15:40 Boarding on the boat back to San Feliciano²

16:20 – 17:30 Arrival in Tuoro where participants will assist to the Historical Representation of the "Battle of the Lake"²

18:00 – 19:00 Arrival in Castiglione del Lago and visit of the Historical Center



Figure 16 Lake Trasimeno

Japanese Reception hosted by ILEC at Goldoniana Hall of Gallenga Palace, University for Foreigners of Perugia.

Social dinner at La Penisola Country house, Corbara Lake on Sept. 4th

"The Seasons of Love", a show by ATMO Theatre Company which took place after the social dinner at La Penisola's garden on Sept.4th



Figure 17 Cultural Performance by ATMO



Figure 18 Corbara Lake

7 Committees

The International Scientific Committee is embodied by the following Scientists and Researchers:

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Pietro Vannucci Fine Arts Academy of Perugia
Municipalities of Trasimeno Lake: <ul style="list-style-type: none"> - Tuoro sul Trasimeno; - Castiglione del Lago; - Passignano sul Trasimeno; - Magione; - Città della Pieve; - Panicale - Paciano - Piegara
Italian Association for Diet and Clinical Nutrition "ADI"
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With the contributions of:

- Italian Association of Oceanology and Limnology (AIOL)
- Chamber of Commerce of Perugia
- Board of Engineers Foundation
- Honors Center of Italian Universities (H2CU)

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