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## Welcome to GLOW10 in delightful Dar es Salaam, Tanzania!

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GLOW10 is part of an ongoing series of symposia organized by the GLOW (Great Lakes of the World) Chapter of the Aquatic Ecosystem Health & Management Society (AEHMS). It is the silver jubilee event celebrating 25 years of GLOW. The first GLOW symposium was organized more than 1996 in Victoria Falls, Zimbabwe. Since then the AEHMS has launched a continuing series of GLOW symposia regularly in order to promote interaction and communication amongst various Great Lakes/Large Lakes researchers across the world. The purpose of GLOW is to establish a global platform where ecosystem-based studies of the structure, function and performance of Great Lake ecosystems are promoted, organized and synthesized. In addition, GLOW propagates ecosystem science-based management from an integrated, multi-trophic and multi-disciplinary perspective.

GLOW10 is the eighth of the series organized in the African continent. The AEHMS always co-organizes GLOW conferences with local hosts with regional knowledge to improve participation of African scientists. The AEHMS is proud to be partnering with the Lake Victoria Fisheries Organization (LVFO), the African Center for Aquatic Research and Education (ACARE) and the Tanzania Fisheries Research Institute (TAFIRI), to promote the health of the African Great Lakes. The AEHMS is delighted to collaborate with its partners in an international exchange of ideas and peer reviewed high quality publications.

We are indeed pleased to report that GLOW10 had overwhelming response. Selected presentations will form the basis of an interesting GLOW program in Dar es Salaam. Later it is planned to publish selected papers in special issues of the journal, *Aquatic Ecosystem Health and Management* (AEHM) published jointly with Michigan State University Press, USA and/or a book under the Ecovision World Monograph Series published by AEHMS and Michigan State University Press.

We greatly appreciate the assistance of Organizing, Scientific and Local Arrangements Committees towards the facilitation of this meeting. Sincere thanks to the AEHMS secretariat (Jennifer Lorimer, Lisa Elder) for their assistance in all aspects of the organization of GLOW10.

We are optimistic that the GLOW10 symposium in the beautiful surroundings of Dar es Salaam, will be a productive, scientific and interesting experience generating new ideas, energy and momentum for the continued success of the AEHMS-GLOW Chapter and its future activities.

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**AQUATIC ECOSYSTEM**  
HEALTH & MANAGEMENT SOCIETY

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## The AEHMS at a Glance

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The *Aquatic Ecosystem Health & Management Society (AEHMS)* was established in 1989 to promote ecosystem-based science for managing both marine and freshwater aquatic resources of the world. The Society has four broad objectives centering on health, management, the convening of conferences/symposia, and peer-reviewed publications through its international journal, monograph series, and website ([www.aehms.org](http://www.aehms.org)). The objectives of the Society are:

- To focus on the aquatic ecosystem structure, function, performance and management from an integrated multidisciplinary and multi-trophic and sustainable perspective.
- To enhance our knowledge about the ecology and integrity of the Great/Large Lakes of the world
- Advocate holistic approaches, novel concepts, techniques, tools, models and emerging technologies for remediation and restoration
- Elucidate food-web linkages from microbial loop to plankton, fish and fisheries
- To explore the impact of multiple stressors (climate change, invasive species, HABs etc.)
- To foster global interdisciplinary communication of ecosystem management science amongst researchers, managers, citizens, universities, governments, industry, and the public sector.
- To promote ecosystem-based science, practices, knowledge and publications in developing countries across the world

The Society is actively involved in primary and peer-reviewed publications. It publishes an international journal, *Aquatic Ecosystem Health and Management (AEHM)* on a quarterly basis (in collaboration with the publisher Michigan State University Press). From 2007 onwards the AEHM was selected by Thomson Scientific for coverage in the Science Citation Index Expanded (SciSearch®); Journal Citation Reports; Current Contents®/Agriculture, Biology, and Environmental Sciences; Zoological Record; Biological Abstracts; and BIOSIS Previews. It has published over **50** special issues on diverse topics from across the world. Table 1 provides a general overview of lake publications (also see [www.aehms.org](http://www.aehms.org)).

Table 1. Selected special issues of the Aquatic Ecosystem Health and Management devoted to Great Lakes.

<b>Special issues</b>	<b>Volume</b>	<b>Year</b>
Large Lakes of the World: Comparative Ecology	3(1)	2000
Great Lakes of the World: Food Web, Fisheries, and Management	5(3)	2002
Comparing Great Lakes of the World	6(3)	2003
Coastal Wetlands of the Laurentian Great Lakes: Health, Integrity and Management	7(2)	2004
Emerging Issues in Lake Superior Research	7(4)	2004
Great Lake Victoria Fisheries: Changes, Sustainability, and Building Blocks for Management	10(4)	2007
Changing Great Lakes of the World	11(1)	2008
State of Lake Huron: Ecosystem Change, Habitat, and Management, Part I	11(2)	2008
Checking the Pulse of Lake Ontario	11(4)	2008
The State of Lake Huron: Ecosystem Change, Habitat and Management, Part II	12(1)	2009
Changing Great Lakes of the World and Rift Valley Lakes: Sustainability, Integrity & Management	13(1)	2010
Assessing Large and Great Lakes of the World	13(2)	2010
Ecosystem Health and Recovery of the Bay of Quinte, Lake Ontario	14(1)	2011
Ecology of Lake Superior	14(4)	2011
Great Lakes of the World (GLOW VI): Linking Ecosystem-Based Science to Management	16(3)	2013
Protecting Great Lakes of the World: Managing Exploitation with Ecosystem-Based Science (GLOW VII)	17(1)	2014
State of Lake Vänern Ecosystem	17(4)	2014
Lake Ontario Ecosystem: Status and Future Directions	18(1)	2015

Application of ecosystem approach to fisheries and good governance in Lake Malawi and other Great Lakes	21(2)	2018
Restoring Great Lakes Areas of Concern: 32 Years of Remediation and Restoration	21(4)	2018
Ecology, fisheries and aquaculture in African aquatic ecosystems: GLOW 9, Part I	24(1)	2021
Ecology, fisheries and cage culture in African aquatic ecosystems: GLOW 9, Part II	25(4)	2022

In addition, the AEHMS also publishes a peer reviewed book series under the banner of the *Ecovision World Monograph Series*. It has already published over 20 peer reviewed books on a large variety of subjects, including lakes, ecosystems and other topics of interest (see <http://aehms.org/publications/ecovision/published-books/>).

The Society welcomes individuals for membership belonging to a wide range of disciplines. AEHMS cordially invites you to join the Society to support global conservation and outreach. Membership includes 4 quarterly issues of the journal with on-line access as well as discounts on conference registration fees, purchases of books and back issues of our journal. A discounted membership is available for students, retired persons and members of developing countries. See <http://aehms.org/membership/> for the application. Welcome aboard.

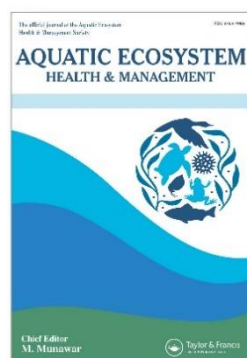
**Mohiuddin Munawar, Ph.D**

President and Chief editor

Aquatic Ecosystem Health & Management Society, Canada



**AQUATIC ECOSYSTEM  
HEALTH & MANAGEMENT SOCIETY**



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## The Organizers at a Glance

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### **Lake Victoria Fisheries Organization**

The Lake Victoria Fisheries Organization (LVFO) was established by a Convention in 1994, and became a specialized institution of the East African Community (EAC) after the latter's re-establishment in 1999. The LVFO Secretariat is based in Jinja (Uganda), and signatories to the Convention comprise four Partner states: The Republics of Kenya, Uganda, Burundi and the United Republic of Tanzania. On the other hand, the EAC with its headquarters in Arusha (Tanzania), is guided by a Treaty (1999). In addition to the LVFO Member States, the Republics of Rwanda and South Sudan, and the Democratic Republic of Congo (DRC) are also signatories to the EAC Treaty.

The mandate of LVFO is to promote and coordinate the sustainable management and development of fisheries and aquaculture resources in the EAC region for the purpose of ensuring sustainability in food security and wealth creation. As one of its functions, the LVFO is charged with strengthening the EAC framework and capacity for fisheries and aquaculture research and resources monitoring, and dissemination and sharing of fisheries and aquaculture research results.

It is in this regard that LVFO has teamed up with TAFIRI, AEHMS and ACARE to co-organize this important conference in Dar es Salaam, Tanzania. It is our belief that researchers, students, managers, policy makers, the civil society and the private sector from the seven EAC Partner States and beyond, will utilize this auspicious occasion to attend and present their findings of research, actively participate in policy dialogues, showcase their work through exhibitions, discuss issues of strategic importance in fisheries and aquaculture, and most importantly, reflect on lessons learned and future perspectives for the Great Lakes.

### **African Center for Aquatic Research and Education**

Recognizing that no one organization or institution can address the challenges that our global freshwater resources face, the African Center for Aquatic Research and Education (ACARE) partners with local, regional, and global experts to leverage the combined skills, assets, technologies and resources to strengthen freshwater science and networks in the African Great Lakes region.

To do this well, ACARE is creating a long-term collaborative process by which the scientific, academic, policy and management, and other interested communities interact to prioritize research and thus, harness the resources and knowledge to positively influence policy and management of these resources. The entire focus of ACARE is to ensure that the ecological structures of the African Great Lakes are preserved and enhanced for the benefit of the millions of people who depend on them.

ACARE serves as a support mechanism for local and regional partners, collaborating, coordinating, and harmonizing efforts and information to ensure the health of some of the largest, and most important freshwater resources in the world.

### **Tanzania Fisheries Research Institute**

The Tanzania Fisheries Research Institute (TAFIRI) is an Institution under the Ministry of Livestock and Fisheries that was established by the Act of Parliament No. 6 of 1980 with the aim of promoting, conducting, and coordinating fisheries and aquaculture research in Tanzania. The Act was repealed by the Act of Parliament No. 11 of 2016.

TAFIRI headquartered at the Coelacanth House, located on Ugweno Street in Kunduchi, Dar es Salaam, Tanzania. The Institute has four Research Centres and one sub-station, which are located on all major water bodies — the three Great Lakes and the Indian Ocean. The Centres are in Kigoma, Kyela, Mwanza and Sota for Lakes Tanganyika, Nyasa and Victoria respectively, and at Kunduchi in Dar es Salaam for the Indian Ocean. TAFIRI's scope of research extends to all water bodies — natural and man-made —including satellite lakes, dams, wetlands, streams, rivers and brackish water. TAFIRI has a Vision of becoming “a strong centre of excellence in fisheries research and consultancy in the eastern and southern Africa”, and a Mission “to promote, conduct and manage fisheries research and consultancy for sustainable development of fisheries in Tanzania”.

TAFIRI’s mandate includes the obligation to ensure that all fisheries and aquaculture and allied research conducted in the country is properly and timely communicated/disseminated to the scientific and policymakers’ communities through research meetings, conferences, science-to-policy dialogues and various publication outlets. To fulfill this mandate, TAFIRI is, in collaboration with the Aquatic Ecosystem Health and Management Society (AEHMS), the African Center for Aquatic Research and Education (ACARE), and the Lake Victoria Fisheries Organization (LVFO), organizing the 10th Great Lakes of the World (GLOW 10) conference which will focus on the health of the Great Lakes of the world. The conference, which will take place from 15th to 17th February 2023 at the Julius Nyerere International Convention Centre (JNICC) in Dar es Salaam, Tanzania, is expected to bring together over 300 scientists, scholars and decision-makers to expound on the status and future of the world’s Great Lakes. We believe the conference will offer a platform for communicating fundamental, innovative and applied research approaches, thus informing policy to guide sustainable resources use, conservation and management in the Great Lakes of Africa and the world.

On behalf of the Organizing and Program Committees at AEHMS, ACARE and LVFO, we are pleased to welcome you to Tanzania, Dar es Salaam in particular, to enjoy both the healthy scientific and policy discourses and the beautiful and unforgettable nature experiences — ranging from ancient lakes, nature reserves and parks, to white sand beaches and rich underwater worlds. As co-chairs of this conference, we are delighted and honored to extend a warm welcome to you all.

**“Karibuni Tanzania”**



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## Publication Plans

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Selected manuscripts will be considered for publication subject to peer review in the ISI rated journal: Aquatic Ecosystem Health and Management (AEHM). AEHM is an ISI rated international primary journal published by Michigan State University Press.

Presenters are encouraged to submit manuscripts to the AEHM for consideration for publication subject to the AEHMS instructions to authors, and guidelines (<http://aehms.org/publications/author-instructions/>). Due to the large number of manuscripts expected the AEHMS has set page limit guidelines as follows: Keynote: 12; Oral & Poster: 10 printed pages including tables and figures (Text: Times New Roman 11 pt, Margins: 2.5 cm (1”), Paper: letter size 21.6x28 cm (8.5x11”). For more information please contact Dr. M. Munawar, Chief Editor ([mohiuddin.munawar@dfo-mpo.gc.ca](mailto:mohiuddin.munawar@dfo-mpo.gc.ca)).

Presenters who are planning to publish in the special issues are requested to complete the publication questionnaire (<https://conferences.aehms.org/glow10/publication/>).

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## General Information

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### Copyright

All presentations and posters are the property of the presenter. Audio recordings, copying, videotaping or photography of the presentations is prohibited. Media should obtain the permission of the AEHMS for use of any conference material.

### Disclaimer

Lake names may be given at the discretion of the contributors in their own presentations. The organizers are not responsible for the content of the presentations or abstracts.

### Electronic devices

We request participants to silence mobile phones in the conference hall.

### Badges

You should consider your personal name badge as your entry ticket. Please wear your badge at all times during the conference.

### Coffee and tea breaks

Coffee/tea breaks are included with registration.

### Liability

Neither the conference organization nor the Aquatic Ecosystem Health & Management Society can be held responsible for damage, loss or theft during the conference.



<b>Wednesday, February 15<sup>th</sup></b>		
8:30-9:00	<b>Registration</b>	
9:00-9:30	<b>Opening Ceremonies with: Dr. Ismael Kimrei (TAFIRI), Dr. Rashid Tamatamah (Permanent Secretary of Fisheries, Ministry of Livestock and Fisheries), Dr. Mohiuddin Munawar (AEHMS)</b>	
9:30-10:15	<b>Key:</b> Mohiuddin Munawar	Celebrating the Silver Jubilee of GLOW: Promoting the Ecosystem Approach and Water Quality Agreements in the Great Lakes of the World
10:15-10:45	<b>Break</b>	
10:45-11:30	<b>Key:</b> Martin Van der Knaap	The influence and effectiveness of the Great Lakes of the World (GLOW) Conferences and publications to manage the African Great Lakes
<b>Session 1. Adoption and implementation of ecosystem approach for healthy lakes and livelihoods</b>		
11:30-11:45	Marie Claire Dusabe	Family-level bio-indication does not detect the impacts of dams on macroinvertebrate communities in a low-diversity tropical river
11:45-12:00	Jeppe Kolding	The potential of Silver cyprinid ( <i>Rastrineobola argentea</i> ) to improve food and nutrition security in East Africa
12:00-12:15	Deogratias Nahayo	Assessing land-use/land-cover effects on the hydrological regimes of the major influents of lake Kivu, Rwandan side
12:15-12:30	Deogratias Nahayo	Water quality assessment of major influent rivers of the Lake Kivu, Rwandan side
12:30-12:45	Stuart A. Ludsin	Needs for and challenges to successful implementation of ecosystem-based approaches in the world's Great Lakes
12:45-1:45	<b>Lunch</b>	
1:45-2:30	<b>Key:</b> Ted Lawrence	Lessons from the past, focusing on the future: A 100 year vision for the African Great Lakes
2:30-3:30	African Great Lakes Action Commitments Session	
3:30-4:00	<b>Break</b>	
4:00-5:30	African Great Lakes Action Commitments Session	
5:30-6:15	Special Remote Sensing Presentation	



<b>Thursday, February 16<sup>th</sup> – PARALLEL PROGRAM (Main Hall)</b>		
9:00-9:45	Key: Jouko Sarvala	Climate change and overfishing threaten the fisheries on Lake Tanganyika – or do they?
<b>Session 2. Status and trends of African Large and Great Lakes' health and resources</b>		
9:45-10:00	Kenneth Irvine	Lessons from the past and directions for the future sustainable use of the African Great Lakes
10:00-10:15	Patrick Doran	Defining coastal resilience in the Laurentian Great Lakes: A systematic review and critical comparison
10:15-10:30	Pierre-Denis Plisnier	African Great Lakes limnological cycle driven by trade winds
10:30-10:45	Stuart A. Ludsin	Overview of the 2019 CSMI program designed to understand harmful algal bloom & hypoxia impacts on Lake Erie's webs
10:45-11:15	<b>Break</b>	
11:15-11:30	Elizabeth Wanderi	Ecological changes in the Lake Victoria Basin: trends, status and a search for mitigation
11:30-11:45	Mboni Elison	Spatial distribution and biomass of pelagic fish of Lake Tanganyika, Tanzania
11:45-12:00	Herbert Nakiyende	Solar lights as alternatives for increased and sustainable fisheries production in lakes Victoria and Albert, East Africa.
12:00-12:15	Mulugeta Wakjira	Fish diversity and Fisheries of Omo-Turkana Basin in the face of hydrological modifications
12:15-12:30	Huruma Mgana	Seasonal patterns in growth of three commercially important pelagic fish species of Lake Tanganyika, Kigoma, Tanzania
12:30-12:45	Janvière Tuyisenge	Assessing the implications of cage aquaculture on Lake Kivu
12:45-1:00	Benedicto Kashindye	Fish maws trade; its implication to Nile perch ( <i>Lates niloticus</i> : linnaeus, 1758) fisheries management in Lake Victoria, Tanzania
1:00-2:00	<b>Lunch</b>	
<b>Session 3. Techniques</b>		
2:00-2:15	Victor Langenberg	The Role of Life Scientists in the African Great Lakes' Biospheric crisis: 25 yrs of perceiving success and flaws, and the need for changing tactics
2:15-2:30	Lisa Peters	Using eDNA/eRNA analysis to assess change metrics in aquatic community health.
2:30-2:45	Steven Greb	Satellite Remote Sensing of African Great Lakes
2:45-3:00	Emma Tebbs	Towards a satellite-based monitoring system for the African Great Lakes: Pilot study in Winam Gulf, Lake Victoria, Kenya.
3:00-3:15	Lauren Timlick	Utility of fish embryo-larval exposures for Great Lakes contaminants research
3:15-3:45	<b>Break</b>	
<b>Session 4. Multiple stressors: climatic events, invasive species and eutrophication</b>		
3:45-4:00	Nestory Gabagambi	Life history shifts in an exploited African fish following invasion by a castrating parasite
4:00-4:15	Claver Sibomana	Lake Tanganyika biodiversity conservation challenges and opportunities: the case of a highly populated country, Burundi
4:15-4:30	Diane Umutoni	Effect of Octylphenol (OP) water exposure to sexually mature female mosquitofish, <i>Gambusia affinis</i> life history
4:30-4:45	Oscar Wembo Ndeo	Impact of anthropic activities on the littoral zone of Lake Edward (RDC)
4:45-6:15	<b>Poster Session</b>	

<b>Thursday, February 16<sup>th</sup> – PARALLEL PROGRAM (Saadani Room)</b>		
9:00-9:45	Key: Jouko Sarvala	Climate change and overfishing threaten the fisheries on Lake Tanganyika – or do they?
<b>Session 5. Fisheries management and emerging aquaculture in relation to value chains, food and nutrition security</b>		
9:45-10:00	Christopher Aura	Unbundling Sustainable Community-Based Dam Aquaculture For Blue Growth
10:00-10:15	James Barasa	A metagenomics study uncovers bacteria microbial diversity in African catfish hatcheries of Western Kenya
10:15-10:30	Julie Bwoga	Fish Parasites and Diseases: Contextual Analysis of the Kenyan Aquaculture
10:30-10:45	Lwabanya Mabo	The Atyid shrimps' fishery of Lake Tanganyika: Implication for Bycatch Management and its Application in Functional Aquafeeds in Zambia
10:45-11:15	<b>Break</b>	
11:15-11:30	Lambert Niyoyitungiye	Assessment of Physico-Chemical and Trophic Characteristics of Lake Tanganyika Water, with Reference to Pollution Stage and Pisciculture Potential
11:30-11:45	Maxon Ngochera	Assessment of the status of Oreochromis species and Other Shallow-water Stocks in the Southwest and Southeast Arm of Lake Malawi
11:45-12:00	Jeppe Kolding	Monitoring and assessing Balanced Harvest approaches in data limited inland fisheries
12:00-12:15	Abebe Getahun	Socio-economic and management status of small-scale fisheries in Omo River Delta and Ethiopian side of Lake Turkana, southern Ethiopia
12:15-12:30	Elizabeth Wanderi	Value Chain Bottlenecks To Attaining Sustainability And Economic Empowerment Of Fisher Communities Of The African Great Lakes: A Case Of Lake Turkana
1:00-2:00	<b>Lunch</b>	
2:00-3:15	<b>TNC Workshop on Aquaculture in and around Lake Tanganyika</b>	
3:15-3:45	<b>Break</b>	
3:45-4:45	<b>TNC Workshop on Aquaculture in and around Lake Tanganyika</b>	
4:45-6:15	<b>Poster Session</b>	

<b>Posters</b>	
Simon Buhungu	Assessment of water quality of Lake Dogodogo in Burundi by zooplanktonic diversity indices
Gladys Chigamba	Costing Ecosystem Services for African Rivers, does it matter in management? A case of Linthipe River in Southern Africa.
Tallent Dadi	Availability of phosphorus in sediments of Lake Victoria
Catherine Fridolin	The Role Of Shredders in the Dynamics of Particulate Organic Matter in Streams
Lloyd Haambiya	A Pilot Approach Towards Managing the Commons of Lake Tanganyika
Enock Mlaponi	Impact of New Technologies in the Fisheries of The Lake Victoria
Naftaly Mwirigi	Recommended nutrient daily intakes of micronutrients from Lake Victoria's small pelagic fish for dietary populations.
Asante Nkhata	Community Participation in Ecosystem Based Fisheries Management in Restoring Lake Malawi Fish Biodiversity
Joseph Nyaundi	Using a Hazard Quotient to Evaluate Pesticide Residues Detected in cultured Nile tilapia, Oreochromis niloticus, (Linnaeus 1758) in River Kuja drainage Basin, Kenya
Ragnhild Overå	Small fish for small children: Challenges and potentials of increasing the dietary intake of small fish among primary school-age children in Northern Uganda
Margret Sinda	Analysis of the quality of fried and smoked Engraulicypris sardella and Copadichromis species using Chitofu 3-in-1 fish processing technology
Lauren Timlick	Fish mucus as a non-lethal sampling matrix to quantify contaminant exposure



<b>Friday, February 17<sup>th</sup></b>		
9:00-9:45	<b>Key:</b> James Njiru	
<b>Session 6. Generating cross-disciplinarity among African Great Lakes science for the application of systemic solutions</b>		
9:45-10:00	James Last Keyombe	Opportunities and Challenges in the Lake Turkana Fishery; Building a Sustainable Fisheries Sector
10:00-10:15	John Malala	Harnessing the potential of a Conflict Prone Trans-Boundary Fisheries for Blue Economic Growth: The Case of Lake Turkana
10:15-10:30	Frank Masese	Challenges and opportunities for sustainable management of transboundary water resources in East Africa
10:30-10:45	Geoffrey Chavula	Lake Malawi/Niassa/Nyasa Basin: Status, Challenges, and Research Needs
10:45-11:15	<b>Break</b>	
11:15-12:00	<b>Key:</b> Stuart Ludsin	Understanding and anticipating fish community change in large, human-dominated lakes: lessons learned from North American Great Lakes
12:00-1:00	<b>Panel Discussion</b>	
1:00-2:00	<b>Lunch</b>	
2:00-2:15	<b>Concluding ceremony and publication plans</b>	
2:15	<b>Adjournment</b>	





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## Ecovision World Monograph Series

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6. Checking the Pulse of Lake Erie, 2008.
7. Ecotoxicological Testing of Marine and Freshwater Ecosystems: Emerging Techniques, Trends, and Strategies, 2005.
8. State of Lake Michigan (SOLM): Ecology, Health and Management, 2005.
9. State of Lake Ontario(SOLO): Past, Present and Future, 2003
10. Sediment Quality Assessment and Management: Insight and Progress, 2003
11. The Gulf Ecosystem: Health and Sustainability, 2002.
12. Ecology, culture and conservation of a protected area: Fathom Five National Marine Park, Canada, 2001.
13. The Great Lakes of the World (GLOW): Food-web, Health & Integrity, 2001.
14. Phytoplankton Dynamics in the North American Great Lakes, Vol. 2.: Lakes Superior, Michigan, North Channel, Georgian Bay and Lake Huron, 2000.
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**Dr. M. Munawar, Series Editor**

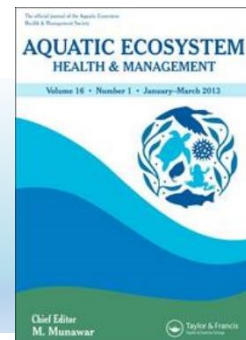
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