CAWQ ACQE

Canadian Association on Water Quality
Association canadienne sur la qualité de l'eau

47th Central Canadian Symposium on Water Quality Research

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Canada Centre for Inland Waters, Burlington, Ontario

Session Descriptions

01-CCG: Climate Change and its Implications for the Water Industry

Chair: Michael Lywood, AMEC Environment & Infrastructure

Abstract: Climate change will have significant impacts across Canada. While the severity of the impacts will vary with geography, one change that will be widespread is higher temperatures, both air and water. This will result in alterations in stream flow and runoff, evaporation rates, agricultural consumption and shifts in urban demands in response to population change.

This session will focus on the social, economic, and infrastructure implications/impacts of climate change to Canada's water industry – municipal and natural resource industries - and strategies for adaptation to the new norm in the near term (5 to 10 year) and over the life cycle of the investment.

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02-EMC: Contaminants of Emerging Concern

Co-Chair: Ève Gilroy, Green House Science
Co-Chair: Adrienne Bartlett, Environment Canada

Abstract: Over the last few decades, the development of increasingly sensitive analytical methods has permitted the widespread identification and detection of numerous "emerging contaminants" in aquatic systems, which in turn has generated concerns regarding the risks that these compounds may pose to environmental and/or human health. In order to properly assess and manage these risks, it is essential to obtain information on the fate, exposure, and effects of contaminants of emerging concern on non-target organisms, and the goal of this session is to highlight the latest research related to these issues. This session covers the measurement, occurrence, fate, effects, and risk assessment of emerging contaminants, including compounds such as pharmaceuticals, personal care products, fluorinated compounds, brominated flame retardants, current use pesticides, siloxanes, and nanomaterials.

This session is mainly targeted towards members of the scientific community (e.g., scientists, graduate students) conducting research on contaminants of emerging concern.

Key themes:

- Advances in analytical method development
- Occurrence of chemicals of emerging concern in the aquatic environment
- Environmental fate (mobility, transformation, persistence)
- Toxicity of emerging contaminants to aquatic organisms
- Risk assessment and/or regulation of emerging contaminants

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03-GLN: Great Lakes Nearshore Water Quality Issues

Co-Chair: Veronique Hiriart-Baer, Environment Canada
Co-Chair: Jacqui Milne, Environment Canada

Abstract: Nearshore environments are highly productive ecotones where much of the terrestrially derived organic and inorganic material is processed. They are vital ecological links between watersheds, tributaries, wetlands, groundwater and lake offshore waters and provide valuable ecosystem services such as drinking water and wildlife habitat. Nearshore environments are also vulnerable to anthropogenic stressors and nuisance algal growth, beach closings and habitat loss are but a few symptoms diagnostic of nearshore ecosystem disruptions. This session will focus on understanding ecosystem processes related to water quality management in the nearshore zone. Papers covering all levels of organization, from molecular to organism to ecosystems are encouraged.

Keywords: Nearshore; water quality; ecosystem processes.

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04-HAB: Harmful Algal Blooms and Source Water Impacts: Causes, Consequences and Controls

Co-Chair: Sue Watson, Environment Canada
Co-Chair: Jennifer Winter, Ontario Ministry of the Environment
Co-Chair: Lewis Molot, York University

Abstract: Harmful Algal Blooms (HABs) are an increasing concern in lakes and rivers throughout the world. Although algal blooms can be natural phenomena, they have expanded as an issue in Canada over the last several decades in terms of both extent and public perception They have major socioeconomic and ecological impacts – costing the USA, for example, an estimated ~ $2 – 4.6 billion /yr in response monitoring, fisheries, tourism, public health & advisory, lost revenue & property value. Blooms of cyanobacteria are of particular concern in freshwater systems because of their potential for toxins (cyanotoxins) which impact human and animal health and can affect freshwater ecosystem processes. However, non-toxic algal taxa also produce harmful blooms. Thick mats of Cladophora and Lyngbya are becoming increasingly problematic in inshore areas of the Great Lakes and elsewhere. Many algae (including cyanobacteria) and other microorganisms (e.g. Actinomycetes, fungus) release noxious taste and/or odour causing compounds that have major negative impacts on the public and the drinking water industry.

This session will have three parts;

I. HABs: causes and monitoring (who, why, field detection and monitoring methods) Papers are invited that focus on research into HAB species, their ecophysiology, metabolites and and toxicity, environmental factors promoting their dominance and methods used for bloom and toxin detection and monitoring (from molecular to remote sensing),

II. HABs: consequences and controls (toxins, treatment, risk management, nutrient management, public outreach, stewardship etc.) This session invites papers dealing with trends in algal bloom reporting, costs and approaches to bloom risk management strategies, treatment and long term remediation and management and public outreach/stewardship.

III. Panel discussion (open to public) to further explore algal bloom issues in Canada.

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05-MDL: Modelling of Environmental Systems

Chair: Ferdous Ahmed, Rideau Valley Conservation Authority

Abstract: This session deals with the modeling of environmental systems, which, in the broader sense, can be defined as concepts or computational procedures dealing with any particular aspect of the environment. However, for the purpose of this conference, the meaning of the term has largely been limited to the movement of water and contaminants therein.

The papers of this session deal with subjects as diverse as hydrology and hydrodynamics, data analysis and numerical methods, and the circulation of various pollutants within these systems.

Keywords: Watershed modeling; Computational hydraulics; Lake hydrodynamics; Numerical modeling; Contaminant transport

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06-NNT: Nanotechnology in Water Treatment and Sampling Applications

Co-Chair: Frank Gu, University of Waterloo
Co-Chair: Anming Hu, University of Waterloo

Abstract: An important current societal concern is the effective decontamination of wastewater and unpurified water from natural sources. The traditional methods of water filtration and disinfection, while still effective at removing many contaminants, are becoming less viable in the total purification process. Recent research has revealed the presence, and hazardous nature, of harmful organic compounds present in many water supplies which are unable to be removed by traditional purification strategies. These harmful contaminants include endocrine disrupting compounds and pharmaceutical drugs as well as by-products of manufacturing processes and certain pathogenic microorganisms, which are recalcitrant to filtration and chlorination. This information regarding the nature of contamination in our water supply mandates the introduction of new, efficient and effective water purification technologies capable of removing these pollutants. Here we seek to review and summarize significant recent research development on free-standing TiO_2 nanowire membranes and magnetically separable particles for use in water treatment, and highlights the many ways nanotechnology and separation technology is currently being employed to treat polluted water.

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07-DWT: Research and Advances in Drinking Water Treatment

Co-Chair: Ron Hofmann, University of Toronto
Co-Chair: Souleymane Ndiongue, Walkerton Clean Water Centre

Abstract: This session will focus on research and development in drinking water treatment processes and approaches to drinking water supply. Subjects may include, but are not limited to:

- treatment options for emerging contaminants
- evolving treatment technologies and process combinations (e.g., advanced oxidation, membrane filtration, biofiltration)
- distribution system quality
- small system approaches

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08-SWM: Research and Advances in Stormwater Management

Chair: Hazel Breton, Conservation Hamilton

Abstract: Three streams have been identified to provide insights into Urban Runoff Water Quality

Stream 1 will look at what scientific work that has been conducted to assess water quality issues from urban sources. This will include a variety of sources of pollution including stormwater runoff, stormwater ponds, stream erosion, spills etc. using a variety of parameters to illustrate impact.

Stream 2 will focus on solutions to the issues raised in Stream 1. This can be in the form of research and management approaches (e.g. Integrated Watershed Management). In the last couple of years many advances have been made in trying to considerably reduce impacts, developing innovative solutions where problems exist, and looking at multi-objective solutions to address other impacts such as climate change, increased growth and failing infrastructure etc. Case studies illustrating innovative solutions could also be presented.

Stream 3 will focus on implementation issues, including looking at opportunities that are available for paying for stormwater management, how can council/public be made aware of new concepts and so gain acceptance for innovative approaches etc.

Questions that these sessions will answer include:
1. What are the water quality issues associated with urban runoff?
2. What are the solutions being used to offset impacts?
3. How do we implement these solutions to ensure long-term sustainability?

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09-WWT: Research and Advances in Wastewater Treatment

Co-Chair: Shirley Anne Smyth, Environment Canada
Co-Chair: Mehran Alaee, Environment Canada
Co-Chair: Yaldah Azimi, University of Toronto

Abstract: Water quality and water quantity issues are becoming more important around the world. Different geographical areas require different approaches to wastewater treatment depending on population pressures and environmental considerations. We invite submissions that demonstrate the breadth of wastewater treatment research underway in Canadian universities, industry and government. Possible topic areas are given below, but submissions on other wastewater treatment topics are also welcome.

Topic areas:

- Innovative treatment technologies (e.g. optimizing energy usage)
- Removal of legacy and emerging contaminants in wastewater treatment
- Microbiology, disinfection and their by-products
- Solids treatment and management

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10-RMT: Risk Management in Drinking Water Quality and Environmental Pollution Control

Chair: Roland Bradshaw, Associated Engineering

Abstract: A common theme in the public sector is an emerging understanding that the current levels of investment do not address deteriorating or inadequate infrastructure to meet current environmental protection and public health needs. This is brought about by natural infrastructure decay but also changes in economic and/or population growth.

Managing risk in the face of limited resources has long been an implicit component of asset management in the public sector yet increasing pressures ranging from financial constraints to low rate tolerability have created a climate in which the public sector has to negotiate spending on capital investment and maintenance schemes in light of acceptable levels of risk. Over- or under-engineering facilities with the presumption of screening out all risk or tolerating excessive levels of risk are no longer acceptable for stakeholders.

Many argue that a sustainable long-term approach is required to assess and bridge the funding gap that is determined by level of service expectations. This approach places level of service expectations and risk management at the centre of public and environmental health management and the availability and quality of risk assessments at the centre of decision making.

This session will explore the application of risk assessment in decision making and invites practitioners and academics to share their experience with risk analysis and assessment in the context of public and environmental health strategies.

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11-SED: Sediment Quality: Assessment and Implications

Chair: Hans Biberhofer, Environment Canada

Abstract: Inputs of recalcitrant compounds to water bodies from both anthropogenic and natural sources can result in the in situ sediment functioning as a sequestering agent and transport mechanism of those compounds. As the sediment accumulates in low energy regions, the aggregated material has the potential duality of being both sink and\or source of the sequestered contaminants to the surrounding aquatic environment. This session will provide an opportunity for presentations related to assessment of sediment deposits from risk and management perspectives, and the role sediment plays as a mechanism of transport and focussing compounds.

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12-SGQ: Surface and Groundwater Quality

Co-Chair: Veronique Hiriart-Baer, Environment Canada
Co-Chair: John Spoelstra, Environment Canada

Abstract: As human populations grow, so do the pressures on our water resources. This is challenging our ability to sustain and enhance surface and groundwater quality. As we improve our understanding of the sources, transport, transformation and sinks of contaminants (e.g. nutrients, metals) through our water networks we become better equipped to strategically manage these vital natural resources. Technological and computational advances have created a number of diagnostic methods and tools to identify contaminant sources and track the evolution of, and ecosystem response to, contaminants as they make their way through our aquatic environments. In this session, papers are encouraged on aspects of contaminant source identification, transport and fate (biogeochemistry) including advances in diagnostic/monitoring methods and approaches are encouraged. Topics related to surface and groundwater quality are of interest, and especially those involved with groundwater-surface water interaction.

Keywords: Surface water; groundwater; contaminant biogeochemistry.

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13-RWS: Rural and Agricultural Water Stewardship *NEW*

Chair: Gabrielle Ferguson, Ontario Ministry of Agriculture, Food and Rural Affairs

Abstract: Water management is complex because water has so many functions. It takes an interdisciplinary effort to bring about robust, enduring and realistic actions that can assure each of us we are "doing the right thing". Business and lifestyle choices in the rural and agricultural landscape effect water quantity and quality. Making positive choices starts with a good understanding of water use followed by science based options for effective water management. This session will include topics such as water use efficiency, water quality, nutrient management, social factors affecting BMP adoption, evaluation of BMPs and collaborative approach to sub-watershed management. Come learn of how community stewardship creates synergy towards water quality improvements through examples.

Keywords: Agricultural, water use efficiency, rural water quality, behavioural change, water quantity, and best management practices

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14-GEN: General

Contributions from all aspects of water quality research are welcomed. Abstracts that do not necessarily fit within the proposed thematic areas will also be considered and should be submitted under this code.

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