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Climate Change, Water Security and Adaptation

Abstract: Drinking water security (DWS) is essential for meeting the United Nations Sustainable Development Goals because of its indisputable connection to human health and its direct impacts on poverty alleviation, economic development, environmental sustainability, gender equality, conflict prevention, and disaster preparedness. While DWS is a critical priority, it is also an allusive one. This is in part because tools for identifying, assessing, and mitigating threats to source water quantity, quality, and treatability are often misunderstood in their limitations or lacking entirely. Globally, a “Multiple Barrier Approach” is used for public health protection by providing safe drinking water. It includes source water protection (SWP), treatment, monitoring and compliance, and individual/community action. Climate change-exacerbated disturbances such as fires and floods increasingly highlight inadequacies in state-of-the-art SWP, treatment, and monitoring approaches essential to advancing drinking water security. In this talk, key climate-change-exacerbated threats to water security will be discussed, and opportunities for and barriers to adaptation will be highlighted.

Bio: Monica Emelko is a Professor and the Canada Research Chair in Water Science, Technology & Policy at the University of Waterloo in Canada. She is the Scientific Director of the forWater Network, a Professional Engineer, and a Fellow of the Canadian Academy of Engineering. Her research on water treatment and risk analysis has informed water regulations globally, including the suite of U.S. Surface Water Treatment Rules and their international equivalents. She has worked on wildfires and their implications for drinking water treatment since 2004. Her team was the first globally to describe wildfire effects on drinking water treatability and received the Canadian Council of the Federation Award of Excellence in Water Stewardship in 2014. They assisted as first responders, helping with water treatment response and re-entry risk management during and after the Horse River wildfire in Fort McMurray in 2016, and received a citation from the Premier for service to the province. Monica is the Scientific Director of “forWater” a Canada-wide and internationally-partnered research network of academics, water utilities, government agencies, industrial forestry companies, and NGOs focused on maximizing the benefit from concurrent forest management-based approaches for drinking water source protection and enhanced resilience in water treatment, operations, and risk management.



Steven N. Liss
Vice-President, Research and Innovation
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A perspective on One Water when stepping away from the microscope

Abstract: One Water is an emerging paradigm that recognizes that climate change, emerging contaminants, infrastructure renewal and increasing energy costs should be addressed in an integrated fashion due to the impacts these pressures place on treatment systems. These are converging environmental, human health and economic issues, fundamentally challenging sustainability goals. One Water framework has the potential to enable healthy communities and environments, reduce water inequities between large and small communities, occupy smaller footprints than centralized drinking water and wastewater treatment plants, be affordable, and offer high levels of monitoring and water quality. One Water explicitly includes social, economic, policy and community engagement barriers to implementation that have been historically absent from attempts to provide water treatment technology to small communities and thereby integrates planning and implementation to manage finite water resources for long-term resilience and sustainability. There have been significant gains in the insight of conventional treatment technologies and recent innovations, opening new avenues and opportunities in the stewardship and management of water resources toward a more sustainable future. One such avenue includes increasing emphasis on decentralized approaches that offer more agility, flexibility and scalability than traditional centralized approaches characteristic of large cities. The presentation looks towards a One Water framework where water's true value is realized. This entails concerted, collaborative efforts and embracing new tools and technologies that could fundamentally transform the approach to water systems. A major goal is to remove the barriers that prevent access to current and emerging technologies and the disconnects between water treatment and reuse options driven by fear and cultural obstacles.

Bio: Steven N. Liss is Ryerson's Vice-President, Research and Innovation and a professor of Chemistry and Biology in the Faculty of Science. Professor Liss returned to Ryerson, in April 2017 following a decade of distinguished service at the University of Guelph and Queen's University, where he served as Vice-Principal (Research). Steven was awarded the Queen Elizabeth II Diamond Jubilee Medal in 2012 for his contributions to Canada's research and innovation ecosystem. He has also held numerous positions on a number of boards and councils and continues to play an important leadership role nationally in the advancement of support for digital infrastructure. Professor Liss has been instrumental in advancing Ryerson's significant research growth and developing partnerships and collaborations to support scaling and accelerating scholarly, creative and research activities across the university. He leads a bold research plan. In his role, he has been instrumental in the creation of the Rogers CyberSecure Catalyst, Ryerson's role in the establishment of the Future Skills Centre, harnessing the university's strengths in city building through the launch of City Building Ryerson, and advancing Ryerson's role as a leader in health and well-being.