



Alberta Lake Management Society

19TH ANNUAL WORKSHOP

Water: where we live, work and play.



Photo by: Kellie Nichiporik

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The purpose of the Society is to promote understanding and comprehensive management of lakes and reservoirs and their watersheds. We work to build understanding and awareness among Albertans for responsible management through programs and information sharing.

Our programs strive to increase awareness of water resources through the local monitoring of Alberta's surface waters and to foster a sense of stewardship in Alberta's watersheds. ALMS and its members are active across Alberta in providing support to individuals, local communities, educational institutions, governments and industry that are interested in lake and watershed management. The Society organizes an annual workshop at a different Alberta community each fall. ALMS is also widely recognized through its two community-based lake water quality sampling programs called Lakewatch and Alberta Water Quality Awareness Day (AWQA Day).



For more information or to get involved in lake monitoring please contact us!



www.alms.ca

780-702-2567

Moose Lake Watershed Society

Over the past ten years, residents have raised concerns about the health of the Moose Lake Watershed, and the quality of life it provides. In response to concerns, local government, landowners, and stakeholders have taken initiative to ensure the preservation of the water, and the surrounding ecosystem within the Watershed. The Moose Lake Watershed Society has taken the lead role and is working to find solutions for these concerns through the course of a Watershed Management Plan. The Moose Lake Watershed Management Plan was the first of its scale and has since become a model for Watershed Management Plans in the province. Formed in 2002, this non-profit organization counts nine members including a combination of municipal and community representation.



Keynote Speakers

Dr. Rolf Vinebrooke

Past, Present, and Future Effects of Eutrophication on Prairie Lakes and Ponds

Department of Biological Sciences, University of Alberta

Paleolimnological reconstruction of the histories of Canadian prairie lakes reveal that many have been naturally very productive for several centuries. However, multiple human stressors that define modern global change have further heightened the productivity of these systems, resulting in the proliferation of nuisance and potentially toxic algae (e.g., cyanobacteria or "blue-greens"). For example, climatic warming is expected to synergistically amplify the positive effect of excess nutrients (i.e. eutrophication) on cyanobacterial production, thereby increasing the probability of outbreaks of toxic phytoplankton (i.e. blooms) during hot summer months. A potential future remediation strategy involves the application of dissolved iron to eutrophic prairie water bodies, which suppresses cyanobacteria by reducing the bioavailability of phosphorus. Preliminary findings from a replicated whole-ecosystem experiment highlight how iron remediation may offset some of the future ecological surprises of global change for eutrophic prairie water bodies.



Rolf Vinebrooke is an Associate Professor in the Department of Biological Sciences at the University of Alberta and editor of the Canadian Journal of Fisheries and Aquatic Sciences. He began his scientific interest in aquatic ecology as a M. Sc student examining algal communities as bioindicators of recovery in acidified lakes. Then, he investigated food-web responses to ultraviolet radiation in mountain lakes as part of his PhD research. His postdoctoral research with Dr David Schindler examined the biodiversity and ecosystem stability of a lake ecosystem that had been experimentally acidified and then allowed to recover chemically during the 1990s. To date, his research has focused on the impacts of multiple ecological stressors (e.g., air pollution, climate change, exotic sport fish, eutrophication, ultraviolet radiation) on alpine, arctic, boreal, and prairie lakes. His research group uses lake surveys and paleolimnological techniques to generate hypotheses that are then tested using mesocosm and whole-ecosystem experiments.

Dr. Hamid Habibi

Dangers of Chemicals in Alberta Rivers

Department of Biological Sciences and Institute of Environmental Toxicology, University of Calgary

Hamid R Habibi, Ava Zare, Julia Jordan, Suzanne Henderson, Aalim Weljie, and Leland J Jackson



There is increasing awareness for the presence of contaminants, including organic chemicals, pharmaceuticals, and endocrine disruptors as well as pathogens and heavy metals in our environment. Recently, we studied 61 locations along the Red Deer, Bow and Oldman Rivers in Southern Alberta to identify and investigate the impact of environmental contaminates. Water and fish samples were collected from different sites upstream of major cities as well as downstream sites close to alternative land uses such as intensive agriculture for comparison. In the city of Calgary, sites were chosen to allow water quality monitoring upstream and downstream of municipal wastewater treatment plants. The results demonstrate the presence of trace amounts of pharmaceuticals, phthalate esters, and nonylphenol ethoxylates in receiving river waters of Southern Alberta. These compounds have hormone-like activity and are present at concentrations capable of causing sex changes in fish. Our findings provide a strong evidence for cumulative impacts of municipal wastewater, agriculture and large cattle operations within the basin.

To address this problem effectively, we established the Institute of Environmental Toxicology, and initiated an ambitious multidisciplinary project known as Advancing Canadian Wastewater Assets (ACWA) to build a unique, world-class research facility embedded within the City of Calgary's new Pine Creek Wastewater Treatment Plant. The ACWA is an innovative partnership between the University of Calgary and the City of Calgary, whose main goal is to advance wastewater treatment technologies to address increasing environmental and public health issues. Engineering modules will test novel wastewater treatment technologies at full-scale, thereby avoiding scale translation issues associated with bench and pilot-scale research, and ensuring rapid adoption by wastewater utilities. The ACWA Facility will allow us to perform leading edge wastewater treatment studies and research on the assessment of the impacts of treated wastewater.

Dr. Hamid Habibi obtained his undergraduate and Ph. D. degrees from Birmingham, England, followed by postdoctoral training at St. Francis Xavier University and University of Alberta, Canada. He joined the University of Calgary in 1988 as an Assistant Professor and NSERC Scholar. He went through the ranks and was promoted to full professor in the Department of Biological Sciences in 1999. He is also an Adjunct Professor of Physiology and Pharmacology at the Faculty of Medicine. Dr. Habibi is the founder and Director of the newly established Institute of Environmental Toxicology at the University of Calgary. In addition, he is the principal investigator and former Interim Executive Director of the Advances in Canadian Wastewater Asset (ACWA). His teaching and research interests are in the areas of Environmental Toxicology and Comparative Endocrinology. He received a number of prestigious awards in recognition of his work including the Grace Pickford Medal by the International Federation of Comparative Endocrinological Societies, Research Achievement Recognition award by the University of Calgary, and a Professional/Lectureship in Science and Sustainable Development by the UNESCO and the Third World Academy of Sciences.

Dr. William Shotyk

The Natural Removal of As from Water by Peat

Bocock Chair in Agriculture and Environment at the University of Alberta, Faculty of Agricultural, Life and Environmental Sciences, Renewable Resources

A minerotrophic peatland (Gola di Lago) in Canton Ticino, Switzerland contains anomalous enrichments of arsenic (As). Stream waters entering the peatland may contain up to 400 μ g/l (parts per billion) of total dissolved As (As_T), but the surface waters which leave the mire contain less than 2 μ g/l. To explain the mechanism of As removal from waters by peat, comprehensive studies of chemical composition of solid and aqueous phases were undertaken. In the zones of greatest As concentrations (700 mg/kg, or parts per million), the porewaters contained < 1 μ g/l As_T which suggest an extremely efficient removal process. The peat was also highly enriched in Fe (iron) and S (sulphur), in addition to Se (selenium) and U (uranium). Although pyrite framboids were abundant in the peat layers, analyses of these phases using synchrotron XRF (Advanced Photon Source, USA) failed to detect As. Analyses using X-ray photoelectron spectroscopy (Surface Science Western, UWO) also failed to reveal As adsorbed onto the surface of the pyrite framboids. Plant materials isolated from the peat horizon containing anomalous As concentrations were also analyzed using synchrotron XRF (European Synchrotron Radiation Facility, Grenoble) revealed abundant As uniformly distributed throughout the plant matter. Saturation state calculations using PHREEQEC showed that the porewaters were saturated with respect to iron oxides and hydroxides in the oxic zone, whereas iron and arsenic sulphides saturate the porewaters of the anoxic zone. We suggest that As(V) in the stream waters is scavenged during the precipitation of ferric hydroxides in the oxic zone of the peatland, but subsequently reduced to As(III) in the anoxic zone (along with the reduction of Fe and S), allowing nanocrystalline As-bearing metal sulphides to accumulate.



Dr. Shotyk completed his B.Sc. (Agr.) at the University of Guelph (Soil and Science and Chemistry) in 1981, and his Ph. D. at the University of Western Ontario (Geochemistry) in 1986. After postdoctoral research at the University of California, Riverside (1987) and at the University of Western Ontario (1988-1989), he joined the Geological Institute at the University of Berne, Switzerland, as Oberassistent. He completed his Habilitation (Geochemistry) at the University of Berne in 1995. In October of 2000, he joined the University of Heidelberg as Professor, becoming Director of the Institute of Environmental Geochemistry.

As of October 2011, Dr. Shotyk holds the position of Bocock Chair in Agriculture and Environment at the University of Alberta, Faculty of Agricultural, Life and Environmental Sciences, Renewable Resources. Edmonton , Alberta, Canada.

Richard Casey

Water Quality Conditions and Long-Term Trends in Beaver River Lakes

The Government of Alberta along with partners including provincial parks and ALMS have monitored water quality in the Beaver watershed for over 30 years. Trends were examined for select water quality variables (including phosphorus and chlorophyll-a) in 9 lakes in the Beaver River basin. The talk will focus on methods and results for the Beaver River lakes and relative to other lakes in Alberta.

Alberta Environment & Sustainable Resource Development (AESRD). Email contact:
richard.casey@gov.ab.ca

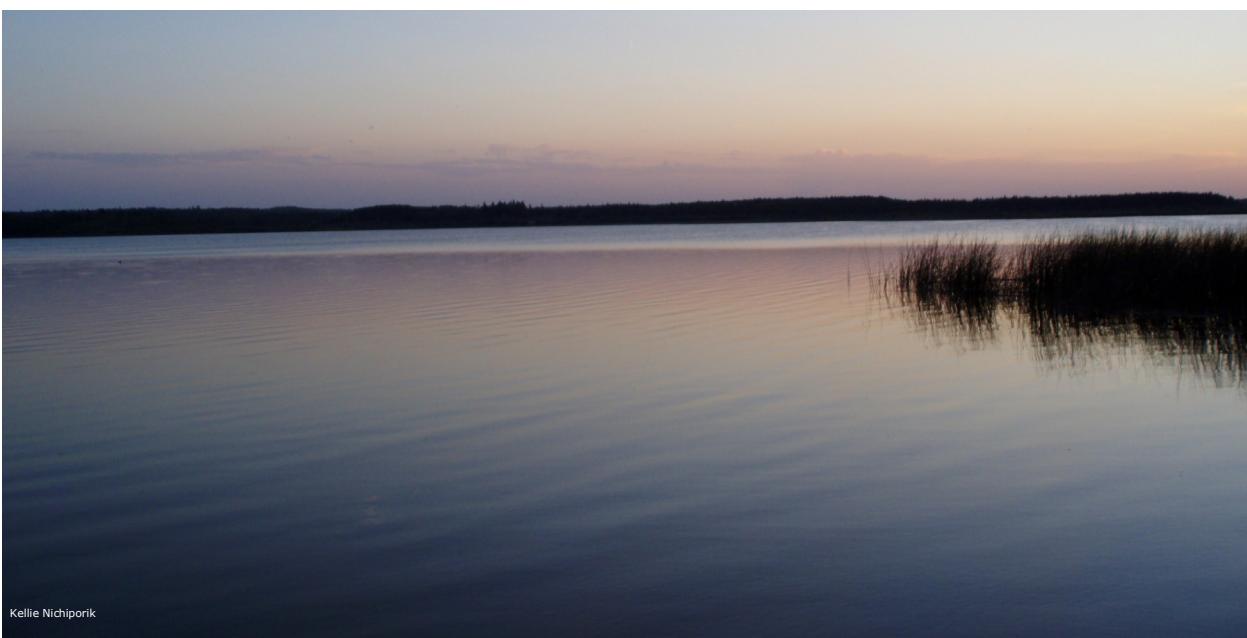


George Walker

Riparian Area Video Assessments

- ◆ Short introduction and brief description of low-level aerial videography as a tool for completing riparian management area assessments.
 - ◆ Provide an example of a lake assessment survey and demonstrate some of the products and tools that can be used by project proponents to effectively engage adjacent land owners, industry, municipalities and government resource managers in pertinent discussions or education and awareness activities.
 - ◆ Look at riparian assessments and their results from lakes around the province and what we can glean from that knowledge.
 - ◆ Short discussion of the importance of riverine riparian management assessment.
-

George Walker graduated from Biological Sciences in Ecology at NAIT. He then spent 26 years with Alberta Fisheries Management Branch of Alberta Sustainable Resource Development, much of it in the northeast region as a Regional Technician and Area Fisheries Biologist. During the last twelve years he has used his knowledge and experience (within ASRD, in association with the Alberta Conservation Association and later as Walker Environmental) to develop and complete Aerial Videography based Riparian Health and Integrity Assessment projects for many Alberta lakes and rivers.



Jen Russel-Houston

Saline Water Source for Steam Injection

Steam is often used to reduce the viscosity and increase the mobility of the bitumen contained in oil sands. In the proposed Taiga Project within the Cold Lake Oil Sands Region, the source of the water to create the steam will come from the McMurray Formation Basal Aquifer. This is a Cretaceous-aged sandstone that lies beneath the Clearwater Formation oil sand reservoir at a depth of approximately 500 meters below ground level. In 2009, Osum Oil Sands Corp. drilled and completed four wells and acquired 2D seismic in the Taiga Project area to confirm the hydrogeologic conditions in the Basal Aquifer and chemistry of the water. The study revealed that the Basal Aquifer will provide an adequate source of brackish water for the life of the Taiga Project. How the locations were selected, tested, and modeled and the significance of this work for future thermal developments will be discussed.



Dr. Jen Russel-Houston is the Geoscience Manager at Osum Oil Sands Corp. where she leads the team in geological and geophysical investigations related to exploration and development of the Cold Lake Taiga Project and the Wabasca area bitumen-saturated carbonates. Her team's research involves the integration of all geoscience disciplines to create a complete characterization of the reservoir, the cap rock and the associated aquifers. This research is applied to successfully plan and optimize thermal bitumen developments.



Nicole Kimmel

Dealing with Invasive Plants

Invasive plant identification, provincial distribution and control efforts. Species of greatest concern for water bodies include: Himalayan Balsam, Eurasian Water Milfoil, Flowering Rush, Pale yellow Iris and Purple Loosestrife.



Nicole Kimmel has been with Alberta Agriculture and Rural Development for the last 12 years. She started with the department right after graduating from the University of Alberta. She started in the weed research "trenches" and got to intimately know several weeds with in the province, through various research activities. After two maternity leaves, Nicole returned to the department in the role of Weed Specialist, where she supports the newly revised AB Weed Control Act through various extension activities. She has been and continues to travel all over Alberta, raising awareness on invasive plants.

Mark Graham

Exploring Rapid Early Detection of Harmful Versus Benign Algal Blooms in Alberta Freshwaters

Graham, M.D*, Vinebrooke, R., Galbraith, C., Zurawell, R., Huang, D., Kinniburgh, D., Graydon, J., Gabos., Zhang, W., & Fok, N.

The province of Alberta as a primary source of water for the other prairie provinces is plagued by some of the worst water quality in Canada because of outbreaks of toxic and other nuisance algae, collectively termed harmful algal blooms (HABs). Cyanobacteria (aka “blue-green algae”) are the key determinants of the potential toxicity of a HAB, producing neurotoxins, liver-damaging hepatotoxins, and /or odour-causing chemicals. They cause oxygen depletion and alter food webs, posing a major threat to drinking and irrigation water supplies, fishing and recreational use of surface waters within Alberta. In contrast, certain algal blooms are relatively benign, consisting often of harmless microscopic phytoplankton and filamentous taxa. Effective forecasting and management of HABs and maintenance of ecosystem services requires an early warning system in which rapid, user-friendly, and cost-effective technology can be used to quickly detect and respond to early indicators of potentially problematic species. Our ultimate goal is to employ state-of-the-art laser optics flow cytometry (FlowCAM ®) to develop the first ever digitalized image library of HABs and other freshwater algae for the purpose of rapid early detection of “hotspots” by water managers, environmental and governmental agencies, along with concerned private citizens. FlowCAM offers a more accurate means of detection in a fraction of the time needed using manual methods, thereby making for more confident assessment of the presence of problematic species such that remediation can be performed to negate or minimize the occurrence of a HAB. The FlowCAM analytical services will aid Albertans with the knowledge needed to monitor their aquatic ecosystems, and make informed decisions regarding their use and management.

Mark Graham is a postdoctoral researcher in the Department of Biological Sciences at the University of Alberta. He began his scientific interests in the study of physiology and aquatic sciences as a B.Sc student at the University of Toronto, examining the responses of algal assemblages under varying grazing regimes within environmentally stressed lakes of northern Ontario. Then, he investigated food web dynamics in alpine and prairie lakes at the University of Regina as part of his M.Sc research. His PhD research at the University of Alberta examined the dynamics of primary producers and consumers in boreal lakes under a changing environment. To date, his postdoctoral research with Dr Rolf Vinebrooke has focused on water quality and aquatic ecosystem responses to multiple environmental stressors under a changing climate, and the development of remediation management strategies to reduce toxin-forming cyanobacteria.



Kellie Nichiporuk

Judy Stewart

Critically Assessing Lakeshore Subdivision or Development Proposals: Pointers for Lake Stewards

Lake stewards usually only have one opportunity to provide input on lakeshore subdivision or development proposals. Only adjacent property owners have the opportunity to appeal development permit applications, and there is no ability for anyone else to have input before the development permit is issued. Often lake stewards who live adjacent to lands that are proposed to be developed miss this opportunity to appeal development permits because they feel they have no real influence and that development permits are done deals.

Subdivision proposals are quite different. Anyone who claims to be affected by a subdivision proposal, and who the development authority agrees to hear, can make oral or written submissions during a public hearing to ask for changes to the proposal. The workshop presentation provides a few pointers for lake stewards to help them prepare for the public hearing and develop good written and oral submissions based on a critical assessment of the subdivision proposal. The pointers reflect individuals' common reactions and insights to proposals based on five major sustainability factors: governance; social programs; community economics; and social-ecological systems. Lake stewards who develop good relationships with their local development authorities can become effective advocates for lakeshore subdivision and development that reflects shared community values.



Hopefully participants will be entertained as well as enlightened about how to critically assess subdivision proposals and write or speak to well-crafted meaningful public hearing submissions that make a difference.

Judy Stewart is a teacher and lawyer who practices law in Cochrane, Alberta, primarily in municipal and water law. She is currently pursuing a Doctor of Philosophy in the Department of Environmental Design at the University of Calgary. Judy completed her Master of Laws at the University of Calgary, and her thesis was about municipal tools to protect wetlands and riparian lands in Alberta. She promotes integrated air, land and water management in all aspects of her personal and professional life. Recently Judy had an article published in the Alberta Law Review about the potential for municipal water management planning under section 60 of the *Municipal Government Act*, which gives municipalities "direction, control and management" of water bodies within their jurisdiction. Current research includes diversion and use of storm drainage as a water supply source. Judy is a well known local politician, as she spent nine years on Cochrane town council-6 years as a councilor and 3 years as mayor. She is an avid volunteer, helping on local, regional and provincial watershed stewardship groups in diverse hands on activities, from tree planning to policy development and the creation of governance policy manuals. Two important provincial groups she serves on are the Alberta Water Council as an Alternate Director, and the Alberta Lake Management Society as Director. Regionally, she served on the Bow River Basin Council and the Alberta Low Impact Development Partnership for many years, and is currently a Director of the Calgary Region Airshed Zone. Locally, Judy is actively involved in the Cochrane Environmental Action Committee and that group's diverse watershed stewardship activities .

R. A. (Bob) Halliday

The State of the Beaver River Watershed

This presentation provides an overview one of the Beaver River Watershed Alliance's current projects, namely the preparation of a state of the watershed report for the Beaver River-Cold Lake watershed in Alberta. As one of the designated major watersheds of Alberta, the Beaver river watershed is unusual in that lies entirely on the boreal plain. It is not sustained in any way by mountain runoff. Other features of the watershed include exceptional recreational lakes as well as significant energy and agricultural operations.



Preparation of the state of the watershed report has led to consideration of indicators of environmental quality related to water quantity, water quality, water use and aquatic resources. These have been identified on a sub-watershed basis, including both lakes and streams of the watershed. The presentation will provide examples of indicators selected and identify information gaps.

Bob is the president of R. Halliday & Associates and has practiced as a consulting engineer in Saskatoon for almost 15 years. His consulting activities have taken him to eight Canadian provinces and a few USA states. He previously worked for Environment Canada and is a former director of Canada's National Hydrology Research Centre. His interests include interjurisdictional water management, floodplain management and effects of climate change on water resources.

He has served on International Joint Commission boards including the Commission's Task Force on Red River flooding, and other Canada-United States water-related entities. He is a former alternate member of the Prairie Provinces Water Board and was a founding member of the Advisory Council for international Project WET – a water education initiative. He has also consulted overseas, primarily in Latin America and China.

Among Bob's more recent projects was the preparation of a state of the basin report for the entire Saskatchewan River basin. More recently he has been preparing a state of the watershed report for the Alberta portion of the Beaver River-Cold Lake watershed for the Beaver River Watershed Association. The report will be released in 2013.



Larry Kuchmak

Developments Along Shore Lands

Larry will discuss the Water Act regulatory requirements for lake shore developments. In his discussion Larry will provide you with an understanding of not only the Water Act, but how other legislation such as the Public Lands Act and federal Fisheries Act apply.

Larry Kuchmak is an engineering technologist and has worked with Alberta Environment and Sustainable Resource Development for many years. Initially Larry worked with Albertans in solving surface water problems and conflicts amongst landowners. For the last 16 years, Larry has been a Water Act surface water approvals coordinator. Larry has also served on numerous committees including the codes of practice review, the Provincial Water Quantity Coordinating Team, and the interministry Joint Technical Working Group to name a few.

Kay Lee Kinch

Development of an Environmental Reserve

Environmental Reserves are the lands set aside when a parcel is subdivided if that parcel includes a water body or natural drainage course. These areas are generally set aside to assist in the protection of the water body and are the responsibility of the local Municipality.

The MD of Bonnyville is in the heart of lake country, a short drive will find you at the shores of a sparkling water body and a beach. With all of these lakes, and plenty of subdivisions, there are numerous Environmental Reserves within county boundaries. Educating the public, and conserving these lands has always been an important role for staff at the county, but with pressure from land use and development, this task has become critical to the health of many of the lakes. The MD of Bonnyville has recently developed, and is currently implementing, bylaws to assist with the governance, and protection, of these very vital areas.



Kay Lee grew up on a farm in the foothills of Alberta and developed a sense of conservation early on as she watched the native land around her become altered. She is a Technical Agrologist in Training with her studies focused in Land and Water resources and a major in Land Reclamation. Kay Lee is currently employed with the MD of Bonnyville and works as their Environmental Coordinator. On a day to day basis she acts as a liaison between government bodies, the municipality and the public in regards to environmental issues and activities. Kay Lee participates on a wide variety of committees including the Beaver River Watershed Alliance, the Moose Lake Watershed Society, the local Airshed and the recently formed Northeast Watershed Team. When she isn't hard at work, Kay Lee can be found fishing, hiking, or playing with her two water loving mutts.



Dwayne Rowlett

Working with Water in Saskatchewan—Subdivision Development

This presentation will review the legislation that guides the development of subdivisions in Saskatchewan to prevent flooding and owner disputes. The presentation will also review the lessons learned during recent flooding events by providing real world examples of failures and describe how it is guiding policy in Saskatchewan.

Dwayne Rowlett, M. Sc, P. Eng, is the Manager of Northern Regional Services for the Saskatchewan Watershed Authority. Mr. Rowlett manages two offices, one located in North Battleford and the other in Nipawin. These offices are primarily responsible for administering the provinces water legislation and providing water management advice to those located in the northern half of Saskatchewan.

Mr. Rowlett has been involved in water management for the past 11 years and has had the opportunity to observe the drought of the early 2000s as well as the flooding conditions that have been experienced over the past 6 years due to above normal precipitation.

Mr. Rowlett has a wife, Betty and three teenage children, Thomas, April and Nicole.

Sandi Riemersma

Taking Transboundary Watershed Management to the Next Level—Locally: Milk River Watershed Case Study

Communication is critical to overcoming transboundary watershed issues in southern Alberta, particularly in the Milk River watershed. This has proven true since 1909 when the Boundary Waters Treaty was written to solve water-sharing disputes between Alberta and Montana. More recently, the IJC established a Task Force to investigate the apportionment of flows between Alberta and Montana, and if not apportioned equally, to determine how the flows could better be apportioned. In 2006, the Task Force Report was filed with the IJC, but no resolution could be found. Alberta and Montana were then asked to collaborate through a Joint Initiative Team made up of government officials and local citizens that could address issues. Through these more informal routes, the Team could share information, ask questions, gain trust and work toward a solution. At the same time, the Milk River Watershed Council Canada focused on local ability and strived to unite jurisdictions toward common watershed goals, from water supply and quality, to groundwater resources and weed management. With the understanding that shared information, knowledge and successes across boundaries are critical to achieving watershed goals, a transboundary Milk River State of the Watershed Report is currently underway.

Sandi graduated from the University of Calgary with a M.Sc. in Environmental Engineering. She worked for the Alberta government as a Water Quality Specialist and as a Resource Planner. In 2005, Sandi started Palliser Environmental Services, undertaking watershed management, research and monitoring. Noteworthy planning projects include the Nose Creek, Jumpingpound Creek and Milk River integrated watershed management plans, and the transboundary Milk River State of the Watershed Report uniting stakeholders from Alberta, Saskatchewan and Montana.



Don Davidson

Himalayan Balsam

The Himalayan Balsam, an invasive ornamental, became abundant along the shoreline at Pigeon Lake about 10 years ago. When it was realized that the plant was a noxious weed, the Pigeon Lake Watershed Association undertook a project to eradicate it from the watershed. This year is the third year of the 5 year eradication program.

A unique protocol was developed to control the weed. Because of its great abundance along the shoreline, bagging the plant would be an impossible undertaking. Also, off-shoreline disposal would cause the spread of the plant to other locations. A simple yet effective method to kill the plant was by using the “pick, break and drop” procedure. The plant is extremely easy to pick by the roots, its hollow stem snaps readily and by dropping it dry ground, the plant quickly dies. The flowers do not progress into the seed stage after picking. This method has been used for three years and has proven to be extremely effective. The greatest advantage of this procedure is ease that the general public can participate without the concern of bagging and disposal – simply pick it and break it and leave the problem on the shore.

Several organizational strategies were tried for the eradication program but the most effective was having one person responsible for the program and the hiring of part time staff to patrol the shorelines on a routine basis to locate and pick the plant. Patrols are required from the first of July until late September to ensure all plants are picked. Financing and budgeting strategies are also discussed.

Don Davidson continued

Don Davidson is a retired engineer who resides at Pigeon Lake. When it became apparent that the Himalayan Balsam weed was invading the shores of Pigeon Lake, he volunteered to lead the program to eradicate the plant from the watershed. For the past three years, he has worked throughout the summer months to educate the residents of the lake about invasive plants and to patrol the shoreline to pick the weed. He has developed the “pick, break and drop” protocol for eliminating the plant in a safe and effective manner. This method ensures that everyone can participate in the eradication program without special equipment or disposal techniques and prevents the unintentional spreading of the plant to other areas.

Don has been raising the concern about the invasion of this plant to other lakes and advises that each watershed association should be vigilant and ready for its arrival. Further information can be obtained by contacting Don Davidson at donald_d @ telus.net



Lauren Bortolotti

Wetland Restoration

More than half of prairie wetlands in North America have been lost to human development, but there is a growing interest in restoring these wetlands because many of the many valuable ecosystem services they provide. In their natural state wetlands are highly biologically productive and diverse systems that provide critical habitat for wildlife, especially waterfowl, perform essential services such as groundwater recharge, erosion control, and water quality improvement, and are important carbon sinks. This may not be the case when these ecosystems are disturbed, so it is important for management and conservation planning to understand whether and how fast wetlands, and the ecosystem services they provide, recover after restoration. This project represents one of the most comprehensive evaluations of wetland restoration to date, simultaneously assessing multi-trophic level biodiversity, ecosystem function (biogeochemical processes), and the relationship between biodiversity and function in these wetlands.



Lauren's diverse past research experience—in fields ranging from cell biology to bird behavior—has helped her shape a clear vision of the contributions she wants to make through her current and any future academic research. She believes strongly in the importance of science-based conservation and management decisions and thinks that, given the projected effects of climate change on the prairies, interest in preserving our watersheds will only continue to grow. She hopes to participate in finding solutions to the challenges that climate change and other anthropogenic stressors pose for the conservation of freshwater systems.

Melissa Orr-Langner

Water Requirements for Household and Agricultural Use

One of the challenges in rural areas is managing water for agricultural and household use. Often, little thought is given into planning a water system, and many people do not realize how much water is required for various uses on their farms. Aspects to consider include: water sources that are available, the quantity that these sources are able to produce, the quality produced from these sources, and the needs of your home and farming operation.

On many farms, there are limitations of the water source due to quantity, quality, or both. Some may have more than enough to supply their need, but the quality is unsuitable. Others may have a good quality source, but they often find themselves in times of shortage. Knowing these limitations and understanding your requirements are key to managing and allocating water on your farm.



Melissa Orr-Langner is an Agricultural Water Engineer with Alberta Agriculture and Rural Development. She graduated from the U of S in 2003 with a degree in Agricultural and Bioresource Engineering, and has been with the department since 2006. Melissa's role as a water specialist is to provide technical expertise to agricultural producers, non-profit groups and other organizations on the areas of water supply, quality, treatment and management. Melissa was raised on a mixed farm near Kelsey, AB, and has a keen interest in assisting farmers and rural landowners develop, protect and manage their water supplies.



Kellie Nichiporik

Dr. Bill Donahue

Groundwater Risks Imposed by In Situ Oil Sands Development

The rapid rate of approvals and construction of in situ oil sands operations in Alberta seems to have outpaced the Government of Alberta's development of legislative and regulatory controls to protect groundwater resources that are critical to sustaining healthy rivers, lakes, and wetlands. Several aspects of in situ oil sands development and its growing dependence on groundwater in north-central Alberta pose substantial risks to regional groundwater resources:

- surface land disturbances and unsealed wells that increase the potential for groundwater contamination;
- unquantified groundwater supplies that complicate the ability of in situ oil sands projects to meet their approval obligations to rely on groundwater for steam production;
- buried groundwater channels that permit vertical and horizontal movement of contaminants from in situ oil sands operations;
- and shallow aquifers that are particularly susceptible to harm and play an important role in recharging regional lakes, rivers, and streams.

The continued failure to assess or consider risks to groundwater associated with in situ oil sands developments will have far reaching consequences. Therefore, it is prudent that Alberta develop a clear understanding of groundwater quality, quantity and dynamics, the cumulative effects of regional development on groundwater and surface water resources, and the sustainable limits for groundwater extraction, if our goal is to sustainably manage our waters and avoid substantial costs of attempting to deal with problems after they arise .



Brent Welsh

Uranium in the Beaver River Watershed

Brent Welsh is a district hydrogeologist with Alberta Environment and Sustainable Resource Development's Northern Region, where he has worked since 2007. In this role, Brent is responsible for reviewing groundwater licence applications and annual surveillance monitoring reports for industrial facilities. Most of the sites Brent is involved in regulating are in the Cold Lake-Beaver River Basin, which is where he grew up. Since working at Alberta Environment and Sustainable Resource Development Brent has developed a keen interest in metals in groundwater and groundwater-surface water interactions. Prior to working for the Government of Alberta, after receiving his Civil Engineering degree from the University of Alberta in

2005, he was a consultant with Omni-McCann, installing water wells for municipal clients and sampling groundwater at landfills. In his spare time, Brent is currently working on a Master's degree in Hydrogeology through the University of Waterloo. Brent enjoys canoeing and cross country skiing, sports that both rely heavily on water.



Thursday September 27 th		
7:00 – 10:00 PM	Opening Prayer, Wine and Cheese Reception and Keynote Speaker Dr. Rolf Vinebrooke, University of Alberta Past, Present and Future Effects of Eutrophication on Prairie Lakes and Ponds	
Friday September 28 th		
7:00 AM – 8:15 AM	Registration and Breakfast	
8:15 AM – 8:30 AM	Greetings	
Water Usage and Management 8:30 AM – 10:00 AM		
8:30 AM	Household and Agricultural Water Allocation. (Melissa Orr-Langner, ARD)	
9:00 AM	Saline Water Source for Steam Injection (Jen Russel-Houston, Osum)	
9:30 AM	In-situ Operations (Kathleen Zellweger, Shell)	
Networking Break		
Planning for Healthy Watersheds 10:30 AM – 12:00 PM		
10:30 AM	Transboundary Watershed Management (Sandi Riemersma, Palliser Environmental)	
11:00 AM	Beaver River Watershed Alliance State of the Watershed (Robert Halliday)	
11:30 AM	Working with Water in Saskatchewan (Dwayne Rowlett, Sask. Watershed Authority)	
Lunch and First Nations Perspective		
Concurrent Sessions 1:30 PM – 3:00 PM		
	Scouting out the Issues	Shoreline Development
1:30 PM	Long Term Water Quality Monitoring in the BRW (Richard Casey)	Critically Assessing Lakeshore Development Proposals: Pointers for Lake Stewards (Judy Stewart, ALMS)
2:00 PM	Developments Along Shore Lands (Larry Kuchmak, AESRD)	Riparian Aerial Video Assessments (George Walker, Walker Environmental)
2:30 PM	Dealing with Invasive Plants (Nicole Kimmel, ARD Weed Specialist)	Development of Environmental Reserve Bylaws (Kay Lee Kinch, MD of Bonnyville)
Break		

Friday September 28th		
ALMS AGM 3:15 PM – 4:30 PM		
3:15 PM	Wetland Restoration (Lauren Bortolotti, University of Alberta)	
3:45 PM	AGM	
4:15 PM	ALMS Elections	
Break		
Banquet 6:30 PM – 10:30 PM		
6:30 PM – 7:30 PM	Banquet	
7:30 PM – 8:30 PM	<u>Keynote Speaker:</u> Dr. Hamid R. Habibi, University of Calgary Dangers of Chemicals in Alberta's Rivers	
8:30 PM – 10:30 PM	Cash Bar and Live Entertainment featuring	
Saturday September 29th		
8:00 AM – 9:00 AM	Breakfast	
Facing and Dealing with Water Quality Issues 9:00-11:30 AM		
9:00 AM	Uranium in the Beaver River Watershed (Brent Welsh, AESRD)	
9:30 AM	Exploring Rapid Early Detection of Harmful Versus Benign Algal Blooms in Alberta (Dr. Mark Graham, University of Alberta)	
10:00 AM	Groundwater Risks Imposed by In Situ Oil Sands Development (Dr. Bill Donahue, Water Matters)	
10:30 AM	<u>Keynote Speaker:</u> Dr. William Shotyk, University of Alberta Removal of Arsenic from Surface Waters by Natural Wetlands	
Break		
Field Tours 12:00 PM – 3:30 PM		
Stop One	Jessie Lake Himalayan Balsam Site	Wood Creek Resort at Moose Lake and Lunch
Stop Two	Wood Creek Resort at Moose Lake and Lunch	Jessie Lake Himalayan Balsam Site



NOTES:



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19TH ANNUAL WORKSHOP

Water: where we live, work and play.

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**COME AND JOIN US AT TAPS TO SHARE
ABOUT ISSUES, CONCERNS AND SUCCESS
STORIES IN YOUR WATERSHED.**

SATURDAY SEPTEMBER 28TH AT 5:00 PM



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