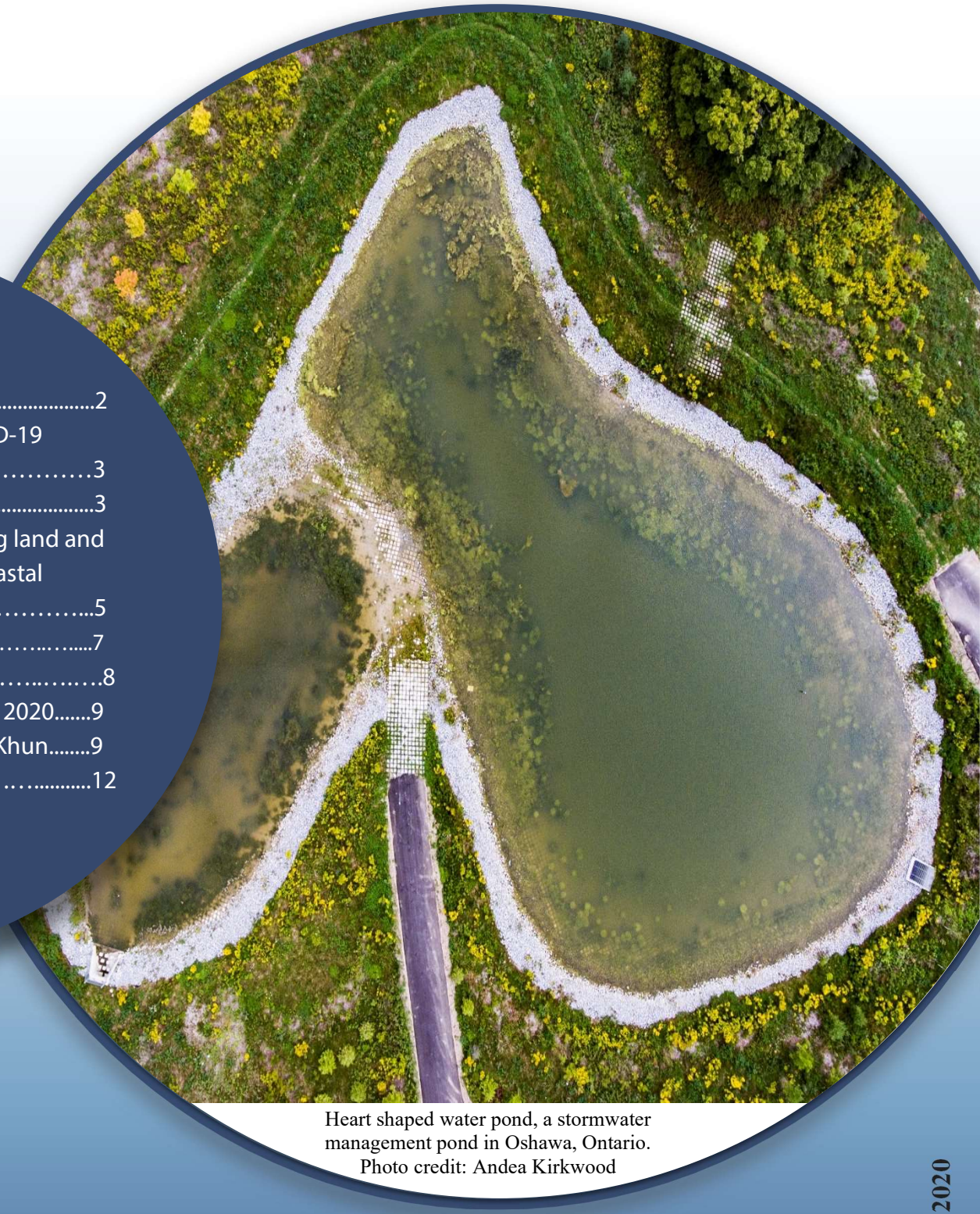
THECURRENT

Society of Canadian Limnologists | Société canadienne de Limnologie

Newsletter of the Society of Canadian Limnologists



Heart shaped water pond, a stormwater management pond in Oshawa, Ontario. Photo credit: Andea Kirkwood

In this issue:

& much more!

Facebook • Webpage • Twitter

ISSUE 17, July 2020

Message from the president

Björn Wissel, President

First of all I hope that you and your family and friends are safe and healthy. The past several months have been trying for all of us, and my particular thoughts go out to those who have been most severely impacted: victims and patients of COVID-19 and their families, healthcare and other essential workers, people who lost their livelihood, and those whose lives are further impacted by limited access to vital services such as clean water and health care. As a Professional Society, we are not in the position to change these primary impacts of the pandemic. Instead, SCL has been focusing on helping students, researchers and professionals in aquatic science to better cope with the strict and sudden limitations on laboratory and field work that were implemented across the country. With travel, field/lab research pretty much shut down, this might be a good time to focus on synthesis work. Many senior researchers have existing data sets that need to be analyzed and graduate student / PDF projects based on such existing data sets could be a way to help out those students/PDF whose projects are stranded now. SCL promoted an already existing web-based data-student/post-doc matching website (https://otlet.io/coivd19-resources), and we encourage our members to broadly participate. Once research and sampling programs will become active again, it will be critical to document the potential environmental impacts of COVID-19-related changes in industrial and transportation intensity on aquatic systems. In this regard, SCL teamed up with SIL and created a website that gathers information on pre vs. post-COVID-19 sampling programs worldwide (https://forms.gle/b9ZsGLhRfGnd6LFC8). So far, 16 programs participated representing eight countries on three continents). SCL also offered free 2020 student and ECR membership to enable and increase engagement of young aquatic scientists during this critical time. With over 75 new members taking advantage of this offer, SCL had now the highest number of student members in its history. We are truly excited about this overwhelming response and are looking forward to working with everyone. Links to the above initiatives and many other COVID-19 related activities and resources is provided at http://socanlimnol.ca/covid-19/.

Together with our colleagues and friends at CCFFR (Canadian Conference for Fisheries Research) we continued to explore the possibility of creating a joint, larger and more impactful Society that would create a home to scientist and professionals from all aquatic disciplines across Canada. As you know, we recently distributed a brief survey asking for your feedback in regard to a potential merger of SCL and CCFFR. We encourage you to make your voice heard and participate, so that we can engage accordingly with CCFFR based on a strong mandate.

I do hope that common sense will prevail so that we can continue to "flatten the curve" here in Canada and across the globe. Nevertheless, while the "new normal" keeps evolving it is unlikely that we will be able to get together anytime soon with friends and colleagues outside of our "bubbles". As many of us are still working from home and universities are teaching remotely, the upcoming 2021 SCL/CCFFR meeting will most likely go virtual as well. We are just at the beginning of our discussion with CCFFR about timing, format and specifics of the conference, but we will keep you informed about any developments.

Until then stay safe, sane and healthy (and 2 m apart)!

SCL Response to the COVID-19 Pandemic

By Andrea Kirkwood, Cécilia Barouillet and François Guillemette

It goes without saying that 2020 has been an unprecedented year for big changes and impacts to our limnological community. On top of coping with the very real health concerns posed by the SARS-CoV-2 virus, the COVID-19 pandemic has altered our ability to conduct our lab and field work, as well as engage with one another face to face. In response to these challenges, SCL has created a webpage that is devoted to resources and opportunities for our members during the COVID-19 pandemic. Information includes links to research opportunities, online educational resources, professional development and training webinars and websites. For links to these resources, please visit our website:
http://socanlimnol.ca/covid-19/

Society Updates

New board members

By Andrea Kirkwood

At the 2020 SCL business meeting in Halifax, two new members were elected to the executive committee: Andrea Kirkwood (Communications – Anglophone) and Matt Bogard (Early Career Researcher). Short biographies for Andrea and Matt are provided below.

Andrea Kirkwood is an Associate Professor of Environmental Biology at Ontario Tech University in Oshawa, Ontario. Andrea's limnology training began at Kennisis Lake, where she spent the summers of her childhood. After grad and postdoctoral studies spanning lakes, rivers, salt flats, and wastewater lagoons, Andrea's research program continues to be very diversified, with the addition of wetlands and stormwater ponds. Please visit Andrea's lab website for more details:
https://kirkwoodlab.weebly.com/

Warm congratulations to our newly elected board members!

Matt Bogard is the Early Career Researcher (ECR) rep. on the SCL board. He is the Canada Research Chair of Aquatic Environments at the University of Lethbridge. His research focuses on understanding biogeochemical processes in inland and coastal environments. Matt began his career in aquatic science as a B.Sc. summer student at the University of Saskatchewan and completed M.Sc. and Ph.D. degrees at the University of Regina, and Université du Québec à Montréal, respectively. Prior to moving to Lethbridge, he was a postdoctoral scientist at the University of Washington in Seattle. As ECR rep., Matt is focused on advocating for ECR opportunities within the SCL community. More on Matt's past and current work can be found at www.bogardlab.com.

Inaugural SCL Service Award - Mike Rennie

By Björn Wissel

The SCL Executive Committee decided to create a new *Service Award* to recognize significant and long-term contributions to our society. The inaugural recipient is Dr. Michael Rennie (Research Chair in Freshwater Ecology and Fisheries at Lakehead University). Mike was SCL Communications Officer from 2011 until 2019 and his dedicated and upbeat efforts to keep our members informed via messages and our website have coined the face of SCL for many years. Even though he recently stepped away from his official duties, we still keep relying on his advice and thoughts moving forward. We wish Mike all the best with his ongoing research, teaching and other responsibilities!

Update on EDI (Equity, Diversity and Inclusion)

By Cécilia Barouillet

Last January, during our annual scientific meeting, CCFFR and SCL announced the creation of a joined CCFFR-SCL EDI committee. Our goal is to foster a safe environment and strengthen the scientific community within CCFFR and SCL through greater equity, diversity and inclusion. The EDI committee aims to promote and undertake concrete actions to ensure that EDI is achieved within the societies. The ultimate goal is to eliminate systemic barriers and mitigate bias that could impede career advancements and/or one's integration into the societies.

Why is it important: A diverse and inclusive workforce in science brings about i) competitive advantages and innovation; and ii) new knowledge, skills, and experiences for understanding complex problems involving the science and management of natural resources.

Draft of our plan of action:

1. Gather data on the demographics of participants and presenters at the conference.
2. Create a code of conduct to set expectation for appropriate behavior (e.g. inclusive and respectful of all people and ensures equitably treatment of individuals) during the conference, at the venue and off site. Put in place a plan of action to facilitate notification of inappropriate behavior during the conference.
3. Encourage the promotion of symposia dedicated to Indigenous ways of knowing, including co-designed and co-produced research.
4. Target potential funding resources for future conferences to provide accessible and appropriate resources for participants, such as interpreters, onsite

childcare, family rooms, nursing rooms, etc…

5. Use pronoun-specific name tags: she/her, he/him, they/them etc. and explain why it is important. This was already put it in place for this year by the co-chairs of the conference, it was a great initiative on their part, thanks a lot to both of them. Our job as the EDI committee will be to make sure that this is done at every conference from now on.
6. Send out a survey after the conference to assess whether equity and inclusion goals were met during the conference and what steps can be taken to improve EDI at the conference?
7. The committee will also support the scientific community throughout the year to facilitate and implement EDI initiatives beyond the conference by facilitating the access to tools and resources.

We are happy to hear from our members about their idea on what should be done to improve EDI within our society!

#BlackLivesMatter

For SCL and CCFFR, Black Lives Matter (BLM), and it was important to show our support for the current BLM movement! This is why we took a step forward and wrote a joined statement on the importance of #BlackLivesMatter, this statement is now available on our website http://socanlimnol.ca/scl-news/

Meet our committee:

Cécilia Barouillet (SCL co-chair of the EDI committee)
Chrisitina Semeniuk (CCFFR co-chair of the EDI committee)
Margaret Docker - CCFFR
Britt Hall - SCL
Andrea Kirkwood - SCL
Sarah Lehnert - CCFFR
Charles Ramcharan – SCL
Karly Roberts – CCFFR
Matt Guzzo – CCFFR

Some Definitions:

Diversity involves the recognition of the visible and invisible physical and social characteristics that make an individual or group of individuals different from one another.

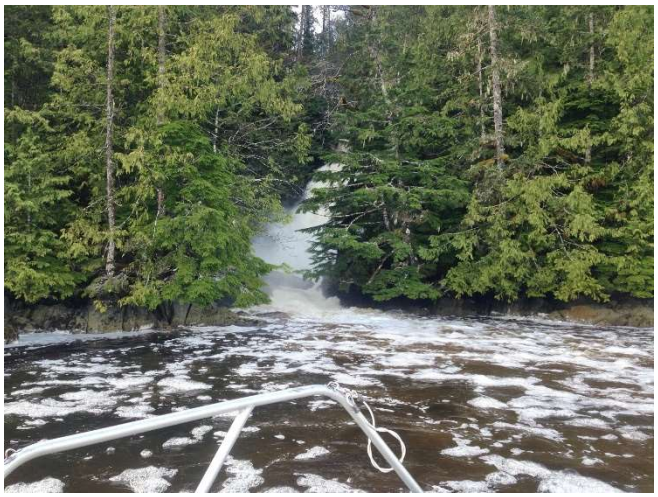
Equity refers to the enactment of specific policies and practices that ensure equitable access and opportunities for success for everyone

Inclusion involves bringing together and harnessing diverse forces and resources, in a way that is beneficial.

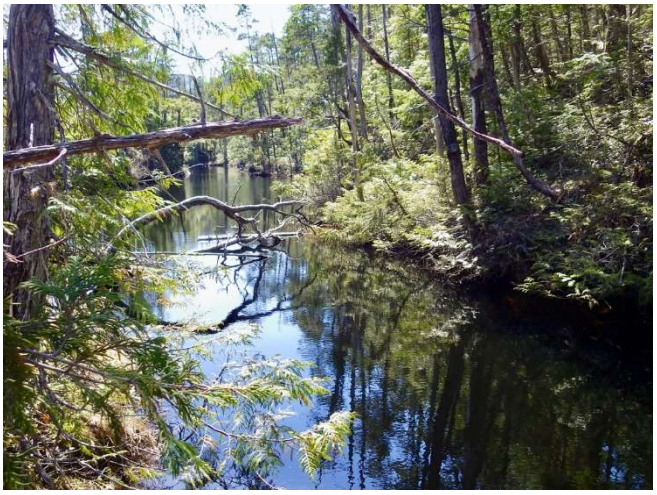
Research Highlight: Linking land and sea in the North Pacific Coastal Temperate Rainforests

By Kyra St. Pierre (University of British Columbia & Hakai Institute)

The North Pacific Coastal Temperate Rainforest (NPCTR) region extends from southeast Alaska to northern California. Watersheds within the NPCTR are characterized by extensive wetlands and many lakes, and range from small, low elevation rain-dominated systems to larger, high elevation watersheds with both snow and glacial melt contributions. Receiving more than 2000 mm of precipitation per year,



Stream discharge to coastal waters following a summertime rainfall event. High rainfall and large freshwater exports to nearshore waters are a defining feature of the wet autumn and winter months. Photo credit: Allison A. Oliver.



Stream draining one of the Calvert Island focal watersheds during the drier spring-summer months. Photo credit: Kyra St. Pierre

the one thing that unites watersheds of the NPCTR is that they export a lot of freshwater to coastal waters of the Northeast Pacific Ocean. So much freshwater is discharged in this region that the rivers and streams collectively generate a current that moves northwards along the North American continent, coined the "Riverine Coastal Domain". While the importance of freshwaters to coastal environments is recognized, fresh and marine waters are still rarely examined in tandem, thus limiting the conclusions that can be drawn about the connectivity between and impact of freshwaters on marine ecosystems.

Since 2013, the Hakai Institute has been conducting monthly paired freshwater and marine water quality surveys, producing a unique time series of water quality (carbon, nutrients, temperature, salinity) across the land-ocean interface at the Hakai Coastal Margin Critical Zone Observatory (Hakai CZO) on Calvert and Hecate Islands (51.7°N, 128.0°W). The Hakai CZO, which consists of seven gauged focal watersheds, and several marine stations at varying distances from the shoreline, is located at the heart of the NPCTR, along British Columbia's Central Coast. The goal of the Hakai CZO is to understand the origins, pathways, processes and food web consequences of the flux of terrestrial materials from land to sea, work conducted in collaboration between researchers at the Hakai Institute, University of British Columbia, Simon Fraser University, University of Alberta and B.C. Ministry of Forests, Lands and Natural Resource Operations.

Recent work from Calvert Island has revealed it to be a global hotspot of freshwater dissolved organic carbon fluxes, which originate from the organic-rich soils that underlie the forests of the region, to nearshore waters (Oliver et al. 2017, Biogeosci.). Freshwater fluxes are highest in autumn and winter, while upwelling-driven marine primary production is highest in spring and summer. These distinct freshwater and marine seasonalities translate to nearshore waters that oscillate between being much more terrestrial in nature (based on organic carbon stable isotopes) between October and February, and more marine

between March through September (St. Pierre & Oliver et al. 2020 Limnol. Oceanogr.). Summertime storms, though, can act to recall the connection between land and sea during periods of otherwise low connectivity and can favour short term increases in the microbial populations capable of consuming terrestrial materials in nearshore surface waters. Using a five year time series (2014-2018), current research within the Hakai CZO is examining patterns in freshwater nutrient exports and stoichiometry on interannual, seasonal and individual storm time scales and relating these to nutrient concentrations, stoichiometry and productivity in marine waters. One thing is for certain: what happens within watersheds doesn't stay in watersheds, and can have far-reaching consequences beyond watershed boundaries.

Members Update

Josh Kurek, an Assistant Professor at Mount Allison University received funding in 2020 from New Brunswick Wildlife Trust Fund to investigate legacy contaminants in brook trout from remote, headwater NB lakes. This 1-yr project builds off of recent findings in Kurek et al. (2019) where we demonstrated massive shifts in aquatic food webs due to legacy DDT use in the mid-20th century. Some of the highest sediment levels of DDTs in North America were observed at several of our study lakes. Field work has been challenging given COVID guidelines, very cold spring out east (still some snow in northern forests into late May), and recently all provincial crown lands closed due to extreme fire danger. Nonetheless, we continue to do our best to meet these challenges and have been further supported by staff at NB Natural Resources and Energy Development (NRED) and also collaborator Karen Kidd.

Peter Leavitt selected as Fellow of the Royal Society of Biology (UK).

In the News

Starry stonewort is making its aggressive presence known in Peterborough-area lakes. (https://www.thepeterboroughexaminer.com/opinion/columnists/2020/07/03/drew-monkman-starry-stonewort-is-making-its-aggressive-presence-known-in-peterborough-area-lakes.html)

Ghost fleas' bring toxic mercury up from the depths of prairie lakes. (https://www.sciencemag.org/news/2020/07/ghost-fleas-bring-toxic-mercury-depths-prairie-lakes)

U of R study says south Sask. water toxicity rising due to algae, global warming, farm run-off. (https://leaderpost.com/news/saskatchewan/u-of-r-study-says-south-sask-water-toxicity-rising-due-to-algae-global-warming-farm-run-off)

Toxic algae levels appearing in Sask. lakes, U of R researchers say (https://regina.ctvnews.ca/toxic-algae-levels-appearing-in-sask-lakes-u-of-r-researchers-say-1.4992878)

Award Nominations

Frank Rigler Award

By Jérôme Comte

The Frank Rigler Award is the highest honour given by the Society of Canadian Limnologists. It was first presented in 1984 to recognize and honor major achievements inthe field of limnology by Canadians or those working in Canada. Emphasis in selection is given to established aquatic scientists with a proven record of contribution to the field of aquatic sciences, whose work is widely recognized for its influence and importance. The winner of this award must give an overview on their research during the plenary session of the annual meeting of SCL/CCFFR, and will receive complimentary registration at the meeting and a one-year membership with the Society.

A nomination for the Frank Rigler Award shall consist of: 1. A cover letter, not to exceed two pages describing clearly how the nominee has made a lasting contribution to the field of limnology, either as a Canadian citizen abroad or to the field of limnology in Canada. The cover letter must also confirm the nominee's commitment to attend the upcoming society meeting and, if selected, present the Rigler lecture. 2. A CV covering the applicant's full scientific career that highlights employment history, publication record, funding held, contributions to training of students, invited lectures and contributions to public outreach, honours and prizes, and journal editorships and reviewing. Nominations should be sent to jerome.comte@inrs.ca by August 31st. Details about the award can be found here: http://socanlimnol.ca/awards/frank-h-rigler/

Robert Peters Award

By Kerry Finlay

The Rob Peters Award is given by SCL each year to recognize the best aquatic sciences paper published in the preceding year by a Canadian student or a student working in Canada. Students need not be SCL members to be nominated. The award is valued at $500 and a free 1-year membership in the society. The awardee will present his/her paper at the upcoming virtual SCL meeting in Jan 2021!

Please consider nominating your published students for a Rob Peters Award! The nomination consists of a submission of the paper, typically from the student's supervisor. Nominations may be accompanied by a one-page cover letter outlining the quality, importance and impact of the paper.

Nomination packages should be sent to kerri.finlay@uregina.ca by August 31st, 2020. Details about the award can be found here: http://socanlimnol.ca/awards/robert-peters-award/#instructions

For details on how to apply, visit our website at http://socanlimnol.ca/awards/

Deadline: August 31st 2020

SCL Conference Round-up 2020

By Andrea Kirkwood

As a society, we were very fortunate to have had our 2020 conference in person back in early January of this year. Halifax proved to be a warm and inviting venue, even with the occasional snow flurry outside. Local hosts Trevor Avery and Laura Weir picked a conference venue in downtown Halifax that was close to all the amenities, including places for libations and live music. Frank Rigler Award winner Brian Cumming presented an overview of his research program, including studies from Osoyoos Lake and the Adirondack lakes. The SCL business meeting involved the election of two new executive members (Andrea Kirkwood, Communications (anglophone) and Matt Bogard (Early-Career Researcher). The bulk of the meeting involved a fulsome discussion on the proposed merger of CCFFR and SCL to form one aquatic-science society. It was agreed that feedback from the SCL membership was necessary, and that a survey would need to be sent out this year to accrue the views of members. The survey was deployed to the membership on June 30th, 2020, of which the results will be shared with society members later this year.

For further details on the conference, check out the hashtag #CCFFRSCL2020 on Twitter, and you will see the excellent array of student-driven limnology research being conducted across Canada.

List of 2020 conferences

July 28-31	**Animal Behavior Society** (Virtual Meeting). Link: https://www.animalbehaviorsociety.org/2020-virtual/index.php
July 29-30	**Phycological Society of America** (Virtual Meeting). Link: https://www.psaalgae.org/news/2020/6/23/psa-2020-virtual-meeting-july-29-30
Aug. 3-6	**Ecological Society of America** (Virtual Meeting). Link: https://eco.confex.com/eco/2020/meetingapp.cgi/Home/0
Aug. 30-Sept. 3	**American Fisheries Society** (Virtual Meeting). Link: https://afsannualmeeting.fisheries.org/
Oct. 19-23	**Global Lake Ecological Observatory Network (GLEON 21.5)** (Virtual Meeting). Link: https://gleon.org/meetings/gleon21.5/main
Oct. 26-30	**Geological Society of America** (Virtual Meeting). Link: https://community.geosociety.org/gsa2020/home
Nov. 15-19	**Society of Environmental Toxicology and Chemistry – North America**, Forth Worth, Texas, USA. Link: https://fortworth.setac.org/
Nov. 16-20	**North American Lake Management Society** (Virtual Meeting). Abstracts being accepted until July 31, 2020. Link: https://www.nalms.org/nalms2020/
Dec. 7-11	**American Geophysical Union**, San Francisco, California, USA. Link: https://www.agu.org/Fall-Meeting

Student Spotlight

Interview by Kristen Coleman

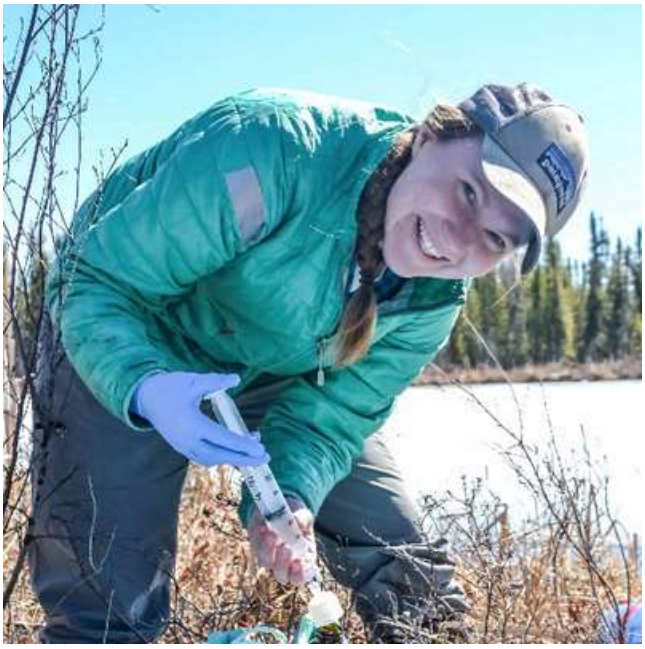
Kenzie Khun began her post-secondary studies at Wheaton College in Massachusetts and graduated with a Bachelor of Arts in Environmental Science. She spent 3 months in northeast Russia as a Research Assistant on The Polaris Project (http://www.thepolarisproject.org), looking at dissolved methane, oxygen, and carbon dioxide in tundra ponds. She was also a Fulbright Scholar, and received the opportunity to study greenhouse gas emissions in northern Sweden. She is currently a 4th year PhD candidate at the University of Alberta, studying with Dr. David Olefeldt.

What are your research interests?

In general I study carbon and nutrient cycling in northern ponds/lakes, in particular as it relates to permafrost thaw. My current research is looking at how we can estimate current carbon emissions from ponds in northern Canada, and how we can predict how this will change with climate change and as permafrost thaws.

Any cool results so far?

Yes definitely! We found that as you move from the high Arctic to the Utikuma Region Study Area (URSA) near Slave Lake,Alberta, there is a lot more variability in carbon dioxide and methane emissions, and higher methane emissions in general. We also found that the more southern lakes in Alberta tend to be carbon dioxide sinks, not sources. We believe this is related to increased hydrological connectivity and nutrient delivery to the lakes, leading to high productivity which is reflected in the high Chl a concentrations.



McKenzie "Kenzie" Kuhn
(Ph.D. Candidate) – University of Alberta, ALB

Do you have a favorite project?

I really enjoyed my work in the Abisko region in Sweden. Northern Sweden is beautiful and I enjoyed fostering international collaborations. I examined methane emissions from small ponds in a wetland complex and integrated these emissions into the carbon budget for the wetland complex. We learned that ponds here are an important carbon source https://www.nature.com/articles/s41598-018-27770-x.

What has been your favorite part of research?

A favorite part has been the fieldwork, and in particular developing relationships with First Nations communities and my field teams. We gave a few community presentations in Wrigley, Northwest Territories, and had the opportunity to discuss this research with community leaders. It's been rewarding to foster these relationships, and have the opportunity to work with Land Guardians (https://landneedsguardians.ca/) who come in the field with us and make sure we are crossing their land safely, and also respectfully.

What do you do outside of research? Do you have time for hobbies?

Outside of fieldwork I also enjoy outdoor activities like hiking and kayaking. I also played for the university basketball team during my undergrad and I've been a youth basketball coach during my PhD and I have really enjoyed that.

What are your plans for the future?

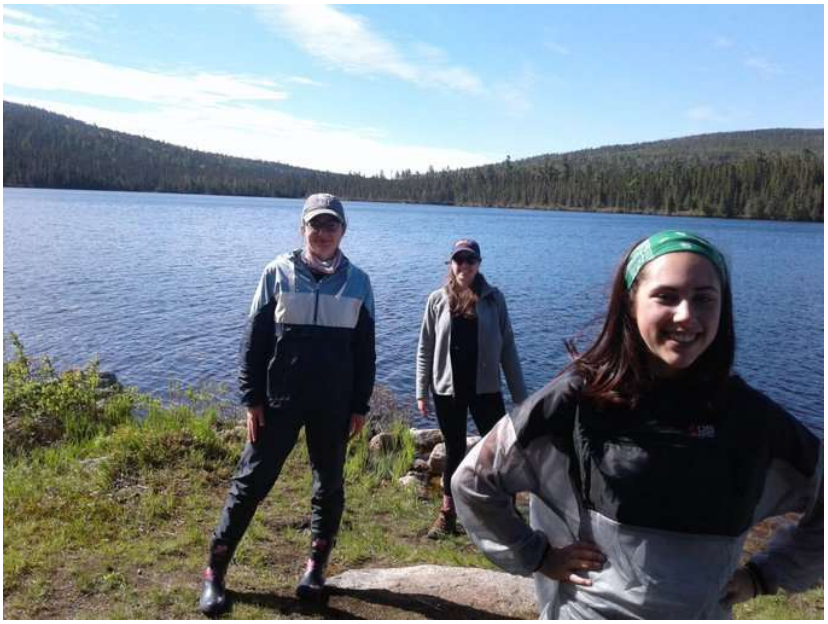
I think I would like to continue in academia, perhaps with a post-doc. I think I would like an academic position that is more focused on teaching, such as at a smaller school with a focus on student-professor relationships. I also sometimes consider other options like government research or NGOs.

Publications

Kuhn, M., Lundin, E.J., Giesler, R., Johansson, M. and Karlsson, J., 2018. Emissions from thaw ponds largely offset the carbon sink of northern permafrost wetlands. Scientific reports, 8(1), pp.1-7. https://www.nature.com/articles/s41598-018-27770-x

Do you want to be our next student spotlight?

If you want to share your research project, send us an email at **comms@socanlimnol.ca**



In photo from back to front: Sarah Waldron UG summer researcher, Meghan Fraser MSc student, Amber Leblanc recent Mount Allison graduate. *Contribution from Josh Kurak (see page 7)*

- • - Recent Citings - • -

This section highlights some of the current work of our members. If you have a recent (past 6-12 months) contribution to the peer-reviewed literature that you'd like to share with the society, please e-mail it to comms@socanlimnol.ca!

1. Abirhire, O., J. M. Davies, X. Guo and J. Hudson. 2020. Understanding the factors associated with long-term reconstructed turbidity in Lake Diefenbaker from Landsat-imagery. Science of the Total Environment. https://doi.org/10.1016/j.scitotenv.2020.138222)
2. Arnott, S.E., M.P. Celis-Salgado, R. Valleau, A. DeSellas, A. Paterson, N. Yan, J.P. Smol, J. Rusak. 2020. Road salt impacts freshwater zooplankton at concentrations below current water quality guidelines. Environmental Science and Technology. (in press).
3. Bagnoud, A., H. Peter, P. Pramatefaki, M.J. Bogard, T. Battin. 2020. Microbial ecology of methanotrophy in streams along a gradient of CH4 availability. Frontiers in Microbiology. 11:771.
4. Baustian, M.M., Y. Brooks, M. Baskaran, P.R. Leavitt, B. Liu, N. Ostrom, R.J. Stevenson, and J. Rose. 2020. Paleo-environmental evidence of ecosystem change in Lake St. Clair region of Laurentian Great Lakes basin: Contrasting responses to land-use change and invasive mussels. J. Paleolimnol. 63: 177–193. doi.org/10.1007/s10933-019-00108-x.
5. Bogard, M., R.J. Vogt, N. Hayes, G. Simpson, P.R. Leavitt. 2020. Unabated nitrogen pollution favors growth of toxic cyanobacteria over chlorophytes in most hypereutrophic lakes. Environmental Science & Technology. 54: 3219-3227.
6. Bogard, M.J., B. Bergamaschi, D.E. Butman, F. Anderson, S. Knox, L. Windham-Myers. 2020. Hydrologic export is a major component of coastal wetland carbon budgets. Global Biogeochemical Cycles. In press.
7. Bogard, M.J., D.E. Butman, P.A. del Giorgio. 2020. Comment on "On the calculation of lake metabolic rates: Diel O2 and 18/16O technique" by Peeters et al. [Water Res. 165 2019, 114990]. Water Research. 115772.
8. Bogard, M.J., N.F. St. Gelais, D. Vachon, and P.A. del Giorgio. 2020. Patterns of spring/summer open-water metabolism across boreal lakes. Ecosystems. In press.
9. Bogard, M.J., R.J. Vogt, N.M. Hayes, and P.R. Leavitt. 2020. Unabated nitrogen pollution favours growth of toxic cyanobacteria over chlorophytes in most hypereutrophic lakes. Environ. Sci. Technol. 54: 3219-3227. doi.org/10.1021/acs.est.9b06299
10. Carey, J. C., J. Gewirtzman, S. E. Johnston, A. Kurtz, J. Tang, A. M. Vieillard, and R. G. M. Spencer. 2020. Arctic River Dissolved and Biogenic Silicon Exports—Current Conditions and Future Changes With Warming. Global Biogeochemical Cycles 34: e2019GB006308.
11. Elmslie, B.G., C.A.C. Gushulak, M.P. Boreux, S.F. Lamoureux, P.R. Leavitt, and B.F. Cumming. 2020. Complex responses of phototrophic communities to climate warming during the Holocene of northeastern Ontario, Canada. Holocene 30: 272-288. doi.org/10.1177/ 0959683619883014.

12. Ewing, H.A., K.C. Weathers, K.L. Cottingham, P.R. Leavitt, M.L. Greer, C.C. Carey, B.G. Steele, A.U. Fiorillo, and J.P. Sowles. 2020. "New" cyanobacterial blooms are not new: Two centuries of lake production are related to ice cover and land use. Ecosphere. e03170. doi.org/10.1002/ecs2.3170
13. Gauthier, J., I. Gregory-Eaves, L. Bunting, P.R. Leavitt, T. Tran, L. Godbout, B.P. Finney, D.E. Schindler, G. Chen, G. Holtgrieve, M. Shapley, and D.T. Selbie. 2020. Ecological dynamics of a peri-urban lake: A multi-proxy paleolimnological study of Cultus Lake (British Columbia) over the past ~200 years. J. Paleolimnol. In press.
14. Haig, H.A., and P.R. Leavitt. 2019. The Qu'Appelle long-term ecological research program: A 26-yr hierarchical platform to study freshwater ecosystems of the northern Great Plains. Limnol. Oceanogr. Bull. 28: 99-103. doi.org/10.1002/lob.10337.
15. Hall R.I., B.B. Wolfe, J.A. Wiklund. 2019. Discussion of "Frequency of ice-jam flooding of Peace-Athabasca Delta" (Beltaos S. Can. J. Civ. Eng. 45: 71-75; 2018). Canadian Journal of Civil Engineering 46: 236-238. dx.doi.org/10.1139/cjce-2018-0407
16. Hall, B.D., T. Cobb, M.D. Graham, R. H. Hesslein, K.A. Kidd, R. J. Vogt and P.R. Leavitt. 2020. Mercury elevator in lakes: A novel vector of methylmercury transfer to fish via migratory invertebrates. Environ. Sci. Technol. Lett. doi.org/10.1021/acs.estlett.0c00446.
17. Harrow-Lyle, T.J. and Kirkwood, A.E. 2020. The invasive macrophyte *Nitellopsis obtusa* may facilitate the invasive mussel *Dreissena polymorpha* and *Microcystis* blooms in a large, shallow lake. Canadian Journal of Fisheries and Aquatic Sciences https://doi.org/10.1139/cjfas-2019-0337
18. Hayes, N.M., H.A. Haig, G.L. Simpson, and P.R. Leavitt. 2020. Local and regional effects of lake warming on risk of toxic algal exposure. Limnol. Oceanogr. Lett. doi.org/10.1002/lol2.10164.
19. Johnston, S.E.*, R. Striegl, M.J. Bogard, M. Dornblaser, D. Butman, A. Kellerman, K. Wickland, D. Podgorski, R. Spencer. 2020. Hydrologic connectivity determines dissolved organic matter biogeochemistry in northern high-latitude lakes. Limnology & Oceanography. In press.
20. Kay, M.L., J.A. Wiklund, C.R. Remmer, K. Brown, E. MacDonald, L.K. Neary, K. Thomson, J.M. Vucic, K. Wesenberg, R.I. Hall, B.B. Wolfe. 2019. Bi-directional hydrological changes in perched basins of the Athabasca Delta (Canada) in recent decades caused by natural processes. Environmental Research Communications 1: 08 11001. https://doi.org/10.1088/2515-7620/ab37e7.
21. Kay, M.L., J.A. Wiklund, C.R. Remmer, T.J. Owca, W.H. Klemt, L.K. Neary, K.C. Brown, E. MacDonald, K. Thomson, J.M. Vucic, K. Wesenberg, R.I. Hall, B.B. Wolfe. 2020. Evaluating temporal patterns of metals concentrations in floodplain lakes of the Athabasca Delta (Canada) relative to pre-industrial baselines. Science of the Total Environment 704: 135309. https://doi.org/10.1016/j.scitotenv.2019.135309.
22. Klemt, W.H., M.L. Kay, J. A. Wiklund, B.B. Wolfe, R.I. Hall. 2020. Assessment of vanadium and nickel enrichment in Lower Athabasca River floodplain lake sediment within the Athabasca Oil Sands Region (Canada). Environmental Pollution 265, Part A: 114920. https://doi.org/10.1016/j.envpol.2020.114920.

23. Korovchinsky, Nikolai M. and S.E. Arnott 2019. Taxonomic resolution of the North American invasive species of the genus Bythotrephes Leydig, 1860 (Crustacea: Cladocera: Cercopagididae). Zootaxa 4691 (2): 125–138.
24. Kuhn, C., M.J. Bogard, S.E. Johnston, A. John, E. Vermote, M. Dornblaser, K. Wickland, R. Spencer, R. Striegl, D. Butman. 2020. Primary productivity observed in remote boreal lakes from space and in situ measurements. Environmental Research Letters. In press.
25. Leavitt, P.R. 2020. Don't stressor the small stuff. Nature Ecol. Evol. 4: doi.org/10.1038/s41559-020-1227-1
26. Leiva-Dueñas, C., P.R. Leavitt, T. Buchaca, A. Martínez Cortizas, L. López-Merino, O. Serrano, P.S. Lavery, S. Schouten, and M.A. Mateo. 2020. Factors regulating primary producer assemblages in Posidonia oceanica ecosystems over the past 1800 years. Sci. Total Environ. 718: 137163. doi.org/10.1016/j.scitotenv.2020.137163
27. McGowan, S., P.R. Leavitt, T. Barker, and B. Moss. 2020. Shallow water phytoplankton responses to nitrate and salinity enrichment may be modified by benthic processes. Inland Wat. 10: 137-151. doi.org/ 10.1080/20442041.2019.1634948.
28. McMeans, B.C., McCann, K.S., Guzzo, M.M., Bartley, T.J., Bieg, C., Blanchfield, P.J., Fernandes, T., Giacomini, H.C., Middel, T., Rennie, M.D. and Ridgway, M.S., 2020. Winter in water: Differential responses and the maintenance of biodiversity. Ecology Letters, 23(6), pp.922-938. https://onlinelibrary.wiley.com/doi/abs/10.1111/ele.13504
29. Mushet, G.R., K.R. Laird, P.R. Leavitt, S. Maricle, A. Klassen, A. Rahi, and B.F. Cumming. 2020. Bottom-up forces drive historical increases in the abundance of large daphniids in four small lakes stocked with rainbow trout (Oncorhynchus mykiss), interior British Columbia, Canada. Ecosystems. doi.org/ 10.1007/s10021-019-00443-0
30. Nanayakkara, L., E. Starks, R. Cooper, P.R Leavitt and B. Wissel. 2020. Resource-use, body condition and parasite load metrics indicate contrasting health of stocked and native game fishes in Canadian prairie lakes. Fisheries Manage Ecol., doi.org/10.1111/fme.12447
31. Nürnberg, G.K., 2020. Internal phosphorus loading models: A critical review. In 'A.D. Steinman and B.M. Spears (Eds.), Internal Phosphorus Loading: Causes, Case Studies, and Management'. Chapter 3. J. Ross Publishing, Plantation, FL, pp. 45–62.
32. Nürnberg, G.K., 2020. Observed and modelled internal phosphorus loads in stratified and polymictic basins of a mesotrophic lake. In 'A.D. Steinman and B.M. Spears (Eds.), Internal Phosphorus Loading: Causes, Case Studies, and Management'. Chapter 6. J. Ross Publishing, Plantation, FL, pp. 111–123.
33. Nürnberg, G.K., Howell, T., Palmer, M., 2019. Long-term impact of Central Basin hypoxia and internal phosphorus loading on north shore water quality in Lake Erie. Inland Waters 9, 362–373. https://doi.org/10.1080/20442041.2019.1568072
34. Oleksy, I.A., J.S. Baron, P.R. Leavitt, and S.A. Spaulding. Nutrients and warming interact to force mountain lakes into unprecedented ecological state. Proc. Roy. Soc. B. 287: doi.org/10.1098/rspb.2020.0304
35. Owca, T.J., M.L. Kay, J. Faber, C.R. Remmer, N. Zabel, J.A. Wiklund, B.B. Wolfe, R.I. Hall. 2020. Use of pre-industrial baselines to monitor sources and pathways of metals in

recently-deposited surface sediment of floodplain lakes in the Peace-Athabasca Delta (Alberta, Canada). Environmental Monitoring and Assessment 192: 106-128. https://doi.org/10.1007/s10661-020-8067-y.

36. Pearce NJT, Thomas KE, Venkiteswaran JJ, Chambers PA, Yates AG. 2020. Metabolic regimes of three mid-order streams in southern Ontario, Canada exposed to contrasting sources of nutrients. Hydrobiologia 847: 1925-1942, doi: 10.1007/s10750-020-04222-0.
37. Pelletier, N., Chételat, J., Blarquez, O., & Vermaire, J. C. (2020). Paleolimnological assessment of wildfire-derived atmospheric deposition of trace metal (loid)s and major ions to subarctic lakes (Northwest Territories, Canada). Journal of Geophysical Research: Biogeosciences, 125, e2020JG005720. https://doi.org/10.1029/2020JG005720
38. Remmer, C.R., T. Owca, L. Neary, J.A. Wiklund, M. Kay, B.B. Wolfe, R.I. Hall. 2020. Delineating extent and magnitude of river flooding to lakes across a northern delta using water isotope tracers. Hydrological Processes 34: 303-320. https://doi.org/10.1002/hyp.13585
39. Sinclair, J.S., J.L. Lockwood, S. Hasnain, P. Cassey, and S.E. Arnott. 2020. A framework for predicting with non-native individuals and species will enter, survive, and exit human-mediated transport. Biological Invasions 22:217-231. https://doi.org/10.1007/s10530-019-02086-7
40. Sinclair, J.S., S.E. Arnott, K.L. Millette, and M. E. Cristescu. 2019. Benefits of increased colonist quantity and genetic diversity for colonization depend on colonist identity. Oikos 128:1761-1771.
41. Swarbrick, V.J., Z. Quiñones-Rivera, and P.R. Leavitt. 2020. Seasonal variability in effects of urea and phosphorous on phytoplankton abundance and composition in a hypereutrophic hardwater lake. Freshwat. Biol., doi.org/10.1111/fwb.13580
42. Tammeorg, O., Nürnberg, G., Niemistö, J., Haldna, M., Horppila, J., 2020. Internal phosphorus loading due to sediment anoxia in shallow areas: implications for lake aeration treatments. Aquatic Sciences 82. https://doi.org/10.1007/s00027-020-00724-0
43. Vachon D., S. Sadro, M.J. Bogard, H. Baulch, J.F. Lapierre, J. Rusak, A. Laas, B. Denfeld, P. Staehr, G. Weyhenmeyer, B. Obrador, P.A. del Giorgio. 2020. Paired O2-CO2 measurements provide emergent insights into aquatic ecosystem function. Limnology and Oceanography Letters. In press.
44. Venkiteswaran JJ, Boeckx P, Goody D. 2019. Towards a global interpretation of dual nitrate isotopes in surface waters. Journal of Hydrology X 4: 100037, doi: 10.1016/j.hydroa.2019.100037.
45. Venkiteswaran JJ, Schiff SL, Ingalls BP. 2019. Quantifying the Fate of Wastewater Nitrogen Discharged to a Canadian River. FACETS 4: 315-335, doi: 10.1139/facets-2018-0028.
46. Wolfe, B.B., R.I. Hall, J.A. Wiklund, M.L. Kay. 2020. Past variation in Lower Peace River ice-jam flood. Environmental Reviews (er-2019-0047.R2). Published as Just-IN article. https://doi.org/10.1139/er-2019-0047.

47. Wurtsbaugh, W.A., P.R. Leavitt, and K. Moser. 2020. Effects of a century of mining and industrial production on metal contamination of a model saline ecosystem, Great Salt Lake, Utah. Environ. Pollut. doi.org/10.1016/j.envpol.2020.115072.

Thank you to all our members who contributed to this newsletter!

If you would like to contribute to our next newsletter, share your stories, and cool research project, please contact

comms@socanlimnol.ca

co-Editors: Andrea Kirkwood and François Guillemette