BULLETIN

www.iahcnc.ca
December 2020

President's Message

Let me begin by wishing everyone a very safe and happy holiday season. This past year (hard to believe it has almost been a year) has been less than we had all hoped for as we rung in the new year last year. But hopefully once 2020 is past us, we can gradually get back to some sense of normality.

As has become my custom, I will highlight some of the many papers published by Canadian authors in *Hydrogeology Journal* this past year. And a bumper crop it was!

A significant Canadian contribution was a "Topical Collection: Hydrogeology of a cold-region watershed near Umiujaq (Nunavik, Canada)", which summarized research carried out in a Canadian watershed aimed at increasing understanding of the subarctic water cycle and permafrost dynamics. In an introductory essay to the topical collection, authors J-.M. Lemieux, R. Fortier, J. Molson, R. Therrien & M. Ouellet give an overview of six papers that: respectively characterize the physical three-dimensional cryo-hydrogeological system (Fortier et al.); present a detailed water balance of the watershed (Lemieux et al.); characterize groundwater and surface-water hydrogeochemistry (Cochand et al.); describe the application of a tracer method to determine groundwater fluxes (Jamin et al.); develop a two-dimensional numerical model identifying impacts of groundwater flow on permafrost dynamics (Dagenais et al.); and present a parameter sensitivity analysis (Albers et al.). What an amazing achievement.

H.C. Smith & R.C. de Loë contributed a groundwater governance paper titled "Challenges and opportunities from a paradigm shift in groundwater governance" (HJ, 28(2): 467–476). They argue that a broader and more inclusive risk analysis approach is needed for groundwater protection efforts, specifically, a shift to a more open and inclusive process of policy development and implementation.

G. Labrecque, R. Chesnaux & M-.A. Boucher's contribution titled "Water-table fluctuation method for assessing aquifer recharge: application to Canadian aquifers and comparison with other methods" (HJ, 28(2): 521–533) evaluates the use of the widely known Water Table Fluctuation (WTF) method against several other recharge estimation techniques in a regional aquifer setting. They found that the WTF method can be used for the assessment of groundwater recharge at large regional scales if the aquifer is monitored by an appropriate network of observation wells.

M-.L. Bréard Lanoix, T. Pabst & M. Aubertin contributed a paper titled "Field determination of the hydraulic conductivity of a compacted sand layer controlling water flow on an experimental mine waste rock pile" (HJ, 28(4): 1503–1515). They used three in-situ methods: single-ring infiltrometer, double-ring infiltrometer and Guelph permeameter, and compared the results to analytical solutions and inverse numerical modelling.

D.M. Ferris, G. Potter & G. Ferguson contributed a paper titled "Characterization of the hydraulic conductivity of glacial till aquitards" (HJ, 28(5): 1827–1839), in which they analyze hydraulic conductivity data for Pleistocene-aged till aquitards collected at 15 sites compiled from 21 studies in the Interior Plains region of Saskatchewan. They found that the observed data variability occurs primarily at the site scale, while the central tendency and variability of the data are consistent between sites separated by hundreds of kilometres, suggesting that statistically derived, depth-defined regional hydraulic conductivity estimates can be meaningful.

C.W. Christensen, M. Hayashi & L.R. Bentley contributed a paper titled "Hydrogeological characterization of an alpine aquifer system in the Canadian Rocky Mountains" (HJ, 28(5): 1871–1890). They used a combination of geological, hydrological, and hydrochemical observations to understand the overall hydrogeological setting of an alpine cirque basin, and three different geophysical methods (electrical resistivity tomography, seismic refraction tomography, and ground penetrating radar) to characterize the subsurface structure and connectivity, and to develop a hydrogeological conceptual model. They found that a minor, shallow groundwater system feeds springs on the talus and streams on the meadow, whereas a deep system in the moraine supplies most of the water to the basin outlet springs, thereby serving as a 'gate keeper' of the basin.

S.G. Gardner, J. Levison, B.L. Parker & R.C. Martin contributed a paper titled "Groundwater nitrate in three distinct hydrogeologic and land-use settings in southwestern Ontario, Canada" (HJ, 28(5): 891–1908) that focuses on characterizing groundwater nitrate trends in a spatial and temporal context across three unique hydrogeologic and land-use settings in southwestern Ontario. They also compare groundwater nitrate trends at the sites to determine the potential influence of the hydrogeologic setting on seasonal nitrate variability. They identified a relationship between climatic conditions during winter months and nitrate concentrations.

J.S. Kindred & W.D. Reynolds contributed a paper titled "Using the borehole permeameter to estimate saturated hydraulic conductivity for glacially over-consolidated soils" (HJ, 28(5): 1909–1924). The Borehole Permeameter (BP) method was previously calibrated only for normally consolidated soils and ponding depth (H) versus borehole radius (r) ratios ($H/r \leq 22$. Here, they recalibrate the BP method for use in glacially over-consolidated soils with H/r ranging from 0.05 to 200. Numerical simulations were also used to develop criteria for estimating time required to achieve steady BP flow, and for correcting BP estimates of saturated hydraulic conductivity (K_s) where steady flow was not achieved.

And last but not least, L. Boumaiza, R. Chesnaux, J. Walter & C. Stumpp contributed a paper titled "Assessing groundwater recharge and transpiration in a humid northern region dominated by snowmelt using vadose-zone depth profiles" (HJ, 28(6): 2315–2329). They analyze $\delta^{18}O$ and $\delta^{2}H$ from the soil pore water and volumetric water content of the cores collected from two 7-m boreholes drilled at two sites: one sparsely vegetated and the other in a pine forest. They use a peak-shift method for estimating groundwater recharge and a water balance method for estimating transpiration.
Phew! What a long list! Congratulations to all authors of these articles, and apologies if I missed any.

As for conferences, GeoConvention, which was held virtually in September, was successful. Sixty-one IAH-CNC members attended, including 25 students. Next up is GeoNiagara September 26th to 29th, 2021. Check out the webpage - it is really cool - and consider submitting an abstract. Abstracts are due January 15th, 2021. Let's hope for an in-person event, although I know that the local organizing committee has backup plans.

Warmest wishes for the holiday season and all the best in 2021.

Diana Allen, Ph.D., P.Geo.
President, IAH-CNC Inc.

2020 IAH-CNC Conference Summary

The 2020 IAH-CNC conference was hosted online in partnership with other organizations involved in GeoConvention. We had 61 IAH-CNC members in attendance who also supported or led the sessions below.

Groundwater-focused sessions

- Groundwater issues associated with energy development
- Rural groundwater issues
- Environmental and groundwater applications of geophysics
- General hydrogeology
- Meeting groundwater resource management challenges
- Nitrate in groundwater
- Groundwater in mountain regions
- Deep groundwater sourcing and wastewater disposal

Tóth Award for 2020

Our student awards are the highlight of our annual conferences. The Tóth Award for the Best Student Presentation in Canadian Hydrogeology was awarded to Victoria Propp, a M.Sc. student in the School of Earth, Environment & Society at McMaster University. Her presentation was titled "Contaminants from an old closed landfill impacting an urban stream". Her abstract is listed below.

There was also a runner-up for the Tóth Award, given to Marwa Kraouaia from Université du Québec en Abitibi-Témiscamingue (UQAT) for her presentation "Assessing the impacts of mine dewatering on the hydrogeochemistry of peatlands and surficial aquifers".

Congratulations to Victoria and Marwa for their excellent contributions to the unique virtual GeoConvention.

Photo: 2021 Tóth Award recipient, MSc student Victoria Propp (McMaster)

Photo: 2021 Tóth Award runner-up Marwa Kraouaia (UQAT)

Tóth Award Abstract: Municipal waste landfills can contain leachate with many harmful contaminants, including contaminants of emerging concern (CECs). Many of the older landfills, of which there are many thousands across Canada, were operational prior to the current stringent environmental regulations and had no engineered liners or leachate collection systems. Therefore, old landfills have potential to be continuous long-term sources for contaminants to leach into groundwater, potentially then impacting nearby wells and surrounding surface water ecosystems. The objective of this study is to assess the processes and effects of leachate-impacted groundwater discharging to a stream. A detailed field site investigation was performed on an urban stream adjacent to a closed municipal landfill. This site was chosen based on a recent survey of CECs in 20 old closed municipal landfills. Contaminants of emerging concern that have recently been detected in municipal landfill leachate, including per- and polyfluoroalkyl substances (PFASs), flame retardants, plasticizers (such as bis-phenol A and substitutes) and artificial sweeteners, were sampled along with common landfill leachate constituents in order to characterize the potential risk of leachate-impacted groundwater as it enters a stream. Shallow groundwater and surface water

concentrations, temperature profiles, water table levels, and stream discharge were evaluated along multiple sections of the stream seasonally to capture variation in the flux of landfill leachate into the stream. Although analytical data is still being processed, preliminary work has shown that total PFAS and total OPFR concentrations in groundwater discharging to the stream can be as high as 12.7 µg/L and 19 µg/L, respectively. Analysis of surface water upstream and downstream of the study site show that the mass flux of leachate-impacted groundwater does appear to have an impact on the surface water quality. Through the investigation of groundwater-surface water interactions at this site, this study will provide insight into how landfill monitoring strategies and regulations can be improved to protect surface water ecosystems from harmful contamination.

2021 IAH-CNC Conference Details

The 2021 IAH-CNC annual conference will be held in partnership with the Canadian Geotechnical Society at the Scotiabank Convention Centre in Niagara Falls, ON, Canada from Sunday, September 26th to Wednesday, September 29th, 2021. Groundwater-themed short courses are already in development, and hydrogeology special sessions are being planned. Please check the conference website for updated details as we hope to transition back to an in-person (or hybrid) conference in 2021.

2021 IAH Congress Details

The 47th IAH Congress, which was rescheduled due to COVID-19, will be held in São Paulo, Brazil from August 22nd to 27th, 2021. One month later, the 48th IAH Congress will be held in Brussels, Belgium from September 6th to 10th, 2021. An invitation letter from the Belgium organizing committee is appended to this newsletter

2020 IAH-CNC Scholarship for Graduate Studies in Hydrogeology

The IAH-CNC Scholarship for Graduate Studies in Hydrogeology was recently awarded to Aspen Anderson of Simon Fraser University. Aspen's PhD research focuses on evaluating the risk to fresh groundwater resources in coastal deltas. The vulnerability of coastal communities can be increased when effects of groundwater use and sea-level rise are combined. Her work brings together modelling of delta formation (using Delft3D) and evolution of groundwater (using SEAWAT) to investigate the likelihood of groundwater salinization under different scenarios. Congratulations Aspen!

PROVINCIAL CHAPTER NEWS

British Columbia

News from the Provincial Government
Ministry of Environment and Climate Change Strategy (ENV)
Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD)

The Province of British Columbia (the Province) recently updated the *Guidance for Technical Assessments in Support of Applications for Groundwater use in B.C Version 2*. This document provides guidance to new groundwater use applicants and hydrogeology professionals so they may provide the appropriate level of analysis typically required by Statutory Decision Makers on water applications. The guidance was updated to Version 2 following a review and engagement period to better respond to operational needs and address gaps.

In addition, the Province recently released the *Compendium of Provincial Groundwater Science and Monitoring Projects: 2019-20*. This compendium is published under the Water Science Series to bring together a compilation of short summaries of the groundwater science and monitoring projects supported by the province during the 2019-20 fiscal year. The intent is to communicate to a wide audience the nature of the projects undertaken and to provide a quick overview of the project results. Links to key personnel and additional reporting are provided within each summary for anyone who might require more detailed information.

News from Academia

Simon Fraser University: The Groundwater Research Group at Simon Fraser University (SFU) is pleased to recognize Teresa Rosales Ramirez who completed her M.Sc. thesis "Modelling Wastewater Spills and Mapping Areas Most Vulnerable to Groundwater Quality Deterioration in Northeast British Columbia" in April 2020.

Forthcoming as a BC Water Science Series Report is research project report "Assessment of Aquifer-Stream Connectivity Related to Groundwater Abstraction in the Lower Fraser Valley: Phase 2 Field Investigation at Otter Park, Langley", by Diana Allen, Brynje Johnson, Andrew Garnet, Kira Howe, Michele Lepitre and Mike Simpson. This work was carried out by SFU in collaboration with the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

The Groundwater Research Group at SFU welcomes Matthew Martinolich who started his M.Sc. in January 2020. Matt's research focusses on establishing regional groundwater chemistry baselines in northeast BC and is largely funded through the BC Oil and Gas Research and Innovation Society (BC OGRIS).

M.Sc. student Andrew Allen is continuing his research project investigating the effects on groundwater quality from the interaction between fugitive methane and aquifer materials in shallow groundwater systems within the Peace Region, British Columbia. Andrew is hoping to finish early in the new year.

University of Victoria: The Groundwater Science and Sustainability research group at UVic has published a new manuscript on streamflow depletion modeling in British Columbia based on a project funded by and in collaboration with the BC Ministry of Environment and Climate Change Strategy.

Summary: Groundwater pumping can reduce streamflow by reducing groundwater discharge and/or inducing streamflow infiltration, which together are defined as streamflow depletion. We tested recently developed analytical depletion functions (ADFs) in two distinct hydrogeological settings of the Okanagan and Peace regions. Overall, we found that the analytical depletion functions provide reasonable predictions to estimate streamflow depletion in the pumping season for perennial streams. We also found different responses of ADF performance to hydrostratigraphic properties and well depth

across two domains, indicating that different factors control ADF accuracy in different hydrogeological settings. Therefore, we conclude that ADFs are useful tools for conjunctive water management, but a good understanding of local hydrogeological conditions is needed to address the potential uncertainty for decision-making. Reference: Li, Q., Gleeson, T., & Zipper, S. C., Streamflow depletion from groundwater pumping in contrasting hydrogeological landscapes: evaluation and sensitivity of a new management tool. *Journal of Hydrology*. 590: 125568 doi: 10.1016/j.jhydrol.2020.125568 or the preprint is at eartharxiv.org/tm6j7.

Streamflow depletion estimates coming to the water tools in Northeast BC!
Foundry Spatial and the Groundwater Science and Sustainability group at UVic embarked on a multi-year research initiative in 2016 to explore ways to incorporate groundwater pumping impacts on streamflow into the decision-support framework which drives the BC Water Tools. ADFs, discussed above, enable applications in real world settings with multiple wells and streams. Over the past year, Foundry Spatial has moved the ADF approach from the workbench into automated analytic workflows which support cumulative assessment of pumping impacts on streamflow depletion across large regions. These are presently being deployed with the support of the BC Oil and Gas Commission into the water tools operating in Northeast British Columbia (Northeast Water Tool / Groundwater Review Assistant). By spring 2021 users will be able to assess the potential impacts of new or existing wells on streamflow, as well as evaluate the cumulative effects of existing pumping on streams and rivers in the region. For supporting paper references, or to get a preview of a beta implementation example of the ADFs in California, contact ben@foundryspatial.com.

BC IAH-CNC Events: Our first BC webinar was held as a local event on December 2, 2020. Thanks to Michele Lepitre, Jennifer Todd, and David Thomson from the Province of BC for their presentation on the new technical guidance noted above. Please let me know if you have any ideas for future BC webinar presentations!

Best wishes for a safe and happy holiday season.

Laurie Welch
BC Director

Alberta

During 2020, due to restrictions related to COVID-19, a few scheduled conferences that may have been of potential interest to Alberta groundwater professionals were postponed and/or modified into "virtual" events. GeoConvention 2020 was to be held in Calgary in May but was rescheduled as Virtual GeoConvention 2020 from September 21st to 23rd. IAH-CNC was a partner in this event which included the IAH-CNC Annual General Meeting. The CGS annual conference, GeoCalgary 2020 was scheduled for September and was also modified into a virtual event, GeoVirtual 2020 from September 14th to 16th. GeoVirtual 2020 ended up being a successful event with over 500 registrants and included hydrogeological content in the technical sessions. For details, please check out the website. The CGS annual conference is scheduled to be hosted in Calgary in October 2022. ESSA's annual remediation conference REMTECH 2020 was scheduled for October 14th to 16th and switched to a virtual platform. Details can be found on their site.

If you have been an IAH-CNC member then please consider renewing your membership for 2021. Your support is appreciated and needed. If Alberta IAH members or groundwater practitioners have ideas for organizing IAH or general groundwater related events (once things get back to normal), then please feel free to contact me to discuss further (frank@oakenviro.com).

Frank Magdich
Alberta Director

Manitoba

I hope that everyone is having a pleasant and busy fall season this year. Things have certainly been interesting. I have sad news to share with the recent passing of Frank Render at the age of 85.

Frank worked in hydrogeology for the Province of Manitoba for 45 years, and he has left a long legacy here. Frank was born in Carberry, Manitoba, on top of the Assiniboine Delta Aquifer, which he would ultimately spend so much time on. He graduated from the University of Manitoba with a Geology degree in 1957 after putting himself through school. He worked in mineral exploration in northern Manitoba for a few years for Inco, undertaking some of the initial groundwork in the Thompson area. In the fall of 1957, Frank returned to University of Manitoba to complete his geological engineering degree. After the start of the construction of the Red River Floodway in early 1961 showed some groundwater problems with the underlying carbonate aquifer, Frank found himself in the right place at the right time when he was approached to work on the project for the province by the Chief Engineer for the floodway. Frank began work by installing the first long term observation wells around the city and developing a comprehensive study of the carbonate and sandstone aquifers. He worked on the floodway project until its completion, conducting many major investigations and dewatering programs. Frank undertook much of the work relating to the inlet control structure, which involved one of the largest dewatering systems in Manitoba at the time. After completing the floodway project, Frank elected to complete his Master's degree at the University of Manitoba as one of John Cherry's students. Frank often spoke of his masters, and also enjoyed collaborating with his fellow student Frank Schwartz; his master's degree also resulted in his first major publication on the hydrogeology of Winnipeg.

Frank continued to work on a variety of aquifers in Manitoba. He did much of the early water supply studies for the City of Selkirk and the Town of Winkler. He also conducted a large amount of research on the Assiniboine Delta Aquifer. These projects all resulted in many publications and reports, many of which are still used today. Frank retired from the province in 2006 but continued to consult and conduct research. One his favorite things to do would be to obtain the conference proceedings from any hydrogeology conference, where he would proceed to read as many of the papers as he could. Frank was an insightful and detailed hydrogeologist, and he will be missed. Frank has been survived by his wife Gloria, his three sons and their families, and many friends and colleagues in the community. We will miss Frank's unmistakable imprint that he has had on Manitoba hydrogeology. His wit and dry sense of humor was also quite legendary. Frank will be missed.

Jeff Bell
Manitoba Director

Ontario

The summer and fall this year were quite different for Ontario, as was the case for other parts of Canada and the rest of the world. Ontario IAH members along with their peers and colleagues from the rest of the country (nationwide from coast to coast) had a great opportunity to join the IAH-CNC webinar series in hydrogeology 'Make Invisible Visible', including the most recent webinar from the Ontario Region on 'Groundwater Infrastructure – Ushering in the Big Data Era on the Oak Ridges Moraine' presented by Steve Holysh of Oak Ridges Moraine Groundwater Program (ORMGP) on December 2nd, 2020 (video online). Steve is a manager of ORMGP. ORMGP is a recently rebranded York Peel Durham Toronto (YPDT) – Conservation Authorities Moraine Coalition (CAMC) Groundwater Management Strategy Study, a 13-agency partnership groundwater management strategy that stretched across a broad part of South-Central Ontario. ORMGP is a hydrogeological centre of excellence for groundwater management which is recognized well beyond provincial borders. Steve Holysh is a recipient of the 2020 Award of Merit from Professional Geoscientists of Ontario (PGO).

Congratulations Steve on the success! We would like to extend our thanks to the presenters and organizers for this great webinar conference.

The Ontario Geological Survey, the Geological Survey of Canada, and Conservation Authorities will present at the 6th annual two-day open house on 'Regional-Scale Groundwater Geoscience in Southern Ontario' on February 16th and 18th, 2021. Open house details are appended ***at the end*** of this newsletter. This event is planned as a live virtual event and is sponsored and supported by the IAH-CNC Ontario. If you would like Ontario IAH updates by email, please notify myself, Nataliya Tkach, at nataliya.tkach@exp.com and Tessa Di Iorio at tessa.diiorio@ottawa.ca. Please let us know if you have any suggestions for regional events, presentations, or seminars. We would like to take this opportunity to wish everyone a Merry Christmas, and a safe and happy New Year! Best Wishes to all for 2021 from Ontario!

Nataliya Tkach
Tessa Di Iorio
Ontario Directors

Québec

Despite the constraints imposed by the pandemic, the hydrogeology community remains dynamic and proactive in Québec. The fall semester was largely conducted remotely in Universities across Québec and the new teaching methods deployed in several institutions offering training in hydrogeology could mark a change in the teaching of this science. To this end, it is important to underline the great adaptability and perseverance of the students pursuing studies in hydrogeology. In Québec, fall 2020 also marks the end of the reform of Québec's environmental authorization framework. The Règlement sur l'encadrement d'activités en fonction de leur impact sur l'environnement will allow the application of the new Environment Quality Act (LQE). This regulation, which will come into force on December 31st, 2020, will certainly be of interest to many professionals working in hydrogeology.

In terms of knowledge sharing, the Geological Society of America conference which took place virtually from October 26th to 30th, 2020 included a number of high-quality presentations related to hydrogeology from Québec. Finally, for professionals working in hydrogeology in a northern context, note that the Government of Quebec just released its 2020-2023 Northern Action Plan, which addresses issues associated with water resources.

Malgré les contraintes imposées par la pandémie que nous traversons, la communauté œuvrant dans le domaine de l'hydrogéologie au Québec demeure dynamique et proactive. La session d'automne dans les universités du Québec s'est déroulée en grande partie à distance et les nouvelles méthodes d'enseignement déployées dans plusieurs institutions offrant des formations en hydrogéologie pourraient marquer un changement dans l'enseignement de cette science. À cet effet, il incombe de souligner la grande capacité d'adaptation et la persévérance des étudiant qui cheminent dans les formations universitaires en hydrogéologie malgré la pandémie. Au Québec, l'automne 2020 marque aussi la fin de la réforme du cadre d'autorisation environnementale du Québec. Le Règlement sur l'encadrement d'activités en fonction de leur impact sur l'environnement a pour objectif de permettre l'application de la nouvelle Loi sur la Qualité de l'Environnement (LQE). Ce règlement, qui entrera en vigueur le 31 décembre 2020, constituera certainement un élément d'intérêt pour bon nombres de professionnels œuvrant en hydrogéologie.

Sur le plan du partage de connaissances en hydrogéologie, notons la tenue récente de la conférence de la Geological Society of America qui s'est déroulée virtuellement du 26 au 30 octobre 2020, avec bon nombre de présentations de grande qualité liées à l'hydrogéologie. Finalement, pour les professionnels œuvrant en hydrogéologie en contexte nordique, notons que le gouvernement du Québec vient de présenter son Plan d'Action Nordique 2020-2023, lequel aborde notamment des enjeux associés aux ressources hydriques.

Éric Rosa
Québec Director

Atlantic Canada

Prior to the new physical distancing reality we now find ourselves in, IAH-CNC Atlantic activities included hosting a talk by Ph.D student Diana Loomer and participating in the 2022 Halifax GAC-MAC-IAH conference organizing committee meetings.

The Atlantic region endured another unusually dry summer, especially in PEI and New Brunswick, with drought impacts being felt across the region, especially by farmers and users of shallow dug wells. The past few months (and post-tropical storm Dorian) provided some much-needed recharge.

There has not been too much IAH-CNC activity to report here in the Atlantic Region with no local talks since the start of the pandemic. Looking ahead we are planning a virtual local IAH-CNC talk for mid-January 2021. Ph.D. candidate Julia Cantelon (Dalhousie University) will be presenting some of her early research on the groundwater dynamics of Sable Island.

As members of the local organizing committee, Dr. Kurylyk and I continue to help prepare for the joint GAC-MAC-IAH meeting scheduled to be in Halifax in 2022. At this point there are high hopes for an in-person conference.

We are also excited to welcome another hydrogeologist to the region with Dr. Lauren Somers joining the Centre for Water Resources Studies at Dalhousie University in the Department of Civil and Resource Engineering as an Assistant Professor in May of 2021.

Atlantic IAH members or groundwater practitioners are encouraged to submit newsworthy items or ideas for future talks or events by contacting me.

Gavin Kennedy
Atlantic Director

Membership

Total Canadian National Chapter (IAH-CNC) membership in 2020 is 351 domestic members, plus 11 internationally sponsored members.

Our chapter remains strong with 2020 closing with one Corporate Sponsor and four Corporate Memberships. We would like to thank these Corporations for their on-going support.

Membership Renewal
The 2021 membership portal is now open. We would also like to express our appreciation for the 55 domestic members who have registered for 2021 as well as our newest corporate member: MTE. We encourage members continue to use the on-line registration system available on the IAH-CNC web page.

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We are looking to build our membership with greater focus on on-line webinars and interaction. These activities could reflect both real-time and posted webinar sessions discussing hydrogeology related topics raised by our membership. Please join us in the up-coming conferences, symposia, and online seminars in 2021 including GeoNiagara to be held from September 26th to 29th, 2021. We are pleased to announce that 2021

membership fees will remain the same cost as in 2020. Membership rates for 2021 are listed in the table on the right.

Kristina Anderson
Membership Officer

Membership Category	*Membership Fee*
Regular	$145
Student	$50
Online (Regular)	$130
Online Student	$40
Retired	$70
Life Member	$2900
Corporate	$825
Associate student	$0

Early Career Hydrogeologists' Network Update

Ray Craddock, ECHN

The ECHN was proud to launch the Discovery Webinar Series in October 2020. The objective of this series to expose ECHN members to a variety of different research topics explored by hydrogeology labs across Canada. Each session will be hosted by a different groundwater lab and will consist of a series of short presentations from different members of that group. The next session, which is focused on integrated modeling and contaminant transport (December 18th), will be hosted by Université Laval. Notification of upcoming webinars will be sent out to ECHN members by email.

We are excited to continue expanding the ECHN network in Canada. We are still actively seeking presenters for our ECHN webinar series, so if you are interested in presenting, please contact Ray Craddock (ray.crad@dal.ca).

Message from our VP North America

It is was an honour to be elected as the IAH VP North America this fall and I am looking forward to serving the IAH CNC again. I have served the IAH in various capacities for almost 20 years now and am looking forward to the challenge of this new position. I would like to thank Joanne Thompson for the hard work she put in during her term at VP North America and her decades of service to the IAH CNC. There are few people, if any, who have put as much effort into growing the IAH in Canada as Joanne.

The pandemic has challenged all of us, but it may have created opportunities to do things differently moving forward. We have figured out how to make a variety of events, including GeoConvention, virtual during 2020. There should be possibilities to continue to have at virtual events going forward, offering new ways to engage as a community. Participation at the international level within IAH has always been a challenge due the need for travel to congresses and other events and offering the option to join such events without travelling is something that I hope to promote going forward.

Over the next few years, I hope to continue to grow the relationship between the IAH United States National Chapter (USNC) and the CNC. I attended my first USNC board meeting last month and was pleased to see many familiar faces. While we have had a friendly relationship with our colleagues to the south, there is an untapped potential to further engage with them and I believe that this could have great benefits for our IAH members in both the CNC and the USNC.

I am optimistic about what the future holds for IAH and the broader groundwater community. While hydrogeologists are acutely aware of the issues of groundwater management and protection, last year's Global Groundwater statement has

raised the profile of groundwater and in 2022, the theme of World Water Day is "Groundwater: Making the Invisible Visible". Groundwater is an often overlooked part of the hydrologic cycle and I hope that we can take advantage of this increased visibility to grow the IAH and make progress on a variety of groundwater issues.

Wishing everyone the best for 2021,

Grant Ferguson
IAH VP North America

From the Editor

Thank you to Nicole LeRoux (MASc student, Dalhousie University) for helping me once again with this newsletter.

Bulletin Submissions: The next issue of the bulletin will be published in June 2021. Submissions are welcomed on or before June 1, 2021. Please send contributions to barret.kurylyk@dal.ca.

Advertising: Paid advertisements in this Bulletin are possible. You do not have to be a member to advertise; however, there are discounted rates for IAH corporate member companies. Contact barret.kurylyk@dal.ca for current rates.

Webinars: Stay tuned for announcements and details regarding upcoming webinars. Events such as webinars are posted to our events page if I am provided information ahead of time.

Social Media: If you are on Twitter, please follow us and pass along any relevant information (e.g., web links) you would like tweeted (Twitter direct message or email to barret.kurylyk@dal.ca). **We are especially interested in tweeting about new publications from ECHN members.**

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SAVE THE DATE

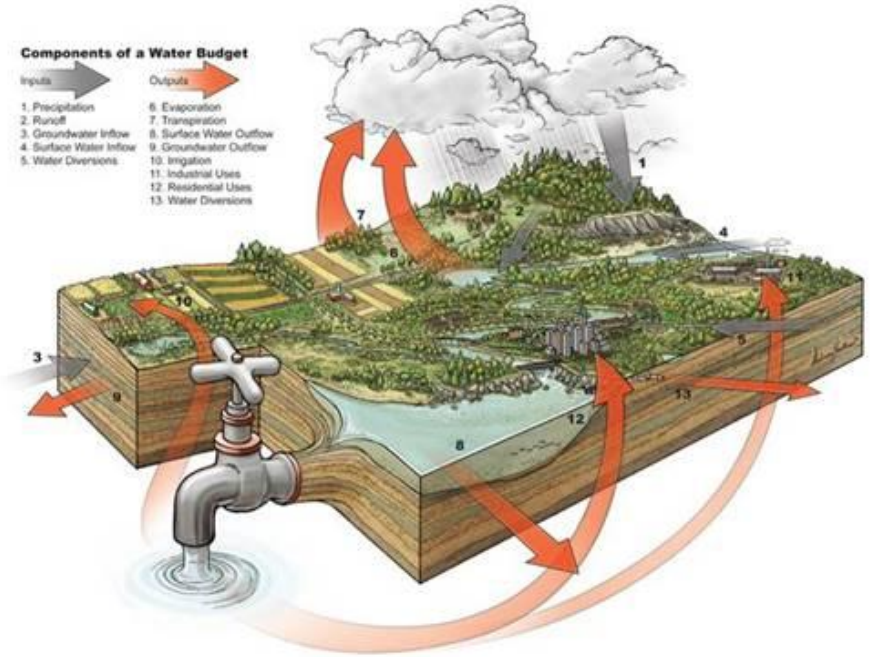
Regional-Scale Groundwater Geoscience in Southern Ontario

Open House

February 16th and 18th, 2021

From 1:00 pm to 4:30 pm

Via Microsoft Teams Live Events



The 2021 open house for the southern Ontario Groundwater Community will consist of two half-days of presentations hosted collaboratively by the Ontario Geological Survey, the Geological Survey of Canada, and Conservation Authorities. Both days will include presentations by Federal, Provincial, Conservation Authority, academic, and private sector collaborators involved in groundwater studies in southern Ontario. The objective of the open house is to update groundwater practitioners and water managers on the activities of the respective agencies and collaborators.

For more information or to provide feedback, please contact:
Elizabeth Priebe (OGS): Elizabeth.priebe@ontario.ca
Don Ford (TRCA): dford@trca.on.ca
Steve Holysh (ORMGP): sholysh@owrc.ca
Hazen Russell (GSC): hazen.russell@canada.ca

Please circulate this information amongst your colleagues

**** Registration and more information coming soon ****

Conservation ONTARIO Ontario CANADA 1842 GEOLOGICAL SURVEY - COMMISSION GÉOLOGIQUE iah aih CNC-SNC

Brussels, Belgium - November 16th, 2020

To the National Chapters of the IAH

Concerns: IAH2021 – Inspiring Groundwater
Brussels, Belgium - September 6th – 10th , 2021

Dear colleagues:

Four years ago, the Belgian Chapter's board decided to launch its candidature to host the 48th IAH Congress in 2021. We were very proud to get the approval from the IAH Council at the IAH 2018 Congress in Daejeon, South Korea.

Why 2021? Belgium hosted the congress once before, in 1958 - as the 1st President of the IAH was the Belgian Paul Fourmarier - but has never hosted it since then. Also, the IAH will be 65 years old, and our chapter will be 20 years old in 2021 : good reasons to celebrate all together with you, the world hydrogeological community, and put our little country on the water map.

Here we are less than 10 months before our Grand Opening. We are working hard to present you a high level scientific congress, with more than 350 slots for speakers, 6 keynote lecturers, several meetings of IAH Commissions, Networks and working groups (already confirmed), some workshops, 10 field trips, the AGM of IAH and the Council Meeting, and some special guests (VIPs of course). But we also want to let you discover Belgium: our rich culture, our unique comics, our colourful music, our great food and our tasty beers and chocolates.

We already have partnerships with UNESCO – PHI, with the City of Brussels, with different companies, with the Lufthansa group (including United Airlines and Air Canada). We're seeking more.

The year 2021 will be special for our community and for the IAH. 2021 is highly anticipated, as it is "the year *after*" the outbreak of the 2020 Covid pandemic that hardly affects us all. For us hydrogeologists, 2021 will see 2 congresses

- the 47th IAH Congress held in Brazil on August 22nd – 27th
- and the 48th IAH Congress in Belgium on September 6th – 10th

Yes, there will be two congresses in 2021, for IAH's 65th birthday! Both Organising Committees are working together to bring you coordinated events.

Although the pandemic forced us to adapt our lifestyles, and to change the way we are meeting each other, we are confident for the future and that we will be able to meet, greet, talk and laugh together. We are confident that we will be able to share knowledge, accompanied by fine Belgian food and drinks.

It goes without saying that organising such an event is a big challenge. It requires a lot of time, effort and energy. And this congress can only be a success with your participation and your help. Therefore, we would like to ask you to transfer this letter to all your members, so that they can visit our website

www.iah2021belgium.org

and subscribe to our newsletter (through the website) to get the latest updates.

The Call for Abstracts has already been launched and registration will be open in January, and

It will be a great honor for the IAH Belgian Chapter, the CBH-BCH, to welcome and host the world-wide hydrogeology specialists in Brussels, Belgium, for 5 *inspiring* days, from September 6th till September 10th, 2021.

We are proud and happy to welcome you in Brussels very soon!

ir Olivier LAGNEAU
President
Organising Committee

Tom Diez
Vice-President
Organising Committee

Marijke Huysmans
President
Scientific Committee

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