

Annual Activities Report 2018-2019

International Joint Commission



Cover Image: The Lake Superior shoreline from Sugarloaf Mountain, Michigan. Credit: [yooperann](#)

About Us

Canada and the United States created the International Joint Commission (Commission) because they recognized that each country is affected by the other's actions in lake and river systems along the border. Through independent binational science-based advice, the IJC helps the two countries manage these waters wisely and protect them for the benefit of today's citizens and future generations.

The Commission assists the two governments and is guided by the Boundary Waters Treaty between Canada and the United States signed in 1909. The treaty provides general principles for preventing and resolving disputes over waters shared between the two countries and for settling other transboundary issues.

The Commission has two main responsibilities: setting conditions for projects that affect water levels and flows at the boundary and investigating transboundary issues and recommending solutions. The Commission's decisions and recommendations on water levels and flows strive to take into account impacts on, and the needs of, a wide range of water uses, including sanitation and drinking water, commercial shipping, hydroelectric power generation, agriculture, industry, fish and wildlife, recreational boating and shoreline property. The Commission also works extensively on Great Lakes water quality, assessing progress made by the governments towards protecting and restoring water quality and by providing advice by issuing reports.

Table 1: The Commission is funded by the governments of Canada and the United States

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2018 & 2019 in Review

When it comes to water issues along the boundary, Canada and the United States have shown the value of binational cooperation for more than a century. Since the Commission was formed following the signing of the Boundary Waters Treaty in 1909, the Commission has been fulfilling requests from governments to regulate water levels and flows and report on transboundary water issues. With the assistance of expert staff and board members from both countries, the Commission reports on projects that may have an impact on water flows and levels and offers scientifically sound recommendations on water quantity and quality to benefit local water users, communities and interests in both countries and the environment. This report will highlight the work that the Commission and its boards have done during the 2018 and 2019 calendar years. We would like to note that the Commission could not do its work without the assistance of individuals and resource agencies in both countries.

Members from Indigenous Nations -- Tribes, First Nations, and the Métis Nation -- with lands in transboundary watersheds also commit their time and expertise and provide valuable input to IJC boards and committees, and the Commission would like to recognize their voices and roles too.

The Commission and its boards have been hard at work determining what steps must be taken to prepare for a changing climate. A Climate Change Guidance Framework exercise through the Commission's International Watersheds Initiative commenced in 2018 with the International St. Croix River Watershed Board assessing whether aspects of its Order of Approval might be significantly impacted by climate change, and the Commission is working to have other of its boards follow this process. Climate change also played a role in an ongoing update of water quality objectives and aquatic ecosystem alerts in the Rainy-Lake of the Woods basin. The Rainy-Lake of the Woods Board formed an Adaptive Management Committee to follow adaptive management principles -- essentially determining how best to manage flows and conditions over time in the face of uncertainty like the impacts of climate change.

Climate variability, which was apparent in a number of western watersheds in 2018-19, challenged some of the Commission's western boards. In 2018, the control boards for the Osoyoos and Kootenay Lakes monitored flooding amidst a rapidly melting heavy snowpack in the spring, which gave way to a dry, nearly rain-less summer. A similar story was seen in the St. Mary and Milk rivers east of the Rocky Mountains in 2018, where dry summer weather brought challenges to the apportionment of water between the two countries after an extremely wet spring. In 2019 these regions were not flooded with as much snowmelt and rain during the early months, but nevertheless saw dry summers with which water managers had to cope.

In August 2018, the Commission's International Rainy-Lake of the Woods Watershed Board implemented its new rule curves for the Rainy-Namakan Lakes system, located along the border between Ontario and Minnesota. When the 2000 curves were implemented, part of the order was to review them within 15 years to see if adjustments could be made to improve them. The new rule curves modify the previous ones to give dam operators more flexibility to better manage levels and flows. In addition, the new rule curves should assist with invasive species control, and flood preparation and mitigation when forecasts suggest high water levels are likely. In 2019 the adaptability in the new rule curves allowed dam operators to promote sturgeon spawning and reduce water levels on Rainy Lake to minimize flood risks.

The Commission undertook investigative studies through its boards and committees in 2018 on the 2017 flooding experienced along the shores of Lake Ontario and the St. Lawrence River. The studies concluded that the flooding was primarily caused by a record-breaking amount of precipitation from April into June, coupled with a heavy snowmelt along the Ottawa River downstream and exacerbated by winter outflow limitations due to fragile ice conditions in the St. Lawrence River. Unfortunately, flooding returned in 2019 as water levels reached record

highs across the entirety of the Great Lakes, and Lake Ontario was no exception. The Ottawa River also saw a record freshet (the period where melting snow and rain surges into the stream, raising the water) that limited the amount of water that could be removed from Lake Ontario at the same time that the lake was seeing high inflows from Lake Erie and its own drainage basin. While the Commission's own scientific investigation has found no regulation plan could have prevented the flooding in 2017 or 2019, the Commissioners initiated an expedited review of Plan 2014 to see whether improvements could be made. This work is supported financially by both governments and was underway as of the end of 2019.

During 2018 and 2019, work continued on two reference studies in the Lake Champlain-Richelieu River region. One study is focusing on the causes, impacts, and possible mitigation measures for flooding in Lake Champlain and the Richelieu River. The progress achieved was shared at a series of public meetings in November 2018. A final report with recommendations is expected in 2022. In a second study, Commission staff continued its review of efforts underway to address the impacts of nutrient loading in lakes Champlain and Memphremagog, in collaboration with Canadian and US basin organizations in both watersheds. The Commission submitted the Lake Champlain and Lake Memphremagog reports to governments in spring 2020.

A three-year reference study looking at potential improvements to the operating plan for the reservoirs in the Souris River basin also made progress. The goal of this study is to make recommendations to reduce the risks of flooding and water supply and to optimize other water use benefits in the basin in North Dakota, Saskatchewan and Manitoba. The study's final report is expected by February 2021.

The Commission's Great Lakes Water Quality and Science Advisory Boards, as part of their work under the Great Lakes Water Quality Agreement, continued their investigations into several key scientific and policy issues facing the lakes. In 2018, the Water Quality Board issued the results of its second basin-wide poll, in which 88 percent of the 4,250 respondents felt it essential to protect the Great Lakes from threats ranging from pollution to invasive species, and more than half felt there are too few regulations to protect the lakes for the benefit of fish and wildlife, their economic significance, and their importance to human health. The WQB also continued work on other topics, including a project to assess and understand the role of coastal wetlands systems to support coastal resiliency and risk mitigation; a project to evaluate regulations, rules and policies to manage manure from animal feeding operations; and finally a project to consider climate change adaptation and resiliency strategies and frameworks. In addition, the board released an informational report, Nuclear Power Facilities in the Great Lakes Basin: Compendium of information related to the current status and decommissioning of Great Lakes nuclear power facilities, which supports the development of a Great Lakes Water Quality Board report in 2019 that will recommend steps governments can take to reduce or eliminate the risks of contamination from decommissioning nuclear plants in the Great Lakes. Also in 2018, The Great Lakes Science Advisory Board completed studies and produced reports on information coordination and flow throughout the basin, the potential

ecological impacts of crude oil transport, and an assessment of fertilizer application patterns and their impacts on water quality in western Lake Erie. In 2019, the Commission held a series of public hearings and listening sessions throughout the Great Lakes basin as it gathered input for its second Triennial Assessment of Progress Report, expected in 2020.

Finally, the new Commission website went live in October of 2018, using modern web design to serve up the Commission's many areas of work and consultation to the public. The website features an array of maps, reports, and information dating back decades to the Commission's founding, all in a user-friendly manner.

In 2019, the Commission had a full changeover, following the departure of the three former Canadian commissioners in 2018 and the two former American Commissioners once their replacements had been confirmed by the US Senate in 2019. The six new Commissioners all came on board in late May 2019, the first time this had happened since the first Commissioners came on board in 1911.

The Commission's work in 2018 and 2019 would not have been possible without the continued friendship and collaboration between Canada and the United States. The Commission is a testament to the value of bringing together people, organizations, institutions and agencies from both sides of the international boundary to solve problems and manage our precious shared resources responsibly and to our mutual benefit.



The Richelieu River and Mont Saint-Hilaire in Quebec. Credit: View [orb_cz](#)

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Chapter I: Coast-to-Coast

Osoyoos Lake, Kootenay Lake and Columbia River Basin



Flooding occurred in Osoyoos Lake and the waterfront town of Osoyoos, British Columbia, in May 2018 due to excessive precipitation and a rapid snowmelt. Credit: Tamara Morgan

The Columbia River basin covers 668,000 square kilometers (258,000 square miles), touching seven US states and the Canadian province of British Columbia. The Commission has three boards overseeing specific operations within this system: The Columbia River Board of Control monitors backwater effects from the Grand Coulee Dam; the Osoyoos Lake Board of Control oversees levels in Osoyoos Lake, which crosses the British Columbia-Washington border; and the Kootenay Lake Board of Control oversees the Corra Linn Dam at the outlet of Kootenay Lake in British Columbia, which gets its water from tributaries flowing through Idaho, Montana and British Columbia.

Osoyoos Lake flooded in May 2018 due to a very wet spring and a high snowpack followed by a rapid melt, which inundated the watershed and flooded the lakeshore. Water managers opened all gates on the Zosel Dam downstream of the lake in an attempt to bring water levels down to those prescribed by the Commission's Order of Approval for the operation of the dam, but the Okanagan River downstream was simply unable to pass enough water to ease flooding for some time. This was due in part to a high flow volume of water from the unregulated Similkameen River that meets the Okanagan River downstream of Zosel Dam. The high Similkameen River

flows caused water to back up in the Okanagan River, restricting the ability of Zosel Dam to pass flow.

A extremely dry, drought-like summer helped bring water levels back into compliance with the Commission's Order. Similar circumstances occurred in the basin in 2017, which also saw a wet spring and floods followed by a dry summer.

2019's spring season opened with concerns over a low seasonal snowpack. Osoyoos Lake levels were held higher in the July-September period to protect against drought before falling in the latter months of the year. This "variance" from the standard outflows continued to November in an effort to protect against drought conditions.



Kootenay Lake is part of the Columbia River basin and is located in British Columbia; it's fed by the Kootenai River, which flows through Idaho and Montana. Credit: [Doug Zwick](#)

Similar circumstances were seen in the Kootenay Lake region in 2018, where the International Kootenay Lake Board of Control monitors compliance with a Commission Order. Starting on March 1, the Corra Linn Dam passed as much water as possible to deal with the excessive inflows and snowmelt, resulting from above normal precipitation in the fall of 2017 and the spring of 2018. The region subsequently saw flooding during the May runoff period, but this gave way to an extremely dry late spring through summer.

2019 was a drier year in the Kootenay basin with a smaller than average snowpack. Water levels on Kootenay Lake were maintained within the rule curve much of the year, save for brief periods in April and July when levels

at Queens Bay were slightly above the curve.

The operators of the Corra Linn Dam, FortisBC, started work on upgrading the dam in 2018 and that continued through 2019; the board does not anticipate that this will impact the operator's ability to comply with the Order. The upgrade work is expected to be finished in late 2021 or early 2022.

The Kootenay Lake Board of Control is developing a recommendation to the Commission regarding a review of its Order from governments. That recommendation is expected sometime in 2020.

St. Mary and Milk River Basins



The St. Mary River and the Milk River are hydrologically separate, except for a manmade canal connecting the two that allows water from the more consistently flowing St. Mary River to enter the Milk River, which sometimes runs dry in the summer.

The St. Mary and Milk Rivers each wind through the Canadian province of Alberta and the US state of Montana. Article VI of the Boundary Waters Treaty sets out how the water in the two rivers is to be apportioned between

Canada and the United States. A 1921 IJC Order of Approval sets out a process for the apportionment of the waters. The process of apportionment is further refined in administrative procedures which are the approaches and methods used to calculate and apportion natural flow in the St. Mary and Milk Rivers. These administrative procedures are developed by the Accredited Officers of the St. Mary and Milk Rivers, the two countries' water accounting officers, and are subject to the 1921 Order of Approval.

The Commission asked the Accredited Officers to review their Administrative Procedures. In June 2019, the Accredited Officers reported that they had identified several options to potentially improve apportionment measures that warranted further study. In December 2019, the Commission wrote to governments requesting funds to study these options. On the structural side, these included improvements to the US St. Mary Canal, storage on the Milk River in Canada, and an alternative method of conveying water in Canada. On the non-structural end, options include modifying the balance periods, capping the credit system and further formalizing deficit trading. The Accredited Officers further suggest modeling the apportionment regime in the 1921 Order in view of a changing climate.

Similar to 2017, a wet winter in 2018 followed by a severe dry spell in the summer months made it increasingly difficult for the Accredited Officers of the St. Mary and Milk Rivers to apportion the waters according to the 1921 Order. If the opportunity presents itself, the Accredited Officers can offset extra water used by the United States early in the year with extra water used by Canada later in the year. But this was difficult with the weather conditions in 2018.

The snowmelt and wet spring in 2018 was followed by a dry summer, which made apportionment tricky. The United States did not need extra water in the spring, but Canada did in the summer months. The Accredited Officers fulfilled the treaty obligations by working with Montana and Alberta to manage water flows in the late summer into the fall to balance the apportionment.

In the 2019 irrigation season, the United States built a deficit in the spring and Canada built a similar deficit during the summer irrigation months. These were ultimately balanced out by the fall.

Red River Basin



The Red River flows through Selkirk, Manitoba. Credit: [Robert Linsdell](#)

The Red River flows northward between North Dakota and Minnesota, continuing into Manitoba before emptying into Lake Winnipeg.

The International Red River Board reported exceedances of its water quality targets for sulfate and total dissolved solids in both 2018 and 2019. These are not new exceedances and are currently being investigated using water quality trend analyses; more information can be found in the International Watersheds Initiative section.

The Board's water quality committee has been examining nutrient problems along the Red River and into Lake Winnipeg, which suffers from algal blooms. In 2019, the International Red River Board proposed additional water quality objectives (WQO) for the nutrients phosphorus and nitrogen, to go along with the five current parameters of chloride, sulfate, total suspended solids, dissolved oxygen, and e. Coli. The Board sent the recommendations to the Commission in 2019 following an independent review of the board's studies. Commissioners proposed a public hearing be held in early 2020 in the Red River basin on the proposed recommendations, alongside a public comment period, to give convenient opportunity for all parties to be heard prior to making a decision on any recommendations the Commission may make to the governments.

The Red River basin saw significant snow fall in October 2019, which led to unprecedentedly high water levels and flooding as well as high soil moisture content throughout the basin. The high soil moisture in combination with above normal snowfall in the southernmost part of the Red River basin increases the risk of spring flooding in 2020.

Souris River Basin



The Souris flows through Saskatchewan, North Dakota, and Manitoba.

The Souris River originates in Saskatchewan before winding its way through North Dakota and Manitoba to join the Assiniboine River.

Like the Red River Board, the International Souris River Board is reviewing its water quality objectives to determine what updates should be considered and investigating regular exceedances of water quality objectives, namely, sulfate and total dissolved solids through IWI funding. The board is also developing recommendations for a natural flow procedures manual to assist with the allocation of Souris River flows between the two countries. Any recommendations will be reviewed by the Commission and forwarded to governments for approval.

The Souris River Study Board is a temporary group created under a reference from governments that is actively investigating flooding and water supply issues in the basin. The study board submitted both an updated work plan and progress report to the Commission in October 2018 on the development of forecasting and hydrology

models, performance indicators and potential alternative operating scenarios. A Public Advisory Group, Resource Agency Advisory Group, and Climate Advisory Group all provided feedback to the study board on its work. Input from the public was also encouraged at the study's two public meetings in 2018, held in North Dakota and Saskatchewan. In 2019, the study board's advisory groups met numerous times in the basin with agencies, Indigenous communities and the general public. As part of the study's Indigenous engagement, the study board is working to create an Indigenous Advisory Group to continue Indigenous input into the study following a meeting with Indigenous governments and representatives in November 2019 at the Peace Gardens. As part of the larger IJC goal of improved Indigenous engagement, this advisory group is intended to shift to the Souris River Board upon completion of the study. The objective is to continue to include input from Indigenous nations and tribes to continue into future IJC activities in the basin. The board should be developing this advisory group further in 2020. The study board also held two public meetings in 2018 and two in 2019.

The governments also granted an extension to the study, which will now conclude in February 2021 and send its report to governments that summer. The study board has completed several tasks related to the hydrology of the river system and is continuing work related to reservoirs, forecasting, climate change and water supplies. The study board also met with the Souris River Board in November 2019 to update the latter on the progress of the study.

The Souris River basin saw significant snowfall early in 2019, but a drawn-out snowmelt mitigated the risk of flooding. While spring and summer were dry seasons, there was significant precipitation in the southern and eastern portions of the region in the fall.

Rainy-Lake of the Woods Basin



Fort Frances, Ontario provides a picturesque view of Rainy Lake. Credit: [Aaron Hwarren](#)

The Rainy-Lake of the Woods basin lies in northwestern Ontario and northern Minnesota. The basin responds quickly to changes in water supply conditions, such as extreme rainfall events and can often go above and below the prescribed levels in the rule curves established by the Commission.

The Commission issued a new order under the 1938 Rainy Lake Convention for emergency water levels in the basin in 2018, which included the new 2018 Rule Curves that the International Rainy-Lake of the Woods Watershed Board implemented in August 2018. The Rainy and Namakan Rule Curves guide the management of water levels and flows from the lakes over various times of the year to assist in the prevention of emergency conditions. These new rule curves are similar to the 2000 rule curves but have a few key differences. First, they require a speedier drawdown of water levels in the fall, reducing the amount of water drawn down in the winter and ideally improving survival rates for muskrats that were freezing out, which in turn should help control invasive cattail populations and create more habitats for local fish populations. This positive impact on the ecosystem should help several fish species spawn successfully in the fall. The new rule curves also provide more flexibility for the Board's Water Levels Committee if it anticipates a wet spring. The Water Levels Committee would be able to implement a high flood risk rule curve that would draw water levels down below normal levels on Rainy Lake, creating more space to store water and help reduce flooding.

To ensure that the 2018 Rule Curves are successfully doing what they're designed to do – and to allow for any gaps to be filled the next time the rule curves are reviewed – the Commission has also asked the board to evaluate how it would continue to investigate potential strategies to manage levels and flows in the Rainy Lake system, monitoring impacts of the 2018 rule curves and other environmental changes to the watershed. The board formed an Adaptive Management Task Team to make recommendations on this to the board for their consideration for delivery to the Commission.

Previously, dam operators were required to try and keep water levels to the central portion of the rule curves for any given time of year, which could have an impact on water flows throughout the system. Under the 2018 Rule Curves, they've gained the ability to target any point in the rule curves, not just that central band, to benefit various interests as conditions allow. For example, an effort is underway to come up with ideal water levels to target to promote wild rice growth in years where the plants are off to a strong, early start and emergency conditions are not expected.

The new rule curves performed as expected in 2019. Water levels were drawn down in the spring in anticipation of a flood risk and were maintained within the new rule curves. The board also had an opportunity to follow its sturgeon spawning protocols in 2019, maintaining flows in such a way to assist the fish in successfully spawning in the Rainy River. The basin saw a wet autumn, which may lead to an increased flood risk in 2020.

The Rainy-Lake of the Woods Board finished the first phase of its work in updating its water quality objectives and alerts. The existing objectives have not been updated since the 1960s, and the alerts have not been updated since the 1990s. As such, the board has been working to identify new issues to focus on in its work helping protect the water system. In a draft report put out for public comment in fall 2019, the board identified the nutrient phosphorus – which can lead to excessive algal growth if too much enters the water system – as its proposed sole water quality objective, with climate change, aquatic invasive species, erosion, water levels and contaminants as new alerts. The board started the second phase of its work quantifying the objectives and alerts in 2020, which will entail working with partner agencies in both countries.

In October 2018, previous IJC Commissioners met with Grand Council Treaty #3 (GCT3) to discuss ways of working together on matters of mutual concern in the Rainy-Lake of the Woods Basin. During this meeting, a tapestry was presented to Commissioners representing the relationship between the Commission and GCT3.



Members of Grand Council Treaty #3 meeting with Commissioners in October 2018. Credit: Commission

In August 2019, the new Commissioners met with members of GCT3 to reinforce the existing partnership between GCT3 and the International Rainy-Lake of the Woods Watershed Board. The board and GCT3 work together on several levels, including on International Watersheds Initiative projects in the basin, and a member of GCT3 serving on the board. The meeting with Commissioners was an important step in solidifying the working relationship that has existed between these two groups in the basin for several years.

The board also submitted its recommendations for updating the board's Directive and committee Terms of Reference. These amendments were approved by Commissioners in December 2019.

Lake Champlain and the Richelieu River



Lake Champlain, as seen from a ferry going from Vermont to New York. Credit: Commission

The Commission's International Lake Champlain and Richelieu River Study Board continued its investigations into the causes of flooding in the basin, which straddles southern Quebec and northern New York and Vermont and the development of potential mechanisms for mitigating the impacts of future flooding. Looking at past floods, notably those in 2011, the board will evaluate adaptation strategies, develop a real-time flood forecasting system and a water resource response model to address different climatic and weather events – and recommend structural and non-structural ways to deal with flooding, as well as other potential management and mitigation measures. Through a series of meetings, it will also invite feedback from area residents and organizations throughout the study.

In 2018 the study board began work on computer modeling of the basin, identifying some contributors to flooding that slow down water leaving Lake Champlain through the Richelieu River. These include old canals for defunct mills, dikes and stone eel traps. The board is exploring individual minor to moderate infrastructure measures at or near the St-Jean Shoals, upland water storage, floodplain management and flood response measures with the objective of reducing extreme events such as the 2011 flood.

The board held a series of public meetings in Quebec, New York and Vermont in November 2018 to get local input into its current findings and to gauge what the biggest concerns are to residents throughout the basin. The study board is planning for another round of public hearings in 2020, and in the interim members visited community events in the basin to discuss the board's work. It has also been working on outreach to specific interests in the basin, such as indigenous communities. As part of its communications efforts, the study board started putting out a bimonthly newsletter, the *Current*, in 2019, and has continued to work on factsheets and videos for its website.

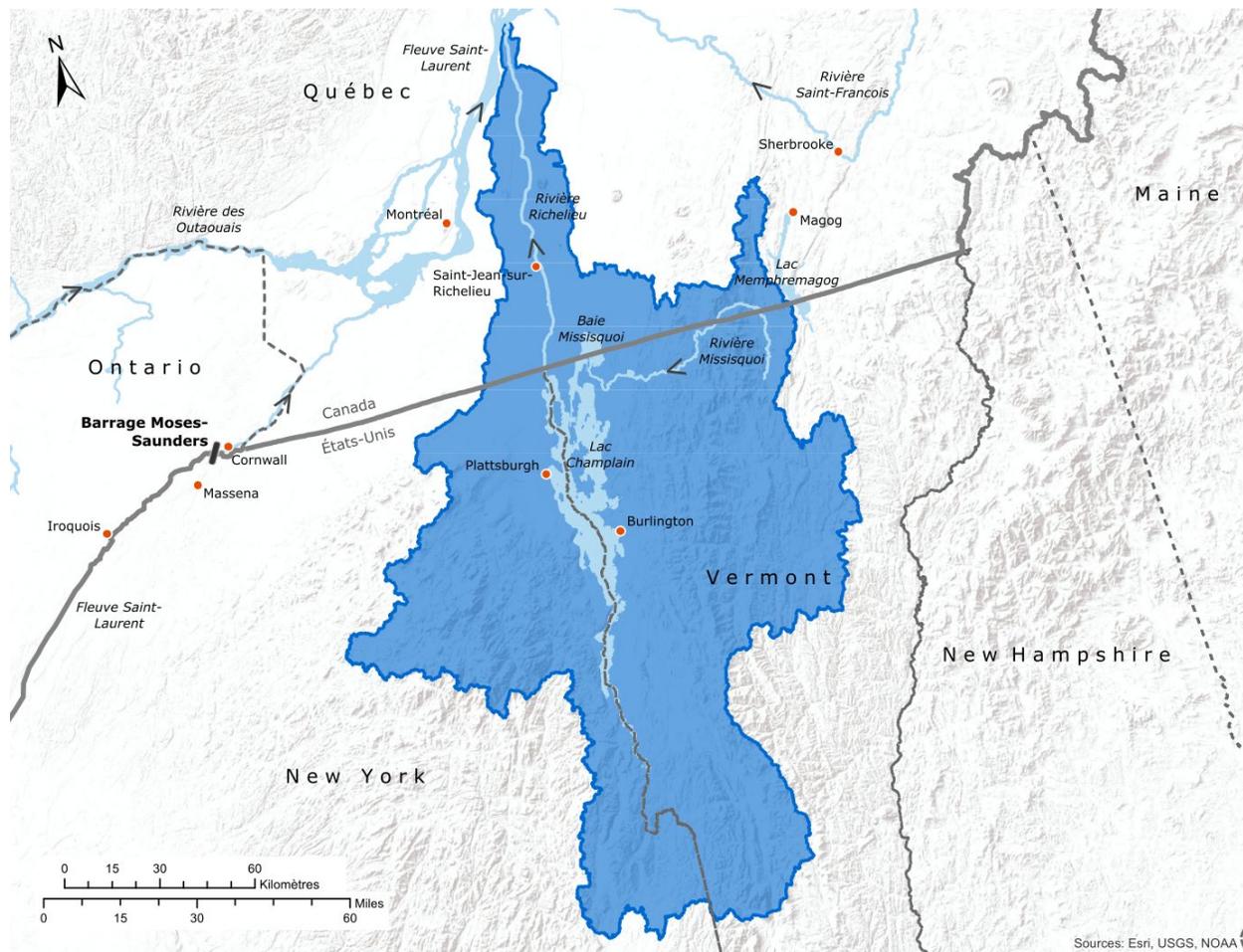
The Lake Champlain-Richelieu River Study Board also worked with the Mohawks of Kahnawà:ke and Le Grand Conseil de la Nation Waban-Aki in 2018 and 2019 to maintain open dialogue on the progress of the study and to collaboratively develop an Indigenous People's Performance Indicator that is sensitive to how water level

fluctuations affect wild rice habitat and traditional uses, particularly along the Richelieu River.

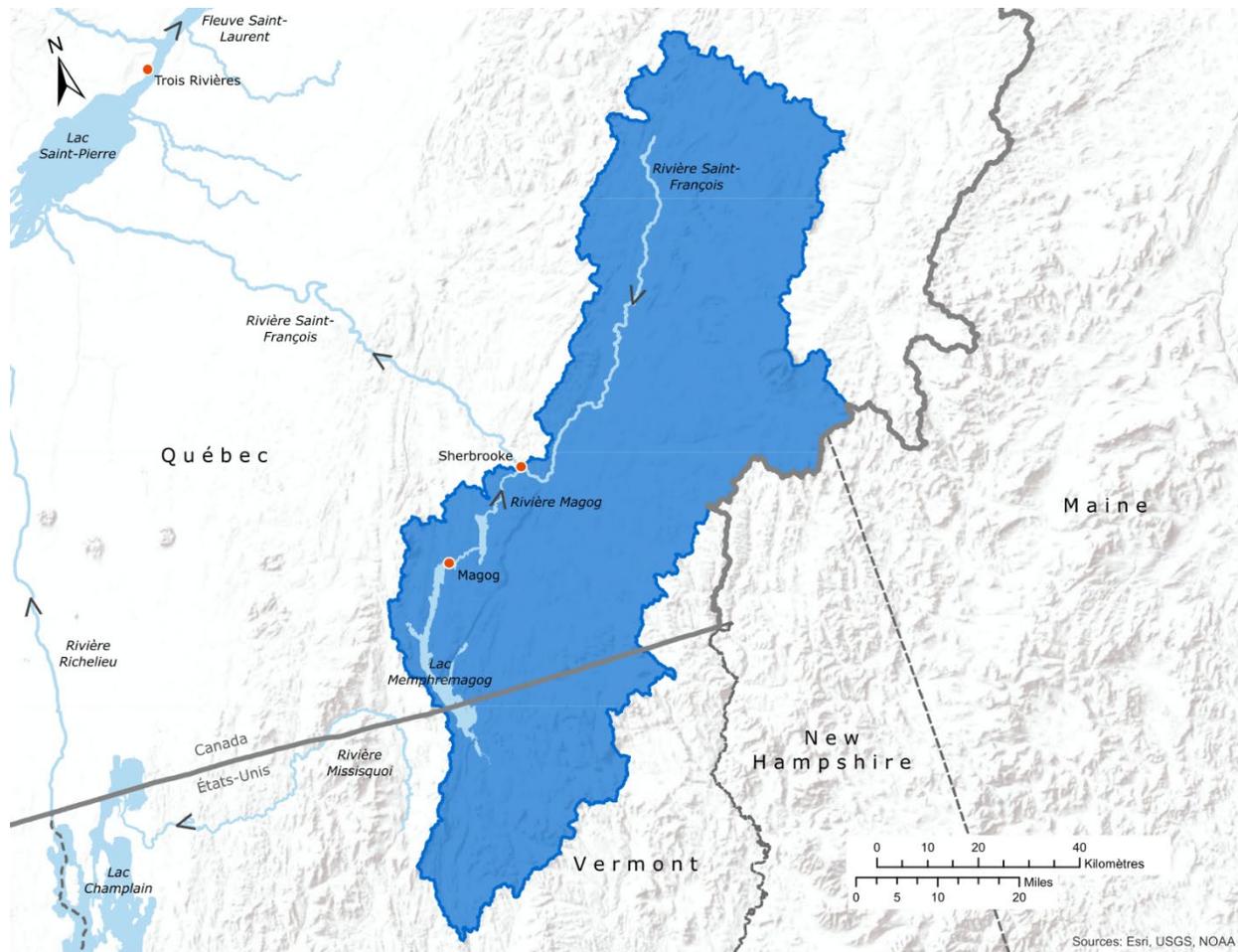
The board also worked on wrapping up its Causes and Impacts of Past Floods in the Lake Champlain-Richelieu River Basin report and a 16-page booklet summarizing the report; both are to be published in early 2020.

A final report on the flooding with recommendations is due in 2022.

Lake Memphremagog and Lake Champlain



Lake Champlain straddles the borders of New York, Vermont and Quebec before flowing north into the Richelieu River.



Lake Memphremagog is located to its east along the Vermont-Quebec border.

A progress report to governments, dated November 2018, outlined work that had been done to date in collaboration with watershed organizations in Vermont, New York and Quebec. This work includes a review of the existing local and global literature on the issues and planning for a set of technical workshops at which science and policy experts will contribute relevant perspectives. An online public comment period on the organizations' final reports took place at the end of 2019 for the Lake Memphremagog basin, while the Commission held public meetings to collect comments in the Lake Champlain basin in November. The Commission transmitted the final reports to governments in the spring of 2020.

St. Croix River Basin



Calais, Maine, near the Milltown Dam and the St. Croix River, was the site of the St. Croix board's annual meeting in 2018. Credit: Barbara Blumeris

The St. Croix River forms the border between Maine and New Brunswick before emptying into Passamaquoddy Bay on the Atlantic Ocean. The International St. Croix River Watershed Board reports on water quality in the river and monitors the recovery of the alewife fishery.

The St. Croix Board also monitors the compliance with requirements of four Orders of Approval issued by the Commission for dams on the St. Croix River at Forest City, Vanceboro, Grand Falls and Milltown. Activities included monitoring proposed changes in ownership at Forest City Dam and receiving updates on a proposed refurbishment or decommissioning of the Milltown Dam.

New Brunswick Power announced its intentions to decommission Milltown Dam in June 2019. By the end of 2019, the company was still going through the environmental review process and any federal, state and provincial requirements. The St. Croix Board continued to monitor the proceedings to see what role it may play, if any. New Brunswick Power's proposal would see the power generating facility decommissioned and the structure removed to restore the area to its pre-project natural state when it was known as Salmon Falls.

The board also worked on several projects related to water level conditions, the fishery and fish runs, and assessing the localized risks to the board's work from climate change. These are detailed in the International Watersheds Initiative section.

Chapter II: The Great Lakes

High Waters and Flooding on the Great Lakes

Following several years of wet weather across the region, water levels across the Great Lakes approached or exceeded record-high water levels in 2019. These conditions caused flooding and erosion in shoreline communities from Lake Superior to the lower St. Lawrence River.

The Great Lakes basin saw wetter than usual weather in fall in 2018 that lasted into the spring of 2019, leading to record-high water levels in the upper lakes and record-high inflows from Lake Erie into Lake Ontario. Downstream of Lake Ontario, the Ottawa River saw record flows during the spring freshet due to a late, heavy snowmelt and a wet spring. In accordance with the Commission's December 8, 2016, Order, this situation required the adjustment of outflows from Lake Ontario to keep flooding downstream of where the two rivers meet, including Montreal, from getting worse. The International Lake Ontario-St. Lawrence River Board determined that the regulation of outflows from Lake Ontario under Plan 2014 did not cause the high water levels seen in 2019.

The same determination was made in Lake Superior and Lakes Michigan-Huron, where Plan 2012 had no significant impact on water levels in 2019. The Commission's Lake Superior and Lake Ontario boards continued to issue updates throughout the year on conditions and outflows from the lakes. More details can be found in each board's respective section.

The International Lake Superior Board of Control



Waves crash on a Lake Superior beach. Credit: [Shutterstock](#)

The Lake Superior board regulates outflows through the control structures on the St. Marys River between Lakes Superior and Michigan-Huron, using Regulation Plan 2012 to determine the flow rate.

In April 2018, the Commission gave the board approval to deviate from Plan 2012 per the Order of Approval to assist with maintenance at the hydropower plants along the river and to help manage high water levels as much as possible within the limits of the regulation plan. As a result, the gate settings on the Compensating Works were adjusted to temporarily pass more water through the St. Marys Rapids and ensure that the annual volume of water released from the lake remained near the range prescribed by the regulation plan.

In 2018, the US Army Corps of Engineers completed work to automate four of the US gates on the Compensating Works structure. These new gates – and two that were already automated – no longer need a crew to go out and make adjustments using cranks; rather they can be adjusted from a control room, allowing for more fine control of water flows along the river. Nevertheless, the eight Canadian gates and the remaining two on the US

side of the structure still require manual operation.

Water levels on both lakes Superior and Michigan-Huron were above long-term average values through 2018 and approached record levels in 2019 due to wet conditions through the year. While the regulation plan attempts to balance water supplies between these two lakes, it is not capable of significantly regulating the amount of water in the lakes during times of such wet conditions.

The International Niagara Board of Control

The International Niagara Board of Control continues to oversee the operation of the control gates to ensure that sufficient water is directed over Niagara Falls to maintain the scenic spectacle. The board noted that the flow over the falls met or exceeded the treaty requirements at all times in 2018 and 2019.

The board also continued to oversee that the installation, operation and removal of the Lake Erie-Niagara River Ice Boom was in accordance with the 1967 IJC Order of Approval issued to power entities. The ice boom limits the amount of ice entering the Niagara River that could result in significant loss in hydro power generating capacity if ice jams occur at the Power Entity intakes. The ice boom span removal was completed on April 19, 2018 for the 2017/18 ice season and the ice boom installation was completed on December 18, 2018 for the 2018/19 ice season. In 2019, the ice boom was removed April 22, and put back into place for the 2019/20 ice season on December 17.

The board also works closely with the International Niagara Committee, which reports to US and Canadian Governments, to ensure that waters of the Niagara River are shared between Canada and United States of America in accordance with the 1950 Niagara River Diversion Treaty.

The International Lake Ontario-St. Lawrence River Board



Commissioners meet with John Peach, Save the River executive director, about high water conditions in the Thousand Islands in June 2019. Credit: [Commission](#)

The Lake Ontario-St. Lawrence River board regulates Lake Ontario outflows through the St. Lawrence River at

the Moses-Saunders Dam, located on the St. Lawrence River itself, following the December 8, 2016 Order.

The plan continued to direct higher outflows from Lake Ontario through 2018 to help bring water levels on the lake back down to the long-term average, despite continued high water supplies entering the lake through the year. These increased water flows have had the effect of reducing water levels on Lake St. Lawrence, the forebay to the Moses Saunders Dam, which concerned residents in that area.

Unfortunately, a wet winter across the Great Lakes basin and the Ottawa River led to a massive amount of snowmelt in 2019. Combined with rainfall and high flows into Lake Ontario from the upper Great Lakes, Lake Ontario and the St. Lawrence River suffered flooding along their banks. In response the board, following its procedures, increased flows out of the lake to try and reduce flooding without further flooding communities downstream. Once the Ottawa River freshet subsided, the board was able to direct sustained, record-high flows out of the lake during the summer. The board directed dam operators to continue high flows for the remainder of 2019, up to the limit that would create unsafe navigation conditions set in Regulation Plan 2014.

The board's outreach efforts were intensified in 2019, with frequent contacts with elected officials, stakeholder groups and the media. The board also posted real-time information about water levels and flows, along with frequent updates and answers to frequently asked questions on its website and in social media. Commissioners also visited flood-stricken areas as their first order of business after being appointed and met with elected officials to learn about what their communities were experiencing. In the wake of the crisis, the board added two new members from local municipalities on the lake and river to assist in its decision-making processes.



Commissioners Corwin, Béland and Yohe meet with elected officials in upstate New York alongside Rep. John Katko in June 2019. Credit: [Commission](#)

The board released an after-action report in June 2018 to assess the 2017 flooding event. This report found that extreme precipitation, inflows, and weather conditions (such as the spring freshet on the Ottawa River and subsequent flooding downstream) were the primary causes of flooding along Lake Ontario and the St. Lawrence River, and that Plan 2014 did not cause or exacerbate the flooding. Under the conditions faced in 2017, Plan 2014 performed as well as the previous regulation plan would have. An additional after-action report was released by the board following the 2019 floods that similarly found record wet conditions from the Ottawa River

and the upper Great Lakes were the primary cause of flooding. Following the 2019 floods, the Commission requested funds for an expedited review of Plan 2014; more information on this can be found in the next section.

Regulation and the Great Lakes Adaptive Management Committee



The Great Lakes Adaptive Management Committee reports to commissioners during the 2019 fall semi-annual meeting in Ottawa, Ontario. Credit: [Commission](#)

The Great Lakes-St. Lawrence River Adaptive Management Committee evaluates the performance of the plans used to regulate Lake Superior and Lake Ontario outflows, examines changing conditions in the watershed and advises on whether modifications to the regulation plans may be warranted. A report by the committee to the Commission's Great Lakes Control Boards reviewed the climate conditions and water levels and flows in 2017. The committee also conducted surveys and compiled available information on how different sectors were impacted by high water in 2017, however, more information would be needed to get a full accounting of the flooding, erosion and other coastal damages. Because of the high water crisis, Plan 2014 is setting outflows in a nearly identical manner as the previous regulation plan would have. As such, there has not been an opportunity so far for Plan 2014 to do anything that would improve the health of coastal wetlands.

The committee found that the regulation plans for Lake Superior and Lake Ontario outflows performed as expected in response to the extremely high rainfall that occurred in 2017. The Summary of 2017 Great Lakes Basin Conditions and Water Level Impacts to Support Ongoing Regulation Plan Evaluation report supported earlier findings that Plan 2014, the plan used to regulate Lake Ontario outflows, did not cause nor meaningfully exacerbate the extensive flooding and coastal damages that occurred.

The committee's 2017 summary report responded to numerous questions and criticisms of Plan 2014 from residents and officials in affected coastal communities. The committee examined potential changes to the rules in Plan 2014, including the maximum flow limits and high-water trigger levels, and found that the changes would not have significantly reduced water levels in 2017 and, in some cases, would have only shifted the damaging impacts from one geographic location or interest to another. This analysis included looking at how the previous

regulation plan would have performed. Overall, the analyses reinforce the fact that regulation of outflows alone cannot eliminate severe impacts during such extreme events.

In late 2019, commissioners requested additional funding to have GLAM perform an expedited review of Plan 2014 to see where improvements could be made to flow releases. The United States included \$1.5 million in the FY 2020 budget in December 2019, matching the \$1.5 million committed by Canada for the first part of that review that is currently expected to wrap up in 2021. This review will include an advisory committee that provides local input. The board has also proposed two additional review phases over the medium- and long-term: a 3-5 year assessment of the regulation plan under many possible extreme conditions and a full 10-12 year strategy covering the full range of conditions that the water system could face.

The Commission and the Great Lakes Water Quality Agreement

The Great Lakes Water Quality Agreement was first signed by Canada and the United States in 1972. Under the agreement the two countries agree to restore and protect the water quality of the Great Lakes; amendments in 1978, 1987 and 2012 included processes for improving conditions in specific areas and expanded the mandate to include habitat degradation and controlling invasive species. The Commission is tasked under the agreement to monitor and report on progress made by the two governments. Under the agreement, the Commission operates its Great Lakes Regional Office located in Windsor, Ontario.

The New Great Lakes Regional Office Director

In June 2018, the Commission brought in David Burden to serve as the new director of the Great Lakes Regional Office in Windsor for a four-year period. Prior to joining the Commission, Burden worked with the Canadian Department of Fisheries and Oceans (DFO) as the Central and Arctic Regional Director General.

In his previous position, Burden served as the DFO point person for the renegotiation of the Great Lakes Water Quality Agreement, assisted in keeping the sea lamprey control program running with his US counterparts, and helped implement the department's Asian carp program. His experience working with binational water-related issues is an asset to the Commission's ongoing work within the Great Lakes basin.

Great Lakes Water Quality Board



The Great Lakes Water Quality Board discusses its work with commissioners during the fall 2019 semi-annual meeting. Credit: [Commission](#)

The Great Lakes Water Quality Board released its Second Binational Poll Report in July 2018, a large survey of public perceptions of the Great Lakes system. The poll itself was completed in January 2018, receiving 4,250 responses from the eight Great Lakes states, the province of Ontario and indigenous communities. It found 88 percent of respondents felt it essential to protect the Great Lakes from threats ranging from pollution to invasive species, an increase of three percent from the previous poll released in 2015. A full 89 percent felt it important to protect the lakes for recreational purposes, even among those who don't engage in recreational activities personally. More than half felt there were too few regulations to protect the lakes, and a large majority thought the lakes should be protected for the benefit of fish and wildlife, their economic significance, and their importance to human health. The IJC is hopeful that this information will be of value in informing work done under the Agreement and inspiring support for actions to protect, restore and enhance the quality of the waters of the Great Lakes.

The board celebrated its 200th meeting during the IJC's semi-annual meeting on April 25, 2018, and held a public event in Hamilton, Ontario September 25 focused on the progress made to restore Hamilton Harbour. It continued outreach efforts into 2019, holding a public engagement event in Green Bay, Wisconsin in May, which focused on actions to restore the vitality of Green Bay and Lake Michigan in response to nutrient management challenges and climate change impacts.

The board is continuing to assess and understand the role of coastal wetlands systems to support coastal resiliency and risk mitigation in the Great Lakes. The board co-hosted a webinar with the Great Lakes Coastal Assembly in December 2019 that brought together 400 participants to discuss the challenges and opportunities to achieving net habitat gain for Great Lakes coastal wetlands. It is hoped the webinar will spur further engagement and discussion among Great Lakes community members and stakeholders on the issue. In 2019, the board engaged in further dialogue with the Great Lakes Coastal Assembly to answer some critical questions that arose as a result of the work that had been done. This should allow the board to better establish potential

goals and actions for the protection, restoration and enhancement of wetlands.

In late 2018, the board started work on a report looking at the issue of decommissioning practices of nuclear power facilities in the Great Lakes region. This project will provide advice and recommendations to the Commission on what the governments could do to reduce or eliminate threats to the Great Lakes from the potential release of radioactive contaminants as a result of decommissioning power plants in the future. The first part of this project was a background report released in September 2019. This background report compiled information about nuclear energy production, regulations, waste management, decommissioning processes and the state of the facilities themselves. The board's report is expected to be completed in the fall of 2020. The board hopes that their report will help regulators and governments ensure their decommissioning plans protect the Great Lakes from the risk of accidental releases of radioactive material and incorporate best practices as these plants reach the end of their lives over the coming decades.

A project ongoing since 2017 continued through 2018 to evaluate regulations, rules, policies and practices for the management of manure from animal feeding operations in the Great Lakes basin. The project is aiming to identify opportunities to reduce nutrient runoff through strengthening manure management practices. The board held a binational workshop in November 2018, bringing together 25 experts to discuss the draft findings and recommendations of the work group; the board completed a report that Commissioners approved in October 2019. The outcomes of this project are expected to inform the work of the governments under Annex 4 (Nutrients) of the Agreement, particularly actions to manage phosphorus loadings through the development of domestic action plans. The board intends to engage with several target audiences, including regulators, agricultural organizations and non-government organizations to promote its recommendations and add to the broader conversation around fertilizer and manure management.

The board has continued its work on the topic of climate change adaptation and resiliency that began in 2015. In 2016, the board issued a report that developed preliminary recommendations on ways to reduce the impacts from climate change. In November 2018, the work group hosted a session at the Latornell Conservation Symposium in Alliston, Ontario. Symposium participants provided input to inform a WQB recommendation that Canada and the United States play a global leadership role in developing a binational approach for climate change adaptation and resilience in the Great Lakes. The board released its summary report in September 2019, which reaffirmed the board's 2017 recommendations and the urgent need for a coordinated, regional anticipatory and responsive approach to climate resiliency and adaptation to help protect communities and ecosystems from extreme weather events.

Great Lakes Science Advisory Board

The Great Lakes Science Advisory Board provides advice on research to the International Joint Commission and to the Great Lakes Water Quality Board. It also provides advice on scientific matters referred to it by the Commission or by the Great Lakes Water Quality Board in consultation with the Commission. The Science Advisory Board consists of two committees, the Science Priority Committee (SPC) and the Research Coordination Committee (RCC).

The SPC issued its Potential Ecological Impacts of Crude Oil Transport in the Great Lakes Basin report in 2018. Focused on the ecological hazards posed by crude oil spills, the report found that a spill would have impacts on all levels of the aquatic food chain from plankton to fish to fish-eating birds and mammals. The SPC analysis found that existing crude oil transport infrastructure near or in the Great Lakes makes the entire ecosystem particularly vulnerable to spills. In addition, the analysis identified 15 areas that are of most concern because of their level of biodiversity and habitat importance. Most of these 15 areas are near oil pipelines or rail corridors, and five areas are near refineries. As the Commission transmitted the board report to the governments, it commended them for their substantial investments in spill prevention and response capabilities, and encouraged the governments to continue these activities in addition to implementing the additional activities recommended in the report.



Fertilizer being applied to farm field. Credit: [Shutterstock](#)

In February 2018, the Commission published the Fertilizer Application Patterns and Trends and Their Implications for Water Quality in the Western Basin of Lake Erie report, which was developed by the SAB in 2017. The primary focus of the report was to quantify the relative influence of commercial fertilizers and manure to phosphorus loading into the western basin of Lake Erie, using the most recent comparable binational datasets. The report reviewed land and nutrient management programs and considered how tile drainage and changing climate may affect eutrophic conditions in Lake Erie. A supplement to the main report was issued in October 2019 which incorporated an additional five years of data for the Canadian side of the basin. The supplementary analysis showed that the growing greenhouse sector in extreme southwest Ontario is increasing the proportion of agricultural phosphorus that is applied as commercial fertilizer in Canada.

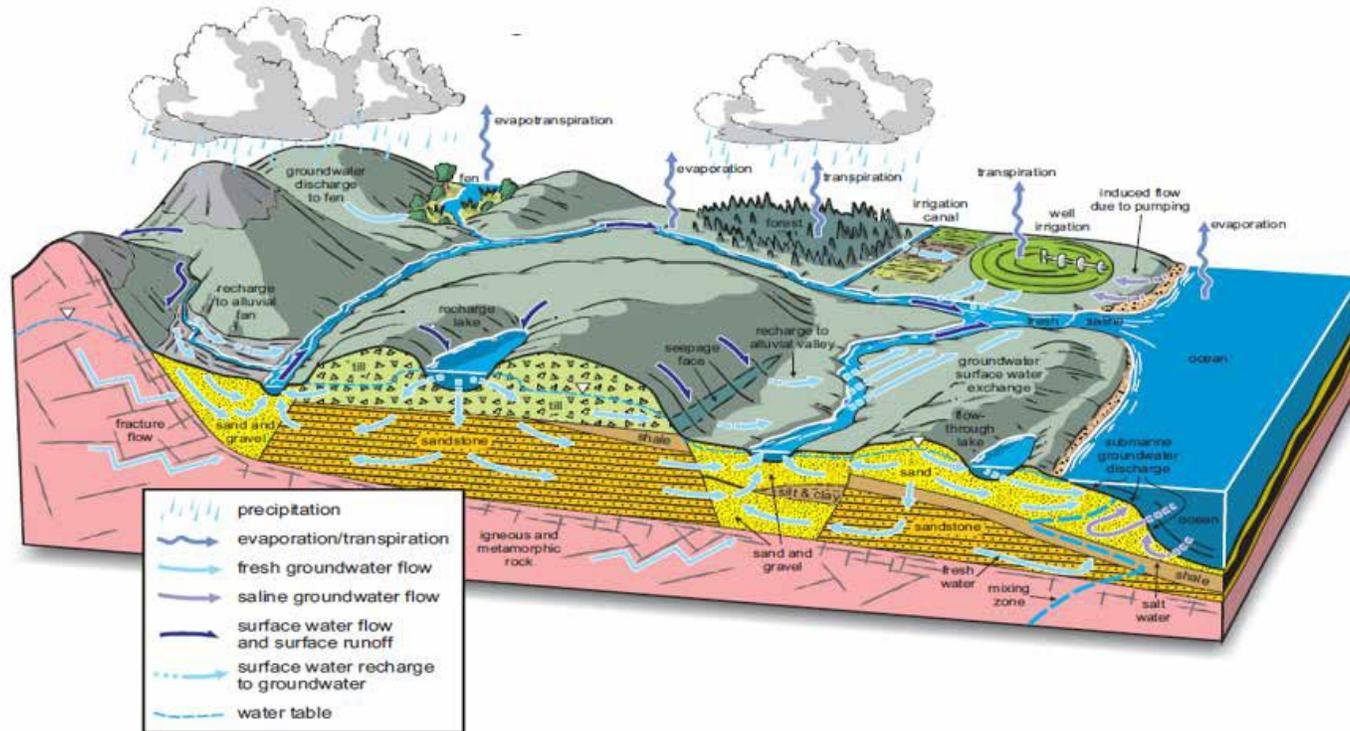
The SPC is concluding and will soon complete work on two other projects. The first report is on declining offshore lake productivity, focusing on the interplay between nutrient-enriched nearshore regions and low concentrations of nutrients in the offshore, and implications for fish populations. The report will provide information to help better understand and manage the complicated nutrients issue seeking an ecosystem approach that addresses the excessive nutrients (eutrophic conditions) found in western Lake Erie, many bays and nearshore areas, while at the same time sustaining fish populations in offshore regions that are nutrient deficient (oligotrophic).

The other SPC project is expected to summarize what we know, and don't know, about stressor interactions in the Great Lakes, and will identify select pairs of stressors and describe how they interact across the lakes. This should help alert managers to potential and problematic interactions and mitigate them before they become major issues. Both SPC reports are expected to be completed in early 2020.

In 2019 the SPC strengthened its expertise and experience by adding four new members: Dr. Gail Krantzberg and Dr. Karen Kidd from McMaster University, Dr. Jerome Marty from the Council of Canadian Academies, and Mr. Mic Isham from the Great Lakes Indian Fish and Wildlife Commission.



The Research Coordination Committee discusses new project plans with commissioners at the fall 2019 semi-annual meeting Credit: [Commission](#)



The groundwater cycle. Credit: Rivera

The RCC completed and published its Groundwater Model Integration Review report in 2019. This work addresses information needs about the contribution of groundwater to Great Lakes water quantity and quality, by developing an initial action plan describing how to integrate groundwater-surface water modeling for the basin. The report informs the work of the Annex 8 Groundwater Sub-committee that operates under the Great Lakes Water Quality Agreement. It is anticipated the recommendations will be useful in supporting the sub-committee's science priorities, including developing improved models to assess groundwater-surface water interaction within the Great Lakes basin to better inform binational Great Lakes management decisions. The report may also be useful to other organizations seeking to improve the use of integrated groundwater and surface water models in decision making.

The RCC completed and published its Great Lakes Nutrient Adaptive Management report in 2019. This work synthesized the current state-of-the-science on watershed and lake modeling that has been used to set binational targets for nutrients and as the basis for establishing domestic action plans to tackle the Lake Erie eutrophication problem. The project used those findings to provide advice on using modeling in an adaptive management framework to assess outcomes of management actions to reduce nutrient loading. This report helps address the gaps relevant to Annex 4 on how to maximize the value of modeling, research, and monitoring to support decision making in the face of uncertainty. The report is anticipated to help for the Annex 4 Sub-

committee and all parties in future nutrient management decision making.

The RCC is currently working on developing a better understanding of water and habitat quality issues facing the connecting channels across the Great Lakes-St. Lawrence River System. The project will also describe the infrastructure that would be needed to improve connecting channel surveillance and monitoring programs to better understand and address water quality and habitat issues. This project started in 2018 and should be completed in the summer of 2020.

Finally, both the SPC and RCC are jointly working on two full Science Advisory Board projects. The first will develop an approach for a Great Lakes Early Warning System. This project will identify and describe a preferred organizational approach for an early warning system and present a preliminary list of threats and stressor types that could be prioritized for further assessment. This project will provide advice and recommendations to the governments on emerging stressors and threats that warrant additional attention, as well as stressors and threats that are known but not receiving adequate science and management attention. The board submitted the project's findings to the Commission in spring 2020.

The Science Advisory Board initiated a second project in the fall of 2019 to develop a Science Plan for the Great Lakes. The Science Plan will summarize major existing investments in Great Lakes research and monitoring, and hold two workshops to develop science questions and needs, assess gaps, describe required scope and effort including research infrastructure, human resource, funding needed to implement the plan through agency programs and universities.

Health Professionals Advisory Board



The Health Professionals Advisory Board discusses its projects and studies underway during its presentation to commissioners at the spring 2018 semi-annual meeting. Credit: [Commission](#)

In 2019, the Health Professionals Advisory Board concluded its research on a “centennial study” regarding microbial contamination in the Great Lakes. This study is a follow-up to one performed over a century ago in 1913 by the Commission. It focuses on tracking sources of microbial contamination in nearshore waters, and the

potential impact of such contamination on human health. The Commission held a binational workshop to inform the study in Ann Arbor, Michigan on May 21, 2019, where available data and literature on fecal contamination and fecal source identification were examined. The workshop participants proposed an updated binational centennial study, to provide a framework for future efforts around microbial source tracking. The proposed framework would be intended to help 1) improve restoration efforts associated with contaminated waters, increasing TMDLs (total maximum daily loads) of contaminants, and algal blooms; 2) further both countries' investment in storm and wastewater treatment, and agricultural best management practices, and 3) assist the binational Great Lakes community to move from a reactionary to preventative approach to beach and nearshore management. A study report is expected in 2020.

Another study undertaken by the board looked at waterborne acute gastrointestinal illnesses in four Great Lakes communities: Hamilton and Toronto in Ontario, and Green Bay and Milwaukee in Wisconsin. This project combines reported cases with weather reports, and raw water indicators (turbidity, water temperature, pH levels and coliform fecal testing). The burden of waterborne AGI could increase with climate change. Understanding the relationship between weather, drinking water systems (DWS) and AGI can help increase adaptive capacity for DWS. This project will provide advice and recommendations to the Governments on impacts of climate change on the risk of gastrointestinal illness from drinking water obtained from Great Lakes water intakes. The report is expected around the end of 2020.

The board continued its joint work with the Great Lakes Beaches Association to examine the use and impact of environmental surveys by beach managers across the Great Lakes, which are recommended to detect and identify sources of fecal contamination at beaches. This work will help assess the risk to the health and safety of recreational water users. This project will present recommendations on how local beach programs can develop or improve environmental surveys, which can help prioritize funding allocations to improve beach water quality and contribute to the development of predictive models for recreational waters.

Finally, there are multiple human health determinants associated with consuming fish, including benefits of the nutrients, effects of chemical mixtures in the fish, cultural values, as well as availability and quality of substitutes. However, most of these factors are not evaluated as part of current Great Lakes fish advisories. This is why the HPAB and Science Advisory Board are partnering with the Mohawk Council of Akwesasne's (MCA) Environmental Program to develop common approaches to frame fish consumption advisories that consider all identified factors and address the concerns of fishers and First Nations for the Saint Lawrence River Area of Concern (AOC).

The St. Lawrence River AOC was selected for the case study because it is a multi-jurisdictional AOC with multiple chemicals of concern including mercury (Ontario), PCBs (NY) and dioxins and furans (minor) with the potential

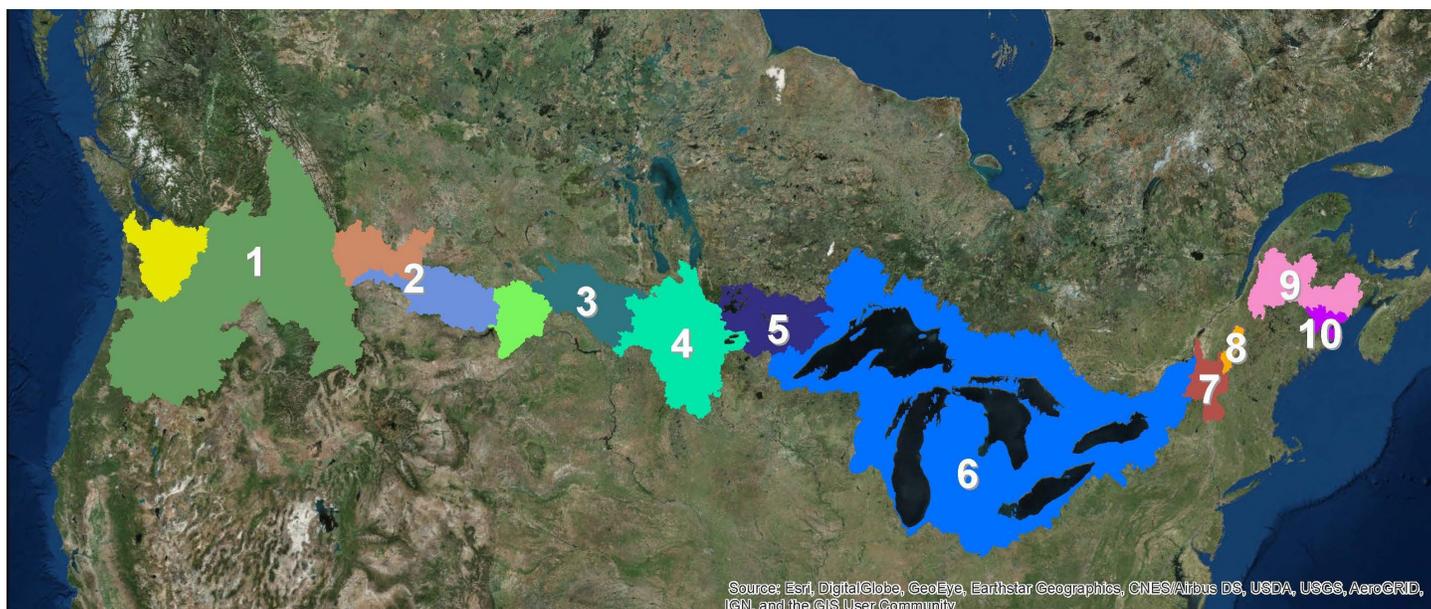
to impact downstream areas (Quebec). The project aims include a recommended fish advisory framework for the St. Lawrence River; examples of recommended communication messages on fish advisories including First Nations' perspectives; and a list of recommended science and policy priorities to support collaborative fish consumption advisory frameworks for other regions in the Great Lakes.



Akwesasne, New York is located on the shores of the St. Lawrence River Area of Concern.

Credit: Saint Regis Mohawk Tribe

Transboundary Map



[Transboundary Boards] Health Professionals Advisory Board: The board provides advice to the Commission on public health issues related to the waters of the Great Lakes basin and other locations where the Commission reports on water quality.

[1: Columbia River Basin] International Osoyoos Lake Board of Control: The Osoyoos Lake board monitors water levels on Osoyoos Lake – which straddles British Columbia and Washington State – and whether water managers operating the Zosel Dam downstream are following the IJC’s order of approval.

International Kootenay Lake Board of Control: The board supervises the operation of the Corra Linn Dam in British Columbia, and makes sure the conditions set for Kootenay Lake’s water levels are maintained. Upstream of the lake, the Kootenay River flows from British Columbia into Montana and Idaho, before turning north again.

International Columbia River Board of Control: The board monitors the effects of the Grand Coulee Dam, located in Washington, on the water levels upstream up to and above the US-Canada border.

[2: St. Mary and Milk Rivers] Accredited Officers of the St. Mary and Milk Rivers: The Accredited Officers measure and apportion of water from the linked river systems, which run through Montana, Alberta and Saskatchewan.

[3: Souris River Basin] International Souris River Board: The board monitors compliance with the interim measures for apportionment of waters from the Souris River at its international boundary crossings between

Saskatchewan, North Dakota and Manitoba. It also assists with the implementation and review of the joint water quality monitoring program and performs an oversight function for flood operations in the basin. The board also reports on ecosystem health, and informs the Commission of water use and water-related development activities in the Souris River basin.

International Souris River Study Board: The Souris River study board was established to assist with reporting on the July 2017 reference to review the operating plan contained in the 1989 Canada US Souris River Agreement. It is investigating flooding and water supply issues in the Souris River basin.

[4: Red River Basin] **International Red River Board:** The board informs the Commission of basin-wide activities that may affect water levels and flows and water quality and ecosystem health, as well as monitors the implementation of flood-related recommendations by the Commission. The river is located between North Dakota, Minnesota and Manitoba.

[5: Lake of the Woods and Rainy River Basin] **International Rainy-Lake of the Woods Watershed Board:** The board oversees compliance with Commission orders on emergency water levels and flows in the Rainy-Namakan system, and assists with reporting on water quality in the boundary waters of the watershed.

[6: The Great Lakes] **Great Lakes Water Quality Board:** Created by the Great Lakes Water Quality Agreement, the board assists the Commission with assessing progress to meet the goals of the agreement and carrying out its other functions assigned under the agreement.

Great Lakes Science Advisory Board: The board provides scientific advice to the Commission and the Great Lakes Water Quality Board, and is responsible for developing recommendations on all matters and research related to Great Lakes water quality.

International Lake Superior Board of Control: The board oversees the operation of control works on the St. Marys River that control the outflow of Lake Superior at Sault Ste. Marie, located between Michigan and Ontario.

International Niagara Board of Control: The board monitors the operation of the Chippawa-Grass Island Pool control structure above Niagara Falls between Ontario and New York, and supervises the annual installation and removal of an ice boom at the outlet of Lake Erie.

International Lake Ontario-St. Lawrence River Board: The board ensures that outflows from Lake Ontario through the Moses-Saunders Dam – located between New York and Ontario – meet the requirements of the IJC order.

Great Lakes-St. Lawrence River Adaptive Management Committee: The committee uses monitoring data to

support the ongoing modeling and evaluation of the regulation of water levels and flows in the Great Lakes. The committee reports to the three Great Lakes control boards.

[7: Lake Champlain and Richelieu River Basin] International Lake Champlain-Richelieu River Study Board: The Lake Champlain-Richelieu River Study Board is assisting the Commission in responding to the references from governments to explore the causes, impacts, risks and solutions to flooding in the watershed.

[8: Lake Memphremagog Basin] In close cooperation with local experts and basin organizations, the Commission is examining nutrient loading and harmful algal bloom issues in Lake Memphremagog (and Lake Champlain) and will make recommendations on how current efforts can be strengthened and improved.

[9: St. John River Basin] International St. Croix River Watershed Board: The board maintains an awareness of issues related to the Commission's order of approval for the Grand Falls dam.

[10: St. Croix River Basin] International St. Croix River Watershed Board: The board reports to the Commission on compliance with water quality objectives in the boundary waters and on ecosystem health in the watershed, and ensures the four privately owned dams are operated consistently with conditions set by the Commission Orders.

Chapter III: International Watersheds Initiative (IWI)

Introduction

Under the International Watersheds Initiative (IWI), several of the Commission's boards use a watershed approach in the discharge of their responsibilities, engaging with the public and utilizing local expertise in doing so. This approach recognizes that ecosystems and watersheds both function as interconnected systems and should be managed as such. It is also grounded in the belief that local communities, given appropriate assistance, are often best placed to address issues in a basin and achieve results.

The history of IWI dates back to 1997. In a letter dated April 16, 1997, the governments asked the Commission to provide proposals on how it might best assist the parties to meet environmental challenges of the 21st century "within the framework of their treaty responsibilities." The Commission's October 1997 Report "The IJC and the 21st Century" introduced the IWI concept as one proposal based on the model of success the Commission had working under the Great Lakes Water Quality Agreement. The Commission recommended that it receive a reference from governments to establish ecosystem-based international watershed boards from coast to coast. These boards would be available to monitor, alert, study, facilitate, and provide advice on a range

of transboundary environmental and water-related issues.

As noted in the Commission's first IWI Report to governments (2000), the Commission amalgamated water quality and water quantity responsibilities to its St. Croix Board and Red River Boards prior to 2000. The governments of Canada and the United States endorsed the Commission's proposal to establish international watershed boards that would adopt an integrated, ecosystem approach to transboundary environmental issues. The governments agreed to the establishment of the International St. Croix River Watershed Board in 2007. In 2013, a second watershed board, the International Rainy-Lake of the Woods Watershed Board, was established. The Commission also established two pilot watershed boards in the Red River and Souris River basins.

The IWI has helped to inform, engage, and provide tools for Commission boards and decision makers at all levels to better address a broad range of water-related issues along the border at the watershed level. Many of the Commission's boards participate in the IWI program by submitting proposals and acquiring funding for board projects stemming from watershed-based concerns about water quantity and quality, and the value of using an ecosystem approach to address these concerns. Most IWI projects also leverage resources from other partnering agencies and organizations.

IWI Project Highlights

The Commission supported more than 30 IWI projects during 2018 and 2019; many of the ones included here were highlighted by the boards during Commission meetings and on the Commission's website. The projects listed are sorted by the committee or board responsible for implementing them. Each Commission board has a work plan that is consistent with their mandates, focuses on the issues they face in their respective basins, and are regularly updated.



The St. Croix River and St. Stephen, New Brunswick as seen from Calais, Maine. Credit: [Jimmy Emerson](#)

Great Lakes – St Lawrence River Adaptive Management Committee

Several studies on the impacts of the high water levels and flooding along Lake Ontario and the St. Lawrence River were underway in 2018 and continued into 2019 through the Great Lakes St. Lawrence River Adaptive

Management Committee. The studies include examinations of the impacts on municipal and industrial water infrastructure, including drainage and pumping infrastructure; impacts on marinas and yacht clubs along the shoreline; and damages to private homes and properties, including the condition of shore protection structures following the floods. In another IWI project, the committee monitored how coastal wetland habitat is responding to Plan 2014, which is used to regulate Lake Ontario outflows.

In 2018, GLAM continued creating an extended computer model calculating likely past conditions of water supply components over the Canada and US transboundary watersheds (called a hindcast), which would generate and evaluate datasets of these components over most of North America. The dataset covers a period of 35 years, including daily estimates of precipitation, evaporation and runoff, as well as many other atmospheric and surface variables such as water equivalent of snow on the ground and soil moisture on a 15-km horizontal resolution grid. This project is based on the Canadian Precipitation Analysis, Canadian Land Data Assimilation System and Global Environmental Multiscale systems, with coordination with the US National Weather Service's Multi-Precipitation Estimates project that followed a project assessing the impacts of the 2017 high water levels on Lake Ontario and the St. Lawrence River.

In late 2019 the Commission received \$1.5 million each from the Canadian and US governments to initiate an expedited review of Plan 2014; more information about this can be found in the GLAM section of the report.

International Lake Ontario – St. Lawrence River Board

In 2018, the International Lake Ontario-St. Lawrence River Board completed an IWI project to assess the success of communications efforts that took place resulting from the 2017 high water event. This project yielded a fulsome analysis of the communications efforts that took place resulting from this event and noted where there were successes and opportunities for improvement in future similar situations.

International Rainy-Lake of the Woods Watershed Board

Part of the International Rainy-Lake of the Woods Watershed Board's directives is to review, recommend, establish, monitor and report on water quality and aquatic ecosystem health. An IWI project started in 2018 to develop updated water quality objectives and alert levels within the basin. The first phase of that project wrapped at the end of 2019 with the publishing of a draft report and invitation for public comment. Phase two began in 2020.

International St. Croix River Watershed Board

The International St. Croix River Watershed Board undertook an IWI project in conjunction with the US

Geological Survey to model how unregulated stream flows would affect water levels on the Forest City Stream and East Grand Lake if the Forest City Dam's gates were all left open. The study was prompted by proposals under consideration by the owner of the dam at Forest City, one of which is to open the dam's gates and give up ownership of the structure, letting the river return to a more natural flow. The work provides an independent assessment of possible impacts to the St. Croix River and valuable information on water level conditions subject to Commission orders and is beneficial to the Board's assessment of climate change, as it provides a baseline of "normal" and "expected" conditions.

Another project the Board undertook in conjunction with the US Geological Survey was the development of a user-friendly interface for assessing scenarios associated with the recovery of alewife populations. The work included engaging with stakeholders and First Nations and Tribes to develop and address fundamental questions associated with alewife management and scenario-specific population information. An interactive web tool was then developed that can be used to compare possible management approaches related to passage improvements, commercial fishery placement within the watershed, and stocking, among other potential scenarios. The board completed the project and plans to use this tool for future work to study improvements to aquatic resources.

In 2019 the board got underway with a project investigating the opportunities and constraints for fish passage improvements on the St. Croix River. Researchers are working closely with dam operators to make recommendations for possible solutions to allow more fish through to the habitat upriver. That project is expected to be completed in 2020.

The board continued its IWI project to count alewives and other historically notable fish migrating upstream to spawn. In 2018, 270,659 alewives were counted crossing Milltown Dam, along with 255 American shad. These numbers were up from 2017's count of 157,750 alewives and 54 shad. Alewife numbers improved further in 2019, when 486,500 alewives passed the Milltown Dam along with 29 American shad. The board started work on another IWI project to understand the theoretical outcomes to changes in fish passage and commercial harvests of alewife runs in the river. Another project tracking fish through the river system to learn the effectiveness of the dams' fish ladders was completed in 2018.

International Red River Board

In the Red River basin, a binational telemetry study investigating how specific fish species are moving and using habitat in the watershed concluded in 2019. This information will be vital for determining the flow needs in the Red River system, and should provide new data on how these fish, including lake sturgeon, bigmouth buffalo and channel catfish, are using the river for spawning and overwintering.

Another study is using 10-25 years of data from 37 sites to develop a water quality trend analysis for a variety of contaminants, such as nutrients, sulfate and chloride. This analysis uses the US Geological Survey software QWTrend to effectively estimate the water quality trend and will take into account changes in the Red River's stream flow over the past few decades; these flow changes make a fresh trend analysis valuable to water managers and governments trying to determine the best courses of action to improve water quality in the river.

Additionally, IWI funds have been used for projects to study possible recommendations for the transboundary region of the Red River. Nutrients have a significant impact on Lake Winnipeg and the Red River. The Red River board advises that reporting on nutrient targets will assist in understanding whether nutrients are being properly managed or if improvements are needed. The project wrapped up in 2019 with the board making recommendations to the Commission for consideration. More information can be found under the Red River section of this report.

International Souris River Board

In 2018, the International Souris River Board started a multi-year project to determine the factors affecting dissolved oxygen levels in the Souris River to inform operation decisions and assist with a water quality objectives review.

The Souris board submitted an IWI proposal in the fall of 2019 to analyze water quality trends in the Souris River watershed. This is a vital step in reviewing and potentially updating water quality objectives at the two border crossings for the river, and to identify risks to water quality – tasks overdue under the board's mandate. This is similar to work being undertaken in the Red River basin and the lessons learned from that process will be applied to the Souris River as well.

Accredited Officers of the St. Mary and Milk Rivers

In 2018 and 2019 the Accredited Officers updated their approach to calculating consumptive use by replacing the so-called "Thompson numbers," a method developed in the 1980s with the "Patterson numbers," an updated approach developed as part of a recently completed IWI study. Determination of consumptive use is an important component for determining natural flow. Natural flow is used in the apportionment calculation for each country by the Accredited Officers, so having up-to-date methods for calculation is a necessity for adjusting apportionment. This work is associated with the Accredited Officers' review of their Administrative Procedures.

International Osoyoos Lake Board of Control

The IWI project that enabled the creation of the documentary film entitled "A River Film," reported previously in

the Commission's 2017 Activities Report, was followed by another IWI project to distribute it, beginning with theaters and film festivals before eventually moving on to libraries, educational institutions, DVDs, and educational television and online outlets. The documentary continues to win awards and the film festivals it has been shown at, earning five such honors in 2018.

The International Osoyoos Board of Control also worked on a project to design, construct and install monuments displaying Osoyoos Lake record high-water levels. One monument has already been installed; the pair will be placed in two different parks (one in each country) adjacent to the lake to increase public awareness of historic water levels, operations and activities of the board, as well as the Commission.



High water monument on the Canadian side of Osoyoos Lake. Credit: Commission

IJC Strategic Initiatives

In addition to single board specific projects geared to meet the needs of the work plan for one board, the IWI also supports a number of strategic initiatives that address challenges faced by multiple transboundary boards.

Data Harmonization and SPARROW



The Data Harmonization Task Force meets with commissioners during the fall 2018 semi-annual meeting in Ottawa to explain the challenge ahead of them: maintaining and updating the data that has been harmonized.

Credit: [Commission](#)

The Commission has been a leader on hydrographic data harmonization efforts, initiating and leading the program to develop a seamless hydrological model across both sides of the border in the first place. Without the Commission working with them, it is unlikely that the governments would have undertaken the effort. The governments and the Commission continued this work across the transboundary region to completely harmonize the two nations' datasets through 2018 and 2019. This work was largely completed, as efforts in the eastern portions of the transboundary wrapped up in 2018. Some remaining harmonization work continued into 2019 along the Yukon River, the St. John River, the Great Lakes and a few drainage areas in Quebec.

For all the other completed areas, Commission involvement is moving towards a backseat role in the future, supporting maintenance and updates to the shared hydrological model by Canadian and US government agencies. With harmonized data, water modeling done by either Canada or the United States will be built on a common framework that takes all of these water systems into account.

In areas where data has been harmonized, transboundary water quality SPARROW (SPATIally-Referenced Regression On Watershed attributes) models have been developed to fully describe nutrient loading in watersheds that cross the Canada-US border. SPARROW modeling was originally developed by the US Geological Survey and has proven useful in the Red River basin due to its focus on regional nutrient loading and quantifying the sources of those pollutants; in 2019 it was applied to the Rainy-Lake of the Woods basin and the Great Lakes basins through IWI funds. While SPARROW model output is based on data that is several years old, it is still useful for certain purposes, such as identifying which watersheds are major contributors to phosphorus to other water bodies like the Great Lakes. Updated data could accordingly be used for additional purposes.

Climate Change Guidance Framework



The Commission hosted a workshop during its 2018 fall semi-annual meeting in Ottawa about its climate change framework. Credit: Commission

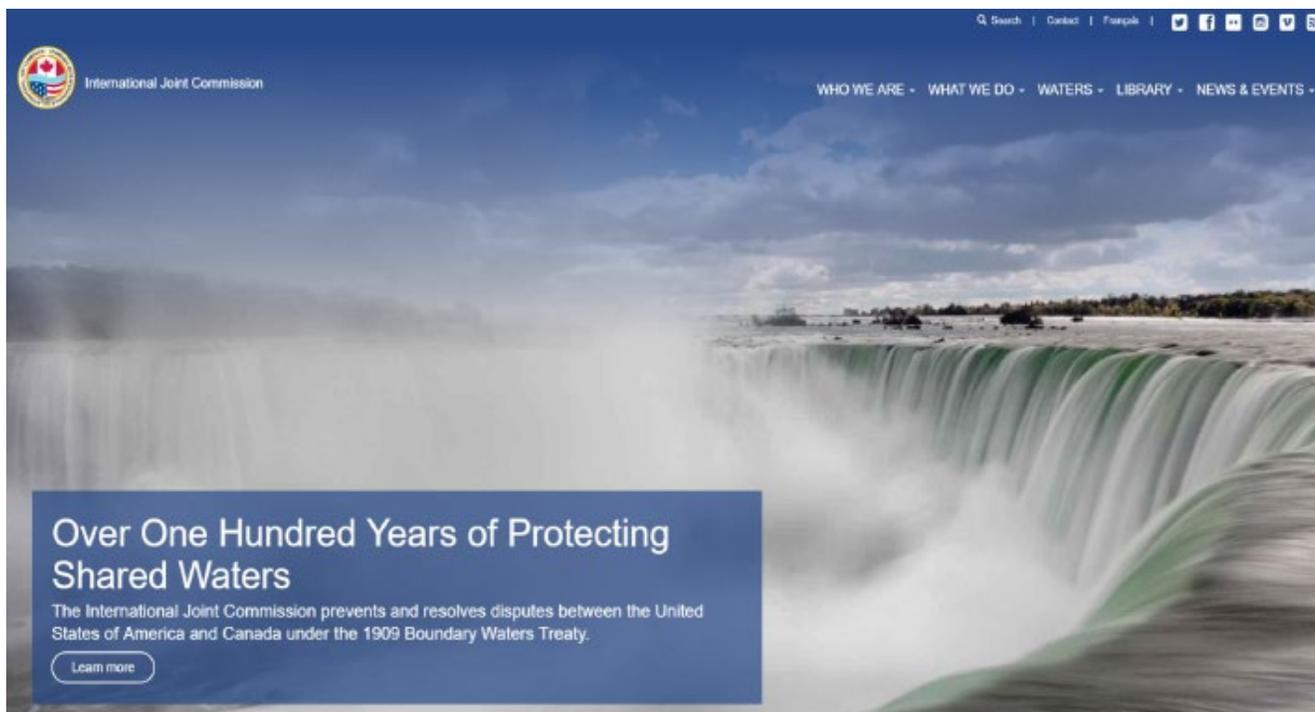
The Commission's development of a framework to help watershed and control boards assess their vulnerability to the effects of climate change took another step forward in 2018. The St. Croix Watershed Board was the first

board carry out the framework analysis (in 2017) of what climate stressors could be coming in the future and how current board activities may be affected by those changes. The Commission received the St. Croix board's final report in 2018. The report noted that reservoir lake levels could go beyond the minimum and maximum prescribed levels in the future, due in part to earlier snowmelts and an increased chance of winter rainfall changing how water moves through the system. Water temperatures and evaporation rates are also expected to increase, which would stress fish and make passage more difficult for them, particularly when coupled with a greater amount of water moving over the dams earlier in the year from precipitation changes.

The Commission is continuing with framework analyses in other watersheds. The International Rainy-Lake of the Woods Watershed Board (IRLWWB) is the second Commission transboundary board to work on applying the framework to its range of activities. The International Osoyoos Lake Board of Control is completing a preparatory project that will then allow it to complete the framework.

Chapter IV: Additional Highlights

Communications Strategy



The new International Joint Commission website homepage. Credit: Commission

The Commission unveiled a new website in October 2018, replacing its aging web infrastructure with an improved platform having better performance and modern design. The new website offers a more user-friendly experience for the many people who use the site. There were more than 279,000 visitors to the site in 2019, and pages were viewed more than 1 million times.

The Commission's outreach efforts through social media and its two newsletters, the quarterly Water Matters and the nearly monthly Great Lakes Connection, continued to surpass expectations. The Commission's Twitter account, @IJCSHaredWaters, continued to gain followers in 2018 and 2019, growing by 22 percent in 2018 and 29 percent in 2019, ending the year 2019 with nearly 6,000 followers. Its Facebook also continued to gain followers in 2018 and 2019, growing by 22 percent in 2018 and 29 percent in 2019, ending the year 2019 with nearly 6,000 followers. In both years, the social media engagement rates for the Commission's accounts were well above the industry measurements.

Newsletter subscription rates increased as well. The number of people receiving Water Matters rose by almost 10 percent in 2018 and almost 27 percent in 2019, ending 2019 with more than 1,800 subscribers. Great Lakes Connection subscribers grew by about 2 percent in 2018 but jumped another 33 percent in 2019, ending the year 2019 with more than 5,900 subscribers. Open rates for the newsletters were about 26.6 percent for the years 2018 and 2019, above industry benchmarks. The Commission published eight issues of Great Lakes Connection and four quarterly issues of Water Matters in each of the two years.



A full house turned out for a water quality public session in Goderich, Ontario in August 2019.

Credit: [Commission](#)

Commissioners and communications team members held a series of public events and listening sessions around the Great Lakes basin in summer and fall 2019. Comments provided from more than 1,300 people who attended these meetings—held in places such as Collingwood, Goderich and Thunder Bay in Ontario; Brockport, New York; Ashland and Milwaukee, Wisconsin and Traverse City, Michigan—will help to shape the key findings in the forthcoming 2020 Triennial Assessment of Progress (TAP) report on progress under the Great Lakes Water Quality Agreement. Input from the Commission's Agreement advisory boards and more than 750 comments provided through online comments and survey responses will also contribute to the 2020 TAP report's findings

and recommendations.

The Commission's communications team held a workshop during the October 2019 semiannual meeting for board members on effective communications practices. Board members shared their experiences and expertise, learned about communication tools and receive advice on engaging the public. Communications staff also participated in a crisis communications workshop in December 2019 in Washington, DC. The workshop was designed to increase internal capabilities to effectively communicate the Commission's activities and message during emergency situations.

Indigenous Engagement

In May 2019, the Commission organized an Indigenous Peoples workshop focused on the development of an Indigenous engagement strategy. The workshop was held in Niagara, Canada and included current and former members of IJC Boards, as well as representatives from First Nations, the Metis Nation and Tribes that the Commission is currently working. The ideas shared in this workshop will help shape how the Commission works in partnership with Indigenous Peoples on matters of mutual interest in the future.

The Commission also continues its outreach and relationship building with Indigenous organizations. In November 2019, the Chair of the Canadian Section attended and provided a presentation on the IJC at the Assembly of First Nation's Annual Water Symposium. In December 2019, Commissioners Lickers and Yohe gave a presentation to the AFN National Fisheries Committee. All six Commissioners also attended a Water Ceremony held at the Gathering of the Anishinaabe Nation cohosted in Brandon, Manitoba by Grand Council Treaty #3 and the Southern Chiefs' Organization in August 2019.

Commissioners Completing Service

Benoît Bouchard, 2013-2018



Canadian Commissioner Benoît Bouchard completed a one-year term as of June 21, 2018; he had previously served for four years from June 6, 2013 until June 5, 2017. Commissioner Bouchard brought decades of experience as a public servant to his role as commissioner, having previously served as a Member of Parliament, a Cabinet minister, Ambassador to France, chair of the Transportation Safety Board, and a representative in negotiations with First Nations. Commissioner Bouchard focused on issues related to flooding, pollution and water quality during his tenure, and was particularly interested in providing First Nations and Metis with a significant opportunity to be involved and in addressing the protection of children's health.

Richard Morgan, 2014-2018



Canadian Commissioner Richard Morgan completed a four-year term from Dec. 4, 2014 until Dec. 3, 2018. Prior to joining the Commission, Commissioner Morgan had 25 years of experience in government, business and management consulting, on topics ranging from natural resources and transportation to health sciences, including within the office of the Prime Minister. As a Commissioner, Mr. Morgan focused on issues confronting western Canadian Boards and watershed residents and on the renewal of the Commission's website, an important public information tool.

Rich Moy, 2011-2019



Before coming to the Commission, Rich Moy spent years focused on Indigenous water rights, water policy and water management across several positions. Over his career he worked as a land and water consultant, chair of the Flathead Basin Commission, at the Montana Department of Natural Resources and Conservation, and as an ecologist with Glacier National Park. He brought those interests to his work at the Commission, focusing on western water management and advocating for its protection.

Lana Pollack, 2010-2019



Lana Pollack served as the US Co-Chair on the Commission for nearly a decade, but her career focus on water issues stretched back decades. As a Michigan state senator, she advocated for bills that protected women, children and the environment, most notably a law that required proven polluters to clean up their toxic messes. Past her legislative career, she was president of the Michigan Environmental Council and taught at the University of Michigan, among other activities. As co-chair, Pollack was focused on the effects of chemical pollution in transboundary waters and climate change.

Gordon Walker, 2013-2018



Prior to joining the Commission, Commissioner Gordon Walker was a practicing lawyer, and served as a London, Ontario city councilor before being elected to the Ontario provincial parliament, where he served as a Cabinet minister for seven years.

Commissioner Walker served on the Commission from June 6, 2013 until Dec. 3, 2018, but this was actually his second tenure on the Commission, having also served from 1992 until 1995. He took on the role of Canadian Chair on an acting basis in January 2014 before being formally appointed in December of that year. Chair Walker was particularly interested in what could be done to reduce nutrient enrichment in transboundary waters and to control and eradicate invasive species across the boundary.

Board and Staff Members Completing Service

Several board members completed their service in 2018-2019, leaving a legacy of volunteer service and expertise:

Table 2: Board and Staff Members Completing Service

Name/Title	Board/Committee	Service Years
Kate Bassil	Health Professionals Advisory Board	2011-2018
Bryce Carmichael, secretary	Great Lakes Adaptive Management Committee	2017-2019
Anne Cook	Great Lakes Water Quality Board	2016-2018
Rob de Loë	Great Lakes Water Quality Board	2014-2019
Renaud DeLisle	International Lake Champlain-Richelieu River Study Board	2017-2018
Jessica Dexter	Great Lakes Water Quality Board	2015-2019
Marvourneen Dolor	Great Lakes Water Quality Board	2014-2019
Sam Dorevitch	Health Professionals Advisory Board	2016-2018
Gail Faveri	International Rainy-Lake of the Woods Watershed Board and Lake Ontario-St. Lawrence River Board	2011-2018
Richard Ferrero	Accredited Officers of the St. Mary and Milk Rivers	2015-2018
Karl Gebhardt	Great Lakes Water Quality Board	2015-2018
Gwyn Graham, secretary	Columbia River Board of Control, Kootenay Lake Board of Control, Osoyoos Lake Board of Control	2012-2018
Tinka Hyde	Great Lakes Water Quality Board	2017-2018
Andrea Kirkwood	Science Advisory Board-Science Priority Committee	2016-2019

Henry Lickers	Science Advisory Board-Science Priority Committee	2014-2019
Simone Lightfoot	Great Lakes Water Quality Board	2016-2019
Fred Luckey	Great Lakes Adaptive Management Committee	2015-2018
Charlene Mason	International Rainy-Lake of the Woods Watershed Board	2013-2018
David Mengebier	Great Lakes Water Quality Board	2014-2018
David O'Connell	International Souris River Study Board	2017-2018
Dale Phenicie	Science Advisory Board-Science Priority Committee	2014-2019
Russ Powers	Great Lakes Water Quality Board	2014-2018
Clare Robinson	Science Advisory Board-Science Priority Committee	2014-2019
Karen Sands	Great Lakes Water Quality Board	2016-2019
Darren Schepp, secretary	International Souris River Board	2017-2019
Bruno Tassone	International Columbia River Kootenay Lake and Osoyoos Lake Boards of Control	2012-2019
Dave Ullrich	Great Lakes Water Quality Board	1997-2019
James Wagar	Great Lakes Water Quality Board	2016-2019
Don Zelazny	Great Lakes Adaptive Management Committee	2015-2019

The Commission wishes to recognize with appreciation the staff members who completed their service in 2018-2019:

Name	Title	Section Office
Glenn Benoy	Senior Water Quality and Ecosystem Advisor	Canadian Section

Daniel Berube	Senior Systems Analyst	Great Lakes Regional Office
David Fay	Senior Engineering Advisor	Canadian Section
Nick Heisler	Senior Advisor	Canadian Section
Talante Henderson	Network Specialist (contractor)	US Section
David Hermann	Senior Advisor	US Section
Valerie Hoopes	Administrative Specialist	US Section
Andrew Keen	Management Analyst for Acquisition (contractor)	US Section
Cynthia Lahm	Administrative Assistant	Canadian Section
Michael Mezzacapo	IJC Sea Grant Fellow	Great Lakes Regional Office
Patricia Morris	Director	Great Lakes Regional Office
Randi Morry	Communications Advisor	Canadian Section
Cindy Warwick	Policy Analyst	Canadian Section

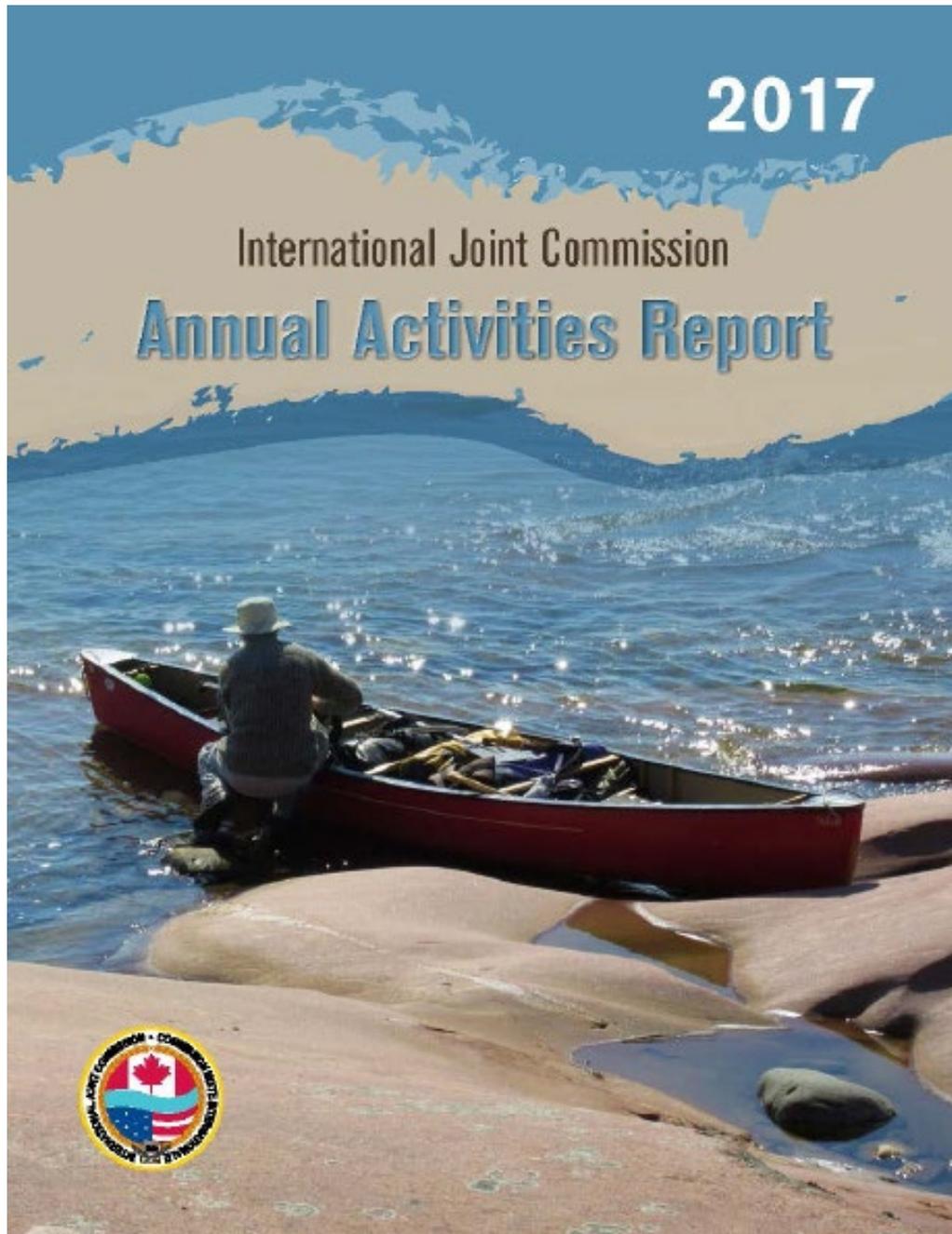
The Commission would also like to recognize with appreciation the students and interns who served in 2018-2019:

Name	Section Office
Kaelan Beckstead	Canadian Section
Rachel Carmichael	Canadian Section
Sarah Colbourn	US Section
Sarah Djeffal	Canadian Section
Bryce Dolishny-Sinclair	Canadian Section
Désirée Estephan-Saliba	Canadian Section

Andrew Heath	Canadian Section
Christopher Holland	Canadian Section
Maeesha Ibnat	Canadian Section
Kelsey Kennedy	Canadian Section
Paisley Meyer	US Section
Reem Ali Moawiya	Canadian Section
Patrick Orenstein	US Section
Gil Paolo-Adiao	Canadian Section
Nazifa Uddin	Canadian Section
Mackenzie Vaughn-Salt	Canadian Section
Michelle Woodhouse	Canadian Section
Findlay Yates-Lavery	Canadian Section
Maaha Zia	Canadian Section

Reports to Governments

Throughout 2018 and 2019, the Commission issued reports to governments on a variety of topics. Others were issued by the IJC boards themselves; more information on these can be found in the board sections



[2017 Annual Activities Report](#): This report summarizes all of the Commission's activities during the 2017 calendar year.

**Lakes Champlain and Memphremagog
Nutrient Loading and Harmful Algal Bloom Reference**

Interim Report

**International Joint Commission
November 2018**



[Lakes Champlain and Memphremagog Nutrient Loading and Harmful Algal Bloom Reference Interim Report](#): This report details the work done so far by the Commission regarding a reference to look into water quality issues on Lake Champlain and Lake Memphremagog. This interim report details the work plans and what has been achieved so far, along with an anticipated timeline of workshops and recommendations throughout 2019.

[Climate Change Guidance Framework for IJC Boards: A Highlights Report 2018](#): This report presents the essentials of the Commission's climate change framework for its boards, along with background information and how the framework process was developed. This report is to be updated annually. More information can be found under the IWI section of this report.

[Fertilizer Application Patterns and Trends and Their Implications for Water Quality in the Western Lake Erie Basin](#): This assessment of fertilizer application and impacts in the western Lake Erie basin consists primarily of research into commercial fertilizers and manure, as well as other nutrient-containing materials applied to agricultural lands. More information can be found under the Science Advisory Board section of this report. A supplement to this report featuring updated data was released in 2019 by the Science Advisory Board.

[Synthesis of Public Comment on the 2016 Progress Report under the Agreement between the Government of Canada and the Government of the United State of America on Air Quality](#): This document is a synthesis of comments received on the 2016 air quality progress report and a concise analysis of common themes seen in them. It is the thirteenth biennial report completed under the 1991 Canada-United States Air Quality Agreement and covers activities undertaken between 2014 and 2016.

Financial Summary

The Commission is funded by the United States and Canada directly through the US and Canadian IJC section offices in Washington, D.C. and Ottawa, Ontario, as called for in the Boundary Waters Treaty. Commission expenditures are reported in U.S. and Canadian dollars with no adjustment for the exchange rate.

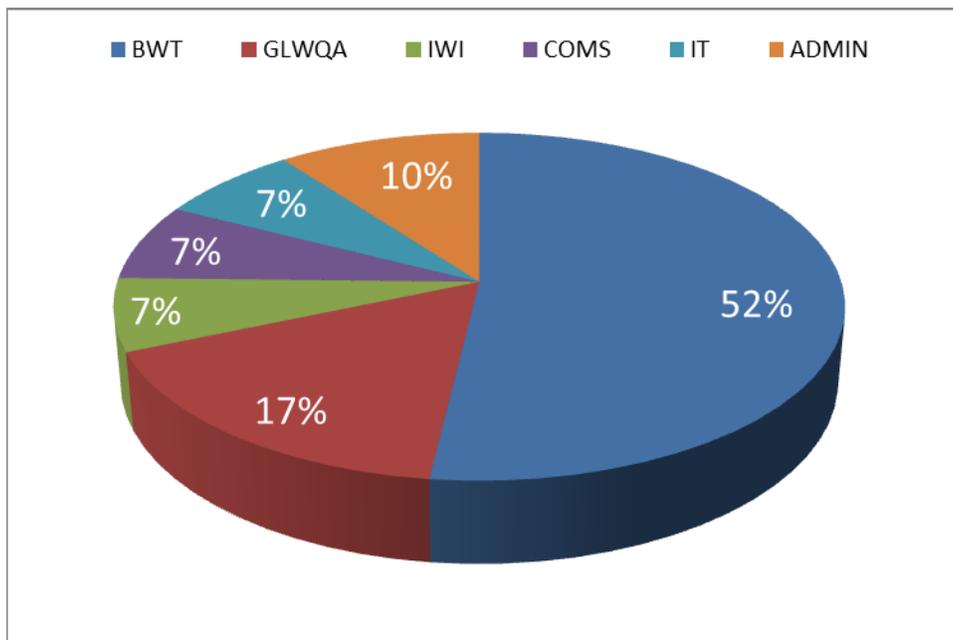
Table 3: For the purposes of this report, Commission expenditures are reflected in six categories in the table below:

Category/Acronym	Description
BWT	Work under Boundary Waters Treaty references and applications outside the Great Lakes Water Quality Agreement
GLWQA*	Work under Great Lakes Water Quality Agreement
IWI	International Watersheds Initiative project funding
COMS	Communications activities
IT	Information technology and support
ADMIN	Administrative costs

For 2018:

Commission expenditures in 2018 reflect US Fiscal Year Oct. 1, 2017-Sept. 30, 2018, and the Canadian Fiscal Year April 1, 2017-March 31, 2018.

Expense Area	Combined Expenditures
BWT	\$6,808,000
GLWQA	\$2,194,000
IWI	\$886,000
COMS	\$935,000
IT	\$947,000
ADMIN	\$1,531,000
Total	\$13,121,000

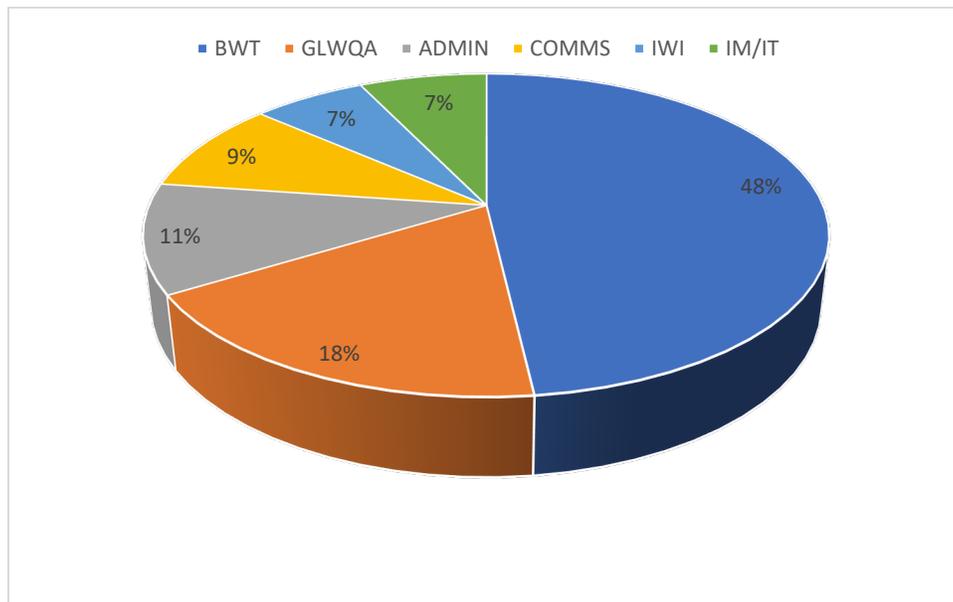


* Each section's budget contributes funds in the amount to \$1.6M for the Great Lakes Regional Office, which includes funds accounted for under operations, Communications, Administration and Information Technology in this summary.

For 2019:

Commission expenditures in 2019 reflect US Fiscal Year Oct. 1, 2018-Sept. 30, 2019, and the Canadian Fiscal Year April 1, 2018-March 31, 2019.

Expense Area	Combined Expenditures
BWT	\$7,094,178
GLWQA	\$2,669,040
IWI	\$940,109
COMS	\$1,356,060
IT	\$1,056,460
ADMIN	\$1,615,902
Total	\$14,731,749



* Each section's budget contributes funds in the amount to \$1.6M for the Great Lakes Regional Office, which includes funds accounted for under operations, Communications, Administration and Information Technology in this summary.