The International Joint Commission

Pierre Béland Chair, Canadian Section  Jane Corwin Chair, U.S. Section

Henry Lickers Commissioner  Rob Sisson Commissioner

Merrell-Ann Phare Commissioner  Lance Yohe Commissioner

IJC Commissioners from left to right: Commissioner Lickers, Commissioner Phare, Chair Béland, Chair Corwin, Commissioner Yohe, and Commissioner Sisson
Previous IWI Reports

For more information on the International Watersheds Initiative or the International Joint Commission (IJC), please visit the IJC’s website: www.ijc.org. Information also can be obtained by contacting any of the following IJC offices:

**United States Section Office**  
1717 H Street NW, Suite 835  
Washington, DC 20006  
Phone: 202-736-9000  
Fax: 202-632-2006  
commission@washington.ijc.org

**Canadian Section Office**  
234 Laurier Avenue West, 22nd Floor  
Ottawa, ON K1P 6K6  
Phone: 613-995-2984  
Fax: 613-993-5583  
commission@ottawa.ijc.org

**Great Lakes Regional Office**  
100 Ouellette Avenue 8th Floor  
Windsor, ON N9A 6T3  
Phone: 519-257-6700  
Fax: 519-257-6740OR  
P.O. Box 32869  
Detroit, MI 48232  
Phone: 313-226-2170 x6733  
commission@windsor.ijc.org

Ce rapport est également disponible en français.

Front cover photo credit: Minnesota Pollution Control Agency
Preface

As the second decade of the 21st Century comes to a close and the third begins, the International Watersheds Initiative (IWI) continues to prove both relevant and effective in sustainable custodianship of our boundary waters. With its integrated ecosystem approach, the IWI is uniquely structured to support collaborative, inclusive, and science-based adaptations for the future.

The IWI, and the International Joint Commission, also recognize that this inclusive approach must extend to Indigenous Peoples, whose knowledge, values, and wisdom broaden our understanding of water and support better decision-making about water resources. The IJC’s first Indigenous Commissioner, Dr. Henry Lickers, was appointed in May 2019. In addition to being a scientist with over 40 years of experience in environmental and water resource management, he is a Haudenosaunee citizen of the Seneca Nation, Turtle Clan.

To set the scene for this 5th Report on the International Watersheds Initiative, Commissioner Lickers suggested that the Haudenosaunee Thanksgiving Address would be uniquely appropriate. Translated to English, this address is known as, “The Words that come before all else”. The final verses are also being used to close this report. This particular translation was developed by John Stokes and Kanawahienton (David Benedict, Turtle Clan/Mohawk) and provided, courtesy of: Six Nations Indian Museum and the Tracking Project, All rights reserved.

Today we have gathered and we see that the cycles of life continue. We have been given the duty to live in balance and harmony with each other and all living things. So now, we bring our minds together as one as we give greetings and thanks to each other as people. Now our minds are one.

We are all thankful to our Mother, the Earth, for she gives us all that we need for life. She supports our feet as we walk about upon her. It gives us joy that she continues to care for us as she has from the beginning of time. To our mother, we send greetings and thanks. Now our minds are one.

We give thanks to all the waters of the world for quenching our thirst and providing us with strength. Water is life. We know its power in many forms- waterfalls and rain, mists and streams, rivers and oceans. With one mind, we send greetings and thanks to the spirit of Water. Now our minds are one.

We turn our minds to all the Fish life in the water. They were instructed to cleanse and purify the water. They also give themselves to us as food. We are grateful that we can still find pure water. So, we turn now to the Fish and send our greetings and thanks. Now our minds are one.
Now we turn toward the vast fields of Plant life. As far as the eye can see, the Plants grow, working many wonders. They sustain many life forms. With our minds gathered together, we give thanks and look forward to seeing Plant life for many generations to come. Now our minds are one.

With one mind, we turn to honor and thank all the Food Plants we harvest from the garden. Since the beginning of time, the grains, vegetables, beans and berries have helped the people survive. Many other living things draw strength from them too. We gather all the Plant Foods together as one and send them a greeting of thanks. Now our minds are one.

Now we turn to all the Medicine herbs of the world. From the beginning they were instructed to take away sickness. They are always waiting and ready to heal us. We are happy there are still among us those special few who remember how to use these plants for healing. With one mind, we send greetings and thanks to the Medicines and to the keepers of the Medicines. Now our minds are one.

We gather our minds together to send greetings and thanks to all the Animal life in the world. They have many things to teach us as people. We are honored by them when they give up their lives so we may use their bodies as food for our people. We see them near our homes and in the deep forests. We are glad they are still here and we hope that it will always be so. Now our minds are one.

We now turn our thoughts to the Trees. The Earth has many families of Trees who have their own instructions and uses. Some provide us with shelter and shade, others with fruit, beauty and other useful things. Many people of the world use a Tree as a symbol of peace and strength. With one mind, we greet and thank the Tree life. Now our minds are one.

We put our minds together as one and thank all the Birds who move and fly about over our heads. The Creator gave them beautiful songs. Each day they remind us to enjoy and appreciate life. The Eagle was chosen to be their leader. To all the Birds—from the smallest to the largest—we send our joyful greetings and thanks. Now our minds are one.

We are all thankful to the powers we know as the Four Winds. We hear their voices in the moving air as they refresh us and purify the air we breathe. They help us to bring the change of seasons. From the four directions they come, bringing us messages and giving us strength. With one mind, we send our greetings and thanks to the Four Winds. Now our minds are one.

Now we turn to the west where our grandfathers, the Thunder Beings, live. With lightning and thundering voices, they bring with them the water that renews life. We are thankful that they keep those evil things made by Okwiseres underground. We bring our minds together as one to send greetings and thanks to our Grandfathers, the Thunderers. Now our minds are one.
We now send greetings and thanks to our eldest Brother, the Sun. Each day without fail he travels the sky from east to west, bringing the light of a new day. He is the source of all the fires of life. With one mind, we send greetings and thanks to our Brother, the Sun. Now our minds are one.

We put our minds together to give thanks to our oldest Grandmother, the Moon, who lights the nighttime sky. She is the leader of woman all over the world, and she governs the movement of the ocean tides. By her changing face we measure time, and it is the Moon who watches over the arrival of children here on Earth. With one mind, we send greetings and thanks to our Grandmother, the Moon. Now our minds are one.

We give thanks to the Stars who are spread across the sky like jewelry. We see them in the night, helping the Moon to light the darkness and bringing dew to the gardens and growing things. When we travel at night, they guide us home. With our minds gathered together as one, we send greetings and thanks to the Stars. Now our minds are one.

We gather our minds to greet and thank the enlightened Teachers who have come to help throughout the ages. When we forget how to live in harmony, they remind us of the way we were instructed to live as people. With one mind, we send greetings and thanks to these caring teachers. Now our minds are one.

Now we turn our thoughts to the Creator, or Great Spirit, and send greetings and thanks for all the gifts of Creation. Everything we need to live a good life is here on this Mother Earth. For all the love that is still around us, we gather our minds together as one and send our choicest words of greetings and thanks to the Creator. Now our minds are one.

**Thanksgiving Address: Greetings to the Natural World**

Copyright © 1993 Six Nations Indian Museum and The Tracking Project.

ISBN 0-9643214-0-8

Reprinted by permission
Acknowledgements

The International Joint Commission thanks the governments of Canada and the United States for their continued support of the International Watersheds Initiative (IWI). Without their contributions and funding, the accomplishments highlighted in this report would not have been possible. IJC boards deserve special recognition for embracing the IWI to help address the challenging binational water issues in their basins.

All Commissioners have shown a keen interest and have been actively involved in the IWI. The Commission particularly acknowledges former U.S. Commissioner Irene Brooks and former Canadian Commissioner Jack Blaney, who were instrumental in moving the IWI forward in its early years.

The outstanding work of the Transboundary Hydrographic Harmonization Task Force and the Binational SPARROW Modelling Team exemplifies the importance and value of the IWI.

The Commission acknowledges the hard work and dedication of the IWI Coordinators over the past five years: Mark Colosimo on the U.S. side, and Pierre-Yves Caux on the Canadian side.

The work of Michael Laitta from the U.S. Section of the IJC and a number of geospatial co-op students on geospatial aspects of the IWI and work by Samantha Klaus, Catherine Lee-Johnston, and Tristan Lecompte of the Canadian Section as well as Brian Maloney and Adam Greeley of the U.S. Section on project administration greatly contributed to the overall success of the IWI. The Commission would like to acknowledge the contributions to this final report of lead drafters David Dempsey and Kevin Bunch, its staff, and boards.
International Watersheds Initiative:  
Building on Success  
Fifth Report

Executive Summary

The Boundary Waters Treaty of 1909, which established the International Joint Commission (IJC), has been called a model for managing shared water resources. It provides a framework for the cooperative management of waters straddling or flowing across the Canada-U.S. border. Its core premise – that water knows no political boundaries – has successfully guided the U.S. and Canada in preventing and resolving transboundary water disputes for well over a century.

Launched at the request of the Canadian and U.S. governments in November 1998, the IJC’s International Watersheds Initiative (IWI) moved from that premise to a bedrock operating principle: that transboundary watershed problems are best prevented and resolved in an integrated fashion by those who live and work in that watershed. Everything done in the name of the IWI is consistent with that principle.

This fifth report on the IWI, in keeping with the mandate from the governments in their 1998 request to make periodic reports, spans the years 2015-2019 and demonstrates the progress made during those years, with a look ahead to the next five years and the opportunities that those years present. In its fourth IWI Report (International Joint Commission 2015), the IJC called the IWI a cornerstone of its work in transboundary watersheds. With continued support from the IJC and governments in years to come, the IWI promises to build on its substantial accomplishments.

In proposing the IWI in its 1997 report to governments, The IJC and the 21st Century (International Joint Commission, 1997) the IJC stated that the establishment of international watershed boards would “provide a much improved mechanism for avoiding and resolving transboundary disputes by building a capacity at the watershed level” to deal with the increasingly complex water-related and other environmental challenges that could be foreseen for the 21st century. As set forth in this report, the IWI continues to demonstrate the intrinsic value of international watershed boards and revalidates this vision as the most resilient model for the future.
Objectives and Approaches

Under the conflict prevention and resolution goal of the IWI as agreed to by governments in 1998, the IWI has three objectives:

1. Contributing to the prevention and resolution of watershed issues by building a shared scientific understanding of watershed issues by harmonizing data and information, developing shared tools, knowledge and expertise, and expanding outreach to and cooperation among stakeholders and Indigenous communities.
2. Contributing to the prevention and resolution of watershed issues by communicating transboundary water issues at the local, regional, and national levels, including First Nations, Métis and Tribes, to increase awareness and understanding of these important issues.
3. Contributing to the prevention and resolution of watershed issues by facilitating discussions, participating in development of shared solutions, creating decision-making tools, fostering common ground, brokering resolutions, and bringing unresolved issues to the attention of the IJC, including by engaging with broader communities that are affected by these issues more directly.

The IWI strives to identify and bring together programs and individuals with an interest in water quality, aquatic ecosystem health and water quantity in each IWI watershed. In so doing, the IWI has succeeded in developing and tailoring solutions to local issues, while reducing duplication and making best use of existing resources and expertise, including local and government (federal, state, and provincial) experts.

The IWI navigates through existing frameworks to promote and coordinate watershed-level approaches to transboundary issues, instead of adding to bureaucracy. But new, informal coordination and collaboration has also been forged.

Work in Diverse Watersheds

The IWI led to the creation of international watershed boards in the St. Croix and Rainy River-Lakes of the Woods watersheds, and pilot international watershed boards in the Red River and Souris River basins.
### Benefits of Designation as a Watershed Board

#### Benefits to environment and community:
- ✔ Ability to prevent and resolve water resource and environmental problems locally;
- ✔ Inclusive and diverse membership that provides more expertise, resources and perspectives;
- ✔ Ability to look at watershed as a whole, allowing for greater diversity of projects and collaborative work with agencies, NGOs, and others;
- ✔ Ability to more effectively execute board mandates;
- ✔ Increased trust and problem solving through local collaboration and input; and
- ✔ Ability to address emerging issues promptly.

#### Benefits to governments:
- ✔ A forum for the early discussion of concerns in a neutral, non-adversarial manner, thereby preventing disputes and the potential costs to governments that come with them;
- ✔ Access to new information sharing methods, technology, models;
- ✔ Renewed engagement of binational institutional structures;
- ✔ Better understanding of shared responsibilities;
- ✔ Development of practical, local solutions through existing networks on the ground;
- ✔ Ability to address emerging issues promptly; and
- ✔ Increased ability to leverage with local activities and projects.

These boards work to build a shared understanding of the watershed, communicating watershed issues at all levels, resolving these issues, preventing potential disputes, and administering existing orders and references from the governments. The boards also depend on public input through public meetings and informal channels.

The IWI supports activities in basins beyond the four named above. For example, IWI efforts have helped address needs in Osoyoos Lake and the Lake Ontario-St. Lawrence River watersheds. Since 2015, the Osoyoos Basin has experienced droughts as well as flooding. The board developed IWI projects explaining to the public how the system is operated, including the award-winning documentary *A River Film* in 2017, and the design and placement of historic high-water markers in two parks (one each in the U.S. and Canada) located adjacent to Osoyoos Lake. These markers are a permanent reminder of the possibility of future high water levels.
One of the most critical and challenging issues the IJC has recently faced is severe flooding in the Lake Ontario – St Lawrence River watershed in 2017 and again in 2019. The Great Lakes – St. Lawrence River Adaptive Management (GLAM) Committee, working in collaboration with the International Lake Ontario – St Lawrence River Board, undertook IWI projects to evaluate the effects of the high water and to identify data and information gaps.

In July 2019, the IJC directed staff to work with the GLAM Committee and the Lake Ontario-St. Lawrence River Board to explore using IWI funding to identify priority projects and developed four Scopes of Work (SOW) for which U.S. and Canadian Section IWI funding was available. These include an economic assessment of the impacts on commercial navigation on the St. Lawrence Seaway from dangerous velocities and cross currents, as well as engaging South Shore Lake Ontario municipalities in documenting high water impacts to support GLAM's expedited Plan 2014 review. Two further studies investigated the potential for increased outflows on the St. Lawrence River during winter operations and how changes in flow rates and low water levels impact critical ice cover formation and municipal and industrial water intakes in Lake St. Lawrence.
Process Improvements

The IJC has adapted and improved IWI activities and process to meet changing priorities and to improve the effectiveness and relevance of the work done by the IJC as well as all levels of government agencies that are associated with IJC boards. The 2015 IWI report emphasized continued consultation with boards and governments to further refine priority issues. IJC staff communicated with boards on incorporating priority issues into board work plans. The report called for the convening of workshops and webinars to improve board understanding of the strategic priorities. This has led to multiple workshops since 2015.

Public Involvement

The 2015 IWI report called for greater local public involvement through more diverse board membership. The IJC had previously formed a Community Advisory Group and Industry Advisory Group in the Rainy-Lake of the Woods watershed in 2013 to enhance public engagement. The IJC also added First Nations, Métis and Tribal leaders to the Rainy-Lake of the Woods Watershed Board, added four local members to the Osoyoos Board and added two local members to the Souris Board. The IJC added two more local members to the Lake Ontario-St. Lawrence River Board in 2019. This diverse board membership contributes to dispute prevention by bringing key voices to the table to discuss their concerns so they can quickly be addressed.

Following up on other priorities, the IJC has increased the visibility and promoted the relevance of the IWI website and produced additional newsletter articles on IWI activities; included IWI activities in the IJC annual activities report; and improved international collaboration through use of online project management systems.

The IJC has overseen other IWI process improvements, including better tracking of projects, establishing a new web-based system to foster internal communication within boards, and enhancing reviews of completed projects. The IJC has also strengthened the project proposal evaluation and selection process. Improvements have been made to the IWI project management system and more personnel have been dedicated to it.
**Leveraging Dollars, Emphasizing Science**

One of the most important IWI values is the IJC’s emphasis on pursuing opportunities to leverage additional non-IWI resources. This helps deliver on the IWI dispute prevention and resolution mandate while reducing duplication of effort and ensuring prudent expenditure of IWI funds. Between 2015 and 2019, IWI projects have leveraged $5,530,776 in external funds and $2,498,066 worth of in-kind contributions.

Science has been a key IWI project emphasis. Of the 47 IWI project proposals that were completed or are currently ongoing from 2015-2019, 35 had the primary objective of “promoting a shared scientific understanding of watershed issues” under the IWI’s dispute prevention and resolution goal and mandate.

**Accountability**

Documenting program accomplishments, quantifying return on investment, and strengthening communication with governments are critical to the IJC. Meetings in 2018 and 2019 among staff of IJC, Global Affairs Canada (GAC) and the U.S. Department of State (DOS) resulted in a shared understanding of the importance of appropriately communicating program news and successes with governments, and the need for increased clarity in IWI objectives and how IWI projects and initiatives achieve them.
**Issues Along the Transboundary**

The IJC has, through the IWI, begun the assessment of impacts on water quantity and quality in transboundary basins resulting from climate change. The IJC refined and strengthened its Climate Change Guidance Framework (CCGF), helping boards that have a mandate to manage water levels or flows and water apportionment or monitor flood preparedness to deal with one of the most important challenges of the 21st Century.

The IJC has become increasingly aware of water quality concerns across the United States-Canadian transboundary region. In the four international basins outside the Great Lakes where the IJC has an existing mandate to report on water quality, the IJC is to review existing water quality objectives through its boards and make recommendations to governments regarding changes.

A proposed 2020-2025 IWI strategic initiative, linking back to the original 1998 request from governments, is to assess the merits of, and stakeholder support and timing for, establishing international watershed boards in other transboundary basins. This would allow exploration of whether the success of the IWI binational approaches and its solutions can be applied in these shared waters.

**Looking Ahead**

Designed by the IJC, the 2020-2025 IWI Plan was reviewed by representatives from multiple IJC boards. Further, IJC meetings with Global Affairs Canada (GAC) and Department of State (DOS) have helped IJC understand the perspective of the governments and their input has been considered in the IWI Plan. IWI Plan elements for 2020-2025 are designed to play a role in further achieving the IWI’s objectives and improving the program’s efficiency.

With continued support from governments, the IWI promises to be an even more valuable instrument in helping the U.S. and Canada prevent and resolve disputes affecting boundary waters in the next five years.
Acronyms

CCGF   Climate Change Guidance Framework
DFO   Department of Fisheries and Oceans (Canada)
DOS   Department of State (U.S.)
ECCC   Environment and Climate Change Canada
EPA   Environmental Protection Agency
GLAM   Great Lakes Adaptive Management Committee
GAC   Global Affairs Canada
IRLWWB   International Rainy – Lake of the Woods Watershed Board
IERM   Integrated Ecosystem Response Model
IOLBC   International Osoyoos Lake Board of Control
IRRB   International Red River Board
ISCRWB   International St. Croix River Watershed Board
ISRB   International Souris River Board
MPE   Multi-Precipitation Estimates
NRC   National Research Council Canada
NRCAN   Natural Resources Canada
RFPI   Request for Project Ideas
SOW   Scopes of Work
SPARROW   Spatially-Referenced Regression on Watershed Attributes
USACE   U.S. Army Corps of Engineers
USGS   U.S. Geological Survey
WQ   Water Quality
WQO   Water Quality Objectives
Overview

This report by the International Joint Commission (IJC) to the Governments of Canada and the United States on the International Watersheds Initiative (IWI) presents activities and accomplishments from 2015 to 2019. It tells the story of significant, continuing progress toward the transboundary water stewardship goals and objectives articulated by the IJC and the governments over 20 years ago. It also envisions further enhancements to the IWI in years to come.

A 1998 IWI reference letter (Canada Department of Foreign Affairs, U.S. State Department 1998) from the governments affirmed their interest in creation of the IWI to assist in preventing and resolving conflicts and called on the IJC to report on the Initiative at regular intervals. This is the fifth IJC report on the IWI. The IJC previously reported to the governments on IWI in 2000, 2005, 2009 and 2015. The 2009 report was issued earlier than on the five-year cycle as part of the commemoration of the 100th anniversary of the Boundary Waters Treaty.

The Boundary Waters Treaty of 1909, which established the IJC, is one of the world’s longest-lasting transboundary water agreements. Canada and the U.S. have much at stake in maintaining positive relations with respect to water stewardship in the transboundary region, since approximately 43% of the 8,891-kilometer (5,525-mile) boundary traverses water. The Treaty calls on the IJC to assist the two nations by preventing and resolving disputes involving these boundary waters. The IWI helps fulfill the IJC’s mandate.

The IWI reflects the latest wisdom regarding stewardship of transboundary waters, an approach that flowed from the reference from governments. Traditionally, IJC transboundary boards approached issues from the perspective of either water quality or water quantity. In reality, water quality and quantity management are inseparable, and influence aquatic ecosystem health. The IWI recognizes this.

Prior to the IWI, the IJC’s transboundary boards outside of the Great Lakes basin typically consisted largely of government agency personnel and did not systematically interact with each other. From an organizational perspective, the boards were unable to build on each other’s knowledge and experience. Membership at the time also limited local perspectives. The IWI is helping to change that.

The IWI looks at whole watersheds and the range of problems and resources found in those watersheds. Just as important, its premise is that local people and institutions are typically best positioned to prevent or resolve many transboundary water disputes.
The IWI’s strategic approach and emphasis has evolved over the years. The IWI has benefited from multi-board input to improve efficiency and effectiveness. In the 2015 report, the IJC pledged it would continue to work closely with governments, boards and all transboundary interests in implementing IWI principles, and that it would convene workshops and webinars with the boards to assist in understanding of priorities. The strategic approach has been systematized, with science-based workshops, staff submittal of proposed priority issues and Commissioner choice of the IJC’s priority issues.

To respond to lessons learned in the implementation of the IWI, the IJC is further strengthening IWI management through the development of an IWI plan that includes proposals for additional program enhancements and directions for 2020-2025.

The remainder of this report outlines the IWI’s origins, goal, and objectives in brief. It also provides IWI program assessments; highlights key IWI accomplishments; presents IWI challenges, opportunities and key findings; discusses lessons learned; and presents the IJC’s vision for moving forward on the IWI.
Chapter 1

Origins, Goal, and Objectives
The IWI reaches back to a 1997 request from the U.S. and Canadian governments for advice “on how the Commission itself might best assist the parties to meet the environmental challenges of the 21st Century within the framework of their treaty responsibilities.” In October 1997, the IJC’s report, *The IJC and the 21st Century*, recommended a watershed approach across the boundary to enable the IJC to better assist the governments in preventing and resolving disputes related to shared waters.
Via a reference in November 1998, the governments accepted in principle the proposal outlined in the IJC’s report to establish international watershed boards, implementing an integrated ecosystem approach, to assist in helping prevent and resolve disputes. Specifically, the reference outlined five tasks for the IJC:

- Defining the IWI framework;
- Identifying where the first international watershed board might be established;
- Recommending the structure and composition of watershed boards;
- Projecting costs; and,
- Entering into consultations with stakeholders on the establishment of additional international watershed boards.

The IJC replied with its first IWI report, Transboundary Watersheds, in 2000 (International Joint Commission 2000). The report identified the Red River and St. Croix River basins as candidates for the implementation of the watershed management approach and observed that stakeholders in those watersheds were willing to establish a watershed board. The report also identified the Rainy River and Souris River watersheds as potential locations for pilot watershed boards. The IJC outlined notional budget requirements totaling $165,000 for initial establishment of one watershed board, including $25,000 for scientific studies and $75,000 for outreach and work with in-basin stakeholders. The U.S. government responded with special funding for further development of the IWI concept.

The second IWI report, submitted by the IJC in 2005, affirmed the potential benefits of establishing international watershed boards in the Rainy, Red and St. Croix basins (International Joint Commission 2005). With the IWI concept more fully developed, the IJC estimated annual budget requirements for the IWI and recommended that funding be used for outreach, education, partnership building and better understanding of boundary watersheds. The governments responded favorably and the U.S. government advanced funds for IWI in 2006. In 2007, the Canadian government allocated five years of funding for the IWI with an ongoing commitment for subsequent years, enabling matching expenditures with the U.S. The same year, the IJC designated the St. Croix River Board as the first watershed board, adding the Souris River to the list of potential pilot boards.

“The IWI program has funded several initiatives over the last few years to help us gather critical data in the St. Marys Rapids and help us begin development of an ecosystem model. This tool will help the International Lake Superior Board of Control understand the impacts of outflow decisions on the critical habitat immediately downstream of the control structures. Board decisions and regulation plans have a large impact on this area, and the IWI program has helped us fill a critical knowledge gap of our influence on spawning habitat in the rapids.”

- John Allis, GLAM U.S. Co-chair, US Army Corps of Engineers - Detroit District

The second IWI report, submitted by the IJC in 2005, affirmed the potential benefits of establishing international watershed boards in the Rainy, Red and St. Croix basins (International Joint Commission 2005). With the IWI concept more fully developed, the IJC estimated annual budget requirements for the IWI and recommended that funding be used for outreach, education, partnership building and better understanding of boundary watersheds. The governments responded favorably and the U.S. government advanced funds for IWI in 2006. In 2007, the Canadian government allocated five years of funding for the IWI with an ongoing commitment for subsequent years, enabling matching expenditures with the U.S. The same year, the IJC designated the St. Croix River Board as the first watershed board, adding the Souris River to the list of potential pilot boards.
The third IWI report, 2009’s *The International Watersheds Initiative: Implementing a New Paradigm for Transboundary Basins*, coincided with the 100th anniversary of the Boundary Waters Treaty and contained news of significant progress on a variety of fronts, from board structure and membership to conflict resolution and prevention, thanks to funding from the governments (International Joint Commission 2009). The report included recommendations for action by the watershed boards, the IJC and governments to advance the IWI. A critical feature of the 2009 report was a list of priority areas for action, a framework for the IWI including mandate, scope of activities, operating principles and a strategic process for organization and management of IWI boards and IWI-funded projects. The IJC requested that annual funding for the IWI from governments be increased to $1 million, split evenly between the U.S. and Canada.

The governments responded to these recommendations in 2011. The U.S. government particularly supported the IJC’s efforts in transboundary hydrographic data harmonization and encouraged the IJC to strengthen partnerships with Tribal, First Nations and Métis governments. The Canadian government included specific responses to the report’s recommendations such as funding and the composition of international watershed boards. Between 2010 and 2015, the governments invested approximately $5 million in the IWI (see Table 1).

The IJC moved forward on hydrographic data harmonization in transboundary basins. Workshops in 2010 and 2012, with active participation from IJC boards, led to the launch of a second strategic effort, focusing on water quality and water quantity modeling. A binational water quality effort using the SPARROW (Spatially-Referenced Regression on Watershed Attributes) model followed along with the expansion of its application into additional basins.

In 2013, the IJC, with support of the governments, established the second officially designated international watershed board, the International Rainy-Lake of the Woods Watershed Board (IRLWWB), by amalgamating the existing International Rainy Lake Board of Control and the International Rainy River Pollution Board and adding water quality responsibilities in Lake of the Woods.

“Data Harmonization is foundational to work of the IRLWWB and member agencies – essential to the Board’s development of Objects and Alert Levels; the IJC Sparrow basin model; and agency integrated watershed-lake pollution load modeling (i.e., Minnesota’s phosphorus TMDL; Canada’s Can-SWAT/ELCOM CAEDYM). The Board is currently exploring how the climate change framework and adaptive management initiatives can improve responsiveness and resilience in management of basin waters.”

-Diane de Beaumont, Canadian Secretary, International Rainy-Lake of the Woods Watershed Board
In 2015, the fourth IWI report to the governments, *The International Watersheds Initiative: From Concept to Cornerstone of the International Joint Commission*, summarized progress on the initial priority issues of the IWI. These priorities focused on the development of tools and techniques needed to address transboundary issues. The report proposed a new set of priority issues associated with changes to ecosystems due to natural or anthropogenic influences.

After a series of meetings on the development of the new set of priority issues and based on feedback received from the IJC boards, the IJC adopted a strategic plan in 2015. In the fourth IWI report the IJC identified three overarching topics as new priority issues, including the impacts on water quantity and quality in transboundary basins from climate change, impacts on water quality in transboundary basins from nutrient loading and eutrophication/harmful algae blooms and impacts on the quality of transboundary waters from heavy metals and associated contaminants.

**Table 1: IWI Expenditures, by Country**

<table>
<thead>
<tr>
<th>Canadian Fiscal Year</th>
<th>Canadian Expenditures (Cdn $)</th>
<th>U.S. Fiscal Year</th>
<th>U.S. Expenditures (U.S. $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-2016</td>
<td>$515,258</td>
<td>2015</td>
<td>$587,097</td>
</tr>
<tr>
<td>2016-2017</td>
<td>$545,190</td>
<td>2016</td>
<td>$319,594</td>
</tr>
<tr>
<td>2017-2018</td>
<td>$356,208</td>
<td>2017</td>
<td>$315,384</td>
</tr>
<tr>
<td>2018-2019</td>
<td>$384,025</td>
<td>2018</td>
<td>$595,150</td>
</tr>
<tr>
<td>2019-2020</td>
<td>$300,358</td>
<td>2019</td>
<td>$690,430</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$2,101,039</td>
<td></td>
<td>$2,507,655</td>
</tr>
</tbody>
</table>

*Canadian fiscal years are April 1-March 31. U.S. fiscal years are October 1-September 30.*
IWI Principles

The goal of the IWI for the past two decades has been to help prevent or resolve transboundary water issues, grounded in the belief that local communities, given appropriate assistance, are best placed to achieve solutions. The IWI has provided a holistic approach to water management that, through IWI-defined projects, enables IJC boards to gain a better scientific understanding of problems and communicate findings to binational resource managers, thereby providing a progressive means by which the IJC and its boards can deliver on their individual mandates.

The IWI framework, or problem-solving approach, is the result of extensive IJC efforts reaching back to 2008. IJC boards participated in a workshop in March 2008 and agreed on IWI operating principles in October of that year. **Those principles are:**

1. An integrated ecosystem approach to transboundary water issues;
2. Binational collaboration;
3. Involvement of local expertise;
4. Public engagement;
5. Balanced and inclusive board representation;
6. Open and respectful dialogue; and
7. An adaptive management perspective.

The first and fundamental principle, the ecosystem approach, was a change from previous frameworks where transboundary water issues were often seen as centered on a specific location or were examined as pollution problems in isolation from other matters. The IJC’s experience with the Great Lakes Water Quality Agreement, beginning in 1972, changed that perspective (Governments of Canada and the United States of America, 1972). The governments explicitly embraced the ecosystem approach in the 1978 iteration of the Agreement. It is clear transboundary water issues must be addressed in an integrative manner, including both biophysical and human aspects. Problems that arise in the transboundary environment are seldom disconnected from a larger context.

The aim of the IWI is to facilitate conflict prevention and resolution through watershed-level solutions to transboundary environmental challenges, promoting science, communication, collaboration and coordination among various stakeholders and interests, using an integrated ecosystem approach.
The ecosystem approach recognizes that ecosystems function as whole entities and should be managed as such, looking beyond traditional jurisdictional boundaries.

Balanced and inclusive board membership has long been an IJC priority. Since 2015, the IJC has taken additional steps to emphasize appointment of local, non-governmental members to its boards to assist them in understanding local concerns and to foster a better understanding of the role of the IJC. Diverse board membership and extensive public outreach help the IJC fulfill Article XII of the Boundary Waters Treaty, which provides that “all parties interested therein shall be given convenient opportunity to be heard.”

Implementing IWI principles has helped the IJC accelerate and strengthen this effort through expanded membership on its watershed and pilot watershed boards. The IJC has accomplished this while assuring the boards do not become so large that decision-making is slowed and accountability diluted. This contributes to the IWI goal of dispute prevention by bringing communities into discussions on shared waters so that voices in the basins can be heard and potential disputes can be prevented by early discussion. Increased diversity is being achieved in part through broadening board membership to include representatives of Indigenous Nations and Tribes, consistent with recommendations from the Canadian and U.S. governments. In 2013 the IJC set a goal of 50% local, public members on each international watershed board, while striving for a diversity of disciplinary perspectives, gender parity, and inclusion of non-governmental organizations. The IJC has achieved this goal for the International Rainy-Lake of the Woods Watershed Board (IRLWWB) and has made considerable progress toward the goal for the International St. Croix River Watershed Board.

IJC Diversity Policy for Board Appointments

The Guiding Principles of the IJC provide that the IJC seeks to ensure the inclusion of appropriate expertise in the membership of its boards, while drawing that expertise from a diversity of sources on a non-discriminatory basis.

The IJC values diversity and the benefits it can bring to its boards, committees and work groups. The IJC is committed to a merit-based system for board composition within a diverse and inclusive culture and strives for this in all its boards through application of its diversity policy.

In addition to the board diversity policy, watershed boards stress the importance of the inclusion of local board members in addition to scientists.
to build on existing local groups and basin commissions in forming these outreach groups.

Adaptive management is an essential element of best management practices and a strong contributor to addressing binational ecosystem water stewardship challenges. The IJC has embraced adaptive management in its IWI principles. Adaptive management is a structured, iterative process for continually improving management results by learning from the outcomes of previous policies and practices. Adaptive management recognizes some level of scientific uncertainty always exists when addressing environmental issues.

IWI Objectives and Strategic Process

The three overarching objectives outlined in past IWI communications with governments remain critical today. Each objective serves to contribute to the IWI goal of prevention and resolution of watershed conflicts. They include:

1. Contributing to the prevention and resolution of watershed issues by building a shared scientific understanding of watershed issues by harmonizing data and information, developing shared tools, knowledge and expertise, and expanding outreach to and cooperation among stakeholders and Indigenous communities to prevent and resolve watershed issues.

2. Contributing to the prevention and resolution of watershed issues by communicating transboundary water issues at the local, regional, and national levels, including First Nations, Métis and Tribes, to increase awareness and understanding of these important issues in order to prevent and resolve watershed issues.

3. Contributing to the prevention and resolution of watershed issues by facilitating discussions, participating in development of shared solutions, creating decision-making tools, fostering common ground, brokering resolutions, and bringing unresolved issues to the attention of the IJC, including by engaging with broader communities that are affected by these issues more directly.

Since the IWI fourth report, the IJC has refined these objectives to reflect updated priorities, which capture the importance of Indigenous engagement. These updated priorities are discussed in Chapter 4 under IWI opportunities, IWI Priorities 2019-2023.

The IWI strategic process begins with a workshop and solicits input from boards. In the latest five-year cycle, the IJC organized six workshops including a multi-board strategic workshop, three on the Climate Change Guidance Framework, one on data harmonization and SPARROW, and one on general topics. Participants in workshops discussed gaps, needs, challenges and opportunities presented by IWI. Boards identified the need for climate change adaptation as a priority.
In the cycle leading up to this report, the IJC reviewed IWI outcomes and the program process. Review and approval by IJC Commissioners have concluded the process of developing revised and new priorities.

The IJC’s efforts since the governments’ 1998 IWI reference have not only resulted in improved science, dispute prevention and resolution, public understanding and public participation in transboundary watershed matters, but also laid the groundwork for further improved stewardship of these watersheds through the 21st Century.
Chapter 2

Program Assessments
The IWI has undergone rigorous review, analysis and renewal since its inception. Program assessments have yielded important findings about the IWI, which have been incorporated into the program design and operation. The result is an initiative that has evolved to reflect lessons learned and changing needs. Further, these reviews have strengthened program accountability and the communication of project outcomes.

Because the focus in the early years of the IWI was establishing and developing the program, formal assessments did not take place during that time, but informal discussions took place that led to improvements. This chapter describes comprehensive, formal assessments undertaken as the IWI has matured over the last decade.

**Third IWI Report (2009)**

In the third report, the IJC found that taking an integrated, ecosystem approach to transboundary waters by improving scientific knowledge and strengthening capacity at the local level had proven effective, practical and intellectually sound.

An important finding was that each transboundary basin is different, and various models or paths to a watershed approach are appropriate, depending on the local context and circumstances. The IJC concluded that the initial IWI focus on establishment of international watershed boards in the St. Croix and Rainy-Lake of the Woods basins had worked and should continue, but that different mechanisms might be appropriate elsewhere along the border.

**IJC Retreat (2013)**

At a retreat of Commissioners and staff, an IWI review was a major focus of attention. It was agreed that the IWI does not change IJC’s responsibilities or priorities per se, but provides another way to achieve its goals and aspirations. One of the hallmarks of the IWI is integration – of issues, interests, and information.

Participants agreed that the keys to success in achieving the goal and aspirations of the IWI include but are not limited to:

- The extent to which initiatives are locally-driven;
- The presence of a local champion or leadership;
- Board and government agency support;
- Diverse representation – including Indigenous peoples, agencies, stakeholders, and more,
- Time, patience, and continuous communication; and
- Providing peer-to-peer consultation and learning across watersheds.
Commissioners determined that a collaborative process among Commissioners, staff and boards should be used to establish thematic priorities and that the proposal process should be clarified. The IWI has undergone rigorous review, analysis and renewal since its inception. The participants also discussed potential future IWI priority issues.

Shared with the boards at the IJC October 2013 semi-annual meeting, these ideas received their support, along with their input on future priority issues for the IJC that should be incorporated into the IWI, as well as other IJC work activities.

**2015 Multi-Board Workshop**

In October 2015, IJC staff convened a workshop with transboundary boards. Nearly 60 people from IJC boards and IJC staff participated in the workshop, whose purpose was to obtain board input on the approach and activities, tools, methods and products required to address the IJC’s new priority issues. The workshop facilitated board collaboration, knowledge transfer, and discussion on the ongoing IWI strategic Initiatives and other key board work. Another key item at the workshop was exploring with the boards how to highlight accomplishments, improve communication and better promote the results of IWI projects.

**Continuing IWI Program Assessment**

In June 2018, IJC staff met with staff of Global Affairs Canada and the Department of State to discuss the IWI. IJC staff delivered a presentation that outlined an overview of the history, purpose, successes, and future planning of the IWI program. The presentation also set the table for Commissioner discussion on possible future directions for the IWI.

The main messages taken from the meeting were that the IJC should further enhance communication with the governments, as IWI funders, regarding program developments and successes, and that the IJC should increase clarity regarding IWI objectives and how IWI initiatives and projects help achieve them.

Taking the feedback from the meeting, IJC staff and independent experts started a review of IWI performance in an August 2018 workshop, seeking to further identify opportunities for improving the IWI. The workshop included discussion on current strategic initiatives. Participants discussed the possibility that data harmonization would wrap up in 2019 and that the task force would shift to a custodial role, ensuring that this initiative remains on the radar of the Canadian and U.S. government agencies and that transboundary water quality modeling (SPARROW) efforts continue.
Continuous improvement is demonstrated by the IWI strategic process since 2008. Workshops or priority selection exercises have occurred almost annually. Changes to the Request for Project Ideas (RFPI) process have also been initiated in order to better align projects with the priorities. In addition to other communications with governments, the IJC is initiating a projects list with status of IWI projects that it provides to governments at semi-annual meetings.

The history of IWI program assessment demonstrates the IJC’s commitment to continuous improvement of the IWI, to conserve limited IWI resources, and to communicate with the governments.
Chapter 3

Key IWI Program and Board Accomplishments
This chapter describes key recent accomplishments under international watershed boards, pilot international watershed boards, and in other transboundary basins. Projects highlighted here, like all IWI projects, align with board work plans that are regularly updated and are consistent with the boards’ mandates. Although projects differed in their objectives and activities, all had one goal: helping the IJC fulfill its Treaty mandate to assist the governments in preventing and resolving disputes over shared waters.

Project proposals submitted to the IWI and subsequently accomplished by the respective boards must be consistent with the objectives of the IWI, and must include a communications plan to inform the interested public, including other researchers and end users of the study, of its progress and final results. The first step in this process often involves collecting scientific evidence through studies, models and surveys to build an understanding of watershed issues. Nearly all IJC boards along the transboundary have conducted or started IWI-funded scientific studies that will help them meet their objectives. These projects revolve around gaining a greater understanding of each watershed’s aquatic ecosystem health, water quality and water quantity.

IWI Objective: Contributing to the prevention and resolution of watershed issues by harmonizing data and information, developing shared tools, knowledge and expertise, and expanding outreach to and cooperation among stakeholders.

International St. Croix River Watershed Board

The annual anadromous fish count at the Milltown dam fishway research trap began in 1981 and provides the scientific basis for measuring the progress of international efforts to restore sea-run alewife, blueback herring, and American shad to the St. Croix River watershed. This project plays an important role in improving the collective understanding of aquatic ecosystem health in the St. Croix River, supporting and validating fish population models used for alewife restoration planning, and resolving and preventing conflicts in the watershed.

From 1995 to 2013, fish passages at dams were closed out of concern that alewives were outcompeting smallmouth bass populations in Spednic Lake to the detriment of recreational fishing. As a result of fish passage closures, spawning grounds in the St. Croix River basin become inaccessible to alewives and the alewife population in the watershed plummeted as recorded by the annual Milltown fish count. The dramatic reduction in alewives caused concern for environmental managers, and Indigenous groups in the area for whom alewives hold cultural significance.
The IJC’s International St. Croix River Watershed Board, along with other groups and organizations in the basin, helped prevent this conflict from escalating further by initiating studies to provide scientifically based information characterizing what is now understood to be the beneficial relationship between alewives and smallmouth bass in the watershed. Following these studies, the Board supported additional efforts to assist stakeholders in their advocacy for opening the fish passages to restore the native alewife population to the St. Croix River ecosystem. In partnership with government agencies, the St. Croix International Waterway Commission, and the Passamaquody Tribe and Peskotomuhkati Nation, the IWI began providing funding and in-kind services to continue the Milltown fish counts in 2012 after provision of funding from others ended due to local resource constraints. The continued collection of this valuable dataset is instrumental for monitoring the recovery of the alewife population after fish passages were re-opened in 2013. Alewife runs counted at Milltown dam grew from 16,677 in 2013 to over 600,000 in 2020 (St. Croix International Watershed Commission 2019).

"On the St. Croix River the Board has been working with stakeholders on the issue of sea-run fish passage at the transboundary dams for several years without an adequate understanding of the options for fish passage. Working with the IJC advisors and through the International Watershed Initiatives (IWI) the Board was able to secure the support of technical resources to help look at alternatives to inform the many partners interested in sea-run fish passage including the Passamaquoddy, resources agencies in both the US and Canada, and local entities.”

-Sean Ledwin, U.S. Board Member, International St. Croix River Watershed Board

*Figure 3: Annual Milltown Dam Alewife Counts (1981-2019)*
In parallel with the yearly fish counts, in 2016-17, the Passamaquody at Sipayik Environmental Department, through the IWI, conducted a study to determine the effectiveness of fish passages in the watershed. The study evaluated the three fish ladders in the lower basin that provide access to alewife spawning grounds by tracking fish as they passed through the ladders using passive integrated transponders and assessing water quality near the dams. Although there were technical difficulties with the technology used for tracking, the study helped to further the understanding of the need for additional study of the fishways.

In fall 2019, the IWI funded a study to explore a range of upstream and downstream fish passage improvements on the St. Croix River at Grand Falls Dam and Woodland Dam and evaluate benefits of aquatic resources to ensure the continued health of the entire St. Croix River ecosystem. The study will produce an informational document only, not a decision document. This study is an important step to provide information to local stakeholders to assist them with understanding fish passage options for the dams. Providing information to assist local stakeholders with alewife restoration is one of the Board’s work plan priorities. The Board continues to monitor new developments in the watershed.

The owners of the Milltown dam, New Brunswick Power, announced in 2019 that they are exploring decommissioning the power generating station, removing the impounding structure at Milltown, and restoring the area known as Salmon Falls to a more natural, pre-project state. As the most downstream impediment to fish passage on the St. Croix River, removing this dam may improve fish passage at this location, but will require consideration for how and where to continue fish counts on the St. Croix River to monitor alewife recovery, validate improvements to fish passage at upstream dams, and evaluate ecosystem health in the watershed.

The future ownership and operation of the Forest City dam presents an additional ongoing challenge to balance interests and prevent disputes in the watershed. The US Federal Energy Regulatory Commission (FERC) renewed the license for the Woodland Pulp owned Forest City dam in 2016, but requested additional assessments as part of the license renewal. Woodland Pulp found these additional requirements made operation of the dam uneconomical.

“The International Watershed Initiatives (IWI) funding for the project “Estimation of Unregulated Monthly, Annual, and Peak Streamflows in Forest City Stream and Lake Levels in East Grand Lake, United States-Canada Border Between Maine and New Brunswick, 2018” provided the Board and US and Canadian Stakeholders with key information on lake levels under different gate operation scenarios. This detailed analysis would not have been possible without the IWI funding.”

-Bob Lent, U.S. Board Member, International St. Croix River Watershed Board
and petitioned to surrender ownership and operation of the dam. One option to dam surrender proposed was to leave two of the dam’s gates permanently opened, which would lower water levels on East Grand Lake, upstream of Forest City dam. Changes to East Grand Lake water levels would impact recreational boating and fishing activities on the lake. Another option proposed by Maine and the Province of New Brunswick was to have a private owner take over the dam ownership and operation to maintain conditions similar to what exists today for recreation and aquatic habitat.

Province of New Brunswick was to have a private owner take over the dam ownership and operation to maintain conditions similar to what exists today for recreation and aquatic habitat.

“As the first Watershed Board, the International St. Croix River Watershed Board has appreciated the support that the International Watershed Initiative (IWI) has provided to help address broad watershed issues. The support for studies to count, track, assess fish ladder efficiency and understand aquatic food webs has been a key contribution to the re-establishment of the alewife (gaspereau) fish migrations. In addition, studies to understand unregulated streamflows and lake levels have been key in understanding the potential implications of the Forest City dam removal.”

- Bill Appleby, Canadian Co-Chair, International St. Croix River Watershed Board
To better understand impacts and anticipate potential conflicts, the St. Croix River board collaborated with the U.S. Geological Survey (USGS) in 2018 to complete a study assessing several proposed changes to the operation of the Forest City dam (Lombard 2018). Understanding the potential range of water levels on East Grand Lake resulting from changes in the operation of Forest City dam is an important step to avoid conflict between riparians and local communities who live on and use the lake and to address changes to downstream flows and the needs of dam operators in Maine and New Brunswick. The study calculated changes to East Grand Lake water levels and estimated unregulated monthly, annual, and peak flows resulting from proposed changes to Forest City Dam’s operation. As of summer 2020, the surrender or potential ownership transfer request was still under review by FERC, and the St. Croix River board continues to monitor the situation to alert governments and prevent emerging conflicts.

**Great Lakes**

High water events in 2017 and 2019 on Lake Ontario caused great harm to riparian homeowners and municipalities. IWI funds have been used by the Great Lakes – St Lawrence River Adaptive Management Committee (GLAM) and the International Lake Ontario-St. Lawrence River Board to evaluate the impacts of recent flooding events and study mechanisms to reduce the impact of potential future flooding. Several surveys of the impacts of the 2017-2018 high-water levels and flooding along Lake Ontario and the St. Lawrence River were underway in 2018 and into 2019. These 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. Through a separate IWI project, the committee analyzed aerial imagery data collected during the high-water event to assess

“The International Watersheds Initiative (IWI) has been critical to the initial success of the Great Lakes – St. Lawrence River Adaptive Management (GLAM) Committee. Through the IWI, the GLAM Committee has been able to undertake a wide variety of important tasks that support the review of outflow regulation plans for Lake Superior and Lake Ontario. These tasks have contributed to improved understanding of the Great Lakes water balance, monitoring of the effects of changing water levels on a wide range of stakeholders, and the building of new models to better understand how regulation plan changes may impact people and the environment. In many cases, IWI resources have been leveraged through the GLAM Committee to expand the impact of these efforts. These IWI projects are vital to ensure information is available to support ongoing adaptive management of outflow regulation in the Great Lakes basin.”

-Bryce Carmichael, U.S. Secretary, International Lake Ontario -St. Lawrence River Board, International Lake Superior Board of Control, and International Niagara Board of Control
the impacts to municipalities and ecosystems, industry and boating along the shores of Lake Ontario. Further studies initiated in 2019 and 2020 will engage shoreline municipalities on the shores of Lake Ontario and the St. Lawrence River to document the impact of high-water levels in 2019. The engagement process will gather local information and impact data through series of meeting with municipal officials. Impacts could include (but are not limited to) flooding and erosion damage to shoreline infrastructure and parks, damages to private property and infrastructure, increased costs for municipal emergency response and loss of revenue from facilities closure.

The flooding events of 2017 and 2019 have generated heated arguments among governments, the public and the media in the Lake Ontario-St. Lawrence River basin and while the cause of the flooding is due to record water supplies to the basin, continued pressure precipitated an expedited review of Plan 2014. Plan 2014 is the regulation plan that set the rules for governing the releases from Lake Ontario-St. Lawrence River and was developed on the basis of adaptive management. Under the adaptive management strategy, the plan was to be reviewed by the GLAM Committee within 15 years to assess its performance and propose improvements. However, due to the extraordinary conditions in 2017 and 2019, the IJC has asked the Committee to expedite the review of Plan 2014. This review will take part in two phases. Phase 1 will provide information to help the board make deviation decisions during current and future high-water level events while phase 2, contingent on funding, will focus on the longer term and on how the plan addresses extreme highs and lows under a broad range of plausible future conditions. The expedited review of the plan aims to assist in resolving the conflicts created by the flooding in 2017 and 2019 by providing improved information for regulating Lake Ontario and the St. Lawrence River and engaging and consulting the public and governments during the review.

The IWI currently is supporting the first phase of the review by funding several projects that will provide decision makers more information when deviating from the plan and improving communications with the public. In 2019 and 2020, the GLAM committee and LOSLRB conducted a series of IWI funded studies with the US Army Corps of Engineers, the École Polytechnique de Montréal, and Clarkson University to identify the operational and physical constraints of releasing additional water through the Moses-Saunders Dam to explore opportunities for increasing flows during high water conditions on Lake Ontario. One study assessed the economic impact of temporarily halting commercial navigation on the St. Lawrence Seaway in order to be able to release higher flows to lower Lake Ontario further. Quantified estimates of the economic impact of passing higher flows will improve the robustness of future decisions when seeking to provide additional relief to riparian homeowners, business and recreational water users.
Two further studies investigated the potential for increased outflows on the St. Lawrence River during winter operations and how changes in flow rates and low water levels impact critical ice cover formation and municipal and industrial water intakes in Lake St. Lawrence. Changing flow rates too quickly can fracture the stable ice cover and lead to ice jams, thus requiring flow reductions. The study analyzed historical ice conditions to define an optimal flow rate and maximum drawdown while maintaining a stable ice cover. A complementary study updated the engineering information on minimum operational elevation requirements of municipal and industrial water intake and assessed potential shore well users in the system to identify the potential number of impacted properties under a range of water level conditions.

In addition to measuring the impacts of high-water events, the GLAM Committee has conducted monitoring projects studying the extent of wetland types on the shores of Lake Ontario in order to develop a strong database of wetland conditions to be used for adaptive management. The monitoring study collected data on vegetation type referenced to elevation, water level fluctuations and water quality. The data helped quantify vegetation response in each site and how coastal wetland habitat is responding to water level changes over the past number of years including 2017 and 2019. The GLAM Committee, in partnership with the River Institute, also assessed the ecological impact of winter drawdown on Lake St. Lawrence. Increased outflows during the winter months at the Moses-Saunders Dam can leave more riverbeds exposed, leaving aquatic species vulnerable to isolation in shallow pools. The study identified the potential risk to aquatic species in different drawdown scenarios through an in-depth literature review of ecological impacts of dam drawdowns and geospatial

“The International Watersheds Initiative (IWI) has been instrumental in assisting the International Lake Ontario –St. Lawrence River Board with the persistent need for quality information required in its’ regulatory decision-making process. The Board is consistently faced with difficult decisions during high water events such as observed in 2019 and often find themselves asking what the trade-offs are involved in a specific regulatory strategy. In order to understand the ramifications of such decisions the Board must possess accurate information on the impacts of such decisions on all the affected interest groups. Support of Great Lakes Adaptive Management Committee initiatives from the IWI in the form of funding specific projects has helped the Board gather the necessary information needed to make informed regulatory decisions. Without IWI support in collecting some of the information considered by the Board in their decision-making process, the Board would be less confident in setting regulatory strategies during the 2019 event.”

-Bryce Carmichael, U.S. Secretary, International Lake Ontario –St. Lawrence River Board, International Lake Superior Board of Control, and International Niagara Board of Control
modeling of various water levels of the lake. These findings will inform decisions on future winter outflows at the dam.

In 2018, GLAM continued creating an extended computer model calculating likely past conditions of water supply components over the Canada and U.S. transboundary watersheds (called a hindcast), which would generate and evaluate datasets of these components over most of North America. The data set 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, in coordination with the U.S. National Weather Service’s Multi-Precipitation Estimates (MPE) project and the “Shore Protection Structure Condition Assessment” that followed a project assessing the impacts of the 2017 high water levels on Lake Ontario and the St. Lawrence River.

The International Lake Superior Board of Control and the GLAM Committee have conducted several studies of the St. Mary’s Rapids and Compensating Works. In 2015, a joint study by USACE, USGS and the Water Survey of Canada investigated the potential benefits of employing partially open gate settings at the Compensating Works. This approach helps release more natural flows, which is beneficial for ice management and the ecology of the St. Mary’s Rapids.

In 2017, an IWI project completed by ECCC with collaboration of USACE initiated the creation of an Integrated Ecosystem Response Model (IERM) to evaluate the effects of water regulation plans on the rapids’ ecosystem. Following the creation of the IERM, an IWI project, led by the U.S. Army Corps of Engineers (USACE) with support from ECCC, collected additional data on substrate and habitat classification to further the calibration of the IERM, and expand its boundaries further downstream in the St. Marys River.

**International Rainy-Lake of the Woods Watershed Board**

In 2015, the board, in collaboration with the Seine River First Nation, Ontario Ministry of Natural Resources (OMNR) and North-South Consultants, completed the Seine River Temperature Project, which helped identify the spring spawning time for Seine River sturgeon and determine the impacts of peak hydroelectric developments on spawning. The Seine River drains to Rainy Lake. Several performance indicators, including water temperature, photoperiod and two traditional Indigenous knowledge indicators including the observations of tiger swallowtails and the size of poplar tree leaves relative to a beaver’s ear were identified to help determine the spawn time of the sturgeons. Peak water levels and flows have the potential to impair Seine River Sturgeon spawning. The
protection of lake sturgeon is a priority for resource managers, power corporations, water management boards, and First Nations.

The board also collaborated with the Seine River First Nation to determine the effect of water management regime on wild rice production and cattail invasion into wild rice stands. These projects were started in 2014 and were completed in 2016. Wild rice production and protection has been an ongoing concern of the Seine River First Nation (SRFN) as well as other First Nations in the basin. Water level management in the Rainy-Namakan System has detrimental effects on existing and historical stands of wild rice within the Rainy Lake and Seine River sections of this system; wild rice harvests have decreased considerably compared to historical sales. The first project quantified the effect of water level fluctuations on wild rice productivity at critical stages of phenological development. A parallel project was conducted to determine the effectiveness of cattail removal based on rule curve regulations in the Rainy-Namakan system and the corresponding survival of wild rice stands. The exotic perennial narrow leaf cattail invades wetlands with dense monospecific stands and is particularly problematic since it can tolerate depths normally occupied by wild rice. The Seine River First Nation successfully removed cattail by cutting cattails culms with a mechanical harvester above the sediment layer. However, cattails deplete many nutrients in the former wild rice areas and can hinder wild rice growth in cut cattail locations. In addition, above average lake levels favoured the spread of cattails while lower lake levels during the growing season favoured wild rice. These projects helped build a scientific understanding of wild rice management and contributes to the resolution of wild rice issues in the basin.

In 2015-16 the board compiled its first water quality report for the basin, with a primary focus on phosphorus loading and conditions (International Rainy-Lake of the Woods Watershed Board 2016).
Taking the lead, the board’s Aquatic Ecosystem Health Committee synthesized information on water quality conditions in the basin received from agencies, with the intent of summarizing findings and highlighting key observations where appropriate in relation to established standards. The report identified emerging concerns in the basin and submitted recommendations for increased monitoring, updating their objectives and alert levels and creating an information request and reporting structure.

IWI funds have been used to fund components of USGS’s StreamStats application. StreamStats is a widely used hydrologic modeling tool for estimating the magnitude and frequency of peak stream flows. IJC supported this project to develop and expand the tool for use in the Rainy River basin. StreamStats assists with floodplain mapping, water resource planning and other management application. The tool takes advantage of the harmonized Canadian and U.S. data to create a complete picture of peak-flow statistics in the basin.

**International Red River Board**

In the Red River basin, a binational telemetry study is ongoing, investigating how specific fish species are moving and using habitat in the watershed. 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. The study is also collecting information on the fragmentation of the habitat due to the dams and locks in the basin.

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 U.S. Geological Survey (USGS) 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 available to water managers and governments to determine more accurately the best courses of action to improve water quality in the river.

The Board has completed the fifth phase of the two-dimensional hydrodynamic model to simulate hypothetical flood mitigation scenarios on the lower Pembina River Floodplains. The latest modelling efforts on hypothetical flooding in the Pembina Basin explored the potential relief of floods through the development of short floodways.

**International Souris River Board**

The International Souris River Board is using IWI funds to investigate how variations in river flow affect dissolved oxygen levels, which are important to determining river biological conditions. This
“As the International Souris River Board and IJC look at possible changes in the management of the Souris River, the work of the IWI through the Sparrow Water Quality model and the Hydrographic Data Harmonization project have been a great help in broadening our understanding of the basin. The ability to access data from across the basin has been critical to our ability to evaluate different management scenarios and their potential impact.”

-Garland Erbele, U.S. Co-Chair, International Souris River Board

project will allow continuous water quality monitoring through installation of new sensors which measure water quality parameters such as temperature and dissolved oxygen. These data are needed to provide an understanding of the river water quality under the range of conditions experienced in the Souris River and will inform proposed updates to the board’s water quality objectives – a key part of the board’s mandate associated with its pilot watershed board status. Results from this study will also have implications for proposed water management strategies being evaluated in the Souris River Study. The Souris River Study is outside of the IWI program but has been a high priority for the Souris River Board for the past few years; some river board concerns such as climate change, which would normally be evaluated by the river board through IWI, are being evaluated as part of the study.

**Accredited Officers of the St. Mary and Milk Rivers**

The Accredited Officers of the St. Mary-Milk Rivers conducted an IWI-funded study in 2017 to reassess and update the approach and methods used to determine consumptive water use in the St. Mary and Milk Watersheds (Paterson Earth & Water Consulting Ltd. 2017). A follow-up study commenced in 2019 will develop a tool to estimate evapotranspiration using remote sensing. The project’s results will help accurately apportion water based on better consumptive use estimates and help manage the effects of climate change and any extreme dry or wet conditions. Accurate measurements for the apportionment of water are necessary to prevent conflict between the various water users and governments in the basin.

“Funding of a half-dozen or more small IWI proposals over the last 5 years have been critical to the AOs achieving our mission and meeting the needs of our stakeholders. Continuation of the IWI is important if the AOs are to address the new issues arising in the St. Mary and Milk Rivers and consider changes to our administrative procedures. I wholeheartedly support the IWI goals and approach to water issues in these watersheds.”

- John Kilpatrick, U.S. Accredited Officer, St. Mary and Milk Rivers
IWI Objective: Contributing to the prevention and resolution of watershed issues by communicating transboundary water issues at the local, regional and national levels, including First Nations, Metis and American Tribes, to increase awareness of these important issues by supporting outreach and consultation.

Individual IWI projects must include an accompanying communication plan to identify the key messages and audiences of the project and ensure the results are communicated through various media outlets and organizations, including IJC newsletters and website. The communication plan plays a key role in increasing the likelihood that the scientific findings will be used in decision making. Other projects have made the communication of transboundary water issues their primary objective. These projects contribute to resolving and preventing transboundary water issues by educating the public on their local watershed distinctions and elevating discourse on heated issues.

**International Osoyoos Lake Board of Control**

The International Osoyoos Lake Board of Control, with IWI support, is building a hydrologic model of the Similkameen Basin in advance of the Climate Change Guidance Framework review. The model will be integrated with previously developed hydrologic and hydraulic models of the Okanagan Basin that were funded by the Okanagan Basin Water Board, a collaboration of the three regional districts on water issues spanning the Okanagan Valley in Canada. The models will be used to analyze the vulnerability of Osoyoos Lake, the Okanagan/Okanogan River, and the Similkameen River to projected shifts in climate and hydrology within the basins. This analysis will help prevent future conflict by allowing the Board to predict the timing and frequency of changes in projected lake levels and evaluate those in relation to the IJC Orders of Approval for Osoyoos Lake including the rule curve and drought criteria.

“In recent years, both flooding and drought have impacted Osoyoos Lake with increasing frequency due to a less consistent and earlier melting mountain snowpack. The International Watershed Initiative has funded important tools to support the Osoyoos Lake Board of Control’s adaptive management of the IJC Orders for Osoyoos Lake including a model to estimate the projected frequency of future hydrologic conditions. The IWI has also promoted engagement between the Board and the communities surrounding Lake Osoyoos by funding the production of “A River Film,” the establishment of high-water monuments that communicate the history of Osoyoos Lake flooding, and the Osoyoos Lake Science Forum.”

-Andy Gendaszek, U.S. Secretary, International Osoyoos Lake Board of Control

With IWI support, the International Osoyoos Lake Board of Control has accomplished a number
of communication and awareness-raising projects from 2015 to 2019. *A River Film*, produced by Ascent Films, Inc. and the Washington State Department of Ecology, in coordination with the IJC’s International Osoyoos Lake Board of Control (IOLBC) and Okanagan Basin Water Board, premiered at the IOLBC annual public meeting in Osoyoos, B.C., and at the IJC semi-annual meeting in Ottawa, ON in October 2017. The first theatrical release was to a sold-out crowd of 300 watershed residents from the U.S. and Canada, on October 25, in Oliver, B.C. The film was met with enthusiastic reviews and the IOLBC currently seeks funding to distribute *A River Film* to maximize its exposure to audiences within and outside of the Okanagan/Okanogan basin. *A River Film* was shown at screenings in theaters and at film festivals and distributed through libraries and educational institutions, educational television outlets, online outlets, and DVDs. The film won three awards of excellence including a Platinum Award at the 2018 Oregon International Film Festival, an Award of Excellence in Cinematography at the 2018 Docs Without Borders Film Festival, and an Award of Excellence in Narration at the 2018 Docs Without Borders Film Festival. A film trailer is available at [https://vimeo.com/235960865](https://vimeo.com/235960865).

Monuments indicating the historic peak lake level of Osoyoos Lake, documented in 1894, 1972, and 2018 by the U.S. Geological Survey, also were constructed at public parks on both sides of the border in Osoyoos, British Columbia and Oroville, Washington in 2019. These prominently displayed the elevation of historic peak lake levels to provide current residents and visitors to Osoyoos Lake with visible context to understand the effects of current regulation of dams in the Okanogan Basin and the IJC Orders of Approval and as a reminder that these extreme peak levels, while infrequent, are a part of normal lake fluctuations. The IJC also funded the installation of a webcam at Zosel Dam, which was installed in spring 2019 and published on the [USGS website](https://www.usgs.gov/) for the Osoyoos Lake gage. This
webcam allows the public to monitor real-time operations of Zosel Dam and observe backwater effects of the Similkameen River during the spring freshet.

**International Lake Ontario-St. Lawrence River Board**

The International Lake Ontario-St. Lawrence River Board, in collaboration with the River Institute, produced outreach materials to address public concerns about the impacts of low water levels in Lake St. Lawrence in 2018. These outreach materials included a short video documentary that covers the parallel study on the impacts of low water levels on fish communities and delivers the message in plain language understandable to a wide audience.

Projects have also focused on improving communication efforts by boards. In 2018, the International Lake Ontario-St. Lawrence River Board completed an IWI project to assess the success of communications efforts that took place as a result of the 2017 high water event. This project yielded a fulsome analysis of the communications efforts and noted where there were successes and opportunities for improvement in future similar situations.

**International Rainy-Lake of the Woods Watershed Board**

A three-year project uses Project WET (Water Education for Teachers) tools to bring news and activities of the International Rainy River-Lake of the Woods Watershed to schools in the basin. The project directly aligns with the board’s directive by providing a novel opportunity to extensively engage the public, via students and their families, educators, school boards and education authorities, in the board’s work pertaining to watershed water quality and quantity priorities such as aquatic invasive species, flooding, contaminants, and other water resource issues of specific concern to this board. The board and/or its Engagement Committee will provide binational oversight and assistance to basin educators as they begin to deliver the program to a handful of pilot schools throughout the basin. Ultimately, the board anticipates broader implementation of the program at schools throughout the basin.

**IWI Objective:** Contributing to the prevention and resolution of watershed issues through facilitation of discussions, participation in development of shared solutions, and creation of decision-making tools.

Some projects leverage results from previous scientific studies and communication efforts to contribute directly to the resolution of watershed issues. These projects help advance the IWI objective of resolving watershed issues through facilitation of discussions, creation of decision-making tools, and development of shared solutions. They can range from science forums in which
various experts and members of the public exchange ideas to creating tools and developing objectives that can help in managing the watershed.

**International Osoyoos Lake Board of Control**

The third binational Osoyoos Lake Water Science Forum took place at the Sonora Centre in Osoyoos, BC in October 2015. The forum included presentations and panel discussions by scientists, environmental professionals, advocates, and officials from all levels of government on both sides of the border, as well as First Nations and Tribal organizations. Ninety participants, including panelists, local community members and students registered for the 2015 forum. Forty local high school students also joined for an afternoon session. Presenters and participants discussed the implications of science and management updates, commended successes and offered recommendations for ways they can better work together to protect our shared waters. Some topics discussed focused specifically on Osoyoos Lake and the Okanagan River system, while others had a broader focus, pertaining to the Okanagan basin, the Columbia River basin, or the Pacific Northwest more generally. The Board has begun planning for its next Osoyoos Lake Water Science Forum, tentatively scheduled for the fall of 2021. These forums contribute to the resolution of watershed issues by facilitating discussions between those in the basin with water interests. They also help prevent potential conflicts by allowing learning and encouraging sharing of concerns so they do not escalate.

**International St. Croix River Watershed Board**

Building on the data collected from the fish counts at the Milltown Dam and the assessments of fish ladders along the St. Croix River, the IWI program provided support for a project focused on developing an online tool to estimate potential changes to alewife populations resulting from changes in fish passages and in commercial harvest management on the St. Croix River. Results from this user-friendly, plain-language tool will provide a clear platform for communication and weighing and assessing pros and cons associated with theoretical management scenarios. This contributes to the resolution of watershed issues by allowing the easy sharing of accurate information on the alewife population with interested parties; this can prevent issues which may arise from those parties not having access to correct data.

**International Rainy-Lake of the Woods Watershed Board**

Using IWI funds, the International Rainy Lake of the Woods Watershed Board (IRLWWB) has completed the first phase of a planned two-year study that will be used to suggest updates to the board’s water quality objectives, including the development of ecosystem indicators. This project
could be the blueprint for how other future watershed boards routinely investigate basin water quality and ecosystem conditions. This project corresponds to the adaptive management principle of the IWI. The IWI plans to review the water quality objectives and alert levels of International Watershed Boards and Pilot International Watershed Boards every few years. Water quality is important to many in the basin. This project contributes to the resolution of watershed issues by ensuring that water quality objectives are based on current science and input from stakeholders and rights-holders. The routine reviews will also keep the board on top of any changes that could lead to future issues.

The board also completed their update of the Upper Rainy River Numerical Model in 2016. The update was to the existing 2-D hydrodynamic model of the Upper Rainy River to analyze conveyance capacities during the on-going gate refurbishment project at the Fort Frances dam on the Rainy River. A separate objective updated an interactive visualization tool used by decisions makers and the public to estimate effects of changing water levels at the Fort Frances – International Falls Dam. The Board was concerned that the temporary cofferdams installed during the gate refurbishment project would have an adverse effect on the water levels and flows of the Rainy River and Rainy Lake. This project simulated the resulting changes in levels and flows resulting from refurbishment work and has also produced simulation results of the 2014 high water levels and the overtopping of the dam spillway.

Figure 7: Cattail harvesting machine in Voyageurs National Park, Minnesota on Rainy Lake to help eradicate invasive hybrid cattails, August 2017
Making Efficient Use of Resources

One of the most important IWI values is the IJC’s emphasis on pursuing opportunities to leverage additional local resources with IWI funding. This helps deliver on the IWI mandate while reducing duplication of effort and ensuring prudent expenditure of IWI funds. Additional funds leveraged for IWI projects are categorized into external monetary contributions, which refer to funds directly financing the project, and in-kind contributions, an estimate of the non-monetary contributions to the project (examples are provided in Table 2). IJC boards that submit IWI project proposals are encouraged to leverage external monetary and in-kind resources and are required to specify the amounts in their proposals.

Between 2015 and 2019, IWI projects have received $5,530,776 in external funds and $2,498,066 in in-kind contributions. In-kind contributions, offered by government agencies, municipalities, NGOs and Indigenous communities, have taken the form of providing technical expertise and data, access to sites and research facilities, guidance and steering of projects, mentoring and collaboration, equipment and labor. The major contributors of monetary and in-kind resources are Canadian and U.S. federal agencies, followed by state and provincial agencies. Smaller groups such as non-governmental organizations, municipalities and academia have also invested funds and, in particular, in-kind resources on specific IWI projects that aligned with their interests and expertise. For example, the town of Osoyoos contributed a forum venue and expertise for the 2015 Osoyoos Lake Water Science Forum, the River Institute contributed in-kind resources to the review of ecological impacts in Lake St. Lawrence, and multiple school boards assisted in the delivery and development of Project WET. Several First Nations and Tribes have also contributed assistance and funds to several projects in their respective watersheds. For example, the Passamaquoddy Tribe assist each year in the alewife fish count project at Milltown Dam by offering fish counting equipment and assistance, and Tribal and Métis council assisted in the program delivery and development of Project WET. Table 2 highlights several IWI projects that have received significant contributions from partner groups.
Table 2: Examples of leveraging in IWI projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Agency Partners</th>
<th>IWI Contribution</th>
<th>Funds Leveraged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osoyoos Lake Climate Change Vulnerability: Phase 1 - Similkameen Basin Hydrologic Model 2019</td>
<td>The International Osoyoos Lake Board of Control is building the Similkameen Basin Hydrologic Model as a precursor to the Climate Change Guidance Framework review</td>
<td>Okanagan Basin Water Board, BC River Forecast Center</td>
<td>$75,000</td>
<td>Funding - $3,315,000, In-Kind - $17,500</td>
</tr>
<tr>
<td>Assessing fish ladder effectiveness on the St. Croix River 2015</td>
<td>The Sipayik Environmental Department of the Passamaquoddy Tribe conducted a multi-year fish behaviour, passage and tracking studies starting in 2015</td>
<td>National Fish and Wildlife Foundation, US Fish and Wildlife Foundation, Bureau of Indian Affairs</td>
<td>$25,000</td>
<td>Funding - $130,400</td>
</tr>
<tr>
<td>Red River Telemetry Study 2016</td>
<td>The study, spearheaded by multiple agencies and institutions in Canada and the U.S., collected information on fish movement, spawning sites and timing and habitat use by tagging fish and using acoustic receivers.</td>
<td>Fisheries and Oceans Canada, University of Nebraska-Lincoln</td>
<td>$100,000</td>
<td>Funding - $123,000, In-Kind -- $550,000</td>
</tr>
<tr>
<td>Red River Telemetry Study 2018</td>
<td></td>
<td>Fisheries and Oceans Canada, University of Nebraska-Lincoln</td>
<td>$82,500</td>
<td>Funding - $118,500, In-Kind - $192,250</td>
</tr>
<tr>
<td>Project</td>
<td>Description</td>
<td>Agency Partners</td>
<td>IWI Contribution</td>
<td>Funds Leveraged</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Determination of factors affecting dissolved oxygen levels in the Souris River to inform operation decisions and assist with water quality objectives review 2018</td>
<td>This International Souris River Board project collected data and created analysis reports on how flow and under-ice conditions affect oxygen levels, using monitoring sensors.</td>
<td>ECCC, USGS, U.S. Fish and Wildlife Service, Saskatchewan Water Security Agency, North Dakota Department of Health, North Dakota Game and Fish Department and Manitoba Sustainable Development</td>
<td>$159,250</td>
<td>In-Kind - $129,200</td>
</tr>
<tr>
<td>Development of an international, web-based StreamStats model for the Rainy-Lake of the Woods Basin 2015</td>
<td>The project expanded the USGS StreamStats model to the entirety of the Rainy-Lake of the Woods basin, allowing interested parties on both side of the border access to streamflow statistics and basin characteristics online</td>
<td>USGS, Minnesota Department of Transportation, Ontario Ministry of Natural Resources, Lake of the Wood Control Board, Minnesota Pollution Control Agency</td>
<td>$55,000</td>
<td>In-Kind - $327,550</td>
</tr>
</tbody>
</table>
Chapter 4

IWI Challenges and Opportunities

Credit: Robert Linsdell
Challenges

Climate Change

Water managers should be prepared for conditions never experienced over the short period of our weather records. The October 1997 *IJC and the 21st Century* report identified climate change as an issue facing water managers in the transboundary regions in which the IJC works. It also proposed to governments that the IJC review each of its orders governing water levels and flows in light of changing circumstances in transboundary watersheds (the IJC has since reviewed orders for Osoyoos, Lake Ontario, Lake Superior and Rainy-Namakan Lakes.) Since then there have also been record high level water events all along the transboundary.

Following a series of workshops with IJC boards in 2016 and 2017, the Climate Change Guidance Framework was developed to address the IJC priority with the objective of supporting the boards in their management of climate-related risks. The framework has already been used to do an initial assessment of climate-related risk linked to the mandate of the St. Croix Board, and the initiative should continue and produce assessments for the other boards. The IJC's climate change guidance framework examines how a changing climate may affect boards and how they deliver on their mandates. This assessment will give an idea of potential future issues so that they can be prevented or mitigated rather than being addressed once they occur.

Increased Board Activity Due to Increased Hydrologic Variability

IJC boards have increased their activities, and the frequency with which they meet, to address increased hydrologic variability and extreme events across the U.S.-Canadian border. Record precipitation in the Great Lakes region in 2017 and 2019 raised all five lake levels to near, or above, historic records. The International Lake Ontario-St Lawrence River Board met almost weekly from May 2019 through fall 2019 to address regulation strategies and deviations in the face of record high lake levels and outflows.

“The International Watersheds Initiative facilitates valuable information sharing amongst the Boards. With that structure of collaboration and communication, we are able to build upon the expertise and efforts of other Boards in order to tackle local challenges, such as communicating the specific nuances of Kootenay Lake operations to the public. Additionally, initiatives such as the Climate Change Guidance Framework have helped shape our focus on evaluating the resiliency of the Kootenay Lake Order into the future.”

-Kevin Shaffer, U.S. Secretary, International Kootenay Lake Board of Control
The International Rainy-Lake of the Woods Watershed Board developed a new high-flood risk rule curve for Rainy Lake that was implemented in 2018 to address increased frequency of spring high water levels. This board now meets more frequently each year in the early spring to monitor and decide whether the high-flood risk rule curve needs to be implemented. The International Rainy-Lake of the Woods Watershed Board has also increased stakeholder engagement activities associated with the implementation of the high-flood risk rule curve.

The International Osoyoos Lake Board of Control has added more board agenda time to assess the potential for flood and drought risks associated with increased variability in shifting precipitation patterns, such as summer rainfall, mountain snowpacks, and the timing of snow melt. The rapid melting of mountain snowpacks in the Okanagan and Similkameen basins in the spring contributed to widespread flooding of Osoyoos Lake in May 2017 and May/June 2018. During 2015, 2016, and 2019, low mountain snowpacks resulted in low runoff during the spring freshet. However, the established drought criteria were not met and thus, use of the drought rule curve was not triggered by hydrologic conditions especially in the Canadian part of the basin. During each of these low-runoff years, the Board considered requests from the Applicant, under Condition 10 of the IJC Orders, to adopt the drought rule curve so that the Applicant had more flexibility to meet lake levels, water supply, and instream flows to support fish and other aquatic species because of more severe hydrologic conditions in the U.S. part of the basin.

**Designating Watershed Boards**

Consistent with the 1998 request from Governments, the IJC has established processes for the designation of pilot watershed boards and watershed boards. Becoming a watershed board or a pilot watershed board helps a board deliver on its mandate by supporting projects that address water quality, water quantity and aquatic ecosystem health. These projects foster local resolution of water resource and environmental problems, a more inclusive and diverse membership, trust building and problem solving through local collaboration and input, and new information sharing methods, technology, and models. They also promote prompt consideration of emerging issues, more effective execution of board mandates, and leveraging with local activities and projects.

To become a pilot watershed board, a board must have a water quality/quantity mandate, report to the IJC on aquatic ecosystem health, aid the IJC in the prevention and resolution of disputes, and adopt a work plan. That plan is premised on a watershed approach, strong links to and support from stakeholder organizations, and the support of the board, the IJC and the Governments. Commissioners discuss with the board its interest in becoming a pilot watershed board and seek to
confirm widespread stakeholder support in the relevant watershed.

Becoming an official watershed board requires evidence that a pilot watershed board has demonstrated its ability to help prevent and resolve disputes, supports becoming a watershed board, and has adhered to IWI operating principles. Other considerations include the strength of local organization and agency support for the designation and a review of whether additional membership is required to provide satisfactory diversity. If the IJC then supports the watershed board designation, it asks the governments for their approval. If the governments concur, the board becomes a full watershed board. The new watershed board’s directive is revised to include periodic reporting on water quantity, quality and aquatic ecosystem health.

Two IJC boards are currently International Watershed Boards: The International St. Croix Watershed River Board (ISCRWB), established in 2007, and the International Rainy Lake of the Woods Watershed Board (IRLWWB), established in 2013.

Two other boards are designated as Pilot International Watershed Boards. The International Red River Board (IRRB) was established as a pilot international watershed board in 2005. The International Souris River Board (ISRB) was established as a pilot international watershed board in 2007.

There are two fundamental barriers for international watershed board designation beyond the direct control of the IJC: first, the need for a mandate for a specific board to report on water quality, aquatic ecosystem health and water quantity (these three tenets of the mandate support the ecosystem approach, which optimizes dispute prevention and resolution) before it is eligible; and second, support from governments.

The new IWI Plan, developed to guide the program from 2020 to 2025, calls for IJC staff to lead an effort to explore establishing international watershed boards in other basins. The IWI Plan proposes an assessment of the potential for additional international watershed boards and to compile the information in a white paper and host an expert workshop to review the information and gather feedback from stakeholders. The assessment would include identifying boards that would benefit from a water quality mandate, and to consider adding more local members, or advisory groups to appropriate boards such as Kootenay, Lake Superior and Lake Ontario-St. Lawrence boards. The IJC may also assess other watersheds along the transboundary which could benefit from the framework, purpose, and collaborative qualities of a watershed board, but currently do not have an IJC board or mandate. Any findings of potential benefits to these basins which could be imparted by a watershed board would be the basis for discussion with governments.
**Water Quality Concerns**

Article IV of the Treaty states that cross-border waters “shall not be polluted on either side to the injury of health or property on the other side.” Water quality challenges are likely to continue, and the IJC and its boards will need to continue monitoring and addressing them.

In October 2016 the IJC sent the governments a white paper, *Threats to Water Quality in Shared Waters between Canada and the United States in the Climate Change Era*. The white paper alerted the governments to existing and emerging water quality issues and concerns that could grow into binational disputes. Through its presence in transboundary watersheds, the IJC and its boards identified key water quality issues and concerns, including algal blooms; chemical contamination of aquatic biota and associated risk to human health; and aquatic invasive species.

In basins outside the Great Lakes where the IJC has existing water quality reporting responsibilities, the IJC is to review existing water quality objectives through its boards and make recommendations to governments regarding changes. As part of this effort, in January 2017, the IJC sent a letter and a report to the governments, titled *Review of International Water Quality Objectives in the Souris, Red, Rainy-Lake of the Woods and St. Croix River Basins: Historical Perspective, Trends and Future Directions* (International Joint Commission 2017). Developed with active participation from members of the International Souris River Board (ISRB), the International Red River Board (IRRB), the International Rainy-Lake of the Woods Watershed Board (IRLWWB) and the International St. Croix River Watershed Board (ISCRWB), this report reviews the underlying history and background of the water quality objectives (WQOs) for each of these four boards, monitoring station criteria, and recent trends. It also discusses some key issues such as WQO exceedances and the relevancy of current WQOs.

**Transitioning IWI Projects to Agencies**

As the number of new project solicitations from transboundary watersheds across the U.S.-Canadian border increases, the IWI is considering transferring the management and funding of well-established projects to local agencies and partners with better understanding of, and ability to adapt to, the changing needs and goals of communities engaged in IWI-initiated projects.

Neither section office of the IJC has a budget line item for the operation of any of its boards beyond minimal cost for board member and IJC staff travel to meetings. Participating agencies generally use their own funds to cover the involvement of their staff in board activities. The IJC does provide basic financial assistance to cover the direct costs for public members to travel to board meetings on a case-by-case basis when there is need (e.g. when their home organization can’t cover their travel
costs). The IWI encourages, promotes, and helps coordinate a watershed approach in transboundary basins by working by and large through existing and ongoing structures, activities and budgets.

The relationship of the IWI to the IJC’s strategic initiatives is critically important. Strategic initiatives are, in essence, flagship IJC projects that assist many IJC boards in delivering on their mandates. Strategic initiatives are often more complex than single board projects and are usually more long-term. Strategic initiatives also involve large teams of experts and workplans with larger budgets, relatively speaking. For example, projects that address climate change through time and help boards address their vulnerabilities with a changing climate, or projects that look to harmonize the geomapping of the hydrology between the two countries, are considered to be strategic initiatives. The challenge for the IJC is to ensure that it creates products that assist IJC boards operating binationally but that do not duplicate mandates of such agencies as EPA or ECCC. Deliverables have to be useful to the boards and their effectiveness needs to be evaluated and the projects adjusted continuously.

In due course, strategic initiatives should be transitioned to governments and agencies for them to integrate into their programming or for them to maintain. For example, through the IWI hydrological geomapping initiative, the IJC has assisted governments in better harmonizing their hydrological data mapping at the border. In the long run it is a responsibility of governments to ensure those harmonized data sets are maintained.

Another project that could be transitioned to government agencies is the anadromous fish count at the Milltown Dam fishway in the St. Croix watershed. The count and research trap have been funded since 1981, originally by Canada’s Department of Fisheries and Oceans (DFO) through 2010. Both the fishway and research trap are located on the Canadian side of the river and are under the jurisdiction of DFO. The IWI has provided funding, originally envisioned as a stopgap, to conduct the annual fish count at the Milltown Dam research trap since 2011 at the request of the International St. Croix River Watershed Board. The fish count meets the IWI’s funding priorities of building shared scientific understanding of watershed issues, communicating transboundary water issues, and contributing to the resolution of watershed issues. It is also within the St. Croix Watershed Board’s mandate to monitor the ecological health of the St. Croix River boundary waters aquatic ecosystem and is a highly valued project in the watershed. Stretched research budgets present challenges to involving agencies in ongoing projects that appear to have an existing funding stream. Going forward, more effort is needed to re-engage agencies to leverage their expertise and resources for these initiatives to thrive sustainably across the transboundary.
Board Water Quantity, Water Quality and Aquatic Ecosystem Health Mandate

International watershed boards carry out a multi-faceted water quality, water quantity and aquatic ecosystem health approach to resolve transboundary water issues in part because droughts, flooding events and management of water levels can lead to negative consequences for water quality and aquatic ecosystems. Certain boards that undertake IWI projects, such as the Osoyoos Lake Board of Control, Accredited Officers of the St. Mary and Milk Rivers, International Niagara Board of Control and the International Lake Ontario-St. Lawrence River Board do not have a mandate to report on water quality and aquatic ecosystem health, although they take these into considerations in their decision-making, as their decisions have an ecological impact on their watersheds. Although the International Osoyoos Lake Board of Control has no water quality or aquatic ecosystem mandate within the Orders, the IOLBC does have the mandate to supervise water level regulation operations of Zosel Dam.

These boards may find opportunities to act within their mandate to improve aquatic ecosystem health through collaborating and partnering with other agencies. For example, the International Osoyoos Lake Board of Control, which has the mandate to supervise water level regulation operations of Zosel dam, leveraged its responsibilities of overseeing the operation of Osoyoos Lake levels.
to provide cleansing flows to fish spawning habitat downstream of the dam, removing silts from spawning gravels while working with local fisheries experts. Additionally, the board participates in, and IWI helps fund, the Osoyoos Lake Water Science Forums, which provide an opportunity to share information regarding the board’s responsibilities, including drought response and planning, and to receive information on water quality and aquatic ecosystem health from local groups, governments and scientists. By participating in this forum, the board gains a greater understanding of the health of the watershed and can operate the dam while considering the benefits to the aquatic ecosystem.

**Opportunities**

**GLAM**

The Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee’s role is to undertake the monitoring, modeling and assessment needed to support ongoing evaluation of the regulation of water levels and flows. The GLAM Committee reports to the Lake Superior Board of Control, Niagara Board of Control and Lake Ontario-St. Lawrence River Board. These boards report to the IJC. The Great Lakes represent an important and considerable portion of waters where the IJC has a role. These waterbodies include a number of ecosystems and affect a considerable array of interests. Their management is optimized by the most current science and modelling. GLAM is crucial in delivering on these needs.

In the 2016 Budget, the government of Canada proposed $5M over five years to the IJC to support adaptive management within the Great Lakes – St. Lawrence River basin. This funding was contingent on the contribution of equivalent funding from the U.S. Government, which was not received in years 2016 to 2019. As such, GLAM has been relying on IWI funding to support many of its projects and priorities.

While IWI funding has been able to support most GLAM activities until this point, GLAM needs have increased in recent years. The most important factors contributing to this are the increasingly extreme water levels in the Great Lakes. In light of flooding in 2017 and 2019 on Lake Ontario and the St. Lawrence River, the IJC has asked GLAM to complete an expedited review of Lake Ontario’s regulation plan, Plan 2014. In December 2019 the U.S. government appropriated $1.5M in support of the expedited review of Plan 2014, enabling matching funds to be made available from the Canadian Budget 2016 allocation. This will allow the IWI to dedicate more of its resources to projects for other boards as well as strategic initiatives (applicable to multiple boards). The GLAM will also benefit from this dedicated resourcing in that it may now expand the scope of its projects beyond those that fit within the IWI objectives as well as simply having greater resources to meet increasing needs.
**SPARROW**

SPARROW models were developed by the USGS in the late 1990s and early 2000s. These models bring together data about nutrient sources, watershed characteristics, and information from samples collected in the field to estimate how contaminants are transported within watersheds, and how various changes to one part of the system can affect others.

SPARROW modeling was implemented for the U.S. portion of the Great Lakes in 2010. In 2011, at the request of the Souris River and Red River Boards, the IWI partnered with the USGS and National Research Council Canada (NRC) to develop a SPARROW model to estimate nutrient loading in the Red-Assiniboine River Basin. With this work complete, the IWI then expanded the SPARROW model geographical coverage to include the entire transboundary Great Lakes region in 2018, as well as within the Rainy-Lake of the Woods Basin. While SPARROW models have proved useful in quantifying and understanding the sources and transport of excessive nutrient loading in transboundary watersheds, researchers are concerned that census data reaching as far back as 10 years may cover too long a period to reveal meaningful details and trends. Using the SPARROW model to best effect is challenged by the size and complexity of the watersheds, not only in terms of their physical parameters but also the different agencies and organizations that have a role in their management. The IJC and its boards therefore work diligently to identify water quality and quantity research already underway, with the aim of minimizing duplication and leveraging work already in progress.

**IJC Priorities 2019-2023**

In 2019, newly-appointed IJC commissioners adopted IJC-wide priorities for its transboundary work from 2019-2023. Several relate to IWI.

**Climate Change And Adaptive Management**

Climate change strongly impacts water levels, flows and water quality. The IJC needs to continue to adapt its approach to the management of water levels and flows and to the advice it provides to governments to support their efforts to maintain and restore water quality in transboundary watersheds, with climate change in mind. This underscores the importance of the following activities:

- Transboundary water quality objectives for watershed boards need to be updated to reflect new conditions;
- Water quality issues need to be detected and addressed before they become problematic;
- Climate change water level vulnerabilities need to be identified for all transboundary watersheds and appropriate jurisdiction involved;
- Water quality and ecosystem function vulnerability assessments should guide appropriate actions taken;
Climate change guidance framework needs to be applied to all IJC boards who have a mandate to manage water levels and flows or apportion water;

- Resiliency workshop models should be undertaken in partnership with governments. Make workshop model available for use in transboundary watersheds;

- Tools to evaluate climate change, socioeconomic and cultural impacts associated with high/low water events have been developed in the Souris basin and for the LCRR study and need to be shared.

**Current Activities Where IJC Can Be of Assistance:**

- Climate Change Guidance Framework being applied by all control boards and review of orders initiated where warranted;
- Review of Red River and Rainy River water quality objectives;
- St. Mary-Milk Rivers apportionment review; and
- Continued dialogue with governments focused on water level resilience in the Great Lakes

**Transboundary Water Quality**

With emerging water-related issues all along the transboundary, the IJC should endeavor to build relationships and raise its profile with governments. Many issues concerning water quality are having impacts at the watershed scale. Nutrient enrichment, non-point source pollution, metals and other related pollutants and the incursion of aquatic invasive species in transboundary watersheds require a binational approach to regulating, monitoring and remediation, possibly through the development of binational water quality agreements. This underscores the importance of the following initiatives:

- Existing and emerging water quality issues in transboundary watersheds need to be identified and addressed;
- In watersheds where IJC has a water quality mandate, studies, advice, and recommendations need to focus on remediation;
- Red and Souris WQ objectives/alert levels need to be reviewed;
- The SPARROW water quality model needs to be completed using 2012 data for the Red/Souris Assiniboine watershed;
- An update of SPARROW models to reflect the most recent data sets available should be considered;
- A request from governments to conduct SPARROW in other non-Great Lakes transboundary areas should be secured.

**Current Activities where IWRI can be of Assistance:**

- SPARROW water quality model complete for Red/Souris/Assiniboine River, as well as the Great Lakes and Rainy-Namakan Basin.
- Red River water quality trend analysis.
- Water quality and aquatic ecosystem health Objectives and Alert Levels for the Rainy-Lake of
Indigenous Governments, Organizations and Citizens

Indigenous peoples along the boundary have historical experience and ecological knowledge that can greatly contribute to the IJC’s fulfillment of its mission of preventing and resolving watershed issues while supporting the goals and aspirations of Indigenous peoples. Greater inclusion of Indigenous perspectives in decision-making can be attained through the IJC and its boards and its entire program of work, but also directly through IWI activities. The IJC is developing guidance for its boards on how to increase Indigenous presence on IJC boards, better engage with Indigenous peoples, and include Traditional/Indigenous Ecological Knowledge in their work, including IWI projects. This has already begun to progress for a number of boards, including the current pilot watershed boards (the International Souris River Board and the International Red River Board). The IWI will continue to contribute to this initiative through working to increase Indigenous board membership. This initiative underscores the importance of IWI projects that address issues of importance to Indigenous peoples and IWI projects that, where possible, seek or include use of Traditional/Indigenous Ecological Knowledge.

Figure 9: Commissioners with women from the Bad River Band of Lake Superior Tribe of Chippewa who performed a Water Ceremony in Ashland, Wisconsin
Chapter 5
Moving Forward
The 2020s provide an opportunity for the IJC to build on its IWI program successes and expand the number of and connections between watershed boards. The decade will also bring a host of challenges due to a changing climate across the transboundary region, and new strategic priorities will be important to ensure the IWI continues to contribute meaningfully under these new circumstances.

Addressing Challenges

The IJC has created a work plan to take the program through to 2025. This work plan was generated out of discussions with governments, with board members and internally among IJC staff through 2018 and into 2019, with the primary takeaways synthesized into current and future strategic initiatives and proposed methods to improve the management of the IWI. The IJC also funds board-specific IWI projects identified on their work plans in approximately a 65/35 ratio with strategic initiatives, which can also help shape IJC priorities. These projects were also part of the IWI planning discussions and are important in moving the work of the IWI forward.

Current Strategic Initiatives

The IJC has two ongoing strategic initiatives under the IWI. The first is the binational, coordinated effort to harmonize hydrographic data between the United States and Canada; before this initiative, the two countries had developed their own suites of datasets with slightly different standards and methods. The IJC formed a task force in 2008 to reconcile these datasets and ensure that they are mutually usable to agencies and organizations on either side of the transboundary. This work continued in 2019 with the harmonization of the Great Lakes shoreline. The task force is now in maintenance mode. Data harmonization of geomatics information is complete and the data are being put to use on new projects.

The other ongoing strategic initiative uses the USGS SPARROW water quality modeling product. The model is being used on both sides of the border to gain a fuller picture of where excessive nutrients are entering the Great Lakes system, as well as the Red, Souris, and Rainy-Lake of the Woods watersheds. This data can be used to gain a better idea of the concentrations of nutrients entering water systems and from where, in turn helping agencies and governments craft plans to deal with it. This work is ongoing.

Looking ahead to 2020-2025, a new challenge will be maintaining the relationships and collaborations that came out of the recently concluded data harmonization effort as new data come in, new managers arrive, and new opportunities arise. There have already been discussions by USGS and Natural Resources Canada (NRCan) on the formation of a committee to address these
collaborative challenges, with participation from ECCC and the IJC. For the IWI program, this would entail developing a maintenance plan that outlines the transfer of harmonized data management among the agencies; while the agencies have already internalized this practice, this initiative would formalize the process. From there, the benefits of this harmonized data could continue to be shared amongst national and subnational agencies so that they can use it in their work.

The IJC wishes to revisit these watersheds with SPARROW using newer datasets up through 2012, potentially including the region around the St. Croix River (New England, southern Quebec and western New Brunswick). The latter work would require a new reference from governments.

A third priority issue from the previous IWI report, water quality objectives, has progressed as an IJC-wide priority. The IWI has provided funding for a white paper on this priority issue. The IJC is aware that water quality is a problem across the transboundary, but currently has no reference from governments outside the Great Lakes to begin dealing with the issue on a broader basis.

The IJC had also set a priority for 2015-2020 to look at climate change and how it could impact watersheds where the IJC has references. A focused pilot study was done in the St. Croix watershed, and plans are in place to take a similar look at other IJC boards. The International Rainy-Lake of the Woods Watershed Board and the International Osoyoos Lake Board of Control are planning to examine their responsibilities and the potential risks to those responsibilities posed by climate change.

**New Strategic Initiatives**

The IJC is interested in starting new IWI-related initiatives or expanding existing ones along the transboundary in 2020-2025. These initiatives stemmed from a series of workshops held between the IJC and its boards, a meeting in June 2018 with GAC and DOS, and discussions among IJC staff later that year in August.

**Adaptive Management**

The IJC intends on using the IWI to review how climate change would impact each of its boards to inform how operations and plans may need to be adjusted. By taking action now, before the most prominent impacts are likely to occur, the IJC and its boards hope to aid in cost savings for governments. The IWI will also be vital in ensuring that information and lessons learned are effectively shared between boards.

Beyond climate change, IWI projects have been used to help with the reevaluation of water quality
objectives, and the IJC is proposing regular reviews using IWI funds to ensure that relevant water quality issues are being focused upon. Issues and proposed changes could then be brought before governments.

Establishing New Watershed Boards

Through the IWI, the IJC proposes to evaluate, in collaboration with governments, the merits of establishing new international watershed boards. The IJC also aims to add local and Indigenous membership and input to non-watershed boards. This has been a hallmark of the IJC’s current international watershed boards and has proven effective in gaining a better understanding of local issues, concerns and knowledge, and assists in the sharing of information.

IWI Program Management

Aspects of the IWI program itself would benefit from some adjustments. These items include standardizing project documentation, developing an IWI steering committee, improving communication strategies and tools, and further organization of strategic initiative planning. These items come from the IWI Plan and were initially identified by the June 2018 meeting with governments and the IJC staff workshop in August 2018.

Standardizing IWI Project Documentation

The IJC intends to standardize how IWI project products are compiled, assessed and cataloged, with a summary posted online and greater details readily available as needed. Improved information management will also be required to ensure all IWI documents and reports are organized and made available. This is timely, as new information management tools are better facilitating interagency collaboration. These include SharePoint software, which provides a versatile, user-friendly platform that can make information easy to find and utilize.

Developing an IWI Steering Committee

The IJC is interested in forming a steering committee consisting of staff members already working with IWI and board members. This steering committee would also use the standardized project documentation in its assessments.

Improving Communication Strategies And Tools

In the fourth IWI report, the IJC offered a series of promised communication improvements. These include involving Indigenous governments to ensure their concerns and perspectives are included in
planning; building greater public involvement through more diverse board membership, increased local outreach, and community advisory groups; developing new outreach products to promote the IWI and make it more visible; improving board communications regarding the IWI; and organizing workshops and webinars for boards regarding environmental issues and advancements in science and technology. The IJC and the IWI have made advancements with these and other communications measures. A community advisory group is now a vital part of the International Rainy-Lake of the Woods Watershed Board. Indigenous partners have worked with the IJC extensively in areas such as the Rainy-Lake of the Woods, St. Croix and Osoyoos Lake watersheds. Boards across the transboundary have added community and Indigenous membership. And IWI project information can be found in the IJC’s Annual Activities Report and on its website.

The IJC is not sitting idle, however. To best communicate the goals and outcomes of IWI projects, the IJC is working to ensure projects are communicated effectively on an ongoing basis to program managers, partners, funders and the public using plain language, and effective outreach activities to help explain the project’s conclusions. This would also include stronger communication between boards and improving an online database of both completed and ongoing IWI projects. Formally educating boards and staff members on best practices gleaned from the past would also benefit future work, and the IJC is working to develop a formalized system to ensure people can find the information they need regarding IWI projects and their lessons learned.

**Strategic Initiative Planning**

The IJC is planning to develop a standard process to propose and execute new strategic initiatives. This would indicate who can propose these initiatives, what features they need, and their proposed duration, cost and approval process. These would be revisited every 2.5 years to evaluate progress and renew the strategic initiatives as appropriate.

**Past Resources of the IWI**

Investments in the IWI have allowed research into the success of alewives returning to the St. Croix River, a look into long-term water quality trends on the Red River, progress toward the setting of water quality objectives and alert levels in the Rainy River-Lake of the Woods basin, and consideration of ways to protect people from flooding across the transboundary.

The IJC has continually aimed to get the best return on investment by collaborating with federal, state, and provincial agencies, Indigenous communities, and NGOs to keep costs reasonable while still acquiring useful data. To ensure money is spent most wisely, proposed projects are brought
before a review committee twice a year; committee members can approve the projects as-is, request revisions, ask for additional information, or determine that the project should not move forward. This process includes a review of the project proposal and the communications plan associated with the project. If approved, the IJC handles contracting and financial aspects of the project, while the board and its partners leverage additional funds and gather the relevant data to meet the goals laid out in their project proposals. Commissioners are briefed every 6 months (April and October) regarding the status of active or recently completed IWI projects.

Future Resources of the IWI

The IJC commends governments for their support of the IWI. By drawing on existing IJC investments, continuing to work with outside agencies and organizations, and examining what potential resources the new strategic initiatives and program enhancements might require, the IJC believes it can continue operating the IWI in a cost-effective manner.

Finally, the IJC intends to ask boards to continue submitting IWI proposals for review for projects that would address issues that come up within their mandates and their individual work plans. This is done each March and September.
Chapter 6

Conclusion
Since our fourth report on the International Watersheds Initiative in 2015, the IWI has continued to mature. The IWI has become an essential part of the IJC’s approach to fulfilling its Treaty mandate of preventing and resolving disputes over transboundary water issues and assisting governments in effectively addressing transboundary issues. It has succeeded in achieving its mission to date and with continued support will continue contributing to effective management of shared waters.

The IJC is pleased that the Canadian and U.S. governments have continued to support implementation of the IWI. This support since 2015 has enabled the IJC to undertake the breadth and depth of IWI collaborative work highlighted in this report. Watershed boards have become more diverse and fostered increased public participation, the IJC has improved the linkage between IWI and Treaty responsibilities, and IWI projects have been closely tailored to IWI objectives, leading to growing public awareness and better water resource stewardship. The U.S. and Canada and several of their jurisdictions have greatly benefited from IWI successes, particularly the data harmonization work and binational water quality modelling.

The IJC has provided valuable advice to the governments of Canada and the U.S. on key transboundary water management concerns. The IJC and the governments have been able to adjust to an evolving environment in their efforts to anticipate, avoid and resolve transboundary water conflicts.

The IWI has contributed to the health and sustainability of the transboundary waters and holds increasing promise for binational water stewardship in the future. The IJC will be addressing the list of actions identified in this report and will continue to work closely with Governments, boards, and all transboundary basin interests in implementing IWI principles and the IWI goal of preventing and resolving watershed issues in these shared basins. The IJC looks forward to reporting back to governments on the IWI’s progress in 2025.
Closing Words

We have now arrived at the place where we end our words. Of all the things we have named, it was not our intention to leave anything out. If something was forgotten, we leave it to each individual to send such greetings and thanks in their own way. Now our minds are one.

This translation of the Mohawk version of the Haudenosaunee Thanksgiving Address was developed, published in 1993, and provided, courtesy of: Six Nations Indian Museum and the Tracking Project, All rights reserved.

Thanksgiving Address: Greetings to the Natural World English version: John Stokes and Kanawahienton (David Benedict, Turtle Clan/Mohawk) Mohawk version: Rokwaho (Dan Thompson, Wolf Clan/Mohawk) Original inspiration: Tekaronianekon (Jake Swamp, Wolf Clan/Mohawk)


