

**International Lake of the Woods Basin
Water Quality Plan of Study
Your comments are invited!
November 12 - December 11, 2014**

With a drainage basin of nearly 70,000 km² (27,000 mi²) straddling the borders of Ontario, Manitoba and Minnesota, the International Lake of the Woods basin is an important natural, economic and recreational resource. Over the past decade, attention has increasingly focused on the health of the basin and on the need for cooperative action to address complex water quality challenges.

The **International Lake of the Woods Basin Water Quality Plan of Study** has been prepared to guide the International Joint Commission (IJC) in making recommendations to the Governments of Canada and the United States regarding launching a water quality study for the Basin. The Plan of Study was based on extensive engagement with public agencies, scientific and technical experts, community groups, First Nations, Métis and Tribes, and the general public.

The Plan of Study identifies 32 projects that it finds are needed to improve understanding of the basin ecosystem and support a balanced, binational approach to water quality management (see the summary table). The Plan also outlines three funding options for consideration:

- *Option A* proposes that 17 priority projects be funded for a total estimated cost of \$4,150,000. These projects will focus on providing core data and knowledge, but will allow for only a limited response to the full scope of current and emerging water quality challenges in the basin.
- *Option B* proposes 28 projects – the projects under Option A, as well as 11 additional important projects – for a total estimated cost of \$7,105,000. These projects will allow for a more comprehensive undertaking to respond to water quality concerns in the basin.
- *Option C* proposes the funding of all 32 projects recommended in the Plan of Study, at a total estimated cost of \$7,805,000. This option would support a broadly-based coordinated effort to improve understanding of the basin's ecosystem and strengthen water quality management.

Monitoring Challenges

A primary challenge to strengthened watershed management and improved ecosystem health in the basin is the limited availability of long-term, consistent data. Without such data, resource agencies cannot track trends in nutrients, contaminants and aquatic invasive species.

- *The Plan of Study recommends a single comprehensive project to address this challenge. The project will address gaps in the existing monitoring and data acquisition work currently supported by agencies in the basin, make recommendations for new monitoring locations and equipment, and establish more effective ways to share data within the basin.*

Nutrient Enrichment and Harmful Algal Blooms Challenges

Harmful algal blooms, triggered by a variety of climatic, physical, chemical and biological factors, continue to occur in the basin, particularly in the southern portion of Lake of the Woods and in other lakes upstream from Rainy River. These blooms can: affect recreational usage of lakes for sport fishing, boating and swimming; alter population densities of commercial and subsistence fisheries; cause undesirable taste and odor of drinking water; and compromise water treatment facilities. As well, the

blooms sometimes release algal toxins, which can threaten drinking water supplies, human health and animal welfare.

- *The Plan of Study identifies 11 projects that will improve understanding of what contributes to the occurrence of these blooms and develop better communication tools for alerting the public of risks when blooms occur. Information from these projects will be critical to improved management of algal blooms, reducing their severity and frequency and the risks associated with algal toxins.*

Aquatic Invasive Species Challenges

Over the last 30 years, the Lake of the Woods basin has been invaded by many non-native species, including the zebra mussel, hybrid cattail, spiny waterflea, rusty crayfish and rainbow smelt. These species have the potential to permanently alter aquatic ecosystems, leading to the loss of native species, reductions in game fish populations, and costly damage to water infrastructure.

- *The Plan of Study recommends seven projects that will strengthen ongoing prevention efforts and pursue control efforts in some cases where invasive species have infested waters in the basin.*

Surface and Groundwater Contamination Challenges

In recent years, the impacts of contaminants in the basin have been greatly reduced through reductions of pollutant inputs into the Rainy River. However, important concerns remain. There are areas in the basin listed as contaminated sites from past mining activities. There is atmospheric contamination of lakes and fish by mercury, and growing concerns over potential contamination from new mining activities and from the transport of petroleum through the basin by pipeline and rail.

- *The Plan of Study recommends seven projects that will provide a comprehensive assessment of the existing and potential contaminant issues in the basin. The goals are to improve understanding about potential sources of contamination, assess vulnerability of water resources, and ensure protection measures are in place to minimize risks.*

Capacity Building Challenges

Current water management in the basin is characterized by a diversity of approaches, driven by different legislative frameworks and policies, and with limited ability to coordinate management efforts across the international boundary. This diversity can be a major road block to any coordinated effort between the two countries.

- *The Plan of Study recommends six projects that will help build greater capacity across the basin for engaging all basin interests on water quality management. The projects will help share critical water quality information among natural resource managers, the public, First Nations, Tribes and Métis, and help promote greater cooperation among institutions and agencies active in the basin.*

Beyond the Plan of Study: Additional Observations

There are important issues affecting the basin that cannot be addressed within the context of a water quality Plan of Study. These concerns will continue to be part of the dialogue on the future of the basin. They include: the need to review water level regulation on Lake of the Woods; the capacity of indigenous communities in the basin to participate in water quality management initiatives; and, the need for a long-term binational strategy for balancing mining activities in the basin with watershed protection.

Review and Comment on the Plan of Study

The IJC wants to hear from you before submitting its recommendations to the Governments of Canada and the United States. The **International Lake of the Woods Basin Water Quality Plan of Study** is available for review and comment for a 30-day period, from November 12 to December 11, 2014.

Copies of the Plan of Study can be obtained through the Plan's website: http://ijc.org/en_/LWBWQPOS

Comments may be submitted electronically through the Plan's website, or in writing to http://www.ijc.org/en_/LOWWQPOS

Taking into account comments received, the IJC will submit its final report and recommendations to governments in late 2014.

**Lake of the Woods Basin Water Quality Plan of Study
Recommended Projects**

Challenge	Plan of Study Projects and Activities	Timing (years)	Cost (\$K)	Option
Monitoring	1. International Monitoring Program for the Lake of the Woods Basin	3 ongoing	\$700	A
Nutrient Enrichment and Harmful Algal Blooms	2. Mass-Balance Models for Phosphorus and Nitrogen in the Lake of the Woods Basin	3 ongoing	\$200	A
	3. Internal Loads and Hypoxia in Lake of the Woods	3	\$400	B
	4. Assessment of Iron Controls from Sediments on Phosphorus Availability in Lake of the Woods	3	\$250	C
	5. Assessment of Nutrient Subsidies from Shorelines Due to Erosion from High Water Levels in Lakes and High Flows in Rivers	3	\$375	B
	6. Application of Water Quality Models at Watershed and Basin-Wide Scales to Apportion Nutrient Sources	2	\$150	A
	7. Implementation of Nutrient Load-Reduction Strategies in Lake of the Woods Basin	3 ongoing	\$400	A
	8. Application of Satellite Imagery and Remote Sensing Tools to Map and Characterize Water Quality and Algal Blooms	3	\$285	B
	9. Development of Predictive Models of Algal Blooms from Hydrological and Meteorological Processes	3	\$200	B
	10. Influence of Altered Food-Web Structure on Production of Harmful Algal Blooms	3	\$300	B
	11. Taxonomic Characterization of Algal Communities and Algal Toxins	3	\$300	B
	12. Public Health and Animal Welfare Risks Including Public Alerting Mechanisms	1	\$50	A
Aquatic Invasive Species	13. Binational Aquatic Invasive Species Management Team and Prevention Strategy for the Lake of the Woods Basin	4 Ongoing	\$200	A
	14. Evaluation and Implementation of Options to Manage Recent Zebra Mussel Infestation in Headwaters Areas in Minnesota	2 Ongoing	\$500	A
	15. Ecological Impact of the Spiny Waterflea in Infested Boundary Lakes	3	\$300	A
	16. Pilot Studies on Adaptive Control Measures for Hybrid Cattail and Rusty Crayfish in Infested Wild Rice Habitat	2 ongoing	\$300	B

Challenge	Plan of Study Projects and Activities	Timing (years)	Cost (\$K)	Option
	17. Comprehensive Assessment of Potential Invasion Risks to and within the Lake of the Woods Basin	2	\$400	B
	18. Water Quality Risk Assessment for Zebra Mussels and Quagga Mussels	< 1	\$100	A
	19. Climate Risk Assessment for Aquatic Invasive Species	3	\$150	C
Surface and Groundwater Contamination	20. Assessment of Binational Implementation of Water Quality Objectives for Sulfate, Copper, Nickel, and Mercury	2	\$150	A
	21. Synthesis Report on Contaminants in Water, Aquatic Sediment, and Fish	2	\$300	A
	22. Methylmercury Flux and Bioaccumulation in Large Border Lakes	3	\$300	B
	23. Spatial Survey of Contaminants of Emerging Concern	2	\$200	C
	24. Vulnerability Assessment of Border Waters to Contamination from Mining	3	\$600	A
	25. Vulnerability Assessment of Border Waters to Contamination from Rail and Pipeline Transport of Petroleum and other Chemicals	2	\$200	A
	26. Mining Effects Science Workshop	Biennial	\$100	A
Capacity Building	27. International Platform for Implementation	< 1	\$20	A
	28. Review of Data Collection Programs and Monitoring in the Headwaters Regions of the Basin	1	\$75	B
	29. Application of Regional Climate Models for the Basin and Improved Public Education and Engagement on the Issue of Climate Change	1	\$100	C
	30. Development of the Lake of the Woods Basin Geospatial Mapping Framework and Public Communication Tool	2 ongoing	\$160	A
	31. Indigenous Perspectives on Ecosystem Health	1	\$20	A
	32. Funding Program for Non-governmental Organizations to Promote Watershed Protection	1	\$20	B