

**STATUS REPORT ON THE ACTIVITIES OF THE
INTERNATIONAL RED RIVER BOARD**

**Prepared for the International Joint Commission
Spring Semi-Annual Meeting,**

**April 17, 2013
Washington, D.C.**

April 17, 2013

Table of Contents

1.0 Introduction.....	2
2.0 Water Quality and Quantity Conditions.....	2
3.0 Initiatives and Activities	9
4.0 Red River Basin – Activities and Issues.....	15
5.0 International Red River Board Membership.....	27
6.0 Summary of Priorities	28

1.0 Introduction

This status report provides highlights of current International Red River Board (IRRB) activities and basin issues. The report reflects the deliberations and decisions of the IRRB in implementing its work plan, and builds upon previous reports including the Board's thirteenth annual progress report dated October 2012 which covers the period October 1, 2011 to September 30, 2012. The water quantity information presented below highlights flow and level conditions for the spring 2013. For information on spring 2012 water quantity refer to the April 2012 status report. The water quality data, for the five IJC objectives, covers the period 2003-2012 to show any variations over that time span.

2.0 Water Quality and Quantity Conditions

Water Quantity

The 2013 spring flood potential in the United States portion of the Red River basin is higher than last year but still below the levels observed in 2009 and 2011. According to the US National Weather Service (NWS) hydrologic outlook on March 21, 2013 there exists a high risk (50% or greater) of major flooding in at Wahpeton, Fargo, Halstad, Oslo, and Pembina. Moderate flooding at Hickson, Grand Forks, and Drayton. Snow fall in March added substantially to the basin-wide snowpack. Snow equivalents are ranking above the 80th percentile for most of the basin. In the basin south of Fargo and also along the U.S. / Canadian border, the snow water equivalents are ranking above the 95th percentile. The NWS forecasts a 10% probability of Fargo experiencing a flood of record this year.

In Manitoba, the potential for spring flooding was moderate to major in the Red River Basin. Soil moisture conditions were generally below normal with near normal to above normal snowpack in most of the basin. With favourable weather, minor was expected. With normal weather conditions there may have been minor to moderate flooding. With unfavourable weather conditions, moderate to major localized flooding could have occurred especially in small tributaries such as the La Salle, the Rat and the Morris Rivers. Also with unfavourable weather conditions, levels in the Red River main stem would be higher than in 2011, but slightly less than 2009 from Emerson to Winnipeg. Levels at James Avenue were forecasted to be 5.4 m (17.7), 5.7 m (18.8 feet) and 6.2 m (20.5 feet) for favourable, average and unfavourable weather conditions, respectively. Operation of the Portage Diversion and the Red River Floodway is expected to occur under all weather conditions to reduce levels within the City of Winnipeg.

The flood potential is expected to range from minor to moderate in the Pembina River. The average weather scenario would produce minor to moderate flooding. Due to above average snow water equivalent in the snow, an unfavourable weather scenario could produce major flooding with levels close to those of 1998.

Water Quality

The IJC recommended the establishment of water quality objectives for a limited number of variables at the International Boundary on April 11, 1968, and the recommendation was approved by governments on May 4, 1969. These variables are *dissolved oxygen*, *total dissolved solids*, *chloride*, *sulphate*, and *fecal coliform* bacteria. The IRRB is responsible for monitoring and reporting on compliance with these objectives. Several exceedances were observed during the 2011-2012 water year, as explained in detail below. Figure 1 shows *dissolved oxygen* levels in the Red River at Emerson. Observed levels did not exceed (i.e., fell below) the objective of 5 mg/L in 2011-2012.

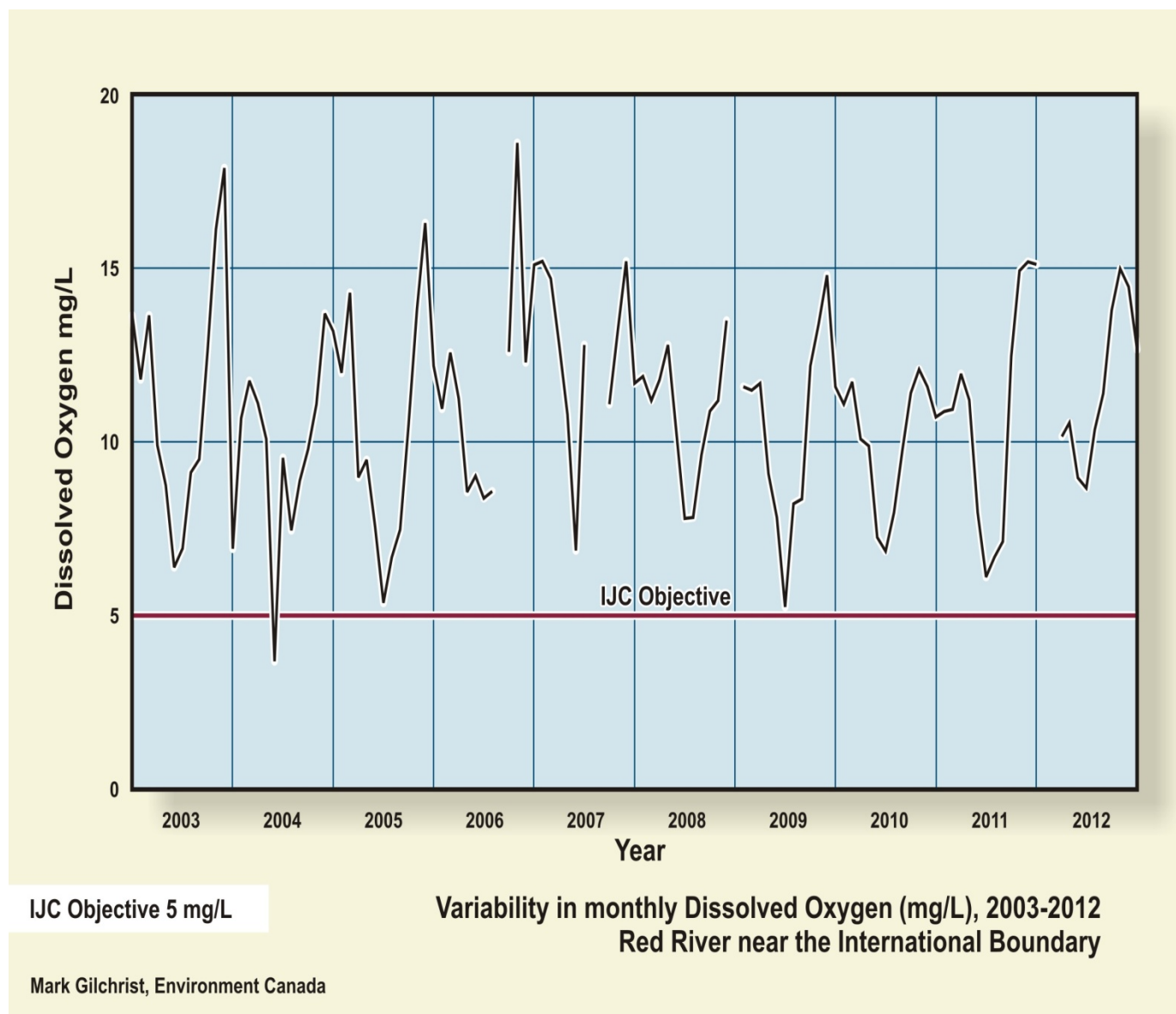


Figure 1 Dissolved Oxygen Levels - Red River at the International Boundary

The TDS objective of 500 mg/L was exceeded on most occasions during the water year (Figure 2). The highest observed value of 1,248 mg/L occurred in November 2012. The main reason for the increase in TDS in 2012 was due to higher and sustained releases from Devils Lake coupled with low flow / drought conditions for the majority of the basin. Flows in the Sheyenne River were lower in 2012 and facilitated increased releases from Devils Lake. At its meetings held in 2009, the Board had some discussion regarding the rationale for the water quality objectives that were set in the 1960's and the reasons why some objectives, specifically TDS, are exceeded several times in a given year. The Board will pursue this discussion at its future meetings to assess and re-examine the water quality objectives.

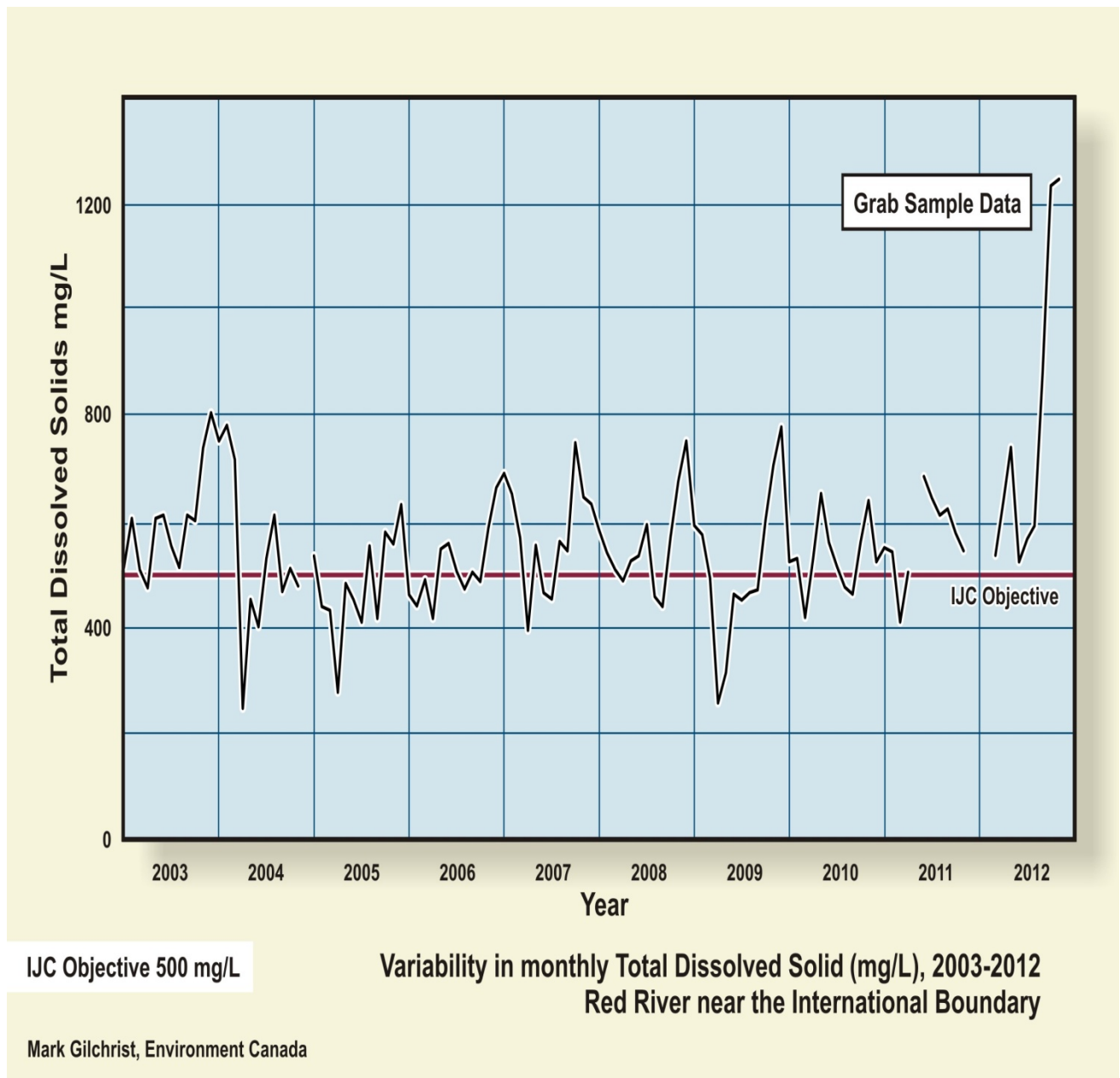


Figure 2 Total Dissolved Solids (TDS) - Red River at the International Boundary

The *chloride* objective (100 mg/L) was exceeded once during this reporting period. Monthly values ranged from a high of 186 mg/L in October 2012 to a low of 27 mg/L in April 2012 (Figure 3).

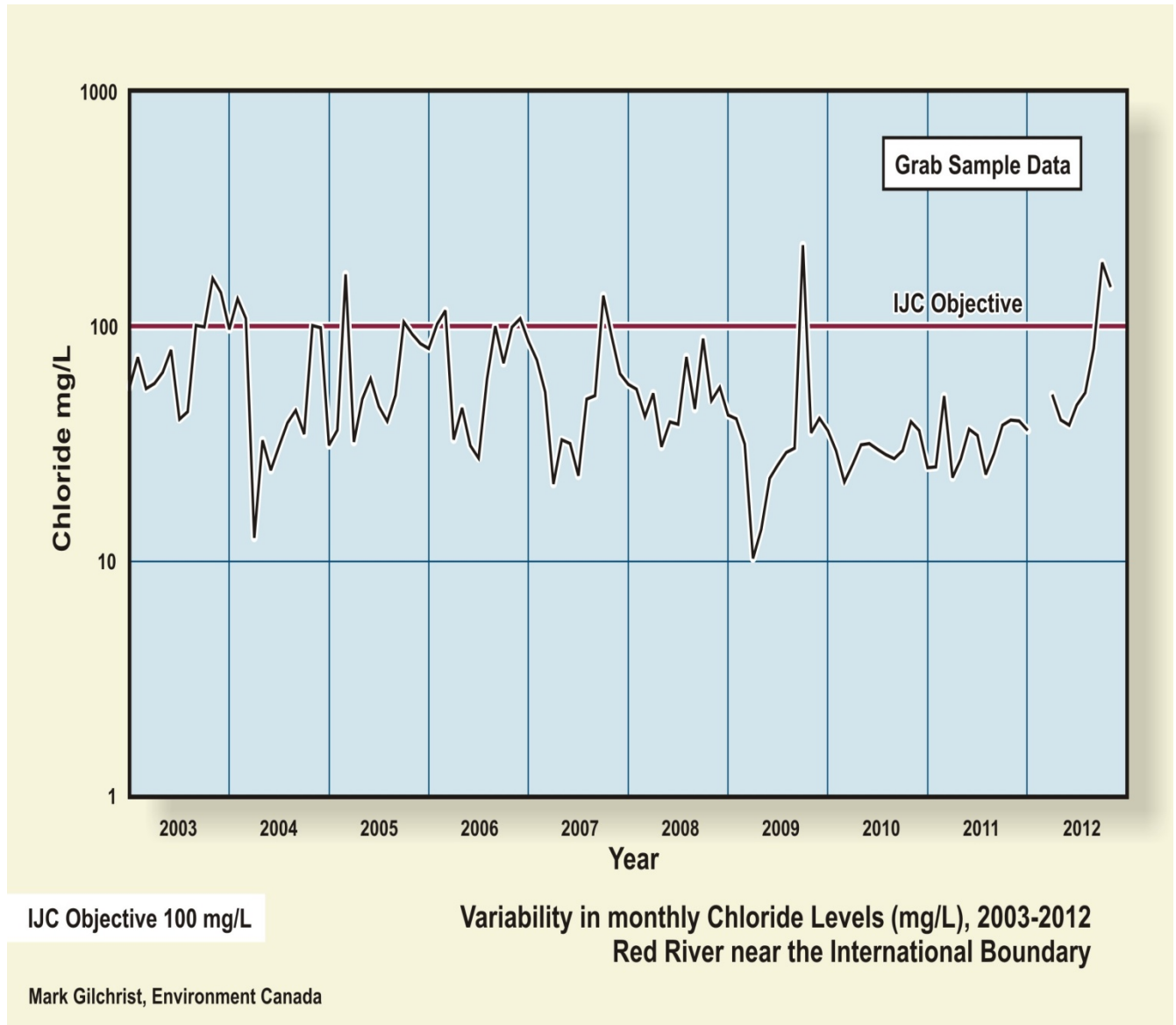


Figure 3. Chloride Levels – Red River at the International Boundary

The *sulphate* objective (250 mg/L) was exceeded on fourteen occasions during the water year which was unprecedented. Like the TDS objective, the main reason for such a high increase in sulphate concentrations was the additional releases from Devils Lake through most of 2012. Other monthly values ranged from a low of 137 mg/L in January 2012 to a high of 456 mg/L in November 2012 (Figure 4).

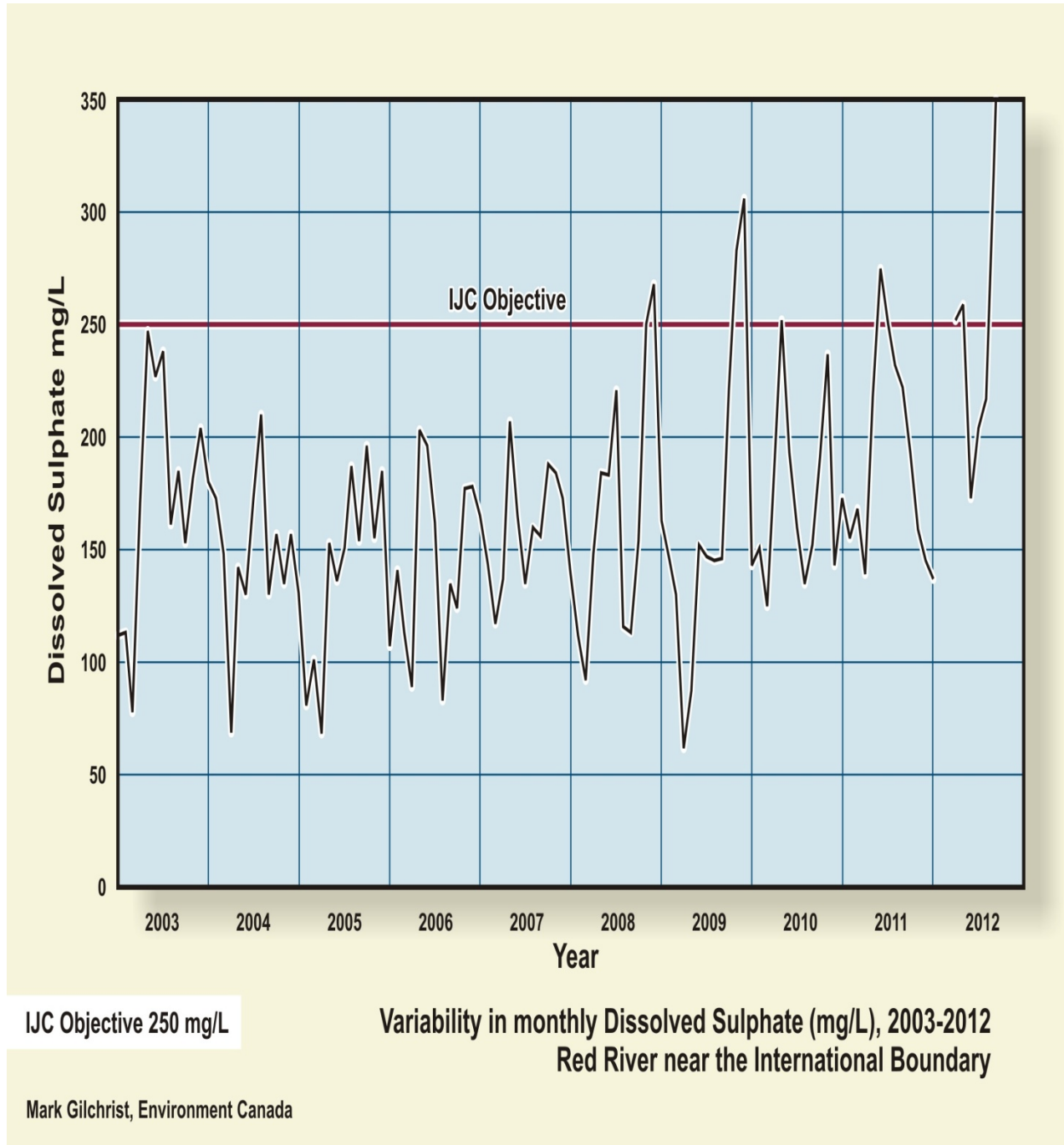


Figure 4 Sulphate Levels - Red River at the International Boundary

Observed E. coli and Fecal coliform bacteria as shown in Figure 5 were not exceeded during the reporting period. The E. coli objective has replaced Fecal coliform since October 1, 2010.

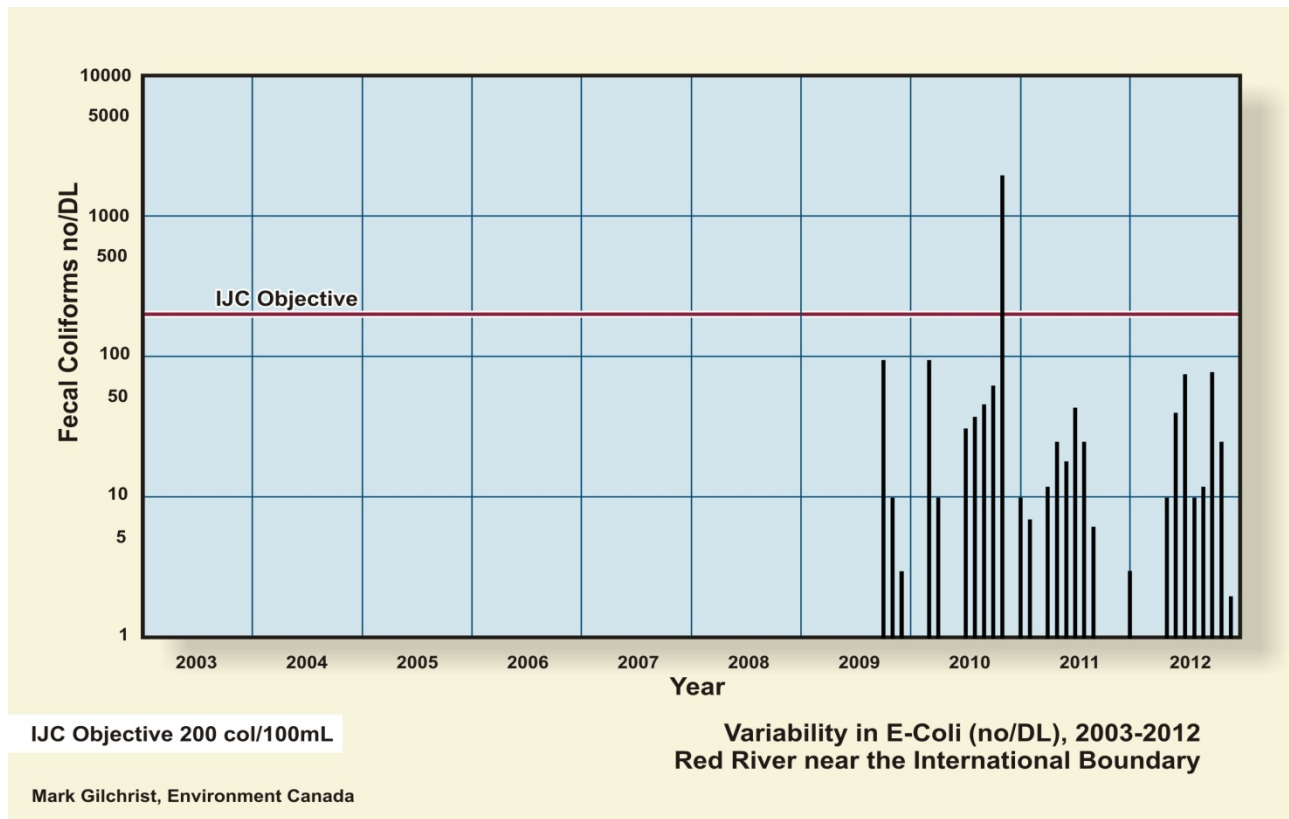


Figure 5 E. coli and Fecal coliform Count - Red River at the International Boundary

Alert Levels

Ten pesticides and herbicides, and one metabolite (desethyl atrazine), for which alert levels were established by the former International Red River Pollution Board were detected during the reporting period. Based on a total of 12 water samples, 10 pesticides and/or herbicides with a total aggregate of 55 exceedances (greater than detection concentration) were recorded during the October 1, 2011 - September 30, 2012 reporting period. The detection levels were below the Canadian Aquatic Guidelines. Given that the Red River basin is an agriculturally dominated region, the presence of pesticides and herbicides is expected.

The IRRB recognizes that there is very little scientific information available to assess the implications of long-term exposure to low concentrations of pesticides and herbicides by aquatic organisms and humans. The IRRB continues to closely monitor trends in these concentrations and their frequency of detection with the view to updating its assessment as new scientific information becomes available.

Water Quality Monitoring at Emerson in 2012

Following North Dakota's decision to increase releases from Devils Lake, Environment Canada conducted additional water quality monitoring on the Red River at Emerson. The following

Parameter	Mean concentration 2012 (mg/L)					IJC Objective (mg/L)	Canadian Drinking Water Guideline (aesthetic mg/L)
	May-July (N = 14)	Sept (N = 2)	Oct (N = 5)	Nov (N = 3)	Nov. vs. May-July (Change in %)		
Total dissolved solids	572	787	1313	1019	78.1	500	500
Sulphate	198	297	402	351	77.3	250	500
Chloride	35	59	127	128	265.0	100	250
Sodium	60	109	206	132	120.0	No objective	200

tables summarize the results of the monitoring program from May to October 2012.

River	Conductance			
	22 Sept	2 Oct	29 Oct	30 Nov
Sheyenne (upstream Devils Lake)	No data	No data	No data	No data
Devils Lake (State Outlet)	1900	1900	1890	2040
Devils Lake (Tolna Coulee Outlet)	2970	2960	3000	Not operated
Sheyenne (Cooperstown)	2560	2540	2100	1850
Sheyenne (Baldhill Dam)	2090	2230	2240	2320
Sheyenne (Horrace)	1940	2030	2090	1900
Red River (Halstad)	1510	1660	1380	1440
Red River (Grand Forks)	1460	1560	1240	1710
Red River (Emerson)	1430	1624	1805	1900

Current Water Quality Status at the Red River at Emerson

During the winter of 2012-13, the Baldhill Dam holds an undiluted mixture of water discharged from the two outlets of Devils Lake. There was minimal to no natural discharge into the Sheyenne River in fall 2012. In effect, the influence of Baldhill Dam/Devils Lake on water quality in the Red River will continue until spring break-up, and the spring freshet of snow melt water enters the Sheyenne River, Baldhill Dam, and Red River.

On 18 February 2013, discharge for the Sheyenne River below Baldhill Dam was 3.5 m³/s with conductivity at 2370 which is equivalent to total dissolved solids of 1540 mg/L. Discharge at the international boundary on February 18 was 23.9 m³/s. Thus, Sheyenne River water is about 15% of the flow at Emerson and has a significant influence on TDS at the boundary.

Key water quality parameters remain above established objectives, although water quality at the international boundary has improved somewhat from fall 2012, On January 16, 2013, TDS at the international was about 995 mg/L, or well above the International Joint Commission (IJC) water quality objective of 500 mg/L. Chloride concentration was 117 mg/L, and was also above the IJC objective of 100 mg/L. Sulphate concentration was 302 mg/L, and was greater than the IJC objective of 250 mg/L. Environment Canada will continue to provide monthly updates throughout the winter.

3.0 Initiatives and Activities

3.01 International Red River Board Work Plan

The Board currently operates under a three-year work plan it has developed for the period 2012-2015. The three-year work plan reflects the current status of the Board's activities that affirm consistency with the International Watersheds Initiative and the IJC Directive to the IRRB. The work plan priorities include a continued effort to expand the existing scientific knowledge of aquatic ecosystem dynamics and current conditions. The Board is currently exploring the possibility of extending the Pathogens and Parasites Study for the entire basin (Phase II). The Aquatic Ecosystems Committee is expected to come up with a proposed study plan. In addition, the IRRB work plan priorities include strategic goals that highlight flood preparedness and mitigation; Lower Pembina flooding, water quality, water quantity/apportionment, outreach and public engagement.

A significant milestone for 2012 was the completion of the Lower Pembina River Flooding Task Team (LPRFTT) Report. The LPRFTT has overseen the completion of an International Watersheds Initiatives (IWI) study report entitled "Simulation of Flood Scenarios on the Lower Pembina River Flood Plains with the Telemac 2D Hydrodynamic Model"; a Phase 3 study conducted by the National Research Council's (NRC) Canadian Hydraulics Centre dated October 2012. The two previous phases were also conducted by the Canadian Hydraulics Centre with IWI funding. Based on the results of this Phase 3 modelling effort, the LPRFTT developed a document titled, "An exploratory analysis of mitigation measures for the lower Pembina River basin". This LPRFTT document provides comments on the Phase 3 Report, summarizes main modelling results and conclusions from the report, and suggests a path forward to the IRRB concerning flood mitigation within the basin. This document was approved by the IRRB (with only two minor modifications) at a special IRRB meeting held on November 14, 2012. This LPRFTT report and the Phase 3 NRC report were then presented to the IJC and accepted at their December 2012 meeting. These two reports, the model and animations have been made public.

3.02 Water Quality Committee

In September 2011, the Board created a Water Quality Committee (WQC) made up of members from Manitoba, North Dakota, and Minnesota. Prior to their official formation as a committee, Manitoba, North Dakota and Minnesota took the initiative and prepared a proposal on nutrient management strategy. Copies of their proposal were distributed to the Board at the September 2011 meeting. The Board briefly discussed the proposal, made some comments and endorsed the proposal that contained six components. The Committee is developing a Nutrient Management Strategy that has been endorsed by the Board.

The Water Quality Committee currently consists of the following members:

Jim Ziegler, Minnesota Pollution Control Agency (co-chair)
Nicole Armstrong, Manitoba Conservation and Water Stewardship (co-chair)
Dennis Fewless, North Dakota State Department of Health
Mike Ell, North Dakota State Department of Health
Leah Thvedt, Red River Basin Commission
Rochelle Nustad, U.S. Geological Survey
Eric Steinhaus, U.S. Environmental Protection Agency
Sharon Reedyk, Agriculture and Agri-Food Canada
Lance Yohe, Red River Basin Commission
Mike Vavricka, Minnesota Pollution Control Agency
Iris Griffin, Environment Canada
Rob Sip, Minnesota Department of Agriculture
Keith Weston, United States Department of Agriculture

The Committee last met on March 7, 2013 in Grand Forks. Following approval by the International Red River Board (IRRB), the Water Quality Committee (WQC) submitted a proposal to the IJC under the International Watersheds Initiative (IWI). The following is a brief description of the project undertaken by the WQC.

International Watersheds Initiative Project – Review of Methods for Developing Water Quality Targets

The contract for this project was awarded to RESPEC Consulting & Services and work is almost finished. The contract was extended to March 31, 2013 to provide additional time to review and provide comments back to the contractor. A draft final report was circulated to the Water Quality Committee for review on January 7, 2013 and a final report was circulated on March 1, 2013. The Water Quality Committee met on March 7, 2013 in Grand Forks and RESPEC provided a presentation on the project. Final comments on the report are due March 18, 2013 and the project will be completed by March 31, 2013.

Water Quality Modelling Workshop Sub-Group

Key to the successful implementation of the goals, objectives and tasks described in the Red River basin nutrient management strategy will be the use of water quality and watershed models. These include models which are applicable at different spatial and temporal scales, as well as models which are applicable for different water resource types (lakes vs. rivers).

A small Water Quality Committee sub-group has been established to provide the committee with additional information on water quality and watershed modelling. The sub-group has organized a modelling meeting for April 30, 2013. The goal of this meeting is to provide federal, state, provincial and local water resource managers with a better understanding and awareness of the wide array of available modeling tools that can be used to meet a diverse set of water quality and watershed management objectives in the Red River basin, including nutrient management. A call for presentations was circulated on January 7, 2013 and about 12 presentations were proposed. Costs will be minimal and will likely be funded by involved jurisdictions or consultants. Coffee/refreshments and a free space have been secured for the meeting at the Energy & Environmental Research Center, University of North Dakota.

Monitor and Report on Progress towards Meeting Water Quality Targets and Nutrient Load Allocations - Work to assess the comparability of existing water quality monitoring programs and data throughout the watershed is underway and the committee is exploring options for web-based delivery of information on water quality monitoring programs. With assistance and guidance from the committee, the USGS has developed a web-based map of water quality monitoring stations. The map has been transferred to International Joint Commission web site and the Committee is now providing suggestions for corrections and further improvements. This work is ongoing. The expected outcome of the work by the WQC is to adapt a nutrient management strategy based on progress and ongoing evaluation.

3.03 Water Quantity Apportionment

As indicated by the historic streamflow records, water supply in the Red River basin is highly variable seasonally, annually, and over longer time periods. Recent forecasts of water demand based on population and economic growth projections further test the adequacy and reliability of these supplies. Scientific opinion with respect to climate change provides added caution regarding future hydrologic trends and the prospect of greater instability in water supply in the region. Projected increases in water use will likely cause larger departures from the natural regime to occur. The IRRB considers it prudent to consider establishment of flow targets at the international boundary before they are needed. The Board's Committee on Hydrology (COH) has been working on apportionment issues since 2006.

A literature review on apportionment for the Red River was completed by Dr. Rob de Loe, University of Guelph, with funding from the International Watersheds Initiative (IWI). Dr. de Loe's report titled, "Sharing the Waters of the Red River Basin: A Review of options for Transboundary Water Governance" was completed in 2009. The study recommends an apportionment model and approach to transboundary water governance in the Red River basin that includes the following major elements:

1. A prior appropriation to meet critical human and environmental needs,
2. Rules to apportion remaining natural flows between Canada and the United States based on the principle of equitable sharing, and
3. Rules regarding waters that originate in the respective countries' portion of the basin but do not cross the boundary. This model represents a balanced approach that takes account of local circumstances (e.g., the role of the *Boundary Waters Treaty of 1909*, existing management relationships, climatic conditions and the nature of water uses).

The second IJC funded report, by R. Halliday & Associates; entitled “Determination of Natural Flow for Apportionment of the Red River” was completed on May 30, 2010. This report established a process for the development and implementation of water quantity apportionment procedures. Various apportionment methodologies in the context of the Red River basin to assess natural flows were investigated and the Project Depletion Method is recommended. The report reviews the actual natural flow calculation and provides information on how the calculation can be accomplished. Gaps and concerns were discussed, particularly: hydrometric and meteorological networks, water allocation, water use, and instream flows. More detailed discussion on natural flow determination dealt with evaporation, minor projects, channel losses and travel times. Apportionment was addressed about location(s), period, make-up water and dispute resolution.

There is also a need for in-stream flow needs (IFN) studies to make recommendations for apportionment. IFN is a multi-disciplinary issue involving biology, geomorphology, connectivity, water quality, and hydrology. The Board’s Aquatic Ecosystem Committee and its Committee on Hydrology are working together to address IFN questions as part of the Board’s ongoing water quantity apportionment efforts. A joint proposal for IWI funding to hire a contractor to collect available bathymetric and hydrographic information for the Red River along with the following has been developed:

- Identification of representative fish species and life stages for the Red River,
- Data on distribution, habitat use and habitat availability of these representative fish species and life stages in the reference sites where bathymetric and flow data were recorded,
- Determination of biologically significant periods,
- Temperature preferences for the different fish species, and
- Any available reports on validating Habitat Suitability.

In January 2011, IRRB approved the joint IFN proposal and submitted it the IJC for IWI funding in the new fiscal year starting April 1, 2011. The project was conducted by Bill Franzin and completed in 2012.

3.04 Lower Pembina Flooding

The IRRB at its January 2008 meeting established the Lower Pembina River Flooding Task Team (LPRFTT). The mandate of this Task Team is to develop a science-based solution(s) to mitigate flooding in the lower Pembina River basin.

The LPRFTT has overseen the completion of an International Watershed Initiatives (IWI) study report entitled “Simulation of Flood Scenarios on the Lower Pembina River Flood Plains with the Telemac 2D Hydrodynamic Model”; a Phase 3 study conducted by the National Research Council’s (NRC) Canadian Hydraulics Centre dated October, 2012. The two previous phases were also conducted by the Canadian Hydraulics Centre with IWI funding. Based on the results of this Phase 3 modelling effort, the LPRFTT developed a document titled “An exploratory analysis of mitigation measures for the lower Pembina River basin”. This LPRFTT document provides comments on the Phase 3 Report, summarizes main modelling results and conclusions from the report, and suggests a path forward to the IRRB concerning flood mitigation within the basin. This document was approved by the IRRB (with only two minor modifications) at a special IRRB meeting held on November 14, 2012. This LPRFTT report and the Phase 3 NRC

report were then presented to the IJC and accepted at their December, 2012 meeting. These two reports, the model and animations have been made public.

Early in 2010, the USACE conducted the survey of Switzer Ridge area, which experienced significant erosion during the spring of 2009. The first report (Phase 1) was completed during July 2009; model details including model description, how it was applied to the Lower Pembina River flood plains, calibration, verification, etc. were presented at the IRRB September 2009 meeting by the NRC modeller, Thierry Faure; and the report was later approved by the IRRB at its January 2010 meeting and was forwarded to the IJC. Reviewers of the first phase thought that the model fairly accurately replicated what flooding occurred during the spring of 2006.

The second study (Phase 2) was completed during June 2010, expanded the model domain geographically and included more infrastructures, such as more roads and culverts. This was accomplished by provision of additional agency infrastructure data and additional LiDAR information to the NRC. Based on consultations with a number of stakeholders, simulation scenarios such as removal of both County Road 55 and the border road dyke, and flattening of all roads; along with various flood mitigation scenarios including set-back dykes, various floodway alignments and various diversion alternatives, were simulated using the 2006 flood event. Stakeholders consulted included the Pembina River Basin Advisory Board, the Pembina County Water Resource District, the Red River Basin Commission, and the IRRB. Results of the study were presented to the IRRB September 2010 meeting by the LPRFTT. Model generated results were also presented to the Pembina River Basin Advisory Board and Pembina County Water Resource District and at the January 2011 Annual Red River Basin & Water International Summit Conference and at the June 2011 Canadian Water Resources Annual Conference.

The third phase of the study, "Simulation of Flood Scenarios on the Lower Pembina River Flood Plains with the Telemac 2D Hydrodynamic Model" refined the model along various rivers and coulees to allow more accurate simulation of the flood extent along these watercourses. The model was further enhanced in some key areas in terms of inclusion of additional roads, bridges, and culverts; and the upstream boundary was moved upstream to Morris, Manitoba, to properly assess the confluence of Buffalo Creek with the Red River. Four different flood scenarios were modeled: the 1:10, 1:50 and 1:100 year return period spring floods and the 1:20 year summer flood allowing a wide range of flood severity levels to be assessed. The model used the USACE developed hydrographs (annual events) and Manitoba Water Stewardship hydrographs (summer rainfall events) at Walhalla along with local hydrographs for specific return periods. Local hydrographs for both annual events and summer rainfall events were estimated by NRC. The model was then used to analyze the increase and decrease of flooding when comparing the existing conditions to other scenarios. The modelled scenarios included the removal of the border road/dyke, all roads removed ("natural conditions"), removal of ND County Road 55, and compared the existing and "natural" scenarios with hypothetical situations including a floodway, a set-back dyke, and diversions or cuts in the border road/dyke. The model provided a general estimate of acres flooded and flood duration.

Preliminary modelled results were presented by Thierry Faure at the January 2012 Annual Red River Basin & Water International Summit Conference and the IRRB January 2012 meeting. Thierry also presented modelled results to the Pembina River Basin Advisory Board at a March 26th, 2012 meeting in Walhalla, North Dakota. Finalized modeled results were presented by the LPRFTT at the IRRB August 2012 Detroit Lakes meeting. A similar presentation was provided to the public at the January 24, 2013 meeting of the IRRB.

The National Research Council's (NRC) Canadian Hydraulics Centre provided a March 1, 2013 webinar, showing how Blue Kenue can be used as an analysis and visualization tool for hydraulic models. A workshop on the Telemac modeling is being planned for later in 2013.

One of the recommendations that the IJC provided was for the Governments to establish a Task Team to work towards a binational solution to help manage the flooding issues in the Pembina Basin. The Pembina River Basin Advisory Board (PRBAB) will be meeting on April 4 to discuss the possible formulation of a Task Team. The PRBAB is expected to provide a recommendation to other Government entities on this subject.

3.05 Invasive Species - Zebra Mussels

Zebra mussels, a nonnative invasive species, were discovered in the Red River basin for the first time in September 2009. The mussels were found in Pelican Lake in Otter Tail County, Minnesota, which is on the Otter Tail River. Native to Eastern Europe and Western Russia, zebra mussels were first discovered in the Great Lakes in 1988. They entered the Upper Mississippi River system from Lake Michigan via the Illinois River (Chicago Sanitary and Shipping Canal) and spread upriver into Minnesota and Wisconsin via recreation and commercial boat traffic. Heavy infestations can kill native mussels, impact fish populations, interfere with recreation, and increase costs for industry, including power and water supply facilities.

Zebra mussels are adapted to lentic (lakes/reservoir) habitat. They can survive in riverine habitat, but they require an upstream source of healthy zebra mussel populations to continually supply free floating larvae – typically from an upstream reservoir or lake. Zebra mussels are typically spread overland from infected lakes via transient recreational boat traffic and transfers of boat docks or lifts. It is probable that there is an established and reproducing population in Pelican Lake, as evidenced by small and large individuals observed. Based on previous experience on the Upper Mississippi River, it is likely that zebra mussels will colonize the reservoir immediately downstream (Orwell Reservoir) and larvae likely will drift down the Otter Tail River to the Red River. However, the higher energy and flashy nature of the Red River does not provide ideal zebra mussel habitat. Eventual Zebra mussel infestation of the Red River is possible, but surviving population levels are likely to be minimal.

The confluence of the Red River and the Otter Tail River is approximately 550 river miles from Lake Winnipeg. U.S. Army Corps of Engineers experience on the Upper Mississippi River indicates that larval drift ranges from approximately 75 to 125 miles before juveniles settle and attach to hard surfaces. It is highly unlikely that larval juveniles will drift from the Otter Tail to Lake Winnipeg. Infestation of Lake Winnipeg via the Red River would require the establishment of a viable population within closer proximity (a lake or a reservoir which is non-existent at this time). Over land transport by humans from infested waters appears to be a more likely vector for zebra mussels to become established in Lake Winnipeg.

There is little that can be done to address an existing infestation of zebra mussels. Natural resource agencies in the U.S. and Canada are focused on public awareness and education aimed at preventing transportation of mussels on boats, trailers, and docks. Actions include increased signage at infested lakes, watercraft inspections, and monitoring.

4.0 Red River Basin – Activities and Issues

4.01 Devils Lake Sub-Basin

Devils Lake

Hydrology:

The water surface elevation on January 1, 2013 was 1451.4 msl. This is about 1.9 feet below the January 21, 2012 elevation and about 2.9 feet below the record high of 1454.30 msl set on June 27, 2011.

The water surface increased about 0.3 feet in the spring of 2012, peaking around 1453.6 msl in early May. It has steadily fallen about 2.2 feet, from May through September 2012. The water elevation remained relatively flat from October to the present date. In comparison, the 2009 spring stage rise was 3.5 feet, with an inflow of 540,000 ac.-ft and the 2010 spring stage rise was 1.8 feet with an inflow of 312,000 ac.-ft. In 2011, the spring stage increase was about 2.7 feet, with a total inflow of about 595,000 acre-feet. The total storage of Devils Lake (including Stump Lake) is now 3.62 million ac-ft., covering an area of 176,000 acres. This is a decrease of 380,000 ac. ft. of storage and 21,000 acres in surface area from the beginning of 2012.

<u>Date</u>	<u>Elevation (msl)</u>	<u>Area (acres)</u>	<u>Volume (acre-feet)</u>
Jan. 16, 2010	1449.92	162,100	3.36 million
Jun. 27, 2010	1452.05	182,800	3.73 million
Nov. 20, 2010	1451.26	175,000	3.59 million
Jan. 16, 2011	1451.65	178,600	3.66 million
Jun. 27, 2011	1454.30	208,500	4.19 million
Jan. 21, 2012	1453.30	197,000	4.00 million
May 7, 2012	1453.60	200,057	4.03 million
Jan. 1, 2013	1451.40	176,000	3.62 million

State Emergency Outlet Project Update:

Operation:

West Devils Lake Outlet:

The release of Devils Lake water from the west outlet into the Sheyenne River began on April 2, 2012. Little spring runoff in the Sheyenne River watershed allowed the early start. Maintenance of the pumps initially limited the discharge to about 125 cfs. Repairs allowed the discharge to be increased to 175 cfs on May 24 and to the 250 cfs capacity on June 12. The pumps were shut down for a couple of days during the week of July 9, for maintenance of vegetation problems in the channel. Except for some minor reduction near the middle of September the outlet operated at capacity until November 8, when the project was shut down for the winter. Minor flows continued through the system until November 13.

East Devils Lake Outlet:

Installation of about 27,000 feet of 8 foot diameter pipe was completed on December 12, 2011. Construction of the inlet and outlet structures and installation of pumps was completed near the beginning of June 2012. Testing of the system started on June 20. It started discharging at full capacity, of 350 cfs, on July 3. The discharge was reduced for a few days during the week of July 9 in order to remain well within the water quality limits in the Sheyenne River, while maintenance was done on the west outlet. (The water quality is better from the west outlet. Mixing of the water from each outlet is required to ensure that the Sheyenne River remains quality within the water quality standards.) The outlet ran at, or near, full capacity through September. It was shut down starting near the beginning of October after a leak occurred in the pipeline near the terminal structure. After repairs, the outlet resumed discharge near full capacity on October 22.

The following table summarizes the extent of discharge from the outlet for 2012:

<u>Month</u>	<u>Days Discharge Occurred</u>		<u>Average Discharge (cfs)</u>		<u>Monthly Volume (acre-feet)</u>	
	<u>West</u>	<u>East</u>	<u>West</u>	<u>East</u>	<u>West</u>	<u>East</u>
April 2012	27		117		6,263	
May	31		135		8,286	
June	30	10	215	160	12,755	3,489
July	31	31	221	296	13,644	18,182
Aug	31	31	243	321	14,919	19,537
Sept	30	30	229	310	13,626	18,086
Oct	31	16	200	248	12,277	6,659
Nov 2012	<u>13</u>	<u>13</u>	<u>133</u>	<u>273</u>	<u>3,426</u>	<u>6,393</u>
TOTAL	224	131			85,196	72,346

The following is a summary of the volume and inches of water removed from the lake since pumping was started in 2005:

<u>Year</u>	<u>Volume Removed (acre-feet)</u>	<u>Inches Removed (inches)</u>
2005	38	0.0
2006	0	0.0
2007	298	0.02
2008	1,241	0.1
2009	27,653	2.0
2010	62,977	4.2
2011	46,911	2.7
<u>2012</u>	<u>157,542</u>	<u>9.5</u>
TOTAL	296,661	18.5

Water Quality:

Water quality testing has been ongoing at several locations along the Sheyenne River and Red River. During some conditions, it was found that the full operation of the Devils Lake outlets could cause a numeric violation of the water quality regulations in the Sheyenne River and Red River. The aquatic life state standard for sulfate may be exceeded from time to time. In part, due to the extreme threat that the dangerously high level of Devils Lake poses, along with damages already caused, Governor Jack Dalrymple issued an executive order to permit more flexibility in responding to the continuing emergency. The executive order waives compliance with water quality standards, although the outlets' operating plan will continue to provide adequate safeguards for water quality while allowing for flexibility in balancing the risk associated with the level of Devils Lake. The executive order was signed on July 30, 2012 and remained in effect until December 31, 2012.

Water quality impacts from the outlets were increased due to low flow conditions that existed on the rivers throughout 2012. Flows on the Sheyenne River, just upstream of the west outlet from Devils Lake, remained less than 100 cfs after May 13. The flow was below 10 cfs from July 25 through October 9. Flows on the Red River at Fargo were in the normal range for much of the year. The flow dipped into the below normal range, for a short time near the end of September, around 62 cfs. At Grand Forks, the Red River was at, or below, a flow of 1,000 cfs from the beginning of September and later. Flows dipped to less than 800 cfs for a portion of this time. This flow includes the discharge from Devils Lake. Therefore, around ½ to 2/3 of the flow was from Devils Lake.

Devils Lake Outlet Committee:

The Devils lake Outlet Committee met on May 22 and November 29, 2012 in Carrington, ND. The committee includes a representative from Manitoba and Minnesota.

Construction:

Emergency Gravity Water Transfer Channel:

The proposed gravity flow channel would provide an outlet from Stump Lake, extending south to Tolna Coulee. The control elevation at the bottom of the channel is proposed at 1452 msl. The channel would include stop logs to control releases based on downstream conditions. The channel would have a capacity of 100 cfs when Stump Lake is at an elevation of 1454 msl, if the stop logs were not in place. The channel would be operated to maintain downstream water quality uses. An operating committee is being proposed for the project.

Soil borings have been taken along the proposed alignment. Some of the soil conditions are not of the quality expected. Borings may be required along a different alignment, if a suitable change in the design is not possible at the original location. The Devils Lake Joint Water Resource Board is the local sponsor for this project. They have recently indicated that they are withdrawing as the lead agency of the gravity outlet.

Tolna Coulee Control Structure:

This project is a cooperative effort between the State Water Commission and the U.S. Army Corps of Engineers. The Corps of Engineers was overseeing the construction.

Construction of this project is complete, with dedication held in July. This is a control structure project consisting of a combination of sheet pile, embankment, and a steel stop log weir structure. The purpose of this project is to allow the natural erosion of the divide between Stump Lake and the Tolna Coulee, while protecting downstream communities from an uncontrolled release of the water in Stump Lake. To this end, this structure is designed to allow flow in the Tolna Coulee to cause erosion the same as would occur naturally while providing the ability to lower the lake elevation in a controlled manner as the divide erodes. It is not the purpose of this project to impound water in Stump Lake above the natural outlet elevation, as it exists now or what it may become in the future.

Upstream Storage:

The State Water Commission (SWC) is committed to a three-pronged approach to flooding in the Devils Lake basin, of which upper basin water management is an integral part. Several programs exist to store water, including the Extended Storage Acreage Program (ESAP), and projects by the ND Natural Resources Trust (Trust), and the U.S. Fish and Wildlife Service. The new Devils Lake Executive Committee action plan has reinforced and placed emphasis on the need to increase upper basin storage where possible.

The Trust is pursuing a plan to acquire privately held land for a multipurpose, multi-wetland restoration project in northeastern Ramsey County. SWC staff has estimated that this project will store approximately 631 acre-feet of additional water over existing conditions. The project requires commitments from multiple funding sources, including the Wetland Reserve Program (WRP), the North American Wetlands Conservation Act, ND Game and Fish, and the Trust. The project will put the land under a 30-year WRP easement with the ND Game and Fish taking title to the land for use as a public access wildlife conservation area. Total project cost is estimated at \$2,048,000, and would result in long term water storage on land available for public use. The Trust has requested water storage funding from the SWC in the amount of \$125,000. If approved, the SWC will develop a seven-year contract for water storage at the Johnson Farms site. Annual inspections will be conducted to ensure water storage at the site for the duration of the agreement. This expenditure equates to about \$30.00/acre-foot per year of storage for the duration of the contract, which is comparable to the rates paid for existing ESAP temporary storage easements. The acquisition plan developed by the Trust involves several partners and as a result has several contingencies.

Outlet Mitigation Plan:

Beginning in 1993, as Devils Lake began its historically unprecedented rise, the State Water Commission (SWC) has been at the forefront of efforts to combat flooding in the basin. The lake level has now risen 30 feet expanding from about 49,000 acres to over 200,000 acres. At its overflow elevation of 1458 feet msl, where it naturally spills into the Sheyenne River, Devils Lake will cover more than 261,000 acres. To combat the growing flooding problem, local, state, and federal authorities adopted a three-pronged approach in the mid-1990s: infrastructure protection for roads, levees, and relocations; upper basin water management, including water

storage in the upper basin; and discharge of flood water through an emergency west-end outlet to the Sheyenne River. This approach was designed with the interests of both Devils Lake basin and downstream residents in mind. The principal concept has been to manage water and flood damage within the Devils Lake basin, while attempting to prevent a potentially catastrophic natural overflow through Tolna Coulee to the Sheyenne River.

The 2011 Devils Lake Outlet Mitigation plan being developed by SWC staff with input from stakeholders, including the Devils Lake Outlet Advisory Committee, provides important direction in addressing problems that could arise downstream from emergency measures taken at Devils Lake to protect the safety and general welfare of both basin and downstream residents. The draft plan has two key components; construction of emergency outlets to remove floodwater from Devils Lake and a course of action to address downstream issues along the Sheyenne River that may result from operating the emergency outlet projects.

2013 Flood Outlook:

The March 18, 2013 Spring Flood Outlook, provided by the National Weather Service stated that Devils Lake and Stump Lake could rise (50 percent probability) around 2.4 feet (Figure 6 and Figure 7). There is a 10 percent chance that the lake will rise above 1455.0. This is due to a somewhat above normal topsoil wetness and snowpack.

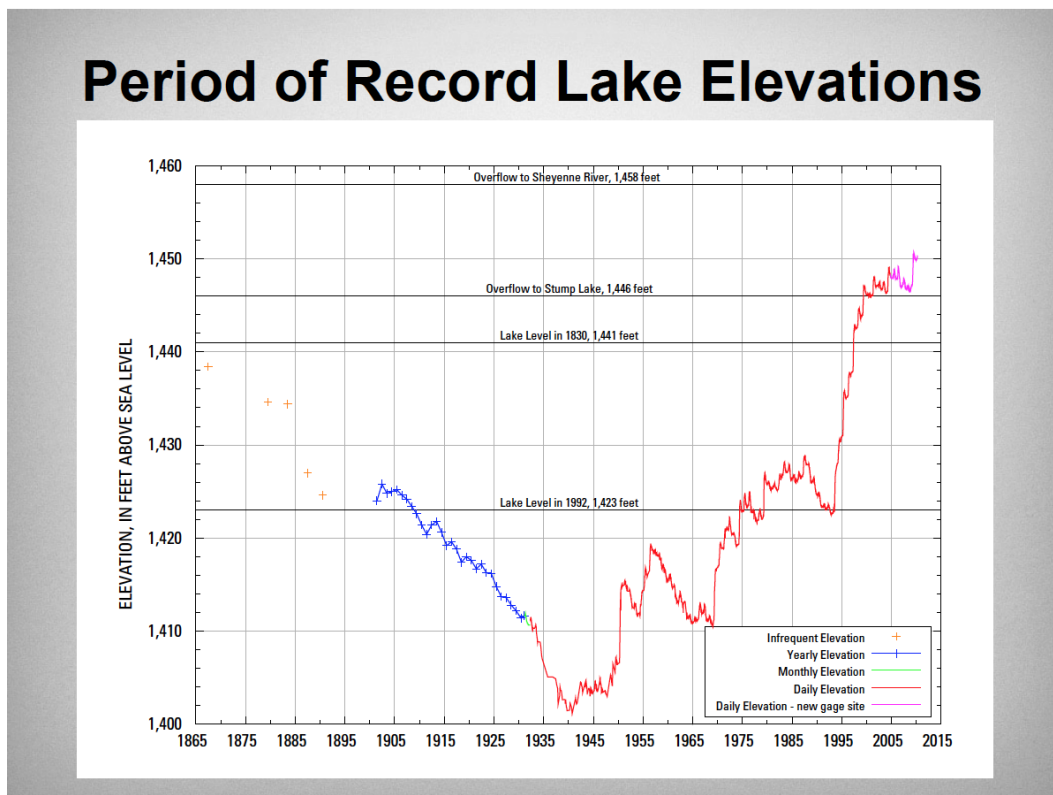


Figure 6 Devils Lake Historic Water Surface Elevations

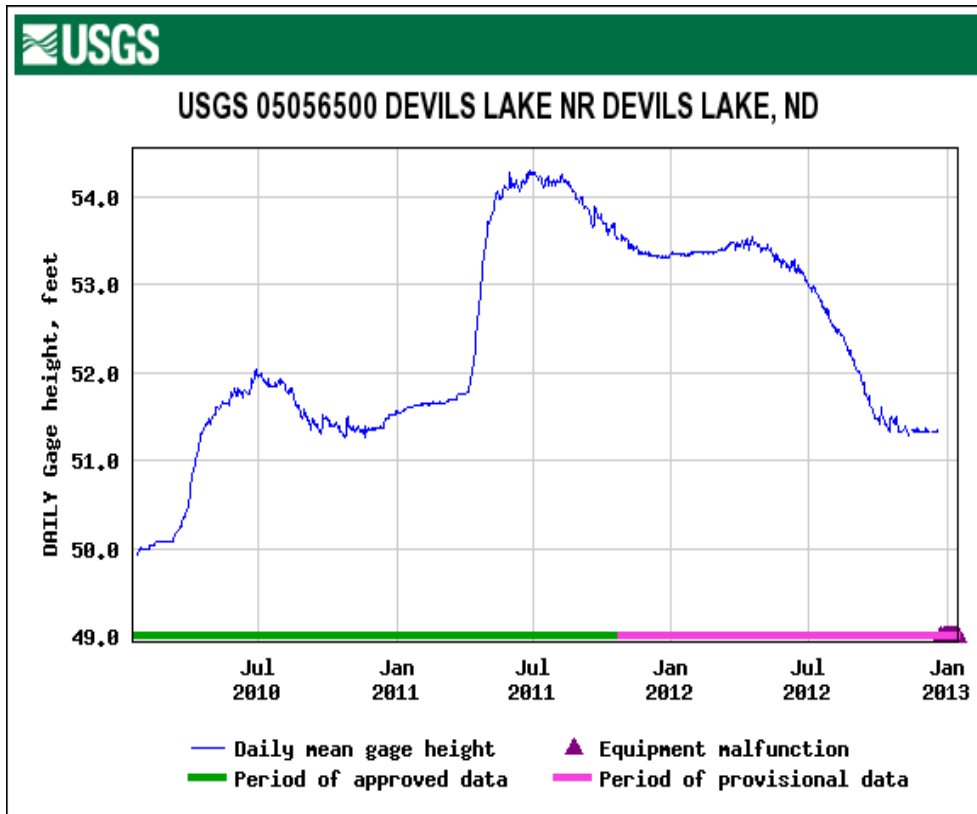


Figure 7 Devils Lake near Devils Lake Water Surface Elevations - 2010-2013

US Federal Government Initiatives to Reduce Flooding in the Devils Lake Basin

In June 2010, the United States government directed an intensive Federal interagency effort to assess the status of the efforts of each major Federal agency actively addressing the flooding in the area of Devils Lake and options for additional near-term actions within existing authorities. This U.S. Federal Interagency Task Force used data from previous analyses to re-examine what options might be feasible to address Devils Lake flooding.

This Working Group effort involved extensive analysis by all key Federal agencies engaged in responding to flooding at Devils Lake. Led by the U.S. Army Corps of Engineers, the Working Group also included the U.S. Environmental Protection Agency (EPA), the Office of Management and Budget (OMB), and the Departments of Agriculture (USDA), Commerce, Defense, Homeland Security, Interior, Transportation, and State. The Working Group was committed to gaining an understanding of the local perspectives on these issues, and held four focus group meetings in North Dakota (“the State”) – three in the City of Devils Lake and one in Valley City, North Dakota. The purposes of these meetings were to gather information and testimony from local and state officials and other subject matter experts, and to obtain recommendations on actions that the Federal government could undertake to assist with the problems caused by the rising lake.

The Working Group completed several specific tasks to assess the status of each agency’s ongoing activities to address the flooding in the area and identified the near-term actions that could be taken within existing authorities. These tasks included:

- Identifying past and current Federal activities/programs and spending
- identifying all available legal authorities to respond to the flooding, including those that have been used in the past and those that have not
- compiling existing analyses of near-term and longer-term actions, including evaluating the actions raised by the North Dakota congressional delegation
- re-examining possible solutions using data generated from its previous analyses

Federal agencies have been involved in a number of initiatives to assist the population affected by the flooding, including rebuilding and elevating roads and levees; constructing dams; reimbursing local governments for damaged infrastructures; purchasing easements; relocating and buying out homes; studying the cause and modeling potential future lake levels; providing area-specific weather, water and climate forecasts; and providing assistance to farmers and local businesses. Since 1992 (when the lake started rising from an elevation of 1423 feet), using at least 49 different Federal program authorities, Federal agencies have spent or committed about \$852 million of Federal funding to assist those affected by Devils Lake flooding. Many of the authorities Federal agencies operate under require a local sponsor and matching contribution. As such, State and local governments have also expended hundreds of millions of dollars.

In addition to these ongoing activities, the Working Group identified and developed twenty one specific actions that are underway or could be undertaken by Federal, State, and/or local agencies. Those items are identified in the table below with the Federal and local agency responsible for each (see table on next page).

Table 3: Actions and Lead Agencies Responsible for Flood Mitigation Works

#	Action	Lead Agency	
		Federal	State/Tribal
1	Devils Lake Executive Committee (DLEC)	USACE (MVD)	NDSWC
2	Devils Lake Collaborative Working Group (DLCWG)	USACE (MVP)	NDSWC
3	Comprehensive Watershed Management Strategy	FEMA	NDSWC / NDDDES
4	Development of the Multi-Purpose “Pelican Bay Recreation and Wildlife Area”	USFWS	NDGF
5	Consider Options for Revising Water Quality Standards	EPA	NDDH
6	<i>Control Outflows from Tolna Coulee Outlet at Elevation 1458.0</i>	USACE (MVP)	NDSWC
7	East Devils Lake Outlet	USACE (NWO)	NDSWC
8	<i>Expansion of West End Outlet</i>	USACE (NWO)	NDSWC
9	<i>Flooded Land Compensation and Increase Upper Basin Storage</i>	NRCS	NDGF
10	Increase Sheyenne River Channel Capacity	USACE (MVP)	NDSWC
11	Construct Biota Filter for Devils Lake Outlets	USACE (MVP)	NDSWC
12	Control Structure on Jerusalem Channel between East Devils Lake and Stump Lake	USACE (MVP)	NDSWC
13	Construct Diversion from Edmore Coulee to Tributaries of the Red River of the North	USACE (MVP)	NDSWC
14	Non-Structural Hazard Reduction: Acquisition/Relocation of Imperiled Structures	FEMA	NDDDES
15	Fully Fund Roads Acting as Dams Project	BIA/FHWA	SLT
16	Road Raise Contracts to 1460/1465	FHWA	NDDOT
17	<i>Raise Township Roads</i>	FHWA	NDDOT
18	Utility Relocations	RD	NDDDES
19	Railroad Embankment Raises	FRA/FHWA	NDDOT
20	Prepare a Multi County Evacuation and Mass Care Annex to Existing Emergency Operations Plans	FEMA	NDDDES
21	Additional Observations for Emergency Preparedness	USGS	NDSWC
22	<i>Mental Health Assistance</i>	<i>FEMA</i>	<i>NDDDES</i>
23	<i>Digital Flood Insurance Rate Maps (DFIRMS)</i>	<i>FEMA</i>	<i>NDDDES</i>
24	<i>Local/ Tribal Hazard Mitigation Planning</i>	<i>FEMA/BIA</i>	<i>NDDDES</i>
25	<i>Business and Employment Preservation</i>	<i>Dept. Commerce</i>	<i>NDDC</i>

Since the release of the federal report, the U.S. Federal Government directed that action item 1, the Devils Lake Executive Committee, be established to oversee efforts and to ensure Federal actions are expedite to the greatest extent possible to address the flooding issues in and around Devils Lake. The DLEC was additionally directed to prepare an action plan and present it to the Office of Management and Budget in June 2011. Those actions are currently ongoing.

4.02 Garrison Diversion Projects

Dakota Water Resources Act

The Dakota Water Resources Act (DWRA) of December 2000 amended authorizing legislation for the Garrison Diversion Project. The legislation outlines a program to meet Indian and non-Indian water supply needs in North Dakota and authorizes water uses including municipal, rural and industrial, fish and wildlife, recreation, irrigation, flood control, stream flow augmentation, and ground water recharge.

Red River Valley Water Supply Project

The final version of the EIS underwent internal review within Reclamation and the Department of the Interior and was finalized on December 21, 2007 and published in the Federal Register on December 28, 2007. The “preferred option” is to bring water from the Missouri River Basin into the Hudson Bay Basin (inter-basin transfer). Reclamation consulted with the Environmental Protection Agency and State Department regarding the 1909 Boundary Waters Treaty between Canada and the United States; and the document has been submitted to Congress for further action. Many agencies, along with Canada, have expressed concern and opposition to inter-basin transfer of water from the Missouri River Basin into the Hudson Bay Basin. No action has occurred on this project since the last report.

4.03 Lake Winnipeg

Lake Winnipeg is the 10th largest freshwater lake in the world. The Lake's watershed spans an area of almost one million km², from the eastern slopes of the Rocky Mountains to the Winnipeg River system and Lake of the Woods. The watershed extends into four provinces and four U.S. states as illustrated in Figure 8.



Figure 8 Lake Winnipeg Watershed (Map by Manitoba Conservation & Water Stewardship)

Lake Winnipeg Basin Initiative

Lake Winnipeg continues to experience poor water quality due to excess nutrient loading from multiple transboundary sources, including agriculture, industry, municipal wastewater, and surface runoff. More than half of this originates outside Manitoba's borders, predominantly from the Red River.

Renewal of the Lake Winnipeg Basin Initiative (\$18M, 2012-2017) was announced in Budget 2012 and formally announced by Prime Minister Harper on August 2, 2012. The LWBI focuses on three areas: facilitating watershed governance; research, information and monitoring; and a stewardship fund for projects that reduce nutrient loads into the lake. The renewed initiative continues Environment Canada's work to address excess nutrients in Lake Winnipeg and its basin and will maintain the progress and momentum gained under the first Phase of the LWBI to further engage citizens, scientists, and domestic and international partners in actions to improve the health of Lake Winnipeg.

Phase II of the LWBI shifts emphasis from discovery to action, using the knowledge gained from 2008-12 to focus on on-the-ground action to reduce nutrient loads to Lake Winnipeg. Monitoring of the watershed and research on impacts of land-based activities on nutrient loads will continue, but with decreased emphasis. An increased Lake Winnipeg Stewardship Fund will shift in focus from general "stewardship" programs in the Basin to targeted key geographic areas (Red/Assiniboine and Winnipeg/ Rainy sub-basins). Environment Canada will continue to ensure priority progress on nutrient issues through domestic and international water boards, working with partners toward the development of a broad bi-national nutrient management strategy across the basin.

Program priorities under the renewed Lake Winnipeg Basin Stewardship Fund remain unchanged and will focus on:

- reducing nutrient inputs from rural and urban sources,
- controlling point and non-points sources of nutrients,
- rehabilitating priority aquatic ecosystems that support nutrient reduction & sequestration, and
- enhancing research and monitoring capacity to assist in decision-making.
- increasing emphasis on collaborative work with other governments within the watershed to address nutrient sources from outside Manitoba

LWBI activities since the last IRRB update:

- Work continues with Manitoba to evaluate and validate 18 priority indicators that will measure changes in the lake. Work is also ongoing with Manitoba on finalizing a framework for establishing nutrient objectives.
- Contribution Agreements have been signed with the Lake Winnipeg Research Consortium to support their in-lake research and with the University of Manitoba to support the [Lake Winnipeg Basin Information Portal](#).
- On December 13, 2012, the Canadian consulate in Minneapolis hosted a forum on water quality in Lake Winnipeg and the Red River Basin at the University of Minnesota in Minneapolis. The Associate RDG-WN participated in a panel discussion along with Manitoba, state, and US government representatives to highlight actions being taken to address Lake Winnipeg's water quality problems.
- International Red River Board (IJC) - EC staff provided an overview and an update on Phase II of the LWBI at the January 2013 meeting of the IRRB in Grand Forks, ND.

- A call for Letters of Intent was issued for the Lake Winnipeg Basin Stewardship Fund on February 21, 2013 with a submission deadline of April 1st. Public notices will appear in major English and French newspapers in Calgary, Regina, Saskatoon, Winnipeg and Kenora from February 23rd – March 6th. This will be the second funding round under the renewed Lake Winnipeg Basin Initiative and the seventh round overall. Round 6 funding recommendations are currently working through approvals, which are expected in late March 2013.
- The Canada-Manitoba Lake Winnipeg MOU Steering Committee held their sixth meeting on February 27, 2013. A joint work plan to undertake the Management Review of the MOU was approved by the Committee with a target for completion of Fall 2014. This Management Review will inform decisions related to extending the MOU post 2015.
- Drs. Selena Randall, Don Flaten, and Genevieve Ali from the University of Manitoba's Watershed Systems Research Program met with the CA-MB Steering Committee and provided an overview of their watershed research. A key focus in their study is assessing the role of holding water on the landscape as a means of reducing nutrient loading to the lake. The key message is to 'lighten the load' in the watershed through reduction of nutrient inputs.
- The final report documenting the activities and achievements of the first phase of LWBI is available on the [Lake Winnipeg Basin Initiative Information Portal](#) and a [Highlights Report](#) is also available on the Environment Canada web site.
- A presentation on Phase II of the LWBI will be provided to colleagues in other provinces as part of upcoming CESI-WQI workshop on March 27, 2013 in Winnipeg.
- Scientists will be presenting research results and updates at the Lake Winnipeg Research Consortium Annual Science meeting March 20th to 21st in Winnipeg.

Contact: Les Rutherford, Manager, Lake Winnipeg Basin Unit, Environment Canada, Winnipeg, MB, Phone: 204-983-5897 or e-mail Les.Rutherford@ec.gc.ca
 Website: http://www.ec.gc.ca/doc/eau-water/winnipeg_e.html

5.0 International Red River Board Membership

Current membership is as follows - seven members on the Canadian side and eight members on the United States side. The full complement of membership is nine members from each country.

United States

Col. Michael Price – U.S. Co-Chair District Engineer, St. Paul District U.S. Army Corps of Engineers	Megan Estep U.S. Fish and Wildlife Service
James Ziegler Detroit Lakes Office Minnesota Pollution Control Agency	Bert Garcia Director of Ecosystems Protection Remediation U. S. Environmental Protection Agency (Region 8)
Dennis Fewless Director, Division of Water Quality North Dakota Department of Health	Daniel Wilkens Administrator, Sand Hill River Watershed District, Minnesota (Red River Basin Commission)
Randy Gjestvang Red River Water Resources Engineer North Dakota State Water Commission	Gregg Wiche Director, North Dakota U.S. Geological Survey, Water Science Center
Peter Buessler (Nominated), Regional Manager, Division of Ecological and Water Resources, Minnesota Department of Natural Resources	Scott Jutila- U.S. Co-Secretary Hydraulic Engineer St. Paul District U.S. Army Corps of Engineers

Canada

Mike Renouf – Canadian Chair Executive Director Transboundary Waters Unit Environment Canada	Herm Martens Red River Basin Commission
Nicole Armstrong Director, Water Science and Management Manitoba Conservation & Water Stewardship	Vacant
Steven Topping Executive Director, Infrastructure and Operations, Manitoba Water Stewardship	Dr. Brian Parker Director, Fisheries Branch Manitoba Conservation & Water Stewardship
Gordon Bell Senior Hydrologist, Ag Water Directorate Agri-Environment Services Branch Agriculture and Agri-Food Canada	Dr. Patricia Ramlal Manager, Environmental Science Division Fisheries and Oceans Canada
Dr. L. Gordon Goldsborough Delta Marsh Field Station and Department of Botany, University of Manitoba	Girma Sahlu - Canadian Co-Secretary Senior Engineering Advisor Transboundary Waters Unit Environment Canada

6.0 Summary of Priorities

The IRRB work plan identifies a suite of activities in response to the IJC Directive and in support of the International Watersheds Initiative. These activities are being undertaken as resources and capacity of the participating agencies allow. The work plan includes the following strategic goals and three-year outcomes:

- 1. FLOOD PREPAREDNESS AND MITIGATION: The human and economic impacts of flooding in the Red River Basin are minimized.
 - Monitor and Report progress by the governments (federal, state, provincial, municipal) in implementing the recommendations of the Commission's report on Red River basin flooding, and in maintaining and advancing the work of the Task Force's legacy projects.
 - IRRB is aware of the Basin runoff conditions.
 - Identify strategies to encourage governments to develop and implement long-term flood mitigation and emergency preparedness in the Basin.
 - Provide scientific support to address Pembina flooding issues.
 - Meet IJC's requirements for ongoing reporting.
- 2. WATER QUALITY: Water quality at the international boundary is at an acceptable level so that international disputes with respect to water quality in the Red River Basin are avoided and resolved.
 - Meet IJC's requirements for ongoing Monitoring and Reporting of Water Quality Objectives and Alert Levels at the International Boundary.
 - Develop and Recommend science-based nutrient objectives at the international boundary.
- 3. AQUATIC ECOSYSTEM HEALTH: Water resources of the Red River of the North Basin support and maintain a balanced community of organisms with species composition, diversity and functional organization comparable to the natural habitats within the Basin without regard to political boundaries so that disputes with respect to aquatic ecosystem health are avoided and resolved.
 - Complete Devils Lake Fish Pathogens and Parasites Survey.
 - Complete the risk analysis, peer review, and prepare final report.
 - The IRRB is aware of and takes appropriate action regarding the natural transfer of water between the Red River basin and other basins.
- 4. WATER QUANTITY: International disputes with respect to water quantity in the Red River Basin are avoided and resolved.
 - Long-term: Assess and recommend a process for the development and implementation of water quantity apportionment procedure for the Red River at the International Boundary.
 - Short-term: Compile information identified in the January 2008 approved multi-year "Proposed Flow Apportionment Conceptual Framework Plan".
- 5. OUTREACH AND ENGAGEMENT: The IRRB's work is enhanced by its relationships with key stakeholders and interested members of the public.