

PRAIRIE PROVINCES WATER BOARD
2013 ANNUAL REPORT



**PRAIRIE
PROVINCES
WATER
BOARD**

ANNUAL REPORT

**FOR THE FISCAL YEAR
APRIL 1, 2013 TO MARCH 31, 2014**

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LETTER OF TRANSMITTAL

November 13, 2014

Honourable Leona Aglukkaq
Minister of the Environment
Ottawa, Ontario

Honourable Kyle Fawcett
Minister of Alberta Environment and
Sustainable Resource Development
Edmonton, Alberta

Honourable Gerry Ritz
Minister of Agriculture & Agri-Food
Ottawa, Ontario

Honourable Steve Ashton
Minister of Manitoba Infrastructure and Transportation
Winnipeg, Manitoba

Honourable Scott Moe
Minister Responsible for the
Saskatchewan Water Security Agency
Regina, Saskatchewan

Honourable Gord Mackintosh
Minister of Manitoba Conservation
and Water Stewardship
Winnipeg, Manitoba

Honourable Ministers:

On behalf of the members of the Prairie Provinces Water Board, it is my pleasure to submit herewith the Annual Report of the Prairie Provinces Water Board for the fiscal year from April 1, 2013 to March 31, 2014.

Yours truly,



Richard Smith
Chair
Prairie Provinces Water Board

MESSAGE FROM THE CHAIR

The Prairie Provinces Water Board (PPWB) continues to be a vital institution of governance in the prairies that facilitates sound and collaborative management of shared water resources.

In 2013 - 2014, the PPWB continued to be guided by its Strategic Plan, approved in 2006, and revised in 2012. This Strategic Plan ensures the PPWB delivers on its mandate to monitor whether the commitments made in the *Master Agreement on Apportionment (MAA)* have been met by the Signatory Parties.

Further to its core mandate, the PPWB continued to track and respond to other important influences. In response to a growing interest in the relationship between climate variability, climate change, and water resources, the PPWB is advancing its project to assess the resiliency of the *MAA* to predicted impacts of climate change. The next step will be to test various critical drought scenarios against various water management strategies. The PPWB continued to maintain attention on the need for involvement of upstream jurisdictions in resolving water quality issues in Lake Winnipeg. Work begins on priority setting for water quality investigations on the 12 transboundary river reaches. Nutrient pollution has been determined to be the number one priority for further investigation. Finally, the PPWB continues to provide a cooperative forum for discussion of transboundary water issues.

I thank Mike Norton for his representation as the PPWB Chair in his role as the Environment Canada Member. Mike Norton left Environment Canada in June 2013 and Christine Best was appointed in this role on an acting basis until October 2013. Cheryl Baraniecki was appointed as the PPWB Chair and Environment Canada Member in November 2013. I am currently filling in for Cheryl on an acting basis while she is away on Parental leave.

I thank David Phillips and Rick Butts for their capable representation as the Regular and Alternate Board Members for Agriculture and Agri-Food Canada. Both retired in fiscal year 2013 - 2014. In April 2013, Lynden Hillier was appointed as Regular Board Member and Scott Roy as the Alternate Board Member for Agriculture and Agri-Food Canada. I welcome them to the Board and look forward to working with them.

I also thank Robert Harrison for his capable representation as the Board Member for Alberta. Robert retired in January 2014. Brian Yee, as the Alternate Board Member for Alberta has been acting as the Alberta Board Member until Alberta appoints a new Member.

The success of the PPWB is dependent on the work of the Secretariat and the three standing committees, including the Committee on Hydrology (COH), the Committee on Water Quality (COWQ), and the Committee on Groundwater (COG). Dedication and engagement by board members, jurisdictional representatives on committees, and the Secretariat are essential, and much appreciated.



Richard Smith
A/Chair

MESSAGE FROM THE EXECUTIVE DIRECTOR

During 2013 - 2014, the work of the PPWB Secretariat and three standing committees focused on achieving the goals outlined in the PPWB Strategic Plan and activities listed in the 2012 - 2017 Work Plan.

During 2013, agreed transboundary apportionment of flows on all eastward flowing streams was achieved for all PPWB river reaches. Adherence to the MAA's water quality objectives was good.

The COH continued work on its modernization of computational infrastructure that is used to calculate apportionable flows. In December 2012, another contract was awarded to Optimal Solutions Ltd. to deliver additional work to improve the functionality of the River Basin Assessment Tool (RBAT). The enhanced RBAT program is expected to be completed and available for use in the fall of 2014.

In 2013 - 2014, the COH purchased a Net-Radiometer in order to provide more representative evaporation data. The COH will be investigating various methods to determine evaporation from reservoirs in 2014 - 2015.

Work continued towards the development of a groundwater schedule (Schedule F) that will be added to the MAA. The Committee on Groundwater (COG) developed drafting instructions for Schedule F, and the Board has reviewed these documents. The COG is in the process of creating a first draft of Schedule F. The next step will be to send the draft Schedule F document for legal review.

The transboundary water quality objectives (WQOs) are descriptions of water quality conditions that are known to protect specific water uses and are acceptable to upstream and downstream provinces.

A comprehensive review of the PPWB WQOs was completed by the Committee on Water Quality (COWQ) in October 2012. In 2013 - 2014, the PPWB members worked within their jurisdictions to review the policy and management implications of accepting the proposed changes to the WQOs. This work is currently ongoing.

In 2013 - 2014, the COWQ identified that nutrient pollution is a priority and will be undertaking a review of nutrients across Transboundary River reaches. The review is scheduled to commence in 2014 - 2015

The Board continued its role in helping to ensure coordination of water management and planning that may have transboundary implications. Through the PPWB Chair, the Board represented the Provinces of Saskatchewan and Alberta on the Lake Winnipeg Basin Steering Committee that will implement the Memorandum of Understanding between Canada and Manitoba. Similarly, the Board continued to provide a forum for sharing information, including progress on actions to address Saskatchewan - Manitoba drainage issues, the impacts of sediment transport on the Carrot River, and the Montana - Alberta Water Management Initiative.



Mike Renouf
Executive Director

SUMMARY OF PERFORMANCE RESULTS

During 2013 - 2014, apportionment responsibilities of the Board were met through the following activities:

- Reviewing and approving the apportionment monitoring network comprised of hydrometric and meteorological stations;
- Confirming apportionment obligations were met on Cold Lake, North Saskatchewan River, South Saskatchewan River below the Red Deer River, Battle Creek, Lodge Creek, Middle Creek, Churchill River, Saskatchewan River, Red Deer River (Saskatchewan), Qu'Appelle River, Assiniboine River, and Pipestone Creek;
- Continuing work on the process of review apportionment methods in all basins, and advancing the review of the North Saskatchewan River;
- Continuing the work on the modernization of the natural and apportionable flow computation software programs; and
- Investigating methods to estimate evaporation from reservoirs.

In 2013, water quality objectives were adhered to an average of 95% of 2,883 samples on the 11 *MAA river reaches*.

- The Committee on Water Quality (COWQ) began the exercise of setting priorities for the 12 transboundary river reaches and determined that nutrient pollution is the number one priority for further investigation. Work is underway to review nutrients across transboundary river reaches.
- The 2014 water quality monitoring program was reviewed and approved by the Board in October 2013.

During the 2013 - 2014 fiscal year the Committee on Groundwater (COG) prepared drafting instructions for the development of an agreement on transboundary groundwater (Schedule "F"). The proposed agreement will provide a cooperative framework for managing transboundary groundwater using a Risk Informed Management approach.

In accordance with the PPWB Event Contingency Plan, the Board members were provided with two cautionary notifications in June 2013 from Alberta Environment and Sustainable Resource Development. There were no transboundary impacts. In July 2013, Saskatchewan Water Security Agency reported a spill on the Saskatchewan River. The downstream jurisdiction was not affected.

During the year, the PPWB discussed the following transboundary issues:

- Water quality in Lake Winnipeg;
- Downstream impacts of drainage in Saskatchewan upon Manitoba;
- Manitoba's concerns related to sediment transport in the Carrot River; and
- Montana - Alberta St. Mary and Milk River Water Management Initiative.

The PPWB member governments were informed about PPWB activities through:

- Board and Committee Minutes, Quarterly and Annual Reports, brochures/fact sheets, technical reports, and the PPWB website.

Internal communication was enhanced through regular meetings between Board members and their respective Committee members.

1. INTRODUCTION

This report summarizes the activities of the Prairie Provinces Water Board (PPWB), its Secretariat, and three standing committees that supported PPWB activities for the period April 1, 2013 to March 31, 2014.

The PPWB administers the *Master Agreement on Apportionment (MAA)*, signed on October 30, 1969 by Canada and the Provinces of Alberta, Saskatchewan, and Manitoba.

The MAA provides for an equitable sharing of available waters for all eastward flowing streams that cross interprovincial boundaries, including transboundary lakes. It also serves to protect transboundary aquifers and surface water quality. Schedules to the MAA describe the role of the Board, stipulate how the water shall be apportioned, and set water quality objectives for the water passing from Alberta to Saskatchewan and from Saskatchewan to Manitoba.

The Board consists of three provincial members, representing the Provinces of Alberta, Saskatchewan, and Manitoba and two federal members, representing Environment Canada and Agriculture and Agri-Food Canada.

PPWB activities are jointly funded by the provinces and the federal government, with the provinces each contributing one-sixth and the federal government contributing one-half to the annual budget. The MAA assigns the responsibility to monitor water quantity and quality in support of the Agreement to the federal government. Environment Canada conducts this monitoring on behalf of the Government of Canada. The Board approves the annual budget and costed work plan.

Section 2 of this Annual Report presents the performance results for each of the Goals in the Strategic Plan and 2013 - 2014 activities in the Work Plan. Included in this section is Goal 8, which provides a summary of the administration activities and financial expenditures for the year 2013 - 2014.

Appendices provide detailed information on the PPWB. Appendix I illustrates where monitoring is conducted to assess whether jurisdictions have met their requirements in the MAA. Appendix II presents 2013 apportionable flow data. Appendices III and IV present the water quality parameters that were monitored by Environment Canada and the 2013 Report on Excursions to Interprovincial Water Quality Objectives. Appendix V provides the organization chart and Appendix VI lists agency representatives on the board and committees. Appendix VII provides the Financial Expenditure Statement. Finally, Appendix VIII describes the history of the PPWB.

2. PERFORMANCE RESULTS

Update

All activities in the 2008 - 2013 and 2012 - 2017 PPWB work plans target achieving the eight goals in the PPWB's Strategic Plan. Progress made in 2013 - 2014 is discussed below for each of these goals.

GOAL 1: Agreed Transboundary Apportionment of Water Is Achieved

The PPWB's Strategic Goal 1 is to achieve transboundary apportionment of water as agreed to in the 1969 MAA's Schedule A and Schedule B.

Apportionment Monitoring of Rivers

The MAA states that all eastward flowing streams are subject to apportionment. Currently, the Board conducts apportionment monitoring of Cold Lake, North Saskatchewan River, South Saskatchewan River below the Red Deer River confluence, Battle Creek, Lodge Creek, and Middle Creek on the Alberta - Saskatchewan border; and Churchill River, Saskatchewan River, Red Deer River, Qu'Appelle River, Assiniboine River, and Pipestone Creek on the Saskatchewan - Manitoba border.

Water Quantity Monitoring

The PPWB is required to assess and report on whether apportionment requirements were met. Environment Canada conducts the water quantity monitoring in accordance with the terms of the MAA. In 2013 - 2014, the PPWB Secretariat calculated apportionable flows using monitoring data from 93 hydrometric stations, 20 meteorological stations and other meteorological and water use data (see Appendix I).

In October 2013, the Board reviewed and approved the monitoring stations lists for 2014 - 2015. As a result of sedimentation issues, the Assiniboine River hydrometric station located at Russell, Manitoba, has been relocated west of Russell. The operation of the new and old stations will be overlapped for one year for correlation purposes. The 2014 - 2015 meteorological station lists includes three changes: The Altawan Station at Lodge Creek has been changed from an Ordinary

Climate Station, operated by an Environment Canada volunteer, to an Automated Weather Observing System, operated by Environment Canada; the Lodge Creek Agriculture Climate Monitoring station has been added to the monitoring list and is operated by Alberta Agriculture and Rural Development; and the Eagle Butte Station no longer collects data and therefore is considered inactive.

Flows Reported in 2013

Quarterly flow reporting was completed for two basins in 2013. Interim recorded and apportionable flows were reported for the South Saskatchewan River, Middle Creek and Lodge Creek for Quarter 1 and Quarter 2.

Appendix II presents the monthly and total final apportionment results. All apportionment requirements were met in the calendar year of 2013. For all apportioned rivers and creeks, recorded flows were higher than the amounts that Alberta was obligated to deliver to Saskatchewan. The combined daily recorded flows for the South Saskatchewan and Red Deer Rivers at the Alberta - Saskatchewan border exceeded the minimum flow requirement of 42.5 m³ / sec (1,500 cfs) through all periods when Alberta was storing water.

Saskatchewan also delivered higher recorded flows on all rivers and creeks than the amounts they were obligated to deliver to Manitoba.

Figures 1 and 2 show the flow amounts for the entire record of apportionment data. The black bars show the amount of apportionable flows that were required to be delivered by Alberta to Saskatchewan (Figure 1) and by Saskatchewan to Manitoba (Figure 2). The blue bars show the flow surplus amounts that were delivered in excess of required flows. The red bars indicate amounts of required flows that were not delivered (deficits).

Figure 1. Historic River Flows on the Alberta - Saskatchewan Border

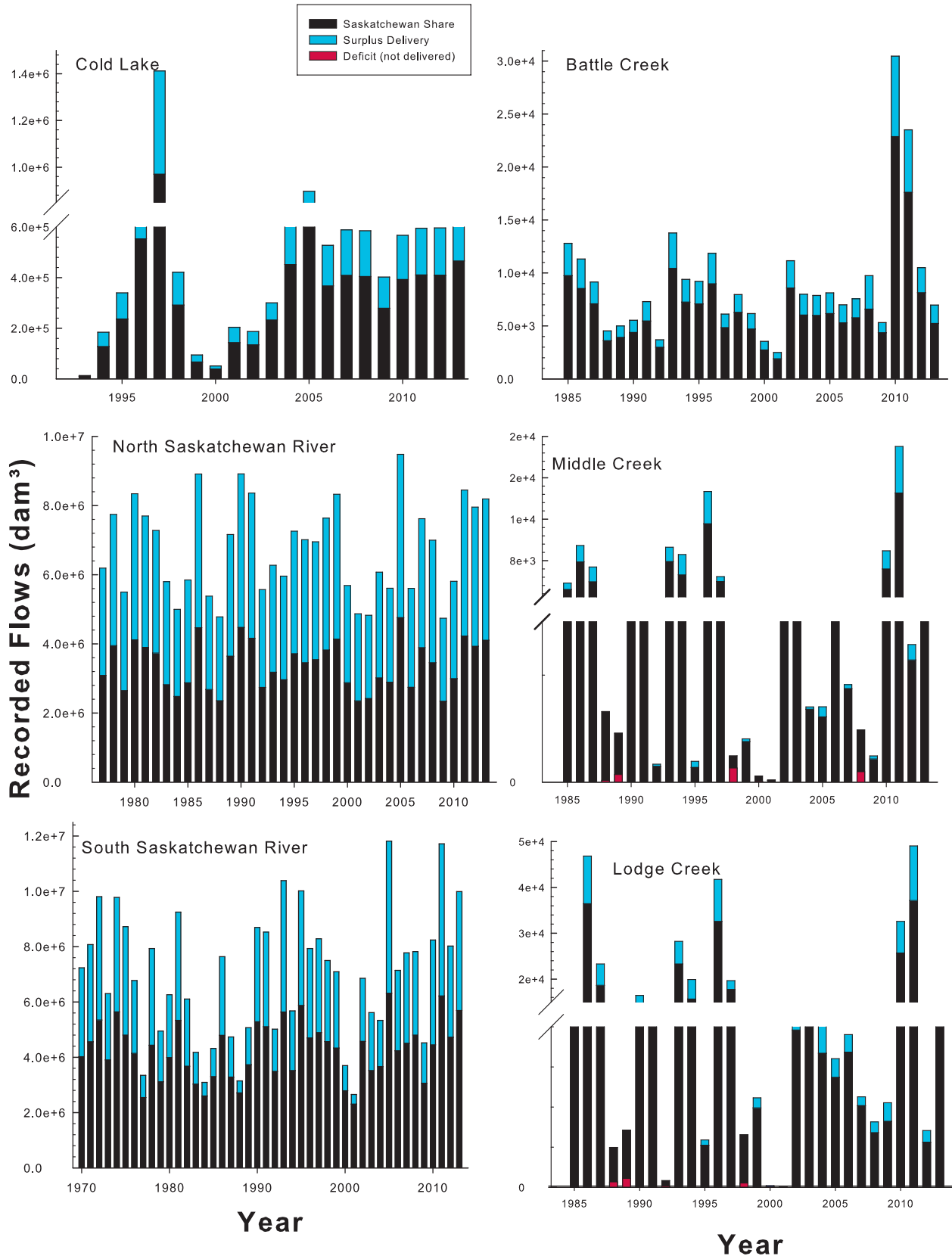
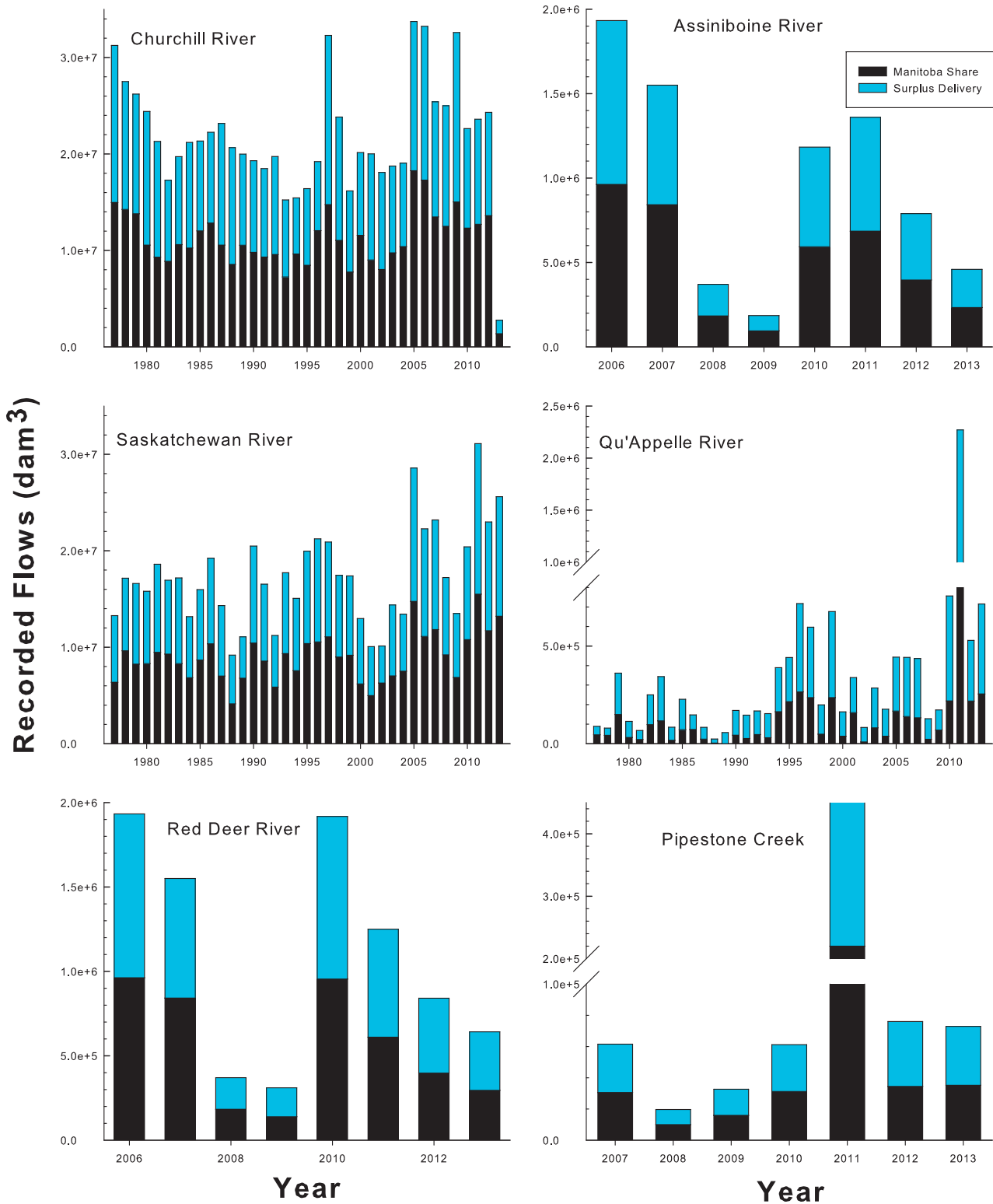


Figure 2. Historic River Flows on the Saskatchewan - Manitoba Border



For rivers with surplus flows, the combined black (provincial share) and blue (surplus) stacked bars show the total recorded flows. The red bars indicate deficits. For rivers showing a deficit, the required provincial share is the combined height of the black and red bars.

Figures 1 and 2 illustrate that the vast majority of delivery requirements were met throughout the entire data records. Large surpluses are fairly common for many of the rivers. Annual flow volumes vary considerably over the years. Because flows vary so much, scientific notation¹ is used on the y-axis to show the magnitude of differences of flows across rivers.

Only two streams have experienced deficits throughout the recorded history: Middle and Lodge Creeks. For Middle Creek, five minor deficits were found in 1988, 1989, 1998, 2000 and 2008. Deficits were, however, so small in 1988 and 2000 that they cannot be seen on Figure 1. For Lodge Creek, five minor deficits were found in 1988, 1989, 1992, 1998 and 2000. Deficits were too small to be seen on Figure 1 in 1992 and 2000. Alberta and Saskatchewan worked cooperatively to address these deficits as they occurred. As these creeks are also part of the international agreement between Canada and the United States, Alberta must pass 75% of the flow to Saskatchewan and then Saskatchewan must pass 50% to Montana. This means that any early season use within Alberta puts Alberta at a risk of deficit if the remainder of the year is dry. Alberta and Saskatchewan work cooperatively to address these deficits as they occur and are evaluating potential long-term solutions.

Improving Apportionment Methods

The Committee on Hydrology (COH) continues to be engaged in a review of apportionment methods and associated documentation to ensure apportionment monitoring and calculations are accurate.

Reviewing Streams and Basins

In March 2011, the review of apportionable flow computations for all basins was added to the renewed 5-year Work Plan. The COH preliminarily ranked basins into high, medium and low priority, based on each basin's current monitoring status, issues regarding the apportionable flow computation methodology, and the likelihood of apportionment concerns now or in the future. The objective of the committee is to review two basins per year, with some of the smaller basins grouped together for review. It is anticipated that it will take approximately ten years to review all of the 26 interprovincial basins for which PPWB approved apportionable flow computation procedures have been documented.

The North Saskatchewan River basin is the first river basin to undergo a review with work being conducted in-house by the PPWB Secretariat. A first draft of the report documenting the review was provided to the COH for review in February 2013. Work to finalize the study remains ongoing with a target for approval of the report and associated apportionable flow calculation procedures by the COH by early 2015.

In March 2013, the Board indicated its support for contracting external service providers to complete basin reviews, thereby enabling the COH to meet its target review schedule. A generic Statement of Work for basin review contracts was prepared by the Secretariat and approved by the COH. This Statement of Work will form the basis for basin review contracting documents, with only slight modifications required to tailor the assignment requirements for each basin. The first contract is expected to be issued in 2014 for the review of the apportionment procedures for Cold River at the Alberta and Saskatchewan boundary.

¹ The number following the e in the Scientific Notation shows how many zeros should be placed before the decimal place.

Modernizing Apportionment Software

The PPWB Secretariat currently uses a suite of FORTRAN programs to compute transboundary apportionable flows. The COH is modernizing this practice through the creation of a customized apportionable flow calculation platform called the River Basin Assessment Tool (RBAT).

Phase I of RBAT was delivered in 2010. The Secretariat and the COH reviewed the new software and concluded that enhancements were needed to improve the visual display, ease of use, installation processes, and functionality before the program could be put into use by the PPWB.

Through a competitive bid process, a contract with Optimal Solutions Ltd. to make the desired improvements to RBAT was entered into in December 2012. Work on this contract continued through 2013. The enhanced RBAT program is expected to be complete and available for use in fall 2014. The contract with Optimal Solutions will culminate in a training session on the enhanced software for the PPWB member agencies to be held at the Environment Canada office in Regina.

Evaporation Investigations

Evaporation estimates are an important part of apportionment calculations used to ensure equitable distribution of water between Alberta, Saskatchewan and Manitoba. The COH currently uses Altawan gross evaporation estimates and Eagle Butte precipitation data for interprovincial water apportionment calculations in the Lodge and Middle Creek basins. In 2013 - 2014, the Eagle

Butte Station was no longer in operation. At their September 2013 meeting, the COH proposed the use of the Lodge Creek AGCM station to replace Eagle Butte for precipitation data and potentially to replace Altawan for gross evaporation estimates. This is a new station operated by Alberta, and is better located to provide representative evaporation data for the upper Lodge and Middle Creek reservoirs. In order to achieve the same or better standard of evaporation estimates as the Altawan station that is currently used, the COH recommended the purchase of a Net-Radiometer for installation at the Alberta run Lodge Creek station. In October 2013, the Board supported COH's proposal for the purchase of a Net-Radiometer to be installed at the Lodge Creek AGCM Station.

The Net-Radiometer will provide accurate net radiation measurement for evaporation estimation with the Penman method, which is used by Water Survey of Canada for International water apportionment. The usage of the Penman method will provide more representative evaporation data and allow the COH to improve interprovincial apportionment calculations.

GOAL 2: Transboundary Groundwater Aquifers are Protected and Used Sustainably

The PPWB's Strategic Goal 2 protects groundwater quantity and quality and sustainable use of transboundary aquifers.

The MAA currently has a general statement to refer any transboundary groundwater issues to the Board for their review and recommendation. No issues or concerns were identified in 2013 - 2014.

Groundwater Schedule

In October 2007, the Board directed the Committee on Groundwater (COG) to focus on the development of a possible groundwater schedule to the MAA.

The COG developed a number of potential concepts and principles which were incorporated into an Impact Analysis Statement report. This report also analyzed groundwater uses and stressors, existing groundwater agreements and rationale for the need for a groundwater agreement.

Subsequently, the COG completed an environmental scan to understand the current and future pressures on the transboundary aquifers. The COG presented the results of the scan to the Board in May 2011. The results suggested that stresses to transboundary aquifers are currently low, but stresses are expected to increase on a few transboundary aquifers as a result of projected future developments.

In June 2013, the Board requested the COG to prepare "drafting instructions" for the development of a Schedule F to be added to the MAA. The draft document is expected to be completed in early 2014. The COG will be using a Risk Informed Management approach to guide the structure and clarify the way the Parties to the MAA work together. The RIM approach involves regular assessment of the risks and vulnerabilities to transboundary groundwater and a classification system for transboundary aquifers.

Reporting of Transboundary Withdrawals

Provincial COG members have contacted their respective water rights offices to inform them of the need to report groundwater projects with significant withdrawals to the neighbouring province. No transboundary groundwater withdrawal projects were brought to the attention of the PPWB in 2013.

GOAL 3: Agreed Transboundary Water Quality Objectives Are Achieved

The PPWB's Strategic Goal 3 is to achieve agreed transboundary water quality objectives that are included in Schedule E of the *MAA* for a number of key watercourses at the Alberta - Saskatchewan and Saskatchewan - Manitoba borders.

Water Quality Monitoring

The *MAA*'s water quality monitoring locations are shown in Appendix I. The *MAA*'s water quality monitoring parameters are shown in Appendix III.

Several changes to the monitoring program were implemented in 2012 to address proposed changes to the water quality objectives. The proposed changes to the water quality objectives include the addition of seasonal nutrient objectives for each of the 12 transboundary rivers and the inclusion of new water quality objectives on Cold River.

A rotational strategy for the sampling of pesticides was developed and implemented in 2006. Sampling of pesticides was switched to rotational sampling at sites with a long data record and where most data points were below detection. Two or three of these sites are sampled each year providing a 5 year return frequency for most PPWB stations. The Carrot and Assiniboine rivers are sampled every year because they are agricultural watersheds and pesticide detections occur frequently.

In 2013, in accordance with the terms of the *MAA*, Environment Canada conducted water quality monitoring at 11 sites as requested by the PPWB. There were minor changes to the monitoring program in 2013. The changes included:

- rotational sampling of pesticides at the Churchill and Red Deer River, at the Saskatchewan - Manitoba border,
- rotational sampling of pesticides at Beaver River, at the Alberta - Saskatchewan border,
- sampling of acid herbicide pesticides on the Battle River and South Saskatchewan River due to a number of detections of these pesticides on these two rivers.

One hundred and nineteen water sampling events were conducted on 12 occasions in accordance with the approved 2013 monitoring plan; with some exceptions. Three sampling events on the Carrot and two sampling events on the Saskatchewan River. These samples were not collected due to health and safety concerns resulting from a combination of high flows, steep slopes due to bank erosion and ice that prevented access to the sampling site. In addition, pesticide samples collected on the Beaver River in February 2013 were lost due to container breakage.

The monitoring schedule in 2013 was similar to that of 2012. Monitoring was also undertaken monthly on the Cold River as part of the approved monitoring plan. While there are no transboundary water quality objectives for the Cold River, site specific objectives have been proposed for this River as part of the current review of transboundary water quality objectives by the PPWB. Monitoring on the Cold River establishes baseline water quality data and will allow future determination of excursions to the proposed objectives.

Adherence or Excursions to Transboundary Water Quality Objectives

The *MAA* established transboundary water quality objectives for individual parameters based on values that protect human consumption, agricultural and recreational uses and the aquatic environment.

A total of 2,883 water quality samples were compared to the transboundary water quality objectives to determine whether any excursions to the objectives occurred in 2013. The Committee on Water Quality (COWQ) has been developing an action plan to assess the risks and causes of excursions and the potential to mitigate by the respective jurisdiction.

The PPWB report on Excursions of Transboundary Water Quality Objectives January to December 2013 is shown in Appendix IV. This report was recommended by the COWQ and approved by the Board in November 2014. Results are summarized.

In 2013, the transboundary water quality objectives were adhered to an average of 95% of samples (Figure 3). The adherence rate ranged from 100% (Churchill River) to 88.2% (Qu'Appelle River), indicating that water quality was suitable for the majority of the intended water uses for these rivers. Of the 11 transboundary rivers, the Carrot and the Qu'Appelle rivers had an overall adherence rate of less than 90% which is attributed to excursions of manganese, total phosphorus and salts (sodium, chloride and sulphate).

Annual adherence rates of rivers have varied only slightly over the last 11 years. The Red Deer River (Alberta/Saskatchewan) and the Qu'Appelle River have shown the greatest fluctuation. However, overall variations in adherence rates are minor and did not highlight significant changes in water quality in 2013.

These variations in adherence rates can occur naturally and can be influenced by a number of factors including climate variability, flow, sediment loading, groundwater and point or non-point inputs into the river.

In 2013, 14 parameters had excursions to the interprovincial water quality objectives. Total phosphorous, dissolved manganese and dissolved sodium were the parameters most frequently exceeded. Concentrations of total phosphorus, dissolved manganese and other parameters can be influenced by various natural and anthropogenic factors such as seasonal runoff and flow, land use and point source effluents.

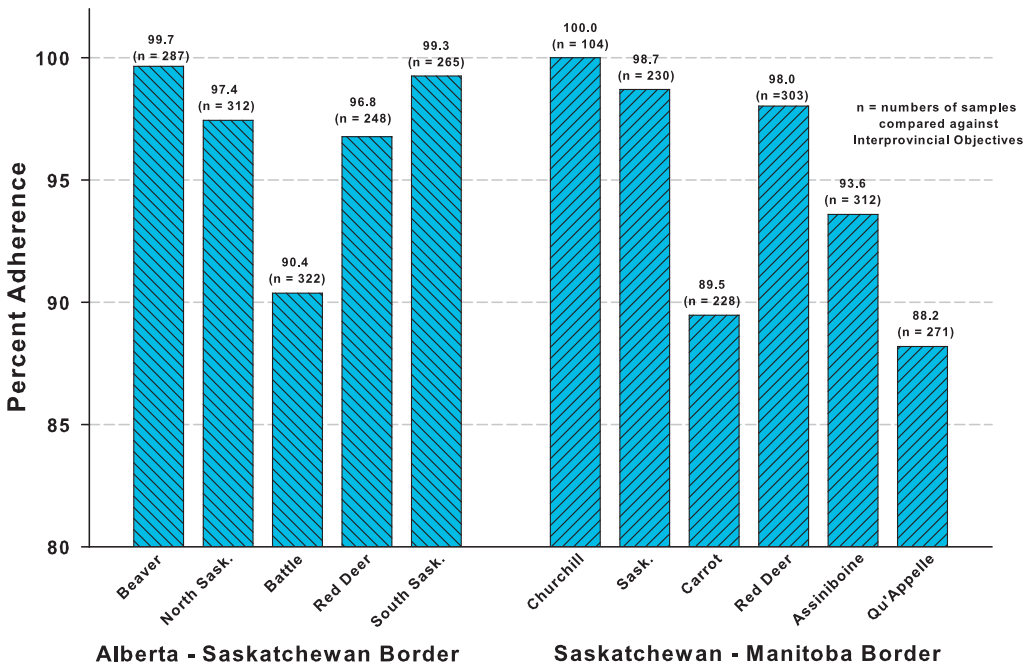


Figure 3. 2013 Percent Adherence to PPWB Objectives

Reviewing and Improving Transboundary Water Quality Objectives

The COWQ completed its work on the comprehensive review of the interprovincial water quality objectives in 2012 - 2013. The Board confirmed their support of the work completed by COWQ. In 2013 - 2014, each PPWB member organization commenced an internal review of the recommended changes. The internal review is currently ongoing.

In 2013, the COWQ began setting priorities for the 12 transboundary river reaches. The Committee determined that nutrients are the number one priority for further investigation due to increasing trends at some river reaches and exceedances of water quality objectives. Nutrients are also key to the overall water quality protection of rivers. In 2013 - 2014, the COWQ began preparation of a Statement of Work to be used to hire a consultant to undergo a review of nutrients across all transboundary river reaches. The Committee intend to link the trends that have been observed at the transboundary sites and the excursions to the proposed water quality objectives to possible causes or influences.

In 2013 - 2014, the COWQ considered how to prioritize potential investigations of exceedances of water quality objectives at the transboundary reaches and developed an "Excursion Response

Flow Chart". The Flow Chart will be used to develop a process to assess excursions to water quality objectives and potential follow up actions.

New Look for Future PPWB Report on Excursions of Transboundary Water Quality Objectives.

In 2013 - 2014, the COWQ developed a "Mock Excursion Report" that will replace the current PPWB Report on Excursions of Interprovincial Water Quality Objectives once the review of the Transboundary Water Quality Objectives has been completed and Ministerial approval has been received. Highlights for the new proposed excursion report include:

- Summary at the beginning of the report;
- More detailed explanation of results;
- More detailed examination of specific parameter excursions at each border stations;
- More detailed discussions on the tables related to excursion frequency summary for water quality stations;
- Discussion and tables on pesticide and nutrient excursions; and
- Update of on-going activities identified in previous reports.

The new "look" is expected to occur as early as 2015.

GOAL 4: Governments Are Informed About Emergency and Unusual Water Conditions

In the PPWB's Strategic Plan, Goal 4 is to inform jurisdictions of emergency and unusual water conditions, facilitating effective and cooperative transboundary water management.

PPWB Contingency Plan

Historically, the PPWB Interprovincial Water Quality Contingency Plan was an effective method of informing government agencies of spills or unusual water quality conditions in transboundary streams.

This plan had only considered spills that affected surface water quality but its scope was expanded in March 2010 to also include emergency or unusual surface water quantity or groundwater quantity and quality events.

The PPWB Event Contingency Plan is not meant to replace any jurisdictional Emergency spill response mechanism.

The Event Contingency Plan currently involves a "how to" guide to inform jurisdictions. An Event Notification Report Form is used to inform PPWB and Committee members, providing them sufficient information to investigate whether adequate mitigation efforts are being taken to avoid impacts to neighbouring jurisdictions.

In order to enhance, streamline and improve communications on emergency and unusual water quantity and quality conditions, the Board will undertake a review of the Event Contingency Plan beginning in 2014 - 2015.

Three unusual water quality events were reported in 2013 - 2014:

- In June 2013, Alberta Environment and Sustainable Resource Development distributed a cautionary notification of a potential breach of both the Sindre and Red Deer's municipal wastewater lagoons as a result of rising water levels in the Red Deer River. No transboundary impacts occurred.
- In June 2013 Alberta Environment and Sustainable resources distributed a cautionary notification related to a train derailment on the Bow River Bridge in Calgary. No spill of material occurred.
- In July 2013, Saskatchewan Water Security Agency reported a spill on the Saskatchewan River at EB Campbell Dam. The spill was mostly contained with the exception of approximately 3500 litres of Teresso lubricating liquid. The spill was deemed to have low ecological impact and no transboundary impacts occurred.

GOAL 5: Conflicts over Transboundary Water Issues are Avoided

The PPWB's Strategic Plan Goal 5 is to avoid conflicts and disagreements over transboundary water issues. During the year, the PPWB discussed issues related to several existing projects of interest to different jurisdictions.

Lake Winnipeg Nutrient Issues

Lake Winnipeg is Canada's sixth-largest freshwater lake, and is fed by a vast international basin covering 960,000 square km, extending over four provinces and four states. Concern over nutrient loading in Lake Winnipeg has risen in recent years, with reports of increased frequency, duration, and intensity of algal blooms. The Province of Manitoba, Environment Canada and many other partners have been engaged in several large initiatives to address water quality issues in Lake Winnipeg.

The PPWB provides a forum to exchange information on Lake Winnipeg initiatives with the Provinces of Saskatchewan and Alberta. Canada and Manitoba signed a Memorandum of Understanding in September 2010 to continue their collaborative partnership into the long-term. An Implementation Steering Committee was formed in October 2010. The Provinces of Alberta and Saskatchewan have agreed to have the PPWB Chair represent their interest on the Steering Committee. In 2013 - 2014, the Steering Committee held its 7th meeting on December 11th, 2013. Work is underway to conduct a management review of the MOU in anticipation of its renewal in September 2015. The Steering Committee's next meeting is scheduled for May 2014.

The Board was informed about activities in the Lake Winnipeg Basin Initiative (LWBI). Phase II of the LWBI began in 2012 (2012 - 2017) and builds on the work of Phase I (2008 - 2012). The LWBI focuses on three areas: transboundary partnerships to manage nutrients in the basin; research, information and monitoring; and, a stewardship fund for projects that reduce nutrient loads into the lake.

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 Basin Stewardship Fund will shift in focus from general "stewardship" programs in the Basin to targeted key geographic areas, for example Red/Assiniboine and Winnipeg/Rainy sub-basins.

The Board was also kept informed of Manitoba's actions to reduce nutrient loading. Manitoba is working through the International Red River Board (IRRB). The IRRB is preparing a basin-wide nutrient management strategy and is compiling information on how each jurisdiction is addressing nutrient issues. One component of the nutrient management strategy involves developing targets for nitrogen and phosphorus at the International Boundary. In April 2013, the Water Quality Committee of the IRRB considered presentations from 14 water quality modelling experts from Canada and the United States. The development of the Red River nutrient objectives will be coordinated with developing nutrient objectives for Lake Winnipeg.

At its March 2014 meeting, the Board was informed of the new Lake Friendly Accord. In June of 2013, the Government of Manitoba announced a new Lake Friendly Accord and Stewards Alliance, and partnerships and initiatives between the Government and other jurisdictions to better coordinate efforts to improve all waterways in the Lake Winnipeg basin. The Lake Friendly Accord will coordinate action to improve water quality by reducing nutrient pollution. The Lake Friendly Accord is not meant to duplicate the work of other initiatives, but is meant to build on existing transboundary initiatives and agreements, for example, the PPWB, the International Joint Commission, and the Red River Basin Commission.

Carrot River Sediment Concerns

Saskatchewan, with the support of Manitoba, is preparing to explore opportunities to investigate the reduction of stream capacity as a result of

sediment concerns in the Carrot River. The Terms of Reference for the project was completed in March 2013. The Saskatchewan and Manitoba members of the Committee on Hydrology will be working together on the project.

Manitoba/Saskatchewan Drainage

In September 2008, the Minister of Manitoba Conservation and Water Stewardship (formerly Manitoba Water Stewardship) wrote to the Minister responsible for the Saskatchewan Water Security Agency (formerly Saskatchewan Watershed Authority) requesting support for interprovincial meetings of staff responsible for licensing drainage works, investigating complaints, and enforcing illegal drainage activities. A co-operative approach was agreed upon to understand and resolve bilateral drainage issues.

A bilateral Saskatchewan - Manitoba Task Force was created in 2009 to develop a strategy for dealing with drainage in Saskatchewan watersheds that may affect lands in Manitoba. Manitoba and Saskatchewan, through the Task Force have met on a number of occasions and are jointly investigating drainage issues along the Border.

The PPWB will continue to be kept informed of the Task Force's progress.

Saskatchewan is developing a new drainage regulation to address drainage issues including downstream flooding that has the potential to affect Manitoba. There has been some discussion with the Drainage and Water Control Licensing staff in Manitoba for input into the proposed drainage regulation although formal Agency consultation has not yet begun.

Initiation of a Flood Forecasting Model

In June 2013 Southern Alberta was hit by a severe rain event which led to massive flooding which extended from Canmore to Calgary and beyond. The storm event brought home the importance of sharing of information between the Prairie Provinces. The sharing of information by Alberta and Saskatchewan members on meteorology and hydrology of the 2013 Alberta flood has led to initiation and discussions on an interprovincial flood forecasting model.

Cold Lake Interprovincial Apportionment - Town of Bonnyville Withdrawal

A proposal to supply the Town of Bonnyville with water from Cold Lake was approved by Alberta in 2013 - 2014. The potential impact of this withdrawal on the apportionment of Cold Lake was reviewed by Alberta and the results of the study concluded that issuing the license would not compromise Alberta's ability to meet its apportionment obligations. Saskatchewan has reviewed this report and is in agreement with the findings.

Annual Report on Transboundary Drainage Projects

The COH prepares an annual report on drainage projects approved in Saskatchewan that have the potential for downstream impacts in Manitoba.

The Board agreed that Alberta only needs to provide the PPWB with drainage project information if there is a specific project that could have an impact on Saskatchewan.

No projects were licensed by Saskatchewan in 2013 - 2014 that had the potential for transboundary impacts into Manitoba.

Montana - Alberta St. Mary and Milk Rivers Water Management Initiative

The Alberta member informed the Board in 2008 of an initiative between Alberta and Montana related to the sharing of the waters in the St. Mary and Milk Rivers. The purpose of this initiative is to cooperatively explore and evaluate options for improving both Montana's and Alberta's access to the shared water of the St. Mary and Milk Rivers, and to make joint recommendations on preferred options to both governments for their consideration and approval.

This Alberta provincial - Montana state initiative also furthers the goals of the Governments of Canada and the USA which have an existing international treaty to share the waters of the St. Mary and Milk Rivers.

The Terms of Reference for the Joint Initiative Team does not include Alberta's sharing of water with

Saskatchewan under the *MAA*. Nonetheless, the Alberta member will inform the Saskatchewan PPWB member of issues relevant to Saskatchewan.

In 2009 - 2010, the Joint Initiative Team developed a water management model of the St. Mary and Milk rivers to assess the benefits and impacts on water supplies in Alberta and Montana. In 2010 - 2011, this model was employed to examine a number of scenarios. Joint management recommendations are expected from the Governments of Alberta and Montana.

Alberta had provided information updates for this initiative at each PPWB Meeting. The Initiative has progressed to a point where the Alberta Board member will only report as needed in the future.

GOAL 6: Governments Are Informed About PPWB Activities

The PPWB's Strategic Goal 6 is to keep jurisdictions informed about PPWB activities. This transparency ensures that cost-shared activities are delivered efficiently and effectively and are consistent with the mandate of the PPWB.

The PPWB member governments were informed about PPWB activities through various means, including the ongoing distribution of Board and Committee Minutes and Quarterly and Annual Reports, as well as through brochures and fact sheets, technical reports, and the PPWB website.

The PPWB website (www.ppwb.ca) exists to inform the public and interested parties of PPWB activities, and provide a means for Member governments to exchange information and facilitate the business of the PPWB. The PPWB website provides access to a complete suite of PPWB publications and fact sheets. A member portal also facilitates the exchange of information.

In order to maintain good communications between the Board and the Committees, joint meetings with the Committees are scheduled periodically. In 2013 - 2014, the Board participated in a Committee on Groundwater (COG) meeting held on June 17-18, 2013 in Edmonton. The Board participated by teleconference call to discuss the development of a Schedule F to the *Master Agreement on Apportionment*.

In addition, the Board regularly invites Committee members to participate in Board meetings when the meetings are held in the Committee member's jurisdiction.

GOAL 7: Information, Knowledge and Research Are Shared Among Governments

The PPWB provides a forum to foster effective and cooperative water management on the Prairies. Goal 7 facilitates cooperation by exchanging information and knowledge amongst jurisdictions and participating in research projects of mutual interest and relevance to the PPWB mandate.

Resiliency of the MAA to Climate Change

In March 2008, the PPWB initiated a project to assess how resilient the MAA would be to changes in water availability resulting from climate change. The Committee on Hydrology (COH) was tasked by the Board to prepare flow arrays depicting various scenarios of water scarcity in the Prairie Provinces. In November 2011, the Board indicated their support of using paleorecords coupled with the historic hydrological records to simulate droughts of varying length and severity. Dr. Dave Sauchyn of the Prairie Adaptation Research Collaborative (PARC), University of Regina was contracted by the COH to complete this work. The contract was completed in May 2013 with the delivery of a report titled: Development of Drought Scenarios for Rivers on the Canadian Prairies. The report describes the methods used to correlate severe drought conditions observed in the paleo-hydrologic records to years within the gauged records. The basins studied were:

- South Saskatchewan River below Red Deer River (AB/SK boundary)
- North Saskatchewan River (AB/SK boundary)
- Battle River (AB/SK boundary)
- Saskatchewan River (SK/MB boundary)
- Churchill River (SK/MB boundary)
- Assiniboine River (SK/MB boundary).

The next step is for each jurisdiction to use the scenarios developed by PARC with their own water management models to assess the impact of various water management strategies on interprovincial water sharing under the simulated drought conditions. A report will be produced by COH once the work has been completed.

Drainage Area Delineation

Drainage basins or watersheds consist of a network of stream channels that link from smaller to larger, providing a conduit for surface water runoff and sediment transport on the landscape. Mutually agreed drainage basin boundaries are necessary for purposes of calculating apportionable flows and monitoring interprovincial apportionment. A Member Agency of the PPWB had been delineating gross and effective drainage area for all the member agencies since 1975. However, changes in the department's mandate has resulted in the cessation of drainage area delineation services for the PPWB and its member agencies. The COH is discussing the implications of the loss of this service.

Invasive Species

In October 2013 the Board was informed about findings of zebra mussels (*Dreissera polymorpha*) on Lake Winnipeg. Manitoba Conservation and Water Stewardship Fisheries Branch is the lead to coordinate the response to this situation. Actions plans are being developed by Manitoba's Fisheries Branch to eradicate the species with support for the Department of Fisheries and Oceans as the Federal lead. Environment Canada will monitor, provide science expertise on water quality implications for Lake Winnipeg.

GOAL 8: PPWB Business is Conducted Effectively

The PPWB's Strategic Goal 8 focuses primarily on administration, work planning, and financial management. Goal 8 ensures that work planning and budgeting is consistent amongst jurisdictions, day to day activities are administered effectively, there is effective communications, and succession planning is done to ensure continuity of Board, Committee and Secretariat functions.

ADMINISTRATIVE AND FINANCIAL MANAGEMENT

As illustrated by the organization chart in Appendix V, the Board operates through its Executive Director and three technical Standing Committees (Committee on Hydrology, Committee on Groundwater, and Committee on Water Quality). The Board consists of senior officials engaged in the administration of water resources in the Provinces of Alberta, Saskatchewan, and Manitoba and senior officials from Environment Canada and Agriculture and Agri-Food Canada (Appendix VI). Committee members are managers and technical experts within each member agency. The Board is chaired by the Environment Canada member. The Committees are chaired by the Executive Director.

Secretariat support is provided to the PPWB through the Transboundary Waters Unit, Environment Canada at Room 300, 2365 Albert St., Regina, Saskatchewan. The portion of time each Secretariat staff person spends on PPWB activities is charged to the PPWB and cost-shared by the members. In addition, technical support is provided, as required, by other staff of the Government of Canada and the three Prairie Provinces.

Four Board and nine Committee meetings were held throughout the 2013 - 2014 fiscal year. The Board participated in the COG Meeting No. 65 by teleconference call. The discussion focused on the drafting of the Schedule F to the *Master Agreement on Apportionment (MAA)*. The Board invites the various Committee members to participate in Board meetings. This practice is common with all of the Board Committees, thereby improving communication and understanding between the Board and the Committees.

PPWB

- Meeting No. 105. October 25, 2013 - Teleconference
- Meeting No. 106. November 5-6, 2013 - Edmonton
- Meeting No. 107. March 6-7, 2014 - Saskatoon
- Meeting No. 108. March 20, 2014 - Teleconference

COH

- Meeting No. 125. May 21, 2013 - Teleconference
- Meeting No. 126. September 17-18, 2013 - Calgary
- Meeting No. 127. October 31, 2013 - Teleconference
- Meeting No. 128. February 13-14, 2014 - Regina

COWQ

- Meeting No. 120. May 22-23, 2013 - Winnipeg
- Meeting No. 121. October 15-16, 2013 - Edmonton
- Meeting No. 122. December 10, 2013 - Teleconference

COG

- Meeting No. 65. June 17-18, 2013 - Edmonton
- Meeting No. 66. August 28-29, 2013 - Regina

The Board approves the annual budget for the PPWB. The budget for 2013 - 2014 was \$882,000 and final expenditures were \$663,637 as shown in Appendix VII. Final expenditures were below the approved budget due to the flow modernization contract not being completed because of delays in the contracting process. The contract work to modernize flows continued to be administered by a PPWB Member Agency in 2013 - 2014.

The Board conducts budget planning early in the year and has a substantial discussion on the budget at the fall meetings. This discussion facilitates early input by the Board into the budget processes of the PPWB member governments.

The Board approved the renewal of the 5-year work plan in December 2011. The renewed 5-year work plan provides direction until March 2017.

The purpose of the work plan is to:

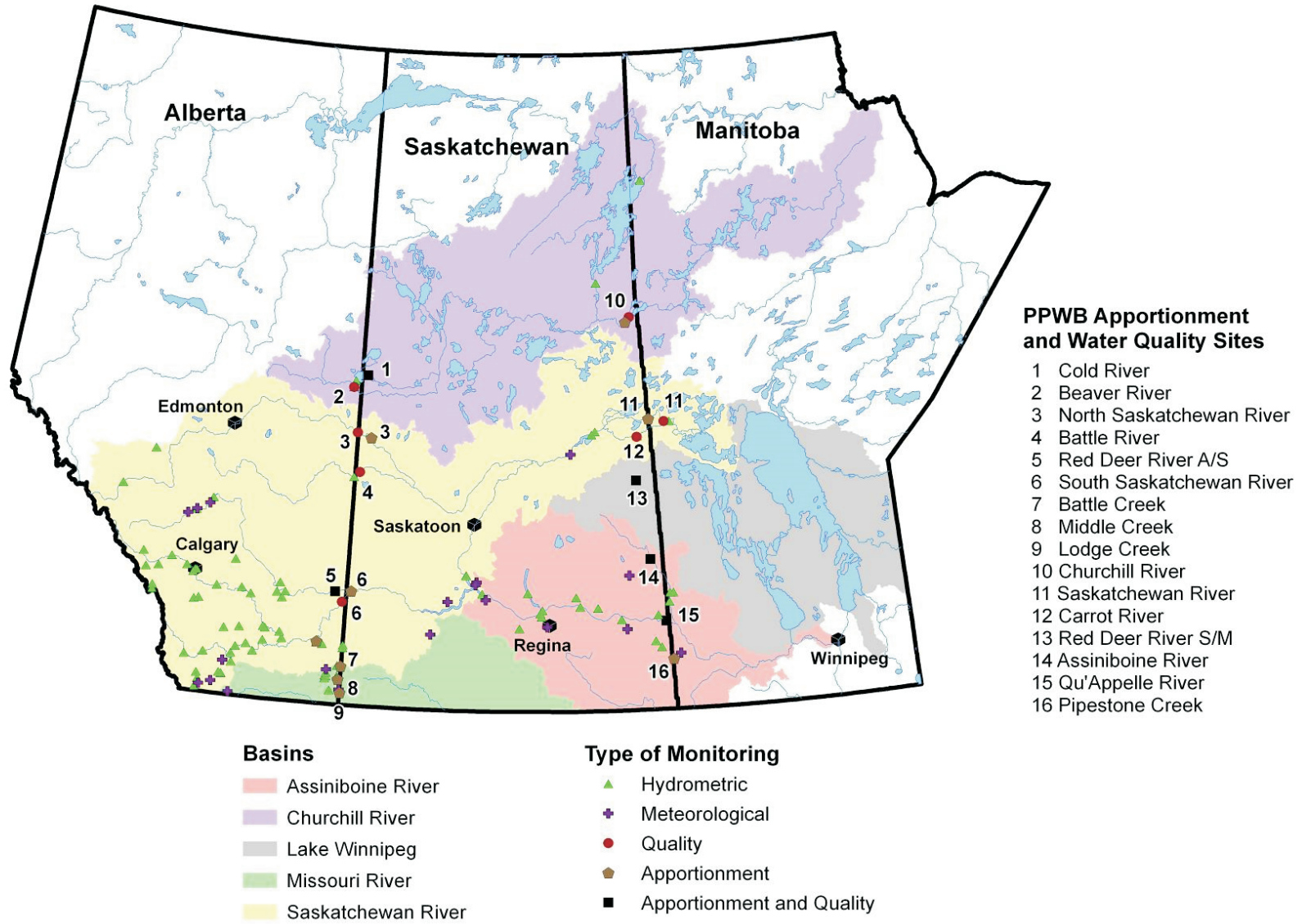
- position the Board to anticipate and plan for future work priorities and resource Requirements;
- guide the Board in its work over 5 years, ensuring that activities target fulfilling the Goals in the PPWB Strategic Plan;
- feed into multi-year work plans for the three Standing Committees and the Secretariat; and
- provide the foundation for communication with Ministers and senior officials within each government.

Renewal and Modernizing of PPWB Documents

In order to modernize, enhance, streamline and avoid duplication, the Board reviews PPWB documents periodically. The Strategic Plan and Charter underwent a review in 2012 as part of the work plan renewal process to evaluate whether current government priorities were reflected in the PPWB activities. These documents were approved at the Board's fall 2012 meeting. In 2013, the Board began the review of the PPWB By-Laws and Rules and Procedures. At the November 2013 meeting, the Board agreed to the review of other core PPWB documents. This work will begin in fiscal year 2014 - 2015.

Further information on the history and administration of the PPWB can be found in Appendix VIII.

APPENDIX I: PPWB Monitoring Stations for 2013 - 2014



APPENDIX II: 2013 Recorded and Apportionable Flows

APPENDIX IIA: Flows at the Alberta - Saskatchewan Border (in Cubic Decametres)

SOUTH SASKATCHEWAN RIVER - ALBERTA - SASKATCHEWAN BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	247000	225000	2700000	346000	723000	2620000	1180000	571000	396000	392000	245000	209000	7420000
CONSUMPTIVE USE	150	400	210	39900	284000	158000	379000	278000	165000	12100	560	250	1320000
CHANGE IN RESERVOIR STORAGE	-69600	-82300	-70800	-38100	187000	351000	-1360	-73200	-83500	13200	-39500	-65900	26900
INTERBASIN TRANSFER*	0	0	0	29700	19900	37610	28900	17800	15900	9440	0	0	159000
APPORTIONABLE FLOW	172000	146000	194000	349000	1180000	3190000	1580000	795000	513000	438000	222000	146000	8930000

* Irrigation diversions to the Eastern and Western Irrigation Districts which are subsequently returned to the Red Deer River

RED DEER RIVER - ALBERTA - SASKATCHEWAN BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	42700	40900	48200	338000	249000	858000	470000	197000	125000	89400	56400	45700	2560000
CONSUMPTIVE USE	0	0	0	0	0	970	4380	4500	3960	0	0	0	13800
CHANGE IN RESERVOIR STORAGE	-24100	-23900	-23500	12300	13500	53400	18100	15200	2080	420	-5670	-11800	26000
INTERBASIN TRANSFER*	0	0	0	-29700	-19900	-37610	-28900	-17800	-15900	-9440	0	0	-159000
APPORTIONABLE FLOW	18200	17500	21700	317000	242000	879000	457000	202000	116000	80200	52800	33800	2440000

** Irrigation return flow from the Eastern and Western Irrigation Districts

SOUTH SASKATCHEWAN RIVER - BELOW JUNCTION WITH RED DEER RIVER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	290000	266000	318000	684000	973000	3480000	1650000	768000	521000	481000	301000	255000	9990000
APPORTIONABLE FLOW	190000	163000	216000	666000	1420000	4070000	2040000	997000	629000	518000	275000	180000	11400000
SASKATCHEWAN SHARE (50%)	95000	81500	108000	333000	710000	2040000	1020000	199000	315000	259000	138000	90000	5690000
EXCESS (+) OR DEFICIT (-) DELIVERY	195000	185000	210000	351000	263000	1440000	630000	269000	206000	222000	163000	165000	4300000
CUMULATIVE EXCESS OR DEFICIT	195000	380000	630000	981000	1240000	2680000	3310000	3580000	3790000	4010000	4170000	4340000	4300000

Recorded Flow is 88% of apportionable flow. Alberta is required to deliver 50% of apportionable flow to Saskatchewan. Apportionment of flow in the South Saskatchewan River is specified in Article 4, Schedule A of the MAA. Apportionable flow calculations are based on the methodology described in the report entitled "South Saskatchewan River Below Red Deer River - Natural Flow", April 1985 (PPWB Report No. 45). Flows have been routed and, as a result, the values presented in the table cannot be exactly balanced on a monthly basis. Final numbers might differ due to rounding-off to three significant figures.

NORTH SASKATCHEWAN RIVER - ALBERTA - SASKATCHEWAN BORDER (NEAR DEER CREEK)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	295000	305000	321000	591000	935000	1940000	1400000	715000	537000	463000	394000	289000	8190000
APPORTIONABLE FLOW	46300	87700	46500	373000	1060000	2480000	1780000	1050000	663000	354000	203000	65700	8210000

Recorded Flow is 99.8% of apportionable flow. Alberta is required to deliver 50% of apportionable flow to Saskatchewan.

BATTLE CREEK - ALBERTA - SASKATCHEWAN BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	196	1070	1690	982	791	749	497	555	441	0	0	6970
APPORTIONABLE FLOW	0	196	1070	1690	997	795	749	497	555	441	0	0	6990

Recorded Flow is 99.7% of apportionable flow. Alberta is required to deliver 75% of apportionable flow.

LODGE CREEK - ALBERTA - SASKATCHEWAN BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	0	383	468	604	1223	147	0	0	2	0	0	2830
APPORTIONABLE FLOW	0	3	439	485	683	1239	147	0	0	2	0	0	3000

Recorded Flow is 92% of apportionable flow. Alberta is required to deliver 75% of apportionable flow to Saskatchewan.

MIDDLE CREEK - ALBERTA - SASKATCHEWAN BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	4	656	1600	270	125	43	26	26	30	0	0	2780
APPORTIONABLE FLOW	0	4	690	2070	331	153	43	26	25	12	0	0	3350

Recorded Flow is 83% of apportionable flow. Alberta is required to deliver 75% of apportionable flow to Saskatchewan.

COLD LAKE - ALBERTA - SASKATCHEWAN BORDER (AT OUTLET OF COLD LAKE)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	41100	39100	39500	36200	55400	89400	112000	92600	62600	43900	33000	29100	674000
APPORTIONABLE FLOW	41500	39500	39900	36600	55900	89900	112000	94000	64300	44500	33400	29500	681000

Recorded Flow is 99% of apportionable flow. Alberta is required to deliver 68.4% of apportionable flow to Saskatchewan.

APPENDIX IIB: Flows at the Saskatchewan - Manitoba Border (in Cubic Decametres)

CHURCHILL RIVER - SASKATCHEWAN - MANITOBA BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
ESTIMATED FLOW	2530000	2130000	2210000	2000000	1950000	2200000	2920000	2590000	2590000	2350000	1990000	2120000	2760000
APPORTIONABLE FLOW	2370000	1960000	2000000	1870000	1960000	2280000	3240000	3030000	2460000	2430000	1860000	1860000	2730000

Estimated Flow includes recorded flow at Sandy Bay, SK and estimated inflow from Sandy Bay to the Saskatchewan-Manitoba Border. Estimated flow is 101% of apportionable flow. Estimated flow exceeded the apportionable flow in 2013 due to a net reduction in reservoir storage of 291 000 dam³ in Reindeer Lake. Saskatchewan is required to deliver 50% of apportionable flow to Manitoba.

SASKATCHEWAN RIVER - SASKATCHEWAN - MANITOBA BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
ESTIMATED FLOW	1140000	1280000	1440000	1540000	3270000	3010000	5300000	3030000	1760000	1560000	1280000	1030000	25600000
APPORTIONABLE FLOW	740000	798000	1120000	1700000	3880000	3790000	6050000	3300000	1830000	1460000	1000000	717000	26400000

Estimated Flow at the Saskatchewan-Manitoba border is calculated using recorded flow of the Saskatchewan River at The Pas minus 1.31 times the recorded flow of the Carrot River near Turnberry. Estimated flow is 97% of apportionable flow. Saskatchewan is required to deliver 50% of the apportionable flow to Manitoba.

CARROT RIVER - SASKATCHEWAN - MANITOBA BORDER (NEAR TURNBERRY)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	17800	11500	10300	30500	356000	204000	141000	74700	38800	28500	12300	5290	931000

QU'APPELLE RIVER - SASKATCHEWAN - MANITOBA BORDER (NEAR WELBY)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	6100	7160	12000	33500	252000	161000	97200	47100	28500	33700	26400	11100	716000
APPORTIONABLE FLOW													509000

Recorded flow is 141% of apportionable flow. Recorded flow exceeded the apportionable flow by 207 000 dam³ in 2013 because of diversions of 68 900 dam³ from the South Saskatchewan River, as well as inaccuracies in estimating ungauged local inflows and actual water use in the basin. Saskatchewan is required to deliver 50% of apportionable flow to Manitoba.

RED DEER RIVER - SASKATCHEWAN - MANITOBA BORDER (NEAR ERWOOD)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	10400	7160	7130	51300	386000	99500	51700	13200	3190	5250	4510	2760	642000
APPORTIONABLE FLOW	9550	6570	6430	50200	354000	90000	46700	11900	2860	4800	4120	2520	590000

In 2013 recorded flow exceeded the apportionable flow by 9%. Such a result is normal for this basin, due to the contribution of agricultural drainage to the flow of the Red Deer River. Saskatchewan is required to deliver 50% of the apportionable flow to Manitoba.

ASSINIBOINE RIVER - SASKATCHEWAN - MANITOBA BORDER (AT KAMSACK)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	10400	7160	7130	51300	386000	99500	51700	13200	3190	5250	4510	2760	642000
APPORTIONABLE FLOW	9550	6570	6430	50200	354000	90000	46700	11900	2860	4800	4120	2520	590000

Recorded Flows are 99% of apportionable flow. Saskatchewan is required to deliver 50% of apportionable flow to Manitoba.

PIPESTONE CREEK - SASKATCHEWAN - MANITOBA BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	10400	7160	7130	51300	386000	99500	51700	13200	3190	5250	4510	2760	642000
APPORTIONABLE FLOW	9550	6570	6430	50200	354000	90000	46700	11900	2860	4800	4120	2520	590000

Recorded Flows are 104% of apportionable flow. Recorded flow exceeded the apportionable flow in 2013 due to pumping of water from Kiplin Marsh into Pipestone Lake. Saskatchewan is required to deliver 50% of apportionable flow to Manitoba.

APPENDIX III: PPWB Water Quality Monitoring 2013 Parameter List

Water is collected monthly at all sites with the exception of Red Deer (SK/MB) (6x/yr) and Churchill River (4x/yr)

ALKALINITY, phenol & total
 ALUMINUM, diss. & total ^o
 AMMONIA, total ^o
 ANTIMONY, diss. & total
 ARSENIC, diss. ^o & total
 BARIUM, diss. & total ^o
 BERYLLIUM, diss. & total
 BICARBONATE, calc.
 BISMUTH, diss. & total
 BORON, diss. ^o & total
 CADMIUM, diss. & total ^o
 CALCIUM, diss.
 CARBON, diss. organic
 CARBON, part. organic
 CARBON, total organic, calcd.
 CARBONATE, calcd.
 CHLORIDE, diss. ^o
 CHROMIUM, diss. & total ^o
 COBALT, diss. & total ^o
 COLIFORMS FECAL ^o ◆
 COLOUR TRUE
 COPPER, diss. & total ^o
 E. COLI ◆
 FLUORIDE, diss. ^o
 FREE CO₂, calcd.
 GALLIUM, diss. & total
 HARDNESS NON-CARB. (CALCD.)
 HARDNESS TOTAL (CALCD.) CaCO₃
 IRON, diss. ^o & total
 LANTHANUM, diss. & total
 LEAD, diss. & total ^o
 LITHIUM, diss. & total
 MAGNESIUM, diss.

MANGANESE, diss. ^o & total
 MOLYBDENUM, diss. & total
 NICKEL diss. & total ^o
 NITROGEN NO₃ & NO₂, diss. ^o
 NITROGEN. part.
 NITROGEN, total calcd.
 NITROGEN, diss.
 OXYGEN, diss. ^o
 pH ^o
 PHOSPHOROUS ortho, diss.
 PHOSPHOROUS, part. calcd.
 PHOSPHOROUS, total ^o
 PHOSPHOROUS, diss.
 POTASSIUM, diss.
 RESIDUE FIXED NONFILTRABLE
 RESIDUE NONFILTRABLE
 RUBIDIUM, diss. & total
 SELENIUM, diss. ^o & total
 SILVER, diss. & total
 SILICA,
 SODIUM ADSORPTION RATIO, calcd. ^o
 SODIUM, diss. ^o
 SODIUM PERCENTAGE, calcd.
 SPECIFIC CONDUCTANCE
 STRONTIUM, diss. & total
 SULPHATE, diss. ^o
 TEMPERATURE WATER
 THALLIUM, diss. & total
 TOTAL DISSOLVED SOLIDS, calcd. ^o
 TURBIDITY
 URANIUM, diss. & total ^o
 VANADIUM, diss. & total ^o
 ZINC diss. & total ^o

 ACID HERBICIDES*^o
 NEUTRAL HERBICIDES*
 ORGANOCHLORINE INSECTICIDES*

- o Parameters with PPWB site-specific objectives
- * Collected from the Battle, Red Deer, Assiniboine and Carrot Rivers in 2011
- ◆ Collected between 6 - 12 X/year at all sites but the Churchill and Cold Rivers

**APPENDIX IV: PPWB REPORT ON EXCURSIONS OF INTERPROVINCIAL
WATER QUALITY OBJECTIVES**

JANUARY - DECEMBER 2013



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INTRODUCTION

The Prairie Provinces Water Board (PPWB) has been involved in interprovincial water management since the signing of the *Master Agreement on Apportionment (MAA)* in 1969. This agreement signed by the governments of Alberta, Saskatchewan, Manitoba and Canada established an intergovernmental framework to manage transboundary waters. Schedule E of this agreement addresses the water quality mandate of the PPWB which is “to foster and facilitate interprovincial water quality management among the parties that encourages the protection and restoration of the aquatic environment.”

To ensure the water quality is protected, water quality objectives were established at 11 major interprovincial eastward flowing river reaches in 1992 (Table 1). Five of these reaches are along the Alberta-Saskatchewan border and six are along the Saskatchewan-Manitoba border (Figure 1). Cold River was added to the long term monitoring network in 1994, although there are currently no objectives for the Cold River. Water quality objectives include chemical, physical and biological parameters. The objectives are descriptions of water quality conditions that are known to protect various water uses including the protection of aquatic life, source water, recreation, agricultural uses (livestock watering and irrigation) and fish consumption.

As part of the water quality program for the PPWB, and as a requirement of Schedule E, the PPWB monitors the quality of the aquatic environment and makes annual comparisons with the established interprovincial water quality objectives. As part of the objectives under Schedule E the provincial governments agreed that “if a chemical, physical or biological variable in a river reach, as a result of human activities, is not within the limit or limits when compared to the agreed objective, reasonable and practical measures will be taken by the party in whose jurisdiction the chemical, physical or biological variable originates so that the quality of the water in the river reach is within the acceptable limit or limits”.

To fulfill the monitoring requirement for the PPWB, Environment Canada collects and analyzes water quality samples from 11 transboundary river reaches. Monitoring includes nutrients, major ions, metals, fecal coliforms, physical characteristics and pesticides. The Committee on Water Quality (COWQ) annually reviews the results of the water quality monitoring program, with emphasis on the comparisons to interprovincial water quality objectives as part of the water quality program and as the first step to ensuring water quality is protected and maintained in the transboundary river reaches. This report presents the 2013 adherences and excursions to the 1992 interprovincial water quality objectives.

FIELD PROGRAM (2013)

In 2013, Environment Canada undertook a total of 119 water sampling events from the 11 transboundary river reaches. The monitoring program was completed as approved by the Board (Appendix 1) with several exceptions. Three sampling events were not completed on the Carrot River in April, November and December 2013. Two sampling events were not completed on the Saskatchewan River in April and November 2013. The samples were not collected due to health and safety concerns caused by high flows, steep slopes, bank erosion, and ice that prevented access to the sites. For the Beaver River, the

pesticide samples collected in February 2013 were lost due to container breakage.

Monitoring was also undertaken monthly on the Cold River in 2013 as part of the approved monitoring plan. Currently, there are no interprovincial water quality objectives for the Cold River, but site-specific objectives were developed as part of the interprovincial water quality objectives review process. Monitoring on the Cold River establishes baseline water quality data and will allow future determination of excursions to the proposed objectives.

Table 1 PPWB Water Quality Station Information.

River	Station Number	Latitude	Longitude	Hydrometric Site(s)
Alberta - Saskatchewan				
Battle	SA05FE0001	52° 56'25.008"	109° 52'23.988"	05FE004
Beaver	AL06AD0001	54° 21'15.012"	110° 12'42.984"	06AD006
Cold	SA06AF0001	54° 34'00.000"	109° 50'10.000"	06AF001
North Saskatchewan	AL05EF0003	53° 36'05.004"	110° 00'29.988"	05EF001
Red Deer (Bindloss)	AL05CK0001	50° 54'10.008"	110° 17'48.984"	05CK004
South Saskatchewan	AL05AK0001	50° 44'15.000"	110° 05'44.016"	05AJ001*
Saskatchewan - Manitoba				
Assiniboine	SA05MD0002	51° 31'59.016"	101° 53'20.004"	05MD004
Carrot	SA05KH0002	53° 36'00.000"	102° 07'00.012"	05KH007
Churchill	SA06EA0003	55° 36'29.016"	102° 11'44.016"	06EA002**
Qu'Appelle	SA05JM0014	50° 29'02.004"	101° 32'35.016"	05JM001
Red Deer (Erwood)	SA05LC0001	52° 52'00.012"	102° 10'59.016"	05LC001
Saskatchewan	MA05KH0001	53° 50'30.012"	101° 20'03.984"	05KJ001 ***

* Estimated flow for the PPWB South Saskatchewan site is based on recorded flow at Medicine Hat plus the flow from Seven Person Creek and Ross Creek with a two day lag

** Estimated flow for PPWB Churchill site includes recorded flow at Sandy Bay and estimated inflow from Sandy Bay to the border.

*** Estimated flow for PPWB Saskatchewan site includes recorded flow at 05KJ001 minus flow at the Carrot River 05KH007.

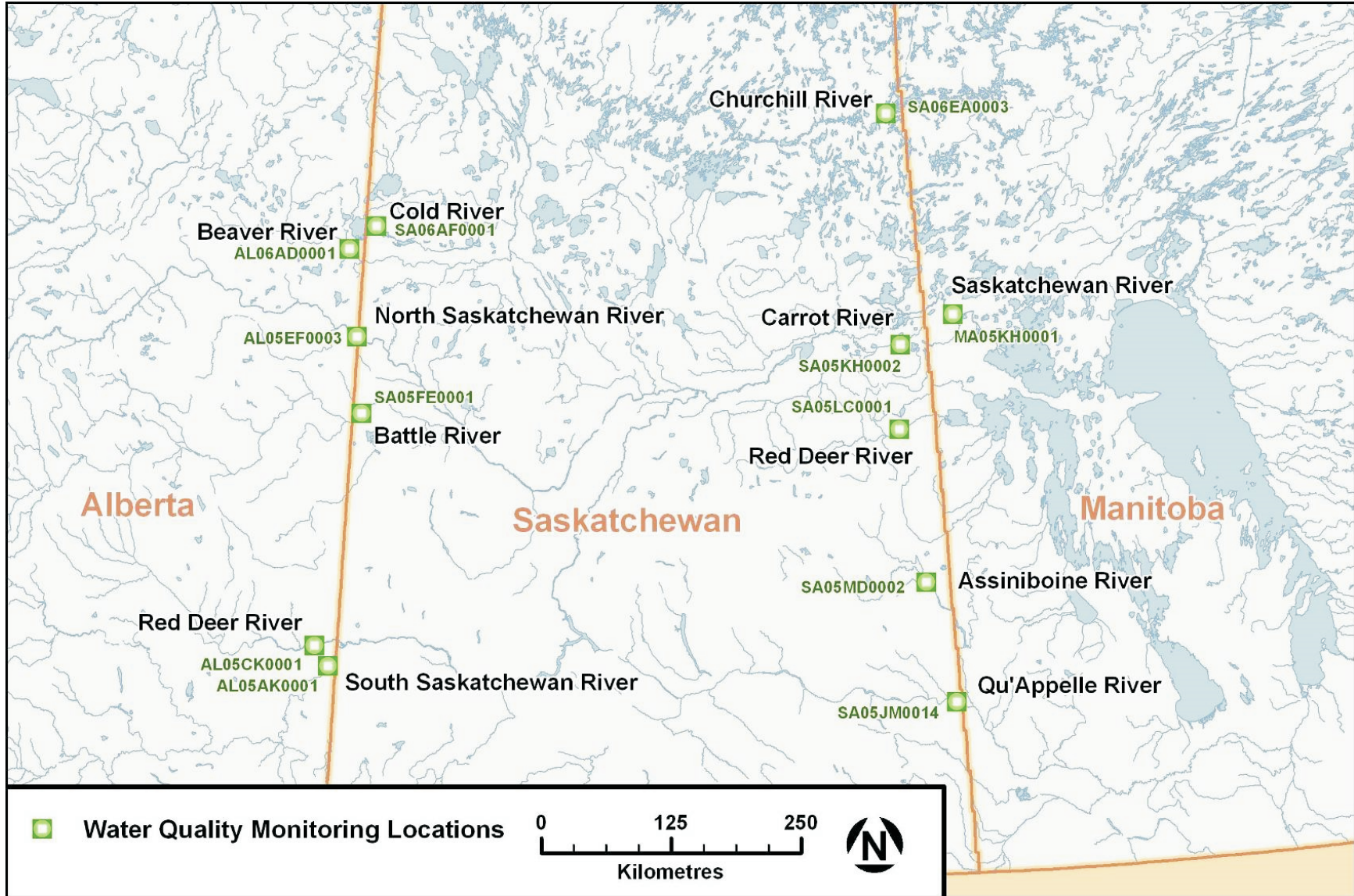


Figure 1 PPWB Water Quality Monitoring Locations

RESULTS AND DISCUSSION

Overall Adherence to Interprovincial Water Quality Objectives

The overall adherence rate to the interprovincial water quality objectives was, on average, 95% in 2013. This adherence rate is based on the comparison of 2,883 water quality results to water quality objectives. The adherence rates for the 11 rivers ranged from 88.2% for the Qu'Appelle River

to 100% for the Churchill River (Figure 2). Of the 11 transboundary river reaches, only the Carrot and Qu'Appelle rivers (on the Saskatchewan / Manitoba border) had an overall adherence rate of less than 90%. For the Carrot and the Qu'Appelle rivers the lower adherence rate can be attributed primarily to excursions of manganese, total phosphorus and salts (sodium, chloride and sulphate).

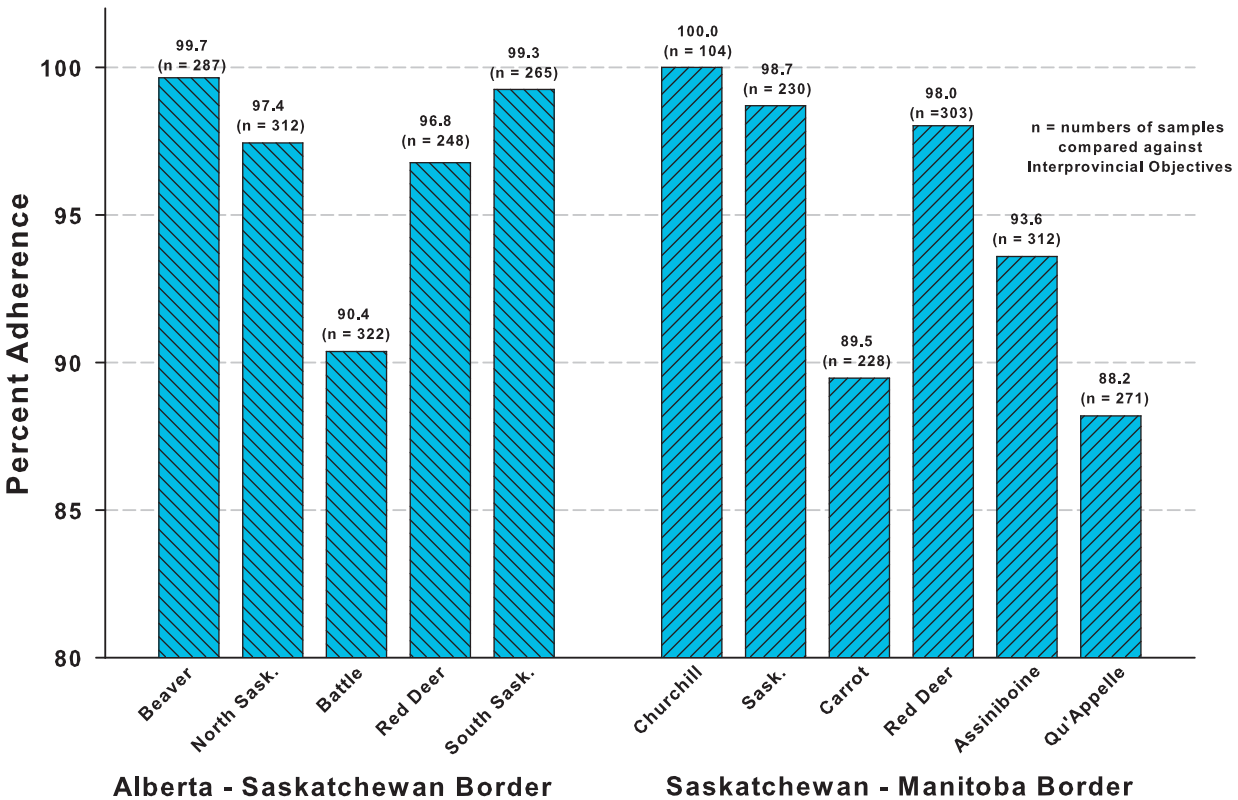


Figure 2 Percent Adherence to 1992 Interprovincial Water Quality Objectives in 2013.

Overall adherence rates from 2013 are similar to previous years (Figure 3). Most rivers show little variation in the adherence rate over the last 11 years (less than 5%). The Red Deer River (Alberta/Saskatchewan boundary) and the Qu'Appelle River have shown the greatest fluctuation in adherence rates among years. For

the Red Deer River the greatest range in adherence rate occurred due to a low adherence rate in 2005 (89.3%) and a high adherence rate in 2006 (98.4%). The lower adherence rate in 2005 was attributed to an increase in the number of excursions for certain metals and bacteria. For the Qu'Appelle River the highest and lowest adherence

rates over the last ten years were observed in 2009 and 2004, respectively. The lower adherence rate for the Qu'Appelle River in 2004 was attributed, in part, to increased excursion frequencies of total phosphorus, sodium and manganese. Several dissolved oxygen readings were also below the objective that year.

The adherence rates for each of the 11 transboundary river sites, to interprovincial water quality objectives in 2013, were similar to the last 10 year median excursion rates for each of the rivers. The overall adherence rates did not highlight significant changes in water quality in 2013.

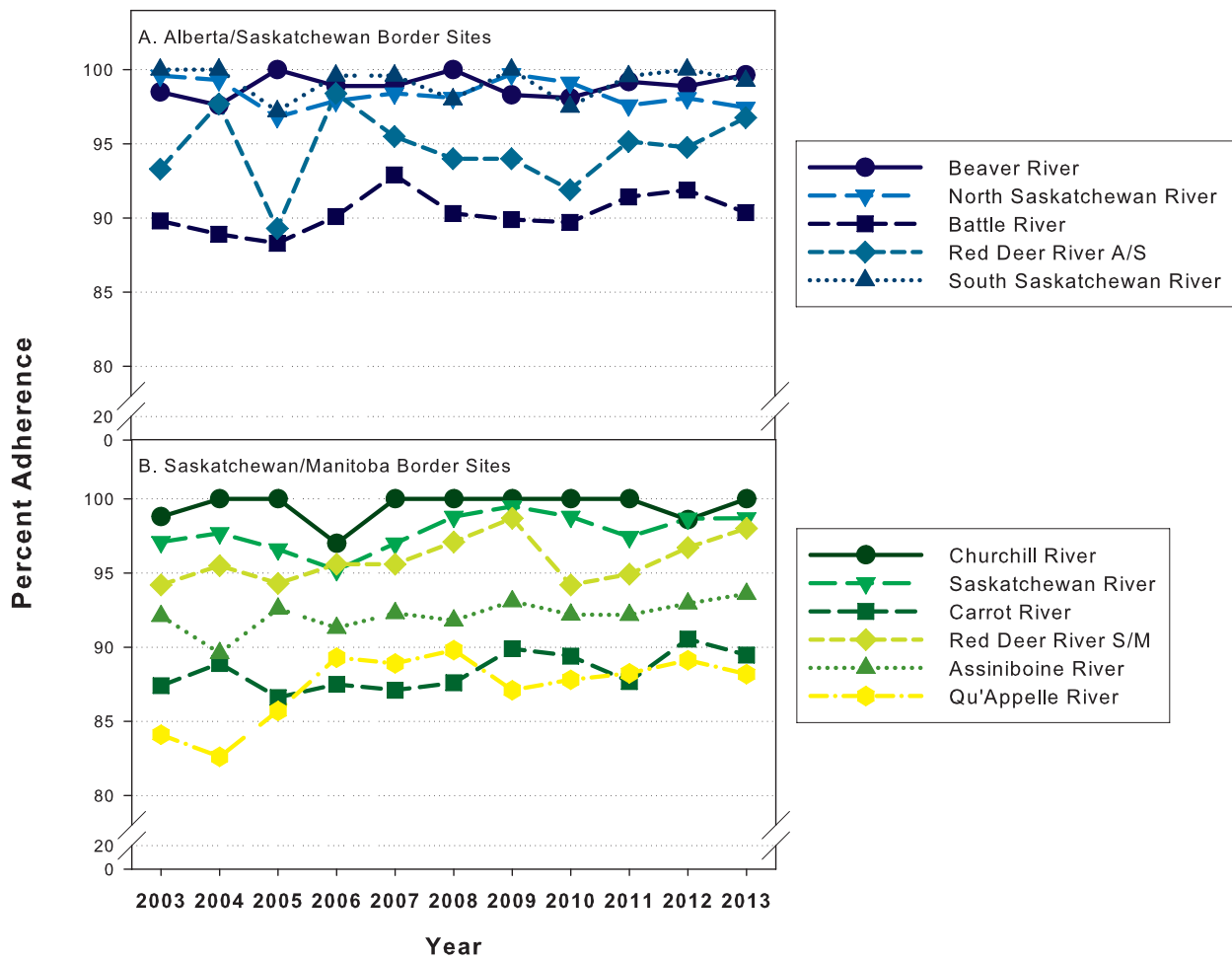


Figure 3 Percent Adherence to 1992 Interprovincial Water Quality Objectives for the Alberta/Saskatchewan (A) and the Saskatchewan Manitoba (B) borders from 2003 to 2013.

Parameter Specific Excursions in 2013

In 2013 a total of 14 parameters exhibited excursions to the interprovincial water quality objectives of which 10 exceeded objectives at more than one site (Table 4). Excursions were observed in all groups of variables including metals, nutrients, major ions, biota and physical characteristics. Of these parameters total phosphorus, sodium and manganese accounted for most of the excursions (>20% excursions among all 11 river reaches). Total phosphorus showed numerous excursions to the transboundary water quality objective at the Saskatchewan/Manitoba border. Total phosphorus objectives were exceeded 100% of the time on the Assiniboine and Qu'Appelle Rivers. The Carrot River also showed a high (89%) excursion rate to the total phosphorus objective. Fewer total phosphorus excursions were noted on the Saskatchewan and Red Deer rivers. In 2013 no excursions of total phosphorus were reported on the Churchill River. Background concentrations of total phosphorus are often naturally high in prairie river systems. Currently, total phosphorus objectives have only been established at the Saskatchewan/Manitoba border. However, the COWQ have proposed new interprovincial water quality objectives for nutrients including seasonal objectives for total phosphorus, total dissolved phosphorus and total nitrogen for all transboundary river reaches. Nutrients have been identified as a priority for prairie river systems by all jurisdictions; consequently the Committee on Water Quality (COWQ) will conduct further work to investigate potential sources of nutrients and identify watersheds or sub-watersheds at high risk.

Concentrations of sodium exceeded objectives at three of the transboundary river reaches in 2013 including the Battle River, Carrot River and the Qu'Appelle River. Sodium excursions occurred on most sample dates for the Qu'Appelle and Battle rivers. Sulphate concentrations were also close to the objective for most sample dates on the Qu'Appelle River, but only exceeded the objective in February 2013 under ice conditions. For the Carrot River, sodium excursions occurred in February and March during low flow periods. Elevated levels of sodium but within objectives were also observed in

January and December. Similarly, chloride was also observed to exceed interprovincial water quality objectives at the same time as sodium on the Carrot River.

Six metals exceeded interprovincial water quality objectives (aluminum, copper, iron, lead, manganese and zinc). Manganese (dissolved) exceeded objectives at 5 of the 11 transboundary river reaches monitored in 2013. However, background concentrations of manganese are often naturally high in prairie river systems. Iron was also observed to exceed the objective on the Carrot River on the Saskatchewan/Manitoba border in the winter of 2013 (February and March). Other metal objective exceedances occurred on the Alberta/Saskatchewan border and included aluminum (total), copper (total), lead (total) and zinc (total). All four metals exceeded objectives on the North Saskatchewan River and the Battle River and these excursions occurred in May, with some additional excursions of copper in June and July. Water quality monitoring found substantially higher concentrations of total metals compared to dissolved forms, implying the excursions are mainly attributable to high suspended solids. These excursions may be related to higher flows in spring. Higher flows can cause spikes in total suspended solids (TSS) in prairie rivers. While there are currently no interprovincial water quality objectives for TSS concentrations are measured at transboundary sites. Elevated TSS values occurred in May and July in 2013 in the North Saskatchewan and Battle rivers suggesting the higher TSS related to spring flows may be the cause of the excursions in trace metals.

Protective Water Use Excursions in 2013

Interprovincial water quality objectives have been established at the transboundary river reaches to protect for different water uses: aquatic life, treatability of source water, agricultural uses (irrigation and livestock watering), recreation and consumption of fish (Table 2). Ammonia objective values vary based on temperature and pH of the sample (Appendix 2). In this report, measured values are compared to the water use objectives.

Fish monitoring is currently not part of the routine monitoring program conducted at the sites. The data set of contaminants in fish for the transboundary sites has been compiled and is currently being reviewed by the Committee on Water Quality.

Of the parameters with protection of aquatic life objectives, five occasionally exceeded water quality objectives including three metals; copper (total), lead (total), and zinc (total), dissolved oxygen and pH. Background concentrations of select metals are naturally high in prairie river systems and as noted earlier exceedances of the water quality objectives may occur during high flow events when total suspended solids are often elevated. Dissolved oxygen concentrations were occasionally below the interprovincial water quality objectives at two of the six rivers on the Saskatchewan/Manitoba border (Saskatchewan River and Carrot River). Periodic excursions of dissolved oxygen objectives have occurred in previous years. Field pH measurements were also observed to be slightly outside of the range for the protection of aquatic life for the North Saskatchewan River and the Battle River in October 2013. However, these values were not substantially outside of the range and could simply relate to instrumentation accuracy/variability and are not likely to contribute to adverse effects on aquatic life. For the Qu'Appelle River field pH was slightly acidic (6.48) in February 2013. This is unusual and unexpected for the Qu'Appelle River. This measurement is likely an anomaly since other field readings in 2013 ranged from 7.5 to 8.7 and historically the lowest field pH measurement for the Qu'Appelle site was 7.2 (median value 8.2). The corresponding laboratory pH value for the Qu'Appelle River in February 2013 was 8.1. Historical data comparison of the field and laboratory pH values does not show substantial differences between the two readings, which would suggest that the field reading for the Qu'Appelle River in February 2013, was anomalous and may be a field meter or calibration issue.

Water quality objectives for the protection of irrigation and livestock watering uses or recreation for fecal coliforms were occasionally exceeded in 2013. The overall excursion rate for fecal coliform

bacteria was 7% in 2013. Fecal coliform bacteria exceeded objectives at 6 of the 11 transboundary river reaches, which is greater than 2010 and 2011. On the Alberta/Saskatchewan border the water quality objective for fecal coliform bacteria for the protection of recreational uses was exceeded twice on the North Saskatchewan River. The water quality objective for the protection of irrigation/livestock uses was exceeded once each on the Battle River, Beaver River, Red Deer River, and the South Saskatchewan River. At the Saskatchewan/Manitoba border one excursion of the water quality objective for recreation (fecal coliform) occurred in the Red Deer River. Sources of fecal coliform bacteria are numerous and include wildlife and pet waste, discharge of wastewater and runoff from agricultural activities. Occasional exceedances of fecal coliform objectives are not unexpected in surface waters as they are open to the environment, particularly in response to rainfall events that can transport fecal bacteria through runoff.

Treatability objectives (for the protection of drinking water sources) for iron and manganese, sulphate and total dissolved solids (TDS) were exceeded in 2013. For the Battle River (AB/SK boundary) TDS exceeded objectives in 9 of the 12 samples in 2013 and manganese occurred above the treatability objective in 42% of the samples collected. For the rivers on the Saskatchewan/Manitoba border, manganese exceedances occurred in 4 of the 6 rivers including the Carrot, Red Deer River, Assiniboine and Qu'Appelle rivers, with over 50% of the samples exceeding the treatability objective for the Carrot, Red Deer and Qu'Appelle rivers. Iron exceeded the objective during the winter months (February and March) for the Carrot River in 2013. Sulphate also exceeded the treatability objective in the Qu'Appelle River in February 2013. These parameters can be elevated naturally due to background water chemistry conditions and groundwater inputs but can also be influenced by activities in the watershed.

CONCLUSION

Interprovincial water quality objectives are set at the 11 transboundary river reaches to protect water uses for protection of aquatic life, agricultural uses, recreation, treatability of source water and consumption of fish. Interprovincial water quality objectives were met on average 95% of the time in 2013.

The adherence rate to interprovincial water quality objectives ranged from 100% (Churchill River) to 88.2% (Qu'Appelle River), indicating that water quality was suitable for the majority of the intended water uses for these rivers. Generally, each of the 11 transboundary river reaches has shown little variation in their adherence rates over the past 11 years.

Interprovincial water quality objectives were most frequently exceeded for total phosphorus, dissolved manganese, and dissolved sodium (overall excursion rate greater than 20%). In total, interprovincial water quality objectives were exceeded for 14 parameters in 2013. Of these, 10 were exceeded at more than one site.

Concentrations of total phosphorus, dissolved manganese and other parameters can be influenced by various natural and anthropogenic factors (e.g., seasonal runoff and flow, land use and point source effluents).

Interprovincial water quality objectives have been reviewed for all transboundary river reaches. The jurisdictions have undertaken a review of the proposed objectives and implementation of updated water quality objectives is anticipated in 2015. Current activities of the Committee on Water Quality include further review of excursions to the proposed interprovincial water quality objectives and prioritization of any potential issues for further consideration or other actions. Several areas have been flagged by the COWQ for further investigation or analysis, however, nutrients has been assessed as the greatest priority. While nutrients have been assigned the highest priority in all transboundary watersheds there is a focus on investigating nutrient levels in two transboundary watersheds as a pilot program; the Red Deer River (AB/SK) and Carrot River watersheds.

Table 2 Summary of 1992 Interprovincial Water Quality Objectives by Transboundary River Reach

INTERPROVINCIAL WATER QUALITY OBJECTIVES: MASTER AGREEMENT SCHEDULE E

1 of 2

LOCATION SITE PPWB REPORT SITE NUMBER		ALBERTA / SASKATCHEWAN BORDER				
		BEAVER RIVER	NORTH SASK. RIVER	BATTLE RIVER	RED DEER RIVER A/S	SOUTH SASK. RIVER
		2	3	4	5	6
METALS						
	UNITS					
ALUMINUM (total)	mg/L	---	5	5	---	---
ARSENIC (diss)	mg/L	0.05	0.05	0.05	0.05	0.05
BARIUM (total)	mg/L	1	1	1	1	1
BORON (diss)	mg/L	5	5	5	5	5
CADMIUM (total)	mg/L	0.001	0.001	0.001	0.001	0.001
CHROMIUM (total)	mg/L	0.011	0.011	0.011	0.011	0.011
COBALT	mg/L	---	0.05	0.05	1	1
COPPER (total)	mg/L	0.004	0.004	0.004	0.004	0.01
CYANIDE (free)	mg/L	0.005	0.005	0.005	0.005	0.005
IRON (diss)	mg/L	1	0.3	0.3	0.3	1
LEAD (total)	mg/L	0.007	0.007	0.007	0.007	0.02
MANGANESE (diss)	mg/L	0.2	0.05	0.05	0.05	0.05
MERCURY (total)	ug/L	---	---	---	---	---
NICKEL (total)	mg/L	0.1	0.1	0.1	0.025	0.025
SELENIUM (diss)	mg/L	0.001	0.001	0.001	0.001	0.002
SILVER (total)	mg/L	0.0001	---	---	---	---
URANIUM	mg/L	0.02	0.02	0.02	---	---
VANADIUM (TOTAL)	mg/L	---	0.1	0.1	0.1	0.1
ZINC (total)	mg/L	0.03	0.03	0.03	0.03	0.05
NUTRIENTS						
AMMONIA (total)	mg/L	APPENDIX 1	APPENDIX 1	APPENDIX 1	APPENDIX 1	APPENDIX 1
NO2+NO3 (as N)	mg/L	10	10	10	10	10
PHOSPHORUS (total)	mg/L	---	---	---	---	---
MAJOR IONS						
CHLORIDE (diss.)	mg/L	100	100	100	---	---
FLUORIDE (diss)	mg/L	1.5	1.5	1.5	1.5	1.5
SODIUM (diss)	mg/L	100	100	100	---	---
SULPHATE (diss)	mg/L	500	500	500	500	500
TOTAL DISS. SOLIDS	mg/L	---	500	500	500	500
BIOTA						
FECAL COLIFORM	NO/dL	100/100ml	100/100ml	100/100ml	100/100ml	100/100ml
PHYSICALS						
pH	pH Units	6.5-9.0	6.5-9.0	6.5-9.0	---	---
OXYGEN (diss)	mg/L	OW 6.0	6.5	OW 6.0	---	---
SAR	mg/L	---	---	---	3	3
PESTICIDES/CONTAMINANTS						
LINDANE	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
2,4-D	mg/L	0.004	0.004	0.004	0.004	0.004
2,4,5-TP	mg/L	0.01	0.01	0.01	0.01	0.01
CHLORINE	mg/L	0.002	0.002	0.002	---	---
CHLOROPHENOLS (total)	mg/L	0.001	0.001	0.001	0.001	0.001
PCP	mg/L	0.0005	0.0005	0.0005	---	---
MERCURY IN FISH	ug/g TISSUE	0.5	0.5	0.5	0.5	0.5
PCB IN FISH	ug/g TISSUE	2	2	2	2	2
RADIOACTIVE						
CESIUM-137	Bq/L	---	---	---	---	---
IODINE-131	Bq/L	---	---	---	---	---
RADIUM-226	Bq/L	---	---	---	---	---
STRONTIUM-90	Bq/L	---	---	---	---	---
TRITIUM	Bq/L	---	---	---	---	---

- Protection of Aquatic Life
- Treatability
- Irrigation/Livestock
- Recreation
- Fish Consumption

Notes:
 = --- No PPWB Objectives
 OW = Open Water Objectives

Table 2 Summary of 1992 Interprovincial Water Quality Objectives by Transboundary River Reach (continued)

INTERPROVINCIAL WATER QUALITY OBJECTIVES: MASTER AGREEMENT SCHEDULE E

2 of 2

LOCATION		SASKATCHEWAN / MANITOBA BORDER					
SITE		CHURCHILL RIVER	SASK. RIVER	CARROT RIVER	RED DEER RIVER S/M	ASSINIBOINE RIVER	QU'APPELLE RIVER
PPWB REPORT SITE NUMBER		7	8	9	10	11	12
METALS							
ALUMINUM (total)	mg/L	---	---	---	---	---	---
ARSENIC (diss)	mg/L	0.05	0.05	0.05	0.05	0.05	0.05
BARIUM (total)	mg/L	1	1	1	1	1	1
BORON (diss)	mg/L	5	0.5	2	5	2	2
CADMIUM (total)	mg/L	0.00058	0.001	0.001	0.00058	0.001	0.001
CHROMIUM (total)	mg/L	0.011	0.011	0.011	0.011	0.011	0.011
COBALT	mg/L	---	---	---	---	---	---
COPPER (total)	mg/L	0.0057	0.01	0.01	0.01	0.01	0.01
CYANIDE (free)	mg/L	0.005	0.005	0.005	0.005	0.005	0.005
IRON (diss)	mg/L	0.3	0.3	0.3	0.3	0.3	0.3
LEAD (total)	mg/L	0.011	0.0061	0.015	0.0118	0.02	0.02
MANGANESE (diss)	mg/L	0.05	0.05	0.05	0.05	0.05	0.05
MERCURY (total)	ug/L	---	---	---	---	---	0.006
NICKEL (total)	mg/L	0.025	0.1	0.1	0.1	0.1	0.1
SELENIUM (diss)	mg/L	0.01	0.01	0.01	0.01	0.01	0.01
SILVER (total)	mg/L	---	---	---	---	---	---
URANIUM	mg/L	0.02	0.02	0.02	0.02	0.02	0.02
VANADIUM (TOTAL)	mg/L	---	---	---	---	---	---
ZINC (total)	mg/L	0.047	0.047	0.047	0.047	0.047	0.047
NUTRIENTS							
AMMONIA (total)	mg/L	APPENDIX 1	APPENDIX 1	APPENDIX 1	APPENDIX 1	APPENDIX 1	APPENDIX 1
NO2+NO3 (as N)	mg/L	10	10	10	10	10	10
PHOSPHORUS (total)	mg/L	0.05	0.05	0.05	0.05	0.05	---
MAJOR IONS							
CHLORIDE (diss.)	mg/L	250	68	100	100	100	100
FLUORIDE (diss)	mg/L	1.5	1	1	1	1	1
SODIUM (diss)	mg/L	300	100	100	100	100	100
SULPHATE (diss)	mg/L	500	250	500	500	500	500
TOTAL DISS. SOLIDS	mg/L	---	---	---	---	---	---
BIOTA							
FECAL COLIFORM	NO/dL	200/100ml	200/100ml	200/100ml	200/100ml	200/100ml	100/100ml
PHYSICALS							
pH	pH Units	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
OXYGEN (diss)	mg/L	6.5	6.5	OW 6.5	6	6	6
SAR	mg/L	---	---	---	---	---	---
PESTICIDES/CONTAMINANTS							
LINDANE	mg/L	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
2,4-D	mg/L	0.004	0.004	0.004	0.004	0.004	0.004
2,4,5-TP	mg/L	0.01	0.01	0.01	0.01	0.01	0.01
CHLORINE	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
CHLOROPHENOLS (total)	mg/L	0.001	0.001	0.001	0.001	0.001	0.001
PCP	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
MERCURY IN FISH	ug/g TISSUE	0.2	0.2	0.5	0.5	0.5	0.5
PCB IN FISH	ug/g TISSUE	2	2	2	2	2	2
RADIOACTIVE							
CESIUM-137	Bq/L	50	50	50	50	50	50
IODINE-131	Bq/L	10	10	10	10	10	10
RADIUM-226	Bq/L	1	1	1	1	1	1
STRONTIUM-90	Bq/L	10	10	10	10	10	10
TRITIUM	Bq/L	40000	40000	40000	40000	40000	40000

Protection of Aquatic Life
Treatability
Irrigation/Livestock
Recreation
Fish Consumption

Notes:
 = --- No PPWB Objectives
 OW = Open Water Objectives

Table 3 Summary of Excursions for the Alberta - Saskatchewan Border 2013

LOCATION SITE PPWB REPORT SITE NUMBER	ALBERTA / SASKATCHEWAN BORDER				
	BEAVER RIVER	NORTH SASK. RIVER	BATTLE RIVER	RED DEER RIVER A/S	SOUTH SASK. RIVER
	2	3	4	5	6
	number excursions (number of tests)				
METALS					
ALUMINUM (total)	---	1(12)	1(12)	---	---
ARSENIC (diss)	0	0	0	0	0
BARIUM (total)	0	0	0	0	0
BORON (diss)	0	0	0	0	0
CADMIUM (total)	0	0	0	0	0
CHROMIUM (total)	0	0	0	0	0
COBALT	---	0	0	0	0
COPPER (total)	0	2 (12)	3 (12)	5 (12)	1 (12)
CYANIDE (free)	ND	ND	ND	ND	ND
IRON (diss)	0	0	0	0	0
LEAD (total)	0	1 (12)	1 (12)	1 (12)	0
MANGANESE (diss)	0	0	5 (12)	0	0
MERCURY (total)	---	---	---	---	---
NICKEL (total)	0	0	0	0	0
SELENIUM (diss)	0	0	0	0	0
SILVER (total)	0	---	---	---	---
URANIUM	0	0	0	---	---
VANADIUM (TOTAL)	---	0	0	0	0
ZINC (total)	0	1 (12)	1 (12)	1 (12)	0
NUTRIENTS					
AMMONIA (total)	0	0	0	0	0
NO2+NO3 (as N)	0	0	0	0	0
PHOSPHORUS (total)	---	---	---	---	---
MAJOR IONS					
CHLORIDE (diss.)	0	0	0	---	---
FLUORIDE (diss)	0	0	0	0	0
SODIUM (diss)	0	0	9 (12)	---	---
SULPHATE (diss)	0	0	0	0	0
TOTAL DISS. SOLIDS	---	0	9 (12)	0	0
BIOTA					
FECAL COLIFORM	1 (9)	2 (12)	1 (12)	1 (8)	1 (9)
PHYSICALS					
pH	0	1 (12)	1 (12)	---	---
OXYGEN (diss)	0	0	0	---	---
SAR	---	---	---	0	0
PESTICIDES/CONTAMINANTS					
LINDANE	0	ND	ND	ND	ND
2,4-D	0	ND	0	ND	0
2,4,5-TP (Silvex)	0	ND	0	ND	0
CHLORINE	ND	ND	ND	---	---
CHLOROPHENOLS (total)	ND	ND	ND	ND	ND
PCP	ND	ND	ND	---	---
MERCURY IN FISH	ND	ND	ND	ND	ND
PCB IN FISH	ND	ND	ND	ND	ND
RADIOACTIVE					
CESIUM-137	---	---	---	---	---
IODINE-131	---	---	---	---	---
RADIUM-226	---	---	---	---	---
STRONTIUM-90	---	---	---	---	---
TRITIUM	---	---	---	---	---
No. Excursion Comparisons	287	312	322	248	265
Total No. Excursions Observed	1	8	31	8	2
Sampling Frequency (no./year)	12	12	12	12	12
Overall Adherence Rate	99.65	97.44	90.37	96.77	99.25

"--" = no objective

ND = no data to compare to objective; PPWB approved monitoring plan for 2013 did not include these parameters

* Fecal Coliform and/or Pesticide sampling frequency reduced to 8X per year during open water.

Table 4 Summary of Excursions for the Saskatchewan - Manitoba Border 2013

LOCATION SITE PPWB REPORT SITE NUMBER	SASKATCHEWAN / MANITOBA BORDER					
	CHURCHILL RIVER	SASK. RIVER	CARROT RIVER	RED DEER RIVER S/M	ASSINIBOINE RIVER	QU'APPELLE RIVER
	7	8	9	10	11	12
	number excursions (number of tests)					
METALS						
ALUMINUM (total)	---	---	---	---	---	---
ARSENIC (diss)	0	0	0	0	0	0
BARIUM (total)	0	0	0	0	0	0
BORON (diss)	0	0	0	0	0	0
CADMIUM (total)	0	0	0	0	0	0
CHROMIUM (total)	0	0	0	0	0	0
COBALT	---	---	---	---	---	---
COPPER (total)	0	0	0	0	0	0
CYANIDE (free)	ND	ND	ND	ND	ND	ND
IRON (diss)	0	0	2(9)	0	0	0
LEAD (total)	0	0	0	0	0	0
MANGANESE (diss)	0	0	6(9)	1(12)	8(12)	7(12)
MERCURY (total)	---	---	---	---	---	ND
NICKEL (total)	0	0	0	0	0	0
SELENIUM (diss)	0	0	0	0	0	0
SILVER (total)	---	---	---	---	---	---
URANIUM	0	0	0	0	0	0
VANADIUM (TOTAL)	---	---	---	---	---	---
ZINC (total)	0	0	0	0	0	0
NUTRIENTS						
AMMONIA (total)	0	0	0	0	0	0
NO2+NO3 (as N)	0	0	0	0	0	0
PHOSPHORUS (total)	0	2(10)	8(9)	4(12)	12(12)	12(12)
MAJOR IONS						
CHLORIDE (diss.)	0	0	4(9)	0	0	0
FLUORIDE (diss)	0	0	0	0	0	0
SODIUM (diss)	0	0	2(9)	0	0	11(12)
SULPHATE (diss)	0	0	0	0	0	1(12)
TOTAL DISS. SOLIDS	---	---	---	---	---	---
BIOTA						
FECAL COLIFORM	0	0	0	1(12)	0	0
PHYSICALS						
pH	0	0	0	0	0	1(12)
OXYGEN (diss)	0	1(10)	2(6)	0	0	0
SAR	---	---	---	---	---	---
PESTICIDES/CONTAMINANTS						
LINDANE	0	ND	0	0	0	ND
2,4-D	0	ND	0	0	0	ND
2,4,5-TP (Silvex)	0	ND	0	0	0	ND
CHLORINE	ND	ND	ND	ND	ND	ND
CHLOROPHENOLS (total)	ND	ND	ND	ND	ND	ND
PCP	ND	ND	ND	ND	ND	ND
MERCURY IN FISH	ND	ND	ND	ND	ND	ND
PCB IN FISH	ND	ND	ND	ND	ND	ND
RADIOACTIVE						
CESIUM-137	ND	ND	ND	ND	ND	ND
IODINE-131	ND	ND	ND	ND	ND	ND
RADIUM-226	ND	ND	ND	ND	ND	ND
STRONTIUM-90	ND	ND	ND	ND	ND	ND
TRITIUM	ND	ND	ND	ND	ND	ND
No. Excursion Comparisons	104	230	228	303	312	272
Total No. Excursions Observed	0	3	24	6	20	32
Sampling Frequency (no./year)	4	10	9	12	12	12
Overall Adherence Rate	100.0	98.7	89.47	98.02	93.59	88.24

"---" = no objective

ND = no data to compare to objective; PPWB approved monitoring plan for 2013 did not include these parameters

* Fecal Coliform and/or Pesticide sampling frequency reduced to 8X per year during open water.

Table 5 Summary of 2013 Excursions by Parameter. (Parameters and sites with % excursions > 20 are highlighted in grey. Blank cells are parameters with no excursions in 2013).

Parameters	Protective Uses	EXCURSION SUMMARY		SITE SUMMARY	
		TOTAL NUMBER EXCURSIONS (# SAMPLES)	% EXCURSIONS	NUMBER SITES WITH EXCURSIONS (# SITES)	% SITES WITH EXCURSIONS
METALS					
ALUMINUM (total)	Irrigation/Livestock	2 (24)	8.30	2 (2)	100
ARSENIC (diss)					
BARIUM (total)					
BORON (diss)					
CADMIUM (total)					
CHROMIUM (total)					
COBALT					
COPPER (total)	Protection of Aquatic Life	11 (119)	9.2	4 (11)	36.4
CYANIDE (free)					
IRON (diss)	Treatability	2 (119)	1.7	1 (11)	9.1
LEAD (total)	Protection of Aquatic Life	3 (119)	2.5	3 (11)	27.3
MANGANESE (diss)	Treatability/Irr/Livestock	27 (119)	22.7	5 (11)	45.5
MERCURY (total)					
NICKEL (total)					
SELENIUM (diss)					
SILVER (total)					
URANIUM					
VANADIUM (TOTAL)					
ZINC (total)	Protection of Aquatic Life	3 (119)	2.5	3 (11)	27.3
NUTRIENTS					
AMMONIA (total)					
NO2+NO3 (as N)					
PHOSPHORUS (total)	Recreation	38 (59)	64.4	5 (6)	83.3
MAJOR IONS					
CHLORIDE (diss.)	Irrigation/Livestock	4 (95)	4.2	1 (9)	11.1
FLUORIDE (diss)					
SODIUM (diss)	Irrigation/Livestock	22 (95)	23.2	3 (9)	33.3
SULPHATE (diss)	Treatability	1 (119)	0.8	1 (11)	9.1
TOTAL DISS. SOLIDS	Treatability	9 (46)	19.6	1 (4)	25.0
BIOTA					
FECAL COLIFORM	Irrigation/Livestock/Recreation	7 (102)	6.9	6 (11)	60.0
PHYSICALS					
pH	Protection of Aquatic Life	3(94)	3.2	3(11)	27.3
OXYGEN (diss)	Protection of Aquatic Life	3 (80)	3.8	2 (9)	22.2
SAR					
PESTICIDES/ CONTAMINANTS					
LINDANE					
2,4-D					
2,4,5-TP					
CHLORINE		na	na	na	na
CHLOROPHENOLS (total)		na	na	na	na
PCP		na	na	na	na
MERCURY IN FISH		na	na	na	na
PCB IN FISH		na	na	na	na
RADIOACTIVE					
CESIUM-137		na	na	na	na
IODINE-131		na	na	na	na
RADIUM-226		na	na	na	na
STRONTIUM-90		na	na	na	na
TRITIUM		na	na	na	na

APPENDIX 1: PPWB 2013 Water Quality Monitoring Program

PPWB MONITORING 2013: A/S Sites

SITE	NUTRIENTS & PHYSICALS	MAJOR IONS/ SAR	METALS (Total and Dissolved)	BACTERIA (Fecal & E. Coli)	PESTICIDES (AH, NH, OC's) ² Glyphosate
Site 1 Cold River	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013: 12x / year	2013: none
Site 2 Beaver River	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 8x/ year ^{ow}	2013: 8x/year ¹
Site 3 North Sask. River	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : none
Site 4 Battle River	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013: none
Site 5 Red Deer River A/S	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 8x/ year ^{ow}	2013 : none
Site 6 South Sask	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 8x/year ^{ow}	2013 : none

^{ow} = open water sampling only, Apr-Nov;

¹ Months sampled = Feb, Apr, May, June, July, Aug, Oct, Dec

²Pesticides; AH = Acid Herbicides; NH = Neutral Herbicides; OC's = Organochlorine

PPWB MONITORING 2013: S/M Sites

SITE	NUTRIENTS & PHYSICALS	MAJOR IONS/ SAR	METALS (Total and Dissolved)	BACTERIA (Fecal & E. Coli)	PESTICIDES (AH, NH, OC's) ³ Glyphosate
Site 7 Churchill ¹	2013 : 4x / year	2013 : 4x / year	2013 : 4x / year	2013 : 4x / year	2013: 4x / year
Site 8 Saskatchewan River	2013: 12x / year	2013: 12x / year	2013: 12x / year	2013: 12x / year	2013: none
Site 9 Carrot River	2013: 12x / year	2013: 12x / year	2013: 12x / year	2013: 8x / year ^{ow}	2013: 12x / year
Site 10 Red Deer River S/M	2013: 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 8 x / year ²
Site 11 Assiniboine River	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 12 x / year
Site 12 Qu'Appelle River	2013 : 12x / year	2013 : 12x / year	2013 : 12x / year	2013 : 8x / year ^{ow}	2013 : none

^{ow} = open water sampling only, Apr-Nov;

¹ Months sampled = Feb, May, July, Oct; ² Months sampled = Feb, Apr, May, June, July, Aug, Oct, Dec;

³Pesticides; AH = Acid Herbicides; NH = Neutral Herbicides; OC's = Organochlorine

APPENDIX 2: Total Ammonia Objectives Based on Temperature and pH

Total Ammonia Nitrogen (mg/L) **

The toxicity of ammonia relates primarily to the un-ionized form (NH_3). The concentration of un-ionized ammonia present in water increases with pH and temperature. The values below represent total ammonia-nitrogen concentrations (at various temperatures and pH levels) above which

accompanying NH_3 concentrations may be harmful to aquatic life.

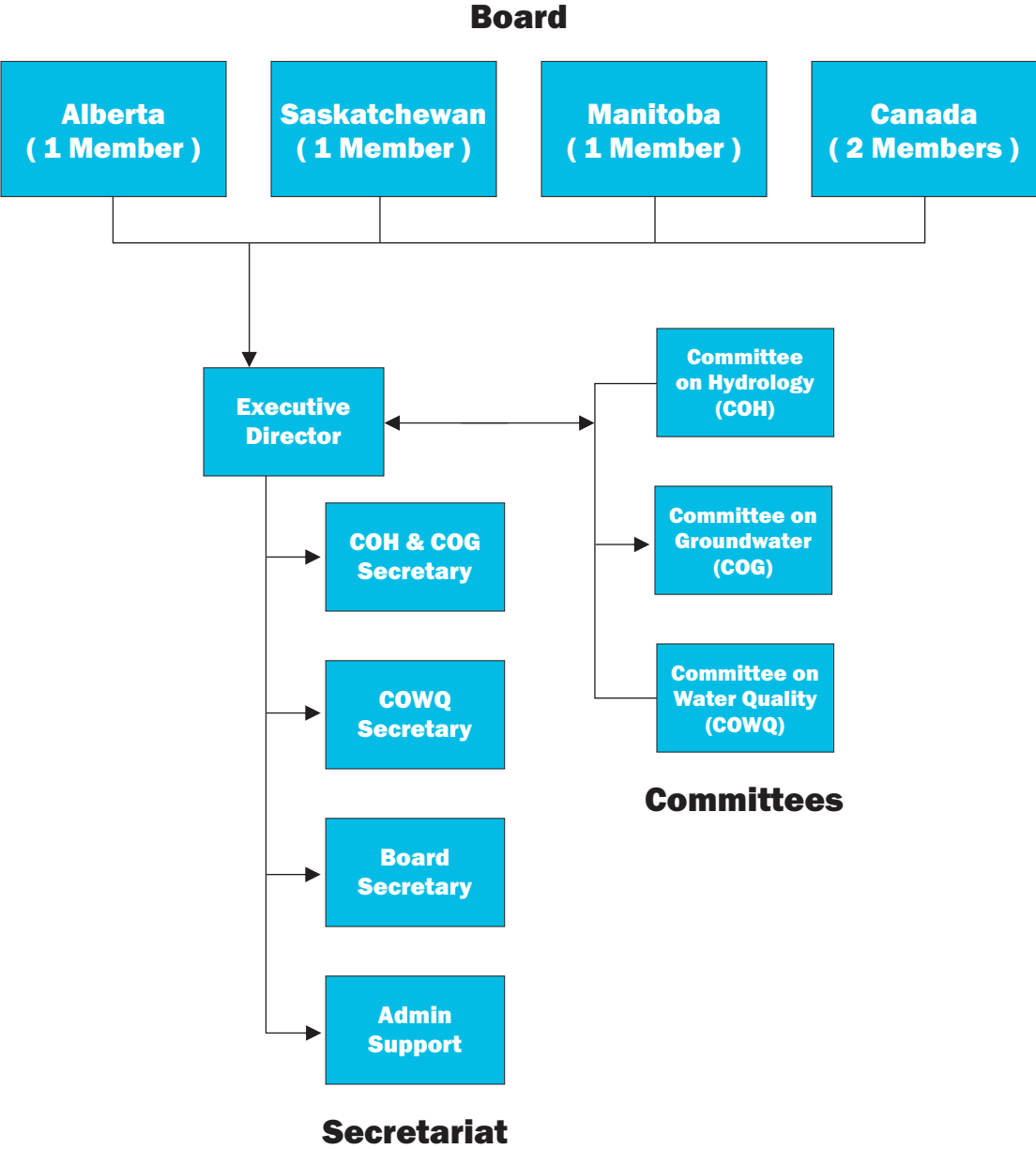
Total Ammonia ($\text{NH}_3 + \text{NH}_4^+$)

(Maximum levels expressed as N at various pH/temperature conditions)

Toxicity of Ammonia under varying Temperature and pH Conditions							
Water Temperature (°C) / pH (pH units)							
	0°	5°	10°	15°	20°	25°	30°
6.50	2.06	1.97	1.81	1.81	1.22	0.85	0.60
6.75	2.06	1.97	1.81	1.81	1.22	0.85	0.61
7.00	2.06	1.97	1.81	1.81	1.22	0.85	0.61
7.25	2.06	1.97	1.81	1.81	1.23	0.86	0.61
7.50	2.06	1.97	1.81	1.81	1.23	0.87	0.62
7.75	1.89	1.81	1.73	1.64	1.15	0.81	0.58
8.00	1.26	1.18	1.13	1.09	0.76	0.54	0.39
8.25	0.72	0.67	0.64	0.62	0.44	0.32	0.23
8.50	0.40	0.39	0.37	0.37	0.26	0.19	0.15
8.75	0.23	0.22	0.21	0.22	0.16	0.12	0.09
9.00	0.13	0.13	0.13	0.13	0.11	0.08	0.06

** Excerpt from the "Surface Water Quality Objectives", Water Quality Branch Saskatchewan Environment and Public Safety, November, 1988 (WQ 110)

APPENDIX V: PPWB Organizational Chart



APPENDIX VI: Board / Committee Membership 2013 - 2014

PRAIRIE PROVINCES WATER BOARD

Manitoba, Saskatchewan, Alberta and Canada agree to establish and there is hereby established a Board to be known as the Prairie Provinces Water Board to consist of five members to be appointed as follows:

- (a) two members to be appointed by the Governor General in Council, one of whom shall be Chairman of the Board, on the recommendation of the Minister of Energy, Mines and Resources,
- (b) one member to be appointed by the Lieutenant Governor in Council of each of the Provinces of Manitoba, Saskatchewan and Alberta.

Schedule C, Section 1
Master Agreement on Apportionment

PPWB BOARD MEMBERS

CHAIR	Mike Norton (Apr/11 to Jun/13)	Associate Regional Director General Prairie and Northern Region Environment Canada
	Christine Best (June/13 to Oct/13)	A/Associate Regional Director General Prairie and Northern Region Environment Canada
	Cheryl Baraniecki (Beginning Nov/13)	Associate Regional Director General Prairie and Northern Region Environment Canada
	Lynden Hillier	Director General Asset Management and Capital Planning Corporate Management Branch Agriculture and Agri-Food Canada
	Robert P. Harrison (Oct/01 to Jan/14)	Lead Transboundary Secretariat Alberta Environment and Sustainable Resource Development
	Steve D. Topping	Executive Director Hydrologic Forecasting & Water Management Water Management & Structures Division Manitoba Infrastructure and Transportation
	Jim Gerhart	Executive Director Integrated Water Services Division Saskatchewan Water Security Agency

SECRETARIAT

EXECUTIVE DIRECTOR	Mike Renouf	Transboundary Waters Unit Environment Canada
SECRETARY	Lynne Quinnett-Abbott	Transboundary Waters Unit Environment Canada

PPWB ALTERNATE BOARD MEMBERS

Vacant	Environment Canada
Scott Roy	Director, Water Infrastructure Division Corporate Management Branch Agriculture and Agri-Food Canada
Brian Yee	Transboundary Water Specialist Transboundary Secretariat Alberta Environment and Sustainable Resource Development
Bill Duncan	Executive Director Engineering and Geoscience Division Saskatchewan Water Security Agency
Dwight Williamson (2007 to May/13)	Assistant Deputy Minister Ecological Services Division Manitoba Conservation and Water Stewardship
Nicole Armstrong	Director Water Science and Management Manitoba Conservation and Water Stewardship

COMMITTEE ON HYDROLOGY

Terms of Reference: Mandate

At the request of, and under the direction of the PPWB, the Committee on Hydrology (COH) shall investigate, oversee, review, report and recommend on matters pertaining to hydrology of interprovincial or interjurisdictional basins.

The committee may consider such things as natural flow; forecasting; network design; collection, processing and transmission of data; basin studies and other items of interprovincial interest involving hydrology.

The COH will engage the Committee on Groundwater and the Committee on Water Quality on items of mutual interest or when the expertise of those committees will assist the COH.

PPWB Board Minute 92-65 (Oct. 7, 2009)

CHAIR	Mike Renouf	Executive Director Prairie Provinces Water Board
MEMBERS		
	Vacant	Environment Canada, Hydrometric
	Ron Woodvine	Corporate Management Branch Agriculture and Agri-Food Canada
	Brian Yee (Mar/11 to Feb/14)	Transboundary Secretariat Alberta Environment and Sustainable Resource Development
	Carmen de la Chevrotiere (Feb/14 to Current)	Transboundary Secretariat Alberta Environment and Sustainable Resource Development
	Mark Lee	Manager Surface Water Management Section Manitoba Conservation and Water Stewardship
	Bart Oegema	Hydrology Services Saskatchewan Water Security Agency
	Anthony Liu	Meteorological Service of Canada Environment Canada, Meteorological
SECRETARY		
	Vir Khanna	Transboundary Waters Unit Environment Canada

COMMITTEE ON WATER QUALITY

Terms of Reference: Mandate

Under the direction of the Prairie Provinces Water Board (PPWB), the Committee on Water Quality (COWQ) shall investigate, oversee, review, report, recommend and advise the Board on matters pertaining to the water quality and aquatic ecosystem integrity of interprovincial waters.

The responsibilities of the committee shall include directing, planning, and coordinating a water quality monitoring and trend assessment program by identifying monitoring requirements and overseeing transboundary monitoring and synoptic surveys. The committee shall promote an ecosystem approach to water quality management and the protection and enhancement of interprovincial waters by ensuring the compatibility of water quality guidelines, objectives, sampling and analytical protocols, monitoring approaches, quality assurance and data bases. It shall interpret data and identify, investigate and define existing and potential interprovincial water quality problems through the application of PPWB Water Quality Objectives, trend assessment and other approaches. The committee shall inform the Board and member agencies, through the PPWB contingency plan, of any spills or unusual water quality conditions that have the potential to adversely affect interprovincial streams. It shall assess the implications of these problems and may recommend remedial or preventative measures for avoiding and resolving water quality issues and if required, additional synoptic water quality monitoring.

The committee shall foster awareness and understanding of the importance of effective water quality management, encourage the use of "state of the art" procedures for evaluating water quality and identify research needs pertinent to water quality management on the prairies. The committee shall facilitate effective water quality management practices through integration of agency initiatives and the promotion of joint planning on interprovincial streams.

The COWQ will engage the Committee on Hydrology and the Committee on Groundwater on items of mutual interest or when the expertise of those committees will assist COWQ.

PPWB Board Minute 92-65 (Oct. 7, 2009)

CHAIR	Mike Renouf	Executive Director Prairie Provinces Water Board
MEMBERS	David Donald (May/00 to Sept/13)	Prairie and Northern Water Quality Monitoring Environment Canada
	Paul Klawunn (Sept/13 to Current)	Science and Technology Branch Environment Canada
	Nicole Armstrong	Water Science and Management Branch Manitoba Conservation and Water Stewardship
	John-Mark Davies	Water Quality Services Saskatchewan Water Security Agency

	Richard Casey	Water Policy Branch Alberta Environment and Sustainable Resource Development
	Bill Schutzman (Dec/01 to Dec 2013)	Science and Technology Branch Agriculture and Agri-Food Canada
	Sharon Reedyk (Feb/14 to Current)	Science and Technology Branch Agriculture and Agri-Food Canada
SECRETARY	Joanne Sketchell	Transboundary Waters Unit Environment Canada Environment Canada, Meteorological

COMMITTEE ON GROUNDWATER

Terms of Reference: Mandate

Recognizing the inter-relationship between surface and groundwater, the Committee on Groundwater shall, at the request of, and under the direction of the Prairie Provinces Water Board, investigate, oversee, review, report, and recommend on matters pertaining to quantity and quality of groundwater at or near interprovincial boundaries.

Responsibilities of the committee may include: exchange of information; compilation and interpretation of existing data; recommendations on groundwater information and monitoring requirements; determination of implications of proposed projects which may impact the quantity and/or quality of waters at interprovincial boundaries; and other items of interjurisdictional interest involving groundwater.

The COG will engage the Committee on Hydrology and the Committee on Water Quality on items of mutual interest or when the expertise of those committees will assist the COG.

PPWB Board Minute 92-65 (Oct. 7, 2009)

CHAIR	Mike Renouf	Executive Director Prairie Provinces Water Board
MEMBERS	Garth van der Kamp	Groundwater Hydrology Water Science and Technology Directorate Environment Canada
	Anthony Cowen	Science and Technology Branch Agriculture and Agri-Food Canada
	Robert George	Water Policy Branch Alberta Environment and Sustainable Resource Development
	John Fahlman (Oct/11 to Oct/13)	Hydrology and Groundwater Services Saskatchewan Water Security Agency
	Kei Lo (Oct/13 to Current)	Hydrology and Groundwater Services Saskatchewan Water Security Agency
	Graham Phipps	Groundwater Management Water Sciences and Management Branch Manitoba Conservation and Water Stewardship
SECRETARY	Vir Khanna	Transboundary Waters Unit Environment Canada

APPENDIX VII: Statement of Final Expenditures 2013 - 2014

	2013/14	
	Budget	Actual
Salary Component		
PY's	5.000	4.333
Base Salary	\$460,000	\$387,571
BPE	\$92,000	\$77,514
Total Salary	\$552,000	\$465,085
O&M Component		
Contracts & Students		
Goal 1		
Cont. Improvement	\$60,000	\$12,055
Modernization*	\$115,000	\$115,000
Goal 2		
Cont. Improvement	\$10,000	\$0
Goal 3		
Core Activities		
Cont. Improvement	\$60,000	\$34,261
Modernization		
Goal 5		
Cont. Improvement		
Goal 7		
Cont. Improvement		
Modernization	\$25,000	\$0
Sub-total Contracts	\$270,000	\$161,316
Operating Expenses	\$60,000	\$37,236
Total O&M	\$330,000	\$198,552
Grand Total	\$882,000	\$663,637

*contracted services delivered by Alberta in Lieu of its annual contribution

APPENDIX VIII: History of the PPWB

The Prairie Provinces Water Board was formed on July 28, 1948 when Canada and the Provinces of Alberta, Saskatchewan, and Manitoba signed the Prairie Provinces Water Board Agreement. This Agreement established a Board to recommend the best use of interprovincial waters, and to recommend allocations between provinces.

From 1948 to 1969, the Engineering Secretary to the Board was a Prairie Farm Rehabilitation Administration employee. The support staff for studies and office accommodation during these years was provided by the PFRA in Regina at no charge.

After twenty years, changes in regional water management philosophies resulted in a need to modify the role of the Board. Consequently, the four governments entered into the MAA on October 30, 1969. This Agreement provided an apportionment formula for eastward flowing interprovincial streams, gave recognition to the problem of water quality, and reconstituted the Prairie Provinces Water Board.

The MAA has five schedules which form part of the Agreement. These Schedules are:

1. Schedule A. An apportionment agreement between Alberta and Saskatchewan.
2. Schedule B. An apportionment agreement between Saskatchewan and Manitoba.
3. Schedule C. The Prairie Provinces Water Board Agreement describes the composition, functions and duties of the Board.
4. Schedule D. A list of Orders-in-Council for allocations of interprovincial waters made before 1969.
5. Schedule E. A Water Quality Agreement describes the role of the PPWB in interprovincial water quality management and established Water Quality Objectives for 11 interprovincial river reaches. This Schedule became part of the Master Agreement in 1992.

Under Schedule C, the Prairie Provinces Water Board was reconstituted and was given the responsibility of administering the agreement. Schedule C also provided for the necessary board staff, accommodation, and supplies to be jointly financed by the four participating governments. Following the reconstitution of the PPWB, the members also agreed to the establishment of a semi-autonomous Board Secretariat.

The PPWB's change in administration policy was implemented when an Executive Director was appointed on July 1, 1972. The By-laws, and Rules and Procedures also came into effect on this date.

On April 2, 1992, the MAA was amended to include a Water Quality Agreement that became Schedule E to the Master Agreement. The Agreement sets interprovincial water quality objectives at 11 transboundary river reaches and commits each of the Parties to take reasonable and practical measures to maintain or improve existing water quality.

At the Board's March 1995 meeting, the Board agreed that full time Secretariat staff was no longer necessary and that functional support would be provided by staff of Environment Canada. The process of disbanding the PPWB Secretariat and integrating its functions into Environment Canada was completed during 1995 - 1996. The portion of time each Environment Canada staff person spends on PPWB activities is charged to the PPWB and cost-shared by the members.

The Board currently operates through its Executive Director, supported by three standing committees the Committee on Hydrology, the Committee on Groundwater, and the Committee on Water Quality.

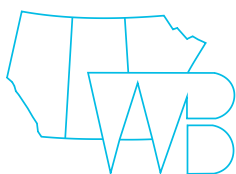
The Board approves an annual PPWB budget with one-half the operating budget being provided by Canada and one-sixth by each of the three provinces. The Government of Canada is responsible to conduct and pay for the costs of water quantity and quality monitoring.

In 2008, a costed multi-year Work Plan was approved by the Board to identify activities and

projected budgets for 2008 - 2013. The 5-year Work Plan was renewed in December 2011 and covers the period from 2012 to March 2017. Activities in this Work Plan are directed to achieving the goals that were identified in the 2006 Strategic Plan that fulfill the vision, mission and key deliverables that are outlined in the 2006 Charter. Activities are targeted towards assessing whether the commitments made in the *MAA* have been met by the Signatory Parties (Government of Canada, and Provinces of Alberta, Saskatchewan and Manitoba).

The 2006 PPWB Charter and Strategic Plan were reviewed in 2012 as part of the Work Plan review. These documents were approved at the fall 2012 Board Meeting.

In February 2009, the *MAA*, By-laws, and Rules and Procedures were published in an updated document that included all changes made to date. The By-Laws and Rules and Procedures, along with other key PPWB documents will be undergoing a review in 2014 - 2015.



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