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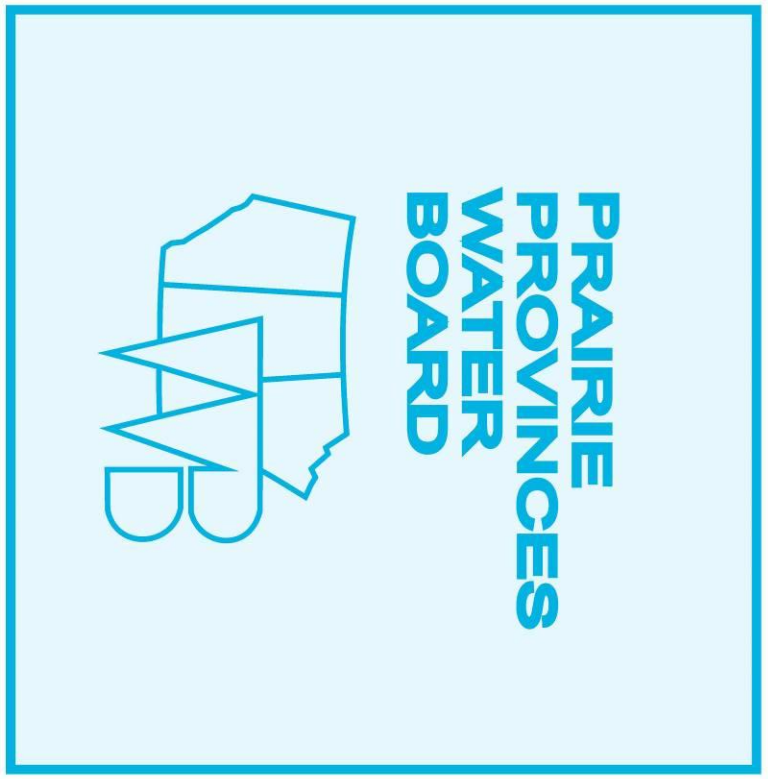

PRAIRIE PROVINCES WATER BOARD

ANNUAL REPORT

FOR THE FISCAL YEAR

APRIL 1, 2011 TO MARCH 31, 2012

ISSN 0704-8726

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LETTER OF TRANSMITTAL

April 24, 2013

Honourable Peter Kent
Minister of the Environment
Ottawa, Ontario

Honourable Diana McQueen
Minister of Alberta Environment and
Sustainable Resource Development
Edmonton, Alberta

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

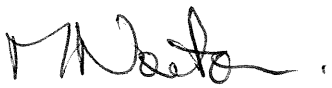
Honourable Steve Ashton
Minister of Manitoba Infrastructure
and Transportation
Winnipeg, Manitoba

Honourable Ken Cheveldayoff
Minister Responsible for the
Saskatchewan Water Security Agency
Regina, Saskatchewan

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, 2011 to March 31, 2012.

Yours truly



Mike Norton
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 2011-2012, the PPWB continued to be guided by its Strategic Plan, approved in 2006. 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. In support, the Board has reviewed and approved a new 5-year costed work plan. The work plan will guide the work of the Board and its Committees, providing a solid foundation for resource allocation until March 2017. As part of the work plan review, the Board initiated a review of the Charter and Strategic Plan in June 2011. The review included an analysis of strategic directions of each government. The revised key documents are expected to be approved at the Fall Meeting of 2012. This suite of foundational documents that are current, relevant, and specific will ensure the PPWB is well positioned to continue its solid legacy.

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 PPWB also maintained attention on the need for involvement of upstream jurisdictions in resolving water quality issues in Lake Winnipeg. Work underway through the PPWB to establish interprovincial nutrient objectives is nearing completion and will be an important contribution. Finally, the PPWB continues to provide a cooperative forum for discussion of interjurisdictional water issues, such as wetland drainage issues between Saskatchewan and Manitoba.

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. The engagement of senior managers from Environment Canada with the PPWB in 2011-2012 on the subject of water quality monitoring is also appreciated.

Mike Norton
Chair

MESSAGE FROM THE EXECUTIVE DIRECTOR

During 2011 - 2012, 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 2008 – 2013 or the 2012 – 2017 Work Plans.

During 2011, agreed interprovincial apportionment of flows on all eastward flowing streams was achieved for all PPWB river reaches. Adherence to the *MAA*'s water quality objectives was high.

In 2007 and 2008, the Ministers requested that the PPWB assess the resilience of the *MAA* to climate change. The Committee on Hydrology (COH) was tasked by the Board to develop flow scenarios. Member agencies can then evaluate these flows to test the *MAA*'s resilience for water management. In November 2011, the Board agreed to support the approach to use paleorecords and the hydrological flow records to develop future flow scenarios.

The COH continued work on its modernization of computational infra-structure that is used to calculate apportionable flows. Optimal Solutions Ltd., the software contractor, delivered an initial version of the River Basin Assessment Tool (RBAT) in March 2010. The Board approved additional work to improve the functionality of the RBAT. This contract work will be administered by a PPWB member agency in the next fiscal year.

Work continued to develop a ground-water schedule (Schedule F) that will be added to the *MAA.* The Committee on Groundwater (COG) completed an environmental scan of groundwater risks in May 2011 and a guidance document in March 2012. The Board indicated their support at their March 2012 meeting of the concepts outlined in the COG's guidance document. A second document will be drafted to describe potential bilateral management of a transboundary aquifer under different levels of stress.

The interprovincial 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. The Committee on Water Quality (COWQ) continued work on a comprehensive review of the PPWB WQOs, as required by the *MAA.* The development of nutrient objectives remained a priority.

In their review, the COWQ used a consistent approach to setting WQOs across all transboundary river reaches that also considered site specific characteristics and conditions.

On April 29, 2011, Vir Khanna was appointed as the Senior Engineering Advisor. Megan Garner joined the Secretariat on February 13, 2012 as the Engineering Advisor.

The Board continued its role in helping to ensure coordination of water management and planning that may have transboundary implications. As an example, 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. This agreement was signed in September 2010. Similarly, the Board continued to provide a forum for sharing information, including Saskatchewan - Manitoba drainage projects or sedimentation issues, and the Montana - Alberta Water Management Initiative.

Mike Renouf
Executive Director

SUMMARY OF PERFORMANCE RESULTS

During 2011 - 2012, 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 modernization of the natural and apportionable flow computation software programs;
- developing a process to review apportionment methods in basins over ten-years, and continuing the review of the North Saskatchewan River; and
- continuing assessing whether Alberta irrigation data can be used in apportionment computations.

In 2011, water quality objectives were adhered to an average of 95% of 2,646 samples on the 11 *MAA* river reaches.

The Committee on Water Quality (COWQ) continued the comprehensive review of water quality objectives, with nutrient objectives being a top priority.

In 2011 - 2012, Environment Canada undertook a Risk-Based Assessment and statistically analyzed historic PPWB water quality data. The PPWB 2012 monitoring program was approved in March 2012 after this review was completed.

In May 2011, the COG completed an environmental scan of groundwater; current risks are low but may increase with future development. The COG then drafted a guidance document to outline the concepts of a possible groundwater Schedule to be added to the *MAA*. The Board indicated their support of the proposed concepts in March 2012.

In accordance with the PPWB Event Contingency Plan, Board members were informed in December 2011 of a diesel truck spill on the Battle River in Alberta. Saskatchewan, the downstream jurisdiction, was not affected.

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

- water quality in Lake Winnipeg;
- downstream impacts of drainage in Saskatchewan upon Manitoba;
- Manitoba's concerns of sedimentation 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;
- presentations to senior managers of government agencies;
- and joint discussions with Environment Canada Managers in September and November 2011 and March 2012.

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, 2011 to March 31, 2012.

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

The Agreement provides for an equitable sharing of available waters for all eastward flowing streams that cross interprovincial boundaries, including interprovincial lakes. It also serves to protect interprovincial aquifers and surface water quality. Schedules to the Agreement 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 of 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 2011-2012 activities in the Work Plan.

Section 3 of this Annual Report summarizes the administration activities and financial expenditures for the year 2011 - 2012.

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 2011 apportionable flow data. Appendices III and IV present the water quality parameters that were monitored by Environment Canada and the 2011 Excursion Report. 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 seven goals in the PPWB's Strategic Plan. Progress made in 2011-2012 is discussed below for each of these goals.

GOAL 1: Agreed Interprovincial Apportionment of Water Is Achieved

The PPWB's Strategic Goal 1 is to achieve interprovincial apportionment of water that was 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 2011-2012, the PPWB Secretariat calculated apportionable flows using monitoring data from 92 hydrometric stations, 20 meteorological stations and other meteorological and water use data (see Appendix I).

In November 2011, the Board reviewed and approved the monitoring stations lists for 2012 - 2013. Two hydrometric stations were added on the Assiniboine River. Three meteorological stations were changed and one new one was added on the South Saskatchewan River.

Flows Reported in 2011-2012

Flow reporting was done for each quarter in the calendar years 2011 and 2012. Quarterly reports presented interim recorded and apportionable flows for the South Saskatchewan River, and Middle and Lodge Creeks and from January to September for Cold Lake.

Appendix II presents the monthly and total final apportionment results. All apportionment requirements were met in the calendar year of 2011. 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 m^3 / 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).

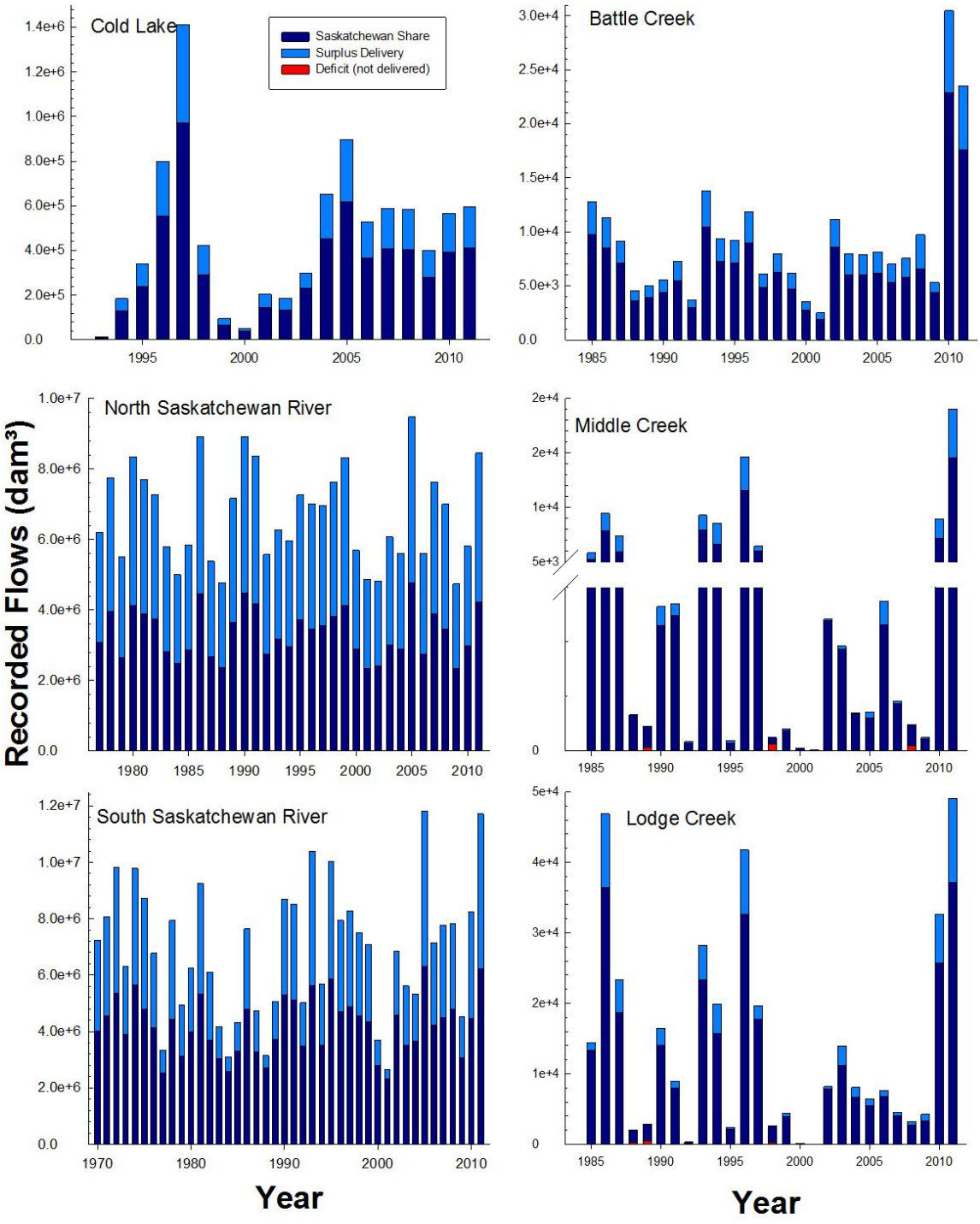


Figure 1. Historic River Flows on the Alberta-Saskatchewan Border

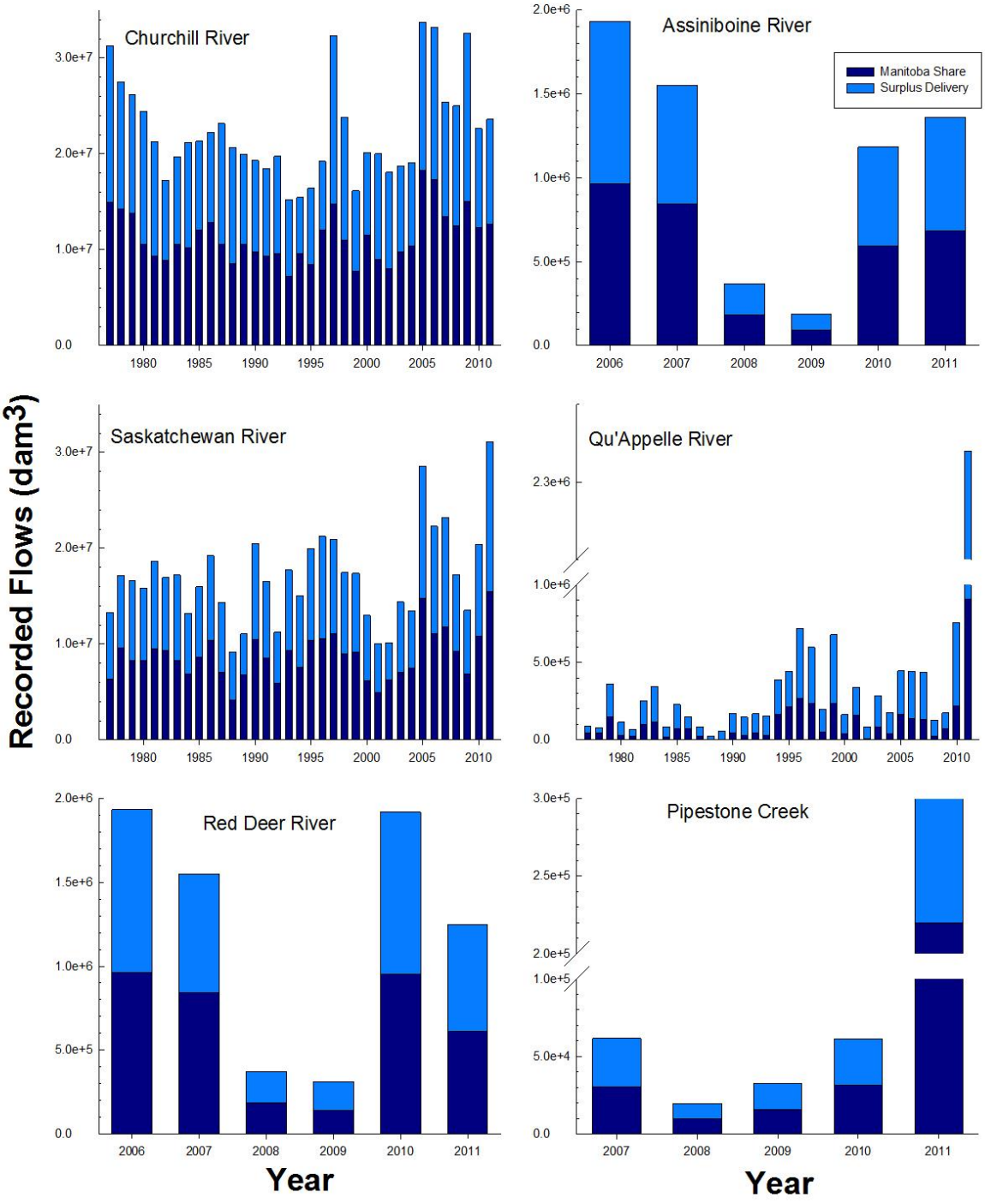


Figure 2. Historic River Flows on the Saskatchewan-Manitoba Border

For rivers with surplus flows, the combined black (provincial share) and blue (surplus) stacked bars show the total recorded flows. For rivers with deficit flows, the combined black and red bars indicate recorded flow as the amounts of flow deficits are subtracted from the provincial share. 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. The amounts of flows vary considerably over the years. Because flows vary so much, scientific notation[1] 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 are evaluating potential long term solutions.

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

Improving Apportionment Methods

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

Reviewing Streams and Basins

Apportionment monitoring of a transboundary river is generally initiated when water use in the upstream jurisdiction increases to a level where the downstream jurisdiction's entitlement may not be met without active management.

The 1993 COH report "Strategies for Apportionment Monitoring of Small Interprovincial Streams" (PPWB Report No. 122), evaluated and ranked interprovincial streams on their potential requirement for apportionment monitoring using the following criteria.

- the number of times an apportionment deficit has, or could have, occurred in the past;
- the present level of use and forecasted future demands in both upstream and downstream provinces;
- the existence of storage projects in the upstream province; and
- the perception of basin residents towards the reality of an apportionment problem.

Since 1993, the COH has reviewed these watercourses occasionally and made recommendations to the Board on whether watercourses should be monitored for apportionment. In March 2011, the Board suggested adding a

review of the need for apportionment for all basins to the renewed 5-year Work Plan. In March 2012, the COH preliminarily ranked basins into high, medium and low priority, based on the need to evaluate the level of effort expended to compute apportionment.

The Board agreed in 2008 that the COH will review apportionment computational procedures for all basins that are currently being apportioned. The 2011 - 2012 Work Plan included the development of the process used to evaluate apportionment computation methods and continued review of the North Saskatchewan River. The objective is to review two basins per year using this new decision criteria and process. These reviews are projected to take ten years.

Modernizing Apportionment Software

The PPWB Secretariat uses approximately 50 FORTRAN programs to compute interprovincial apportionable flows. The COH is modernizing these computational programs and data management techniques. In 2006 - 2007, "Phase 1, Charter and Requirements Documents", was completed under contract. From 2007 to 2010, work continued to develop a new software platform. Optimal Solutions Ltd, the contractor, began work in May 2008, and presented the new software, the River Basin Assessment Tool (RBAT) to the Secretariat and at a COH meeting in March 2010.

The Secretariat and COH Members have reviewed this new platform and calibrated the results of RBAT to the FORTRAN program outputs that have been used historically for the South Saskatchewan River. The review concluded that the functionality of the RBAT needs to be improved by adding a flow-weighted routing capability, and improving the data architecture and user interface. The Board approved the additional future expenses associated with these improvements. The cost of this contract was a significant component of the 2011 - 2012 PPWB budget, but the contract could not be initiated. A PPWB Member Agency will administer the contract in the next year.

South Saskatchewan River Irrigation Return Flows Study

The PPWB approved the "South Saskatchewan River Natural Flow and Apportionment: Irrigation Return Flows 2001 - 2005 Phase I" Report No. 170. This report was prepared for the COH by Environment Canada's Water Survey of Canada – Calgary Office. The intent of this report is to assess whether irrigation return flow data from Alberta Irrigation Districts can be used by the PPWB to compute apportionable flows at the borders.

Return flow data were reviewed from the 13 Irrigation Districts of southern Alberta. The adequacy of the data's accuracy and timeliness was also reviewed. Overall, return flow from all the sources comprises about five percent of the South Saskatchewan River apportionable flow at the Alberta - Saskatchewan border.

The COH is evaluating the implementation recommendations to the Board on how to assess irrigation return flows in apportionment methods. The COH proposed to draft another report, Phase 1B, to complete the evaluation. The timing of future work for Phase 2 will depend upon the results of this evaluation and the availability of funding.

GOAL 2: Interprovincial 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 2011 - 2012.

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 Schedule is expected to be completed in 2014.

A task group was established in 2008 to organize a workshop that was held on January 13 - 15, 2009. The workshop's objective was to review concepts and principles on which a groundwater schedule could be based. The results of the workshop were discussed with the Board at a joint meeting in March 2009.

In 2009 - 2010, the COG developed a number of potential concepts and principles based on the discussions held at the workshop and with the Board. These concepts and principles were incorporated into an Impact Analysis Statement that was submitted to the Board in March 2011. This report also analyzed groundwater uses and stressors, existing groundwater agreements and rationale for the need for a groundwater agreement.

At their March 2011 Meeting, the Board requested that the COG complete 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 September 2011, the Board requested that the COG draft a guidance document to outline the concepts of a possible groundwater Schedule to be added to the *MAA*. The COG submitted a draft document and the Board indicated their support of the proposed concepts in March 2012.

A second document will be drafted by the COG to describe potential bilateral management of a transboundary aquifer under increasing levels of stress.

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 2011 - 2012.

GOAL 3: Agreed Interprovincial Water Quality Objectives Are Achieved

The PPWB's Strategic Goal 3 is to achieve agreed interprovincial 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.

In 2011, in accordance with the terms of the *MAA*, Environment Canada conducted water quality monitoring at all 11 sites as requested by the PPWB. One hundred and eleven water sampling events were conducted on 12 occasions in accordance with the approved 2011 monitoring plan; with some exceptions. One sampling event was not completed on each of the South Saskatchewan River and the Red Deer River (Alberta/Saskatchewan) in March, on the Carrot River in January, and on the Churchill River in October. Four water quality samples were collected at a 12th transboundary river reach, Cold River, to obtain baseline data for the purpose of establishing interprovincial water quality objectives.

Adherence or Excursions to Interprovincial Water Quality Objectives

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

A total of 2,646 water quality samples were compared to the interprovincial water quality objectives to determine whether any excursions to the objectives occurred in 2011. 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 Interprovincial Water Quality Objectives January to December 2011 is shown in Appendix IV. This report was recommended by the COWQ and approved by the Board in December 2012. Results are summarized.

In 2011, the interprovincial water quality objectives were adhered to an average of 95% of samples (Figure 3). Only the Carrot and Qu'Appelle Rivers had adherence rates of less than 90%. The Battle River showed improvement with an adherence rate just over 90%.

Annual adherence rates of rivers have varied only slightly since 2003. The Red Deer River in Alberta and Qu'Appelle River had the largest ranges in adherence rates (9.1% and 7.2% differences across years respectively). Compared to 2010, two rivers had slightly improved adherence rates, two remained the same and six had slight decreases. 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 2011, 15 parameters had excursions to the PPWB objectives. Total phosphorous, dissolved manganese and sodium accounted for most of the excursions.

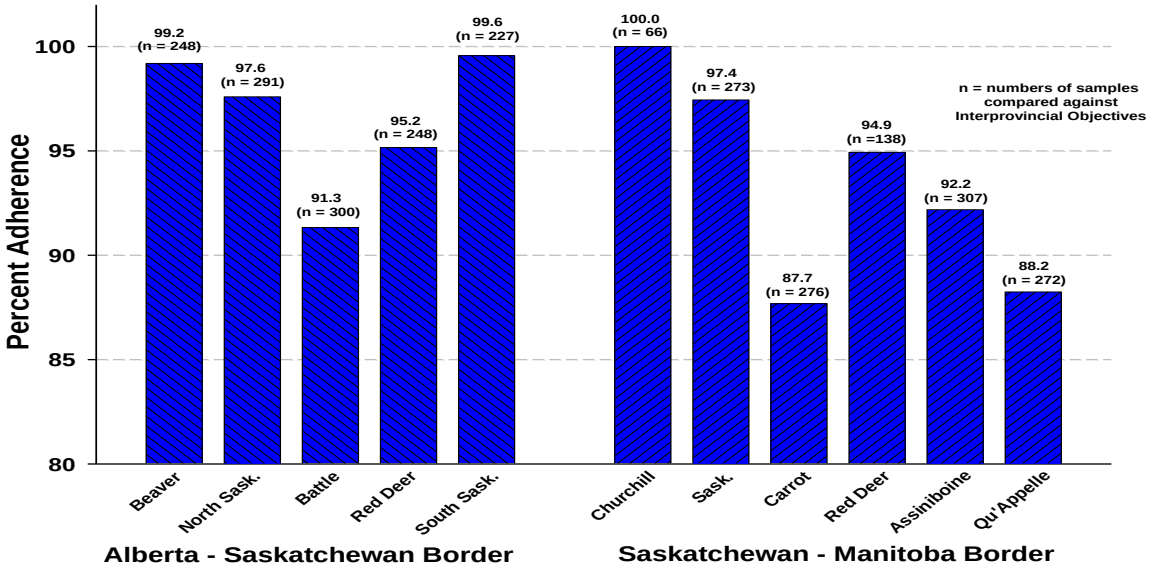


Figure 3: 2011 Percent Adherence to PPWB Objectives

Reviewing and Improving Interprovincial Water Quality Objectives

Work continued in 2011 - 2012 on the comprehensive review of the interprovincial water quality objectives. A framework for the approach to establish water quality objectives was developed by the COWQ and approved by the Board in March 2008. In 2009 - 2010, the PPWB identified that all water uses were relevant for all transboundary river reaches. The list of parameters requiring objectives was evaluated and is expected to be finalized next year. A list of existing objectives was compiled in April 2010. Excursions rates were assessed by graphing the historic data against these existing objectives.

The development of nutrient objectives is the highest priority. Progress was made in developing a "Background Approach" that will be applied to revise existing or develop new objectives for nutrients and possibly other parameters. Seasons were delineated for these parameters to establish open water and ice covered water quality objectives. Trends were analyzed for nutrient and other parameters to assess historic background levels. If trends were observed, two-tier objectives were developed to provide an early warning signal for degrading water quality conditions.

A review was initiated to evaluate the effects of data gaps and changes in methods (and detection limits), flows, and sediment levels on metal levels.

The COWQ is expected to recommend objectives to the Board in spring 2013.

This on-going review will improve the understanding of how and why excursions occur and provide meaningful information to water managers in each province so that water quality will continue to meet objectives established for the protection of human uses and the aquatic environment.

GOAL 4: Jurisdictions Are Informed About Emergency and Unusual Water Quantity and Quality Conditions

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

PPWB Contingency Plan

Historically, the PPWB Interprovincial Water Quality Contingency Plan has been an effective method of informing government agencies of spills or unusual water quality conditions in interprovincial 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 revised Event Contingency Plan involves a "how to" guide to inform jurisdictions and evaluate potential impacts of emergency or unusual water conditions for surface and groundwater quantity and quality issues. An Event Notification Report Form was also updated and 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.

One unusual water quality event was reported in 2011 - 2012:

- On December 5, 2011, Alberta Environment and Water reported that a truck had spilt diesel fuel into the Battle River. No downstream impacts occurred.

GOAL 5: Conflicts over Interjurisdictional Water Issues are Avoided

The PPWB's Strategic Plan Goal 5 is to avoid conflicts and disagreements over interjurisdictional 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 formed in October 2010 and met on June 8 and October 25, 2011 to facilitate this partnership. The Provinces of Alberta and Saskatchewan agreed to have the PPWB Chair represent their interests on the Steering Committee

The Board was informed about activities in the Lake Winnipeg Basin Initiative, where the Government of Canada allocated $17.7 million for 2008 - 2012. This Initiative focuses on strengthening watershed governance; research, information and monitoring; and a stewardship fund for projects that reduce nutrient loads into the lake, thereby improving water quality conditions.

The Board was also kept informed of Manitoba's actions to reduce nutrient loading. Manitoba's Lake Winnipeg Action Plan was created in 2003 and the multi-stakeholder Lake Winnipeg Stewardship Board completed its final report in December 2006. The Manitoba Government is undertaking a number of the proposed actions in these reports to reduce nutrient loading.

On July 4, 2011, the Province of Manitoba and the Government of Canada published a technical report on the State of Lake Winnipeg.

Manitoba/Saskatchewan Drainage

In September 2008, the Minister of Manitoba Water Stewardship wrote to the Minister responsible for the Saskatchewan Watershed Authority requesting support for interprovincial meetings of staff responsible for licensing drainage works, investigating complaints, and enforcing against 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. A consultant prepared a report to assess the causes of erosion and potential erosion control mitigation. The PPWB is kept informed of the Task Force's progress.

Annual Report on Interprovincial 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.

In November 2010, Saskatchewan submitted a proposal to federal and provincial authorities to license the Fishing Lake Emergency Drainage Project to address flooding issues on Fishing Lake. The project involved enhancing outlet channel flows into the Assiniboine River that crosses the Manitoba border. Construction work was completed in 2011 - 2012. A Manitoba-Saskatchewan Operations Committee was formed, created a plan and cooperatively manages releases to minimize downstream impacts.

No other projects were licensed by either Alberta or Saskatchewan in 2011 - 2012 that had the potential for transboundary impacts into downstream provinces.

Saskatchewan-Manitoba Co-operation and Communication during 2011 Flood

Communication fostered cooperation between Manitoba and Saskatchewan during the 2011 flood conditions. Communications between Saskatchewan Watershed Authority and Manitoba Water Stewardship on flood conditions and on forecasts was primarily through the respective COH members as both members were also a part of their respective forecasting and operations organizations with significant flood monitoring and operations roles during the event(s).

Forecasts and conditions were discussed as needed on the Assiniboine and Qu'Appelle Rivers. Two distinct peaks occurred on the Qu'Appelle; the first in response to snowmelt runoff, and the second in response to a large rainfall event in mid-June in the headwaters of the Moose Jaw River and of Wascana Creek.

Regular emails were exchanged with respect to operation of the Fishing Lake flood relief channel project to ensure that operation of the channel would not incur additional flood damages downstream of Shellmouth Dam in Manitoba as per the Operating Agreement. Beyond the Agreement, operation of the channel project was delayed due to the extraordinary flooding occurring in Brandon and at the Portage Diversion.

A June rainfall event in the North Saskatchewan River basin, combined with high flows in the South Saskatchewan River resulted in flood concerns at both Cumberland House in Saskatchewan and at The Pas in Manitoba. Near daily collaboration during this event gave each jurisdiction the most recent information and forecast of water levels and flows at each location.

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: Jurisdictions 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 Communication Strategy was revised to focus efforts on communicating effectively about the PPWB to members and governments. The revised Strategy is expected to be approved by the Board at the fall 2012 Meeting.

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 had been housed on the Environment Canada's website for a number of years. In 2009 - 2010, a project was initiated to move the website to an external host. 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 enhanced website provides access to a complete suite of PPWB publications and fact sheets. A member portal also facilitates the exchange of information.

In 2011 - 2012, the Board continued the practice of inviting senior officials of the host governments to meet with the Board. The practice was begun in 2007 - 2008 as Board members recognized that the introduction of new senior officials in member governments, along with internal organizational restructuring, necessitated greater efforts to increase general awareness of the PPWB and government responsibilities related to implementation of the *MAA*.

Senior managers and executives from Environment Canada – Science and Technology Branch – Water Science had joint discussions with the Board at meetings in September and November 2011 and March 2012. The meetings provided an opportunity for Environment Canada Managers to discuss their Risk-Based Assessment of water quality monitoring sites across Canada and the statistical analysis of historic interprovincial water quality trends. This information was used to support the proposed PPWB Water Quality Monitoring Plan. The meetings also provided an opportunity to inform the Environment Canada Managers on PPWB activities.

This approach to increasing awareness by senior officials within PPWB member governments will continue in the future.

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

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.

Resilience of the *MAA* to Climate Change

In March 2008, the PPWB initiated a project to assess how resilient the *MAA* is to predicted impacts of and adaptations to climate change. The Ministers had asked this question in the joint June 2007 Meeting and continued their discussion on how to assess resilience at their June 2008 Meeting.

A workshop was held in September 2010 to explore "What if" scenarios of potential circumstances to test the resilience of the agreement. Various potential climate impacts were considered including potential increased variability in future flows, flooding, multi-year hydrological droughts and increased water use. The workshop considered hydrological issues and associated surface and groundwater quality issues.

The COH was tasked by the Board to prepare flow array scenarios that can be used to evaluate the resiliency of the *MAA*. In November 2011, the Board indicated their support of using paleorecords and the historic hydrological records to identify extreme drought flow scenarios. These scenarios will be produced in partnership using data provided by Dr. Dave Sauchyn, Prairie Adaptation Research Collaborative (PARC), University of Regina.

Prairie Hydrology Workshop

In the fall of 2008, the Board agreed to host a Prairie Hydrology workshop. The workshop had however been delayed because of government travel restrictions. The workshop is scheduled for the fiscal year 2012-2013.

The intent of this workshop is to provide a forum to exchange information, and collaboratively address current and emerging water management hydrological issues amongst PPWB members and other practicing hydrologists within member governments. For example, the flooding events in the past two years presented challenges for water managers that would benefit from discussions with other hydrologists. In addition, climate change is predicted to increase both the frequency and severity of extreme flooding and drought events. The workshop will allow participants to discuss new and innovative solutions to new challenges.

The workshop will also provide an orientation and networking opportunity for practicing hydrologists and water resource managers. The hydrologist community across the Prairies has had a number of retirements in recent years, and more are expected within the next few years. This workshop will, therefore, provide a vital succession plan transition by providing an opportunity for long-term and new hydrologists to network and learn from each other.

3 . 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.

On April 29, 2011, Vir Khanna was appointed as the Senior Engineering Advisor. Megan Garner joined the Secretariat as the Engineering Advisor on February 13, 2012.

Four Board and eighteen Committee meetings were held throughout the 2011 - 2012 fiscal year. The Board invited executives and senior managers of Environment Canada to meet with the Board on September and November 2011 and March 2012 to discuss the PPWB Water Quality Monitoring Plan and foster improved internal awareness of PPWB operations and objectives. Invitations were also sent to Committee members residing in the province where the meeting is located, thereby improving communication and understanding between the Board and the Committees.

PPWB

- Meeting No. 98. Part B on June 7, 2011 and Part C on September 27, 2011 – Videoconference
- Meeting No. 99. Part A on November 24 - 25, 2011 – Winnipeg and Part B on December 5, 2011 – Teleconference
- Meeting No. 100. March 19, 2012 – Teleconference
- Meeting No. 101. Part A on March 29, 2012 – Edmonton (and Part B, on June 5, 2012 – Teleconference)

COH

- Meeting No. 117. May 31, 2011 – Teleconference
- Meeting No. 118. Part A on July 15, 2011 and Part B on July 26, 2011 – Teleconference
- Meeting No. 119. October 6 - 7, 2011 – Calgary
- Meeting No. 120. December 8, 2011 – Teleconference
- Meeting No. 121. March 8 – 9, 2012 – Regina

COWQ

- Meeting No. 108. April 8, 2011 – Teleconference
- Meeting No. 109. Part A on June 9, 2011 and Part B on June 23, 2011 – Teleconference
- Meeting No. 110. July 28, 2011 – Teleconference
- Meeting No. 111. September 1, 2011 – Teleconference
- Meeting No. 112. September 19, 2011 – Teleconference

- Meeting No. 113. October 3 - 4, 2011 – Saskatoon
- Meeting No. 114. December 14, 2011 – Teleconference
- Meeting No. 115. January 18-19, 2012 – Winnipeg.
- Meeting No. 116. March 6, 2012 – Teleconference

COG

- Meeting No. 61. April 6, 2011 – Teleconference
- Meeting No. 62. May 7, 2011 – Teleconference
- Meeting No. 63. December 15, 2011 – Teleconference
- Meeting No. 64. March 1-2, 2012 – Edmonton

The Board approves the annual budget for the PPWB. The budget for 2011 - 2012 was $ 905,837 and final expenditures were $ 575,426 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 Board requested that the contract work to modernize flows be administered by a PPWB Member Agency in 2012 - 2013.

The Board agreed at its meeting in March 2007 that, in the future, the Board's budget planning cycle must begin earlier in the year, with substantial discussion being held on the Board's budget during the October meeting. This discussion will facilitate early input by the Board into the budget processes of the PPWB member governments.

A 5-year costed work planning process was initiated in 2007 - 2008, and completed in 2008 – 2009 to give direction until March 2012.

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.

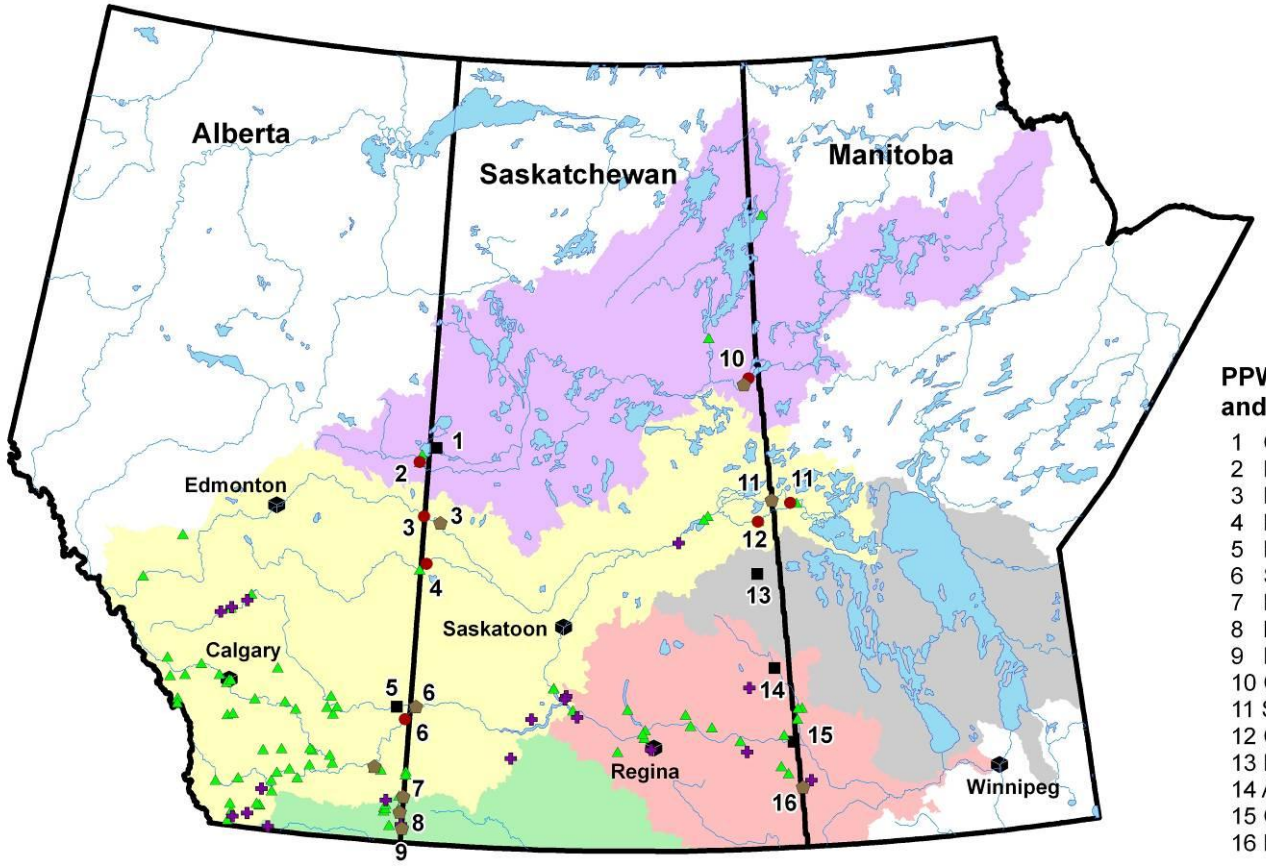
At the October 2010 meeting, the Board initiated discussions on the renewal of the five-year work plan. The review was completed in December 2011 and a new 5-year work plan was approved that provides direction until March 2017. The approved work plans were adhered to in 2011 – 2012.

The PPWB Charter and Strategic Plan were also reviewed as part of the work plan renewal process to evaluate whether current government priorities were reflected in the PPWB activities. Strategic directions were considered from provincial and federal water strategies, programs and activities. These documents are expected to be approved in the fall 2012 Meeting.

The PPWB By-Laws and Rules and Procedures will be reviewed in the next fiscal year.

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

APPENDIX I: PPWB Monitoring Stations for 2011 – 2012



PPWB Apportionment and Water Quality Sites

1 Cold River
2 Beaver River
3 North Saskatchewan River
4 Battle River
5 Red Deer River A/S
6 South Saskatchewan River
7 Battle Creek
8 Middle Creek
9 Lodge Creek
10 Churchill River
11 Saskatchewan River
12 Carrot River
13 Red Deer River S/M
14 Assiniboine River
15 Qu'Appelle River
16 Pipestone Creek

Basins

- Assiniboine River
- Churchill River
- Lake Winnipeg
- Missouri River
- Saskatchewan River

Type of Monitoring

- Hydrometric
- Meteorological
- Quality
- Apportionment
- Apportionment and Quality

APPENDIX II: 2011 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	197000	203000	342000	785000	1350000	3020000	1350000	520000	316000	356000	214000	223000	8870000
CONSUMPTIVE USE	330	140	400	13900	27000	11900	357000	262000	316000	37700	30	130	904000
CHANGE IN RESERVOIR STORAGE	-87000	-80000	-86000	-100000	122000	413000	103000	-97000	-148000	-45800	-32000	-47000	-84000
INTERBASIN TRANSFER*	0	0	0	105000	30500	28600	24100	20500	15300	10900	0	0	235000
APPORTIONABLE FLOW	32400	130000	253000	788000	1470000	3450000	1830000	727000	387000	372000	192000	171000	9800000

*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	38000	26500	42200	477000	602000	760000	441000	176000	109000	76200	50400	47500	2840000
CONSUMPTIVE USE	0	0	0	0	0	1950	3760	4310	4410	0	0	0	14400
CHANGE IN RESERVOIR STORAGE	-22000	-21600	-25300	26700	16500	20400	8060	28400	1170	-250	-12100	-15000	4880
INTERBASIN TRANSFER**	0	0	0	-105000	-30500	-29600	-24000	-20500	-15300	-11000	0	0	-235000
APPORTIONABLE FLOW	16300	6140	15500	388000	585000	765000	422000	191000	100000	65700	40900	33100	2630000

**Irrigation return flows 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	235000	229000	384000	1260000	1950000	3780000	1790000	696000	425000	432000	264000	270000	11700000
APPORTIONABLE FLOW	49000	136000	268000	1180000	2060000	4220000	2250000	918000	487000	438000	233000	205000	12400000
SASKATCHEWAN SHARE (50%)	24500	68000	134000	588000	1030000	2110000	1120000	459000	244000	219000	117000	103000	6220000
EXCESS (+) OR DEFICIT (-) DELIVERY	211000	161000	250000	675000	920000	1670000	664000	237000	182000	213000	148000	168000	5500000
CUMULATIVE EXCESS OR DEFICIT	211000	372000	622000	1300000	2220000	3890000	4550000	4790000	4970000	5180000	5330000	5500000	5500000

Recorded Flow is 94% of Apportionable Flow. Alberta is required to deliver 50% of Apportionable Flows. 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.

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

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	313000	256000	340000	728000	1070000	2110000	1500000	683000	420000	388000	327000	316000	8450000
APPORTIONABLE FLOW	82800	44100	85500	499000	1170000	2550000	1880000	944000	542000	373000	168000	109000	8450000

Recorded Flow is 100% of Apportionable Flow. Alberta is required to deliver 50% of Apportionable Flows.

BATTLE CREEK – ALBERTA-SASKATCHEWAN BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	190	1060	1790	8990	4560	2590	1790	1400	1140	0	0	23500
APPORTIONABLE FLOW	0	190	1060	1780	8990	4540	2600	1800	1400	1140	0	0	23500

Recorded Flow is 100% of Apportionable Flow. Alberta is required to deliver 75% of Apportionable Flows.

LODGE CREEK – ALBERTA-SASKATCHEWAN BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	3	270	21600	16900	9800	430	50	21	10	0	0	49100
APPORTIONABLE FLOW	0	3	280	22200	16700	9780	430	50	7	10	0	0	49500

Recorded Flow is 99% of Apportionable Flow. Alberta is required to deliver 75% of Apportionable Flows.

MIDDLE CREEK – ALBERTA - SASKATCHEWAN BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	1	30	6220	10400	2170	130	50	40	30	0	0	19000
APPORTIONABLE FLOW	0	1	50	6750	10300	2040	120	50	30	10	0	0	19400

Recorded Flow is 98% of Apportionable Flow. Alberta is required to deliver 75% of Apportionable Flows.

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	34800	30200	31200	29500	35800	43200	87800	103000	74000	55000	38600	31700	595000
APPORTIONABLE FLOW	35300	30600	31700	29900	36300	43700	88300	104000	74500	55300	38800	31900	600000

Recorded Flow is 99% of Apportionable Flow. Alberta is required to deliver 68.4% of Apportionable Flows.

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	2020000	1630000	1730000	1640000	1870000	1610000	1950000	2900000	2420000	2040000	1760000	2080000	23600000
APPORTIONABLE FLOW	1840000	1580000	1630000	1540000	1920000	1750000	2360000	3390000	2910000	2490000	2070000	1910000	25400000

Estimated Flow includes Recorded Flow at Sandy Bay and estimated inflow from Sandy Bay to the Saskatchewan-Manitoba Border. Estimated flow is 93% of Apportionable Flow. Saskatchewan is required to deliver 50% of Apportionable Flows to Manitoba.

SASKATCHEWAN RIVER – SASKATCHEWAN - MANITOBA BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
ESTIMATED FLOW	1070000	873000	1370000	2720000	3720000	4610000	5730000	4340000	2230000	1760000	1440000	1270000	31100000
APPORTIONABLE FLOW	854000	590000	1060000	3510000	3850000	4980000	5970000	4380000	2130000	1670000	1080000	953000	31000000

Estimated Flow at the Saskatchewan-Manitoba border is computed using recorded flow of the Saskatchewan River at The Pas minus 1.31 times the recorded flow of Carrot River near Turnberry. Estimated Flow is 100% of Apportionable Flow. Saskatchewan is required to deliver 50% of Apportionable Flows to Manitoba. In 2011 the Recorded Flow was equal to Apportionable flow owing to the depletion of Lake Diefenbaker by approximately 1.5 m in elevation during 2011. In a more typical year the difference in storage in Lake Diefenbaker from January 1 to December 31 is not as significant.

CARROT RIVER – SASKATCHEWAN - MANITOBA BORDER (NEAR TURNBERRY)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	34800	27900	21200	207000	447000	170000	138000	109000	46100	28400	18300	11400	1260000

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

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	41500	37100	36700	333000	634000	404000	298000	171000	118000	94300	60700	46400	2270000
APPORTIONABLE FLOW													1810000

Recorded flow is 126% of Apportionable Flow. Recorded Flow exceeded the Apportionable Flow by 460 000 dam^3 in 2011 because of diversions of 54 500 dam^3 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*

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	18100	15900	16900	441000	441000	180000	83600	26500	8590	7130	7020	5470	1250000
APPORTIONABLE FLOW	17600	15500	16300	434000	431000	174000	80700	25600	8030	6940	6820	5320	1220000

* The hydrometric station used to obtain recorded flow information is located at Erwood rather than the border. Recorded Flows are thereby estimated by compensating for the difference in drainage area between Erwood and the border. Estimated Flow is 102% of Apportionable Flow. Estimated Flow exceeded the Apportionable Flow in 2011 because agricultural drainage contributed an estimated 29 000 dam^3 to the flow of the Red Deer River. Saskatchewan is required to deliver 50% of 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	30900	18200	14500	449000	477000	177000	129000	26000	20000	9850	7250	6700	1360000
APPORTIONABLE FLOW	30800	18200	14400	450000	477000	177000	129000	26600	20500	10000	7300	6750	1370000

Recorded Flows are 99% of Apportionable Flows. Saskatchewan is required to deliver 50% of Apportionable Flows to Manitoba. In 2011 additional water was contributed to the Assiniboine River as a result of the operation of a constructed outlet from Fishing Lake by the Saskatchewan Water Security Agency. This addition of water is not included in the apportionable flow calculations. It is estimated that the operation of this outlet contributed approximately 3300 dam^3 to the Assiniboine River in 2011.

PIPESTONE CREEK – SASKATCHEWAN - MANITOBA BORDER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	1670	1450	1210	102000	166000	110000	36200	7380	5470	7150	6560	5820	451000
APPORTIONABLE FLOW	1700	1480	1010	106000	166000	109000	34300	6400	662	1890	6560	5850	440000

Recorded Flows are 103% of Apportionable Flows. Recorded Flow exceeded the Apportionable Flow in 2011 due in part to significant pumping of water out of Kipling Marsh into Pipestone Lake. Saskatchewan is required to deliver 50% of Apportionable Flows to Manitoba.

NOTE: Flow numbers are rounded to three significant figures in recognition of the precision of the input that were used in the calculations. Annual totals may differ slightly than the sum of the monthly flows because of the rounding off.

APPENDIX III

PPWB Water Quality Monitoring 2011 Parameter List

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

ALKALINITY, phenol & total
ALUMINUM, diss. & total$^{\theta}$
AMMONIA, total$^{\theta}$.
ANTIMONY, diss. & total
ARSENIC, diss.$^{\theta}$ & total
BARIUM, diss. & total$^{\theta}$
BERYLLIUM, diss. & total
BICARBONATE, calc.
BISMUTH, diss. & total
BORON, diss.$^{\theta}$ & total
CADMIUM, diss. & total$^{\theta}$
CALCIUM, diss.
CARBON, diss organic
CARBON, part. organic
CARBON, total organic, calcd.
CARBONATE, calcd.
CHLORIDE, diss$^{\theta}$
CHROMIUM, diss. & total$^{\theta}$
COBALT, diss. & total$^{\theta}$
COLIFORMS FECAL$^{\theta}$ ♦
COLOUR TRUE
COPPER, diss. & total$^{\theta}$
E. COLI ♦
FLUORIDE, diss$^{\theta}$
FREE CO_2, calcd.
GALLIUM, diss. & total
HARDNESS NON-CARB. (CALCD.)
HARDNESS TOTAL (CALCD.) CACO3
IRON, diss.$^{\theta}$ & total
LANTHANUM, diss. & total
LEAD, diss. & total$^{\theta}$
LITHIUM, diss. & total
MAGNESIUM, diss.
MANGANESE, diss.$^{\theta}$ & total
MOLYBDENUM, diss. & total
NICKEL diss. & total$^{\theta}$
NITROGEN NO_3 & NO_2, diss$^{\theta}$.
NITROGEN. part.
NITROGEN, total calcd.
NITROGEN, diss.
OXYGEN, diss.$^{\theta}$
Ph$^{\theta}$
PHOSPHOROUS ortho, diss
PHOSPHOROUS, part. calcd.
PHOSPHOROUS, total$^{\theta}$
PHOSPHOROUS, diss.
POTASSIUM, diss.
RESIDUE FIXED NONFILTRABLE
RESIDUE NONFILTRABLE
RUBIDIUM, diss. & total
SELENIUM, diss.$^{\theta}$ & total
SILVER, diss. & total
SILICA,
SODIUM ADSORPTION RATIO, calcd.$^{\theta}$
SODIUM, diss.$^{\theta}$
SODIUM PERCENTAGE, calcd.
SPECIFIC CONDUCTANCE
STRONTIUM, diss. & total
SULPHATE, diss.$^{\theta}$
TEMPERATURE WATER
THALLIUM, diss. & total
TOTAL DISSOLVED SOLIDS, calcd.$^{\theta}$
TURBIDITY
URANIUM, diss. & total$^{\theta}$
VANADIUM, diss. & total$^{\theta}$
ZINC diss. & total$^{\theta}$

ACID HERBICIDES*$^{\theta}$
NEUTRAL HERBICIDES*
ORGANOCHLORINE INSECTICIDES*

θ 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 2011

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Introduction

In 1969 the governments of Alberta, Saskatchewan, Manitoba and Canada signed the Master Agreement on Apportionment (MAA). This agreement is administered by the Prairie Provinces Water Board (PPWB). Schedule E to the MAA was signed in 1992 and defined the mandate of the PPWB in interprovincial water quality management. As part of Schedule E, Water Quality Objectives (WQOs) were established for 11 river reaches crossing the Alberta-Saskatchewan and Saskatchewan-Manitoba borders (Table 1). Five of these reaches are along the Alberta-Saskatchewan border and six are along the Saskatchewan-Manitoba border (Figure 1). The objectives were established to protect various water uses including the protection of aquatic life, drinking water, recreation, agricultural uses (livestock watering and irrigation) and fish consumption.

Environment Canada collects and analyzes water quality samples from the 11 transboundary river reaches. Monitoring includes a range of physical, chemical and biological parameters at one location in each of the river reaches. Parameters include nutrients, major ions, metals, fecal coliforms, physical characteristics and pesticides. The Committee on Water Quality (COWQ) annually reviews the results of the PPWB Water Quality Monitoring program, with emphasis on the comparisons to Interprovincial Water Quality Objectives. This report presents the 2011 adherences and excursions to the interprovincial water quality objectives.

Field program (2011)

In 2011, Environment Canada undertook a total of 111 water sampling events from the 11 transboundary river reaches. The 2011 monitoring program was completed as approved by the Board; with some exceptions. One sampling event was not completed on each of the South Saskatchewan River and the Red Deer River (Alberta/Saskatchewan) in March, on the Carrot River in January, and on the Churchill River in October. In addition, the frequency of some variables was reduced. Analyses of metal concentrations were also not completed in August for the North Saskatchewan River, Battle River, and the Beaver River. For the four rivers that were monitored for pesticides in 2011, the frequency of sampling was reduced from the approved monitoring plan for the organochlorine pesticides. Depending on the river reach, organochlorine pesticides were sampled between 4 to 7 times in 2011. Raw water quality data for all rivers were distributed to the PPWB COWQ members on October 4, 2012 for their review.

Monitoring in 2011 was also undertaken on four separate occasions on the Cold River in 2011 as part of the approved monitoring plan. While there are no interprovincial water quality objectives for the Cold River, site specific objectives are being developed for this river as part of the current review of interprovincial water quality objectives by the PPWB.

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 2011. A comparison of over 2646 chemistry results to water quality objectives was made in 2011.

The adherence rates for the 11 rivers ranged from 87.7% for the Carrot River to 100% for the Churchill River (Figure 2). Of the 11 transboundary river reaches, only two rivers (the Carrot and Qu'Appelle Rivers on the Saskatchewan/Manitoba border) had an overall adherence rate of less than 90%. The Carrot and Qu'Appelle rivers have consistently over the past ten years shown adherence rates of less than 90%. In comparison to 2010, the Battle River showed some improvement in water quality in 2011 with an adherence rate just over 90%.

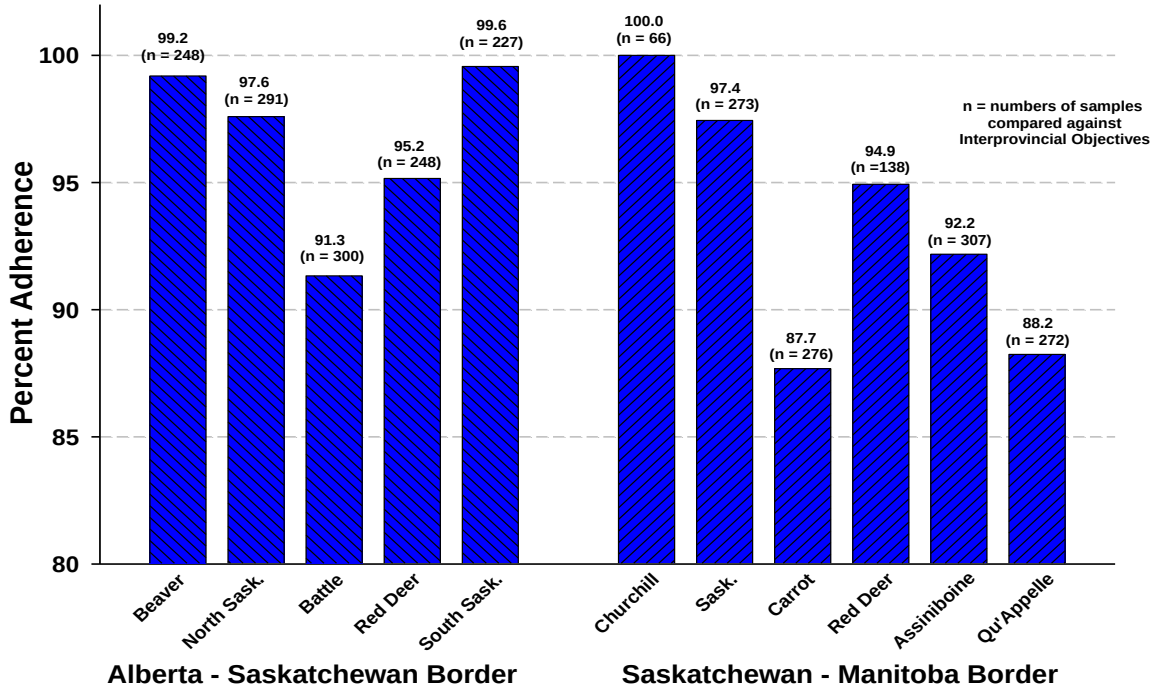


Figure 2 2011 Percent Adherence to Interprovincial Water Quality Objectives

Comparison of the adherence rates from 2003 to 2011 shows three rivers (Beaver River, North Saskatchewan River, and the South Saskatchewan River)

have shown little fluctuation in the adherence rates to interprovincial water quality objectives (ranges < 3%); six rivers (Battle, Churchill, Saskatchewan, Carrot, Red Deer (Saskatchewan/Manitoba) and Assiniboine rivers) have shown more variability, but less than a 5% range in adherence rates (Figure 3). Two of the eleven rivers, (Red Deer River (Alberta/Saskatchewan) and the Qu'Appelle River) have shown greater variability in adherence rates with ranges of 9.1 and 7.2% respectively. In comparison to 2010, adherence rates in 2011 were generally higher. However, overall variations in adherence rates are minor and still within the expected variability.

Six rivers showed greater percent adherence to interprovincial water quality objectives, three rivers showed lower overall percent adherence rates to these interprovincial water quality objectives and two rivers remained the same. The six rivers that showed an increase in adherence rates were the Beaver River (1.1%), Battle River (1.7%), Red Deer River (Alberta/Saskatchewan (3.2%), South Saskatchewan River (2.1%), Red Deer River (Saskatchewan/Manitoba) (0.8%) and Qu'Appelle River (0.4%).

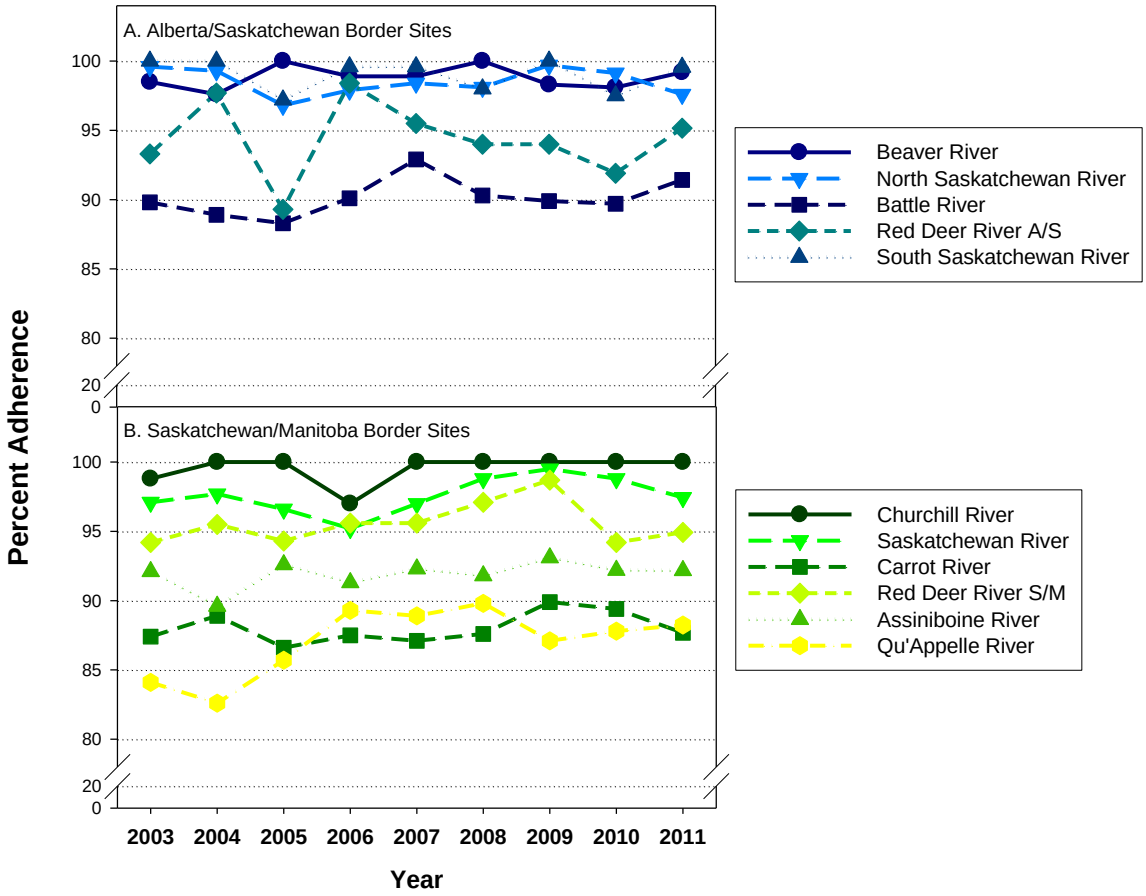


Figure 3 **2003 to 2011 Percent Adherence to Interprovincial Water Quality Objectives for the Alberta/Saskatchewan (A) and the Saskatchewan/Manitoba (B) borders**

The rivers that showed a slight decrease in the adherence rate between 2010 and 2011 were the North Saskatchewan River (-1.5%), the Saskatchewan River (-1.4%), and the Carrot River (-1.7%). The adherence rate for the Assiniboine River remained the same between 2010 and 2011. For the Churchill River in 2010 and 2011 the river met all interprovincial water quality objectives. The overall adherence rates and the excursions by parameter are shown in Tables 2 and 3 for the Alberta/Saskatchewan border and the Manitoba/Saskatchewan border respectively.

Parameter Specific Excursions in 2011

Excursions were also calculated on a parameter by parameter basis for all 11 river reaches to quantify which parameters exceeded the interprovincial water quality objectives (*i.e.* total number of excursions for a single parameter among all sites / total number of comparisons for that parameter among all sites) (Table 4). Two parameters had excursion rates greater than 20%; total phosphorus (80.4%), and manganese (37.8%).

When comparing all transboundary river reaches, 11 parameters exceeded the water quality objectives by greater than 20% (Table 4). This included total phosphorus (83.3%), dissolved manganese (63.6%), fecal coliform, and aluminum (each with 50%), sodium and dissolved oxygen (each with 33.3%), copper, iron, zinc and lead (each with 27.3%) and total dissolved solids (25%).

In 2011, a total of 15 parameters exhibited excursions to the interprovincial water quality objectives (Table 4). Of these parameters total phosphorus, dissolved manganese, and sodium accounted for most of the excursions.

Of the 15 parameters that exceeded interprovincial water quality objectives, 9 exceeded objectives at more than one transboundary river reach (Table 4). In particular, the total phosphorus objective was exceeded at 5 of the 6 transboundary river reaches on the Saskatchewan/Manitoba border. Currently, total phosphorus objectives have only been established at the Saskatchewan/Manitoba border. However, interprovincial water quality objectives for phosphorus are being developed for all transboundary river reaches on both borders. Manganese (dissolved) had excursions from objectives at 7 of the 11 transboundary river reaches monitored in 2011. Fecal coliform bacteria exceeded objectives at 50% of the transboundary river reaches, which is similar to the 2010 results.

Protective Water Use Excursions in 2011

Interprovincial water quality objectives to protect water uses have been established at the transboundary river reaches including: protection of aquatic life, treatability of the water for drinking water, agricultural uses (irrigation and livestock watering), recreation and consumption of fish (Table 1). In this report,

measured parameters were compared to the different water use objectives. Comparisons to the consumption of fish objectives were not made because these long-term data are currently being compiled for review and the fish tissue program still needs to be reviewed. Radioactive isotope data were also not collected from any of the transboundary river reaches, although there are interprovincial water quality objectives for these parameters on the Saskatchewan/Manitoba border.

Of the parameters with protection of aquatic life objectives, seven occasionally exceeded water quality objectives including six metals; cadmium (total), chromium (total), copper (total), lead (total), nickel (total), and zinc (total). The protection of aquatic life objective was also exceeded for dissolved oxygen. Dissolved oxygen concentrations were occasionally below the interprovincial water quality objectives at three of the six rivers on the Saskatchewan/Manitoba border (Carrot River, Saskatchewan River and the Assiniboine River). Periodic excursions of dissolved oxygen objectives have occurred in previous years in these three rivers.

Five parameters with objectives for the protection of irrigation and/or livestock watering uses were occasionally exceeded in 2011: aluminum, manganese, chloride, sodium, and fecal coliforms. For recreational water use, excursions of water quality objectives for total phosphorus and fecal coliform occurred in 2011. Fecal coliform bacteria exceeded the site-specific objective for recreational or agricultural uses at 50% of the transboundary river reaches that have an objective for this parameter in 2011. The water quality objective for fecal coliform for the protection of recreational uses was exceeded on the North Saskatchewan River on the Alberta/Saskatchewan border and the Assiniboine River on the Saskatchewan/Manitoba border. The water quality objective for fecal coliform for the protection of irrigation/livestock uses was exceeded on the Battle River, the Red Deer River (Alberta/Saskatchewan) and the Qu'Appelle River (Saskatchewan/Manitoba).

Treatability objectives for the protection of drinking water sources have been established at the transboundary river reaches. Water quality objectives for total dissolved solids, iron and manganese were exceeded in 2011. Total dissolved solids, iron and manganese can be elevated naturally due to background water chemistry conditions and groundwater inputs but can also be influenced by anthropogenic 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, drinking water and consumption of fish. Interprovincial water quality objectives were met on average 95% of the time in 2011.

The adherence rate to interprovincial water quality objectives was over 90% for nine of the eleven rivers in 2011, indicating that water quality was suitable for the majority of the intended water uses for these rivers.

Similar to previous years, interprovincial water quality objectives were exceeded more frequently on the Carrot River and the Qu'Appelle River in 2011 (adherence rates <90%). Interprovincial water quality objectives exceeded include iron, manganese, total phosphorus, sodium and chloride on the Carrot River and manganese, total phosphorus and sodium on the Qu'Appelle River.

Generally, each of the 11 transboundary river reaches has shown little variation in their adherence rates over the past nine years. The largest overall fluctuations in adherence rates over the past eight years were observed on the Red Deer River (Alberta/Saskatchewan) and the Qu'Appelle River.

Interprovincial water quality objectives were most frequently exceeded for total phosphorus, dissolved manganese, and dissolved sodium based on the percentage of excursions. In total, interprovincial water quality objectives were exceeded for fifteen parameters in 2011. Of these, nine 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 *etc.*).

Interprovincial water quality objectives are under review for all transboundary river reaches and future activities of the COWQ will include further investigation of exceedances to the interprovincial water quality objectives.

Table 1 Summary of Interprovincial Water Quality Objectives by Transboundary River Reach

INTERPROVINCIAL WATER QUALITY OBJECTIVES: MASTER AGREEMENT SCHEDULE E

LOCATION		ALBERTA / SASKATCHEWAN BORDER				
SITE		BEAVER RIVER	NORTH SASK. RIVER	BATTLE RIVER	RED DEER RIVER A/S	SOUTH SASK. RIVER
PPWB REPORT SITE NUMBER		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 1 Summary of Interprovincial Water Quality Objectives by Transboundary River Reach (continued)

INTERPROVINCIAL WATER QUALITY OBJECTIVES: MASTER AGREEMENT SCHEDULE E

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	**UNITS**						
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 2 Summary of Excursions for the Alberta-Saskatchewan Border 2011

LOCATION		ALBERTA / SASKATCHEWAN BORDER				
SITE		BEAVER RIVER	NORTH SASK. RIVER	BATTLE RIVER	RED DEER RIVER A/S	SOUTH SASK. RIVER
PPWB REPORT SITE NUMBER		2	3	4	5	6
		number excursions (number of tests)				
METALS	**UNITS**					
ALUMINUM (total)	mg/L	---	0	1 (11)	---	---
ARSENIC (diss)	mg/L	0	0	0	0	0
BARIUM (total)	mg/L	0	0	0	0	0
BORON (diss)	mg/L	0	0	0	0	0
CADMIUM (total)	mg/L	0	0	0	0	1 (12)
CHROMIUM (total)	mg/L	0	0	1 (11)	0	0
COBALT	mg/L	---	0	0	0	0
COPPER (total)	mg/L	0	3 (11)	4 (11)	4 (11)	0
CYANIDE (free)	mg/L	ND	ND	ND	ND	ND
IRON (diss)	mg/L	0	0	1 (11)	1 (11)	0
LEAD (total)	mg/L	0	0	2 (11)	1 (11)	0
MANGANESE (diss)	mg/L	2 (11)	0	5 (11)	2 (11)	0
MERCURY (total)	ug/L	---	---	---	---	---
NICKEL (total)	mg/L	0	0	0	1 (11)	0
SELENIUM (diss)	mg/L	0	0	0	0	0
SILVER (total)	mg/L	0	---	---	---	---
URANIUM	mg/L	0	0	0	---	---
VANADIUM (TOTAL)	mg/L	---	0	0	0	0
ZINC (total)	mg/L	0	1 (11)	2 (11)	2 (11)	0
NUTRIENTS						
AMMONIA (total)	mg/L	0	0	0	0	0
NO2+NO3 (as N)	mg/L	0	0	0	0	0
PHOSPHORUS (total)	mg/L	---	---	---	---	---
MAJOR IONS						
CHLORIDE (diss.)	mg/L	0	0	0	---	---
FLUORIDE (diss)	mg/L	0	0	0	0	0
SODIUM (diss)	mg/L	0	0	4 (11)	---	---
SULPHATE (diss)	mg/L	0	0	0	0	0
TOTAL DISS. SOLIDS	mg/L	---	0	5 (9)	0	0
BIOTA						
FECAL COLIFORM	NO/dL	0	3 (12)	1 (11)	1 (7)	0
PHYSICALS						
pH	pH Units	0	0	0	---	---
OXYGEN (diss)	mg/L	0 (* 4 under ice)	0	0 (*2 under ice)	---	---
SAR	mg/L	---	---	---	0	0
PESTICIDES/CONTAMINANTS						
LINDANE	mg/L	ND	ND	0	0	ND
2,4-D	mg/L	ND	ND	0	0	ND
2,4,5-TP (Silvex)	mg/L	ND	ND	0	0	ND
CHLORINE	mg/L	ND	ND	ND	---	---
CHLOROPHENOLS (total)	mg/L	ND	ND	ND	ND	ND
PCP	mg/L	ND	ND	ND	---	---
MERCURY IN FISH	ug/g MUSCLE TISSUE	ND	ND	ND	ND	ND
PCB IN FISH	ug/g MUSCLE TISSUE	ND	ND	ND	ND	ND
RADIOACTIVE						
CESIUM-137	Bq/L	---	---	---	---	---
IODINE-131	Bq/L	---	---	---	---	---
RADIUM-226	Bq/L	---	---	---	---	---
STRONTIUM-90	Bq/L	---	---	---	---	---
TRITIUM	Bq/L	---	---	---	---	---
No. Excursion Comparisons		**248**	**291**	**300**	**248**	**227**
Total No. Excursions Observed		**2**	**7**	**26**	**12**	**1**
Sampling Frequency (no./year)		**12**	**12**	**12**	**11**	**11**
Overall Adherence Rate		**99.19**	**97.59**	**91.33**	**95.16**	**99.56**

"---" = no objective

ND = no data to compare to objective; PPWB approved monitoring plan for 2011 did not include these parameters

*** Low Dissolved Oxygen conditions recorded under ice cover**

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

Table 3 Summary of Excursions for the Saskatchewan- Manitoba Border 2011

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
		number excursions (number of tests)					
METALS	**UNITS**						
ALUMINUM (total)	mg/L	---	---	---	---	---	---
ARSENIC (diss)	mg/L	0	0	0	0	0	0
BARIUM (total)	mg/L	0	0	0	0	0	0
BORON (diss)	mg/L	0	0	0	0	0	0
CADMIUM (total)	mg/L	0	0	0	0	0	0
CHROMIUM (total)	mg/L	0	0	0	0	0	0
COBALT	mg/L	---	---	---	---	---	---
COPPER (total)	mg/L	0	0	0	0	0	0
CYANIDE (free)	mg/L	ND	ND	ND	ND	ND	ND
IRON (diss)	mg/L	0	0	2 (11)	0	0	0
LEAD (total)	mg/L	0	0	0	0	0	0
MANGANESE (diss)	mg/L	0	0	10 (11)	3 (6)	10 (12)	10 (12)
MERCURY (total)	*ug/L*	---	---	---	---	---	ND
NICKEL (total)	mg/L	0	0	0	0	0	0
SELENIUM (diss)	mg/L	0	0	0	0	0	0
SILVER (total)	mg/L	---	---	---	---	---	---
URANIUM	mg/L	0	0	0	0	0	0
VANADIUM (TOTAL)	mg/L	---	---	---	---	---	---
ZINC (total)	mg/L	0	0	0	0	0	0
NUTRIENTS							
AMMONIA (total)	mg/L	0	0	0	0	0	0
NO2+NO3 (as N)	mg/L	0	0	0	0	0	0
PHOSPHORUS (total)	mg/L	0	6 (12)	11 (11)	4 (6)	12 (12)	12 (12)
MAJOR IONS							
CHLORIDE (diss.)	mg/L	0	0	5 (11)	0	0	0
FLUORIDE (diss)	mg/L	0	0	0	0	0	0
SODIUM (diss)	mg/L	0	0	3 (11)	0	0	9 (12)
SULPHATE (diss)	mg/L	0	0	0	0	0	0
TOTAL DISS. SOLIDS	mg/L	---	---	---	---	---	---
BIOTA							
FECAL COLIFORM	*NO/dL*	ND	0	0	0	1 (12)	1 (8)
PHYSICALS							
pH	*pH Units*	0	0	0	0	0	0
OXYGEN (diss)	mg/L	0	1 (11)	3 (8)(* +3 under ice)	0	1 (12)	0
SAR	mg/L	---	---	---	---	---	---
PESTICIDES/CONTAMINANTS							
LINDANE	mg/L	ND	ND	0	ND	0	ND
2,4-D	mg/L	ND	ND	0	ND	0	ND
2,4,5-TP (Silvex)	mg/L	ND	ND	0	ND	0	ND
CHLORINE	mg/L	ND	ND	ND	ND	ND	ND
CHLOROPHENOLS (total)	mg/L	ND	ND	ND	ND	ND	ND
PCP	mg/L	ND	ND	ND	ND	ND	ND
MERCURY IN FISH	*ug/g TISSUE*	ND	ND	ND	ND	ND	ND
PCB IN FISH	*ug/g TISSUE*	ND	ND	ND	ND	ND	ND
RADIOACTIVE							
CESIUM-137	*Bq/L*	ND	ND	ND	ND	ND	ND
IODINE-131	*Bq/L*	ND	ND	ND	ND	ND	ND
RADIUM-226	*Bq/L*	ND	ND	ND	ND	ND	ND
STRONTIUM-90	*Bq/L*	ND	ND	ND	ND	ND	ND
TRITIUM	*Bq/L*	ND	ND	ND	ND	ND	ND
No. Excursion Comparisons		**66**	**273**	**276**	**138**	**307**	**272**
Total No. Excursions Observed		**0**	**7**	**34**	**7**	**24**	**32**
Sampling Frequency (no./year)		**3**	**12**	**11**	**6**	**12**	**12**
Overall Adherence Rate		**100.0**	**97.44**	**87.68**	**94.93**	**92.18**	**88.24**

"---" = no objective

ND = no data to compare to objective; PPWB approved monitoring plan for 2011 did not include these parameters

*** Low Dissolved Oxygen conditions recorded under ice cover**

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

Table 4 Summary of 2011 Excursions by Parameter. ***(Parameters and sites with % excursions > 20 are highlighted in grey. Blank cells are parameters with no excursions in 2010).***

		EXCURSION SUMMARY			SITE SUMMARY	
Parameters	**Protective Uses**	TOTAL NUMBER EXCURSIONS (# SAMPLES)	% EXCURSIONS		NUMBER SITES WITH EXCURSIONS (# SITES)	% SITES WITH EXCURSIONS
METALS						
ALUMINUM (total)	**Irrigation/Livestock**	**1 (22)**	**4.50**		**1 (2)**	**50**
ARSENIC (diss)						
BARIUM (total)						
BORON (diss)						
CADMIUM (total)	**Protection of Aquatic Life**	**1 (111)**	**0.9**		**1 (11)**	**9.1**
CHROMIUM (total)	**Protection of Aquatic Life**	**1 (111)**	**0.9**		**1 (11)**	**9.1**
COBALT						
COPPER (total)	**Protection of Aquatic Life**	**11 (111)**	**9.9**		**3 (11)**	**27.3**
CYANIDE (free)						
IRON (diss)	**Treatability**	**4 (111)**	**3.6**		**3 (11)**	**27.3**
LEAD (total)	**Protection of Aquatic Life**	**3 (111)**	**2.7**		**3 (11)**	**27.3**
MANGANESE (diss)	**Treatability/Irr/Livestock**	**42 (111)**	**37.8**		**7 (11)**	**63.6**
MERCURY (total)						
NICKEL (total)	**Protection of Aquatic Life**	**1 (111)**	**0.9**		**1 (11)**	**9.1**
SELENIUM (diss)						
SILVER (total)						
URANIUM						
VANADIUM (TOTAL)						
ZINC (total)	**Protection of Aquatic Life**	**5 (111)**	**4.5**		**3 (11)**	**27.3**
NUTRIENTS						
AMMONIA (total)						
NO2+NO3 (as N)						
PHOSPHORUS (total)	**Recreation**	**45 (56)**	**80.4**		**5 (6)**	**83.3**
MAJOR IONS						
CHLORIDE (diss.)	**Irrigation/Livestock**	**5 (89)**	**5.6**		**1 (9)**	**11.1**
FLUORIDE (diss)						
SODIUM (diss)	**Irrigation/Livestock**	**16 (89)**	**18.0**		**3 (9)**	**33.3**
SULPHATE (diss)						
TOTAL DISS. SOLIDS	**Treatability**	**5 (45)**	**11.1**		**1 (4)**	**25.0**
BIOTA						
FECAL COLIFORM	**Irrigation/Livestock/Recreation**	**7 (89)**	**7.9**		**5 (10)**	**50.0**
PHYSICALS						
pH						
OXYGEN (diss)	**Protection of Aquatic Life**	**3 (83)**	**3.6**		**3 (9)**	**33.3**
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

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 (NH_3 + NH_4+)

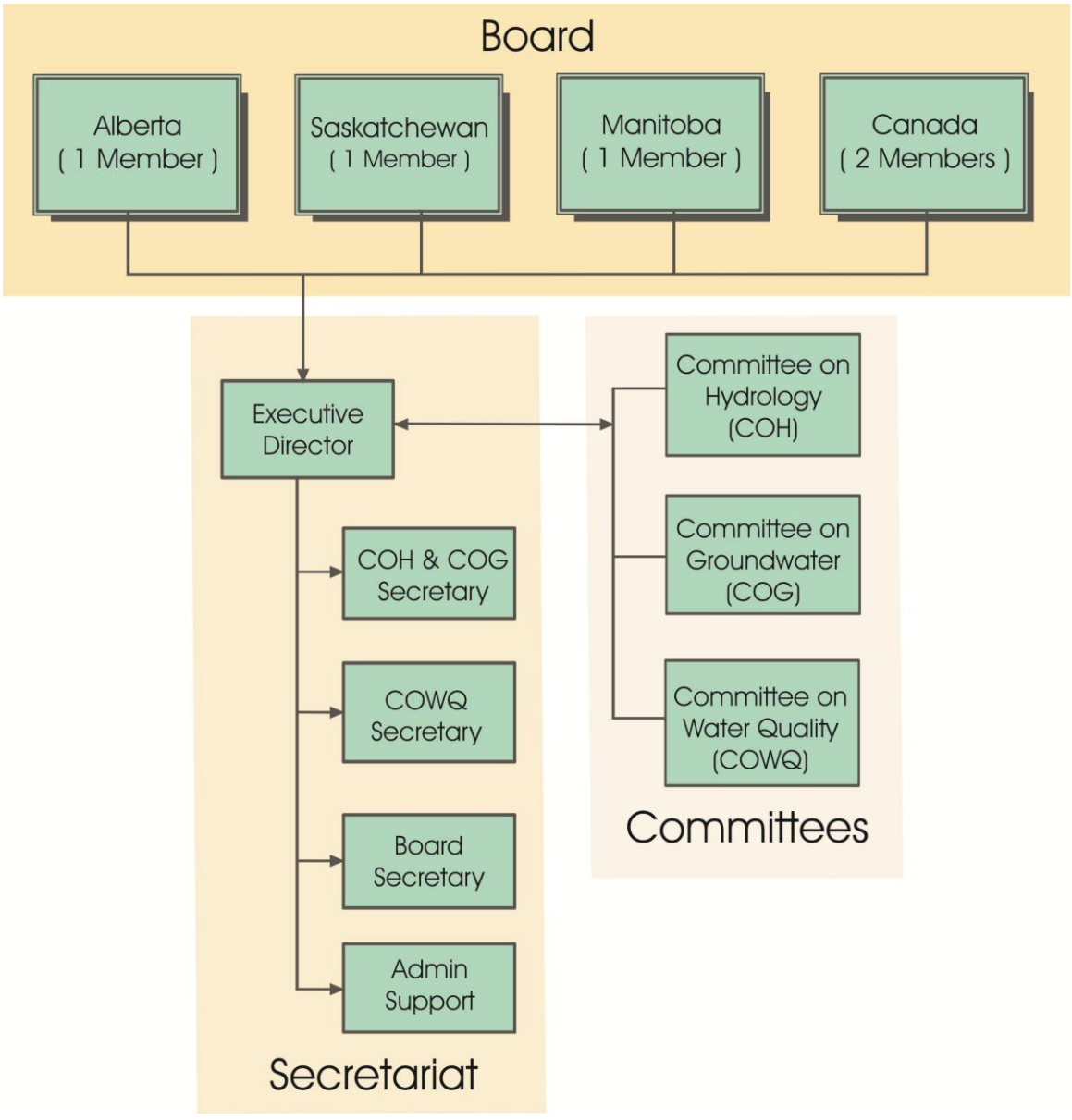
(Maximum levels expressed as N at various pH/temperature conditions)

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 2011 - 2012

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	Regional Director General Prairie and Northern Region Environment Canada
David Phillips (Beginning May/11)	Director General Agri-Environmental Adaptation and Practice Change Agri-Environment Services Branch Agriculture and Agri-Food Canada
Alan Parkinson (May/10 to May/11)	Acting Director General Agri-Environmental Adaptation and Practice Change Agri-Environment Services Branch Agriculture and Agri-Food Canada
Robert P. Harrison	Lead Transboundary Secretariat Alberta Environment and Water
Steve D. Topping	Executive Director Hydrologic Forecasting & Water Management Water Management & Structures Division Manitoba Infrastructure and Transportation
Wayne L. Dybvig	President Saskatchewan Watershed Authority

SECRETARIAT

EXECUTIVE DIRECTOR	Mike Renouf	Transboundary Waters Unit Environment Canada
SECRETARY	Michele Williamson	Transboundary Waters Unit Environment Canada

PPWB ALTERNATE BOARD MEMBERS

Vacant	Environment Canada
Rick Butts	Director General Agri-Environmental Knowledge, Innovation and Technology Agri-Environment Services Branch Agriculture and Agri-Food Canada
Brian Yee	Transboundary Water Specialist Transboundary Secretariat Alberta Environment and Water
Jim Gerhart (Beginning Sep./11)	Executive Director, Integrated Water Services, Saskatchewan Watershed Authority
Dwight Williamson	Assistant Deputy Minister Ecological Services Division 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	M. Renouf	Executive Director Prairie Provinces Water Board
MEMBERS	Greg MacCulloch	Water Survey Division Environment Canada, Hydrometric
	R. Woodvine	Agri-Environment Services Branch Agriculture and Agri-Food Canada
	B. Yee	Transboundary Secretariat Alberta Environment and Water
	R.W. Harrison	Surface Water Management Manitoba Conservation and Water Stewardship
	D. Johnson (Jan./03 – Oct./11)	Basin Operations Saskatchewan Watershed Authority
	B. Oegema (Beginning Oct. /11)	Hydrology Services Saskatchewan Watershed Authority
	A. Liu (Beginning Oct./11)	Meteorological Service of Canada Environment Canada, Meteorological
	N. Taylor (Sep./05 – Oct./11)	Meteorological Service of Canada Environment Canada, Meteorological
SECRETARY		
	V. 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	M. Renouf	Executive Director Prairie Provinces Water Board
MEMBERS	D.B. Donald	Prairie and Northern Water Quality Monitoring Environment Canada
	N. Armstrong	Water Science and Management Branch Manitoba Water Stewardship
	T. Hanley (Mar./04 – Oct./11)	Watershed Monitoring and Assessment Saskatchewan Watershed Authority
	J.-M. Davies (Beginning Oct./11)	Water Quality Services Saskatchewan Watershed Authority
	R. Casey	Water Policy Branch Alberta Environment and Water
	B. Schutzman	Agri-Environment Services Branch Agriculture and Agri-Food Canada
SECRETARY	J. Sketchell	Transboundary Waters Unit Environment Canada

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	M. Renouf	Executive Director Prairie Provinces Water Board
MEMBERS	G. van der Kamp	Groundwater Hydrology Water Science and Technology Directorate Environment Canada
	A. Cowen	Agri-Environment Services Branch Agriculture and Agri-Food Canada
	R. George	Water Policy Branch Alberta Environment and Water
	N. Shaheen (Oct./89 – Oct./11)	Groundwater Management Saskatchewan Watershed Authority
	J. Fahlman (Beginning Oct./11)	Hydrology and Groundwater Services Saskatchewan Watershed Authority
	R. Betcher	Groundwater Management Water Sciences and Management Branch Manitoba Water Stewardship
SECRETARY		
	V. Khanna	Transboundary Waters Unit Environment Canada

APPENDIX VII

Statement of Final Expenditures 2011 - 2012

Salary Component	2011/12 Budgeted	2011/12 Actual
Person Years	4.980	4.195
Salary & Benefits	$509,837	$429,061
O&M Component		
Contracts & Students		
Goal 1		
Cont. Improvement	$36,000	$24,300
Modernization	$150,000	$0
Goal 2		
Cont. Improvement	$10,000	$0
Goal 3		
Cont. Improvement	$75,000	$70,247
Modernization		
Goal 7		
Cont. Improvement	$10,000	$0
Modernization	$15,000	$0
Sub-total contracts	$296,000	$94,547
Operating Expenses	$100,000	$51,818
Total O&M	$396,000	$146,365
Grand Total	$905,837	$575,426

Notes:
- Salary: Vir Khanna appointed as Senior Engineering Advisor in April, 2011, Megan Garner appointed Engineering Advisor in February, 2012.
- Goal 1: Continuous Improvement expense is for a student to support COH activities.
- Goal 3: Continuous Improvement expense is for students to support COWQ activities.

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 are scheduled for approval in 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 will be reviewed in the fiscal year 2012 - 2013.

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