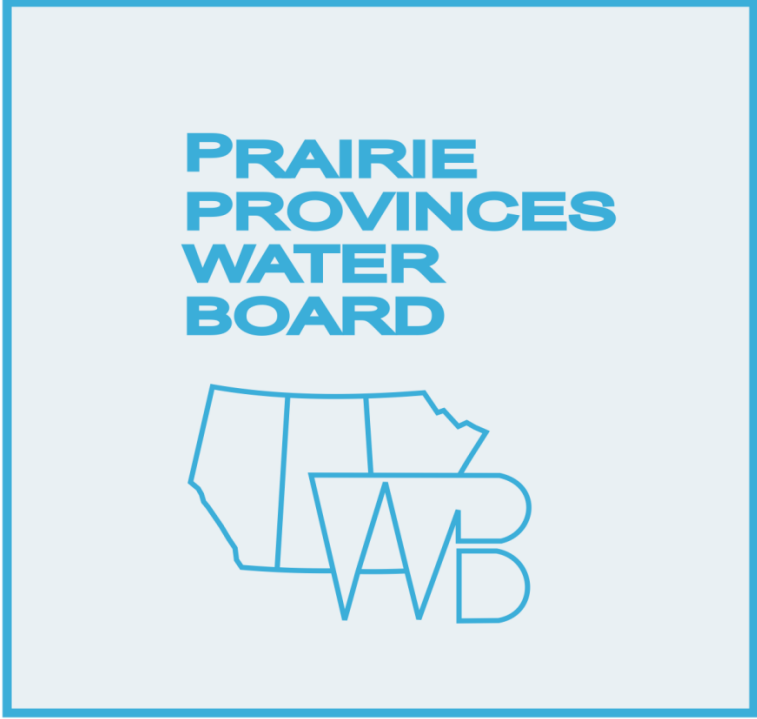


ANNUAL REPORT • 2012

CANADA • ALBERTA • SASKATCHEWAN • MANITOBA





PRAIRIE PROVINCES WATER BOARD

ANNUAL REPORT

FOR THE FISCAL YEAR

APRIL 1, 2012 TO MARCH 31, 2013

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REGIE DES EAUX DES PROVINCES DES PRAIRIES

LETTER OF TRANSMITTAL

December 6, 2013

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

Honourable Ministers:

On behalf of the members of the Prairie Provinces Water Board, it is my pleasure to submit herewith the Annual Report of the Prairie Provinces Water Board for the fiscal year from April 1, 2012 to March 31, 2013.

Yours truly

Cheryl Baraniecki
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 2012-2013, 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 June 2011, the Board initiated a review of the Charter and Strategic Plan. The review included an analysis of strategic directions of each government. The revised key documents were approved at the PPWB 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 continued to maintain attention on the need for involvement of upstream jurisdictions in resolving water quality issues in Lake Winnipeg. Work was completed through the PPWB to establish transboundary nutrient objectives in 2012. Finally, the PPWB continues to provide a cooperative forum for discussion of transboundary water issues.

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.



Cheryl Baraniecki
Chair

MESSAGE FROM THE EXECUTIVE DIRECTOR

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

During 2012, agreed transboundary apportionment of flows on all eastward flowing streams was achieved for all PPWB river reaches. Adherence to the MAA's water quality objectives was good.

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 would 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 recorded hydrological flow records to develop strategic drought scenarios. These scenarios will be produced in 2013 using data provided by Dr. Dave Sauchyn, Prairie Adaptation Research Collaborative.

The COH continued work on its modernization of computational infrastructure 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. In 2012, another contract was awarded to Optimal Solutions and it is being administered by a PPWB member agency.

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 next step for the COG will be to develop drafting instructions for the development of Schedule F for review by the Board in 2013-2014.

The transboundary water quality objectives (WQOs) are descriptions of water quality conditions that are known to protect specific water uses and are acceptable to upstream and downstream provinces. The Committee on Water Quality (COWQ) completed the comprehensive scientific review of the PPWB WQOs, and provided recommendations for changes to the PPWB in October, 2012. The PPWB members are working within their jurisdictions to review the policy and management implications of accepting the proposed changes to the WQOs.

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.

Michele Williamson, PPWB Secretary since September 2009, left the position in November 2012. Lynne Quinnett-Abbott was welcomed as the new PPWB Secretary, and joined the Secretariat on March 4, 2013.

The Board continued its role in helping to ensure coordination of water management and planning that may have transboundary implications. Through the PPWB Chair, the Board represented the Provinces of Saskatchewan and Alberta on the Lake Winnipeg Basin Steering Committee that will implement the Memorandum of Understanding between Canada and Manitoba. Similarly, the Board continued to provide a forum for sharing

information, including Saskatchewan - Manitoba drainage projects on sediment issues, and the Montana - Alberta Water Management Initiative.



Mike Renouf
Executive Director

SUMMARY OF PERFORMANCE RESULTS

During 2012 - 2013, 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;
- continuing work on the process of review apportionment methods in basins over ten-years, and continuing the review of the North Saskatchewan River.

In 2012, water quality objectives were adhered to an average of 95% of 2,909 samples on the 11 MAA river reaches.

The Committee on Water Quality (COWQ) completed the comprehensive scientific review of water quality objectives and developed a nutrient objective.

The 2013 water quality monitoring program was reviewed and approved by the Board in October 2012.

In May 2011, the Committee on Groundwater (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. The next steps are for the COG to develop the legal drafting instructions for the development of the Schedule "F".

In accordance with the PPWB Event Contingency Plan, Board members were informed in June 2012 of an oil spill on the Red Deer River in Alberta. Saskatchewan, the downstream jurisdiction, was not affected.

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

- water quality in Lake Winnipeg;
- downstream impacts of drainage in Saskatchewan upon Manitoba;
- Manitoba's concerns 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;

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, 2012 to March 31, 2013.

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 transboundary lakes. It also serves to protect transboundary 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 2012-2013 activities in the Work Plan. Included in this section is Goal 8, which provides a summary of the administration activities and financial expenditures for the year 2012 - 2013.

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 2012 apportionable flow data. Appendices III and IV present the water quality parameters that were monitored by Environment Canada and the 2012 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 eight goals in the PPWB's Strategic Plan. Progress made in 2012-2013 is discussed below for each of these goals.

GOAL 1: Agreed Transboundary Apportionment of Water Is Achieved

The PPWB's Strategic Goal 1 is to achieve transboundary apportionment of water 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 2012-2013, the PPWB Secretariat calculated apportionable flows using monitoring data from 93 hydrometric stations, 20 meteorological stations and other meteorological and water use data (see Appendix I).

In October 2012, the Board reviewed and approved the monitoring stations lists for 2013 - 2014. One station located on the Saskatchewan River (Broderick Irrigation Project Main Canal below Pumping Station) operated by a third party is no longer being monitored. The 2013-2014 meteorological station list included one change, a switch to use the Yorkton RCS Auto station because it was found to be more reliable than the Aviation Weather Observation System that was previously used.

Flows Reported in 2012

Quarterly flow reporting was completed for four basins in 2012. Interim recorded and apportionable flows were reported for the South Saskatchewan River, Middle Creek and Lodge Creek for the entire year, but only for January to June for Cold Lake.

Appendix II presents the monthly and total final apportionment results. All apportionment requirements were met in the calendar year of 2012. For all apportioned rivers and creeks, recorded flows were higher than the amounts that Alberta was obligated to deliver to Saskatchewan. The combined daily recorded flows for the South Saskatchewan and Red Deer Rivers at the Alberta-Saskatchewan border exceeded the minimum flow requirement

of 42.5 m³ / sec (1,500 cfs) through all periods when Alberta was storing water.

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

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

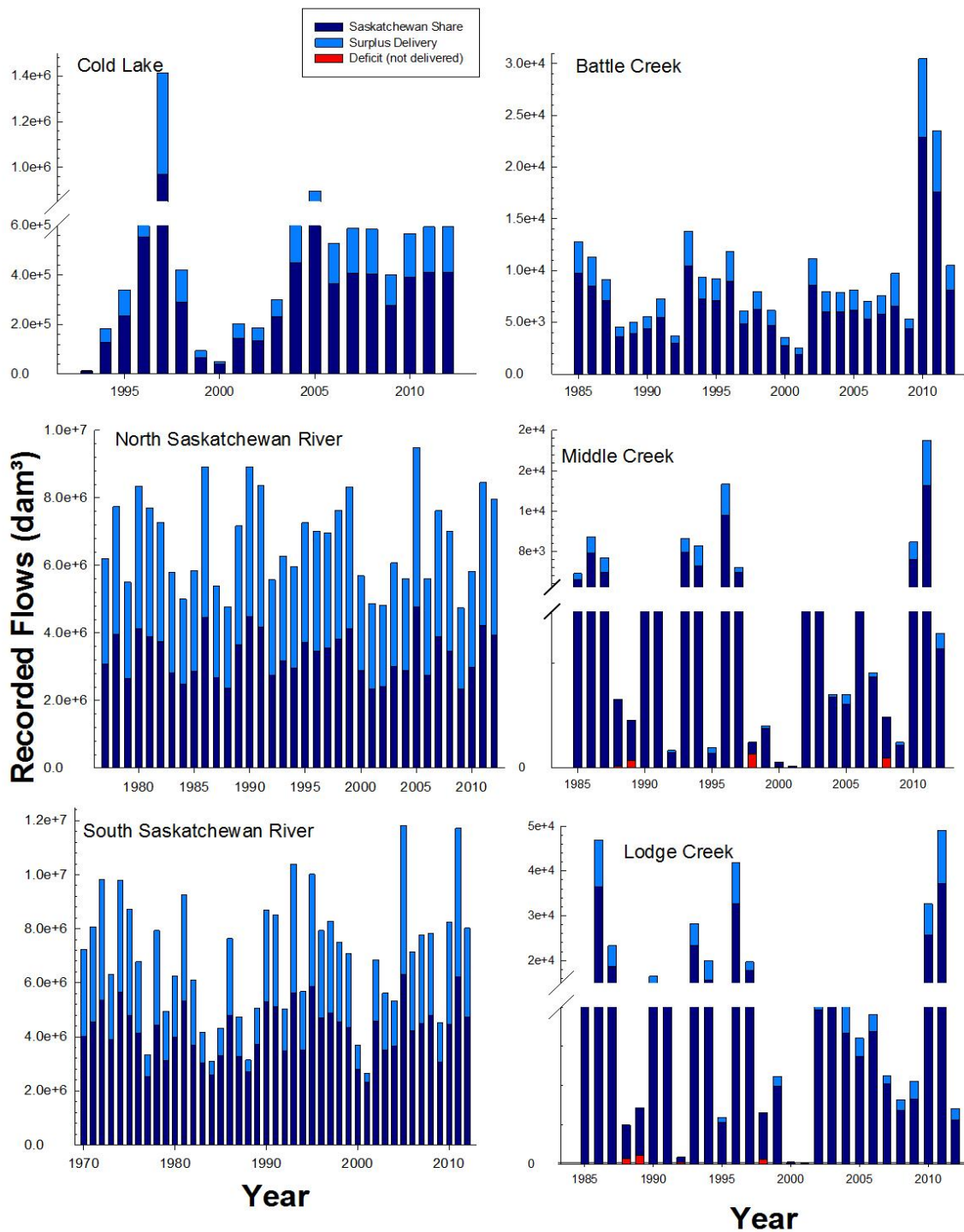


Figure 1. Historic River Flows on the Alberta-Saskatchewan Border

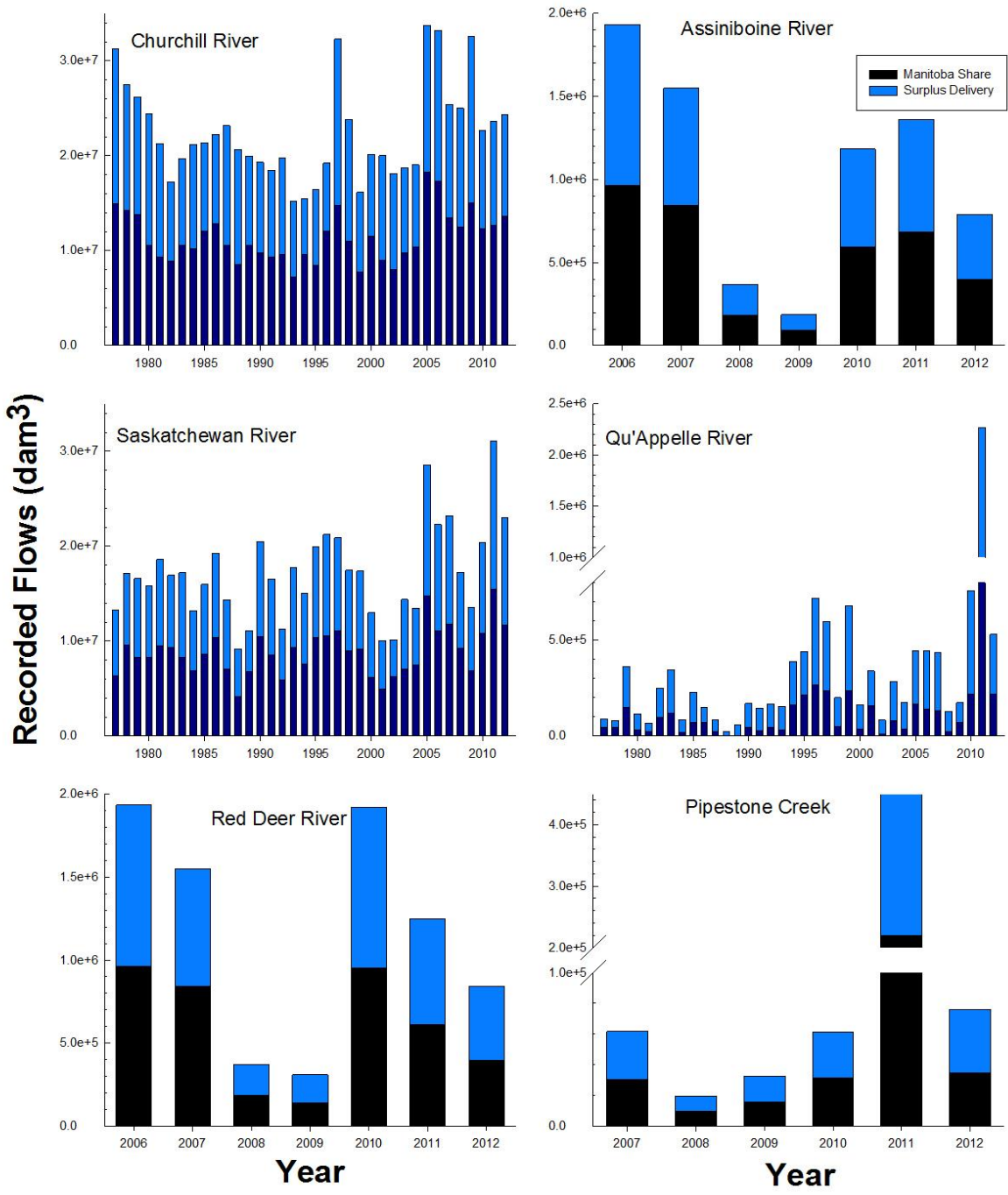


Figure 2. Historic River Flows on the Saskatchewan-Manitoba Border

For rivers with surplus flows, the combined black (provincial share) and blue (surplus) stacked bars show the total recorded flows. 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 notation¹ is used on the y-axis to show the magnitude of differences of flows across rivers.

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

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

are evaluating potential long term solutions.

Improving Apportionment Methods

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

Reviewing Streams and Basins

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 transboundary Streams" (PPWB Report No. 122), evaluated and ranked transboundary 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 each basin's current monitoring status, issues regarding the apportionable flow computation methodology, and the likelihood of apportionment concerns now or in the future.

In 2012-2013, the COH continued to develop a process to evaluate apportionment computation methods, and initiated a systematic review of apportionment computation methodology for all transboundary basins. The objective is to review two basins per year using this new decision criteria and process. In March 2013, the Board supported the idea of a service contract to look at the data requirement for apportionment computation methodology in order to complete the work for the basin reviews. These reviews are projected to take ten years.

The North Saskatchewan River basin is the first river basin to undergo a review. The review has been completed and the COH is currently drafting a report that is anticipated to be presented to the Board in early 2014.

Modernizing Apportionment Software

The PPWB Secretariat uses approximately 50 FORTRAN programs to compute transboundary 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 at a COH meeting in March 2010.

The Secretariat and COH Members have reviewed this new platform and concluded that improvements are needed to the visual display, ease of use, installation processes, and functionality. Another contract with Optimal Solutions Ltd was administered to develop the agreed upon code for RBAT Phase II and this work is anticipated to be completed by December 2013.

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", PPWB Report No. 170 in March 2011. 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: Transboundary Groundwater Aquifers are Protected and Used Sustainably

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

The *MAA* currently has a general statement to refer any transboundary groundwater issues to the Board for their review and recommendation. No issues or concerns were identified in 2012 - 2013.

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.

COG established a task group in 2008, held a workshop in January 2009 to review concepts and principles on which a groundwater schedule could be based, and presented the outcome to the Board at a joint meeting in March 2009. In 2009 - 2010, the COG developed a number of potential concepts and principles which were incorporated into an Impact Analysis Statement and 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 guidance document and the Board indicated their support of the proposed concepts in March 2012.

The next steps for the COG is to develop drafting instructions for the development of the Schedule 'F'. A draft document is expected to be reviewed by the Board in 2013-2014.

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 2012.

GOAL 3: Agreed Transboundary Water Quality Objectives Are Achieved

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

Water Quality Monitoring

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

In 2012, in accordance with the terms of the *MAA*, Environment Canada conducted water quality monitoring at all 11 sites as requested by the PPWB. There were several changes to the monitoring program in 2012 to address proposed changes to water quality objectives. The changes included:

- increasing monitoring on the Red Deer River (Saskatchewan/Manitoba Border) from six times a year to twelve times a year to improve the sample size;
- increasing monitoring on the Cold River from four times a year to 12 times a year to reflect the need to assess proposed objectives on this river; and,
- incorporating bacterial monitoring on the Cold River and the Churchill River.

One hundred and twenty-two water sampling events were conducted on 12 occasions in accordance with the approved 2012 monitoring plan; with two exceptions. One sampling event was not completed on each of the Churchill River (October 2012) and the Carrot

River (November 2012). These samples were not collected due to health and safety concerns resulting from a combination of high flows, steep slopes due to bank erosion and ice that prevented access to the sampling site.

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

Adherence or Excursions to Transboundary Water Quality Objectives

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

A total of 2,909 water quality samples were compared to the transboundary water quality objectives to determine whether any excursions to the objectives occurred in 2012. The Committee on Water Quality (COWQ) has been developing an action plan to assess the risks and causes of excursions and the potential to mitigate by the respective jurisdiction.

The PPWB report on Excursions of Transboundary Water Quality Objectives January to December 2012 is shown in Appendix IV. This report was recommended by the COWQ and approved by the Board in November 2013. Results are summarized.

In 2012, the transboundary water quality objectives were adhered to an average of 95% of samples (Figure 3). Only the Qu'Appelle River had adherence rates of less than 90% predominantly due to excursions of dissolved manganese, total phosphorus and sodium.

Annual adherence rates of rivers have varied only slightly since 2003. The Beaver, North Saskatchewan and the South Saskatchewan Rivers have shown little fluctuation in the adherence rates to transboundary water quality objectives since 2003. The Red Deer River (Alberta/Saskatchewan) and the Qu'Appelle River have shown the greatest variability in adherence rates with ranges of 9.1 and 7.2 respectively.

Adherence rates in 2012 were generally higher than in 2011. Eight rivers showed greater percent adherence to transboundary water quality objectives,

and three rivers showed lower overall percent adherence rates. However, overall variations in adherence rates are minor and still within the inter annual variability.

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 2012, 13 parameters had excursions to the PPWB objectives. Total phosphorous, dissolved manganese, sodium and total dissolved solids accounted for most of the excursions. Background concentrations of these four variables are often naturally high in prairie river system and exceedances of the water quality objectives are not unusual or unexpected.

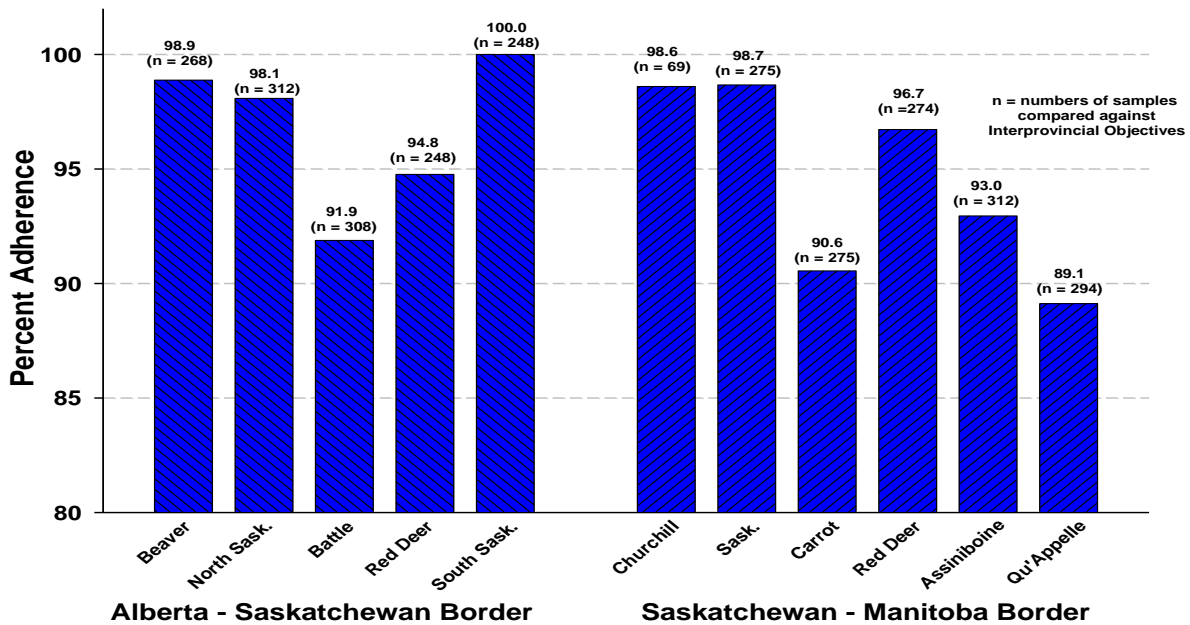


Figure 3: 2012 Percent Adherence to PPWB Objectives

Reviewing and Improving Transboundary Water Quality Objectives

In 2012-2013 the COWQ completed its work on the comprehensive review of the interprovincial water quality objectives. The list of parameters requiring objectives was evaluated.. Excursions rates were assessed by graphing the historic data against these existing objectives.

On October 25, 2012, the COWQ provided a presentation to the Board on the work that was conducted on the review of the Transboundary Water Quality Objectives. Two main approaches were used to revise and develop new water interprovincial water quality objectives:

- Adopt the most protective and appropriate water quality guidelines that have been developed for the site/basin, province, country or North America;
- Develop a background approach, where there was no appropriate guideline.

The COWQ also completed a report detailing their work completed on the transboundary Water Quality Objectives for the PPWB. The Board confirmed their support of the work completed by COWQ including maintaining objectives for parameters sampled in fish tissue. Once the fish tissue data is compiled, it will be analyzed by the COWQ. The next step is for each PPWB member organization to commence internal review of the recommended changes.

The Transboundary Water Quality Objectives review has been conducted to 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.

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

Currently the PPWB Report on Excursions of Transboundary Water Quality Objectives provides information on the year's monitoring program, and provides the results of the analysis of the data. Once the review of the Transboundary Water Quality Objectives has been completed by each PPWB member organization, and Ministerial approval has been received, the PPWB Report on Excursions of Transboundary Water Quality Objectives will be more robust and also include more analysis and interpretation on longer term trends and patterns in water quality. The new "look" is expected to occur as early as 2015.

GOAL 4: Governments 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 transboundary 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 transboundary streams.

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

The 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 2012 - 2013:

- In June 2012, Alberta Environment and Sustainable Resource Development reported an oil spill on the Red Deer River, at Gleniffer Reservoir. The oil spill was contained within the Dickson Dam and no downstream impacts occurred.

GOAL 5: Conflicts over Transboundary Water Issues are Avoided

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

Lake Winnipeg Nutrient Issues

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

The PPWB provides a forum to exchange information on Lake Winnipeg initiatives with the Provinces of Saskatchewan and Alberta. Canada and Manitoba signed a Memorandum of Understanding in September 2010 to continue their collaborative partnership into the long-term. An Implementation Steering Committee formed in October 2010. The Steering Committee met in September 2012 and again in February 2013. 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. In March 2012, funding was renewed for the Lake Winnipeg Basin Initiative (LWBI). In late August 2012, the Prime Minister announced \$9 million in federal

funding to support Lake Winnipeg activities over five years. Phase II (2012-2017) of the LWBI will build on the work of Phase I (2008-2012) and will continue to focus 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 is working through the International Red River Board (IRRB). The IRRB is preparing a basin-wide nutrient strategy and is compiling information on how each jurisdiction is addressing nutrient issues.

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. Preliminary targets have been identified to reduce loading on the overall lake. The next step will be to develop targets for specific regions of the lake.

Manitoba/Saskatchewan Drainage

In September 2008, the Minister of Manitoba Conservation and Water Stewardship (formally Manitoba Water Stewardship) wrote to the Minister responsible for the Saskatchewan Water Security Agency (formally 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 was hired and prepared a report to assess the causes of erosion and potential erosion control mitigation. The report has not yet been finalized.

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

Annual Report on Transboundary Drainage Projects

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

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

No projects were licensed by either Alberta or Saskatchewan in 2012-2013 that had the potential for transboundary impacts into downstream provinces.

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

The Alberta member informed the Board in 2008 of an initiative between Alberta and Montana related to the sharing of the waters in the St. Mary and Milk Rivers. The purpose of this initiative is to cooperatively explore and evaluate options for improving both Montana's

and Alberta's access to the shared water of the St. Mary and Milk Rivers, and to make joint recommendations on preferred options to both governments for their consideration and approval.

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

The Terms of Reference for the Joint Initiative Team does not include Alberta's sharing of water with Saskatchewan under the *MAA*. Nonetheless, the Alberta member will inform the Saskatchewan PPWB member of issues relevant to Saskatchewan.

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

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

GOAL 6: Governments Are Informed About PPWB Activities

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

The PPWB Communication Strategy was revised to focus efforts on communicating effectively about the PPWB to members and governments. The revised Strategy was approved by the Board at their November 13, 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 (www.ppwb.ca) exists to inform the public and interested parties of PPWB activities, and provide a means for Member governments to exchange information and facilitate the business of the PPWB. The PPWB website provides access to a complete suite of PPWB publications and fact sheets. A member portal also facilitates the exchange of information.

In order to maintain good communications between the Board and the Committees, joint meetings with the Committees are scheduled periodically. In 2012-2013, the Board invited the COWQ to its October 25, 2012 held in Regina to discuss the update to the Master Agreement on Apportionment's (MAA) water quality objectives.

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

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

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 Committee on Hydrology (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 using data provided by Dr. Dave Sauchyn, Prairie Adaptation Research Collaborative (PARC), University of

Regina. The contract completion date is May 2013.

Prairie Hydrology Workshop

In the fall of 2008, the Board agreed to host a Prairie Hydrology workshop; however, the workshop was initially delayed as a result of government travel restrictions. The workshop was eventually held in Winnipeg on January 29-30, 2013.

The intent of this workshop was 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 allowed participants to discuss new and innovative solutions to new challenges.

The Prairie Hydrology Workshop was a success with sixty participants in attendance. The participants showed a strong support for future workshops. At their March 2013 meeting, the Board provided their support for future workshops on a three to five year cycle, beginning as early as 2016.

A summary report on the workshop was prepared by R. Halliday and Associate. The report will be reviewed early in the new 2013-2014 fiscal year.

GOAL 8: PPWB Business is Conducted Effectively

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

ADMINISTRATIVE AND FINANCIAL MANAGEMENT

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

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

Michele Williamson, PPWB Secretary, left the Transboundary Waters Unit, Environment Canada, in November 2012. Lynne Quinnett-Abbott started on March 4, 2013 as the new Senior Water Program Advisor, Transboundary Waters Unit to fill in the position of the PPWB Secretary.

Five Board and eight Committee meetings were held throughout the 2012 - 2013 fiscal year. Invitations were sent to the COWQ Committee members to participate in the October 25, 2012 Board meeting in Regina. The meeting focused on the Committees review of the transboundary water quality objectives. This practice is also common with the other Board Committees, thereby improving communication and understanding between the Board and the Committees.

PPWB

- Meeting No. 102. October 25-26, 2012 – Regina
- Meeting No. 103A. November 13, 2012 – Teleconference
- Meeting No. 103B. December 6, 2012 – Teleconference.
- Meeting No. 104. March 20-21, 2013 – Winnipeg.

COH

- Meeting No. 122. Part A on June 4, 2012 and Part B on June 20, 2012 – Teleconference
- Meeting No. 123 Part A. October 10, 2012 – Teleconference
- Meeting No. 123 Part B. October 23, 2012 – Teleconference
- Meeting No. 123 Part C. December 3, 2012 - Teleconference
- Meeting No. 124. January 31, 2013 - Winnipeg

COWQ

- Meeting No. 117. April 3, 2012 – Teleconference
- Meeting No. 118. June 18–19, 2012 – Edmonton
- Meeting No.119. October 24-25, 2012 - Regina

COG

- No meetings occurred in fiscal year 2012-2013.

The Board approves the annual budget for the PPWB. The budget for 2012 - 2013 was \$956,200 and final expenditures were \$ 687,077 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. 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 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.


The approved work plans were adhered to in 2012 – 2013.

Strategic Plan and Charter

The Strategic Plan and Charter underwent a review in 2012 as part of the work plan renewal process to evaluate whether current government priorities were reflected in the PPWB activities. Strategic directions were considered from provincial and federal water strategies, programs and activities. These documents were approved at the Board's fall 2012 meeting.

Considerable changes were made in order to modernize, update and avoid duplication. Some of the changes include:

- streamlining the Charter and avoid duplication with the Strategic Plan,
- clarifying governance/responsibilities,
- enhancing core mandate and elements of the MAA,
- enhancing and ensuring consistency of subgoals across goals; and,
- modernizing groundwater subgoals.

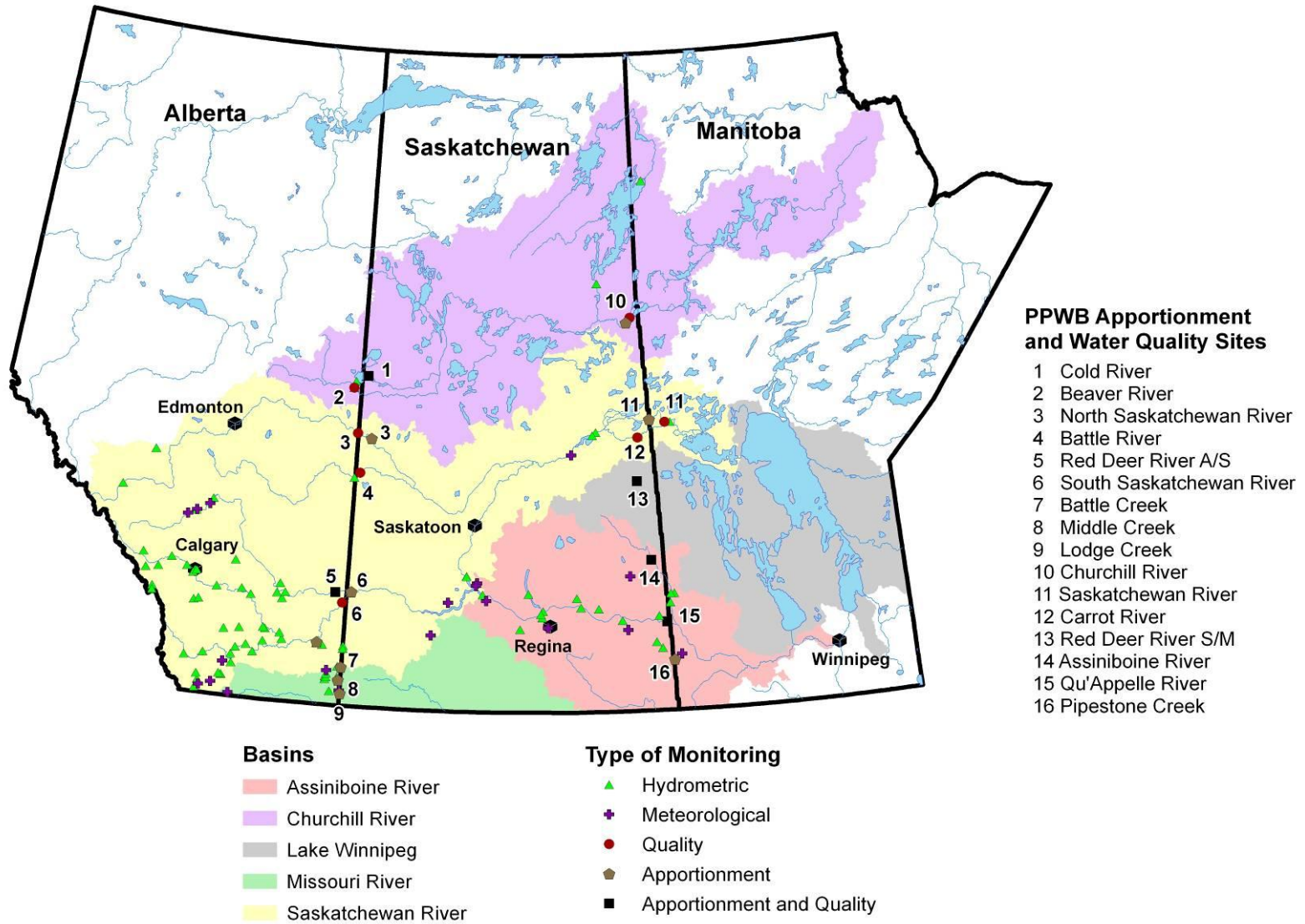


The Strategic Plan has moved from having 7 strategies to 8 with the addition of “*PPWB business is conducted effectively*” (Goal 8).

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 2012 – 2013



APPENDIX II: 2012 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 | 188000 | 187000 | 255000 | 241000 | 643000 | 1800000 | 1320000 | 468000 | 250000 | 260000 | 265000 | 239000 | 6110000 |
| CONSUMPTIVE USE | 320 | -10 | 500 | 102000 | 236000 | 146000 | 377000 | 230000 | 207000 | 23400 | -240 | -400 | 1320000 |
| CHANGE IN RESERVOIR STORAGE | -85400 | -61900 | -50000 | 36100 | 132000 | 341000 | 67700 | -106000 | -131000 | -22400 | 39600 | -68900 | 90700 |
| INTERBASIN TRANSFER* | 0 | 0 | 0 | 4270 | 14400 | 25300 | 20400 | 20700 | 14600 | 10200 | 0 | 0 | 110000 |
| APPORTIONABLE FLOW | 113000 | 125000 | 198000 | 299000 | 1050000 | 2310000 | 1790000 | 645000 | 322000 | 287000 | 321000 | 185000 | 7650000 |

* From Western Irrigation District

RED DEER RIVER – ALBERTA - SASKATCHEWAN BORDER

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | TOTALS |
|-----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| RECORDED FLOW | 51500 | 44800 | 51200 | 175000 | 231000 | 531000 | 357000 | 182000 | 92900 | 92700 | 53900 | 44400 | 1910000 |
| CONSUMPTIVE USE | 0 | 0 | 0 | -4800 | 1560 | 2530 | 1580 | 5220 | 3110 | -280 | 0 | 0 | 8920 |
| CHANGE IN RESERVOIR STORAGE | -25600 | -23400 | -16900 | -11000 | 14300 | 53800 | 23000 | 15500 | 2300 | -1580 | -11700 | -25700 | -6810 |
| INTERBASIN TRANSFER* | 0 | 0 | 0 | -4270 | -14400 | -25300 | -20400 | -20700 | -14600 | -10200 | 0 | 0 | -110000 |
| APPORTIONABLE FLOW | 27800 | 21400 | 28600 | 163000 | 220000 | 560000 | 361000 | 188000 | 84800 | 81900 | 45000 | 20600 | 1800000 |

** From Eastern Irrigation District

SOUTH SASKATCHEWAN RIVER – BELOW JUNCTION WITH RED DEER RIVER

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | TOTALS |
|------------------------------------|--------|--------|--------|--------|---------|---------|---------|--------|---------|---------|---------|---------|---------|
| RECORDED FLOW | 239000 | 231000 | 306000 | 417000 | 874000 | 2330000 | 1680000 | 650000 | 343000 | 353000 | 318000 | 283000 | 8020000 |
| APPORTIONABLE FLOW | 141000 | 146000 | 226000 | 462000 | 1270000 | 2870000 | 2150000 | 833000 | 407000 | 369000 | 366000 | 205000 | 9450000 |
| SASKATCHEWAN SHARE (50%) | 70500 | 73000 | 113000 | 231000 | 637000 | 1440000 | 1070000 | 417000 | 204000 | 185000 | 183000 | 103000 | 4730000 |
| EXCESS (+) OR DEFICIT (-) DELIVERY | 169000 | 158000 | 193000 | 186000 | 237000 | 891000 | 603000 | 234000 | 140000 | 169000 | 135000 | 181000 | 3290000 |
| CUMULATIVE EXCESS OR DEFICIT | 169000 | 327000 | 520000 | 706000 | 943000 | 1830000 | 2440000 | 260000 | 2810000 | 2980000 | 3110000 | 3290000 | 3290000 |

Recorded Flow is 85% 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. Final numbers might differ due to rounding-off to three significant figures.

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

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | TOTALS |
|--------------------|--------|--------|--------|--------|--------|---------|---------|---------|--------|--------|--------|--------|---------|
| RECORDED FLOW | 303000 | 293000 | 316000 | 643000 | 710000 | 1490000 | 1390000 | 1170000 | 487000 | 423000 | 391000 | 343000 | 7960000 |
| APPORTIONABLE FLOW | 59000 | 61000 | 78600 | 468000 | 706000 | 2040000 | 1920000 | 1380000 | 530000 | 327000 | 189000 | 93000 | 7860000 |

Recorded Flow is 101% of Apportionable Flow. Recorded flow exceeded the Apportionable Flow by 90 900 dam³ in 2012 because of a net reduction in reservoir storage of 85 500 dam³ in Lake Abraham and 5 400 dam³ in Brazeau Reservoir. Alberta is required to deliver 50% of Apportionable Flows to Saskatchewan.

BATTLE CREEK – ALBERTA - SASKATCHEWAN BORDER

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | TOTALS |
|--------------------|------|------|------|------|------|------|------|------|-------|------|------|------|--------|
| RECORDED FLOW | 0 | 207 | 1550 | 1680 | 1900 | 1850 | 986 | 817 | 708 | 819 | 0 | 0 | 10500 |
| APPORTIONABLE FLOW | 0 | 208 | 1550 | 1700 | 2000 | 1980 | 1010 | 868 | 722 | 820 | 0 | 0 | 10900 |

Recorded Flow is 97% 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 | 0 | 383 | 468 | 604 | 1223 | 147 | 0 | 0 | 2 | 0 | 0 | 2830 |
| APPORTIONABLE FLOW | 0 | 3 | 439 | 485 | 683 | 1239 | 147 | 0 | 0 | 2 | 0 | 0 | 3000 |

Recorded Flow is 94% 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 | 0 | 171 | 557 | 266 | 129 | 46 | 31 | 49 | 36 | 0 | 0 | 1290 |
| APPORTIONABLE FLOW | 0 | 0 | 243 | 681 | 305 | 147 | 39 | 31 | 47 | 28 | 0 | 0 | 1520 |

Recorded Flow is 85% 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 | 31300 | 31100 | 29600 | 35900 | 44200 | 89100 | 103000 | 73300 | 54400 | 38200 | 31500 | 596000 |
| APPORTIONABLE FLOW | 35000 | 31400 | 31300 | 29800 | 36200 | 44400 | 89300 | 103000 | 73400 | 54600 | 38400 | 31700 | 599000 |

Recorded Flow is 100% 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 | 2070000 | 1880000 | 1920000 | 1940000 | 2460000 | 2980000 | 2760000 | 2390000 | 2340000 | 2560000 | 2720000 | 2720000 | 29000000 |
| APPORTIONABLE FLOW | 1900000 | 1710000 | 1710000 | 1750000 | 2260000 | 2900000 | 2720000 | 2350000 | 2280000 | 2460000 | 2600000 | 2600000 | 27200000 |

Estimated Flow includes Recorded Flow at Sandy Bay and estimated inflow from Sandy Bay to the Saskatchewan-Manitoba Border. Estimated flow is 107% of Apportionable Flow. Estimated Flow exceeded the Apportionable Flow by 1 795 000 dam³ in 2012 because of a net reduction in reservoir storage of 1 795 000 dam³ in Reindeer Lake. 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 | 1160000 | 1020000 | 1300000 | 2180000 | 2170000 | 2430000 | 3660000 | 3380000 | 1830000 | 1500000 | 1330000 | 1040000 | 23000000 |
| APPORTIONABLE FLOW | 720000 | 681000 | 1150000 | 2320000 | 2410000 | 3470000 | 4270000 | 3500000 | 1790000 | 1350000 | 1000000 | 759000 | 23400000 |

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 98% of Apportionable Flow. Saskatchewan is required to deliver 50% of Apportionable Flows to Manitoba.

CARROT RIVER – SASKATCHEWAN - MANITOBA BORDER (NEAR TURNBERRY)

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | TOTALS |
|---------------|------|------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|--------|
| RECORDED FLOW | 8820 | 6820 | 26400 | 108000 | 152000 | 117000 | 111000 | 101000 | 72400 | 64000 | 64500 | 35700 | 868000 |

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

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | TOTALS |
|--------------------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|------|------|--------|
| RECORDED FLOW | 34600 | 27600 | 58900 | 70500 | 75900 | 117000 | 71000 | 31200 | 14700 | 11000 | 8680 | 8640 | 529000 |
| APPORTIONABLE FLOW | | | | | | | | | | | | | 437000 |

Recorded flow is 121% of Apportionable Flow. Recorded Flow exceeded the Apportionable Flow by 92 000 dam³ in 2012 because of diversions of 83 000 dam³ from the South Saskatchewan River as well as inaccuracies in estimating ungauged local inflow and actual water use in the basin. Saskatchewan is required to deliver 50% of Apportionable Flow to Manitoba.

RED DEER RIVER – SASKATCHEWAN - MANITOBA BORDER (near Erwood)

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | TOTALS |
|--------------------|------|------|-------|--------|--------|--------|-------|-------|-------|-------|--------|-------|--------|
| RECORDED FLOW | 6200 | 3420 | 22300 | 195000 | 185000 | 217000 | 76400 | 64000 | 13900 | 17800 | 21200 | 18500 | 841000 |
| APPORTIONABLE FLOW | 5840 | 3360 | 21000 | 187000 | 175000 | 204000 | 71300 | 60100 | 13100 | 16700 | 200000 | 17500 | 795000 |

Recorded Flow is 106% of Apportionable Flow. Recorded Flow exceeded the Apportionable Flow by 46 000 dam³ in 2012 because agricultural drainage contributed an estimated 48 000 dam³ 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 | 4840 | 3370 | 52300 | 137000 | 136000 | 236000 | 158000 | 39200 | 5410 | 3960 | 6240 | 6300 | 789000 |
| APPORTIONABLE FLOW | 4930 | 3460 | 52300 | 138000 | 136000 | 236000 | 159000 | 40000 | 6010 | 4170 | 6220 | 6370 | 792000 |

Recorded Flows are 96% of Apportionable Flows. Saskatchewan is required to deliver 50% of Apportionable Flows to Manitoba.

PIPESTONE CREEK – SASKATCHEWAN - MANITOBA BORDER

| | JAN. | FEB. | MAR. | APR. | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. | TOTALS |
|--------------------|------|------|-------|-------|-------|-------|------|------|-------|------|------|------|--------|
| RECORDED FLOW | 3060 | 1090 | 11300 | 11000 | 13800 | 27600 | 5300 | 1480 | 38 | 16 | 198 | 1080 | 76000 |
| APPORTIONABLE FLOW | 3010 | 1020 | 11000 | 8400 | 11600 | 27300 | 4350 | 521 | 137 | 110 | 296 | 1100 | 68900 |

Recorded Flows are 110% of Apportionable Flows. Recorded Flow exceeded the Apportionable Flow by 7 100 dam³ in 2012 because of a net reduction in reservoir storage of 580 dam³ in Moosomin Reservoir and pumped diversions of 6 840 dam³ from Kipling Marsh to Pipestone Lake. Saskatchewan is required to deliver 50% of Apportionable Flows to Manitoba.

APPENDIX III

PPWB Water Quality Monitoring 2012 Parameter List

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

ALKALINITY, phenol & total
ALUMINUM, diss. & total^θ
AMMONIA, total^θ
ANTIMONY, diss. & total
ARSENIC, diss. ^θ & total
BARIUM, diss. & total^θ
BERYLLIUM, diss. & total
BICARBONATE, calc.
BISMUTH, diss. & total
BORON, diss. ^θ & total
CADMIUM, diss. & total^θ
CALCIUM, diss.
CARBON, diss organic
CARBON, part. organic
CARBON, total organic, calcd.
CARBONATE, calcd.
CHLORIDE, diss^θ
CHROMIUM, diss. & total^θ
COBALT, diss. & total^θ
COLIFORMS FECAL^θ ♦
COLOUR TRUE
COPPER, diss. & total^θ
E. COLI ♦
FLUORIDE, diss^θ
FREE CO₂, calcd.
GALLIUM, diss. & total
HARDNESS NON-CARB. (CALCD.)
HARDNESS TOTAL (CALCD.) CaCO₃
IRON, diss. ^θ & total
LANTHANUM, diss. & total
LEAD, diss. & total^θ
LITHIUM, diss. & total
MAGNESIUM, diss.
MANGANESE, diss. ^θ & total
MOLYBDENUM, diss. & total
NICKEL diss. & total^θ
NITROGEN NO₃ & NO₂, diss^θ.
NITROGEN. part.
NITROGEN, total calcd.

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

ACID HERBICIDES* ^θ
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 2012

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Introduction

The 1969 Master Agreement on Apportionment (MAA) was signed by the governments of Alberta, Saskatchewan, Manitoba and Canada and is administered by the Prairie Provinces Water Board (PPWB). Under Schedule E of this agreement the PPWB is required to monitor the quality of the aquatic environment and to make annual comparisons with established interprovincial water quality objectives. To ensure the water quality is protected, water quality objectives have been established at 11 major interprovincial eastward flowing river reaches (Table 1). Five of these reaches are along the Alberta-Saskatchewan border and six are along the Saskatchewan-Manitoba border (Figure 1). These objectives were established in 1992 to protect various water uses including the protection of aquatic life, source 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 site in each of the river reaches. These include nutrients, major ions, metals, fecal coliforms, physical characteristics and pesticides. The Committee on Water Quality (COWQ) annually reviews the results of the water quality monitoring program, with emphasis on the comparisons to interprovincial water quality objectives. This report presents the 2012 adherences and excursions to the 1992 interprovincial water quality objectives.

Field program (2012)

In 2012, Environment Canada undertook a total of 122 water sampling events from the 11 transboundary river reaches. The monitoring program was completed as approved by the Board (Appendix 1) with two exceptions. One sampling event was not completed on the Carrot River in November 2012 and on the Churchill River in October 2012. The samples were not collected due to health and safety concerns caused by high flows, steep slopes, bank erosion, and ice that prevented access to the sites.

Monitoring was also undertaken as monthly samples on the Cold River in 2012 as part of the approved monitoring plan. Currently, there are no interprovincial water quality objectives for the Cold River, but site-specific objectives are being developed as part of the current review of the interprovincial water quality objectives. Monitoring on the Cold River establishes baseline water quality data and will allow future determination of excursions to the proposed objectives.

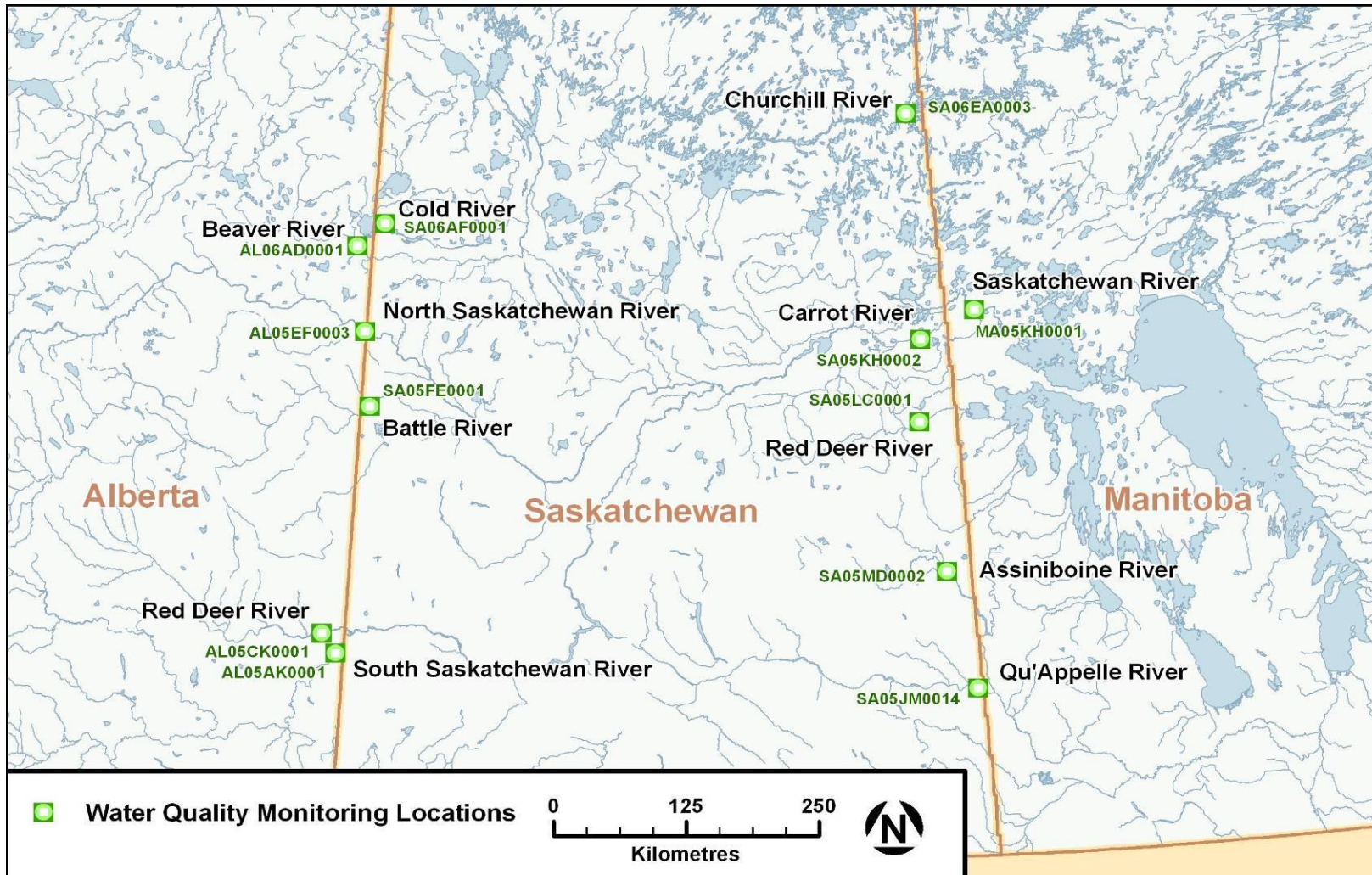


Figure 1 PPWB Water Quality Monitoring Locations

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 2012. This adherence rate is based on the comparison of over 2,909 water quality results to water quality objectives.

The adherence rates for the 11 rivers ranged from 89.1% for the Qu'Appelle River to 100% for the South Saskatchewan River (Figure 2). Of the 11 transboundary river reaches, only the Qu'Appelle River (on the Saskatchewan/Manitoba border) had an overall adherence rate of less than 90% predominantly due to excursions of dissolved manganese, total phosphorus and sodium. Background concentrations of these parameters on the Qu'Appelle River are often greater than the current objectives.

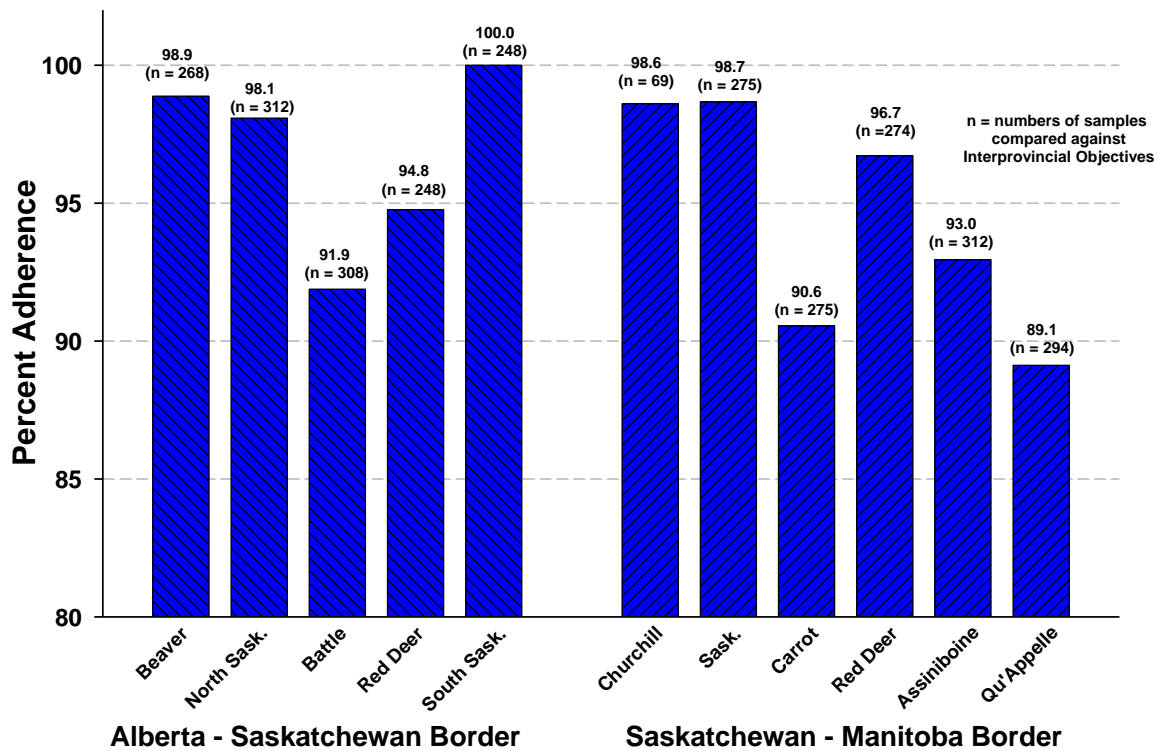


Figure 2 Percent Adherence to 1992 Interprovincial Water Quality Objectives in 2012.

Comparison of the adherence rates from 2003 to 2012 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%); five 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 2011, adherence rates in 2012 were generally higher. Eight rivers showed greater percent adherence to interprovincial water quality objectives, and three rivers showed lower overall percent adherence rates to these interprovincial water quality objectives. However, overall variations in adherence rates are minor and still within expected inter annual variability.

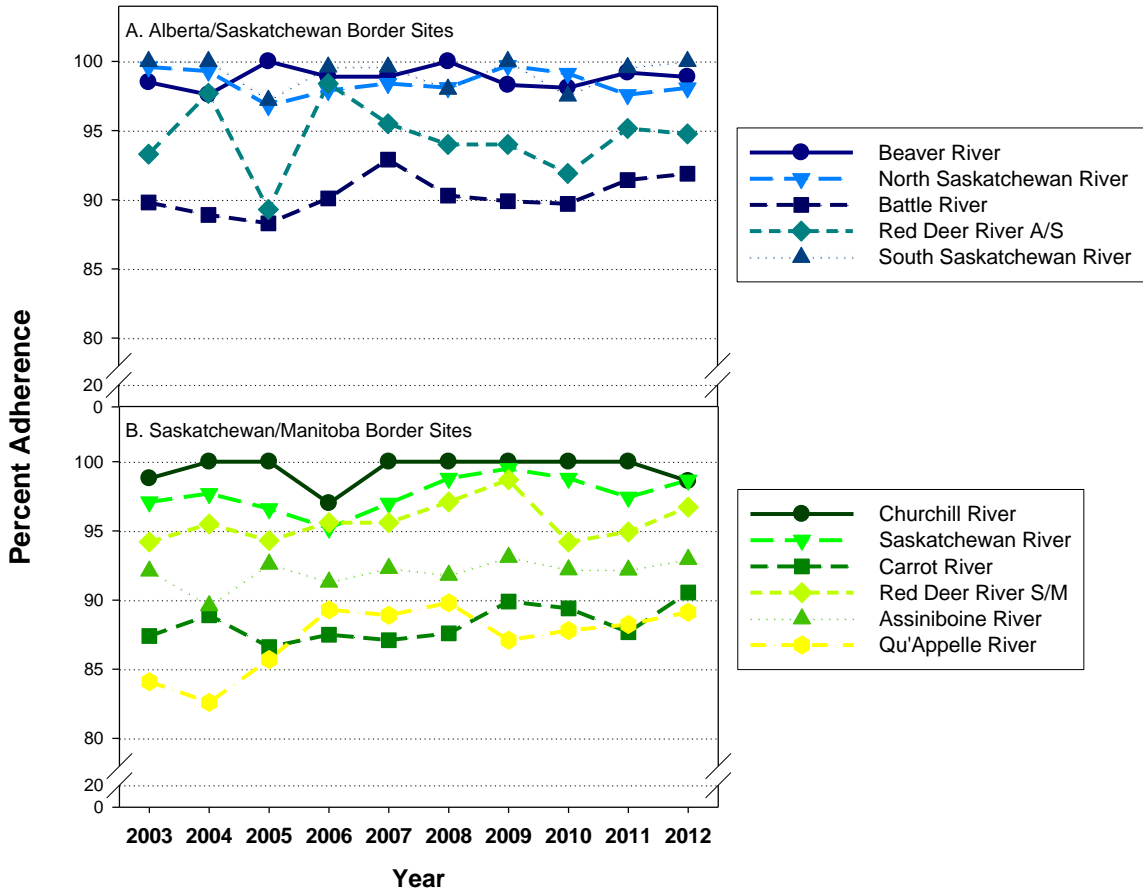


Figure 3 Percent Adherence to 1992 Interprovincial Water Quality Objectives for the Alberta/Saskatchewan (A) and the Saskatchewan Manitoba (B) borders from 2003 to 2012.

Parameter Specific Excursions in 2012

A total of 13 parameters exhibited excursions to the interprovincial water quality objectives (Table 4). Of these parameters total phosphorus, dissolved manganese, sodium and total dissolved solids accounted for most of the excursions.

Excursions were calculated for individual water quality parameter basis for all 11 river reaches to quantify which ones had the greatest number of excursions (*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). Four parameters had excursion rates greater than 20%; total phosphorus (74.2%), manganese (25.4%), sodium (23.5%), and total

dissolved solids (22.9%). Background concentrations of these four variables are often naturally high in prairie river systems.

Of the 13 parameters that exceeded interprovincial water quality objectives, 8 exceeded objectives at more than one transboundary river reach (Table 4). In particular, the total phosphorus objective was exceeded at all 6 of the transboundary river reaches on the Saskatchewan/Manitoba border. Currently, total phosphorus objectives have only been established at the Saskatchewan/Manitoba border. However, proposed new interprovincial water quality objectives for nutrients including total phosphorus, total dissolved phosphorus and total nitrogen are being developed for all transboundary river reaches. Concentrations of manganese (dissolved) exceeded objectives at 6 of the 11 transboundary river reaches monitored in 2012. However, background concentrations of manganese are often naturally high in prairie river systems. Fecal coliform bacteria exceeded objectives at a third of the transboundary river reaches, which is a lower excursion rate than in 2010 and 2011.

Protective Water Use Excursions in 2012

Interprovincial water quality objectives have been established at the transboundary river reaches to protect for different water uses: aquatic life, treatability of source water, agricultural uses (irrigation and livestock watering), recreation and consumption of fish (Table 1). Ammonia objective values vary based on temperature and pH of the sample (Appendix 2). In this report, measured parameters were compared to the water use objectives.

Comparisons to the consumption of fish objectives were not made because fish data were not available for 2012. The data set of contaminants in fish for the transboundary sites has been compiled and is currently being reviewed. Any future fish monitoring program will reflect the results of the previous program.

Of the parameters with protection of aquatic life objectives, six occasionally exceeded water quality objectives including five metals; chromium (total), copper (total), lead (total), nickel (total), and zinc (total). Background concentrations of select metals are naturally high in prairie river systems and exceedances of the water quality objectives may occur during high flow events when total suspended solids are often elevated. Dissolved oxygen concentrations were occasionally below the interprovincial water quality objectives at three of the six rivers on the Saskatchewan/Manitoba border (Carrot River, Assiniboine River and the Qu'Appelle River). Periodic excursions of dissolved oxygen objectives have occurred in previous years in these three rivers.

Four parameters with objectives for the protection of irrigation and/or livestock watering uses were occasionally exceeded in 2012: manganese, chloride, sodium, and fecal coliforms. For recreational water use, excursions of water quality objectives for total phosphorus and fecal coliform occurred in 2012. Fecal coliform bacteria exceeded the site-specific objective for recreational or agricultural uses at 3 of the 11 transboundary river reaches that have an objective for this parameter in 2012. 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. The water quality objective for fecal coliform for the protection of irrigation/livestock uses was exceeded on

the Battle River and the Red Deer River (Alberta/Saskatchewan). There were no fecal coliform bacterial excursions on Saskatchewan/Manitoba border. Sources of fecal coliform are numerous and include wildlife and pet waste, discharge of wastewater and runoff from agricultural activities. Occasional exceedances of fecal coliform objectives are not unexpected in surface waters, particularly in response to rainfall events that can transport fecal bacteria through runoff.

Treatability objectives (for the protection of drinking water sources) for total dissolved solids, iron and manganese were exceeded in 2012. 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 activities in the watershed.

Conclusion

Interprovincial water quality objectives are set at the 11 transboundary river reaches to protect water uses for protection of aquatic life, agricultural uses, recreation, treatability of source water and consumption of fish. Interprovincial water quality objectives were met on average 95% of the time in 2012.

The adherence rate to interprovincial water quality objectives ranged from 100% (South Saskatchewan River) to 89.1% (Qu'Appelle River), indicating that water quality was suitable for the majority of the intended water uses for these rivers. Generally, each of the 11 transboundary river reaches has shown little variation in their adherence rates over the past ten years.

Interprovincial water quality objectives were most frequently exceeded for total phosphorus, dissolved manganese, dissolved sodium and total dissolved solids. In total, interprovincial water quality objectives were exceeded for 13 parameters in 2012. Of these, eight 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 have been reviewed for all transboundary river reaches. Implementation of reviewed and updated objectives is anticipated in 2014. Future activities of the Committee on Water Quality and/or provinces will include further review of excursions to the interprovincial water quality objectives and prioritization of any potential issues for further consideration or other actions.

Table 1 Summary of 1992 Interprovincial Water Quality Objectives by Transboundary River Reach

INTERPROVINCIAL WATER QUALITY OBJECTIVES: MASTER AGREEMENT SCHEDULE E

1 of 2

| LOCATION SITE PPWB REPORT SITE NUMBER | | ALBERTA / SASKATCHEWAN BORDER | | | | |
|---|-------------|-------------------------------|-------------------|--------------|--------------------|-------------------|
| | | BEAVER RIVER | NORTH SASK. RIVER | BATTLE RIVER | RED DEER RIVER A/S | SOUTH SASK. RIVER |
| | | 2 | 3 | 4 | 5 | 6 |
| METALS UNITS | | | | | | |
| ALUMINUM (total) | mg/L | --- | 5 | 5 | --- | --- |
| ARSENIC (diss) | mg/L | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| BARIUM (total) | mg/L | 1 | 1 | 1 | 1 | 1 |
| BORON (diss) | mg/L | 5 | 5 | 5 | 5 | 5 |
| CADMIUM (total) | mg/L | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| CHROMIUM (total) | mg/L | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 |
| COBALT | mg/L | --- | 0.05 | 0.05 | 1 | 1 |
| COPPER (total) | mg/L | 0.004 | 0.004 | 0.004 | 0.004 | 0.01 |
| CYANIDE (free) | mg/L | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 |
| IRON (diss) | mg/L | 1 | 0.3 | 0.3 | 0.3 | 1 |
| LEAD (total) | mg/L | 0.007 | 0.007 | 0.007 | 0.007 | 0.02 |
| MANGANESE (diss) | mg/L | 0.2 | 0.05 | 0.05 | 0.05 | 0.05 |
| MERCURY (total) | ug/L | --- | --- | --- | --- | --- |
| NICKEL (total) | mg/L | 0.1 | 0.1 | 0.1 | 0.025 | 0.025 |
| SELENIUM (diss) | mg/L | 0.001 | 0.001 | 0.001 | 0.001 | 0.002 |
| SILVER (total) | mg/L | 0.0001 | --- | --- | --- | --- |
| URANIUM | mg/L | 0.02 | 0.02 | 0.02 | --- | --- |
| VANADIUM (TOTAL) | mg/L | --- | 0.1 | 0.1 | 0.1 | 0.1 |
| ZINC (total) | mg/L | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 |
| NUTRIENTS | | | | | | |
| AMMONIA (total) | mg/L | APPENDIX 1 | APPENDIX 1 | APPENDIX 1 | APPENDIX 1 | APPENDIX 1 |
| NO2+NO3 (as N) | mg/L | 10 | 10 | 10 | 10 | 10 |
| PHOSPHORUS (total) | mg/L | --- | --- | --- | --- | --- |
| MAJOR IONS | | | | | | |
| CHLORIDE (diss.) | mg/L | 100 | 100 | 100 | --- | --- |
| FLUORIDE (diss) | mg/L | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| SODIUM (diss) | mg/L | 100 | 100 | 100 | --- | --- |
| SULPHATE (diss) | mg/L | 500 | 500 | 500 | 500 | 500 |
| TOTAL DISS. SOLIDS | mg/L | --- | 500 | 500 | 500 | 500 |
| BIOTA | | | | | | |
| FECAL COLIFORM | NO./L | 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 1992 Interprovincial Water Quality Objectives by Transboundary River Reach (continued)

INTERPROVINCIAL WATER QUALITY OBJECTIVES: MASTER AGREEMENT SCHEDULE E

2 of 2

| LOCATION | | SASKATCHEWAN / MANITOBA BORDER | | | | | |
|---|---------------------|--------------------------------|-------------|--------------|--------------------|-------------------|------------------|
| SITE | | CHURCHILL RIVER | SASK. RIVER | CARROT RIVER | RED DEER RIVER S/M | ASSINIBOINE RIVER | QU'APPELLE RIVER |
| PPWB REPORT SITE NUMBER | | 7 | 8 | 9 | 10 | 11 | 12 |
| METALS | | | | | | | |
| | 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 |
| NO ₂ +NO ₃ (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 ₃ /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 2012

| LOCATION SITE PPWB REPORT SITE NUMBER | ALBERTA / SASKATCHEWAN BORDER | | | | |
|---|--------------------------------------|-------------------|------------------|--------------------|-------------------|
| | BEAVER RIVER | NORTH SASK. RIVER | BATTLE RIVER | RED DEER RIVER A/S | SOUTH SASK. RIVER |
| | 2 | 3 | 4 | 5 | 6 |
| | number excursions (number of tests) | | | | |
| METALS | | | | | |
| ALUMINUM (total) | --- | 0 | 0 | --- | --- |
| ARSENIC (diss) | 0 | 0 | 0 | 0 | 0 |
| BARIUM (total) | 0 | 0 | 0 | 0 | 0 |
| BORON (diss) | 0 | 0 | 0 | 0 | 0 |
| CADMIUM (total) | 0 | 0 | 0 | 0 | 0 |
| CHROMIUM (total) | 0 | 0 | 0 | 1 (12) | 0 |
| COBALT | --- | 0 | 0 | 0 | 0 |
| COPPER (total) | 0 | 1 (12) | 2 (12) | 5 (12) | 0 |
| CYANIDE (free) | ND | ND | ND | ND | ND |
| IRON (diss) | 1 (12) | 1 (12) | | 1 (12) | 0 |
| LEAD (total) | 0 | 1 (12) | | 2 (12) | 0 |
| MANGANESE (diss) | 2 (11) | 0 | 2 (12) | 0 | 0 |
| MERCURY (total) | --- | --- | --- | --- | --- |
| NICKEL (total) | 0 | 0 | 0 | 1 (12) | 0 |
| SELENIUM (diss) | 0 | 0 | 0 | 0 | 0 |
| SILVER (total) | 0 | --- | --- | --- | --- |
| URANIUM | 0 | 0 | 0 | --- | --- |
| VANADIUM (TOTAL) | --- | 0 | 0 | 0 | 0 |
| ZINC (total) | 0 | 1 (12) | 0 | 2 (12) | 0 |
| NUTRIENTS | | | | | |
| AMMONIA (total) | 0 | 0 | 0 | 0 | 0 |
| NO2+NO3 (as N) | 0 | 0 | 0 | 0 | 0 |
| PHOSPHORUS (total) | --- | --- | --- | --- | --- |
| MAJOR IONS | | | | | |
| CHLORIDE (diss.) | 0 | 0 | 0 | --- | --- |
| FLUORIDE (diss) | 0 | 0 | 0 | 0 | 0 |
| SODIUM (diss) | 0 | 0 | 9 (12) | --- | --- |
| SULPHATE (diss) | 0 | 0 | 0 | 0 | 0 |
| TOTAL DISS. SOLIDS | --- | 0 | 11 (12) | 0 | 0 |
| BIOTA | | | | | |
| FECAL COLIFORM | 0 | 2 (12) | 1 (12) | 1 (8) | 0 |
| PHYSICALS | | | | | |
| pH | 0 | 0 | 0 | --- | --- |
| OXYGEN (diss) | 0 (* 4 under ice) | 0 | 0 (*2 under ice) | --- | --- |
| SAR | --- | --- | --- | 0 | 0 |
| PESTICIDES/CONTAMINANTS | | | | | |
| LINDANE | ND | ND | ND | ND | ND |
| 2,4-D | ND | ND | ND | ND | ND |
| 2,4,5-TP (Silvex) | ND | ND | ND | ND | ND |
| CHLORINE | ND | ND | ND | --- | --- |
| CHLOROPHENOLS (total) | ND | ND | ND | ND | ND |
| PCP | ND | ND | ND | --- | --- |
| MERCURY IN FISH | ND | ND | ND | ND | ND |
| PCB IN FISH | ND | ND | ND | ND | ND |
| RADIOACTIVE | | | | | |
| CESIUM-137 | --- | --- | --- | --- | --- |
| IODINE-131 | --- | --- | --- | --- | --- |
| RADIUM-226 | --- | --- | --- | --- | --- |
| STRONTIUM-90 | --- | --- | --- | --- | --- |
| TRITIUM | --- | --- | --- | --- | --- |
| No. Excursion Comparisons | 268 | 312 | 308 | 248 | 248 |
| Total No. Excursions Observed | 3 | 6 | 25 | 13 | 0 |
| Sampling Frequency (no./year) | 12 | 12 | 12 | 12 | 12 |
| Overall Adherence Rate | 98.88 | 98.08 | 91.88 | 94.76 | 100 |

"---" = no objective

ND = no data to compare to objective; PPWB approved monitoring plan for 2012 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 2012

| LOCATION SITE PPWB REPORT SITE NUMBER | SASKATCHEWAN / MANITOBA BORDER | | | | | |
|---|-------------------------------------|--------------|----------------------|--------------------|-------------------|------------------|
| | CHURCHILL RIVER | SASK. RIVER | CARROT RIVER | RED DEER RIVER S/M | ASSINIBOINE RIVER | QU'APPELLE RIVER |
| | 7 | 8 | 9 | 10 | 11 | 12 |
| | number excursions (number of tests) | | | | | |
| METALS | | | | | | |
| ALUMINUM (total) | --- | --- | --- | --- | --- | --- |
| ARSENIC (diss) | 0 | 0 | 0 | 0 | 0 | 0 |
| BARIUM (total) | 0 | 0 | 0 | 0 | 0 | 0 |
| BORON (diss) | 0 | 0 | 0 | 0 | 0 | 0 |
| CADMIUM (total) | 0 | 0 | 0 | 0 | 0 | 0 |
| CHROMIUM (total) | 0 | 0 | 0 | 0 | 0 | 0 |
| COBALT | --- | --- | --- | --- | --- | --- |
| COPPER (total) | 0 | 0 | 0 | 0 | 0 | 0 |
| CYANIDE (free) | ND | ND | ND | ND | ND | ND |
| IRON (diss) | 0 | 0 | 0 | 0 | 0 | 0 |
| LEAD (total) | 0 | 0 | 0 | 0 | 0 | 0 |
| MANGANESE (diss) | 0 | 0 | 9 (11) | 1 (12) | 9 (12) | 8 (12) |
| MERCURY (total) | --- | --- | --- | --- | --- | ND |
| NICKEL (total) | 0 | 0 | 0 | 0 | 0 | 0 |
| SELENIUM (diss) | 0 | 0 | 0 | 0 | 0 | 0 |
| SILVER (total) | --- | --- | --- | --- | --- | --- |
| URANIUM | 0 | 0 | 0 | 0 | 0 | 0 |
| VANADIUM (TOTAL) | --- | --- | --- | --- | --- | --- |
| ZINC (total) | 0 | 0 | 0 | 0 | 0 | 0 |
| NUTRIENTS | | | | | | |
| AMMONIA (total) | 0 | 0 | 0 | 0 | 0 | 0 |
| NO2+NO3 (as N) | 0 | 0 | 0 | 0 | 0 | 0 |
| PHOSPHORUS (total) | 1 (3) | 4 (12) | 9 (11) | 8 (12) | 12 (12) | 12 (12) |
| MAJOR IONS | | | | | | |
| CHLORIDE (diss.) | 0 | 0 | 3 (11) | 0 | 0 | 0 |
| FLUORIDE (diss) | 0 | 0 | 0 | 0 | 0 | 0 |
| SODIUM (diss) | 0 | 0 | 3 (11) | 0 | 0 | 11 (12) |
| SULPHATE (diss) | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL DISS. SOLIDS | --- | --- | --- | --- | --- | --- |
| BIOTA | | | | | | |
| FECAL COLIFORM | 0 | 0 | 0 | 0 | 0 | 0 |
| PHYSICALS | | | | | | |
| pH | 0 | 0 | 0 | 0 | 0 | 0 |
| OXYGEN (diss) | 0 | 0 | 2 (7)* +3 under ice) | 0 | 1 (12) | 1 (12) |
| SAR | --- | --- | --- | --- | --- | --- |
| PESTICIDES/CONTAMINANTS | | | | | | |
| LINDANE | ND | 0 | 0 | ND | 0 | 0 |
| 2,4-D | ND | 0 | 0 | ND | 0 | 0 |
| 2,4,5-TP (Silvex) | ND | 0 | 0 | ND | 0 | 0 |
| CHLORINE | ND | ND | ND | ND | ND | ND |
| CHLOROPHENOLS (total) | ND | ND | ND | ND | ND | ND |
| PCP | ND | ND | ND | ND | ND | ND |
| MERCURY IN FISH | ND | ND | ND | ND | ND | ND |
| PCB IN FISH | ND | ND | ND | ND | ND | ND |
| RADIOACTIVE | | | | | | |
| CESIUM-137 | ND | ND | ND | ND | ND | ND |
| IODINE-131 | ND | ND | ND | ND | ND | ND |
| RADIUM-226 | ND | ND | ND | ND | ND | ND |
| STRONTIUM-90 | ND | ND | ND | ND | ND | ND |
| TRITIUM | ND | ND | ND | ND | ND | ND |
| No. Excursion Comparisons | 69 | 301 | 275 | 274 | 312 | 294 |
| Total No. Excursions Observed | 1 | 4 | 26 | 9 | 22 | 32 |
| Sampling Frequency (no./year) | 3 | 12 | 11 | 12 | 12 | 12 |
| Overall Adherence Rate | 98.6 | 98.67 | 90.55 | 96.72 | 92.95 | 89.12 |

"---" = no objective

ND = no data to compare to objective; PPWB approved monitoring plan for 2012 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 2012 Excursions by Parameter. (Parameters and sites with % excursions > 20 are highlighted in grey. Blank cells are parameters with no excursions in 2012).

| Parameters | Protective Uses | EXCURSION SUMMARY | | SITE SUMMARY | |
|--------------------------------|---------------------------------|-------------------------------------|--------------|--|-------------------------|
| | | TOTAL NUMBER EXCURSIONS (# SAMPLES) | % EXCURSIONS | NUMBER SITES WITH EXCURSIONS (# SITES) | % SITES WITH EXCURSIONS |
| METALS | | | | | |
| ALUMINUM (total) | | | | | |
| ARSENIC (diss) | | | | | |
| BARIUM (total) | | | | | |
| BORON (diss) | | | | | |
| CADMIUM (total) | | | | | |
| CHROMIUM (total) | Protection of Aquatic Life | 1 (122) | 0.8 | 1 (11) | 9.1 |
| COBALT | | | | | |
| COPPER (total) | Protection of Aquatic Life | 8 (122) | 6.6 | 3 (11) | 27.3 |
| CYANIDE (free) | | | | | |
| IRON (diss) | Treatability | 3 (122) | 2.5 | 3 (11) | 27.3 |
| LEAD (total) | Protection of Aquatic Life | 3 (122) | 2.5 | 2 (11) | 18.2 |
| MANGANESE (diss) | Treatability/Irr/Livestock | 31 (122) | 25.4 | 6 (11) | 54.5 |
| MERCURY (total) | | | | | |
| NICKEL (total) | Protection of Aquatic Life | 1 (122) | 0.8 | 1 (11) | 9.1 |
| SELENIUM (diss) | | | | | |
| SILVER (total) | | | | | |
| URANIUM | | | | | |
| VANADIUM (TOTAL) | | | | | |
| ZINC (total) | Protection of Aquatic Life | 3 (122) | 2.5 | 2 (11) | 18.2 |
| NUTRIENTS | | | | | |
| AMMONIA (total) | | | | | |
| NO2+NO3 (as N) | | | | | |
| PHOSPHORUS (total) | Recreation | 46 (62) | 74.2 | 6 (6) | 100.0 |
| MAJOR IONS | | | | | |
| CHLORIDE (diss.) | Irrigation/Livestock | 3 (98) | 3.1 | 1 (9) | 11.1 |
| FLUORIDE (diss) | | | | | |
| SODIUM (diss) | Irrigation/Livestock | 23 (98) | 23.5 | 3 (9) | 33.3 |
| SULPHATE (diss) | | | | | |
| TOTAL DISS. SOLIDS | Treatability | 11 (48) | 22.9 | 1 (4) | 25.0 |
| BIOTA | | | | | |
| FECAL COLIFORM | Irrigation/Livestock/Recreation | 4 (97) | 4.1 | 3 (11) | 27.3 |
| PHYSICALS | | | | | |
| pH | | | | | |
| OXYGEN (diss) | Protection of Aquatic Life | 4 (85) | 4.7 | 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 PPWB 2012 Water Quality Monitoring Program

PPWB MONITORING 2012: A/S Sites

| SITE | NUTRIENTS & PHYSICALS | MAJOR IONS/ SAR | METALS (Total and Dissolved) | BACTERIA (Fecal & E. Coli) | PESTICIDES (AH, NH, OC's) Glyphosate |
|-------------------------------------|-----------------------|-------------------|------------------------------|-------------------------------|--------------------------------------|
| Site 1 Cold River | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012: 12x / year | 2012: none |
| Site 2 Beaver River | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 8x/ year ^{ow} | 2012: none |
| Site 3 North Sask. River | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : none |
| Site 4 Battle River | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012: none |
| Site 5 Red Deer River | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 8x/ year ^{ow} | 2012 : none |
| Site 6 South Sask | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 8x/year ^{ow} | 2012 : none |

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

PPWB MONITORING 2012: S/M Sites

| SITE | NUTRIENTS & PHYSICALS | MAJOR IONS/ SAR | METALS (Total and Dissolved) | BACTERIA (Fecal & E. Coli) | PESTICIDES (AH, NH, OC's) Glyphosate |
|---|-----------------------|-------------------|------------------------------|--------------------------------|--------------------------------------|
| Site 7 Churchill¹ | 2012 : 4x / year | 2012 : 4x / year | 2012 : 4x / year | 2012 : 4x / year | 2012: none |
| Site 8 Saskatchewan River | 2012: 12x / year | 2012: 12x / year | 2012: 12x / year | 2012: 12x / year | 2012: 8 x /year ² |
| Site 9 Carrot River | 2012: 12x / year | 2012: 12x / year | 2012: 12x / year | 2012: 8x / year ^{ow} | 2012: 12x / year |
| Site 10 Red Deer River³ | 2012: 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : none |
| Site 11 Assiniboine River | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12 x / year |
| Site 12 Qu'Appelle River | 2012 : 12x / year | 2012 : 12x / year | 2012 : 12x / year | 2012 : 8x / year ^{ow} | 2012 : 8 x / year ² |

^{ow} = open water sampling only, Apr -Nov; ¹ seasonal sampling distribution = Feb, May, July, Oct; ² seasonal sampling distribution = Feb, Apr, May, June, July, Aug, Oct, Dec; ³ seasonal sampling distribution = Feb, Mar, Apr, June, Aug, Oct

Appendix 2

Total Ammonia Objectives Based on Temperature and pH

Total Ammonia Nitrogen (mg/L) **

The toxicity of ammonia relates primarily to the un-ionized form (NH₃). 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 NH₃ concentrations may be harmful to aquatic life.

Total Ammonia (NH₃ + NH₄⁺)

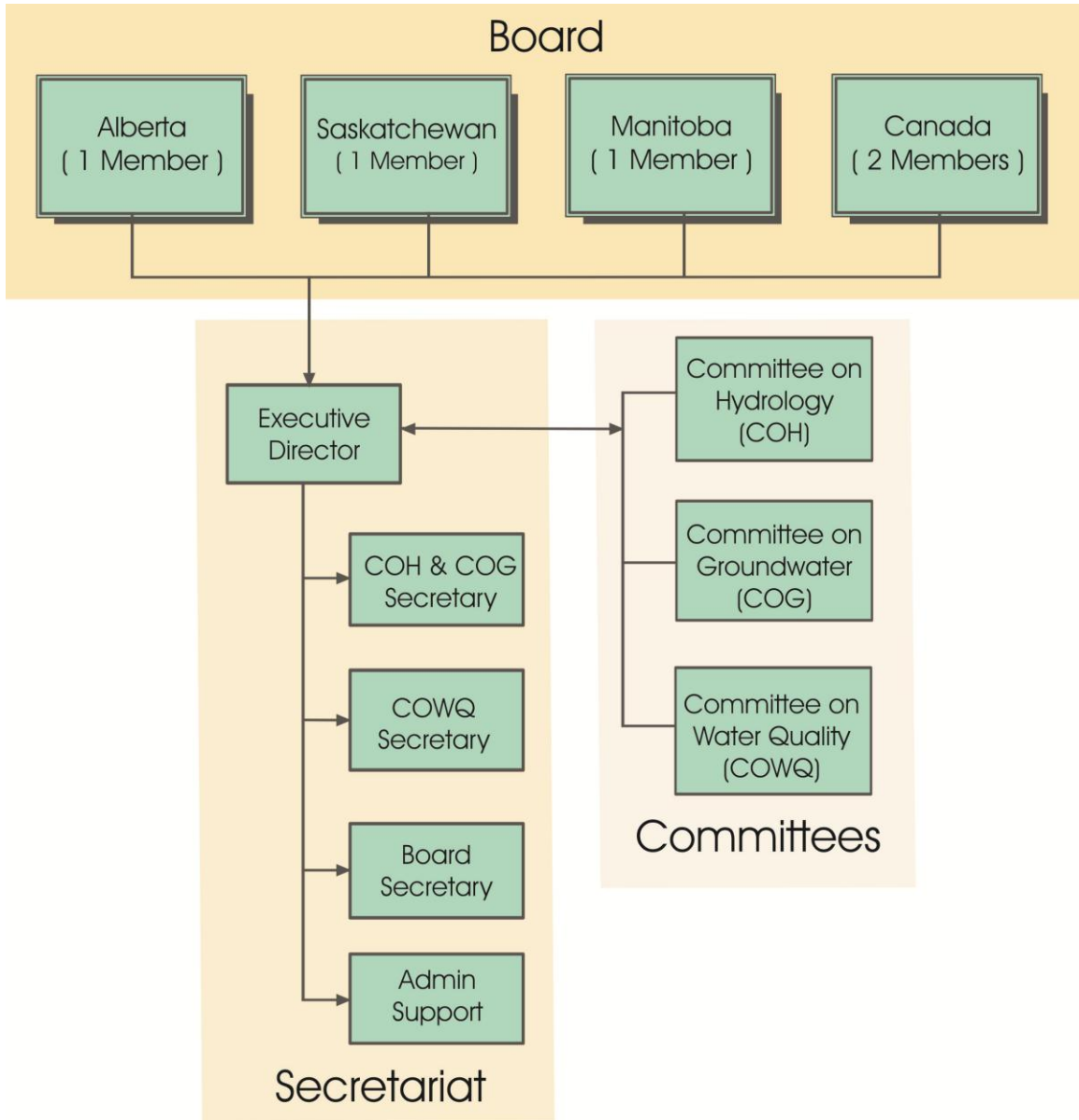
(Maximum levels expressed as N at various pH/temperature conditions)

| 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 2012 - 2013

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 | 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 Sustainable Resource Development |
| Steve D. Topping | Executive Director Hydrologic Forecasting & Water Management Water Management & Structures Division Manitoba Infrastructure and Transportation |
| Wayne Dybvig (Oct/08 to May/12) | President Saskatchewan Water Security Agency |
| Jim Gerhart (Beginning May/12) | Executive Director Integrated Water Services Division Saskatchewan Water Security Agency |

SECRETARIAT

EXECUTIVE DIRECTOR Mike Renouf Transboundary Waters Unit
Environment Canada

SECRETARY L. Quinnett-Abbott Transboundary Waters Unit
(Mar/13 to current) Environment Canada

M. Williamson Transboundary Waters Unit
(Jul/09 to Nov/12) 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 Sustainable Resource Development

Jim Gerhart Executive Director
(Sept/11 to May/12) Integrated Water Services
Saskatchewan Water Security Agency

Bill Duncan Executive Director
(Beginning May/12) Engineering and Geoscience Division
Saskatchewan Water Security Agency

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 | Vacant | Environment Canada, Hydrometric |
| | R. Woodvine | Agri-Environment Services Branch Agriculture and Agri-Food Canada |
| | B. Yee | Transboundary Secretariat Alberta Environment and Sustainable Resource Development |
| | R.W. Harrison (Sept/05 To Nov/12) | Surface Water Management Manitoba Conservation and Water Stewardship |
| | Mark Lee (Beginning Nov/12) | Manager Surface Water Management Section Manitoba Conservation and Water Stewardship |
| | B. Oegema | Hydrology Services Saskatchewan Water Security Agency |
| | A. Liu | 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 Conservation and Water Stewardship |
| | J.-M. Davies | Water Quality Services Saskatchewan Water Security Agency |
| | R. Casey | Water Policy Branch Alberta Environment and Sustainable Resource Development |
| | 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 Sustainable Resource Development |
| | J. Fahlman | Hydrology and Groundwater Services Saskatchewan Water Security Agency |
| | G. Phipps | Groundwater Management Water Sciences and Management Branch Manitoba Conservation and Water Stewardship |
| SECRETARY | V. Khanna | Transboundary Waters Unit Environment Canada |

APPENDIX VII
Statement of Final Expenditures 2012-2013

| | | 2012/13 | |
|---------------------------------|--|-----------|-----------|
| | | Budget | Actual |
| - | | | |
| Salary Component | | | |
| PY's | | 5.000 | 4.660 |
| Base Salay | | \$438,500 | \$418,315 |
| BPE | | \$87,700 | \$83,663 |
| Total Salary | | \$526,200 | \$501,978 |
| O&M Component | | | |
| <u>Contracts & Students</u> | | | |
| Goal 1 | | | |
| Cont. Improvement | | \$20,000 | \$0 |
| Modernization* | | \$250,000 | \$115,000 |
| Goal 2 | | | |
| Cont. Improvement | | \$10,000 | \$0 |
| Goal 3 | | | |
| Core Activities | | | |
| Cont. Improvement | | \$40,000 | \$37,164 |
| Modernization | | | |
| Goal 5 | | | |
| Cont. Improvement | | | |
| Goal 7 | | | |
| Cont. Improvement | | \$15,000 | \$10,347 |
| Modernization | | \$35,000 | |
| Sub-total contracts | | \$370,000 | \$162,511 |
| Operating Expenses | | \$60,000 | \$22,588 |
| Total O&M | | \$430,000 | \$185,099 |
| Grand Total | | \$956,200 | \$687,077 |

* - contracted services delivered by Alberta in lieu of its annual contribution

APPENDIX VIII

History of the PPWB

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

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

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

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

1. Schedule A. An apportionment agreement between Alberta and Saskatchewan.
2. Schedule B. An apportionment agreement between Saskatchewan and Manitoba.

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

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

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

On April 2, 1992, the *MAA* was amended to include a *Water Quality*

Agreement that became Schedule E to the Master Agreement. The Agreement sets interprovincial water quality objectives at 11 transboundary river reaches and commits each of the Parties to take reasonable and practical measures to maintain or improve existing water quality.

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

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

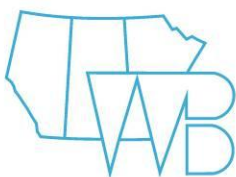
The Board approves an annual PPWB budget with one-half the operating budget being provided by Canada and one-sixth by each of the three provinces. The Government of Canada is responsible to conduct and pay for the

costs of water quantity and quality monitoring.

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

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