

ANNUAL REPORT • 2006

CANADA • ALBERTA • SASKATCHEWAN • MANITOBA

**PRAIRIE
PROVINCES
WATER
BOARD**



PRAIRIE PROVINCES WATER BOARD

ANNUAL REPORT

FOR THE YEAR ENDING MARCH 31, 2007

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LETTER OF TRANSMITTAL

October 30, 2007

Honourable John Baird
Minister of the Environment
Ottawa, Ontario

Honourable Rob Renner
Minister of Alberta Environment
Edmonton, Alberta

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

Honourable Christine Melnick
Minister of Manitoba Water Stewardship
Winnipeg, Manitoba

Honourable John Nilson, Q.C.
Minister Responsible for Saskatchewan Watershed Authority
Regina, Saskatchewan

Honourable Ministers:

On behalf of the members of the Prairie Provinces Water Board, it is my pleasure to submit herewith the Annual Report of the Prairie Provinces Water Board for the fiscal year ending March 31, 2007.

Yours truly



Tim Goos
A/Chair
Prairie Provinces Water Board

MESSAGE FROM THE CHAIR

The Prairie Provinces Water Board (PPWB) Charter and Strategic Plan, approved in 2005-2006, continued to guide the work of the Board and its committees during the past year.

External influences on new Board activities were notably:

- the present or potential future impact of strong economic development on shared surface and groundwater resources;
- a growing interest in the relationship between climate variability, climate change, and water resources; and
- the need for involvement of upstream jurisdictions in resolving water quality issues in Lake Winnipeg.

Operations of the Board were also affected by the same factors that are challenging provincial and federal governments to improve accountability and transparency. These challenges, together with human resource constraints, are expected to persist into the foreseeable future.

In December 2006, J. Vollmershausen represented PPWB in a meeting with Minister John Nilson and staff of the Saskatchewan Watershed Authority. The purpose of the meeting was to explain the role of the Board. Consideration was given by Minister Nilson to holding a broader meeting of PPWB Ministers. This meeting contributed directly to meeting Goal 6, "Ministers, senior managers and appropriate staff of jurisdictions are informed about PPWB activities", as stated in the Strategic Plan.

Wayne Dybvig, Executive Director since June 2005, informed the Board of his

decision to return to the Saskatchewan Watershed Authority, effective as of May 1, 2007. His vast knowledge and experience in all aspects of water resources in the Prairie Provinces was evident as he led the work of the PPWB Secretariat and standing committees during a turbulent period. On behalf of the Board, I thank him for his dedication and hard work. The position of Executive Director was filled on an acting basis by Brian Yee.

Shortly thereafter, Jim Vollmershausen, Chair of the Board since 1993, advised the Board that he had accepted another position effective June 1, 2007. The continuity and experience which he brought to the Board was a great asset and will be missed. Tim Goos was appointed as Acting Chair.

The success of the Board, each and every year, is due in large part to the work of the secretariat and its three standing committees, including the Committee on Hydrology (COH), the Committee on Water Quality (COWQ), and the Committee on Groundwater (COG). Secretariat support is housed within Environment Canada. The Executive Director manages the secretariat staff and chairs the three standing committees. Committee members consist of senior representatives from all of the parties. It is their work that helps to ensure that the Board and the parties can meet their obligations under the Master Agreement on Apportionment (MAA). The Board members appreciate their professional conduct and dedication to the goals of the PPWB.



Tim Goos
A/Chair

MESSAGE FROM THE EXECUTIVE DIRECTOR

The work of the PPWB Secretariat and three standing committees in 2006 was focused on achieving the seven goals outlined in the recently approved PPWB Strategic Plan.

During 2006, agreed interprovincial apportionment of flows on all eastward flowing streams was achieved. At present, the Board monitors, on a monthly basis, the apportionment of the South Saskatchewan River below the Red Deer River, the North Saskatchewan River, Churchill River, Saskatchewan River, Qu'Appelle River, Battle Creek, Lodge Creek, Middle Creek, and Cold Lake. In addition, the Board carries out the apportionment monitoring for the Assiniboine River, Pipestone Creek, and the Red Deer River (Sask) on an annual basis.

On the South Saskatchewan River, where there is the largest amount of development of all eastward flowing watercourses, Alberta delivered greater than 84% of the natural flow to Saskatchewan.

The Committee on Hydrology (COH) continued work, begun in 2005, on reassessing its data management and computational infrastructure necessary to determine natural flows. This work will facilitate the transition of computational procedures to a more modern platform. The COH agreed to provide the Board with data on new water allocations annually which would affect the calculation of natural flows. To help refine the reporting procedures for such data, the COH initiated a pilot project for the South Saskatchewan River. Other activities included studies related to a) the contribution of irrigation return flows in the South Saskatchewan River, b) natural flows on the Battle River; and c)

the development of a prairie hydrological model with application to effects of land use changes, wetland drainage, and wetland restoration. The last study, led by the University of Saskatchewan, is being conducted in collaboration with other partners, including the Prairie Habitat Joint Venture and Ducks Unlimited Canada. Consideration was given to supporting work which would contribute to an understanding of the relationships between water resources in the prairie region, climate change, and drought.

The Committee on Groundwater (COG) received a draft version of a "Conceptual Aquifer Management Framework Study, prepared under contract by the Saskatchewan Research Council. The report will be presented to the Board in 2007 and will contribute to furthering work on sharing of transboundary aquifers.

The Committee on Water Quality (COWQ) initiated work on a review of water quality objectives, as required by the Master Agreement on Apportionment. Priority was placed on nutrient objectives. The committee's work on nutrient objectives will contribute to interjurisdictional efforts to address the eutrophication of Lake Winnipeg. Further consideration was also given to developing a biological monitoring program.

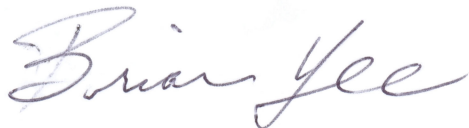
Planning was initiated for an All Committee Meeting in 2007 for the purpose of sharing information on current activities and issues and identifying areas of common interest with a potential for future collaboration on joint projects.

The Board continued its role in helping to ensure coordination of water management and planning that may have transboundary implications. As an example, the Board agreed to represent

the provinces of Saskatchewan and Alberta on any Lake Winnipeg committees. The nature of the Board's involvement will be clarified in 2007.

Similarly, the Board continued to provide a forum for sharing information on developments of projects with interprovincial implications, including the proposed Highgate Dam on the North Saskatchewan River in Saskatchewan, the Special Areas Project in Alberta, the Assiniboine River Watershed Plan, and the response to flooding on Fishing Lake in Saskatchewan.

The Board continues to look ahead and address new issues. During 2006-2007, this interest was demonstrated by a presentation to the Board by Dr. David Sauchyn on his research on paleoclimate data (tree rings) and by a presentation by Dwight Williamson on Lake Winnipeg water quality issues.

A handwritten signature in cursive script that reads "Brian Yee". The signature is written in a dark ink and is positioned above the printed name and title.

Brian Yee
A/Executive Director

SUMMARY OF PERFORMANCE RESULTS

During 2006-2007, apportionment responsibilities of the Board were met through the following activities:

- reviewing and approving the hydrometric and meteorological networks;
- continuing work on a review of the natural flow computation computer programs;
- monitoring apportionment of the South Saskatchewan River below the Red Deer River, North Saskatchewan River, Churchill River, Saskatchewan River, Qu'Appelle River, Battle Creek, Lodge Creek, Middle Creek, and Cold Lake;
- undertaking and conducting various studies related to the current and future hydrology of eastward flowing prairie streams, and the impact of irrigation and other water uses on stream flows; and
- monitoring the impact of interprovincial drainage projects.

Apportionment requirements were met on all streams.

Cooperative efforts continued in 2006-2007 to better understand the nature and extent of interprovincial aquifers in support of their sustainable use and management. Efforts included completion of a draft conceptual aquifer management framework study report, a review of the Q₂₀ concept and sustainable yield, and reporting of well casing failures and large groundwater withdrawals which might have interprovincial impacts.

The Committee on Water Quality (COWQ) implemented a new format for

reporting water quality excursions, approved by the Board in 2004. Work on a review of water quality objectives continued, with nutrient objectives given top priority.

In 2006, water quality objectives were adhered to, on average, 94% of the time.

A revised water quality monitoring program was presented to the Board. The monitoring program was approved by the Board at its fall meeting, thereby allowing changes to be made at the beginning of the year.

Through reporting procedures outlined in the PPWB Interprovincial Water Quality Contingency Plan, Board members were informed of one spill on interprovincial streams involving the release of raw sewage into the South Saskatchewan River at Medicine Hat. No other spills were reported under the PPWB Contingency Plan.

During the year, the PPWB discussed issues related to several projects of interest to different jurisdictions. Among the issues discussed were:

- Highgate Dam proposal – North Saskatchewan River;
- Upper Assiniboine River/Shellmouth Reservoir;
- Co-Management of Resources in the Qu'Appelle River Basin;
- Water Management Plan for the South Saskatchewan River Basin;
- Special Areas Water Supply Project;
- Water Quality in Lake Winnipeg; and
- Flooding on Fishing Lake.

The PPWB member agencies were informed about PPWB activities through:

- Board and Committee Minutes, Quarterly and Annual Reports, brochures/fact sheets, and technical reports;
- PPWB website;
- presentations at workshops and symposia;
- letters to the Ministers of member agencies; and
- a meeting with Minister John Nilson and Saskatchewan Watershed Authority staff in December 2006.

1. INTRODUCTION

This report summarizes the activities of the Prairie Provinces Water Board (PPWB), its Secretariat, and three standing committees, involved in supporting PPWB activities for the period April 1, 2006 to March 31, 2007.

The PPWB administers the Master Agreement on Apportionment, signed on October 30, 1969 by Canada and the provinces of Alberta, Saskatchewan, and Manitoba.

The Board consists of three provincial members, representing the provinces of Alberta, Saskatchewan, and Manitoba and two federal members, representing Environment Canada and the Prairie Farm Rehabilitation Administration (PFRA) of Agriculture and Agri-Food Canada.

PPWB activities are equally funded by the provinces and the federal government, with the provinces each contributing one-sixth and the federal government (Environment Canada) contributing one-half of the annual budget. The Board approves the annual budget and workplans.

The Agreement provides for an equitable sharing of available waters for all eastward flowing streams, including interprovincial lakes, crossing interprovincial boundaries. It also serves to protect interprovincial aquifers and 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.

2. PERFORMANCE RESULTS

GOAL 1: Agreed Interprovincial Apportionment of Water Is Achieved

Monitoring Responsibilities

The 1969 Master Agreement on Apportionment directs “...that the Prairie Provinces Water Board shall monitor and report on the apportionment of waters set out in the provisions of the First and Second Agreements and ratified by the Master Agreement.”

In accordance with the 1969 Master Agreement on Apportionment, all eastward flowing streams are subject to apportionment. At present, the Board monitors, on a monthly basis, the apportionment of the South Saskatchewan River below the Red Deer River, the North Saskatchewan River, Churchill River, Saskatchewan River, Qu’Appelle River, Battle Creek, Lodge Creek, Middle Creek, and Cold Lake. In addition, the Board carries out the apportionment monitoring for the Assiniboine River, Pipestone Creek, and the Red Deer River (Sask) on an annual basis. Hydrometric stations needed for apportionment computation of these streams are included in the PPWB stations list.

Formal apportionment monitoring of an eastward flowing watercourse is generally initiated when water use increases to a level whereby the downstream jurisdiction’s entitlement may be threatened.

The 1993 Committee on Hydrology (COH) report “Strategies for Apportionment Monitoring of Small Interprovincial Streams” (PPWB Report No. 122), evaluated and ranked interprovincial streams in terms of their potential for apportionment monitoring.

The categorization of small interprovincial streams for potential apportionment has been based on the following criteria:

- the number of times an apportionment deficit has, or would 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.

The COH reviews these watercourses from time to time to identify whether watercourses are to be monitored for apportionment.

In fulfilling the terms of this Agreement, Environment Canada, on behalf of the PPWB, monitors streamflow at several hydrometric sites. Data gathered are used by the PPWB to determine annual natural flows for apportionment purposes.

During 2006-2007, the COH reviewed the hydrometric network to ensure that changing use patterns were appropriately monitored to allow computation of natural flow. As of March 31, 2007, 87 stations were required for computational purposes. These are plotted on the map in Appendix I.

The COH confirmed the continuing need for 17 Environment Canada meteorological monitoring stations in the three Prairie Provinces. These sites provide information for computing

natural flow at the interprovincial boundaries. These are also plotted on the map in Appendix I.

At its October 11, 2005 meeting, the Board approved the 2006/2007 list of PPWB hydrometric and meteorological monitoring sites. In March 2006 the COH suggested that the Jaydot Reservoir station be removed from the list.

As directed by the Board, the COH continued its review of the existing documentation of natural flow computational programs to ensure orderly transition of future secretariat staff so they will be able to undertake computations in an efficient and effective manner.

The PPWB Secretariat, housed within the Transboundary Waters Unit, Environment Canada, maintains about 50 computer programs which are used for interprovincial natural flow computation. The COH is undertaking a review of the computational programs and data management techniques. In 2006-2007, "Phase 1, Charter and Requirements Documents", was completed under contract. Work was initiated on terms of reference and a statement of work for a contract for Phase 2, Design Document and Applications Prototype. It is expected that Phase 2 will be completed in 2007-2008.

In 2006, Environment Canada, Calgary office, provided PPWB with hydrometric records needed for apportionment balance computations of the South Saskatchewan River. Quarterly reports on natural flows, consumptive uses, and storage changes for the South Saskatchewan River basin in Alberta were prepared and distributed.

The total annual natural flow for the South Saskatchewan River, at the point

below its junction with the Red Deer River near the Alberta-Saskatchewan boundary, was 8,467,000 cubic decametres (dam^3). This compared with the total annual recorded flow of 7,140,000 dam^3 . Recorded flow represented close to 84% of natural flow. A summary of recorded and natural flow volumes for 2006 at this apportionment point is shown in table and graph form in Appendix II. Figure 1 illustrates the percentage of annual natural flow, passed to Saskatchewan, for the period 1981 to 2006.

The natural flow of the Qu'Appelle River at the Saskatchewan-Manitoba boundary, between January 1, 2006 and December 31, 2006, was 277,100 dam^3 . Recorded flow, augmented by releases of 72,200 dam^3 from Lake Diefenbaker, was 441,700 dam^3 . Recorded and natural flows for the year 2006 are shown in Appendix II.

Natural flows for the South Saskatchewan River basin were calculated using the Project Depletion Method (PDM), while natural flows for the Qu'Appelle River basin were determined using the Annual Water Balance Method (AWBM). Both methods have been approved by the Board.

Environment Canada continued to provide the Board with hydrometric information needed for computing natural flows of Lodge and Middle Creeks for apportionment purposes. Apportionment balance reports, providing the month-end apportionment balance of these two streams for the months of March through October, were prepared and distributed to PPWB agencies eight times during 2006.

In accordance with Article 6, Schedule A of the Master Agreement on Apportionment, Alberta is required to pass 75% of the annual natural flow of

the Battle, Lodge, and Middle Creeks to Saskatchewan. During 2006, Alberta passed more than 75% of the annual natural flow to Saskatchewan. The 2006 flow data for Battle, Lodge, and Middle Creeks are shown in Appendix II.

The Board, at its March 1994 meeting, reviewed a COH report entitled "Interprovincial Lakes Apportionment Study". Use of the Rational Method, and accompanying provisions, was approved for apportioning Cold Lake basin. In accordance with the Rational Method, the computed percentage of Cold Lake's natural flow to which each province is entitled is 31.6% for Alberta, 43.4% for Saskatchewan, and 25% for Manitoba.

Natural flow at the outlet of Cold Lake was computed periodically during 2006 to determine if Saskatchewan had received its share of natural flow from Cold Lake. Based on the information provided by Environment Canada, Imperial Oil, and the City of Cold Lake, the natural outflow from Cold Lake was 536,700 dam³ for the period January to December 2006. Recorded outflow for the same period was 527,700 dam³ (98 % of natural flow). Figure 2 illustrates the percentage of annual natural flow passed to Saskatchewan for the period 1993 to 2006.

Natural flows (or apportionment flows) were also calculated for the North Saskatchewan, Saskatchewan, and Churchill Rivers at the provincial boundaries. Monthly recorded and natural flows (or apportionment flows) at these sites, as well as recorded flows at five additional boundary sites, are shown in Appendix II. Apportionment was met on all the watersheds.

In addition to the apportionment monitoring activities, PPWB also computed the apportionment balance of Pipestone Creek, Assiniboine River, and Red Deer River at the Saskatchewan-Manitoba boundary. The 2006 annual natural flow on Pipestone Creek was 32,500 dam³ compared with recorded flows of 32,300 dam³ (99% of natural flow). The annual natural flow on the Assiniboine River was 599,500 dam³ compared with recorded flows of 595,000 dam³ (99% of natural flow). The natural flow on the Red Deer River (Sask) at Erwood was 1,924,400 dam³ compared with recorded flows of 1,932,600 dam³. This amount was slightly greater than 100 % of natural flow.

In 2006, Saskatchewan met the apportionment requirements by passing more than 50% of the natural flow to Manitoba on each watercourse.

Figure 1

**PERCENT OF NATURAL FLOW PASSED TO SASKATCHEWAN
SOUTH SASKATCHEWAN RIVER BELOW RED DEER RIVER**

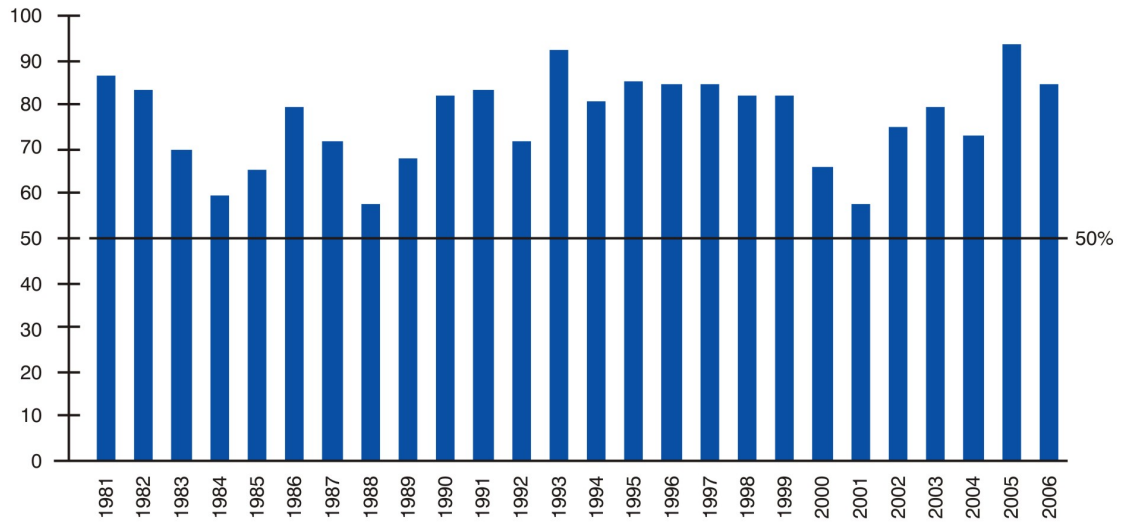
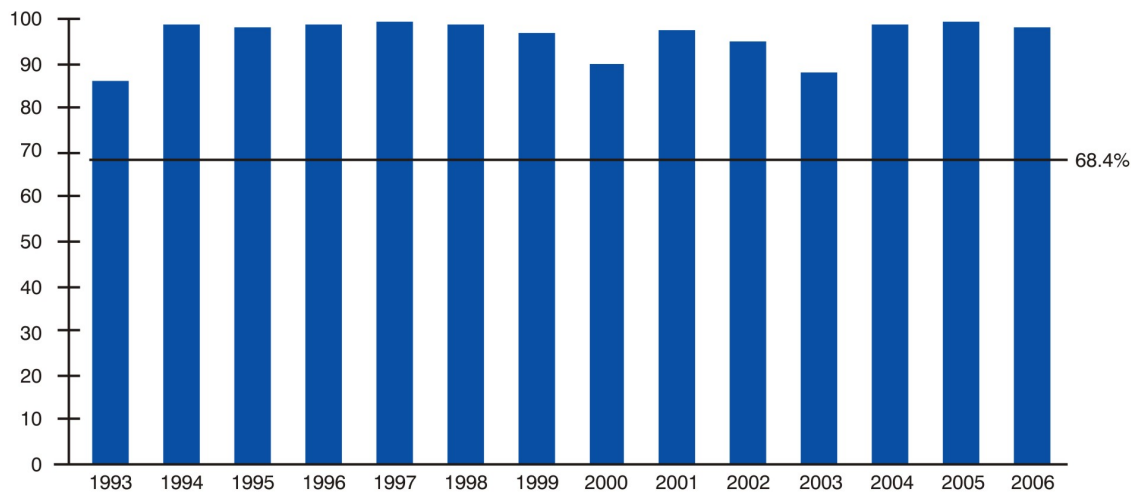


Figure 2

**PERCENT OF NATURAL FLOW PASSED TO SASKATCHEWAN
COLD LAKE BASIN**



STUDIES

Battle River Natural Flow Study

In the spring of 2005, the COH identified the need for a Battle River Natural Flow Study, to be undertaken by the Saskatchewan Watershed Authority. A first draft of the study was prepared in 2006-2007. A final report is likely to be completed in 2007-2008 and recommendations made to the Board at its fall meeting in 2007.

Study objectives are to:

- determine the historic (1980-2004) level of water use for the Battle River upstream of the Alberta-Saskatchewan boundary;
- naturalize flows for the Battle River at the Alberta-Saskatchewan boundary by adding the water uses to the recorded flows at hydrometric station 05FE004, Battle River near Saskatchewan Boundary; and
- determine if an apportionment deficit would have occurred at the Alberta-Saskatchewan boundary from 1912 to 2004, based on historic (1912-2004) and current (2004) water uses within the Battle River basin.

Based on preliminary results, it is unlikely that formal apportionment will be recommended at this time for the Battle River.

Prairie Drainage Impacts Modelling Study

The PPWB, through the COH, entered into a multi-year collaborative research study with the University of Saskatchewan. Funding support was

obtained through the National Water Supply Expansion Program delivered by PFRA, Agriculture and Agri-Food Canada. Alberta Environment also contributed funding.

The study will lead to the development of a "Prairie Hydrological Model with Application to Effects of Land Use Changes, Wetland Drainage and Wetland Restoration". Phase 1 of the study, a field monitoring program, is planned to begin during the summer of 2007.

Other agencies collaborating in the study include the Prairie Habitat Joint Venture and Ducks Unlimited Canada.

South Saskatchewan River Irrigation Return Flows Study

Phase 1 of an interim report entitled "South Saskatchewan River Natural Flow and Apportionment: Irrigation Return Flows 2001-2005" was prepared for the COH by Environment Canada's Water Survey of Canada – Calgary Office. The report reviews the impact of irrigation return flow in the natural flow determinations for the South Saskatchewan River Basin. The report also reviews return flow data from the thirteen irrigation districts of southern Alberta, as well as the Water Survey of Canada, with respect to the adequacy of the data's accuracy and timeliness. Overall, return flow from all the sources comprises approximately 10 percent of the South Saskatchewan River natural flow at the Alberta-Saskatchewan boundary.

The COH will make recommendations based on Phase 1 of the study to the Board in 2007-2008. Timing of Phase 2 will depend on availability of funds.

The Application of Paleoclimate Data for Frequency Analysis of Droughts and Floods

Following a presentation from Dr. David Sauchyn, Prairie Adaptation Research Collaborative (PARC), the Board and the COH initiated discussions on the potential application of paleoclimate data, derived from tree rings, to frequency analysis of floods and droughts. Discussions will continue in 2007-2008 with a view to gaining greater understanding of the potential contribution of paleoclimate data to planning for future droughts and floods in the Prairie region.

Annual Water Use Report Boxelder Creek Basin

Boxelder Creek is part of an internal drainage basin straddling the Alberta-Saskatchewan boundary, midway between Maple Creek, Saskatchewan and Medicine Hat, Alberta. Because of the complexity of the basin, including numerous diversions and the high percentage of natural flow allocated for water use, the PPWB has agreed that Boxelder Creek be treated as a special interprovincial basin. Available flow in this basin is to be jointly managed by Alberta and Saskatchewan.

Alberta and Saskatchewan annually collect sufficient water use data to provide an estimate of total consumption in the Boxelder Creek Basin. This data is reported to the COH.

In 2006, a total of 104 dam³ was diverted for irrigation purposes in the Alberta portion of the Boxelder Creek Basin. Based on the responses of the 2006 water use survey, conducted by the Saskatchewan Watershed Authority, 223 dam³ was diverted for irrigation purposes in the Saskatchewan portion of the Boxelder Creek basin.

Annual Report on Interprovincial Drainage Projects

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

The Board agreed with the COH that there is no need for Alberta to provide the PPWB with drainage project information on an ongoing basis, unless there is a specific project that could have an impact on Saskatchewan.

In 2006, Saskatchewan licensed 22 new drainage projects. Manitoba reported no projects with the potential to affect streams crossing interprovincial boundaries.

WATER USE DATA

In 2006-2007, the COH continued work to address procedures related to water use and new allocations. As directed by the Board, the COH will report new allocations of water use annually to the Board so that they can be considered in the calculation of natural flows.

To help develop procedures for reporting of new allocations, the COH began a pilot project for the South Saskatchewan River Basin in 2006-2007.

Further work will be carried out in 2007-2008 to categorize water allocations, establish criteria and threshold amounts, and develop general rules for inclusion or exclusion of uses in natural flow computations. Issues related to allocations include double counting of licenses and identifying licenses which are non-consumptive. Allocations that are currently included in computations and how water use is accounted for in computations will be documented.

GOAL 2: Interprovincial Groundwater Aquifers are Protected and Used Sustainably

Conceptual Aquifer Management Framework Study

In October 2005, the COG proposed that a conceptual aquifer plan project be undertaken. The project would provide a better understanding of information needed to allocate, or apportion, surface and groundwater within a complete hydrological balance at transboundary locations.

As suggested by the COG, in March 2006 the Board entered into a contract with the SRC for a transboundary aquifer management framework study. The draft report was completed in March 2007.

Priority Listing for Transboundary Aquifers

Establishment of a priority listing for transboundary aquifers where issues could arise is one of the work items identified in the COG multi-year work plans. There are 13 transboundary aquifers along the Alberta-Saskatchewan boundary and six along the Saskatchewan-Manitoba boundary. Appendix III provides a list of major interprovincial aquifers in the prairies.

The Committee agreed that the priorities for determining future sharing arrangements for aquifers along the Alberta-Saskatchewan boundary should be ranked as follows:

- 1) aquifer along the Cold Lake area;
- 2) aquifer near the South Saskatchewan River crossing, and
- 3) aquifer near the North Saskatchewan River crossing.

Along the Manitoba-Saskatchewan boundary, the aquifer near the Three Rivers area should be ranked highest.

No further progress was made in 2006-2007 on developing sharing arrangements for these priority aquifers.

Well Casing Failure Reporting

Due to historical public concerns about the potential threats from well casing failures, the COG agreed that any well casing failure in the Cold Lake area (Township 63 to 66 and Range 6) should be reported to the Committee. The Alberta COG member will inform the Committee of any casing failure incidents, as they are reported to Alberta Environment.

No well casing failures were reported by Alberta during 2006/2007.

Reporting of Large Withdrawals

The COG, in dealing with guidelines for reporting projects with large groundwater withdrawals near the interprovincial boundary, agreed that the types of projects for which the neighbouring provinces should be notified include:

- 1) projects with the cone of depression potentially extending into the neighbouring province; and
- 2) controversial projects where the cone of depression from the project may not be expected to extend into the neighbouring province.

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.

GOAL 3: Agreed Interprovincial Water Quality Objectives Are Achieved

The Master Agreement on Apportionment includes a schedule of water quality objectives that were established for a number of key watercourses at the Alberta-Saskatchewan and Saskatchewan-Manitoba boundary locations. The monitoring locations are shown in Appendix I.

Each year a water quality monitoring program is approved by the PPWB and the results compared with the objectives to determine if any excursions to the objectives occurred. If there are any, the Committee on Water Quality (COWQ) will prepare a work plan to undertake an assessment of the cause and the potential to mitigate.

Water Quality Monitoring Program

In accordance with the process changes implemented in 2005-2006, the Committee reviewed and approved the PPWB Water Quality Monitoring Program for the 2007 calendar year in the fall of 2006. Changes to the monitoring program for the 2007 calendar year were minimal after the major revisions which were approved in the fall of 2005 and implemented in 2006. A detailed summary of those changes was recorded in the PPWB Annual Report 2005. Specific changes to the 2007 monitoring program are as follows:

- The frequency will increase from 7 times/year to 8 times/year for the five sites with bacteriological sampling in open water; and
- The site rotational pesticide sampling initialized in 2006 (with the sampling of the North and South Saskatchewan Rivers),

was continued at the Battle and Red Deer (Alberta-Saskatchewan) Rivers for 2007.

In addition to the site specific changes outlined above, the COWQ agreed that, as the sampling location on the Beaver River is currently upstream of a municipal effluent discharge, it does not necessarily capture the water quality in the Beaver River at the Alberta-Saskatchewan border. The COWQ recommended that the site be relocated to a more appropriate site closer to the border, downstream of the discharge point. It was further recommended that, commencing in the 2007 monitoring year, both the current site and the proposed location be sampled concurrently for a period of two years. After the two year period, the data will be assessed and a decision made regarding the permanent relocation of the sampling site.

The PPWB Water Quality Monitoring Parameter List is included in Appendix IV.

Water Quality Objectives

The COWQ annually reviews the results of the PPWB Water Quality Monitoring Program and compares the data to PPWB Water Quality Objectives. All sites were sampled at the approved frequency with the exception of three sites on the Saskatchewan-Manitoba border (Churchill, Saskatchewan and Red Deer Rivers) where unusual poor ice conditions limited access due to safety. In 2006, the PPWB reach-specific water quality objectives were adhered to, on average, 94% of the time over a total of 2,631 comparisons of water chemistry results to the objectives (Figure 3). Although, in 2006, no sites exhibited 100% adherence, all but two sites (the Carrot and Qu'Appelle Rivers) had adherence rates greater than 90%. In recent years, several modifications to

the monitoring program have resulted in changes to sampling frequency at some sites. This should be considered during any exercise comparing overall adherence rates between years.

Four sites on the Alberta – Saskatchewan border (N. Sask, S. Sask, Battle, and Red Deer Rivers) exhibited increases in adherence rates, ranging from 1.1-8.6%, compared to 2005. The Beaver River had a slight decline in adherence rate (-1.1%) due to three excursions for dissolved manganese, a common excursion in years previous to 2005. The sites with increased adherence in 2006 did not experience the high suspended sediment events, as in 2005, and thus, there were only 9 excursions for the total metal parameters, as opposed to 40 in 2005 (a 78% reduction).

The largest change was observed at the Red Deer River at the Alberta-Saskatchewan boundary (+8.6%). This change can be attributed to the major reduction in excursions at these sites for total metal objectives.

The six sites on the Saskatchewan – Manitoba border showed little change to overall adherence rates compared to 2005. Four sites (Saskatchewan, Carrot, Red Deer (Saskatchewan-Manitoba) and Assiniboine Rivers) showed less than a 2% change while the Churchill River declined from 100% to 97% adherence due to two dissolved oxygen values that were below the objective. The Qu'Appelle River, on the other hand, increased in adherence rates from 85.7% to 89.3%, due to fewer sodium and dissolved oxygen excursions.

In 2006, six parameters accounted for 85% of all excursions. These parameters, and their overall exceedence rates, in descending order include: total phosphorus (30%), dissolved manganese (17%), dissolved

sodium (15%), dissolved oxygen (14%), and total dissolved solids (7%). Similar parameters were responsible for excursions in 2005, with the addition of many of the total metals

At all sites where an interim total phosphorous objective exists (0.05 mg/L), with the exception of the Churchill River (100% adherence), the percent adherence was, at best, 33% for the Red Deer (Saskatchewan-Manitoba) River. Three sites (Carrot, Assiniboine and Qu'Appelle Rivers) exhibited a 0% adherence, (i.e., every sample exceeded the 0.05 mg/L objective), and in fact, maximum concentrations were close to an order of magnitude above the objective (e.g. 0.42 mg/L). This interim phosphorous objective had been identified as inappropriate for large prairie rivers and the development of more relevant site specific nutrient objectives remains the highest priority for the COWQ.

The dissolved manganese objective (0.05 mg/L) was exceeded a total of 28 times, most of those being from the Assiniboine and Carrot Rivers, with the remainder spread among the Battle, Beaver, and Qu'Appelle Rivers. The maximum dissolved manganese concentration occurred at the Carrot River in January (11.9 mg/L). Most exceedences, and all maximum values for this parameter, occur in the winter under low flow, high groundwater input conditions. Previous provincial and federal studies have concluded that these exceedences are largely natural in origin (e.g. groundwater source).

The objective for sodium (100 mg/L) was exceeded on a total of 23 occasions. Exceedences largely occurred in the Qu'Appelle (11 of 12 samples) and Battle (11 of 12 samples) Rivers with two excursions in the Carrot River. This is identical to the 2005 excursions for sodium. Higher

concentrations tend to occur in winter, but the relative difference is not as great as with manganese. As in previous analyses, these excursions may, in part, be due to a high proportion of groundwater input to the systems during low flows. There may also be point and/or non-point inputs which need further investigation.

At least one excursion to the dissolved oxygen objective is observed at each of the Saskatchewan-Manitoba border sites, including the Churchill River, this year. In the Carrot River, for the previous two years the adherence rate during open water has been less than 15% (6 of 7 samples were below the 6.5 mg/L objective). The lowest value was 3.5 mg/L and occurred in July; the average value between April-September when excursions occurred was 4.5 mg/L. This appears to be a distinct change from the conditions measured in 2003 and 2004 where adherence rates of 71% and 86%, respectively, were observed. These results are currently being examined in more detail by the COWQ. The Assiniboine River had the next most dissolved oxygen excursions, not atypical from previous years, while the other Saskatchewan-Manitoba sites exhibited a similar number of excursions to previous years. No dissolved oxygen excursions were observed at the Alberta-Saskatchewan sites.

Of the four PPWB sites with an objective for total dissolved solids, only the Battle River exhibited exceedences. The total dissolved solids objective (500 mg/L) for the Battle River was exceeded 92% of the time. As total dissolved solids are directly related to sodium, these excursions may be due, in part, to a high proportion of groundwater input to the systems during low flows, and to the underlying geology. Other parameters which were exceeded occasionally were chloride, fecal coliforms, dissolved iron, and many of

the total metals (aluminum, chromium, copper, lead, zinc). All other parameters, which have PPWB objectives listed in Schedule E and were measured in 2006, did not exceed the objectives.

Excursion Report

To simplify the excursion analysis and distribution to member agencies, Environment Canada developed an Excelmacro. The report, with draft text, excursion tables, raw data and excursion analysis, is now distributed for COWQ review prior to approval.

The 2006 Excursion Report is included in Appendix V.

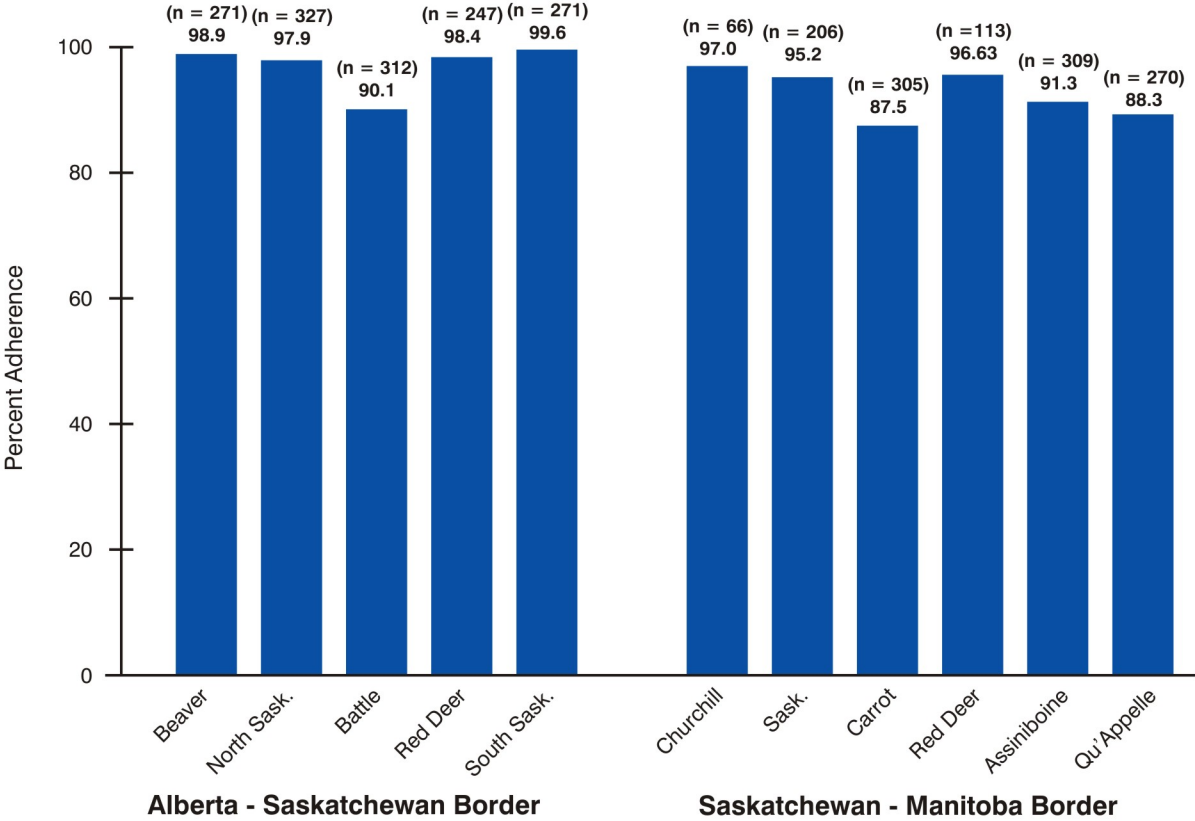
Data Analysis

Two analyses were discussed and approved for work in the upcoming reporting period:

- An analysis of the water quality in the North Saskatchewan River in relation to the site relocations which occurred in 1982 and 1988. Environment Canada will produce a draft report for review and approval in 2007; and
- A data analysis study, with the objective of directly comparing the results from non-parametric and parametric long term trend analysis techniques. This analysis will be conducted by Environment Canada on data provided, in part, by Manitoba.

Figure 3

2006 PERCENT ADHERENCE TO PPWB OBJECTIVES



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

PPWB Contingency Plan

The PPWB Interprovincial Water Quality Contingency Plan is an effective method of informing Board agencies of spills or unusual water quality conditions in interprovincial streams. The plan was updated in October 2005 with member agencies reporting any spills or unusual water quality conditions with the potential to affect downstream water quality or create possible media

coverage. A spill notification form was drafted for use by Board agencies.

It was reported at the September 18, 2006 meeting, that the local number for Alberta Environment was added for out of province calls as the 1-800 number only applied within the province. It was also reported that the Contingency Plan had been finalized and printed.

One spill was reported in 2006, involving a spill of raw sewage into the South Saskatchewan River at Medicine Hat on July 19, 2006. The spill had negligible impact on water quality at the Alberta-Saskatchewan boundary.

GOAL 5: Conflicts over Interjurisdictional Water Issues are Avoided

During the year, the PPWB discussed issues related to several existing or proposed projects of interest to different jurisdictions.

Highgate Dam Proposal – North Saskatchewan River

The North Saskatchewan River Water Resources Committee (NSRWRC), a local non-profit group in the North Battleford area of Saskatchewan, is promoting the construction of a dam on the North Saskatchewan River about 16 km upstream of North Battleford. Funding for a pre-feasibility study was approved, under the National Water Supply Expansion Program, administered by Agriculture and Agri-Food Canada. A technical steering committee was set up to help administer the study. A contract was awarded in December 2006 to Golder Associates Ltd. for the pre-feasibility study which will be completed in 2007.

The proposed dam would create a reservoir which would extend upstream approximately 240 km, of which 77 kilometres would be located in Alberta.

Upper Assiniboine River/Shellmouth Reservoir

Shellmouth Dam, located on the Assiniboine River in Manitoba, has been operated since 1970 to provide both flood control and water supplies for the Assiniboine River. During 2006, severe weather conditions in mid-April resulted in overtopping of the reservoir spillway with resultant downstream flooding. Manitoba Agriculture, Food and Rural Initiatives began development of a compensation program for flooding in

2006 in response to concerns from landowners who experienced flood damage. A comprehensive report on the flood of 2006 was undertaken by Manitoba Water Stewardship.

Lake of the Prairies, the reservoir created by Shellmouth Dam, extends upstream into Saskatchewan.

Co-Management of Resources in the Qu'Appelle River Basin

Water management agreements on the Qu'Appelle River are being sought by various First Nations and the Province of Saskatchewan, but co-management is in its infancy. Significant progress on negotiations with First Nations was made in 2006 for all but Round Lake. In 2006, all of the Qu'Appelle Lakes, with the exception of Round Lake, were operated as normal.

At issue here is the ongoing operation and maintenance of three federally owned water control structures on the Qu'Appelle River (Echo Lake, Crooked Lake, and Round Lake) during negotiations towards final settlement agreements that will resolve First Nations' claims. Interim Agreements for Echo/Pasqua Lake expired on December 31, 2006 while the Interim Agreement for Crooked Lake ends in December 2007.

Transboundary implications for Manitoba will likely be minimal but there could be minor water quality impacts.

Water Management Plan for the South Saskatchewan River Basin

The province of Alberta approved the Water Management Plan for the South Saskatchewan River Basin in Alberta in August 2006. The plan provides broad direction for more efficient and effective use of water and improved management

of aquatic ecosystems. Among the specific directions, the plan:

- establishes a balance between diverting water from the rivers of the South Saskatchewan Basin and leaving water in the rivers for aquatic ecosystems;
- stops new applications for water withdrawals on South Saskatchewan River sub-basins;
- allows, through a Crown Reservation of water, for licensing for First Nations, storage for existing licenses, pending applications, and Water Conservation Objective licenses; and
- pre-determines that, when allocations in the Red Deer River basin reach 550,000 cubic decametres, new applications will be stopped until the allocation limit is determined and a Crown Reservation is created.

Flows in the South Saskatchewan River basin are apportioned between Alberta and Saskatchewan.

Special Areas Water Supply Project

The Special Areas Board in Alberta filed an application to divert water from the Red Deer River to provide an improved supply of water for landowners and communities in the counties of Stettler and Paintearth in the Special Areas of the province.

The average use of the project would amount to about 5% of the median annual natural flow of the Red Deer River. The percentage of withdrawals will be higher in some months when flows are lower or in low flow years.

The proposed pump station will be located near Nevis. Water will be conveyed through a combination of pipelines and canals to the distribution system in Sounding and Berry Creeks. As a portion of the water would pass through the Battle River sub-basin and eventually flow into the Sounding Creek Basin, this is considered an inter-basin transfer and will require approval via a Special Act of the Alberta Legislature. Based on hydrological modelling (1930s – 1995) spilling of water from Sounding Lake into the Battle River is considered very unlikely.

Public consultations demonstrated considerable local public support for the proposal in the benefiting areas of the Red Deer Basin with less support outside.

Feasibility studies were completed in 2006 and the proposed project is going through internal processes for moving the project forward. A decision was not made with respect to provincial and federal environmental assessment requirements.

Interest by downstream jurisdictions occurs due to the possibility of water being transferred into the Battle River.

1921 Order for the St. Mary and Milk Rivers

In response to a request from the State of Montana to open the 1921 Order for review, the International Joint Commission (IJC) established the St. Mary-Milk Rivers Administrative Measures Task Force in December 2004. The Task Force was to examine whether the existing administrative procedures in the basin can be improved to ensure more beneficial use and optimal receipt, by each country, of its apportioned waters within the terms of the 1921 IJC Order. Canadian

members included Environment Canada (Co-Chair), Saskatchewan Watershed Authority, and Alberta Environment. Consideration was given by PPWB to the potential future implications for apportionment of the Eastern Tributaries to the Milk River. The St. Mary River contributes to the South Saskatchewan River. Any change to the current administrative measures and the 1921 Order could impact flows on the South Saskatchewan River.

The report to the IJC was completed in 2005-2006 and posted on the internet at http://www.ijc.org/rel/news/060418_e.htm

The report was submitted to the IJC in April 2006 and public consultations followed in May 2006. A final decision was not reached by the IJC in 2006.

GOAL 6: Jurisdictions Are Informed About PPWB Activities

The PPWB member agencies 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, presentations at workshops and symposia, and the PPWB website housed on Environment Canada's website at <http://www.pnr-rpn.ec.gc.ca/water/fa01/index.en.html>

In December 2006, J. Vollmershausen represented PPWB at a meeting with Minister John Nilson and staff of the Saskatchewan Watershed Authority. The purpose of the meeting was to explain the role of the Board. Consideration was given to a broader meeting of PPWB Ministers in 2007.

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

Lake Winnipeg Nutrient Issues

Concern over nutrient loading in Lake Winnipeg has risen in recent years, with reports of increased frequency, duration, and intensity of algal blooms. Managing nutrients within the lake's watershed, comprising four provinces and two states, poses a complex challenge. Provincial and federal agencies have responded to the challenge through the initiation of interagency, multidisciplinary research programs.

The PPWB agreed to represent the interests of Alberta and Saskatchewan with respect to Lake Winnipeg. Details of how that will be achieved will be provided in 2007.

Manitoba's Water Protection Plan

The third phase of Manitoba's Water Protection Plan was announced November 8, 2006. Phase 3 focused on the principle of shared responsibility and was submitted to the Clean Environment Commission for review. Regulations limiting the use and application of manure in Manitoba were introduced and water quality management zones that restrict use of synthetic fertilizers were published for comment.

Rosenberg International Forum on Water Policy

The fifth biennial Rosenberg International Forum on Water Policy was held in Banff in September 2006. Representatives of provincial PPWB agencies participated. The theme of the forum was *Managing Upland Watersheds in an Era of Global Climate Change*. A summary report of the meeting, dated February 2007, was

posted on their website at:
<http://rosenberg.ucanr.org>.

Ag Water Forum II

Ag Water Forum II took place February 13-14, 2007 in Winnipeg. The theme of the forum was *Agricultural Perspectives on Source Water Protection*. PPWB was represented on the organizing committee through the Executive Director.

Objectives of the forum were to:

- share progress and improve understanding of federal and provincial activities in water policy, management, and planning related to source water protection and agriculture;
- create networking opportunities between provinces and federal departments in ag-water and watershed related activities; and
- serve as a mechanism for informal feedback into the next generation of agricultural policy and programming.

3 . ADMINISTRATIVE AND FINANCIAL MANAGEMENT

The Board consists of senior officials engaged in the administration of water resources in each province of Alberta, Saskatchewan, and Manitoba and senior officials from Environment Canada and Agriculture and Agri-Food Canada – PFRA (Appendix VI). As illustrated by the organization chart in Appendix VII, the Board operates through its Executive Director and three Standing Committees (Committee on Hydrology, Committee on Groundwater, and Committee on Water Quality). The Board is chaired by Environment Canada.

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 Environment Canada.

Two Board and ten Committee meetings were held throughout the year.

PPWB

- Meeting No. 79, October 11-12, 2006 – Edmonton (jointly with COH)
- Meeting No. 80, March 15, 2007 - Winnipeg

COH

- Meeting No. 95, May 2, 2006 - conference call
- Meeting No. 96, May 15, 2006 – conference call
- Meeting No. 97, July 6-7, 2006 – Regina
- Meeting No. 98, October 10-11, 2006 – Edmonton

- Meeting No. 99, December 8, 2006 – conference call
- Meeting No. 100, January 15, 2007 – conference call
- Meeting No. 101, February 28, 2007 – conference call

COG

- No meetings were held

COWQ

- Meeting No. 82, September 18, 2006 – conference call
- Meeting No. 83, September 25, 2006 – conference call
- Meeting No. 84, February 1-2, 2007 – Saskatoon

During 2006-2007, the PPWB Secretariat completed and distributed the audit and final apportionment balance reports for the South Saskatchewan River, Lodge, Middle, and Battle Creeks at the Alberta-Saskatchewan boundary.

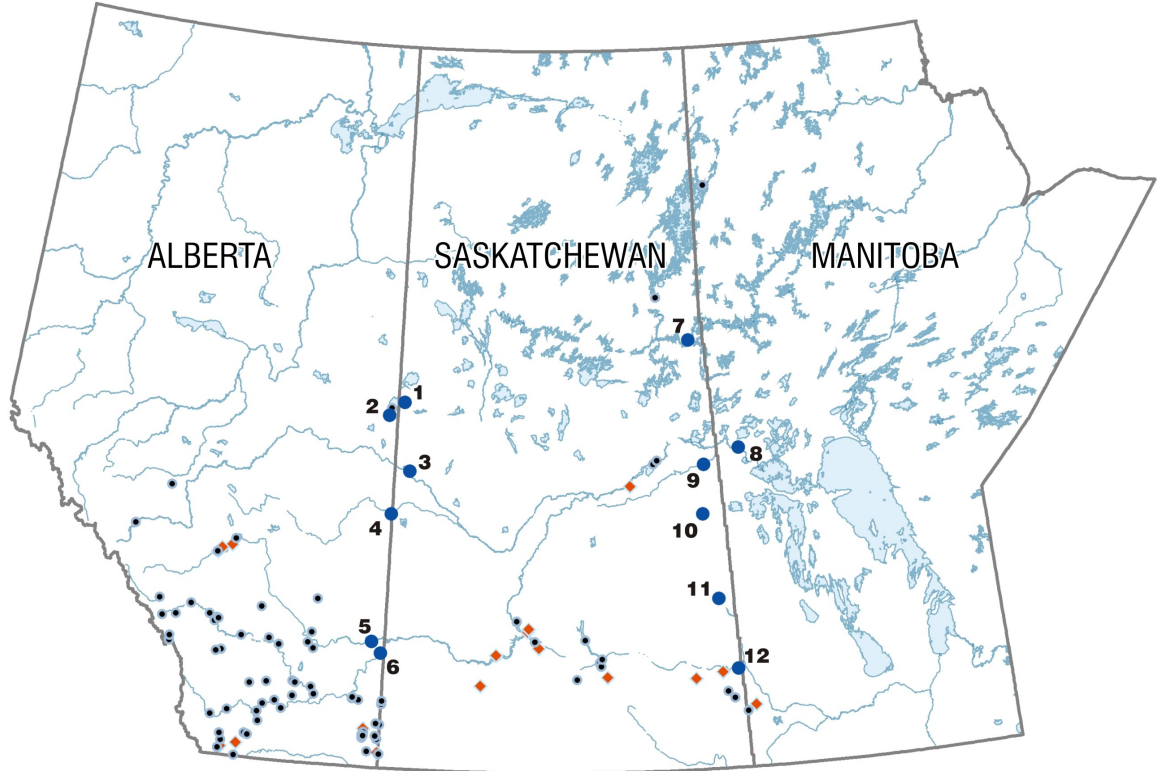
To ensure the terms of the 1969 Master Agreement on Apportionment were met, the staff computed the natural flow or apportionment flow (i.e., flow volume that is subject to apportionment) at the interprovincial boundary for the North Saskatchewan, Churchill, Qu'Appelle, and Saskatchewan Rivers. The apportionment balance of Cold Lake was also computed for 2006.

The Board determines the annual budget. The approved budget for 2006-2007 was \$448,203; final expenditures were \$368,212. The Statement of Final Expenditures for 2006-2007 is shown in Appendix VIII. Final expenditures were below the approved budget due to contracts not being completed. Contract work will continue in 2007-2008.

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

APPENDIX I

PPWB Monitoring Locations Map



● PPWB Water Quantity and Quality Monitoring Locations

- | | | |
|----------------------------|--------------------------------|--------------------------------|
| 1 Cold River | 5 Red Deer River (Alta./Sask.) | 9 Carrot River |
| 2 Beaver River | 6 South Saskatchewan River | 10 Red Deer River (Sask./Man.) |
| 3 North Saskatchewan River | 7 Churchill River | 11 Assiniboine River |
| 4 Battle River | 8 Saskatchewan River | 12 Qu'Appelle River |

● Hydrometric Sites used for apportionment monitoring

◆ Meteorological Sites used for apportionment monitoring

APPENDIX II
2006 Flow Data

**RECORDED AND NATURAL FLOWS, CONSUMPTIVE USE, DIVERSION, AND STORAGE
(in Cubic Decametres) FOR THE 2006 APPORTIONMENT PERIOD**

SOUTH SASKATCHEWAN RIVER – ALBERTA-SASKATCHEWAN BOUNDARY

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED DISCHARGE	347 150	269 710	331 010	544 890	475 580	1 844 360	500 230	159 520	204 300	275 190	320 810	262 240	5 534 990
CONSUMPTIVE USE	7 720	6 790	7 380	25 640	245 860	114 450	452 800	300 140	185 180	34 220	4 040	4 240	1 388 460
CHANGE IN RESERVOIR STORAGE	-83 360	-89 390	-71 300	-23 210	165 320	249 820	-5 220	-131 830	-86 310	-48 760	78 440	-35 770	-81 570
DIVERSION FROM BASIN	0	0	0	11 450	10 160	23 010	16 040	16 200	12 810	10 450	0	0	100 120
NATURAL FLOW ALTA. – SASK. BOUNDARY	283 020	188 810	258 270	535 860	859 980	2 237 030	928 640	394 400	327 950	288 030	416 320	228 500	6 946 810

RED DEER RIVER – ALBERTA-SASKATCHEWAN BOUNDARY

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED DISCHARGE	56 433	45 950	63 209	405 594	113 111	237 852	124 664	101 691	165 110	178 554	59 766	52 989	1 604 923
CONSUMPTIVE USE	0	0	0	-3 000	830	3 370	4 700	6 460	5 310	-280	0	0	17 390
CHANGE IN RESERVOIR STORAGE	-12 100	-16 350	-14 520	-55 790	39 340	33 120	19 090	17 990	490	150	-6 350	-10 590	-5 520
DIVERSION INTO BASIN	0	0	0	-11 450	-10 160	-23 010	-16 040	-16 200	-12 810	-10 450	0	0	-100 120
NATURAL FLOW ALTA. – SASK. BOUNDARY	46 943	30 980	44 589	347 404	115 241	267 492	130 724	110 411	158 160	168 644	56 996	42 249	1 519 833

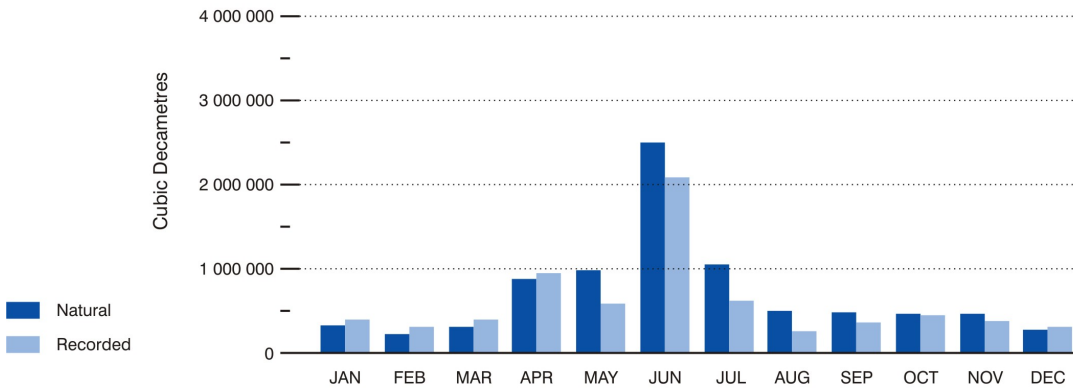
SOUTH SASKATCHEWAN RIVER – BELOW JUNCTION WITH RED DEER RIVER

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED DISCHARGE	404 000	316 000	394 000	950 000	589 000	2 082 000	625 000	261 000	369 000	454 000	381 000	315 000	7 140 000
NATURAL FLOW	330 000	220 000	303 000	883 000	975 000	2 505 000	1 059 000	505 000	486 000	457 000	473 000	271 000	8 467 000

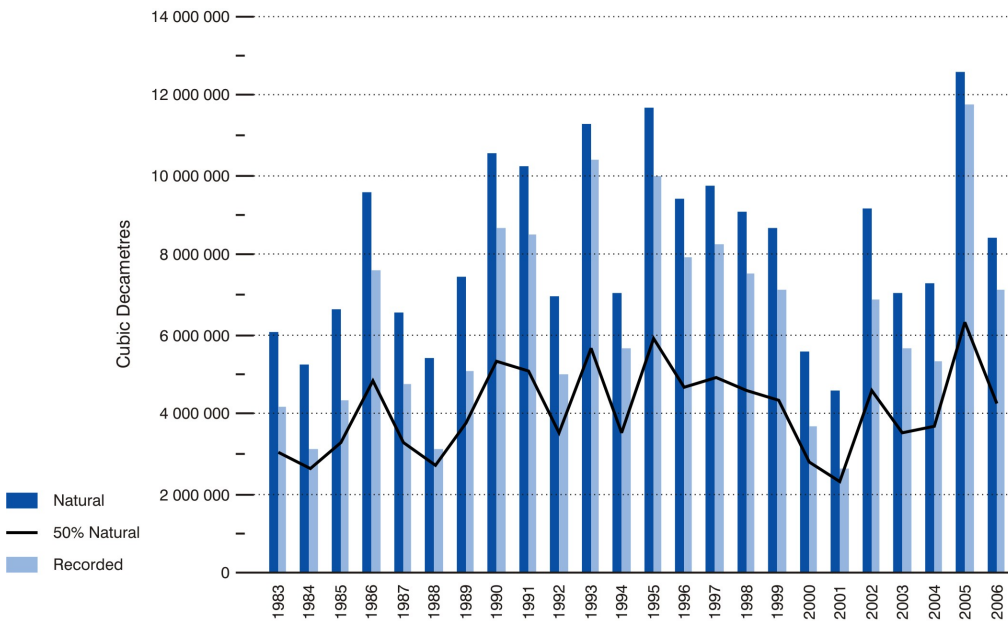
NOTES:

- (A) All data is rounded to significant figures.
- (B) Natural 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).
- (C) Apportionment of natural flow in the South Saskatchewan River is as specified in Article 4, Schedule A of the Master Agreement on Apportionment.
- (D) Flows have been routed and, as a result, the values presented in the table cannot be exactly balanced on a monthly basis.

**2006 MONTHLY FLOW
SOUTH SASKATCHEWAN RIVER BELOW RED DEER RIVER**



ANNUAL FLOWS OF THE SOUTH SASKATCHEWAN RIVER BELOW RED DEER RIVER



**RECORDED AND NATURAL FLOWS – SUMMARY OF SELECTED STREAMS CROSSING THE
SASKATCHEWAN-MANITOBA BOUNDARY (in Cubic Decametres) FOR THE 2006 APPORTIONMENT PERIOD***

CHURCHILL RIVER – SASKATCHEWAN-MANITOBA BOUNDARY (AT SANDY BAY)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	2 630 000	2 490 000	2 700 000	2 610 000	2 860 000	3 220 000	3 380 000	3 560 000	3 140 000	2 620 000	2 080 000	1 940 000	33 230 000
NATURAL FLOW	3 015 000	2 456 000	2 571 000	2 473 000	2 752 000	3 200 000	3 526 000	3 808 000	3 370 000	2 867 000	2 374 000	2 160 000	34 572 000

SASKATCHEWAN RIVER – SASKATCHEWAN-MANITOBA BOUNDARY

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
ESTIMATED ** FLOW	1 445 000	1 296 000	1 643 000	3 222 000	2 743 000	2 511 000	2 340 000	1 576 000	1 242 000	1 630 000	1 442 000	1 178 000	22 268 000
APPORTIONMENT FLOW	1 096 000	850 000	1 035 000	3 586 000	2 883 000	3 279 000	2 603 000	1 522 000	1 389 000	1 722 000	1 259 000	990 000	22 214 000

CARROT RIVER – SASKATCHEWAN-MANITOBA BOUNDARY (NEAR TURNBERRY)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	21 900	14 000	16 000	233 000	391 000	186 000	107 000	63 700	43 700	134 000	128 000	60 900	1 400 000

OU'APPELLE RIVER – SASKATCHEWAN-MANITOBA BOUNDARY (NEAR WELBY)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	16 500	13 100	13 700	90 000	103 000	65 000	43 300	25 200	19 200	16 300	23 500	12 900	441 700
NATURAL FLOW	-	-	-	-	-	-	-	-	-	-	-	-	277 101

RED DEER RIVER – SASKATCHEWAN-MANITOBA BOUNDARY (NEAR ERWOOD)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	10 767	7 354	7 044	914 976	324 086	274 752	46 336	24 963	93 830	143 562	60 912	24 025	1 932 607
NATURAL FLOW	10 714	7 320	6 905	913 771	323 053	272 038	45 399	24 585	93 286	142 823	60 591	23 899	1 924 384

ASSINIBOINE RIVER – SASKATCHEWAN-MANITOBA BOUNDARY (AT KAMSACK)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	2 380	1 010	2 210	337 000	128 000	87 600	18 300	2 330	3 460	5 170	3 660	3 880	595 000
NATURAL FLOW	2 360	1 045	2 231	338 507	128 330	88 208	19 137	3 112	3 686	5 381	3 559	3 937	599 493

*Apportionment period for streams crossing the Saskatchewan-Manitoba boundary was changed from water year to calendar year.

** For the Saskatchewan River, estimated flow at the Saskatchewan-Manitoba boundary is computed using recorded flow of the Saskatchewan River at The Pas minus 1.31 times the recorded flow of Carrot River near Turnberry.

Apportionment flow is the volume of flow subject to apportionment.

**RECORDED AND NATURAL FLOWS – SUMMARY OF SELECTED STREAMS AND LAKE CROSSING
THE ALBERTA-SASKATCHEWAN BOUNDARY (in Cubic Decametres) FOR THE 2006 APPORTIONMENT PERIOD**

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

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	346 000	269 000	297 000	676 000	512 000	741 000	503 000	450 000	482 000	557 000	404 000	367 000	5 604 000
NATURAL FLOW	86 000	39 000	68 000	463 000	536 000	1 129 000	887 000	695 000	677 000	546 000	239 000	124 000	5 489 000

BATTLE CREEK – ALBERTA-SASKATCHEWAN BOUNDARY

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	76	1 205	2 362	1 130	813	339	270	437	364	0	0	6 996
NATURAL FLOW	0	76	1 205	2 362	1 145	807	336	270	463	399	0	0	7 063

LODGE CREEK – ALBERTA-SASKATCHEWAN BOUNDARY

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	0	2 560	4 230	284	512	24	0	0	0	0	0	7 610
NATURAL FLOW	0	0	2 838	5 565	240	311	24	0	0	0	0	0	8 978

MIDDLE CREEK – ALBERTA-SASKATCHEWAN BOUNDARY

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	0	4	876	1 821	23	7	3	2	2	6	0	0	2 744
NATURAL FLOW	0	12	1 122	1 917	22	0	1	2	1	3	0	0	3 080

COLD LAKE – ALBERTA-SASKATCHEWAN BOUNDARY (AT OUTLET OF COLD LAKE)

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
RECORDED FLOW	45 757	39 554	39 588	37 835	51 451	74 727	69 319	51 270	39 174	31 856	23 532	23 675	527 738
NATURAL FLOW	48 700	40 066	40 074	38 327	52 005	75 286	69 922	51 837	39 737	32 438	24 070	24 261	536 723

APPENDIX III

Interprovincial Aquifers in the Prairie Provinces

Alberta – Saskatchewan Boundary	Townships
Wiau Buried Valley	72
Helena-Hatfield Buried Valley	63-64
Vermilion/Big Meadow-Bronson Buried Valley System	59-62
Rex Buried Valley	52
Lloydminster Buried Valley	50-51
Wainwright/Battleford Buried Valley	42
Sibbald-Eyre Buried Valley	27
Calgary and Lethbridge-Tyner Buried Valley System	22-23
Johnsborough Buried Valley	13-14
Jaydot Buried Valley	3
Belly River-Judith River Formations	1-53
Eastend-Ravenscrag Formations	7-8
Bearpaw Formation sandstone members	6-8
Saskatchewan-Manitoba Boundary	
Hatfield Buried Valley System	22-23
Rocanville Buried Valley	15-16
Carbonate Aquifer	53-63
Swan River Formation	33-46
Welby Sand Plain	17-18
Odanah Shales	1-14

Source: PPWB Report No. 155, "A Review of Transboundary Groundwater Apportionment" (September 2000) by Krista Plaster and Gary Grove, National Water Research Institute, Environment Canada.

APPENDIX IV

PPWB Water Quality Monitoring 2006 Parameter List

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

ALKALINITY, phenol & total
ALUMINUM, diss. & total^θ
AMMONIA, diss.^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 (Alta/Sask), Assiniboine, and Carrot Rivers in 2006

♦ Collected between 6 -12 X/year at all sites but the Churchill and Cold Rivers

APPENDIX V
COWQ 2006 Excursion Report to the Board

Table 1: Summary of PPWB Objectives

PPWB SITE SPECIFIC OBJECTIVES: MASTER AGREEMENT SCHEDULE E

1 of 2

LOCATION		ALBERTA / SASKATCHEWAN BORDER				
		BEAVER RIVER	NORTH SASK. RIVER	BATTLE RIVER	RED DEER RIVER A/S	SOUTH SASK. RIVER
SITE		2	3	4	5	6
PPWB REPORT SITE NUMBER						
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 3	APPENDIX 3	APPENDIX 3	APPENDIX 3	APPENDIX 3
NO2+NO3 (as N)	mg/L	10	10	10	10	10
PHOSPHORUS (total)	mg/L	---	---	---	---	---
MAJOR IONS						
CHLORIDE (diss.)	mg/L	100	100	100	---	---
FLUORIDE (diss)	mg/L	1.5	1.5	1.5	1.5	1.5
SODIUM (diss)	mg/L	100	100	100	---	---
SULPHATE (diss)	mg/L	500	500	500	500	500
TOTAL DISS. SOLIDS	mg/L	---	500	500	500	500
BIOTA						
FECAL COLIFORM	NO/dL	100/100ml	100/100ml	100/100ml	100/100ml	100/100ml
PHYSICALS						
pH	pH Units	6.5-9.0	6.5-9.0	6.5-9.0	---	---
OXYGEN (diss)	mg/L	OW 6.0	6.5	OW 6.0	---	---
SAR	mg/L	---	---	---	3	3
PESTICIDES/CONTAMINANTS						
LINDANE	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
2,4-D	mg/L	0.004	0.004	0.004	0.004	0.004
2,4,5-TP	mg/L	0.01	0.01	0.01	0.01	0.01
CHLORINE	mg/L	0.002	0.002	0.002	---	---
CHLOROPHENOLS (total)	mg/L	0.001	0.001	0.001	0.001	0.001
PCP	mg/L	0.0005	0.0005	0.0005	---	---
MERCURY IN FISH	ug/g TISSUE	0.5	0.5	0.5	0.5	0.5
PCB IN FISH	ug/g TISSUE	2	2	2	2	2
RADIOACTIVE						
CESIUM-137	Bq/L	---	---	---	---	---
IODINE-131	Bq/L	---	---	---	---	---
RADIUM-226	Bq/L	---	---	---	---	---
STRONTIUM-90	Bq/L	---	---	---	---	---
TRITIUM	Bq/L	---	---	---	---	---

OW = open water objective only

Table 1: Summary PPWB Objectives (cont'd)

PPWB SITE SPECIFIC 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 3	APPENDIX 3	APPENDIX 3	APPENDIX 3	APPENDIX 3	APPENDIX 3
NO2+NO3 (as N)	mg/L	10	10	10	10	10	10
PHOSPHORUS (total)	mg/L	0.05	0.05	0.05	0.05	0.05	0.05
MAJOR IONS							
CHLORIDE (diss.)	mg/L	250	68	100	100	100	100
FLUORIDE (diss)	mg/L	1.5	1	1	1	1	1
SODIUM (diss)	mg/L	300	100	100	100	100	100
SULPHATE (diss)	mg/L	500	250	500	500	500	500
TOTAL DISS. SOLIDS	mg/L	---	---	---	---	---	---
BIOTA							
FECAL COLIFORM	NO/dL	200/100ml	200/100ml	200/100ml	200/100ml	200/100ml	100/100ml
PHYSICALS							
pH	pH Units	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
OXYGEN (diss)	mg/L	6.5	6.5	OW 6.5	6	6	6
SAR	mg/L	---	---	---	---	---	---
PESTICIDES/CONTAMINANTS							
LINDANE	mg/L	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008
2,4-D	mg/L	0.004	0.004	0.004	0.004	0.004	0.004
2,4,5-TP	mg/L	0.01	0.01	0.01	0.01	0.01	0.01
CHLORINE	mg/L	0.002	0.002	0.002	0.002	0.002	0.002
CHLOROPHENOLS (total)	mg/L	0.001	0.001	0.001	0.001	0.001	0.001
PCP	mg/L	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
MERCURY IN FISH	ug/g MUSCLE TISSUE	0.2	0.2	0.5	0.5	0.5	0.5
PCB IN FISH	ug/g MUSCLE 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

OW = open water objective only

Table 1A: Summary PPWB Objectives with protective uses indicated

PPWB SITE SPECIFIC 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
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 3	APPENDIX 3	APPENDIX 3	APPENDIX 3	APPENDIX 3
NO2+NO3 (as N)	mg/L	10	10	10	10	10
PHOSPHORUS (total)	mg/L	---	---	---	---	---
MAJOR IONS						
CHLORIDE (diss.)	mg/L	100	100	100	---	---
FLUORIDE (diss)	mg/L	1.5	1.5	1.5	1.5	1.5
SODIUM (diss)	mg/L	100	100	100	---	---
SULPHATE (diss)	mg/L	500	500	500	500	500
TOTAL DISS. SOLIDS	mg/L	---	500	500	500	500
BIOTA						
FECAL COLIFORM	NO/dL	100/100ml	100/100ml	100/100ml	100/100ml	100/100ml
PHYSICALS						
pH	pH Units	6.5-9.0	6.5-9.0	6.5-9.0	---	---
OXYGEN (diss)	mg/L	OW 6.0	6.5	OW 6.0	---	---
SAR	mg/L	---	---	---	3	3
PESTICIDES/CONTAMINANTS						
LINDANE	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
2,4-D	mg/L	0.004	0.004	0.004	0.004	0.004
2,4,5-TP	mg/L	0.01	0.01	0.01	0.01	0.01
CHLORINE	mg/L	0.002	0.002	0.002	---	---
CHLOROPHENOLS (total)	mg/L	0.001	0.001	0.001	0.001	0.001
PCP	mg/L	0.0005	0.0005	0.0005	---	---
MERCURY IN FISH	ug/g TISSUE	0.5	0.5	0.5	0.5	0.5
PCB IN FISH	ug/g TISSUE	2	2	2	2	2
RADIOACTIVE						
CESIUM-137	Bq/L	---	---	---	---	---
IODINE-131	Bq/L	---	---	---	---	---
RADIUM-226	Bq/L	---	---	---	---	---
STRONTIUM-90	Bq/L	---	---	---	---	---
TRITIUM	Bq/L	---	---	---	---	---

Fisheries
Drinking
Irrigation/Livestock
Recreation
Fish Consumption

Table 1A: Summary PPWB Objectives with protective uses indicated (cont'd)

PPWB SITE SPECIFIC 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
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 3	APPENDIX 3	APPENDIX 3	APPENDIX 3	APPENDIX 3	APPENDIX 3
NO2+NO3 (as N)	mg/L	10	10	10	10	10	10
PHOSPHORUS (total)	mg/L	0.05	0.05	0.05	0.05	0.05	---
MAJOR IONS							
CHLORIDE (diss.)	mg/L	250	68	100	100	100	100
FLUORIDE (diss)	mg/L	1.5	1	1	1	1	1
SODIUM (diss)	mg/L	300	100	100	100	100	100
SULPHATE (diss)	mg/L	500	250	500	500	500	500
TOTAL DISS. SOLIDS	mg/L	---	---	---	---	---	---
BIOTA							
FECAL COLIFORM	NO/dL	200/100ml	200/100ml	200/100ml	200/100ml	200/100ml	100/100ml
PHYSICALS							
pH	pH Units	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0	6.5-9.0
OXYGEN (diss)	mg/L	6.5	6.5	OW 6.5	6	6	6
SAR	mg/L	---	---	---	---	---	---
PESTICIDES/CONTAMINANTS							
LINDANE	mg/L	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
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

Fisheries
Drinking
Irrigation/Livestock
Recreation
Fish Consumption

Table 2: PPWB Excursions 2006

PPWB EXCURSION SUMMARY 2006

1 of 2

LOCATION	ALBERTA / SASKATCHEWAN BORDER					
	SITE	BEAVER RIVER	NORTH SASK. RIVER	BATTLE RIVER	RED DEER RIVER A/S	SOUTH SASK. RIVER
	PPWB REPORT SITE NUMBER	2	3	4	5	6
number excursions (number of tests)						
METALS	UNITS					
ALUMINIUM (total)	mg/L	---	1 (12)	0	---	---
ARSENIC (diss)	mg/L	0	0	0	0	0
BARIUM (total)	mg/L	0	0	0	0	0
BORON (diss)	mg/L	0	0	0	0	0
CADMIUM (total)	mg/L	0	0	0	0	0
CHROMIUM (total)	mg/L	0	1 (12)	0	0	0
COBALT	mg/L	---	0	0	0	0
COPPER (total)	mg/L	0	1 (12)	1 (12)	3 (12)	0
CYANIDE (free)	mg/L	ND	ND	ND	ND	ND
IRON (diss)	mg/L	0	0	0	0	0
LEAD (total)	mg/L	0	1 (12)	0	0	0
MANGANESE (diss)	mg/L	3 (12)	0	4 (12)	0	0
MERCURY (total)	ug/L	---	---	---	---	---
NICKEL (total)	mg/L	0	0	0	0	0
SELENIUM (diss)	mg/L	0	0	0	0	0
SILVER (total)	mg/L	0	---	---	---	---
URANIUM	mg/L	0	0	0	---	---
VANADIUM (TOTAL)	mg/L	---	0	0	0	0
ZINC (total)	mg/L	0	1 (12)	0	0	0
NUTRIENTS						
AMMONIA (total)	mg/L	0	0	0	0	0
NO2+NO3 (as N)	mg/L	0	0	0	0	0
PHOSPHORUS (total)	mg/L	---	---	---	---	---
MAJOR IONS						
CHLORIDE (diss.)	mg/L	0	0	0	---	---
FLUORIDE (diss)	mg/L	0	0	0	0	0
SODIUM (diss)	mg/L	0	0	11 (12)	---	---
SULPHATE (diss)	mg/L	0	0	0	0	0
TOTAL DISS. SOLIDS	mg/L	---	0	11 (12)	0	0
BIOTA						
FECAL COLIFORM	No/dL	0	2 (12)	4 (12)	1 (7)	1 (7)
PHYSICALS						
pH	pH Units	0	0	0	---	---
OXYGEN (diss)	mg/L	0 (6)	0	0 (12)	---	---
SAR	mg/L	---	---	---	0	0
PESTICIDES/CONTAMINANTS						
LINDANE	mg/L	ND	0	ND	ND	0
2,4-D	mg/L	ND	0	ND	ND	0
2,4,5-TP	mg/L	ND	0	ND	ND	0
CHLORINE	mg/L	ND	ND	ND	---	---
CHLOROPHENOLS (total)	mg/L	ND	ND	ND	ND	ND
PCP	mg/L	ND	ND	ND	---	---
MERCURY IN FISH	ug/g MUSCLE TISSUE	ND	ND	ND	ND	ND
PCB IN FISH	ug/g MUSCLE TISSUE	ND	ND	ND	ND	ND
RADIOACTIVE						
CESIUM-137	Bq/L	---	---	---	---	---
IODINE-131	Bq/L	---	---	---	---	---
RADIUM-226	Bq/L	---	---	---	---	---
STRONTIUM-90	Bq/L	---	---	---	---	---
TRITIUM	Bq/L	---	---	---	---	---
No. Excursion Comparisons		271	327	312	247	271
Total No. Excursions Observed		3	7	31	4	1
Sampling Frequency (no./year)		12	12	12	12	12
Overall Adherence Rate		98.9	97.9	90.1	98.4	99.6

"---" = no objective

ND = no data to compare to objective; PPWB approved monitoring plan for 2004 did not include these parameters

Table 2: PPWB Excursions 2006 (cont'd)

PPWB EXCURSION SUMMARY 2006

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
		number excursions (number of tests)					
METALS							
ALUMINUM (total)	mg/L	---	---	---	---	---	---
ARSENIC (diss)	mg/L	0	0	0	0	0	0
BARIUM (total)	mg/L	0	0	0	0	0	0
BORON (diss)	mg/L	0	0	0	0	0	0
CADMIUM (total)	mg/L	0	0	0	0	0	0
CHROMIUM (total)	mg/L	0	0	0	0	0	0
COBALT	mg/L	---	---	---	---	---	---
COPPER (total)	mg/L	0	0	0	0	0	0
CYANIDE (free)	mg/L	ND	ND	ND	ND	ND	ND
IRON (diss)	mg/L	0	0	4 (12)	0	0	0
LEAD (total)	mg/L	0	0	0	0	0	0
MANGANESE (diss)	mg/L	0	0	11 (12)	0	8 (12)	2 (12)
MERCURY (total)	ug/L	---	---	---	---	---	ND
NICKEL (total)	mg/L	0	0	0	0	0	0
SELENIUM (diss)	mg/L	0	0	0	0	0	0
SILVER (total)	mg/L	---	---	---	---	---	---
URANIUM	mg/L	0	0	0	0	0	0
VANADIUM (TOTAL)	mg/L	---	---	---	---	---	---
ZINC (total)	mg/L	0	0	0	0	0	0
NUTRIENTS							
AMMONIA (total)	mg/L	0	0	0	0	0	0
NO ₂ +NO ₃ (as N)	mg/L	0	0	0	0	0	0
PHOSPHORUS (total)	mg/L	0	7 (9)	12 (12)	4 (6)	12 (12)	12 (12)
MAJOR IONS							
CHLORIDE (diss.)	mg/L	0	0	3 (12)	0	0	0
FLUORIDE (diss)	mg/L	0	0	0	0	0	0
SODIUM (diss)	mg/L	0	0	2 (12)	0	0	11 (12)
SULPHATE (diss)	mg/L	0	0	0	0	0	0
TOTAL DISS. SOLIDS	mg/L	---	---	---	---	---	---
BIOTA							
FECAL COLIFORM	NO/dL	ND	0	0	ND	1 (10)	0
PHYSICALS							
pH	pH Units	0	0	0	0	0	0
OXYGEN (diss)	mg/L	2 (3)	3 (9)	6 (12)	1 (6)	6 (11)	4 (12)
SAR	mg/L	---	---	---	---	---	---
PESTICIDES/CONTAMINANTS							
LINDANE	mg/L	ND	ND	0	ND	0	ND
2,4-D	mg/L	ND	ND	0	ND	0	ND
2,4,5-TP	mg/L	ND	ND	0	ND	0	ND
CHLORINE	mg/L	ND	ND	ND	ND	ND	ND
CHLOROPHENOLS (total)	mg/L	ND	ND	ND	ND	ND	ND
PCP	mg/L	ND	ND	ND	ND	ND	ND
MERCURY IN FISH	ug/g TISSUE	ND	ND	ND	ND	ND	ND
PCB IN FISH	ug/g TISSUE	ND	ND	ND	ND	ND	ND
RADIOACTIVE							
CESIUM-137	Bq/L	ND	ND	ND	ND	ND	ND
IODINE-131	Bq/L	ND	ND	ND	ND	ND	ND
RADIUM-226	Bq/L	ND	ND	ND	ND	ND	ND
STRONTIUM-90	Bq/L	ND	ND	ND	ND	ND	ND
TRITIUM	Bq/L	ND	ND	ND	ND	ND	ND
No. Excursion Comparisons		66	206	305	113	309	270
Total No. Excursions Observed		2	10	38	5	27	29
Sampling Frequency (no./year)		3	9	12	5	12	12
Overall Adherence Rate		97.0	95.2	87.5	95.6	91.3	89.3

"---" = no objective
 ND = no data to compare to objective; PPWB approved monitoring plan for 2004 did not include these parameters

APPENDIX VI

Board / Committee Membership 2006 -2007

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 MEMBERS

CHAIR	J. Vollmershausen	Regional Director General Prairie and Northern Region Environment Canada
	C. Neggers	Director General Prairie Farm Rehabilitation Administration Agriculture and Agri-Food Canada
	W.S. Macdonald	Director Science and Standards Division Environmental Assurance Branch Alberta Environment
	S.D. Topping	Executive Director Regulatory and Operational Services Division Manitoba Water Stewardship
	Vacant	Saskatchewan Watershed Authority
EXECUTIVE DIRECTOR	W. L. Dybvig	Transboundary Waters Unit Environment Canada
SECRETARY	E. Kienholz	Transboundary Waters Unit Environment Canada

PPWB ALTERNATE MEMBERS

Vacant	Environment Canada
C. Straub	Manager, Water Supply Infrastructure Development Prairie Farm Rehabilitation Administration Agriculture and Agri-Food Canada
R.P. Harrison	A/Director, Environmental Strategies Branch Alberta Environment
R. Wiebe	A/Director, Regional Operations Saskatchewan Watershed Authority
Vacant	Manitoba Water Stewardship

COMMITTEE ON HYDROLOGY

Terms of Reference

At the request of, and under the direction of the PPWB, the Committee on Hydrology 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.

PPWB Minute 7-11 (Oct. 17, 1972)

MEMBERS

CHAIR	W.L. Dybvig	Executive Director Prairie Provinces Water Board
	R.G. Boals	Water Survey Division Environment Canada
	F.R.J. Martin	Prairie Farm Rehabilitation Administration Agriculture and Agri-Food Canada
	S. Figliuzzi	Environmental Strategies Branch Alberta Environment
	R.W. Harrison	Water Science and Management Branch Manitoba Water Stewardship
	D. Johnson	Basin Operations Saskatchewan Watershed Authority
	N. Taylor	Meteorological Service of Canada Environment Canada
SECRETARY	A.J. Chen	Transboundary Waters Unit Environment Canada

COMMITTEE ON WATER QUALITY

Terms of Reference

Under the direction of the Prairie Provinces Water Board, the Committee on Water Quality shall investigate, oversee, review, report, recommend and advise the Board on matters pertaining to the water quality 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 recommend remedial or preventative measures for avoiding and resolving water quality issues.

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 committee shall also assist the Committee on Groundwater in the development of interprovincial groundwater programs by identifying water quality monitoring needs for interprovincial groundwater aquifers.

PPWB Minute 47-54 (Oct. 17, 1991)

MEMBERS

CHAIR	W.L. Dybvig	Executive Director Prairie Provinces Water Board
	D.B. Donald	Water Quality Monitoring Environment Canada
	D. Williamson	Water Science and Management Branch Manitoba Water Stewardship
	T. Hanley	Watershed Monitoring and Assessment Saskatchewan Watershed Authority

R. Casey Environmental Assurance
Alberta Environment

B. Schutzman Water Quality Unit
Prairie Farm Rehabilitation Administration
Agriculture and Agri-Food Canada

SECRETARY N.E. Glozier Ecological Sciences Division
Environment Canada

COMMITTEE ON GROUNDWATER

Terms of Reference

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 will 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.

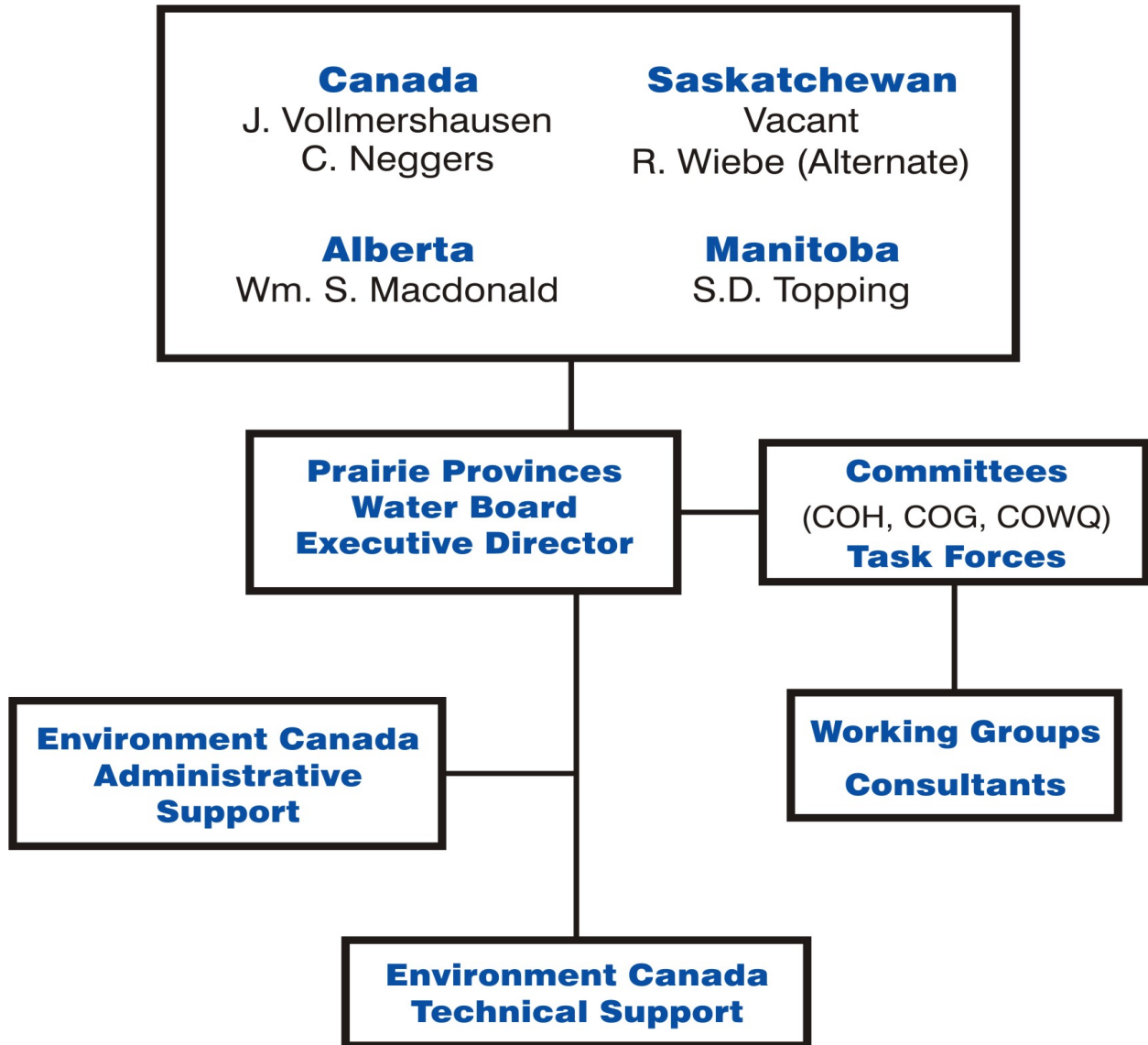
PPWB Minute 26-25 (Nov. 18-19, 1981)

MEMBERS

CHAIR	W.L. Dybvig	Executive Director Prairie Provinces Water Board
	G. van der Kamp	Groundwater Hydrology National Water Research Institute Environment Canada
	A. Cowen	Prairie Farm Rehabilitation Administration Agriculture and Agri-Food Canada
	N. de la Cruz	Science and Innovation Section Environmental Policy Branch Alberta Environment
	N. Shaheen	Groundwater Management Saskatchewan Watershed Authority
	R. Betcher	Groundwater Management Section Water Sciences and Management Branch Manitoba Water Stewardship
SECRETARY	A.J. Chen	Transboundary Waters Unit Environment Canada

APPENDIX VII

PPWB Organizational Chart 2006



**APPENDIX VIII
PPWB STATEMENT OF FINAL EXPENDITURES 2006-2007**

	2006-2007	Final Expenditures
	Approved Budget	March 31, 2007
SALARIES:		
SALARIES(1) *	\$281,035	\$272,616
OVERTIME/OTHER	\$0	\$0
TOTAL SALARIES	\$281,035	\$272,616
OPERATING EXPENSES:		
TRAVEL	\$14,200	\$9,357
POSTAGE	\$1,000	\$1,007
TELECOMMUNICATIONS	\$4,675	\$5,770
PRINTING	\$6,500	\$8,498
PROFESSIONAL SERVICES**	\$100,000	\$37,829
TRAINING	\$1,000	\$815
TEMPORARY HELP	\$200	\$0
OTHER SERVICES	\$6,500	\$2,442
RENTALS (2)	\$500	\$0
EQUIPMENT REPAIR	\$300	\$1,054
SUPPLIES	\$4,500	\$2,689
EQUIPMENT PURCHASES	\$2,500	\$1,600
TOTAL OPERATING EXPENSES	\$141,875	\$71,061
TOTAL SALARIES AND O&M	\$422,910	\$343,677
FRINGE BENEFITS (9% of salaries)	\$25,293	\$24,535
TOTAL	\$448,203	\$368,212

*\$20,000 received from Alberta for Term to do Return Flow Study Funded under Salaries.

**Contracts completed in 2006-07 were:

Conceptual Aquifers Management \$25K

TMC \$12,829 (Data Needs Assessment)

1) Salaries: Dybvig 40% of ENG6 (actual salary paid was higher than ENG6 as per provincial scale); Kienholz 60% of PC3; Chen 80% of ENG4; Mason 50% of SCY2; Glozier 35% of PC2 (acting PC3); Yee 40% of ENG4.

2) rental charges: no charges for office space by EC

APPENDIX IX

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 some 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 Master Agreement on Apportionment 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 Master Agreement on Apportionment 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 describing the composition, functions and duties of the Board.
4. Schedule D. A listing of Orders-in-Council for allocations of interprovincial waters made before 1969.
5. Schedule E. A Water Quality Agreement describing the role of the PPWB in interprovincial water quality management and establishing PPWB 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, rules, and procedures also became effective on this date.

On April 2, 1992, the Master Agreement on Apportionment was amended to include a water quality agreement that

became Schedule E to the Master Agreement. The agreement sets water quality objectives at 11 interprovincial 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 now 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 budget with one-half the budget being provided by Canada (Environment Canada) and one-sixth by each of the three provinces.



Prairie Provinces Water Board
2365 Albert Street, Room 300
Regina, Saskatchewan
S4P 4K1

PPWB Web Site address:
<http://www.pnr-rpn.ec.gc.ca/water/fa01/index.en.html>