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FIFTY-FOURTH ANNUAL REPORT

TO THE International Joint Commission

COVERING Calendar Year 2012

International Souris River Board

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INTERNATIONAL SOURIS
RIVER BOARD

CONSEIL INTERNATIONALE
DE LA RIVIERE SOURIS

October 2013

The International Joint Commission
Ottawa, Ontario and Washington, D.C.

Commissioners:

In accordance with the Directive of January 22, 2007 (replaces Directives of April 11, 2002 and May 31, 1959), we have enclosed the Fifty-Fourth Annual Report covering calendar year 2012.

Respectively submitted,

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For the 2012 calendar year, the natural flow of the Souris River at the Sherwood Crossing was 103 485 cubic decametres (83,895 acre-feet), which represents 67 percent of the 1959-2012 long-term mean. North Dakota received 74 725 cubic decametres (60,580 acre-feet) or 72 percent of the natural flow.

Net depletions in Canada were 28 760 cubic decametres (23,316 acre-feet). Recorded runoff for the Souris River near Sherwood, North Dakota, was 72 838 cubic decametres (59,050 acre-feet), or about 55 percent of the 1931-2012 long- term mean. The apportionment between Canada and the United States was discussed at the February 22, 2012 meeting of the International Souris River Board. The Board declared 2012 to be a 50/50 year as the forecast was for a less than 1:10 year event. The August 31, 2012 Determination of Natural Flow showed a surplus of 24 988 cubic decametres (20,258 acre-feet) to the United States. Calculations made after the end of the year indicated that Saskatchewan was in surplus to the United States by 33 335 cubic decametres (27,025 acre-feet). The natural flow at Sherwood exceeded 50 000 cubic decametres (40,535 acre-feet), resulting in a 60/40 sharing of the natural flow at the Sherwood Crossing.

The flow of the Souris River as it enters North Dakota at Sherwood was more than 0.113 cubic metres per second (4 cubic feet per second) for the entire year. Accordingly, Saskatchewan complied with the 0.113 cubic metres per second (4 cubic feet per second) provision specified in Recommendation No. 1 of the Interim Measures.

Recorded runoff for Long Creek at the Western Crossing as it enters North Dakota was 6 852 cubic decametres (5,555 acre-feet), or 22 percent of the long-term mean since 1959. Recommendation No. 2 of the Interim Measures was met with a net gain in the North Dakota portion of the Long Creek basin of 4 475 cubic decametres (3,628 acre-feet).

Recorded runoff leaving the United States at Westhope during the period of June 1 through October 31, 2012, was 48 549 cubic decametres (39,359 acre-feet). The flow was in compliance with the 0.566 cubic metres per second (20 cubic feet per second) minimum flow requirement as specified in Recommendation No. 3(a) of the Interim Measures for the period of June 1 through October 24, 2012 but was below 0.566 cubic metres per second (20 cubic feet per second) from October 25 2012, to October 31, 2012.

The water quality of the Souris River in calendar year 2012 was similar to prior years. The principle water quality concerns in the Souris River basin relate to elevated concentrations of total dissolved solids (TDS), depleted dissolved oxygen, and high levels of nutrients especially phosphorus. Exceedances of specific water quality objectives at the Saskatchewan/North Dakota boundary include phosphorus, sodium, sulfate, iron, TDS dissolved oxygen and pH. Exceedances of specific water quality objectives at the Manitoba/North Dakota boundary include phosphorus, sodium, sulphate, TDS, dissolved oxygen, pH and iron.

On July 19, 2012 Paul Pilon announced he was retiring from Canadian Federal Public Service. Ted Yuzyk assumed the duties as liaison for the Canadian Section to the Board.

Robert Harrison, Member for Canada, Manitoba Water Stewardship, announced his retirement.

Edward Eaton, U.S. Army Corps of Engineers retired on November 3, 2012.

1.0 INTERNATIONAL SOURIS RIVER BOARD

1.1 SOURIS RIVER REFERENCE (1940)

The following excerpt describes the history of the water-apportionment program that the International Souris River Board currently maintains.

In a letter on behalf of the Government of Canada dated 20 March 1959 and a letter on behalf of the Government of the United States of America dated 3 April 1959, the International Joint Commission was informed that the Interim Measures recommended in its report of 19 March 1958, in substitution for those recommended in the report dated 2 October 1940 in response to the Souris River Reference (1940), had been accepted by both Governments.

The Governments of the United States and Canada entered into an Agreement for Water Supply and Flood Control in the Souris River Basin on October 26, 1989. Pursuant to this Agreement, the Interim Measures related to the sharing of the annual flow of the Souris River from Saskatchewan into North Dakota contained in paragraph 22(1) of the Commission's 1958 Report to the Governments were modified. In light of the modifications in 1989 and pursuant to a February 28, 1992, request from the Governments of the United States and Canada, the Commission, on April 23, 1992, directed the International Souris River Board of Control to begin applying the "Interim Measures as Modified in 1992." The measures were further modified by the Governments in December 2000. The "Interim Measures as Modified in 2000" are shown in Appendix C of this report.

1.2 INTERIM MEASURES AS MODIFIED IN 2000

In December 2000, the International Joint Commission directed the Board to implement the "Interim Measures as Modified in 2000" for the 2001 calendar year and each year thereafter. The 2000 Interim Measures, shown in Appendix C, were developed to provide greater clarification of the conditions that must prevail for the determination of the share of natural flow between Saskatchewan and North Dakota at the Sherwood Crossing.

In general, the Interim Measures provide that Saskatchewan shall have the right to divert, store, and use waters that originate in the Saskatchewan portion of the Souris River basin, provided that the annual runoff of the river into North Dakota is not thereby reduced to less than half of the runoff that would have occurred in a state of nature; that North Dakota shall have the right to divert, store, and use the waters that originate in the North Dakota portion of the basin together with the waters that cross the boundary from Saskatchewan; and that Manitoba shall have the right to use the waters that originate in the Manitoba portion of the basin and, in addition, that North Dakota must provide to Manitoba, except during periods of severe drought, a regulated flow of 0.566 cubic metres per second (20 cubic feet per second) during the months of June through October.

For the benefit of riparian users of water between the Sherwood Crossing and the upstream end of Lake Darling, the Province of Saskatchewan shall as far as practicable regulate its diversions, storage, and uses in such a manner that the flow in the Souris River channel at the Sherwood Crossing shall not be less than 0.113 cubic metres per second (4 cubic feet per second) when that level of flow would have occurred under the conditions of water-use development prevailing in the Saskatchewan portion of the drainage basin prior to the construction of Boundary Dam, Rafferty Dam, and Alameda Dam.

Under certain conditions, a portion of the North Dakota share will be in the form of evaporation from Rafferty and Alameda Reservoirs. During years when those conditions occur, the minimum flow actually passed to North Dakota will be 40 percent of the natural flow at the Sherwood Crossing. This lesser amount is in recognition of Saskatchewan's operation of Rafferty Dam and Alameda Dam for flood control.

Except in flood years, flow releases to the United States should occur in the pattern that would have occurred in a state of nature. To the extent possible and in consideration of potential channel losses and operating efficiencies, releases from the Canadian dams will be scheduled to coincide with periods of beneficial use in North Dakota. The flow release to the United States may be delayed when the State of North Dakota determines and notifies Saskatchewan through the International Souris River Board that the release would not be of benefit to the State at that time.

The State of North Dakota shall have the right to divert, store, and use the waters that originate in the North Dakota portion of the Souris River basin together with the waters delivered to the State of North Dakota at the Sherwood Crossing, provided that any diversion, use, or storage of Long Creek water shall not diminish the annual runoff at the Eastern Crossing of Long Creek into Saskatchewan below the annual runoff of Long Creek at the Western Crossing into North Dakota.

In periods of severe drought, when it becomes impracticable for North Dakota to deliver the regulated flow of 0.566 cubic metres per second (20 cubic feet per second), North Dakota's responsibility to Manitoba will be limited to providing such flows as the Board determines to be practicable and in accordance with the objective of making water available for human and livestock consumption as well as for household use.

1.3 BOARD OF CONTROL

At its meeting in May 1959, the International Joint Commission officially approved and signed a directive that created the International Souris River Board of Control. At that time, the Board was charged with the responsibility of ensuring compliance with the Interim Measures set out and of submitting to the Commission such reports as the Commission may require or as the Board at its discretion may desire to file.

1.4 AMALGAMATION OF THE INTERNATIONAL SOURIS-RED RIVERS ENGINEERING BOARD AND INTERNATIONAL SOURIS RIVER BOARD OF CONTROL

In 2000, the International Joint Commission directed the International Souris-Red Rivers Engineering Board to transfer its responsibilities that related to the Souris River to the International Souris River Board of Control. The Commission also changed the International Souris River Board of Control's name to the International Souris River Board.

1.5 AMALGAMATION OF THE INTERNATIONAL SOURIS RIVER BOARD AND SOURIS RIVER BI-LATERAL WATER QUALITY MONITORING GROUP

In 2006 the International Joint Commission changed the Board’s mandate. Because of the change in the mandate and the desire of the Commission to move to a more encompassing watershed approach, the Board was requested to develop a Directive based on existing Commission responsibilities in the Souris River basin that would move toward an enhanced mandate for the Board. By letter dated

January 22, 2007, the International Souris River Board was officially notified by the Commission that the new directive dated January 18, 2007, replaced the previous directive dated April 11, 2002. The new Directive sets out the duties of the Board as it moves toward a watershed approach in the Souris River basin and combined the duties of the International Souris River Board and Souris River Bi-Lateral Water Quality Monitoring Group. It also increased the membership of the Board to twelve members.

The Board's duties were revised to include the following:

- Maintain an awareness of existing and proposed developments, activities, conditions, and issues in the Souris River basin that may have an impact on transboundary water levels, flows, water quality, and aquatic ecosystem health and inform the Commission about existing or potential transboundary issues.
- Oversee the implementation of compliance with the Interim Measures as Modified for Apportionment of the Souris River as described in Appendix A of the Directive.
- Assist the Commission in the review of a Joint Water Quality Monitoring Program.
- Perform an oversight function for flood operations in cooperation with the designated entities identified in the 1989 Canada-United States Agreement for Water Supply and Flood Control in the Souris River Basin.
- Report on aquatic ecosystem health issues in the watershed and regularly inform the Commission on the state and implications of aquatic ecosystem health.
- Carry out such other studies or activities as the Commission may, from time to time, request.
- Prepare an annual work plan including both routine board activities and new initiatives planned to be conducted in the subsequent year.
- The Board shall submit an annual report covering all of its activities at least three weeks in advance of the Commission’s fall semi-annual meeting, and the Board shall submit other reports as the Commission may request or the Board may feel appropriate in keeping with this Directive.
- The Board shall provide opportunities for the public to be involved in its work, including at least one public meeting in the basin each year. The Board has agreed to hold the public meeting in the spring/summer and to advertise it.

In 2007 three committees were established to assist with administering the conditions of the Board’s mandate. The Natural Flow Methods Committee was renamed as the Hydrology Committee, which is charged with investigating procedures and questions on the approach and methods used to determine the natural flow of the Souris River basin. The Flow Forecasting Liaison Committee has the responsibility to ensure there is information sharing and coordination between the forecasting agencies in the basin. The Aquatic Ecosystem Health Committee has responsibility to identify water quality and aquatic health concerns in the basin and report on the adequacy of the aquatic quality monitoring programs. Membership on these committees includes all affected agencies in the basin.

1.6 BOARD MEMBERS

At the end of 2012, the members of the International Souris River Board were as follow:

Todd Sando North Dakota State Engineer Bismarck, North Dakota	Member for the United States (Co-Chair)
Colonel Michael Price U.S. Army Corps of Engineers St. Paul, Minnesota	Member for the United States
Gregg Wiche U.S. Geological Survey Bismarck, North Dakota	Member for the United States
Megan Estep U.S. Fish and Wildlife Service Denver, Colorado	Member for the United States
Dennis Fewless North Dakota Department of Health Bismarck, North Dakota	Member for the United States
Scott Gangl North Dakota Game and Fish Department Bismarck, North Dakota	Member for the United States
Russell Boals Retired (Co-Chair) Regina, Saskatchewan	Member for Canada
John Fahlman Saskatchewan Watershed Authority Moose Jaw, Saskatchewan	Member for Canada
David Donald Environment Canada Regina, Saskatchewan	Member for Canada
Nicole Armstrong Manitoba Conservation & Water Stewardship Winnipeg, Manitoba	Member for Canada
Thon Phommavong Saskatchewan Ministry of Environment Regina, Saskatchewan	Member for Canada
Vacant Manitoba Water Stewardship Winnipeg, Manitoba	Member for Canada

2.0 2012 ACTIVITIES OF THE BOARD

Since the presentation of the Fifty - Third Annual Report to the International Joint Commission, the International Souris River Board has held two meetings and has had two teleconference calls. The discussions and decisions made are summarized in the following sections.

2.1 FEBRUARY 22, 2012, MEETING IN BISMARCK, NORTH DAKOTA

Members in attendance were:

Russell Boals
Member for Canada

John Fahlman
Member for Canada

Robert Harrison
Member for Canada

Dwight Williamson
Member for Canada

Thon Phommavong
Member for Canada

Todd Sando
Member for the United States

Megan Estep
Member for the United States

Gregg Wiche
Member for the United States

Colonel Michael Price
Member for the United States

Scott Gangl
Member for the United States

Dennis Fewless
Member for the United States

The determination of Natural Flow of the Souris River at Sherwood for the period of January 1 through December 31, 2011, was presented at the February 22, 2012, meeting. The final apportionment balance for the 2011 calendar year showed that Saskatchewan was in surplus to North Dakota by 1 416 650 cubic decametres (1,148,478 acre-feet). The summary of the natural flow computations showed that 2011 had the highest flows of record.

The Saskatchewan Watershed Authority (now Water Security Agency) said winter precipitation up to January 2012 was below normal in the Souris River Basin. The February 1 data indicated no significant snowfall. Depressional areas are still holding water, however, the 30-day local runoff forecast is only 10, 000 cubic decametres (8,107 acre-feet).

The Saskatchewan Watershed Authority (now Water Security Agency) reported there was a dam safety issue with Alameda Dam following the record-breaking flows of 2011. There is a possibility that Alameda Dam may not be used to its full flood storage level in 2012. New 3-D modeling results show that the 2-D modeling was not correct, and the 3-D model indicated that the dam could operate at the same levels as 2011. For less than normal to normal flood events, Rafferty and Alameda dams may be operated according to the Agreement, however Alameda can only operate to where it was in 2011. There are outflow restrictions at both dams. In 2011 it was discovered that when Rafferty is at maximum allowable flood level the maximum allowable release is more than the actual gate discharge capacity. Alameda has a railroad embankment downstream that creates tail water that could erode the embankment. It can only release 320 cubic metres per second (11,300 cubic feet per second). The

Saskatchewan Watershed Authority and the United States worked jointly to put together an interim operating plan that will have no impact to operating according to the Agreement.

The United States Geological Survey reported the peak flow at Sherwood was 841 cubic metres per second (29,700 cubic feet per second) on June 23, 2011. This was a peak of record. The peak flow at Westhope was 861 cubic metres per second (30,400 cubic feet per second) on July 05, 2011. This was a peak of record. Total flow at Westhope for the period June 1 to October 31, 2011 was 2,760,932 cubic decametres (2,238,287 acre-feet). This was more than the 7 486 cubic decametres (6, 069 acre feet) North Dakota is required to deliver to Manitoba.

The United States Geological Survey reported that the Westhope gage was damaged, but was repaired by the North Dakota State Water Commission and funded by International Joint Commission.

The National Weather Service reported that stream flows are normal or above normal for this time of year. Last year was a La Nina year. The Arctic Oscillation over Canada is positive. That shields us from severe weather and storms have not materialized.

The National Weather Service further explained that the period from March to May was originally expected to be cool and wet because of the Arctic Oscillation, however it is now shifting to a negative oscillation and the forecast has to be revised for a lesser than expected runoff.

Manitoba reported that they had below normal precipitation in the fall however basin conditions are saturated and depressional areas are full from 2011. Some minor flooding is expected in 2012.

The International Souris River Board members decided that apportionment for 2012 would be 50/50 between Canada and the United States.

The United States Fish and Wildlife Service reported the sluice gates on Lake Darling are not operable They are working with the US Army Corps of Engineers to repair the gates. Dams 320 and 332 also have gates that are not operable.

Colonel Michael Price presented the US Army Corps of Engineers report on the 2011 Flood. He also presented a White Paper reviewing Annex A of the 1989 Agreement. Colonel Michael Price mentioned that the project handled the snowmelt runoff. However, it was not designed to handle the subsequent rain events. It was suggested a task force be struck with United States Army Corps of Engineers and Saskatchewan Watershed Authority to lead a review of Annex A of the 1989 Agreement. Commissioner Lana Pollack thanked the United States Army Corps of Engineers for preparing the White Paper and stated that no reference is needed from the International Joint Commission. The International Joint Commission welcomes the International Souris River Board to make recommendations and suggested they move forward.

2.2 MARCH 28, 2012, TELECONFERENCE CALL

Members in attendance were:

Russell Boals
Member for Canada

John Fahlman
Member for Canada

Robert Harrison
Member for Canada

Dwight Williamson
Member for Canada

Thon Phommavong
Member for Canada

Todd Sando
Member for the United States

Colonel Michael Price
Member for the United States

Gregg Wiche
Member for the United States

Scott Gangl
Member for the United States

The Saskatchewan Watershed Authority (now Water Security Agency) reported inflow to Rafferty was 21 000 cubic decametres (17,025 acre feet), whereas the forecasted spring runoff volume was 37 000 cubic decameters (29,996 acre feet). The total volume including winter flow was 42 000 cubic decameters (34,050 acre-feet) at Sherwood. Based on these volumes, the United States share would be about 21 000 cubic decametres (17,025 acre feet). To date Sherwood has seen 20 550 cubic decametres (16,660 acre feet).

There was much discussion on the Terms of Reference for the Task Force. It was agreed that the Task Force would report to the International Souris River Board for direction and answers to questions that may arise. The International Souris River Board will report to the International Joint Commission with recommendations. The International Souris River Board approved revised Terms of Reference. The Terms of Reference were finalized.

There was discussion on who would be on the Task Force. Members of the Task Force were to be selected from Federal, State, Provincial and local agencies.

2.3 JUNE 20, 2012, MEETING IN MINOT, NORTH DAKOTA

Members of ISRB in attendance were:

Russell Boals
Member for Canada

John Fahlman
Member for Canada

David Donald
Member for Canada

Robert Harrison
Member for Canada

Thon Phommavong
Member for Canada

Todd Sando
Member for the United States

Megan Estep
Member for the United States

Scott Gangl
Member for the United States

Gregg Wiche
Member for the United States

Colonel Michael Price
Member for the United States

Water Survey of Canada completed the determination of Natural Flow for 2011. The recorded flow at Sherwood was 2 043 157 cubic decameters (1,656,387 acre feet). The natural flow at Sherwood was 1 572 094 cubic decameters (1,274,497 acre feet). According to the computations, the United States share at 40 percent was 628 840 cubic decameters (509,801 acre feet). The flow received by the United States was 2 045 490 cubic decameters (1,658,279 acre feet) which constitutes a surplus delivery of 1 416 650 cubic decameters (1,148,478 acre feet). The annual apportionment requirement at Long Creek was met. The International Souris River Board accepted the determination of Natural Flow computation for 2011.

Water Survey of Canada also presented the determination of Natural Flow computation of the Souris River at Sherwood to May 31, 2012. The total diversion was 51 366 cubic decameters (41,642 acre-feet). The recorded flow at Sherwood was 46 600 cubic decameters (37,779 acre-feet). The natural flow computed for the Sherwood station was 82 461 cubic decameters (66,851acre-feet). The United States share at 40 percent was 32 980 cubic decameters (26,737 acre-feet). The flow received by the United States was 48 365 cubic decameters (39,210 acre-feet) resulting in a surplus delivery of 15,385 cubic decameters (12,473 acre-feet). The International Souris River Board accepted the determination of Natural Flow computation to May 31, 2012.

The Saskatchewan Watershed Authority (now Water Security Agency) reported that winter releases were made from Rafferty Dam to draw the reservoir below its normal drawdown elevation of 549.5 metres (1802.82 feet). During spring runoff the dam rose approximately 0.31 metres (1 foot). The Boundary Diversion was operated which raised the dam to 550.18 metres (1805.05 feet), below its Full Supply Level of 550.5 metres (1806.1 feet). Alameda Dam was at elevation 562.0 metres (1843.83 feet) or at Full Supply Level on January 1, 2012. During spring runoff it rose to 562.18 metres (1844.42 feet). A 4.0 cubic metres per second (141 cubic feet per second) release was made from Alameda to lower it to Full Supply Level.

The United States Geological Survey reported the total volume of flow past the Long Creek at Noonan gage through May 31, 2012, was 7,269 cubic decametres (5,893 acre-feet). Flows for the current year, based on the last 53 years of record are in the normal to above normal range. The peak discharge for the period January 1 to May 31, 2012, was 5.0 cubic metres per second (175 cubic feet per second).

The United States Geological Survey also reported the total volume of water at the Sherwood gage near Sherwood through May 31, 2012 was 46 688 cubic decametres (37, 850 acre-feet). Based on the last 82 years of record, the flows in 2012 are in the normal to above normal range. The peak discharge for the period January 1 to May 31, 2012, was 11.0 cubic metres per second (382 cubic feet per second).

According to the United States Geological Survey, the flows recorded at the Souris River near Westhope gage exceeded the long-term mean for the entire period, except for February 10 to March 15, when flows dropped to around 0.14 cubic metres per second (5 cubic feet per second). Based on the last 82 years of record, the flows in 2012 are in the normal to above normal range. The peak discharge for the period January 1 to May 31, 2012, was 16.0 cubic metres per second (553 cubic feet per second).

The National Weather Service reported that flows in the Souris River near Sherwood were above the median flow. Due to the already wet basin conditions there is risk of flooding.

Manitoba reported that hydrologic conditions were similar to those reported by Saskatchewan and North Dakota. Flows in the Sours River in Manitoba were below average after a dry fall.
The United States Fish and Wildlife Service said Lake Darling was at 1596 ft in February 2012. The Full Supply Level of Lake Darling is 486.77 metres (1597 feet). Lake Darling is releasing 2.83 cubic metres per second (100 cubic feet per second). The United States Fish and Wildlife Service is working with the United States Army Corps of Engineers to fix the sluice gate. The gates on Pools 320 and 341 are not operable at this time

Water Survey of Canada reported that they would add a new gage at Stony Creek, but nothing on the mainstem of the Souris River. The United States Geological Survey said there were no changes planned to the monitoring program for the United States portion of the hydrometric network. They said the North Dakota State Water Commission has done repairs to and raised some gages for the United States Geological Survey which were originally established for drought monitoring.

The Saskatchewan Watershed Authority (now Water Security Agency) reported there were no new appropriations in the Saskatchewan part of the basin in 2012.

The North Dakota State Water Commission reported that there were two new appropriations in 2012; a surface water permit for a golf course authorized to withdraw 76.5 cubic decametres (62 acre-feet); and a groundwater permit for 395 cubic decametres (320 acre-feet) of groundwater. Of the 395 cubic decametres (320 acre-feet), the permit was issued for 123 cubic decametres (100 acre-feet) and the remaining 271 cubic decametres (220 acre-feet) is held in abeyance.

The Flow Forecasting Liaison Committee met on June 19, 2012. The members dicussed communication among the members. They discussed the need for a better and improved communication following the 2011 flood event. There was consensus among the members to the create a formal communication strategy.

The Aquatic Ecosystem Health Committee's last meeting was on March 29, 2011. The committee recommended to the International Souris River Board replacing Total coliform with E. coli for the Souris River at Westhope. They will add E. coli to its sampling program without dropping Fecal coliform. The procedure to add E. coli to the water quality objectives would be a recommendation from the committee to the International Souris River Board, followed by the International Souris River Board requesting the International Joint Commission for approval. The Aquatic Ecosystem Health Committee will provide a short report indicating the reasons/justifications for the addition of E. coli to the water quality objectives. A motion was made that the International Souris River Board request the International Joint Commission to include E. coli to the water quality objectives. The E. coli objective would be implemented in 2013.

Nutrient strategies have not been established for the Souris River at Westhope. Water quality in the Souris River improved in 2011 due to high flows. Dissolved Oxygen also improved due to winter releases. The North Dakota Game and Fish Department provided information on low dissolved oxygen levels in the Souris River and its consequences that included fish kills in the past (2006-2008). Low Dissolved Oxygen coincides with period of low flows. Any time the flow drops below 0.28 cubic metres per second (10 cubic feet per second) problems with low Dissolved Oxygen levels begin to show. The North Dakota Game and Fish Department asked for a 0.28 cubic metres per second (10 cubic feet per second cubic feet per second) release, but does not need the water now due to the relatively high flows in the Souris River. They are currently looking at installing equipment to monitor Dissolved Oxygen near the Minot and Sherwood gages. Minot was considered to be the key area for

now. The United States Fish and Wildlife Service said they were willing to cooperate if International Watershed Initiative funds were available. It was estimated that $10,000/year is needed to install and operate a Dissolved Oxygen monitoring program. The International Joint commission said they could provide funding through the United States Geological Survey as a “Special Monitoring Co-operative Program”.

The US Army Corps of Engineers has developed a draft Plan of Study outlining what is needed, who can do what, and what activities are going on now. On the April 20, 2012 conference call of the Task Force, the Terms of Reference were presented and objectives were discussed. A draft outline, the Terms of Reference, and organizational status for the Plan of Study were developed. Tasks identified in the Terms of Reference included identification of what is needed, who does it, and existing work.

The International Souris River Board also approved engaging an International Joint Commission resource person who worked on the Great Lakes Study. The resource person from the International Joint Commission was identified as Syed Moin who is expected to provide technical support and advice to the Task Force.

The International Souris River Board acknowledged and recognized the work of Allen Walter, Minot Public Works Director, who has worked for several years in the Souris River Basin. Colonel Michael Price presented an award to Allen Walter on behalf of the US Army Corps of Engineers for his long-term service and fight against the 2011 Flood.

Paul Pilon announced his retirement from Public Service, and mentioned this was his last Board meeting.

Bob Harrison announced his retirement and that his term expires in July 2012.

2.4 JULY 26, 2012, TELECONFERENCE CALL

Members in attendance were:

Russell Boals
Member for Canada

Megan Estep
Member for the United States

David Donald
Member for Canada

There were not enough members for a quorum, however, the members present decided to hold the call. There were two main agenda items for discussion. The first was the Plan of Study and the second was discussion on last week’s meeting in St. Paul.

The United States Army Corps of Engineers provided an update since the June 20, 1012 International Souris River Board meeting in Minot. The US Army Corps of Engineers said an outline for the Plan of Study was presented at that meeting as background information. They noted that the International Joint Commission had offered the services of Syed Moin to facilitate and move the Plan of Study forward. A meeting was held in St. Paul, Minnesota to bring agencies together to exchange information on flood risk reduction and avoid duplication of efforts. Issues such as modeling and information gaps were discussed. There were no representatives at the meeting from Saskatchewan or Manitoba.

The United States Army Corps of Engineers mentioned two project proposals were submitted. The first was the Silver Jacket proposal that includes small to mid-size projects dealing with flood risk management. The second proposal was a hydrometric network improvement project that looks at the existing network, identifies gaps, and provides rationale for additional gauging stations in light of the 2011 Flood. The United States Army Corps of Engineers also mentioned there were other smaller projects that were undertaken to raise dikes in North Dakota as interim measures until a permanent flood risk management mechanism has been put in place.

The US Army Corps of Engineers noted that the International Joint Commission has $200,000 in its International Watershed Initiatives program that the Task Force could tap in to if it could identify a suitable project.

Syed Moin presented and explained the objectives of the Strategic Framework for the Task Force and the tasks for the Plan of Study. He has identified six major tasks ranging from developing a Plan of Study and Scope of Work to preparing progress reports, an interim draft report, and final report.

2.5 OCTOBER 2, 2012, TELECONFERENCE CALL

Members in attendance were:

Russell Boals
Member for Canada

Robert Harrison
Member for Canada

John Fahlman
Member for Canada

David Donald
Member for Canada

Todd Sando
Member for the United States

Gregg Wiche
Member for the United States

Megan Estep
Member for the United States

Scott Gangl
Member for the United States

The purpose of the teleconference call was to review the flow conditions and discuss the apportionment balance of the Souris River for the period of January 1 through August 31, 2012. However, the data needed to compute the natural flow was not available. Water Survey of Canada reported that they would complete the computations and send them to the Secretary who could then distribute them to the members. It was noted in the May 31, 2012 Determination of Natural Flow, there was a 15,385 cubic decameters (12,473 acre-feet) surplus.

The United States Fish and Wildlife Service reported that Lake Darling was at elevation 486.4 metres (1595.9 feet) and dropping. They have kept a flow in the Souris River of 1.4 cubic metres per second (25 cubic feet per second) all summer in order to maintain Dissolved Oxygen levels sufficient for the fishery. At J. Clark Salyer Refuge, pools 320 and 326 have been drawn down and flows at Westhope are being kept at 0.68 cubic metres per second (24 cubic feet per second). There should be no problem drawing down Lake Darling to its February 1 target elevation of 486.46 metres (1596.0 feet).

The Saskatchewan Watershed Authority (now Water Security Agency) reported Rafferty Reservoir was at 549.7 metres (1803.5 feet) or 0.8 metres (2.6 feet) below its Full Supply Level on October 1. There are no plans to make fall or winter releases from Rafferty Reservoir. Alameda Reservoir was at 561.57 metres (1842.42 feet) or 0.43 metres (1.41 feet) below its Full Supply Level on October 1.

Alameda had 63,00 cubic decametres to release (minus evaporation) in order to achieve its February 1 target elevation of 561.0 metres (1840.55 feet). They expect to release around 1.75 cubic metres per second (61.8 cubic feet per second). Boundary Reservoir was at 550.0 metres (1804.46 feet) on October 1 or 0.8 metres (2.6 feet) below its Full Supply Level. There are no plans for fall or winter releases from Boundary Reservoir.

3.0 MONITORING

3.1 INSPECTIONS OF THE BASIN

During the year, the staff of the Water Survey Division of Environment Canada, Saskatchewan Watershed Authority, the North Dakota State Water Commission, Manitoba Water Stewardship, and the United States Geological Survey carried out frequent field inspections of the Souris River basin.

3.2 GAUGING STATIONS

A list of the gauging stations being operated in the Souris River basin is given in Table 1. In addition, the United States Geological Survey operated three miscellaneous stream flow-measurement sites in the vicinity of the Eaton Irrigation Project near Towner, North Dakota.

The station numbers and the locations of the hydrometric stations measuring streamflow are shown in Part I of Table 1. The gauging station numbers and the locations of the hydrometric stations located on lakes and reservoirs in the basin are shown in Part II of Table 1.

Table 1.
STREAMFLOW, WATER-LEVEL, AND WATER QUALITY STATIONS
IN THE SOURIS RIVER BASIN
Part I--Streamflow

Index Number	Stream	Location	State or Province	Operated By
05NA003	Long Creek[1]	at Western Crossing	Saskatchewan	Environment Canada
(05113360)				
05NA004	Long Creek	near Maxim	Saskatchewan	Saskatchewan Watershed Authority
05NA005	Gibson Creek	near Radville	Saskatchewan	Environment Canada
05NB001	Long Creek	near Estevan	Saskatchewan	Environment Canada
05NB011	Yellowgrass Ditch	near Yellowgrass	Saskatchewan	Environment Canada
05NB014	Jewel Creek	near Goodwater	Saskatchewan	Environment Canada
05NB017	Souris River	near Halbrite	Saskatchewan	Environment Canada
05NB018	Tatagwa Lake Drain	near Weyburn	Saskatchewan	Environment Canada
05NB021	Short Creek[1]	near Roche Percee	Saskatchewan	Environment Canada
(05113800)				
05NB031	Souris River	near Bechard2	Saskatchewan	Saskatchewan Watershed Authority
05NB033	Moseley Creek	near Halbrite	Saskatchewan	Environment Canada
05NB034	Roughbark Creek	near Goodwater	Saskatchewan	Environment Canada
05NB035	Cooke Creek	near Goodwater	Saskatchewan	Environment Canada
05NB036	Souris River	below Rafferty Reservoir	Saskatchewan	Environment Canada
05NB038	Boundary Reservoir Diversion Canal	near Estevan	Saskatchewan	Environment Canada
05NB039	Tributary	near Outram	Saskatchewan	Environment Canada
05NB040	Souris River	near Ralph	Saskatchewan	Environment Canada
05NB041	Roughbark Creek	above Rafferty Reservoir	Saskatchewan	Environment Canada
05NC001	Moose Mountain Creek	below Moose Mountain Lake	Saskatchewan	Saskatchewan Watershed Authority
05ND004	Moose Mountain Creek	near Oxbow	Saskatchewan	Environment Canada
05ND010	Moose Mountain Creek	above Alameda Reservoir	Saskatchewan	Environment Canada
05ND011	Shepherd Creek	near Alameda	Saskatchewan	Environment Canada
05NE003	Pipestone Creek	above Moosomin Reservoir	Saskatchewan	Environment Canada
05NF001	Souris River	at Melita	Manitoba	Environment Canada
05NF002	Antler River	near Melita	Manitoba	Environment Canada
05NF006	Lightning Creek	near Carnduff	Saskatchewan	Environment Canada

05NF007	Gainsborough Creek	near Lyleton	Manitoba	Environment Canada
05NF008	Graham Creek	near Melita	Manitoba	Environment Canada
05NF010	Antler River	near Wauchope	Saskatchewan	Environment Canada
05NG001	Souris River	at Wawanesa	Manitoba	Environment Canada
05NG003	Pipestone Creek	near Pipestone	Manitoba	Environment Canada
05NG007	Plum Creek	near Souris	Manitoba	Environment Canada
05NG012	Elgin Creek	near Souris	Manitoba	Environment Canada
05NG020	Medora Creek	near Napinka	Manitoba	Environment Canada
05NG021	Souris River	at Souris	Manitoba	Environment Canada
05NG024	Pipestone Creek	near Sask. Boundary	Manitoba	Environment Canada
05113520	Long Creek Tributary	near Crosby	North Dakota	U.S. Geological Survey
05113600	Long Creek[1 3]	near Noonan	North Dakota	U.S. Geological Survey
(05NB027)				
05114000	Souris River[1 3]	near Sherwood	North Dakota	U.S. Geological Survey
(05ND007)				
05116000	Souris River[3]	near Foxholm	North Dakota	U.S. Geological Survey
05116135	Tasker Coulee Tributary	near Kenaston	North Dakota	U.S. Geological Survey
05116500	Des Lacs River[3]	at Foxholm	North Dakota	U.S. Geological Survey
05117500	Souris River[3]	above Minot	North Dakota	U.S. Geological Survey
05119410	Bonnes Coulee	near Velva	North Dakota	U.S. Geological Survey
05120000	Souris River[3]	near Verendrye	North Dakota	U.S. Geological Survey
05120180	Wintering River Tributary	near Kongsberg	North Dakota	U.S. Geological Survey
05120500	Wintering River[3]	near Karlsruhe	North Dakota	U.S. Geological Survey
05122000	Souris River[3]	near Bantry	North Dakota	U.S. Geological Survey
05123300	Oak Creek Tributary	near Bottineau	North Dakota	U.S. Geological Survey
05123400	Willow Creek[3]	near Willow City	North Dakota	U.S. Geological Survey
05123510	Deep River[3]	near Upham	North Dakota	U.S. Geological Survey
05124000	Souris River[1 3]	near Westhope	North Dakota	U.S. Geological Survey
(05NF012)				

Table 1.
STREAMFLOW, WATER-LEVEL, AND WATER QUALITY STATIONS
IN THE SOURIS RIVER BASIN
Part II--Water Level

Index Number	Stream	Location	State or Province	Operated By
05113750	East Branch Short Creek Reservoir	near Columbus	North Dakota	U.S. Geological Survey
05115500	Lake Darling	near Foxholm	North Dakota	U.S. Geological Survey
LGNN8	Souris River	at Logan	North Dakota	U.S. Corps of Engineers
				U.S. N. Weather Service
SWRN8	Souris River	at Sawyer	North Dakota	U.S. Corps of Engineers
				U.S. N. Weather Service
TOWN8	Souris River	at Towner	North Dakota	U.S. Corps of Engineers
				U.S. N. Weather Service
VLVN8	Souris River	at Velva	North Dakota	U.S. Corps of Engineers
				U.S. N. Weather Service
	Upper Souris Refuge	Dams 87 and 96	North Dakota	U.S. Fish and Wildlife
	Des Lacs Refuge	Units 1 - 8 inclusive	North Dakota	U.S. Fish and Wildlife
	J. Clark Salyer Refuge	Dams 320, 326, 332, 341, and 357	North Dakota	U.S. Fish and Wildlife
05NA006	Larsen Reservoir	near Radville	Saskatchewan	Environment Canada
05NB012	Boundary Reservoir	near Estevan	Saskatchewan	Saskatchewan Watershed Authority
05NB016	Roughbark Reservoir	near Weyburn	Saskatchewan	Environment Canada
05NB020	Nickle Lake	near Weyburn	Saskatchewan	Environment Canada
05NB032	Rafferty Reservoir	near Estevan	Saskatchewan	Environment Canada
05NC002	Moose Mountain Lake	near Corning	Saskatchewan	Environment Canada
05ND008	White Bear (Carlyle) Lake	near Carlyle	Saskatchewan	Saskatchewan Watershed Authority
05ND009	Kenosee Lake	near Carlyle	Saskatchewan	Saskatchewan Watershed Authority
05ND012	Alameda Reservoir	near Alameda	Saskatchewan	Environment Canada
05NE002	Moosomin Lake	near Moosomin	Saskatchewan	Environment Canada
05NF804	Metigoshe Lake	near Metigoshe	Manitoba	Manitoba Water Stewardship
05NF805	Sharpe Lake	near Deloraine	Manitoba	Manitoba Water Stewardship
05NG023	Whitewater Lake	near Boissevain	Manitoba	Environment Canada
05NG801	Plum Lake	above Deleau Dam	Manitoba	Manitoba Water Stewardship
05NG803	Elgin Reservoir	near Elgin	Manitoba	Manitoba Water Stewardship
05NG806	Souris River	above Hartney Dam	Manitoba	Manitoba Water Stewardship

05NG807	Souris River	above Napinka Dam	Manitoba	Manitoba Water Stewardship
05NG809	Plum Lake	near Findlay	Manitoba	Manitoba Water Stewardship
05NG813	Oak Lake	at Oak Lake Resort	Manitoba	Manitoba Water Stewardship
05NG814	Deloraine Reservoir	near Deloraine	Manitoba	Manitoba Water Stewardship

Table 1.
STREAMFLOW, WATER-LEVEL, AND WATER QUALITY STATIONS
IN THE SOURIS RIVER BASIN
Part III--Water Quality

Index Number	Stream	Location	State or Province	Operated By
05114000	Souris River[1 3]	near Sherwood	North Dakota	U.S. Geological Survey
(05ND007)	Souris River[1 3]	near Sherwood	North Dakota	U.S. Geological Survey
05115500	Lake Darling	near Foxholm	North Dakota	U.S. Geological Survey
05116000	Souris River[3]	near Foxholm	North Dakota	U.S. Geological Survey
05116500	Des Lacs River[3]	at Foxholm	North Dakota	U.S. Geological Survey
(380021)				N.D. Dept. of Health
05117500	Souris River[3]	above Minot	North Dakota	U.S. Geological Survey
(380161)				N.D. Dept. of Health
05120000	Souris River[3]	near Verendrye	North Dakota	U.S. Geological Survey
(380095)				N.D. Dept. of Health
05122000	Souris River[3]	near Bantry	North Dakota	U.S. Geological Survey
05123400	Willow Creek[3]	near Willow City	North Dakota	U.S. Geological Survey
05123510	Deep River[3]	near Upham	North Dakota	U.S. Geological Survey
	J. Clark Salyer Refuge	Pool 357	North Dakota	U.S. Fish and Wildlife
05124000	Souris River[1 3]	near Westhope (QA)	North Dakota	U.S. Geological Survey
(05NF012)				

[1] International gauging station

[2] Formerly published as Souris River below Lewvan

[3] Operated jointly for hydrometric and water-quality monitoring

4.0 TRANSBOUNDARY WATER QUALITY OBJECTIVES AND MONITORING

4.1 OVERVIEW OF WATER QUALITY

The water quality of the Souris River at the International Boundary has been monitored since 1990.

Water quality objectives are established at the two border crossings. When water quality objectives are not achieved, such conditions are referred to as "exceedances." A summary of water quality exceedances for 2012 along with historical data is reported in Appendix E.

The principal concerns regarding water quality in the Souris River basin are related to total dissolved solids (TDS), depleted dissolved oxygen and high levels of nutrients, especially phosphorus.

At the Saskatchewan/North Dakota border crossing in Sherwood, the United States Geological Survey (USGS) conducted sampling eight times in 2012. At the North Dakota/Manitoba border crossing in Westhope the USGS conducted one sample in 2012 simultaneously with Environment Canada to compare sampling methods. Environment Canada conducted eight samples and two QA/QC samples at the North Dakota/Manitoba border crossing.

At the Saskatchewan/North Dakota boundary, exceedances of specific water quality objectives included total phosphorus, sodium, sulfate, total iron, and total dissolved solids (TDS). These results are relatively consistent with prior year's results. The median values for sodium, sulfate, and total iron were up significantly from 2011, but with the historic flood of 2011 those values could have been diluted in that year. The highest historic value for lead was recorded on June 18th of 2012. That value of 4.5 ug/L was still well below the Water Quality Objective of 13 ug/L

Total phosphorus exceeded the objective of 0.10 milligrams per liter in 100 percent of the samples. The maximum phosphorus concentration was 0.47 milligrams per liter, which is almost 5times the objective. TDS also exceeded the objective of 1,000 milligrams per liter in 50 percent of the samples. Sodium and sulfate represent major constituents in the mineral composition of the Souris Rive and exceeded the objective by 83 percent and 17 percent respectively. Total iron exceeded the objective of 300 micrograms per liter in 100 percent of the samples, with values ranging from 446 micrograms per liter to 2,340 micrograms per liter.

Dissolved oxygen was above the Water Quality Objective for all samples in 2012, ranging from 5.8 milligrams per liter to 13.6 milligrams per liter. A concentration of less than 5.0 milligrams per liter is considered an exceedance. pH also met the Water Quality Objective for all samples in 2012.

At the Manitoba/North Dakota border near Westhope, Total Phosphorus exceeded the objective of 0.10 mg/L in 100% of the samples collected and they ranged from 0.638 to 0.105 mg/L. Other parameters that exceeded their objectives were Sulphate (7 out of 10 samples exceeded the objective of 450 mg/L), Sodium (9 out of 10 samples exceeded the objective of 100 mg/L), Iron (4 samples), pH (7 out of 10 samples exceeded the objective of 8.5), Total Dissolved solids (8 out of 10 samples exceeded the objective of 1000 mg/L) and Dissolved Oxygen only had one sample exceed the Water Quality Objective of < 5.0 mg/L.

Pesticide samples were collected in April, May, June, July and August with 2,4-D, Atrazine, Bromoxynil, Dicamba, MPCA, and Picloram showing positive results, but were below their respective Water Quality Objectives.

Sulphate, Sodium, and TDS values appear to be generally higher in 2012 compared to 2011. This is probably due to decreased flow compared to 2011. Some of the metals were higher in 2012 compared to 2011. These differences may also be attributed to the different hydrological conditions between 2011 and 2012.

4.2 CHANGES TO POLLUTION SOURCES IN 2012

There were no major changes to pollution sources in 2012. The most prevalent source of pollution is nonpoint source pollution from agriculture. The Souris River basin typically experiences short duration but intense precipitation during the spring and early summer months. These storms can cause overland flooding and rising river levels. Cropping practices that don't use soil and water conservation methods and livestock grazing near and watering in the river are the likely sources of excessive nutrient and E. coli bacteria concentrations, along with laying the groundwork for dissolved oxygen depletion.

Development in the Saskatchewan/North Dakota region of the basin in connection with the oil play in the Bakken Formation has the potential to increase areas that are susceptible to erosion. An increase in erosion can cause a variety of water quality impairments.

Point sources pollution from the cities of Estevan and Minot has been reduced by advanced wastewater treatment. Smaller cities continue to discharge effluent intermittently. All wastewater treatment lagoons in North Dakota are required in their permit to meet the State's water quality standards at the point of discharge. These standards are protective of the objectives set up by the International Souris River Board.

Future impacts to water quality and aquatic ecosystem health included changing agriculture and landscape, energy development, water appropriates that reduce flows and reservoir operations.

4.3 CHANGES TO MONITORING

No monitoring changes were implemented for 2012. The 2012 monitoring plan can be found in Appendix F.

4.4 CHANGES TO PHOSPHORUS OBJECTIVE

Phosphorus concentrations tend to be high in prairie soils. Under pre-settlement conditions, phosphorus could enter the river by erosion, transport and subsequent decay of plant material, and by animal activities. Human activities and hydrologic modifications exacerbate nutrient (nitrogen and phosphorus) loadings, which has the potential to increase the production of aquatic plants. The subsequent decay processes drive down dissolved oxygen levels. This process, called eutrophication, has likely been accelerated in the Souris River. Common sources of nutrient enrichment are municipal effluent, leaking septic systems, nonpoint source pollution from cropping agriculture and livestock, and hydrologic modifications.

Phosphorus loading has been reduced by the incorporation of advanced wastewater treatment systems in Estevan and Minot and the installation of animal waste systems and Best Management Practices on agricultural land through a variety of watershed improvement and individual landowner projects. Dams frequently have a substantial additive affect on phosphorus loading. Large reservoirs with hypolimnic releases generally contribute high phosphorus loads. Low head dams can contribute also

as they are often loaded with nutrient rich prairie soils. The reservoirs and dams often become anoxic during the winter, releasing additional phosphorus from bottom sediments. Downstream loading at the border is very high, because spring runoff occurs prior to ice out, thereby purging many of the shallow, nutrient rich ponds.

4.5 WINTER ANOXIA

Winter anoxia and fish kills as the result of very low concentrations dissolved oxygen has been documented in the Souris River basin on many occasions. Factors contributing to low oxygen levels have not been definitively determined, but are thought to be increased sediment oxygen demand (as determined in North Dakota's 2010 Total Maximum Daily Load report on the reach of the Souris River from Sherwood to Lake Darling), macrophyte decomposition, organic enrichment, photosynthesis suppression, low flow, scouring of low head dams during high flow events, and low level draw downs from reservoirs.

A dissolved oxygen concentration of 0.86 mg/L was measured on December 18, 2012 at Westhope. The extent of the anoxia was not determined so the Board agreed to keep a watch on dissolved oxygen conditions and the USGS and Environment Canada will attempt to collect dissolved oxygen and ammonia samples if low flow conditions prevail during future winters.

5.0 WATER-DEVELOPMENT ACTIVITIES IN 2012

5.1 NORTHWEST AREA WATER SUPPLY PROJECT

The Garrison Diversion Municipal, Rural, and Industrial (MRI) water-supply program, passed by the United States Congress on May 12, 1986, as part of the Garrison Diversion Reformation Act of 1986, authorized the appropriation of federal funds for the planning and construction of water-supply facilities throughout North Dakota. An agreement between the North Dakota State Water Commission and the Garrison Conservancy District in 1986 provided a method through which the agencies can request funding for MRI water-system projects from the Secretary of the Interior. On the basis of this agreement, the Northwest Area Water Supply (NAWS) study was initiated in November 1987. The NAWS project has been designed to supply a reliable source of treated water to cities, communities, and rural water systems in 10 counties in northwestern North Dakota. The project has an estimated cost of $217 million.

The water supply for the project is Lake Sakakawea, located in the Missouri River system. The annual use authorized under the State of North Dakota water permit is 18 502 dam3 (15,000 acre-feet). Canada is concerned that the NAWS project could permit the interbasin transfer of non-native biota. NAWS would be the first project to divert water across the continental divide to the Hudson Bay drainage basin.

The Province of Manitoba filed suit in U.S. District Court. The court required the project undergo further NEPA review, and placed an injunction on the project.

On April 15, 2005, the Court modified the injunction to allow the construction on the pipeline between Lake Sakakawea and Minot to continue.

On March 24, 2006, the Court modified the injunction to allow additional construction of the Minot High Service Pump Station, the pipeline from the High Service Pump Station to the northern part of the City of Minot, and the pipeline to Berthold to proceed. It was determined that this construction would not affect treatment decisions. Design work on these projects was completed in 2006 and contract awards were made in 2007 and 2008. All 45 miles of this pipeline were completed by the summer of 2008. Berthold started receiving water in August 2008. The High Service Pump Station started operating in December 2009.

On March 18, 2008, the Court again modified the injunction to allow additional design and construction activities for the entire Northern Tier for features not affecting treatment decisions. The Kenmare-Upper Souris project started serving water in December 2009. The NAWS-All Seasons-Upham pipeline started serving water in September 2009. The Mohall-Sherwood-All Seasons pipeline has planned completion in Spring 2012. The Minot Air Force Base pipeline and the Upper Souris-Glenburn segment north of the Air Force Base have planned completion in 2012. Berthold, the Kenmare-Upper Souris project, and the NAWS-All Seasons-Upham pipeline are currently receiving limited water supply from the Minot and Sundre aquifers.

The construction activity in 2012 revolved around three contracts that were delayed by the flooding in 2011. Two are pipeline contracts connecting Minot's North Hill, the Minot Air Force Base, Glenburn,

Upper Souris Water Users System II water treatment facility three miles north of Glenburn, and two connections for the North Prairie Rural Water System to the NAWS project. These projects were completed.

The other contract was for the rehabilitation of the filter bays and associated piping at the Minot Water Treatment Plant Filtration Upgrades as well as the control instrumentation and SCADA (telemetry) for the entire North Tier project works which were operational by the end of 2012 with substantial completion shortly thereafter.

In 2012, 475 million gallons of potable water were distributed to customers through the NAWS project.

Work continued on the Supplemental Environmental Impact Statement with the Bureau of Reclamation and their consultant, CardnoENTRIX. A status update was provided to the Federal Court in October.

5.2 WATER APPROPRIATIONS

5.2.1 Background

In 1995, the International Souris River Board adopted a new method for reporting minor project diversions for the purpose of determining apportionment. The new method uses a common set of criteria and ensures that the same criteria will be used in both Saskatchewan and North Dakota. It also involves taking the project lists generated by the Natural Flow Methods Committee and adding newly constructed projects or subtracting cancelled projects each year. The projects that met the criteria in 1993 are the benchmark for all future reporting.

5.2.2 Saskatchewan

In 1993 there were 137 minor projects in the Saskatchewan portion of the Souris River basin that met the new criteria. These projects had an annual diversion of 5 099 cubic decametres (4,134 acre-feet). On December 31, 2008, there were 139 minor projects in the Saskatchewan portion of the basin with an annual diversion of 4 824 cubic decametres (3,912 acre-feet). In 2012 there were five new projects with a total allocation of 5.0 cubic decametres (4.1 acre-feet). The annual diversions totaled 4 829 cubic decametres (3,915 acre-feet).

5.2.3 North Dakota

In 1993 there were 12 minor projects in the North Dakota portion of the Souris River basin upstream of Sherwood that met the new criteria. The projects had an annual diversion of 1 257 cubic decametres (1,019 acre-feet). On December 31, 2012, there were 12 minor projects in the North Dakota portion of the Long and Short Creek basins. The annual diversions totaled 1 423 cubic decametres (1,154 acre-feet).

The diversion from East Branch Short Creek near Columbus, North Dakota, was estimated by correcting for precipitation, evaporation and seepage, and the storage change. The diversion in 2012 was 464 cubic decametres (376 acre-feet). The diversion from the reservoir was added to the minor project diversions for the Long and Short Creek basins to obtain the total diversion of 2 124 cubic decametres (1,484 acre-feet) by the United States.

6.0 HYDROLOGIC CONDITIONS IN 2012

The Saskatchewan Watershed Authority (now Water Security Agency) reported that winter precipitation up to January 2012 was below normal in the Souris River Basin. The February 1 data indicated no significant snowfall. Depressional areas were still holding water, however, the 30-day local runoff forecast was only 10, 000 cubic decametres (8,107 acre-feet).

The National Weather Service reported that stream flows were normal or above normal for that time of year. Last year (2011) was a La Nina year. The Arctic Oscillation over Canada was positive. That shields the region from severe weather and storms have not materialized.

The National Weather Service reported that the period from March to May was originally expected to be cool and wet because of the positive Arctic Oscillation, however it was now shifting to a negative oscillation and the forecast was revised for a lesser than expected runoff.

Manitoba reported they had below normal precipitation, however, basin conditions were saturated and depressional areas were full from 2011. Some minor flooding was expected.

On December 31, 2012, Rafferty Reservoir was at an elevation of 549.582 metres (1803.09 feet), or 0.083 metres (0.27 feet) higher than at the beginning of the year. Total inflow to Rafferty Reservoir in 2012 was 35 483 cubic decametres (28,766 acre-feet), and the calculated diversion for 2012 was 27 976 cubic decametres (22,680 acre-feet). No water was transferred from Rafferty Reservoir to Boundary Reservoir via the pipeline in 2012.

The mainstem inflow to Alameda Reservoir (Moose Mountain Creek above Alameda Reservoir) was 42 201 cubic decametres (34,212 acre-feet), and the calculated diversion for 2012 was 8 686 cubic decametres (7,042 acre-feet). Alameda Reservoir was at an elevation of 561.199 metres (1,842.28 feet) on December 31, 2012, or 0.237 metres (2.33 feet) more than at the beginning of the year.

Boundary Reservoir received an inflow of 11 327 cubic decametres (9,183 acre-feet) from Long Creek. The calculated diversion for 2012 was 1 305 cubic decametres (1,058 acre-feet). On December 31, 2012, Boundary Reservoir was at an elevation of 560.834 metres (1,840.01 feet), or 0.108 metres (0.354 acre-feet) higher than at the beginning of the year.

On December 31, 2012, the estimated storage in the five major reservoirs in Saskatchewan (Boundary, Rafferty, Alameda, Nickle Lake, and Moose Mountain Lake) was 830 140 cubic decametres (672,994 acre-feet) as compared to storage of 575 322 cubic decametres (466,414 acre-feet) on December 31, 2011. Figure 1 shows the storage contents of several reservoirs in the Canadian portion of the Souris River basin for 2011 and 2012.

Recorded runoff for the year for the Souris River near Sherwood was 72 838 cubic decametres (59,050 acre-feet), or about 55.1 percent of the 1931-2012 long-term mean. The artificially drained areas of Yellow Grass Ditch and Tatagwa Lake contributed 17 315 cubic decametres (14,037 acre-feet) during 2012. Figure 2 provides a schematic representation of recorded runoff above Sherwood, North Dakota.

On December 31, 2012, the level of Lake Darling was 486.41 metres (1,595.85 feet). The 2012 year-end storage in Lake Darling was 120 056 cubic decametres (97,330 acre-feet), or approximately 8 121 cubic decametres (6,584 acre-feet) more than on December 31, 2011. The 2012 year-end storage in the J. Clark Salyer Refuge pools was 28 082 cubic decametres (22,766 acre-feet), or 13 609 cubic

decametres (11,033 acre-feet) more than on December 31, 2011. The combined year-end storage in Lake Darling and the J. Clark Salyer Refuge pools was 148 139 cubic decametres (120,096 acre-feet), well above the 66 600 cubic decametres (54,000 acre-feet) "severe drought" criterion. Figure 3 shows the storage contents of the mainstem reservoirs in the United States.

Recorded runoff for the year for the Souris River at Westhope was 157 575 cubic decametres (127,746 acre-feet) or some 84,737 cubic decametres (68,696 acre-feet) more than entered North Dakota at the Sherwood Crossing. The annual runoff for the Souris River near Westhope was 55.2 percent of the 1929-2010 long-term mean.

Figure 4 shows the monthly releases from Boundary, Rafferty, Alameda, and Lake Darling Reservoirs.

7.0 SUMMARY OF FLOWS AND DIVERSIONS

7.1 SOURIS RIVER NEAR SHERWOOD

The natural runoff near Sherwood for 2012 was 103 485 cubic decametres (83,895 acre-feet). Depletions in Canada totaled 46 075 cubic decametres (37,353 acre-feet). The additional water received from the Yellow Grass Ditch and Tatagwa Lake Drain basins was 17 315 cubic decametres (14,037 acre-feet). Total depletions in Canada were 28 760 cubic decametres (23,316 acre-feet) more than the additional water received from the Yellow Grass Ditch and Tatagwa Lake Drain basins. The total volume of water released from Boundary, Rafferty, and Alameda Reservoirs in Canada in 2012 was 44 830 cubic decametres (36,344 acre-feet), representing 61.6 percent of the recorded flow at Sherwood, or 43.3 percent of the computed natural runoff at Sherwood. A schematic representation of the 2012 flow volumes in the Souris River basin above Sherwood is shown in Figure 2 and the summary of the natural flow computations is provided in Appendix A. It should be noted that Saskatchewan was in surplus on December 31, 2012 by 33 335 cubic decametres (27,025 acre-feet).

The flow of the Souris River at Sherwood was more than 0.113 cubic metres per second (4 cubic feet per second) the entire year. Accordingly, Saskatchewan complied with the 0.113 cubic metres per second (4 cubic feet per second) provision specified in Recommendation No. 1 of the Interim Measures.

7.2 LONG CREEK AND SHORT CREEK

Recorded runoff for Long Creek at the Western Crossing as it enters North Dakota was 6 852 cubic decametres (5,555 acre-feet), or 22.2 percent of the long-term mean since 1959. Recommendation No. 2 of the Interim Measures was met with the increase of runoff on Long Creek between the Western and Eastern Crossings of 4 475 cubic decametres (3,628 acre-feet).

Short Creek, which rises in North Dakota, contributed 3 106 cubic decametres (2,518 acre-feet) to runoff in the Souris River above Sherwood.

7.3 SOURIS RIVER NEAR WESTHOPE

Recorded flow near Westhope during the period of June 1 through October 31, 2009, was 48 549 cubic decametres (39,359 acre-feet). Figure 5 illustrates the recorded flows at Westhope and at Wawanesa near the mouth of the Souris River in Manitoba.

Due to ice conditions the flows in the Souris River near Westhope were estimated for the periods January 1 to March 20 and November 17 to December 31. The peak daily discharge of 15.7 cubic metres per second (553 cubic feet per second) occurred on June 26, and ranked 30th in 81 years of discharge record.

The flow at Westhope was in compliance with the 0.566 cubic metres per second (20 cubic feet per second) minimum flow requirement as specified in Recommendation No. 3(a) of the Interim Measures.

8.0 WORKPLAN SUMMARY FOR 2012

The International Souris River Board was created by the International Joint Commission in April 2000 when it combined responsibilities for the Souris River previously assigned in two separate References. The two were the International Souris River Board of Control Reference (1959) and the Souris-Red Rivers Engineering Board Reference (1948).

On June 9, 2005, the Board's mandate was changed further through an exchange of diplomatic notes, assigning water quality functions and the oversight for flood forecasting and operations to the Board. The consolidation of water quantity, water quality, and the oversight for flood forecasting and operations is a step in the evolution of the Board as it moves towards an integrated approach to transboundary water issues in the Souris River basin.

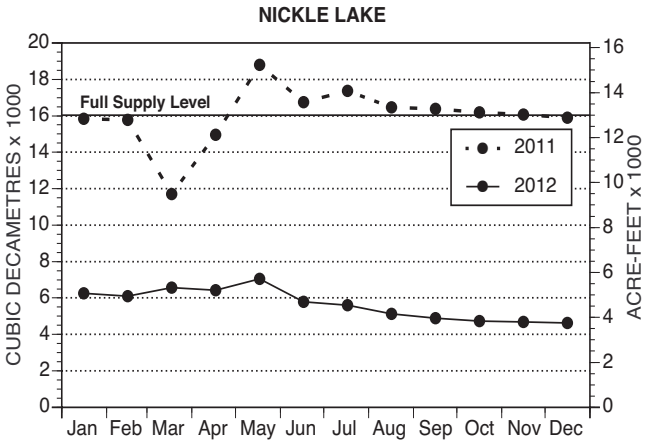
The Board determined that a workplan would be beneficial in helping the Board identify resource requirements and deliver on results. The Board agreed that the workplan should include costs related to normal Board activities such as meetings, the annual report, and special projects.

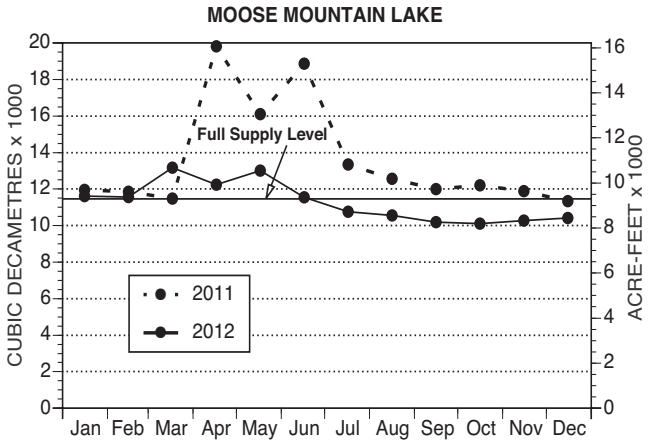
A multi-year workplan was updated for 2012 with the Plan of Study for the 2011 Flood the major focus. The workplan follows the four strategic initiatives of the International Watershed Initiative.

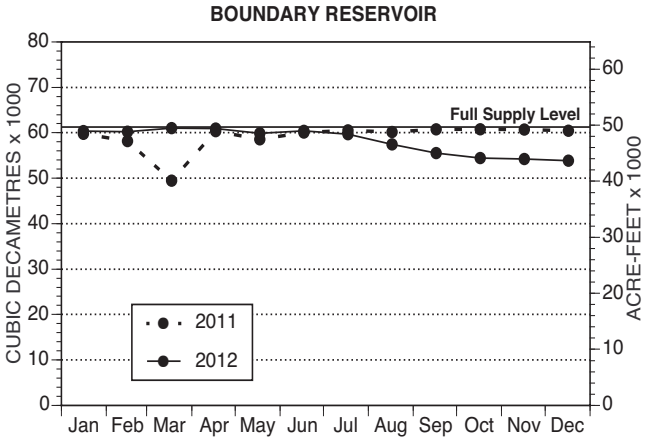
- Build shared understanding of the watershed and related transboundary issues.
- Communicate watershed issues at the local, regional and national levels to increase awareness, highlight potential issues, and identify opportunities for cooperation and resolution.
- Contribute to the resolution of watershed issues.
- Administer the existing orders and references.

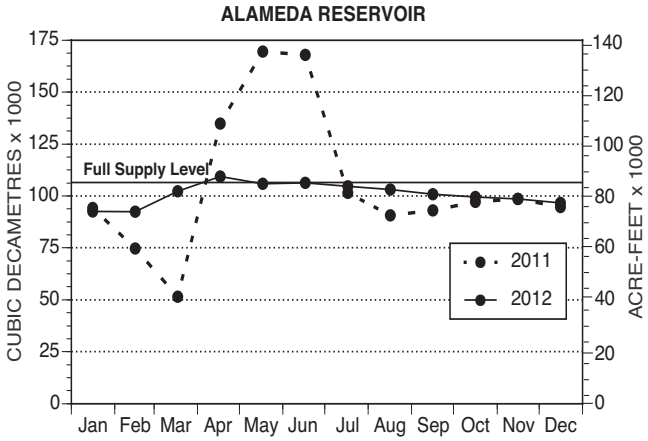
Figure 1

MONTH END CONTENTS OF RESERVOIRS IN CANADA FOR THE YEARS 2011 AND 2012









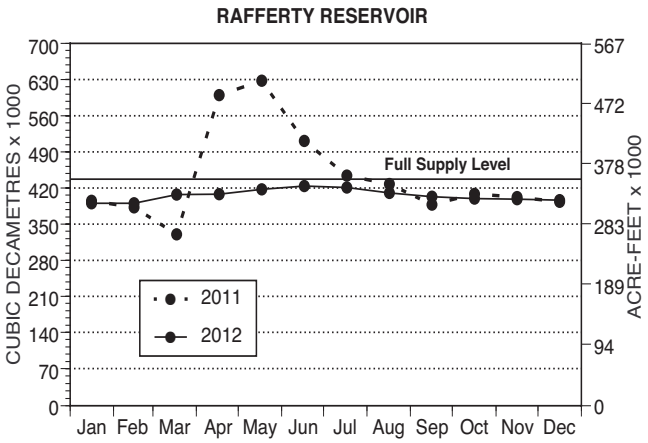


Figure 2

SCHEMATIC REPRESENTATION OF 2012 FLOWS IN THE SOURIS RIVER BASIN ABOVE SHERWOOD, NORTH DAKOTA, U.S.A.

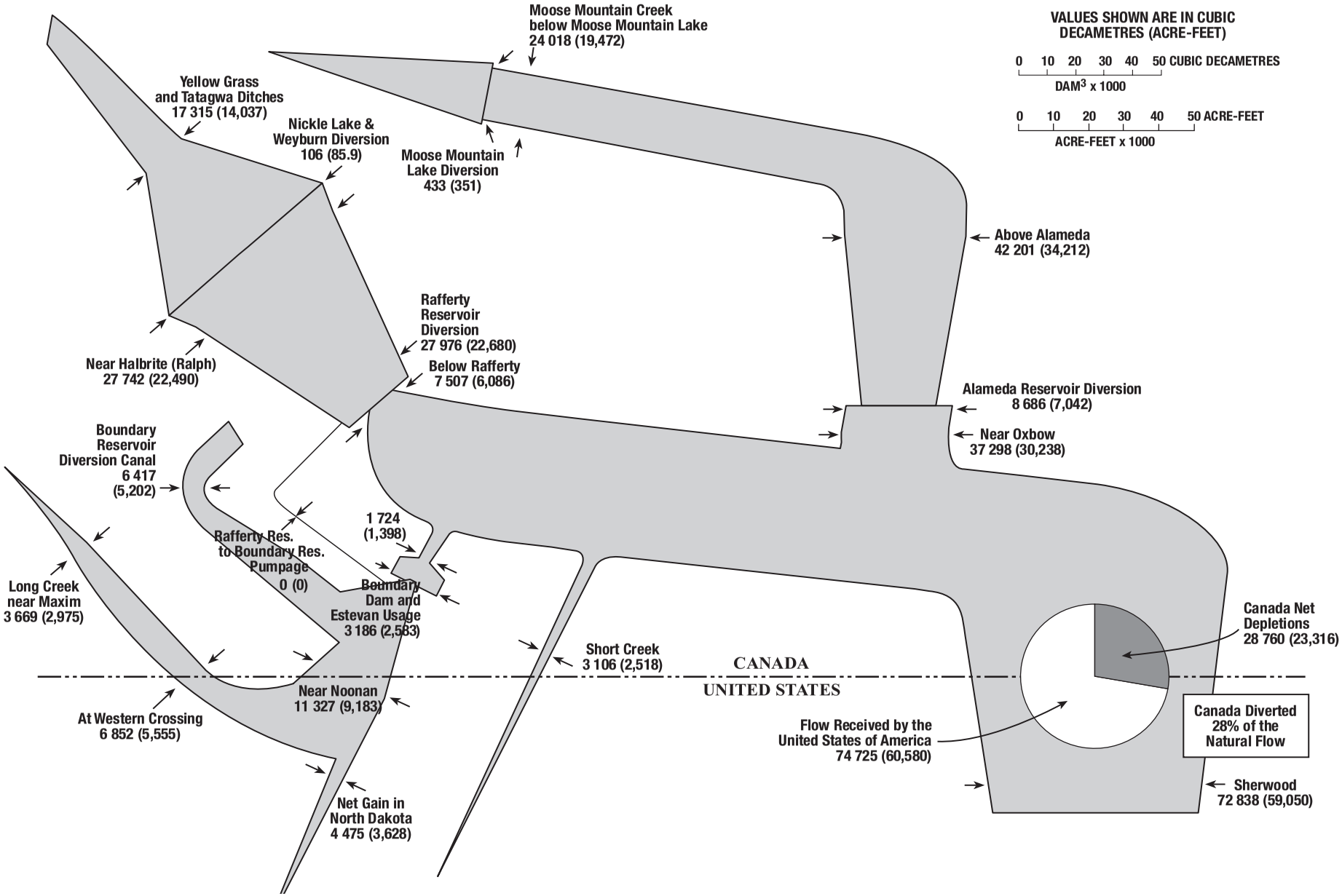


Figure 3

MONTH END CONTENTS OF RESERVOIRS IN USA FOR THE YEARS 2011 AND 2012

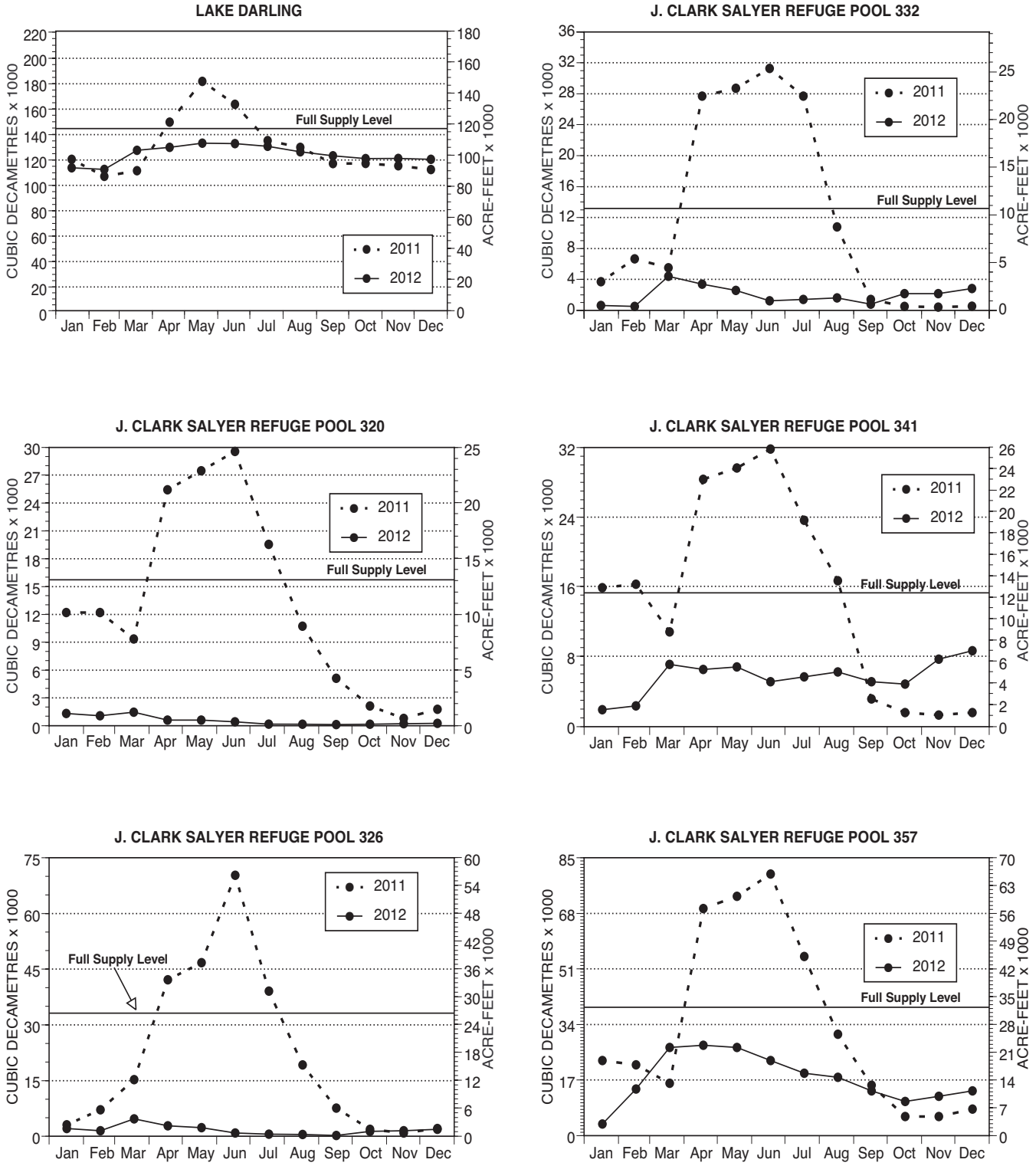


Figure 4

MONTHLY RESERVOIR RELEASES FOR THE YEAR 2012

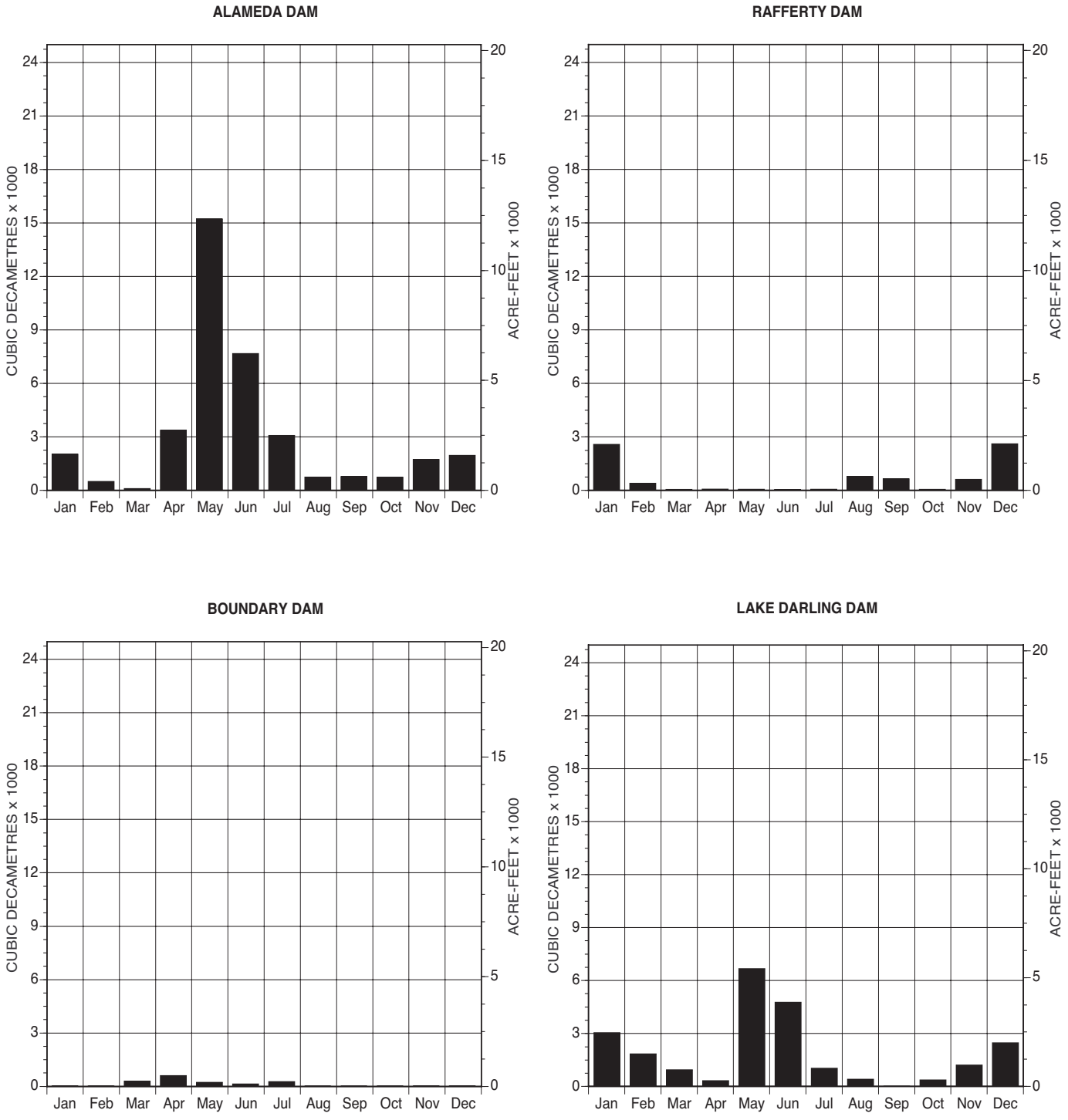
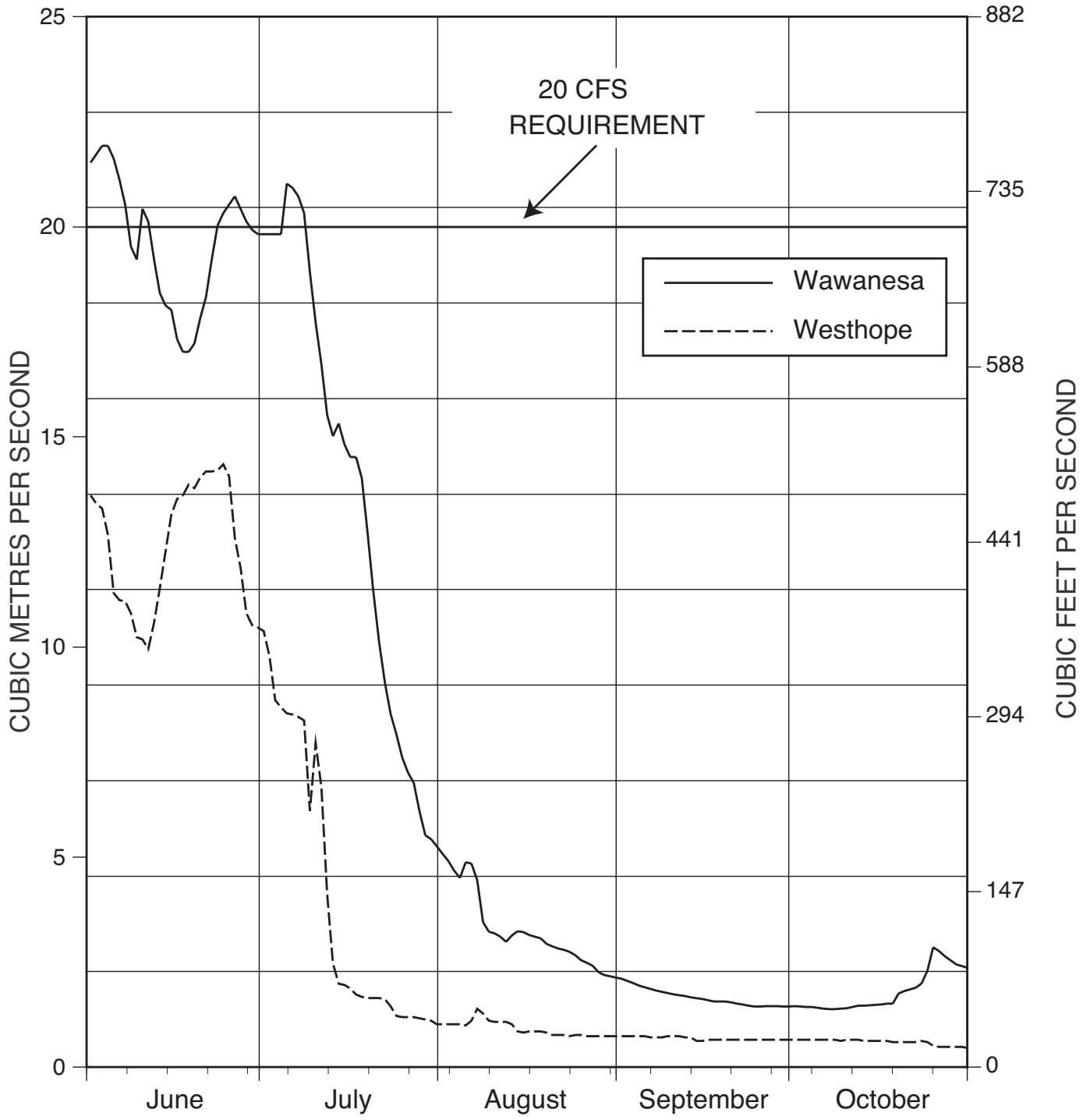


Figure 5

SOURIS RIVER NEAR WESTHOPE
AND
SOURIS RIVER NEAR WAWANESA

June 1, 2012 to October 31, 2012



Map of the Souris River Drainage Basin

INTERNATIONAL JOINT COMMISSION • COMMISSION MIXTE INTERNATIONALE 1909

0 5 10 15 20 Miles

0 10 20 30 40 Kilometres

North

Legend

- Souris River Basin
- Indian / Native Reserve
- Provincial Park
- US Fish and Wildlife
- Gauging Stations
- City
- Town, Village
- Highway
- River
- Lake or Reservoir

Datum: NAD 1983
Projection: Lambert Conformal Conic
Latitude of Origin: 49'
Central Meridian: -104'
Standard Parallel 1: 49'
Standard Parallel 2: 77'

Date: October 2007

Contact: M.R. Gilchrist, 306-780-6411
Environment Canada

APPENDIX A

Determination of Natural Flow of Souris River at International Boundary (Sherwood)

DETERMINATION OF NATURAL FLOW OF SOURIS RIVER AT INTERNATIONAL BOUNDARY (SHERWOOD)

All Quantities Reported In Cubic Decametres

FOR THE PERIOD: JANUARY 1 TO Dec 31, 2012

LONG CREEK BASIN

LARSEN RESERVOIR				BOUNDARY RESERVOIR								
				INFLOW	OUTFLOW							
1	2	3	4	5 *	6	7	8	9	10	11	12 *	13
STORAGE CHANGE	EVAPORATION	DIVERSION	TOWN OF RADVILLE PUMPAGE	LONG CREEK AT EASTERN CROSSING	LONG CREEK NEAR ESTEVAN	ESTEVAN PIPELINE	DIVERSION CANAL	TOTAL (OUTFLOW)	DIVERSION	MINOR PROJECT DIVERSION	U.S.A. DIVERSION BETWEEN WESTERN & EASTERN CROSSING	**TOTAL DIVERSION LONG CREEK**
				11327								
-89	192	103 (1+2)	30	0 PIPELINE	1467	2138	6417	10022 (6+7+8)	1305 (5-9)	840	403	2681 **(3+4+10+11+12)**

UPPER SOURIS RIVER BASIN - ABOVE ESTEVAN

NICKLE LAKE RESERVOIR					ROUGHBARK RESERVOIR			RAFFERTY RESERVOIR				
14	15	16	17	18	19	20	21	22	23	24	25	26
STORAGE CHANGE	EVAPORATION	CITY OF WEYBURN PUMPAGE	DIVERSION	CITY OF WEYBURN RETURN FLOW	STORAGE CHANGE	EVAPORATION	DIVERSION	INFLOW	OUTFLOW	DIVERSION	MINOR PROJECT DIVERSION	**TOTAL DIVERSION UPPER SOURIS RIVER**
									7507			
-3718	2601	2014	897 (14+15+16)	791	-129	247	118 (19+20)	35483	0 PIPELINE	27976 (22-23)	1542	29742 **(17-18+21+24+25)**

LOWER SOURIS RIVER--ESTEVAN TO SHERWOOD

27	28 *	29	30
CITY OF ESTEVAN NET PUMPAGE	SHORT CREEK DIVERSIONS IN U.S.A.	MINOR PROJECT DIVERSION	**TOTAL DIVERSION LOWER SOURIS RIVER**
1881	1484	1603	4968 **(27+28+29)**

MOOSE MOUNTAIN CREEK BASIN

MOOSE MOUNTAIN LAKE			ALAMEDA RESERVOIR				
31	32	33	34	35	36	37	38
STORAGE CHANGE	EVAPORATION	DIVERSION	STORAGE CHANGE	EVAPORATION	DIVERSION	MINOR PROJECT DIVERSIONS	**TOTAL DIVERSIONS MOOSE MOUNTAIN CREEK BASIN**
-1610	2043	433 (31+32)	2800	5886	8686 (34+35)	1452	10571 **(33+36+37)**

NON-CONTRIBUTORY BASINS

39	40	41
YELLOW GRASS DITCH	TATAGWA LAKE DRAIN	**TOTAL ADDITIONS**
16409	906	17315 (39+40)

SUMMARY OF NATURAL FLOW

42	43 *	44	45	46	47
TOTAL DIVERSION SOURIS RIVER BASIN	RECORDED FLOW AT SHERWOOD	NATURAL FLOW AT SHERWOOD	U..S.A. SHARE	FLOW RECEIVED BY U.S.A.	**SURPLUS (+) OR DEFICIT (-) TO U.S.A.**
			40% OF 44 41390		(46-45) 40% SHARE **33335**
47962 (13+26+30+38)	72838	103485 (42+43-41)	50% OF 44	74725 (12+28+43)	(46-45) 50% SHARE

RECOMMENDATION - SECTION 2
ANNUAL FLOW OF LONG CREEK

48	49 *	50
RECORDED FLOW AT WESTERN CROSSING	RECORDED FLOW AT EASTERN CROSSING	**SURPLUS (+) OR DEFICIT (-) FROM U.S.A.**
6852	11327	**4475** (49-48)

*** DATA CONTRIBUTED BY U.S.G.S.**

APPENDIX B

Equivalents of Measurements

EQUIVALENTS OF MEASUREMENTS

The following is a list of equivalents of measurement that have been agreed to for use in reports of the International Souris River Board.

1 centimetre equals 0.39370 inch
1 metre equals 3.2808 feet
1 kilometre equals 0.62137 mile

1 hectare equals 10 000 square metres
1 hectare equals 2.4710 acres
1 square kilometre equals 0.38610 square mile

1 cubic metre per second equals 35.315 cubic feet per second

The metric (SI) unit that replaces the British acre-foot unit is the cubic decametre (dam^3), which is the volume contained in a cube 10 m x 10 m x 10 m or 1 000 cubic metres.

1 cubic decametre equals 0.81070 acre-feet
1 cubic metre per second flowing for 1 day equals 86.4 cubic decametres
1 cubic foot per second flowing for 1 day equals 1.9835 acre-feet

APPENDIX C

Interim Measures as Modified in 2000

INTERIM MEASURES AS MODIFIED IN 2000

APPENDIX A TO THE DIRECTIVE TO THE INTERNATIONAL SOURIS RIVER BOARD

1. The Province of Saskatchewan shall have the right to divert, store, and use waters which originate in the Saskatchewan portion of the Souris River basin, provided that such diversion, storage, and use shall not diminish the annual flow of the river at the Sherwood Crossing more than 50 percent of that which would have occurred in a state of nature, as calculated by the International Souris River Board. For the purpose of these calculations, any reference to "annual" and "year" is intended to mean the period January 1 through December 31.

   For the benefit of riparian users of water between the Sherwood Crossing and the upstream end of Lake Darling, the Province of Saskatchewan shall, so far as is practicable, regulate its diversions, storage, and uses in such a manner that the flow in the Souris River channel at the Sherwood Crossing shall not be less than 0.113 cubic metre per second (4 cubic feet per second) when that much flow would have occurred under the conditions of water use development prevailing in the Saskatchewan portion of the Souris River basin prior to construction of the Boundary Dam, Rafferty Dam, and Alameda Dam.

   Under certain conditions, a portion of the North Dakota share will be in the form of evaporation from Rafferty and Alameda Reservoirs. During years when these conditions occur, the minimum amount of flow actually passed to North Dakota will be 40 percent of the annual natural flow volume at the Sherwood Crossing. This lesser amount is in recognition of Saskatchewan's operation of Rafferty Dam and Alameda Dam for flood control in North Dakota and of evaporation as a result of the project.

   a. Saskatchewan will deliver a minimum of 50 percent of the annual natural flow volume at the Sherwood Crossing in every year except in those years when the conditions given in (i) or (ii) below apply. In those years, Saskatchewan will deliver a minimum of 40 percent of the annual natural flow volume at the Sherwood Crossing.

      i. The annual natural flow volume at Sherwood Crossing is greater than 50 000 cubic decametres (40,500 acre-feet) and the current year June 1 elevation of Lake Darling is greater than 486.095 metres (1594.8 feet); or

      ii. The annual natural flow volume at Sherwood Crossing is greater than 50 000 cubic decametres (40,500 acre-feet) and the current year June 1 elevation of Lake Darling is greater than 485.79 metres (1593.8 feet), and since the last occurrence of a Lake Darling June 1 elevation of greater than 486.095 metres (1594.8 feet) the elevation of Lake Darling has not been less than 485.79 metres (1593.8 feet) on June 1.

   b. Notwithstanding the annual division of flows that is described in (a), in each year Saskatchewan will, so far as is practicable as determined by the Board, deliver to North Dakota prior to June 1, 50 percent of the first 50 000 cubic decametres (40,500 acre-feet) of natural flow which occurs during the period January 1 to May 31. The intent of this division of flow is to ensure that North Dakota receives 50 percent of the rate and volume of flow that would have occurred in a state of

nature to try to meet existing senior water rights.

c. Lake Darling Reservoir and the Canadian reservoirs will be operated (insofar as is compatible with the Projects' purposes and consistent with past practices) to ensure that the pool elevations, which determine conditions for sharing evaporation losses, are not artificially altered. The triggering elevation of 485.79 metres (1593.8 feet) for Lake Darling Reservoir is based on existing water uses in North Dakota, including refuges operated by the U.S. Fish and Wildlife Service. Each year, operating plans for the refuges on the Souris River will be presented to the Board. Barring unforeseen circumstances, operations will follow said plans during each given year. Lake Darling Reservoir will not be drawn down for the sole purpose of reaching the elevation of 485.79 metres (1593.8 feet) on June 1.

   Releases will not be made by Saskatchewan Watershed Authority from the Canadian reservoirs for the sole purpose of raising the elevation of Lake Darling Reservoir above 486.095 metres (1594.8 feet) on June 1.

d. Flow releases to the United States should occur (except in flood years) in the pattern which would have occurred in a state of nature. To the extent possible and in consideration of potential channel losses and operating efficiencies, releases from the Canadian dams will be scheduled to coincide with periods of beneficial use in North Dakota. Normally, the period of beneficial use in North Dakota coincides with the timing of the natural hydrograph, and that timing should be a guide to releases of the United States portion of the natural flow.

e. A determination of the annual apportionment balance shall be made by the Board on or about October 1 of each year. Any shortfall that exists as of that date shall be delivered by Saskatchewan prior to December 31.

f. The flow release to the United States may be delayed when the State of North Dakota determines and notifies Saskatchewan through the Board that the release would not be of benefit to the State at that time. The delayed release may be retained for use in Saskatchewan, notwithstanding the 0.113 cubic metre per second (4 cubic feet per second) minimum flow limit, unless it is called for by the State of North Dakota through the Board before October 1 of each year. The delayed release shall be measured at the point of release and the delivery at Sherwood Crossing shall not be less than the delayed release minus the conveyance losses that would have occurred under natural conditions between the point of release and the Sherwood Crossing. Prior to these releases being made, consultations shall occur between the Saskatchewan Watershed Authority, the U.S. Fish and Wildlife Service, and the State of North Dakota. All releases will be within the specified target flows at the control points.

2. Except as otherwise provided herein with respect to delivery of water to the Province of Manitoba, the State of North Dakota shall have the right to divert, store, and use the waters which originate in the North Dakota portion of the Souris River basin together with the waters delivered to the State of North Dakota at the Sherwood Crossing under Recommendation (1) above; provided, that any diversion, use, or storage of Long Creek water shall not diminish the annual flow at the eastern crossing of Long Creek into Saskatchewan below the annual flow of said Creek at the western crossing into North Dakota.

3. (a) In addition to the waters of the Souris River basin which originate in the Province of Manitoba, that Province shall have the right, except during periods of severe drought, to receive for its own use and the State of North Dakota shall deliver from any available source during the months of June, July, August, September, and October of each year, six thousand and sixty-nine (6,069) acre-feet of water at the Westhope Crossing regulated so far as practicable at the rate of twenty (20) cubic feet per second except as set forth hereinafter: provided, that in delivering such water to Manitoba no account shall be taken of water crossing the boundary at a rate in excess of the said 20 cubic feet per second.

   (b) In periods of severe drought when it becomes impracticable for the State of North Dakota to provide the foregoing regulated flows, the responsibility of the State of North Dakota in this connection shall be limited to the provision of such flows as may be practicable, in the opinion of the said Board of Control, in accordance with the objective of making water available for human and livestock consumption and for household use. It is understood that in the circumstances contemplated in this paragraph the State of North Dakota will give the earliest possible advice to the International Souris River Board of Control with respect to the onset of severe drought conditions.

4. In event of disagreement between the two sections of the International Souris River Board of Control, the matters in controversy shall be referred to the Commission for decision.

5. The interim measures for which provision is herein made shall remain in effect until the adoption of permanent measures in accordance with the requirements of questions (1) and (2) of the Reference of January 15, 1940, unless before that time these interim measures are qualified or modified by the Commission.

APPENDIX D

Board Directive from January 18, 2007

DIRECTIVE TO THE INTERNATIONAL SOURIS RIVER BOARD

The International Souris River Board was created by the International Joint Commission in April 2000 when it amalgamated the Souris River basin responsibilities previously assigned to the Commission in two separate references by the governments of Canada and the United States. The two references were the International Souris River Board of Control Reference (1959) and the Souris-Red Rivers Engineering Board Reference (1948). The International Souris River Board's mandate changed further through an exchange of diplomatic notes on June 9, 2005 assigning water quality functions and the oversight for flood forecasting and operations as described in Section 4 below. The consolidation of water quantity, water quality, and the oversight for flood forecasting and operations is a step in the evolution of the International Souris River Board as it moves towards an integrated approach to transboundary water issues in the Souris River basin.

This directive replaces the April 11, 2002 Directive to the International Souris River Board and sets out the mandate under which the Board will operate.

1. Pursuant to the Boundary Waters Treaty of 1909 and related agreements, responsibilities have been conferred on the Commission to ensure compliance with apportionment measures for the waters of the Souris River, to investigate and report on water requirements and uses as they impact the transboundary waters of the Souris River basin, and to assist in the implementation and review of the Joint Water Quality Monitoring Program pursuant to the 1989 Canada-United States Agreement for Water Supply and Flood Control in the Souris River Basin.

2. The apportionment measures derive from the approvals given by the governments of Canada and the United States, by letters of March 20, 1959 and April 3, 1959 respectively, to the recommendations made by the Commission in paragraph 22 of its report to the governments of March 19, 1958. Subsequently, with the signing of the Canada-United States Agreement for Water Supply and Flood Control in the Souris River basin on October 26, 1989 (hereafter referred to as the 1989 Agreement), the Interim Measures for apportionment of the Souris River at the Saskatchewan-North Dakota boundary were revised as described in Annex B of the 1989 Agreement. By letters of February 28, 1992, the Commission was requested to monitor compliance with the measures as modified in the 1989 Agreement. By letters of December 20 and 22, 2000, the governments amended Annex B of the 1989 Agreement. The attached Appendix A is a consolidation of the apportionment measures against which the Commission is to monitor compliance.

3. By letters of January 12, 1948, the governments requested the Commission to undertake investigations of water requirements and uses arising out of existing dams and other works or projects in the mid-continent portion of the Canada-United States boundary, including the Souris River basin, and to make advisory recommendations.

4. By exchange of diplomatic notes between the governments of Canada and the United States dated January 14 and June 9, 2005, the 1989 Canada-United States Agreement for Water Supply and Flood Control in the Souris River Basin was formally revised to include a reference pursuant to Article IX of the Boundary Waters Treaty which assigned water quality responsibilities contained in the 1989 Agreement to the Commission. The Commission was requested to assist with the implementation and review of the Joint Water Quality Monitoring Program. On October 21, 2005 at the October 2005 Commission's meeting with governments, the U.S. State Department read a statement into the Commission's formal record that the U.S. State Department is of the opinion the Commission has the authority and has obtained the notification it needs from the U.S. State Department to proceed with carrying out the flood related responsibilities for the Souris River. On April 6, 2006 at the April 2006 Commission's meeting with governments, the Department of Foreign Affairs and International Trade indicated that the Board should be assigned these responsibilities. It is recognized that Article X of the 1989 Canada-United States Agreement for Water Supply and Flood Control in the Souris River basin designates the entities responsible for operation and maintenance of the improvements mentioned in the 1989 Agreement and that the operations will be in accordance with the Operating Plan shown in Annex A of the 1989 Agreement. The Department of Army is the entity designated responsible for flood operations within the United States. The Government of Saskatchewan is the Canadian entity designated responsible for flood operations within the Canadian Province of Saskatchewan.

5. The Board's mandate is to support the Commission's initiative to explore and encourage the development of local and regional capacity with the objective of preventing and resolving transboundary disputes regarding the waters and aquatic ecosystem of the Souris River and its tributaries and aquifers. This would be accomplished through the application of best available science and knowledge of the aquatic ecosystem of the basin and an awareness of the needs, expectations and capabilities of residents of the Souris River basin. The Board's mandate will be accomplished by performing the tasks identified in Clause 6 below.

6. The Board's duties shall be to:

   (i) Maintain an awareness of existing and proposed developments, activities, conditions, and issues in the Souris River basin that may have an impact on transboundary water levels, flows, water quality, and aquatic ecosystem health and inform the Commission about existing or potential transboundary issues.

   (ii) Oversee the implementation of compliance with the Interim Measures As Modified For Apportionment of the Souris River as described in Appendix A of this document by:
   - identifying an adequate hydro-climatic monitoring network to support the determination of natural flow and apportionment balance,
   - encouraging the appropriate authorities to establish and maintain hydro-climatic monitoring and information collection networks and reporting

systems to ensure suitable information is available as required for the determination of natural flow and apportionment balance,

- informing the Commission, in a timely manner, of critical water supply or flow conditions in the basin,
- encouraging appropriate authorities to take steps to ensure that apportionment measures are met, and
- preparing an annual report and submitting it to the Commission.

(iii) Assist the Commission in the review of a Joint Water Quality Monitoring Program (referred to hereafter as "the Program") by:

- developing recommendations on the Program and the setting of water quality objectives,
- exchanging data provided by the Program on a regular basis,
- collating, interpreting, and analyzing the data provided by the Program,
- reviewing the Program and the water quality objectives at least every five years and developing recommendations, as appropriate, to the Commission to improve the Program and the objectives, and
- preparing an annual report containing:
  - a summary of the principal activities of the Board during the year with respect to the Program,
  - a summary of the principal activities affecting water quality in the Souris River Basin during the year,
  - a summary of the collated, interpreted, and analyzed data provided by the Program,
  - a summary of the water quality of the Souris River at the two locations at which it crosses the International Boundary,
  - a section summarizing any definitive changes in the monitored parameters and the possible causes of such changes,
  - a section discussing the water quality objectives for the Souris River at the Saskatchewan/North Dakota boundary and at the North Dakota/Manitoba boundary as established and revised pursuant to the 1989 Agreement,
  - a section summarizing other significant water quality changes and the possible causes of such changes, and
  - recommendations on new water quality objectives or on how existing water quality objectives can be met, including suggestions on water quality as it relates to water quantity during periods of low flow, in the event that the annual report indicates that the water quality objectives have not been attained as a result of activities pursued under the 1989 Agreement.

(iv) Perform an oversight function for flood operations in cooperation with the designated entities identified in the 1989 Canada-United States Agreement for Water Supply and Flood Control in the Souris River Basin by:

- ensuring mechanisms are in place for coordination of data exchange, flood forecasts and communications related to flood conditions and operations;
- determining whether the operations under the 1989 Agreement should proceed based on the Flood Operation or Non-Flood Operation of the Operating Plan, which is Annex A to the 1989 Agreement, using its criteria and informing designated agencies of this determination;
- reporting to the Commission on any issues related to flood operations and management; and
- providing the Commission and the designated entities under the 1989 Agreement recommendations on how flood operations and coordination activities could be improved.

(v) Report on aquatic ecosystem health issues in the watershed, regularly informing the Commission on the state and implications of aquatic ecosystem health, and encourage the appropriative authorities to establish and maintain water quality and other monitoring and information collection networks and reporting systems to ensure suitable information is available as required for the determination of the health of the aquatic ecosystem.

(vi) Carry out such other studies or activities as the Commission may, from time to time, request.

(vii) Prepare an annual work plan including both routine board activities and new initiatives planned to be conducted in the subsequent year. The work plan shall be submitted annually to IJC for review.

7. The Board shall provide opportunities for the public to be involved in its work, including at least one public meeting in the basin each year.

8. The Board shall coordinate and collaborate with other agencies and institutions both within and outside the Souris River basin as may be needed or desirable, and facilitate the timely dissemination of pertinent information within the basin. The Board shall keep the Commission informed of these activities.

9. The Board shall have an equal number of members from each country. The Commission shall normally appoint each member for a three-year term. Appointments may be renewed for additional terms. Members shall act in their personal and professional capacity, and not as representatives of their countries, agencies or institutions. The Commission shall appoint Canadian and United States co-chairs of the Board and will strive to appoint chairs with complementary expertise that encompasses a broad spectrum of basin issues.

10. The co-chairs of the Board shall be responsible for maintaining proper liaison between the Board and the Commission, and among the Board members.

11. The co-chairs shall ensure that members of the Board are informed of all instructions, inquiries, and authorizations received from the Commission and also of activities undertaken by or on behalf of the Board, progress made, and any developments affecting such progress.

12. The co-chairs may appoint secretaries of the Board who, under the general supervision of the co-chairs, shall carry out such duties as are assigned by the co-chairs or the Board as a whole.

13. The Board may establish such committees and working groups as may be required to fulfill its responsibilities in a knowledgeable and effective manner. The Commission shall be kept informed of the duties and composition of any committee or working group.

14. Unless other arrangements are made with the Commission, members of the Board, committees, or working groups shall make their own arrangements for reimbursement of necessary expenditures for travel or other related expenses.

15. The Board shall inform the Commission in advance of plans for any meetings, or other means of involving the public in Board deliberations, and shall report to the Commission, in a timely manner, on these and any other presentations or representations made to the Board.

16. The Board shall conduct its public outreach activities in accordance with the Commission's public information policies and shall maintain files in accordance with the Commission policy on segregation of documents.

17. Prior to their release, the Board shall provide the text of media releases and other public information materials to the Secretaries of the Commission for review by the Commission's Public Information Officers.

18. The Board shall submit an annual report covering all of its activities, including the annual report regarding the Program and the work plan, as described in Section 6 above, to the Commission, at least three weeks in advance of the Commission's fall semi-annual meeting, and the Board shall submit other reports as the Commission may request or the Board may feel appropriate in keeping with this Directive. Reports shall be submitted in a format suitable for public release and electronic copies shall be provided to each of the Commission's section offices.

19. Reports, including annual reports, minutes and correspondence of the Board shall, normally, remain privileged and be available only to the Commission and to members of the Board and its committees until their release has been authorized by the Commission. The Board shall provide minutes of Board meetings to the Commission within 45 days of the close of the meeting in keeping with the Commission's April 2002 Policy Concerning Public Access to Minutes of Meetings. The minutes will subsequently be put on the Commission's web site.

20. If, in the opinion of the Board or of any member, any instruction, directive, or authorization received from the Commission lacks clarity or precision, the matter shall be referred promptly to the Commission for appropriate action.

21. The Board shall operate by consensus. In the event of any disagreement among the members of the Board which they are unable to resolve, the Board shall refer the matter forthwith to the Commission for decision.

22. The Commission may amend existing instructions or issue new instructions to the Board at any time.

Signed this 18th day of January, 2007

Elizabeth Bourget
Secretary
United States Section

Murray Clamen
Secretary
Canadian Section

APPENDIX E

Water Quality Data for Sherwood and Westhope

ANNUAL WATER QUALITY OBJECTIVES SUMMARY

SOURIS RIVER - NORTH DAKOTA/SASKATCHEWAN BOUNDARY 2012
STATION 05114000 SHERWOOD USGS

WATER QUALITY PARAMETERS	WATER QUALITY OBJECTIVE	UNITS	HISTORIC DATA* Median (max-min) #samples	ANNUAL DATA Median (max-min) #samples	% EXCEEDANCE
Biological Parameters					
Fecal Coliform	200/100 ml	#/100 ml	30 (8,300-<1) 196	NDA	0
Inorganic Parameters					
Ammonia (un-ionized as N)	****	mg/L	0.001 (0.025-<0.001) 214	NDA	0
Chloride	100	mg/L	38 (220-4) 330	31.3 (63.5-20.5)8	0
Fluoride	1.5	mg/L	0.2 (1.8-<0.1) 330	0.17 (0.22-0.15)8	0
NO2 + NO3 (as N) dissolved	1.0	mg/L	0.1 (1.4-<0.01) 293	0.10 (0.78-<0.04) 8	0
Phosphorus (tota P)	0.10	mg/L	0.22(1.9-0.02)370	0.34 (0.47-0.19) 8	100
Sodium	100	mg/L	128 (532-14) 328	150 (203-68)8	83
Sulfate	450	mg/L	250 (1,000-45) 330	365 (498-271)8	17
Arsenic (total)	50	µg/L	<5.0 (28.3-<5) 155	8.2 (10.9-3.6)8	0
Barium (total)	1,000	µg/L	100 (300-15)164	122 (148-90) 8	0
Boron (total)	500	µg/L	203 (3,500-40) 164	147 (206-103) 8	0
Beryllium (total)	100	µg/L	<10 (43-<10) 164	0.05 (0.08-<0.02) 8	0
Cadmium (total)	***27	µg/L	<1 (2-<1) 163	0.05 (0.07-<0.02) 8	0
Chromium (total)	50	µg/L	<1(30-<1) 163	1.4 (2.0-0.4) 8	0
Cobalt (total)	500	µg/L	1 (3-<1) 163	1.2 (1.5-0.4) 8	0
Coppe r(total)	***30	µg/L	2.4 (20-<1) 157	3.7 (9.7-1.4)8	0
Iron (total)	300	µg/L	518 (10,000- 16) 172	1,770 (2,340-446)8	100

***based on hardness of 300 mg/L

****unionized ammonia is calculated using temperature and pH NDA: No Data Available

NC: Not Calculated

ANNUAL WATER QUALITY OBJECTIVES SUMMARY

SOURIS RIVER - NORTH DAKOTA/SASKATCHEWAN BOUNDARY 2012
STATION 05114000 SHERWOOD USGS

WATER QUALITY PARAMETERS	WATER QUALITY OBJECTIVE	UNITS	HISTORIC DATA* Median (max-min) #samples	ANNUAL DATA Median (max-min) #samples	% EXCEEDANCE
Lead (total)	***13	µg/L	<2 (4.5-<2) 157	1.25 (4.5-0.3) 8	0
Mercury	0.5 ug/g in fish flesh	µg/g	NDA	NDA	NDA
Molybdenum (total)	10	µg/L	2.6 (45-<1) 164	3.7 (4.7 -1.9) 8	0
Nickel (total)	***220	µg/L	4 (17-1) 178	5.1 (6.1-3.0) 8	0
Selenium (total)	5	µg/L	<1(14 -<1) 164	0.5 (0.6-0.3) 8	0
Zinc (total)	30	µg/L	10 (620-<2) 216	7.2 (11.5-<3) 8	0
Miscellaneous					
Total Dissolved Solids	1,000	mg/L	823 (2,540-170) 397	446 (1140-727) 8	50
Total Suspended Solids	the lesser of 10 mg/L	mg/L	15 (98-<1) 206	47 (64-<15) 8	NDA
pH (range)	8.5-6.5	standard units	8.2 (9.2-6.9) 447	8.3 (8.5-7.6) 8	0
Dissolved Oxygen (conc.)	>5.0	mg/L	8.4 (19.4-0.0) 434	7.9 (13.6-5.3) 8	0
Aesthetics		visual	NDA	NDA	NDA
Oil and Grease		visual	NDA	NDA	NDA

***based on hardness of 300 mg/L
****unionized ammonia is calculated using temperature and pH NDA: No Data Available
NC: Not Calculated

ANNUAL WATER QUALITY OBJECTIVES SUMMARY

SOURIS RIVER - NORTH DAKOTA/SASKATCHEWAN BOUNDARY 2012
STATION 05114000 SHERWOOD USGS

WATER QUALITY PARAMETERS	WATER QUALITY OBJECTIVE	UNITS	HISTORIC DATA* Median (max-min) #samples	ANNUAL DATA Median (max-min) #samples	% EXCEEDANCE
Organic Parameters					
Atrazine	2	µg/L	<0.05(0.03-<0.001)12	NDA	NDA
Bromoxynil	5	µg/L	NDA	NDA	NDA
Carbaryl	90	µg/L	<0.003(<0.003)10	NDA	NDA
Chlordane	0.0043	µg/L	<0.10(0.10-<0.10)40	NDA	NDA
DDT	0.001	µg/L	<0.01(0.02-<0.01)40	NDA	NDA
Dieldrin	0.0019	µg/L	<0.01(0.03-<0.01)40	NDA	NDA
Dicamba	IN DEVELOPMENT	µg/L	<0.01(<0.01)3	NDA	NDA
Diclofop-methyl	IN DEVELOPMENT	µg/L	NDA	NDA	NDA
Heptachlor	0.0038	µg/L	<0.01(0.15-<0.01)40	NDA	NDA
MCPA	0.20	µg/L	NDA	NDA	NDA
Parathion	0.04	µg/L	<0.01(<0.01)40	NDA	NDA
Picloram	0.05	µg/L	<0.01(<0.01)3	NDA	NDA
Phenols (total)	1.0	µg/L	<16(26-<16)202	NDA	NDA
Polychlorinated biphenyl (total)	0.001	µg/L	<0.1(0.3-<0.1)39	NDA	NDA
Triallate	0.57	µg/L	<0.001(0.035-<0.001)10	NDA	NDA
Trifluralin	0.10	µg/L	<0.002(0.084-<0.002)10	NDA	NDA
2,4-D	4.0	µg/L	0.02(0.24-<0.01)26	NDA	NDA

***based on hardness of 300 mg/L
****unionized ammonia is calculated using temperature and pH NDA: No Data Available
NC: Not Calculated

ANNUAL WATER QUALITY OBJECTIVES SUMMARY

SOURIS RIVER - NORTH DAKOTA/MANITOBA BOUNDARY 2012 (JAN. 1 - DEC. 31)
00US05NF001 WESTHOPE

WATER QUALITY PARAMETERS	WATER QUALITY OBJECTIVE	UNITS	HISTORIC DATA* Median (max-min) #samples	ANNUAL DATA Median (max-min) #samples	% EXCEEDANCE
Biological Parameters					
Fecal Coliform	200/100 ml	#/100 ml	<10(2300-<2)428	<2(75-12)10	0
Inorganic Parameters					
Ammonia (un-ionized as N)	****	mg/L	0.004(0.433-0.0)202	0.0275(0.076-0.002)8	0
Chloride	100	mg/L	28(297-1.2)565	44(80.9-24.8)10	0
Fluoride	1.5	mg/L	0.2(0.98-<0.01)612	0.2(0.28-0.14)10	0
NO2 + NO3 (as N) dissolved	1.0	mg/L	<0.01 (1.11-<0.01)199	0.022(0.05-<0.01)10	0
Phosphorus (tota P)	0.10	mg/L	0.308(4.52-0.091)196	0.3125(0.638-0.105)10	100
Sodium	100	mg/L	115(1040-6.4)810	195(322-90)10	90
Sulfate	450	mg/L	189(3490-4.8)811	505(838-278)10	70
Arsenic (total)	50	ug/L	4.13(33.4-0.5)377	9.275(11.7-2.37)10	0
Barium (total)	1000	ug/L	98(631-32.3)283	86.65(180-55.8)10	0
Boron (total)	500	ug/L	228(2080-<2)378	145(215-107)10	0
Beryllium (total)	100	ug/L	0.05(<0.5-0.004)167	0.017(0.041-0.007)10	0
Cadmium (total)	***27	µg/L	0.2(1-0.006)318	0.0155(0.03-0.01)10	0
Chromium (total)	50	µg/L	<0.7955(2.36-<0.01)165	0.27(0.43-0.1)10	0
Cobalt (total)	50	ug/L	<1(9-0.172)286	0.4875(1.1-0.338)10	0
Coppe r(total)	***30	µg/L	2(38-0.41)317	1.525(2.33-0.98)10	0
Iron (total)	300	ug/L	125(14500-<7)345	284(541-115)10	40

***based on hardness of 300 mg/L
****unionized ammonia is calculated using temperature and pH NDA: No Data Available
NC: Not Calculated

ANNUAL WATER QUALITY OBJECTIVES SUMMARY

SOURIS RIVER - NORTH DAKOTA/MANITOBA BOUNDARY 2012 (JAN. 1 - DEC. 31)
00US05NF001 WESTHOPE

WATER QUALITY PARAMETERS	WATER QUALITY OBJECTIVE	UNITS	HISTORIC DATA* Median (max-min) #samples	ANNUAL DATA Median (max-min) #samples	% EXCEEDANCE
Lead (total)	***13	µg/L	1.2(6.7-0.07)315	0.249(0.394-0.114)10	0
Mercury	0.5 ug/g in fish flesh	µg/g		NDA	
Molybdenum (total)	10	ug/L	2.63(35.2-0.591)164	2.235(6.96-1.85)10	0
Nickel (total)	***220	µg/L	3.2(24.7-1.6)319	3.36(8.41-3.01)10	0
Selenium (total)	5	ug/L	0.38(2-<0.05)376	0.485(0.69-0.37)10	0
Zinc (total)	30	µg/L	2.3(32-0.36)312	1.1(2.6-0.6)10	0
Miscellaneous					
Total Dissolved Solids	1000	mg/L	754(3821.074-129)283	1124.94(1847.824-633.044)10	80
Total Suspended Solids	the lesser of 10 mg/L	mg/L	15(300-<1)595	8.4(16.4-4.8)10	0
pH (range)	8.5-6.5	standard units	8.3(9.85-6.8)480	8.86(9.47-7.84)10	70
Dissolved Oxygen (conc.)	>5.0	mg/L	8.4(21.6-0.05)477	8.39(11.67-0.86)7	14
Aesthetics		visual	NDA	NDA	NDA
Oil and Grease		visual	NDA	NDA	NDA

***based on hardness of 300 mg/L

****unionized ammonia is calculated using temperature and pH NDA: No Data Available

NC: Not Calculated

ANNUAL WATER QUALITY OBJECTIVES SUMMARY

SOURIS RIVER - NORTH DAKOTA/MANITOBA BOUNDARY 2012 (JAN. 1 - DEC. 31)
00US05NF001 WESTHOPE

WATER QUALITY PARAMETERS	WATER QUALITY OBJECTIVE	UNITS	HISTORIC DATA* Median (max-min) #samples	ANNUAL DATA Median (max-min) #samples	% EXCEEDANCE
Organic Parameters	2	µg/L	<0.05(2.4-<0.00186)141	0.0148(0.0422-0.00668)5	0
Atrazine	5	µg/L	<0.0213(0.202-<0.00099)114	<0.00133(0.0109-<0.00133)5	0
Bromoxynil	90	µg/L			
Carbaryl	0.0043	µg/L	<0.003(0.003-<0.00014)231	<0.0006(<0.0006-<0.0006)5	0
Chlordane	0.0043	ug/L	<0.002(<0.002-<0.00004)231	<0.00031(<0.00031-<0.00031)5	0
DDT	0.001	µg/L	<1(<4.0-<.00004)233	<0.00056(0.00056-<0.00056)5	0
Dieldrin	0.0019	µg/L	<0.002(<0.002-<0.00018)269	<0.00107(<0.00107-<0.00107)5	0
Dicamba	IN DEVELOPMENT	µg/L	<0.03(0.0451-<0.00073)151	0.00998(0.0241-<0.00089)5	0
Diclofop-methyl	IN DEVELOPMENT	µg/L	<0.0452(<0.05-<0.0034)126	<0.00735(<0.00735-0.00735)5	0
Heptachlor	0.0038	µg/L	<0.001(0.004-<0.00014)267	<0.00056(<0.00056-<0.00056)5	0
MCPA	0.20	µg/L	0.06925(0.7-<0.00058)276	0.0153(0.025-0.00507)5	0
Parathion	0.04	µg/L	<0.0155(<0.088-<0.0155)25	NDA	0
Picloram	0.05	µg/L	<0.05(<0.2-<0.00033)215	0.0329(0.0475-0.0142)5	0
Phenols (total)	1.0	µg/L			
Polychlorinated biphenyl (total)	0.001	µg/L	<0.00034(<0.0102-<0.00021)41	<0.00034(<0.00034-<0.00034)5	0
Triallate	0.57	µg/L	<0.00864(0.072-0.0013)133	<0.00222(<0.00222-<0.00222)5	0
Trifluralin	0.10	µg/L	<0.005(0.01-<0.00266)137	<0.00266(<0.00266-<0.00266)5	0
2,4-D	4.0	µg/L	<0.03(0.587-<0.00047)280	0.0473(0.116-0.023)5	0

***based on hardness of 300 mg/L

****unionized ammonia is calculated using temperature and pH NDA: No Data Available

NC: Not Calculated

APPENDIX F

Water Quality Monitoring Plan for Sherwood and Westhope

1. Sherwood Monitoring Plan

Season	No. of Site Visits	No. of Samples Per Year			
		Dissolved Oxygen	Major Ions	Nutrients	Trace Elements
1 (Mar-Jun)	2	2	2	2	2
2 (Jul-Oct)	4	4	4	4	4
3 (Nov-Feb)	1	1	1	1	1
TOTAL	7	7	7	7	7

2. Westhope Monitoring Plan

Season	No. of Site Visits	No. of Samples Per Year				
		Dissolved Oxygen	Major Ions	Nutrients	Trace Elements	Pesticides
1 (Mar-Jun)	3	3	3	2	3	3
2 (Jul-Oct)	3	3	2	3	2	1
3 (Nov-Feb)	2	2	2	2	2	
TOTAL	8	8	7	7	7	4