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**FORTY-FIFTH ANNUAL REPORT  
TO THE  
INTERNATIONAL JOINT COMMISSION  
COVERING  
CALENDAR YEAR 2003**



**INTERNATIONAL SOURIS RIVER BOARD**

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TO THE  
INTERNATIONAL JOINT COMMISSION  
BY THE  
INTERNATIONAL SOURIS RIVER BOARD  
COVERING  
CALENDAR YEAR 2003**

## INTERNATIONAL SOURIS RIVER BOARD

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February, 2004

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

Commissioners:

The directive of April 11, 2002, which replaces the directive of May 31, 1959, instructs that the Board shall transmit annual reports to the Commission in each year.

In compliance with the instruction, we have enclosed the Forty-Fifth Annual Report covering calendar year 2003.

Respectively submitted.



R. Boals  
Member for Canada



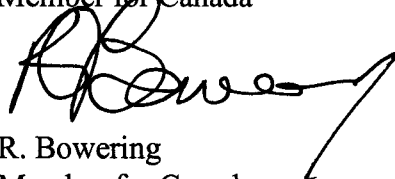
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R. Bowering  
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Colonel R. Ball  
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## HIGHLIGHTS 2003

For the 2003 calendar year, the natural flow of the Souris River at the Sherwood Crossing was 94 475 dam<sup>3</sup> (76,590 acre-feet). This represents 69 percent of the 1959-2003 long-term mean. Net depletions in Canada amounted to 53 215 dam<sup>3</sup> (43,140 acre-feet). Recorded runoff for the Souris River near Sherwood, North Dakota, was 39 480 dam<sup>3</sup> (32,010 acre-feet), or about 35 percent of the 1931-2003 long-term mean.

The flow of the Souris River as it enters North Dakota at Sherwood was more than 0.113 cubic metre per second (4 cubic feet per second) except during the periods of January 14 through March 14, July 23 through July 26, July 28 and 29, August 14 and 15, August 22 through September 23, and November 7 through December 31, 2003. During those periods when the flow was less than 0.113 cubic metre per second (4 cubic feet per second), the Province of Saskatchewan did not divert, store, or use any water above what would have occurred under conditions of water-use development prevailing in the Saskatchewan portion of the basin prior to the construction of Boundary Dam, Rafferty Dam, and Alameda Dam. Accordingly, Saskatchewan complied with the 0.113 cubic metre 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 17 900 dam<sup>3</sup> (14,510 acre-feet), or 63 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 3 270 dam<sup>3</sup> (2,650 acre-feet).

Recorded runoff leaving the United States at Westhope during the period of June 1 through October 31, 2003, was 26 930 dam<sup>3</sup> (21,830 acre-feet). The flow was in compliance with the 0.566 cubic metre per second (20 cubic feet per second) minimum flow requirement as specified in Recommendation No. 3(a) of the Interim Measures for the entire period.

The preliminary forecast for the spring of 2004 is for slightly below normal runoff in the upper Souris River Basin and slightly above normal runoff in the lower Souris River Basin. According to the U.S. Drought Monitor for February 3, 2004, the Souris River Basin in North Dakota is abnormally dry but is not in a drought status.

In addition to overseeing water distribution, the International Souris River Board maintains a watching brief of basin water development, such as the Northwest Area Water Supply Project. As well, the Board fosters the sharing of flow forecasting and reservoir operation information amongst the interested groups in the basin.

## **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 metre per second (20 cubic feet per second) during the months of June to October inclusive.

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 metre 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 Long Creek Basin, 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 metre 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.

As a result of the amalgamation, the Board's mandate was revised to include the following:

1. Maintain an awareness of existing and proposed development, activities, conditions, and issues in the Souris River Basin that may have an effect on transboundary water levels and flows and inform the Commission about transboundary issues.
2. Oversee the implementation of compliance with the Interim Measures for apportionment as described in Appendix C of this document.

3. Inform the Commission, in a timely manner, of critical water-supply or flow conditions in the basin.
4. Encourage appropriate authorities to take steps to ensure that apportionment measures are met.
5. Encourage the appropriate authorities to establish and maintain monitoring and information collection networks and reporting systems to ensure suitable information is available for the required natural flow computations to ensure compliance with apportionment measures.
6. Maintain an awareness of the needs, issues, and expectations of the water users in the Souris River Basin and report to the Commission on any existing or potential problems.
7. Carry out such other studies or activities as the Commission may, from time to time, request.

As a result of the change in mandate and the desire of the Commission to move to a more encompassing watershed approach, the Board has been requested to develop a directive based on existing Commission responsibilities in the Souris River Basin that will move toward an enhanced mandate for the Board. As such, the Commission has requested the Board to engage other basin organizations and the provincial, state, and federal agencies in the development of a suitable and responsible mandate for the Board.

The Board has established two committees to assist with administering the conditions of its mandate. The Natural Flow Methods Committee 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. Membership on these committees includes all affected agencies in the basin.

## 1.5 BOARD MEMBERS

At the end of 2003, the members of the International Souris River Board were as follow:

D.L. Frink North Dakota State Engineer Bismarck, North Dakota	Member for the United States (Co-Chair)
Col. R.L. Ball U.S. Army Corps of Engineers St. Paul, Minnesota	Member for the United States
G.J. Wiche U.S. Geological Survey Bismarck, North Dakota	Member for the United States
R.G. Boals Environment Canada Regina, Saskatchewan	Member for Canada (Co-Chair)
R.J. Bowering Manitoba Water Stewardship Winnipeg, Manitoba	Member for Canada

W.L. Dybvig  
Saskatchewan Watershed Authority  
Moose Jaw, Saskatchewan

Member for Canada

## **2.0 ACTIVITIES OF THE BOARD**

Since the presentation of the Forty-Fourth Annual Report to the International Joint Commission, the International Souris River Board has held two meetings and one teleconference call. The discussions and decisions made are summarized in the following sections.

### **2.1 FEBRUARY 19, 2003, MEETING IN BISMARCK, NORTH DAKOTA**

Members in attendance were:

D.L. Frink	Member for the United States
Col. R.L. Ball	Member for the United States
G.J. Wiche	Member for the United States
R.G. Boals	Member for Canada
R.J. Bowering	Member for Canada
D. Eutineier (representing W.L. Dybvig)	Member for Canada

A summary of the natural flow computations for the period of January 1 through December 31, 2002, was presented at the February 19, 2003, meeting. The final apportionment balance for the 2002 calendar year showed that Saskatchewan was in surplus to North Dakota by 1 160 dam<sup>3</sup> (940 acre-feet).

International Souris River Board members discussed the draft paper on the "Enhanced Mandate for the International Souris River Board Including the Amalgamation of the Souris River Bilateral Water Quality Monitoring Group." The Board co-chairs agreed to modify the draft paper on the basis of input from Board members and to hold joint meetings with the Souris River Bilateral Water-Quality Monitoring Group with the goal of working toward a joint board.

### **2.2 JUNE 24, 2003, MEETING IN MINOT, NORTH DAKOTA**

Members in attendance were:

D.L. Frink	Member for the United States
Col. R.L. Ball	Member for the United States
R.G. Boals	Member for Canada
R.J. Bowering	Member for Canada

D. Johnson  
(representing W.L. Dybvig)

Member for Canada

A summary of the interim natural flow computations for the period of January 1 through May 31, 2003, was presented at the June 24, 2003, meeting. The computed natural flow at the Sherwood Crossing for the period was 89 680 dam<sup>3</sup> (72,700 acre-feet). The United States had received 32 930 dam<sup>3</sup> (26,700 acre-feet) during the period. The computed apportionment balance for the 5-month period showed that Saskatchewan had a deficit to North Dakota of 2 940 dam<sup>3</sup> (2,380 acre-feet) based on the 40/60 sharing of water. The International Souris River Board accepted the compilation of flows and the computed apportionment balance for the period of January 1 through May 31, 2003.

Spring runoff in 2003 was near or below normal in all areas of the Saskatchewan portion of the Souris River Basin. Spring precipitation varied from near normal in the southeastern portion of the basin to above normal in the northeastern and western portions of the basin.

Spring runoff in the North Dakota portion of the basin was minimal. Spring moisture was below normal during January and February, near normal during March and April, and much above normal during May.

Spring runoff in the Manitoba portion of the basin was below normal. Runoff for the western tributaries was greater than runoff for the eastern tributaries.

### **2.3 SEPTEMBER 23, 2003, TELECONFERENCE CALL**

Members in attendance were:

D. Frink	Member for the United States
G.J. Wiche	Member for the United States
R.G. Boals	Member for Canada
W.L. Dybvig	Member for Canada

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, 2003. The deficit to North Dakota was reduced from 2 940 dam<sup>3</sup> (2,380 acre-feet) on May 31, 2003, to 1 090 dam<sup>3</sup> (880 acre-feet) on August 31, 2003. A release of 1.2 cubic meters per second (42.4 cubic feet per second) was begun from Alameda Reservoir on September 19, 2003, and projections were for the deficit to be made up by mid-October. The 0.113 cubic metre per second (4 cubic feet per second) minimum flow criteria at the Sherwood Crossing had been met except for the periods of January 14 through March 14, July 23 through July 26, July 28 and 29, August 14 and 15, August 22 through September 23, and November 7 through December 31, 2003. During those periods, Saskatchewan did not divert, store, or use any water above what would have occurred under conditions of water-use development prevailing in the Saskatchewan portion of the basin prior to the construction of Boundary Dam, Rafferty Dam, and Alameda Dam.

An increase of 1 780 dam<sup>3</sup> (1,440 acre-feet) occurred between Long Creek at the Western Crossing and Long Creek at the Eastern Crossing. Thus, the flow apportionment was met. Also, North Dakota delivered 0.566 cubic metre per second (20 cubic feet per second) to Manitoba from June through September 23, 2003, and projections were for North Dakota to deliver 0.566 cubic meters per second (20 cubic feet per second) through October 2003.

## **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, and the U.S. 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 U.S. Geological Survey operated six miscellaneous streamflow-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.

## **4.0 WATER-DEVELOPMENT ACTIVITIES IN 2003**

### **4.1 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 treated water to cities, communities, and rural water systems in 10 counties in northwestern North Dakota. The project has an estimated cost of \$170 million and will service some 41 communities and 9 rural water associations with a total population base of 63,000.

The water supply for the project is Lake Sakakawea, located in the Missouri River system. A 45-mile pipeline will deliver the water to the Minot Water Treatment Plant before distribution to northwestern North Dakota. The maximum annual use authorized under the State of North Dakota water permit is 18 502 dam<sup>3</sup> (15,000 acre-feet).

Canada is concerned that the NAWS project could permit the interbasin transfer of non-native biota. NAWS project water is disinfected in the Missouri River Basin but is not filtered until it reaches the Hudson Bay drainage. Canada prefers that the water be fully treated in the Missouri River Basin. The St. Mary's–Milk project in Montana and Alberta diverts untreated water between the Missouri and Hudson Bay drainages. NAWS, however, would be the first project to divert water across the continental divide in North Dakota. United States federal agencies, including the U.S. Environmental Protection Agency and the Department of the Interior and State Department, have concluded that, in their view, the project results in little risk to Canada and will not violate the 1909 Boundary Waters Treaty.

**Table 1.** Streamflow and water-level stations in the Souris River Basin

Part I--Streamflow

Index number	Stream	Location	State or province	Operated by
05NA003 (05113360)	Long Creek <sup>1</sup>	at Western Crossing	Saskatchewan	Environment Canada
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 (05113800)	Short Creek <sup>1</sup>	near Roche Percee	Saskatchewan	Environment Canada
05NB031	Souris River	near Bechard <sup>2</sup>	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

**Table 1.** Streamflow and water-level stations in the Souris River Basin—Continued

Part I--Streamflow

Index number	Stream	Location	State or province	Operated by
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 (05NB027)	Long Creek <sup>1 3</sup>	near Noonan	North Dakota	U.S. Geological Survey
05114000 (05ND007)	Souris River <sup>1 3</sup>	near Sherwood	North Dakota	U.S. Geological Survey
05116000	Souris River <sup>3</sup>	near Foxholm	North Dakota	U.S. Geological Survey
05116100	Souris River Tributary	near Burlington	North Dakota	U.S. Geological Survey
05116135	Tasker Coulee Tributary	near Kenaston	North Dakota	U.S. Geological Survey
05116500	Des Lacs River <sup>3</sup>	at Foxholm	North Dakota	U.S. Geological Survey
05117500	Souris River <sup>3</sup>	above Minot	North Dakota	U.S. Geological Survey
05119410	Bonnes Coulee	near Velva	North Dakota	U.S. Geological Survey
05120000	Souris River <sup>3</sup>	near Verendrye	North Dakota	U.S. Geological Survey
05120180	Wintering River Tributary	near Kongsberg	North Dakota	U.S. Geological Survey
05120500	Wintering River <sup>3</sup>	near Karlsruhe	North Dakota	U.S. Geological Survey
05122000	Souris River <sup>3</sup>	near Bantry	North Dakota	U.S. Geological Survey
05123300	Oak Creek Tributary	near Bottineau	North Dakota	U.S. Geological Survey
05123400	Willow Creek <sup>3</sup>	near Willow City	North Dakota	U.S. Geological Survey
05123510	Deep River <sup>3</sup>	near Upham	North Dakota	U.S. Geological Survey
05124000 (05NF012)	Souris River <sup>1 3</sup>	near Westhope	North Dakota	U.S. Geological Survey

<sup>1</sup>International gauging station.<sup>2</sup>Formerly published as Souris River below Lewvan.<sup>3</sup>Operated jointly for hydrometric and water-quality monitoring.

**Table 1.** Streamflow and water-level stations in the Souris River Basin--Continued

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 Velve	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	Province of Manitoba
05NF805	Sharpe Lake	near Deloraine	Manitoba	Province of Manitoba
05NG023	Whitewater Lake	near Boissevain	Manitoba	Environment Canada
05NG801	Plum Lake	above Deleau Dam	Manitoba	Province of Manitoba
05NG803	Elgin Reservoir	near Elgin	Manitoba	Province of Manitoba
05NG806	Souris River	above Hartney Dam	Manitoba	Province of Manitoba
05NG807	Souris River	above Napinka Dam	Manitoba	Province of Manitoba

**Table 1.** Streamflow and water-level stations in the Souris River Basin--Continued

Part II--Water Level

Index number	Stream	Location	State or province	Operated by
05NG809	Plum Lake	near Findlay	Manitoba	Province of Manitoba
05NG813	Oak Lake	at Oak Lake Resort	Manitoba	Province of Manitoba
05NG814	Deloraine Reservoir	near Deloraine	Manitoba	Province of Manitoba

Specifically, the Environmental Assessment for NAWS was completed with a "Finding of No Significant Impact (FONSI)" and Canada was notified on June 4, 2001. Subsequently, Canada and Manitoba made an Administrative Appeal to the Bureau of Reclamation to carry out a full Environmental Impact Statement. On September 10, 2001, Canada was informed that the appeal was rejected.

The Bureau of Reclamation, which was responsible for the NAWS Environmental Assessment, recommended in the Environmental Assessment and FONSI that the Garrison Joint Technical Committee should oversee the building and operation of the project.

The project was started with groundbreaking in Minot on April 5, 2002. About 19 miles of 42-inch pipe has been installed. Work began at Minot and is proceeding toward Lake Sakakawea. Project completion is dependent on funding and legal issues.

The Province of Manitoba filed suit in U.S. District Court to require the completion of an Environmental Impact Statement (EIS) for the NAWS project. Several agencies have joined Manitoba in the lawsuit. The Bureau of Reclamation, through the Department of Justice and the State of North Dakota, is defending the case.

## 4.2 SOURIS RIVER BASIN 1999 POST FLOOD REPORT

The International Souris River Board was directed by the International Joint Commission to conduct a review of the 1999 flood in the Souris River Basin. The Board established a Task Force and provided the following Terms of Reference for the investigation:

- i. Review the 1999 hydrological event, highlighting precipitation, runoff conditions, and duration in the Souris River Basin.
- ii. Review the operations of Rafferty and Alameda Reservoirs according to the flood operation plan established under the 1989 Canada-United States Agreement for Water Supply and Flood Control in the Souris Basin and with respect to departure from natural flows and flows prior to the construction of Rafferty and Alameda Reservoirs.
- iii. Review the operation of refuge reservoirs located in the North Dakota portion of the Souris River according to flood operation plans for those reservoirs and with respect to departure from natural flows.
- iv. Document the occurrence and effects of flooding in 1999 downstream of Rafferty and Alameda Reservoirs to the confluence of the Souris River with the Assiniboine River.

- v. Identify changes in operations that would be required to limit damages from flooding between the reservoirs and the confluence with the Assiniboine River.

The final report from the Task Force was distributed in October 2003.

### **4.3 WATER APPROPRIATIONS**

#### **4.3.1 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.

#### **4.3.2 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 dam<sup>3</sup> (4,134 acre-feet). On December 31, 2003, there were 140 minor projects in the Saskatchewan portion of the basin with an annual diversion of 4 917 dam<sup>3</sup> (3,986 acre-feet).

The minor project diversions that met the criteria increased from 139 in 2002 to 140 in 2003 in the Saskatchewan portion of the basin. The annual diversion increased by 22 dam<sup>3</sup> (18 acre-feet) between 2002 and 2003.

#### **4.3.3 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 dam<sup>3</sup> (1,019 acre-feet). On December 31, 2003, there remained 12 minor projects in the North Dakota portion of the Long and Short Creek Basins. The annual diversions totaled 1 361 dam<sup>3</sup> (1,103 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 2003 was 421 dam<sup>3</sup> (341 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 1 781 dam<sup>3</sup> (1,444 acre-feet) by the United States.

### **5.0 HYDROLOGIC CONDITIONS IN 2003**

Spring runoff in 2003 was near or below normal in all areas of the Saskatchewan portion of the Souris River Basin. The annual runoff volumes for the Saskatchewan portion of the basin ranged from about 30 to 70 percent of the mean.

Spring runoff in North Dakota was minimal. No flood statements or warnings were issued for the Souris River Basin during the runoff period. Fall moisture was near normal. Precipitation amounts for 2003 varied from about 69 percent of normal to about 129 percent of normal.

During the year, Rafferty Reservoir fell 0.02 metre (0.07 feet) to 548.85 metres (1,800.67 feet) with a corresponding drop in contents of 890 dam<sup>3</sup> (720 acre-feet). The inflow to Rafferty Reservoir was 25 155 dam<sup>3</sup> (20,390 acre-feet) and the calculated diversion for 2003 was 23 505 dam<sup>3</sup> (19,060 acre-feet).

From March 21 until late June 2003, a release of about 12 000 dam<sup>3</sup> (9,730 acre-feet) was made from Alameda Reservoir. A further 4 200 dam<sup>3</sup> (3,400 acre-feet) was released from September 19 to October 28, 2003. The main-stem inflow to Alameda Reservoir was 19 200 dam<sup>3</sup> (15,570 acre-feet) and the calculated diversion for 2003 was 10 120 dam<sup>3</sup> (8,200 acre-feet). Alameda Reservoir was at an elevation of 561.002 metres (1,840.54 feet) on December 31, 2003, slightly more than 0.1 m (0.33 foot) higher than in 2002.

Boundary Reservoir received an inflow of 21 170 dam<sup>3</sup> (17,160 acre-feet) from Long Creek as well as 1 045 dam<sup>3</sup> (847 acre-feet) pumped from Rafferty Reservoir. The calculated diversion for 2003 was 12 085 dam<sup>3</sup> (9,800 acre-feet). About 520 dam<sup>3</sup> (420 acre-feet) of the inflow volume to Boundary Reservoir was released downstream into Long Creek, and 7 430 dam<sup>3</sup> (6,020 acre-feet) was transferred to Rafferty Reservoir via the diversion canal. Boundary Reservoir was at an elevation of 559.07 metres (1,834.20 feet) on December 31, 2003, or 1.76 metres (5.77 feet) below Full Supply Level.

On December 31, 2003, the estimated storage in the five major reservoirs in Saskatchewan (Boundary, Rafferty, Alameda, Nickle Lake, and Moose Mountain Lake) was 528 420 dam<sup>3</sup> (42,840 acre-feet) as compared to storage of 527 400 dam<sup>3</sup> (427,600 acre-feet) on December 31, 2002. Figure 1 shows the storage contents of several reservoirs in the Canadian portion of the Souris River Basin for 2002 and 2003.

Recorded runoff for the year for the Souris River near Sherwood was 39 480 dam<sup>3</sup> (32,010 acre-feet), or about 35 percent of the 1931-2003 long-term mean. The artificially drained areas of Yellow Grass Ditch and Tatagwa Lake contributed 6 815 dam<sup>3</sup> (5,525 acre-feet) during 2003. Figure 2 provides a schematic representation of recorded runoff above Sherwood, North Dakota.

On December 31, 2003, the level of Lake Darling was 486.41 metres (1,595.81 feet). The 2003 year-end storage in Lake Darling was 120 290 dam<sup>3</sup> (97,520 acre-feet), or approximately 4 300 dam<sup>3</sup> (3,500 acre-feet) more than on December 31, 2002. The 2003 year-end storage in the J. Clark Salyer Refuge pools was 20 820 dam<sup>3</sup> (16,880 acre-feet), or 5 810 dam<sup>3</sup> (4,710 acre-feet) less than on December 31, 2002. The combined year-end storage in Lake Darling and the J. Clark Salyer Refuge pools was 141 100 dam<sup>3</sup> (114,400 acre-feet), well above the 66 600 dam<sup>3</sup> (54,000 acre-feet) "severe drought" criterion. Figure 3 shows the storage contents of the main-stem reservoirs in the United States.

Recorded runoff for the year for the Souris River at Westhope was 64 500 dam<sup>3</sup> (52,290 acre-feet) or some 25 020 dam<sup>3</sup> (20,280 acre-feet) more than entered North Dakota at the Sherwood Crossing. The annual runoff for the Souris River near Westhope was 27 percent of the 1931-2003 long-term mean.

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

The preliminary forecast for the spring of 2004 is for slightly below normal runoff volumes in the upper portion of the Souris River Basin in Canada and slightly above normal runoff volumes in the lower portion of the basin in Canada. The preliminary forecast for the United States portion of the basin is for normal runoff volumes. In 2003, fall precipitation was much below normal throughout the Canadian portion of the basin and near normal throughout the United States portion of the basin. In the Canadian portion of the basin, winter precipitation varied from above normal in the southern areas to slightly below normal in the northern areas. In the United States portion of the basin, winter precipitation was above normal throughout the basin.

## **6.0 SUMMARY OF FLOWS AND DIVERSIONS**

### **6.1 SOURIS RIVER NEAR SHERWOOD**

The natural runoff near Sherwood for 2003 was 94 475 dam<sup>3</sup> (76,590 acre-feet). Depletions in Canada totalled 60 030 dam<sup>3</sup> (48,670 acre-feet). The additional water received from the Yellow Grass Ditch and Tatagwa Lake Drain Basins was 6 815 dam<sup>3</sup> (5,525 acre-feet). Total depletions in Canada were 53 215 dam<sup>3</sup> (43,140 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 2003 was 16 900 dam<sup>3</sup> (13,700 acre-feet), representing 43 percent of the recorded flow at Sherwood, or 18 percent of the computed natural runoff at Sherwood. A schematic representation of the 2003 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.

The flow of the Souris River at Sherwood was more than 0.113 cubic metre per second (4 cubic feet per second) except during the periods of January 14 through March 14, July 23 through July 26, July 28 and 29, August 14 and 15, August 22 through September 23, and November 7 through December 31, 2003. During those periods when the flow was less than 0.113 cubic metre per second (4 cubic feet per second), the Province of Saskatchewan did not divert, store, or use any water above what would have occurred under conditions of water-use development prevailing in the Saskatchewan portion of the basin prior to the construction of Boundary Dam, Rafferty Dam, and Alameda Dam.

### **6.2 LONG CREEK AND SHORT CREEK**

Recommendation No. 2 of the Interim Measures was met with the increase of runoff on Long Creek between the Western and Eastern Crossings of 3 270 dam<sup>3</sup> (2,650 acre-feet).

Short Creek, which rises in North Dakota, contributed 7 140 dam<sup>3</sup> (5,790 acre-feet) to runoff in the Souris River above Sherwood.

### **6.3 SOURIS RIVER NEAR WESTHOPE**

Recorded flow near Westhope during the period of June 1 through October 31, 2003, was 26 930 dam<sup>3</sup> (21,830 acre-feet). The flow was in compliance with the 0.566 cubic metre per second (20 cubic feet per second) minimum flow requirement as specified in Recommendation No. 3(a) of the Interim Measures for the entire period. Figure 5 illustrates the recorded flows at Westhope and at Wawanesa near the mouth of the Souris River in Manitoba.

Figure 1  
MONTH END CONTENTS OF RESERVOIRS IN CANADA

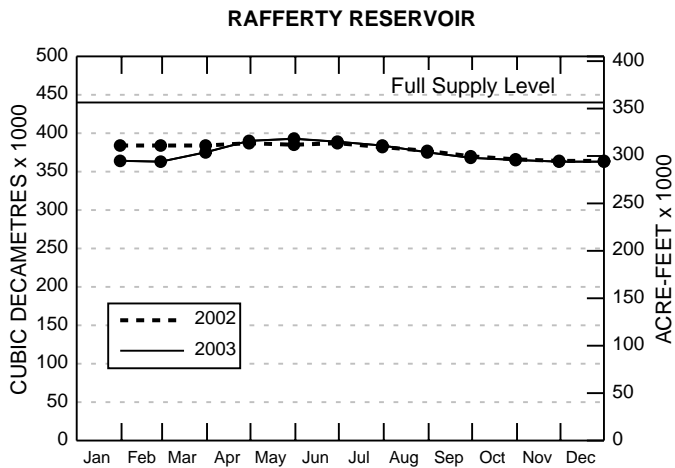
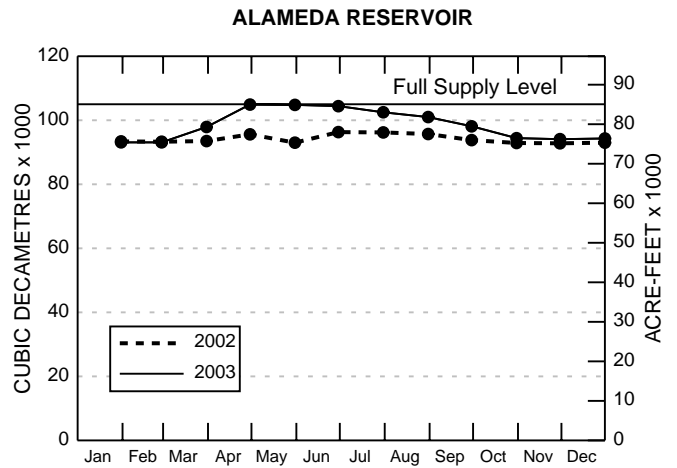
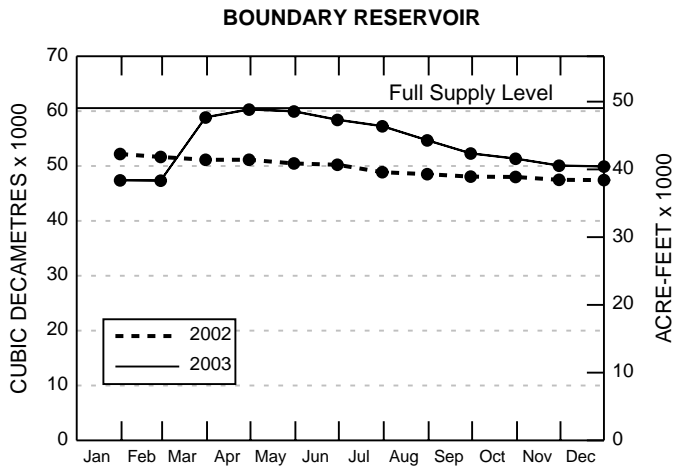
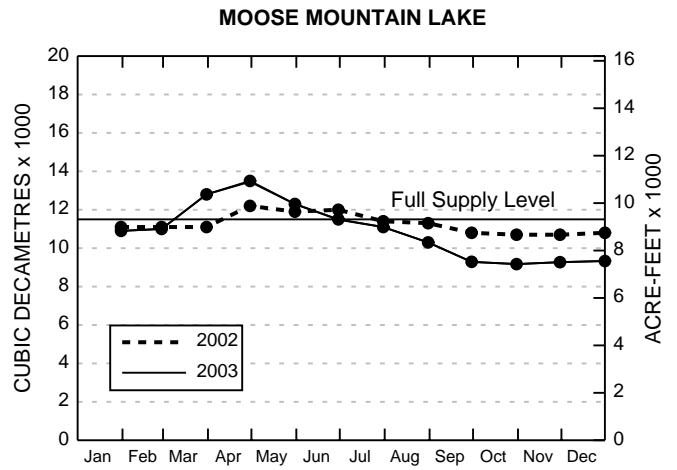
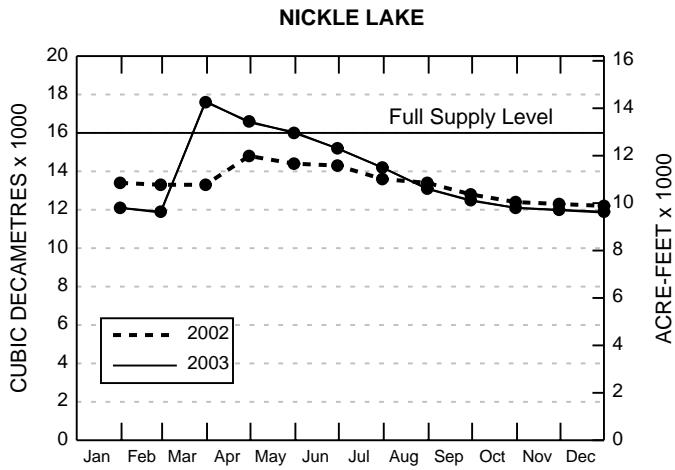


Figure 2

**SCHEMATIC REPRESENTATION OF 2003 FLOWS IN THE SOURIS RIVER BASIN  
ABOVE SHERWOOD, NORTH DAKOTA, U.S.A.**

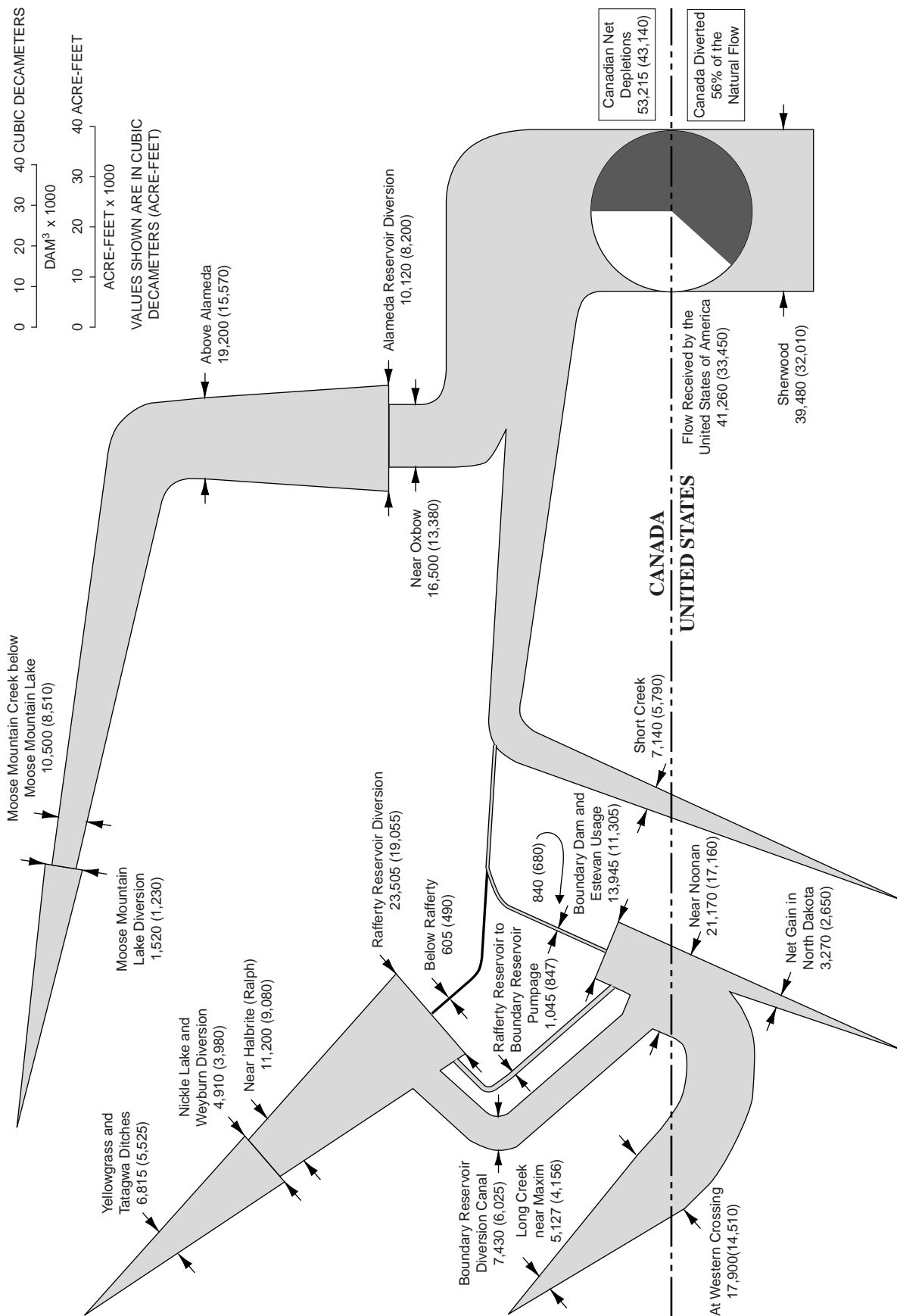


Figure 3

## MONTH END CONTENTS OF RESERVOIRS IN USA

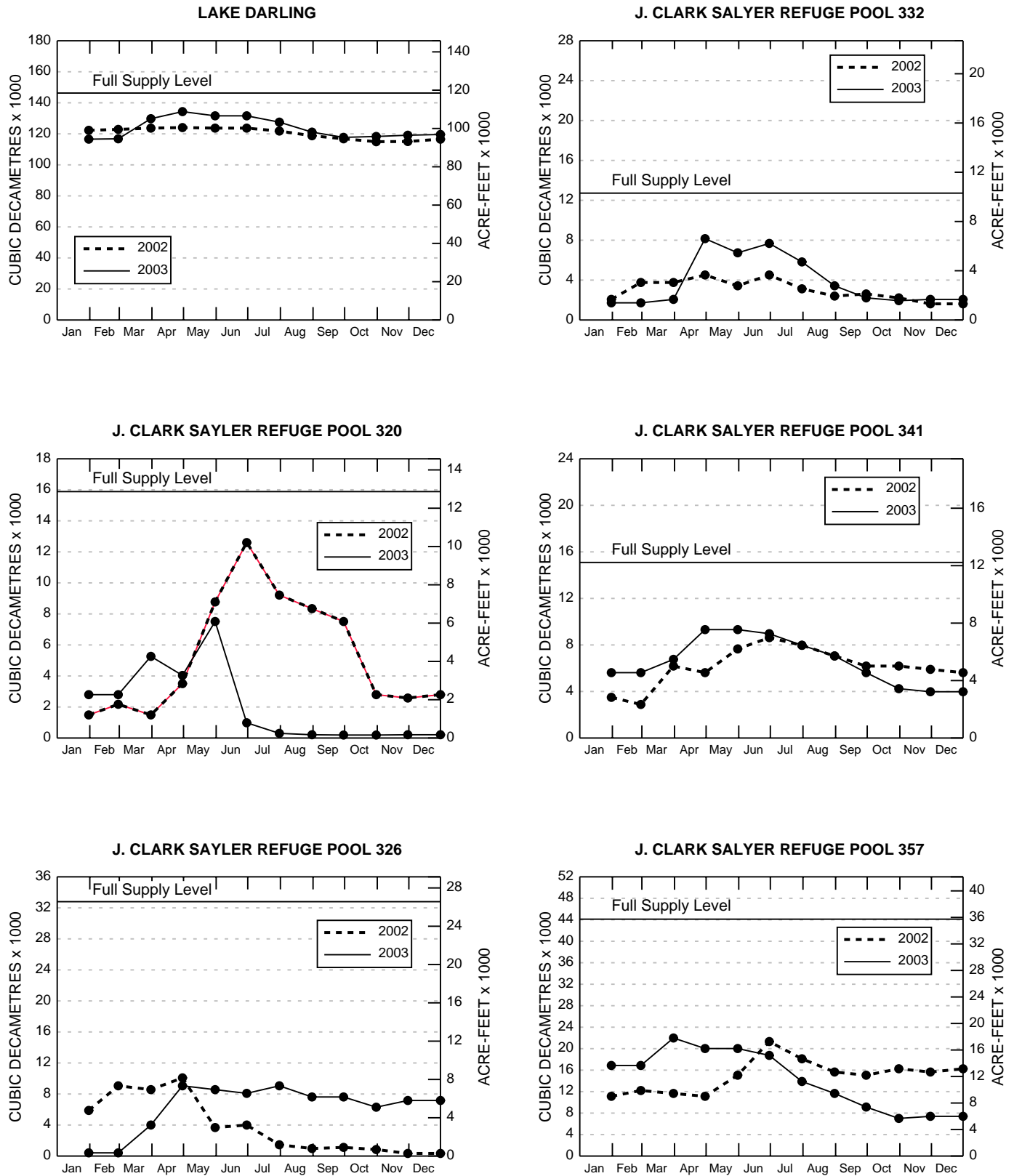
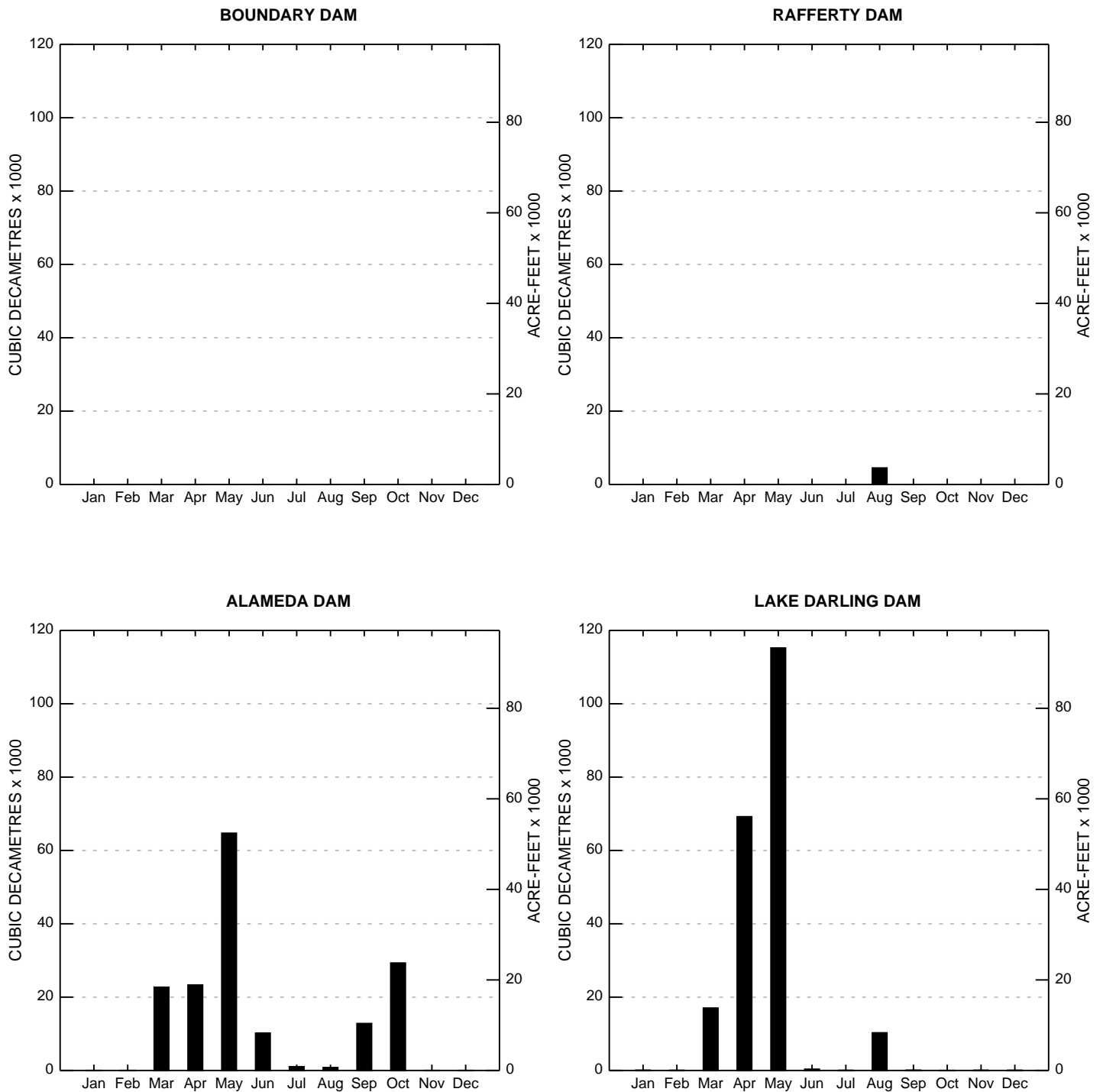


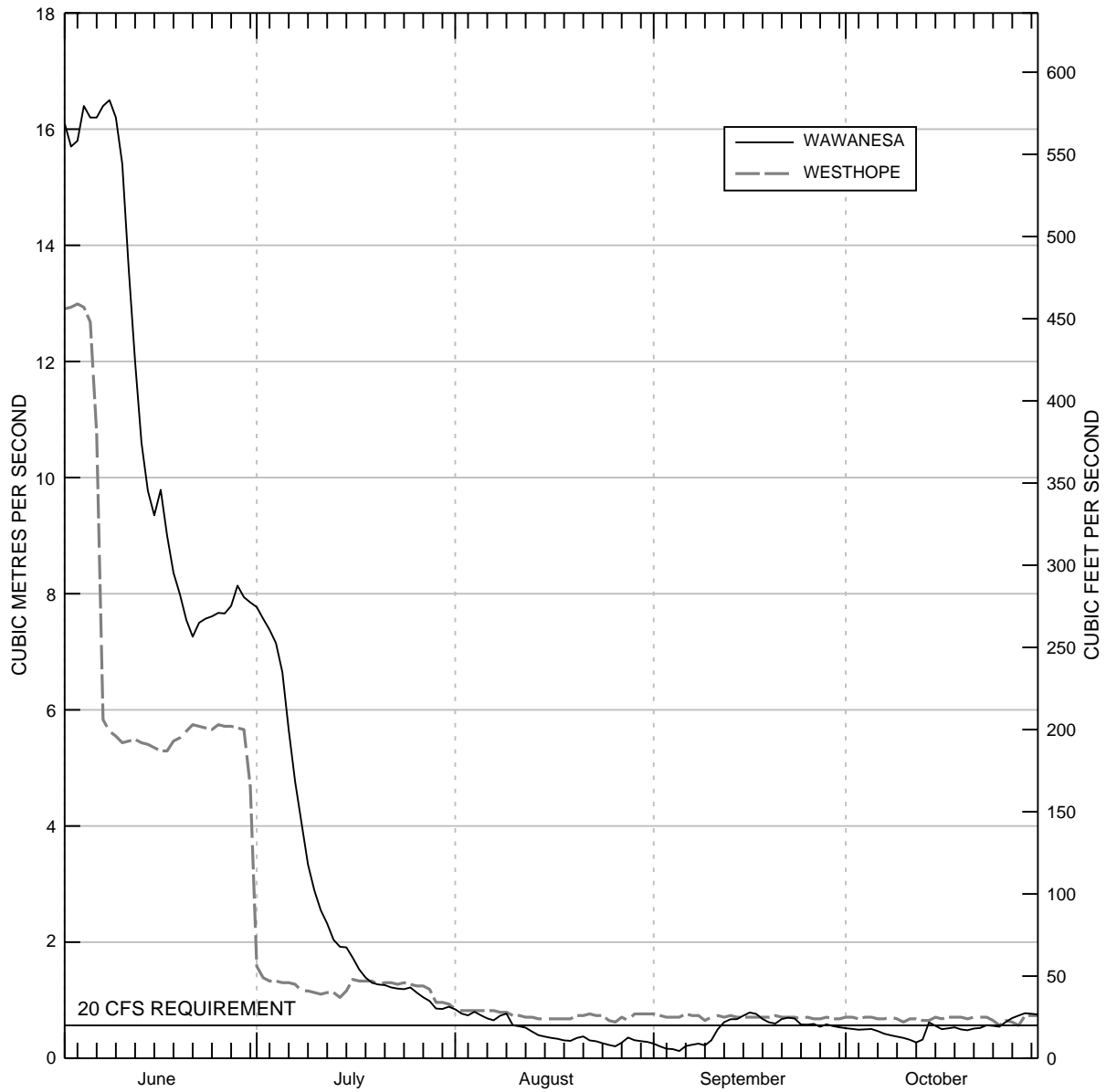
Figure 4

## UPPER SOURIS NATIONAL WILDLIFE REFUGE



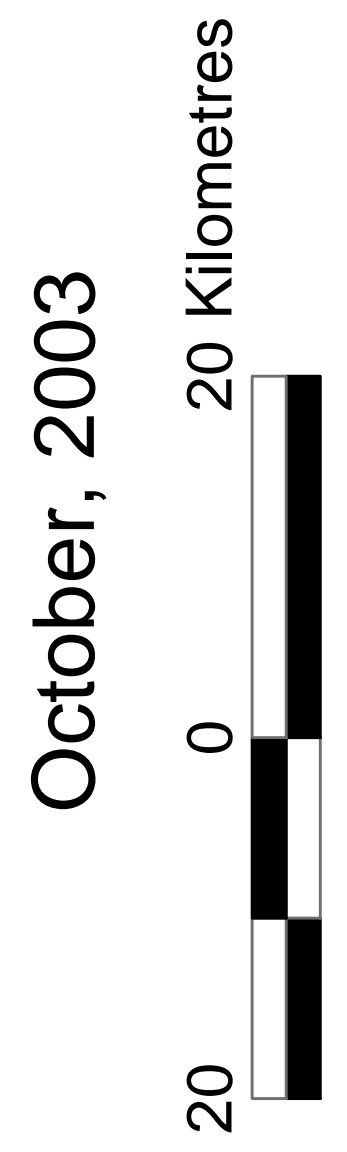
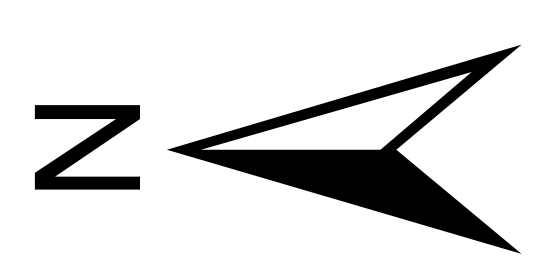
(May represent releases from Lake Darling or releases from only Refuge pools downstream from lake Darling. Figure will not represent when Lake Darling was opened for Refuge management purposes to only fill pools below Lake Darling.)

Figure 5  
**SOURIS RIVER NEAR WESTHOPE**  
**AND**  
**SOURIS RIVER NEAR WAWANESA**  
 June 1, 2003 to October 31, 2003

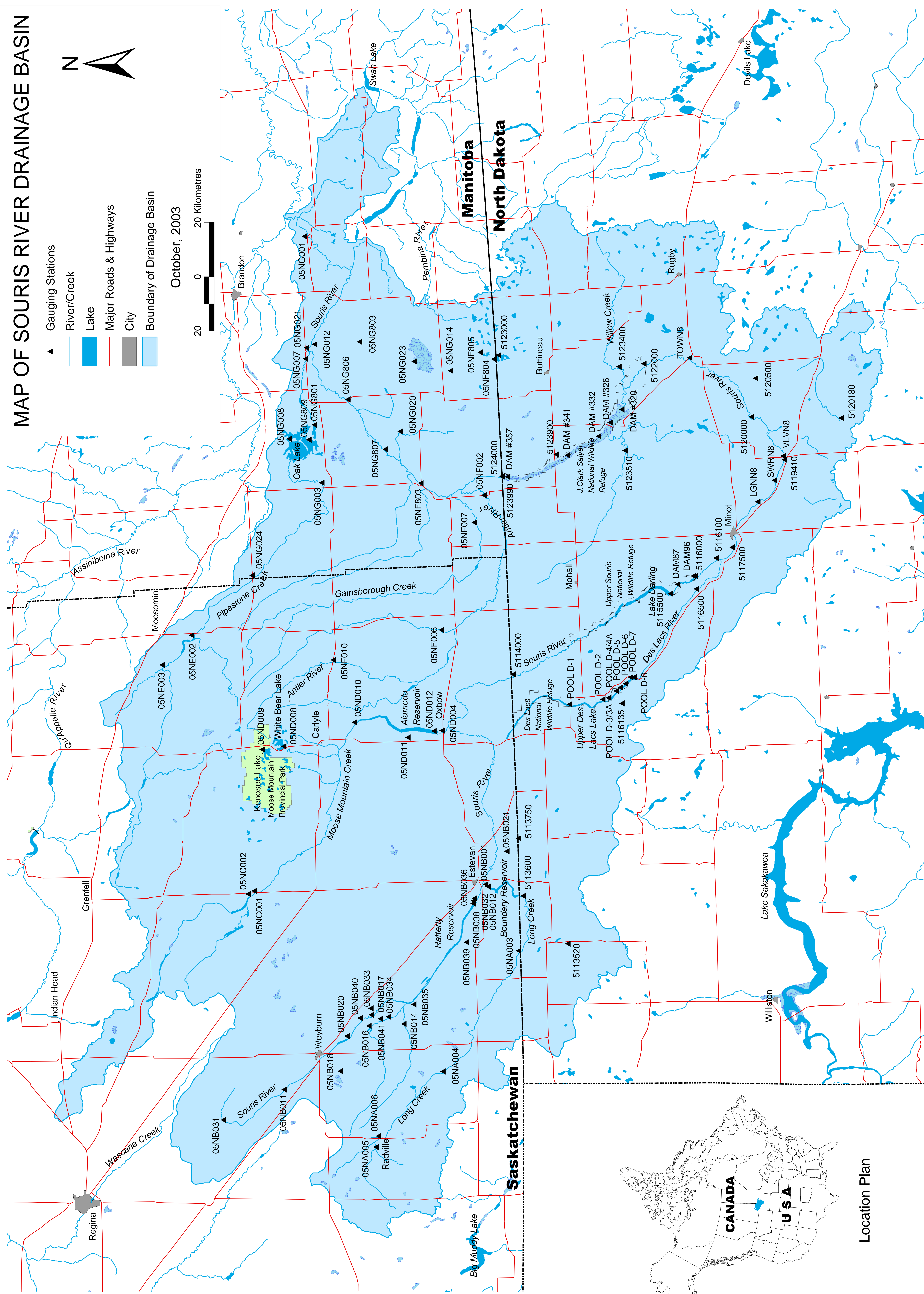


# MAP OF SOURIS RIVER DRAINAGE BASIN

- ▲ Gauging Stations
- River/Creek
- Lake
- Major Roads & Highways
- City
- Boundary of Drainage Basin



October, 2003



Location Plan

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**APPENDIX A. Determination of natural flow of Souris River at  
International Boundary (Sherwood)**

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## APPENDIX B. Equivalents of measurements

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## **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 ( $\text{dam}^3$ ), 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

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## APPENDIX C. Interim measures as modified in 2000

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## **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 AuthoritySaskatchewan 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.