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Acknowledgements

The Plan Author recognizes the tremendous contribution of all of the members of the Planning Team, Steering Committee and supporting staff/organizations. This Water Management Plan is testimony to the fact that much can be achieved when knowledgeable and dedicated people pool resources and embrace a common and worthwhile goal.

Special acknowledgement is due to Lois Chevrier who guided and coordinated the entire planning process and was instrumental in the writing and production of this plan.

The Water Management Plan, contained herein, was developed and refined in a positive and constructive atmosphere. Without doubt, participants have succeeded in setting the stage for water management planning to contribute to the sustainable use of Ontario's water resource.

David Boileau, Plan Author
March 31, 2004

Disclaimer

This water management plan (WMP) sets out legally enforceable provisions for the management of flows and levels on this river within the values and conditions identified in the WMP.

In instances where, due to emergency energy shortages, the Independent Electricity Market Operator (IMO) requests that owners of the waterpower facilities and associated water control structures seek relief from certain provisions of this WMP, the Ministry of Natural Resources (MNR) will consider those requests expeditiously and, after consultation with the IMO, may allow short-term relief from certain provisions.

The mandatory provisions of this WMP will be waived, as appropriate, when the dam owners (which may include other dam owners, such as MNR) are requested to do so by a police service or other emergency organization.

This plan does not authorize any other activity, work or undertaking in water or for the use of water, or imply that existing dam(s) meet with safe design, operation, maintenance, inspection, monitoring and emergency preparedness to provide for the protection of persons and property under the Lakes and Rivers Improvement Act. Approval of this WMP does not relieve the dam owners from their responsibility to comply with any other applicable legislation.

Executive Summary

The Ontario Ministry of Natural Resources, under its "New Business Relationship" with the waterpower industry, and with the subsequent amendments to the *Lakes and Rivers Improvement Act*, required that a Water Management Plan be developed for the Seine River to address the operation of the river storage and generating facilities.

The goal of water management planning is to contribute to the environmental, social and economic well-being of the people of Ontario through the sustainable development of waterpower resources and to manage these resources in an ecologically sustainable way for the benefit of present and future generations.

People of Northwestern Ontario rely on the Seine River for its natural resources and waterpower energy. There are First Nation interests, substantial fishery, and recreational interests throughout the river system. While there are many resource uses in the watershed, only activities and interests related to the management of water levels and flows were considered in the development of the Water Management Plan.

Prior to the development of this Water Management Plan, Seine River water control structures had existing voluntary operating agreements in place with targets for water levels and flows that recognized the multiple uses of the river and the regulatory and lease obligations of the structure owner. These agreements evolved from prior planning exercises. These include the Lac des Mille Lacs Lake Management Plan, the Seine River Water Level Technical Committee and varying degrees of consultation with the public, First Nations, other stakeholders, the Ministry of Natural Resources and other government agencies regarding operations of the structures on the Seine River.

Structures that have operational control on levels and flows in the system are owned by Abitibi-Consolidated Company of Canada, Valerie Falls Limited Partnership and the Ontario Ministry of Natural Resources. These proponents cooperatively prepared the Water Management Plan for this river to ensure that concerns or issues related to the current water management operating plans were addressed.

This Water Management Plan is a comprehensive report outlining a preferred management option for each control structure, supporting sustainable development of water resources for waterpower and other uses while protecting and enhancing the natural ecosystems.

A preferred option was selected for each control structure. The Planning Team recognized that a natural flow regime is the best option for the aquatic ecosystem. However, it was also evident that the water control structures in the system provide a variety of benefits related to power production, flood mitigation, navigation, recreation and other social benefits. Therefore, the option that best addressed the issues and objectives for each control structure was selected as the preferred option.

Following is a brief summary of any significant changes to the operation of the control structures:

Lac des Mille Lacs: During this Water Management Planning process, it was determined that the targets set in the Lac des Mille Lacs Lake Management Plan (rev. 1994) were not always practical to meet given the operating constraints and actual response of the system to weather events. It was also determined, through an expression of public support, to maintain the current operating regime – which was different from the Lake Management Plan. Therefore, the option identified through the Water Management Planning process generally reflect the current operating regime. To enhance spawning, the lake water levels will be stable or rising from April 15 to June 15.

Upper Marmion Lake (Raft Lake Dam): The pre-plan November 1 to March 31 range was 415.17 m to 412.5 m with a provision to draw to 411.5 m during years with poor inflows. The WMP option sets the maximum November 1 level at 415.50 and the minimum winter drawdown at 412.5 m. This change eliminates the 411.5 m low water reserve and it allows for an increase in fall storage. To mitigate spring flooding, a maximum level of 413.7 m by April 1st was adopted. Also, to enhance walleye spawning opportunities and success, the lake water levels will be stable or rising from April 15 to June 15.

Wagita Bay Dam: No change.

Lower Marmion Sluiceway: No significant change. To enhance spawning, the lake water levels will be stable or rising from April 15 to June 15.

Colin Lake (Valerie Falls Headpond): The open water level date range was changed from May 1 to November 1 (403.3 m to 404 m) to April 1 to November 1 (403.2 m to 404.75 m). Also, to enhance spawning, the upstream water levels and outflows will be stable or rising from April 15 to June 15. The outflows are to be equal to or greater than 8 m3/sec (changed from 6 m3/sec).

Calm Lake (Calm Lake Dam): The outflows are to be equal to or greater than 10 m3/sec (changed from 2.5 m3/sec) April 15 to June 15. To enhance spawning, the Calm Lake water level fluctuation is limited to 20 cm (daily range) April 15 to June 15.

Laseine Lake (Sturgeon Falls Dam Headpond): The outflows are to be equal to or greater than 10 m3/sec (changed from 2.5 m3/sec) April 15 to June 15. To enhance spawning, the Calm Lake water level fluctuation is limited to 20 cm (daily range) April 15 to June 15.

The Water Management Plan for the Seine River system includes an operational plan for each individual waterpower facility that addresses water levels and flows. These operational plans are the enforceable components of the water management plan in relation to the operation of each waterpower facility. This document also includes the

compliance plan, the effectiveness monitoring plan and notification procedures when flows and levels are outside the operational plans.

This Water Management Plan applies to the control structures under the normal range of operating conditions. Normal operating conditions are defined in the preferred option for each control structure.

1 Approval Pages

1.1 Signature Page – WMP Author, Abitibi Consolidated, Valerie Falls, Ministry of Natural Resources

Water Management Plan for Waterpower
For the
Seine River

Abitibi Consolidated Company of Canada,
Valerie Falls Limited Partnership,
Ministry of Natural Resources, Fort Frances District, Northwest Region

For the ten year period _____, 2004 to _____, 2014
(Commencement date of the Plan will correspond with date of approval of the plan)

I declare that I have produced this plan to the best of my ability and in accordance with the *Water Management Planning Guidelines for Waterpower,* as approved by the Minister of Natural Resources on May 14, 2002.

SEE REVERSE OF PAGE FOR SIGNATURES

_____ _____
David Boileau, Valerie Falls Limited Partnership Date

In submitting this plan, we confirm that this water management plan for waterpower has been prepared in accordance with *Water Management Planning Guidelines for Waterpower,* as approved by the Minister of Natural Resources on May 14, 2002.

_____ _____
Gary Rogozinski Date
Abitibi Consolidated Company of Canada

David Boileau Date
Valerie Falls Limited Partnership
Great Lakes Power Limited

I concur that this water management plan has been prepared in accordance with *Water Management Planning Guidelines for Waterpower,* as approved by the Minister of Natural Resources on May 14, 2002. We also certify that direction from other sources, policies and other obligations have been considered. We recommend this plan be approved for implementation.

_____
Bill Darby Date
District Manager, Fort Frances
Ministry of Natural Resources

Approved by:

_____
Charles Lauer Date
Regional Director, Thunder Bay
Minister of Natural Resources

In 1994, MNR finalized its Statement of Environmental Values (SEV) under the Environmental Bill of Rights. The SEV is a document that describes how the purposes of the EBR are to be considered whenever decisions are made in the ministry that might significantly affect the environment. During the development of this water management plan, the ministry has considered its SEV.

Water Management Plan for Waterpower
For the
Seine River

Abitibi Consolidated Company of Canada,
Valerie Falls Limited Partnership,
Ministry of Natural Resources, Fort Frances District, Northwest Region

For the ten year period Oct 14 **, 2004 to** Oct 13 **, 2014**
(Commencement date of the Plan will correspond with date of approval of the plan)

I declare that I have produced this plan to the best of my ability and in accordance with the *Water Management Planning Guidelines for Waterpower*, as approved by the Minister of Natural Resources on May 14, 2002.

David Boileau, Valerie Falls Limited Partnership — March 29, 2004 — Date

In submitting this plan, we confirm that this water management plan for waterpower has been prepared in accordance with *Water Management Planning Guidelines for Waterpower*, as approved by the Minister of Natural Resources on May 14, 2002.

Gary Rogozinski — March 29/04 — Date
Abitibi Consolidated Company of Canada

David Boileau — March 29/04 — Date
Valerie Falls Limited Partnership
Great Lakes Power Limited

I concur that this water management plan has been prepared in accordance with *Water Management Planning Guidelines for Waterpower*, as approved by the Minister of Natural Resources on May 14, 2002. We also certify that direction from other sources, policies and other obligations have been considered. We recommend this plan be approved for implementation.

Bill Darby — June 7/04 — Date
District Manager, Fort Frances
Ministry of Natural Resources

Approved by:

Charles Laug — Oct 14/2004 — Date
Regional Director, Thunder Bay
Ministry of Natural Resources

In 1994, MNR finalized its Statement of Environmental Values (SEV) under the Environmental Bill of Rights. The SEV is a document that describes how the purposes of the EBR are to be considered whenever decisions are made in the ministry that might significantly affect the environment. During the development of this water management plan, the ministry has considered its SEV.

1.2 Signature Page – Public Advisory Committees, First Nations

Water Management Plan for Waterpower
for the

Seine River

prepared by:
Abitibi Consolidated Company of Canada
Valerie Falls Limited Partnership
Ministry of Natural Resources, Fort Frances District, Northwest Region

For the ten year period _____, 2004 to _____, 2014
(Commencement date of the Plan will correspond with date of approval of the plan)

We, the members of the planning team as representatives of our respective organizations, agree that, to the best of our knowledge, this plan meets the goal of managing water levels and flows of the Seine River in a manner that supports sustainable development for waterpower production and other uses while protecting and enhancing the natural ecosystems. The issues brought forward from our respective groups were considered during the preparation of this plan.

We understand that if we disagree with this statement, we have the opportunity to outline concerns in a separate letter that will be attached to the plan.

SEE REVERSE OF PAGE FOR SIGNATURES

Steve Peters, Lac des Mille Lacs First Nation date

Tyrone Tenniscoe, Seine River First Nation date

Don Perry, Lac des Mille Lacs Advisory Committee date

Bob Olson, Seine River Water Level Technical Committee date

Water Management Plan for Waterpower
for the

Seine River

prepared by:
Abitibi Consolidated Company of Canada
Valerie Falls Limited Partnership
Ministry of Natural Resources, Fort Frances District, Northwest Region

For the ten year period _____, 2004 to _____, 2014
(Commencement date of the Plan will correspond with date of approval of the plan)

We, the members of the planning team as representatives of our respective organizations, agree that, to the best of our knowledge, this plan meets the goal of managing water levels and flows of the Seine River in a manner that supports sustainable development for waterpower production and other uses while protecting and enhancing the natural ecosystems. The issues brought forward from our respective groups were considered during the preparation of this plan.

We understand that if we disagree with this statement, we have the opportunity to outline concerns in a separate letter that will be attached to the plan.

Steve Penrod, Lac des Mille Lacs First Nation — Mar 29, 2004 — date

Tyrone Tennisco, Seine River First Nation — March 29/2004 — date

Don Perry, Lac des Mille Lacs Advisory Committee — March 29/04 — date

Bob Olson, Seine River Water Level Technical Committee — March 29/04 — date

1.3 Signature Page – First Nations Chiefs

Water Management Plan for Waterpower
for the

Seine River

prepared by:
Abitibi Consolidated Company of Canada
Valerie Falls Limited Partnership
Ministry of Natural Resources, Fort Frances District, Northwest Region

For the ten year period _____, 2004 to _____, 2014
(Commencement date of the Plan will correspond with date of approval of the plan)

The Aboriginal Consultation Report, Section 5.1.2 and Section 10.3 adequately reflects a summary of issues and concerns of the Seine River First Nation and Lac des Mille Lacs First Nation as expressed during the planning process.

SEE REVERSE OF PAGE FOR SIGNATURES

Chief Gary Kishiqueb, Lac des Mille Lacs First Nation Date

Chief Earl Klyne, Seine River First Nation Date

Water Management Plan for Waterpower
for the

Seine River

prepared by:
Abitibi Consolidated Company of Canada
Valerie Falls Limited Partnership
Ministry of Natural Resources, Fort Frances District, Northwest Region

For the ten year period _____, 2004 to _____, 2014
(Commencement date of the Plan will correspond with date of approval of the plan)

The Aboriginal Consultation Report, Section 5.1.2 and Section 10.3 adequately reflects a summary of issues and concerns of the Seine River First Nation and Lac des Mille Lacs First Nation as expressed during the planning process.

Chief, Lac des Mille Lacs First Nation — Date: March 29, 2004

Chief, Seine River First Nation — Date: March 29/04

2 Introduction

2.1 Watershed Location

The Seine River is located in Northwestern Ontario and gathers its flow from a teardrop-shaped watershed having an area of approximately 6,250 square kilometres. The headwaters originate at the Savanne River at Raith (near Upsala Ontario, northeast of Atikokan). The river flows westerly for 250 kilometres and empties into Rainy Lake (near Fort Frances, Ontario, and the Canada/USA border). The Seine River is part of the Winnipeg River drainage system that flows west through Ontario and north through Manitoba to Hudson Bay.

Winnipeg River Drainage Basin

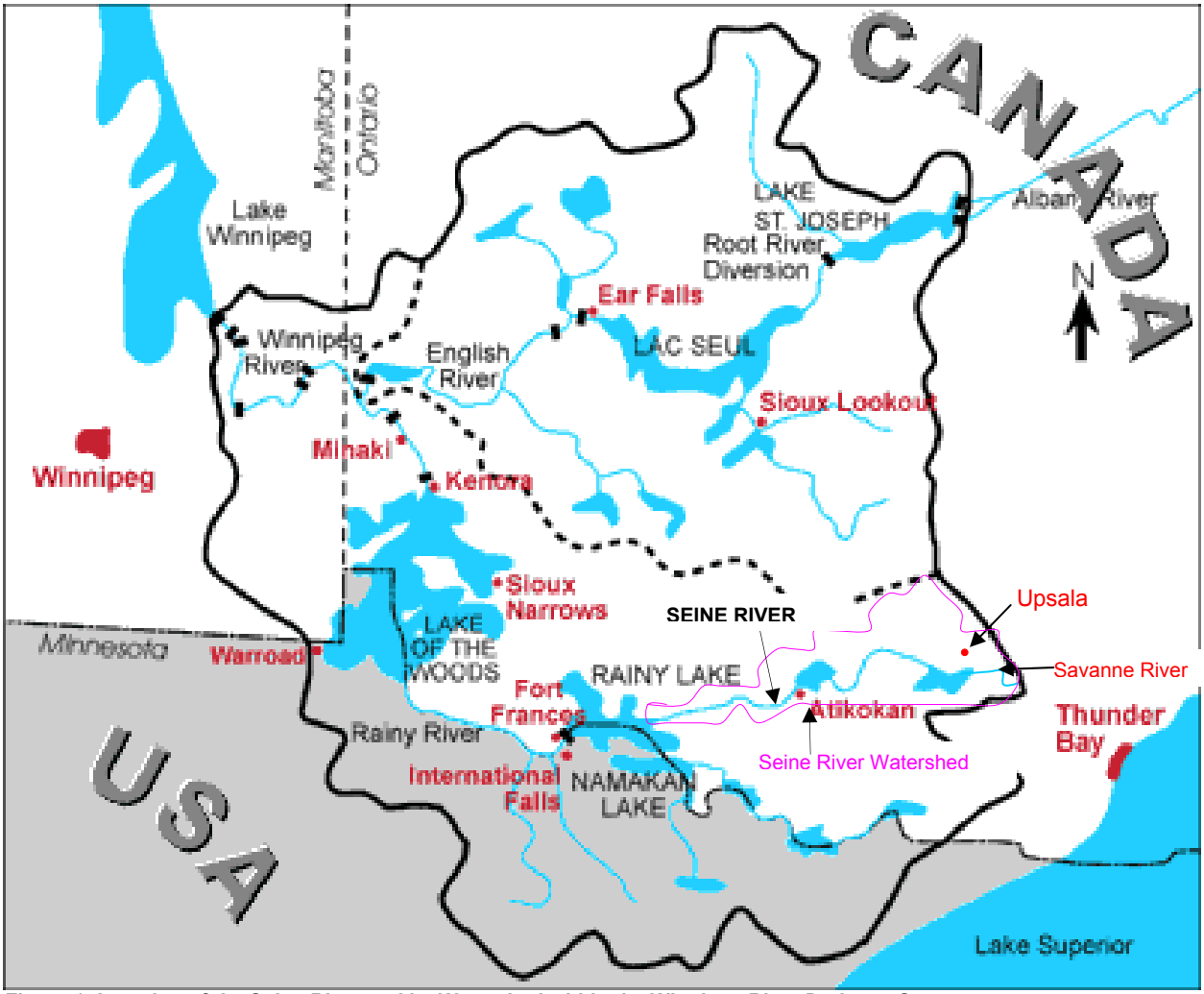


Figure 1: Location of the Seine River and its Watershed within the Winnipeg River Drainage System. Reproduced by permission of the Lake of the Woods Control Board.

The Seine River is located within the districts of Fort Frances and Thunder Bay, in the Northwest Region of the Ministry of Natural Resources. The Planning Area is shown below for the Seine River System. See Appendix 10 for detailed maps of the watershed.

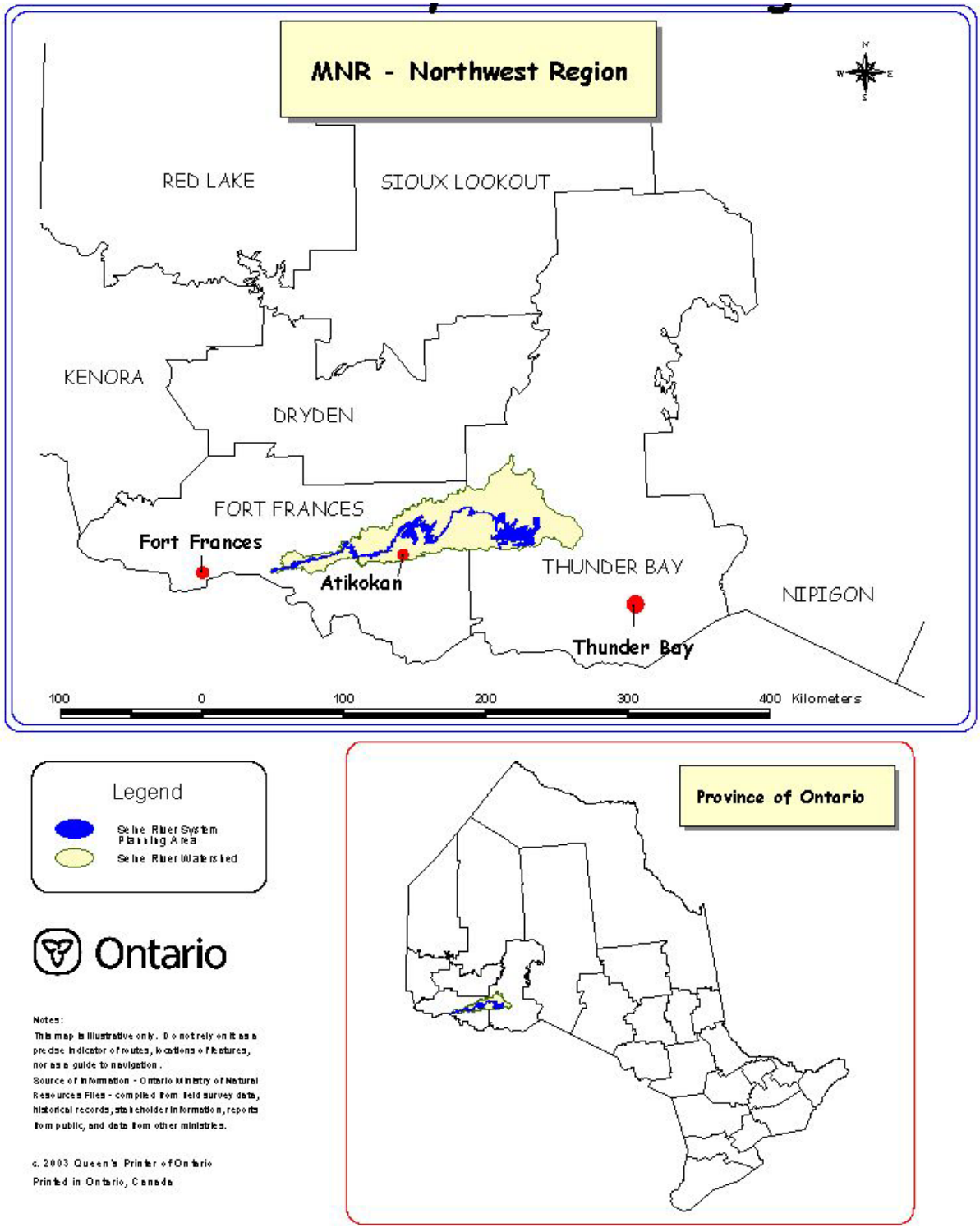


Figure 2: Location of the Seine River and its Watershed Within the MNR Northwest Region.

2.2 Goal and Principles of Water Management Planning

Goal

The goal of this process was to prepare a Water Management Plan for the Seine River that supports sustainable development of water resources for waterpower and other uses, while protecting and enhancing the natural ecosystems.

Guiding Principles of Water Management Planning

The following principles guided planning through the preparation, review, approval and implementation of the Water Management Plan.

1. **Maximum Benefit to Society**. The Water Management Plan (flows and levels) attempted to maximize the net environmental, social and economic benefits derived from how the waterpower facilities and their associated water control structures were operated.
2. **Aquatic Ecosystem Sustainability.** The Water Management Plan addressed any ongoing degradation of aquatic ecosystems and, where possible, improved upon existing conditions.
3. **Planning Based on Best Available Information**. The existing operating regime represents the base condition from which incremental improvements were sought. The best information that was available at the time of decision-making was used in the preparation of the Water Management Plan.
4. **Thorough Assessment of Options**. Identification of issues and assessment of options was a comprehensive exercise and occurred in an open and participative environment.
5. **Adaptive Management.** An adaptive management approach was the basis for the preparation and implementation of the Water Management Plan. Adaptive management is a long-term process that continually improves resource management to reduce areas of uncertainty, builds on successes and makes adjustments to limit failures.
6. **Timely Implementation of Study Findings**. Study findings and information that arise after the Water Management Plan has been approved will be acted upon in a timely manner. This will occur through an amendment process, future-planning sessions, or dispute resolution. The process to be used depends whether the recommendation affects the waterpower industry's operating revenue.
7. **First Nation and Treaty Rights**. Water management planning was undertaken without prejudice to the rights of First Nation people and treaty rights.
8. **Public Participation**. The planning process was an open and transparent process. The public was involved in identifying issues and resource values related to the management of water levels and flows, and in developing and reviewing options.
9. **Decision-Making**. Wherever possible, decisions were made by consensus. A dispute resolution process was available but not used.
10. **Precedents.** Items discussed by the Planning Team that have effects outside the Seine River basin or that set precedents for other watersheds were directed to the Steering Committee.

2.3 The Terms of Reference

In 2002, the Steering Committee developed the Terms of Reference for the Seine River water management planning process. The following describes the participation of both the Steering Committee and the Planning Team (*Source: Appendix 1 — Seine River Terms of Reference, 2003*)

Committee Participation: Roles and Responsibilities

Water Management Plan proponents were responsible for the development and content of the Water Management Plan through the completion of the planning process as outlined in the guidelines. All proponents had a responsibility to contribute to and complete the plan. Principal costs for planning were borne by the proponents.

Abitibi Consolidated Company of Canada (ACCC) and Valerie Falls Limited Partnership (VFLP) were principle Plan proponents, both having ownership of power dams and water control structures on the river.

Since the Ontario Ministry of Natural Resources (OMNR) has control structures on the river system, it was also a Plan proponent. In this circumstance, OMNR was responsible for contributing to the plan as a proponent and developing operational plans for its own control structures that were included in the overall Water Management Plan.

2.3.1 Roles and Responsibilities of the Steering Committee

The Steering Committee was responsible for ensuring that the Water Management Plan was prepared in accordance with the Water Management Plan Guidelines and the Terms of Reference. The Steering Committee met when necessary to review and guide phases of the project.

2.3.2 Roles and Responsibilities of the Planning Team

The Planning Team was responsible for seeing that all tasks were completed to meet the objectives of the Plan development. They met as necessary to meet the deadlines set by the Steering Committee. Draft minutes were circulated to Planning Team members after each meeting with a copy provided to the Steering Committee. If the Planning Team could not reach consensus on a particular item, the Steering Committee was asked to resolve the issue.

2.3.3 Structure of the Public Advisory Committees and Integration into the Planning Team

The Steering Committee decided that two existing Public Advisory Committees (Seine River Water Level Technical Committee and Lac des Mille Lacs Advisory Committee) would serve to support the water management planning exercise, rather than creating a single entity.

2.4 Summary of Planning Process

Actions Undertaken to Develop the Plan

In 2002, the Steering Committee was formed. The Steering Committee developed the Terms of Reference and selected the Planning Team. During the fall 2002 and 2003, the Planning Team worked through the stages of Water Management Planning.

The stages were completed incorporating consultation with the public and First Nations and using the best available information. An in-depth evaluation and weighting process was used during the option development stage to arrive at a preferred option for each control structure.

Following is a brief overview of the plan components developed by the Seine River Water Management Plan committees.

Issues: The issues and resource values were identified through public and First Nations consultation prior to and during this formal water management plan process. Comment forms were distributed at information centres and through the Public Advisory Committee meetings.

Objectives: An objective is a broad statement that describes the meaning of the issue category. The plan objectives were developed to address the issues, and then they were prioritized by the Planning Team to define the management direction for the plan. These processes were confirmed by the Steering Committee.

Sub-Objectives: Sub-objectives are the various components that together comprise the overall objective. For example, improvement to Aquatic Ecosystem is defined as an objective. To achieve this, a variety of sub-objectives were developed. Several sub-objectives would include: minimum flows, natural summer drawdown and constant or rising water levels during spring spawning. Each of these sub-objectives support the main objective. The Planning Team members developed sub-objectives, targets and strategies for each objective. The objectives, targets and strategies were used to develop the various options for each control structure on the Seine River.

Options: Management options were developed to address the plan's objectives and support the principles and goal of water management planning.

Preferred Option for Each Control Structure: Each option was evaluated based on how well it met the objectives. Operating plans based on the preferred option were developed for each control structure.

Compliance Monitoring Plan: Based on the operating plans, the Planning Team developed the compliance monitoring plan. The purpose of the Compliance Monitoring Plan is to determine whether the operation of each dam is within the bounds set out in the operating plans as set out in the Seine River Water Management Plan. It also

provides the data that allows the MNR to take compliance or enforcement action under the Lakes and Rivers Improvement Act if the reason for being outside the operating plans is due to negligence or willful action and not due solely to acts of nature or under the direction of the MNR.

Effectiveness Monitoring Plan: The Effectiveness Monitoring Plan (EMP) is the basis of evaluating how well the management of water levels and flows during the life of the plan meets the objectives identified in the Seine River Water Management Plan. This is different than the compliance monitoring plan which assesses how well the dam operators stay within the rules laid out in the operational plan.

The purpose of effectiveness monitoring is to provide the Planning Team with the information either to confirm that the plan is achieving objectives or to propose modifications to the target levels and flows and strategies in the next planning cycle based on the ability to meet objectives during the plan period.

Draft Plan Development: After a 30-day public consultation feedback period, the Draft Plan was developed. Included in the Draft Plan was the process for amending the plan. In December 2003, the Draft Plan was approved by the Steering Committee for review by the MNR Review Team. The Planning Team received the comments from the Review Team at the beginning of February 2004. The Draft Plan and Review Team comments were presented to the public at Public Information Sessions held in Atikokan on February 17, and Thunder Bay on February 18.

Final Plan Development: After a 30-day public consultation feedback period, the Final Plan was developed. The Planning Team and Steering Committee reviewed and approved the Final Plan and submitted it to the Ministry of Natural Resources on March 31, 2004.

The flowchart on the next page displays the Seine River planning process from the issue gathering stage through the option development stage to final plan development and the next steps.

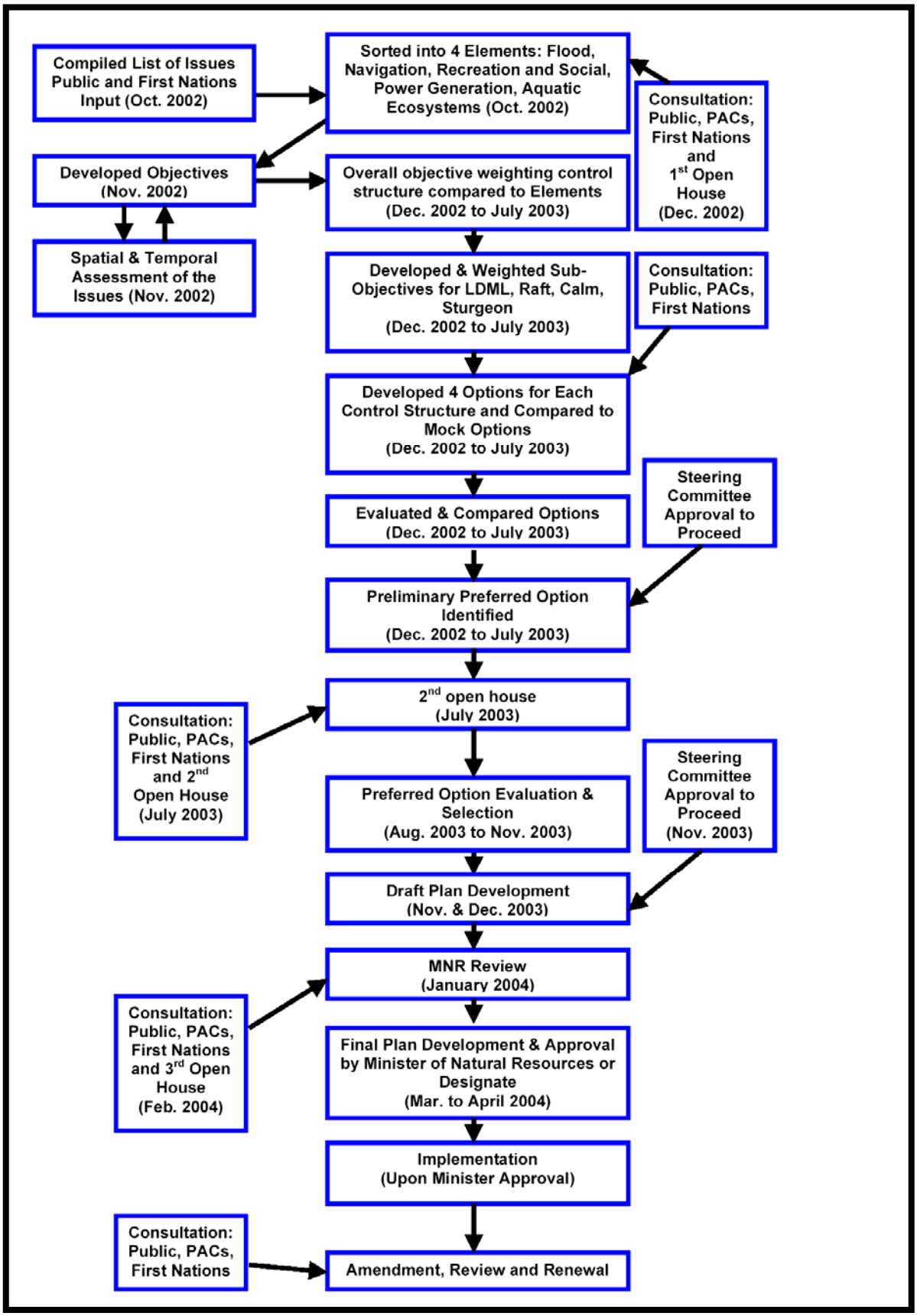


Figure 3: Seine River Water Management Planning Process

3 History of Waterpower Development and Operations

3.1 Brief History of Water Control and Waterpower Development on the Seine River

- Around 1873, the Department of Public Works Canada, under the direction of Simon J. Dawson, constructed a stone dam at the outlet of Lac des Mille Lacs on the Seine River. The purpose of this dam was to allow the water levels to be increased for better navigation along the Red River Route.
- 1905: Canada, Ontario, the United States and an American Industrialist, E.W. Backus, entered into an agreement to permit a power dam to be built across the Rainy River at Fort Frances. The dam was completed in 1909.
- 1923–1926: Water control on the Seine River continued with the building of the Calm, Sturgeon Falls and Moose generating stations in 1926. These power dams were built to supply power to the Fort Frances paper mill (now owned by ACCC) and to facilitate log-driving operations. Most of the significant changes to water surface area occurred in 1926. The Marmion Reservoir was created at this time and served as the primary storage basin for power regulation at Moose, Calm and Sturgeon Falls generating stations.
- 1926: The Backus timber dam replaced the Dawson stone dam at Lac des Mille Lacs. This allowed water levels and flows to be modified for the purpose of power production downstream.
- 1943: The Moose generating station was decommissioned due to the diversion of the Seine River around the Steep Rock mining operations. The Raft Lake dam was built to replace the Moose Lake structures as the principal control works for the system.
- 1944–1961: The East Arm of Steep Rock was leased to Inland Steel and its subsidiary, Caland Ore Canada, commenced dewatering and dredging operations.
    - The bulk of the dredge material from this mining zone was deposited in the Lower Marmion Lake area.
    - Three earth-fill block dams and an overflow sill were constructed to isolate Lower Marmion from Upper Marmion. This minimized the amount of dredge material entering the Seine River.
    - Further development of the Steep Rock iron deposit resulted in additional major and minor watercourse diversions and construction of settling basins for overburden dredged from Steep Rock Lake.
- Mid-1950s: The timber crib dam at Lac des Mille Lacs was replaced with a concrete dam.
- 1980s: The Ontario government assumed ownership of most of the Steep Rock water control structures. Some minor modifications were made at this time.
- 1989: ACCC assumed control of the Raft Lake Dam.
- 1991: The Lac des Mille Lacs Lake Management Plan was developed. New water control objectives were adopted.

- 1993–1994 Valerie Falls generating station and dam were built, capturing 65% of the available drop previously utilized by the Moose Lake power station.
- 1995–1997: The Seine River Water Level Technical Committee (SRWLTC) was formed in 1995 and operational targets for the dams on the Seine River were developed in 1997.
- 2001: The Ontario Government enacted legislation requiring that formal water management plans be developed for each “power” river in the province.

3.2 Description of Reservoirs and Water Control Structures

Reservoirs

Three bodies of water are used as reservoirs for power production along the Seine River system. Lac des Mille Lacs is controlled by the Lac des Mille Lacs dam, Lower Marmion Lake is controlled by the Lower Marmion Sluiceway, and Upper Marmion Lake is controlled by the Raft Lake Dam.

From a power production perspective, the purpose of reservoirs is to stabilize downstream water flows by storing water during high flow events (e.g. spring) and releasing it during times when natural flows are low (e.g. winter). Stabilizing flows also reduces the frequency and/or impact of flood and drought events that would occur naturally. The ability of dam operators to stabilize flows depends on

- the range of inflows
- the amount of storage available
- the ability of the structure to impound water.

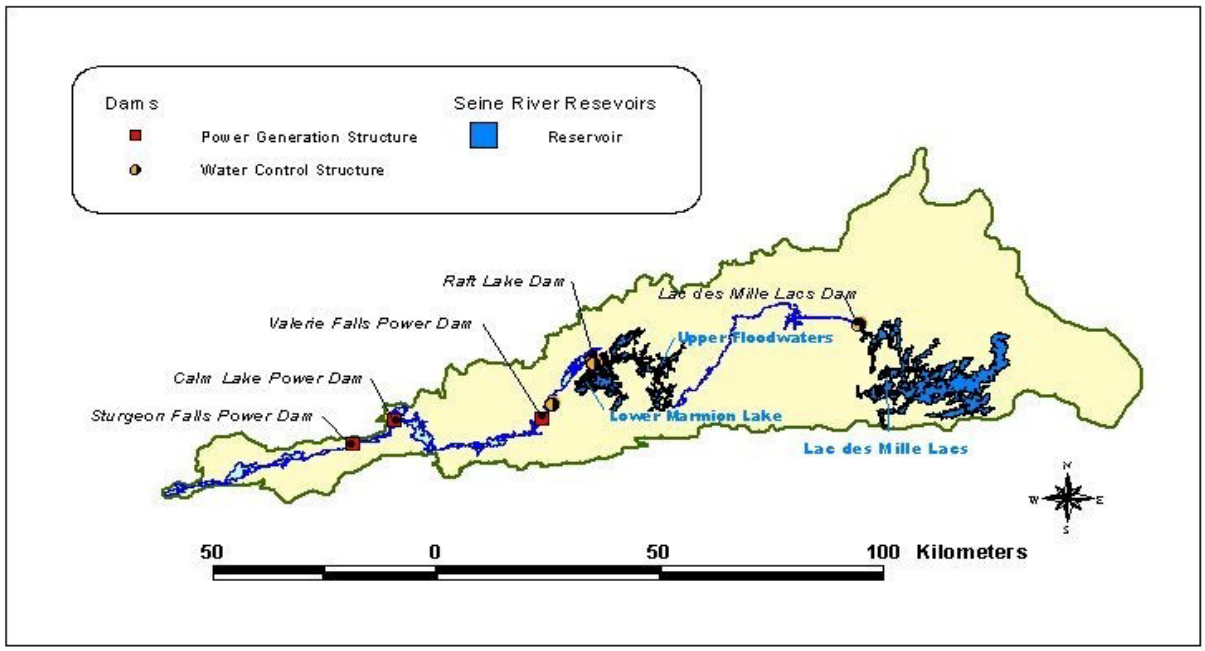


Figure 4: Seine River Reservoirs within Watershed

Power Production Dams

Three dams are used for power production along the Seine River system (Valerie Falls Generating Station, Calm Lake Generating Station and Sturgeon Falls Generating Station).

The purpose of the dams is to provide a head of water in the headpond and direct flows through turbines to convert the energy of falling water into mechanical power and then electrical energy.

The power dams on the Seine River have modest storage capacity (the headpond). Water levels controlled by these dams are typically held close to full supply to maximize the amount of drop that water has to fall (known as *head*). Because of this, the ability to store water in the headponds, beyond a few days, is limited.

The dam operators use the upstream reservoirs to try to produce even flows throughout the year in order to deliver adequate water supply to the headponds for power production purposes. From a daily operations perspective, water flow is typically controlled to produce higher flows during high value electrical production periods (e.g. day) and reduce flows during low value periods (e.g. night). This practice is commonly known as *peaking* or *load-following*.

Watershed and Dams Map Appendix 10 – Map #10.1

Secondary Watersheds Map Appendix 10 – Map #10.2

Generating Stations and Storage Dams on the Seine River

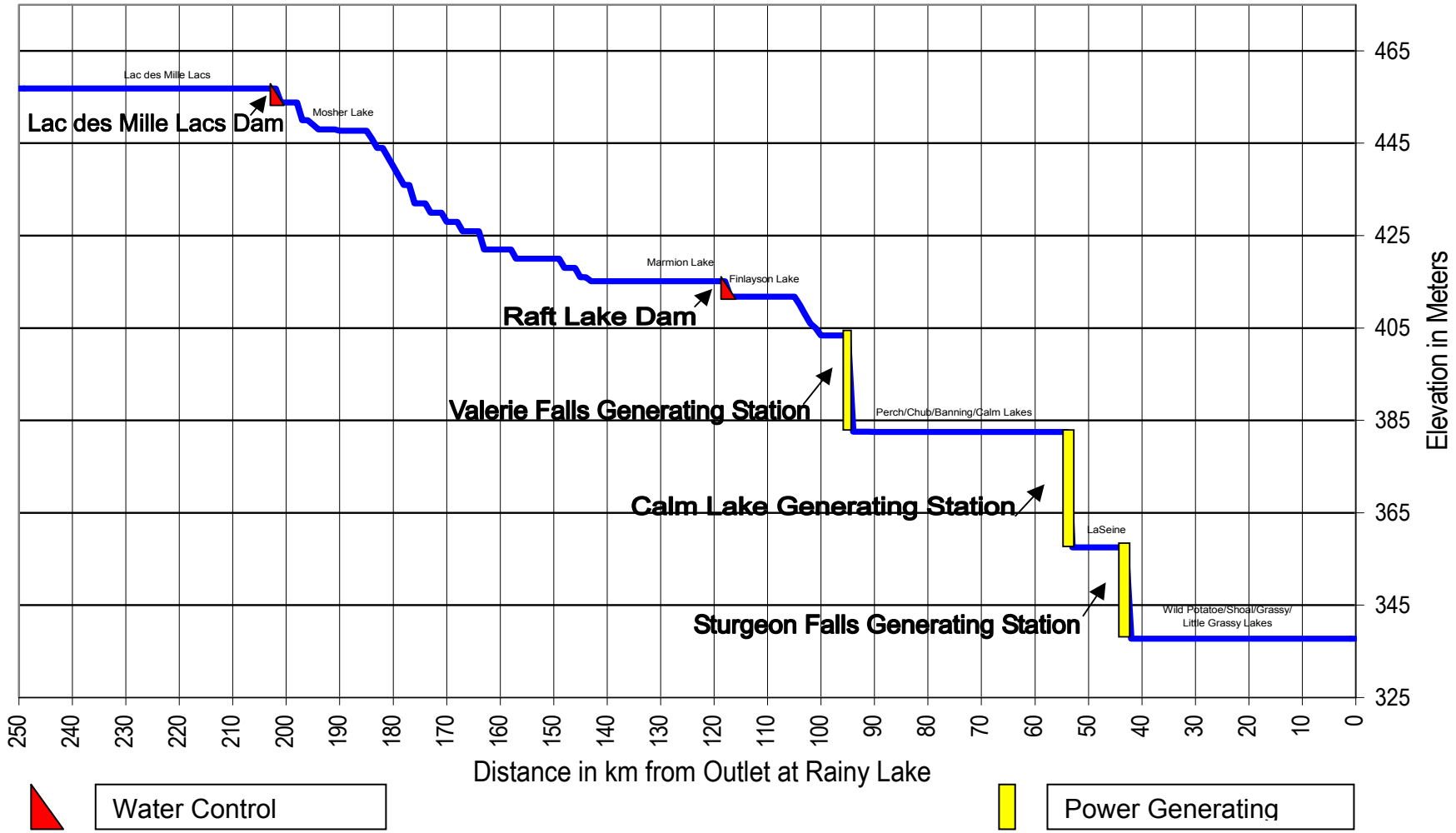
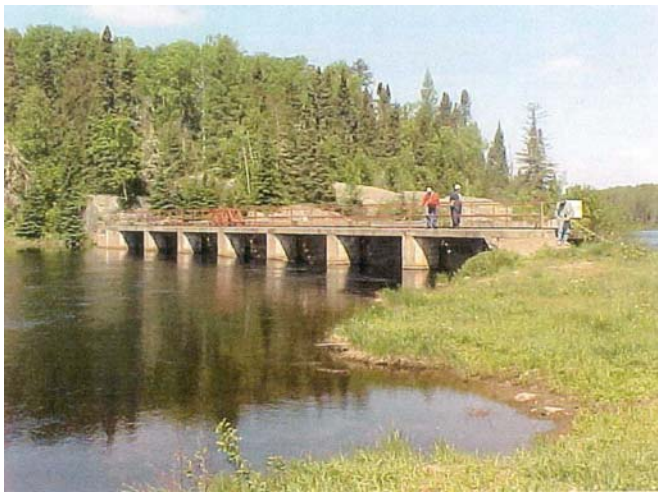


Figure 5 – Elevation of River Sections from Lac des Mille Lacs to Rainy Lake



Lac des Mille Lacs Dam

Lac des Mille Lacs Dam

Ontario Ministry of Natural Resources is the owner of the Lac des Mille Lacs (LDML) dam which was rebuilt by the Ontario government in 1952. It is currently operated by Valerie Falls Limited Partnership under an agreement with the Ministry of Natural Resources.

Lac des Mille Lacs: The Lac des Mille Lacs dam controls water levels and outflows of Lac des Mille Lacs, a large (24,510 ha) lake located at the headwaters of the Seine River system. The watershed area for the Lac des Mille Lacs dam is small (177,455 ha) relative to the size of the lake, which makes up a large proportion of the watershed area (14% of total watershed area). This means that it takes a relatively long time to replace water in the lake, which limits the amount of water level fluctuation that can occur. Inflow into the lake is uncontrolled.

Reservoir (storage)	1,500 m^3/sec/days
Constructed	1952
# of sluices	7 with 8 logs available for each slot
Level at top log with all logs in	456.99 m
Level of sill with all logs out	454.59 m
Constraints	none

Raft Lake Dam

Raft Lake Dam (Marmion Lake)

Abitibi Consolidated Company of Canada (ACCC Fort Frances) is the owner and operator of the Raft Lake dam. The dam was built by Steep Rock Iron Mines in 1943, as part of legal requirement to achieve the diversion. Ontario Hydro operated the dam from 1980 to 1989, when ACCC's then-owner (Boise Cascade Canada) acquired it.

Upper Marmion Lake: The Raft Lake dam controls the water levels and outflows of Upper Marmion Lake (5,525 ha). Unlike the other 2 reservoirs, Upper Marmion Lake makes up a small proportion (1.2%) of its total watershed area (442,575 ha). This means that it takes a relatively short time to replace water removed from the lake, giving a much larger range of potential water level fluctuation relative to Lac des Mille Lacs.

Besides water from the other 2 reservoirs, there is significant inflow to Upper Marmion Lake from uncontrolled sources including the Firesteel River and the Mercutio River. Altogether, uncontrolled inflows account for 56% of the watershed area.

Reservoir (storage)	1500 m^3/sec/days
Constructed	1943
# of sluices	1 slot with 12 logs, 3 slots with 20 logs; discharge capacity 580 m^3/sec; maximum 24-hour flow on record (June 3, 1970) is 246 m^3/sec
Level at top log with all logs in	415.89 m
Level of sill with all logs out	Sluice 1 is 411.8 m; sluices 2, 3 and 4 are 408.15 m
Constraints	Discharge control diminishes progressively as lake level rises above 415.17 m; spillwall crest is 415.17 m (244 m in length)

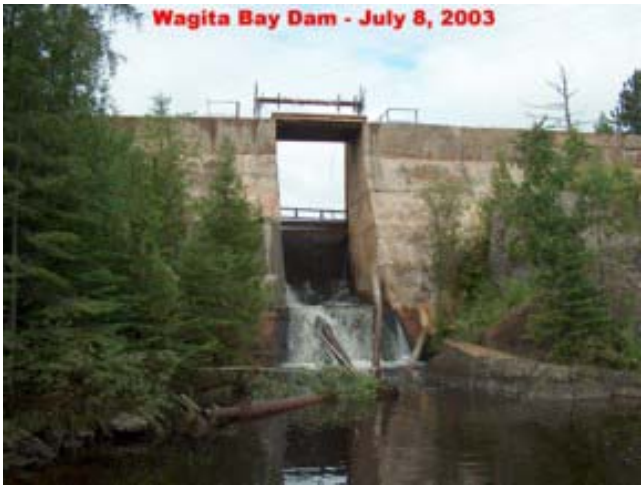
Marmion Sluiceway

Marmion Sluiceway (Lower Marmion Dam)

The Marmion Sluiceway was constructed in the early 1950s when the Marmion block dams were constructed. In 1983, Ontario Hydro, now Ontario Power Generation (OPG), rebuilt the block dams. In 1997, Valerie Falls Limited Partnership installed the new navigation sluice.

Lower Marmion Lake: The Lower Marmion Sluiceway controls the water levels and outflows of Lower Marmion Lake (3,960 ha). The watershed of the lake is very small (15,570 ha) relative to the size of the lake, which makes up 25% of the watershed area. However, unlike Lac des Mille Lacs, Lower Marmion Lake is not dependent on its local watershed for water replacement. Water from Upper Marmion Lake is used to replace water during the spring refill period. This allows a much larger range of potential level fluctuation.

Reservoir (storage)	382 m^3/sec/days
Constructed	1952 and upgraded in 1983 and 1997
# of sluices	1 6-log sluice; discharge capacity is 10 m^3/sec; normal operating range is 414.80–415.50 m
Level at top log with all logs in	415.60 m
Level of sill with all logs out	413.50 m
Constraints	Lower Marmion drawdown is constrained by agreement with OPG to ensure suction head for cooling water pumps (minimum level 414.80 m). OPG may experience inadequate cooling water flows if the summer level is low.



Wagita Bay Dam

Wagita Bay Dam

The Ontario Ministry of Natural Resources is the owner of the Wagita Bay dam, which was constructed in 1943 and raised to present height in 1952. It impounds the Valerie Falls headpond and provides minimum flow to Steep Rock Lake. The minimum flow (0.1 m3/sec) is from stoplog leakage and remains constant year-round. The Wagita Bay Dam is primarily a block dam that serves to separate the Seine River diversion from Steep Rock Lake. It does not act as an effective level control for the Valerie Falls headpond (Colin Lake-Little Falls Lake). However, it does perform important Aquatic Ecosystem functions. These include providing minimum flow for walleye spawning on Steep Rock Lake and water coverage of Steep Rock dredge material.

Reservoir (storage)	n/a
Constructed	1943; height raised in 1952
# of sluices	1 9-log sluice; discharge capacity is 35 m^3/sec
Level at top log with all logs in	404.25 m
Level of sill with all logs out	400.81 m
Constraints	Discharges above 4 m^3/sec may cause mobilization of silt in West Arm of Steep Rock Lake.

Note: The Planning Team recommended that minimum flow from Wagita Bay Dam might be better regulated by a slide gate. Wagita Bay Dam is scheduled for some upgrade work some time during the period 2005–2010. During the upgrade it is anticipated that stop logs might be replaced by new logs or a slide gate and a new hoist mechanism. Prior to construction, flows should be measured with a v-notch weir to establish the appropriate gate setting for the outflows.

Valerie Falls Dam

Valerie Falls Dam

Valerie Falls Limited Partnership (VFLP) is the owner of Valerie Falls Generating Station. VFLP is owned by Great Lakes Power Inc. (Brascan). The power produced by the plant is sold under the terms of a 50-year power purchase agreement to the Ontario Electrical Finance Corporation (successor company to the former Ontario Hydro).

Three other dams owned by VFLP impound the Valerie Falls headpond: McRorrie (1994), Reed (1952) and TW4 (1952). These dams have no ability to control levels and flows and are not discussed further in this Water Management Plan.

The Valerie Falls dam controls water levels in Colin Lake and Little Falls Lake (combined area of approximately 400 ha). Although the lakes (known as the *headpond*) account for a very small amount (0.2%) of the total upstream watershed (458,325 ha), 97% of the inflow to the headpond is controlled by the Raft Lake dam. Because of the small headpond, the Valerie Falls dam has very limited storage and beyond managing water for daily peaking, the dam has little water control ability.

Reservoir (storage) headpond	32 m^3/sec/days
Constructed	1994
# of sluices	2 gated sluices and 2 overflow crests; discharge capacity is 320 m^3/sec; spillage occurs at 403.95 m
Level at top of gated sluices with gates closed	405.5 m
Level of sills	400.5 m
Power generation	10 MW; turbine capacity is 6–60 m^3/sec
Constraints	Department of Fisheries and Oceans (DFO) Agreement regulating flows

Calm Lake Dam

Calm Lake Dam

Abitibi Consolidated Company of Canada (ACCC) owns and operates both the Calm Lake dam and the Sturgeon Falls dam.

The Calm Lake dam controls water levels in the reach from Calm Lake to Perch Lake under normal flows (combined area of 3,660 ha). As with the Valerie Falls dam, lakes (known as the *headpond*) account for a very small amount (0.6%) of the total watershed upstream from it (575,000 ha). There are significant uncontrolled inflows to this dam (20% of total inflow area), principally of the Atikokan River and Eye River systems. Approximately 80% of the inflow area to Calm Lake dam is controlled by the Raft Lake dam.

At low flows, the Calm Lake dam controls water levels over the entire headpond up to Perch Lake. At higher flows (flows above about 75 m^3/sec), the narrows between Chub Lake and Banning Lake acts as a constriction, resulting in events when water levels are much higher in Perch Lake, Chub Lake and Little McCaulay Lake than in Calm or Banning Lake. At these times, the Calm Lake dam has less control over water levels in Perch Lake, Chub Lake and Little McCaulay Lake.

Reservoir (storage) headpond	95 m^3/sec/days
Constructed	1926
# of sluices	16 sluices including 1 remote operated waste gate; discharge capacity is 566 m^3/sec at 382.5 m; maximum 24-hour flow (June 24, 1950) was 370 m^3/sec; spillage occurs at 382.52 m
Level at top log with all logs in	382.52 m
Level of sill with all logs out	waste gate 380.09 m, slot 1 is 378.26 m; slot 2–15 are 380.09 m
Power generation	9 MW; turbine capacity 10–48 m^3/sec
Constraints	None

Sturgeon Falls Dam

Sturgeon Falls Dam

Abitibi Consolidated Company of Canada Fort Frances owns the Sturgeon Falls dam.

The Sturgeon Falls dam controls water levels in Laseine Lake (355 ha), which is also the receiving waterbody for the Calm Lake dam. Laseine Lake is a small lake immediately downstream from the Calm Lake dam. Because of the small size of its headpond and its proximity to Calm Lake (~10km), 98% of its inflows are controlled by the Calm Lake dam. It is almost always operated in tandem with the Calm Lake dam (cascading system). Essentially whatever water flows into the upstream end of the headpond is passed out of the dam. Because of this, fluctuations are typically very low under normal operating flows for the dams.

Reservoir (storage) headpond	13 m^3/sec/days
Constructed	1926; dam is 168 m long
# of sluices	14 sluices, including 1 remote operated waste gate; discharge capacity is 792.9 m^3/sec at 357.5 m; maximum 24-hour flow (June 24, 1950) was 313.1 m^3/sec; spillage occurs at 357.53 m
Level at top log with all logs in	357.53 m
Level of sill with all logs out	waste gate is 354.18 m stop log gates 1–13 are 354.18 m
Power generation	7 MW; turbine capacity 10–48 m^3/sec
Constraints	None

3.3 Pre-plan Water Management on the Seine River

The Seine River has been operating under some form of water level and flow management since 1926. Originally the priority was power production and log driving. The three Seine River power dams and associated reservoirs provided baseload power for the isolated grid that supplied the sole source of power to the Rainy River district and the Fort Frances paper mill. However, over time and subsequent to the diversion of the Seine River, the needs of other users have changed and the knowledge about the impacts of water levels and flow changes has improved.

By the 1990s, an adaptive management process evolved that established a range of operations and priorities that were different than those in place in 1926. Since 1926 priorities include but are not limited to power production, fish habitat, day users, cottagers, flood mitigation, and tourism. In recent years water management; e.g. stoplog changes have reflected these evolving priorities.

Lac des Mille Lacs: Beginning in 1989, the Lac des Mille Lacs Lake Management Planning Committee was formed to participate in a planning process to develop a lake management plan for the Lac des Mille Lacs area. This Committee consisted of representatives from various lake user groups, the public, First Nations, MNR and industry. The Lac des Mille Lacs Lake Management Planning Committee maintained its participation in the resource management of the lake through the formation of the Lac des Mille Lacs Advisory Committee (LDMLAC). The Lake Management Plan included direction regarding the water level management of Lac des Mille Lacs.

The Lac des Mille Lacs Lake Management Plan (LMP) was adopted in November 1991. The water level and flow section was amended in 1992 for recalibration of the instruments and in 1994 for a revision of the water level targets. For the details of the LMP, contact the MNR Shebandowan office in Thunder Bay.

During this Water Management Planning process, it was determined that the targets set in the Lake Management Plan (1991) are not always practical to meet given the operating constraints and actual response of the system to weather events. The table and graph on page 47 reflects the1994-2003 management of the Lac des Mille Lacs dam.

Summary of the Lac des Mille Lacs Lake Management Plan Targets for Management of the LDML dam (1995–2003)
(Source: Amendment to the Lac des Mille Lacs LMP 1994 MNR Shebandowan)

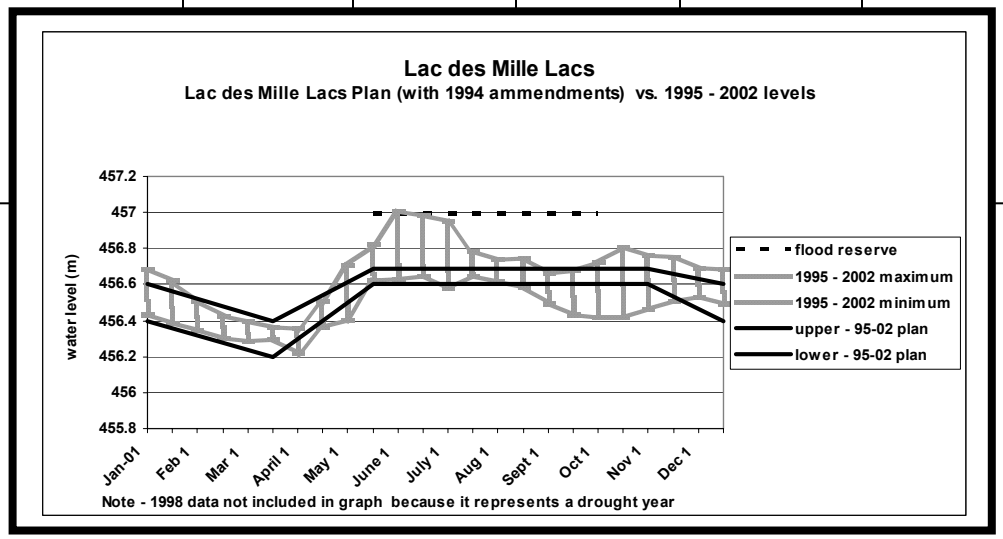
Spring Level – Spawning	456.60 m 1st week of May
Summer Level Range	456.60–456.69 m
Summer Maximum	456.99 m (flood reserve)
Winter Level Range	456.30 m (+/-10 cm)
Fall/Winter Descent Period	November to March 15th
Minimum Flow	1.5–2 m^3/sec

Under the pre-plan operating regime, the operator would generally operate toward the middle of the band. Power generation is not a consideration during the spring and summer.

General Condition: Stoplogs will be removed if the lake level rises more than 0.05 m in one day. Stoplogs will be replaced if the lake level drops more than 0.02 m in one day. During extreme flood or drought a suitable course of action would be determined by the District Manager.

Lac des Mille Lacs Operating Plan (1994 – 2003)

LDML Dam	Minimum Flow	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Water Levels	Open Water Fluctuation	Winter Levels	Winter Fluctuation
LDML Lake Management Plan	1.5 m^3/sec	no restrictions	no restrictions	no restrictions	no restrictions	Normal inflows 456.60–456.69 m from May 7 to Oct. 31; high flows 456.99 m in same period	0.09 m; 0.39 m in high flows	456.20–456.40 m Nov.–Mar. 15	0.47 m average (actual max. 0.54 m)
LDML 1994-2003 Operating Regime	1.5 m^3/sec	15 m^3/sec	40 m^3/sec	20 m^3/sec/day maximum	20 m^3/sec/day maximum	456.40–456.99 m from May 7 to Oct. 31	0.59 m	456.20–456.75 m Nov.–Mar. 15	0.55 m



Seine River from below Lac des Mille Lacs dam to Rainy Lake:

The Seine River Water Level Technical Committee (SRWLTC) was formed in 1995 in response to concerns about the operations of the dams and the resultant impacts on other system users and the ecosystem. As well, there was a need to provide an effective forum for communication between the industry and other stakeholders on the river system. The committee members included representatives from the Ministry of Natural Resources, Abitibi Consolidated Company of Canada, Valerie Falls Limited Partnership, stakeholders of the lower Seine River, the Seine Chain of Lakes and the Marmion Reservoirs, as well as a Fish & Wildlife representative. New management targets were confirmed and implemented in May 1997.

Following are excerpts from the SRWLTC Targets for Management of the Lower Seine River (1997–2003). For the complete text of the targets, please see Appendix 2.

1. November to April operating rule curve band targets for Marmion Reservoir will cover the 411.5–415.5 m range. Drawdowns below 412.5 m due to low water or maintenance considerations will be discussed but do not require consent of the Ministry of Natural Resources or the SRWLTC. ACCC and VFLP will present information to the MNR and SRWLTC regarding the justification for the drawdown, schedule, constraints and alternatives that were considered. As a general principle, power dam operators will conserve water when it is not needed for production, except that the Marmion Reservoir target will be 413.7 m or lower by April 15 to preserve adequate flood freeboard at the start of the spring freshet.

2. After April 15th, Marmion will be steady or rising with a target recovery level of 414.5 m by May 15th and 415.0 m by June 15th. During this same period the target minimum discharge from Raft Lake should be 10 m^3/sec. It is expected that these targets will be met 8 out of 10 years.

3. For the period from the 3rd week of May to November 15th, the target level for Marmion will be 415.0 to 415.5 (excluding major floods).

4. To support capacity production at Calm and Sturgeon, the target discharge from Marmion will be 35 to 40 m^3/sec for December, January, February and March. To reduce the frequency of full draws on Marmion Reservoir, LDML storage will be used first to support Upper Marmion levels. After LDML storage is depleted, Marmion will be used to meet the 35 to 40 m^3/sec discharge target. Lower Marmion reserve will also be drawn before Upper Marmion.

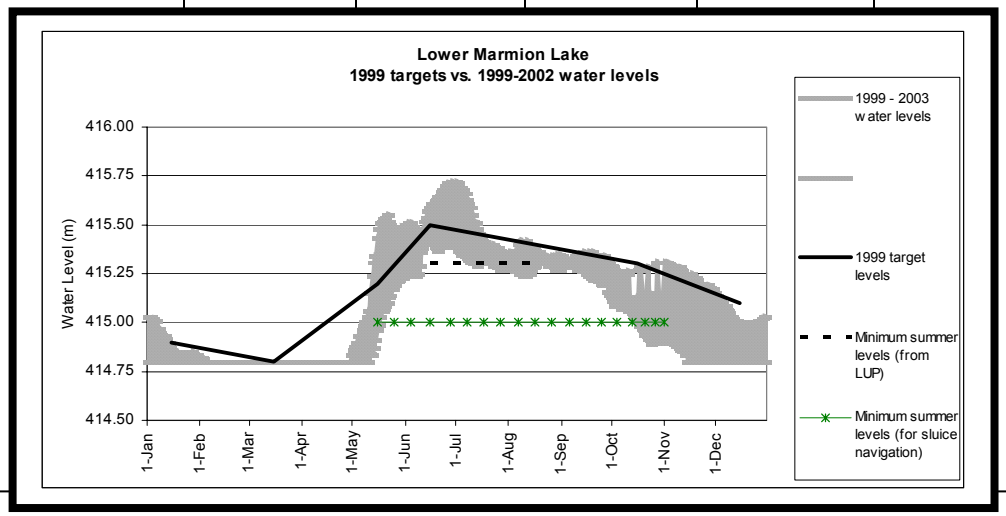
5. Since 1989, the stoplog operations at Raft Lake have been modified to decrease the incidence of sudden major changes in flow. In the interest of system biology and recreational users, this policy should be continued. A target of maximum flow change per day of 25 m^3/sec/day (except during extreme flood events) will be set. When flow changes exceed 25 m^3/sec/day, a public notification procedure will be employed.

The following are the pre-plan operating regimes for each dam below the Lac des Mille Lacs dam:

- Lower Marmion Sluiceway,
- Raft Lake dam,
- Wagita Bay dam,
- Valerie Falls dam,
- Calm Lake dam,
- Sturgeon Falls dam.

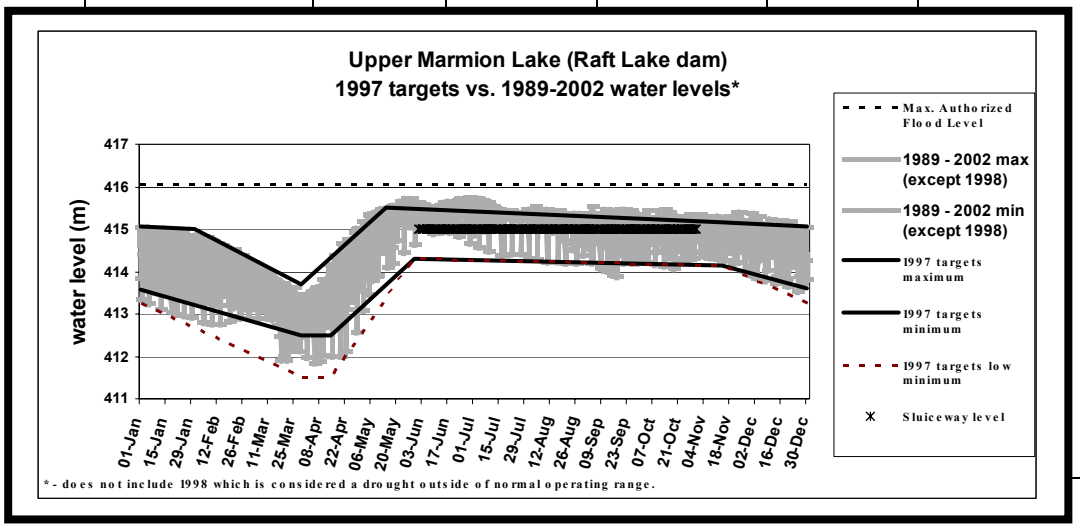
Lower Marmion Sluiceway Pre-Plan Operating Regime

Lower Marmion Sluiceway	Minimum Flow	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Water Levels	Open Water Fluctuation	Winter Levels	Winter Fluctuation
Requirement in Land Use Permit	no restrictions	no restrictions	no restrictions	no restrictions	no restrictions	recover to 415.20 m by May 15 and 415.30 m by Jun. 15; 415.3–415.5 m on Jun. 15–Aug. 15; slow decline to 415.25 m Oct. 30	normal flows: 415.20–415.50 m; high flows up to 415.89 m	415.25 m in Nov. to 414.80 m at Mar. 15	0.45 m
Pre-Plan Operating Regime	(0.2 m^3/sec default by stoplog leakage)	2 m^3/sec	n/a	2 m^3/sec/day maximum	2 m^3/sec/day maximum	Minimum 415 m on May 15 415.25 m Jun. 15–Sept.15 415 m on Nov. 1 Maximum 415.5 m May 15 415.35 m Sept. 1 415.25 m Nov. 1	normal flows: 415.20–415.50 m; high flows up to 415.89 m	Minimum 414.80 m Maximum 415.25 m at Nov.1 414.80 m at Apr.1	0.45 m



Raft Lake Dam Pre-Plan Operating Regime

Raft Lake Dam	Minimum Flow	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Water Levels	Open Water Fluctuation	Winter Levels	Winter Fluctuation
Requirements in Licence of Occupation (LO)	3 m^3/sec	no restrictions	no restrictions	LO has no maximum	LO has no maximum	no restrictions except maximum flood level of 416.05.	no restrictions	no restrictions; lower constraint is the sill level at 408.15 m.	no restrictions
Pre-Plan Operating Regime	10 m^3/sec April 15 to June 15	70 m^3/sec	120 m^3/sec	notification required for changes >25 m^3/sec/day	notification required for changes >25 m^3/sec/day	415.0–415.5 m (3rd Sat. May to Nov. 15). Water levels generally controlled by spillway control (415.17 m) to facilitate navigation targets. After freshet, elevation drops from a typical high of 415.55–415.17 m by end of summer.	0.50 m	spillwall (415.17 m) down to 412.5 m Nov. to Mar. 31 (provision to go to 411.5 m during low flow years) typical end of winter range is 412.0–413.7 m. note: for flood mitigation, operator targeted minimum level of 413.7 m by Apr. 15	2.67 m (provision for 3.67 m)

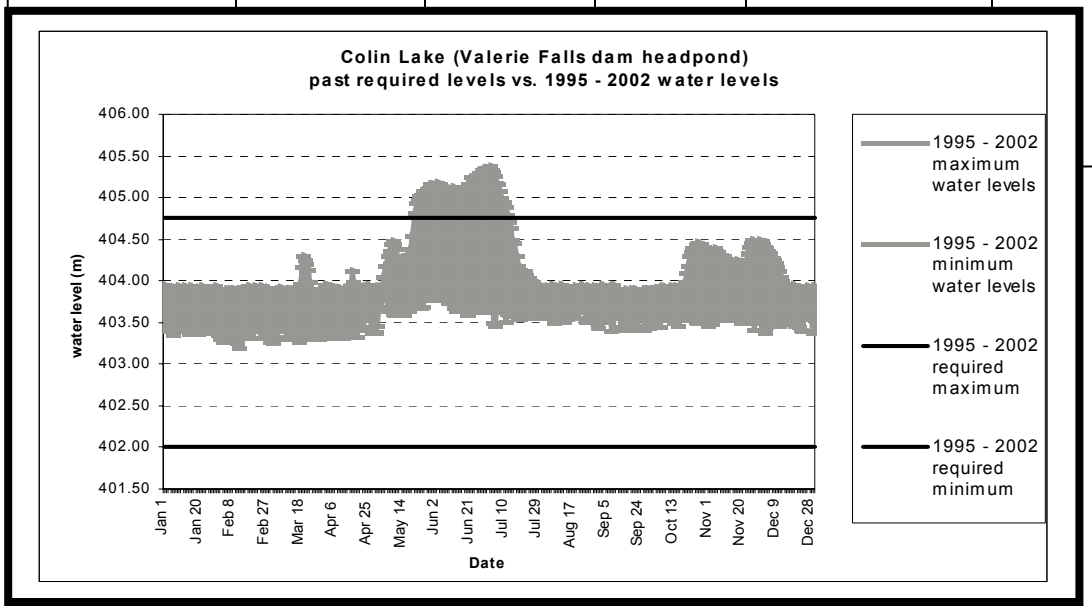


Wagita Bay Dam Pre-Plan Operating Regime

Wagita Bay Dam	Minimum Flow	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Water Levels	Open Water Fluctuation	Winter Levels	Winter Fluctuation
Required	no restrictions	n/a	n/a	n/a	n/a	No impact as headpond water levels are controlled by Valerie Falls Dam			
Pre-Plan Operating Regime	0.1–0.2 m^3/sec	n/a	n/a	n/a	n/a				

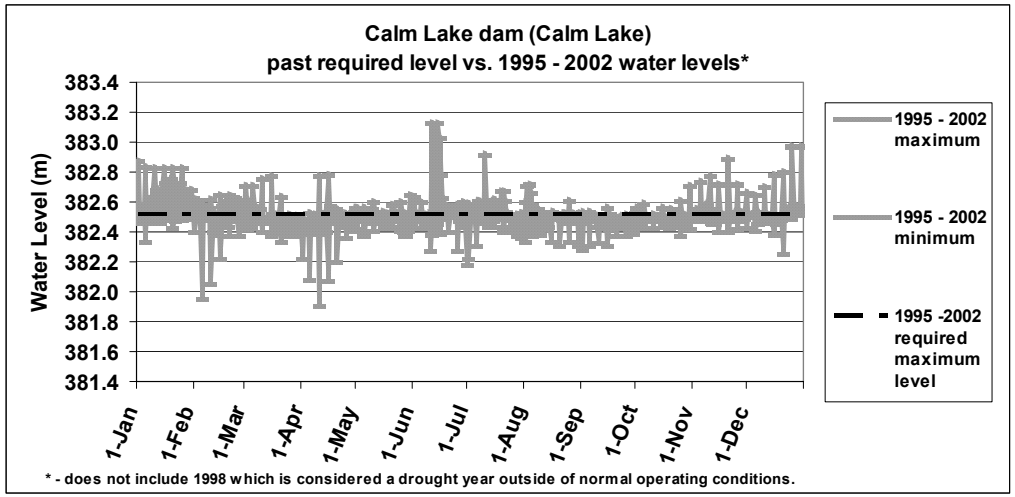
Valerie Falls Generating Station Pre-Plan Operating Regime

Valerie Falls Dam	Minimum Flow	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Water Levels	Open Water Fluctuation	Winter Levels	Winter Fluctuation
Requirements in Licence of Occupation and Department of Fisheries and Oceans (DFO) Agreement	DFO agreement states 1.5 m^3/sec (or minimum natural flow)	no restrictions	no restrictions	60 m^3/sec/day — limited by 0.25 m^3/sec/min Apr. 15 to June 15 velocity 0.5–1.2 m/sec; depth 0.2– 1.5 m	60 m^3/sec/day — limited by 0.25 m^3/sec/min Apr. 15 to June 15 velocity 0.5– 1.2 m/sec; depth 0.2– 1.5 m	402.00– 404.75 m	2.75 m maximum fluctuation	402.00– 404.75 m	2.75 m maximum fluctuation
Pre-Plan Operating Regime	6 m^3/sec	70 m^3/sec	120 m^3/sec	practice is no peaking during spawning period	practice is no peaking during spawning period.	403.20– 404.75 m May 1 to Nov. 1	1.55 m average fluctuation	403.3– 404 m Nov. 1 to Apr. 1	0.7 m



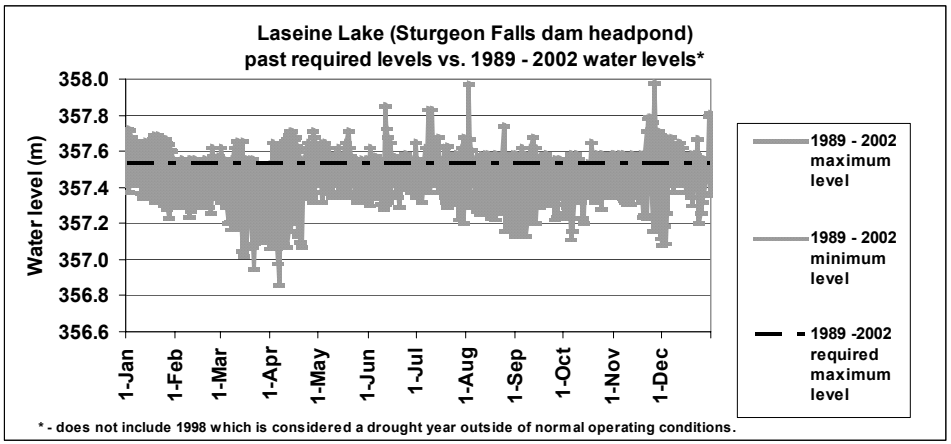
Calm Lake Dam Pre-Plan Operating Regime

Calm Lake Dam	Minimum Flow	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Water Levels	Open Water Fluctuation	Winter Levels	Winter Fluctuation
Requirements in Licence of Occupation (LO)	no restrictions	no restrictions	no restrictions	no restrictions	no restrictions	Maximum 382.52 m; no minimum	no restrictions	Maximum 382.52 m; no minimum	no restrictions
Pre-Plan Operating Regime	default minimum by stoplog leakage approx. 2.5 m^3/sec	90 m^3/sec	150 m^3/sec	2.5 m^3/sec/min	2.5 m^3/sec/min	382.20–382.52 m during normal flows and rising up to 382.75 m during high flows. During high flows Calm Lake dam discharge is increased higher than inflows to lower the level on Calm Lake by approx. 30 cm to suppress flood impacts on Seine Chain of Lakes.	0.32 m in normal flows and 0.55 m in high flows	0.32 m in normal flows and 0.55 m in high flows	0.32 m in normal flows and 0.55 m in high flows



Sturgeon Falls Dam Pre-Plan Operating Regime

Sturgeon Falls Dam	Minimum Flow	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Water Levels	Open Water Fluctuation	Winter levels	Winter fluctuation
Requirements in Licence of Occupation (LO)d	no restrictions	no restrictions	no restrictions	no restrictions	no restrictions	Maximum 357.53 m; no minimum	no restrictions	Maximum 357.53 m; no minimum	no restrictions
Pre-Plan Operating Regime	default minimum by stoplog leakage approx. 2.5 m^3/sec	90 m^3/sec	150 m^3/sec	2.5 m^3/sec/min	2.5 m^3/sec/min	normal flows 357.20 m– 357.53 m and rising up to 357.75 m during high flows; when passing extra water from SF GS during flood suppression attempts for Seine Chain, needs to take into account downstream	0.33 m normal flows and 0.55 m in high flows	0.33 m normal flows and 0.55 m in high flows	0.33 m normal flows and 0.55 m in high flows



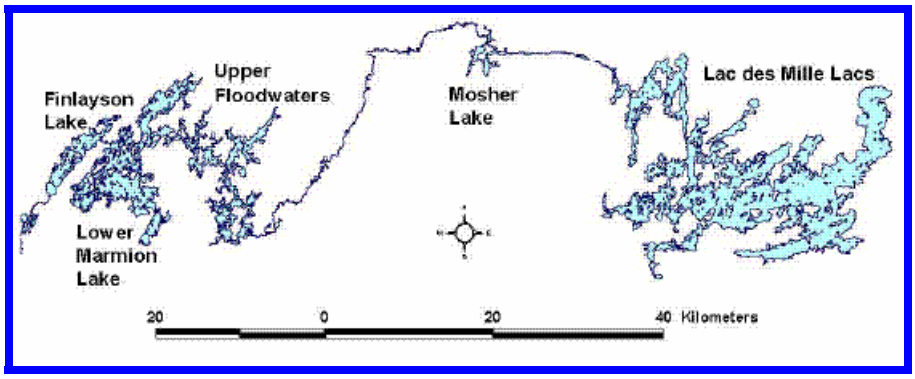
4 Physical and Biological Descriptions

4.1 Physical Description

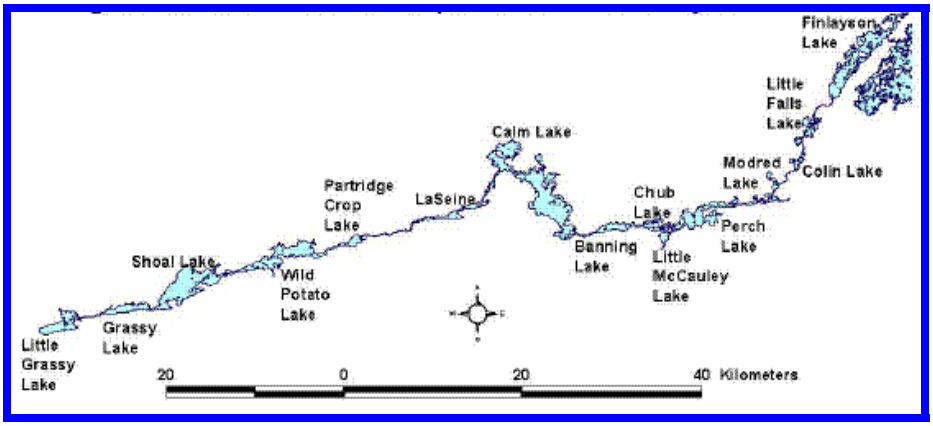
Lakes

The Seine River watershed encompasses approximately 6,250 km^2 and extends about 250 km from an area northwest of Thunder Bay to Rainy Lake. The water flows east to west. With the exception of the stretch between Lac des Mille Lacs and the Upper Floodwaters, it is characterized mainly of lakes connected by short stretches of river. These lakes range in size from 24,510 ha for Lac des Mille Lacs to 90 ha for Little McCaulay Lake.

Some lakes are commonly grouped together because there are no barriers that stop the movement of boats or fish between them. The two most commonly referred to are the lakes between Valerie Falls and the Calm Lake dam (Modred, Perch, Chub, Banning and Calm), usually called the “Seine Chain of Lakes”, and the lakes between the Sturgeon Falls dam and Rainy Lake (Partridge Crop, Wild Potato, Shoal, Grassy and Little Grassy), which are commonly called the “Lower Seine River lakes.”



Upper Seine Lakes



Lower Seine Lakes

Physical and Water Chemistry Description

Physical and water chemistry data was determined from existing lake survey information in the *Summary of Fisheries Data on the Seine River 1991–2002* (Jackson, April 2003). A summary of the report follows.

Lake surveys have only been completed for 10 of the 19 lakes with the most noticeable gap being the Lower Seine lakes between the Calm Lake dam and Rainy Lake. All lakes on the system are classified as mesotrophic (or moderately productive) lakes. Morphoedaphic index (MEI) values range from 2.1 for Finlayson Lake to 24 for Little Falls Lake.

Water clarity is measured by the depth that a black and white disc (known as a Secchi disc) can be observed. Secchi depth values for lakes on the Seine River system ranged from 1.4 m to 2.5 m with the exception of Lower Marmion Lake, which had a Secchi depth of approximately 5.0 m. Preferred walleye secchi depth values are 1-2 m (Lester et al., 2002) while clearer water tends to favour other species such as pike and smallmouth bass.

Total dissolved solids (TDS) values provide a measure of the productivity of the water in a lake (e.g. higher TDS values indicate more productive water). TDS values were very similar among the lakes ranging from 33.6 mg/l to 36.6 mg/l with the exception of Lower Marmion which had a higher TDS estimate of 63.3 mg/l.

There are a variety of methods of grouping lakes together in different classification systems. Lakes in Ontario are generally classified as either coldwater lakes or coolwater lakes, based on the presence or absence of coldwater fish species (e.g. lake trout, brook trout). Based on the absence of trout, all the Seine River lakes are classified as coolwater lakes.

Finlayson Lake once had a healthy lake trout population, but when the Seine River was diverted through it because of the Steep Rock Mine project, the lake was dropped approximately 10 m and the lake trout population apparently collapsed. In the past 10 years, there have only been occasional reports of lake trout being caught. Biologically, Finlayson is now very similar to other coolwater lakes in the area and is currently managed as a coolwater lake.

General Geology and Land Cover of Watershed Area

The Seine River watershed is located on the bedrock of the Precambrian shield. When the glaciers departed from this region about 10,000 years ago, glacial deposits were left behind covering the bedrock. This was sorted and moved by wind and water until it became the landscape we see today.

At the eastern end of the watershed, much of the surface is covered by outwash deposits which make up 19% of the watershed area. This soil is characterized by high contents of coarse sand and gravel.

The most common type of deposit in the Seine River watershed is aeolian (e.g. windblown) and beach deposits. These deposits cover 49% of the watershed; they are mostly found in the southeastern and central portions of the watershed and tend to be finer textured soils.

The lower reaches of the watershed consist of ground moraine deposits, which include a variety of soil types but are dominated by sand and boulders. This type of deposit comprises 29% of the total watershed. The remaining 3% of the area is covered by lacustrine deposits, end moraine and exposed bedrock.

The watershed covers approximately 6,250 km^2. Most of the area (77%) is covered by forest. Water covers 14.5%, with wetlands occupying an additional 7%. Settled areas (e.g. Atikokan, Upsala, etc.) account for only 0.5% of the land, and there is essentially no agricultural land.

The watershed has an average slope of 0.55 m/km over the length of its main channel. The total drop between Lac des Mille Lacs and Rainy Lake is approximately 120 m, of which about 63 m has been captured by the 3 power production dams.

See Appendix 3 for Watershed Characteristics of the Seine River.

4.2 Climate

Because Atikokan is situated approximately at the mid-point of the Seine River system, Atikokan climate data for the period 1971–2000 will be used to describe the area (Source: Environment Canada website — www.climate.weatheroffice.ec.gc.ca).

The average annual temperature at Atikokan is 1.6°C. The warmest month is July with an average temperature of 17.7°C, and the coldest month is January with an average temperature of -18.1°C. Temperatures tend to be warmer at the west end of the system, with an average annual temperature of 2.8°C at Mine Centre near Rainy Lake, and colder at the east end, with an average annual temperature of approximately 0°C at Upsala near Lac des Mille Lacs.

Average annual precipitation at Atikokan is 739.6 mm with 568.3 mm occurring as rain and 220.2 cm falling as snow. The highest precipitation occurs in June (average 103.3 mm) and the month with the least amount of precipitation is February (average 24.7 mm).

The figure below shows the distribution of precipitation throughout the year. Much of the precipitation that occurs during the winter (December to March) is stored as snow and not released into the river systems until snowmelt, which normally occurs around April. Freeze-up of lakes generally occurs around mid-to-late November and lakes open up around the first week of May.

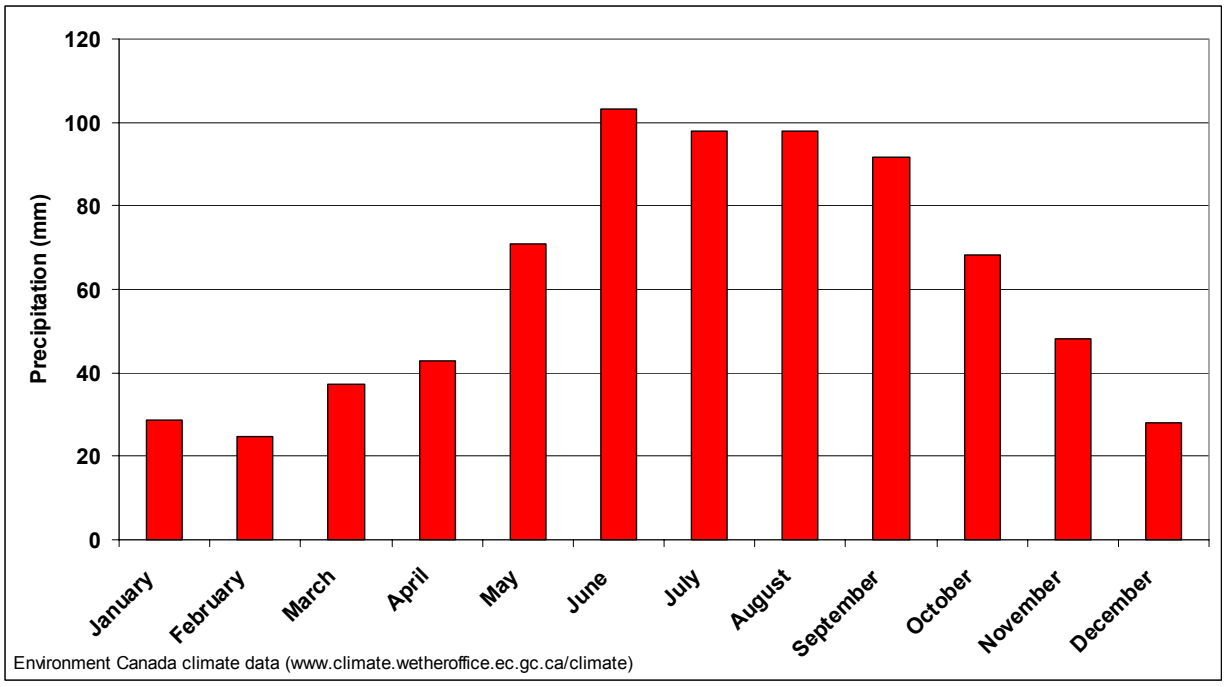


Figure 6: Average Monthly Precipitation for Atikokan for the Years 1971 to 2000

4.3 Biological Description

4.3.1 Summary of Fish Populations

The fish populations of the Seine River system have been the subject of several fisheries surveys in the past, which were reported in *Summary of Fisheries Data on the Seine River System* (Jackson, October 2002). This report provides a summary of the surveys for three different subjects: 1) fish species distribution, 2) angling effort, and 3) population assessment.

Following is a summary of the report.

Fish Species Distribution: Fish species distribution was determined from existing information including lake surveys and netting assessments. No surveys have been done in the river sections. However, it is assumed that the large species living in the river would have been found in the lakes as well. Because surveys for small fish were not done on all lakes, only distribution of large species (e.g. species vulnerable to capture by gill nets) will be discussed here.

A total of 21 large fish species have been found in the Seine River system. Four species (walleye, northern pike, yellow perch and white sucker) have been found in all 19 lakes. Whitefish are nearly as widespread, being caught in all but Colin Lake. Lake herring (ciscoe) are also widespread throughout the system, being found in 14 of the 19 lakes. Only Colin Lake, Little Falls Lake, Chub Lake and Mosher Lake have no records for this species.

Smallmouth bass, an introduced species, have been caught in 15 of the lakes with only Colin Lake, Modred Lake and Mosher Lake not having records for this species. However, there is a good chance that they are inhabiting or will soon be inhabiting these lakes, as there are bass populations in lakes upstream and downstream from these lakes.

A number of species are only found in the Lower Seine River (below Sturgeon Falls dam). These include muskellunge, mooneye, black crappie, sauger, rock bass and brown bullheads. Pumpkinseeds are found in the Lower Seine River; they have also been found in Lower Marmion Lake, presumably from an unauthorized introduction in that area.

Lake Sturgeon are found in the Lower Seine River but also inhabit the Laseine section between the Sturgeon Falls dam and Calm Lake dam.

Two species of redhorse suckers are found in the Seine River system: the silver redhorse and the shorthead redhorse. Both are found only in the lower sections of the river; the shorthead is present in all lakes below Valerie Falls dam. The silver redhorse is less common and has been found only in Modred, Perch and Laseine lakes as well

as the Lower Seine River lakes. Conversely, the longnose sucker has only been found in Lac des Mille Lacs, the uppermost lake on the system.

Burbot (ling) have been found in most of the lakes in the system down to Calm Lake dam. They have not been reported from the Lower Seine River lakes, Modred Lake or Little McCaulay Lake.

Angling Effort: Angling effort was estimated by aerial surveys in the summer of 2000 and winter of 2001 for the Seine River system. The number of anglers observed was used to estimate the total annual angling effort. These numbers were used to provide a comparative assessment of angling use on the lakes.

In terms of total angling hours by lake, Lac des Mille Lacs had by far the most hours of angling with over 223,000 hours. In fact, the estimated angling hours for the rest of the Seine River system in 2000–01 were only about half those for Lac des Mille Lacs.

When evaluating the potential impact of angling effort on a lake, the effort is usually expressed by lake area (e.g. hours/ha). In this region, effort values greater than 10 hours/ha are generally considered high and can cause declines in fish populations. Three lakes in the Seine River system (Banning, Perch and Little Grassy) had angling effort values greater than 10 hours/ha. Six additional lakes (Grassy Lake, Lac des Mille Lacs, Chub Lake, Mosher Lake, Calm Lake, and Finlayson Lake) had an estimate angling effort between 5 and 10 hours/ha. In general, angling effort on the Seine River system is moderate to high.

Population Assessment: Between 1994 and 2002, the fish populations of seven of the major lakes along the Seine River system were assessed using a standard gill netting method (Source: *Fall Walleye Index Netting [FWIN]*, Morgan, 2002). In addition, the lakes of the Lower Seine River (Partridge Crop Lake to Little Grassy Lake) were netted in 1993 by another method (the “Rainy Lake Method”) that has been calibrated with FWIN and provides some comparative data (Source: McLeod and Chepil, 1999a; McLeod, 1999b). These data sets will be used to provide an assessment of fish populations along the Seine River system. Individual reports of these assessments are available from the MNR Atikokan office.

Walleye

For the lakes on the Seine River system, most walleye populations were considered fairly healthy, particularly in the lakes in the upper part of the system. Populations in Lac des Mille Lacs are relatively stable with above average abundance. Recruitment is occurring in all years suggesting that current water management is not negatively impacting walleye populations (T. Cano, Thunder Bay area biologist, pers. comm.)

The walleye catch in Upper Floodwaters was above average, although index netting studies indicate a decline in number of fish caught/net, suggesting a decline in abundance between 1994 and 2001. The age structure of the population shows

recruitment occurring in all years and a wide range of ages present in the population, suggesting that current harvest is not excessive (Jackson 1995; Bioconsulting 2002).

Index netting studies of Finlayson Lake in 1997 indicate good recruitment of young fish but some signs of high harvest. The primary spawning site of Finlayson Lake walleye is below the Raft Lake dam (B.A.R. Environmental Inc., 1994).

Index netting studies on Perch Lake in 1998 have indicated unusual year classes in comparison to other lakes; i.e. results cannot be explained by environmental factors such as weather conditions (Jackson, 1999). A partial netting study in 2001 indicates a decline in the number of fish/net suggesting a decline in population since 1998 (Bioconsulting, 2002). Perch Lake also had high levels of effort that may result in a decline of the walleye population if the levels continue**.**

Three areas (Lower Marmion Lake, Laseine Lake and the Lower Seine lakes) had stressed populations where the level of angling effort observed in 2001 did not explain the low abundance of walleye. There are two possible interpretations of this. First, the lake may have received high effort in the past, which has caused the population to decline. Anglers no longer choose to fish there because they no longer catch as many fish, but the population abundance had not yet recovered from the reduced harvest. Second, there may be a habitat problem reducing the numbers of fish in the lake. Again, anglers choose not to fish there because of poor success. This is known to be the situation on Lower Marmion Lake, where there were habitat problems not related to water level management. It is not clear which situation is occurring on Laseine Lake and the Lower Seine Lakes.

Northern Pike

The lakes along the Seine River generally had healthy northern pike populations with abundance similar to other northwestern Ontario lakes. Netting catches tended to have older and larger pike in the upstream lakes suggesting lower harvest there. Netting studies conducted on Lower Marmion indicate a particularly good population with high abundance and large fish.

Smallmouth Bass

Smallmouth bass abundance was generally low across the lakes of the Seine River System, with high numbers caught only in Lower Marmion. This may reflect the relatively recent arrival of bass in some of the lakes (e.g. Lac des Mille Lacs, Finlayson) although they have been in the Lower Seine lakes for several decades. It has also been found that bass are more abundant in lakes with clearer water. The only lake with water clarity in the range favoured by bass is Lower Marmion Lake.

Lake Whitefish

Whitefish support a commercial fishery on Lac des Mille Lacs and on Rainy Lake. There is limited use by the tourist industry or local anglers of whitefish as a sportfish species in the Seine River system. It is permitted to take whitefish by dipnets in the fall under a

separate licence; however, very few fall whitefish dipnetting licences have been issued in the Atikokan area.

Not as much is known about the status of whitefish as other species in the system. Index netting results tend to show lower catches of whitefish in the Seine River lakes compared to other lakes in the region; however, this may be due to differences in lake type rather than from habitat impacts. Lake whitefish tend to be more abundant in oligotrophic lakes (deep, clear lakes) while the lakes on the Seine River system are mesotrophic lakes (medium deep, stained lakes). Also, the netting method used (Fall Walleye Index Netting or FWIN) is directed more at coolwater fish species and not enough whitefish have been caught to permit an analysis of year class impacts.

4.3.2 Summary of Wildlife and Waterfowl Populations

The Seine River watershed is inhabited by species typical of the Boreal-Great Lakes Forest transition zone. Many of the species are dependent upon aquatic habitat for at least some portion of their life.

Aquatic habitat includes the lakes and rivers of the Seine River system, the wetlands (marshes, etc.) in the shallows of the water, and the land along the edge of the lakes and rivers known as riparian habitat. A list of all known vertebrates that rely upon the aquatic habitat of the Seine River is included in Appendix 4.

While population status of game species and furbearer species is monitored, very little is known about the population status of other species, beyond a general abundance ranking (common, rare, etc.).

Mammals

Some of the best-known and most visible wildlife species associated with Seine River system are mammals. This group includes a number of harvested species, including furbearers (beaver, muskrat, otter, and mink) and large game species, such as moose. Some species, such as beaver and muskrat, have the potential to be particularly affected by water level fluctuation because of their practice of building houses and food piles in shallow water in the fall and having limited ability to move during the winter if water levels decline.

Birds

A wide variety of birds live along the Seine River and are dependent on it for food, nesting habitat or both. Waterfowl such as loons, ducks and geese nest in the riparian habitat along the edge of the rivers and lakes, and spend most of their life on the water. Water fluctuations in the spring may potentially impact on nesting success. Some areas of the Seine River, such as the Little Falls Lake wetland, provide important staging areas for migrating waterfowl, as well as summer breeding habitat.

The bald eagle, a provincially endangered species, and osprey are common throughout the system; areas such as Lower Marmion Lake have a high density of eagle nests.

Fish spawning sites and fast flowing stretches around dams and falls, which have open water in late fall and early spring, provide important feeding areas for migrating bald eagles.

Shorebirds, such as the great blue heron and sandpipers, depend upon the shallow water edges and marsh habitat for feeding habitat. Gulls and terns commonly nest on islands in the lakes and rely on the surrounding water for food.

The black tern, a provincially vulnerable species, has nested in the Little Falls Lake and Steep Rock Lake area in recent years although its current status is unknown. White pelicans (a provincially endangered species) can be found in the Lower Seine River, but they are not known to nest there.

A large number of songbird species, such as warblers, tree swallows and swamp sparrows, depend on the riparian habitat at the edge of the lakes and rivers of the Seine system for their nesting and feeding habitat.

4.3.3 Amphibians and Reptiles

A number of reptiles (snakes and turtles) and amphibians (frogs, toads and salamanders) are present in the Seine River system. Common species include painted turtles, snapping turtles, green frogs and mink frogs. Some of these common species overwinter by hibernating in shallow waters and are therefore potentially vulnerable to freezing if water levels fluctuate during the winter.

4.3.4 Invertebrates

In addition to the vertebrate species, there are numerous aquatic invertebrate species such as crayfish, clams and insects such as the mayfly (Ephemeroptera) that inhabit the Seine River system and are often important prey species for fish and wildlife species. Most of these invertebrate species have yet to be surveyed, and their population status is, for the most part, unknown.

4.4 Valued Ecosystem Components of the Seine River System

To complement ecosystem based flow and level objectives, valued species, communities and critical physical ecosystem components and their flow and level requirements were identified for riverine and reservoir areas of the system. These may be biological or physical indicators selected for monitoring broader ecosystem response or valued species such as a rare or endangered species (OMNR, 2002).

The following VECs have been identified for the Seine River system.

4.4.1 Valued Species

Lake Sturgeon: Lake Sturgeon are present in the Lower Seine River lakes (below Sturgeon Falls dam) and in Laseine Lake (between Calm Lake dam and Sturgeon Falls dam). They are a slow growing, long-lived species with a very low reproduction capacity. Spawning occurs in fast water below falls, rapids or dams during the spring. They are ranked as a vulnerable species in Ontario at this time and there are a number of research and management actions currently taking place to recover the Rainy Lake population, some of which spawn below the Sturgeon Falls dam. They are also an important species to the First Nations people, both historically and currently.

An investigation of the sturgeon population in the Seine River in the early nineties suggests that the abundance was depressed and recruitment into the population was low (McLeod, 1999). The report recommended that minimum flow guidelines be established during the spring spawning period.

Water management to ensure healthy sturgeon populations in the Seine River system should have defined minimum flow and stable or rising flows from Calm Lake dam and Sturgeon Falls dam at all times during spring spawning period (April 15–June 15).

Walleye: Walleye are present throughout the system. They are the most important species to the local recreational fishery. They also support the tourist industry on Lac des Mille Lacs, Upper Floodwaters, Finlayson Lake, Perch to Calm lakes, Laseine Lake and the Lower Seine River.

Critical habitat for walleye includes shallow rapids or wave-washed shoals where they spawn in the spring when temperatures reach ~7^{o}C (usually mid-April–mid-May) with eggs taking about 3 weeks to hatch (Kerr et al., 1997). It is important that water levels not drop during this period or the eggs may become exposed and die. Other critical habitat includes shallow areas with aquatic vegetation and other structures, and slower velocity sections of river which are used as nursery habitat for young fish.

The walleye population in Lower Marmion Lake collapsed in the early nineties due to habitat issues not related to water levels. Habitat problems were addressed in the late nineties and extensive efforts have been directed at rehabilitating this population (Jackson, 2003).

Walleye are known to spawn at the following locations in the Seine River system which are directly impacted by dam operation:

- below Lac des Mille Lacs dam (Upper Seine River/Mosher Lake population)
- Island Falls (Upper Marmion Lake population)
- Abie Weir (Lower Marmion Lake population)
- Marmion sluiceway (Upper and Lower Marmion Lake populations)
- below Raft Lake dam (Finlayson Lake population)
- below Valerie Falls dam (Perch Lake population)
- below Calm Lake dam (Laseine Lake population)
- below Sturgeon Falls dam (Lower Seine lakes/Rainy Lake populations)

(see values maps in Appendix 10 for spawning site locations)

Water management to ensure healthy walleye populations in the Seine River system should have defined minimum flow and stable or rising flows at these at all times during spring spawning period (April 15–June 15).

Walleye are also found in all lakes in the Seine River system. Water management of the lakes to ensure healthy walleye populations should have stable or rising levels during spring spawning period (April 15–June 15) to provide access to spawning areas and declining levels during the summer to expose spawning shoals to wave action and increase amount and diversity of aquatic vegetation for nursery habitat and prey production.

Northern Pike: Northern pike are also found throughout the Seine River system. They are the second most important species for the tourist industry on Lac des Mille Lacs, Upper Floodwaters, Finlayson Lake, Perch to Calm lakes, Laseine Lake and the Lower Seine River.

Northern pike spawn in early spring (mid-to-late April) in shallow areas where eggs are laid over flooded dead vegetation (cattails, grasses, etc.) from the previous year. While few specific pike spawning locations have been identified on the values maps, they spawn in most shallow, weedy bays, particularly those with streams that would provide inflows of warmer water in the spring. Other critical habitat includes shallow areas with abundant aquatic vegetation and other structures which are used as nursery habitat for young fish and foraging habitat for adult fish.

Water management to ensure healthy northern pike populations in the Seine River system should have declining summer water levels in lakes to establish diverse wetlands at a range of depths. Spring water levels should be higher than previous August levels by pike spawning period (April 15–May 15) to provide flooded vegetation that pike can access for spawning.

Lake Whitefish: Whitefish spawn in habitat similar to that used by walleye (shallow rapids or shallow, wave-washed shoals); however, whitefish deposit their eggs in the fall where they remain until hatching in the spring. The eggs are sensitive to declining levels or flows in the winter, which could expose them and cause them to freeze.

Water management to ensure healthy whitefish populations should have constant winter flows or limited decline in winter flows through spawning locations (see walleye spawning locations mentioned above) and winter drawdown of lake levels close to natural winter declines (~0.3 m).

Aquatic Furbearers/Beaver**:** Beaver, muskrat and other aquatic furbearers are currently actively trapped on all bodies of water along the Seine River system. Concern has been expressed that declines in water levels have a negative impact on winter survival of beaver and muskrat populations. This issue has been raised in particular concerning the Upper Floodwaters where water levels decline approximately 2 m over the winter. Studies on similar reservoirs have indicated that winter drawdowns of the same range as the Upper Floodwaters have caused reduced overwinter survival and lower production of beaver kits (Smith and Peterson, 1988).

Water management to ensure healthy beaver populations should have winter drawdown of lake levels close to natural winter declines (~0.3 m).

4.4.2 Valued Sites

Valued spawning sites have been described in the previous section under each species (see values maps in Appendix 10 for spawning site locations). Following spawning recommendations given for each species will provide protection for these sites. In addition, there is a requirement that water level in Lower Marmion Lake is 414.8m or higher to allow fish to access spawning area below the Abie weir.

Little Falls Lake: Little Falls Lake and the surrounding wetlands have been classified as provincially significant (Harris and Foster, 2002). The Wetlands Policy for Ontario (OMNR 1992) states that, in provincially significant wetlands and adjacent lands, development may be permitted if it does not cause a) the loss of wetland function, b) subsequent demand for future development that will negatively impact wetland function, or c) conflict with existing wetland management practices.
To meet this policy, water levels should not increase above current level. Water levels should be managed under natural timing (i.e. levels increase in spring and decline through summer) and natural range of fluctuation as described in Appendix 5.

Values Maps by River Zones Appendix 10 - Map # 10.4 – 10.8

4.5 Effects of Waterpower Facilities and Water Control Structures on Riverine Ecosystem

4.5.1 The following outlines a historical perspective of the changes to the Seine River Watershed from the period pre-1923 to 2002.

Prior to 1923

- Around 1873, the Department of Public Works Canada, under the direction of Simon J. Dawson, constructed a stone dam at the outlet of Lac des Mille Lacs on the Seine River. The purpose of this dam was to allow the water levels to be increased for better navigation along the Red River Route.
- In 1905, Canada, Ontario, the United States and an American Industrialist, E.W. Backus, entered into an agreement to permit a power dam to be built across the Rainy River at Fort Frances. The dam was completed in 1909.

1923 to 1926

- Water control on the Seine River commenced with the building of the Calm, Sturgeon and Moose generating stations in 1926.
- Most of the significant changes to water surface area occurred in 1926.
- In 1926, the Backus timber dam replaced the Dawson stone dam on Lac des Mille Lacs. This allowed water levels to be manipulated for the purpose of power production downstream.
- The Marmion Reservoir was created at this time and served as the primary storage basin for power production at Moose Lake, Calm Lake and Sturgeon Falls generating stations. This reservoir raised the water level in a series of upstream lakes 3–20 m, combining the group of upstream lakes into one lake. The 3–20 m range varies depending on the pre-existing elevation of the lakes that were flooded. The surface area of the upstream lakes was expanded by approximately 40%.
- The water level in the river section above Sturgeon Falls (sometimes referred to as “Crilly Dam”) was raised 2–15 m. This created Laseine Lake.
- The water level in the area above Calm Lake dam was raised 2–20 m. The surface area of Calm Lake was expanded by approximately 30%.

1940 to 1944

- During the period 1940–1943, the Atikokan operations of Steep Rock Iron Mines and Caland Ore Ltd. had a significant impact on control structures and water quality.
- The Seine River Diversion channels routed the Seine River through Finlayson Lake (after dropping level and reversing flow) into Wagita Bay at the north end of the west arm of Steep Rock Lake.

1944 to 1961

- Further development of the Steep Rock iron deposit resulted in additional major and minor watercourse diversions and construction of settling basins for overburden dredged from Steep Rock Lake.

- In 1952, the Seine River Diversion was extended southwest to Modred Lake, thereby bypassing the west arm of Steep Rock Lake.
- Earth-fill block dams were constructed at the narrows of the west arm of Steep Rock Lake, and this area was converted into a settling basin for dredge material from the mining zone.

1980 to 2002

- In the period 1993–1994, the Valerie Falls generating station and dam was built on the Seine River Diversion at Reed Lake.
- The Colin Lake headpond was impounded. Water levels were raised 1–15 m.
- During the development of the Atikokan Generating Station, Lower Marmion water control was modified to ensure a reduced fluctuation of Lower Marmion Lake. This was done to provide a heat sink for the thermal powered station and a higher average level to lower the suction lift for the Atikokan Generating Station cooling water pumps. The sluice at the Marmion west divider dam sluice was blocked and the annual minimum level increased from 413.0 m to 415.0 m.
- In 1997, Valerie Falls Limited Partnership installed a navigation sluice in the West Arm dam in order to enhance water storage and navigation opportunities. This resulted in a new minimum level at 414.8 m (winter). During the open water season Lower Marmion generally matches the elevation of Upper Marmion.

4.5.2 Possible Effects of Waterpower Facilities and Water Control Structures on Riverine Ecosystem (comparison of a managed flow and natural flow system)

The following text summarizes the background document *Natural Flow and Level Characteristics for the Seine River System* (Jackson, September 2003*).* See Appendix 5 for the full report.

The report outlines the methods that were used to estimate natural flow and level characteristics for the Seine River system. This was used as a basis for setting objectives to provide habitat for those animal and plant species dependent on the aquatic ecosystem as outlined in The Aquatic Ecosystem Guidelines for Water Management Planning v1.3 (OMNR, 2002). The basis of these guidelines is that because the animals and plants have evolved to the natural flow and level characteristics, the best management strategy to provide for the aquatic ecosystem would be to mimic the natural conditions.

In order to meet the intent of these guidelines, it is necessary to have an estimate of the natural flow conditions along the water system being managed. Because the dams have been in place on the Seine River since the 1870s, there is no pre-dam flow or level information. However, the watersheds to the north and south of the Seine are not manipulated and have water flow and level data going back to 1921. They have similar watershed characteristics. The approach adopted for this round of Water Management

Planning on the Seine River was to use this data to describe natural conditions and to apply these conditions to the Seine River system.

The figure to the right shows the location of Turtle River (north) and Lac La Croix (south) watersheds in relation to Seine River watershed (middle) (Source: Map modified and reproduced with permission from Lake of the Woods Control Board website). The hydrometric stations used to provide the data are on the west ends of the watersheds at the outlet of Little Turtle Lake for the Turtle River watershed and the outlet of Lac La Croix for the Lac La Croix watershed.

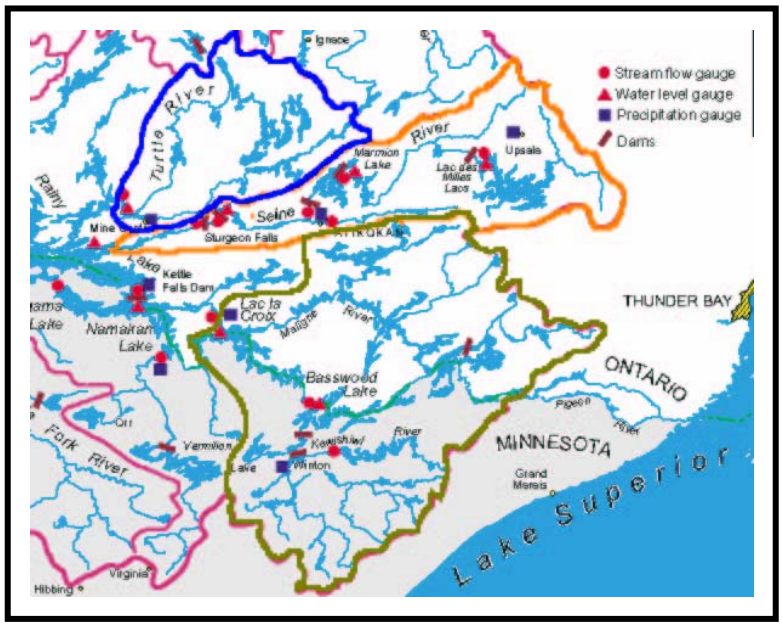


Figure 7: Turtle River and Lac La Croix Watersheds

To evaluate the effects of current water management on water levels and flows in the Seine River system, water levels above each dam and flows through the dams were compared to natural flows and levels. Natural flows were estimated according to Lac La Croix outflow and Turtle River flow rates, and natural levels according to the levels of Lac La Croix and Little Turtle Lake. Data for the period 1921–2000 was summarized for all sites with the exception of Little Turtle Lake, where data was only available for the period 1921–1966.

To compare flows, the percent of the annual flow that occurred each day was calculated for each site. This daily average was applied to the average total annual flow measured at each dam on the Seine River system. This allows a direct comparison of what flows would be at each dam if they followed the same pattern as the flows in the Turtle River and at Lac La Croix.

Natural minimum flows were determined by calculating the monthly 10-percentile flow (i.e. the level below which flows dropped less than 10% of the time). For the purpose of this Water Management Plan, flows less than this would be considered drought flows in terms of water management planning (i.e. equivalent to a 1 in 10 year drought). These 10 percentile flows were converted to a percentage of the average annual flow. These percentages were applied to the average annual flows at each dam to calculate a natural minimum flow by month for each site.

To compare water levels, it was assumed that the amount and timing of fluctuations at Lac La Croix and Little Turtle Lake reflected all the lakes on the Seine River system except Lac des Mille Lacs. The rationale for this approach is based on

a) the observation that Little Turtle Lake and Lac La Croix had very similar fluctuations even though there was a threefold difference in watershed area, and
b) the watershed area and characteristics upstream of Little Turtle Lake were similar to those upstream of the Seine River dams from Raft to Sturgeon.

For Lac des Mille Lacs, since the inflows to the lake are uncontrolled, it was assumed that the current annual fluctuation would be closer to its natural amount than the fluctuation for Lac La Croix or Little Turtle. The fluctuation of Lac La Croix/Little Turtle was reduced to match the current Lac des Mille Lacs fluctuation however the timing of the fluctuations remained the same as Lac La Croix/Little Turtle.

Summary of flow differences between managed and unmanaged systems

In all cases, flows were lower in the summer and higher in the winter in the Seine River system compared to the unmanaged rivers. The spring increase in flows was similar to or slightly later than the Lac La Croix outflow, but was always later than the Turtle River flow. Comparison of watershed size would suggest that flows from the Seine River dams should be closer to the Turtle River flows than the Lac La Croix flow, particularly below the upstream dams.

Where minimum flows had previously been defined for a water control structure, they tended to approximate the lowest monthly flows at that site (typically late winter flows) but did not address minimum flows for the remainder of the year, particularly spring and summer.

Potential impacts of these differences on the aquatic ecosystem include the following:

- reduced spawning success because of lower than natural flows during spring spawning period resulting in less spawning habitat
- reduced abundance of fish and other aquatic organisms in river sections during the summer because of lower than natural flows that reduce the total amount of available habitat.

The comparison did not include an evaluation of daily changes in flows due to daily peaking operations of the power dams (which would not impact the Lac des Mille Lacs dam or Raft Lake dam flows). Water flow changes at the power dams tended to occur rapidly but between limited ranges (e.g. changing from 20 m^3/sec to 40 m^3/sec in less than an hour). It was somewhat difficult to extract relevant information from the natural flow data to compare with these types of rapid changes other than to say that natural systems would not change flows as rapidly and as often as a power dam operated as a peaking plant. However, flow changes at the Lac des Mille Lacs and Raft Lake dams tended to be less frequent and over a larger range, similar to a natural system. An

assessment of the rates of flow change on the Turtle River was used as a guide when planning water flows on the Seine River dams.

Summary of level differences between managed and unmanaged systems

In comparison with the reservoirs (Lac des Mille Lacs and the Upper Marmion – Upper Floodwaters), levels were higher in the summer and, in the case of the Upper Marmion, much lower in the winter in the Seine River system compared to the unmanaged lake. In the two lower headponds (Calm Lake and Laseine), the levels had been held at a stable level and the lakes show none of the fluctuations of the natural lakes. Colin Lake (Valerie Falls dam headpond) is more stable than the natural levels most of the year with the exception of the spring, when the elevation shows an increase similar to natural levels.

Note that this comparison does not include an evaluation of daily changes in levels due to daily peaking that may affect levels of the power dam headponds. Natural systems tend to have limited daily change and rarely increase and decrease in the same day, unlike the headpond of a dam operated as a peaking plant which can have repeated, rapid changes in level within a day.

Differences also exist in the variation of levels between managed and unmanaged systems. Much of the purpose of water management is to minimize differences of water levels between years (e.g. maintaining the same stable level for navigation or maintaining full reservoirs in the fall to maximize the water available for winter power production). The difference between maximum and minimum levels on Lac La Croix and Turtle Lake varied by approximately 2 m. This variability has been found to be important in natural ecosystems and is related to production of strong year classes of walleye. Water levels on the Seine River system show reduced variability, particularly the lakes that are headponds to the power dams (e.g. Colin Lake, Calm Lake and Laseine Lake). However, the range of variability of the reservoir lakes is closer to that found on natural lakes although the timing of the level changes can be quite different.

Potential impacts of these differences on the aquatic ecosystem include the following:

- reduced spawning success for fall spawners in Upper Marmion reservoir because of greater than natural winter drawdown exposing eggs
- reduced spawning habitat for spring spawners that rely on flooded vegetation (e.g. pike) in Upper Marmion reservoir because water levels at spawning time (early May) are below levels that vegetation was established the previous summer
- reduced abundance of aquatic furbearers in Upper Marmion reservoir because increased winter drawdown limits access to underwater food piles resulting in decreased reproduction and increased mortality
- reduced productivity in lakes in both reservoirs and headponds because of stable summer water levels which reduce the diversity and abundance of aquatic vegetation

- reduced recruitment for shoal spawning fish (e.g. walleye) in lakes held at constant elevations all year (i.e. Calm Lake, Laseine Lake) because a lack of summer drawdown can allow a buildup of silt on shoals thereby reducing hatching success.
- reduced productivity of lakes held at constant elevations all year (i.e. Calm Lake, Laseine Lake) because of the lack of nutrient pulses which result from the combination of high years and low flow years in natural lakes.

5 Socio-Economic Description and Profile

5.1 Community Profiles

5.1.1 Upsala and Surrounding Areas

The small community of Upsala, Ontario is located approximately 150 km west of Thunder Bay. Established in 1882, Upsala was an important railway community acting as a fuel and water stop for trains traveling on the then newly constructed Canadian Pacific Railway system. Today the major employment in the area is provided through tourism and forestry operations.

The Upsala area is located in prime fishing country and is situated just north of the famous Lac des Mille Lacs - the "lake of 1000 lakes." Lac des Mille Lacs itself was an important fur trade waterway and today has many fishing and hunting resorts located along its shores. (Source: Ontario Towns Website, 2004)

Lac des Mille Lacs (24,113.6 ha) is a major body of water located in northwestern Ontario near Upsala. Lac des Mille Lacs (LDML) is regionally significant as a major recreational area of economic importance for fishing, cottaging, camping and tourism. It is the single largest contributor to inland angling opportunities in the Thunder Bay District (OMNR, 1989). It receives heavy non-resident angling use as well as significant use by resident anglers.

The Lake has a rich history of human occupation and use. This ranges from its significance as a central location on the historic Kaministiqua River Fur Trade Route to more recent resource developments. These include a commercial fishery, trapping, forestry and mineral exploration. In addition, the water levels of the Lake have historically been regulated for waterpower generation on the Seine River below Atikokan.

Lac des Mille Lacs provides a variety of recreational and economic opportunities. Many users compete for the popular resources of the Lake and its near shore area (LDML Lake Management Plan, 1991). Maps of the Lac des Mille Lacs River Zone is located in Appendix 10, Map # 10.4.

5.1.2 First Nations

The Seine River First Nation and Lac des Mille Lacs First Nation, through 5 separate reserves, have historically utilized the entire length of the Seine River Water System. Although separated by well over 100 km, both First Nations share common elements in their history. Maps of the River Zones where the Reserve Lands are shown can be seen in Appendix 10, Maps # 10.4 and 10.8.

- Prior to taking control of their own membership laws in 1985, some band members migrated between First Nations, sharing memberships in both.
- "Reserve Island", located roughly midpoint between the First Nations, was used as a summer camp when traveling to and from rice picking and trapping areas along the waterway. This practice ended following the development of control dams along the Seine River. Issues associated with this include
    - lack of consultation
    - displacement from traditional lands
    - disruption of lifestyle
    - no benefit gained from the use of area resources — this continues today.
- Important First Nations values for consideration in the development of this plan include the protection of: First Nation and community lands, ongoing traditional harvesting activities throughout traditional territory, seasonal occupations, sacred and ceremonial sites. Confidentiality of information surrounding the documentation of sensitive cultural features is also an important concern.

Lac des Mille Lacs First Nation:

- Lac des Mille Lacs First Nation consists of two reserves on the Upper Seine River water system:
    - Reserve 22A1 (Lac des Mille Lacs) is located on the northeast shore of Lac des Mille Lacs; its size is 1,518 ha.
    - Reserve 22A2 (Seine River) is located on the Seine River at the juncture where the Firesteel River meets the Seine, North of Mosher Lake; its size is 3,430 ha.
- The Lac des Mille Lacs First Nation has a total membership of approximately 500 people. All are dispersed across Northwestern Ontario and beyond. Although neither reserve is populated band members continue to maintain strong interest in pursuing future on-reserve opportunities. Road access to Reserve 22A2 exists, and some seasonal occupation does occur.
- Historically the community site was located at Reserve 22A1 on Lac des Mille Lacs.
- The Lac des Mille Lacs First Nation has submitted to Canada and Ontario a land claim with respect to flooding of its reserve lands. This claim is currently under review.
    - Around 1873, the Department of Public Works Canada, under the direction of Simon J. Dawson, constructed a stone dam at the outlet of Lac des Mille Lacs on the Seine River. The purpose of this dam was to allow the water levels to be increased for better navigation along the Red River Route. In 1923, the Backus timber dam replaced the Dawson stone dam.

This allowed water levels to be manipulated for the purpose of power production down stream. In 1955, Ontario Hydro replaced the Backus timber dam with a permanent concrete structure.
    - The claim from the Lac des Mille Lacs First Nation asserts that the manipulations of water levels resulted in flooding of community and reserve lands. This altered the character of area lands and waters, which in turn prevented the First Nation from living on their lands in the traditional manner. Members of the First Nation began to leave the reserve in the 1920s and today the reserve is considered to be abandoned.
    - The Lac des Mille Lacs Flood Claim remains an outstanding issue to be dealt with between the Canadian government, Ontario, and Lac des Mille Lacs First Nation. Claim for damages includes the loss of farming lands, wild rice crops, traplines, and the ability to maintain traditional livelihoods.

- First Nation members have an objective to re-establish their links with Lac des Mille Lacs. The First Nation wants to participate in resource management activities throughout its traditional lands in a way that would see the First Nation included as a co-manager of the resource and obtaining economic benefit from use of the resource.

Seine River First Nation:

- Seine River First Nation consists of 3 reserves on the Lower Seine River water system:
    - Sturgeon Falls 23 is located on the north bank of the Seine River water system west of Sturgeon Falls. It is 2,488.9 ha in size.
    - Seine River 23A hosts the community of Seine River First Nation. It is located immediately west of Sturgeon Falls 23, encompassing the eastern half of Wild Potato Lake and is 1,758.8 ha in size.
    - Seine River 23B is located between Grassy Lake and Little Grassy Lake as the Seine River flows into Rainy Lake. It is 904.5 ha in size.

- The Seine River community has a population of about 300 people. Total membership in the Seine River First Nation is approximately 650.

- Seine River First Nation wants to participate in resource management activities throughout its traditional lands in a way that would see the First Nation included as a co-manager of the resource and obtaining economic benefit from use of the resource.

- There has been strong and emotional concern regarding the fluctuation of water levels and the resultant impacts on First Nation values. Examples include wild rice and walleye spawning beds that they believe are no longer productive. The First Nation feels that the manipulation of water levels may have been the root cause of issues surrounding both examples.

- The day-to-day relationship with Abitibi, with regard to the operations of both dams, has been a good one — there are no complaints.

- The Seine River First Nation has submitted a land claim with respect to flooding of its reserve lands to Canada and Ontario. This claim is currently under review.
    - In 1905, Canada, Ontario, the United States and an American industrialist, E.W. Backus, entered into an agreement to permit a power dam to be built across the Rainy River at Fort Frances. Construction began that same year, despite fears about flooding and its related impacts. The dam was completed in 1909.
    - The claim submitted by the Seine River First Nation asserts that water levels affected by the dam exceeded natural high-water levels for extended periods of time. This caused sections of the shoreline to be flooded and eroded away. Flooding has occurred as far upstream as the community of Seine River forcing people to live in tents when their homes were flooded. First Nation members suffered damage to their livelihood and way of life. Complaints about damage to reserve lands, personal property, livelihoods and ways-of-life have never been handled to the satisfaction of the First Nation or its members.
    - The Seine River Flood Claim remains an outstanding issue to be dealt with between the Canadian government, Ontario, and the Seine River First Nation. Today's claim seeks redress for, among other things, the damage caused to First Nation lands and livelihoods, impacts to natural resources important to First Nation peoples and the manner in which their grievances have been handled over time.

5.1.3 Atikokan

The name “Atikokan” is believed to be derived from the Ojibway word meaning “Caribou Bones.” (Source: MNDM Community Profile Website, 2003)

Atikokan is a northwestern Ontario community with a population of approximately 3,400. An additional 1,000 residents live in the unincorporated communities surrounding Atikokan. The township is located 2 hours from Thunder Bay and Dryden, and 1.5 hours from Fort Frances/International Falls, Minnesota USA. Atikokan is the gateway to the northern border of Quetico Provincial Park, a world-renowned wilderness park.

Atikokan was originally a railroad divisional point for the CNR railroad. From the late 1890s to the late 1930s, the population ranged from 50 to 300 people. In 1938 prospector, Julian Cross, discovered iron ore beneath Steep Rock Lake, north of Atikokan. To access the ore, the Seine River was diverted. During approximately 40 years of production, iron ore from the Atikokan area made an important contribution to the war effort and economy of Canada. From the 1940s until the mines closed in 1980 the population of Atikokan ranged from 1,000 to 7,500 at peak production of the mines.

Following the closure of the iron ore mines in 1978, the economic health of Atikokan has been based on the forest industry, thermal power generation, tourism, government services, retail services, and a mixture of light manufacturing businesses. (Source for the following statistics and history: Ontario Towns Website, 2004, Courtesy of the Atikokan Mining Attractions)

Major employers in the forest industry are Atikokan Forest Products and Proboard Ltd., both which have harvesting and manufacturing operations located within the township and the adjacent unincorporated area. Approximately 500 people are employed within the forest industry in the Atikokan area. Ontario Power Generation is the other major employer in the area with approximately 120 employees working at the thermal plant located in the northern portion of the township of Atikokan.

Atikokan is known as “Canoeing Capital of Canada.” There are two canoe manufacturers and one paddle manufacturer located within the town and hundreds of kilometers of canoe routes both within the wilderness provincial park and outside it in the beautiful Crown land area surrounding the town. Canoeists come from around the world to enjoy the recreational opportunities in the Atikokan area.

5.2 Economic and Social Values

5.2.1 Division of System into Zones for Water Management Planning

To better understand the different needs of the Seine River within its watershed, the Water Management Planning Team divided the Seine River into zones. These river zones were defined by the areas of the river that were directly affected by the operation of either a water control structure or a waterpower generating station. Defining the river by zones also assisted in developing strategies to address issues along the river. The table below describes these defined zones.

River Sections	Water Management Plan River Zones
Lac des Mille Lacs	Lac des Mille Lacs Dam
Upper Seine River (from Lac des Mille Lacs dam to Upper Marmion Lake – Island Falls)	Lac des Mille Lacs Dam
Upper Marmion Lake (Floodwaters)	Raft Lake Dam
Lower Marmion Lake	Raft Lake Dam
Finlayson Lake	Raft Lake Dam
Little Falls Lake and Colin Lake	Valerie Falls Dam
Modred Lake to Calm Lake	Calm Lake Dam
Calm Lake	Calm Lake Dam
Laseine Lake to Sturgeon Falls dam	Sturgeon Falls Dam
Lower Seine River (Partridge Crop Lake to Rainy Lake)	Sturgeon Falls Dam

Maps of the River Zones Appendix 10 – Maps #10.4 through #10.8.

5.2.2 Activities on the Seine River

Waterpower Generation: Waterpower generating companies and the water control structure owners: Abitibi-Consolidated Company of Canada, Valerie Falls Limited Partnership and the Ontario Ministry of Natural Resources.

There are 3 waterpower generating stations on the Seine River. They are all "Peaking Stations", which are stations that are able to fluctuate the water stored behind the dams in order to produce waterpower (measured in Gigawatt hours [Gwh]). One gigawatt hour equals 1,000 megawatt hours or 1,000,000 kilowatt hours.

Valerie Falls Generating Station — average annual energy production	52 Gwh
Sturgeon Falls Generating Station — average annual energy production	47 Gwh
Calm Lake Generating Station — average annual energy production	56 Gwh
Total average annual energy production	**155 Gwh**

The 3 stations produce enough electricity to meet the residential needs of a city of 30,000 homes.

There are approximately 10 people directly employed by these 3 stations. In addition, at various times there are the equivalent of approximately 20 full time positions employed in jobs related to dam maintenance and construction on the Seine River System.

Abitibi Consolidated of Canada Corporation (ACCC) in Fort Frances (owner of 2 of the Seine River power dams) is a large corporation and major regional employer that produces pulp and paper. The Fort Frances mill receives 25% of its power requirements from their 3 waterpower stations on the Seine and Rainy rivers. Energy from Abitibi's waterpower facilities helps keep paper production costs competitive.

Valerie Falls generating station is owned by Great Lakes Power Incorporated, an affiliate of Brascan Power Corporation. Brascan Power is Ontario's largest privately-owned waterpower producer.

There are 4 water control structures on the Seine River. These structures do not produce waterpower. They control the reservoir water levels and flows at specific locations along the river.

A fifth water control structure location at Wagita Bay on the west arm of Steep Rock Lake controls water flow out of the Seine River and into Steep Rock Lake.

Tourism and Recreation Outfitters: Tourism and Recreation outfitters operate in all areas along the Seine River. There are 18 tourist lodges on the river; 13 of these are located on Lac des Mille Lacs, and the others are located on the chain of lakes from Perch to Shoal Lake. Some of these resorts operate not only main base lodges and cabins (120) but also campgrounds (8). There are also 4 commercial outpost camp locations along the river system. These tourism businesses rely on the river for their

livelihood, which is primarily derived from open water sport-fishing opportunities. These businesses directly employ the owners plus an additional 60 staff during their operating seasons. These employment figures were obtain through a survey of 70% of the tourism establishments during the data gathering stages of planning.

Table 1: Open Water Sport Fishing Data Gathered by MNR During the Year 2000 State of the Resource Project

Lake Name	Water Management Plan - River Zone	Total Angling Effort (hours)	Number of Anglers (8 hour Day)	Angling Effort (hours per hectare)	% Tourist Resort Anglers	Number of Tourist Anglers (8 hour Day)	Number of Day-tripper Anglers	% Guided through Tourist Resort
Lac des Milles Lacs	Lac des mille Lacs Dam	193,152	24,144	7.88	85	20,522	3,622	
Mosher Lake	Lac des mille Lacs Dam	2,951	369	7.83	100	369	0	
Upper Marmion Lake (Floodwaters)	Raft Lake Dam	26,786	3,348	4.85	75	2,511	837	10
Lower Marmion Lake	Raft Lake Dam	5,861	733	1.48	95	696	37	
Finlayson Lake	Raft Lake Dam	9,237	1,155	6.33	90	1,039	115	
Little Falls Lake	Valerie Falls Dam	787	98	3.33	90	89	10	
Colin Lake	Valerie Falls Dam	0	0	0	90	0	0	
Modred Lake	Valerie Falls Dam	0	0	0	90	0	0	
Perch Lake	Calm Lake Dam	12,003	1,500	19.71	60	900	600	3
Little McCaulay Lake	Calm Lake Dam	394	49	4.45	60	30	20	3
Chub Lake	Calm Lake Dam	2,165	271	8.53	60	162	108	3
Banning Lake	Calm Lake Dam	5,314	664	23.46	60	399	266	3
Calm Lake	Calm Lake Dam	15,742	1,968	6.54	60	1,181	787	3
LaSeine Lake	Sturgeon Falls Dam	393	49	1.23	60	29	20	5
Partridge Crop Lake	Sturgeon Falls Dam	0	0	0	0	0	0	
Wild Potato Lake	Sturgeon Falls Dam	1,178	147	1.32	60	88	59	
Shoal Lake	Sturgeon Falls Dam	5,320	665	3.61	60	399	266	
Grassy Lake	Sturgeon Falls Dam	3,148	394	9.6	60	236	157	5
Little Grassy Lake	Sturgeon Falls Dam	7,871	984	17.34	60	590	394	

Explanation of Open Water Angling Effort Data

The total open water angling effort data was extracted from aerial boat counts, flown during the summer of 2000 (20 flights). An eight-hour angling day was used to calculate the total number of anglers per day. The percentage of tourist resort anglers was calculated using data gathered from creel surveys performed on Lac des Mille Lacs, Marmion Lake, Finlayson Lake, Perch Lake, and Calm Lake. The number of tourist anglers per eight-hour day was calculated from these percentages and the total number of anglers data. Day-tripper anglers were the remaining values after the tourist resort anglers were defined. The percent of tourist anglers who were guided was found through the creel survey data and a telephone survey conducted March 2003.

Canoeists have many routes to choose from that use the Seine River as a travel route or as a crossover to another route. The Lac des Mille Lacs area is part of the Provincial Kaministiqua Fur Trade Route, which starts in Thunder Bay and ends in Fort Frances. Canoe Routes throughout the Watershed can be seen on Map #10.9 in Appendix 10.

Winter activities along the river include snowmobiling, ice-fishing, snowshoeing, and cross-country skiing. There are approximately 150 km of snowmobile trail through the

watershed and on the river where the provincial snowmobile trail system follows the river corridor or crosses the river. These trails provide travel routes across the northwestern Ontario area of the province and access to the international border area of the USA. During the winter season sport-fishing (ice-fishing) occurs on the lakes primarily on and river sections that have relatively constant water levels and low flow velocities.

Provincial Snowmobile Trails throughout the Watershed can be seen on Map#10.10 in Appendix 10.

Table 2: Winter Sport Fishing Data Gathered by MNR During the Winter 2001 State of the Resource Project

Lake Name	Water Management Plan - River Zone	Total Angling Effort (hours)	Number of Anglers (8 hour day)	Angling Effort (hours per hectare)
Lac Des Milles Lacs	Lac des mille Lacs Dam	30,394	3,799	1.24
Mosher Lake	Lac des mille Lacs Dam	109	14	0.29
Upper Marmion Lake (Floodwaters)	Raft Lake Dam	331	41	0.06
Lower Marmion Lake	Raft Lake Dam	4,712	589	1.19
Finlayson Lake	Raft Lake Dam	0	0	0
Little Falls Lake	Valerie Falls Dam	0	0	0
Colin Lake	Valerie Falls Dam	0	0	0
Modred Lake	Valerie Falls Dam	0	0	0
Perch Lake	Calm Lake Dam	1,334	167	1.94
Little McCaulay Lake	Calm Lake Dam		0	0
Chub Lake	Calm Lake Dam	0	0	0
Banning Lake	Calm Lake Dam	0	0	0
Calm Lake	Calm Lake Dam	1,011	126	0.42
LaSeine Lake	Sturgeon Falls Dam	0	0	0
Partridge Crop Lake	Sturgeon Falls Dam	0	0	0
Wild Potato Lake	Sturgeon Falls Dam	0	0	0
Shoal Lake	Sturgeon Falls Dam	0	0	0
Grassy Lake	Sturgeon Falls Dam	0	0	0
Little Grassy Lake	Sturgeon Falls Dam	0	0	0

Explanation of Winter Angling Effort Data

The total angling effort data was extracted from aerial angler counts, flown in winter 2000-2001 (15 flights). The number of anglers was derived using an eight-hour angling day.

There are 19 access points along the river where recreationalists can launch their equipment by using road access, including provincial highways (#11, #17, #622) and year-round primary forest access roads (Sapawe–Upsala Road), as well as unmaintained winter trails within the watershed. Locations of access points and tourism establishments throughout the watershed can be seen on the Canoe Routes Map #10.9 in Appendix 10.

Table 3: Tourism and Recreational Opportunities Information Obtained From MNR Land Use Planning Documents and Lake Management Plans

River Sections	Water Management Plan River Zones	# of Camp Grounds	#Tourist Lodges	#Tourist Lodge Cabins	# Outpost Camps	#Access Points
Lac des Mille Lacs	LDML Dam	4	13	94	2	3
Upper Seine River (from Lac de mille Lacs Dam to Marmion Lake)	LDML Dam		0	0	1	1
Marmion Lake	Raft Lake Dam		0	0	1	3
Lower Marmion Lake	Raft Lake Dam	1	0	0	0	4
Finlayson Lake	Raft Lake Dam	1	1	6	0	2
Little Falls Lake & Colin Lake	Valerie Falls Dam		0	0	0	1
Modred Lake to Calm Lake	Calm Lake Dam	1	2	10	0	2
Calm Lake	Calm Lake Dam		1	5	0	1
LaSeine Lake to Sturgeon Falls Dam	Sturgeon Falls Dam		0	0	0	1
Lower Seine River (Partridge Crop Lake to Rainy Lake)	Sturgeon Falls Dam	1	1	5	0	1
	Totals	8	18	120	4	19

These recreational activities attract visitors from around the region, country and North America to the area. This contributes to the economic health of the area. All these recreational activities depend on the health of the river resources.

Cottage and Riparian Area Users: Cottage and riparian area users are abundant throughout the river system. There are approximately 350 cottages located along the river (143 on Lac des Mille Lacs, 43 on Upper Marmion Lake, 1 on Lower Marmion Lake, 3 on Finlayson Lake, 69 from Perch Lake to Banning Lake, 37 on Calm Lake, 7 on Laseine Lake, and 47 between Partridge Crop Lake and Little Grassy Lake). There are active cottage associations on Lac des Mille Lacs and on the Seine Chain of Lakes (Perch to Calm lakes). The cottagers are active users of the Seine River system and enjoy its recreational opportunities year round. Although the cottage areas started out as seasonal residences, a number of them are now being or have been converted to year-round homes. Private/Patent Land areas are indicated on the River Zone Maps in Appendix 10 (#10.4 through #10.8)

Table 4: Cottaging on the Seine River Information Obtained From MNR Land Use Planning Documents and Lake Management Plans

River Sections	Water Management Plan River Zones	# Cottages Dispositions by Ministry of Natural Resources	#Year Round Residents
LDML	LDML Dam	143	?
Upper Seine River (from Lac de mille Lacs Dam to Marmion Lake)	LDML Dam	0	?
Marmion Lake	Raft Lake Dam	43	?
Lower Marmion Lake	Raft Lake Dam	1	2
Finlayson Lake	Raft Lake Dam	2	1
Little Falls Lake & Colin Lake	Valerie Falls Dam	0	?
Modred Lake to Calm Lake	Calm Lake Dam	69	1
Calm Lake	Calm Lake Dam	37	?
LaSeine Lake to Sturgeon Falls Dam	Sturgeon Falls Dam	7	?
Lower Seine River (Partridge Crop Lake to Rainy Lake)	Sturgeon Falls Dam	47	?
	Totals	349	2

Hunting: There are three wildlife management units in the watershed — 12B, 12A, 11A. The annual big game harvest by hunters creates a substantial amount of visitation, tourism income and use of the watershed and river during the fall months. Waterfowl are also abundant along the river and the watershed.

Trapping: The trappers manage the fur-bearers in the watershed. There are 41 active traplines within the river zones. The fur-bearers include fox, wolf, lynx, beaver, fisher and marten. Some of the trappers use their lines to supplement incomes, while others use them as their primary source of income. The resources the Seine River and its watershed provide are important to their livelihood.
Traplines throughout the watershed can be seen on Map #10.11 in Appendix 10.

Table 5: Baitfish and Trap Lines Information Gathered from MNR Files

River Sections	Water Management Plan River Zones	# of Bait-Fish Blocks	# of Trap Lines
Lac des Mille Lacs	LDML Dam	23	23
Upper Seine River (from Lac de mille Lacs Dam to Marmion Lake)	LDML Dam	4	3
Marmion Lake	Raft Lake Dam	3	2
Lower Marmion Lake	Raft Lake Dam	1	1
Finlayson Lake	Raft Lake Dam	2	2
Little Falls Lake & Colin Lake	Valerie Falls Dam	1	1
Modred Lake to Calm Lake	Calm Lake Dam	2	2
Calm Lake	Calm Lake Dam	2	1
LaSeine Lake to Sturgeon Falls Dam	Sturgeon Falls Dam	1	1
Lower Seine River (Partridge Crop Lake to Rainy Lake)	Sturgeon Falls Dam	6	5
	Totals	45	18

Commercial Fishing: Commercial fishing occurs within two of the river zones. Lac des Mille Lacs has a commercial fishery for the following species and round weight quotas per year: Whitefish – 9000 kg, Walleye – 6356 kg and Northern Pike – 2727 kg. On the lakes below the Sturgeon Falls Dam, there is a commercial fishery for Sturgeon with a quota of 182 kg per year. A subsistence fishery for walleye occurs on the lower river lakes as well. Commercial baitfish harvesting occurs throughout the watershed. There are 45 commercial baitfish blocks allotted within the river zones. These operations support the tourism industry, which provides year-round income for the baitfish operators.

Wild Rice Harvesting:
Wild rice harvesting occurs on the Lower Seine River lakes. This harvest supplies the community and has economic value to the harvesters. Locations can be seen on the Lac des Mille Lacs and the Sturgeon Falls River Zone Maps # 10.4 and #10.8 located in Appendix 10.

Water Intakes: Water intakes are located along the river in the areas where cottaging has been developed. The Seine River First Nation community located on Wild Potato Lake uses the river for their water system intake. This community has a population of 300.

6 Issues Identified Through Scoping

6.1 Compilation of Issues

At the onset of the planning process, the Planning Team compiled a comprehensive report of issues received from the public during previous planning and consultation activities. Through the water management plan public consultation process, the public provided additional issues and feedback to the Planning Team. Any issues brought to the Planning Team were addressed as part of the issue-scoping phase. The issues have been documented and are shown in Appendix 6. The issues were summarized and categorized.

Definition of an issue: An issue is a concern expressed during the public consultation phase.

The tables on the next pages summarize the issues by category:

Issue Category

- Minimize Flood Risk: Summary of issues relating to flood concerns.
- Navigation, Recreation, Social: Summary of issues relating to boating, access, docks, and tourism concerns.
- Power Generation: Summary of issues relating to the generation of waterpower.
- Aquatic Ecosystem: Summary of issues relating to spawning, habitat, ecosystem health, slumping and erosion, wetland health and endangered species.

The tables also include a column that displays the link to the corresponding objective and sub-objectives. The objectives and sub-objectives were developed during the Water Management Planning process.

Issue Category: Flood

Issue #	Issue & Description	Corresponding Objective and/or Sub-Objective
1	***Flooding in the Township of Atikokan*** At certain water levels, flood events in the Seine River causes water to back up in the Atikokan River, causing flooding in the Township of Atikokan. Context: Flood inundation studies have shown that the Seine River has no affect on the Atikokan River except when the Seine River and Atikokan River are in a coincident flood. This event would then be out of the scope of this plan. However, management of Seine River flows prior to and during a coincident flood on the Atikokan River can help lower the peak and duration of a flood in the Town of Atikokan.	Flood Sub-Objective 1c
2	***Flooding of the Sapawe/Upsala Road and planned access to Reserve 22A2 during flood events on the Seine River*** Area roads in the Sapawe to highway 17 region are used for forest haul and recreational access road from Highway 11, in the south, to Highway 17, in the north. The road is an extension of Highway 623, which provides access to the Atikokan Forest Products Mill located on Sapawe Lake. When built, sections of the road were built in the Seine River Flood Plain. At the time of this water management planning period, the 22A Access Road was being improved for future forest management. During flood events discharges from the LDML dam might impact access to this road.	Flood Sub-Objective 1b
3	***Flooding transformers*** Water levels affecting electrical transformers that have been placed on shore on populated lakes along system. Known areas: Perch Lake, Chub Lake, Little McCaulay Lake, Banning Lake, Calm Lake.	Flood Sub-Objective 1d
4	***First Nations hunting and gathering*** Fluctuating water levels affect First Nations in several ways including impact on wild rice production and gathering through flooding and dewatering, and change in traditional fishing/hunting/gathering locations through	Flood Sub-Objectives 1a-e

	flooding and dewatering.	
5	***New recreational activities*** New recreational developments on lakes within the Seine River system.	Flood Sub-Objectives 1a-e
6	***Water levels and water intakes*** Water levels affecting water intakes on populated lakes along system. Known areas: Upper Floodwaters, Finlayson Lake, Perch Lake, Chub Lake, Little McCaulay Lake, Banning Lake, Calm Lake Potential areas: Seine River First Nation – 22A2, Seine River First Nation – 23A, Laseine area, Lac des Mille Lacs.	

Issue Category: Navigation, Recreation, Social

Issue #	Issue & Description	Corresponding Objective and/or Sub-Objective
1	***Docks*** Flooding of docks during high flow periods impacts ability of people to access their property. Known Areas: Lac des Mille Lacs, Upper Floodwaters, Finlayson Lake, Perch Lake, Chub Lake, Little McCaulay Lake, Banning Lake, Calm Lake Potential Areas: Seine River First Nation – 22A2 (Upper River), Seine River First Nation – 23A (Lower River), Laseine Area	Flood Sub-Objectives 1a-e
2	***Access points*** Inability to use access points for recreational purposes and water access to cottages due to low water levels. This happens primarily in spring due to slow recovery from winter drawdown. Loss of revenue to commercial tourism operators and loss of recreation to other users. Loss of only access for First Nation hunting and fishing. Known affected access points: Lac des Mille Lacs (Cushing Lake, Maki Bay), Mosher Lake (River between IR 22A2 and Mosher Lake), Upper Floodwaters (Reserve Bay Landing, Upper Seine Bay, Raft Lake, Lower Marmion Landing)	Nav/Rec/Social Sub-Objectives 2a-c
3	***Navigation hazards*** a) Navigation problems due to fluctuating water levels on reservoirs. b) Upper and Lower Marmion Lake Sluiceway becomes impassable by boat at times due to water level fluctuations.	Nav/Rec/Social Sub-Objectives 2a & 2c Nav/Rec/Social Sub-Objective: 2c
4	***Atikokan–Minaki Waterway*** The Atikokan–Minaki Waterway is a proposal to provide a waterway linkage from Atikokan to Minaki through Rainy Lake and Lake of the Woods. Although the Atikokan–Rainy Lake area is not currently being developed, there is a concern that decisions may be made that prevent development of this section some time in the future.	Nav/Rec/Social Sub-Objective 2d Plus communication of the Water Management Plan to the Atikokan–Minaki Waterway Committee

Issue Category: Power Generation

Issue #	Issue & Description	Corresponding Objective and/or Sub-Objective
1	***Gauging station accuracy*** a) Accuracy of level gauging at Valerie Falls dam, Calm Lake dam, Sturgeon Falls dam. b) Accuracy of flow discharge tables (turbines, spillways and sluices).	The Planning Team determined that there was a data gap associated with the gauging station accuracy. Therefore the Planning Team did not develop a specific objective but agreed that gauging station accuracy is an important item because it supports compliance monitoring and decision-making. As a result, the Baseline Data Collection Program (Section 14) summarizes future requirements for additional gauging stations and flow and level calibration.
2	***Power production — increase*** The industry sometimes requests changes in the system to increase power production. These requests range from increased head at power dams, increased storage capacity in reservoirs, increased range of reservoirs, etc. Each of these requests has a different set of potential impacts.	Power Generation Sub-Objectives 3a-f
3	***Power production — year-round*** The waterpower industry would like to produce power to optimize revenue from available run-off in the new open market regime. Valerie Falls generating station: prefers even flow year round; winter rates are higher than summer Calm Lake generating station: based on current market values Sturgeon Falls generating station: based on current market values	Power Generation Sub-Objectives 3a-f
4	***Power production – peaking*** Daily Peaking at Valerie Falls generating station, Calm Lake generating station, Sturgeon Falls generating station. Provincial demand for electricity is typically high	Power Generation Sub-Objectives 3a-f

	during the weekdays, heat waves, cold spells and other events that cause a shortage of supply. Waterpower facilities can react quickly to meet these changes in demand. During these high demand periods, the price paid for power increases. Industry responds to contracted and market prices by retiming turbine flows. This is sometimes referred to as load following or peaking. In addition to helping Ontario meet its energy supply requirement, peaking is an important component of powerdam revenue.	
5	***Lac des Mille Lacs water levels*** Coordination of releases from LDML and Upper and Lower Marmion is an essential component of optimizing power production in the system. During the winter LDML acts an upstream reservoir. LDML holds 44% of available system storage. This winter water supports power production at the downstream powerdams. Also, because of its large surface area, LDML acts as a buffer for the system all year round. During periods of high flow (e.g. spring freshet) water can be retained in LDML thereby minimizing spillage of water and lost revenue at downstream powerdams.	Power Generation Sub-objective 3a

Issue Category: Aquatic Ecosystem

Issue #	Issue & Description	Corresponding Objective and/or Sub-Objective
1	***Walleye spawn*** Flow changes (both hourly and daily) during spawning can negatively affect walleye spawning success. Affected Areas: Valerie Falls power generating dam, Calm Lake power generating dam, Sturgeon Falls power generating dam, Raft Lake dam, Lac des Mille Lacs dam	Aquatic Ecosystem Sub-Objective 4b
2	***Walleye habitat*** Winter drawdown of reservoir affecting walleye habitat. Affected Areas: Lac des Mille Lacs, Upper Floodwaters, Lower Marmion Lake, Finlayson Lake	Aquatic Ecosystem Sub-Objectives 4a-c
3	***Sturgeon spawn*** Flow changes (both hourly and daily) during spawning can negatively affect sturgeon spawning success. Affected Areas: Calm Lake power generating dam, Sturgeon Falls power generating dam	Aquatic Ecosystem Sub-Objective 4b
4	***Whitefish habitat*** Winter drawdown of reservoir affecting whitefish habitat. Whitefish spawn in the fall on shoals and the eggs must overwinter before hatching. There is a concern that winter drawdown is affecting whitefish spawning by dewatering and freezing the eggs. Affected Lakes: Lac des Mille Lacs, Upper Marmion (Floodwaters), Finlayson Lake	Aquatic Ecosystem Sub-Objective 4a
5	***Pike spawn*** Reservoir operations may create conditions in which pike may be unable to access flooded vegetation areas required for spawning in early spring. Affected Areas: Lac des Mille Lacs, Upper Floodwaters, Lower Marmion Lake, Finlayson Lake	Aquatic Ecosystem Sub-Objective 4a &4c
6	***Waterfowl habitat*** The combination of winter drawdown and later than natural spring recovery means that waterfowl (e.g. loons, ducks, geese) can establish nest sites at elevations that are flooded out before young hatch, resulting in reduced recruitment.	Aquatic Ecosystem Sub-Objective 4a-c
7	***Beaver habitat*** Winter drawdown of reservoir, following construction of lodges and food piles, can prevent	Aquatic Ecosystem Sub-Objective 4a

	beaver from accessing food under water affecting furbearer survival and increasing mortality from predators as beaver are forced to access new food sources above the ice. Area: Upper Floodwaters (Similar issue with other species such as muskrat.)	
8	***Ecosystem health*** Water level management, including winter drawdown of reservoirs, can negatively impact ecosystem health including reduced amphibians, aquatic macrophyte abundance/diversity, invertebrate abundance/diversity, etc. Because these components affect the base of the food chain, negative impacts can affect the productivity of the entire aquatic ecosystem. This impacts on the entire system to various degrees.	Aquatic Ecosystem Sub-Objective 4a & 4c
9	***Slumping & erosion*** Slumping and erosion have occurred on the Seine River. This can have a number of negative impacts including effects on fish habitat, declines in water quality for drinking, etc. Known Locations: Lac des Mille Lacs east shore, shoreline burial grounds, between Lac des Mille Lacs dam and Upper Marmion Lake, between Finlayson Falls and Perch Lake. Note: While native burial grounds are not an aquatic ecosystem issue, slumping and erosion does have an impact on shoreline native burial grounds and therefore has been listed in this section to capture the issue.	Aquatic Ecosystem Sub-Objective 4f
10	***Wetland health*** Water level management, including winter drawdown of reservoirs, can negatively impact wetland by reducing abundance/diversity of plants and associated wildlife. Impacts on entire system to various degrees but particularly Upper Floodwaters, Colin Lake, Lower Marmion Lake and Little Falls Lake Wetland, which has been classified as Provincially Significant.	Aquatic Ecosystem Sub-Objective 4c
11	***Endangered species*** Red-Disked Alpine Butterflies are known on one site in the planning area, a meadow marsh at the mouth of the Atikokan River. They are included in the Northwestern Ontario Species at Risk listing, and are classified S-3 Rare to Uncommon.	Aquatic Ecosystem Sub-Objective 4c

6.2 Spatial and Temporal Assessment of the Issues

The Spatial and Temporal Assessment of the issues was used as a format to group the issues in relation to the four seasons (spring, summer, fall and winter). The grouping helped the Planning Team better understand which part of the year the issues were important. For example, access to Mosher Lake is an issue only during a certain period in October. The Planning Team developed a sub-objective to address the issue of access to Mosher Lake for hunting in October.

The information from this matrix was used in developing the objectives and sub-objectives.

River Zone	Spring	Summer	Fall	Winter
LDML dam Includes LDML and Seine River from LDML to Upper Marmion	navigation (minimum flows), spawning below the dam; navigation to Mosher Lake; minimize flooding on Sapawe Road	flooding (LDML), navigation (access points and docks LDML and Seine River to Mosher Lake); aquatic wetlands on LDML and minimum flows	Mosher Lake access for hunting (October)	flows for power generation; ice safety on LDML (communication)
Raft Lake dam Includes Upper Marmion and Finlayson Lake	spawning below dam; recover water levels (navigation)	aquatic wetlands (minimum flows); maintain water levels (navigation)	maintain water levels (navigation)	winter drawdown; ice safety (communication)
Lower Marmion Sluiceway Includes Lower Marmion Lake	spawning above and below dam, navigation	aquatic wetlands	none	none
Valerie Falls dam Includes Little Falls Lake and Colin Lake	spawning below dam; flood freeboard	aquatic wetlands (minimum flows); maintenance (dewatering); maintain flows through Wagita (silt prevention)	none	flows for power generation
Calm Lake dam Includes Perch Lake to Calm Lake	navigation (docks); minimize flooding; maintain water levels (navigation); spawning below dam	aquatic wetlands (minimum flows); maintain water levels (navigation)	none	flows for power generation
Sturgeon Falls dam Laseine to Sturgeon Falls and Seine River to Rainy Lake	spawning below dam; navigation (docks); minimize flooding	aquatic wetlands (minimum flows); maintenance (dewatering)	none	flows for power generation; ice safety (communication)

6.3 Issues not addressed in the Water Management Plan

The following issues were collected as part of the data gathering stage of Planning. However, they were not addressed during the water management planning process, as they were not directly affected by water levels or flows on the Seine River. Please refer to the Planning team responses listed in the below table for rational to support these decisions.

#	Issue & Description	Planning Team Response
1	***First Nations Land Claims*** Possibility of land claims associated with flooding related to the construction of the Lac des Mille Lacs Dam(s).	*Land claims are associated with original flooding when the dam(s) were constructed. Therefore they are outside the scope of the WMP mandate.*
2	***Water Hazards*** Users encounter hazards of both stationary and floating debris.	*Water hazards are not dealt with in this plan as they are either natural conditions or may be a result of past dam construction and reservoir creation and not current levels and flows. Users of waterways are individually responsible for determining navigation conditions.*
3	***Ice Safety*** Winter drawdown of reservoir affects ice safety by creating unsafe air pockets under the ice and increasing current in some areas. Affected areas: Lac des Mille Lacs, Upper Floodwaters, Lower Marmion Lake, Finlayson Lake, Colin Lake, Perch Lake, Chub Lake, Banning Lake, Calm Lake	*Ice safety was not dealt with in this plan, as users of waterways are individually responsible for determining ice conditions. Public ice hazard warning notices may be issued by the OPP, non-governmental organizations (e.g. OFSC), and dam owners.*
4	***New Recreational Developments*** New recreational developments on lakes within the Seine River System.	*Issues related to new recreational developments was not dealt with in this plan. Approvals and constraints on new buildings or improvements near managed waterways are under the direction of the MNR and other agencies of government.*

5	***Walleye Population – Lower Marmion*** Water Management Plan should not adversely affect the recovery of collapsed walleye population in Lower Marmion Lake. The collapse of the walleye population has been linked to habitat alteration due to the Ontario Power Generation Plant (Fossil Fuel). Mitigation action has been taken in 1996 to correct habitat problem.	*This issue is outside the scope of the Water Management Plan. This issue will be addressed in an emergency situation outside the parameters of the normal operating regime of the dams on the river.*
6	***Introduction of fish species*** When establishing reservoirs, the raising of water levels may allow fish species not native into the reservoir/river from lakes in other watersheds. Example: Baril Lake and Lac des Mille Lacs are in different watersheds. When Lac des Mille Lacs water level was raised, a watercourse may have been created that allowed fish not native to either lake to move between them.	*This issue is outside the scope of this Water Management Plan because there is no specific evidence that a watershed breach has occurred. As part of the data gap analysis, the Baril Lake/LDML relationship will be examined.*

7 Plan Objectives

7.1 Developing the Objectives

The objectives of this water management plan were developed in response to the categorized issues identified in the consultation process. The Planning Team reviewed the issues and developed the overall objectives from the four issue categories: Flood; Navigation, Recreation, and Social; Power Generation; and Aquatic Ecosystem.

Four overall objectives were defined by the Planning Team:

1. Address public safety and property damage by minimizing flooding throughout the system.
2. Maintain navigational, recreational and social opportunities throughout the system.
3. Optimize power generation values from the system.
4. Maintain or improve aquatic health of the system.

Because these overall objectives were broad categories, the Planning Team further defined each objective by identifying one or more sub-objectives for each. The development of the sub-objectives took into account the review of issues that were site (river zone) specific as well as those that affected the entire river system.

For example, the following was developed:

Issue Category: Flood
Overall Objective: Address public safety and property damage by minimizing flooding throughout the system.
Sub-Objectives:

- minimize flooding on Lac des Mille Lacs
- minimize Sapawe Road flooding
- minimize flooding on Perch Lake
- minimize flooding on Lower Seine River

Planning Team members also developed targets and strategies for each sub-objective.

A “target” preferred level or flow was defined for each sub-objective. The target was defined based on the solution needed to solve the issue. For example, flooding on Lac des Mille Lacs occurs at water levels above 456.99 m; therefore the target was developed to keep water levels below 456.99 m.

The “strategy” to achieve the target is to keep flood freeboard before and during freshet, and to pull the logs when the water level rises more than 5 cm/day when levels are in the summer band, in order to keep the daily rise below 5 cm.

The objectives, sub-objectives, targets and strategies were used to develop the various options for each control structure on the Seine River.

7.2 List of Objectives and Sub-Objectives

Issue Category: 1. Minimize Flood Risk

Note: Defined flood and drought events are outside the scope of the Water Management Plan.

As conditions approach the defined upper or lower limits discussions will begin between the operators, Ministry of Natural Resources and Department of Fisheries and Oceans. When low or high water events occur the Ontario Ministry of Natural Resources will be contacted along with other stakeholders to discuss and provide input for decisions to mitigate the situation. The Ministry of Natural Resources may issue an order directing the amount of flow if required.

Overall Objective: Address public safety and property damage by minimizing flooding throughout the system.

1a Sub-Objective	Minimize flooding on Lac des Mille Lacs
1a Target	LDML — Keep water levels below 456.99 m
1a Strategy	• Keep flood freeboard before and during freshet; pull logs when water level rises more than 5 cm/day when levels are in summer band to keep daily rise below 5 cm.
Addressed in Option	LDML Option 2, 3, 4
Addresses Issue #	Flood #4 (First Nations Hunting and Gathering) Navigation/Recreation/Social issue #1 (Docks) The strategy identified above helps to minimize flooding on LDML. Maintenance of a flood freeboard during freshet provides an interval for log operations to re-time high flows. The operating strategy of pulling logs during major runoff events (5 cm rise/day) is a key component in minimizing the frequency of events where levels rise above 456.99 m.

1b Sub-Objective	Minimize Sapawe Road flooding, known to occur when river flows range between 120 and 140 m^3/sec
1b Target	Rate of discharge depends on downstream uncontrolled inflows, and the remaining LDML freeboard to 456.99 m. A specific discharge is not practical to target because flow out of LDML that causes flooding of the Sapawe Road is dependant on the relationship between uncontrolled basin flows and LDML discharges.
1b Strategy	• Stage discharge from LDML dam to allow uncontrolled peak basin flows from LDML dam to Upper Marmion to pass. • Utilize the 30 cm flood reserve on LDML during significant

	flood events when inflow is rising and the uncontrolled basin flood is steady or rising.
Addressed in Option	LDML Option 2, 3, 4
Addresses Issue #	Flood #2 (Flooding of the Sapawe/Upsala road during flood events on the Seine River), Flood #4 (First Nations Hunting and Gathering), Flood #5 (New Recreational Activities), and Navigation/Recreation/Social #1 (Docks). The strategy identified above minimizes flooding in the Sapawe Road region. Area roads in the Sapawe to Highway 17 region are forest haul and recreational access road from Highway 11, in the south, to Highway 17, in the north. The road is an extension of Highway 623, which provides access to the Atikokan Forest Products Mill located on Sapawe Lake. When built, sections of the road were built in the Seine River Flood Plain. Note, during the final stages of development of this water management plan period, the 22A LDML First Nation access road was being improved for future forest management. During flood events discharges from the LDML dam might impact access to this road. More information regarding flooding of this road and Lac des Mille Lacs flows is required and has been identified as a data gap for the period of this plan.

1c Sub-Objective	Minimize impacts of Seine River flooding in Town of Atikokan especially during Atikokan river flood events
1c Target	Target: Target discharge from Raft Lake below 150 m^3/sec.
1c Strategy	• Store water at Raft Lake and LDML when storage is available. • Keep flood freeboard at Raft and LDML before and during freshet. • Stage the rate of rise in reservoirs to consider inflow rates. • Lower level of Calm Lake to reduce water level at Tracy Rapids (confluence of Seine and Atikokan Rivers). In extreme flood events, MNR would determine the course of action (if any) to mitigate impacts (Emergency Measures Organization).
Addressed in Option	LDML and Raft Option 2, 3, 4.
Addresses Issue #	Flood #1 (Flooding in the Township of Atikokan), Flood #4 (First Nations Hunting and Gathering), Flood #5 (New Recreational Activities), and

	Navigation/Recreation/Social #1 (Docks). While it has been determined that Seine River floods only impact the town of Atikokan during a coincident Atikokan River flood, the strategies identified above can sometimes help re-time the basin flows thereby allowing the Atikokan River flood peak to pass before the Seine flood peak.

1d Sub-Objective	Minimize flooding on Perch Lake
1d Target	Target discharge from Raft Lake below 150 m^3/sec
1d Strategy	• Store water at Raft Lake and LDML when storage is available. • Keep flood freeboard at Raft and LDML before and during freshet. • Stage the rate of rise in reservoirs to consider inflow rates. • Lower level of Calm Lake to reduce water level in Perch Chain.
Addressed in Option	Raft Lake Option 2, 3, 4
Addresses Issue #	Flood #3 (Flooding Transformers), Flood #4 (First Nations Hunting and Gathering), Flood #5 (New Recreational Activities), and Navigation/Recreation/Social #1 (Docks). The strategies identified above can minimize flooding on Perch Lake because it allows for a re-timing of basin flows and contributes to suppressing the flood peak levels.

1e Sub-Objective	Minimize flooding on Lower Seine River
1e Target	Target discharge below 250 m^3/sec from Sturgeon GS
1e Strategy	• Store water at Raft Lake, LDML and Calm Lake when storage is available. • Keep flood freeboard at Raft and LDML before and during freshet. • Notification during flood events (e.g. stoplog change when >25 m^3/sec increase in flow at Raft and when flows from Raft exceed 150 m^3/sec; see targets). • Implement Valerie Falls Limited Partnership/Abitibi Consolidated Company of Canada Emergency Preparedness Plan protocols.
Addressed in Option	LDML and Raft Option 2, 3, 4
Addresses Issue #	Flood #4 (First Nations Hunting and Gathering), Flood #5 (New Recreational Activities), and Navigation/Recreation/Social #1 (Docks). The strategy identified above minimizes the impact of flooding on the Lower Seine River because it results in the re-timing of basin flows and contributes to suppressing the flood peak levels. Implementation of communication measures and Emergency Preparedness Plans also contributes to the effective management of risks.

Issue Category: 2. Navigation, Recreation, and Social

Overall Objective: Maintain navigational, recreational and social opportunities throughout system. Generally includes boating hazards, access points, accessing docks, the Atikokan – Minaki waterway, and water intakes.

2a Sub-Objective	Maintain stable water levels on LDML during open water season. Minimize ice damage to shoreline structures due to rising levels in winter.
2a Target	456.60–456.69 m from May 7 to October 31 Minimize lake level rises during ice-cover period. During the summer the operator will manage the log changes to target the middle of the min.–max. band.
2a Strategy	• When lake level drops more than 2 cm/day, install logs. • Pull logs when water level rises more than 5 cm/day when levels are in summer band to keep daily rise below 5 cm. • In winter, draw lake down to minimize ice damage to shoreline structures.
Addressed in Option	LDML Option 4
Addresses Issue #	Navigation/Recreation/Social #2 (Access Points), Navigation/Recreation/Social #3a (Navigation Problems), The strategy identified above would contribute to maintaining stable water levels during the open water season and help minimize ice damage due to a rise in water levels during the winter months.

2b Sub-Objective	Maintain water levels on Upper River to allow access from Reserve 22A2 to Mosher Lake and facilitate hunting and fishing opportunities.
2b Target	Data gap; user days/periods and flow requirement in m^3/sec to be confirmed by LDML First Nation.
2b Strategy	• Set minimum flows at a level that supports navigation.
Addressed in Option	LDML Option 1, 3
Addresses Issue #	Navigation/Recreation/Social #2 (Access Points), The strategy identified above would maintain water levels that would improve opportunities for access to LDML First Nation 22A2 and Mosher Lake during the open water season.

2c Sub-Objective	Maintain water levels suitable for access and navigation on Upper Marmion and Lower Marmion during open water season.
2c Target	Lake level at 415.0–415.5 m from 3rd Saturday of May to November 15 (open water walleye fishing season). Lake level at 414.5 m by May 15 provides access to Reserve Bay. Lake level above 415 m permits opening of Lower Marmion navigation sluice.
2c Strategy	• Install logs at Raft to achieve spring recovery. • Adjust logs at Raft to stay between 415.0–415.5 m between 3rd Saturday of May and November 15.
Addressed in Option	Raft Lake Option 2, 3, 4
Addresses Issue #	Navigation/Recreation/Social #2 (Access Points), Navigation/Recreation/Social #3 a (Navigation Problems due to fluctuating water and #3 b (Lower Marmion Lake sluiceway impassable due to water level fluctuations) The strategy identified above would contribute to maintaining open water levels suitable for access and navigation.

2d Sub-Objective	Maintain water levels suitable for access and navigation on Calm Lake, Perch Lake and Laseine Lake during open water season.
2d Target	Calm Lake level at 382.2–382.75 m from May 1 to Nov. 1 Laseine Lake level at 357.2 m–357.75 m from May 1 to November 1
2d Strategy	• Adjust discharges at Calm Lake and Sturgeon Falls dams to stay in targets above
Addressed in Option	Calm Option 2, 3
Addresses Issue #	Navigation/Recreation/Social #1 (Docks), Navigation/Recreation/Social #4 (Navigation – Atikokan-Minaki Waterway) The strategy identified above would contribute to maintaining open water levels suitable for access and navigation.

Issue Category: 3. Power Generation

Overall Objective: Optimize power generation values from system.

Sub-Objective: Optimize power generation values (power, capacity or revenue) on a seasonal and daily basis.

3a Sub-Objective	LDML
3a Target	Use available range of 456–457 m.
3a Strategy	• Pull and replace logs to meet targets. • Coordinate discharges from basins.
Addressed in Option	LDML Option 2, 3, 4
Addresses Issue #	Power Generation #2 – Power production - increase, Power Generation #3 - Power production – year round, Power Generation#4 – Power production – peaking, Power Generation#5 – Power production – system coordination. The strategy identified above would help manage system levels and flows to optimize power production by reducing spillage of water during high flow periods and providing water for power production during low run-off periods (e.g. winter).

3b Sub-Objective	Upper Marmion
3b Target	Use available range of 411.50–415.89 m. Discharges not to exceed downstream turbine capacities (Calm and Sturgeon 48 m^3/sec).
3b Strategy	• Pull and replace logs to meet targets • Coordinate discharges from basins.
Addressed in Option	Raft Option 2, 3
Addresses Issue #	Power Generation #2 – Power production - increase, Power Generation #3 - Power production – year round, Power Generation#4 – Power production – peaking, The strategy identified above would help manage system levels and flows below Raft Lake to optimize power production by reducing spillage of water during high flow periods and providing water for power production during low run-off periods (e.g. winter).

3c Sub-Objective	Lower Marmion
3c Target	Use available range of 414.80 to 415.50 m.
3c Strategy	Pull and replace logs to meet targets, coordinate discharges from basins
Addressed in Option	Lower Marmion Option 1, 2
Addresses Issue #	Power Generation #3 - Power production – year round, Power Generation#4 – Power production – peaking, The strategy identified above would help manage system levels and flows below Lower Marmion Lake to optimize power production by reducing spillage of water during high flow periods and providing water for power production during low run-off periods (e.g. winter).

3d Sub-Objective	LFL & Colin Lake (Valerie Falls power dam)
3d Target	Utilize storage of 403.2–403.9 m.
3d Strategy	• Optimize production to respond to the Power Purchase Agreements price schedules. • Pull and replace logs from upstream dams to meet targets, coordinate discharges from basins.
Addressed in Option	LDML Option 2, 3, 4 and Raft Option 2, 3
Addresses Issue #	Power Generation #2 – Power production - increase, Power Generation #3 - Power production – year round, Power Generation#4 – Power production – peaking, The strategies identified above would help optimize power production and revenue at Valerie Falls Generating Station by providing peaking flexibility, reducing spillage of water during high flow periods and providing water for power production during low run-off periods (e.g. winter)

3e Sub-Objective	**Calm Lake (Calm Lake power dam)**
3e Target	Utilize storage of 382.2–382.75 m.
3e Strategy	• Optimize production to respond to market conditions and minimize spillage. • Pull and replace logs from upstream dams to meet targets, coordinate discharges from basins.
Addressed in Option	LDML Option 2, 3, 4 and Raft Option 2, 3
Addresses Issue #	Power Generation #2 – Power production - increase, Power Generation #3 - Power production – year round, Power Generation#4 – Power production – peaking, The strategies identified above would help optimize power production and revenue at Calm Lake Generating Station by

	providing peaking flexibility, reducing spillage of water during high flow periods and providing water for power production during low run-off periods (e.g. winter)

3f Sub-Objective	**Laseine to SF (Sturgeon Falls power dam)**
3f Target	Deliver to headpond optimum flows (48 m^3/sec daily average). Utilize storage of 357.2–357.75 m.
3f Strategy	• Optimize production to respond to market conditions and minimize spillage. • Pull and replace logs from upstream dams to meet targets. • Coordinate discharges from basins.
Addressed in Option	LDML Option 2, 3, 4 and Raft Option 2, 3
Addresses Issue #	Power Generation #2 – Power production - increase, Power Generation #3 - Power production – year round, Power Generation#4 – Power production – peaking, The strategies identified above would help optimize power production and revenue at Sturgeon Falls Generating Station by providing peaking flexibility, reducing spillage of water during high flow periods and providing water for power production during low run-off periods (e.g. winter)

Issue Category: 4. Aquatic Ecosystem

Overall Objective: Maintain or improve aquatic ecosystem health in system.

4a Sub-Objective	Improve aquatic ecosystem health on Upper Marmion Lake by reducing winter drawdown.
4a Target	Minimize winter drawdown to 0.5 m between November 15 to April 15.
4a Strategy	• Reduce winter outflows from Raft Lake to reduce winter drawdown.
Addressed in Option	Raft Option 1
Addresses Issue #	The strategy identified above would help address the following issues: Aquatic Ecosystem #2 Walleye habitat Aquatic Ecosystem #4 Whitefish habitat Aquatic Ecosystem #5 Pike spawn Aquatic Ecosystem #6 Waterfowl Habitat Aquatic Ecosystem #7 Introduction of fish species Aquatic Ecosystem #8 Beaver habitat Aquatic Ecosystem #9 Ecosystem health Aquatic Ecosystem #10 Slumping and erosion Aquatic Ecosystem #11 Wetland health See Section 6 Issue Category Aquatic Ecosystem for detailed description of issues.

4b Sub-Objective	Maintain spring spawning opportunities by having steady or rising flows throughout the system (April 15–June 15).
4b Target	April 15–June 15 water flows and levels will be stable or increasing at all dams through all hours throughout the system.
4b Strategy	• Balance flows and levels to maintain stable or increasing flows throughout the system.
Addressed in Option	LDML Option 1, 4; Raft Option 1, 2, 3, 4; Valerie Option 1, 2, 3, 4; Calm and Sturgeon Option 1, 2, 3, 4
Addresses Issue #	The strategy identified above would help address the following issues: Aquatic Ecosystem #1 Walleye spawn Aquatic Ecosystem #2 Walleye habitat Aquatic Ecosystem #3 Sturgeon spawn Aquatic Ecosystem #5 Pike spawn Aquatic Ecosystem #6 Waterfowl Habitat Aquatic Ecosystem #9 Ecosystem health Aquatic Ecosystem #11 Wetland health See Section 6 Issue Category Aquatic Ecosystem for detailed description of issues.

4c Sub-Objective	Improve extent and diversity of aquatic wetlands by lowering water levels throughout the summer months.
4c Target	Water levels on all lakes/reservoirs should decline 65% of total annual mean fluctuation between May 31–August 30.
4c Strategy	• Operate stoplogs during summer months to achieve target.
Addressed in Option	LDML Option 1, 2; Raft Option 1; Valerie Option 1; Calm and Sturgeon Option 1
Addresses Issue #	The strategy identified above would help address the following issues: Aquatic Ecosystem #2 Walleye habitat Aquatic Ecosystem #5 Pike spawn Aquatic Ecosystem #6 Waterfowl Habitat Aquatic Ecosystem #9 Ecosystem health Aquatic Ecosystem #11 Wetland health See Section 6 Issue Category Aquatic Ecosystem for detailed description of issues.

4d Sub-Objective	Improve aquatic ecosystem health by maintaining minimum flows throughout system.
4d Target	Minimum flows for each site are based on 10 percentile flows of natural systems.
4d Strategy	• Operate stoplogs to achieve target.
Addressed in Option	LDML Option 1, 3; Raft Option 1, 2, 3, 4; Valerie Option 1, 2, 3, 4; Calm and Sturgeon Option 1, 3, 4 (and 2 during spring)
Addresses Issue #	The strategy identified above would help address the following issues: Aquatic Ecosystem #1 Walleye spawn Aquatic Ecosystem #2 Walleye habitat Aquatic Ecosystem #3 Sturgeon spawn Aquatic Ecosystem #9 Ecosystem health Aquatic Ecosystem #11 Wetland health See Section 6 Issue Category Aquatic Ecosystem for detailed description of issues.

4e Sub-Objective	Maintain current flows at Wagita dam to sustain water levels in West Arm of Steep Rock Lake. Avoid high volume discharges to minimize mobility of silt in West Arm.
4e Target	Maintain year-round flows at 0.1 m^3/sec through Wagita dam
4e Strategy	Currently target is achieved by default through stop log leakage. If repairs are scheduled, there is a need to have an effective means to ensure that current flow is maintained.
Addressed in Option	Wagita Option
Addresses Issue #	The strategy identified above would help address the following issues: Aquatic Ecosystem #1 Walleye spawn Aquatic Ecosystem #5 Pike spawn Aquatic Ecosystem #6 Waterfowl Habitat Aquatic Ecosystem #8 Beaver habitat Aquatic Ecosystem #9 Ecosystem health Aquatic Ecosystem #11 Wetland health See Section 6 Issue Category Aquatic Ecosystem for detailed description of issues.

4f Sub-Objective	Maintain natural rates of flow changes in rivers.
4f Target	Site-specific targets based on natural flow characteristics.
4f Strategy	Operate system so that rate of change of outflows approach natural rates.
Addressed in Option	LDML Option 1; Raft Option 1; Valerie Option 1; Calm and Sturgeon Option 1
Addresses Issue #	The strategy identified above would help address the following issues: Aquatic Ecosystem #9 Ecosystem health Aquatic Ecosystem #10 Slumping and erosion Aquatic Ecosystem #11 Wetland health See Section 6 Issue Category Aquatic Ecosystem for detailed description of issues.

7.3 Weighting of Objectives

The Planning Team weighted the objectives. The assignment of weights served to clarify the importance of each objective relative to each zone of the Seine River. This weighting was completed in order to develop operational priorities.

Rules for Weighting Overall Objectives: On a scale of 1 (low – structure not likely used for this objective) to 5 (high — structure most likely used for this objective), each control structure was weighted pertaining to the objectives (Flood; Navigation, Recreation and Social; Power Generation; Aquatic Ecosystems). It was a subjective ranking based on the Planning Team's assessment of public input and knowledge of the individual team members.

The priority rankings combine the ability of a structure to achieve an objective as well as the sub-objective ranking of how the structure should be used.

See table below.

Table 6: Weighting of Objectives

	Weighting of Objectives			
Zone	**Flood Control**	**Navigation, Rec. & Soc.**	**Power Generation**	**Aquatic Ecosystems**
Lac des Mille Lacs dam	4	4	3	5
Raft Lake dam	4	3	5	4
Lower Marmion Sluiceway	1	2	4	3
Wagita Bay dam	n/a	n/a	n/a	4
Valerie Falls dam	1	1	5	4
Calm Lake dam	2	2	5	4
Sturgeon Falls dam	1	2	5	4

7.4 Weighting of Sub-Objectives

Sub-objectives were developed for each overall objective. The weighting of the sub-objectives helped the Planning Team determine the relative importance of each sub-objective to the overall objective.

Sub-Objective Weighting Methodology

Within each overall objective the planning team weighted the sub-objectives by structure. It was a subjective weighting based on the Planning Team's assessment of public input and knowledge of the individual team members.

Rules for Sub-Objective Analysis

Weighting was done on a percentage basis to determine the relative importance of each sub-objective contribution to the overall objective. Some sub-objectives were only relevant to one or two control structures; therefore, the irrelevancy was marked as n/a (not applicable). See the following pages for the weighting of the sub-objectives for each control structure.

Flood Sub-Objective Weighting

Structure		Flood: Overall Objective: Address public safety and property damage by minimizing flooding throughout system.				
Sub-Objective (summary)	**Original objective weighting**	**1a) Minimize flooding on Lac des Milles Lacs**	**1b) Minimize flooding on Upper River**	**1c) Minimize impacts of Seine R. flooding on Town of Atikokan especially during Atikokan river flood events.**	**1d) Minimize flooding on Perch Lake**	**1e) Minimize flooding on Lower Seine River**
LDML Dam	4	70%	30%	n/a	n/a	n/a
Raft Lake Dam	4	n/a	n/a	10%	90%	n/a
Lower Marmion Sluiceway	1	n/a	n/a	n/a	100%	n/a
Wagita Bay Dam	n/a	n/a	n/a	n/a	n/a	n/a
Valerie Falls Dam	1	n/a	n/a	n/a	100%	n/a
Calm Lake Dam	2	n/a	n/a	n/a	100%	n/a
Sturgeon Falls Dam	1	n/a	n/a	n/a	n/a	100%

Navigation/Recreation/Social Sub-Objective Weighting

Structure		**Navigation/Recreation/Social: Overall Objective: Maintain navigation, recreational and social opportunities throughout system. Generally includes boating hazards, access points, accessing docks, ice travel safety, Atikokan-Minaki waterway, and water intakes.**			
Sub-Objective (summary)	**Original Objective Weighting**	**2a) Maintain stable water levels on LDML during open water season; minimize ice damage to shoreline structures due to rising levels in winter.**	**2b) Maintain water levels on Upper River to allow access from Reserve 22A2 to Mosher Lake and facilitate hunting and fishing opportunities.**	**2c) Maintain water levels suitable for access and navigation on Upper Marmion and Lower Marmion during open water season.**	**2d) Maintain water levels suitable for access and navigation on Calm and Perch during open water season.**
LDML Dam	4	75%	25%	n/a	n/a
Raft Lake Dam	3	n/a	n/a	100%	n/a
Lower Marmion Sluiceway	2	n/a	n/a	100%	n/a
Wagita Bay Dam	n/a	n/a	n/a	n/a	n/a
Valerie Falls Dam	1	n/a	n/a	n/a	100%
Calm Lake Dam	2	n/a	n/a	n/a	100%
Sturgeon Falls Dam	2	n/a	n/a	n/a	100%

Power Generation Sub-Objective Weighting

Structure		**Power Generation: Overall Objective: Optimize power generation values from system.**					
Sub-Objective (summary)	**Original Objective Weighting**	**3a) LDML**	**3b) Upper Marmion**	**3c) Lower Marmion**	**3d) Little Falls Lake & Colin Lake (Valerie Falls power dam)**	**3e) Calm Lake (Calm Lake power dam)**	**3f) Laseine to SF (Sturgeon Falls power dam)**
LDML Dam	3	100%	n/a	n/a	n/a	n/a	n/a
Raft Lake Dam	5	n/a	100%	n/a	n/a	n/a	n/a
Lower Marmion Sluiceway	4	n/a	n/a	100%	n/a	n/a	n/a
Wagita Bay Dam	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Valerie Falls Dam	5	n/a	n/a	n/a	100%	n/a	n/a
Calm Lake Dam	5	n/a	n/a	n/a	n/a	100%	n/a
Sturgeon Falls Dam	5	n/a	n/a	n/a	n/a	n/a	100%

Aquatic Ecosystem Sub-Objective Weighting

Structure		Aquatic Ecosystem: Overall Objective: Maintain or improve aquatic ecosystem health in system					
Sub-Objective (summary)	Original Objective Weighting	4a) Improve aquatic ecosystem health on Upper Marmion Lake by reducing winter drawdown.	4 b) Maintain spring spawning opportunities by having steady or rising flows throughout the system (April 15 - June 15)	4 c) Improve extent and diversity of aquatic wetlands by lowering water levels throughout the summer months	4 d) Improve aquatic ecosystem health; maintain minimum flows throughout system	4 e) Maintain current flows at Wagita dam to maintain West Arm of Steep Rock Lake avoid high volume discharges re suspended silt concerns.	4 f) Maintain natural rates of flow changes in rivers
LDML Dam	5	n/a	25% Lac des Milles Lacs; 20% LDML Outflow	25%	20%	n/a	10%
Raft Lake Dam	4	20%	15% Upper Marmion Lake; 17% Raft Lake Outflow	15%	18%	n/a	15%
Lower Marmion Sluiceway	3	n/a	30%	30%	30%	n/a	10%
Wagita Bay Dam	4	n/a	n/a	n/a	n/a	100%	n/a
Valerie Falls Dam	4	n/a	35%	35%	0%	30%	0%
Calm Lake Dam	4	n/a	15% Calm Lake; 35% Calm Lake Dam Outflow	15%	30%	n/a	5%
Sturgeon Falls	4	n/a	10% Laseine Lake; 40% Sturgeon Falls Dam Outflow	10%	35%	n/a	5%

8 Option Development

8.1 Data and Information Used in Option Development

To develop a range of options, a variety of data and information was used: fish studies, angling studies, current level and flow operating regimes, and industry and MNR knowledge and expertise at managing water levels and flow in the system.

Additional data and information used during the option development stage included historical flow and level data, and mock alternatives. The historical flow and level data per control structure per period was:

Lac des Mille Lacs, 1995 to 2002*
Lower Marmion Lake, 1998 to 2002
Raft Lake, 1989 to 2002*
Valerie Falls dam, 1995 to 2002*
Calm Lake dam, 1995 to 2002*
Sturgeon Falls dam, 1989 to 2002*
(excluding 1998 which was considered a drought year)*

The 1995 to 2002 period was used because 1995 was the year the current operating regime for Lac des Mille Lacs was implemented. The water management practices were different prior to 1995 and therefore, the information would not always be relevant or comparable to the years 1995 to 2002.

Lower Marmion 1998 (start of new operating regime due to installation of sluiceway)
Raft Lake 1989 (period with ACCC management)
Valerie Falls (since commissioning)
Calm Lake (data available at time of plan preparations; also longer period available for Sturgeon Falls downstream of Calm)
Sturgeon Falls (period with ACCC management of Raft Lake)

Mock Alternatives:

A critical part of water management planning involved the creation of different water management options, that were evaluated to identify the one that best meets the needs of the users and resource values of the system.

For the purpose of exploring viable options for water management, it was helpful to develop a set of water management options based solely on the basis of one interest. These options (known as “mock alternatives”) were developed as if the identified interest had complete priority for water management on the system. In a system with several different interests, such as the Seine River, the mock alternatives should not be looked on as viable management options. Rather, they provide a means of capturing the objectives of each interest, and a direction in which water management should be

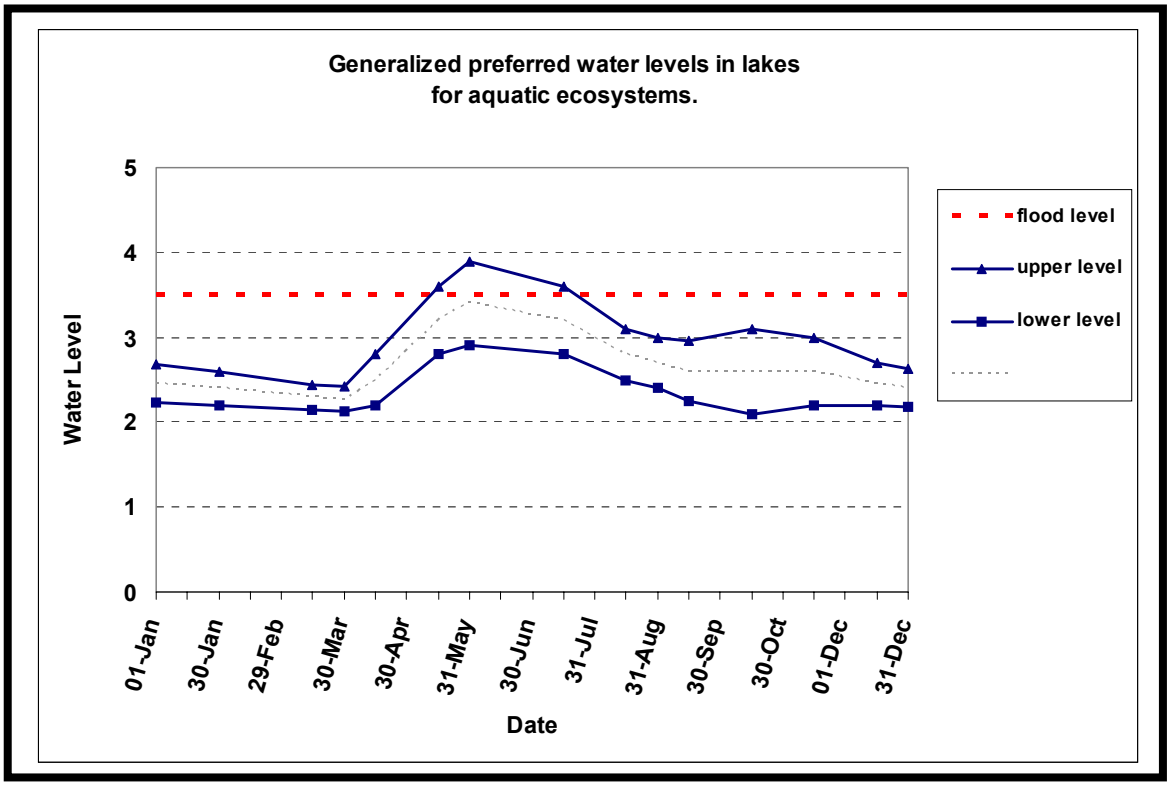
moving during the planning process if it becomes desirable to enhance one particular interest.

Option 1: Aquatic Ecosystems

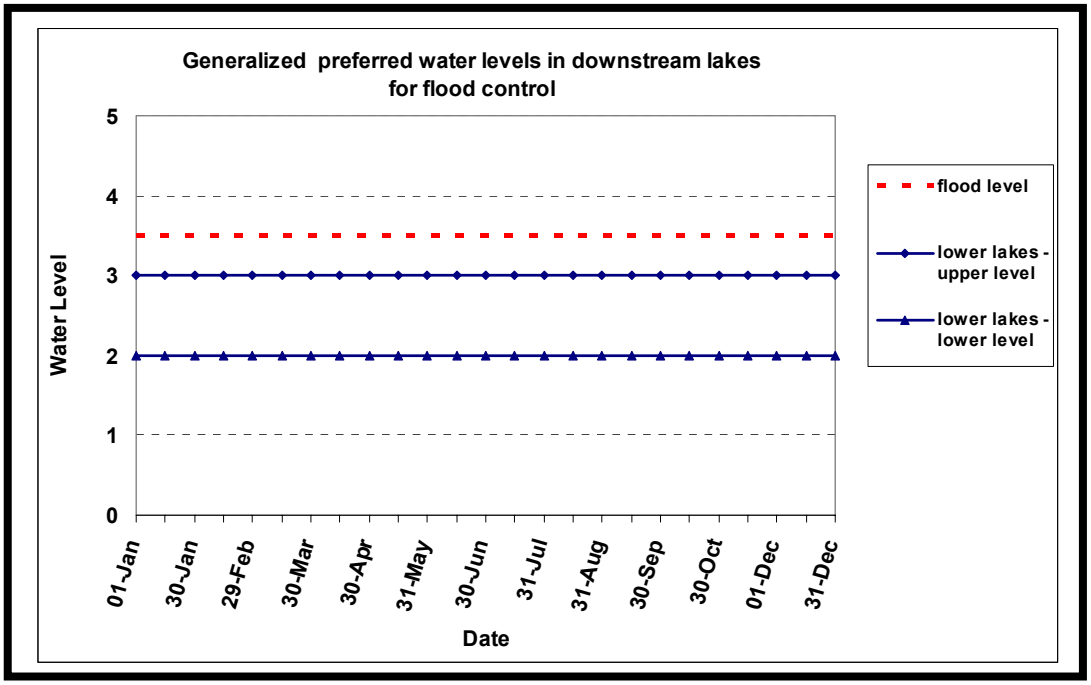
This mock alternative was concerned only with providing habitat for native fish and wildlife species. It was developed using the principles found in the Aquatic Ecosystem Guidelines. These guidelines state that the annual cycle and variability found in natural water systems has provided the background in which plants and animals have evolved since the passing of the glaciers and that these provide the best mix of habitat for the ecosystem as a whole. The alternative was based on the information presented in Appendix 5 *Natural Flow and Level Characteristics for the Seine River System* (Jackson, 2003).

In general, an uncontrolled system begins to rise in early April and peak in late May. This is followed by a steady decline throughout the summer months. Fall levels are relatively stable, followed by a slow decline throughout the winter.

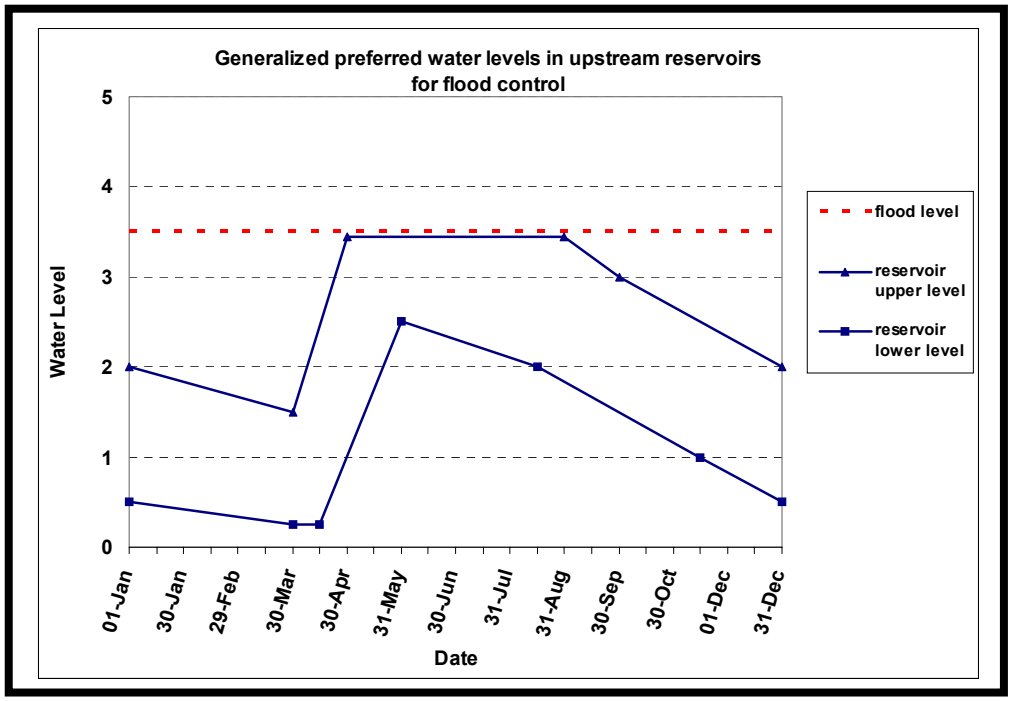
Water levels are most variable in the spring and fall months and least variable in the winter months.



Option 2: Flood

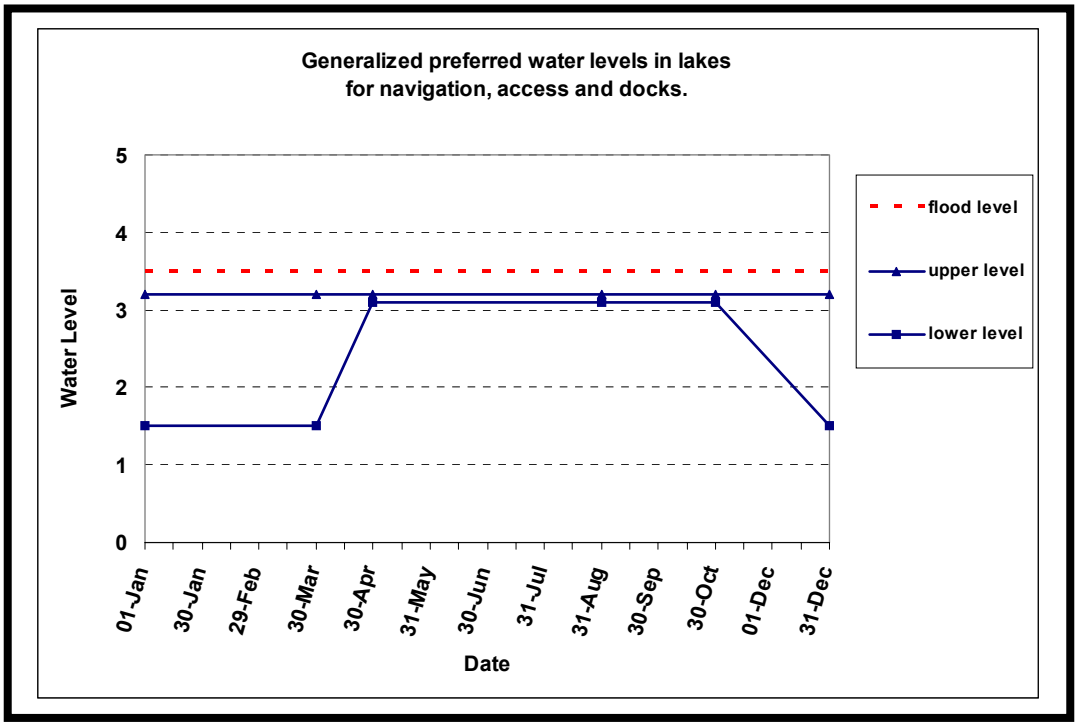


This mock alternative was concerned with prevention of flooding during the open water months. The idea would be to manage flows so that they are stable throughout the year. The reservoirs would be held below maximum levels to provide a flood buffer at all times, especially during the late winter to provide space to buffer the spring runoff. More water storage capability in upstream reservoirs helps to prevent high flows that could potentially cause flooding.



Option 3: Navigation, Recreation and Social Opportunities

This alternative was concerned with maintaining consistent navigation through shallows and around shoals and providing adequate levels to use boat launches and dock levels during the boating season (i.e. early May to November 1). This would be provided by maintaining water levels at relatively high stable levels. It was not particularly concerned with levels during the non-boating seasons (i.e. November 1 to early May).



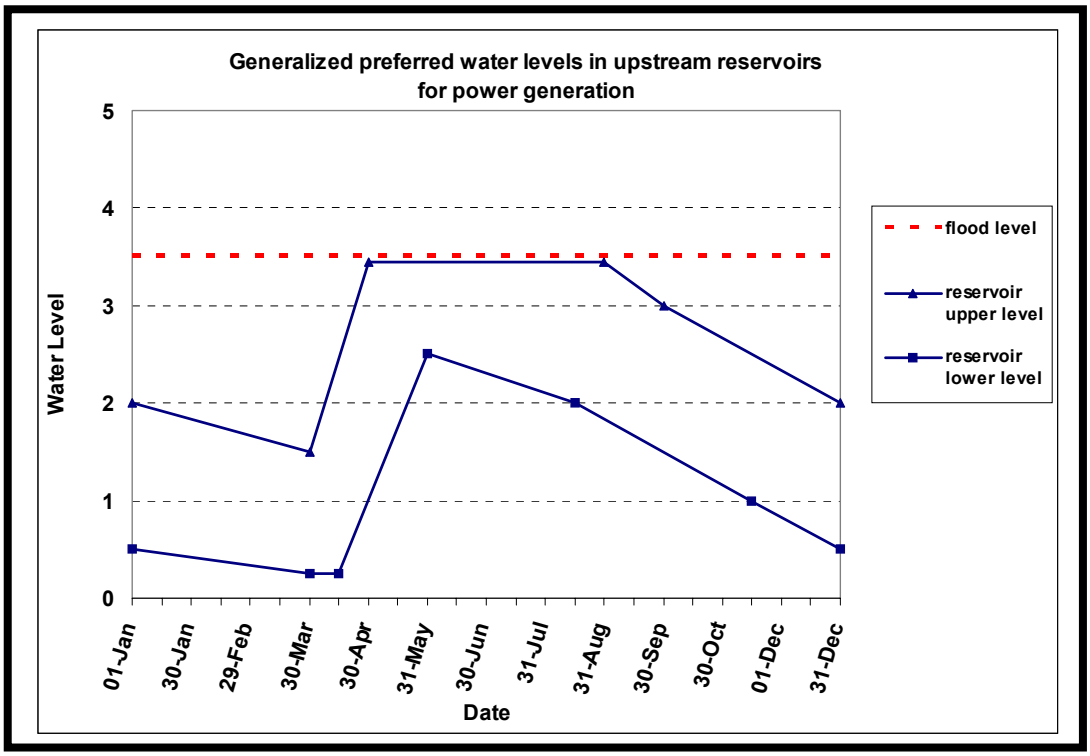
Option 4: Power Generation

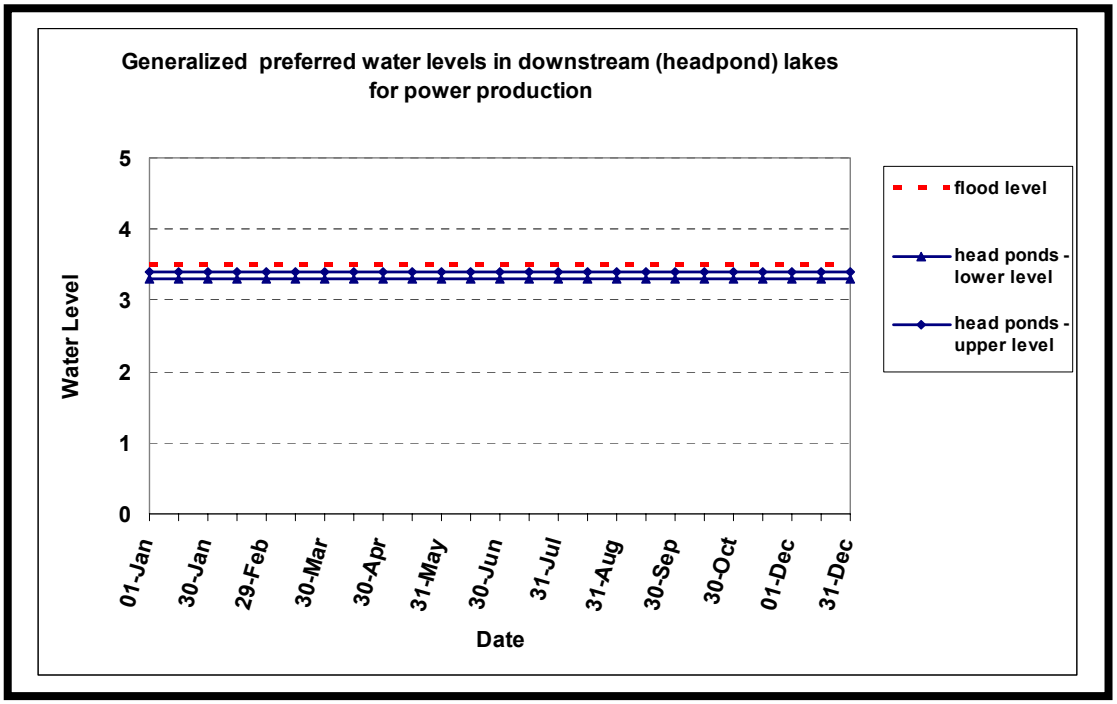
This mock alternative was concerned with optimizing revenues from waterpower production.

In the past, this alternative has been described as maintaining the same flow through the waterpower generating sites every day of the year, but with the ability to do daily peaking; (i.e. to reduce flows during non-demand times of the day and increase flows during high demand periods). However, given the change in the market since the deregulation of the electricity industry, this description may be changing.

For the Seine River system, the traditional approach to ideal waterpower production was to have a steady flow throughout the system with the daily average of ~40 m^3/sec each day passing through the waterpower generating sites. Water levels in the reservoirs (e.g. Marmion and Lac des Mille Lacs) would be full during the spring and then be managed to balance flows throughout the remainder of the year. Ideally, reservoirs would be maintained at high levels during the summer although a wide range of acceptable levels throughout the year would be desirable to allow managers to react

to changing situations. There is also a desire not to allow water flows to exceed turbine capabilities (50-65 m^3/sec depending upon site). More water storage capability in upstream reservoirs helps meet this objective. Water levels in the headponds (i.e. Colin Lake, Calm Lake and Laseine Lake) would be high and stable throughout the year.





8.2 The Range of Options Considered

For each control structure, options were developed to meet the sub-objectives.

The options were developed using the best available information, weighting of sub-objectives, historical level and flow data, ecosystem data, and the socio-economic implications of the options.

For each control structure, the current operating regime was listed first and then the following:
Option 1: For each control structure, one option was developed that attempted to define a natural ecosystem flow based on the Aquatic Ecosystem Guidelines.
Other Options: For each control structure, two or three other options were developed to meet a specific objective or a combination of the objectives (flood; navigation, recreation, and social; aquatic ecosystem; and power generation).

For the Lac des Mille Lacs dam, four options were developed:
1. to favour natural aquatic ecosystem
2. to maximize waterpower production
3. to meet the objectives for aquatic ecosystem and waterpower production
4. to meet the objectives for flood mitigation, navigation/recreation/social and aquatic ecosystems.

For the Lower Marmion Sluiceway two options were developed:
1. to meet observed water levels
2. to meet the option for Raft Lake dam during summer; water levels are primarily controlled by Raft Lake dam during the open water period.

For the Raft Lake dam four options were developed:
1. to favour natural aquatic ecosystem
2. to meet objectives for flood mitigation, navigation/recreation/social and waterpower and aquatic ecosystem in open water season; no fall increase in waterpower storage
3. to meet objectives for winter power production and balance between navigation/recreation/social and aquatic ecosystems in open water season
4. to meet objectives for navigation/recreation/social and aquatic ecosystem with some reduction in waterpower production — reduced winter drawdown.

For the Wagita dam, one option was developed due to the constraint that discharges above 4 m^3/sec may cause mobilization of silt in West Arm of Steep Rock Lake:
1. Minimum flow setting 0.1 m^3/sec.

For the Valerie Falls dam, four options were developed:
1. to favour a natural aquatic ecosystem
2. to meet the objective of a moderate increase in power production
3. to meet the objectives for aquatic ecosystem and waterpower production
4. to meet the objectives waterpower production.

For the Calm Lake dam, four options were developed:
1. to favour natural aquatic ecosystem
2. to meet the objectives for waterpower, aquatic ecosystem during spring spawn season and navigation/recreation/social during open water season
3. to favour the aquatic ecosystem and navigation/recreation/social with impacts on waterpower production
4. to favour aquatic ecosystem with impacts on waterpower production and navigation/recreation/social.

For the Sturgeon Falls dam, four options were developed:
1. to favour natural aquatic ecosystem
2. to meet the objectives for waterpower, aquatic ecosystem during spring spawn season and navigation/recreation/social during open water season
3. to favour aquatic ecosystem and navigation/recreation/social with impacts on waterpower production
4. to favour aquatic ecosystem with impacts on waterpower production and navigation/recreation/social.

9 Identification of Preferred Options

Sites not scored were Wagita dam and the Lower Marmion Sluiceway for the following reasons:

Wagita Dam: Only one viable option was determined. The reasons are 1) Discharges above 4 m^3/sec may cause mobilization of silt in West Arm of Steep Rock Lake and result in unacceptable water quality both there and downstream and 2) water levels upstream are controlled by the Valerie Falls dam and not this structure.
The preferred option met the issues identified and objectives set by the Planning Team.

Lower Marmion Sluiceway: Although two options were identified, only one option was selected. The option chosen for the Raft Lake dam determines how Lower Marmion would be controlled above 414.80 m. This is because Lower Marmion is effectively controlled by the Raft Lake dam for the open water season. The minimum winter lake level of Lower Marmion is limited by an Ontario Power Generation requirement that water levels remain above 414.80 m. to ensure suction head for cooling water pumps. The Lower Marmion Sluiceway is used to keep levels above 414.80 when Upper Marmion levels are lower. In the summer, Ontario Power Generation may experience inadequate cooling water flows if the level is too low. An agreement between Valerie Falls and OPG targets a summer minimum of 415.30 m.

9.1 Methods and Criteria

Comparison of the Options

A matrix was used to compare the options per structure. The option matrix included minimum flow, bankfull flow, riparian flow, up and down ramping rates, open water levels and fluctuation, and winter levels and fluctuation.

The preferred option selection process was designed to select the option that best considered and balanced the aquatic ecosystem and human uses of the water resource. The Planning Team assessed weights for the objectives and sub-objectives based on the best available knowledge. The management capacity and constraints of each water control structure was also considered. Finally, the impacts of the options on Flood, Aquatic Ecosystems, Navigation, Recreation and Social and Power Production were evaluated. The methodology identified the option that has the highest total combined score and best balanced objectives based on the weighting assigned.

The non-preferred option summaries for each structure along with the pros and cons of each of non-preferred options can be found in Appendix 7.

Evaluation: Scoring the Options

A scoring system was used as a method to evaluate the options developed for the Lac des Mille Lacs dam, Raft Lake dam, Calm Lake dam, Sturgeon Falls dam and Valerie Falls dam. The scoring provided an objective means of evaluating the options.

Methodology: Rules for Scoring

A number between 1 and 5 was selected depending on how well the option met the sub-objectives for each objective.
1 = 0 to 20% of the time
2 = 20% to 40% of the time
3 = 40% to 60% of the time
4 = 60% to 80% of the time
5 = 80% to 100% of the time

Where information was available, the scoring was done as quantitatively as possible (e.g. amount of winter drawdown, annual fluctuation). In other situations, such as flood mitigation, a more qualitative approach was taken. The Planning Team scored each option quantitatively or qualitatively on how it achieved the sub-objective, based on the above rules.

Criteria for Scoring the Options are listed below:

Objective 1: Flood Control
Sub-objectives 1a), 1b), 1d), and 1e) minimize flooding on Lac des Mille Lacs, Sapawe Road, Perch Lake and Lower Seine River: These required a qualitative assessment of each option to mitigate floods. Options that had more storage — particularly during spring freshet — were scored higher than options with less storage. The Planning Team did not have access to flooding models that would have provided quantitative data. Although no flood model was available within the planning timeframe, the long history of water flow data and flood event recording provided useful benchmarks against which the relative impacts of changes could be generally determined.

Sub-objective 1c) minimize effects of Seine River flooding on the Town of Atikokan: The planning team determined that flood inundation studies have shown that the Seine River has no effect on the Atikokan River except when the Seine River and Atikokan River are in a coincident flood. This event would then be out of the scope of this plan (see Section 11.2). However, in the period preceding a flood event, when flows and levels are rising, certain flood mitigation measures can be employed to retime flows thereby reducing the frequency of coincidental flood events and the resulting impacts of flooding in downstream areas including the Town of Atikokan.

Objective 2: Navigation/Recreation/Social
Sub-objective 2a) navigation on Lac des Mille Lacs: Options were scored based on the percentage of the open water season that water levels stayed above 456.6 m.

Sub-objective 2b) navigation on the Upper River: Options were scored based on the rationale that higher minimum flows would provide better navigation. The exact flow level to provide adequate navigation is not known at this time. It is listed as a data gap.

Sub-objective 2c) navigation on the Upper Marmion and Lower Marmion: Options were scored based on percentage of the open water season that water levels were above target of 415.0 m.

Sub-objective 2d) navigation on Calm and Perch Lakes: Options were scored based on percentage of the open water season that water levels were above target of 382.4 m.

Objective 3: Power Generation
Sub-objective 3a) Lac des Mille Lacs: Options were scored based on the percentage of their annual fluctuations as a percentage of the total available range of 456–457 m.

Sub-objective 3b) Upper Marmion: Options were scored based on the percentage of their annual fluctuations as a percentage of the total available range of 411.5–415.89 m.

Sub-objective 3c) Lower Marmion: Options were scored based on the percentage of their annual fluctuations as a percentage of the total available range of 414.8–415.89 m.

Sub-objective 3d) Valerie Falls: Options were scored based on the percentage of their annual fluctuations as a percentage of the total available range of 403.2–403.9 m.

Sub-objective 3e) Calm Lake: Options were scored based on the percentage of their annual fluctuations as a percentage of the total available range of 382.2–382.75 m.

Sub-objective 3f) Sturgeon Falls: Options were scored based on the percentage of their annual fluctuations as a percentage of the total available range of 357.2–357.75 m.

In addition, the scoring considered the impact of minimum flows scheduled drawdown, operational flexibility, and hydraulic head on optimization of power, energy and revenue.

Objective 4: Aquatic Ecosystem
Sub-objective 4a) Reducing winter drawdown on Upper Marmion: Options were scored using the following criteria:
0–0.5 m winter drawdown = 5
0.5–1 m winter drawdown = 4
1–1.5 m winter drawdown = 3
1.5–2 m winter drawdown = 2
greater than 2 m winter drawdown = 1

Sub-objective 4b) steady or rising flows throughout the system: Options were qualitatively assessed based on their ability to meet the target. Options where lakes had increased winter drawdown were considered less likely to achieve steady or rising conditions compared to lakes with less volume to refill in the spring.

Sub-objective 4c) summer drawdown: A target of summer drawdown of 65% of annual natural fluctuation was calculated for each control structure (each lake upstream of a dam). Options were scored based on how the summer drawdown (measured at the midpoint of the band) met the target summer drawdown on a percentage basis. For example, if the target was a 0.5 m summer drawdown and the midpoint of bands provided a summer drawdown of .25 m, the option would meet 50% of the target and score 3 points of a 5-point scale (1 = lowest, 5 = highest).

Sub-objective 4d) Minimum flows through system: Options were evaluated by comparing minimum flows to the target minimum flows for each dam on a percentage basis. Target minimum flows were based on the 10^{th} percentile natural flows (see Appendix 5a) and are defined in Option 1 for each dam. Minimum flows were set so that values for each structure were at least as high as the value for the structure upstream from it.

Sub-objective 4e) Maintain existing flows at Wagita: Only one option was developed to meet this sub-objective.

Sub-objective 4f) Natural rates of flow changes: Options were quantitatively assessed against natural flow changes.

9.2 Scoring and Analysis of Options And Description of Preferred Options

Option Scoring – **Lac des Mille Lacs**

LDML			Sub-Account Weighting				Weighted Score			
Sub-Objectives	**Original Weight (from Section 7.3)**	**Sub Account Weight (from Section 7.4)**	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 1**	**Option 2**	**Option 3**	**Option 4 Preferred**
Flood	4									
1a) Minimize flooding on Lac des Mille Lacs		70%	3	4	3	3				
1b) Minimize flooding on Upper River		30%	3	4	3	4				
Sub-Total			3	4	3	3.3	2.4	3.2	2.4	2.6
Nav/Rec/Social	4									
2a) Maintain stable water levels on LDML during open water season; minimize ice damage to shoreline structures due to rising levels in winter		75%	3	2	5	5				
2 b) Maintain water levels on Upper River to allow access from Reserve 22A2 to Mosher Lake		25%	5	4	4	3				
Sub-Total			3.5	2.5	4.75	4.5	2.8	2.0	3.8	3.6
Power Gen	3									
3 a) Optimize power generation values from LDML.		100%	3	5	4	5	1.8	3.0	2.4	3.0
Sub-Total			3	5	4	5	1.8	3.0	2.4	3.0
Aquatic Eco	5									
4 b) Maintain spring spawning opportunities by having steady or rising levels on LDML (April 15 - June 15)		25%	5	4	5	5				
4 b) Maintain spring spawning opportunities by having steady or rising flows on the upper river (April 15 - June 15)		20%	5	3	4	4				
4 c) Improve extent and diversity of aquatic wetlands by lowering water levels throughout the summer months		25%	5	4	3	3				
4 d) Improve aquatic ecosystem health; maintain minimum flows throughout system		20%	5	2	4	2				
4 f) Maintain natural rates of flow changes in rivers		10%	5	4	4	4				
Sub-Total			5	3.4	4	3.6	5.0	3.4	4.0	3.6
Total of options							12.0	11.6	12.6	12.8

***Option 1**: Aquatic Ecosystems*
***Option 2**: Maximize Power Generation*
***Option 3**: Aquatic Ecosystems and Power Generation*
***Option 4 (preferred)**: Flood; Navigation, Recreation, and Social; Aquatic Ecosystems*

Explanation: The option scoring for each of the options was relatively close. Aquatic Ecosystems is the priority for Lac des Mille Lacs (highest weight 5); however, Navigation, Recreation, Social and Flood also received relatively high Original Objective weightings (weighting of 4 for each). Option 4 ranked the highest because it best addressed the combined components within the objectives and sub-objectives.

Sub-Account Weighting and Overall Scoring:

Summary of Methodology (See Section 9 for the detailed explanation of the methodology and criteria for scoring.)

For the objectives a number between 1 and 5 was selected depending on how well the option met the sub-objectives for each objective.
1 = 0 to 20% of the time
2 = 20% to 40% of the time
3 = 40% to 60% of the time
4 = 60% to 80% of the time
5 = 80% to 100% of the time

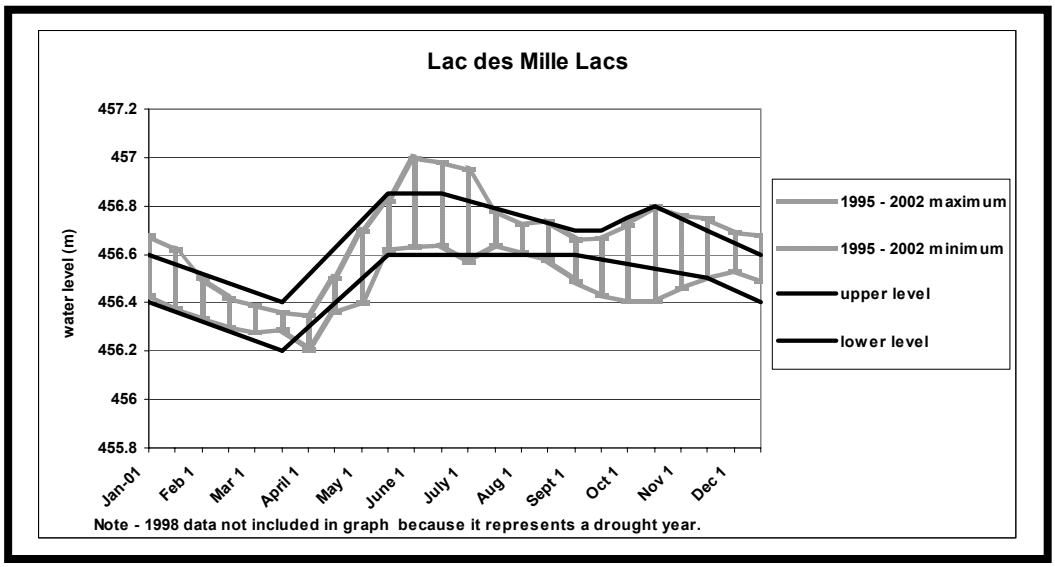
To illustrate sub-account weighting and overall scoring methodology, consider the following explanation for Lac des Mille Lacs.

Sub-objectives
1a) Minimize flooding on Lac des Mille Lacs - keep water levels below 456.99 m. This sub-objective received 70% of the weighting compared to sub-objective 1b) Minimize flooding on Sapawe Road - which received 30% of the weighting. This is because flooding on Lac des Mille Lacs was determined to have a higher impact than flooding on the Sapawe Road.

- Option 2 meets the 1a) and 1b) sub-objective targets 60% to 80% of the time = 4.
- Options 1, 3, and 4 each meet the sub-objective targets 40% to 60% of the time = 3.
- If there were sub-objectives the overall objective score is a weighted average of the sub-objectives.
- The original weighting was 4 out of 5 = 80%.
- The total option weighting for sub-objective 1a) and 1b) for Option 1 = 3
- Therefore, Option 1 Weighted Scoring = 3 x 80% = 2.4.

A similar methodology was used to evaluate options for Raft Lake Dam, Valerie Falls Dam, Calm Lake Dam, and Sturgeon Falls Dam.

Lac des Mille Lacs Preferred Option



The preferred option combines the benefits of aquatic ecosystems; flood mitigation; navigation, recreation and social; and power generation

Pros: Combines the benefits of aquatic ecosystems; flood mitigation; navigation, recreation and social; and power generation. Generally, the operator will operate toward the middle of the band. Power generation was not a consideration during the spring and summer.

- Enhances spring spawning opportunities with steady or rising levels and flows (sub-objective 4b)
- Reduces flood risk on Lac des Mille Lacs (sub-objective 1a) and Sapawe Road/Upper Seine River (sub-objective 1b),
- Provides navigation opportunities during the open water season on Lac des Mille Lacs (sub-objective 2a),
- Provides water for winter power production when power rates are higher (sub-objective 3a)
- Reflects observed levels 1995–2002.

Cons:

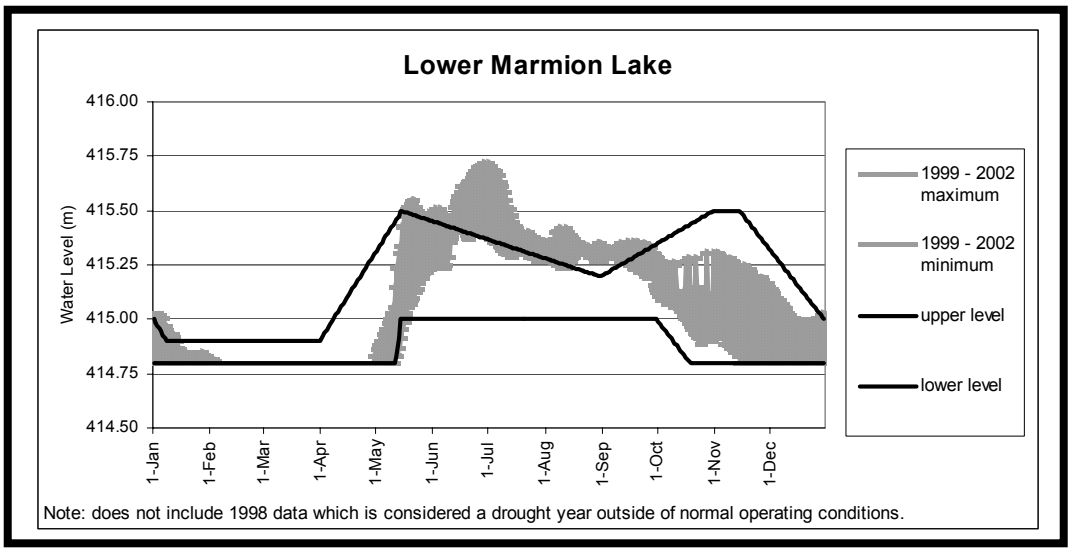
- Does not provide a natural late summer drawdown (sub-objective 4c). The absence of a scheduled late summer drawdown may impact on wetland development. This could also impact on general fish productivity in the system. However, the Planning Team determined that a scheduled late summer drawdown significantly increased risk of low water levels that could impact navigation. The Planning Team also noted that a late summer drawdown is already frequently occurring due to evaporation losses during the summer.
- Partially meets seasonal minimum flows through system (sub-objective 4d improve aquatic ecosystem health by maintaining minimum flows through the system).

Option 4 provides a year round minimum flow of 1.5 m3/sec. A higher minimum flow that varies by season would promote aquatic ecosystem benefits downstream; however, a higher minimum flow increases the risks of negative impacts on navigation, recreation, and social activities on Lac des Mille Lacs. This is because Lac des Mille Lacs has a large surface area inside a relatively small drainage basin. High prescribed minimum flows could cause levels to fall below target levels for navigation especially in the summer months.

Difference between Current Operating Regime and Preferred Option

Lac des Mille Lacs	Current	Preferred
Minimum Flow	1.5 m^3/sec	1.5 m^3/sec
Up Ramping Rate	No restrictions	20 m^3/sec/day during flood situations 5 m^3/sec/day other times
Down Ramping Rate	No restrictions	20 m^3/sec/day during flood situations 5 m^3/sec/day other times
Open Water Levels	456.40 m by May 7 456.99 m by Oct. 31 Actual Practice: Evaporation losses are causing a summer drawdown towards 456.60 m in most years; spring water levels typically range up to 456.99 m.	Minimum: 456.60 m by May 7 456.60 m by Sept. 7 456.50 m by Nov. 15 Maximum: 456.85 m by May 7 456.85 m by June 15 456.70 m by Sept. 7 456.75 m by Oct. 1 456.80 m by Oct. 15 456.70 m by Nov. 15 Lake levels will be stable or rising from April 15 to June 15. During the summer, the operator will manage water levels to target the middle of the operating band (best management target)
Winter Levels	456.75 m by Nov. 15 456.20 m by Mar. 15 Discretion of operator based on snow and ground water conditions	Minimum: 456.50 m by Nov. 15 456.20 m by Mar. 15 Maximum: 456.70 m by Nov. 15 456.40 m by Mar. 15 Lake levels should not increase after ice-in (best management target)

Lower Marmion Preferred Option



The option that matches the preferred option for Raft Lake dam was selected as the preferred option for the Lower Marmion Sluiceway, as the levels of Lower Marmion Lake are controlled by the Raft Lake dam for the open water season annually. Managing Lower Marmion separately from Raft Lake dam would mean the closure of the navigation sluiceway between Upper and Lower Marmion Lakes. This option meets the combined objectives of aquatic ecosystem, navigation, recreation, social and power generation. Note: Lower Marmion winter drawdown is limited to 414.80 m to meet cooling water supply needs for Ontario Power Generation's station.

Pros:

- In combination with the preferred Raft Lake option, this option for Lower Marmion reduces the risk of flood due to modest winter drawdown and a fall increase in levels (sub-objective 1d).
- navigation on Upper and Lower Marmion (sub-objective 2c) – meets the navigation target of 415.0 m to 415.5 m from 3rd Saturday of May (open season of walleye fishing) to November 15
- steady or rising levels during spring spawning period (sub-objective 4b), and
- provides aquatic ecosystem benefits by mimicking a natural decline of water levels through the summer months (sub-objective 4c)
- provides potential for additional water storage in fall for increased winter power production (sub-objective 3c)

Cons:

- increases risk of a later spring lake level recovery which would impact navigation/recreation/social sub-objectives (sub-objective 2c).

Difference between Current Operating Regime and Preferred Option:

Lower Marmion	Current	Preferred
Minimum Flow	0.2 m^3/sec	0.2 m^3/sec
Up Ramping Rate	2 m^3/sec	2 m^3/sec/day
Down Ramping Rate	2 m^3/sec	2 m^3/sec/day
Open Water Levels	Minimum: 415.20 m by May 15 415.30 m by June 15 415.50 m by Aug. 15 415.25 m by Oct. 30	Minimum: 415 m from 3rd Sat. May to Oct. 1 Maximum: 415.50 m by May 15 415.20 m by Sept. 1 415.50 m by Nov. 1 Lake levels will be stable or rising from April 15 to June 15.
Winter Levels	415.25 m Nov. 1 414.80 m Apr. 1	Minimum: 414.8 m Maximum: 415.50 m by Nov. 15 414.90 m by Apr. 1

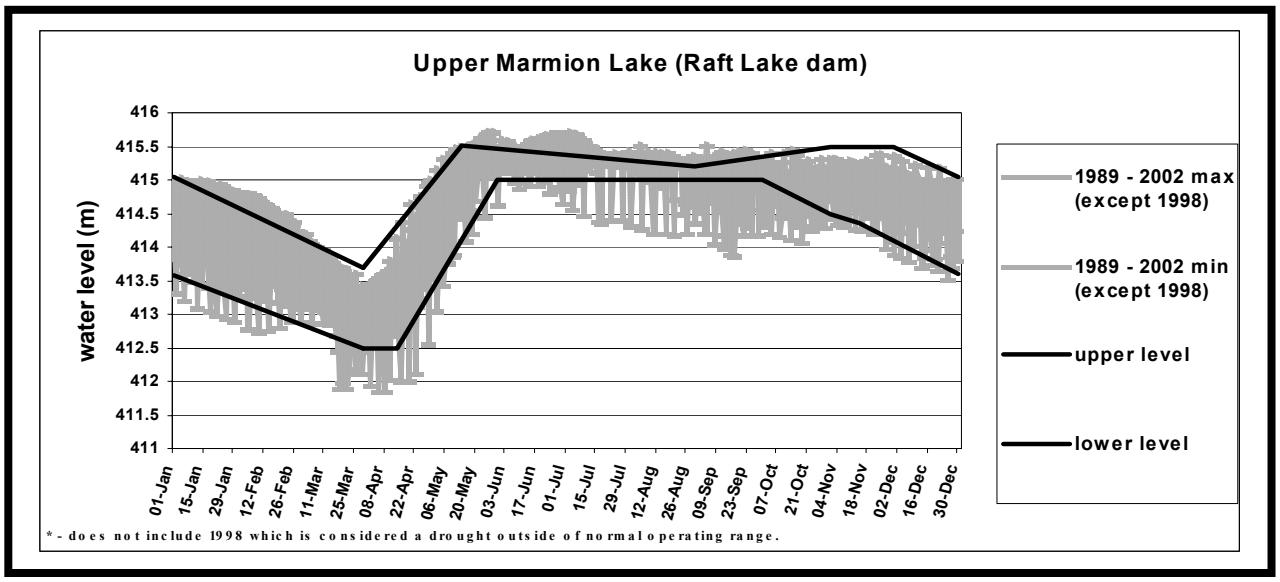
Option Scoring – **Raft Lake Dam**

RAFT			Sub-Account Weighting				Weighted Score			
Sub-Objectives	**Original Weight (from Section 7.3)**	**Sub Account Weight (from Section 7.4)**	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 1**	**Option 2**	**Option 3 Preferred**	**Option 4**
Flood	4									
1c) Minimize impacts of Seine R. flooding on Town of Atikokan especially during Atikokan river flood events.		10%	1	1	1	1				
1d) Perch flooding		90%	1	3	4	3				
Sub-Total Flood			1	2.8	3.7	2.8	0.8	2.2	3.0	2.2
Navigation/Recreation/Social	3									
2c) Sluiceway & Launch Access		100%	2	4	4	4	1.2	2.4	2.4	2.4
Sub-Total Navigation/Recreation/Social										
Power Generation	5									
3b) Optimize power gen on Upper Marmion		100%	1	4	4	3	1.0	4.0	4.0	3.0
Sub-Total Power Generation										
Aquatic Eco	4									
4a) reduce winter drawdown		20%	5	2	2	3				
4b) steady or rising levels in lake - spawn		15%	5	3	3	4				
4b) steady or rising flows downstream from Raft		17%	5	3	3	4				
4c) natural summer drawdown		15%	5	3	3	3				
4d) minimum flows		18%	5	2	2	3				
4f) natural rate of change		15%	5	2	3	3				
Sub-Total Aquatic Ecosystems			5	2.47	2.62	3.32	3.0	1.5	1.6	2.2
Total of options							6.0	10.1	10.9	9.8

***Option 1**: Aquatic Ecosystems*
***Option 2**: Power Generation; Flood; Navigation, Recreation, and Social; and Aquatic Ecosystems (open water season)*
***Option 3 (preferred)**: Power Generation; Flood; Navigation, Recreation, Social; and Aquatic Ecosystems (open water season)*
***Option 4**: Power Generation; Flood; Navigation, Recreation, Social; and Aquatic Ecosystems (open water season and lower winter drawdown)*

Explanation: Option 3 ranked the highest because the Planning Team determined that Power Generation would have the highest overall weighting at this control structure. Also, Option 3 best addressed the role of the Raft Lake Dam in reducing the magnitude of downstream flood events.

Raft Lake Dam Preferred Option



The preferred option favours winter power production and reduces risk of flood. Mostly meets objectives for navigation, recreation and social activities. It also meets aquatic ecosystems objectives during the open water season.

Pros:

- provides more flexibility for power, especially winter power when rates are higher and minimizes spillage at power dams (sub-objective 3b)
- provides potential for additional water storage in fall for increased winter power production (sub-objective 3b)
- increases the end of winter minimum level from 411.5 m to 412.5 m. (reduces aquatic ecosystem impacts associated with drawdown to 411.5 m)
- steady or rising flows and levels during spring spawning period (sub-objective 4b)
- provides aquatic ecosystem benefits by mimicking a natural decline of water levels through the summer months (sub-objective 4c)
- meets minimum flow targets in winter and fall (sub-objective 4d)
- reduces flooding in spring on Perch Lake (sub-objective 1d) – helps to keep discharge from Raft Lake below 150 m3/sec as this discharge is known to cause flooding
- navigation on Upper and Lower Marmion (sub-objective 2c) – meets the navigation target of 415.0 m to 415.5 m from 3rd Saturday of May (open season of walleye fishing) to November 15
- provides access to Reserve Bay by May 15 and permits opening of the Lower Marmion navigation sluice by 3rd Saturday of May.

Cons:

- modest reduction of winter power storage (3b) because of the increased minimum level from 411.5 m to 412.5 m

- the preferred option impacts aquatic ecosystems in winter and slightly increases risk of fall flooding downstream due to a higher level band in the late fall.
- does not explicitly meet minimum flow targets in spring and summer although requirement for steady or rising flows in spring means that in most years flows will increase in spring similar to natural systems (sub-objective 4d)
- does not meet target of reducing winter drawdown to natural levels (sub-objective 4a). This can impact aquatic ecosystems by affecting the following:
    - Reduced whitefish spawning success
    - Reduced aquatic furbearer abundance
    - Reduced access of pike to spawning habitat
    - Reduction in aquatic vegetation abundance and diversity
    - Decreased survival of species that overwinter in shallow zone of lake.
- slightly increases risk of flood (sub-objectives 1c and 1d). Drawdown to 411.5 m may decrease the frequency of downstream flooding. Note: A drawdown to 411.5 m would increase flood freeboard.
- increases risk of a later spring lake level recovery which would impact navigation/recreation/social sub-objectives (sub-objective 2c).

Difference between Current Operating Regime and Preferred Option:

Raft Lake	Current	Preferred
Minimum Flow	10 m^3/sec	10 m^3/sec flows will be stable or rising from April 15 to June 15.
Up Ramping Rate	25 m^3/sec	15 m^3/sec/day except during flood situations
Down Ramping Rate	25 m^3/sec	15 m^3/sec/day except during flood situations
Open Water Levels	Minimum: 415.00 m from 3rd Sat. May to Nov. 15 Maximum: 415.50 m by 3rd Sat. May 415.17 m at end of summer 415.55 m typical high	Minimum: 415.00 m at 3rd Sat. May to Oct. 1 Maximum: 415.5 m by May 15 415.2 m by Sept. 1 415.5 m by Nov. 1 Lake levels will be stable or rising from April 15 to June 15.
Winter Levels	411.50 m to 413.0 m	Minimum: 412.5 m by Apr. 1 - 15 414.5 m by Nov. 15 Maximum: 413.7 m by April 1 415.5 m Nov. 15
Winter Fluctuation	2.67 m with provision for 3.67 m	Maximum 3 m

Wagita Bay Option

Preferred option Wagita Bay Dam outflows: minimum flow setting 0.1 m^3/sec (i.e. pre-plan stoplog leakage) maximum flow setting of 4 m^3/sec.

The minimum flow of 0.1 m^3/sec is required for aquatic ecosystem health in the West Arm of Steep Rock Lake, and maintains flow over the walleye spawning site below dam. Also, this volume balances evaporation losses during the summer and prevents undesirably low water levels in the West Arm of Steep Rock Lake.

The maximum flow of 4 m^3/sec was selected because operational experience, in 1993, demonstrated that flows above this volume may cause mobilization of the silt in the West Arm of Steep Rock Lake. Mobilized silt (from Steep Rock dredging and deposition) can potentially enter the Seine River system because the West Arm of Steep Rock Lake flows into the Seine River via Apungsisagen Lake.

Any flows diverted through Wagita Bay dam above the defined minimum flow of 0.1 m^3/sec will have a negative impact on power production at Valerie Falls generating station. This is because flows through Wagita Bay dam bypass Valerie Falls generating station.

Flows between 0.1 m^3/sec and 4.0 m^3/sec are typically short-term events. They can occur infrequently during flood events and during approved dam maintenance operations.

Difference between Current Operating Regime and Preferred Option:

None.

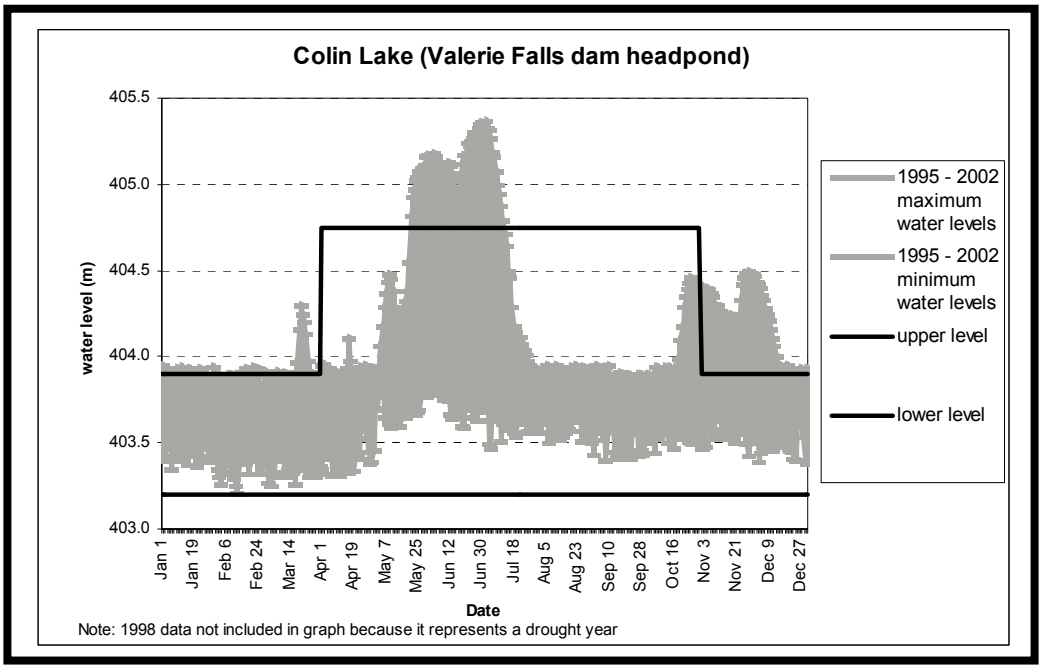
Option Scoring – Valerie Falls Dam

VALERIE FALLS			Sub-Account Weighting				Weighted Score			
Sub-Objectives	**Original Weight (from Section 7.3)**	**Sub Account Weight (from Section 7.4)**	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 1**	**Option 2**	**Option 3**	**Option 4 Preferred**
Flood	1									
1d) Minimize flooding on Perch Lake		100%	1	1	1	1	0.2	0.2	0.2	0.2
Sub-total Flood										
Navigation/Recreation//Social	1									
2d) Maintain open water levels for access and navigation on Calm and Perch		100%	1	1	1	1	0.2	0.2	0.2	0.2
Sub-total Navigation/Recreation/Social										
Power Generation	5									
3d) Optimize power gen on Little Falls Lake and Colin Lake		100%	2	4	4	5	2.0	4.0	4.0	5.0
Sub-Total Power Generation										
Aquatic Ecosystem	4									
4b) steady or rising levels in lake - spawn		15%	5	4	4	4				
4b) Steady or rising flows downstream		30%	5	4	4	4				
4c) natural summer drawdown		30%	5	2	2	1				
4d) minimum flows		20%	5	2	4	3				
4e) maintain flows at Wagita dam to maintain West Arm of Steep Rock Lake (silt concerns)		0%	0	0	0	0				
4f) natural rate of change		5%	5	3	3	3				
Sub-Total Power Aquatic Ecosystems			5	3	3	3	4.0	2.4	2.7	2.3
Total of options							6.4	6.8	7.1	7.7

***Option 1**: Aquatic Ecosystems*
***Option 2**: Increase in Power Production; and Aquatic Ecosystems*
***Option 3**: Power Generation; and Aquatic Ecosystems*
***Option 4 (preferred)**: Optimizes Power Generation; and some Aquatic Ecosystems objectives*

Explanation: Option 4 ranked the highest because the Planning Team determined that Power Generation would have the highest overall weighting at this power dam. Also, Option 4 captured important aspects of Aquatic Ecosystems sub-objectives (steady or rising lake levels and flows during spring spawn, and minimum flows year round).

Valerie Falls Dam Preferred Option



The preferred option provides more flexibility for power.

Pros:

- Enables Valerie Falls Limited Partnership (VFLP) to optimize power generation June 15 to April 14 (3d),
- Provides aquatic ecosystem benefits by provides steady or rising flows (sub-objective 4b) during spring spawning season
- Provides aquatic ecosystem benefits by maintaining minimum flow year round (sub-objective 4d)

Cons:

- The preferred option limits power production optimization April 15 to June 15 due to prescribed minimum flows for spawning.
- The preferred option has moderate aquatic ecosystem impacts.
- It does not provide a natural summer drawdown (sub-objective 4c), which would improve the extent and diversity of aquatic wetlands.
- Also, the preferred option does not ensure that outflows approach natural rate of change (sub-objective 4f).
- Animals and plants have evolved to the natural flow and level characteristics, and it is believed that the best management strategy would be to mimic the natural conditions.

Difference between Current Operating Regime and Preferred Option:

	Current	Preferred
Minimum Flow	6 m^3/sec	8 m^3/sec (see operation plan text) flows will be stable or rising from April 15 to June 15.
Up Ramping Rate	60 m^3/sec no peaking during spawning	60 m^3/sec/day no peaking during spawning
Down Ramping Rate	60 m^3/sec no peaking during spawning	60 m^3/sec/day no peaking during spawning
Open Water Levels	403.20–404.75 m from May 1 to Nov. 1	Minimum: 403.2 m from Apr. 1 to Nov. 1 Maximum: 404.75 m from Apr. 1 to Nov. 1
Winter Levels	403.30–404.00 m from Nov. 1 to Apr. 1	Minimum: 403.2 m from Nov. 1 to Mar. 31 Maximum: 403.90 m from Nov. 1 to Mar. 31
Winter Fluctuation	0.7 m	0.7 m average

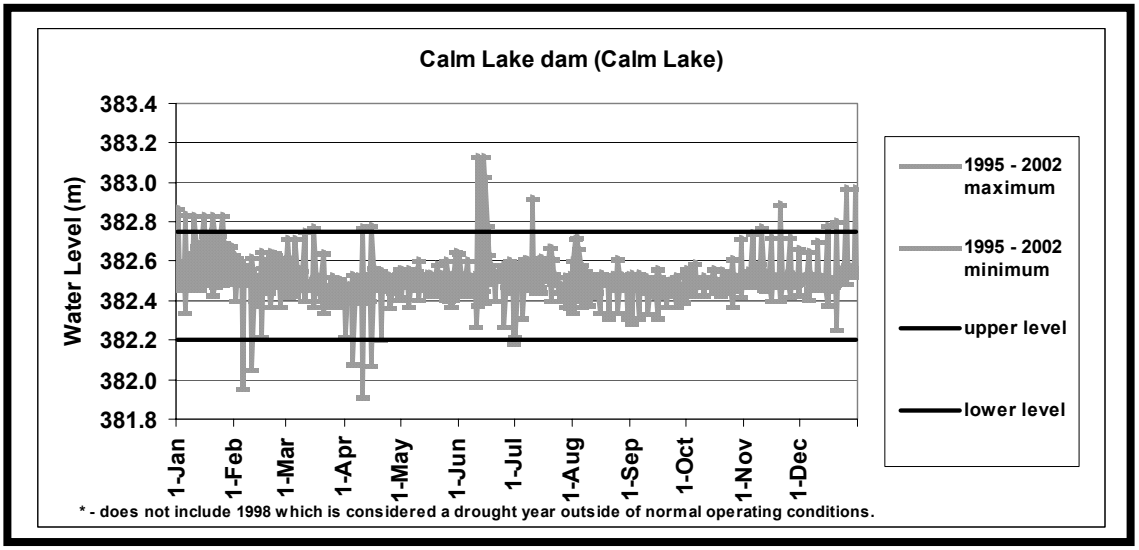
Option Scoring – **Calm Lake Dam**

CALM LAKE DAM			Sub-Account Weighting				Weighted Score			
Sub-Objectives	Original Weight (from Section 7.3)	Sub Account Weight (from Section 7.4)	Option 1	Option 2	Option 3	Option 4	Option 1	Option 2 Preferred	Option 3	Option 4
Flood	2									
1d) Minimize flooding on Perch Lake Sub-Total		100%	2	2	2	2	0.8	0.8	0.8	0.8
Nav/Rec/Social	2									
2d) Navigation Sub-Total		100%	3	5	5	4	1.2	2.0	2.0	1.6
Power Gen	5									
3b) Optimize power gen on Calm Sub-Total		100%	1	4	2	3	1.0	4.0	2.0	3.0
Aquatic Eco	4									
4b) steady or rising levels in lake – spawn		15%	5	5	5	5				
4b) Steady or rising flows downstream		35%	5	5	5	5				
4c) natural summer drawdown		15%	5	1	1	2				
4d) minimum flows		30%	5	4	4	4				
4f) natural rate of change		5%	5	3	4	4				
Sub-Total			5	4	4	4	4.0	3.2	3.2	3.4
Total of options							7.0	10.0	8.0	8.0

***Option 1**: Aquatic Ecosystems*
***Option 2 (preferred)**: Maximize Power Production; Aquatic Ecosystems during spring spawn; Navigation, Recreation, Social during open water season*
***Option 3**: Aquatic Ecosystems; Navigation, Recreation, Social; and Power Generation*
***Option 4**: Aquatic Ecosystems; Power Generation; and Navigation, Recreation, Social*

Explanation: Option 2 ranked the highest because the Planning Team determined that Power Generation would have the highest overall weighting at this power dam. Also, Option 2 captured important aspects of Aquatic Ecosystems sub-objectives (steady or rising lake levels and flows during spring spawn, and minimum flows year round), and navigation sub-objective (access and navigation on Calm and Perch Lakes during open water season).

Calm Lake Dam Preferred Option



The preferred option favours waterpower production. Mostly meets objectives for aquatic ecosystem during spring spawn season and navigation, recreation and social during open water season

Pros:

- The preferred option optimizes waterpower production and revenue (sub-objective 3e).
- It also enhances aquatic ecosystem during spring spawning season, and navigation, recreation and social opportunities during open water season.
- provides spring spawning opportunities through higher minimum flows during spring spawning, steady or rising flows during spawning (sub-objective 4b), and year round minimum flows (sub-objective 4d).
- supports navigation opportunities on Calm and Perch (sub-objective 2d)

Cons: The preferred option

- causes a modest loss of power generation revenue due to prescribed higher minimum flows during spring spawning period. This is due to a reduction of peaking flexibility.
- does not provide a natural summer drawdown (sub-objective 4c), which would improve the extent and diversity of aquatic wetlands.
- does not ensure that outflows approach natural rate of change (sub-objective 4f). Animals and plants have evolved to the natural flow and level characteristics, and it is believed that the best management strategy would be to mimic the natural conditions.

Difference between Current Operating Regime and Preferred Option:

	Current	Preferred
Minimum Flow	2.5 m^3/sec	2.5 m^3/sec balance of year 10 m^3/sec Apr. 15 to June 15 with steady or rising flows
Up Ramping Rate	2.5 m^3/sec/min	2.5 m^3/sec/min
Down Ramping Rate	2.5 m^3/sec/min	2.5 m^3/sec/min
Open Water Levels	382.20–382.75 m	382.20–382.75 m Between April 15 and June 15, Calm Lake water level fluctuation is limited to 20 cm (daily range).
Open Water Fluctuation	0.32 m 0.55 m in high flows	0.2 m from Apr. 15 to June 15 0.55 m balance of year
Winter Levels	382.20–382.75 m	382.20–382.75 m

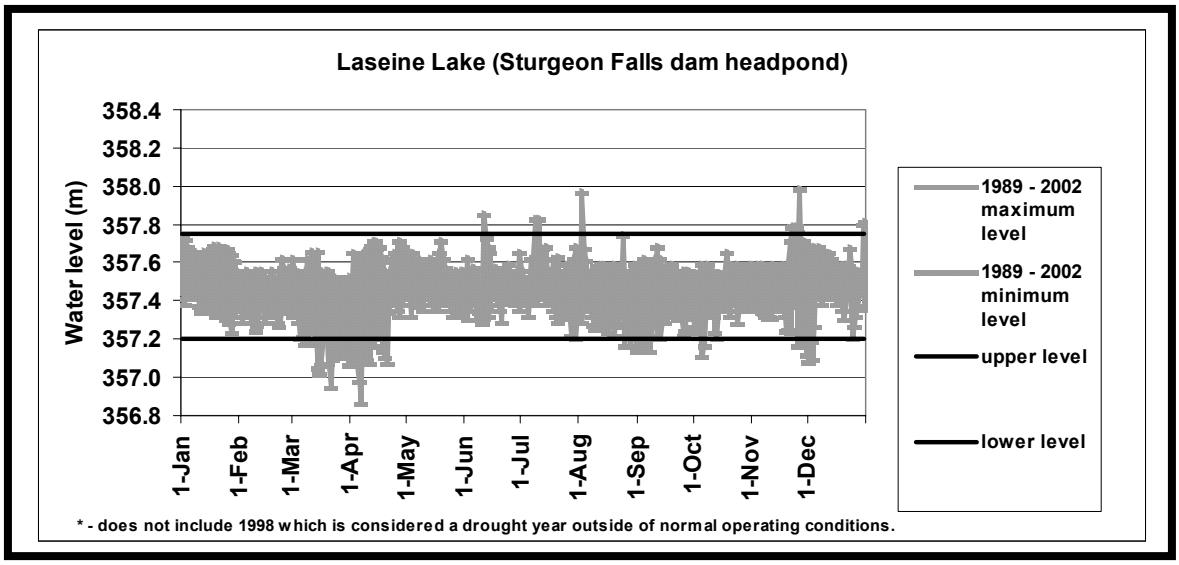
Option Scoring – **Sturgeon Falls Dam**

STURGEON FALLS DAM			Sub-Account Weighting				Weighted Score			
Sub-Objectives	**Original Weight (from Section 7.3)**	**Sub Account Weight (from Section 7.4)**	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 1**	**Option 2 Preferred**	**Option 3**	**Option 4**
Flood	1									
1e) Minimize Flooding on Lower Seine River Sub-Total		100%	1	1	1	1	0.2	0.2	0.2	0.2
Nav/Rec/Social	2									
2d) Navigation Sub-Total		100%	3	5	5	4	1.2	2.0	2.0	1.6
Power Gen	5									
3b) Optimize power gen on Calm Sub-Total		100%	1	4	2	3	1.0	4.0	2.0	3.0
Aquatic Eco	4									
4b) steady or rising levels in lake - spawn		10%	5	5	5	5				
4b) Steady or rising flows downstream		40%	5	5	5	5				
4c) natural summer drawdown		10%	5	1	1	2				
4d) minimum flows		35%	5	4	4	4				
4f) natural rate of change		5%	5	3	4	4				
Sub-Total			5	4	4	4	4.0	3.3	3.4	3.4
Total of options							6.4	9.5	7.6	8.2

***Option 1**: Aquatic Ecosystems*
***Option 2 (preferred option)**: Maximize Power Production; Aquatic Ecosystems during spring spawn; Navigation, Recreation, Social during open water season*
***Option 3**: Aquatic Ecosystems; Navigation, Recreation, Social; and Power Generation*
***Option 4**: Aquatic Ecosystems; Power Generation; and Navigation, Recreation, Social*

Explanation: Option 2 ranked the highest because the Planning Team determined that Power Generation would have the highest overall weighting at this power dam. Also, Option 2 captured important aspects of Aquatic Ecosystems sub-objectives (steady or rising lake levels and flows during spring spawn), and navigation sub-objective (access and navigation on Laseine Lake during open water season).

Sturgeon Falls Dam Preferred Option



The preferred option favours waterpower production. Mostly meets objectives for aquatic ecosystem during spring spawn season and navigation, recreation and social during open water season.

Pros:

- optimizes waterpower production and revenue (sub-objective 3e).
- meets or mostly satisfies these sub-objectives:
    - Steady or rising flows during spawning (sub-objective 4b)
    - Maintains year round minimum flows (sub-objective 4d)
    - Navigation on Laseine Lake (sub-objective 2d).

Cons: The preferred option:

- causes a modest loss of power generation revenue due to prescribed higher minimum flows during spring spawning period. This is due to a reduction of peaking flexibility.
- does not provide a natural summer drawdown (sub-objective 4c), which would improve the extent and diversity of aquatic wetlands.
- does not ensure that outflows approach natural rate of change (sub-objective 4f). Animals and plants have evolved to the natural flow and level characteristics, and it is believed that the best management strategy would be to mimic the natural conditions.

Difference between Current Operating Regime and Preferred Option:

	Current	Preferred
Minimum Flow	2.5 m^3/sec	2.5 m^3/sec balance of year 10 m^3/sec Apr. 15 to June 15, with steady or rising flows
Up Ramping Rate	2.5 m^3/sec/min	2.5 m^3/sec/min
Down Ramping Rate	2.5 m^3/sec/min	2.5 m^3/sec/min
Open Water Levels	357.20–357.75 m	357.20–357.75 m From April 15 to June 15, headpond water level fluctuation is limited to 20 cm (daily average).
Open Water Fluctuation	0.33 m 0.55 m in high flows	0.2 m from Apr. 15 to June 15 0.55 m balance of year
Winter Levels	357.20–357.75 m	357.20–357.75 m

10 Consultation Process

10.1 Historical Consultation Record

Stakeholders of the Seine River watershed have worked since 1995 to ensure effective communication between the proponents, and public and private stakeholders.

Two Public Advisory Committees (Seine River Water Level Technical Committee and Lac des Mille Lacs Advisory Committee) were formed to represent the upstream and downstream users of the Seine River. The Lac des Mille Lacs Advisory Committee was formed in 1989. The Seine River Water Level Technical Committee was formed in 1995.

These two Public Advisory Committees (PACs) have held biannual meetings to resolve current issues and review the elevation and flow reports presented by Valerie Falls and Abitibi Consolidated. These meetings have been an effective forum to gather comments from the public. Any user of the system can approach the PAC in his or her area at any time to get information or ask questions.

The proponents have also been proactive in contacting the upstream and downstream users during out-of-plan events over the past few years.

10.2 The Public Consultation Process

A comprehensive public consultation process took place during the development of the Seine River Water Management Plan to ensure opportunities for public input to the planning process. The mechanisms for public input included the following:

- Environmental Bill of Rights (EBR) public registry notification
- Public Open Houses (Atikokan, Upsala, Fort Frances, Thunder Bay)
- Public Advisory Committee member participation on the Planning Team
- Contacts/communication with representatives of local First Nation communities
- Public notices on community TV channels in Thunder Bay, Atikokan and Fort Frances
- Newspaper public notices in Atikokan, Ignace, Dryden, Fort Frances and Thunder Bay
- Mail outs to identified stakeholders
- Telephone contacts
- Individual and group meetings through the Public Advisory Committees (Planning Team representative(s) met with individuals or groups)

The process included consultation with both the public and the First Nations. See Section 10.3 First Nations Consultation Report.

Stakeholder Contacts

As part of the Water Management Planning process, the planning team invited public participation:

- An invitation to participate was mailed to 100+ stakeholders
- 55 people attended the first Public Information Centres (Atikokan, Upsala and Thunder Bay in November and December 2002)
- Regular biannual meetings with Public Advisory Committees were held in the fall of 2002.
- Meetings to review the preliminary preferred options were held April and November 2003. These meetings were with small groups as well as individuals.

Public Information Centres

Three Public Information Centre opportunities were held during the water management planning process. The purpose of the information centres was to provide a formal opportunity for the public to review and comment on the background material, options and draft plan. The public provided formal input to the MNR by completing comment sheets. Planning Team members participated in the information centres by guiding the public through each open house and answering questions.

First Information Centre: A series of four open houses were held from November 13 to December 9 in Upsala, Atikokan, Fort Frances and Thunder Bay. The purpose of the first information centre was to provide the public with an opportunity to review and comment on the background information to be used in developing the Water Management Plan. The public was encouraged to attend and to provide comments.

First Public Information Centre Comment Summary

- **Upsala, November 13, 2002** (10 attended, 4 comment sheets received) This Public Information Session was held immediately following the Lac des Mille Lacs Advisory Committee fall meeting. Fifteen to twenty people attended the fall meeting. The water management planning process was presented at the meeting and members and guests were invited to provide feedback on issues. In general the issues presented by the Planning Team at the information centres captured the concerns that visitors reflected in conversation with planning team members. Overall, the public has expressed support for the current management regime at bi-annual meetings and by requests to maintain the current level and flow at the Lac des Mille Lacs dam.
- **Atikokan, November 28, 2002** (23 attended, 9 comment sheets received) In general the issues presented by Planning Team, at the information centre, address the concerns that visitors reflected in conversation with planning team members. The comments received are listed as follows.
- **Fort Frances, December 5, 2002** (10 participants attended, no written comments, no verbal comments)
- **Thunder Bay, December 9, 2002** (12 participants attended, 1 comment sheet received) In general the issues presented by Planning Team at the information centre addressed the concerns that visitors reflected in conversations with team members. The comment follows:

Area of concern	***Summary of Comment***	***Planning team response***
Lac des Mille Lacs	Why no fish ladders at the dam?	This question was forwarded to MNR Thunder Bay District. The dam was built by Ontario Public Works in 1952. The WMP addresses issues related to levels and flows from existing structures. The merit of fish ladders in an existing structure is outside the scope of this planning process.
Lac des Mille Lacs	Maintain fishery on Lac des Mille Lacs.	Added to Aquatic Ecosystem Objective 4a) and was considered in the option evaluation process. The preferred option promotes steady or rising water levels in the spring to maintain spring spawning opportunities.

Lac des Mille Lacs	Maintain current water level management on Lac des Mille Lacs.	This preference was considered in the weighting of objectives and the option evaluation process. The preferred option generally reflects the pre-WMP operating practices.
Lac des Mille Lacs	PAC representative advised that one LDML cottage owner expressed concerns that high water levels in late summer combined with high winds cause shoreline erosion.	This preference was considered in the weighting of objectives and the option evaluation process. The preferred option calls for the Lac des Mille Lacs dam operator to operate to the middle of the band.
General	System managed well	Planning Team members considered these comments.
Calm to Perch	Remove rock at Boyce Rapids to facilitate navigation and outflow.	Outside scope of Water Management Plan. Natural obstruction.
General	Approve of smaller power generation facilities on rivers.	Outside scope of Water Management Plan. MNR Site Disposition Plan.
Calm to Sturgeon	Maintain current water levels between Calm and Sturgeon Falls dams.	This preference was considered in the objective weighting and option development process. The preferred option addresses this preference because it matches the management strategy for the two cascading plants.
General	Can the two PAC members of the planning team keep public-at-large informed or should more members be invited to participate?	PAC reps on the Planning Team represent larger Public Advisory Committees and will be presenting to broader groups to help keep them informed.
General	Operational mode of power production should be environmental.	The planning team considered aquatic ecosystems needs, flood mitigation, power production and navigation, recreational and social uses.
Whole System	Utilization of surplus (spill water) should be addressed in plan.	See Objective #3: Power Generation. This preference was considered in the objective weighting and option development process. The preferred option addresses this preference. Spillage would occur only when natural system flows are in the high flow to flood range. This is an

		infrequent occurrence (less than 10% of the time). The powerdam owners have determined that capturing this spill is not economically viable at this time.
Lower Marmion	Require water level gauge near Moose Lake Bridge (Lower Marmion Lake).	Gauge is installed but not activated. The gauge will be activated prior to WMP approval.
General	Amphibians at risk should be listed separately on issues as they are system health indicators.	Planning Team is not aware of any amphibians at risk. If there are any, they would be used as an indicator and also reflected in Objective #4: Aquatic Ecosystem.
General	Require enforceable water level curves, with appropriate fines and penalties for violations.	The final Water Management Plan will have specific reporting compliance items for elevation and flows. The Lakes and Rivers Improvement Act provides authority to MNR to enforce compliance with a range of penalties and fines for violations that are not attributable to conditions beyond the reasonable control of the operator.
General	Install water level measuring devices at public access points on reservoirs.	Gauges are already installed at each reservoir. Following approval of the final WMP, ACCC and VFLP will provide a publicly accessible web page that will show actual water levels and flows at the major water bodies where water control structures are located.
Lac des Mille Lacs	Winter drawdown effect on fall spawning fish in Lac des Mille Lacs, decline in cisco and whitefish will affect walleye. Would like to see a study of cisco and whitefish in Lac des Mille Lacs.	A whitefish study has been done. Additional studies are planned. There is a data gap on recreation harvest and First Nations harvest of whitefish. This information gathering will be one of the effectiveness monitoring activities.

Second Information Centre: A series of three open houses were held from July 14 to 16 in Upsala, Atikokan and Thunder Bay. The purpose of this stage of public consultation was to provide a formal opportunity for public review and a) to comment on water management options, b) to note preliminary preferred options, and c) to request additional contributions to the background information.

Second Information Centre Comment Summary

- Upsala, July 14, 2003 (10 attended, 3 comment sheets received)
- Atikokan, July 15, 2003 (23 attended, 6 comment sheets received)
- Thunder Bay, July 16, 2003 (9 participants attended, no written comments, no verbal comments)

Area of concern	***Summary of Comment***	***Preferred option***	***Planning team response***
Lac des Mille Lacs	Concern with low water levels for the first 2 weeks of fishing season. Prefer higher water levels during winter.	None stated	The water level for the first week of May 2003 was 15 cm below target. At the open house and at the fall bi-annual LDMLAC meeting, Planning Team members advised that spring 2003 was unusually dry and the late recovery was not typical of an “in-plan event.” It was explained that conditions would meet the definition of a drought in the Water Management Plan. In addition it was explained that there was a need to maintain flood freeboard to minimize the risk of spring flooding; that despite the lower 2003 levels the water level was steady or rising water to address walleye spawn habitat requirements and

			navigation. Also, higher water levels during winter would cause shoreline and dock damage. In addition to the flood objective, Lac des Mille Lacs is also used for power storage for winter production at the three downstream power dams.
Lac des Mille Lacs	Reasonably happy with water management over past 10 years.	Option 4 for Lac des Mille Lacs	Planning Team members acknowledged comment.
Lac des Mille Lacs	Normal water level is too high leading to shoreline erosion.	None stated	Option chosen by Planning Team tried to balance off concerns about high water levels and erosion with navigation concerns which desire higher open water levels. Planning Team members explained the option in a follow-up letter.
Upper Marmion	Concern of impacts on aquatic ecosystem (wetland and spawning areas), fire protection, water access, navigation and drinking water quality when Upper Marmion water level is allowed to go below 413 m in winter (especially in low water years)	Option 4 for Upper Marmion	Planning Team chose 412.5 m (Option 3) with the provision of winter maximum flows being 38 m^3/sec out of Raft Lake dam. A letter was sent to people who sent written comment regarding the water access and fire protection. At the open house, a Planning Team member discussed the attendee's concern about impacts on aquatic ecosystem.
Upper Marmion	Concern of impacts on	Option 4	At the open house,

	aquatic ecosystem (wildlife) when Upper Marmion water level is allowed to be drawn down more than 1 m in winter	for Upper Marmion	Planning Team members reviewed the comment on the preference to limit drawdown to 1 m drawdown in winter. The WMP pointed out the importance of the drawdown of 412.5 m to support winter power production and downstream flood mitigation. The Planning Team members also explained that there have been many improvements on the management of the Seine River since 1995 (implementation of the Seine River Targets and Benefits). Planning Team members also added that as part of the effectiveness monitoring plan, the proponents would continue to monitor impacts.
Upper Marmion	Concern expressed that weighting of objectives was too much in favour of power production and not enough consideration for natural environment Also concerned that there is little ability for outside comments to affect the decisions. Feels that this resulted in a flawed process. Concern that current winter drawdown and annual fluctuation is too much.	Option 4 for Upper Marmion	The Planning Team decided that the priority management objective for Raft Lake dam would be power generation. See Section 9.2 Scoring the Options. At the open house, Planning Team members received the concerns from the public related to the current winter drawdown. It was explained that Option

			4 minimum drawdown was reduced from 411.5 m to 412.5 m. The Planning Team members also explained that there have been many improvements on the management of the Seine River since 1995 resulting from the implementation of the Seine River Targets and Benefits. Planning Team members advised that as part of the effectiveness monitoring plan, the proponents would continue to monitor impacts.
Marmion/Finlayson	Concern with sufficient water flow for walleye spawning below Raft Lake dam and out of Lower Marmion. A weir should also be built at outlet of Finlayson Lake.	None stated	At the open house, Planning Team members explained that 2003 was a drought year. Methods for managing out-of-plan events are covered in the plan and minimum flow targets have been in effect since 1995. There are flows and level targets to help ensure sufficient water for walleye spawn. Planning Team members added that as part of the effectiveness monitoring plan, the proponents would continue to monitor impacts. In regard to the suggestion to build a weir at Finlayson

			Lake, the Planning Team did not make a recommendation as the benefits and impacts of constructing a new water control structure was not considered in the Planning process. Instead the Planning Team focused on water level and flow issues associated with existing structures.
Atikokan River	Happy with past work to minimize flooding in Atikokan	None stated	Planning Team acknowledged the comment at the open house.

Prior to completing the draft options and preferred option, the Planning Team PAC members met with representatives of the Seine River Water Level Technical Committee and the Lac des Mille Lacs Advisory Committee to invite input early in the option development phase.

The Lac des Mille Lacs Advisory Committee members reported that they felt the system was well managed by the proponents and required little or no change in the operating management. The preliminary preferred option is suitable.

The Seine River Water Level Technical Committee discussed the preliminary options. Some members of this Committee did not support all of the aspects of the preferred option. The SRWLTC members' comments were added to the comments received as part of the Public Open House process and are reflected in the above table and comment listings.

Third Public Information Centre (Draft Plan review): Two open houses were held - February 17, 2004 in Atikokan and February 18, 2004 in Thunder Bay. The purpose of this stage of public consultation was to provide a formal opportunity for public review and comment on the Draft Water Management Plan for the Seine River.

Third Public Information Centre (Draft Plan review) Comment Summary

- Atikokan, February 17, 2004 (16 attended, 4 comment sheets received)
- Thunder Bay, February 18, 2004 (24 participants attended, 2 comment sheets received)

The following is a summary of comments received during draft plan review.

Area of concern	***Summary of Comment***	***Planning Team Response***
Lac des Mille Lacs	Prefer levels kept closer to lower limit because of beach erosion concerns. Likes idea of email access to express concerns.	Concern expressed at previous open houses. Chosen option attempts to address this concern while balancing downstream flooding and lake navigation concerns.
Lac des Mille Lacs	Prefer not to raise water levels too high because of beach erosion concerns.	Concern expressed at previous open houses. Chosen option attempts to address this concern while balancing downstream flooding and lake navigation concerns.
Upper and Lower Marmion	Felt Upper and Lower Marmion were well managed last year (*drought conditions*) Open house was helpful and informative. Management plan does a fine job of balancing competing interests and values.	Comment noted
Entire system	- support for constant flows during spring spawning season - good work on plan	Comments noted
Entire system	- plan takes into account the concerns of users and presents benefits and minimizes downsides - not sure why drought and flood years were eliminated from plan	Comment noted. The Planning Team expanded the pros and cons of the options in the final water management plan Explained to individual that plan was for normal operating conditions.

	- concern about taxpayer costs and use of studies.	comment noted
Lower Marmion Lake	Concern about water levels in Lower Marmion impacting on operation of Ontario Power Generation's Atikokan Generating Station cooling pumps by being too low in summer months. References a previous agreement between OPG and Valerie Falls Power.	Discussion with OPG Atikokan Generating Station management resulted in setting summer maximum and minimum levels 10 cm higher to reflect existing level profile differences across Lower Marmion sluiceway. This change will not affect achieve-ment of other sub-objectives or conflict with any other comments received regarding Lower Marmion water levels.

Public consultation on the Draft Plan was also facilitated by the following:

- The draft plan was posted on the Environmental Bill of Rights Registry by MNR requesting comments from the public.
- Notices advising that the draft plan is available for review at the MNR offices in Atikokan, Fort Frances and Thunder Bay were mailed to stakeholders on the system (i.e. existing MNR mailing list used to announce previous Public Information Sessions).
- Notices were also published in the newspapers in Fort Frances, Atikokan and Thunder Bay.
- PAC meetings were held with the Lac des Mille Lacs Advisory Committee
- Individual discussions were held with members of the Seine River Water Level Technical Committee.
- Notices were sent to individuals who provided feedback during the 2nd Public Information Session in Upsala, Atikokan and Thunder Bay.
- The draft plan was finalized after a 30-day comment period.

On March 31, 2004, the final plan was submitted to the Minister of Natural Resources for approval.

10.3 Consultation with First Nations

(Consultation with First Nations is a separate and parallel process to consultation with the public and stakeholders. The formatting of this section (10.3) is somewhat different than the layout of the rest of this report. First Nation representatives who prepared and submitted section 10.3 requested that the formatting be kept as submitted. Also see Section 5.1.2 for the Socio-Economic Description and Profile.)

Section 10.3.1 below serves as a report on Aboriginal Consultation to the Seine River Water Management Plan. It has been reviewed by the planning team representatives of both First Nations and adequately reflects a summary of the interests and concerns of the Seine River First Nation and Lac des Mille Lacs First Nation as expressed during the planning process.

Section 10.3.2 below represents the plan response to those Aboriginal interests and concerns identified during the planning response. There can be no inference that these responses have been endorsed or accepted by either First Nation.

10.3.1 Consultation Report

Initial meetings: Initial meetings were held with both Lac des Mille Lacs First Nation (February 1, 2003) and Seine River First Nation (February 5, 2003) to discuss the project and their participation. An initial draft of an Aboriginal Consultation Strategy was used as a basis for discussion.

Background Information left with each First Nation included

- Water Management Planning Guidelines
- Copies of:
    - Invitation to Participate
    - Notice of 1st Information Centre
    - Maps:
        - Small watershed map
        - Small map of Upper Seine
        - Small map of Lower Seine
        - Larger maps of Reserve areas and surrounding lands
    - EBR Notice
    - Terms of Reference
    - Issues: known
    - Issues: as identified at 1st Information Centre
    - Comment Sheet
    - Report on Fisheries Data
- Draft Aboriginal Consultation Strategy

10.3.1.1 Lac des Mille Lacs:

First Nation Historical Context:

Councilor Elaine Hogan has confirmed that Lac des Mille Lacs has submitted a flood claim to Ontario. Past impacts have included the flooding of the former community site and former wild rice harvest areas. A community no longer exists on Lac des Mille Lacs. The First Nation advises that much of the reason the community dispersed away from Lac des Mille Lac was because of flooding impacts. First Nation members want to re-establish their links with Lac des Mille Lacs.

Communications with the First Nation:
Elaine Hogan, a First Nation councillor, is the formal contact with the First Nation. Contact numbers:

- Home: 807 622-9835
- Fax: 807 473-3647

Steve Peters was appointed as the Steering Committee and Planning Team representative. Contact numbers:

- Home: 807 768-3644
- E-Mail: stevepeters@shaw.ca

Temporary mailing address for the First Nation:

Lac des Mille Lacs First Nation
1100 Memorial Avenue
Suite 328
Thunder Bay, ON
P7B 4A3

Meeting minutes and working material were forwarded via e-mail.

Funding Resources:
Initial funding was provided, through Bimose Tribal Council, for the First Nation to participate in the planning process during the fiscal year 2002–2003. Funding specifically addressed

- a review of the background material.
- the documentation of values
- attendance at Steering Committee/Planning Team meetings
- reporting back to chief and council
- preparation of information for distribution to First Nation membership

Subsequent funding was made available directly to the Lac des Mille Lacs First Nation to extend their participation into fiscal year 2003–2004. This included additional resources to address the challenge of consulting with a widely dispersed membership.

First Nation Consultation:
Activities that have provided First Nation members with opportunity for input have included**:**

- Council Briefings/Discussion: The First Nation representative on the planning team was in routine communication with Council following Planning Team meetings.
- Newsletter(s): Newsletter(s) were circulated through community members to advise of new information and solicit feedback.
- Interviews: The First Nation contact was available throughout the process to respond to questions by community members. In addition, information was sought from appropriate individuals on such things as cultural values and resource uses.

First Nation Issues/Concerns:
Lac des Mille Lacs, through the ongoing consideration of council, identified several issues that they felt needed to be addressed within the water management plan:

- Historical Grievances: The historical impact of the original dams' construction should form a part of the background information to be contained within this plan.

- Protection of Aboriginal and Treaty Rights: There needs to be a statement clarifying that the participation of Lac des Mille Lacs First Nation will not prejudice future negotiations or settlements.

- **Slumping and Erosion:** Slumping and erosion have occurred on the Seine River and has an impact on shoreline native burial grounds on the east shore of Lac des Mille Lacs.

- Consultation with LDML Members: Meaningful consultation of band members is compromised by the fact that band members are widely dispersed; there is no "home" community for band members. Newsletters are not the most appropriate means to deal with this issue — particularly with band elders — they hold most of the values information, and knowledge, that could provide helpful information for the planning team. Additionally, there remains a degree of distrust among band members toward the provincial and federal governments that impedes Chief and Councils ability to work with governments on present and future projects.

- Access to Resource Expertise: The participation of Lac des Mille Lacs has been limited to the provision of input at the Planning Team level. Considered input is constrained by the fact that independent resource expertise is simply not available to LDML to provide band council members with advice.

- Future Planning: The First Nation envisions a day when on-the-ground community links with their reserve lands can become re-established. Lac des Mille Lacs First Nation would like to ensure that future opportunity is not constrained by operating parameters contained within the approved Water Management Plan.

10.3.1.2 Seine River First Nation:

First Nation Historical Context:
Lac des Mille Lacs First Nation and Seine River First Nation share very common elements in their history.

- Many members of both First Nations share membership in the other.
- Chief Johnson has indicated that the seasonal home of many First Nation members was located on "Reserve Island" in the Atikokan area prior to the establishment of the Marmion reservoir in 1926 and the subsequent diversion of the Seine River in the 1940's to facilitate the development of the Steep Rock iron ore project. The people who lived on Reserve Island dispersed upon the development of the diversion and mine sites — many of them to Lac des Mille Lacs or Seine River.
- First Nation issues associated with this include:
    - lack of consultation
    - displacement from traditional lands
    - disruption of lifestyle
    - no benefit gained from the use of area resources — this continues today.

- The First Nation wishes to become a participant in resource management activities throughout their traditional lands in a way that would see the First Nation included as a co-manager of the resource and obtaining economic benefit from use of the resource.

- First Nation members have had strong and emotional concern regarding the impact of water levels being manipulated in their area and the resultant impact on traditional values. Examples voiced included wild rice areas and walleye spawning beds that were no longer productive. The First Nation feels that the manipulation of water levels may have been the root cause of issues surrounding both examples.

- The day-to-day relationship with Abitibi, with regard to the operations of both dams, has been a good one — there are no complaints.

- Chief Johnson confirmed that Seine River First Nation does have a flood claim with the province regarding Rainy Lake.

Communications with the First Nation:
Tyrone Tenniscoe is the formal contact with the First Nation and was appointed as the Steering Committee and Planning Team representative. Contact numbers:

- Office 807 599-2224
- Fax: 807 599-2865
- E-Mail: bluethunder40@hotmail.com

Mailing address for the First Nation:

Seine River First Nation
Box 124
Mine Centre, ON
P0W 1H0

Meeting minutes and working material were forwarded via e-mail.

Funding Resources:
Initial funding was provided to establish a contact person within the community to consult community members and represent Seine River First Nation on the Steering Committee and Planning Team. This funding was extended into fiscal year 2003–2004.

First Nation Consultation:
Activities that have provided First Nation members with opportunities for input have included:

- Power Dam Tours: Invited residents spent a day touring all three power dams. Hosts included staff from both Abitibi and Valerie Falls.
- Community Presentation: Approximately seven community residents attended a general presentation the Seine River Water Management Plan and its process.
- Community Display: Maps and a display on the project were posted in the First Nation administration office and community gymnasium through much of the planning process.
- Newsletter(s): Newsletter(s) were circulated through the community to advise of new information and solicit feedback.
- Interviews: The First Nation contact was available throughout the process to respond to questions by the community. In addition, information was sought from appropriate individuals on such things as cultural values and resource use.

Key Issues/Concerns:
Seine River First Nation has identified a number of issues and concerns raised through this process.

- Historical Impacts: The community was interested in the impacts on the Seine River Fishery from the perspective of historical development and also on any changes that this plan might have on the fishery today and into the future.
- Flood Claim: First Nation members are interested in the status of the current Rainy Lake flood claim.
- Emergency Preparedness and Compensation for Flood Damage: There was considerable interest in emergency preparedness – who does what and when in the event of a dam failure or flooding caused by improper management of water levels.

10.3.2 Plan Response to Issues and Concerns

The plan's response to the issues and concerns identified in the previous section are included the following:

10.3.2.1 Historical Grievances

Grievances relating to the historical impact of the original dams construction should form a part of the background information to be contained within this plan.

Plan Response:
General background information on both flood claims is contained in Section 5.1.2. The Seine River Water Management Plan does not address existing flood claims; however, the resolution of these claims through separate processes may or may not require subsequent modifications to the approved Water Management Plan.

Any outcomes of claims, judicial proceedings or other agreements requiring revisions to this plan will be acted on appropriately.

10.3.2.2 Protection of Aboriginal and Treaty Rights

The plan needs to protect First Nation Aboriginal and Treaty Rights. First Nation participation in this planning effort must not prejudice future negotiations or settlements.

Plan Response:
This Water Management Plan has been undertaken without prejudice to the rights of Aboriginal people and Treaty Rights.

10.3.2.3 Protection of Sensitive Information

The confidentiality of information surrounding the documentation of sensitive cultural features is important.

Plan Response:
Mapping of sensitive values will be generalized. Detailed mapping of sensitive values will not be required. In the event of emergency flooding situations, First Nation contacts will be notified when plan parameters are being exceeded and may pose a threat to sensitive values.

10.3.2.4 Future Planning and Ongoing Role in Management

Future opportunity should not be constrained by operating parameters contained within the approved Water Management Plan and the First Nations should be provided an ongoing role in the management of this waterway.

Plan Response:

- Each water management plan is prepared under the authority of the Lakes and Rivers Improvement Act.
- Following plan approval, the Steering Committee that was established to guide the preparation of this management plan will continue to provide direction on its implementation.
- The Steering Committee will liase with the recognized public advisory committees (Lac des Mille Lacs Advisory Committee and the Seine River Water Level Technical Committee). The recognized public advisory committees (Lac des Mille Lacs Advisory Committee and the Seine River Water Level Technical Committee) will review activities and advise the Steering Committee on the implementation of the plan, the monitoring of the plan and public communications surrounding the plan.
- Seine River and Lac des Mille Lacs First Nations will continue to hold ongoing positions on the public advisory committees.
- Amendments to approved plans may occur when new information indicates that there is merit to changing the operating regime. The Water Management Plan will also be subject to review and renewal as determined by the term agreed to in the approved plan (usually between 5 and 10 years).

10.3.2.5 Emergency Preparedness and Compensation for Flood Damage

In the event of a dam failure, who does what, and when? Would compensation be provided if flooding were caused by mismanagement?

Plan Response:

A key objective of the plan is to address public safety and property damage by minimizing flooding throughout system. However; it may not be possible to maintain plan parameters during severe flooding events. The Provincial Flood Forecasting and Warning Program provides the provincial flood advisory report that contains information regarding flood potential for those agencies that must respond to or deal with flood emergencies. Flood emergencies on the Seine River Water System are addressed at three levels:

- Every community in the province has responsibility to develop a Community Emergency Response plan that should address foreseeable types of emergencies including flood potential
- Dam operators are responsible for the development of an Emergency Plan for their own facility.

- MNR has a role in helping to coordinate emergency flood response and responds to flood emergencies in unorganized territory.

Emergency plans will be reviewed following the approval of this Water Management Plan to ensure that any changes in water management do not negatively impact the Emergency Preparedness Plan. If changes in the EPP are required, the dam owners will advise affected parties/stakeholders.

11 Description of Operating Plans for Each Waterpower Facility and Water Control Dam

11.1 Operating Plans

The following are the operational plans (levels and flows) for each structure. See Appendix 8 for daily minimum and maximum levels per control structure.

The preferred option for each control structure was developed to address both the waterpower industry's objectives and environmental, social and economic objectives identified in the plan.

This Water Management Plan applies to the water control structures under the normal range of operating conditions. Normal operating conditions are defined in the preferred option for each control structure.

Flows and levels that are identified as "best management target" will not be enforced. All other flows/levels identified in the operating plans will be enforced as per the compliance plan.

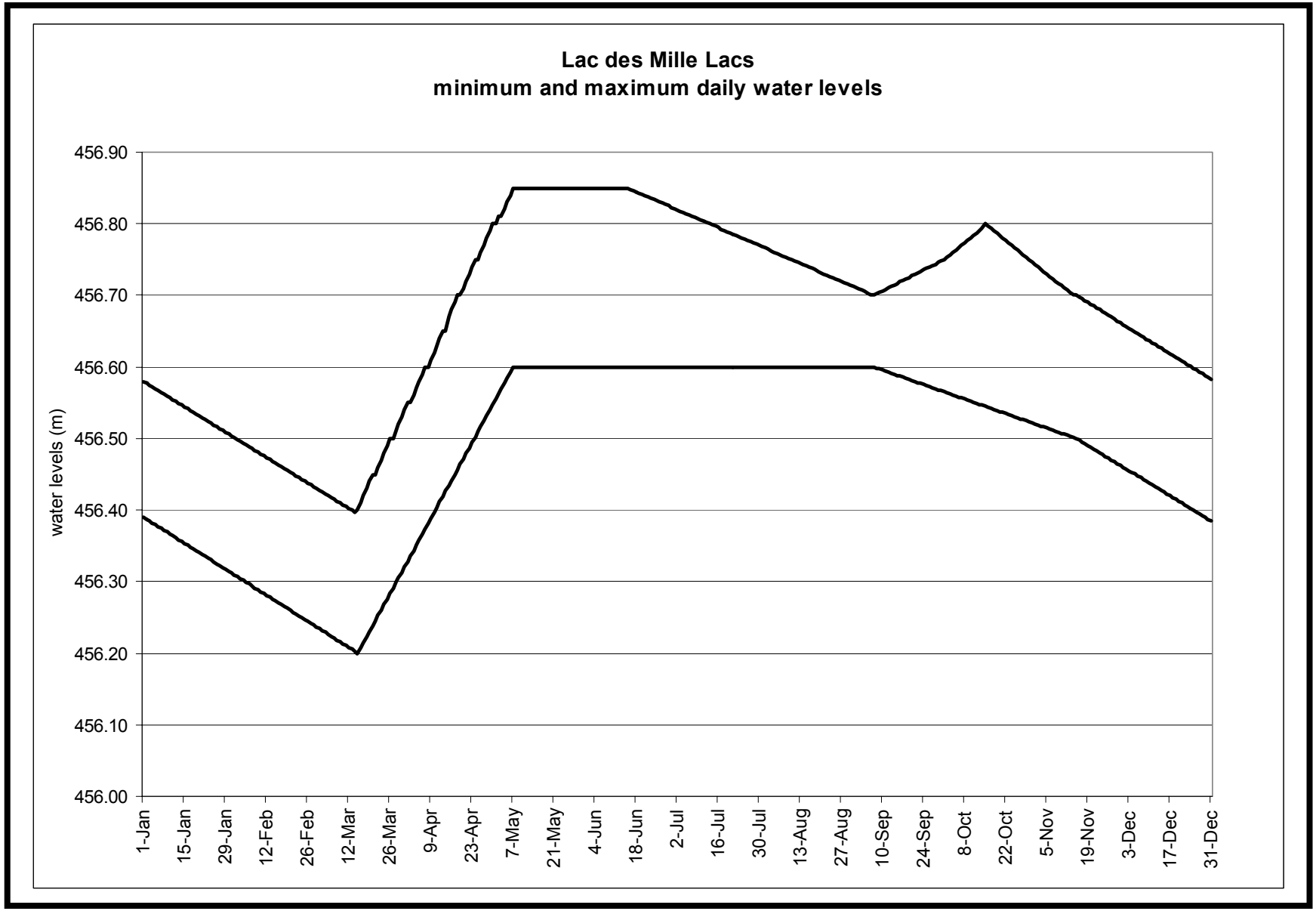
Each control structure operational plan includes graphs (minimum and maximum targets) and also a text description of the operating preferred option.

Operational Plan for Lac des Mille Lacs Dam (all dates are inclusive)

Minimum Flows	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Season Water Levels	Maximum Open Season Water Fluctuation	Winter Water Levels	Maximum Winter Water Level Fluctuation
Outflows to be equal to or greater than 1.5 m^3/sec daily average. Flows are steady or rising Apr. 15–June 15	15 m^3/sec (best management target)	40 m^3/sec (best management target)	20 m^3/sec/day to reduce impacts of flood situations 5 m^3/sec/day during rest of year	15 m^3/sec/day to reduce impacts of flood situations 5 m^3/sec/day during rest of year	Daily maximum and minimum levels are defined in Appendix 8 and summarized below: Minimum 456.6 m - May 7 456.6 m - Sept. 7 456.5 m - Nov. 15 Maximum 456.85 m - May 7 456.85 m - June 15 456.7 m - Sept. 7 456.75 m - Oct. 1 456.8 m - Oct. 15 456.7 m - Nov. 15 Lake levels will be stable or rising Apr. 15–June 15.	0.35 m	Daily maximum and minimum levels are defined in Appendix 8 and summarized below: Minimum 456.5 m - Nov. 15 456.2 m - Mar. 15 Maximum 456.7 m - Nov. 15 456.4 m - Mar. 15 Lake levels should decline after ice-in (best management target).	0.50 m

Best Management Targets:

1. During the summer the operator will manage water levels to target the middle of the operating band.
2. Where applicable implement strategies to:
   - Keep flood freeboard before and during freshet; pull logs when water level rises more than 5 cm/day when levels are in summer band to keep daily rise below 5 cm.
   - Stage discharge from Lac des Mille Lacs dam to allow uncontrolled basin flows between Lac des Mille Lacs dam to Upper Marmion to pass.
   - Utilize the 30 cm flood reserve on Lac des Mille Lacs during significant flood events when inflow is rising and the uncontrolled basin flood is steady or rising.
   - When lake level drops more than 2 cm/day, install logs. Pull logs when water level rises more than 5 cm/day when levels are in summer band to keep daily rise below 5 cm. In winter, draw lake down to minimize ice damage to shoreline structures.


Lac des Mille Lacs
minimum and maximum daily water levels
water levels (m)
456.90
456.80
456.70
456.60
456.50
456.40
456.30
456.20
456.10
456.00
1-Jan
15-Jan
29-Jan
12-Feb
26-Feb
12-Mar
26-Mar
9-Apr
23-Apr
7-May
21-May
4-Jun
18-Jun
2-Jul
16-Jul
30-Jul
13-Aug
27-Aug
10-Sep
24-Sep
8-Oct
22-Oct
5-Nov
19-Nov
3-Dec
17-Dec
31-Dec

-

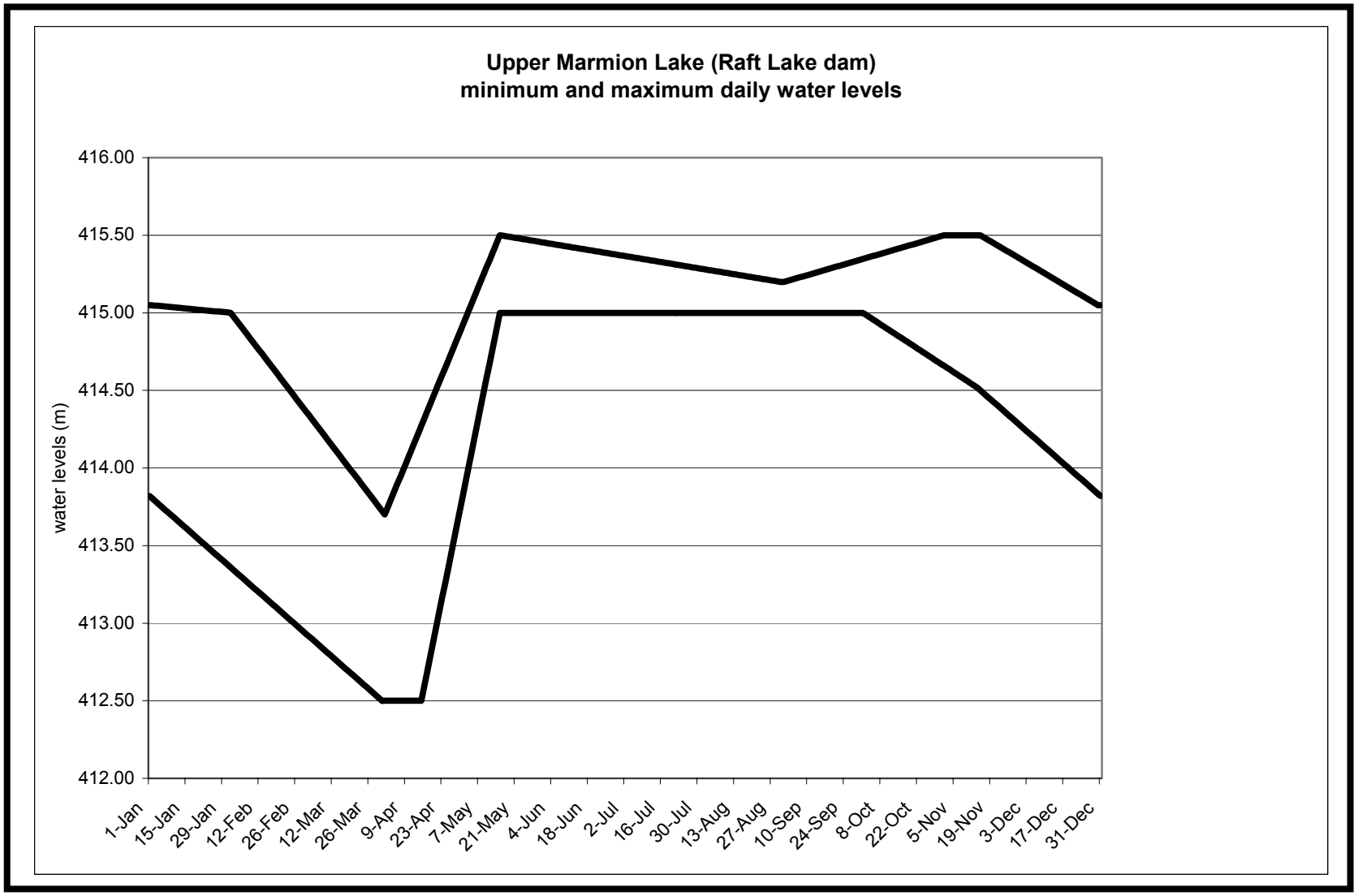
Operational Plan for Raft Lake Dam (all dates are inclusive)

Minimum Flow	Maximum Flow	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Season Water Levels	Maximum Open Season Water Fluctuation	Winter Water Levels	Maximum Winter Water Level Fluctuation
Outflows to be equal to or greater than 10 m^3/sec daily average. Outflows will be steady or rising Apr. 15–June 15. During periods with poor freshet conditions the minimum flow could be reduced to 7 m^3/sec to permit timely recovery of Marmion Reservoir lake levels when at the bottom of the band and in risk of going outside the operating plan.	The flow from Raft Lake dam will not exceed 38 m^3/sec measured as an average of daily flows over any two week period Nov. 15 - Apr. 15.	70 m^3/sec (best management target)	120 m^3/sec (best management target)	15 m^3/sec/day. Exceptions may occur to reduce flood situations when ramping rates can be greater than 15 m^3/sec/day with written notification from MNR.	15 m^3/sec/day	Daily maximum and minimum levels are defined in Appendix 8 and summarized below: Minimum 415 m - 3rd Sat. in May to Oct. 1 Maximum 415.5 m - May 15 415.2 m - Sept. 1 415.5 m - Nov.1 Lake levels will be stable or rising Apr. 15–June 15.	0.5 m	Daily maximum and minimum levels are defined in Appendix 8 and summarized below: Minimum 414.5 m - Nov 15 412.5 m - Apr.1–15; Maximum 415.5 m - Nov.15, 413.7 m - Apr. 1	3.0 m

Best Management Targets:

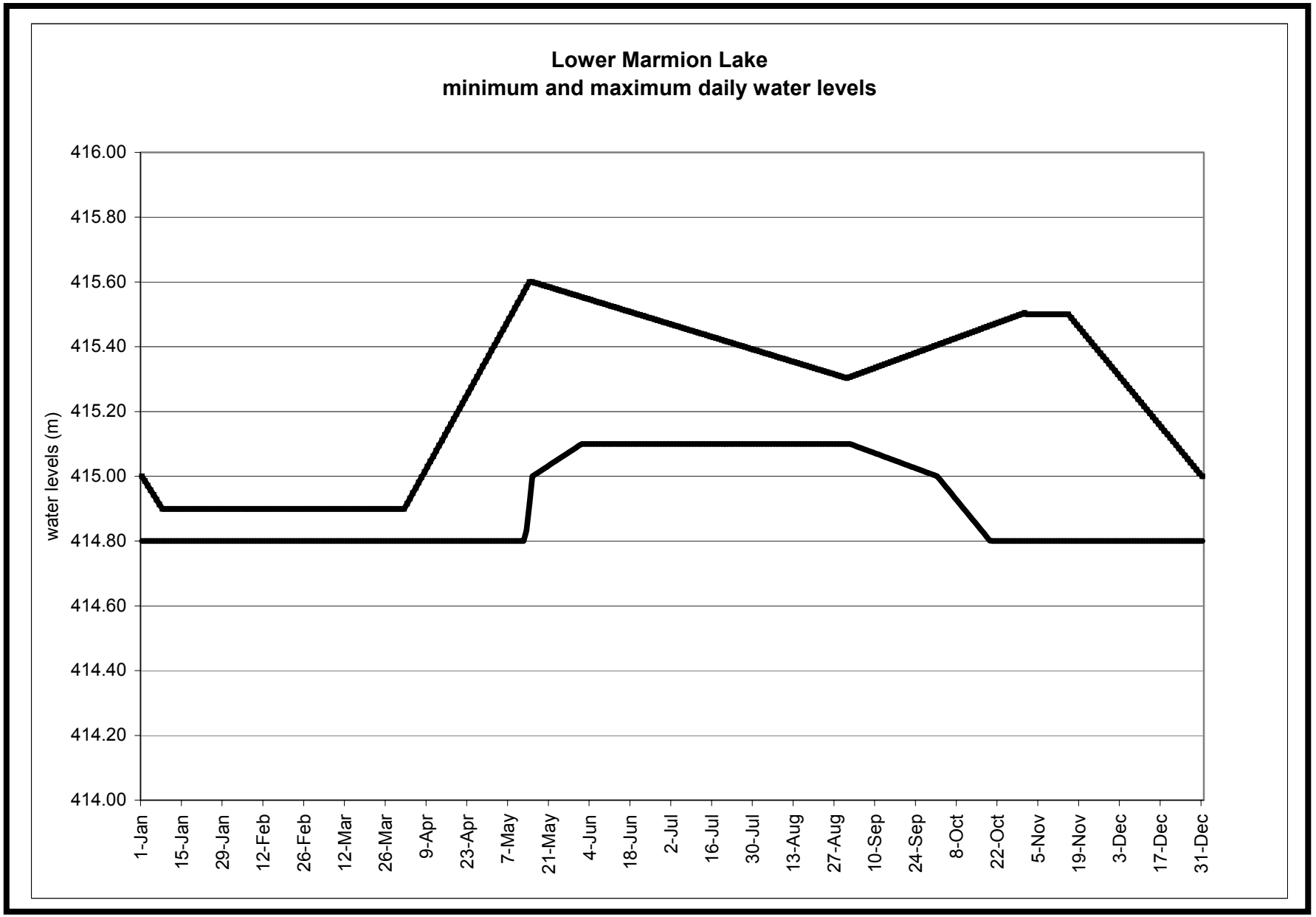
Where applicable, implement strategies to minimize flood impacts

- Store water at Raft Lake and Lac des Mille Lacs when storage is available. Keep flood freeboard at Raft and Lac des Mille Lacs before and during freshet. Stage the rate of rise in reservoirs to consider inflow rates. Lower level of Calm Lake to reduce water level in Perch Chain.
- Store water at Raft Lake, Lac des Mille Lacs and Calm Lake when storage is available.


Upper Marmion Lake (Raft Lake dam)
minimum and maximum daily water levels
water levels (m)
416.00
415.50
415.00
414.50
414.00
413.50
413.00
412.50
412.00
1-Jan
15-Jan
29-Jan
12-Feb
26-Feb
12-Mar
26-Mar
9-Apr
23-Apr
7-May
21-May
4-Jun
18-Jun
2-Jul
16-Jul
30-Jul
13-Aug
27-Aug
10-Sep
24-Sep
8-Oct
22-Oct
5-Nov
19-Nov
3-Dec
17-Dec
31-Dec

Operational Plan for Lower Marmion Sluiceway (all dates are inclusive)

Minimum Flows	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Season Water Levels	Maximum Open Season Water Fluctuation	Winter Water Levels	Maximum Winter Water Level Fluctuation
Outflows to be equal to or greater than 0.2 m^3/sec daily average.	2 m^3/sec (best management target)	5 m^3/sec (best management target)	2 m^3/sec/day	2 m^3/sec/day	Daily maximum and minimum levels are defined in Appendix 8 and summarized below: Minimum 415.00m - 3rd Sat. May 415.10m - June 10 to Sept. 1 415.00m - Oct. 1 Maximum 415.60m-May 15, 415.30m-Sept. 1, 415.50m-Nov.1 Lake levels will be stable or rising Apr. 15 to June 15.	0.50 m	Daily maximum and minimum levels are defined in Appendix 8 and summarized below: Minimum 414.80m Maximum 415.50m - Nov.15 414.90m - Apr. 1	0.70 m

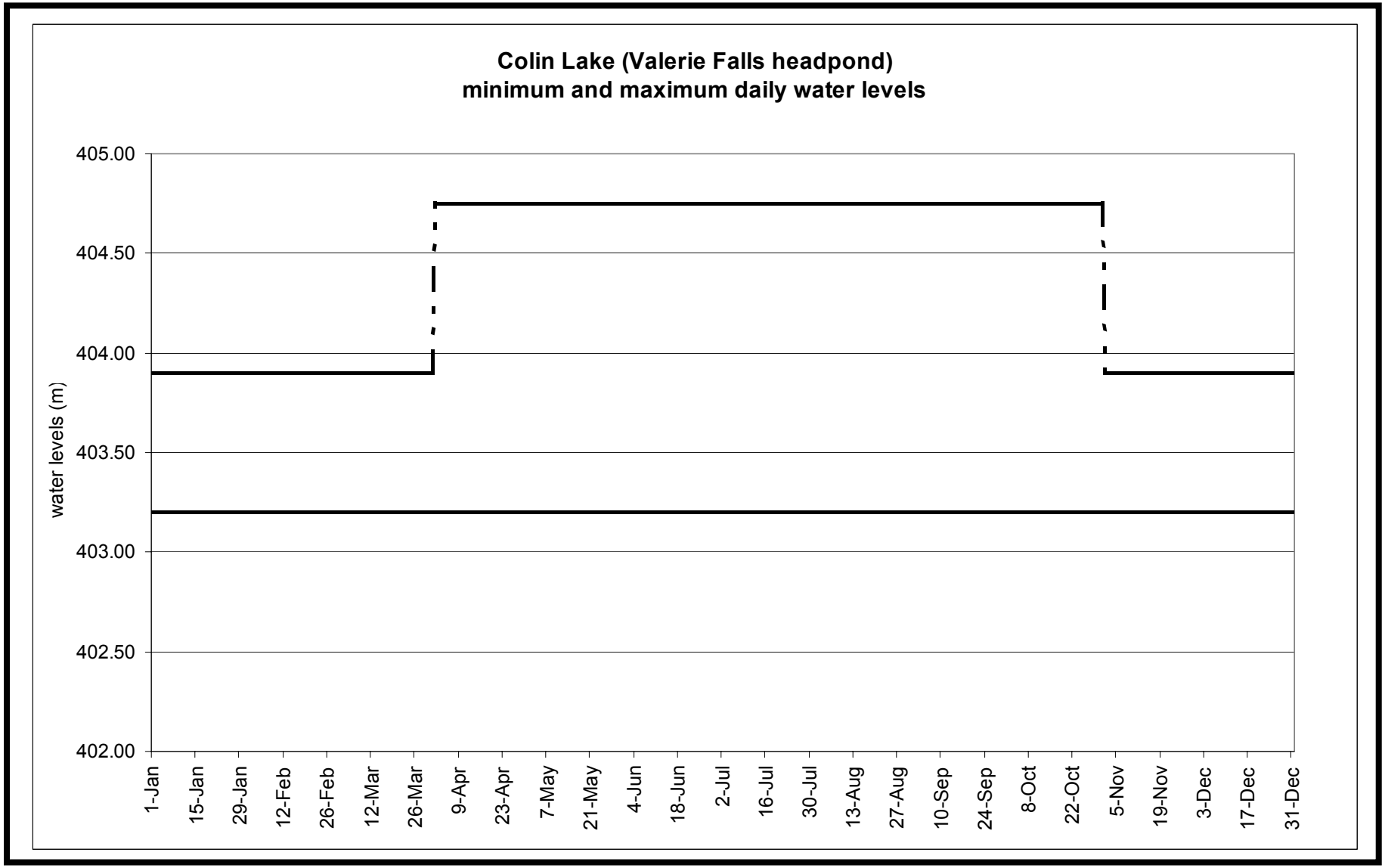

Lower Marmion Lake
minimum and maximum daily water levels
water levels (m)
416.00
415.80
415.60
415.40
415.20
415.00
414.80
414.60
414.40
414.20
414.00
1-Jan
15-Jan
29-Jan
12-Feb
26-Feb
12-Mar
26-Mar
9-Apr
23-Apr
7-May
21-May
4-Jun
18-Jun
2-Jul
16-Jul
30-Jul
13-Aug
27-Aug
10-Sep
24-Sep
8-Oct
22-Oct
5-Nov
19-Nov
3-Dec
17-Dec
31-Dec

Operational Plan for Wagita Bay Dam (all dates are inclusive)

Minimum Flows	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Season Water Levels	Maximum Open Season Water Fluctuation	Winter Water Levels	Maximum Winter Water Level Fluctuation
Outflows to be equal to or greater than 0.1 m^3/sec daily average or the value identified during actual measurement in 2004.	n/a	n/a	n/a	n/a	See VFLP Headpond	See VFLP Headpond	See VFLP Headpond	See VFLP Headpond

Operational Plan for Valerie Falls Dam (all dates are inclusive)

Minimum Flows	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Season Water Levels	Maximum Open Season Water Fluctuation	Winter Water Levels	Maximum Winter Water Level Fluctuation
Outflows to be equal to or greater than 8 m^3/sec at all times. Outflows will be steady or rising Apr. 15–June 15. No peaking of flows will occur Apr. 15–June 15 (i.e. outflows must equal inflows at all times). Flows must be above 60% of daily average inflows (off-peak) and below 140% of daily average inflows (on-peak) June 16–Apr.14	70 m^3/sec (best management target)	120 m^3/sec (best management target)	60 m^3/sec/day	60 m^3/sec/day	Daily maximum and minimum levels are defined in Appendix 8 and summarized below: Minimum 403.2 m - Apr. 1–Nov. 1 Maximum 404.75 m - Apr. 1–Nov. 1 Upstream water levels will be stable or rising Apr. 15–June 15.	1.5 m	Daily maximum and minimum levels are defined in Appendix 8 and summarized below: Minimum 403.2 m - Nov. 1–Mar. 31 Maximum 403.9 m - Nov. 1–Mar. 31	0.7 m


Colin Lake (Valerie Falls headpond)
minimum and maximum daily water levels
water levels (m)
405.00
404.50
404.00
403.50
403.00
402.50
402.00
1-Jan
15-Jan
29-Jan
12-Feb
26-Feb
12-Mar
26-Mar
9-Apr
23-Apr
7-May
21-May
4-Jun
18-Jun
2-Jul
16-Jul
30-Jul
13-Aug
27-Aug
10-Sep
24-Sep
8-Oct
22-Oct
5-Nov
19-Nov
3-Dec
17-Dec
31-Dec

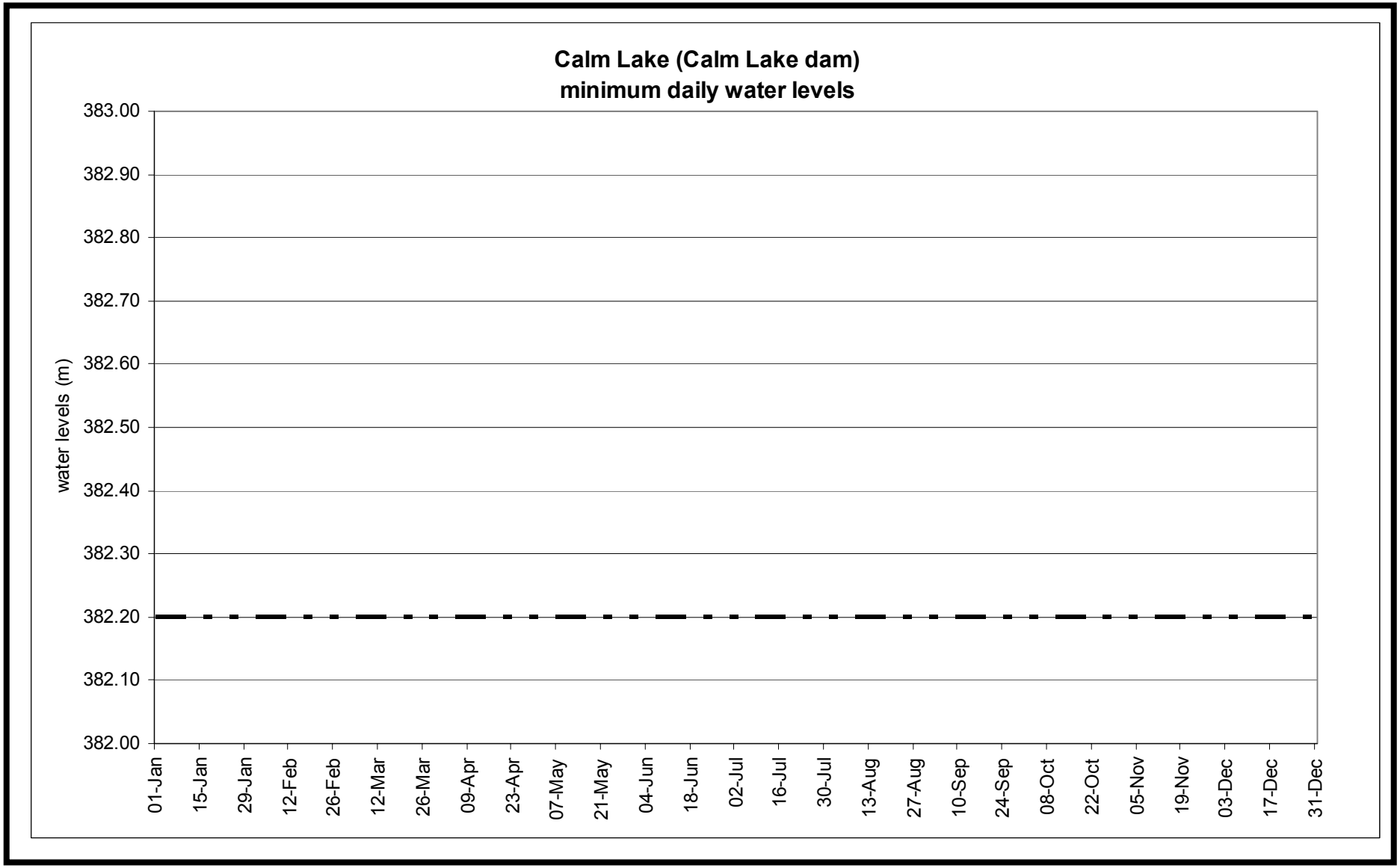
Operational Plan for Calm Dam (all dates are inclusive)

Minimum Flows	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Season Water Levels	Maximum Open Season Water Fluctuation	Winter Water Levels	Maximum Winter Water Level Fluctuation
Total outflows to be equal or greater than 2.5 m^3/sec at all times from June 16–Apr. 14. Total outflows to be equal or greater than 10 m^3/sec at all times Apr. 15–June 15. Total outflows will be steady or rising; (subject to level fluctuation limited to 20 cm - daily range) Apr. 15–June 15. Flows must be above 50% of daily average inflows (off-peak) and below 150% of daily average inflows (on-peak) Apr. 15–June 15.	90 m^3/sec (best management target)	150 m^3/sec (best management target)	2.5 m^3/sec/min	2.5 m^3/sec/min	Daily minimum levels are defined in Appendix 8 and summarized below: Minimum 382.2 m Calm Lake water level fluctuation is limited to 20 cm (daily range) Apr. 15– June 15.	0.55 m; 0.2 m Apr.15–June 15	Daily minimum levels are defined in Appendix 8 and summarized below: Minimum 382.2 m	0.55 m

Best Management Targets:

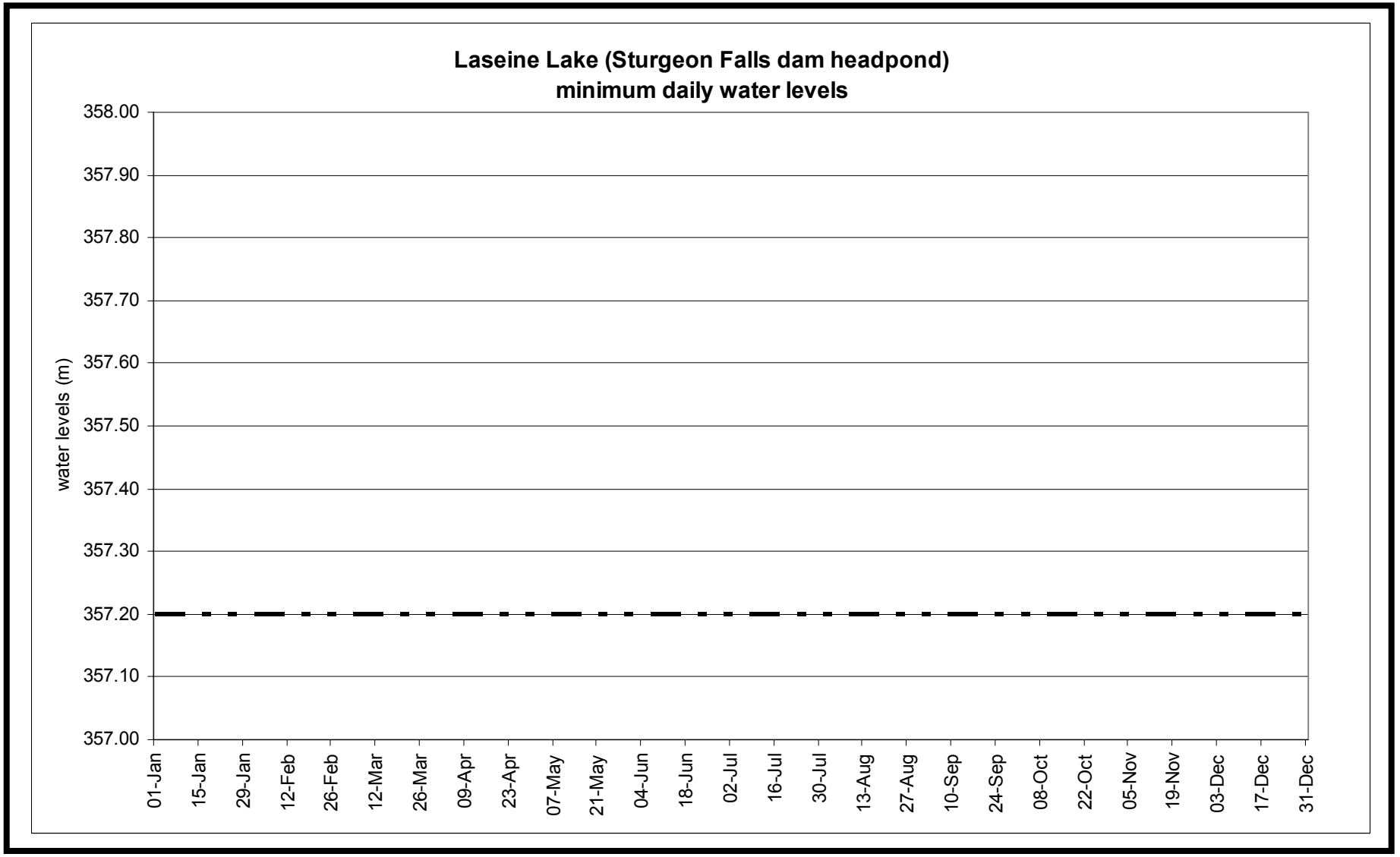
Where applicable, implement strategies to minimize flood risks

- Store water at Raft Lake and LDML when storage is available.
- Keep flood freeboard at Raft and LDML before and during freshet.
- Stage the rate of rise in reservoirs to consider inflow rates.
- Lower level of Calm Lake to reduce water level in Perch Chain.


Calm Lake (Calm Lake dam)
minimum daily water levels
water levels (m)
383.00
382.90
382.80
382.70
382.60
382.50
382.40
382.30
382.20
382.10
382.00
01-Jan
15-Jan
29-Jan
12-Feb
26-Feb
12-Mar
26-Mar
09-Apr
23-Apr
07-May
21-May
04-Jun
18-Jun
02-Jul
16-Jul
30-Jul
13-Aug
27-Aug
10-Sep
24-Sep
08-Oct
22-Oct
05-Nov
19-Nov
03-Dec
17-Dec
31-Dec

Operational Plan for Sturgeon Falls Dam (all dates are inclusive)

Minimum Flows	Bankfull Flow (1 in 1 flood)	Riparian Flow (1 in 10 flood)	Maximum Up Ramping Rate	Maximum Down Ramping Rate	Open Season Water Levels	Maximum Open Season Water Fluctuation	Winter Water Levels	Maximum Winter Water Level Fluctuation
Total outflows to be equal or greater than 2.5 m^3/sec at all times June 16–Apr. 14. Total outflows to be equal or greater than 10.0 m^3/sec at all times Apr. 15–June 15. Total outflows will be steady or rising; (subject to level fluctuation limited to 20 cm - daily range) Apr. 15–June 15. Flows must be above 50% of daily average inflows (off-peak) and below 150% of daily average inflows (on-peak) Apr. 15–June 15.	90 m^3/sec (best management target)	150 m^3/sec (best management target)	2.5 m^3/sec/min	2.5 m^3/sec/min	Daily minimum levels are defined in Appendix 8 and summarized below: Minimum 357.2 m Headpond water level fluctuation is limited to 20 cm (daily range) Apr. 15–June 15.	0.55 m 0.2 m Apr. 15–June 15	Daily minimum levels are defined in Appendix 8 and summarized below: Minimum 357.2 m	0.55 m


Laseine Lake (Sturgeon Falls dam headpond)
minimum daily water levels
water levels (m)
358.00
357.90
357.80
357.70
357.60
357.50
357.40
357.30
357.20
357.10
357.00
01-Jan
15-Jan
29-Jan
12-Feb
26-Feb
12-Mar
26-Mar
09-Apr
23-Apr
07-May
21-May
04-Jun
18-Jun
02-Jul
16-Jul
30-Jul
13-Aug
27-Aug
10-Sep
24-Sep
08-Oct
22-Oct
05-Nov
19-Nov
03-Dec
17-Dec
31-Dec

11.2 Conditions Outside of the Operational Plans

Water management plans are intended to guide the management of water under normal level and flow conditions which are defined as the operational plan levels and flows. However, there are conditions beyond the control of the operator that may cause flows and levels to either exceed, or not achieve the values defined in the operating plan. The following are used to determine when it is no longer considered normal conditions.

Lower compliance level

Reservoir outflows are at minimum values specified in the plan and water levels are below the minimum specified elevation for that day for the following water bodies: Lac des Mille Lacs, Upper Marmion Lake, Lower Marmion Lake, Calm Lake and Laseine Lake. Both conditions must exist at the same time.

Upper compliance level

Lac des Mille Lacs dam – outflow is above 70m^3/sec and the Lac des Mille Lacs water level is above the maximum specified elevation for that day.

Raft Lake dam – outflow is above 150 m^3/sec and the Upper Marmion water level is above the maximum specified elevation for that day.

Calm Lake dam – outflow is above 200 m^3/sec and the Calm Lake water level is above the maximum specified elevation for that day.

Once the situation is determined to be outside of the levels and flows stated in the plan and if the Ministry of Natural Resources considers it necessary, an Order may be issued to maintain, raise or lower the levels or flows in the affected lake or river.

Flood Conditions

When flows and levels reach the following values, MNR is to be contacted.

Lac des Mille Lacs dam – outflow is above 70m^3/sec and the Lac des Mille Lac water level is above 456.99 m.

Raft Lake dam – outflow is above 150 m^3/sec and the Upper Marmion water level is above 415.5 m.

Calm Lake dam – outflow is above 200 m^3/sec and the Calm Lake water level is above 382.9 m.

11.3 Public Notification

Industry: Both Valerie Falls Limited Partnership and Abitibi Consolidated Company of Canada have developed Emergency Preparedness Plans. When there is an emergency, the Emergency Preparedness Plan will be implemented. The Emergency Preparedness Plan includes contact information of emergency departments (municipal and provincial), Ontario Ministry of Natural Resources, industry representatives, and key public stakeholders on the Seine River.

12 Compliance Monitoring Plan

The purpose of the Compliance Monitoring Plan is to determine whether the operation of each dam is within the bounds set out in the operating plans as laid out in the Seine River Water Management Plan. It also provides the data that allows the MNR to take compliance or enforcement action under the Lakes and Rivers Improvement Act if the reason for being outside the operating plans is due to negligence or willful action and not due solely to acts of nature or under the direction of the MNR.

Data will be provided for the identified reporting period, no later than 3 months after the end of the reporting period, in an electronic spreadsheet format as agreed to by MNR., (i.e. data for the month of June is required by Sept 30) or upon request by the Ministry of Natural Resources. The data is to be sent to the location identified as responsible for compliance in the following table (Table 7).

MNR will conduct spot audits (independent water level measurement, etc.) to ensure accuracy of data and compliance.

The operators, through monitoring, will take preventive action to avoid situations that will result in the levels and flows being outside of the approved operating plans. The dam operators are responsible for self-monitoring and must report to the Ministry of Natural Resources, within 24 hours of becoming aware of the occurrence, when out of compliance. The operator will return levels and flows to the approved range in the operating plans, as soon as conditions reasonably allow.

Table 7: Compliance Monitoring Requirements

Dam	Data required	Data collection responsibility	Reporting period	Compliance responsibility
Lac des Mille Lacs	- daily average water level (m) - daily average outflow (m^3/sec)	VFLP	monthly	MNR Thunder Bay district – Shebandowan Area Supervisor
Lower Marmion Weir	- daily average water level	VFLP	monthly	MNR Fort Frances District – Atikokan Area Supervisor
Raft Lake dam	- daily average water level (m) - daily average outflow (m^3/sec)	ACCC	monthly	MNR Fort Frances District – Atikokan Area Supervisor
Wagita dam	- flow at time of inspection(m^3/sec)	VFLP	Quarterly (approximately April 15, August 15, November 15, February 15)	MNR Fort Frances District – Atikokan Area Supervisor
Valerie Falls dam	- daily average water level (m) - daily average outflow (m^3/sec) - minimum daily flow	VFLP	monthly	MNR Fort Frances district – Atikokan Area Supervisor

Dam	Data required	Data collection responsibility	Reporting period	Compliance responsibility
	- average hourly flow for period from April 15 to June 15. - average hourly tailwater elevations for period from April 15 to June 15 - average hourly headwater elevations for period from April 15 to June 15			
Calm Lake dam	- daily average water level of Calm Lake (m) - daily average outflow (m^3/sec) - minimum daily flow - average hourly flow for period from April 15 to June 15 - average hourly tailwater elevations for period from April 15 to June 15 - average hourly headwater (Calm Lake) elevations for period from April 15 to June 15	ACCC	monthly	MNR Fort Frances district – Atikokan Area Supervisor
Sturgeon Falls dam	- daily average water level of Laseine Lake headpond (m) - daily average outflow (m^3/sec) - minimum daily flow - average hourly flow for period from April 15 to June 15 - average hourly tailwater elevations for period from April 15 to June 15 - average hourly headwater (Laseine Lake) elevations for period from April 15 to June 15	ACCC	monthly	MNR Fort Frances district – Atikokan Area Supervisor

In the event of water level or flow being outside of the operational plan, it will be deemed an occurrence of non-compliance and the events leading up to the occurrence will be reviewed by a compliance committee made up of Ontario Ministry of Natural Resources district staff and Ontario Ministry of Natural Resources regional engineer in consultation with input from the operator of the structure. If it is determined that the reason for the event is due to natural conditions beyond the control of the operator (e.g. flood, drought, ice build-up, wind effects, vandalism or other causes beyond the reasonable control of the operator) no charges will be laid and the occurrence and related events will be documented in the annual report to be submitted to the Atikokan Area office of the Ministry of Natural Resources by April 15 of each year of the plan. The report will summarize previous years data from April 1 to March 31. This information will be used during operational plan review during the preparation of the next plan. In most cases, it is expected that occurrences due to drought and, to some extent flood events, will be apparent before they actually occur and the Ontario Ministry of Natural Resources and dam operator will already be in discussion about them.

If it is felt by the compliance committee that the occurrence is due to management action, the event will be deemed non-compliance and the issue will be passed to Ontario Ministry of Natural Resources enforcement staff for their review for potential of laying charges under the Lakes and Rivers Improvement Act.

If there is an occurrence event the proponent will provide, if requested, the following information to the Ministry of Natural Resources: storage-discharge relationships, stage-discharge curves, stop log settings and any other hydrological information that may assist the Ministry of Natural Resources in reviewing the event.

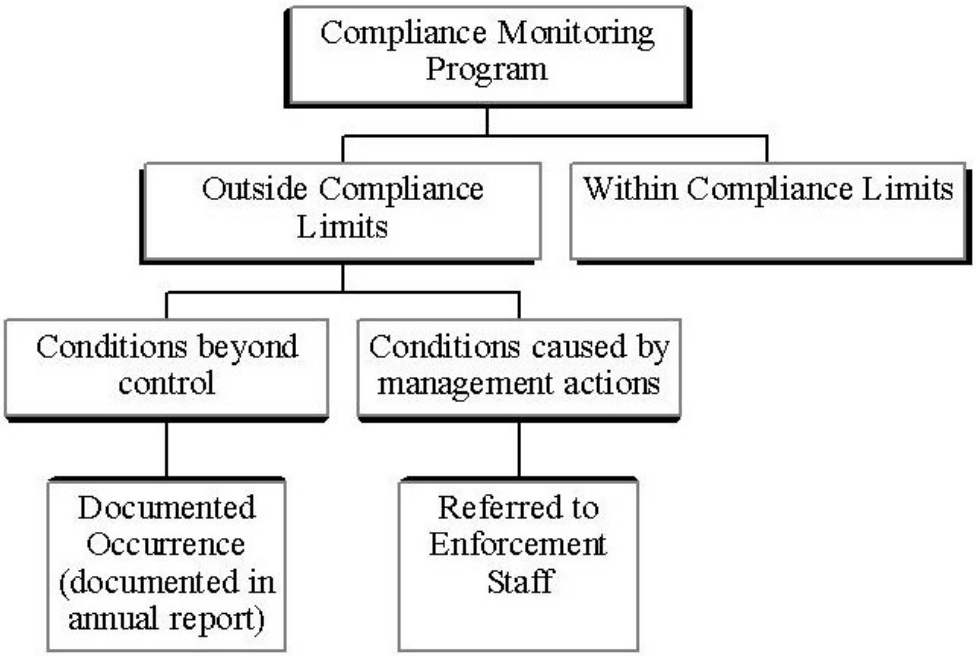


Figure 8: Overview of How Compliance Monitoring Will Work

Gauges used for monitoring flows and levels are described below. If any changes in flow or level monitoring gauges are proposed by the operator (e.g. change in location, upgrade to gauge, recalibration of existing gauge), the operator must outline the changes in writing to the MNR office identified with compliance responsibility.

Table 8: Gauges Used for Monitoring

Waterbody or Control Structure	Gauge Locations and Type	Type of Data	Comments
LDML	**LDML Pine Point** – Staff gauge and Nitrogen bubble data logger at Pine Point Resort (the nitrogen bubbler gauge is the primary gauge for data recording). **LDML Dam** – Staff gauge on left bank of dam. **LDML Sawmill Bay** – Staff gauge on breakwall at Camp Sawmill Bay Resort.	Lake elevation	The bubbler and data logger at Pine Point have been in operation for 4 years and are accessed by phone modem. Owned by VFLP. **Flow** is derived from engineered tables that consider stoplog placement and lake elevation.
Upper Marmion Reservoir	**Raft Lake Dam** – Float gauge and data logger in gauge house near # 4 sluice (primary gauge for data recording). **Raft Lake Dam** – Staff gauge on left bank upstream of # 1 sluice.	Lake elevation	The data logger at Raft Lake reports by GOES satellite and the data is distributed by the USACE. Owned by ACCC. **Flow** is calculated manually from tables that consider stoplog positions, flows over the spillway and elevation. The Raft Lake dam gauge is located approximately 300 metres downstream from Upper Marmion Lake. The difference between the gauge reading and the actual level of Upper Marmion Lake is a function of the approach channel

Waterbody or Control Structure	Gauge Locations and Type	Type of Data	Comments
			losses related to flow and elevation. A MNR approved channel loss table will be used to adjust gauge readings to accurately reflect the level of Upper Marmion. Compliance monitoring will use the channel loss adjusted level of Upper Marmion.
Lower Marmion Lake	Float gauge station in gauge house beside Hwy 622; approximately 3 km past Atikokan Generating Station.	Lake elevation	Paper graph recorder owned by VFLP. Flow is derived from engineered tables that consider stoplog positions and head.
Colin Lake - headpond for Valerie Falls G.S.	Pressure transducers at the Valerie Falls dam (primary gauge) and intake and data recorder for levels.	Lake elevation	The data is gathered by phone modem. The gauging equipment is owned by VFLP. Flows through the turbine are relative values provided by index testing at commissioning and turbine discharge tables. Flows over the spillwall(s) are derived from engineered tables that consider elevation. **Flows** through the gated sluice are calculated from engineered tables that consider gate position and total head.
Valerie Falls G.S. Tailrace	Pressure transducer in turbine pit.	River elevation	The data is gathered by phone modem. The gauging equipment is owned by VFLP.
Calm Lake G.S.	Ultrasonic transducer at the Calm Lake G.S. intake.	Lake elevation	The data is gathered by radiophone modem. The gauging equipment is owned by ACCC. Flows through

Waterbody or Control Structure	Gauge Locations and Type	Type of Data	Comments
			the turbine are relative values provided by index testing at commissioning and turbine discharge tables. Flows through the service gates and stoplog sluices are derived from engineered tables that consider gate position, stop log placement and total head.
Calm Lake G.S. Tailrace	Bubble type pressure transducer (primary gauge).	River elevation	Radiophone modem.
Laseine Lake	Ultrasonic transducer at the Sturgeon Falls G.S. intake (primary gauge).	Lake elevation	The data is gathered by phone modem. The gauging equipment is owned by ACCC. **Flows** through the turbine are relative values provided by index testing at commissioning and turbine discharge tables. Flows through the service gates and stoplog sluices are derived from engineered tables that consider gate position, stop log placement and total head.
Sturgeon Falls G.S. Tailrace	Bubble type pressure transducer (primary gauge).	River elevation	The data is gathered by phone modem. The gauging equipment is owned by ACCC

13 Effectiveness Monitoring Plan

The Effectiveness Monitoring Plan (EMP) is the basis of evaluating how well the management of water levels and flows during the life of the plan meets the objectives identified in the Seine River Water Management Plan. This is different than the compliance monitoring plan which assesses how well the dam operators stay within the rules laid out in the operational plan.

The purpose of effectiveness monitoring is to provide the Planning Team with the information either to confirm that the plan is achieving objectives or to propose modifications to the target levels and flows and strategies in the next planning cycle based on the ability to meet objectives during the plan period.

The Effectiveness Monitoring Plan will lay out how each sub-objective is to be evaluated including what data is required, who is responsible for gathering the data, how the evaluation will be conducted, and when and how the results will be reported.

The monitoring of socially based objectives (e.g. flooding, navigation etc.) will be based on response from the public to conditions that occur during the period of the plan. To facilitate these responses the plan proponents, within 4 months of plan approval, will establish a website that will post water level and flow data for the system. Central to the website function will be a user-friendly comment page to receive comments from the public. These comments will be forwarded to the MNR and the Public Advisory Committees. In addition, for members of the public who wish to keep their comments private, the website will offer a controlled access page with only MNR having the password to access that portion of the site. Comments will be protected by the Freedom of Information Act.

It is assumed that the public will identify to the MNR and/or facility operators situations when they are satisfied or not satisfied with water levels or flows. Importantly, this will provide a means for timely and objective responses to system user comments, questions and suggestions.

In addition to the web page, public comment will be captured through a number of other means:

- individual comments
- comments passed through members of public advisory committees (i.e. Lac des Mille Lacs Advisory Committee and Seine River Water Level Technical Committee)
- surveys (mail-out, phone, etc.) to assess public opinion on water management
- specific meetings that may be called by MNR, public advisory committees or industry during specific events (e.g. high flow/levels, low flows/levels, etc.)

Aquatic ecosystem monitoring will be based on a top-down approach by evaluating species identified as valued ecosystem components (see Section 4.3) at a population level to try and determine whether water level management is resulting in changes at

this level. If impacts are found at the population level, further work may be required to identify what specific management action is responsible for these changes.

Advantages of this approach:
- most efficient in terms of time and money
- addresses ecosystem issues at the level of public concern (e.g. “maintaining good walleye fishing”)

Disadvantages of this approach:
- slow at identifying impacts (have to show up at population level first and then need to work back to identify specific impacts)
- doesn’t identify impacts on ecosystem components that objectives weren’t developed for
- doesn’t address the cumulative impact issue (e.g. ecosystems can absorb impacts with little noticeable change in populations up to a certain point and then any additional impact may cause them to collapse.)
- if a change occurs at population level, additional work will be required to determine if it is due to a water management impact

The schedule for details on project (completion date, costs and who is paying, etc.) is found in Appendix 9. Abitibi-Consolidated Company of Canada and Valerie Falls Limited Partnership will have an opportunity to review and comment on the scope of the work for effectiveness monitoring studies. Abitibi-Consolidated Company of Canada and Valerie Falls Limited Partnership will have an opportunity to comment on draft reports.

Abbreviations used in the following tables:
VFLP – Valerie Falls Limited Partnership
ACCC – Abitibi Consolidated Company of Canada
MNR – Ministry of Natural Resources
LDML – Lac des Mille Lacs
SRWLTC – Seine River Water Level Technical Committee
FWIN – Fall Walleye Index Netting
SRWMP – Seine River Water Management Plan

See Appendix 9 Schedule of Effectiveness Monitoring Projects.

Effectiveness Monitoring for Issue Category: 1. Flood				
Sub-Objective	**Effectiveness Monitoring Strategy**	**Data Required**	**Responsibility for Data**	**Reporting Requirements**
1a) Minimize flooding on Lac des Mille Lacs	a) Evaluate whether plan flood level (456.99 m) is causing flood damage, determine the location(s) and generally quantify the magnitude of the damage	a1) compile input from web page and other sources	a1) MNR to log comments provided to them and forward to VFLP	VFLP to provide annual report to MNR, SRWMP Planning Team, LDML Advisory Committee
		a2) survey residents immediately following high water event by phone or mail	a2) MNR	
	b) Evaluate effectiveness of water management actions taken at LDML dam preceding and during flood	b) log change information for LDML before and during flood events (levels above 456.99)	b) VFLP	
1b) Minimize flooding on Upper River	a) annually evaluate # of times Sapawe Rd. flooded (e.g. water on road) and the relationship between controlled and uncontrolled flows	a1) daily average flow data for LDML	a1) VFLP	VFLP to provide annual report to MNR, SRWMP Planning Team, LDML Advisory Committee
		a2) data on uncontrolled flows (Firesteel River, etc.)	a2) VFLP/MNR	
		a3) compile input from web page and other sources	a3) MNR to log comments provided to them and forward to VFLP.	
	b) evaluate water management actions taken at LDML dam preceding and during flood.	b) log change information for LDML	b) VFLP	
1c) Minimize impacts of Seine River flooding on Town of Atikokan especially during Atikokan River flood events.	a) annually evaluate # of times Seine R. flows impacted on Atikokan R. water levels in Atikokan	a) daily average flow data for Raft Lake dam	a) ACCC	ACCC to provide annual report to MNR, SRWMP Planning Team
	b) evaluate water management actions taken at Raft Lake dam preceding and during flood	b) log change information for Raft Lake dam	b) ACCC	
	c) research relationship between Seine River flows and Atikokan flood events	c) Atikokan River water level information at Atikokan	c) MNR	
1d) Minimize flooding on Perch Lake	a) annually evaluate # of times Perch Lake had issues related to flooding and identify flow/level conditions	a1) compile input from web page and other sources	a1) MNR to log comments provided to them and forward to ACCC	ACCC to provide annual report to MNR, SRWMP Planning Team
		a2) water level staff measurement for Perch Lake during floods	a2) ACCC and VFLP	ACCC and VFLP will install a staff gauge. MNR will specify location and provide elevation benchmark. VFLP will record elevations periodically during flood events.
	b) water management actions taken at Raft	b) log change information for Raft	b) ACCC	

Effectiveness Monitoring for Issue Category: 1. Flood				
Sub-Objective	**Effectiveness Monitoring Strategy**	**Data Required**	**Responsibility for Data**	**Reporting Requirements**
	Lake dam preceding and during flood	Lake dam and Calm Lake dam		
1e) Minimize flooding on Lower Seine River	a) annually evaluate # of times Lower Seine R. (particularly Seine River FN) flooded and identify flow/level conditions	a1) compile input from web page and other sources	a1) MNR to log comments provided to them and forward to ACCC	ACCC to provide annual report to MNR, Seine River First Nation, SRWMP Planning Team
		a2) Rainy Lake water level information to be posted on SRWMP web site	a2) ACCC	
	b) evaluate water management actions taken at upstream dams preceding and during flood	b) water management information for ACCC upstream dams	b) ACCC	
Drought	a) annually evaluate water management actions taken at dams preceding and during drought	a) water management data for dams	a1) VFLP: LDML dam, Valerie Falls dam ACCC: Raft Lake dam, Calm Lake dam, Sturgeon Falls dam	Annual report to MNR, SRWMP Planning Team , LDML Advisory Committee
	b) evaluate whether lower levels of rule bands are causing issues, etc. (e.g. are we in a drought while we are still in the band?)	b1) compile input from web page and other sources	b1) MNR to log comments provided to them and forward to industry	
		b2) survey residents immediately following low water event	b2) MNR	
Communication	a) Annually review public communication strategies to ensure public was adequately aware of significant water level/flow changes in the system	a1) compile input from web page and other sources	a1) MNR to log comments provided to them and forward to industry	Annual report by dam operators to MNR, SRWMP Planning Team, LDML Advisory committee
		a2) issue notices in local media during extreme events	a2) VFLP: LDML dam, Valerie Falls dam ACCC: Raft Lake dam, Calm Lake dam, Sturgeon Falls dam	

Effectiveness Monitoring for Issue Category: 2. Navigation, Recreation, Social				
Sub-Objective	**Effectiveness Monitoring Strategy**	**Data Required**	**Responsibility for Data**	**Reporting Requirements**
2a) Maintain stable water levels on LDML during open water season	Annually review a) number of issues resulting from fluctuating water levels on LDML during the summer b) water management actions taken at LDML dam c) economic impact on camps due to high water levels	a) compile input from web page and other sources including phone and mail surveys b) log change information for LDML c) damage to boats, motors, dock damage	a) MNR to conduct surveys and log comments provided to them and forward to VFLP b) VFLP c) MNR (FOI requirements)	VFLP to provide annual report to MNR, SRWLTC, LDML Advisory committee
2b) Minimize ice damage to shoreline structures due to rising levels in winter	Annually review a) number of issues resulting from rising water levels on LDML during the winter b) water management actions taken at LDML dam	a) compile input from web page and other sources b) log change information for LDML	a) MNR to log comments provided to them and forward to VFLP b) VFLP	VFLP to provide annual report to MNR, SRWLTC, LDML Advisory committee
2c) Maintain water levels on Upper River to allow access from Reserve 22A2 to Mosher Lake	Annually review a) number of times access from Reserve 22A2 to Mosher Lake has been restricted because of low water flow b) water management actions taken at LDML dam at that time.	a) compile input from web page and other sources b) log change information for LDML	a) MNR to log comments provided to them and forward to VFLP b) VFLP	VFLP to provide annual report to MNR, SRWLTC, LDML Advisory committee
2d) Maintain water levels suitable for access and navigation on Upper Marmion and Lower Marmion during open water season	Annually review a) number of access and navigation issues resulting from water levels on Upper Marmion and Lower Marmion during open water season water b) number of days access point at Reserve Bay and Upper Seine is usable c) number of days Marmion sluiceway is usable d) management actions taken at Raft Lake and LDML dam	a) compile input from web page and other sources b) number of days above usable level (to be defined) c) number of days above 414.80 m d) log change information for Lower Marmion, LDML and Raft Lake dam	a) MNR to log comments provided to them and forward to industry b) ACCC c) ACCC d) ACCC (VFLP to provide Lower Marmion and LDML dam information)	ACCC to provide annual report to MNR, SRWLTC Advisory committee
2e) Maintain water levels suitable for access and navigation on Calm and Perch lakes during open water season	Annually review a) number of access and navigation issues resulting from water levels on Calm and Perch lakes during open water season water b) number of days access point at Perch and Calm lakes is usable c) management actions taken at Calm Lake dam and upstream dams. d) occupancy rates of tourist camps and navigation costs	a) compile input from web page and other sources related to navigation between Valerie Falls dam and Calm Lake dam b) number of days above usable level (to be defined) c) log change information for LDML, Raft Lake, Valerie Falls and Calm Lake dam d) number of guests/camp	a) MNR to log comments provided to them and forward to industry b) ACCC c) ACCC (VFLP to provide Valerie Falls dam and LDML dam information) d) MNR	ACCC to provide annual report to MNR, SRWLTC Advisory committee

Effectiveness Monitoring for Issue Category: 3. Power Generation				
Sub-Objective	**Effectiveness Monitoring Strategy**	**Data required**	**Responsibility for Data**	**Reporting Requirement**
3a) LDML	annually evaluate impact of water management on power production		VFLP/ACCC	
3b) Upper Marmion	annually evaluate impact of water management on power production		VFLP/ACCC	
3c) Lower Marmion	annually evaluate impact of water management on power production		VFLP/ACCC	
3d) LFL & Colin Lake (Valerie Falls power dam)	annually evaluate impact of water management on power production		VFLP/ACCC	
3e) Perch to Calm lakes	annually evaluate impact of water management on power production		VFLP/ACCC	
3f) Calm Lake (Calm Lake power dam)	annually evaluate impact of water management on power production		VFLP/ACCC	
3g) Laseine to Sturgeon Falls (Sturgeon Falls power dam)	annually evaluate impact of water management on power production		VFLP/ACCC	

Effectiveness Monitoring for Issue Category: 4. Aquatic Ecosystem				
Sub-Objective	**Effectiveness Monitoring Strategy**	**Data required**	**Responsibility for Data**	**Reporting Requirement**
4a) Improve aquatic ecosystem health on Upper Marmion Lake by reducing winter drawdown	a) assess fish populations	a) FWIN assessment data from Upper Floodwaters	a) MNR staff, industry support $. See Appendix 9.	Report due by beginning of next planning cycle.
	b) assess beaver populations.	b) beaver over-winter survival	b) MNR with partner (trapper, Lakehead University)	Report due by beginning of next planning cycle.
4b) Maintain spring spawning opportunities by having steady or rising flows throughout the system (April 15–June 15)	a) assess fish populations to determine year class failures not related to broader environmental conditions (temperature, etc.)	a) FWIN assessment data from LDML, Upper Floodwaters, Lower Marmion, Finlayson Lake, Perch Lake, Calm Lake, Laseine Lake and Lower Seine lakes; sturgeon population assessment from Lower Seine River	a) MNR staff, industry support $. See Appendix 9.	Report due by beginning of next planning cycle.
4c) Improve extent and diversity of aquatic wetlands by lowering water levels throughout the summer months on all lakes and reservoirs	a) comparative wetland study between lakes (Upper Floodwaters, Lower Marmion, Little Falls, Calm Lake)	a) extent and diversity of wetlands in different management scenarios	a) MNR staff, industry support $. See Appendix 9.	Report due by beginning of next planning cycle.
4d) Improve aquatic ecosystem health by maintaining minimum flows throughout system	a) assess fish populations to determine year class failures not related to broader environmental conditions (temperature etc.)	a) FWIN assessment data from LDML, Upper Floodwaters, Lower Marmion, Finlayson Lake, Perch Lake, Calm Lake, Laseine Lake and Lower Seine lakes to assess fish population impacts	a) MNR staff, industry support $. See Appendix 9.	Report due by beginning of next planning cycle.
4e) Maintain current flows at Wagita dam to maintain West Arm of Steep Rock Lake while avoiding high volume discharges because of suspended silt concerns	a) determine current flows	a) install v-notch weir below dam and benchmark surface profile	a) VFLP	Completed by March 2004
	b) assess turbidity in lake	b) collect water samples	b) MNR	
	c) assess populations to determine year class failures not related to broader environmental conditions	c) FWIN assessment data for Steep Rock Lake to assess fish population impacts	c) MNR	Report due by beginning of next planning cycle
4f) Maintain natural rates of flow changes in rivers	a) annually review rates of flow changes	a1) daily average flow data from LDML dam and Raft Lake dam, Valerie Falls, Calm Lake and Sturgeon Falls a2) hourly flow data from Valerie Falls, Calm Lake and Sturgeon Falls dam April 15–June 15	a1) VFLP for LDML and Valerie Falls dam data - ACCC for Raft Lake dam, Calm Lake dam and Sturgeon Falls dam data	Report due by beginning of next planning cycle
	b) assess fish populations to determine year class failures not related to broader environmental conditions (temperatures, etc)	b) FWIN assessment data from Upper Floodwaters, Lower Marmion, Finlayson Lake, Perch Lake, Calm Lake, Laseine Lake and Lower Seine Lakes to assess fish population impacts	b) MNR staff, industry support $. See Appendix 9.	

14 Baseline Data Collection Program

14.1 Data Gaps

At the onset of the planning process, the Planning Team developed a list of known data gaps. During the process, the team attempted to collect as much information as possible that was required for this planning process. It is expected that data not available at the time of plan development will be subsequently gathered to support the next planning process or possible future amendments to this plan.

14.2 Data Collection Program

The Planning Team was not able to address a few data gaps during the preparation of the plan. Some of these have been captured in the Effectiveness Monitoring Program (see Section 13). The remaining items are identified in the following table. This information will be collected during the plan period. In addition to information requirements, the table identifies a number of products that the Planning Team felt was needed to better inform people on the system about water management on the Seine River. In the following tables, an immediate priority means it will be completed before April 1, 2006. Long-term priorities will be completed before April 1, 2012.

Summary of Data and Information Requirements with priority ratings, responsibilities

	Water Data Required	Responsibility	Priority	Completion date during plan
1	Tailwater deflections (0 - full gate) Lac des Mille Lacs Dam	MNR	immediate	
2	Tailwater deflections (0 - full gate) Raft Lake Dam	Abitibi Consolidated	immediate	
3	Tailwater deflections (0 - full gate) Valerie Falls Dam	Valerie Falls	immediate	
4	Tail Water deflections (0 - full gate) Calm Lake Dam	Abitibi Consolidated	immediate	
5	Tail Water deflections (0 - full gate) Sturgeon Falls Dam	Abitibi Consolidated	immediate	
6	Assess stoplog seepage and if to be used to meet minimum flows, quantify - Lac des Mille Lacs Dam	MNR	immediate	
7	Assess stoplog seepage and if to be used to meet minimum flows, quantify - Raft Lake Dam	Abitibi Consolidated	immediate	
8	Assess stoplog seepage and if to be used to meet minimum flows, quantify - Valerie Falls Dam	Valerie Falls	immediate	
9	Assess stoplog seepage and if to be used to meet minimum flows, quantify – Calm Lake Dam	Abitibi Consolidated	immediate	
10	Assess stoplog seepage and if to be used to meet minimum flows, quantify - Sturgeon Falls Dam	Abitibi Consolidated	immediate	
11	Water levels required to make access points useable (Upper Marmion)	Valerie Falls & Abitibi Consolidated	immediate	
12	Determine relationship between Lac des Mille Lacs outflows, Firesteel R. flows and flooding of access roads to Seine River reserve 22A2	MNR and Lac des Mille Lacs FN	long term	
13	Water Shed Capabilities - Long Term Flow Average	Valerie Falls & Abitibi Consolidated	long term	
14	Storage Capacity of watershed	Valerie Falls & Abitibi Consolidated	long term	

Other Data Required

	Data Required	Responsibility	Priority	Completion date during plan
1	VFPL to supply 2001 netting data for Perch Lake to MNR Atikokan.	Valerie Falls	immediate	draft report - 02
2	VFPL to supply 2001 netting data on Upper Marmion Lake to Atikokan MNR.	Valerie Falls	immediate	draft report - 02
3	MNR Thunder Bay will supply netting results for Lac des Mille Lacs to MNR Atikokan.	MNR Thunder Bay	long term	
4	Potential requests for increase power production during plan period.	Valerie Falls & Abitibi Consolidated	immediate	
5	Schedule for maintenance work on industry water control dams for the period of the Water Management Plan.	Valerie Falls & Abitibi Consolidated	immediate	
6	Schedule for maintenance work on MNR water control dams for the period of the Water Management Plan.	MNR	immediate	
7	Company proposals for upgrades and repairs to waterpower generating dams that will fall within the period of this Water Management Plan.	Valerie Falls & Abitibi Consolidated	immediate	
8	MNR will review the video taken in 2001 of the River and locate areas of slumping/erosion occurrence along the Seine River.	MNR Atikokan	immediate	
9	Survey suitable habitat for endangered species of butterflies (Red-disked Alpine and Macoun's Arctic).	MNR Atikokan	long term	
10	Examine the Baril Bay portage to Baril Lake to see if there is a watercourse between them at high water.	MNR Thunder Bay and LDMLAC rep	long term	

Information Required

	Data Required	Responsibility	Priority	Completion date during plan
1	Hydro One information on flooding affects on transformers	Valerie Falls	immediate	
2	Study of waterfowl that are nesting on the reservoirs in the Seine River System.	MNR Atikokan	long term	
3	Studies on affect of over winter drawdown in reservoirs on ecosystem health.	MNR Science	long term	
4	Studies on affects of managed water levels on wetland health.	MNR Science	long term	
5	Educational material on waterpower generation, winter drawdown and impact on ice travel.	VFLP/ACCC	immediate	
6	Literature on impact of flow rate changes on Walleye Spawning success	MNR Science	long term	
7	Literature/Information on Power Industry Demand Changes - New Open Market	Industry	immediate	
8	Information on Floating Docks (Pamphlet to hand out on how to build/benefits)	MNR	long term	
9	Flow gauging station on the Fire Steel River (near where it flows into the Seine River below the LDML Dam	MNR Atikokan	long term	*(proposal sent Jan. 2003)*
10	Flow gauge below Wagita dam (e.g. v-notch gauge and/or staff gauge)	MNR Atikokan	immediate	
11	Industry will test data and establish future turbine and spillway charts that will be used in the system.	Valerie Falls & Abitibi Consolidated	long term	
12	Water level measurement publication	Industry/MNR	long term	
13	Installation and monitoring of gauge at Finlayson Lake for water levels.	Industry/MNR	immediate	
14	Information on development of Mining Claims into Subdivisions	MNR	long term	
15	Industry to supply Seine River system users details of rates of flow and water levels on the Seine River via a website on the internet.	Valerie Falls & Abitibi Consolidated	immediate	

15 Provision for Plan Reviews, Amendments and Renewals

15.1 Term of the Plan

The Water Management Planning Guidelines make provisions for amendments of Plans described in the Guidelines. The term of this Plan will be 10 years from date of approval by the Minister or designate (e.g. April 1, 2004, to April 1, 2014).

An assessment of the need for a formal public review will be carried out no later than 8 years from the date of plan approval by the Minister of Natural Resources or his designate. The outcome of this assessment will be one of the following:

- direct the preparation of a new plan
- direct a scoped review of specific portions of the plan requiring attention

15.2 Plan Amendments

In order for the Seine River Water Management Plan to remain current and for it to continue to address future issues, amendments may have to be made to the plan. Prior to the plan review and renewal term, new data, information or issues may arise as a result of new policies, scientific research and/or studies and monitoring being conducted as specified in the Water Management Plan. Amendments can be made to the Water Management Plan and operational plans during the term of the plan provided that the outcomes remain consistent with the goals and objectives defined in the Water Management Plan. Amendments to the goals and objectives of the plan require that the plan development process be followed. The recognized public advisory committees (Lac des Mille Lacs Advisory Committee and the Seine River Water Level Technical Committee) should review and comment on all new information. When this information indicates that there is merit in considering changes to the operating regime of one or more waterpower facilities or dams, at the request of the Steering Committee, or following a decision by MNR, the MNR will issue an order to amend the Water Management Plan.

Types of Plan Amendments

Water Management Plan amendments will fall within the following three categories:

1. Administrative
2. Minor
3. Major

The amendment process involves:

1. submission of a request for an amendment
2. review of the request by the Minister or his designate with advice from the recognized public advisory committees
3. acceptance or denial of request
4. if acceptance, assignment of a category to the amendment
5. completion of all application planning requirements, including public consultation
6. record-keeping requirements.

15.2.1 Amendment Request

Any request must be accompanied by sufficient information to allow the Minister or his designate to determine whether the proposed amendment should proceed, and whether the amendment should be treated as administrative, minor or major.

The amendment request must contain the following information:
1. a brief description of the proposed amendment
2. the rationale for the proposed amendment and a discussion of its significance
3. if new operations are proposed:
   a) a brief description of the proposed operation and a description of the previously approved operations in the Water Management Plan that will be changed by the proposed amendment
   b) an outline of the applicable planning requirements for the proposed operations, including public consultation, based on the planning requirements for similar operations in a Water Management Plan.

15.2.2 Review of Amendment Request and Categorization of Amendment

The Minister or his designate is responsible for determining whether an amendment should proceed and for categorizing the amendment as administrative, minor or major. In making this determination, the Minister or his designate, in consultation with the plan proponents, will decide on the appropriate degree of public consultation for the plan amendment.

The Minister or his designate considers the following factors in determining whether to grant the request for an amendment and in determining the appropriate category for the amendment:

- whether there are legitimate time constraints which must be met for reasons of public safety, biological or industrial necessity, or public convenience and necessity

- whether there has been previous notification that the requested amendment will be required, and the degree to which planning and public consultation has taken place previously (e.g. decision deferred in the Water Management Plan; amendment required after public consultation in other planning processes)

- the adequacy of the information concerning the resources features, land uses and values potentially affected and the anticipated potential effects of the requested operations

- the number of previous requests for similar amendments

- whether the amendment is justifiable based on public safety, biological or commercial reasons.

The decision on the amendment request and on the appropriate category for the amendment will normally be made within 15 days of receipt of the request. The Minister or his designate will prepare a written decision, and any disagreements with the categorization of the amendment will be recorded in that written decision.

The recognized public advisory committees (Lac des Mille Lacs Advisory Committee and the Seine River Water Level Technical Committee) will be informed of all amendments and will be given an opportunity to provide comments. The public and area First Nations and First Nation communities will be consulted on any proposed major amendments through an information session and an inspection of the amendments.

15.2.3 Administrative Amendments

If the Minister or his designate decides that a proposed amendment should proceed, and that the appropriate category of amendment is administrative, the Minister or his designate will approve the amendment when the necessary planning has been completed. (Note: There are no formal public consultation requirements for the preparation of an administrative amendment.)

Administrative amendments will not affect the implementation of the plan (e.g. a change in the presentation of information in the plan, a typographical error, and a missing word in a sentence).

Documentation requirements for administrative amendments include**:**
- the amendment request
- replacement text for the changes to the approved Water Management Plan
- a map of the area affected by the amendment, if applicable
- all documentation associated with the planning of operations, if applicable, including any associated supplementary documentation
- recommendations from the recognized public advisory committees (Lac des Mille Lacs Advisory Committee and the Seine River Water Level Technical Committee).

15.2.4 Minor Amendments

If the Minister or his designate determines that the proposed amendment should proceed, and that the appropriate category of amendment is minor, one formal public consultation opportunity will be provided. At least 15 days prior to a final decision on approval of a minor amendment, the Minister or his designate will issue a Notice of Minor Amendment Inspection, which indicates that the proposed minor amendment is available for inspection at the appropriate MNR/industry office location.

The notice will normally contain the following information in concise non-technical language:

- a statement that the proposed minor amendment will be approved by a specified date unless concerns are raised
- a statement that further public consultation may be required if concerns are raised
- a map of the river zone/area for which the amendment is being prepared
- a description of the subject matter of the proposed amendment
- the method by which the public may obtain additional information on the proposed minor amendment
- a request for comments
- the names of appropriate contact people
- a brief explanation of how comments received will be dealt with according to the relevant provisions of the Freedom of Information and Privacy Act
- a statement of the relevant opportunities for resolution of issues.

If the response to the public notice indicates no significant concerns, or if any concerns received can be resolved with no substantial change to the proposed amendment, the Minister or his designate will approve the amendment.

If the response to the public notice indicates significant unresolved concern about the proposed amendment, the amendment request will be re-categorized as major unless the Minister or his designate, determines that the objection is unreasonable or that the amendment is a matter of urgency. In that latter case, the Minister or his designate will approve the amendment.

If an issue arises during the preparation and review of the minor amendment, the issue resolution procedure described in the Water Management Planning Guidelines Appendix F will apply, with whatever modifications are necessary in the circumstances.

Minor amendments will be changes that are anticipated to affect a small geographic scale (i.e. in the immediate vicinity of one dam) and where MNR and the Steering Committee agree that it will not have an anticipated significant impact.

Documentation requirements for minor amendments include the same requirements as for administrative amendment (15.2.3), as well as documentation of the results of the formal public consultation opportunity for inspection of the amendment.

15.2.5 Major Amendments

If the Minister or his designate determines that a proposed amendment should proceed, and that the appropriate category of amendment is major, formal public consultation opportunities will be provided at two stages.

The Minister or his designate will issue public notices at each stage of the public consultation stages.

Notices will normally contain the following information, in concise non-technical language:

- a statement of the purpose of the notice and the public consultation opportunity
- a map of the river zone/area for which the major amendment is being prepared
- a description of the subject matter of the proposed amendment
- the particulars and schedule of any additional public consultation opportunities
- the method by which the public may obtain additional information of the proposed amendment
- a request for comments
- the names of appropriate contact people
- a brief explanation of how comments received will be dealt with according to the relevant provisions of Freedom of Information and Privacy Act
- statement of the relevant opportunities for resolution of issues.

Stage One of the public consultation process for major amendments will begin by issuing a Notice of an Information Centre, at least 30 days before the date of the information centre. At the same time as the Notice of an Information Centre is issued, the provisions of the Environmental Bill of Rights (EBR), requires that the Registry Proposal File be prepared and submitted to MNR's Land Use Planning Branch, Main Office, for placement on the EBR Environmental Registry.

A 30-day period is provided after the information centre for interested persons to provide comments on the proposed amendment. The required documentation for the major amendment is then produced and submitted to MNR for review. After the review, the major amendment will be certified and recommended for approval by the Minister or his designate.

Stage Two of the public consultation process for major amendments will begin by issuing a Notice of Major Amendment Inspection. The notice will be issued upon MNR approval of the major amendment, and will provide direction on how to obtain access to the major amendment documentation. At the same time as the Notice of Major Amendment Inspection is issued, the provisions of the Environmental Bill of Rights (EBR), as amended from time to time, require that a Registry Decision File be prepared and submitted to MNR's Land Use Planning Branch, Main Office, for placement on the EBR Environmental Registry.

If an issue arises during the preparation of a major amendment, the issue resolution procedure described in Water Management Planning Guidelines Appendix F will apply, with whatever modifications are necessary in the circumstances.

Major amendments may involve a significant geographic scale (i.e. extensive areas up and/or downstream of the dam and/or dams) or have a significant impact on the balancing of the environmental, social and economic attributes.

Documentation requirements for major amendments include the same requirements as for administrative amendments (see section 15.2.3), as well as documentation of the results of pubic consultation. A brief description of how MNR's Statement of Environmental Values (SEV) under the Environment Bill of Rights (EBR), as amended from time to time, have been considered in the development of the major amendment must also be produced, in the form of an SEV briefing note.

15.2.6 Amendment Records and Distribution

All approved amendments will form part of the approved Water Management Plan. A copy of each approved amendment will be filed with the approved Water Management Plan at the Fort Frances District, Atikokan Area Office immediately upon approval. In a case involving Lac des Mille Lacs, a copy will be on file at Thunder Bay District, Shebandowan Area office. A record of all amendment requests and all approved amendments will also be maintained in a master list at the front of each of the MNR Office copies of the Water Management Plan.

15.3 Plan Review and Renewal Stage

The term of this Seine River Water Management Plan is 10 years (see Section 15.1 Term of Plan). The plan review process should be initiated 18–24 months prior to the end of the term. The plan review process should mirror the steps involved in plan preparation, as appropriate, with new data and information considered during the review as a basis for continuing with the status quo or recommending changes.

Timeframe	Planning Stage	Lead Proponents ACCC and Valerie Falls Limited Partnership	MNR	Steering Committee	Public Advisory Committees
As required	**Plan amendment**				
	Information identified to warrant plan review	**X**	X	X	X
	Order to amend plan		X		
	Public and First Nation consultation on major amendments	X	X	X	X
10 years	**Plan review and renewal**				
April 1, 2012	Initiate plan review process		X		
	Repeat planning and consultation steps	X			

16 Glossary of Terms

ACCC	Abitibi Consolidated Company of Canada
DFO	Department of Fisheries and Oceans
FWIN	Fall Walleye Index Netting
GS	Generating Station
Ha	Hectare
Km	Kilometre
LDML	Lac des Mille Lacs
LDMLAC	Lac des Mille Lacs Advisory Committee
LDML LMP	Lac des Mille Lacs Lake Management Plan
LO	Licence of Occupation
LRIA	Lakes and Rivers Improvement Act
MNR	Ministry of Natural Resources
OMNR	Ontario Ministry of Natural Resources
PAC	Public Advisory Committee
SRWLTC	Seine River Water Level Technical Committee
VFLP	Valerie Falls Limited Partnership
WMP	Water Management Plan

17 Definitions

1 in 1 Flood: The same as a mean annual flood or the expected highest flow that would occur every year. This would usually occur during the spring freshet, but may be exceeded or equaled in a severe summer rainfall event. This flow estimated from the pre-plan data period for each structure was used to define the bankfull flow in this plan.

1 in 10 Flood: The expected highest flows that would occur only once every ten years. This flow estimated from the pre-plan data period for each structure was used to define the riparian flow in this plan.

BANK-FULL FLOW: Is considered to be the flow that is attained in a river that brings the water to the point where it is about to top over its banks. It determines channel characteristics (MORPHOLOGY) of width, depth, sediment size and sorting, and channel plan form. In most streams and rivers in Northern Ontario, the bank-full flow would be the flow representing a runoff event with a return period of something like once every 1 to 1.5 years.

BEST MANAGEMENT TARGETS: These are flows, levels or strategies that will be targeted for achievement but if they are not, compliance action will not be taken.

CASCADING SYSTEM: A systemic operation, on the same water course, where the operation levels and flows at the upstream dam, affects the operation of the dam(s) immediately below.

DAILY AVERAGE MINIMUM FLOW: The minimum flow attained on average over the course of a 24-hour time period.

DAILY MAXIMUM LEVEL: The maximum water level to which the reservoir or storage lake is operated under normal operating conditions at a given day of the year.

DAILY MINIMUM LEVEL: The minimum water level to which the reservoir or storage lake is operated under normal operating conditions at a given day of the year.

DISCHARGE: The volume of water that can pass through the water control structure and/or generating station.

DRAINAGE BASIN (Watershed): The area enclosed by a topographic divide such that surface runoff drains by gravity into a river, lake or other water body.

FLOOD FREEBOARD: The flood freeboard is generally the difference between the average water level of a reservoir and the level which is defined to be a flood.

FLOW REGIME: A range of flows associated with a river or stream that outlines the flow levels or conditions in a watercourse.

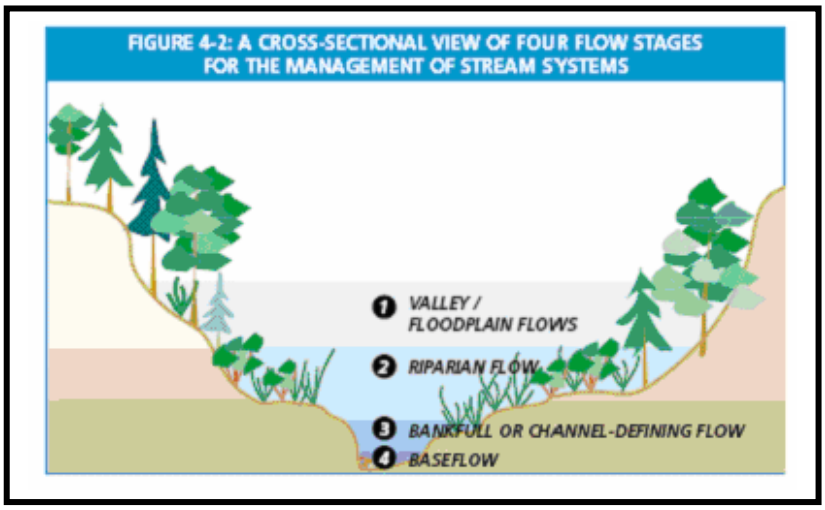
FRESHET: The increased flow attributed to precipitation, melting snow and ice during the spring season.

GIGAWATT (GW): One billion watts.

HEADPOND: The waterbody immediately above the dam or intake structure of a waterpower generating station.

HEADWATER: The section of a river or stream with the highest elevation above seawater. This is the area in a watershed that most streams begin and flow down to areas of lower elevation.

HIGH FLOWS: High flows represent flood events. Flood events provide flushing flows. Flood events also provide exposure to floodplains, a vital part of nutrient cycling and habitat maintenance. This is true for small to medium size floods with a return period of less than 1 to 5 years, larger floods can result in structural damage of bank erosion and total bed movement, from which habitats and biota take longer to recover from. There are three major types of high flows: Valley /Floodplain Flows, Riparian Flows, Bankfull Flows. High flow variables include:



- Bankfull Q_1 - $Q_{1.5}$ The maximum flow attained from 1-1.5 years
- Riparian or floodplain Q_2- Q_{20} The maximum flow attained from 2-20 year
- Valley Q_{25}- Q_{100} The maximum flow attained from 25-100 years

HYDROMETRIC: Pertaining to the measurement of hydraulic parameters of water bodies, which may be flowing above or below ground, or quasistatic in lakes, reservoirs and underground formations.

LOW FLOWS: The dry season stream flow which, in the absence of rain and/or snowmelt, is sustained through groundwater discharge. Extreme Low flow variables include:

- Habitat Maintenance Flow $7Q_2$ (Habitat maintenance flow is the seven (consecutive) day average low flow that occurs on average every two years. It represents a period of stress on the system that can cause some reduction of populations, and thus loss of some productive and reproductive capacity.)

- Local Extinction Flow $7Q_{10}$ (Local extinction flow is the seven-day average low flow that occurs on average every ten years. It represents a major period of stress on the system and in many cases will cause local extinction's, especially in small systems.)
- Systems Extinction Flow $7Q_{20}$ (Systems extinction flow is the seven-day average low flow that occurs on average every 20 years. It represents significant stress on the system and in many cases will result in extirpation of fish communities throughout many sections of the stream system.)

KILOWATT-HOUR (kWh): A kWh is the energy equivalent to one kilowatt of power expended for one hour of time. The kWh is a widely used measure of electricity consumption. One kWh represents 3,600,000 joules (3.600 x 106 J). To obtain joules when kilowatt-hours are known, multiply by 3.600 x 106. To obtain kilowatt-hours when joules are known, multiply by 2.778×10^{-7}

KILOWATT (KW): 1000 Watts.

MINIMUM FLOW: A minimum flow is the designated flow set as the minimum discharge threshold for a waterpower facility or reservoir dam.

MAXIMUM FLOOD LEVEL: The maximum allowable water elevation for a reservoir as outlined in its licence of occupation, or other tenure agreement, for that particular facility.

MEGAWATT (MW): 1,000,000 Watts.

PEAKING: Turbine dispatch practice of adjusting the output of a station to follow system electrical load or revenue peaks.

PEAKING PLANT: Generating stations that have the capability and approval for peaking.

TURBINE RAMPING RATES: The rate of change of flow expressed as volume/time. Up ramping rate is the rate at which the flow volume is increased over time. Down ramping is that rate at which the flow is decreased over time.

RESERVOIR: A body of water stored behind a dam. Reservoirs retime natural flows for the purpose of flood control, power production optimization, and other social, recreational and navigation purposes. In this plan, the term reservoir has generally been used to describe a storage basin.

RIPARIAN FLOW: These are flows that cause water to flow over top the established riverbanks and result in significant interaction between the channel and the floodplain. They are defined as events with a frequency between 1:2 year and 1:20 year return period.

RIPARIAN AREA: Areas adjacent to a stream or body of water that are saturated by ground water or intermittently inundated by surface water at a frequency and duration sufficient to support the prevalence of vegetation typically adapted for life in saturated soil. This is a transition area between the open water ecosystem and terrestrial, upland ecosystem.

RIVER REACH: The distance between two specific points outlining that portion of the stream or river for which a parameter applies. Generally, a reach is a contiguous section of river where channel form is consistent; i.e., a run between two waterfalls.

STAGE-DISCHARGE: The discharge of a facility associated with the specific water level or stage of the headpond or reservoir.

STEADY OR RISING FLOWS: The maintenance of an existing flow or increase of it during a critical time period (usually spring spawn timing).

STEADY OR RISING LEVELS: The maintenance of an existing level or increase of it during a critical time period (usually spring spawn timing).

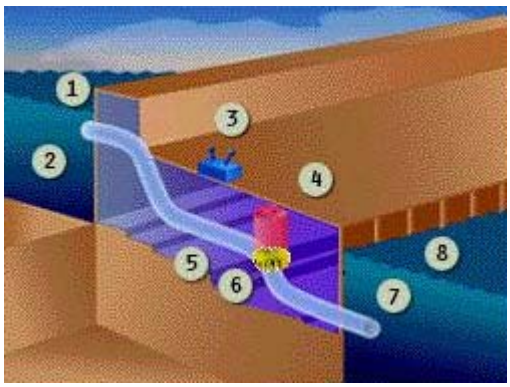
SPILLWAY: A structure over or through which excess flow, flood flows or by-passed flows are discharged. If the flow is controlled by gates, it is a controlled spillway, if the elevation of the spillway crest is the only control it is an uncontrolled spillway (weir).

STOP LOGS: A series of squared logs that acts as a gate which can be placed into an opening at a waterpower facility to regulate the flow of water. Stoplogs are not permanently connected to a lifting device but can be manually connected when removal or replacement is required.

STORAGE BASIN: The lake on the upstream side of a dam that does not have a waterpower generating plant, but is used to store water for other waterpower stations further downstream. The dams at these lakes are usually controlled by stoplog sluiceways.

STORAGE CAPACITY: The volume of water contained between the maximum and minimum allowable levels within a reservoir.

WATERPOWER GENERATING STATION:



1. Forebay
2. Intake
3. Transformer
4. Generator
5. Penstock
6. Turbine
7. Draft tube
8. Tailrace

WATERSHED (DRAINAGE BASIN): The area enclosed by a topographic divide such that surface runoff drains by gravity into a river, lake or other waterbody.

WINTER DRAWDOWN: The winter range of level change in a reservoir related to the withdrawal of water required to provide turbine flows for downstream waterpower facilities. In this plan, it has been defined as the difference between the highest level between November 15 and December 1 and the lowest point between March 15 and April 15. Winter drawdown of reservoirs augments natural flows that are typically low in the wintertime. Another purpose of winter drawdown is to create a flood freeboard to collect the spring freshet. This helps to minimize spillage of potential power flows and mitigate spring flooding of downstream reaches.

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19 Appendices

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