Spanish & Vermilion Rivers Water Management Plan

November 2016

Prepared by:

Spanish & Vermilion Rivers
Water Management Planning Team

Executive Summary

The Spanish River, including its Vermilion River tributary, is the largest watershed reporting to the North Channel of Lake Huron. It is both ecologically and geologically diverse, and possesses substantial valued ecosystem components that have prompted the province of Ontario to set aside large portions of the waterway as protected area. Opportunities for camping and cottaging, boating and canoeing, fishing, hunting, and snowmobiling are enjoyed by public and private users and supported by a number of tourist outfitters. The Sagamok Anishnawbek and Atikameksheng Anishnawbek (formerly known as Whitefish Lake) First Nation reserves are located within the watershed boundary. These, and a number of other First Nation communities, count the area amongst their traditional territory.

Resource-based industries, including logging, pulp and paper and mining are supported by the watershed's natural features and have played a role in area development. The largest urban centres are the City of Greater Sudbury and Town of Espanola. A number of private companies and government agencies own, operate and maintain water level and flow control structures for the purposes of power generation, flood control, recreational uses, municipal water supply and wastewater treatment. Owner/operators include:

- Vale Canada Ltd. (Vale) – a global company whose assets in the watershed include copper/nickel mining, milling and smelting and refining facilities in the Sudbury area.
- Domtar Inc. (Domtar) – a pulp and paper company whose assets in the watershed include a Kraft Pulp and Technical Specialty Paper Mill
- Ontario Ministry of Natural Resources and Forestry (MNRF)
- Nickel District Conservation Authority (NDCA) also known as Conservation Sudbury (CS)
- Municipality of the City of Greater Sudbury (CGS)

The Spanish River system has been used for waterpower generation for more than 100 years. Vale owns and operates 15 main water control structures and 5 generating stations while Domtar owns and operates 5 main control structures and 1 generating station.

In 2002, section 23.1 was added to the Lakes and Rivers Improvement Act (LRIA). Under this authority, the Minister of Natural Resources and Forestry (MNRF) ordered the aforementioned dam owners to prepare and/or participate in the preparation of a Water Management Plan (WMP) for the Spanish and Vermilion Rivers in accordance with MNRF's *Water Management Planning Guidelines for Waterpower (May 2002)*. The stated 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. A main outcome of the planning process is Operating Plans (OP) that document, for each structure, targets and enforceable compliance limits for water levels and/or flows under normal conditions. Planning applies specifically to water levels and flows, but does not include water quality which is covered under separate legislation.

A 1993 Spanish River Watershed WMP (for the planning period through to the year 2012), had been previously prepared by Vale (former Inco) and Domtar (former E.B. Eddy) in cooperation with the MNRF. It contained operating targets for water levels on Upper Spanish River reservoir/lakes (above Agnew Lake Big Eddy Dam), associated with waterpower generation. This plan took into account waterpower requirements, ecological needs and the interests of other river users who may be impacted by waterpower management activities. The current WMP is expanded in scope to include structures on the Spanish and Vermilion Rivers from their headwaters down to Espanola. A number of additional water level control structures, whose purpose is not related to waterpower management, are also considered.

Facilitated by the MNRF, a Steering Committee comprised of representatives from the aforementioned dam owners, Sagamok Anishnawbek, Aundeck Omni Kaning First Nation, Atikameksheng Anishnawbek (formerly known as Whitefish Lake) First Nation, Wikwemikong Unceded Indian Reserve, and the federal Department of Fisheries and Oceans (DFO), was formed to initiate a new cycle of water management planning. A Planning Team was created to do the bulk of the technical work required and a Public Advisory Committee (PAC), with representation from across the river basins, was established to provide advice on the development of the WMP and to assist in public consultation. A PAC representative was included as a member of the Steering Committee and the Planning Team.

Extensive public and First Nations consultations were conducted to identify issues and concerns for consideration in relation to the management of water levels and flows and possible changes to the operating regime for each control structure. Where specific issues were not identified for a given waterbody, the current operating regime was maintained as the target, with seasonal ranges applied as compliance limits and documented in an OP for the applicable control structure. This was the situation for all waterbodies associated with structures owned/operated by MNRF, CS and CGS.

For waterbodies associated with waterpower generation, identified issues related primarily to erosion, property and shoreline issues, aquatic ecosystems and recreational interests. Where there was enough information to make informed decisions on potential options for level and/or flow control, they were proposed and evaluated for their ability to balance the needs of all river users. Based on the results of the evaluation, preferred options were chosen for implementation and included in OPs. In situations where there was not enough information for informed decision-making, plans were made to collect missing information through data gap studies or ongoing effectiveness monitoring activities – the intent being that information gathered will be reviewed annually and considered in future planning exercises, as the WMP is meant to be a living document.

The initial water management planning process resulted in a number of specific operational changes to be implemented and monitored for their effectiveness in balancing the needs of stakeholders. These were primarily related to the maintenance of lake levels and included:

Armstrong and Ministic Lakes (Vale)

- Increase the number of site visits (minimum 6 per year) to provide additional information for future assessments of water levels.

Pogamasing Lake (Domtar)

- Lower the summer maximum water elevation from 368.50m (1209 ft) to 367.89m (1207 ft) to address concerns regarding erosion and to protect shoreline property and infrastructure.
- Achieve summer water level target by June 1st and maintain until Labour Day to improve navigation and recreation.

Onaping Lake (Domtar)

- Lower the maximum water elevation limit of Onaping Lake to 398.68m (1308 ft) throughout the year to minimize damage to shoreline structures.
- Lower the maximum summer elevation target to 398.22 – 398.37m (1306.5 ft to 1307.0 ft) to minimize erosion, protect shoreline property and infrastructure and facilitate docking and launching of boats.
- Attain winter drawdown levels between Labour Day and October 15th to limit the length of time the draw down occurs during lake trout spawning, while still providing adequate water levels for boaters.
- Attain summer water level of 398.22m (1306.5 ft to 1307.0 ft) by Victoria Day long weekend and maintain level until Labour Day to improve navigation and recreation.

Agnew Lake (Vale - Big Eddy Generating Station)

- Commence winter draw down one month earlier (December 1st) to address dock damage resulting from ice.
- Attain the summer operating range of 261.82m, plus 0.15m or minus 0.30m (859.5 ft +6"/-12") by the Victoria Day long weekend in May instead of June 1st to maintain recreational water level needs.
- Establish a maximum draw down lower limit of 257.86m (846.0 ft) with a best operating practice draw down target of 258.77m (849.0 ft). This practice avoids potential issues with water lines whenever possible, but addresses flood mitigation in years with heavy spring runoff potential.
- Maintain the current practice of keeping lake level from dropping more than 4 inches, while the reservoir is filling, during the spring walleye spawn to avoid possible dessication of eggs.

Subsequent to WMP consultations that gave rise to the preferred options above, changing circumstances, ongoing environmental assessment work associated with facility upgrade planning, and/or findings of high priority data gap studies have resulted in further opportunity for consideration of options. Amongst the highest priorities has been improving understanding around the flow regime below the generating stations, the presence/absence of lake sturgeon in the area, and the spawning success of lake sturgeon (where present) and walleye. Some of these more recent water management developments include:

Big Eddy, High Falls, Nairn and Wabageshik Generating Stations (Vale)

- To address a number of high priority data gaps regarding flows from the generating stations, and to support the permitting process for future repairs/upgrades, a comprehensive field program was initiated by Vale (in consultation with MNRF and other stakeholders) to study walleye and lake sturgeon, and their habitat, in the area bounded by Big Eddy, High Falls and Nairn Generating Stations on the Spanish River main branch, Wabageshik Generating Station on the Vermilion tributary and Domtar's Espanola Dam downstream of the Spanish and Vermilion Rivers' confluence. Supported by the field data, a comprehensive hydrological and habitat model was created and subsequently used to predict potential impacts on available spawning habitat using 10 years of actual daily operating data from the generating facilities. In almost all cases, it was discovered that the existing operating regime either enhanced or did not significantly alter the amount of habitat available during the critical period.
- To support general aquatic ecosystem health, a daily minimum flow of 8.5 m^3/s (300 cfs) was established for Big Eddy Generating Station on the Spanish River. Similarly, a minimum daily flow of 1.4 m^3/s (50 cfs) was established for Wabageshik Generating Station on the Vermilion River. In both cases, if inflow falls below the respective minimums, then the inflow becomes the minimum flow requirement. High Falls and Nairn Generating Stations are part of a cascading system below Big Eddy and tend to pass what they receive from the larger control structure. These minimum flows are a starting point that can be revisited periodically as high priority data gap studies progress. They are based upon the approximate water volume that is passed through a single idling generator.

Espanola Main Dam and Generating Station (Domtar)

- For the purposes of facilitating spawning success and movement of walleye and lake sturgeon in the pooled area below the Main Dam, Domtar has adopted a practice of maintaining continuity of the pool to the river between May 1st and July 1st of each year. Domtar Espanola Mill has registered its Hydro generating station under Section 23.12 of the General Regulation under the Ontario Endangered Species Act and has a Mitigation Plan, relating to Lake Sturgeon, in place as per Section 23.12.

- The Espanola Main Dam and Generating Station are located below the confluence of the Spanish River Main Branch and the Vermilion River, receiving combined flows from Vales' Big Eddy and Wabageshik facilities. A minimum flow of 9.9 m^3/s (350 cfs), combining the minimum flows of the upstream facilities, has been established. Vale and Domtar maintain daily communications in regards to expected flows for power generation and, when required, invoke Domtar's Spanish River Minimum Dissolved Oxygen Management Plan (part of Domtar Espanola Mill's MOECC Environmental Compliance Approval).

Armstrong Lake (Vale)

- Beginning in 2013, the target for fall drawdown completion was advanced to October 15th (from October 31st) of each year to facilitiate spawning lake trout. The lake was stocked by MNRF in 2008, 2009 and 2011.
- A new main dam was constructed in fall 2016 following successful completion of an MNRF Class Environmental Assessment, federal Fisheries Act, and other required approvals processes. The stop-log structure was replaced with a non-operational concrete overflow dam and weir design outfitted with a flow compensation pipe to provide a minimum flow downstream of 0.13m^3/s. The design was informed by a hydrological analysis and fish habitat survey as well as public and aboriginal consultation in order to best balance multistakeholder needs for maintaining lake level against the identified need to maintain a minimum downstream flow for ecosystem health. Follow up monitoring will occur in accordance with permitting as well as WMP requirements.

Proponents voluntarily, or in association with permitting, conducted studies and adopted the above options into their respective operating regimes in advance of enactment of the compliance components that take effect upon final MNRF approval of the WMP. Additional options may be considered and potentially adopted for use as additional information becomes available through continuing data gap-filling exercises and/or facility upgrades. The compliance components include upper and lower compliance limits on lake level and/or minimum flow to apply under normal operating conditions. The limitations are accompanied by monitoring and reporting requirements to confirm compliance status on an ongoing basis and to identify situations where flood or drought conditions may necessitate the application of other programs such as Ontario Low Water Response or flood emergency planning and management.

The primary data gap-filling exercise is the implementation of an improved flow and level monitoring network, the collection of long term level and flow data from key locations, and the development of a calibrated hydrological model for the system. This model will support a more robust analysis of potential operational regimes and their ability to balance stakeholder interests - while sustaining the aquatic ecosystem.

In 2016 MNRF released a Technical Bulletin *Maintaining Water Management Plans*, which is intended to replace the *2002 Water Management Planning Guidelines for Waterpower* (with some exceptions as described in the bulletin) which formed the basis of the development of this WMP. The latter sections of the WMP, dealing with processes for maintenance of the plan following final MNRF approval, have been revised in accordance with the new requirements outlined in the bulletin.

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1.0 PLAN APPROVAL

APPROVAL STATEMENT
WATER MANAGEMENT PLAN FOR WATERPOWER
for the
Spanish / Vermilion River Systems
District of Sudbury, Northeastern Region

In submitting this plan, we confirm that this water management plan for waterpower has been prepared in accordance with the *Water Management Planning Guidelines for Waterpower*, as approved by the Minister of Natural Resources on May 14, 2002 and the Technical Bulletin *Maintaining Water Management Plans* 2016.

Nov 24, 2016

Stuart Harshaw, Vale, — Date
I have the authority to bind the corporation.

JAN 11th, 2017

Carol Lapointe, Domtar Inc, — Date
I have the authority to bind the corporation.

FEB 8 2017

Nick Benkovich, City of Greater Sudbury, — Date
I have the authority to bind the corporation.

2017-FEB-03

Carl Jorgensen, Conservation Sudbury, — Date
I have the authority to bind the corporation.

I concur that this water management plan has been prepared in accordance with the Water Management Guidelines for Waterpower, as approved by the Minister of Natural Resources on May 14, 2002, and the Technical Bulletin *Maintaining Water Management Plans* 2016 and recommend it to be approved for implementation.

April 07, 2017

Ross Hart, Sudbury District, MNRF — Date

Approved by:

May 19, 2017

Corrinne Nelson — Date
Regional Director, Northeastern Region
Ontario Ministry of Natural Resources and Forestry

In 1994, the MNRF finalized its Statement of Environmental Values (SEV) under the Environmental Bill of Rights (EBR). The SEV is a record of MNRF's commitment to the environment and its accountability to ensure consideration of the environment in its decisions. During the development of this water management plan, the ministry has considered its SEV, which can be accessed by following the links at http://www.ebr.gov.on.ca.

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

Approval of this WMP does not relieve the owner from their responsibility to comply with any applicable legislation.

Nothing in this WMP precludes the Minister from making further Orders under the Lakes and Rivers Improvement Act (LRIA).

Approval of this WMP does not provide authority to flood private or public land without the consent of the owners of the affected land.

2.0 INTRODUCTION

The MNRF has a key role to play in ensuring that Ontario's resources are managed in a sustainable fashion. The industries that rely on natural resources also have responsibilities for managing them in an environmentally responsible way. In November 1999, the MNRF and the waterpower industry formed a "New Business Relationship" to provide direction on waterpower issues such as water management planning, site release and development, tenure, taxation and dam safety. Under the water management-planning component of this directive, waterpower industries are required to produce a legally enforceable WMP.

On May 1, 2002, the electricity market moved to a free market system. As the market developed, it was felt that there would be increased pressure on developers to manage water for maximum electricity production, and it was feared that voluntary level and flow constraints could give way to operating decisions that favoured the economics of power production. Thus, in 2000, the Lakes and Rivers Improvement Act (LRIA) was amended to require that owners and operators of waterpower facilities ensure that the operations of dams and generating stations are consistent with the needs of other water resource users, stakeholders, and the public. The MNRF was given the authority to oversee the preparation of formal WMPs for waterpower facilities and associated control structures within Ontario watersheds that would ensure legal compliance to specified water level and flow regimes. The MNRF could also direct other dam owners on the applicable water system to participate. As a result, this updated WMP has been prepared for the Spanish and Vermilion Rivers to include all of the rivers' main storage and generating facilities, as well as some additional structures whose purpose is not power generation.

The WMP has been prepared according to the Water Management Planning Guidelines for Waterpower (May 2002) and other applicable direction, including the Aquatic Ecosystem Guidelines. The goal of the Spanish/Vermilion WMP is to develop a water level and flow management strategy for the Spanish/Vermilion System that builds upon and improves, where possible, the current operating regime. The WMP strives to balance environmental, social and economic considerations that will result in sustainable management of waterpower resources.

2.1. Control Structures Considered in the WMP

The Spanish/Vermilion Rivers WMP proponents are owners and operators of flow control structures and generating facilities on the river systems. The structures included in the WMP are listed in Table 2.1a. Additional structures, listed in Table 2.1b, were considered and ultimately excluded from the WMP as they have no or little direct influence on river flows or they are not affected by other water control structures on the system. These include dams whose purpose is retention only (no flow), weirs with no means of flow control, dams that are a part of industrial water/wastewater management systems, or dams whose structures no longer have the means to regulate flow.

The WMP development has involved extensive consultation with the public and First Nations, as well as government agencies such as the federal Department of Fisheries and Oceans (DFO) and the provincial Ministry of the Environment and Climate Change (MOECC), in an effort to achieve a plan that reflects the interests of all parties.

Table 2.1a: Control structures included in the WMP.

Owner	Dam	Function	Watershed
Vale	Big Eddy	Reservoir/Hydro Generation	Spanish
	High Falls 1 & 2	Hydro Generation	Spanish
	Nairn Falls	Hydro Generation	Spanish
	Wabagishik	Hydro Generation	Vermilion
	Frechette Lake	Reservoir/Lake	Spanish
	Canoe Lake	Reservoir/Lake	Spanish
	Ramsey Lake 7	Reservoir/Lake	Spanish
	Ramsey Lake 8	Reservoir/Lake	Spanish
	Biscotasi Lake 1	Reservoir/Lake	Spanish
	Biscotasi Lake 2	Reservoir/Lake	Spanish
	Biscotasi Lake 3	Reservoir/Lake	Spanish
	Mozhabong Dam	Reservoir/Lake	Spanish
	Indian Lake #5	Reservoir/Lake	Spanish
	Ministic Lake	Reservoir/Lake	Spanish
	Armstrong #1	Reservoir/Lake	Spanish
Domtar	Espanola Dam	Hydro Generation	Spanish
	Pogamasing Lake	Reservoir/Lake	Spanish
	Onaping Dam	Reservoir/Lake	Vermilion
	Bannerman Dam	Reservoir/Lake	Spanish
	Sinaminda	Reservoir/Lake	Spanish
	Stobie	Water Level Regulation	Vermilion
CGS	Ramsey Lake	Water Level Regulation	Vermilion
CS	Maley	Flood Control	Vermilion
	Nickeldale	Flood Control	Vermilion
	Lake Laurentian	Flood Control/Recreation	Vermilion
	Nepahwin	Flood Control/Recreation	Vermilion
MNRF Gogama	Three Corner Lake	Water Level Regulation	Spanish
MNRF Sudbury	Windy Lake	Water Level Regulation	Vermilion
	Whitewater (Jutras)	Water Level Regulation	Vermilion

Table 2.1b: Control structures not included in the WMP.

Owner	Dam	Function / Type	Watershed
MNRF	Gull Lake	Sandbag/Stone	Spanish
	Armstrong #2	Timber Crib – Log Drives	Spanish
	Shakwa	Timber Crib – Log Drives	Spanish
	Armstrong #3	Timber Crib – Log Drives	Spanish
	Camp Five	Timber Crib – Log Drives	Spanish
	Apsey Lake	Water Level Regulation	Spanish
	Moore Lake	Water Level Regulation	Vermilion
	Clear Lake	Water Level Regulation	Spanish
	Kennedy Lake	Water Level Regulation	Spanish
	Hutton Lake	Water Level Regulation	Vermilion
	Post Lake	Water Level Regulation	Vermilion
	Fox Lake	Water Level Regulation (Weir)	Spanish
	Birch Lake	Water Level Regulation	Spanish
	Gull Lake	Water Level Regulation	Spanish
Vale	Lady Macdonald	Internal to an industrial water management system	Vermilion
	Crean Hill	Weir	Vermilion
	Ethel Lake	Weir (historic)	Vermilion
	Fairbank Creek	Weir (historic)	Vermilion
	Clarabelle	Internal to an industrial water management system	Vermilion
	Indian Lake #4	Block dam	Spanish
	Frood #1	Weir	Spanish
	Fournier Retainment (Agnew)	Block dam	Spanish
	Jordan Retainment (Agnew)	Block dam	Spanish
	Whitson Lake Dam* See description in 5.2.16.	Industrial Water-Taking	Vermilion
CGS	Copper Cliff Creek	Fog Control	Vermilion
	Frood Dam #2	Weir	Vermilion
	Robinson Lake	Weir	Vermilion
CS	Frood #3	Flood Control Weir	Vermilion
	Kelly Lake	Flood Control Weir	Vermilion
Xstrata	Strathcona	Tailings Control	Vermilion
Domtar	McClary Bay Block on Onaping Lake	Block dam	Vermilion
	Northern Block on Onaping Lake	Block dam	Vermilion

2.2. Goals and Guiding Principles of Water Management Planning

The goal of water management planning is to ensure the sustainable development of waterpower resources to meet economic, environmental and social objectives for the benefit of present and future generations. This will be achieved through the management of water levels and flows as they are affected by the operations of waterpower generating facilities and associated dams. Activities taking place within the Spanish and Vermilion watersheds are often impacted by the water levels and flows. The objectives of developing a WMP for the watersheds are to:

1. Contribute to the environmental, social and economic well being of the people of Ontario through the sustainable utilization of waterpower resources;
2. Sustain and enhance the river's aquatic ecosystems and biological diversity and protect fish and wildlife habitat;
3. Support cottager activities, recreational uses, and tourism needs through the complementary management of water flows and levels;
4. Foster co-operation, partnership and improved levels of communication between waterpower producers, government and area stakeholders;
5. Foster greater public awareness and understanding of the river as an interconnected system; and
6. Minimize the potential for flooding and to give due regard to flood emergency response capabilities.

A set of general water management planning principles was developed based on the Water Management Planning Guideline for Waterpower (2002). These include:

- The WMP should attempt to maximize the net environmental, social and economic benefits derived from how waterpower facilities and their associated water control structures are operated through the manipulation of flows and levels;
- Current and future operations must adhere to licensing and regulatory requirements and build on existing operational practices (under extreme natural conditions, it may not be possible to operate within normal limits);
- Existing operating plans represent the base condition from which improvements will be sought;
- Options for the management of flows and levels shall be developed in an open and participatory manner with technical, financial, social, environmental and economic considerations taken into account;
- Internal and external communications are integral parts of this review and will be coordinated between the organizations;
- The facility operators and MNRF will commit to applying the necessary resources to implement the outcome of the plan;
- WMP will be undertaken without prejudice to Aboriginal and Treaty Rights. MNRF and the facility operators will consult with affected First Nation communities;.
- Public input and consultation will be an integral part of the development of the plan;
- The WMP will promote the ecologically sustainable management of water resources;
- An adaptive management approach will be the basis for the preparation of the WMP;
- The best information that is available at the time of decision-making is to be used in the preparation of the WMP;
- Decisions shall be made by consensus. Where consensus cannot be reached they will go through an MNRF issue resolution process; and
- Both the Steering Committee and the Planning Team will follow the philosophy of consensus-based decision-making.

2.3. Summary of Spanish & Vermilion Rivers WMP Planning Process

The WMP planning process, as outlined in the MNRF's Water Management Planning Guideline includes a number of stages. Once approved, this plan represents the product of phase 6. Subsequent phases provide for ongoing plan monitoring and revision. The water management planning phases are:

1. Planning, Organization and Commencement
2. Scoping for WMP
3. Option Development, Evaluation and Selection
4. Draft Plan
5. Final Plan
6. MNRF Review and Approval
7. Implementation
8. Plan Amendment
9. Plan Review and Renewal

Completed or in-progress phases are detailed below, along with the timing:

2.3.1. Planning, Organization and Commencement (January – July 2003)

Phase 1 of planning involved the participation of facility owners, lead proponents, and the MNRF. Main activities included:

- Steering Committee formation
- Terms of Reference development
- Planning Team formation
- Public notice and invitation to participate
- Public Advisory Committee (PAC) formation, education and meeting identification
- Public and First Nations and Aboriginal communities consultation plans development

2.3.2. Scoping for WMP (July 2003 – March 2005)

Phase 2 involved the participation of the three committees formed in Phase 1, along with the MNRF as lead on consultation activities. The primary activities of this phase were:

- Description of river system
- Identification of issues and resource values
- Consultation on initial issues and values
- Identification of plan objectives
- Identification of information gaps and priorities
- Development of a scoping report
- Consultation on the scoping report
    - Open house at the Chapleau Royal Canadian Legion – May 10, 2004
    - Open house at the Gogama MNRF office – May 11, 2004
    - Open house at the Espanola Recreation and Fitness Centre – May 12, 2004
    - Open house at the Chelmsford Knights of Columbus Hall – May 13, 2004
    - Open house at the Biscotasing Community Hall – Sep. 13, 2004.

2.3.3. Option Development, Evaluation and Selection (March – November 2005)

Phase 3 involved the consideration of a range of options to address issues identified in Phase 2:

- Development and approval of range of options
- Socio-economic evaluation
- Consultation on options
    - Open house at the Biscotasing Community Hall – Jul. 21, 2005
    - Open house at the Northland Motel in Chelmsford – Jul. 26, 2005

    - Open house at the Espanola Knights of Columbus Hall – Jul. 28, 2005
- Selection of preferred option

2.3.4. Draft Plan (November 2005 – February 2006)

Phase 4 involved Draft Plan development by the Planning Team and included consultation activities in the form of advertisement and open houses.

    - Open house at the Espanola Knights of Columbus Hall – Dec. 5, 2005
    - Open house at the Dowling Community Centre – Dec. 6, 2005
    - Open house at the Gogama MNRF office – Dec. 8, 2005.

2.3.5. Final Draft Plan (January 2006 – November 2016)

A final draft of the first version of the plan was first submitted for MNRF review in February 2006. The draft was circulated through various agencies and comments were returned to the Planning Team in November 2008. The 234 comments recommended a number of revisions be made prior to re-submission of the plan for approval. The Planning Team convened on several occasions, throughout the time period between 2009 and 2016, working with MNRF staff to address comments and make significant revisions to the information and its presentation. In some cases, level and flow management options that had not originally been implemented were reconsidered, based on new information and/or operational practices, and incorporated into the revised WMP. In March 2012 a presentation was made to the MNRF Regional Director and staff, at which time the Planning Team was requested to revisit and document how each of the 234 review comments were specifically addressed in the plan. As a result of the work from 2009 to date, a second version of the WMP was developed and approval requested. MNRF requested further edits in 2014. Given the recent changes in resource use on the landscape, government priorities, and public expectations since planning was initiated, a third version of the plan was subsequently developed in 2015 that provides more details around some key elements. The updated version also incorporates results of a number of high priority data gap study commitments completed and/or further developed by proponents between 2009 and 2016.

2.3.6. Plan Amendment, Review and Renewal

In accordance with the *2002 Water Management Planning Guidelines for Waterpower*, Phases 7 to 9 of the WMP process provided for ongoing maintenance of the WMP, once approved by MNRF. The manner in which these activities were to be accomplished was described in previous draft versions of the WMP:

- Compliance self-monitoring and reporting
- Effectiveness monitoring and reporting
- Periodic auditing
- Plan amendment criteria and processes
- Formal plan review.

Prior to 2016, the MNRF oversaw the entire planning process and facilitated and promoted plan maintenance through periodic reviews. In 2016 a new Technical Bulletin Maintaining Water Management Plans was released by MNRF, outlining new requirements for proponent-driven activities that would occur on an ongoing basis. These new requirements have been incorporated to the plan and will be carried forward, as appropriate for this complex plan.

2.4. Spanish & Vermilion WMP Terms of Reference

The original Terms of Reference, as developed and approved by the Steering Committee, may be found in Appendix A. The document contains detail on the following:

- Spanish & Vermilion Rivers water management planning goals and objectives
- Background planning, principles and issues
    - Spanish & Vermilion Rivers Management Area Description (watershed, fisheries, recreational uses, communities)

  - Water Control Facilities and Management
  - Protected Areas
- Organization for Planning
  - Original Steering Team members
  - Original Planning Team members
- Roles of Various Participants
  - Steering Team roles
  - Planning Team roles
  - PAC roles
  - Proponent roles
  - First Nation roles

2.5. Spanish &Vermilion Rivers WMP Objectives

Objectives specific to the Spanish & Vermilion Rivers WMP were developed based on the review of issues and concerns that emerged from public and First Nations consultation, and based on the mandates and concerns of plan participants (see Section 6 and Appendix C). These formed the basis for the evaluation of various operational regimes. For some objectives, sub-objectives were developed to address more specific issues. The order in which they are presented does not indicate priority.

2.5.1. Erosion

Erosion was identified as an issue in most waterbodies, therefore an objective was developed to identify the causes of erosion and related processes on specified lakes and rivers as well as determine to what extent water management practices are contributing to the rate of erosion. Operating practices that mitigate erosion are to be considered for implementation where feasible.

2.5.2. Power Generation

In order to reduce dependency on the grid, power production will be optimized while addressing other socio-economic and environmental concerns within the areas of influence.

2.5.3. Protection of Shoreline Property and Infrastructure

Water Supply:

- ➢ To manage minimum water levels in order to mitigate concerns with the exposure, freezing and drying up of water lines, wells and points.

Shoreline Property Damage:

- ➢ To manage water levels and flows in such a way to minimize the damage to shoreline structures, specifically:
  - Minimize the damage to docks caused by ice build-up and the winter draw down;
  - Minimize the damage to docks and other shoreline structures caused by ice and rising water levels; and
  - Minimize the damage to docks caused by fall storms.

Water Levels:

- ➢ To manage water levels to address issues with high water and inconsistent levels:
  - Minimize the flooding of property that may lead to the damage of property and well water contamination; and
  - Reduce variability and fluctuations in water levels.

2.5.4. Aquatic Ecosystems

Fisheries:

- To maintain or enhance the fisheries by considering sufficient water levels and flows that meet the life history requirements of different fish species;
- To determine if winter draw downs negatively impact fall spawners, and to mitigate where possible;
- To determine if current operating regimes negatively impact spring spawners and to mitigate where possible; and
- To consider options which provide minimum flows for fish and other aquatic organisms downstream of dams and generating stations.

Wildlife Habitat:

- To manage water levels and flows in such a way that may protect, maintain or enhance wildlife habitats and populations, by considering wildlife needs and aquatic ecosystem principles;
- To determine if sufficient water levels are being maintained during the winter and early spring for beaver to to facilitate where possible;
- To determine if sufficient water levels are being maintained in the spring and summer for wetlands and moose aquatic feeding areas and to facilitate where possible;
- To consider the habitat needs of breeding waterfowl, loons and other wetland birds during the spring and summer and to facilitate where possible;
- To determine the impacts of water management operations on the habitat requirements of rare, uncommon or endangered species and to mitigate where possible; and
- To mimic variability of water level fluctuations found in nature.

2.5.5. Recreation

Boat Launches:

- To determine if water levels are adequate for boat launching and docking, and to facilitate where possible.

Navigation:

- To determine if sufficient water levels and flows for boating and navigational purposes are being met, and to facilitate wherever possible.

Snowmobiling:

- To review snowmobiling safety concerns, and where possible, manage water levels during the winter to provide more favourable conditions for snowmobiling. *Note: The Planning Team will not develop options specifically for snowmobiling, but will evaluate potential impacts of various options on snowmobiling activites. Ultimately, the safety of any lake for travelling must be determined by considering a number of factors beyond those under discussion in this WMP. Snowmobilers are advised to consult their local snowmobile club for established routes and to utilize marked trails.*

2.5.6. First Nations

To determine if current operating regimes are affecting current and traditional uses and, where possible, manage water levels and flows to minimize damage to, maintain or protect these uses.

3.0 PHYSICAL & BIOLOGICAL ENVIRONMENT

3.1. Physical Setting – Spanish & Vermilion Rivers Watershed

The watershed of the Spanish River (Figure 3.1) is situated in the northeastern part of the Province of Ontario, north of Georgian Bay, on Lake Huron. It is the largest basin draining into Lake Huron, covering an area of 13,500 km^2 (5,212 mi^2). The river is a total of 260 km (162 mi) long. The Vermilion River is a main tributary of the Spanish, as are the River Aux Sables, Wakonassin River, Snake River, Agnes River and Moncrieff Creek.

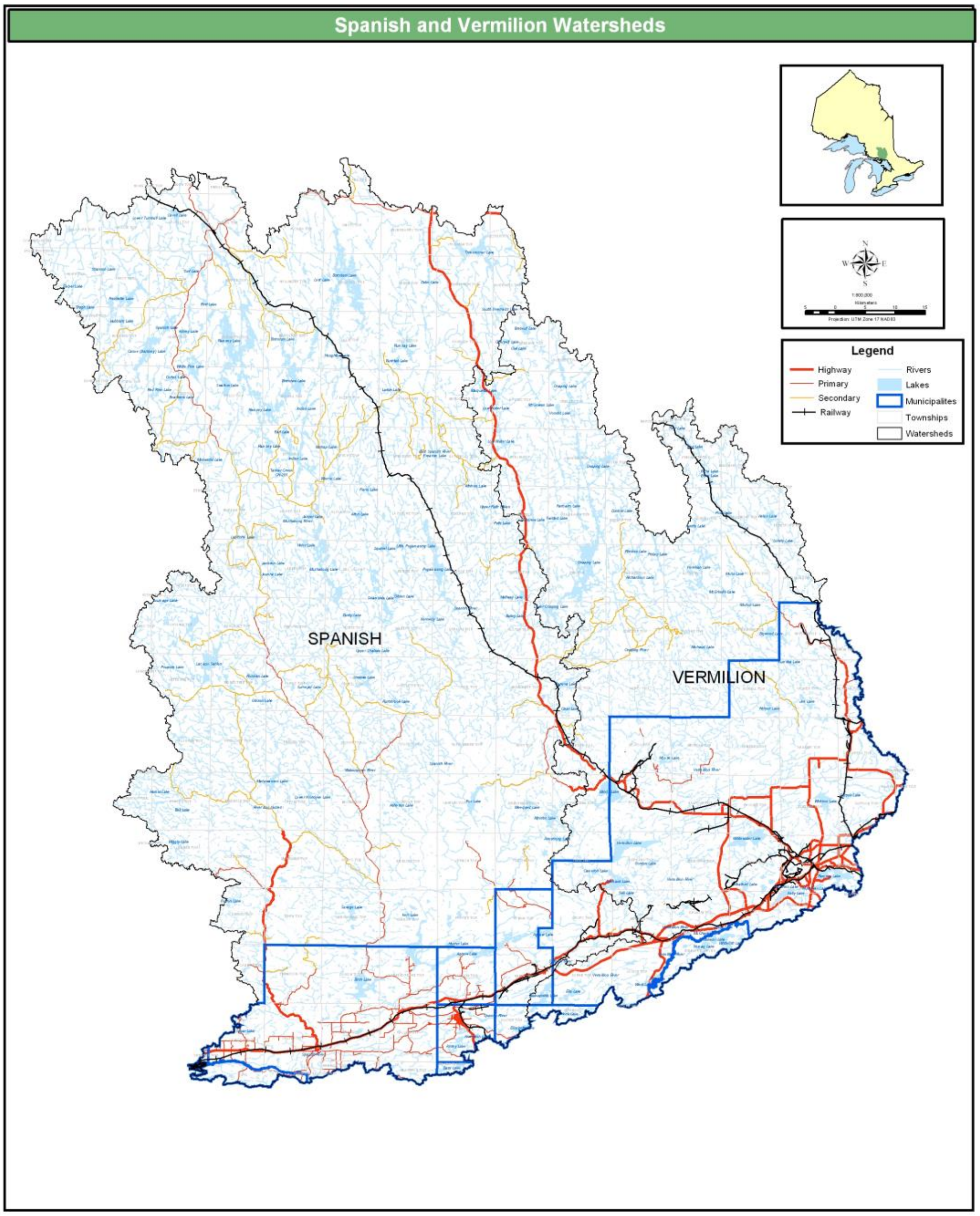

Figure 3.1: Spanish & Vermilion Rivers watersheds

The Spanish River is identified provincially, by the MNRF, as tertiary watershed 2CE. The headwaters of the Spanish River originate at the height of land which is the drainage divide between the Great Lakes St. Lawrence watershed and the Arctic watershed flowing into Hudson and James Bay. The river reaches its outlet into the North Channel of Lake Huron at the town of Spanish.

The Spanish and Vermilion Rivers watershed is located on the Precambrian Shield, with the general drainage pattern controlled by bedrock terrain whose faults form a series of parallel, elongated systems draining from north to south. The bedrock is overlain by discontinuous surface deposits consisting of east-west trending ridges of glacial till and plains of lacustrine sands, left over from glacial lakes, are dominant features of the landscape. Clay and organic deposits occur less frequently (Roed and Hallett, 1980).

The primary urban developed areas of watershed 2CE, the largest being the Town of Espanola, occur in a relatively small southern portion of the Spanish River watershed along Highway 17 West. The remainder is largely undeveloped land, portions of which are subjected to resource-based activity - primarily forestry.

The Vermilion River, watershed 2CF, is included as part of the WMP because it is a main tributary of the Spanish River and is also a tertiary watershed. Its headwaters originate in the Township of Frechette in the rugged northern Precambrian ridges. The Vermilion River has a number of major tributaries and sub-drainage areas. The largest is the Onaping River system. The Onaping River flows southerly for 115 km (71 mi) and forms a drainage basin of 1650 km^2 (638 mi^2). This system discharges in three directions: southerly to the Vermilion River; westerly to the Spanish River; and northerly to the Mattagami River. The Onaping River meets the Vermilion River near the town of Dowling in the City of Greater Sudbury.

The Vermilion River generally flows in a southerly direction and follows a meandering path to its confluence with the Spanish River southwest of Wabagishik Lake. It has a total length along its main channel, of approximately 248 km (154 mi) and encompasses a drainage area of over 4,300 km^2 (1,687 mi^2). The main channel and its primary tributaries, flow through differing geographic formations, from exposed bedrock to flat valley lands to rolling clay/silt plains. The elevation change along the main channel from the headwaters to the confluence is approximately 251 m (825 ft).

The Vermilion River watershed has been heavily influenced by urban development dispersed throughout the municipality of the City of Greater Sudbury, which comprises about one-half of its total watershed area. Mining activity in this area has been extensive over the past century owing to the rich copper-nickel ore deposits contained in the unique Sudbury Basin geological structure.

3.2. Hydrological Conditions

Hydrology, or runoff conditions, in watersheds are affected by a number of natural parameters, including size of the area, topography, soil type and environmental conditions including precipitation, temperature and humidity. Climate Normals calculated for the Environment Canada Weather Station in Sudbury, Ontario give an indication of weather variability for the WMP watershed area. A summary of selected climate variables pertinent to the operation of water control structures is presented in Table 3.2.

3.2.1. Modified versus Natural Flow Regime

Human-derived modifications to natural hydrological conditions include land use and water control structures. The Spanish &Vermilion River watershed flow has been partially regulated for more than a century to facilitate logging and industrial hydropower generation activities as well as to meet needs for municipal and industrial consumptive water supply, flood control and recreation. Storage lakes created by dam construction moderate natural flow and affect runoff conditions. Land use in watershed catchment areas can also drastically affect runoff characteristics.

Through comprehensive modeling of factors that determine runoff characteristics, a cumulative rule curve was established for the Spanish River reservoir lakes whereby water levels are managed to target elevations throughout the year in order to balance the needs of various river users. This modified flow regime is described in the 1993 Spanish River Water Management Plan (Appendix G).

The MNRF, through the *Aquatic Ecosystem Guidelines (January 2003)*, has requested consideration of modified versus natural flow regimes for river systems managed for water power. To aid in the evaluation of options for the Spanish/Vermilion system, Flow Metrics Sheets were prepared by MNRF staff (see Appendix E). Table 3.2.1 presents actual regulated flow data along with simulated natural flow data, generated by computer modeling, for 3 locations where suitable historical flow data was available for comparison:

1. Spanish River at Big Eddy Generating Station
2. Vermilion River at Wabagishik Generating Station
3. Spanish River (downstream of Vermilion River confluence) at Espanola

The storage/reservoir lakes associated with generating facilities are operated in a way that maximizes the water available for power generation throughout the year. Lake/reservoir levels are drawn down in the fall/winter to make room for spring freshet waters. This results in higher than normal fall/winter flows in connecting streams and rivers when additional water is being released, but suppressed flows during spring freshet when water is being held back.

The month of maximum median flow for all three facilities is April under both regulated and natural flow regimes. The Spanish River sites typically experience their lowest actual and simulated minimum median flows in August. The minimum median flow on the Vermilion River at Wabagishik Lake also occurs in August for the simulated natural data set, whereas the regulated data set (much smaller database) shows this occurring in September.

Mean rising rates of change of flow are higher in a natural flow regime than in the regulated regime due to a buffering effect provided by water storage areas. Average falling rates of change of flow are lower in natural flow regimes. Regulated flow regimes tend to have similar mean rising and falling rates.

Bankfull flows are those which bring the water to the edges of the banks and influence the channel characteristics in conjunction with local surficial geology. These flows are those that occur once every 1.5 to 1.7 years (Leopold et al., 1964 and Annable, W.K., 1996). Riparian flows are those between a 2 and 20-year return period where water channels overflow their banks and enter floodplains. These regular occurrences are necessary to fill the needs of riparian ecosystems. Both bankfull and riparian flows exhibit a higher range in the natural regime as compared to the regulated flow regime at Spanish River sites and the ranges overlap. For the Vermilion River site, the regulated and natural flow regimes are similar, with a greater overlap.

For the purposes of this WMP, those areas subject to potential impacts of water management practices (dam management) are of primary interest. However, it must be noted that physical and biological features of the upland portions of the drainage area have an important role to play in hydrology. Disturbances from urban development and resource extraction (logging, mining, etc.) can alter the natural landscape, along with the natural flow regime of surface and groundwater. Flows at facilties operating as “run of river” (e.g. Wabagishik) may not necessarily compare directly to modeled natural flow regimes due to upstream water taking and control structures (e.g. City of Greater Sudbury is upstream of Wabagishik).

Table 3.2: Climate Normals for Sudbury, Ontario 1961-1990
(Source: Environment Canada National Climate Data and Information Archive www.climate.weatheroffice.gc.ca)

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily Temperature (°C)	-13.5	-11.9	-5.6	3	10.8	15.8	19.1	17.4	12.3	6.1	-1.3	-9.9
Daily Maximum Temperature (°C)	-8.5	-6.7	-0.5	8.2	16.7	21.6	24.8	22.8	17.3	10.4	2.2	-5.6
Daily Minimum Temperature (°C)	-18.7	-17.3	-10.8	-2.3	4.9	10	13.3	12	7.2	1.7	-4.8	-14.3
Extreme Maximum Temperature (°C)	17.2	6.7	15.9	29.8	33.9	33.9	33.8	36.7	31.1	25	17.8	14.4
Extreme Minimum Temperature (°C)	-39.3	-37.8	-30.2	-21.1	-6.7	-1.6	4.1	-1.1	-5.4	-10	-25	-35.4
Rainfall (mm)	9.2	6	26.3	45.6	69.4	84.1	71.3	87.4	102.9	69.3	48.9	15.2
Extreme Daily Rainfall (mm)	50.8	19.3	47	49.9	62.8	86.9	91.8	77.7	112	55.6	37.1	42.9
Snowfall (cm)	59.5	48.9	37.9	18.1	1.7	0	0	0	0.1	6.7	32.6	61.2
Extreme Daily Snowfall (cm)	37	37.8	34	33.5	9.9	0	0	0	1.8	25.2	23	27.2
Snow-depth at Month-end (cm)	40	40	13	0	0	0	0	0	0	0	8	28
Days with Maximum Temperature >0°C	4	4	15	28	31	30	31	31	30	30	19	6

Table 3.2.1: Regulated (actual) versus Natural (simulated) Flow Metrics for the Spanish River at Big Eddy GS, Vermilion River at Wabagishik GS, and Spanish River at Espanola GS. Source: MNRF – See Appendix E.

SPANISH RIVER AT BIG EDDY GENERATING STATION	REGULATED FLOW (1996-2004)	SIMULATED NATURAL FLOW (1970-1999)
DESCRIPTIVE METRICS		
Mean Annual Flow (m3/s)	83.4	83.4
20% Time Exceeded Flow (m3/s)	88.8	111.0
Median Flow (m3/s)	63.3	52.3
80% Time Exceeded Flow (m3/s)	22.4	30.7
Month of Max. Median Flow	April	April
Month of Min. Median Flow	August	August
TARGET METRICS		
Riparian Flows (Q2-Q20)	301-905	472-1130
Bankful Flows (Q1.5-Q1.7)	223-257	385-408
VERMILION RIVER AT WABAGISHIK GENERATING STATION	REGULATED FLOW (1996-2004)	SIMULATED NATURAL FLOW (1970-1999)
DESCRIPTIVE METRICS		
Mean Annual Flow (m3/s)	44.4	44.4
20% Time Exceeded Flow (m3/s)	39.1	59.4
Median Flow (m3/s)	25.4	27.9
80% Time Exceeded Flow (m3/s)	12.4	16.3
Month of Max. Median Flow	April	April
Month of Min. Median Flow	September	August
TARGET METRICS		
Riparian Flows (Q2-Q20)	189-501	185-402
Bankful Flows (Q1.5-Q1.7)	145-165	130-144
SPANISH RIVER AT ESPANOLA (DOMTAR) GENERATING STATION	REGULATED FLOW (1972-2002 data)	SIMULATED NATURAL FLOW (1970-1999)
DESCRIPTIVE METRICS		
Mean Annual Flow (m3/s)	125.1	128.3
20% Time Exceeded Flow (m3/s)	161.9	172
Median Flow (m3/s)	91.6	81.3
80% Time Exceeded Flow (m3/s)	53.2	47.8
Month of Max. Median Flow	April	April
Month of Min. Median Flow	August	August
TARGET METRICS		
Riparian Flows (Q2-Q20)	585-1110	719-1720
Bankful Flows (Q1.5-Q1.7)	449-504	565-621

3.3. Biological Conditions

3.3.1. Area Ecological Studies

The Spanish and Vermilion Rivers watersheds support a diverse range of biota which is reflective of a diverse range of influences. Recognizing this diversity and the need to protect representative natural features of Ontario's landscape, the MNRF has undertaken a number of initiatives to inventory, classify, identify and subsequently manage areas of interest through allocations under the Ontario Parks system (Crins and Janetos, 2006). The MNRF has developed an Ecological Land Classification (ELC) which is based upon geological, climate, topographical and pedological considerations, as these are a primary influence on biological features of natural landscapes.

The bulk of the Spanish River watershed lies within ELC Ecodistrict (or Site District) 4E-3, which is mostly composed of Crown Land whose accessibility is limited. The watershed area has historically been subject to logging activities and forest resources continue to be harvested in the area, but it is largely pristine. Most of the Spanish River's main channel area and headwaters has been protected through land designations under the MNRF Ontario Parks system. Ecological data collected through resource management activities is extensive.

South of Ecodistrict 4E-3, beginning roughly at Agnew Lake in the west and Capreol in the east, is Ecodistrict 5E-4. This district encompasses the Vermilion River below Onaping Lake and includes the City of Greater Sudbury urban area. Much of the landscape near the city has been altered by industrial and urban activities that began in the late 1880's. Subsequently, fewer sites have been allocated under the Ontario Parks system. Ecological studies completed in association with the evaluation of industrial impacts and recovery efforts in the Sudbury area are plentiful.

The Spanish River crosses into Ecodistrict 5E-3, below Massey, just before it reaches Lake Huron. In 1985, the Spanish River Harbour (or lower Spanish River) was identified, by the International Joint Commission (IJC), as an Area of Concern (AOC) in the Great Lakes due to its degraded quality and identified use impairments. It has since been designated an Area in Natrual Recovery (AINC) following extensive industrial pollution abatement activities in the watershed and the resulting restoration of impaired uses. Numerous ecological studies were generated through the Remedial Action Plan (RAP) process.

3.3.2. Vegetation

The Spanish and Vermilion Rivers are located within a transition zone between the Great Lakes – St. Lawrence Forest and the northern Boreal Forest regions of Ontario. Local climate and soil conditions play a role in the distribution of tree species, which consist of a mixture of hardwoods and conifers (Rowe, 1972).

Tree species appear largely mixed in Ecodistrict 4E-3 and transition in proportion moving from south to north as the climate and terrain conditions change. Eastern hemlock, red oak and American beech appear in the south, mixed with Eastern white pine, red pine, sugar maple, yellow birch and red maple which are representative of the Great Lakes – St. Lawrence species. These, in turn, transition with black spruce, balsam fir, white spruce, Jack pine, white birch and trembling aspen which are more representative of boreal species. Single-species tree stands are rare (Crins, 1996).

Acres (1978) surveyed vegetation at various locations in the Spanish River watershed, along its main stem, between Agnew Lake and the Forks. The report described predominantly mixed communities of poplar, jack pine, white pine, red pine and spruce. Sugar maple and yellow birch occurred in the southern portion of the study area but were encountered less frequently, and in an increasingly immature state, moving north. Black spruce and jack pine were more common in the northern part of the study area.

Black spruce, tamarack and eastern white cedar occurred in poorly drained depressions and swamps. Red and white pines stands tended to be concentrated in the river valleys of the area.

Vegetation in a lowland swamp location subject to water level fluctuations and conditions ranging, between spring and summer from wetland to dry peat, included predominant black spruce with scattered balsam fir, jack pine and trembling aspen tree species and diverse shrub species including lowbush blueberry, sourtop blueberry, Labrador tea, sheep laurel and willows. Moss mats were dominated by Schreber's and haircap moss.

Lowland forest site species recorded by Acres included balsam fir, black spruce, pine and white cedar, sugar maple, white birch, yellow birch and poplar trees. Shrubs included mountain maple, sarsaparilla, alder and willow. Herbaceous species included bracken fern, big-leaf aster, yellow clintonia, and bunchberry.

Shoreland vegetation described by Acres as occurring in riparian floodplain areas included white cedar, alder, willows, sweet gale, swamp gooseberry, dogwood, and stinging nettle. Floodplain areas tended to contain predominant species of bulrush, sedges and grasses. Also occurring in these areas were wild rose, yarrow, river cinquefoil and trembling aspen. Aquatic macrophytes included arrowheads, bur reed, water lily, waterweed and bladderwort.

Following the work of Crins (1996), North-South (2001) completed a detailed biophysical study of the Biscotasi Lake Provincial Park and Addition and the Spanish River Provincial Park (see Section 4 for map). This study concentrated heavily on the characteristics of a large area of the watershed that would be influenced by water management practices. Detailed species lists can be found in the report, but pertinent general observations from the study included the following:

- A total of 367 species were encountered in the study area. Species counts in main habitat types were: Forest 157 (80 exclusive to habitat), Wetland 225 (118 exclusive), Rock Barren/Cliff 54 (8 exclusive) and Beach 97 (24 exclusive).
- Only 8 species were non-native to the area – reflecting its non-disturbed nature. Two provincially significant vascular plants were identified: yellow-eyed grass (*Xyris difformis*) and awlwort (*Subularia aquatica*).
- The rich biodiversity within the study area was primarily due to the accumulated numbers of species documented within many diverse locales of varying microclimates. Singular areas were not highly diverse.
- Wetlands comprised less than 2% of the landscape, but harboured the highest diversity. Open wetlands were particularly diverse. The highest species diversity was encountered in the graminoid (grass) marsh vegetation type.
- Wetlands occurred primarily in narrow linear bands along lakes, rivers and creeks. Lakeshores tended to be steeply sloping, so shallow zones for aquatic vegetation were limited.
- Beaches were prevalent along the river. The diversity encountered on beaches was reflective of the presence of successional vegetation species and distribution capabilities of water.
- The report contained a discussion about downed woody debris and snags and their importance to wildlife as nesting sites and hibernacula. Debris was plentiful in marsh/fen swamp complexes, but lacking on rock barrens and soil bluffs.
- Most of the area studied was forested, with the forest age generally between 50 and 100 years.

Henry and Quinby (2010) describe Ontario's old growth forests and the importance of dead trees and snags for ecological succession and biodiversity. It is noted that these features are more abundant in older forests. Haider (1992) notes that many people consider downed, woody debris and snags to be aesthetically detrimental.

3.3.3. Mammals

Larger mammals occurring in the area covered by this WMP include moose, black bear, timber wolf, lynx, coyote, and, to a lesser extent, white-tailed deer. Of these species, Moose have habitat requirements that include pond and wetland areas which can produce emergent and submergent aquatic vegetation, as well as poorly drained areas supporting willow, alder and dogwood. These water-based requirements form an estimated 45 to 60% of the total needs with upland forest forming the balance of required moose habitat (Thomasson, no date). The forested area in the vicinity of the confluence of the east and west branches of the Spanish River has been identified as substantial late wintering habitat for moose. Small lakes in the area provide aquatic feeding opportunities (OMNRF, 2000 NRVIS Mapping).

Other species utilizing wetlands as primary habitat are beaver, muskrat, mink and otter. These species are common in the watershed, but occur primarily away from the main channels (Acres, 1978). Beaver require waterbodies with aquatic vegetation and ready access to aspen, willow, alder and birch. Denning activity and buildup of an underwater food supply occurs primarily from September to October. Breeding occurs in the winter months, with the young born in springtime. Muskrat require similar conditions, but rely primarily on aquatic vegetation for denning and food. Mink and otter prefer streambanks and lakeshores, and rely on dens and burrows created by other mammals for their homes. Both otter and mink consume fish and other aquatic organisms, but mink will also prey on muskrats and small rodents.

Fox, marten, raccoon, squirrel, skunk and bobcat also inhabit the WMP area, but are less reliant on water-based habitats for their life requirements.

3.3.4. Birds

There are over 400 species of birds observed in the province of Ontario. They are a combination of year-round residents, seasonal residents which may or may not breed in the province, and many migrating birds that pass through on their way to and from their main habitat areas. The WMP area is not a part of any established migration routes (Hughes, 2001). North-South (2001) compiled a list of one hundred and thirty-three breeding bird species confirmed or believed to be breeding in the area of the Spanish River watershed.

The Spanish and Vermilion Rivers lie in the Northern Forest waterfowl production zone which is home to breeding populations of common loon, horned and pied-billed grebes, mallard, black duck, pintail, green-winged teal, wood duck, ring-necked duck, common goldeneye, hooded and common mergansers (Acres, 1978). These species nest primarily on or near water and feed on fish, aquatic organisms and/or vegetation. Other species utilizing shoreline or wetland habitats include Canada geese, great blue heron, least and American bittern, Virginia and yellow rail, American coot, killdeer, woodcock, common snipe and spotted sandpiper.

Raptors, including the bald eagle and osprey inhabit forested areas bordering large rivers or lakes. These birds can be found in the WMP area.

3.3.5. Amphibians and Reptiles

The life cycles of amphibians and reptiles vary considerably in terms of their reliance on water and adaptations to seasonal temperature variations. Certain amphibians depend on a water environment for overwintering and the diet of both reptiles and amphibians can include food such as aquatic plants, insects or fish.

Nearly all amphibians require a water environment for reproduction and larval habitat. Most juvenile and adult amphibians spend time on land in moist environments. Only the mudpuppy spends its life entirely in a water environment. Reptiles cannot deposit their eggs in a water environment. However, adult and juvenile turtles and some species of snakes spend considerable time in water.

A list of twenty-five reptile and amphibian species observed in the Spanish River watershed was compiled by North-South (2001). Amphibian species that may be found in the planning area include the eastern newt, spotted salamanders, American toad, grey treefrog, spring peeper, wood frog, northern leopard frog, green frog, mink frog, and American bullfrog. Common reptilian species are snapping and painted turtles, common gartersnake, and common watersnake (MacCulloch, 2002). Blanding's turtles are being more commonly reported in the watershed since having been identified as a threatened species in the province of Ontario.

Certain amphibians and reptiles depend on a water environment for overwintering. The diet of both reptiles and amphibians can include food such as aquatic plants, insects, or fish.

3.3.6. Fish

The Spanish and Vermilion river systems provide a variety of water habitats that support a diversity of fish species. Thousands of waterbodies, interconnected by streams and rivers, vary from shallow, warm bogs to large cold deep lakes. Substrate and vegetation in these waterbodies are heavily influenced by bedrock and surficial geology and erosional characteristics. The system supports three general types of species, grouped by their habitat temperature preferences:

1. Warm water (>25°C) – pumpkinseed, brown bullhead, bass
2. Cool water (19-25°C) – muskellunge, black crappie, yellow perch, northern pike, white sucker, walleye
3. Cold water (<19°C) – rainbow trout, lake whitefish, sturgeon, brook trout, lake trout, cisco

Each species has a unique set of habitat requirements at various life stages and seasons. Water management practices, in particular the timing and extent of lake level and stream flow modifications, have the potential to influence habitat and require careful consideration in relation to fish life history requirements.

Tables 3.3.6a, 3.3.6b and 3.3.6c list the species found in lakes/reservoirs and reaches of the Spanish and Vermilion rivers. Further details on locations and species of concern, with respect to the potential impacts of waterpower management practices, may be found in Chapter 6.

Table 3.3.6a: Fish species by reservoir/lake on the Spanish River (compiled by MNRF in 2003, except where otherwise noted)

	Reservoir/Lake												
Species List	**Canoe (Bardney)**	**Frechette**	**Ramsey (Chapleau)**	**Mozhabong**	**Indian**	**Biscotasi**	**Three Corner**	**Poga-masing**	**Onaping**	**Sinaminda**	**Ministic**	**Armstrong**	**Agnew**
Blacknose Shiner													
Bluntnose minnow													
Brook Trout				X					X				
Brown bullhead													X
Brook Stickleback													
Burbot				X		X				X	X	X	
Catostomus spp.						X							
Cisco / Lake Herring			X			X				X	X	X	
Common Shiner				X									
Cyprinidae spp.		X	X										
Fathead Minnow													
Goldnose Shiner			X										
Iowa Darter						X							
Lake Trout				X			X	X	X	X	X	X	
Lake Whitefish	X	X	X	X	X	X	X		X	X		X	X
Largemouth Bass				X									
Muskellunge				X					X				
Northern Pike	X	X	X	X	X	X	X		X	X		X	X
Pumpkinseed													
Rainbow Trout				X					X				
Rock Bass													X
Smallmouth Bass				X			X	X	X		X	X	X
Spottail Shiner													
Stickleback				X									
Trout-Perch						X							
Walleye	X		X		X	X	X	X	X		X	X	X
White Sucker	X	X	X	X	X	X	X		X	X	X	X	X
Yellow Perch	X	X	X	X		X	X		X	X	X	X	X

Table 3.3.6b: Fish species by reservoir/lake on the Vermilion River (compiled by MNRF in 2003, except where otherwise noted)

	Reservoir/Lake								
Species List	**Onaping**	**Windy***	**Vermilion***	**Whitewater***	**Laurentian***	**Ramsey* (Sudbury)**	**Nepahwin***	**Whitson**	**Ella (Nairn)**
Blacknose Shiner			□				X		
Bluntnose minnow									X
Brook Trout	X								
Brown bullhead		X	X	X		X	X	X	X
Brook Stickleback									X
Burbot		X							
Cisco / Lake Herring		X	X	X					X
Common Shiner			X						
Central Mudminnow								X	
Fathead Minnow									X
Goldnose Shiner				X			X		
Iowa Darter								X	
Lake Trout	X	X							
Lake Whitefish	X	X							X
Largemouth Bass									
Muskellunge	X								
Northern Pike	X	X	X	X	X	X	X	X	X
Pumpkinseed			X	X		X	X	X	X
Rainbow Trout	X								
Rock Bass			X			X	X		
Smallmouth Bass	X	X	X	X		X	X	X	X
Spottail Shiner			X						
Stickleback									
Trout-Perch			X						
Walleye	X	X	X	X		X		X	
White Sucker	X	X	X	X		X	X	X	X
Yellow Perch	X	X	X	X	X	X	X	X	X

* *Fish Species in Greater Sudbury Lakes Information found at www.city.greatersudbury.on.ca*

Table 3.3.6c: Fish Species by Spanish and Vermilion River Sections (compiled by the MNRF in 2003, except where otherwise noted)

	SPANISH RIVER REACHES						VERMILION RIVER REACHES		
Species List	**East Branch**	**West Branch to Breader Twp.**	**River From Agnew Lake to Forks**	**Big Eddy to Nairn Falls**	**Nairn Falls to Espanola**	**Lower Spanish**	**Vermilion Lake Upstream of Stobie Dam**	**Stobie Dam To Ella Lake**	**Wabagishik Dam To Espanola Dam**
Alewife						X			
Black Crappie			X	X	X	X			
Bluntnose Minnow						X			
Bowfin						X			
Brown Bullhead			X	X	X	X	X	X	X
Brook Stickleback						X			
Burbot	X					X			
Chinook Salmon						X			
Cisco / Lake Herring						X		X	X
Coho Salmon						X			
Common Carp						X			
Fathead Minnow						X			
Johnny Darter						X			
Lake Sturgeon					X	X			X*
Lake Trout						X			
Lake Whitefish	X					X			
Largemouth Bass						X			
Longnose Sucker									X
Logperch									X
Muskellunge						X			
Northern Pike	X	X	X	X	X	X	X	X	X
Northern Redbelly Dace			X	X	X				
Pink Salmon						X			
Pumpkinseed			X	X	X	X			
Rainbow Smelt						X			
Rainbow Trout						X			
Silver Redhorse						X			X
Shorthead Redhorse						X			
Rock Bass			X	X	X	X	X	X	
Smallmouth Bass			X	X	X	X	X		X
Spottail Shiner						X			
Trout-Perch						X	X		
Walleye	X	X	X	X	X	X	X	X	X
White Sucker	X		X	X	X	X	X	X	X
Yellow Perch	X		X		X	X	X	X	X

**below first set of rapids above Spanish River confluence*

3.3.7. Species at Risk

Threatened and endangered species, as well as species of special concern, exist within the Spanish & Vermilion Rivers WMP area. Table 3.3.7 includes the species with life-history traits and/or habitat requirements that may be susceptible to the effects of water management practices. However, at this time it is not known if current water management practices, specific to the Spanish and Vermilion Rivers has a negative effect on any species at risk.

For many of the species identified in the table records of occurrence or mapped habitat is not known along regulated sections of the watershed. Two species that are well- documented within regulated sections of the watershed are Lake Sturgeon and Blanding's Turtles.

The recent uplisting of the Great Lakes/St. Lawrence population of Lake Sturgeon to a threatened status (MNRF Species at Risk) has raised the priority of needed data gap studies for this species and several surveys have been completed by MNRF, DFO, Vale and Domtar, as described in the data collection chapters of this report. In addition to the section of the Spanish River between the mouth and Espanola Falls, Lake Sturgeon were confirmed to be present in the Spanish River reach between Espanola Main Dam and Nairn Falls as well as in the Vermilion River above its confluence with the Spanish River. Domtar Espanola Mill has registered its hydro generating station under Section 23.12 of the General Regulation under the Ontario Endangered Species Act, and has a Mitigation Plan in place as per Section 23.12.

Blanding's turtles can be found across most of central Ontario, and sightings north of their known range are becoming more common. There have been two recently confirmed sightings of Blanding's Turtle in the northern part of the watershed area.

Table 3.3.7: Species at Risk found within the Spanish and Vermilion watershed that may be affected by water management practices.

SPECIES AT RISK			Status (April 2015)			
Taxon **Common Name** ***Scientific Name***	**Habitat Requirements**	**Potential Threats from Water Management Practices and Other Related Causes**	**SRANK Prov. Rank**	**GRANK (Global Rank)**	**MNRF**	**COSEWIC**
Bird Bald Eagle *Haliaeetus leucocephalus*	Habitat: Nesting - associated with lakes and rivers, large continuous areas of mixed or deciduous woods (white pines and trembling aspen) around shores of large rivers or lakes, and islands in lakes. Most move south in the fall. Distribution may be dependent on high quality habitat (Cadman et. al., 1987). Food: Mainly fish. Reproduction: Most critical period - courtship, nest building, and incubation periods is from about mid-March to late May (OMNRF, 1987). Good indicator of bioaccuulative organoclorine compounds (tertiary predator at top of Great Lakes food web) (Bowerman et. al., 1995).	Individuals abandon breeding site when vegetation and water levels change (Cadman et. al., 1987). Low river flows exert neutral or positive influences on habitat use and prey capture, whereas high river flows reduce eagle foraging habitat diversity, lowered forage success in river habitat, and restricted foraging opportunities (Brown et. al., 1998). DDE and PCB have deleterious effects on reproduction, with possible sources from dredged river sediments and fish below hydroelectric dams (Bowerman et. al., 1995; Anthony et. al., 1993)	**S4B** = Common, breeding migrants/vagrants	**G5** (1996) = Very common.	**SC** = Special concern	**NAR** = Not at risk
Bird Least Bittern I*xobrychus exilis*	Habitat: Nests in freshwater marshes where dense, tall vegetation is interspersed with clumps of woody vegetation and open water and extends 5 ha in area. In northern areas, the least bittern is associated with cattails, the most common tall emergent aquatic plant (Environment Canada, 2003).	Main factor for the decline in population of the least bittern is the drainage of wetland/loss of habitat. Natural succession, that natural filling in of wetlands with woody vegetation has also caused a loss in habitat. Human disturbance during nesting period is another limiting factor. Waves caused by recreational watercraft adversely affect the reproductive success of the least bittern.	**S3B**, = Rare to uncommon, breeding migrants/vagrants	**G5** = Very common	**THR** = Threatened	**THR** = Threatened

SPECIES AT RISK			Status (April 2015)			
Taxon Common Name *Scientific Name*	**Habitat Requirements**	**Potential Threats from Water Management Practices and Other Related Causes**	**SRANK Prov. Rank**	**GRANK (Global Rank)**	**MNRF**	**COSEWIC**
Bird Bank Swallow *Riparia riparia*	Habitat: Nesting benefitted by human activity. Nests commonly on railways, railway embankments, road cuttings in suitable soil, and naturally in riverbanks and lakeshore buffs. Distribution dependent on suitable foraging areas and nesting site availability. Feeds in close proximity to water (Cadman *et. al.,* 1987). Food: Insects. Reproduction: Most critical period - courtship, nest building, and incubation periods is from about mid-April to mid-June (Peterson, 1955).	Rivers within the Canadian shield often have rocky banks; the few sand banks suitable for nesting would be vulnerable to loss during water level fluctuations (Cadman *et. al*., 1987). Natural erosion that scours the sediment from the base of riverbanks maintains bank swallow habitat as it relies on unconsolidated sediment for nesting (Florsheim *et al.* 2008). Local populations move to new sites along a river each year, to take advantage of new vertical banks following natural erosion which prevents predator access to nests and vegetation from covering the bird's habitat (Florsheim *et al.* 2008).	**S4B** = Common, breeding migrants/vagrants	**G5** (1996) = Very common.	**THR** = threatened	**T** = Threatened
Bird Black Tern *Chlidonias niger*	Habitat: Nests in loose aggregations of a few to thirty or more pairs within moderately dense emergent march vegetation such as, and most commonly, cattails. Nest are either built on floating mats of dead vegetation or on small patches of mud, sometimes built on top of muskrat houses (Cadman *et. al.,* 1987).	Nesting requirements are rather specific, nest sites almost always near open water with a 0.5-1.5 m depth. Should the vegetation become too dense or too sparse, or the water level changes drastically, the black terns will move to a new area despite returning to nesting areas year after year (Cadman *et. al.,* 1987).	**S3B**, = vulnerable to extirpation, breeding migrants/vagrants	**G4** = Apparently secure	**SC** = special concern	Not at risk

SPECIES AT RISK			Status (April 2015)			
Taxon Common Name *Scientific Name*	**Habitat Requirements**	**Potential Threats from Water Management Practices and Other Related Causes**	**SRANK Prov. Rank**	**GRANK (Global Rank)**	**MNRF**	**COSEWIC**
Bird Canada Warbler *Cardellina canadensis*	Breeding and Foraging Habitat: Variety of habitats differs across its range but is almost always associated with moist forests with dense, deciduous shrub layer, complex understory, and available perch sites. Associated with boreal mixed-wood forests in Ontario. Densities are negatively affected by the proportion of agriculture and human development.	Threatened by the drainage of forest swamp as they prefer the wet mixed forests with standing water. Water management practices should be in the perspective of preventing decline in insect abundance as aerial insects that make up the majority of its diet have a riparian or standing water important habitat to the lifecycle. The Recovery Strategy for Canada warbler in Canada document recognizes the abstraction of surface water as medium concern with a widespread extent.	**S4B** = Common, breeding migrants/vagrants	**G5** (2009) = Very common.	**SC** = special concern	**T** = Threatened
Bird Olive-sided Flycatcher *Contopus cooperi*	Nesting Habitat: Preference for openings within dead trees naturally found near water, burns, and blow-downs. Logging may create habitat by creating openings in the forest. Considered an indicator species for the coniferous forest biome. Begin to arrive in nesting areas from winter habitat in May.	Makes use of riparian habitats during migration. Northern ranges of the olive-sided flycatcher have a greater association with water because of an increase in insect abundance. Heavily depends on aerial insects with aquatic life cycles. Damages to wetlands are a significant threat to the insect population. Hydroelectric projects that result in alterations to hydrological regimes are an example of human activities with negative impacts.	**S4** = Apparently secure	**G4** = Apparently secure	**SC** = special concern	**T** = Threatened

SPECIES AT RISK			Status (April 2015)			
Taxon **Common Name** ***Scientific Name***	**Habitat Requirements**	**Potential Threats from Water Management Practices and Other Related Causes**	**SRANK Prov. Rank**	**GRANK (Global Rank)**	**MNRF**	**COSEWIC**
Reptile Snapping Turtle *Chelydra serpentina*	Habitat: Large bodies of water, both lakes and rivers. Frequently hunts muddy-bottomed waters, it is an omnivorous feeder. Must eat with their head submerged. Snapping turtles have lived 57 years in captivity. Eggs are laid in June, as many as 80 buried in soft earth or sand (Froom 1975). Eggs have a high mortality rate from common predators such as foxes and raccoons, surviving eggs hatch in late August or September.	Impounded streams reduce the abundance of floodplain swamp. Large dams (man-made and natural) may serve as barriers to movement and would fragment populations. Need areas of upland well-drained soils with sun exposure to nest. Main component of diet are habitat sensitive organisms such as mussels. Required water management to maintain sufficient quality and clarity such as riparian zone management to reduce siltation (Florida Fish and Wildlife Conservation Commission 2013).	**S3** = Rare to uncommon	**G5** = Common	**SC** = special concern	**SC** = special concern
Reptile Wood Turtle *Glyptemys insculpta*	Habitat: Three components typify wood turtle habitat: (1) hard-bottomed streams and rivers, (2) herbaceous Vegetation for foraging, and (3) sandy nesting substrate (Ewert et al. 1998). Wood turtles are found primarily in or near moving water and associated riparian or floodplain habitats. They prefer clear, medium-sized rivers and streams (range 7 to 100 feet wide) with sand or sand and gravel substrates and moderate flow (Buech and Nelson 1991). Examples of nesting habitat include sand bars, sand points, and cutbanks. In areas where natural nesting habitat is not available, wood turtles have been observed nesting on gravel and borrow pits, road cuts and shoulders, railroad and highway bridge crossings, clearcuts, utility rights of way, and residential yards and gardens (Lee, Y, 1999).	Wood turtles tend to avoid drainages with clay or muck bottoms and very slow or fast flow. Upstream of water management structures, flowing water habitats are turned into standing water habitats which can lead to loss of forage; also, flooding occurs which can impact nests and affect reproduction. Downstream flooding also occurs. Changes in flow can lead to erosion of the turtles habitat, this causes loss of vegetation for foraging as well as changes in water quality. Management practices may minimize the magnitude or peak flows of the spring freshet that are required to prevent sedimentation and clear vegetation growth from nesting habitats along a river. The water management structure itself acts as a barrier and inhibits seasonal movements or migrations; this can lead to fragmentation or isolation of populations of wood turtle.	**S2** = Very rare	**G4** = Common	**END** = Endangered	**THR** (2007) = Threatened

SPECIES AT RISK			Status (April 2015)			
Taxon Common Name *Scientific Name*	**Habitat Requirements**	**Potential Threats from Water Management Practices and Other Related Causes**	**SRANK Prov. Rank**	**GRANK (Global Rank)**	**MNRF**	**COSEWIC**
Reptile Blanding's Turtle *Emydoidea blandingii*	Habitat: Found in a variety of habitats, including lakes, ponds, marshes, low fields, ditches, creeks, river sloughs, and bogs. Within these habitats, the species is associated with shallow water where submergent or emergent plants occur. Sandy soil appears to be a habitat requisite (Kofron & Schreiber, 1985) Biology: Female Blanding's turtles make long-distance overland nesting migrations, and that some males travel for exceptionally long distances overland (COSEWIC site). In Minnesota the turtles are active from April through November, and spend winter under ice in shallow water (Piepgras & Jeffrey, 1998).	Reproductive potential is apparently limited by the low availability of suitable nesting sites, and the low survival rate of eggs and young (due to flooding, predation by raccoons, and a short growing season) (COSEWIC site). Marshes and small waters are critically important areas for young turtles and it is suggested that these small waters receive more management attention and protection (Bury & Gremano, 2003). Amount of unmodified river remaining is important on species richness (Terry & James, 1996). Wetland draw down concentrates turtles into a diminished lakebed, creating a vulnerable situation for individuals forced to traverse terrestrial habitats (Hall & Cuthbert, 2000). Draw downs in the winter may also expose the turtles, resulting in mortality. Sensitive to habitat manipulation (Kofron & Schreiber, 1985). There are a few reports of Blanding's Turtles being caught in trash racks (MNRF, pers. comm., 2012).	**S3** = Rare to uncommon	**G4** = Common	**THR** = Threatened	**THR** (2005) = Threatened
Fish Lake Sturgeon *Acipenser fulvescens*	Habitat: Highly productive shoal areas of large lakes and rivers. Lake Sturgeon are bottom dwellers, feeding off bottoms that consist of mud or gravel with mud. Most captures are made at 15-30 feet (4.6-9.2 m) but have rarely been caught as deep as 140 feet (42.7 m) Lake Sturgeon is primarily a freshwater fish but is known in brackish waters of the Lower St. Lawrence River and Hudson and James Bays (Scott & Crossman, 1979). Female lake sturgeon live approximately 50 years, but require 20 years or more to mature. After maturity is reached, the female lake sturgeon spawns every 4-6 years (MOECC, 1999). The decline of the lake sturgeon was aided by its slow reproductive cycle.	The Ontario Waterpower Association's *Lake Sturgeon Best Management Practices Guide for Waterpower Projects* (OWA, 2009) summarizes industry knowledge and best available science on potential impacts to lake sturgeon resources. Potential impacts include loss of habitat due to physical alteration or water level and flow manipulation, as well as habitat fragmentation through the creation of impassable barriers. Physico-chemical characteristics of water (dissolved oxygen, temperature, nutrients, etc.) may also be affected in ways that might impact lake sturgeon life cycle needs. Direct impacts to fish can include stranding and desiccation of eggs as well as turbine damage. The crowding of fish below generating stations can make them more susceptible to fishing pressure.	**S3** = Rare to uncommon	**G3G4** = Rare to uncommon, to common	**THR** = Threatened	**THR** (2006) = Threatened

SPECIES AT RISK			Status (April 2015)			
Taxon Common Name *Scientific Name*	**Habitat Requirements**	**Potential Threats from Water Management Practices and Other Related Causes**	**SRANK Prov. Rank**	**GRANK (Global Rank)**	**MNRF**	**COSEWIC**
Mammal Little Brown Myotis *Myotis lucifugus*	Habitat: Widely distributed across Canada and take advantage of a variety of roost sites (Fenton and Barclay 1980). Preference for dark or dimly lit day roosts sites but will seek exposed areas if it provides protection from predators. They can be found in a variety of habitats to forage near bodies of water such as lakes, rivers, streams and small ponds (Wund 2006). Habitat generalist and will move across habitats when foraging and will change their echolocation calls in response to habitat changes (Wund 2006)	Most species in the diets of little brown bats occur in river, stream, pond, or lake habitats (Clare *et al.* 2011). The largest proportion of prey is typically mayfly, a mass emerging aquatic species of insect. The timing of the emergence of the mayfly corresponds to the maternity season of the little brown bat (Clare *et al.* 2011). Water quality influences the food chain. Mayflies are adversely affected by agricultural run off as well as many other prey species (Lenat 1984). Poorly managed sites have a decline in benthic taxa richness to result in large temporal shifts in taxonomic composition which would directly interfere with the mayfly dependence in the maternity season (Lenat 1984, Clare *et al.* 2011). Populations are threatened by white nose syndrome.	**S4** = Apparently secure	**G3** = Vulnerable	**END** = Endangered	**THR** (2007) = LC=Least concern
Mammal Eastern Small-footed Myotis *Myotis leibii*	Habitat: Only known hibernation sites are caves and old mines. Its rarity as a species is associated with high mortality. Observed to share hibernacula with big brown bats (*E. fuscus)* in Ontario. Have been found in buildings, on the face of rock bluffs, turnpike tunnels and beneath slabs of rocks and stones (Best and Jennings 1995) Biology; There is little information about reproduction but it is believed to be similar to close relatives such that breeding is completed in the fall, sperm is stored in the uterus of hibernating females (Virginia department of Conservation and Recreation 2006). Nursery colonies have been documented as being behind loose bark, within crevasses in bridges, vacant buildings, and under exposed rocks, all with significant sunlight exposure (Virginia department of Conservation and Recreation 2006).	The small-footed myotis forages mainly over water, feeding on flying insects emerged from riparian ecosystems (Seavy *et al.* 2009*,* Virginia department of Conservation and Recreation 2006). Siltation of waterways, flooding, and disturbance by humans are potential threats to the food chain of small-footed myotis (Virginia department of Conservation and Recreation 2006). The small body size makes the small-footed myotis vulnerable to environmental contaminates. Flooding is a potential risk to habitat, causing indirect and direct disturbances to old mine sites, loose rock materials, and caves by altering microclimates in airflow and humidity. Populations are threatened by white nose syndrome (Best and Jennings 1995).	**S2S3** = Rare to uncommon	**G2** = Imperiled	**END** = Endangered	**Unknown**

SPECIES AT RISK			Status (April 2015)			
Taxon Common Name *Scientific Name*	**Habitat Requirements**	**Potential Threats from Water Management Practices and Other Related Causes**	**SRANK Prov. Rank**	**GRANK (Global Rank)**	**MNRF**	**COSEWIC**
Mammal Northern Myotis *Myotis septentrionalis*	Mature forests. Mines commonly used as hibernaculae. Sensitive to disturbance during hibernation, as frequent arousal may deplete their energy reserves. Principle requirements of suitable hibernation sites are winter-long temperatures low but above freezing, high humidity, and lack of disturbances both natural (flooding) and anthropogenic.	Foraging habitat includes flights directly above streams and wetlands for aerial insects whose lifecycle takes part in an aquatic environment. Insects with lifecycles having sensitivity to hydrological changes put the northern myotis at risk upon disruption as there would be a great loss to diet subsistence (Rio Tinto Canada Uranium Corporation 2013).	**S3** = Rare to uncommon	**G1G2** = Critically Imperiled/ Imperiled	**END** = Endangered	**Endangered**

3.4. Significant Natural Features

The Spanish River Valley Signature Site Background Information (Ontario Parks, 2002) describes a number of significant natural features in the Upper Spanish area extending from Biscotasi Lake in the north to Agnew Lake in the south:

- Provincially (P) and Regionally Significant Old Growth Forests (Crins, 1996 and North-South Environmental, 2001)
    - Agnes River Old Pine (P)
    - Craig/Tofflemire Old Pine (P)
    - Spanish River Valley and Old Pine (P)
    - Spanish River – Tremblay Lake Forest
    - Eagle Rock/Spanish River Corridor

- Provincially Significant Wetlands
    - Biscotasi Lake (Crins, 1996)

- Proposed Regionally Significant Riverside Wetlands (North-South Environmental, 2001)
    - The Inchworm – West Branch North of the Forks
    - North of Spanish Lake, in the delta of Bannerman Creek
    - Mouth of the Wakonassin River and Coreaux Creek

- Proposed Regionally Significant Shorelines (North-South Environmental, 2001)
    - Cobble, sands and silt-clay shorelines of the Spanish River and Pogomasing Lake

- Rock Barren/Cliff
    - Biscotasi Lake
    - East Branch of Spanish River

Significant plants found to occur in the area were a rare hair cap moss (*Atrichum undulatum*), yellow-eyed grass (*Xyris montana*), water awlwort (*Subularia aquatica*), *Aulaconmium androgynum* and *Spangnum quinquefarium*.

The Lower Spanish River is home to the provincially significant Spanish River Delta Marsh, which is a 304.5 ha coastal wetland complex composed of 21% swamp and 79% marsh (Elagu Ecosurveys, 1993). As one of 43 areas of concern (AOC) identified under the 1985 International Joint Commission on Great Lakes Water Quality, the Spanish Harbour (and lower Spanish River) was studied extensively to determine a Remedial Action Plan (RAP) for use impairments caused primarily by municipal and industrial discharges (Environment Canada Website www.ec.gc.ca). Today, with most of the identified impairments remediated, the Spanish Harbour is classified as an Area in Natural Recovery.

The Vermilion River Delta Wetlands, located where the Vermilion River empties into Vermilion Lake, were identified by Noble (1991) as a Sensitive Area in the Sudbury District. This site was identified as an important area for waterfowl nesting and migratory stopovers.

3.5. Potential Ecological Impacts of Water Management Practices

The Ontario Waterpower Association's Best Management Practices Guide for Waterpower Projects (June, 2009) provides a detailed outline of potential impacts that can occur as a result of waterpower activities. Four main waterpower activities are described, each having the potential to directly or indirectly alter ecological habitat characteristics that are made up of specific physical, chemical, hydraulic, hydrologic and thermal regimes:

1. *Infrastructure Placement* encroaches upon natural systems and can alter local habitat regimes. Infrastructure can include buildings, transmission corridors, dams, diversions and roads. When constructed, these structures can create physical barriers to natural movement/migration of fish, flora and fauna throughout a larger area. Barriers can also result in aggregation of fish species and potential overfishing.
2. *Generation* involves the active manipulation of water levels and flows in reservoirs and riverine environments. While alterations in water level and flow are natural occurrences, ecological systems have adapted to a certain timing and extent of fluctuation that tend to minimize erosion and related issues and routinely create combinations of conditions that are suitable for fish spawning and other life processes. Generation can alter existing habitat regimes, either reducing or increasing availability of suitable water level and flow conditions. Generation turbines themselves can present a direct physical hazard to fish should they not be prevented from contact. Alternatively, the tailrace of a waterpower facility may enhance flow conditions.
3. *Storage of Water* involves the creation and management of a water headpond or reservoir that can provide water flow through the turbines as required. The initial creation of reservoirs/headponds involves the flooding of land, and requires several years to adjust to a new ecological equilibrium. Loss of habitat, increased erosion, thermal and dissolved oxygen changes in the water column, and increased mercury concentrations in newly-flooded lands, are of particular concern.
4. *Spilling of Water* involves the release of water from a headpond/reservoir over a spillway rather than through the turbines. These are typically temporary flow events, associated with high flow conditions, which can cause erosional issues at the onset of the flow, and fish stranding fish and/or dessication of eggs when the flow subsides.

For new projects, the *Ontario Waterpower Associations Class Environmental Assessment for Waterpower Projects (Third Edition, April 2012)* provides an extensive list of potential ecological, cultural and other impacts requiring assessment and possible mitigation. Ecological baseline studies associated with Class EAs provide an inventory of local ecosystem components and alert the proponent to those areas requiring mitigative measures (Metcalfe et al., 2013). Proponents have the benefit of being able to address concerns, such as those listed above, at the project planning stage.

The primary structures that are a part of this WMP have been in place for decades - up to a century in some cases. The regulated Spanish & Vermilion River systems possess substantial valued ecosystem components, some pre-dating the dams/reservoirs and some that have come about as a result of the alterations and/or further intervention such as fish-stocking efforts. The primary issues facing the WMP Planning Team, considering the existing structures, appear to be associated with generation and spilling of water.

4.0 SOCIO-ECONOMIC ENVIRONMENT

4.1. Community Profiles

The Spanish/Vermilion River basin has a number of communities within and adjacent to its boundaries (Figure 4.1). The largest of the urban areas is the City of Greater Sudbury, located in the southeast portion of the watershed. It consists of an amalgamation of towns and former cities including Sudbury, Capreol, Nickel Centre, Onaping Falls, Rayside-Balfour, Valley East, and Walden as well as a number of unincorporated townships. The unorganized townships located north of Sudbury form the bulk of the undeveloped watershed area and include the communities of Biscotasing, Gogama, Ramsey, Benny and Cartier. Moving westward from the City of Greater Sudbury are Nairn & Hyman Township, Baldwin Township, and the Town of Espanola. The southwestern part of the watershed is the Township of Sables-Spanish Rivers, which is an amalgamation of the towns of Massey, Walford, and Webbwood along with Spanish River, May, and Shakespeare townships. The Town of Spanish and is located along the mouth of the Spanish River. Table 4.1 contains community statistics drawn from the 2006 Census.

Statistics Canada updates census information on varying topics at varying frequencies and should be consulted for the most recent data of interest. Data can be accessed at www.statcan.gc.ca.

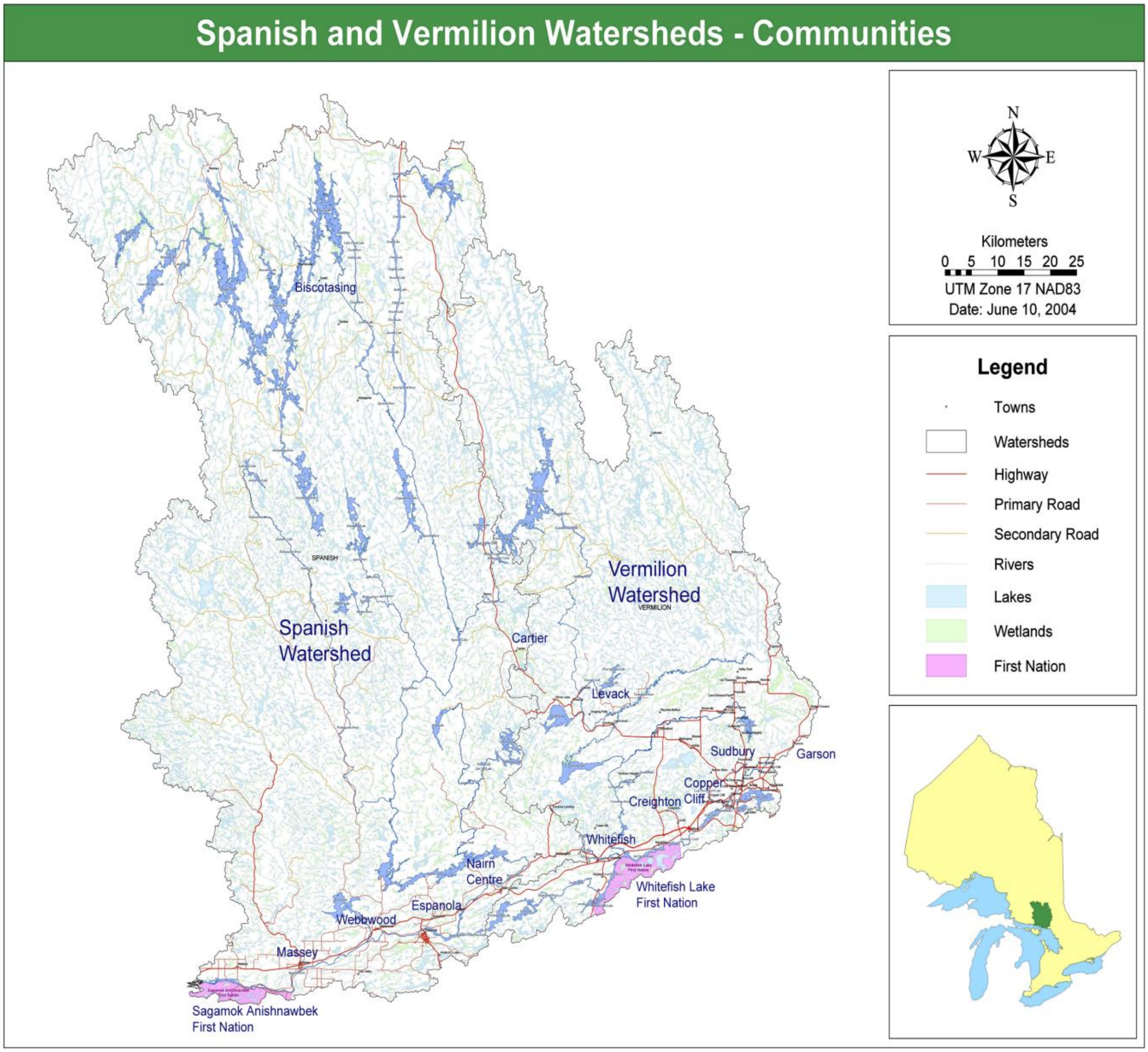

Figure 4.1: Communities on the Spanish River and Vermilion River.

Table 4.1: Spanish/Vermilion River Community Profile Information (source Statistics Canada, 2007)

Community Profile Category	Chapleau, Township	Sudbury, Unorganized North Part,	Greater Sudbury, City	Nairn and Hyman, Township	Baldwin, Township	Espanola, Town	Sables-Spanish Rivers, Township	Spanish, Town
Land Area (sq km)	14.27	35,481.13	3,200.56	159.03	81.82	82.37	806.27	106.02
Population (2006)	2,354	2,415	157,857	493	554	5,314	3,237	728
Population Density per square kilometer	165.0	0.1	49.3	3.1	6.8	64.5	4.0	6.9
Population Change 2001-2006 (%)	-16.9	-17.0	1.7	17.4	-11.2	-2.5	-0.2	-10.8
Total Private Dwellings	1,136	1,911	69,430	424	260	2,331	1,701	400
Employment Rate	58.7	47.2	58.1	55.4	50.5	51.9	49.0	29.4
Unemployment Rate	13.1	13.1	7.8	6.1	8.0	11.1	11.8	21.7
Median Income – Persons 15 years and over (2005$)	30,722	23,405	27,476	22,869	19,566	25,747	19,924	17,650
Total Experienced Labour Force – 15 years and over	1,255	1,150	79,795	245	245	2,500	1,445	215
Occupation:								
A. Management	90	135	6,295	10	20	250	105	15
B. Business, Finance and administration	140	170	15,695	30	25	255	200	25
C. Natural and applied sciences and related	10	20	3,990	0	10	80	75	10
D. Health	60	80	5,145	20	15	200	120	10
E. Social science, education, government service and religion	145	65	7,585	10	0	140	45	15
F. Art, culture, recreation and sport	15	15	1,770	0	10	25	20	0
G. Sales and service	295	290	20,730	70	85	780	325	55
H. Trades, transport and equipment operators and related	305	250	13,105	45	60	420	350	55
I. Occupations unique to primary industry	85	75	3,760	35	10	90	150	25
J. Occupations unique to processing, manufacturing and utilities	110	50	1,715	15	15	260	50	0
Industry:								
A. Resource-based	95	90	6,515	35	15	80	160	30
B. Construction	55	80	5,145	0	15	180	90	20
C. Manufacturing	225	110	4,770	30	45	495	175	20
D. Wholesale Trade	0	30	3,020	0	0	65	50	0
E. Retail Trade	155	145	10,270	70	70	420	240	20
F. Finance and real estate	10	30	3,330	0	15	85	50	20
G. Health care and social services	120	115	9,915	20	15	325	165	10
H. Educational services	130	65	7,045	0	15	125	40	0
I. Business services	220	205	12,215	30	20	220	180	40
J. Other services	235	280	17,570	45	25	515	300	40

4.2. First Nation Communities

A number of First Nation communities have or may have traditional land use areas within the Spanish and Vermilion watersheds. Sagamok Anishnawbek First Nation Reserve is located at the mouth of the Spanish River where it enters Lake Huron. Atikameksheng Anishnawbek (formerly known as Whitefish Lake) First Nation Reserve is located within the Vermilion watershed. Whitefish River First Nation Reserve, Wikwemikong Unceded Indian Reserve, and Aundeck Omni Kaning First Nation Reserve areas are located near the southern part of the watershed in the Manitoulin Island area. Mattagami First Nation, Brunswick House First Nation, Chapleau Cree and Chapleau Ojibway First Nations are located near the northern part of the WMP watershed.

Archaeological work shows that the region has been inhabited since the end of the last ice age, with the earliest known occupation being at Fox Lake, Venturi Township, some 7700 years ago. Additional findings of prehistoric origin have been recorded at Biscotasi, Sinaminda, Pogamasing, and Birch (Gough) Lakes as well as the Lower Spanish River near Massey. It is hypothesized that the Spanish River system was a transit zone and the lakes adjacent to the river were seasonal habitation areas accessed from the traditional canoe route. The lake sites were the location of fall and winter trapping, hunting and fishing, while in the summer the people travelled down the river to tribal meeting places on the shores of Lake Huron. Historically, the Hudson's Bay Company is known to have had a Post on Pogamasing Lake in the 1880's (Hanks, 1980).

4.2.1. Sagamok Anishnawbek

The First Nation community of Sagamok Anishnawbek is located 98 km (61 mi) west of Sudbury and 5 km (3 mi) southwest of Massey. Sagamok Anishnawbek is part of the Robinson-Huron Region as well as a member of the North Shore Tribal Council.

There are approximately 2,115 band members, with approximately 1,230 living on the reserve and 885 band members off the reserve. The land base consists of 113 km^2 (11,331.4 ha) on the reserve with additional lands under resolution (boundary review). Employment for band members consists of public administration, agriculture, forestry, fishing and hunting, health care and social services, construction, professional, scientific and technical services, educational services, retail trade, utilities, transportation and warehousing, other services, manufacturing, waste management and remediation services, accommodation and food services.

Sagamok Anishnawbek has a communal water system, water treatment plant, landfill site, health clinic, library, community centre, school for senior kindergarten to grade 8, fire department, and police department. Hospital and secondary school services are obtained from the Town of Espanola.

4.2.2. Atikameksheng Anishnawbek First Nation (AAFN)

AAFN is located approximately 15 km (9 mi) southwest of the City of Greater Sudbury and is a part of the Robinson Huron Treaty Area as well as a member of the North Shore Tribal Council.

There are approximately 840 band members with approximately 336 living on the reserve and 504 band members off the reserve. The land base is approximately 117 km^2 (17,704.5 ha) on the reserve. Employment for band members consists of public administration, health care and social services, wholesale trade, transportation and warehousing, retail trade, manufacturing, educational services, agriculture, forestry, fishing, and hunting, waste management and remediation services.

AAFN has a communal water system, water treatment facility, sewage system, health clinic, nurse's station, library, community centre, fire department, and police department. Hospital and secondary school services are obtained from the City of Greater Sudbury.

4.2.3. Whitefish River First Nation

The Whitefish River First Nation is located in the Manitoulin District, approximately 107 km (66 mi) southwest of Sudbury and 30km (19 mi) from Espanola. The community of Birch Island is the main settlement. Whitefish River First Nation is a member of the United Chiefs and Councils of Manitoulin and the Union of Ontario Indians – Robinson Huron Region.

The Whitefish River First Nation consists of approximately 1,015 band members with 303 on the reserve and 712 band members off the reserve. The land base of the reserve is approximately 56 km^2 (5,673.4 ha). Employment consists of public administration, construction, health care and social services, manufacturing, agriculture, forestry, fishing, and hunting, waste management and remediation services, accommodations and food services.

Whitefish River First Nation has a communal water system, water treatment facility, sewage system, health clinic, nurse's station, land fill, library, community centre and fire department. Hospital services are obtained from the Town of Little Current. Secondary school services are obtained from the Town of Espanola.

4.2.4. Wikwemikong Unceded Indian Reserve

Located on Manitoulin Island, 160 km (99 mi) southwest of Sudbury and 35 km (22 mi) southeast of Little Current, Wikwemikong Unceded Indian Reserve #26 is home to the People of the Three Fires - Odawa (Traders), Ojibway (Faith Keepers) and Pottawotami (Fire Keepers). Wikwemikong is recognized as Canada's only Unceded Indian Reserve. The main settlement is on Wikwemikong (Smith) Bay. Six satellite communities include Rabbit Island, Murray Hill/Cape Smith, Wikwemikongsing, Kaboni, South Bay and Buzwah.

There are approximately 5,500 band members with 2,600 living on the reserve and 2,900 off the reserve. The reserve consists of 55,000 ha with additional land under resolution (boundary review). Employment includes band administration, health care and social services, educational services, government services, logging and forestry, construction, retail trade, accommodation (food and beverage), transportation and storage, manufacturing, communications and utilities, and hunting and fishing.

Wikwemikong Unceded Indian Reserve has a communal water system, sewage treatment plant, land fill site, health clinic, nursing station, nursing home, library, schools for kindergarten to grade 12, community centre, arena, marina, fire department, and police department. Hospital services are obtained from the Town of Little Current.

4.2.5. Aundeck Omni Kaning First Nation

Aundeck Omni Kaning First Nation (formerly known as Ojibways of Sucker Creek) is located approximately 125 km (78 miles) southwest of Sudbury and 5 km (3 mi) west of the Town of Little Current on Highway 540 on Manitoulin Island. This First Nation is a member of the United Chiefs and Councils of Manitoulin (UCCM) and the Union of Ontario Indians (UOI) – Robinson Huron Region.

The Aundeck Omni Kaning First Nation consists of approximately 670 band members with approximately 350 band members residing on the reserve and 420 band members residing off the reserve. The reserve land base is 6.27 km^2 (627.3 ha). Employment consists of band administration, health care and social services, construction, manufacturing, transportation and warehousing. Businesses provide services for education, agriculture, forestry, fishing, hunting and eco-tourism. Other businesses and sources of employment are the gas station, cigarette shop, take-out stand, and small entrepreneurial businesses that sell cosmetics, arts and crafts, maple syrup, etc.

Aundeck Omni Kaning First Nation has a water treatment plant, landfill site, health clinic, nursing station, day care centre, library, community centre and fire department to service the reserve.

The community is policed by Anishnawbek Police Services, which is an entity of the UCCM. The Manitoulin Legal Clinic and the UCCM Health clinic, which serve the six member First Nation communities, are located there as well. Aundeck Omni Kaning First Nation has recreation facilities that include an exercise gym, youth centre, volleyball court, tennis court, playgrounds, a ball field and an outdoor rink.

The Aundeck Omni Kaning education system is serviced by facilities in the Town of Little Current and the Northeastern Manitoulin and Islands Township. Hospital and ambulatory care services are obtained from the Town of Little Current.

Other First Nation communities located to the north of the watershed were consulted as they also have possible traditional uses in the area. These communities are Mattagami First Nation, Brunswick House First Nation, Chapleau Cree First Nation and Chapleau Ojibway First Nation.

4.3. Economic Activities

4.3.1. Power Generation

Vale and Domtar own and operate a total of 6 power generating facilities on the river system. Vale has 4 generating stations located on the Spanish River (Big Eddy, High Falls 1 and 2, and Nairn) and 1 generating station located on the Vermilion River (Wabagishik). Domtar has 1 generating station located on the Spanish River at Espanola. The generating plants have a combined installed capacity of just over 71 MW and are used primarily to supplement power required to run the owners' industrial processes. Details of these facilities are provided in Section 5.

4.3.2. Resource Extraction

The land area of this watershed is used for mining, mineral exploration, forest management, timber harvesting and farming. Early logging commenced on the Lower Spanish in about 1863 and became a major industry throughout the watershed when the Canadian Pacific Railway accessed the area in 1883. Initially, watershed flows were altered for log driving purposes, but soon the river was shared with mining and pulp and paper industries for power generation. The first hydroelectric facility was built at High Falls in 1905. The last recorded river log drive occurred in 1967 (MNRF, 1989).

Resource extraction and associated uses within the watershed include:

- Three Forest Management Units – Spanish Forest, North Shore Forest and the Sudbury Forest
- Kraft mill and paper manufacturing in Espanola (powered by Domtar's Generating Station)
- 53 Agregate Licences/Permits
- Hard rock mining, milling, smelting and refining – targeting copper, nickel, gold, precious metals (the largest concentration being in the Sudbury Basin area). The power requirements of Vale's mining, milling, smelting and refining operations in Copper Cliff are supplemented by the Big Eddy, High Falls, Nairn and Wabagishik Generating Stations.

4.3.3. Resource Harvesters

Data from MNRF indicates that resource harvesting from the streams and forests within the watershed include:

- 146 Baitfish Harvest Areas (not all of which may be allocated)
- 80 Bear Management Areas
- 94 Traplines
- 67 Trap Cabins

4.3.4. Tourism and Recreation

The rivers and lakes within the basin have a wide variety of water uses that take place during all four seasons. There are numerous water-based tourism operators including campgrounds, marinas, rental cottages and cabins, commercial hunting and fishing lodges, fly-in outpost camps and canoe outfitters. There are also many private camps and cottages. MNRF data indicates the presence of 19 base lodges and 35 outpost camps. The Spanish River is also a popular canoeing destination, with several defined canoe routes (Figure 4.3.4).

4.4. Protected Areas and Provincially Significant Features

The Spanish and Vermilion River watersheds contain a number of parks, reserves and provincially significant features as listed in Table 4.4. The provincially signifant features include Provincially Significant Wetlands (PSW) in both the Spanish and Vermilion Rivers. PSWs are the identified by MNRF using a science-based ranking system known as the Ontario Wetland Evaluation System. The accompanying map (Figure 4.4) highlights the location of these spaces within the planning area. These areas are designated as protected representative ecosystems of Ontario's natural regions. The protection extends to natural and cultural heritage and biodiversity and provides opportunities for compatible, ecologically sustainable recreation.

Each of the areas is protected through a variety of provincial policies, legislations and acts, depending on the nature of their original classification. Many of these spaces were regulated to protect unique physical, geological and, or biological features of the landscape, natural and cultural heritage values, scenic vistas and recreational opportunities. In some instances, future studies within these protected areas may be warranted to determine the sensitivity of these unique features to changing water flows and levels.

Data used for this document were compiled from the Crown Land Use Policy Atlas (CLUPA).

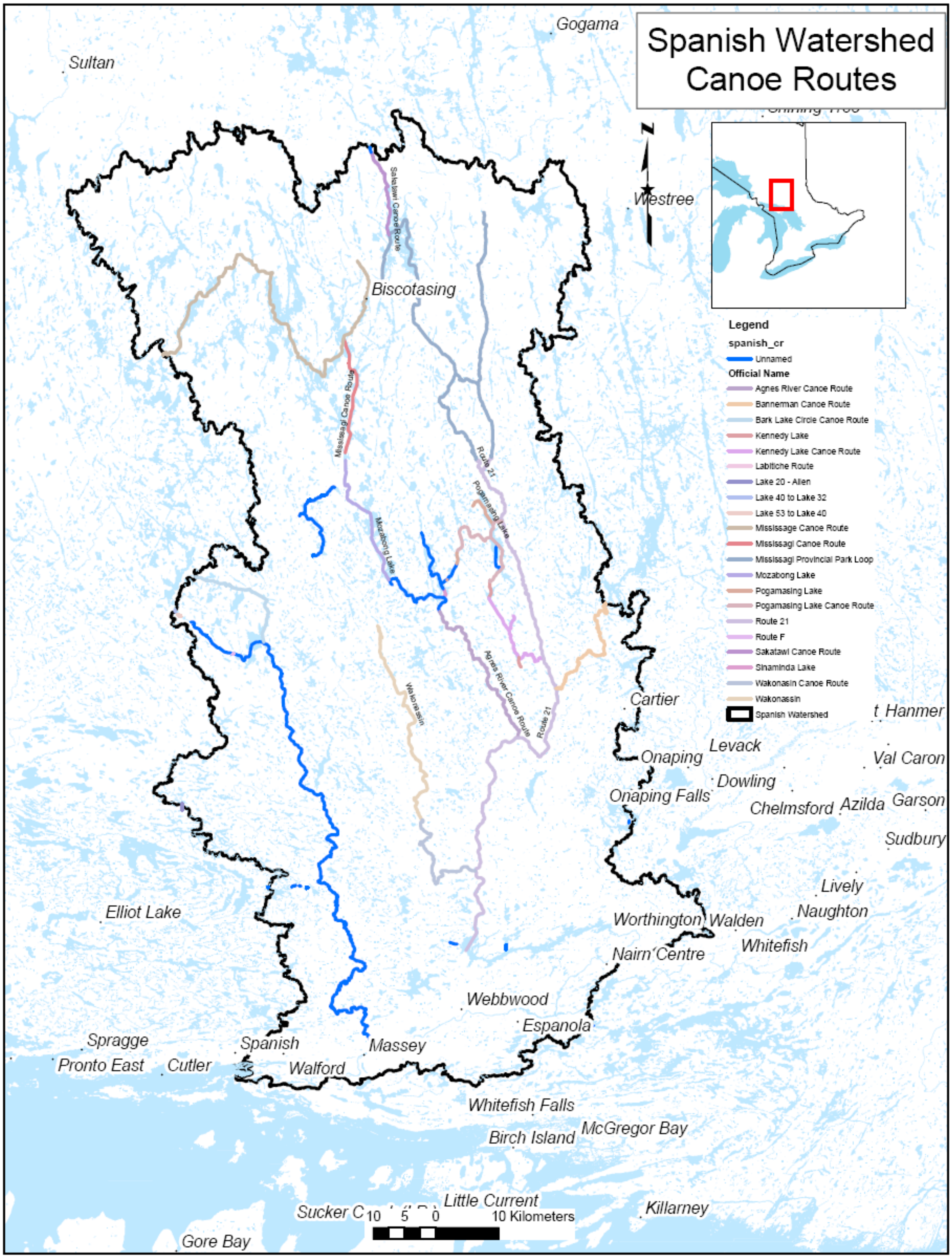

Figure 4.3.4: Spanish River Canoe Routes

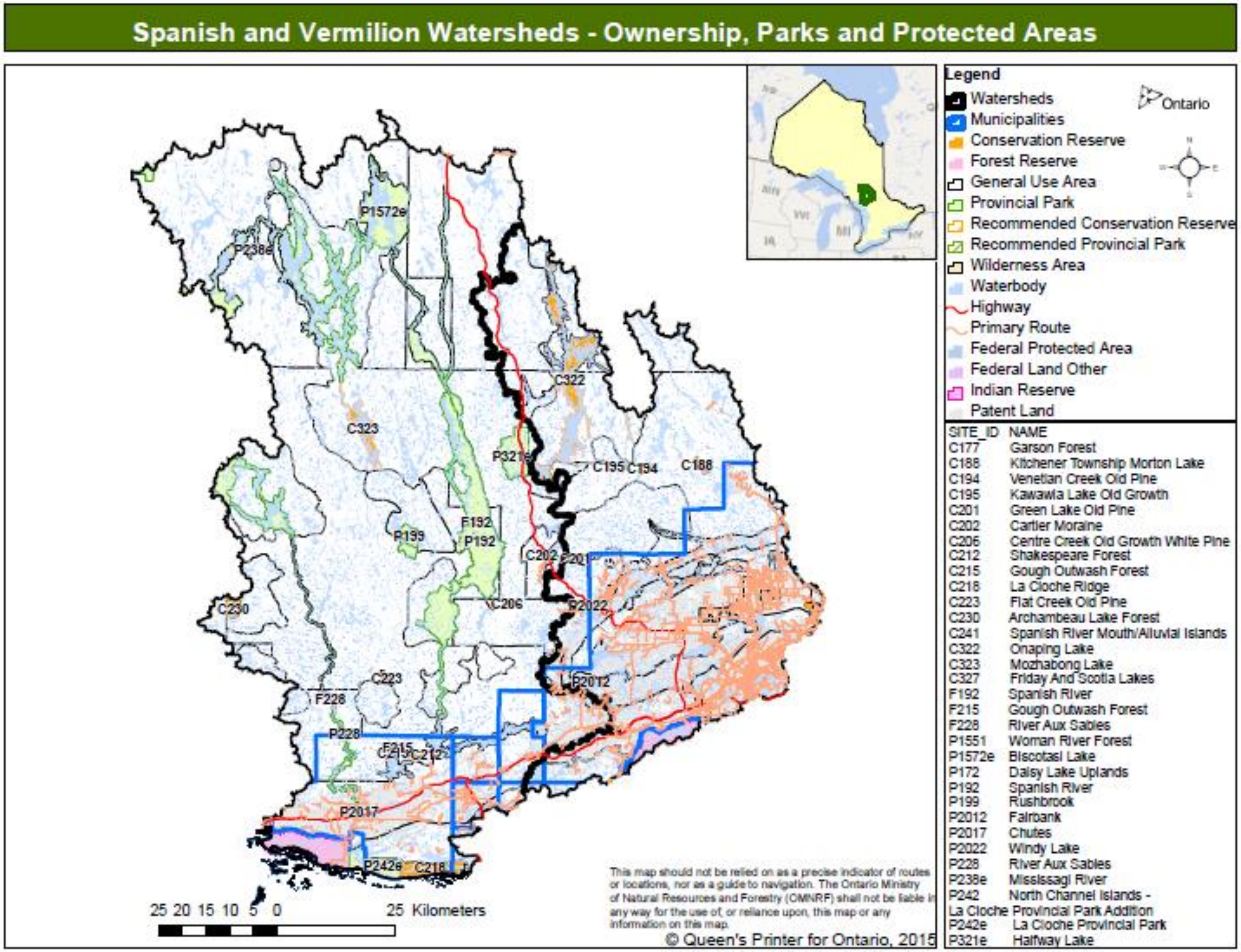

Figure 4.4: Ownership, Parks and Protected Areas

Table 4.4: Protected Lands and Provincially Significant Features

SPANISH RIVER WATERSHED	MNRF DISTRICT	VERMILION RIVER WATERSHED	MNRF DISTRICT
PROVINCIAL PARKS			
P238e Missisagi River Provincial Park (Waterway Class)	Chapleau/ Sault Ste. Marie/Sudbury	P2012 Fairbank Provincial Park (Recreational Class)	Sudbury
P1572e Biscotasi Lake Provincial Park (Natural Environment Class)	Chapleau/ Timmins	P2022 Windy Lake Provincial Park (Recreational Class)	Sudbury
P192 Spanish River Provincial Park (Waterway Class)	Chapleau/ Timmins/ Sudbury		
P228 River Aux Sables Provincial Park (Waterway Class)	Sudbury		
P321 Halfway Lake Provincial Park (Natural Environment Class)	Sudbury		
P199 Rushbrook Provincial Park (Natural Environment Class)	Sudbury		
P2017 Chutes Provincial Park (Recreational Class)	Sudbury		
CONSERVATION RESERVES			
C212 Shakespeare Forest Conservation Reserve	Sudbury	C322 Onaping Lake Conservation Reserve	Sudbury /Timmins
C215 Gough Outwash Forest Conservation Reserve	Sudbury	C327 Friday and Scotia Lakes Conservation Reserve	Sudbury/ Timmins
C223 Flat Creek Old Pine Conservation Reserve	Sudbury	C195 Kawawia Lake Old Growth Conservation Reserve	Sudbury
C206 Centre Creek Old Growth White Pine Conservation Reserve	Sudbury	C194 Venetian Creek Old Pine Conservation Reserve	Sudbury
C323 Mozhabong Lake Conservation Reserve	Sudbury	C188 Kitchener Township Morton Lake Conservation Reserve	Sudbury
C202 Cartier Moraine Conservation Reserve	Sudbury	C201 Green Lake Old Pine Conservation Reserve	Sudbury
C241 Spanish River Mouth/Alluvial Islands Conservation Reserve (recommended)	Sudbury	C177 Garson Forest Conservation Reserve	Sudbury
C230 Archambeau Lake Forest Conservation Reserve	Sudbury		
FOREST RESERVES			
F228 River Aux Sables Forest Reserve	Sudbury		
F192 Spanish River Forest Reserve	Sudbury		
PROVINCIALLY SIGNIFICANT FEATURES			
Spanish River Mouth (PSW)	Sudbury	Vermilion River Wetlands (PSW)	Sudbury

4.5. Spanish River Watershed Archaeological Findings

Hanks (1980) summarized archaeological work conducted for Vale, as well as previous studies and findings by MNRF, the Ministry of Culture and various others at locations along Spanish River system. Cultural remains found at various locations between Spanish Lake and the mouth of the Spanish River include remnants of European habitation in the late 1700’s and 1800’s during the peak of the fur trade, as well as logging activities in the late 1800’s and early 1900’s.

Evidence unearthed during the various studies, as well as interviews with aboriginal persons, suggested both historic and pre-historic use of the Spanish River as a travel route from Lake Huron to smaller inland water bodies such as Pogamasing and Sinaminda Lakes. Pre-historic habitation of Biscotasi Lake, at the divide between the Lake Huron and James Bay drainage basins, is also indicated. Artifacts (tools) composed of rock materials not typically found in the watershed suggest that the Spanish River may have been part of a more extensive Great Lakes travel route.

5.0 WATER CONTROL AND POWER GENERATION

Waterpower generation on the Spanish and Vermilion rivers involves the controlled storage and release of water from upstream storage/reservoir lakes to drive generating station turbines throughout the year, maximizing water use under normal weather conditions and extremes of flood and drought. The Spanish has been a managed watershed for over a century – starting with log-driving and later transitioning into waterpower. Approximately one-half of the total watershed area of the Spanish, above the outlet of Agnew Lake, is controlled.

The Spanish River sub-watersheds may be described as follows (see Figures 5.1a and 5.1b):

1. **Upper Spanish Lakes:** These are six man made lakes acting as reservoirs for water power generation purposes. The water levels on these lakes are controlled by Vale and they include Frechette Lake, Canoe (Bardney) Lake, Mozhabong Lake, Indian Lake, Ramsey Lake (Chapleau District), and Biscotasi Lake.
2. **Spanish River East Branch:** The only regulated lake within the East Branch is Three Corner Lake which is controlled by the MNRF (Timmins District), primarily for recreation and fish and wildlife habitat purposes.
3. **Domtar-Controlled Lakes on the Spanish:** Domtar controls three lakes for low flow augmentation and waterpower purposes – Pogomasing Lake, Siniminda Lake and Onaping Lake. These lakes discharge, ultimately, into the Main Branch. However, Onaping Lake flow may be directed to either the Spanish River (via Bannerman/Moncrieff Creek) or Vermilion River (via the Onaping River).
4. **Wakonassin River:** The river flows, unregulated, into the Main Branch.
5. **Main Spanish and Lower Watershed Lakes:** This part of the watershed includes areas south of the Forks to the inlet of Agnew Lake, which is a man made reservoir. Ministic Lake and Armstrong Lake (up until 2017) are also controlled as reservoirs for waterpower purposes by Vale.
6. **Lower Spanish:** The outlet of Agnew Lake is the location of the Vale's Big Eddy Generating Station and High Falls #1 and #2 Generating Stations. Downstream is the Vale Nairn Generating Station. Further downstream on the Spanish, past the confluence of the Vermilion River, is Domtar's Espanola Generating Station.
7. **Vermilion River:** The Vermilion River is a main tributary of the Spanish. Vale's Wabagishik Generating Station is located upstream of the Vermilion River confluence. The watershed contains a number of other water control facilities whose purposes are other than waterpower generation. These are: Windy Lake and Whitewater Lake Dams (MNRF), Stobie Dam (Domtar), Laurentian Lake and Nepahwin Lake Dams (CS), Maley and Nickeldale Dams (CS), and Ramsey Lake (Sudbury District) Dam (CGS). As mentioned above, Onaping Lake flow may be directed to either the Spanish River (via Bannerman/Moncrieff Creek) or Vermilion River (via the Onaping River).

5.1. The 1993 Spanish River Watershed Management Plan

The 1993 Spanish River Watershed Water Management Plan (Appendix G) considered storage lakes located upstream of the Big Eddy Dam and was developed for the 10-year planning period to the year 2012. It details cumulative rule curves for these lakes for normal, high and low water conditions. The operational strategies were derived, using hydrological modeling, in order to drive waterpower generation under various precipitation and runoff conditions and to balance cooperative multiple use of the river. The rule curves provide storage lake level limits and drawdown schedules to be expected by users throughout the course of a year. The 1993 WMP formed the main basis of reference for planning of this updated WMP.

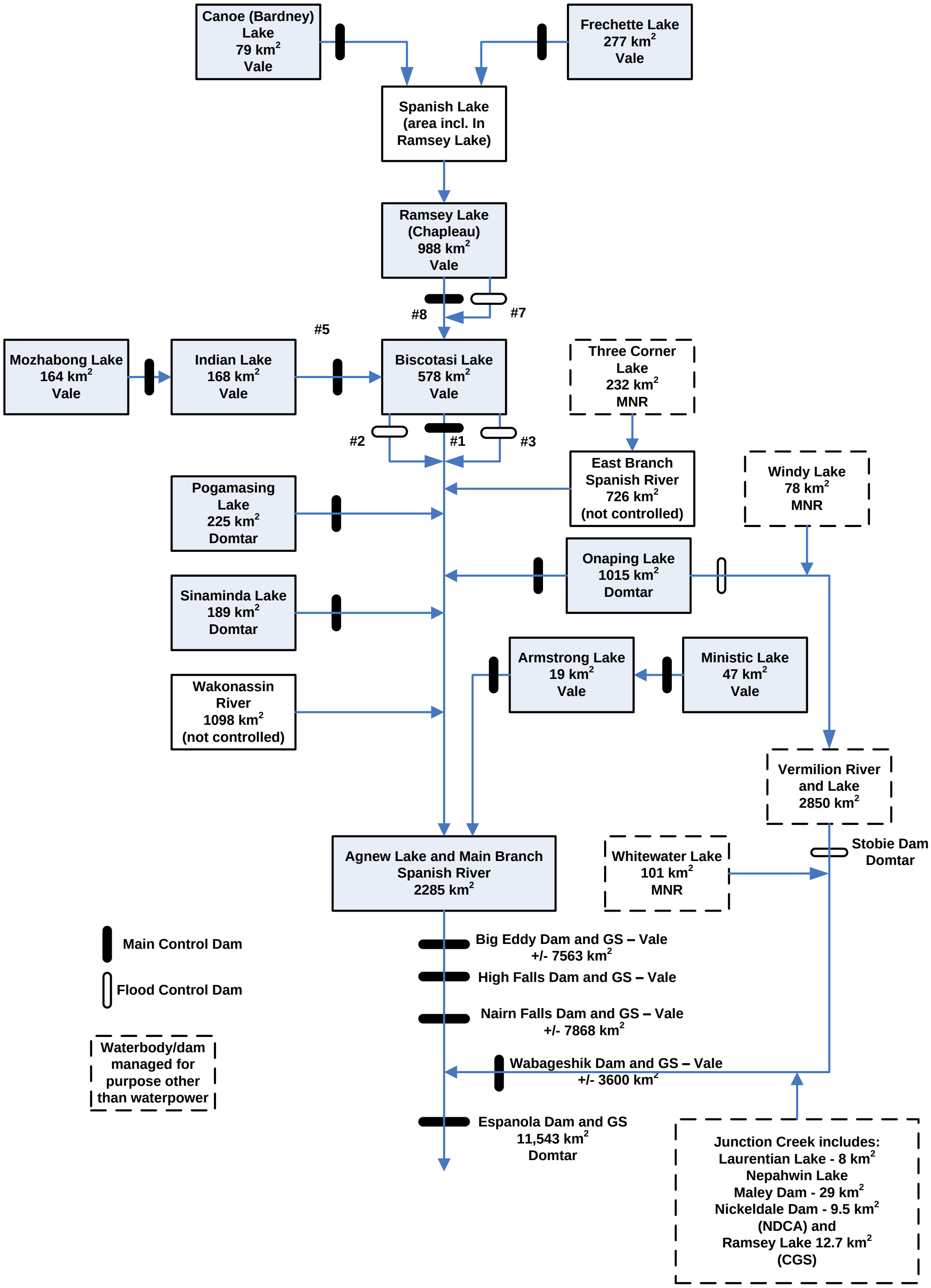

Figure 5.1a: Schematic of dams and generating station locations on the Spanish and Vermilion River watersheds, including estimates of watershed areas controlled by individual dam structures (Note: watershed areas for dams include area between the dam and the next upstream control structure; generating station watersheds include entire upstream watershed including network of structures).

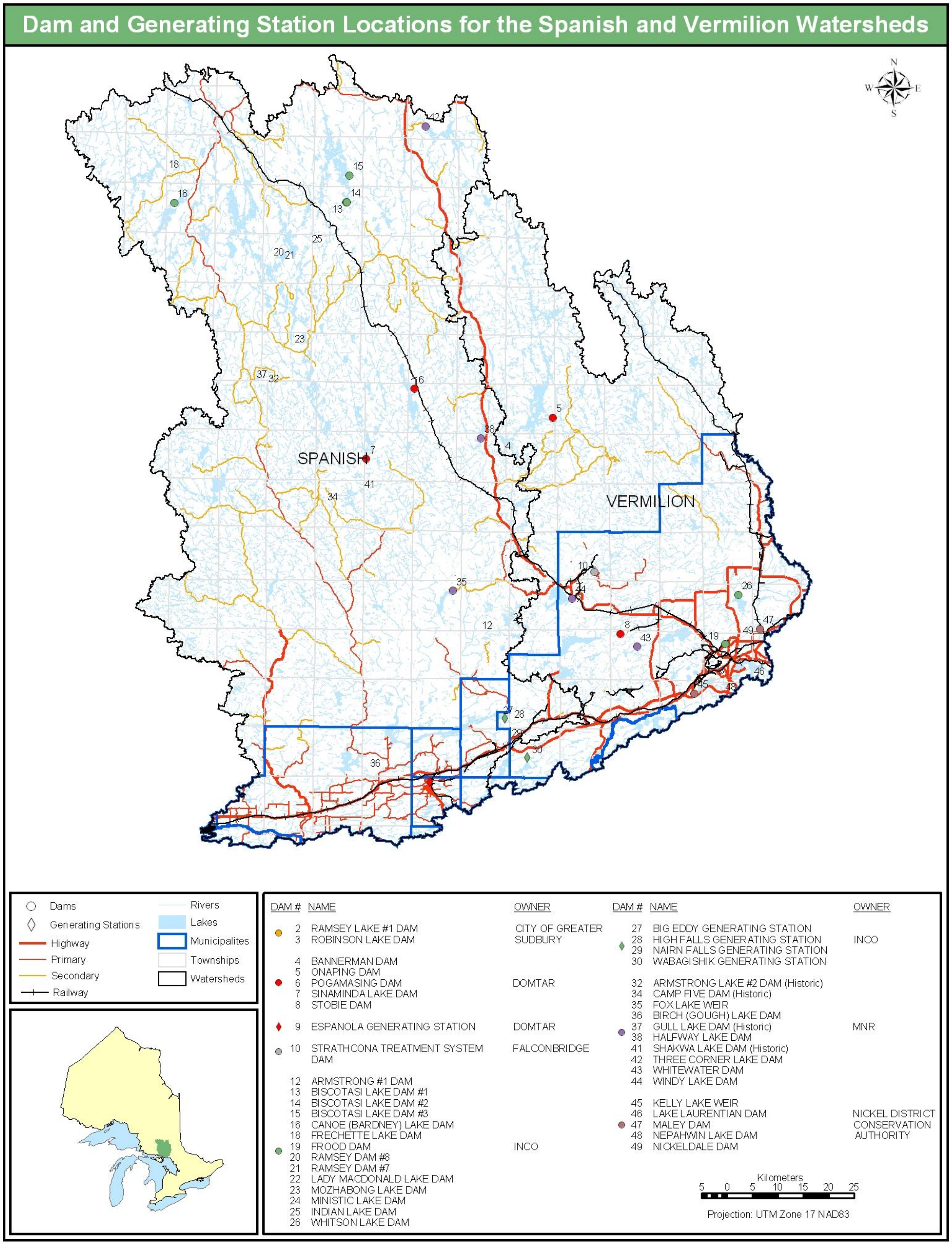

Figure 5.1b: Dam and generating station locations within the Spanish and Vermilion watersheds

5.2. Vale Facilities

5.2.1. Frechette Lake Dam No. 24

The Frechette Lake dam, operated under MNRF License of Occupation #8802, is located in Faust Township (47.3404N, 82.4744W), in the far northwestern corner of the Spanish River watershed. Frechette Lake is approximately 21km^2 (8 mi^2) in size with a watershed drainage area of 277.13 km^2 (107 mi^2). The lake is used as a reservoir. Frechette Lake drains via the Spanish River into Spanish Lake, which then drains into Ramsey Lake (Chapleau District).

The original Frechette Lake dam was constructed in the early 1900's. It was reconstructed in 1979 and retrofitted in 1994. Currently, it is a buttress-walled concrete structure, having a double sluiceway with each containing up to 12 removable stoplogs. The sill elevation is at 1384.79 ft geodetic (422.08 m).

The lake level is presently maintained using the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Control levels vary between 4 ft (1.22 m) and 13 ft (3.96m) above sill. Under normal conditions Frechette Lake will remain at full supply level from the end of May until the end of October. Drawdown begins in November and ends in December.

Frechette Lake is a remote tourism lake with minimal development. It is accessible by air or seasonal resource roads where 4-wheel drive vehicles are required. The lake supports cold-water fish species lake trout and whitefish, as well as the cool-water species northern pike.

5.2.2. Canoe (Bardney) Lake Dam

The Canoe Lake dam, operated under MNRF License of Occupation #8802, is located at the northeast end of the lake in Abney Township (47.2887N, 82.4488W). Canoe Lake is the smallest of the Upper Spanish Lakes with a surface area of 9.0 km^2 (3.5 mi^2) and a drainage area of 77.70 km^2 (30 mi^2). The lake is used as a reservoir. It flows into Spanish Lake and then into Ramsey (Chapleau) Lake.

The Canoe Lake dam was originally constructed in the early 1900's, replaced in 1952 and 1958 and reconstructed in 1978. It is composed of buttress-walled concrete with a single log sluiceway containing up to 10 removable stop logs. The sill elevation is at 1386.33 ft geodetic (422.55 m).

The lake level is presently maintained using the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Control levels vary between 4 and 8 ft (1.22 – 2.44 m) above sill. Under normal conditions, Canoe Lake will remain at full supply level from the end of May until the end of September. Drawdown begins in October and ends in November.

There is no development on the lake, which is accessible by air or by resource roads. The lake is a part of Mississagi River Provincial Park and the Mississagi to Aubrey Falls Canoe Route. It supports whitefish, northern pike, walleye and yellow perch.

5.2.3. Ramsey Lake Dam No. 7 (Chapleau MNRF District)

This dam is one of two located on Ramsey Lake in McPhail Township (47.1894N, 82.1861W). It's main purpose is flood control. Ramsey Lake is the largest of the Upper Spanish lakes with a drainage area of approximately 989.38 km^2 (382 mi^2) and a surface area of approximately 62 km^2 (24 mi^2). The lake is used as a reservoir.

The dam was originally constructed in the early 1900's and reconstructed in 1928. It is a 452 ft long concrete gravity structure with a single sluiceway containing up to 12 removable stop logs. The sill elevation is 1327.0 ft geodetic (404.47 m).

The lake level is presently maintained using the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Under normal conditions elevation varies from 7.5 to 16 ft (2.29 – 4.88 m) above sill, although this has been restricted to 15 ft (4.57 m) pending dam upgrades. Under normal conditions Ramsey Lake will remain at full supply level from the end of May until the end of July. Drawdown begins in August and is discontinued by the end of January.

Ramsey Lake is part of the Mississagi River Provincial Park and additions, and is included as part of the Mississagi to Aubrey Falls Canoe Route. Development on the lake is limited, with access provided by air or resource road, but fishing pressure is heavy. Species include northern pike, walleye, white sucker and yellow perch.

5.2.4. Ramsey Lake Dam No. 8 (Chapleau MNRF District)

This is the main control dam on Ramsey Lake in McPhail Township (47.1840N, 82.1682W) and is operated under MNRF License of Occupation #8802. Ramsey Lake is the largest of the Upper Spanish lakes with a drainage area of approximately 989.38 km^2 (382 mi^2) and a surface area of approximately 62 km^2 (24 mi^2). The lake is used as a reservoir. The dam is located on the southeast side of the lake and discharges flow into Biscotasi Lake.

The original dam construction occurred in the early 1900's and the dam was reconstructed in 1945. It is a combination of earth-rock and a central sluiceway portion of reinforced concrete with buttressing. It has three sluiceways, two sluiceways may contain up to 16 stop logs each, and the remaining sluiceway may contain up to 12 stop logs. The sill elevation is 1327.0 ft. geodetic (404.47 m).

The lake level is presently maintained using the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Under normal conditions elevation varies from 7.5 to 16 ft (2.29 – 4.88 m) above sill, although this has been restricted to 15 ft (4.57 m) pending dam upgrades. Under normal conditions Ramsey Lake will remain at full supply level from the end of May until the end of July. Drawdown begins in August and is discontinued by the end of January.

Ramsey Lake is part of the Mississagi River Provincial Park and additions, and is included as part of the Mississagi to Aubrey Falls Canoe Route. Development on the lake is limited, with access provided by air or resource road, but fishing pressure is heavy. Species include northern pike, walleye, white sucker and yellow perch.

5.2.5. Mozhabong Lake Dam

This dam, operated under MNRF License of Occupation #8802, is located at the north end of Mozhabong Lake in Jasper Township (47.0363N, 82.1387W). Mozhabong Lake flows north into Indian Lake, which flows north into Biscotasi Lake. The drainage area of the lake is approximately 163.17 km^2 (63 mi^2) with a surface area of approximately 23.31 km^2 (9 mi^2). The lake is used as a reservoir.

The dam, originally constructed in the early 1900's and reconstructed in 1945, is a combination of earth-rock fill with an abutting concrete sluiceway containing up to 10 removable stop logs. The sill elevation is 1341.25 ft geodetic (408.81 m).

The lake level maintained using the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Lake level is controlled between 5 and 9 ft (1.52 – 2.74 m) above sill. Under normal conditions Mozhabong Lake will remain at full supply level from the end of May until the end of July. Drawdown begins in August and is discontinued when the lake obtains a level of 5 ft (1.52 m) above the dam sill or September 30th which ever comes first.

Mozhabong Lake has been designated a Conservation Reserve. It currently has restricted access via a gated resource road. Species occurring in the lake include lake trout, whitefish, northern pike, smallmouth bass and yellow perch.

5.2.6. Indian Lake Dam No. 5

This dam, operated under MNRF License of Occupation #8802, is located at the northern outlet of Indian Lake in McPhail Township (47.2126N, 82.1089W). Indian Lake flows north, via the Indian River, into Biscotasi Lake. The drainage area of the lake is approximately 168.35 km^2 (65 mi^2) with a surface area of approximately 14 km^2 (5.5 mi^2). The lake is used as a reservoir.

The dam is a gravity type concrete structure, originally built in 1919 as a timber crib structure, and reconstructed in 1952. It has one sluiceway containing up to 9 removable stop logs. The sill elevation is 1334.26 ft geodetic (406.68 m).

The lake level is presently maintained using the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Control levels vary between 4 and 9 ft (1.22 – 2.74 m) above sill. Under normal conditions Indian Lake will remain at full supply level from the end of May until the end of July. Drawdown begins in August and is discontinued in November.

Development on the lake is minimal, with access via air or resource road. Fish species present include walleye, northern pike, whitefish and yellow perch.

5.2.7. Biscotasi Lake Dam No.1

This is one of three dams on Biscotasi Lake, which is located at the northern end of the west branch of the Spanish River in Lillie Township (47.2947N, 81.9996W). Biscotasi Lake receives water from Ramsey Lake (Chapleau District), Indian Lake, Mozhabong Lake, Canoe (Bardney) Lake, and Frechette Lake. Dam No.1 is the main level controlling dam and works in conjunction with Dam No.2 and Dam No.3, which act as flood control structures. The drainage area of the lake is approximately 567.21 km^2 (219 mi^2) with a surface area of approximately 60 km^2 (23 mi^2). The lake is used as a reservoir, with the control structures covered under MNRF License of Occupation #8802.

Dam No.1 is a concrete gravity structure, originally built in 1917 and upgraded in the 1950's. It was preceded by a timber crib structure that was built in 1887. The dam has two sluiceways, each containing up to 14 removable stop logs. The sill elevation is 1310.08 ft geodetic (399.31 m).

The lake level is presently maintained using the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Level control varies between 7.5 and 16 ft (2.29 – 4.88 m) above sill. Under normal conditions Biscotasi Lake will remain at full supply level from the end of May until the end of September. Drawdown begins in October and is discontinued in February.

Biscotasi Lake has been designated a provincial park and addition area. Passing through it is the Mississagi (Biscotasi) Canoe Loop. The central wetland complex has been identified as being provincially significant.

The small community of Biscotasing, accessible by secondary resource roads, is located beside the lake, which is home to a few tourist outfitters and cottages. Fishing pressure is intensive, with whitefish, walleye and northern pike dominating.

5.2.8. Biscotasi Lake Dam No.2

Dam No.2 is located approximately 200 yards east of Dam No.1 in Lillie Township (47.2943N, 82.0008W). It works in conjunction with Dam No.1 and Dam No.3 to control lake levels and acts primarily as a flood control structure.

The dam was originally constructed using timber cribbing in 1886 and then replaced in 1936 as an earthen dam with a concrete sluiceway containing up to 8 removable stop logs. The sill elevation is 1316.97 ft (401.41 m).

5.2.9. Biscotasi Lake Dam No.3

Dam #3 is located in Biscotasi Township (47.3412N, 81.9942W) on the eastern shore of the Biscotasi Lake. It works in conjunction with Dam No.1 and Dam No.2 to control lake levels. Like Dam #2 it is primarily a flood control structure. When utilized, the spillway flows into the Dead River.

The dam was originally constructed in 1887 as a timber crib structure. It was reconstructed in 1936 as an earthen dam with a concrete sluiceway that contains up to 5 removable stop logs. The sill elevation is 1319.40 ft (402.15 m).

5.2.10. Ministic Lake Dam

This dam, operated under MNRF License of Occupation #1517, is located in Cascaden Township (46.5476N, 81.5678W), at the south end of Ministic Lake. The drainage area is approximately 47 km^2 (18.4 mi^2) and it flows southward into Armstrong Lake. Ministic Lake has a surface area of 6 km^2 (2.2 mi^2).

The original dam was constructed, prior to 1918, by loggers who subsequently sold it to a Vale predecessor company. The current dam is a concrete structure, constructed in 1964, with one sluiceway containing up to 12 removable stop logs. Sill elevation is 1201.0 ft geodetic (366.06 m).

The lake level is presently maintained by following the cumulative rule curve from the 1993 Upper Spanish River Water Management. Level control varies between 4 and 6 ft (1.22 – 1.83 m) above sill. Under normal conditions Ministic Lake will remain at full supply level from the end of May until mid October. Drawdown begins in October and is discontinued in October.

There are approximately 100 cottages on the lake and there is fairly intensive fishing pressure for species that include lake trout, walleye, northern pike, whitefish and perch

5.2.11. Armstrong Lake Dam

This dam, covered under MNRF License of Occupation #1517, is located in Totten Township (46.5349N, 81.5947W) approximately 0.8 km (½ mi) south of Ministic Lake. The drainage area is approximately 19 km^2 (7.5 mi^2), flowing into John's Creek and Lake Agnew. The lake itself has a surface area of 1.5 km^2 (0.6 mi^2).

The original dam was constructed by loggers prior to 1918. The timber crib rock filled structure was reconstructed by Vale in 1964 with one sluiceway containing up to nine removable stop logs. The sill elevation was 1152.11 ft geodetic (351.16 m). The lake level was maintained using the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Control varied between 4 and 7 ft (1.22 – 2.13 m) above sill. Under normal conditions Armstrong Lake would remain at full supply level from the end of May until around October. Drawdown completion was moved up from October 31st to October 15th, commencing in 2013, to accommodate lake trout spawning.

In 2016, the timber crib stoplog structure was replaced with a non-operational concrete overflow dam and wall. A diversion pipe through the dam provides at least 0.13m^3/s minimum flow to the downstream at all times (0.02m^3/s was determined through study to be the minimum ecological flow). The elevations of the overflow wall (1158.00 ft/353m asl in an updated survey) and dam (1158.55 ft/353.13m) were set such that, under normal weather conditions with the diversion pipe flowing, lake water levels should continue to fluctuate within the previously established operational range, but in a more naturalized pattern driven by weather conditions. The design also incorporates updated dam safety features to accommodate high flows during extreme weather events.

There are approximately 25 cottages on the lake, whose resident fish species include whitefish, smallmouth bass, yellow perch and walleye. Lake trout stocking has occurred, although it is unknown if the species was originally present.

5.2.12. Big Eddy Dam and Generating Plant

Big Eddy Dam

The Big Eddy dam is located at the eastern outlet of Agnew Lake in Hyman Township (46.3851N, 81.5789W, Concession No. 02, Lot No. 02) and is operated under MNRF Waterpower Lease Agreement #162. In 1920, the dam was built and Agnew Lake created as the head pond for the Big Eddy powerhouse, which was built in 1924-1928. Agnew Lake has a surface area of 2285.41 km^2 (882.4 mi^2).

Currently, the dam is a concrete gravity type structure. It is 353.57 m (1,160 ft) in length and 44.50 m (146 ft) high. The spillway consists of 2 Bridgestone rubber dams each 22.86 m (75 ft) in length and 3.05 m (10 ft) in diameter. There are also two Obermeyer dams, each 30.48m (100 ft) in length and 3.05 m (10 ft) high. The spillway capacity is presently 1203.47 m^3/s (42,500 cfs).

The headwater elevation is 261.98 m (859.50 ft); the tailrace water elevation is 231.65 m (760.00 ft), giving a gross head of 30.33 m (99.50 ft).

The intake structure consists of a gatehouse, 6 head gates (2 per penstock) and 3 riveted steel penstocks, which are 3.66 m (12 ft) in diameter and 91.44 m (300 ft) long.

The lake level, throughout the year, is presently maintained by following the cumulative rule curve from the 1993 Upper Spanish River Water Management. Under normal conditions Agnew Lake will remain at full supply level from the end of May until mid November. Drawdown begins in December and ends around April 15.

Big Eddy Generating Plant

The Big Eddy generating plant powerhouse is constructed of concrete steel and brick. It contains 3 generating units, No.6, No.7 and No.8. The following is a description of each unit:

Unit No. 6

Turbine - Vertical Francis 2.1 m (84 in) diameter. Design Head 29m (95 ft), original 187.5 rpm for 25 Hz Generator, Dominion Engineering Works (1927)

Generator - 6736 kW, 189.5 rpm, 38-pole, 13.8 kV. 0.8 P.F., 60 Hz Brushless excitation, GE Canada, Peterborough (1985) Note: Converted from 25 to 60 Hz in 1986

Unit No. 7 and No. 8

Turbine - Vertical Francis 2.5 m (97.5 in) diameter. Design Head 29 m (95 ft), 225 rpm, Sulzer Hydro, Montreal (1995)

Generator - 11600 kVA, 225 rpm, 32-pole, 13.8 kV. 0.9 P.F., 60 HZ Brushless excitation GEC Alsthom, Nancy France (1995) Note: 25 to 60 Hz Conversion Completed April 1996

Plant Output is as follows:	No. 6 Unit: 8,000 kW @ 1300 cfs (36.8 m^3/s)
	No.7 Unit: 10,800 kW @ 1500 cfs (42.5 m^3/s)
	No.8 Unit: 10,800 kW @ 1500 cfs (42.5 m^3/s)
	Total: 29,600 kW @ 4300 cfs (121.8 m^3/s)

High Falls No.1 / No.2 and Big Eddy Dams and Generating Plants

5.2.13. High Falls No.1 Dams and Generating Plant

High Falls No.1 generating plant and dams are located in Hyman Township (46.3798N, 81.5707W, Concession No. 01, Lot No. 01), approximately 1 km (0.6 mi) down stream of the Big Eddy dam and generating plant, and are covered under the same MNRF Waterpower Lease Agreement #162. This facility was constructed in 1905.

The tailrace of the Big Eddy plant is the fore bay of High Falls No.1 and No.2 plants. High Falls No.1 generating plant works in conjunction with High Falls No. 2 plant and the Big Eddy generating plant and is known as a 'cascade system'. High Falls No.1 and No.2 plants will use the water that passes through Big Eddy plant/dam. If the flow from the Big Eddy plant/dam is greater than what High Falls No.1 and No.2 plants can use the water will by-pass the plants via the spill way.

The normal operating limits of the High Falls No.1 and No.2 plants forebay are between 230.96 m (757.74 ft) and 231.72 m (760.24 ft) geodetic. The forebay level for High Falls No.1 and No.2 plants is constantly monitored to ensure the tailrace level at Big Eddy is within operating parameters.

High Falls No.1 Dams and Intake Structure

The High Falls No.1 plant dams and intake structure consist of two dams, one spillway and one intake structure. The two dams and spillway are shared with High Falls No.2 plant.

The East dam is a concrete gravity type water retaining dam 198.12 m (650 ft) long.

The North dam is a concrete gravity type water retaining dam 27.43 m (90 ft) long.

The spillway (West dam) is a concrete 'ogee' type gravity dam 204.22 m (670 ft) long.

The intake structure is adjacent to High Falls No.2 plant and consists of a concrete gravity type dam, a gatehouse of steel and wood construction, four intake gates with screw drives, and four - nine foot diameter steel riveted penstocks – 82.3 m (270 ft) long.

High Falls No.1 Generating Plant

The High Falls No.1 generating plant powerhouse is constructed of concrete steel and brick. The powerhouse contains 4 generating units, No.1, No.2, No.3 and No.4. The following is a description of the units.

Units No. 1 – 4

Turbines – Three (3) – Francis horizontal double runner turbines rated at 4,000 horsepower. I.P. Morris Philadelphia.

Unit No.3 runners replaced with stainless steel Oct. 2002. Peacock Engineering Inc.

Generators – Four (4) - 3,333 kW, horizontal generators, 400 rpm, 4160 Volt, 0.9 P.F., 60 Hz, static excitation, GE Canada. Note: Converted from 25 to 60 Hz in 1965.

Plant Output is as follows:	No.1 Unit: 2,500 kW @ 400 cfs (11.3 m^3/s)
	No.2 Unit: 2,500 kW @ 400 cfs (11.3 m^3/s)
	No.3 Unit: 2,500 kW @ 400 cfs (11.3 m^3/s)
	No.4 Unit 2,500 kW @ 400 cfs (11.3 m^3/s)
	Total: 10,000 kW @ 1,600 cfs (45.3 m^3/s)

5.2.14. High Falls No.2 Dam and Generating Plant

High Falls No.2 generating plant and dam are located in Hyman Township approximately 1 km (0.6 mi) down stream of the Big Eddy dam and generating plant, and are covered under the same MNRF Waterpower Lease Agreement #162. The facility was constructed in 1917.

The tailrace of the Big Eddy plant is the forebay of High Falls No.1 and No.2 plants. High Falls No.2 generating plant works in conjunction with High Falls No.1 plant and the Big Eddy generating plant and is know as a 'cascade system'. High Falls No.1 and No.2 plants will use the water that passes through Big Eddy plant/dam. If the flow from the Big Eddy plant/dam is greater than what High Falls No.1 and No.2 plants can use the water will by-pass the plants via the spill way. The normal operating limits of the High Falls No.1 and No.2 plants fore bay are between 230.96 m (757.74 ft) and 231.72 m (760.24 ft) geodetic. The fore bay level for High Falls No.1 and No.2 plants is constantly monitored to ensure the tailrace level at Big Eddy is within operating parameters.

High Falls No.2 Dam and Intake Structure

The High Falls No.2 plant dam and intake structure consist of two dams, one spillway and one intake structure. The two dams and spillway are shared with High Falls No.1 plant.

The East dam is a concrete gravity type water retaining dam 198.12 m (650 ft) long.

The North dam is a concrete gravity type water retaining dam 27.43 m (90 ft) long.

The spillway (West dam) is a concrete 'ogee' type gravity dam 204.22 m (670 ft) long.

The intake structure is adjacent to High Falls No.1 plant and consists of a concrete gravity type dam, a gatehouse of concrete block and steel, a single intake gate with screw drive, and one - thirteen foot diameter steel riveted penstock – 121.92 m (400 ft) long.

High Falls No.2 Generating Plant

The High Falls No.2 generating plant powerhouse is constructed of concrete steel and brick. The powerhouse contains 1 generating unit, No.5. The following is a description of the unit.

Turbine – One (1) – Vertical Francis type 21 blades, 96.5inch diameter, 171.4 rpm, American Hydro Co., York PA, 1992.

Generators - One (1) - 8,130 kVA, vertical generator, 171.4 rpm, 42 pole, 13,800 Volt, 0.9 P.F., 60 Hz, type IMWD, Brushless excitation, GEC Alsthom, Nancy France. Note: Converted from 25 to 60 Hz in 1993.

Plant Output is as follows: No.5 Unit: 7,900 kW @ 1300 cfs (36.8 m^3/s)

5.2.15. Nairn Falls Dam and Generating Plant

Nairn Falls generating plant and dam are located on the Spanish River in Nairn Township (46.3444N, 81.5733W, Concession No. 05, Lot No. 01), approximately 11.3 km (7 mi) downstream of the High Falls No.1 and No.2 generating plants, and are covered under MNRF Waterpower Lease Agreement #163. The facility was constructed in 1915.

Nairn Falls generating plant works in conjunction with High Falls No.1 and No.2 plants and the Big Eddy generating plant as a 'cascade system'. Nairn Falls will use the water that passes through Big Eddy plant/dam and High Falls No.1 and No.2 generating dams/plants. If the flow from upstream is greater than what Nairn Falls can use the water will by-pass the plant via the spillway.

Nairn Falls Dam and Intake Structure

The Nairn Falls powerhouse's 39.01 m (128 ft) upstream wall acts as a dam complete with intakes structures for three concrete penstocks and spiral casing.

The main spill way is of the concrete gravity type construction. It is 30.48 m (100 ft) long, 10.67 m (35 ft) high and contains seven stop log sluiceways. The sluiceways contain varying numbers of stop logs. No.1 sluiceway may contain up to six stop logs, No. 2 sluiceway may contain up to 7 stop logs, No. 3 through No. 7 sluiceways may contain up to 8 stop logs each.

There is a fixed overflow spillway adjacent to the powerhouse. This spillway is 44.2 m (145 ft) long and 1.5 m (5 ft) high. A 0.6 m (2 ft) inflatable rubber dam was installed on this spillway in 1995. The normal operating limits of the Nairn Falls plant forebay are between 205.40 m (673.90 ft) and 206.01 (675.90 ft) geodetic.

Nairn Falls Generating Plant

The Nairn Falls generating plant powerhouse is of the concrete, steel, brick and block type construction. The powerhouse contains 3 generating units, No.1, No.2 and No.3. The following is a description of the units.

Units No.1 and No.2

Turbines – Two (2) – Vertical Francis turbines rated at 2,000 horsepower. Allis Chalmers (1915).

Generators – Two (2) – 1,500kVA, 100 rpm, 2200 Volt, 0.9 P.F., 60 Hz, static excitation,

Unit No.3

Turbine – One (1) – Vertical Francis turbine rated at 2,500 horsepower, Allis Chalmers (1924).

Generator – One (1) – 1,875 kVA, 100 rpm, 2,200 Volt, 0.8 P.F., 60 Hz, static excitation, GE Canada.

Plant Output is as follows:	No.1 Unit: 1,500 kW @ 900 cfs (25.5 m^3/s)
	No.2 Unit: 1,500 kW @ 900 cfs (25.5 m^3/s)
	No.3 Unit: 1,750 kW @ 900 cfs (25.5 m^3/s)
	Total: 4,750 kW @ 2,700 cfs (76.5 m^3/s)

5.2.16. Whitson Lake Dam

The purpose of the Whitson Lake Dam is water level control, primarily to accommodate the taking of process water for Vale's Stobie Mine Complex and to help alleviate flood concerns in the area. The dam is not operated for waterpower purposes. It is located at 502274E 5158081N in Blezard Township and is operated under MNRF License of Occupation No. 6567 (July 16, 1948) and Ministry of Environment and Climate Change Permit to Take Water 0107-8UBPJU (May 18, 2012). The lake itself is 473.4 ha, with a contributing watershed area of 34.5 km^2.

The original masonry dam, constructed in 1914, was replaced in 1968 by a concrete gravity-type structure. It is approximately 33.5m in length with a 1.42m wide sluiceway containing up to 5 stoplogs. A 10.16 x 10.16 cm notch was incorporated in the sill of the sluiceway to provide ongoing minimal flow, beneath the stoplogs, to Whitson Creek. The elevation at the sill of the sluiceway is at elevation 289.79m and, at the top of the dam, 290.70m geodetic.

Whitson Lake lies within the boundaries of the City of Greater Sudbury, near the community of Valley East. Kalmo Beach Park, operated by the City of Greater Sudbury, is located a short distance away from the dam, along with a public boat launch. There are approximately 40 permanent residences and 21 seasonal residences on the lake. Fish species include northern pike, walleye, white sucker and yellow perch. The MNRF has historically stocked Whitson Lake with walleye.

Hydrology studies conducted in 2013 determined that the dam could achieve its purpose with 2 stoplogs left in place year round, thus becoming more of a weir structure with a naturalized flow regime. This study was shared with MNRF, CGS and CS and the new regime was subsequently adopted. The structure is not further discussed in the WMP.

5.2.17 Wabagishik Dam and Generating Plant

The Wabagishik (also know as Lorne Falls) generating plant and dam are located in Lorne Township (46.3156N, 81.5212W, Concession No. 03, Lot No. 08),on the Vermilion River, near the outlet of Ella Lake. The facility was constructed in 1909 and is covered under MNRF Waterpower Lease Agreement #164.

The Wabagishik generating plant is a 'run of the river facility'; this meaning that there is very little storage capacity in the forebay area. The normal operating limits of the Wabagishik plant forebay are between 225.40 m (739.50 ft) and 225.73 m (740.60 ft) geodetic.

Wabagishik Dam and Intake Structure

The dam is a concrete gravity type structure 220.98 m (725 ft) in length. The spillway consists of a single motorized gate, which is 12.19 m (40 ft) in length and 7.31 m (24 ft) in height. There are also 4 stop log sluiceways, which may contain up to 10 stop logs each.

The intake structure consists of 2 motorized head gates (1 per penstock) and 2 riveted steel penstocks, which are 2.44 m (8 ft) in diameter and 128.01 m (420 ft) in length.

Wabagishik Generating Plant

The Wabagishik generating plant powerhouse is a concrete structure, with cast concrete walls and steel roof structure. The powerhouse contains 2 generating units:

Unit No.1

Turbine – One (1) – Double runner horizontal Francis turbine rated at 2,600 horsepower, 300 rpm, originally Allis Chalmers (1909), replaced in 1938 by cast SS runners supplied by Barber Turbine, Port Colborne.

Generator – One (1_– 2,000kW, 24 pole, 300 rpm, 2200 Volt, 0.8 P.F., 60 Hz, Allis Chalmers Bullock, Montreal (1909). Static excitation by Canadian General Electric (1978).

Unit No.2

Turbine – One (1) – Double runner horizontal Francis turbine rated at 3,000 horsepower, 360 rpm, originally Morgan Smith replaced in 1985 by a steel fabricated runners supplied by McKay Hydro Power.

Generator – One (1) – 2675 kVA, 20 pole, 360 rpm, 2,200 Volt, 0.8 P.F., 60 Hz, Canadian Electric synchronous generator. Static excitation by Canadian General Electric (1978).

Plant Output is as follows:	No.1 Unit: 2,000 kW @ 500 cfs (11.3 m^3/s)
	No.2 Unit: 2,000 kW @ 500 cfs (11.3 m^3/s)
	Total: 4,000 kW @ 1,000 cfs (28.3 m^3/s)

5.3. Domtar Facilities

5.3.1. Pogamasing Lake Dam

The dam, operated under MNRF Licence of Occupation No. 9112, is located in Morse Township (North 46^{o} 57' 57", West 81^{o} 49' 3"), at the eastern outlet of Pogamasing Lake. Pogamasing Lake is approximately 20.72 km^2 (8 mi^2) in size with a watershed drainage area of 225.33 km^2 (87 mi^2). The lake is used as a reservoir. Pogamasing Lake drains into the Spanish River.

Pogamasing Lake dam was constructed, in 1925, of reinforced concrete. It has two log sluiceways which may contain up to twelve 15 ft (4.57 m) wide stop logs in one sluiceway and up to six 8 ft (2.44 m) wide stop logs in the other sluiceway.

The lake level, throughout the year, is maintained by following the cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. Generally under normal conditions, Pogamasing Lake will remain at full supply level of 1206 ft (367.6 m asl) from the end of May until Labour Day in September. Drawdown begins in September after Labour Day and discontinues when the lake obtains a level of 1204 ft (367 m asl), or September 30th which ever occurs first.

Pogamasing Lake is located within the confines of Spanish River Provincial Park. There are about 20 cottages and one tourist lodge on the lake. Sport fish include lake trout, walleye and smallmouth bass.

5.3.2. Sinaminda Lake Dam

This dam, operated under MNRF Licence of Occupation No. 6428, is located in Gilbert Township (North 46º 50' 26", West 81º 56' 26"), at the southern outlet of Sinaminda Lake. Sinaminda Lake is approximately 18.13 km^2 (7 mi^2) in size with a watershed drainage area of 189.07 km^2 (73 mi^2). The lake is used as a reservoir. Sinaminda Lake drains into the Agnes River and then into the Spanish River.

The dam was originally built in 1916 and reconstructed in 1948 as a timber crib structure. It is approximately 10 ft (3 m) high and 230 ft (70 m) long. The dam incorporates two 17 ft (5.18 m) wide stop-log sluiceways, both of which are currently not operated, which historically contained up to 10 stop logs in one sluiceway and up to 6 stop logs in the other sluice way.

The lake level, throughout the year, is currently maintained by natural flow regime, as the dam is not operational. Generally, Sinaminda Lake will be at full supply level of 1365 ft (416.1 m asl) at the end of May. The lake level gradually subsides until the end of August, at which time the lake is typically at an elevation of 1364 ft (415.1 m asl). The lake level naturally rises again in the fall, depending on the extent of fall rains. No winter target is set for this lake, due to its natural flow operation.

Sinaminda Lake is accessible by air or resource roads. Its fish species include lake trout and northern pike.

5.3.3. Onaping Lake – Bannerman Dam

This dam, operated under MNRF Licence of Occupation No. 9839, is located in Ulster Township (North 46º 51' 1", West 81º 35' 29"), at the southwest outlet of Onaping Lake. Onaping Lake is approximately 62.16 km^2 (24 mi^2) in size with a watershed drainage area of 1015.28 km^2 (392 mi^2). The lake is used as a reservoir. The drainage route through Bannerman dam is into Bannerman (Moncrieff) Creek and then into the Spanish River.

Bannerman dam was originally constructed circa 1917, rebuilt in 1946 as a concrete dam, and again in 1999 of reinforced concrete. It is has a single log sluiceway, which may contain up to 16 stop logs (7 doubles, 2 singles). The dam also has an east and west weir. The east weir is 14.63 m (48 ft) in length; the west weir is 10.36 m (34 ft) in length.

The lake level, throughout the year, is presently maintained by following a modified cumulative rule curve from the 1993 Upper Spanish River Water Management Plan. The lake level is regulated using both the Bannerman dam and the Onaping dam. Due to flooding concerns in the Vermilion River system the Bannerman Dam is used preferentially to divert water away from the Vermilion system. Generally under normal conditions, Onaping Lake will remain at full supply level (1306.5 to 1307 ft (398.2-398.4m asl) from Victoria Day weekend in May until Labour Day. Drawdown begins in September after Labour Day and discontinues when the lake obtains a level of 1304 ft (397.5 m asl) at Bannerman dam, or October 15th which ever occurs first.

Onaping Lake contains the Onaping Lake Conservation Reserve and the southern portion of the lake is part of an established canoe route to the Onaping River. There are over 200 cottages, along with a tourist lodge and marina. Fishing pressure is high, with the lake supporting species which include lake trout, walleye, whitefish, northern pike and perch.

5.3.4. Onaping Lake – Onaping Dam

This dam, operating under MNRF Licence of Occupation No. 9839, is located in Emo Township (North 46° 55' 1", West 81° 27' 36"), at the southeast outlet of Onaping Lake. Onaping Lake is approximately 62.16 km^2 (24 mi^2) in size with a watershed drainage area of 1015.28 km^2 (392 mi^2). The lake is used as a reservoir. The drainage route through Onaping dam is into the Onaping River and then into the Vermilion River.

Onaping dam was originally constructed in 1917, and replaced by a new upstream reinforced concrete dam in 1946. It has three log sluiceways. Two are 10 ft (3.05 m) wide and may contain up to 13 stop logs each. The third sluiceway is 16 ft (4.88 m) wide and may contain up to 7 stop logs.

The lake level, throughout the year, is presently maintained by following a modified cumulative rule curve from the 1993 Upper Spanish River Water Management. The lake level is regulated using both the Bannerman dam and the Onaping dam. Due to flooding concerns in the Vermilion River system the Bannerman Dam is used preferentially to divert water away from the Vermilion system. Generally under normal conditions Onaping Lake will remain at full supply level of 1306.5 to 1307 ft (398.2-398.4m asl) from Victoria Day weekend in May until Labour Day. Drawdown begins in September after Labour Day and discontinues when the lake obtains a level of 1304 ft (397.5 m asl) at Bannerman dam, or October 15th which ever occurs first.

Onaping Lake contains the Onaping Lake Conservation Reserve and the southern portion of the lake is part of an established canoe route to the Onaping River. There are over 200 cottages, along with a tourist lodge and marina. Fishing pressure is high, with the lake supporting species that include lake trout, walleye, whitefish, northern pike and perch.

5.3.5. Stobie Dam

The dam, operated under MNRF Licence of Occupation No. 9122, is located in Creighton Township (North 46º 32' 6", West 81º 16' 56") on the Vermilion River approximately three 3 km downstream from the eastern outlet of Vermilion Lake. Vermilion Lake is approximately 11 km^2 (4 mi^2) in size with a watershed drainage area of 2850 km^2 (1100 mi^2). The lake is no longer used as a reservoir – level is maintained for local users. The lake is a widening of the Vermilion River.

Stobie dam was originally constructed in 1925, and was rebuilt in 1997 of reinforced concrete. It has five sluiceways. Four sluiceways are 14 ft (4.27 m) wide and may contain up to 14 stop logs (7 doubles) each. The fifth sluiceway is 8 ft (2.44 m) wide and does not have any stop logs in it; this sluiceway provides a continuous flow. The dam also has an east and west weir. The east weir is 64 ft. (19.5 m) in length and the west weir is 190 ft (57.91 m) in length.

The target elevation for the dam is a year-round elevation 841.5 ft (256.49 m) asl.

Due to the large weirs associated with this dam, the operational portion requires infrequent changes. In years of exceptional spring run off the dam may need to be opened. Opening of the dam must be done in communication with Conservation Sudbury to minimize flooding of downstream landowners.

Vermilion Lake is part of an established canoe route on the Vermilion River. This area is within the Greater City of Sudbury and is readily accessible by municipal roads. The lake has several cottages, a couple of campgrounds, and a growing number of year-round residents. Walleye, perch and northern pike are some of the fish species present.

5.3.6. Espanola Dams and Generating Plant

The Espanola generating station, operating under MNRF Licence of Occupation No. 7184 and Crown Licence No. 3518, is located in Merritt Township in the Town of Espanola, supplied by the waters of both the Spanish and Vermilion River systems. This dam was originally used for power generation and pulp grinding. It is presently used for power generation, which provides up to 30% of the power required to operate the Domtar Pulp and Paper Mill. The drainage area of this dam is 11,543 km^2 and it produces 16 MW of power with an annual power output of 116 GW hours. Two working hydro generators are located within the plant, numbers 5 and 9. The combined MW plant capacity is 16 MW. The Domtar Espanola hydrogeneration plant is a "run of river" facility; this meaning that there is very little storage capacity in the forebay area.

No. 5 Unit (built 1945)
8MW @ 1650 cfs/ 47 cms
Turbine: Vertical Francis Type Hydro Turbine. Design Head 64 ft (19.5 m), 144 rpm.
Manufacturer: Allis Chalmers.
Generator: Westinghouse, 4.16 kV, 144 rpm.

No. 9 Generator (built 1993)
8.4MW @1712 cfs / 48.5 cms
Turbine: Kaplan S type turbine with stainless steel propeller. Net Head 62 ft (18.9 m), 240 rpm.
Manufacturer: Voith.
Generator: 8 MW @ 0.85 pf and 9.412 MVA @ 394 amps.

1a) Espanola Main Dam
The Dam is a reinforced concrete stop log dam and railroad bridge, located at North 46° 16.276, West 81° 46.186. It has nine control gates. The head of the dam is 64 ft (19.2 m) in height. Water not required for hydro generation passes over this dam.

1b) Espanola Power Canal Dam
This dam is located next to the Domtar Mill (North 46º 16.238, West 81º 46.093) and is used to drain the power canal. The dam is a reinforced concrete with four control gates that have a sill level of 627.92 ft (188.4 m) and a maximum water level elevation of 649 ft (194.7 m). This dam is typically left wide open for power generation, and is only closed for maintenance in the power canal. Large steel gates are lifted into the openings to close up the dam.

1c) Espanola Forebay Dam
The Espanola forebay dam (North 46º 16.185, West 81º 46.186) is located about 300 ft (91.5 m) downstream of the Espanola Main River Dam. A reinforced concrete structure, it has two gates that operate at a sill level of 627 ft (188.1 m), with a maximum water elevation of 194.7 m (649 feet).

The dam is located in the Town of Espanola. There are cottage and residential properties located within short distances on both the upstream and downstream sides. The Lower Spanish River contains a large variety of fish species, including northern pike, smallmouth bass, perch, walleye, muskellunge and lake sturgeon. Lake sturgeon, both adults and juveniles, have recently been confirmed upstream between Nairn and Espanola. Muskellunge have been re-introduced to the Lower Spanish over the last decade and are becoming established.

5.4. MNRF Facilities

5.4.1. Three Corner Lake Dam

Three Corner Lake Dam is situated in the northeastern corner of the watershed, in the township of Vrooman. The dam is located at the northwest end of Lower Three Corner Lake where it flows into the East Sand River, which then flows into the Upper Spanish River's East Branch. The structure, located near the height of land on the Spanish River, controls the water levels on Three Corner Lake and Lower Three Corner Lake.

The dam controls the water levels for water storage, recreational use and the propagation of fish and wildlife. The dam controls a total drainage area of approximately 232.0 km^2 and impounds Three Corner Lake which has a surface area of approximately 12.5 km^2. (DSA Report)

Average flow at the dam is 3.8 m^3/s.

The lake is accessible by air or by resource roads from Highways 144 and 560 (to Shining Tree). Sportfish include lake trout, whitefish, northern pike, smallmouth bass, walleye and perch.

5.4.2. Windy Lake Dam

The Windy Lake Dam is used for water level regulation and is located in Dowling Township. The dam is located on the southeast arm of Windy Lake, at the head of a former rapid, which provided natural control of lake water levels. The Windy Lake watershed, at the site of the dam, drains 78.07 km^2 of land and the watershed is ungauged (Dam Inspection Report March 1999).

Watershed discharge is in a southeast direction and occurs through a network of channels controlled by bedrock. The dam discharges into Windy Creek, which discharges into the Onaping River near Dowling.

The dam contains a rounded concrete Ogee spillway. The operating range for the dam is approximately 0.5 m with the lake drawn down in the winter to address flooding concerns in the spring.

Windy Lake is home to approximately 200 permanent residences, 90 seasonal residences, two commercial tourist operators and the Windy Lake Provincial Park. The lake is a coldwater fishery containing lake trout, as well as whitefish, northern pike, smallmouth bass, walleye and perch. The mean annual peak flow out of Windy Lake is 9.5 m^3/s.

5.4.3. Whitewater Lake (Jutras) Dam

The purpose of the Whitewater Lake Dam is for recreational water level regulation. The dam is situated on Levey Creek in Creighton Township. Levey Creek drains into Emma Lake and the Vermilion River. The surface area of the lake is 9.35 km^2 with a drainage area of 101 km^2 (DSA Report 2001).

The dam is a reinforced concrete structure. It has two log sluiceways which may contain up to 7 stop logs each. The sluiceways are 8.534 m in width. The dam height is 3.96 m with a maximum head of 2.743 m and a total dam length of 24.384 m. The current operating target range for the dam is from 265.17 m to 265.48 m, with a maximum upper level limit of 265.80 m. The sill elevation of the dam is 263 m.

The fall drawdown of the lake begins in November with the removal of 1 log from each of the stop log bays. Four logs are pulled in early spring in preparation for the spring freshet. The summer level of Whitewater Lake was established through public consultation prior to the dam's construction in 1971.

The lake is adjacent to the town of Azilda in the City of Greater Sudbury, with numerous lakefront properties located on the north shore. Some of the fish species present include northern pike, smallmouth bass, walleye and perch.

5.5. Conservation Sudbury Facilities

5.5.1. Maley Dam

This dam is located on the East Branch of Junction Creek (Easting 505942 Northing 5154203) north of Maley Drive in Garson Township. The dam controls a drainage area of approximately 18 km^2. It is an actual flood control dam whose purpose is to protect developed areas downstream within the City of Sudbury.

The 242 m long dam, built in 1971, is an earth fill type with a core of impervious clay. It has a 1.5 m by 1.5 m main gate concrete sluiceway and 36 cm overflow discharge conduit built into the structure. There are four bays of wooden flashboards in the spillway (elevation 270.4 m). These boards are designed to fail under high water flood conditions. The conduit (invert 266.1 m) is utilized, under normal conditions, to maintain the conservation elevation of 268.4 m in the summer/fall. The main gate (invert 266.1 m) is utilized during larger precipitation events.

In mid-October, the reservoir level is drawn down to 266.1 m, with the conduit and gate opened for the winter months to prevent freeze up. During spring runoff, the gate is set at 1 m open and altered only if the water elevation rises above 270.4 m, which is the elevation of the spillway. Once spring freshet is completed, the conservation level is resumed.

5.5.2. Nickeldale Dam

This dam is located on the West Branch of Junction Creek (Easting 501768 Northing 5152472), in McKim Township, north of Lasalle Blvd. and the City of Sudbury municipal cemetery. This flood dam controls a drainage area of approximately 4.5 km^2, protecting downstream urban areas.

The earth fill dam is 381 m long and 9 m high, with a core of impervious clay, protected by a layer of rock fill. The main discharge pipe (1.2 m in diameter) and the overflow discharge conduit (0.36 m) are located in the centre of the concrete overflow weir/spillway.

5.5.3. Lake Laurentian Dam

This dam is located in McKim Township (Easting 504027 Northing 5144410), at the outlet of Lake Laurentian in the City of Sudbury. It drains into the South Bay of Ramsey Lake, controlling a drainage area of approximately 14 km^2 for both flood control and recreational purposes.

The structure, originally built in the late 1950's and rehabilitated in 1982, is a wing-walled concrete box culvert in combination with an earthen dam. Six 4-inch logs are utilized to control the lake level. The sill is at an elevation of 265.89 m and the top of the dam at 266.56 m.

One log is removed in mid-October. A second log may be removed in November if precipitation is heavy. A third log is removed at the onset of spring freshet. Once freshet has peaked, logs are installed as required to restore normal summer levels. Under high flow conditions, excess water may be handled by the concrete overflow weir/spillway.

Laurentian Lake is a part of the CS's Laurentian Lake Conservation Area, a recreational and educational facility. Fish species present in the shallow man-made lake include northern pike and yellow perch.

5.5.4. Nepahwin Dam

The dam is located at the outlet of Nepahwin Lake in McKim Township (Easting 499900 Northing 5144835) and drains into Lily Creek in the City of Sudbury. The purpose of the dam is flood control and to maintain water levels for recreational purposes.

The structure was built in the mid 1960's and rehabilitated in 1996. It is 11.2 m long, with three concrete bays, each approximately 0.91 m (3 ft) wide, and three 0.10 m (4 in) stop logs in each bay. The logs are never removed.

Nepahwin Lake is located within the City of Sudbury and has in excess of 250 residences on its shores. Fish species include northern pike, smallmouth bass, yellow perch, splake, lake trout and rainbow trout. The urban lake is routinely stocked by MNRF.

5.6. City of Greater Sudbury Facilities

5.6.1. Ramsey Lake Dam (Sudbury District)

The dam is located in McKim Township at the outlet of Ramsey Lake, near Science North in downtown Sudbury. Ramsey Lake has a drainage area of 12.7 km^2. The dam supports a number of purposes, including flood control, recreation, and municipal water supply via the David Street Water Treatment Plant.

The dam's latest construction was in 1972, consisting of reinforced concrete box culvert with wing walls. There are 2 sluiceways containing seven stop logs (0.2m height) each.

The operating parameters of the dam are to control the level of Ramsey Lake within the parameters of the Ministry of Environment and Climate Change Permit to Take Water. The normal operating range on the lake is between 248.70 m) and 249.56 m). Water consumption advisories are implemented if water levels drop below 248.70 m, with water bans following at levels below 248.56 m.

There are over 400 residences on this urban lake, which is also a poular destination for day-use boating and fishing. The south bay of the lake abuts the Laurentian Conservation Area. Fish species include whitefish, walleye, northern pike, smallmouth bass and yellow perch.

6.0 IDENTIFICATION OF ISSUES, RESOURCE VALUES AND INTERESTS

The identification of issues, resource values and interests that could be impacted by water management practices was achieved through extensive consultation with the public, First Nations communities, as well as the expertise provided by a diverse group of participants (plan proponents, MNRF, EC, other government agencies) in the planning process. The information collected from various individuals and groups was intended to identifiy the need for and drive the creation of water management options that would best balance the interests of various stakeholders.

6.1. General Statements, Issues and Concerns of Plan Participants

6.1.1. Vale

- Vale wants to continue to minimize the potential of spring flooding, and protect structural assets, by using the winter drawdown of Agnew Lake to assist in the control of spring runoff;
- Vale wants to ensure that there is no economic loss as a result of changes to the existing water management plan;
- Vale wants to promote better communications and relationships with other stakeholders within the Spanish and Vermilion watersheds; and
- Vale wants to maintain hydropower generation to assist the Ontario government in its green power efforts to curtail coal fire generation in the province.

6.1.2. Domtar

- Domtar would like a flexible management plan that enables full utilization of the power generation opportunities without incurring any economic loss;
- Domtar wants to continue to have the ability to store water for flood mitigation, recreational opportunites and power generation;
- Domtar wants to ensure adequate dissolved oxygen levels for the health of the aquatic ecosystem of the Spanish River below the Espanola dam; and
- The province of Ontario and Domtar derive great benefit from the green power generated at the Espanola facility.

6.1.3. MNRF

- The MNRF role is to ensure the protection and preservation of the waters of lakes and rivers and to protect the public right to use water, as well as the interests of riparian owners;
- MNRF manages fish and wildlife populations, natural heritage and biological features;
- MNRF ensures that threatened or endangered species will not be put at further risk due to the methods of water management employed;
- MNRF wishes to maximize recreational opportunities through the integrated management of water and resource values; and
- MNRF will ensure that the Aquatic Ecosystem Guidelines are considered to address specific impacts of water management on the watershed.

6.1.4. Ontario Parks (MNRF)

- The Spanish River Valley Signature Site encompasses both the Biscotasi Provincial Park and the Spanish River Waterway Park. The management of water levels and flows that preserve or enhance the natural ecological attributes with the area will be a priority to Ontario Parks. Specific issues include:
    - Lake level requirements on Biscotasi Lake for recreational navigation;
    - Water level requirements to maintain healthy wetlands on Biscotasi Lake and the fish and wildlife dependent upon them;

- Recreational flow requirements for paddlers from Biscotasi Lake downstream to Agnew Lake;
- The effects of regulated flows from Onaping Lake on the Bannerman Creek Nature Reserve;
- Consideration of the effects of water levels and flows on identified Species at Risk in the signature site (ie. bald eagle, lake sturgeon); and
- General maintenance of aquatic ecosystem health through the implementation of adequate flows.

6.1.5. CS

- CS wishes to mitigate flooding within its jurisdictional area.

6.1.6. CGS

- CGS wishes to ensure that the new water management plan is in compliance with the municipal and official planning processes;
- CGS has an interest in ensuring that public property in riparian zones is not lost, resulting in a reduction in the tax-assessed values of such properties;
- CGS wants to ensure that wastewater treatment facilities located on the Onaping River, in Dowling/Levack, comply with MOECC conditions on their Certificate of Approval.

6.1.7. Sagamok Anishnawbek First Nation

- Sagamok Anishnawbek has an interest in ensuring that management of the Spanish and Vermilion waters does not infringe upon any Aboriginal or treaty rights and considers much of the Spanish River watershed its traditional territory;
- The Sagamok Anishnawbek community is located on the south shore of the Spanish River. As a result, changes to the water levels and flows of the Spanish River may directly impact community members; and
- Water is a commodity within the very heart of Sagamok Anishnawbek; essential to the community's well-being. The detriment of this commodity threatens the existence of any culture. The protection of water is crucial.

6.1.8. Atikameksheng Anishnawbek First Nation (AAFN)

- AAFN has an interest in ensuring that the management of the Spanish and Vermilion waters does not infringe upon any Aboriginal or treaty rights.
- The AAFN community is located along the shore of the lower Vermilion River. As a result, changes to the water levels and flows of the Vermilion River may direcly impact community members.

6.1.9. Wikwemikong Unceded Indian Reserve

- Wikwemikong Unceded Indian Reserve has an interest in ensuring that the management of the Spanish and Vermilion waters does not infringe upon any Aboriginal or treaty rights.

6.1.10. Aundeck Omni Kaning First Nation

- Aundeck Omni Kaning First Nation has an interest in ensuring that the management of the Spanish and Vermilion waters does not infringe upon any Aboriginal or treaty rights.

6.1.11. Public Advisory Committee

General Recommendations:

- That Vale and Domtar use due diligence to inform the public affected by levels and flows of the Spanish and Vermilion water systems of any substantial changes in levels;
- That Vale and Domtar establish contact through telephone and notices with representatives of the respective communities affected by the water levels and flows of these water systems;
- That Vale and Domtar continue to work cooperatively with interest groups, local residents and members of the public;
- That Vale and Domtar exercise control over water levels to minimize impacts on fisheries and recreation;
- Rule curves need to be re-assessed and altered to reflect concerns of other users;
- Where required, alterations should be made to dam structures so that desired water levels can be achieved;
- Industry and MNRF representatives should be available to inspect damage to property and to discuss remediation with landholders;
- A local individual/association should be trained and authorized to open dams on small and remote lakes when conditions warrant action;
- Fisheries, especially the lake trout fishery, should be given a higher priority than it currently has. An MNRF fish biologist should be assigned and available to address local concerns in this regard; and
- A monitoring system should be put into place in areas that are not currently monitored on a scheduled basis. This could be achieved by having someone who lives or spends a lot of time in the area, phone in water levels or concerns on a weekly basis.

Specific Recommendations for Agnew Lake

- That Vale control the water level on Agnew Lake to minimize impacts on fisheries, recreation and potable water, maintaining minimum levels between March 15th to April 15th at or above 849 ft. geodetic and at the 859 ft. geodetic level between May 1st to November 15th.
- Maximum water level of 859 ft. should not fluctuate more than 0.5 ft. between May 1st and November 15th.
- That Vale establish contact persons at Sand Bay, Espanola Bay and Webbwood areas to inform residents of expected levels of runoff by March 1st of the current year; and
- The minimum level of Agnew Lake not to exceed an elevation of 849 ft. geodetic.

Specific Recommendations for the Vermilion River

- Erosion of property is a concern of residents on the Vermilion watershed. In order to build retaining walls to protect property, the MNRF should issue work permits in a timely fashion.

Specific Recommendations for Onaping Lake

- That Domtar exercise control over water levels on Onaping Lake to minimize the impact on fisheries, erosion, property damage and recreation, by maintaining the water levels between May 1st and September 1st at 1306 ft. geodetic and between September 1st and April 31st at a minimum of 1304 ft.;
- That Domtar begin drawdown no earlier than September 1st and end drawdown at 1304 ft. or on October 31st, whichever comes first;

- That Domtar establish a contact person at Onaping Lake to inform residents of expected levels of runoff by March 1st of the current year and to also inform residents of any change in status of the dams throughout the year;
- That Domtar continue to maintain the Onaping Dam in a condition suitable for controlling water levels;
- That Domtar utilize the Onaping Dam in conjunction with the Bannerman Dam to control water levels during periods of high runoff and high water levels; and
- That Domtar, in conjunction with MNRF, design and install a device on the Bannerman and Onaping Dams that will prevent fish from getting past the dams.

Specific Recommendations for Pogamasing Lake

- A maximum level of 6’6” in spring and summer with a minimum of 5’3” in the fall and winter;
- Lake trout studies to assess and investigate ways to enhance their population and/or determine causes of mortality; and
- A system developed so that Domtar receives weekly updates on water levels during the spring, summer and fall.

6.2. Watershed Uses and Issues Identified During Scoping Phase Consultations

A 12 member Public Advisory Committee (PAC) was established in August, 2003 to represent the broad spectrum of interests associated with water level and flow management on the Spanish & Vermilion river system. The PAC’s principle duties were to assist in carrying out public consultation and to provide advice and comment on the content of the WMP.

The purpose of the initial scoping phase consultations was to raise awareness of the water management planning process and to solicit information on uses of the watershed and related issues. Steering Committee, Planning Team, and PAC members were available for discussion. Advertising for scoping phase open houses included newspaper notices, a mail out, flyers, and posters. In addition to receiving invitations to all public open houses, offers were made by the Steering Committee to conduct information sessions at any interested First Nation community.

6.2.1. Public Uses of the Watershed

Scoping Phase Open Houses were held in May 2004. A total of 51 people attended the following sessions:

Chapleau (May 10, 2004) - 4
Gogama (May 11, 2004) - 4
Espanola (May 12th, 2004) - 20
Chelmsford (May 13th, 2004) - 23

A record of public consultation, including the questionnaires utilized, can be found in Appendix B.

A total of forty-eight questionnaires were submitted by the public in response to the scoping phase open houses. The first section of the questionnaire related to uses of the watershed, including the identification of specific waterbodies utilized. A summary of responses, outlining specific waterbodies and identified uses, is presented in Table 6.2.1.1 and 6.2.1.2.

MNRF also held open houses in conjunction with the Spanish River Signature Site Strategy in 2002/2003. These were held to review the 1993 Spanish River Watershed WMP and determine if there were any issues with the water management strategy the plan proposed.

Table 6.2.1.1: Scoping Phase Open House questionnaire responses regarding uses of waterbodies whose levels are influenced by Vale waterpower facilities.

Number of Questionnaires Received and Responses Regarding Use	Lake/Reservoir						
	Ramsey (Chapleau)	Mozhabong	Indian	Biscotasi	Ministic	Armstrong	Agnew
# of Questionnaires Received	1	1	1	8	1	8	25
Permanent Residence				4		1	16
Overnight Camping				1			2
Seasonal Residence	1		1	3	1	2	3
All Year Camp or Cottage		1		1		2	2
Open Water Angling	1	1	1	9	1	5	21
Ice Fishing	1	1		6		4	11
Hunting	1	1	1	9		5	15
Trapping							1
Motorboating	1	1	1	9	1	5	23
Sailboating							
Paddling			1	6		5	9
Jet Skis							1
Swimming	1		1	7		3	18
Snowmobiling	1	1		6		2	14
Skiing				1		2	3
Snowshoeing				4		2	3
ATV/Bikes		1		4		2	16
Business Operator – Outfitter			1	3			
Business Operator – Guide							1
Business Operator – Lodge				1			2
Business Operator – Other				1		1	
Drinking Water (Well, Point, Water Line)	1	1	1	6	1	3	19
Wilderness Viewing/Photography		1	1	6		2	12
Blueberry Picking							1
Teaching				1			

Table 6.2.1.2: Scoping Phase Open House questionnaire responses regarding uses of waterbodies whose levels are influenced by Domtar and/or Vale waterpower facilities or MNRF facilities.

Number of Questionnaires Received and Uses Indicated	**Waterbody**							
	Influenced by Domtar Facilities				**Influenced by Vale and Domtar Facilities**		**Influenced by MNRF Facilities**	
	Pogamasing Lake & River	**Onaping Lake & River**	**Sinaminda Lake**	**Vermilion Lake & River**	**Upper Spanish R.**	**Lower Spanish R.**	**Three Corner Lake**	**Windy Creek**
# of Questionnaires	4	7	1	3	2		1	
Permanent Residence		3		3		1		
Overnight Camping		1			1		1	
Seasonal Residence	1	1						
All Year Camp or Cottage	3	3		1		1		
Open Water Angling	4	8		2	1	1	1	
Ice Fishing	2	6		1	1		1	
Hunting	1	7	1	1	1	1	1	
Trapping	1		1					
Motorboating	4	8		3	1	1	1	
Sailboating	1							
Paddling	3	6		3	2	1	1	
Jet Skis								
Swimming	4	5		2	1		1	
Snowmobiling	3	7	1	2	1		1	
Skiing	1	4		2				
Snowshoeing	3	5	1	1	1		1	
ATV/Bikes	2	5						
Business Operator – Outfitter		1			1			
Business Operator – Guide								
Business Operator – Lodge		2						
Business Operator – Other								
Drinking Water (Well, Point, Water Line)	3	7		4		2		
Wilderness Viewing/Photography	2	5		1	1	1	1	1
Blueberry Picking								
Teaching		1			1		1	1

6.2.2. First Nations Use of the Watershed

In addition to receiving invitations to all public open houses, offers were made by the Steering Committee to conduct information sessions at any interested First Nation community. Reviews of the 1993 Spanish River Water Management Plan were held in Sagamok Anishnawbek on November 13, 2002 and in Brunswick House First Nation on November 19, 2002.

On June 18th 2004, an information session was held at the Sagamok Anishnawbek Treaty Day. Community members had the opportunity to view information to-date and speak to WMP representatives. Copies of scoping phase questionnaires, prepared by the Planning Team in 2003, were also available to those wishing to participate. A total of 5 questionnaires were returned. A summary of identified community uses of the watershed are summarized in Table 6.2.2.

Table 6.2.2: Watershed uses identified in questionnaires returned by Sagamok Anishnawbek community members following the Treaty Day information session.

Number of Questionnaires Received and Uses Indicated	Number of Responses	Additional Information Provided by Participants
# of Questionnaires	5	
Permanent Residence	3	
Year Round Camp or Cottage	3	
Fishing	Open Water – 4 Ice Fishing – 4	Species: walleye (4), lake trout (2), brook trout (2), whitefish (1), yellow perch (2), northern pike (5), bass - small and largemouth (4)
Hunting		Species: moose (3), white-tailed deer (3), black bear (1), waterfowl (2), small game (4) - grouse
Trapping	1	Species: beaver
Motorboating	4	
Paddling	5	
Swimming	4	
Snowmobiling	5	
Skiing	1	
Snowshoeing	2	
ATV/Bikes	6	
Business Operator – Guide	1	
Drinking Water (Well, Point, Water Line)	4	
Wilderness Viewing/Photography		Species: all, bald eagle, bear

A detailed record of First Nations consultation is contained in Appendix C.

6.2.3. Summary of Issues Identified During Public and First Nations Consultations

Whereas the first part of the scoping phase questionnaire involved the identification of uses of the water shed, the second part was designed to identify issues related to the management of water levels and flows. Responses were reviewed and subsequently compiled into a single summary table (Table 6.2.3) since there was a high degree of overlap between public and First Nations' issues and concerns. The results of the consultations, along with the input from plan participants, formed the basis for the development of WMP objectives, as described in Section 2.5 of this document.

Table 6.2.3: Summary of issues and concerns expressedin in regards to various waterbodies during scoping phase consultations. Responses for the Lower Spanish River pertain to information from completed Sagamok Anishnawbek questionnaires.

WATER BODY	ISSUE/CONCERN										
	Erosion (incl. Sedimentation And shoreline vegetation concerns)	Fisheries	Dock Damage	Navigation	Boat Access	Water Levels (High)	Snowmobiling	Water Supply	Habitat	Water Flows	Total
Agnew	21	19	11	7	8	5	8	14	1		94
Armstrong	5	2	3	5	4	2	1	1			23
Biscotasi	2	5	3	3	3	5	3	1	1		26
Indian	1	1	1			1					4
Kennedy		1									1
Ministic			1	1							2
Mozhabong		1		1		1	1		1		5
Onaping Lake and River	7	6	7	5	2	7	2		1	3	40
Pogamasing	4	2	3	2	3		1	1	1		17
Ramsey	1		1								2
Sinaminda	1		1		1		1	1	1		6
Lower Spanish River*	5	4	3	4	5	5	2		3		28
Upper Spanish River				1							1
Vermilion Lake and River	3	1		1	3	3				1	12
Total	50	42	34	26	29	29	19	18	9	4	261

6.3. Options Development Process

For the options development phase of the WMP process, public open houses were held to present options that had been created by the Planning Team in response to issues raised during the scoping phase. The preferred option for each facility was highlighted. If the Planning Team had not come to a consensus on a preferred option, then this was also conveyed. The public was given another opportunity to comment via a questionnaire.

The options development process for the WMP utilized the Issue to Option Flowchart found in the MNRF Water Management Planning Guideline for Waterpower (Figure 6.3.1) as a guide. Comments received were examined and grouped by issue and facility/waterbody. They were then reviewed to determine if the issue was related to the WMP (ie. within the scope of the WMP process). Applicable issues were examined to determine which of three actions was required to address the issue from a water management planning perspective:

1. If it was determined that enough information existed to substantiate an issue, then that issue was advanced to an options development process that would carefully examine potential alternative operating regimes and their resultant impacts on WMP objectives in order to come up with a preferred option. If there were no issues identified for a specific facility during the scoping phase then the existing operating regime was automatically chosen as the preferred option.
2. If it was determined that insufficient information was available to enable informed decision-making on potential options that might address a particular concern, then a data gap was identified with the intention of developing a plan to collect the missing information for use in future planning exercises. In some instances, the data gap related to the identification of the extent of an issue amongst stakeholders.
3. Some issues were referred to effectiveness monitoring as a next step. This was the case for some social and other concerns where there was not enough existing information on the causative agent, the specific water level, location, or other circumstance that results in the issue, or extent of the concern amongst stakeholders, to substantiate the development of an option at the time. The intention would be to collect and regularly review stakeholder feedback as part of the ongoing WMP process and to consider options development when sufficient information becomes available.

Table 6.3.1 lists the comments/issues identified for each facility/waterbody and the subsequent action to be taken with respect to water management planning. In situations where no issues were raised for a particular waterbody/facility during the public and First Nations consultations, then the current operating regime was automatically chosen as the preferred option. This was the case for Frechette and Canoe Lakes (Vale), and all MNRF (3), CS (4) and City of Greater Sudbury (1) waterbodies/facilities subject to this water management planning process. For these waterbodies/facilities, effectiveness monitoring will be used to identify any issues as they arise.

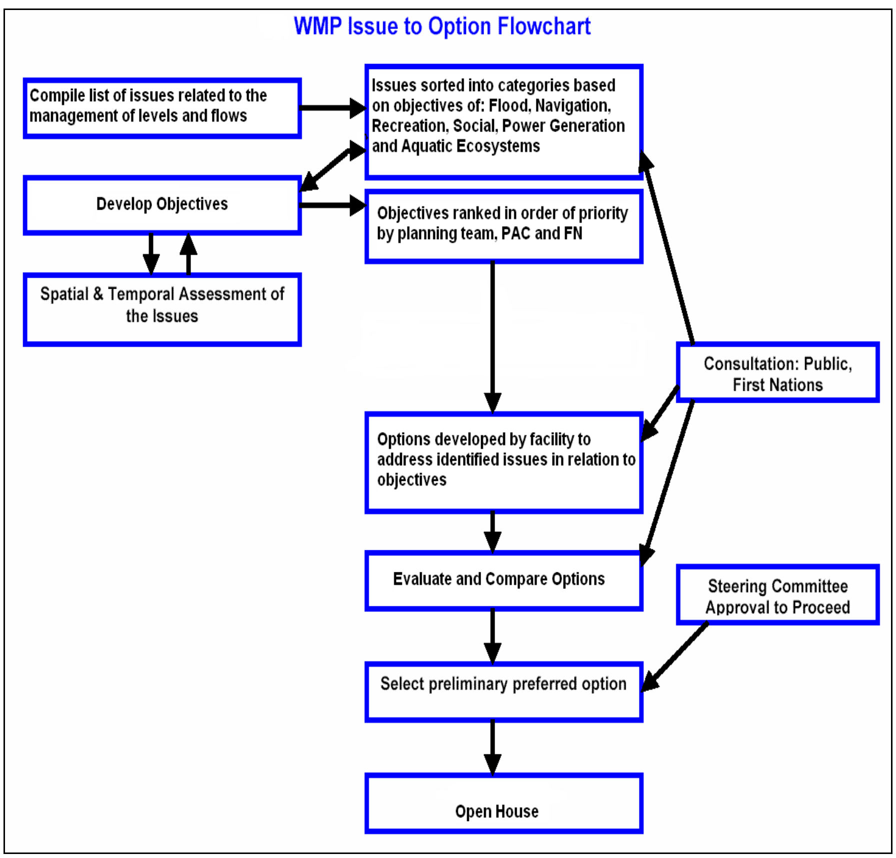

Figure 6.3.1: Option Development Process

Table 6.3.1: Incorporation of issues/concerns, identified during scoping phase consultation, into the WMP process. See accompanying Public Consultation Document in Appendix F.

WATER BODY	ISSUE# and CONCERN	CONCERN EXPRESSED BY				WITHIN SCOPE OF WMP?			APPROACH CHOSEN FOR WMP			WMP OBJECTIVE (See Section 2.5 of the WMP)
		Public	MNRF	Ontario Parks	First Nations	Yes	No	Undetermined	Data Gap	Develop Option	Effectiveness Monitoring	
Ramsey Lake (Chapleau District)	1.1 High water levels and ice damages docks	X	X			X			X		X	Shoreline Property and Infrastructure Property Damage
	1.2 High water levels are eroding the shoreline	X	X			X			X		X	Erosion
	Recommendation: Lake level should be maintained at 13.5 ft. (above sill)	X				X						Recommendations to be considered through ongoing water management planning process involving proponents, MNRF and Stakeholder Advisory Committee.
	Recommendation: Weekly dam sets and elevations should be posted in the Biscotasing General Store; hold regular meetings with Vale, MNRF and stakeholders		X			X						Recommendations to be considered through ongoing water management planning process involving proponents, MNRF and Stakeholder Advisory Committee.
Mozhabong Lake	2.1 The start of the winter drawdown in the fall drives fish populations into deeper water	X	X			X			X			Aquatic Ecosystems Fisheries
	2.2 High water levels wash trees and debris into the lake during spring and summer	X				X			X		X	Erosion Recreation Navigation
	2.3 A low water level in the fall makes navigation difficult	X				X			X	X	X	Recreation Navigation
	2.4 Winter drawdown creates unsafe snowmobiling conditions	X				X					X	Recreation Snowmobiling
	2.5 Fluctuation in water level is harmful to wildlife habitat and shoreline vegetation	X				X			X			Aquatic Ecosystems Wildlife Habitat
Indian Lake	3.1 Fluctuations in water levels on Indian Lake affect walleye and northern pike spawning	X	X			X			X			Aquatic Ecosystems Fisheries
	3.2 Start of winter drawdown in the fall harms the lake trout (*whitefish?*) population.	X	X			X			X			Aquatic Ecosystems Fisheries
	3.3 High water levels wash trees and debris into lake	X	X			X			X		X	Erosion Recreation Navigation
	3.4 High water levels damages docks	X	X			X				X	X	Shoreline Property and Infrastructure Property Damage
	3.5 High water levels are eroding the shoreline	X	X			X			X		X	Erosion
	Recommendation: Weekly dam sets and elevations should be posted in Biscotasing General Store											Recommendations to be considered through ongoing water management planning process involving proponents, MNRF and Stakeholder Advisory Committee.
Biscotasi Lake	4.1 Water levels are too low in the spring for northern pike spawning	X	X	X		X			X			Aquatic Ecosystems Fisheries
	4.2 Fluctuations in water levels on Biscotasi Lake affect fish spawning	X	X	X		X			X			Aquatic Ecosystems Fisheries
	4.3 High water levels washes trees and debris into the lake	X				X			X		X	Erosion Recreation Navigation
	4.4 High water levels and ice damages docks					X				X	X	Shoreline Property and Infrastructure Property Damage
	4.5 Water levels too low in the spring, summer and fall to launch boats	X	X			X				X	X	Recreation Boat Launches
	4.6 Low water levels in the spring, summer and fall makes navigation difficult	X	X	X		X			X	X	X	Recreation Navigation
	4.7 At times, water levels are too high to navigate safely	X		X		X				X	X	Recreation Navigation
	4.8 Winter drawdown creates unsafe snowmobiling conditions	X	X			X					X	Recreation Snowmobiling
	4.9 High water levels are eroding the shoreline	X	X			X			X		X	Erosion
	4.10 Winter drawdown lowers water in the winter and spring, dewatering beaver lodges and freezing the beavers out	X	X			X			X			Aquatic Ecosystems Wildlife Habitat
	4.11 Fluctuations in water levels negatively affects moose aquatic feeding locations	X	X	X		X			X			Aquatic Ecosystems Wildlife Habitat
	4.12 Biscotasi Lake contains large and diverse wetlands that are home to a wide variety of bird species	X		X		X			X			Aquatic Ecosystems Wildlife Habitat
	4.13 Low water levels kills shoreline vegetation	X	X	X		X			X			Aquatic Ecosystems Wildlife Habitat
	4.14 High water levels in the spring degrade water quality	X					X					Aquatic Ecosystems Wildlife Habitat
	4.15 Low water levels in the winter result in frozen water lines	X	X			X			X		X	Shoreline Property and Infrastructure Water Supply

WATER BODY	ISSUE# and CONCERN	CONCERN EXPRESSED BY				WITHIN SCOPE OF WMP?			APPROACH CHOSEN FOR WMP			WMP OBJECTIVE (See Section 2.5 of the WMP)
		Public	MNRF	Ontario Parks	First Nations	Yes	No	Undetermined	Data Gap	Develop Option	Effectiveness Monitoring	
Biscotasi Lake (continued)	4.16 Minimum flows for paddling		X	X		X			X			Recreation Navigation
	4.17 Minimum flows for ecosystem health		X	X		X			X			Aquatic Ecosystems
	4.18 Blanding's turtle		X			X			X			Aquatic Ecosystems
	4.19 Short-term changes in river flows on the Spanish River can result in lost equipment	X				X					X	Recreation
	Recommendation: Weekly dam sets and elevations should be posted in the Biscotasing General Store	X										Recommendations to be considered through ongoing water management planning process involving proponents, MNRF and Stakeholder Advisory Committee.
Ministic Lake	5.1 Fluctuating water levels damages docks	X					X				X	Shoreline Property and Infrastructure Property Damage
	5.2 A decrease from existing summer levels would impede navigation (ie. maintain status quo)	X					X					Recreation Navigation
	5.3 A decrease from existing summer levels would force cottagers to reset water lines (ie. maintain status quo)	X					X					Shoreline Property and Infrastructure Water Supply
Armstrong Lake	6.1 High water levels as well as seasonal fluctuations in water levels eroding the shoreline	X				X			X		X	Erosion
	6.2 High water levels in the spring wash trees into the lake, creating navigation hazards	X				X			X		X	Erosion Recreation Navigation
	6.3 Water levels too low in the summer and fall to launch boats	X				X				X		Recreation Boat Launches
	6.4 High water levels in the fall and spring damages docks	X				X					X	Shoreline Property and Infrastructure Property Damage
	6.5 The start of the winter drawdown in the fall harms the lake trout population	X				X			X			Aquatic Ecosystems Fisheries
	6.6 Water levels are too high in the spring, and after heavy rains in the summer and fall. Shoreline structures such as boathouses are flooded. High water levels in the spring also degrade water quality and contaminate well water	X	X			X				X	X	Shoreline Property and Infrastructure Property Damage
	6.7 Low water levels in the summer increases water temperatures and promotes aquatic vegetation growth	X					X					Aquatic Ecosystems
	6.8 Requests to maintain stable water levels	X				X		X			X	Relationship to specific objective is not stated
	6.9 Winter drawdown creates unsafe snowmobiling conditions	X				X					X	Recreation Snowmobiling
	6.10 Minimum flow for ecosystem health in John Creek	X				X			X			Aquatic Ecosystem
	Recommendation: The lake should be managed on a more consistent basis.	X										Recommendations to be considered through ongoing water management planning process involving proponents, MNRF and Stakeholder Advisory Committee.
	Recommendation: An emergency flood plan for the lake needs to be developed	X					X					Flood emergencies not covered in WMP
Agnew Lake	7.1 Fluctuation in water levels are eroding the shoreline	X	X			X			X		X	Erosion
	7.2 Erosion of banks downstream from Big Eddy and High Falls Generating Facilities	X				X			X			Erosion
	7.3 Rising water after fish spawn in the spring may result in egg mortality due to cooler temperatures and siltation. In some years, high water and flooding can wash emerged fry over the dam.	X	X			X			X			Aquatic Ecosystem Fisheries
	7.4 Low water or decreasing water levels in the spring increases egg mortality of spring spawners	X				X			X	X	X	Aquatic Ecosystem Fisheries
	7.5 Walleye and lake sturgeon spawning beds are located downstream from the Vale generating facilities		X			X			X			Aquatic Ecosystem Fisheries
	7.6 Fluctuation in water levels are detrimental to fish populations	X	X			X			X			Aquatic Ecosystem Fisheries
	7.7 The winter drawdown "fragments" Agnew Lake, leaving fish trapped in small bays, possibly with little forage or oxygen	X				X			X			Aquatic Ecosystem Fisheries
	7.8 Water levels are too low in spring, summer and/or winter for point, well and/or water lines	X				X				X	X	Shoreline Property and Infrastructure Water Supply
	7.9 High water levels in the fall and spring damages docks	X				X				X	X	Shoreline Property and Infrastructure Property Damage

WATER BODY	ISSUE# and CONCERN	CONCERN EXPRESSED BY				WITHIN SCOPE OF WMP?			APPROACH CHOSEN FOR WMP			WMP OBJECTIVE (See Section 2.5 of the WMP)
		Public	MNRF	Ontario Parks	First Nations	Yes	No	Undetermined	Data Gap	Develop Option	Effectiveness Monitoring	
Agnew Lake (continued)	7.10 Fluctuating water levels are eroding breakwall	X				X			X		X	Erosion Shoreline Property and Infrastructure Property Damage
	7.11 Water levels are too low in the spring and summer to launch boats	X				X				X	X	Recreation Boat Launches
	7.12 Winter drawdown creates unsafe snowmobiling conditions	X	X			X					X	Recreation Snowmobiling
	7.13 Water levels too low in the spring and summer	X				X				X	X	Recreation
	7.14 High water levels in the spring wash trees into the lake, creating navigation hazards	X				X			X		X	Erosion Recreation Navigation
	7.15 Open water levels too high	X				X			X	X	X	Recreation
	7.16 Water levels are too low in the spring and summer	X				X				X	X	? – relationship to specific objective not clear
	7.17 Requests to maintain stable water levels	X				X				X	X	? – relationship to specific objective not clear
	7.18 Rising and falling water in the spring, and drawdown beginning in the fall deposits material on the shoreline	X				X			X		X	Erosion Shoreline Property and Infrastructure
	7.19 Winter drawdown lowers water in the winter and spring, dewatering beaver lodges and freezing the beavers out	X				X			X			Aquatic Ecosystems Wildlife Habitat
	Recommendation: Vale should notify residents of drawdowns anticipated going below 849 ft.	X				X						Recommendations to be considered through ongoing water management planning process involving proponents, MNRF and Stakeholder Advisory Committee.
Pogamasing Lake	8.1 High water levels eroding the shoreline and damaging shoreline structures	X				X			X	X	X	Erosion Shoreline Property and Infrastructure Property Damage
	8.2 Erosion of shoreline adds sand and particles to the lake	X				X			X		X	Erosion
	8.3 High water levels causes damage to docks and buildings	X				X			X	X	X	Shoreline Property and Infrastructure Property Damage
	8.4 Low water levels in the fall make it difficult to launch boats	X				X				X	X	Recreation Boat Launching
	8.5 Frequent changes in elevation make navigation dangerous	X				X			X	X	X	Recreation Navigation
	8.6 Fluctuations in water levels affects spawning in the spring and fall	X				X			X			Aquatic Ecosystem Fisheries
	8.7 High water levels negatively affects waterfowl habitat	X				X			X	X	X	Aquatic Ecosystem Wildlife Habitat
	8.8 High water levels damages wetland habitats	X				X			X	X	X	Aquatic Ecosystem Wildlife Habitat
	8.9 Winter drawdown creates unsafe snowmobiling conditions	X				X					X	Recreation Snowmobiling
	Recommendations: maintain lake at a constant level, lower lake level earlier in spring to minimize erosion, accurately monitor and record lake levels, inform cottagers of changes in lake levels	X										Recommendations to be considered through ongoing water management planning process involving proponents, MNRF and Stakeholder Advisory Committee.
Onaping Lake	9.1 Fluctuations in water levels and high water levels are eroding the shoreline	X	X			X			X	X	X	Erosion
	9.2 Winter drawdown and high water levels in the spring damages docks	X				X				X	X	Shoreline Property and infrastructure Property Damage
	9.3 Open water levels are too high	X				X				X	X	? – relationship to specific objective not clear
	9.4 Requests to maintain stable water levels	X				X				X	X	? – relationship to specific objective not clear
	9.5 Fluctuations in water levels on Onaping Lake affect spawning	X	X			X				X	X	Aquatic Ecosystem Fisheries
	9.6 Sufficient flows should be maintained in the Onaping River in the late summer	X	X			X			X			? – relationship to specific objective not clear
	9.7 High water levels in the spring and summer wash trees into the lake, creating navigation hazards	X				X				X	X	Erosion Recreation Navigation
	9.8 Water levels too low in the spring and fall to launch boats	X				X				X	X	Recreation Boat Launches
	9.9 Winter drawdown creates unsafe snowmobiling conditions	X				X					X	Recreation Snowmobiling
	9.10 Fluctuating water levels negatively affect nesting loons	X				X			X	X	X	Aquatic Ecosystem Wildlife Habitat
	9.11 Water flows into Bannerman Creek Delta Nature Reserve			X		X			X			Aquatic Ecosystem

WATER BODY	ISSUE# and CONCERN	CONCERN EXPRESSED BY				WITHIN SCOPE OF WMP?			APPROACH CHOSEN FOR WMP			WMP OBJECTIVE (See Section 2.5 of the WMP)
		Public	MNRF	Ontario Parks	First Nations	Yes	No	Undetermined	Data Gap	Develop Option	Effectiveness Monitoring	
	Comment: Water flowing through the Bannerman Creek Dam contributes to flows for navigation of the Spanish River			X		X			X			Recreation Navigation
	Recommendation: A meeting with Onaping Representatives is required to develop a lake/dam operating plan. Public needs to be advised in advance when water is to be lowered	X										
Sinaminda Lake	10.1 There is floating debris in the lake	X				X			X		X	Erosion Recreation Navigation
	10.2 Fluctuating water levels damages docks	X				X				X	X	Shoreline Property and Infrastructure Property Damage
	10.3 Low water levels in the summer hinder access to Sinaminda Lake	X				X				X	X	Recreation Navigation
	10.4 Winter drawdown creates unsafe snowmobiling conditions	X				X					X	Recreation Snowmobiling
	10.5 Erosion along the shoreline is noticeable	X				X			X		X	Erosion
	10.6 Water levels are too low for beaver	X				X			X			Aquatic Ecosystem Wildlife Habitat
	10.7 Water levels in the summer expose water lines	X				X				X	X	Shoreline Property and Infrastructure Water Supply
	10.8 Lowered lake levels would affect lake trout population		X			X			X			Aquatic Ecosystem Fisheries
	10.9 Water levels regulation may affect walleye and northern pike		X			X			X			Aquatic Ecosystem Fisheries
Vermilion Lake and River	11.1 High water levels on lake are eroding the shoreline	X				X			X		X	Erosion
	11.2 High water and flow levels washes trees, vegetation, garbage and other debris onto the lake shore	X				X			X		X	Erosion Recreation
	11.3 Requests for lower levels in the spring and higher levels in the summer to launch boats in lower Vermilion River	X				X					X	Recreation Boat Launches
	11.4 Lake water levels too low in summer for use of dock	X				X					X	Recreation Boat Launches
	11.5 Lake water levels too low in the summer and too high in the spring and fall	X				X					X	Recreation Navigation
	11.6 Low water levels in the summer dewater spawning beds	X				X			X			Aquatic Ecosystem Fisheries
	11.7 Walleye spawning downstream of Wabagishik (Lorne) Lake generating facility		X			X			X			Aquatic Ecosystem Fisheries
	11.8 Sufficient flows should be maintained in the Vermilion River to address discharge of sewage treatment plants	X	X				X					Aquatic Ecosystem
	11.9 High river flows on the Vermilion River can backup Blackwater Creek and spill over into Panache Lake on the Whitefish River watershed, causing flooding on that system. McCharles Lake on the Vermilion River system can also experience significant flooding at times		X			X					X	Shoreline Property and Infrastructure Water Levels (Flooding)
	Recommendation for MNRF to conduct annual inspection of boat launches to determine if sufficient water levels permit launching as well as inspect dock or shoreline structure damage											Recommendations to be considered through ongoing water management planning process involving proponents, MNRF and Stakeholder Advisory Committee.
Lower Spanish River (below Espanola Dam)	12.1 High flows flood and damage property	X	X		X	X					X	Shoreline Property and infrastructure Property Damage (Flooding)
	12.2 Low water levels make it difficult to launch boats	X			X	X			X		X	Recreation Boat Launches
	12.3 Low water levels make it difficult to access parts of the river				X	X			X		X	Recreation Navigation
	12.4 Erosion along sections of the lower Spanish River has been observed		X		X	X			X		X	Erosion
	12.5 Regulated flows may damage wildlife habitat, wetlands, and shoreline vegetation		X		X	X			X		X	Aquatic Ecosystem Wildlife Habitat
	12.6 Safety concerns for snowmobiling on the river in the winter				X	X					X	Recreation Snowmobiling
	12.7 The Shorthead redhorse sucker is a provincially uncommon fish species inhabiting the lower Spanish River. Increased siltation of habitat is considered the largest threat to this species		X			X			X			Aquatic Ecosystem Wildlife Habitat
	12.8 Muskellunge restoration efforts in the lower Spanish River		X			X					X	Aquatic Ecosystem Fisheries
	12.9 Algae growth due to low water flows cover walleye spawning beds		X			X			X			Aquatic Ecosystem Fisheries

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		Public	MNRF	Ontario Parks	First Nations	Yes	No	Undetermined	Data Gap	Develop Option	Effectiveness Monitoring	
	12.10 Minimum flows for walleye spawning and incubation		X			X			X	X	X	Aquatic Ecosystem Fisheries
	12.11 Minimum flows required for aquatic ecosystem health		X							X	X	Aquatic Ecosystem

6.4. Discussion of Water Management Issues, Resource Values and Interests Identified Through Consultations

Public and First Nation consultations provided the Planning Team with a basis for the development of water management planning objectives specific to the Spanish and Vermilion Rivers. The issues were sorted into categories and further discussed by the Planning Team as to the potential impacts of water management practices on the various resource values and interests identified.

In most cases, public feedback from questionnaires urged proponents to communicate advance information about water level movements to cottagers and tourist outfitters and, in some cases, to hold regular public meetings.

6.4.1. Erosion

Overall, the largest number of concerns raised in the Scoping Phase related to erosion, which could be shoreline erosion, structural erosion or the washing of debris into lakes. This issue was raised for Ramsey (Chapleau), Mozhabong, Indian, Biscotasi, Armstrong, Agnew, Pogamasing, Onaping and Vermilion Lakes, as well as the Vermilion and Lower Spanish Rivers.

Erosion is a natural process which can be accelerated by human activities such as land clearance, agriculture, forestry, construction along a shoreline or riverbank, and water regulation. Depending on geology and weather conditions, the rate of erosion may vary. Shoreline or bank erosion may be caused from surface run-off, wind, wave action, water levels, local topography, and/or soil type. The relative contribution from each factor is site dependent.

Shoreline erosion on a lake may occur once a reservoir is created. Natural lakes have had millennia to reach a state of equilibrium; where the lake has been eroded to a shape that most efficiently dissipates wave energy. Newly created lakes or reservoirs will undergo new erosion processes to achieve a state of equilibrium. The time required to re-equilibrate a lake depends on a variety of factors including the extent to which new areas are flooded, the shape of the reservoir, and the types of soils and rock along the shoreline (Benson, 1980).

A rapid decrease in water levels whether daily, monthly, or seasonally, can cause shorelines to slump. Bank soils that are initially saturated with water are not given sufficient time to dry out. The result is that after a lowering of water levels, the heavier saturated soils of the lower part of the bank will slide into the water, undercutting the bank. The rest of the bank will slump when the toe can no longer support the weight above. This type of erosion is pronounced with sandy shorelines. Vegetation that may have originally colonized the bank is removed in this process, further destabilizing the bank and accelerating erosion (MNRF, 2003).

Winter drawdown results in greater than natural flows downstream. Cold water has a greater ability than warmer water to uptake sediment and, therefore, has greater potential to erode riverbanks in the winter (Annear et al., 2005). Sediment from eroded shorelines can be transported and deposited in other locations of the water body - possibly eroding or filling in fish habitat, reducing access into parts of the water body historically accessed, or altering watercourses. These changes (either natural or enhanced) can affect cultural heritage, recreational or ecosystem values.

However, due to the complex nature of erosion, it was difficult to quantify the impact from specific sources of erosion and develop water management options that mitigate this concern, especially when the mechanism and contribution of other factors are not fully understood. It is recommended that a provincial initiative be undertaken to fill a data gap with respect to a standardized approach to erosion issues. If guidelines are ever developed, the WMP can be amended accordingly. In the interim, the Planning Team recognized the importance of erosion concerns and considered them, where plausible, when evaluating options developed to address other concerns. Also, related stakeholder feedback will be monitored and recorded by proponents using the system described in Effectiveness Monitoring.

6.4.2. Power Generation

The waterpower facilities that are the subject of this WMP are of vital importance to the sustainability of the main proponents' businesses and their contribution to the local economy. Vale and Domtar utilize energy from their waterpower facilities to supplement purchased energy, which is more expensive and may not be as "clean" in terms of air emissions, for running their industrial processes. Other structures included in the WMP are used for public recreational, flood control and drinking water supply purposes.

Each of the above uses of water is dependent upon the alteration of natural waterbody levels and flows. The purpose of this WMP is to weigh these uses along with expressed needs/concerns of other stakeholders and the aquatic ecosystem. The total amount of water to be managed is driven by long-term climatic, seasonal and event-related weather conditions. Conditions are predicted using computer models that incorporate watershed characteristics along with weather data and forecasts. Along with watershed data, information on the various needs of stakeholders (at specific times of the year) is incorporated into the timed releases of water from reservoir systems. A particular challenge noted by waterpower proponents is the balancing of ecosystem and recreational needs on lakes/reservoirs with needs of those in the downstream environment, as there is a limited amount of water resource available in any given watershed. Once available water is passed through a management structure, the water cannot be retrieved. Only new water from precipitation events can replenish the system – so drought induced by climate change presents a particular challenge. Even in non-regulated systems, needs of all ecosystem and recreational users are typically not able to be fully satisfied in any given year due to natural environmental fluctuations.

6.4.3. Damage to Shoreline, Property and Infrastructure

Low Water Levels and Water Supply

The loss of potable water drawn from point wells on Agnew Lake during the winter draw down is reported to occur when the lake level drops below an elevation of 849 ft (258.78 m). It is estimated that as many as 20 households may be affected in this manner. The freezing of water lines during the winter draw down was reported by one person on Biscotasi Lake. There was also a report of exposed water line on Sinaminda Lake during the summer season. On Ministic Lake there was a concern that, if summer lake levels were lowered as a result of the planning process, then cottagers would have to reset water lines.

Winter draw downs can decrease accessibility to water supply for wells, points and intake lines if the expected low water level (where known) has not been taken into account during the design and installation. Water levels may be drawn down to elevations below intake or recharge point, or low water levels may not provide adequate insulation against freezing. During years of minimal spring freshet and/or spring rains, summer levels may not be achieved until later. Drought years may also result in reduced elevations due to the lack of precipitation and increased evaporation.

Damage to Shoreline Structures and/or Property

Water bodies where damages to shoreline structures and properties (excluding erosion) have been reported are Ramsey, Indian, Biscotasi, Ministic, Armstrong, Agnew, Pogamasing, and Sinaminda Lakes, as well as the Lower Spanish River.

Changes in levels and flows occur on natural systems, but may be more pronounced on regulated systems. Also, the frequency and timing of fluctuations can be altered from natural conditions. Shoreline structures such as docks, boathouses, retaining walls and break walls can be impacted by changing water levels and flows and, in some cases, it may be difficult to determine if the damages are caused by natural processes alone or are influenced by hydro-power operations. For the Spanish and Vermilion River systems, reports of damage were predominantly related to docks in association with high water levels and ice buildup or impact from water fluctuations in general. Where high water levels were referenced, it was unclear if these were “normal” high levels or were associated with flood conditions. An eroding breakwall was reported on Agnew Lake and damage to shoreline structure and buildings was reported on the Lower Spanish River.

The weight of ice that has built up on docks prior to a winter draw down can collapse the structures once the lake level is lowered. Conversely, rising water levels in early spring on lakes with a significant ice cap can result in damage to shoreline structures due to moving ice floes. High water levels during fall storms can also result in damage to shoreline structures caused by wave action. Similar problems can occur downstream in riverine environments where water flow is fluctuating under changing temperature conditions.

The drawdown of Onaping, Indian, Ministic and Armstrong (prior to 2017) Lakes is scheduled to occur prior to November 1st, and Pogamasing and Sinaminda (historically) Lakes by September 30th of each year so it is not expected that ice would build up on docks in the fall, but spring conditions could pose an issue if rising waters are capped by ice. Ramsey, Biscotasi and Agnew Lakes are drawn down through the winter so, depending on weather trends in a particular year, ice build-up could have potential damaging impacts during both drawdown and/or spring freshet. Sinaminda Lake no longer has a winter draw down.

High Water Levels (Flooding)

High water levels and flows may occur during all seasons, but occur primarily in the spring and fall. In some cases, flooding may cause damage to properties and residential buildings, or prevent access and egress. Other potential negative impacts of high water levels include erosion and road washouts, sedimentation, well water contamination, debris, property loss, and logs from the shore washed into the lake, causing a boating hazard. High water levels in early spring with significant ice flows can scour the shorelines causing further erosion.

Flooding issues of this nature were noted for the lower Spanish River and Armstrong Lake. Flooding on the Vermilion River at McCharles Lake has been reported in past years, and is caused by a downstream choke point causing it to back up. High flows from the Vermilion River are also believed to flow up Blackwater Creek and spill over into the Whitefish River watershed, causing potential high water and flooding situations on this adjacent watershed.

On unregulated lakes and rivers, flow patterns generally show a pattern of high flows in the spring. While dams do have the ability to control water flows downstream, the amount of control is limited to the discharge capacities of the dam. Dams, and their associated reservoirs, tend to buffer peak flows in the spring and can prevent damage from extreme events.

Operators are expected to comply with the operating regimes described within the WMP. Flooding events that are outside the ability of water control structures to manage within established compliance limits are identified as high water indicators in the compliance section of the plan, and operators will be required to report these events when they occur.

6.4.4. Aquatic Ecosystems

Fisheries

Changes in water levels and flows may result in impacts to fisheries (both lake and riverine species), including loss of spawning and nursery habitat, aquatic vegetation, and invertebrate production. In extreme cases, water management operations can prevent migration or entrap fish and result in fish mortality.

Although there are general concerns for the fish communities as whole, specific concerns for the following species were raised. Detailed descriptions of habitat needs and potential impacts of hydroelectric operations for other fish species can be found in Rochester et al. (1984).

Walleye

Walleye (also known as pickerel) spawn on boulder to coarse gravel substrate shoals of lakes, and often below waterfalls and dams. They spawn in early April to early May, between water temperatures of 5.6ºC to 11.1ºC. Eggs are laid at depths less than 1m to facilitate aeration, but at depths greater than 0.4m. Optimal incubation temperatures are between 9ºC to 15ºC. The eggs hatch within 18 days. The young disperse within 10 - 15 days of hatching. Temperatures over 15ºC are important for early fry survival (Kerr et al., 1996).

Optimal water flows or velocities in streams and rivers depends on the life-history requirement and may vary geographically. Adults prefer optimal flows of 0.75 m/s to 1 m/s but will spawn in streams with velocities as low as 0.36 m/s. Eggs require velocities between 0.7 m/s – 3.2 m/s for incubation, while fry cannot tolerate any flow greater than 0.6 m/s (Kerr et al., 1996).

Fluctuations in river flows due to water management practices can cause stranding of fish and eggs, resulting in poor survival and recruitment.

Specific issues or concerns with walleye within the planning area were expressed, during the Scoping Phase, as follows:

At Agnew Lake there were concerns that raising water levels after fish spawn in the spring may result in egg mortality due to cooler temperatures and siltation. Although it is possible, in some years, that walleye eggs are covered in 3 – 4 m of water, no scientific literature was found indicating that this magnitude of increasing water level is detrimental to the survival of walleye eggs. Instead, the dewatering and exposure of eggs is more harmful to spawning fish communities. Vale already attempts to mitigate this concern by not decreasing the lake level more than 4 inches (0.10 m) during walleye spawning/incubation.

Also, at Agnew Lake, there are concerns that high water and flooding can wash emerged fry over the dam in some years. There are no reports of fish being washed over the dam and it would be impractical, due to safety issues, to investigate this concern.

Significant walleye spawning grounds have been identified below the High Falls GS, the Nairn Falls GS, and south of the Highway 17 bridge. Also, a walleye spawning area is located below the Domtar Espanola Main Dam. Some flows are diverted around the pool when water is going through the generating station, rather than over the falls. There is a concern that there may be insufficient flow through the main dam, in low flow years, to support spawning and that low flows could strand fish and eggs, causing mortality. Another concern was that low flows promote algal growth on the spawning substrate, possibly diminishing its suitability.

Walleye spawning habitat is located at the base of the spillway of the Wabagishik GS. This habitat is located in Wabagishik Lake and is thought to be sufficiently watered during the spawning period, although this still requires confirmation. There are also a couple of spawning sites located downstream of Wabagishik Lake, just before the Spanish and Vermilion Rivers' confluence.

Other lakes where the impact of fluctuating water levels on walleye was named as a concern were Onaping, Biscotasi, Sinaminda, Canoe, Ramsey (Chapleau) and Indian Lakes.

Northern Pike

Northern pike spawn in early April to early May at temperatures between 4.4ºC to 11.1ºC. Pike spawn during the daytime in shallow (< 20-cm) but heavily vegetated floodplains or rivers, marshes and bays of lakes. Eggs are scattered randomly to attach to the stems of aquatic vegetation. Hatching generally occurs within 14 days but can be sooner if water temperatures increase significantly. The young remain in the shallow spawning areas for several weeks (Scott and Crossman, 1973).

Declining water levels after pike have spawned can expose the eggs, thereby killing them. Low spring water levels reduce the amount of potential spawning habitat, while high lake water levels in spring have a strong positive influence on abundance of new generation by expanding the spawning area into wetland areas.

Due to winter draw downs on several of the reservoirs, the frequency of high water levels during the spring freshet is mitigated, which may reduce access to potential pike spawning habitat. Lakes where this has been raised as a concern include: Agnew Lake, Biscotasi Lake, Indian Lake, Ramsey Lake, Frechette Lake, Canoe Lake, Onaping Lake and Sinaminda Lake.

Lake Trout

Lake trout spawn in early October through to early November, in water temperatures between 13.9ºC and 8.9ºC. In inland lakes, lake trout spawn on coarse textured substrate at depths of 0.3-m to 12.2m, but generally spawn in 1-m to 3-m of water. Usually, 4 to 5 months are required for incubation and hatching usually occurs in March or April (Scott and Crossman, 1973).

Reservoirs managed for hydroelectric generation and/or user needs such as flood mitigation, recreation and aquatic ecosystems, may begin drawing down water levels in the fall and throughout winter. This may impact the spawning success of lake trout as this species sometimes spawn in shallow water. Water level fluctuations in these types of reservoirs may subject eggs to increased mortality by exposing the spawning beds. The degree of mortality depends on the timing and extent of the draw down.

Concerns for lake trout were identified for Onaping Lake, where the fall draw down may continue to the end of October, which may affect the commencement of lake trout spawning. Similar concerns were raised for Sinaminda Lake.

Concerns for lake trout in Pogamasing Lake were raised; specifically the possible sedimentation of lake tout spawning habitat in the “Lost Channel”. There were also concerns about the ability of lake trout accessing this habitat in the fall after the draw down is complete, due to shallow water levels in this part of the lake.

The 1993 WMP specifies completion of drawdown for Pogamasing and Sinaminda by September 30th of each year, specifically to address the issue of lake trout spawning. Onaping, Ministic and Armstrong (prior to 2017) Lakes’ drawdowns are to be completed by November 1st. Although it has not been confirmed if lake trout were originally present in Armstrong Lake, it has been stocked by the MNRF and is being monitored for success.

Lake Whitefish

Lake whitefish begin spawning when water temperatures drop to 7.8ºC, which is normally in October to December. Whitefish randomly spawn on stony substrates but will sometimes deposit their eggs on sandy bottoms. Spawning depth is between 3.5-m to 7.6-m. Optimal egg development is 0.5ºC but they can tolerate temperatures up to 6.1ºC. Eggs hatch in April or May (Scott and Crossman, 1973).

For whitefish, a reduction in water level may cause egg mortality when eggs are laid at depths less than 3.5 m due to decreases in water temperature as the lake ice nears the eggs. Water level decreases in hydroelectric reservoirs may result in egg mortality due to exposure. Early draw down may reduce the amount of available habitat. However, it would also reduce the likelihood of egg mortality due to exposure.

The potential impacts of winter draw down practices on spawners in general, or specifically on lake whitefish was identified during public consultation for Frechette, Canoe, Biscotasi Lake, Indian Lake, Ramsey Lake (Chapleau District). These lakes experience drawdowns throughout the winter.

Smallmouth Bass

Smallmouth bass spawn from mid-May to mid-July when water temperatures are between 12.8ºC to 20.0ºC. The male builds a nest at depths from 0.6m to 6.1m on sandy, gravely, or rocky bottoms near the protection of logs or large rocks. Eggs incubate for 4- -10 days, but the young remain on the nest for 12 days until the yolk sac is absorbed (Scott and Crossman, 1973). Males actively guard the nest to protect the eggs and fry from predators.

Water level fluctuations can cause males to build nests in unsuitable locations which can promote male desertion if water depths become too deep or shallow. Spawning is adversely influenced by high river levels, which floods nest sites with cool water and cause other perturbations. Stable water levels during the early part of the summer are beneficial to bass on most lakes.

While no specific water management issues have been identified for bass, the planning team was cognizant of the species needs when developing and evaluating options.

Lake Sturgeon

The Great Lakes Western St. Lawrence population of lake sturgeon is considered a threatened species in Ontario. Lake sturgeon spawning occurs from early May to late June, with optimal spawning temperatures between 13ºC and 18ºC. Lake sturgeon generally leave lakes and move into rivers to spawn, not long after ice out, and sometimes move under the ice. They spawn in depths of 2 – 15 ft (0.6 m – 4.5 m) in areas of swift water or rapids, often at the foot of low falls that prevent further migration (Scott and Crossman 1974). Males are the first to reach the spawning grounds and the fish congregate while they await spawning temperatures. The females spawn for only a brief period and release their eggs which adhere to rocks and logs. All the eggs are not shed at once but probably over a period of one or more days (Scott and Crossman – 1974).

On the Spanish River, lake sturgeon inhabit the reach of the river below Espanola Main Dam, and above the dam up to the Nairn Falls Generating Station. Extensive fishing effort above Nairn Falls has not resulted in any catch. The presence of lake sturgeon was confirmed in the Vermilion River, at the first set of rapids above the Spanish River confluence, in 2012.

Concerns have been raised over the potential stranding of individual fish and the dessication of eggs due to changes in water flow through the area immediately below Espanola Main Dam. The population of lake sturgeon above Espanola (and below Nairn) is not well understood, but appears to be limited in number. Further understanding of these situations has been assigned a high priority by the Planning Team.

White Sucker

White suckers spawn from early May to early June, usually migrating from lakes into gravelly streams that have reached a temperature of 10°C. Sites are usually in shallow water, but could be in rapids. White suckers are also known to spawn on lake margins or in the mouths of blocked streams. Adults home to spawning streams for a period of 10-14 days, where eggs are scattered, adhering to gravel or drifting to calmer areas downstream. Eggs hatch in about 2 weeks, with the young remaining in the gravel 1-2 weeks before migrating to the lake (Scott and Crossman, 1985).

Chapleau MNRF expressed a concern for fluctuating water levels and potential impacts on white sucker in Biscotasi, Frechette, Indian, Ramsey (Chapleau) and Canoe Lakes.

Muskellunge

Muskellunge are a spring spawner, preferring termperatures of 9.4°C to 15°C (optimally 12.8°C), which typically occur in late April or early May soon after ice out. Spawning occurs over several days in heavily vegetated flood plains, with eggs being randomly scattered. Hatching occurs in 8-14 days and the young remain in the vegetation for about 10 days before beginning to feed (Scott and Crossman, 1985).

Following the active Spanish Harbour Remedial Action Plan (RAP) process in the 1990's, a program was initiated by federal and provincial authorities, and the Friends of the Spanish River, to re-introduce the extirpated muskellunge to the Lower Spanish River. The program has thus far met with success as musky sightings are routinely reported.

Shorthead Redhorse

The Shorthead Redhorse is a provincially uncommon fish species that was identified as a concern in the Lower Spanish River due to siltation. Scott and Crossman (1985) indicate that little is known about this species in the Great Lakes, St. Lawrence Region but that, as a bottom dweller in moderately rapid streams, it may compete with lake sturgeon where they are present. Shorthead Redhorse migrate upstream in springtime to spawn in rocky substrates at temperatures around 13ºC.

Domtar's environmental effects monitoring studies indicate that Shorthead Redhorse is making a steady recovery below Espanola Main Dam.

Fragmentation and Reduction in Littoral Zone

For Agnew Lake, there was the concern that due to the large draw down, bays may become isolated from the rest of the water body. Potential effects are speculated to be decreased temperatures, oxygen and/or forage within these isolated sections. Current bathymetry mapping for Agnew Lake is in intervals of 20 feet (6 m), and too large to model the 4 m draw down to assess potential impacts.

Because of the winter draw down, other reservoir lakes on the Spanish and Vermilion River watersheds such as Mozhabong, Indian, Ramsey, Frechette, Canoe, Biscotasi and Onaping may also experience ranges of water levels greater than what would be observed on unregulated water bodies of respective sizes (Krezek et al. 2004). The potential impacts of these fluctuations on aquatic habitats in the littoral zone have not been documented.

Wildlife and Vegetation

Wetland Species

Water level and flow fluctuations may negatively affect plants and animals inhabiting wetlands (Slivitzky 2002). Low water levels in the open water season can deprive certain species of breeding habitat. Fluctuating water levels can create instability along the shoreline and negatively affect breeding habitat. Winter draw downs can expose hibernating amphibians and reptiles, resulting in increased mortality due to freezing or predation. In addition, the roots of wetland plant species can be damaged during the winter if the draw down is extensive.

Concerns for wetland habitats were expressed for the mouth of the Spanish River, Biscotasi Lake, Bannerman Creek, Pogamasing Lake and Mozhabong Lake. The Spanish River Delta, identified as an Area of Concern (AOC) under the Great Lakes Water Quality Agreement, is currently designated as an Area in Recovery following development and implementation of a Remedial Action Plan (RAP) under the Canada-Ontario Agreement. Biscotasi Lake is within a provincial park where some nature reserve zones have been designated that include wetland habitats. The Bannerman Creek Nature Reserve Zone is located at the confluence of the Spanish River and Bannerman Creek, and is described as having sensitive features. Any potential impacts of water management practices on these wetlands have not yet been determined.

A concern was raised regarding low summer water levels contributing to increased water temperature and excessive aquatic vegetation growth in Armstrong Lake. Several factors can contribute to undesirable vegetation growth. These include nutrient enrichment from septic systems and fertilizer applications at cottages and the introduction of invasive species. The factors at play on Armstrong Lake are not known.

Waterfowl

Birds such as ducks, geese, loons, cranes and other wetland dependant species may be negatively affected by water level and flow fluctuations during nesting periods (spring and summer). In general, most shoreline birds and waterfowl can breed as early as April or shortly after ice break-up. The eggs incubate for about one month and the young leave the nest by July (Godfrey 1986). Water levels that drop after nesting may leave the birds and eggs exposed to predation. Water levels that continue to rise after nesting may flood the nest. Stable water levels during nesting may improve nesting success, particularly for birds such as loons. A general concern for the impact of water management on waterfowl was raised for Pogamasing Lake and concerns specific to loons were raised for Onaping Lake.

Moose

Moose utilize certain wetlands, rich in preferred species of aquatic vegetation, to supplement their dietary intake. Moose aquatic feeding areas are generally used from early July to mid-August (MNRF, 1988). Decreased water levels and flows may negatively affect moose aquatic feeding areas by reducing the amount of foraging area (Slivitzky 2002). Depending on the timing and extent of water level fluctuations, or lack of any variability; certain operating regimes may select for plant species tolerant to water regulation that may not be the dietary preference for moose.

The question of whether moose aquatic feeding areas are impacted by water management practices was raised for Biscotasi Lake. Potential moose aquatic feeding areas have been identified on this lake, but there is currently no information on whether there is an impact or not.

Beaver

During the winter, draw downs can expose the entrances to beaver lodges, preventing the beavers from safely accessing the water, leaving the beaver susceptible to increased predation (Rochester et al. 1984). In addition, increased flows from dams during the fall and/or winter can wash away feed piles located downstream, possibly resulting in starvation.

Questions on whether beaver have been impacted by water management practices were raised for Agnew Lake, Biscotasi Lake, and Sinaminda Lake. There are currently no reports available that demonstrate an impact.

Wood Turtle

The wood turtle is a provincially endangered species and is federally designated as threatened. Its' aquatic habitat consists of clear rivers, streams or creeks with a moderate current and a sandy or gravel bottom. Wood turtles over-winter on stream bottoms, but spend proportionately more time on land - preferring more open habitats such as wet meadows, swamps and fields. Water management practices that dewater wetlands, or draw down water levels in the winter can harm this species.

Wood turtles are known to inhabit the Spanish and Vermilion Rivers and may reside within the zone of influence of water management structures.

Blanding's Turtle

Blanding's turtle is a provincially threatened species. Marshes are important for young turtles. The dewatering of wetlands can concentrate turtles in localized areas exposing them to an increased risk of predation. Floods or high water flows can increase the mortality rates of eggs in the spring or young turtles in the fall (Kofron and Schreiber, 1985).

The species has a low reproductive rate and very late age of maturity. Flooding of nest sites may also limit reproductive success. Marshes and small waters are critically important areas for young turtles and it is suggested that these small waters receive more management attention and protection (Bury & Gremano, 2003). Wetland drawdown concentrates turtles into a diminished lakebed, creating a vulnerable situation for individuals forced to traverse terrestrial habitats (Hall & Cuthbert, 2000).

There have been recent reports of Blanding's turtles being found on Sultan Road in the Biscotasi Lake area, which is well beyond the normal northern extent of habitat. They have also been reported in the southern portions of the watershed, including the urban area of the City of Sudbury.

Bald Eagle

Bald eagles are a species of special concern in Ontario. From late spring to fall, high water levels or flows reduce the amount of foraging habitat. Foraging opportunities increase under low flows because fish become easier to catch (Brown et al, 1988).

Bald eagles are believed to be present throughout the watershed. While no specific water management issues have been identified for bald eagles, the planning team was cognizant of the species needs when developing and evaluating options.

6.4.5. Recreational Uses

Water uses such as boating and snowmobiling were categorized as recreational uses. Any impacts on these recreational activities could impact both individuals and organizations or businesses that depend on tourism. While damage to structures was discussed previously under the category of infrastructure and property damage, the ability to use docks and boat launches or other access points to lakes and rivers was grouped under recreational uses.

Boat Launching

Extreme fluctuations in water levels during open water periods can affect access to docks and launching pads. During years of minimal spring freshet and/or spring rains, summer levels may not be achieved until later on – after boaters, cottagers and business owners begin to use recreational access points. Drought years may exacerbate reduced elevations due to the lack of precipitation and increased evaporation. These types of concerns were raised on almost all water bodies where comments were received.

In some cases, as part of the normal operating regimes, summer levels are not attained until late May or early June, making it difficult to angle for pike in early spring. This type of complaint was primarily directed toward Agnew Lake but could be applicable for the rest of the other regulated lakes that have northern pike.

Requests for stable water levels were received in regards to Ramsey (Chapleau), Armstrong, Agnew, Pogamasing and Onaping Lakes.

Navigation (low water)

Lower than normal water levels due to draw down can increase the potential for obstacle hazards such as rocks and logs. The timing and extend of these effects can be influenced by drought. Submerged trees at the lake bottom may also surface and pose a navigation hazard known as "dead-heads". Low water levels can also limit boat access into some bays and can restrict people accessing cottages or favourite fishing or hunting areas. This type of concern was noted for most lakes.

Low flows on rivers were also noted to prevent boaters and paddling enthusiasts such as canoeists and kayakers from using the river at times. In particular, situation was noted as potentially negatively affecting the paddling experience of users of the Spanish River Waterway Provincial Park.

Navigation and Floating Debris (high water)

High water levels, generally in the spring and during a secondary peak in the fall, can make navigation more dangerous by increasing water flows in rivers and by washing logs and other debris into water bodies creating obstacle hazards. Even on unregulated lakes and rivers, flow patterns generally show a pattern of high flows in the spring, so it is difficult to ascertain to what degree, if any, regulated operations are increasing floating debris. While dams do have the ability to control levels and flows, the amount of control is limited to the discharge capacity. Reaction time of the operator depends on the frequency of monitoring and the time it takes to reach the dam site. Concerns of this nature were noted for almost all water bodies.

One tourist outfitter on the Spanish River noted that sudden changes (increases) in flow, attributed to increased flow from upstream reservoir lakes, sometimes results in equipment being washed downstream.

Snowmobiling

Snowmobiling safety was identified as a concern on Mozhabong, Biscotasi, Armstrong, Agnew, Pogamasing, Onaping and Sinaminda Lakes, as well as on the Lower Spanish River. It is strongly recommended that snowmobilers stay on designated marked trails when crossing over water to avoid danger. There are numerous factors that affect the formation and stability of ice on lakes and rivers and these must be assessed on a situation-specific basis. Natural factors include temperature and precipitation. On reservoir lakes, winter draw downs may expose underlying rocks or create pressure ridges. The lowering of water levels may also increase water movement or change flow patterns resulting in thin ice.

For some of the lakes where snowmobiling safety was raised as a concern (Mozhabong Lake, Armstrong (prior to 2017), Pogamasing, Onaping and Sinaminda Lakes), the draw down is completed well before the lake freezes. Any changes in water levels during the winter are generally a result of changes in precipitation and temperature, unless extreme conditions warrant further water management activities.

On Biscotasi and Agnew Lakes, the draw down occurs throughout the winter. Because of the winter draw downs, downstream flows in the Lower Spanish River during the winter are higher than what would occur naturally. Since it is not operationally feasible to change the draw down on reservoir lakes such as Agnew and Biscotasi, no options to modify the current operating regimes to address snowmobiling concerns were developed in this WMP. However, management of water levels to provide for a safer snowmobiling experience, where feasible, is a sub-objective of the WMP and therefore, will be considered when evaluating options. Also, stakeholder feedback will be recorded using the system described in WMP Effectiveness Monitoring.

6.4.6. First Nation Traditional Use

Traditional use of the Spanish and Vermilion Rivers by First Nations communities includes fishing, hunting, trapping and gathering. The WMP-related issues identified during First Nations consultations were similar in nature to those expressed by the general public and included erosion, shoreline property and infrastructure, fisheries and wildlife (and their habitat) and recreation. The bulk of the comments received during the Scoping Phase related to the Lower Spanish River, below Espanola.

6.4.7. Minimum Flow Requirements for Aquatic Ecosystems

For many fish species and invertebrates, a minimum flow threshold is needed to meet life-history requirements. Insufficient flows can result in high egg and fry mortality, and in extreme cases, adult mortality due to entrapment or impaired water quality. The amount of flow required may be species-dependant and, therefore, it is often difficult to model for an operating regime that considers the needs of several species. Instead, MNRF recommends the application of the Aquatic Ecosystem Guidelines (MNRF, 2002) as a holistic approach to addressing ecosystem needs. Provision of a minimum flow that mimics natural duration, timing and magnitude is considered the best option to addressing the life-history needs of all species.

Potential concerns about low water flows on aquatic systems were raised for the Spanish River Waterway Provincial Park, Onaping River, Bannerman Creek Delta Nature Reserve, the Vermilion River and John Creek. MNRF's mandate includes ongoing consideration and implementation of minimum flow at all hydro generating stations, through adaptive management, which is establishing and/or adjusting minimum flows based on evaluations of their overall potential effectiveness or consequences. It is intended that data collected as part of compliance and effectiveness monitoring, as well as data gap studies, will be reviewed annually in this context.

During planning team discussions, it was noted that flow in the Vermilion River, in particular, is influenced by the urban developments dotting its watershed. Junction Creek, a sub-watershed of the Vermilion, flows through Sudbury's downtown. Subsequently, it became apparent that more direct studies of flow and timing in certain areas might be justified – especially in association with temperatures critical to spawning.

Although some water quality concerns were expressed by the public, the scope of this water management plan does not deal with impairment of water quality due to the introduction of contaminants from sewage or other effluents. These issues typically fall within the mandate of the Ministry of Environment and Climate Change. If a period of insufficient flow were to develop the MNRF's (multi-agency) Ontario Low Water Response Plan is intended to be activated.

6.5. Priority Water Bodies and Related Issues

Rating criteria were developed to reflect the importance of concerns and/or issues relative to one another. The planning team summarized all issues, concerns, and mandates and assigned priority ranking based on five basic criteria: including public safety, environmental, socio-economic considerations and the number of users affected on system and/or the number of comments received. Obligations due to relevant federal and provincial legislation, regulations and Aboriginal rights and treaties were also taken into consideration during planning.

Based on these criteria, priorities were assigned to the following water management facilities and structures to address the issues and concerns. The priorities were assigned by the Planning Team and PAC, and approved by the Steering Committee. Priorities assigned to lakes and issues assisted in establishing data collection and effectiveness monitoring priorities, and were also used during options evaluation.

The following control structures, with their associated water bodies, were ranked based on the content and number of responses received through consultation, as well as known environmental concerns related to water management practices. Issue priorities were also assigned. For each water body, similar issues were grouped into one item.

1. Big Eddy Generating Station (includes High Falls and Nairn Falls Generating Stations)
    a. Erosion on Agnew Lake, and downstream of Agnew Lake
    b. The effect of water levels on water supply on Agnew Lake
    c. Fish concerns on Agnew Lake
    d. Dock/structure damage on Agnew Lake
    e. Boat launching on Agnew Lake
    f. Navigation on Agnew Lake
    g. Effect of water levels on wildlife on Agnew Lake
    h. Minimum flows for downstream aquatic ecosystems

2. Downstream of Espanola Generating Station (Lower Spanish River)
    a. Fish and aquatic ecosystem health concerns for the lower Spanish River
    b. Erosion on the lower Spanish River (from Agnew Lake to the mouth of the Spanish River)
    c. Boat launching on the lower Spanish River
    d. Effect of river level fluctuations on wetlands and wildlife on the lower Spanish River.
    e. Navigation on the lower Spanish River
    f. Minimum flows for downstream aquatic ecosystems

3. Onaping Lake Dam and Bannerman Creek Dam
    a. Erosion and sedimentation
    b. High water levels
    c. Fish concerns
    d. Low (minimum) river flows in the Onaping River and Vermilion River
    e. Boat launching
    f. Effect of water levels on wildlife (i.e loons)
    g. Bannerman Creek Delta Nature Reserve Zone
    h. Paddling on the Spanish River

4. Biscotasi Lake Dams
    a. Fish concerns
    b. Effect of water levels on wildlife and wetlands
    c. Navigation and flows on the upper Spanish River
    d. Minimum flows for aquatic ecosystem
    e. Dock damage
    f. Boat launching
    g. Erosion
    h. The effect of low water levels on water supply

5. Armstrong Lake Dam
    a. Erosion
    b. Boat launching
    c. Dock damage
    d. High water levels

6. Pogamasing Lake Dam
    a. Erosion and sedimentation
    b. Dock damage
    c. Boat launching
    d. Fish concerns
    e. The effect of water levels on water supply
    f. Effect of water levels on waterfowl and wetlands

7. Stobie Dam
    a. Erosion
    b. Boat launching
    c. Navigation

8. Indian Lake Dam
    a. Erosion
    b. Fish concerns
    c. Dock damage

9. Mozhabong Lake Dam
    a. Fish habitat concerns
    b. Effect of water levels on wildlife and shoreline vegetation
    c. Navigation

10. Ramsey Lake (Chapleau) Dam
    a. Erosion
    b. Dock damage

11. Wabagishik Lake Generating Station (Vermilion River)
    a. Minimum flows (including flows for walleye spawning and incubation).

12. Sinaminda Lake Dam
    a. Navigation
    b. Dock damage
    c. Boat launching
    d. Erosion
    e. Wildlife
    f. Fish concerns

13. Frechette Lake Dam
    a. Fish concerns (raised by Chapleau District MNRF during the draft plan review)

14. Canoe (Bardney) Lake Dam
    a. Fish concerns (raised by Chapleau District MNRF during the draft plan review)

All other lakes within planning area were not identified as having concerns (Three Corner Lake, Whitewater Lake, Windy Lake, Ramsey Lake (Sudbury), Lake Laurentian and Nepahwin Lake).

7.0 KEY GAPS IN BASELINE DATA AND INFORMATION

7.1. Summary of Key Data and Information Gaps

Water management planning discussions around issues, resource values and interests resulted in the identification of a number of gaps in baseline data that prevented informed decision-making on potential options that might advance the objectives of the Spanish & Vermilion Rivers WMP.

7.1.1. Erosion

Overall, the largest number of concerns raised in the scoping phase related to erosion of shoreline and also the washing of debris into lakes. Due to the complex nature of erosion, it was difficult to develop water management options that mitigate this concern when the mechanism and contribution of other factors are not fully understood. Also, erosion may be exacerbated by extremes in weather where water control by proponents is limited. The current water management plan is limited in scope to normal conditions where proponents are able to exercise control. It is recommended that a provincial initiative be undertaken to understand and develop a standardized approach to erosion issues. Once these guidelines have been developed, the water management plan may be amended accordingly. In the interim, the Planning Team recognized the importance of erosion concerns and considered them, where plausible, when evaluating options developed to address other concerns.

7.1.2. Power Generation

The impact of potential changes to the water management regime in the options development process could be estimated, from an economic standpoint, using potential gains or losses in available water for power generation and the application of a standard rate for purchased electricity and the application of a number of assumptions.

7.1.3. Damage to Shoreline Property and Infrastructure

The numbers of reports of shoreline property and infrastructure damage and the perceived causes varied. In some cases, it could not be determined if the damage was directly or indirectly related to water management practices or was the result of natural events. In some cases, it was also not known if the issue was widespread. In a couple of situations, there was conflicting information provided by stakeholders during consultations. In these instances, a decision was made to seek additional information through ongoing stakeholder feedback in the effectiveness monitoring process.

7.1.4. Aquatic Ecosystems

For fisheries-related issues there was a considerable amount of existing information on life history requirements of the various fish species, but little information on specific populations and habitat characteristics in the various waterbodies. The information gaps included presence/absence of species, available habitat, and reproductive success as influenced by water management practices rather than non-WMP issues such as angling pressure or natural events/processes. The same types of gaps were encountered for wildlife (flora and fauna).

Efforts to fill these data gaps are reflected in the baseline data collection program and data gap studies described in the next Chapter.

7.1.5. Recreation

Issues raised in regards to recreational uses (docking/launching of boats, navigation and snowmobiling) were sometimes similar to those for damage to shoreline property and infrastructure in that the cause and extent of the issues were not well understood or reports were conflicting. In these instances, a decision was made to seek additional information for subsequent re-evaluation through ongoing stakeholder feedback in the effectiveness monitoring process. As the information received through consultations was often very general, the intent of the stakeholder feedback information gathering exercise is to determine information on specific water flows, lake/reservoir elevations and timing perceived as problematic to stakeholders.

7.1.6. First Nations

Specific WMP-related issues raised by First Nations communities were similar in nature to those raised by members of the general public, therefore the identified data gaps were also similar. The process to collect and review stakeholder feedback, on an ongoing basis, applies also to feedback received from First Nations communities.

7.1.7. Aquatic Ecosystem Guidelines Natural Flow Regime

Information on the natural flow regime throughout the Spanish and Vermilion rivers is lacking due to its long history as a managed watershed and lack of historical data. Gaps of this nature may be filled by computer modeling exercises using managed flow data, long term climatic data and certain assumptions. Sufficient flow data is available only in association with hydroelectric generating facilities, not the more remote storage/reservoir lake dams. In these locations, data is limited and pertains only to lake levels, not downstream receiving environments. Data gaps remain in this area. The identified gaps and proposed action plans are discussed in Section 8.

8.0 BASELINE DATA COLLECTION PROGRAM

8.1. Original Data Collection Program

Baseline data describing the physical, biological and socio-economic characteristics of the Spanish and Vermilion Rivers system and the various water control structures was collected and reviewed from the following sources:

- Published reports and data (ie. Spanish River Valley Signature Site Strategy, Provincially Significant Wetland Reports, Statscan, etc.)
- Unpublished MNRF data (historical lake assessment surveys, Natural Resource Values Information System NRVIS, Natural Heritage Information Centre NHIC database, etc.)
- Information and advice from various MNRF jurisdictions – Ontario Parks Northeast Zone Sudbury, Espanola, Chapleau and Gogama field offices, Northeast Region Engineering Unit, and Northeast Region Science and Technology
- Lake level and flow data records from waterpower producers (Domtar and Vale)
- Operating Manuals and Plans (ie. 1993 Spanish River Water Management Plan and background documents)
- Discussions with local agencies and municipalities including MOECC, CS, CGS
- Information from the public and consultations with First Nation communities
- Discussions with various stakeholders such as tourist outfitters, baitfish harvesters, trappers, anglers, hunters, recreational boaters and paddling enthusiasts, and cottager associations (e.g. Onaping, Agnew and Pogamasing)

8.2. Information Collected and Studies Completed During the Planning Period and Subsequent to Submissions of the Draft WMPs in 2006 and 2009

Since 2006 a number of studies have been undertaken to fill specific data gaps identified in WMP Sections 6 and 7. Studies by others that are relevant to the planning area have also been identified. The following provides a brief description and summary of the results from some of those additional investigations.

8.2.1. Spanish River Valley Signature Site – Management Options

As part of the planning process for the Spanish River Valley Signature Site, MNRF created the Spanish River Valley Signature Site Management Options (MNRF 2004) document to identify issues and present options for the management of Spanish River and Biscotasi Lake Provincial Parks and three Enhanced Management Areas (EMA) – Sinaminda and Kennedy Lake Area EMA, Acheson Lake EMA and Swann Lake EMA. The Signature Site document recognizes the importance of water management planning for waterpower and the relationship with the Spanish & Vermilion Rivers WMP.

The purpose of the Signature Site document was to:

- Present to the public the proposed policy direction for the signature site, as specified in the policies and related directives of MNRF, including Ontario Parks;
- Outline planning options for dealing with significant issues;
- Identify proposed zoning alternatives within the provincial parks;
- Identify proposed management direction for the EMAs; and
- Seek and reflect public input to the proposed direction and planning alternatives.

The WMP process will continue to incorporate information and feedback from MNRF and Ontario Parks.

8.2.2. Erosion Study Between High Falls and Nairn Falls (Agnew Lake Issue 7.2 from Table 6.3.1)

On November 4, 2004, Trow Associates Inc. inspected two areas along the Spanish River with potential erosion concerns (Trow 2004). The first site was located approximately 1.5 miles downstream of the Big Eddy Dam on the east bank of the Spanish River along a gentle outside bend of the river where significant erosion was noted along an 80 ft. long section of the bank. The second site was located approximately 1.2 miles upstream of the Nairn Falls Dam on the east bank of the Spanish River along a gentle outside bend section of the channel where significant erosion was noted along a 15 ft. long section of the bank.

A sample of the eroded face material was collected and tested for grain size and erosion susceptibility. The material was generally fine grain sand with up to 50% silt-sized particles. Trow estimated that this kind of material, without vegetative cover, would be susceptible to erosion with channel water velocities in excess of 0.5 to 1.0 ft/sec.

Three general remediation options were explored but, at the time, Trow did not consider the erosion severe enough to warrant remedial action. It was Trow's opinion that the erosion was occurring under the natural process of migration of the river. The threshold velocities for erosion to occur are considered to be well within the normal flow regime of the channel, especially during the peak spring runoff event.

8.2.3. Flow Metric Sheets for Regulated and Predicted Natural Flow (Agnew Issue 7.5, Lower Spanish River Issues 12.1, 12.2, 12.3, 12.5, 12.10, 12.11, and Vermilion Lake and River Issue 11.7 from Table 6.3.1)

Regulated and natural flow metric sheets were prepared by MNRF for three generating facilities on the Spanish and Vermilion Rivers: Big Eddy (Vale), Wabagishik (Vale) and Espanola Main Dam (Domtar). The purpose of the flow metric sheets was to allow a comparison between regulated and (simulated) natural flows in accordance with MNRF's aquatic ecosystem guidelines.

From a comparison of the flow metric sheets, several main differences were identified between regulated and natural flows:

- The range of winter level fluctuations on several storage lakes are greater than the natural range, As a result, flows downstream of these reservoirs are greater than would occur naturally during the winter;
- The increased storage capacity of reservoirs dampens the spring peak flows; and
- When power generation facilities cycle operations during low flow conditions, flows are often less than what would occur in a natural flow regime. This is especially prevalent in August and September.

These flow metrics sheets will continue to be utilized when evaluating potential impacts and options for the identified concerns and will be updated as flow and level data are collected. It was expected that more specific information gained through focused aquatic ecosystem studies and stakeholder feedback could be used to identify specific flows/levels and timing that cause concern and potential options that could be explored.

8.2.4. Spanish River Rule Curves and Habitat Mapping for High Falls, Nairn Falls and the Abandoned Railway Crossing (Agnew Lake Issue 7.5 from Table 6.3.1)

A study was conducted between 2008 and 2009 (Great Lakes Environmental Services, 2009) to provide habitat mapping and to prepare rule curves for the High Falls and Nairn Falls Generating

Stations as well as an abandoned railway crossing located approximately 1.5km downstream of Highway 17 on the Spanish River.

The rule curves were then used to determine where and when velocity and water depth were appropriate for walleye spawning. They were also used to determine the impact of variations in discharge on the amount of usable habitat at the three sites.

Five cross sections were surveyed downstream of High Falls GS and four deemed suitable for walleye spawning. Seven cross sections were surveyed downstream of the Nairn Falls GS. Although all sections had some suitable spawning substrate, only three had water depths and flow velocities that were suitable for walleye spawning. Six cross sections were surveyed downstream of the abandoned railway, with only two found to have suitable substrate, depth and flow velocities for walleye spawning.

The study recommended further work, including actual walleye spawning surveys, in the various sections of the river.

8.2.5. Confirm Presence of Lake Sturgeon Below Nairn Falls (Agnew Lake Issue 7.5 from Table 6.3.1)

A survey was conducted by MNRF in 2008. The presence of both adult and juvenile sturgeon was confirmed in the Spanish River below Nairn Falls (and above Espanola Main Dam), indicating the presence of a reproducing population (pers. comm.. W. Selinger, MNRF). Only one juvenile was captured.

8.2.6. Flow requirements for Spawning Walleye in the Spanish River below the Espanola Generating Station (Lower Spanish Issue 12.5 and Agnew Issue 7.5 from Table 6.3.1)

A pooled area, created by a depression below the Espanola Main Dam, was examined by S. Finucan, MNRF in 2009 for its ability to support spawning walleye. Water that passes through the generators, rather than over the dam, bypasses the slightly elevated pooled area. There was a concern that spawning walleye may be trapped in the pool and/or egg mortality might occur under dry conditions where available water is preferentially passed through the generators.

For the purposes of maintaining connectivity between the pooled area and the rest of the river, Domtar maintains a continuous flow from the Main Dam to provide sufficient water depth to allow fish such as walleye and Lake Sturgeon to move safely out of the Pool from May 1st to June 15th. This has been in place since the spring of 2010; in 2013 this was extended to July 1st .

8.2.7. Spanish and Vermilion River Walleye and Lake Sturgeon Studies between Lorne Fall, High Falls and Espanola Falls (Agnew Lake Issue 7.5, Vermilion River Issues 11.6 and 11.7 and Lower Spanish Issues 12.5, 12.10 and 12.11 from Table 6.3.1)

Vale and Domtar have had long-standing daily communications in regards to water regulation from their respective facilities on the Spanish and Vermilion Rivers. Domtar's facility is located downstream of the confluence of the Spanish and Vermilion Rivers and receives water that is passed from Vale's Big Eddy/High Falls and Nairn stations on the Spanish River and Vale's Wabageshik station on the Vermilion River. With participation from Domtar, MNRF and Sagamok Anishnawbek First Nation, Vale conducted a comprehensive field investigation from 2011 to 2013 (Kilgour and Associates, 2012 and 2013), which was mainly focused on characterizing walleye and lake sturgeon habitat downstream of existing Spanish and Vermilion River generating stations and potential impacts posed by the current operating regime.

The study, at a cost of approximately $600,000, includes documented field observation of spawning walleye, walleye and lake sturgeon netting studies, water flow and habitat observations and predictive habitat and hydrodynamic modeling. Preliminary modeling results, using flow data from a 10-year period, predict that the amount of potential spawning habitat for walleye is actually enhanced downstream of High Falls, Wabageshik and Domtar Espanola generating stations,by the current operating regime as opposed to a naturalized flow regime. However, these differences are sometimes offset by the potential for drying of spawning habitat due to water fluctuations. At Nairn, the potential spawning habitat consists largely of original construction rubble and the total available area is much less than at other locations.

The presence of a remnant population of lake sturgeon was confirmed in the area of the Spanish and Vermilion Rivers confluence bounded (based on current information) by Domtar Main Dam, Nairn Falls Dam and the Vermilion River Graveyard Rapids area (first rapids upstream of the confluence). However, the presence of juveniles was not detected as it had been previously by MNRF in 2008. Based on extensive netting effort, lake sturgeon are not believed to be present above Nairn Falls and none have been documented above Graveyard Rapids. The total potential lake sturgeon spawning habitat below Nairn generating station,was predicted to be greater under the current flow regime than one that is naturalized. However, the available area in both scenarios is not believed to be sufficient to support a viable population. The cobble area of the Graveyard Rapids, based on visual observation, is believed to present far more potential to support lake sturgeon spawning activity.

The area below Domtar facilities has the highest amount of available habitat for walleye and lake sturgeon spawning – enough to support viable populations. Based on modeling using 10 years of historic data, there is potential for spawning habitat loss of about 7% - largely due to drying exhibited in the “pool” below the Main Dam. Domtar’s recently-adopted practice of providing continuous flow over the Main Dam during spawning season is expected to restore available habitat to an area similar to that which would be expected under a naturalized flow regime.

Studies funded by Domtar in 2013 and 2014 (Kilgour, 2013 and 2014) confirmed spawning activity in the pool and that the Lower Spanish River is utilized by adult lake sturgeon throughout the summer months – with movement from the river into the North Channel of Lake Huron by late September. While young-of-year and juvenile lake sturgeon were not encountered during the field surveys that were conducted in late August, it was established that a 2007 study by DFO had documented movement of juvenile lake sturgeon from the river into the North Channel by mid-August. Kilgour also determined that suitable habitat for spawning occurred downstream of Espanola at the Cameron Rapids and at the Sables River tributary. Birch Creek and Lacloche Creek did not have suitable habitat.

8.2.8. Restoration Stocking, Water Level Fluctuations and Minimum Downstream Flow at Armstrong Lake (Armstrong Issues 6.1 through 6.10 from Table 6.3.1)

A 2009 MNRF lake trout review listed lake trout as extirpated from Armstrong Lake. Restoration stocking commenced in 2009, with 2000 2-yr olds placed, and this was repeated in 2011. In 2012, 500 2-year olds were stocked, along with 1500 yearlings. There will be ongoing work to assess the success of the stocking effort, in particular recruitment. (pers. communication W. Selinger, MNRF). Vale voluntarily advanced the fall drawdown target date from November 1st to October 15th for the purpose of reducing potential impacts on spawning lake trout.

In 2013, as part of its ongoing infrastructure management program, Vale initiated engineering studies, along with hydrological and fish surveys, to identify options for the aging Armstrong Dam structure. The preferred option, approved by MNRF and DFO following the completion of an environmental assessment and associated permitting consultations, was to replace the stop-log dam structure with a non-operational concrete dam and weir, outfitted with a diversion pipe through the dam to provide a minimum outflow of 0.13m3/s (4.6 cfs) at all times. The design considered minimum flow for ecosystem health downstream in combination with maintaining acceptable lake levels throughout the year (based on the existing rule curve and public consultations) for recreational and other purposes in the lake itself. Construction of the preferred option occurred in fall 2016. As of the new construction, drawdown practices are discontinued in favour of naturalized lake level fluctuations. Dam features also include greater ability to safely pass water in extreme weather events.

8.2.9. Shorthead Redhorse (Lower Spanish River Issue 12.7 in Table 6.3.1)

The Shorthead Redhorse *(Moxostoma macrolepidotum)*, described in section 7, is a sucker species present in the Spanish River below Domtar's Espanola Main Dam and has been studied as a part of Domtar's Pulp and Paper Environmental Effects Monitoring (EEM) program. It has been determined that populations of this fish are on the rise due primarily to riverbed substrate improvements associated with a reduction in historical fibre deposits. Studies did not identify any water management-related impacts, therefore neither options development nor effectiveness monitoring is proposed as part of the WMP process.

8.2.10. Rising Water and Walleye Spawning Success (Agnew Issue 7.3 in Table 6.3.1)

A Fish Community Ecologist with MNRF's Biodiversity Branch was consulted on the topic of potential for rising waters on Agnew Lake during the spring spawn to have a detrimental impact on walleye populations. A literature search did not reveal any papers indicating such potential, rather the primary issue reported for water level management and impact on walleye was related to falling water levels and egg dessication (S. Kerr, personnel communication). During the spring freshet and filling of the Agnew Lake reservoir, Vale has adopted a practice of not allowing the water level to be reduced by more than 4 inches from the maximum water level attained on a given day. This measure was implemented specifically for the walleye spawning period to prevent dessication of deposited eggs.

8.2.11. Blanding's Turtle in Biscotasi Lake Area (Biscotasi Issue 4.18 in Table 6.3.1)

Blanding's turtle is listed as a threatened species in Ontario. This medium-sized turtle inhabits a network of lakes, streams, and wetlands, preferring shallow wetland areas with abundant vegetation. Generally, it can be found throughout the southern and central portions of the province except along the Bruce Peninsula and the far southeast. In recent years though, there has been a number of confirmed observations in northern Ontario, as far north as Timmins. Currently, there are only two known occurrences of Blanding's turtle in Biscotasi Lake area, from 2008 and 2009. Three days of field surveys were conducted in the summer of 2009 around these sightings, but no additional turtles were found. Since then, no additional observations of Blanding's turtles have been reported to the Chapleau MNRF office or to the Natural Heritage Information Centre.

Blanding's turtles hibernate from October to April in clean, shallow waters that can also include lacustrine wetlands in the embayments of lakes. Lowering of the lake level after the turtles enter hibernation can affect their survival. Since all storage lakes in the northern part of the Spanish River watershed operate with a drawdown through the fall and winter, there is a concern that water management practices may negatively affect populations potentially inhabiting these lakes.

Although, to date, there have been no targeted surveys for Blanding's turtles on Biscotasi Lake, public awareness of Blanding's turtles and other species at risk has been greatly increased since implementation of the *Endangered Species Act (ESA)*. Members of the public are encouraged to report the sightings of any species at risk to the MNRF. Both Vale and MNRF (including Ontario Parks) staff are aware of the potential presence Blanding's turtles in the watershed and will report any encounters to MNRF biologists or park ecologists.

In the event the presence of this species is confirmed on Biscotasi Lake (or any other controlled lake), an assessment of the current operating regime on potential impacts to Blanding's turtles will be conducted. If it is determined that negative impacts are likely, then the dam owner will require authorizations under the ESA, either through registration and application of rules in regulation to minimize impacts to the turtles, or through a Section 17(2)(c) permit that also has requirement for overall benefit measures where negative impacts cannot be sufficiently minimized.

8.3. Remaining Baseline Data Collection

The following items represent areas where it is felt there could be a potential direct or partial correlation between an issue/concern and water management practices, yet there remains insufficient information to develop an option for an alternative operating regime in order to address a specific issue or objective in the Water Management Plan. As these data gaps become resolved their information will be incorporated into the WMP process.

8.3.1. High Priority Data Gaps

A brief description of proposed high priority studies is provided below with potential partnerships indicated. Final project participation will be determined at a later date and may also include other governments, agencies, organizations, and public groups. Timing or implementation of these studies is contingent on funding or the availability of resources (i.e. in-kind contributions), with the intention to complete higher priority studies first.

Flows in the Upper Spanish River (Biscotasi Issues 4.12, 4.13, 4.16 and 4.17, Onaping Issue 9.11 Table 6.3.1)

The upper Spanish River is part of the Spanish River Waterway Park. Several wetlands and nature reserves exist within the park that may require adequate flows for ecosystem health and maintenance. At the same time, lake level management must take into account ecosystem and stakeholder needs on the reservoir/lakes, of which several are also part of designated park and/or conservation areas. In order to provide information on potential impacts from any alternative flow regimes that might be considered, it would be necessary to weigh downstream benefits with any potential impacts/benefits to be realized on the reservoir/lakes.

Unfortunately, the Spanish River does not possess long-term flow monitoring data other than the flow estimates collected at the generating stations on the lower part of the river. Lake level and flow data for the remote upper watershed area is sparse. This data is not suitable for the creation of a model that might be utilized to evaluate potential alternative combined level and flow scenarios resulting from manipulations of the various control points along the system. Other Water Management Planning exercises in the province have benefitted from the presence of long-term flow monitoring data from gauges such as those set up and maintained by Environment Canada.

A consultant has been retained by Vale to evaluate options for longer-term flow measurement and the development of a calibrated flow model for the river/reservoir system. The plan for 2016 is to implement flow monitoring devices on the east and west branches of the upper Spanish River and the Wakonassin River, and level monitoring at Biscotasi Lake. A minimum of 10 years data, commensurate with the term of this WMP, is required for initial model development and calibration, considering that long term data is required to capture natural system fluctuations. The progress of this project will be monitored routinely as part of the annual reporting and review process.

In subsequent plans, the calibrated hydrological model will enable more robust evaluation from an ecological and power generation standpoint and in consideration of all identified stakeholders, to identify potential operational improvements that best balance stakeholder interests and sustain the aquatic ecosystem. The benefit of a watershed model is that it is pertinent to any and all waterbodies within the system, which allows for predictive modeling of alternative operational scenarios at one or more control points and the resultant impact on the system as a whole.

While the model is being constructed, additional data such as the experiences of paddlers within the Spanish River Waterway Park over a range of years and flow conditions can be collected to supplement future evaluations of potential alternative operational regimes.

Survey Pogamasing Lake Residents to Develop a Preferred Option for Lowering the Maximum Summer Elevation Level (Pogamasing Issue 8.1, and would also impact 8.3, 8.5, 8.7 and 8.8 from Table 6.3.1)

A survey was distributed in 2015, to determine how the residents of Pogamasing Lake feel about a proposed option from the Public Advisory Committee to lower the maximum (summer) elevation from 1206 feet (367.59 m) to 1205.5 feet (367.44 m) in order to help mitigate erosion.

Currently, Pogamasing Lake is maintained at an elevation of 1206.0 feet from the end of May to the end of August. During high flow years, the maximum allowable summer elevation is 1207.0 feet. The lake is lowered to an elevation of 1204.0 feet or until September 30th, whichever comes first.

The results of the survey are being compiled to determine possible next steps for discussion within the ongoing annual WMP reporting and review process.

8.3.2. Remaining Data Gaps

Fulfillment of remaining data gaps (from Table 6.3.1), which were not initially identified as amongst the highest priority, or which were deferred pending a larger strategy, will be contingent on funding and resource availability or opportunities identified throughout the ongoing WMP process.

Although there was a key data and information gap around the commonly identified issue of erosion (discussed Section 7.1), due to its complexity the issue was deferred pending the development of a larger strategy and accompanying guidance by MNRF.

Remaining aquatic ecosystem issues consisted primarily of perceived or unknown impacts from water level manipulations to fish and fish habitat, aquatic and shoreline vegetation, beavers and loons. There are opportunities to conduct data gap studies on these issues, where appropriate, with ongoing dam infrastructure upgrades and/or proposed changes to the current operating regimes of WMP structures. For example, detailed studies occurred at Vale's Armstrong Dam in association with permitting its replacement in 2016. Ongoing assessment and repairs of other dam infrastructure will continue to occur throughout the life of the WMP.

Opportunities to explore remaining data gaps may also arise as a result of the data collected through the implementation of flow monitoring stations and the development of hydrological models as is being pursued through high priority data gap studies. Additionally, opportunities may arise from provincial government initiatives involving Crown Land, parks and protected areas – which comprise a large portion of the planning area – as well as through potential partnerships with public and Aboriginal stakeholder groups where interest is expressed.

9.0 OPTIONS DEVELOPMENT

Taking into account comments received during the Scoping Phase (presented in Table 6.3.1), and where there was enough data to consider the development of options to current water management operating regimes, potential options were identified for further evaluation with respect to their ability to balance the needs of river users.

These options were presented for further public input at Options Development Phase consultations. Where there was not enough information to adequately justify the consideration of options, or if potential options for identified issues conflicted, then issues were referred for follow up as either a data gap to be filled, or to effectiveness monitoring – with the potential for future options development. For those situations where public input was not received in the initial Scoping Phase Consultations, a second opportunity was provided for the public to comment.

9.1. Options Presented for Consideration in 2005 and Resulting Public Response

9.1.1. Ramsay Lake Dams

After consideration of input received, the current operating regime was presented to the public as the recommended option for Ramsay Lake (Chapleau) #7 and 8 dams. The Planning Team felt that, due to its complexities, the issue of erosion should be considered by the MNRF and addressed as a province-wide initiative. Ramsay Lake elevation is currently managed to 1 foot lower than stipulated in the 1993 WMP, therefore the issue of high water levels damaging docks was referred to effectiveness monitoring for follow-up, with the potential for future options development. No responses were received during the Options Development Phase consultations.

Options Presented During Consultation	Responses (0)		
	Agree	Disagree	Unsure
Current Operating Regime	0	0	0

9.1.2. Mozhabong Lake Dam

The current operating regime and a 2nd option to decrease the amount of drawdown in Mozhabong Lake by 1 foot were presented to the public for consideration. One response was received, in favour of the latter option, which was proposed in response to an issue raised regarding low water levels in the fall making navigation difficult (Issue 2.3 from Table 6.3.1). Mozhabong Lake is a naturally-sustaining lake trout lake. The drawdown, as much as 2m, outlined in the 1993 WMP is timed to occur by September 30th. It is acknowledged that this could impact navigation in the fall, but it is necessary that the drawdown be completed prior to lake trout spawning.

Options Presented During Consultation	Responses (1)		
	Agree	Disagree	Unsure
Current Operating Regime	0	1	0
Decrease Drawdown 1 Foot	1	0	0

9.1.3. Indian Lake Dam

The current operating regime and a 2nd option to decrease the high water target by one foot was presented to the public for consideration. The option was directed at a comment about high water levels damaging docks (Issue 3.4 from Table 6.3.1).

Options Presented during Consultation	Responses (0)		
	Agree	Disagree	Unsure
Current Operating Regime	0	0	0
Lower Lake Level 1 Foot	0	0	0

No completed questionnaires were received from stakeholders during consultation sessions. Subsequently, the issue will be monitored and reviewed through ongoing stakeholder feedback.

9.1.4. Biscotasi Lake Dams

The current operating regime and 3 other potential options were presented to the public. An option to lower the lake level by one foot was considered in response to concerns about property damage from high water (Issue 4.4) and difficult navigation (Issue 4.7). An option to increase the summer level by one foot was presented to address concerns about boat launching (Issue 4.5) and navigation (Issue 4.6) during low water levels. An option to complete the drawdown by February 1st was presented in consideration of an issue regarding snowmobiling (Issue 4.8 from Table 6.3.1).

Options Presented During Consultation	Responses (2)		
	Agree	Disagree	Unsure
Current Operating Regime	0	0	1
Lower Lake Level 1 Foot	1	0	0
Increase Lake Level 1 Foot	0	1	0
Complete Drawdown by February 1st	0	0	1

A total of two completed questionnaires were received for Biscotasi Lake options. The results indicated one favourable response for lowering the summer level by one foot and one response indicating disagreement with increasing the lake level by one foot. Responses indicated some uncertainty around the options for status quo and for completing the drawdown by February 1st. Stakeholder feedback will be monitored and assessed to gain more specific information on the frequency of occurrence and circumstances surrounding these issues.

9.1.5. Ministic Lake Dam

Aside from the current operating regime, an option to increase level monitoring of Ministic Lake was presented to the public. Maintaining the current operating regime would alleviate concerns about navigation and water supply issues if the summer lake level were to be lowered. The purpose of the increased monitoring would be to alert operators to high waters and allow for some potential mitigation through log movements.

Options Presented During Consultation	Responses (0)		
	Agree	Disagree	Unsure
Current Operating Regime	0	0	0
Increased Monitoring	0	0	0

No completed questionnaires were received from the public in regards to these options.

9.1.6. Armstrong Lake Dam

A total of five options, including current operating regime, were proposed for consideration by the public at WMP consultation sessions. Similarly to Ministic Lake, an option was proposed to increase the frequency of lake level monitoring. To facilitate boat launching in the summer and fall, an option to raise the lake level by 9 inches was proposed. Conversely, to address concerns about property damage due to high water in the spring and fall, an option to decrease the summer level by 9 inches was presented. To address property damage concerns due to ice buildup in the winter, an option to increase the winter drawdown by 9 inches was proposed.

Options Presented During Consultation	Responses (0)		
	Agree	Disagree	Unsure
Current Operating Regime	0	0	0
Increased Monitoring	0	0	0
Raise Lake Level 9 Inches	0	0	0
Increase Winter Drawdown 9 Inches	0	0	0
Lower Lake Level 9 Inches	0	0	0

No completed questionnaires were received from public consultation sessions.

9.1.7. Agnew Lake (Big Eddy) Dam and Generating Station

The greatest number of completed questionnaires (14) was received in regards to Agnew Lake options. The majority of respondents disagreed with the current operating regime and agreed with a drawdown limit of 849 ft. that was proposed in response to water supply concerns (Issue 7.8 from Table 6.3.1). The majority favoured an earlier start for drawdown (December 1st) that was proposed to alleviate concerns regarding dock damage from ice buildup (Issue 7.9). Having the summer level achieved by the May long weekend was favourable to almost all as a way to address boat launching (Issue 7.11), navigation (Issues 7.13 and 7.16) and low water concerns in the spring. Also, most favoured more stable summer levels. There was a split in opinion in regards to the proposed lowering of the summer level by six inches to address identified open water season high water issues (Issue 7.15). Almost half of respondents were unsure about a proposal for the consideration of minimum water flows from Agnew Lake, through Big Eddy Generating Station.

Options Presented During Consultation	Responses (14)		
	Agree	Disagree	Unsure
Current Operating Regime	1	10	1
Drawdown Limit of 849 Ft.	12	0	1
Draw Down Starts in December	7	2	1
Summer Level Reached by May 24 Weekend	11	1	0
Lower Lake by 6 Inches	7	3	3
More Stable Summer Levels	8	2	1
Minimum Flows at Big Eddy GS	1	3	6

9.1.8. Pogamasing Lake Dam

Respondents interested in Pogamasing Lake level options appeared to be largely split in opinion on options presented to address various concerns about boat launching (Issue 8.4 from Table 6.3.1), navigation (Issue 8.5), erosion (Issues 8.1 and 8.2) and property damage (Issues 8.1 and 8.3), but the majority favoured the option that would have the summer elevation lowered by ½ foot as multiple concerns were associated specifically with high water (Issues 8.1, 8.3, 8.7 and 8.8).

Options Presented During Consultation	Responses (11)		
	Agree	Disagree	Unsure
Current Operating Regime	3	4	0
Lake Level 1 ft. Lower until June 15th	3	3	0
Increase Summer Levels by 1 Month	1	2	1
Lower Lake Level ½ Ft.	8	3	0

9.1.9. Onaping Lake/Bannerman Dams

A total of 13 questionnaires were received in relation to Onaping Lake options. Respondents were consistently in agreement. None agreed with maintaining the status quo. All agreed with lowering the lake level by one foot between May 15th and September 15th, which was proposed to address concerns over high open water season levels (Issues 9.1, 9.2, 9.3, 9.4, 9.7 and 9.10 from Table 6.3.1). For the purposes of boat launching (Issue 9.8), an option to maintain summer levels from May 15th to September 15th was proposed, but was not favoured by respondents. However, all agreed with an option to start the drawdown on September 15th and have it completed by October 15th for the purpose of minimizing potential impacts to spawning lake trout (Issue 9.5).

Options Presented During Consultation	Responses (13)		
	Agree	Disagree	Unsure
Current Operating Regime	0	11	0
Lower Lake Level 1 Ft.	12	0	0
Summer Levels – May 15th to September 15th	0	9	0
Complete Drawdown by October 15th	13	0	0

9.1.10. Sinaminda Lake Dam

A total of three options, including the current operating regime, were presented for public consideration. There were some concerns that lowered levels would affect lake trout. One favourable response was received for status quo. Another favourable response was received on the option of maintaining the same lake level year round. An option to increase the open water season lake level by one foot was proposed to address access and water line issues, but did not elicit any responses.

Options Presented During Consultation	Responses (2)		
	Agree	Disagree	Unsure
Current Operating Regime	1	0	0
Maintain Lake Level Year Round	1	0	0
Increase Lake Level 1 Ft.	0	0	0

The questionnaires distributed during the WMP Consultation Phase also contained a second opportunity to comment on the following dams/waterbodies for which no options were proposed (this following a lack of identified issues raised during the Scoping Phase). These waterbodies were Canoe Lake, Frechette Lake, High Falls, Kelly Lake, Lake Laurentian, Maley Reservoir, Nairn Falls, Nepahwin Lake, Nickeldale Reservoir, Ramsey Lake (Sudbury District), Robinson Lake, Three Corner Lake, Windy Lake, Whitewater Lake and Strathcona Lake. Again, no feedback was received.

9.2. Subsequent Revised Issue/Concerns and Associated Options Following Consultation Feedback

The Consultation Phase resulted in variable degrees of response from the public. Subsequent consideration of options by the Planning Team was limited to those waterbodies where feedback was deemed sufficient to warrant further analysis. In some cases, revised options were proposed based on feedback received from the public at the consultation sessions, from the PAC, or from subsequent meetings between proponents and cottager's associations. Options arising from flow metrics sheets developed by MNRF during the baseline data collection were also considered, where appropriate. The final suite of issues for which alternative operating regimes were proposed and evaluated was as follows:

9.2.1. Agnew Lake (Big Eddy Generating Station)

1. *Water levels are too low in spring, summer and/or winter for point, well and/or water lines (WMP objective relating to protection of shoreline property and infrastructure).* **An option was developed to reduce the extent of the winter draw down to an elevation of 849.00 feet.**

2. *High water levels in the fall and spring damage docks (WMP objective relating to protection of shoreline property and infrastructure)*. **An option was developed to start the draw down earlier prior to freeze-up (December 1). Minimal draw down elevation maintained throughout April to May 1.**

3. *Water levels are too low in the spring and summer to launch boats (WMP objective relating to recreation).* **An option was developed to achieve summer level by the May long weekend. Another option was to achieve summer level by May 1st.**

4. *Water levels too low in the spring and summer (WMP objective relating to recreation).* **An option was developed to achieve summer level by the May long weekend.**

5. *MNRF Aquatic Ecosystem Guidelines (AEG) - Minimum Flow for Ecosystem Health*. The regulated nature of the Spanish River alters the flow regime, and thus the aquatic ecosystem, from its natural state. The goal of the AEG is ecological sustainability of the managed river system, which is the point of the water management planning process. **The estimation of natural flow metrics for the Big Eddy location allows for consideration of regulated versus natural flow regimes as follows:**

   a. Maintain minimum flow at Big Eddy of 8.5 cms (300 cfs) at all times versus daily average (ie. cycling);
   b. Maintain minimum flows comparable to 80% exceeded in natural flow metrics for each month; and
   c. Maintain minimum flows comparable to 80% exceeded in natural flow metrics for the lowest month (20.2 cms/713 cfs).

9.2.2. Pogamasing Lake

1. *High water levels eroding the shoreline and damaging shoreline structures (WMP objective relating to erosion).* This type of situation occurs naturally, so the contribution of water management practices is unclear. However, **an option to lower the maximum operating level by 2 ft., from 1209 ft. (368.503m) to 1207 ft. (367.894m) was developed.**

2. *High water levels cause damage to docks and buildings (WMP objective relating to protection of shoreline property and infrastructure).* **An option to lower the summer target by 0.5 ft., to 1205.5 ft. (367.436m) was considered.**

9.2.3. Onaping Lake

1. *Fluctuations in water levels and high water levels are eroding the shoreline (WMP objective relating to erosion).* This type of situation occurs naturally, so the contribution of water management practices is unclear. However**, an option to decrease the maximum operating limit by one foot, from 1309 ft. (398.678m) to 1308 ft. (398.983m) was developed.**

2. *Winter drawdown and high water levels in the spring damage docks (WMP objective relating to protection of shoreline property and infrastructure)*. **An option to decrease the maximum operating limit by one foot, from 1309 ft. (398.678m) to 1308 ft. (398.983m) was developed.**

3. *Open water levels too high (WMP objective relating to protection of shoreline property and infrastructure).* **An option was developed for a summer operating target of 1306.5 ft (398.221m).**

4. *Fluctuations in water levels on Onaping Lake may affect spawning (WMP objective relating to aquatic ecosystems)*. There are several information needs such as the locations and depths of spawning areas, impacts of rising water over incubating eggs, and the current impact of the draw down on incubating lake trout eggs. **An option was developed to complete the draw down by October 15th.**

5. *Water levels too low in the spring and fall to launch boats (WMP objective relating to recreation).* **An option was developed to reach summer water levels by Victoria Day weekend and to maintain them until Labour Day weekend.**

9.3. Range of Options Evaluated

The options subsequently developed by the planning team for further evaluation are summarized below.

9.3.1. Agnew Lake (Big Eddy Generating Station)

1. Current operating regime.
2. Limit winter draw down (January 1 to April 15) of Lake Agnew to best practice level of 849 ft (261.82 m) with a compliance level of 846 ft. (257.86 m) to accommodate flood avoidance in high flow years.
3. Begin drawdown a month earlier (start December 1).
4. Achieve summer elevation of 859.50 ft (+6"/-12"), or 261.98m (+15 cm/-30 cm) by:
    a. the long weekend in May; and
    b. May 1st.
5. Minimum flows passed downstream:
    a. minimum flow for 1 generator (~300 cfs or 8.5 cms)
    b. 80% exceeded flow by month
    c. 80% flow exceeded for lowest month (~ 700 cfs or 19.8 cms).

9.3.2. Pogamasing Lake Dam

1. Current operating regime.
2. Lower maximum elevation by 2 ft. (0.61m) to 1207 ft. (367.89 m)
3. Lower summer target elevation, by 0.5 ft. (15 cm), to 1205.50 ft (367.44 m) between May and June 1.

9.3.3. Onaping Lake (Onaping Dam and Bannerman Creek Dam)

1. Current operating regime.
2. Reduce maximum lake level by 1 ft. (30 cm), to 1308 ft. (398.68 m), from May 1 to August 31.
3. Lower summer target elevation of 1306.5 ft.
4. Complete the draw down by October 15th.
5. Extend existing summer levels from Victoria Day weekend to Labour Day weekend.

9.4. Net Benefits and Costs Associated with Each Option

The net benefits and costs associated with each option were evaluated by the Planning Team in light of the WMP objectives and sub-objectives developed during the Scoping Phase of the planning process. This evaluation was revisited in 2009, with a quantitative component added for the purpose of validation. A score ranging from -3 to +3 was assigned, with 0 indicating no impact or no net impact and -3 or +3 indicating significant negative or positive impacts, respectively. Tables 9.4.1 through 9.4.3 provide a summary of anticipated impacts of each of the options considered for Agnew, Pogamasing and Onaping Lakes, respectively.

Table 9.4.1: Net benefits and costs anticipated from Agnew Lake options on WMP objectives (score from -3 to +3 in brackets reflects net cost or net benefit)

WMP OBJECTIVES and SUB-OBJECTIVES	AGNEW LAKE LEVEL – OPTIONS CONSIDERED					FLOW OPTIONS FOR BIG EDDY GENERATING STATION (Normal Operations)		
	1	2	3	4a	4b			
	OPTION ADDRESSES ISSUE(S) OF							
	Current Operating Regime	**Wells and Point Lines**	**Dock Damage**	**Boat Launches**	**Boat Launches**	**Low Flow Augmentation**	**Natural Flow Regime**	**Natural Flow Regime**
	DESCRIPTION					DESCRIPTION		
	Current operating regime	**Compliance level of 846 ft. (minimum) with best practice of 849 ft. depending on environmental conditions (draw down January 1st – April 15th of 10.5 ft. maximum)**	**Begin drawdown a month earlier (December 1st to April 15th; December 1st to 31st – 6 inches)**	**Have summer levels (859.5 ft. +6/-12 inches) by May long weekend**	**Have summer levels reached by May 1st**	**Maintain minimum flow at Big Eddy of 8.5 cms (300 cfs) at all times versus daily average (ie. cycling)**	**Maintain minimum flows comparable to 80% exceeded in natural flow metrics for each month**	**Maintain minimum flows comparable to 80% exceeded for natural flow metrics to lowest month (20.2 cms/713 cfs)**
EROSION								
Mitigate erosion with operating processes	No change (0)	(1)	(0)	(0)	(0)	No change expected (0)	No change expected (0)	No change expected (0)
POWER GENERATION								
Maximize hydroelectric power production	No change (0)	Estimated loss of 3 million kwh generation in years when the lake is not lowered to 846 ft. (-3)	Estimated loss of 86,400 kwh generation if the drawdown is one month earlier (-1)	Estimated gain of 115,584 kwh generation when the lake is filled two weeks earlier (1)	Estimated gain of 246,680 kwh generation when the lake is filled 4 weeks earlier (1)	Steady flow versus cycling would reduce generation at 3 plants by an estimated 252,000 kwh. Also, cycling occurs during peak consumption when purchased electricity is more expensive, saving an estimated $53,000 per month based on July-Sept 2008 on-peak rates from IESO web site (-1)	An estimated loss of 300,000 kwh generation would occur if maintaining continuous minimum flows compared with cycling. The cost of purchased power would be an estimated additional $406,000 over the three month period evaluated (July-Sept 2008) (-3)	Cycling the plants rather than maintaining a continuous minimum flow increases generation by an estimated 28,000 kwh per month, netting an estimated $96,000 worth of electricity due to maximum use of on-peak generation (-2)
PROTECTION OF SHORELINE PROPERTY AND INFRASTRUCTURE								
Prevent the exposure, freezing and drying up of water lines, wells and points	No change (0)	Assumption that 849 ft. would address everyone's concerns (3)	Does not address concerns with draw down on wells (0)	No anticipated effect – water issues are in April (0)	No anticipated effect – water issues are in April (0)	Only a concern in late winter/early spring (0)	Only a concern in late winter/early spring (0)	Only a concern in late winter/early spring (0)
Manage water levels and flows in such a way as to minimize the damage to shoreline structures (ice, fall storms, fluctuating water levels)	No change (0)	Changes in the draw down will not mitigate any damages to shoreline structures (0)	Lower water levels prior to freeze-up, to prevent ice build-up on docks will not address all damages (2)	Full supply level reached earlier presents potential increased chance of wave damage caused by storms in May (-1)	Full supply level reached earlier presents potential increased chance of high water and wave damage caused by storms in May. Ice may also be present in cold springs (-2)	Minimum flow will not enhance damages (0)	Only a concern in late winter/early spring (0)	Only a concern in late winter/early spring (0)
Manage water levels to address fluctuating water levels and minimize flooding	No change (0)	Higher risk to public safety and property due to increased flooding potential (-3)	Will not address flooding concerns (0)	Greater risk of flooding due to loss of freeboard (-1)	Greatly reduces capacity to mitigate flooding caused by spring freshet (-3)	Will not exacerbate flooding (0)	Only a concern in late winter/early spring (0)	Only a concern in late winter/early spring (0)
AQUATIC ECOSYSTEMS								
To maintain or enhance the fisheries by considering sufficient water levels and flows that meet the life history requirements of different fish species	No change (0)	Reduction in the amount of littoral zone exposed (1)	Early draw down will not result in any additional negative impacts to fish community (0)	Reduction in generation to bring water levels up earlier may cause impacts to downstream fisheries? (0)	Increased access to potential pike habitat. May negatively impact walleye eggs? (0)	Benefit to downstream fisheries (walleye, sturgeon), but potential conflict with lake fisheries (bass, walleye) (0)	Greater negative impact to bass on Agnew Lake if water levels drop more quickly (-1)	Greater negative impact to bass on Agnew Lake if water levels drop more quickly (-1)
Manage water levels and flows in such a way that may protect, maintain or enhance wildlife habitats and populations by considering wildlife needs and aquatic ecosystem principles	No change (0)	In theory, reduction in operating range will move closer to natural viability (1)	Earlier drawdown will not result in any additional negative impacts to wildlife (species already hibernating) (0)	Better mimics natural variability (0)	Closer to natural range of variability on the lake, but decreases flows downstream to almost 0 cm/s resulting in potential negative impact to walleye and sturgeon (-1)	Closer to Aquatic Ecosystem Guideline principle of natural flow regime (1)	Meets Aquatic Ecosystem Guideline intents (3)	Moves closer to Aquatic Ecosystem Guideline intents (2)
RECREATION								
Facilitate the docking and launching of boats by having adequate water levels	No change (0)	(0)	Not expected to impact boating, but may need to confirm in effectiveness monitoring (0)	Addresses long weekend interests, but not always the walleye anglers (2)	Will address angler requirements to fish for pike and walleye (3)	Negative impacts to larger number of lake users, but would benefit downstream users (-1)	(-3)	(-2)
Facilitate navigation by having adequate water levels	No change (0)	(0)	Not expected to impact boating, but may need to confirm in effectiveness monitoring (0)	Addresses long weekend interests, but not always the walleye anglers (2)	Will address angler requirements to fish for pike and walleye (3)	Negative impacts to larger number of lake users, but would benefit downstream users (-1)	(-3)	(-2)
Manage water levels during the winter to provide more favorable conditions for snowmobiling	No change (0)	(0)	No measurable improvement expected in ice conditions (0)	Not in snowmobile season (0)	Not in snowmobile season (0)	Not in snowmobile season (0)	(0)	(0)

WMP OBJECTIVES and SUB-OBJECTIVES	AGNEW LAKE LEVEL – OPTIONS CONSIDERED					FLOW OPTIONS FOR BIG EDDY GENERATING STATION (Normal Operations)		
	1	2	3	4a	4b			
	OPTION ADDRESSES ISSUE(S) OF							
	Current Operating Regime	Wells and Point Lines	Dock Damage	Boat Launches	Boat Launches	Low Flow Augmentation	Natural Flow Regime	Natural Flow Regime
	DESCRIPTION					DESCRIPTION		
	Current operating regime	Compliance level of 846 ft. (minimum) with best practice of 849 ft. depending on environmental conditions (draw down January 1st – April 15th of 10.5 ft. maximum)	Begin drawdown a month earlier (December 1st to April 15th; December 1st to 31st – 6 inches)	Have summer levels (859.5 ft. +6/-12 inches) by May long weekend	Have summer levels reached by May 1st	Maintain minimum flow at Big Eddy of 8.5 cms (300 cfs) at all times versus daily average (ie. cycling)	Maintain minimum flows comparable to 80% exceeded in natural flow metrics for each month	Maintain minimum flows comparable to 80% exceeded for natural flow metrics to lowest month (20.2 cms/713 cfs)
FIRST NATIONS								
Manage water levels and flows to minimize damage to, maintain or protect traditional uses and cultural heritage values	No change (0)	Some risk of flooding and possible damages to values. Sagamok further downstream than other affected communities (-1).	No known aboriginal values on Agnew Lake (0)	No known aboriginal values on Agnew Lake (0)	Increased risk of flooding and possible damages to values. Sagamok further downstream than other affected communities (-2)	Slight improvement to use of fisheries (1)	(1)	(1)

Table 9.4.2: Net benefits and costs anticipated from Pogamasing Lake options on WMP objectives (score from -3 to +3 in brackets reflects net cost or net benefit)

WMP OBJECTIVES and SUB-OBJECTIVES	POGAMASING LAKE LEVEL – OPTIONS CONSIDERED		
	1	2	3
	OPTION ADDRESSES ISSUE(S) OF		
	Current Operating Regime	Erosion	Erosion Shoreline Damage
	DESCRIPTION		
	Current operating regime	PAC recommends lowering summer target elevation to 1205.5 ft. (June 1st to Aug 31st)	Lower maximum elevation from 1209 to 1207 ft. (June 1st to Sept 30th)
EROSION			
Mitigate erosion with operating processes	No change (0)	Lowering of 6 inches may have some positive impact (1)	Levels higher than 1207 ft. are not very frequent, so little change (1)
POWER GENERATION			
Maximize hydroelectric power production	No change (0)	No net change (0)	Amount of water lost for generation is negligible (0)
PROTECTION OF SHORELINE, PROPERTY AND INFRASTRUCTURE			
Prevent the exposure, freezing and drying up of water lines, wells and points	No change (0)	No information in plan on what the issue is. Therefore, cannot evaluate with confidence (0)	No information in plan on what the issue is. Therefore, cannot evaluate with confidence (0)
Manage water levels and flows in such a way as to minimize the damage to shoreline structures (ice, fall storms, fluctuating water levels)	No change (0)	(1)	Levels higher than 1207 ft. are not very frequent, so limited benefit (1)
Manage water levels to address fluctuating water levels and minimize flooding	No change (0)	(0)	Minimize local flooding (1)
AQUATIC ECOSYSTEMS			
To maintain or enhance the fisheries by considering sufficient water levels and flows that meet the life history requirements of different fish species	No change (0)	(0)	Levels higher than 1207 ft. are not very frequent, so limited benefit (0)
Manage water levels and flows in such a way that may protect, maintain or enhance wildlife habitats and populations by considering wildlife needs and aquatic ecosystem principles	No change (0)	No information in plan on what the issue is. Therefore, cannot evaluate with confidence (0)	(0)
RECREATION			
Facilitate the docking and launching of boats by having adequate water levels	No change (0)	Several comments from public asking to keep status quo as lowering lake levels will make access harder (-1)	(0)
Facilitate navigation by having adequate water levels	No change (0)	Several comments from public asking to keep status quo as lowering lake levels will make navigation harder (ie. rocks) (-1)	(0)
Manage water levels during the winter to provide more favorable conditions for snowmobiling	No change (0)	(0)	(0)
FIRST NATIONS			
Manage water levels and flows to minimize damage to, maintain or protect traditional uses and cultural heritage values	No change (0)	No known issues (0)	No known issues (0)

Table 9.4.3: Net benefits and costs anticipated from Onaping Lake options on WMP objectives (score from -3 to +3 in brackets reflects net cost or net benefit)

WMP OBJECTIVES and SUB-OBJECTIVES	ONAPING LAKE LEVEL – OPTIONS CONSIDERED				
	1	2	3	4	5
	OPTION ADDRESSES ISSUE(S) OF				
	Current Operating Regime	High Water Levels Property Damage	High Water Levels (PAC)	Fisheries	Boat Launches
	DESCRIPTION				
	Current operating regime	Lower maximum elevation to 1308 ft. year round	Lower maximum summer elevation target to 1306.5 ft.	Complete draw down between Labor Day and October 15th	Have summer elevation reached by Victoria Day long weekend, maintained until Labour Day
EROSION					
Mitigate erosion with operating processes	No change (0)	Water levels as high as 1309 were rare, so there is probably little change (0)	Tighter control of elevation will mitigate concerns that erosion occurs at water levels of 1307 ft. or more (2)	Most of draw down completed in September anyway (0)	(0)
POWER GENERATION					
Maximize hydroelectric power production	No change (0)	Water levels as high as 1309 were rare, so there is probably little loss to generation (0)	Possible spillage in spring (wasted), and lost generating potential in the fall (-1)	Using water for shorter period of time may increase risk of spilling and wasting water (0)	May be holding water back for one week in September that could be used for generation (-1)
PROTECTION OF SHORELINE, PROPERTY AND INFRASTRUCTURE					
Prevent the exposure, freezing and drying up of water lines, wells and points	No change (0)	(0)	(0)	Elevation of 1304 ft. reached sooner gives potentially longer period with no water (-1)	(0)
Manage water levels and flows in such a way as to minimize the damage to shoreline structures (ice, fall storms, fluctuating water levels)	No change (0)	Most docks set at 1307 ft. anyway (0)	(1)	(0)	(0)
Manage water levels to address fluctuating water levels and minimize flooding	No change (0)	Benefits gained by lake residents offset by increased risk of flooding downstream (0)	Increased risk of flooding downstream (-1)	Need to pass more water over shorter period of time could increase risk of flooding downstream (-1)	(0)
AQUATIC ECOSYSTEMS					
To maintain or enhance the fisheries by considering sufficient water levels and flows that meet the life history requirements of different fish species	No change (0)	Levels of 1309 ft. were not commonly reached anyway (0)	Reduced amount of potential pike habitat and increased dessication of eggs if levels lowered (-1)	(2)	(0)
Manage water levels and flows in such a way that may protect, maintain or enhance wildlife habitats and populations by considering wildlife needs and aquatic ecosystem principles	No change (0)	(0)	Will result in lower flows downstream during the fall (-1)	(0)	Need water to address effluent concerns in Espanola (-1)
RECREATION					
Facilitate the docking and launching of boats by having adequate water levels	No change (0)	(0)	Suggested by cottagers that 1307 ft. or higher impeded access to boathouse and docks (too high) (1)	Delayed start of drawdown benefits cottagers on Labour Day but earlier completion may be detrimental for cottagers in October/November (0)	Will address the needs of most lake users during spring and late summer (2)
Facilitate navigation by having adequate water levels	No change (0)	(0)	Risk of exposed rocks balanced by risk of floating debris (ie. deadheads) (0)	Delayed start of drawdown benefits cottagers on Labour Day but earlier completion may be detrimental for cottagers in October/November (0)	Will address the needs of most lake users during spring and late summer (2)
Manage water levels during the winter to provide more favorable conditions for snowmobiling	No change (0)	(0)	(0)	(0)	(0)
FIRST NATIONS					
Manage water levels and flows to minimize damage to, maintain or protect traditional uses and cultural heritage values	No change (0)	Not aware of any issues on Onaping Lake (0)	(0)	(0)	(0)

10.0 METHODS AND CRITERIA FOR EVALUATION OF ALTERNATIVE OPERATING REGIMES

Alternative operating regimes were evaluated using baseline information collected during the Scoping Phase and the expertise of the various Planning Team participants in anticipating the possible impacts of each option against the WMP objectives.

To validate qualitative discussions and decision-making, a quantitative scoring system was subsequently developed to compare the various options for their impact on meeting the WMP objectives for each waterbody/facility:

1. Each of the five main WMP objectives was assigned an equivalent weighting of 1 which was further divided amongst any sub-objectives based on their relative priority and/or the extent of the issue/impact potentially related to water management practices in the specific waterbody (see Table 10.1).
2. The scores (-3 to +3) that had been determined previously in Section 9.5 for each unique combination of option and objective were then multiplied by the weighting factor for that objective or sub-objective.
3. The resultant scores for each option were then added to give a net score for the option, all objectives considered (see Table 10.2).

Table 10.1: Weightings used to evaluate options' impact on achieving WMP objectives.

WMP OBJECTIVES and SUB-OBJECTIVES	WEIGHTING		
	Agnew	**Pogamasing**	**Onaping**
EROSION	**1**		
Mitigate erosion with operating processes	1	1	1
POWER GENERATION	**1**		
Maximize hydroelectric power production	1	1	1
PROTECTION OF SHORELINE, PROPERTY AND INFRASTRUCTURE	**1**		
Prevent the exposure, freezing and drying up of water lines, wells and points	0.35	0.3	0.1
Manage water levels and flows in such a way as to minimize the damage to shoreline structures (ice, fall storms, fluctuating water levels)	0.15	0.7	0.4
Manage water levels to address fluctuating water levels and minimize flooding	0.5	0	0.5
AQUATIC ECOSYSTEMS	**1**		
To maintain or enhance the fisheries by considering sufficient water levels and flows that meet the life history requirements of different fish species	0.67	0.67	0.67
Manage water levels and flows in such a way that may protect, maintain or enhance wildlife habitats and populations by considering wildlife needs and aquatic ecosystem principles	0.33	0.33	0.33
RECREATION	**1**		
Facilitate the docking and launching of boats by having adequate water levels	0.4	0.45	0.3
Facilitate navigation by having adequate water levels	0.3	0.35	0.5
Manage water levels during the winter to provide more favorable conditions for snowmobiling	0.3	0.2	0.2
FIRST NATIONS	**1**		
Manage water levels and flows to minimize damage to, maintain or protect traditional uses and cultural heritage values	1	1	1

Table 10.2: Net scores for individual options' anticipated impact on achieving combined WMP objectives

WATERBODY/ FACILITY	OPTIONS CONSIDERED	NET SCORE
Agnew Lake/ Big Eddy	Current operating regime	0
	Compliance level of 846 ft.(minimum) with <u>best practice</u> of 849 ft. depending on environmental conditions (draw down Jan 1st to Apr 15th 10.5 ft. max) The option was compliance limit of 849 ft., but the preferred option recognizes a best practice limit of 849 ft. with 846 ft. allowed pending environmental conditions.	-2.45
	Begin draw down one month earlier (draw down Dec 1st to Apr 15th, Dec 1st to Dec 31st, 6 inches)	-0.7
	Have summer levels (859.5 ft. +6"/-12") reached by May long weekend	1.75
	Have summer levels reached by May 1st	-1.03
	Maintain minimum flow at Big Eddy 8.5 cms (300 cfs) at all times versus daily average (ie. cycling)*	-0.37
	Maintain minimum flows comparable to 80% exceeded in natural flow metrics for each month*	-3.78
	Maintain minimum flows comparable to 80% exceeded in natural flow metrics for lowest month (20.2 cms/713 cfs)*	-2.41
Onaping Lake	Current operating regime	0
	Lower maximum elevation to 1308 ft. year round	0
	Lower maximum summer elevation target to 1306.5 ft.	0.2
	Complete drawdown between Labor Day and October 15th	0.74
	Have summer elevation reached by Victoria Day long weekend, maintained until Labor Day	0.27
Pogamasing Lake	Current operating regime	0
	PAC Recommendation to lower summer target elevation to 1205.5 ft. (June 1st to Aug 31st)**	0.9
	Lower maximum elevation from 1209 to 1207 ft. (June 1st to Sept 30th)	1.7

* *These options were developed after the creation of MNRF flow metrics sheets*

A range of scores resulted from the quantitative evaluation of individual options' abilities to achieve the combination of WMP objectives. For the most part, the quantitative exercise validated the preferred options. Most had positive scores, indicating an overall anticipated net positive impact. However, there were instances where the preferred options achieved an overall negative score. These were further discussed amongst the Planning Team and a couple of options adopted by proponents despite the negative scores. In the case of the minimum drawdown level on Agnew Lake, a compromise was reached whereby 849 ft. would be Vale's best operating practice, with 846 ft. used only during potential spring flood conditions where public and dam safety could be compromised. Also, the fall drawdown would begin one month earlier, on December 1st, despite an estimated loss to power generation potential. These compromises would help to alleviate public concerns over water supply and dock damage due to ice buildup, yet provide an opportunity to reduce potential flooding and risks to dam safety during spring freshet in high flow years. The options, and those identified as preferred, were presented at Public Information Sessions on July 21st, 26th and 28th, 2005. Feedback was requested from the public via questionnaires distributed at the sessions. In some cases, preferred options were revisited and subsequently modified based on further public input.

11.0 OPERATING REGIME

The purpose of the WMP is to derive an operating regime that best balances the needs of all users on the managed water system. The updated WMP also adds an enforceable compliance component to water management facility operation which necessitates some general changes to existing rule curves as well as those where alternative operating regimes are to be implemented following stakeholder consultations and Planning Team deliberations.

Proposed facility operating regimes and the general appearance of the rule curves in comparison to those in the 1993 WMP are listed in this section. All waterpower facilities now have proposed normal operating target levels throughout the year along with compliance limits for maximum and minimum water levels. The rationale for the stated targets and compliance limits are also provided for reference. Operation outside of these boundaries is only expected to occur under abnormal conditions, which are described in the Compliance section of the WMP.

11.1. Addition of Compliance Limits to Existing Normal Operation Rule Curves

The 1993 Spanish River WMP included rule curves for the operation of waterpower generation storage lakes under low, normal and high flow situations. The current directive of MNRF water management planning is to introduce an enforceable compliance component to the management of waterpower facilities that applies to “normal” conditions. Therefore, in the new WMP the rule curve for normal operating conditions has been represented as the “target” elevation to which each storage lake should be managed in order to balance the needs of river users. A number of factors including precipitation, temperature, hours of sunshine, snow pack and water content, all impact waterpower management. Given the variable nature of these factors and their impact on water levels and flows, there will inevitably be fluctuation around the targets.

In the current WMP, it has been decided to apply the high and low operating condition targets from the 1993 WMP as upper and lower compliance limits of the normal target range for the storage lakes. This is primarily due to the relative lack of data points available for remote sites to establish a reasonable estimate of normal variability around the target. However, at sites where there was suitable data, compliance limits could be established in this way.

Given the limitations of these facilities with respect to maintaining target elevations during weather extremes, there are allowances made for relief from compliance limits under flood and drought conditions. These are further explained in Section 13.

Following consultation with the MNRF, in situations where the normal target elevation in the 1993 WMP was at the same elevation as the proposed winter minimum lower level limit, the winter minimum lower level limit was lowered by six inches to one foot in the current WMP to provide an operating buffer to account for normal variation around target levels. This buffer is not intended to allow proponents to drop their target levels and this will be monitored through effectiveness monitoring activities. The following lakes were adjusted: Armstrong, Biscotasi, Indian, Ministic, Mozhabong, Onaping, Pogamasing, and Ramsey (Chapleau District).

For Ramsey Lake (Sudbury District), the compliance limits are consistent with existing trigger levels for reporting associated with the City of Greater Sudbury Permit to Take Water for the Davis St. Pump Station, which is a part of the City’s potable water supply system.

11.2. Facilities Maintaining Current Normal Operating Regime

There were a number of waterbodies/facilities for which no comments were received during public or First Nations consultations. In the absence of identified concerns, no options were developed. In other cases, comments/concerns were received, but options were not developed due to a lack of supporting information (see discussion in Section 9). For waterbodies/facilities in these categories the current operating regime has been chosen as the preferred option until such time as data gap or effectiveness monitoring initiatives provide sufficient information to support potential options development.

11.2.1. Frechette Lake

No issues were raised during the Scoping and Options Development Phases, so normal condition target levels were adopted from the 1993 WMP rule curve with high and low level compliance limits derived from the high and low water rule curves. Chapleau MNRF later provided comments expressing concern about fluctuating water levels and potential impacts on spawning activities in the lake, which contains northern pike, lake whitefish and white sucker. However, no alternative operating regimes were proposed. Data from ongoing WMP review and reporting exercises, including levels and stakeholder feedback will continue to be monitored and evaluated under Effectiveness Monitoring.

The minimum summer limit is 1395.79 ft geodetic (425.44 masl or 11 ft above sill) from June 1st to November 1st. The maximum upper level limit is 1399.79 ft (426.66 masl or 15 ft above sill) and the minimum lower level limit from November 2nd until May 31st is 1387.79 ft (422.99 masl or 4 ft above sill). The drawdown begins in November and ends in December. Targets and levels are depicted in Figure 11.2.1.

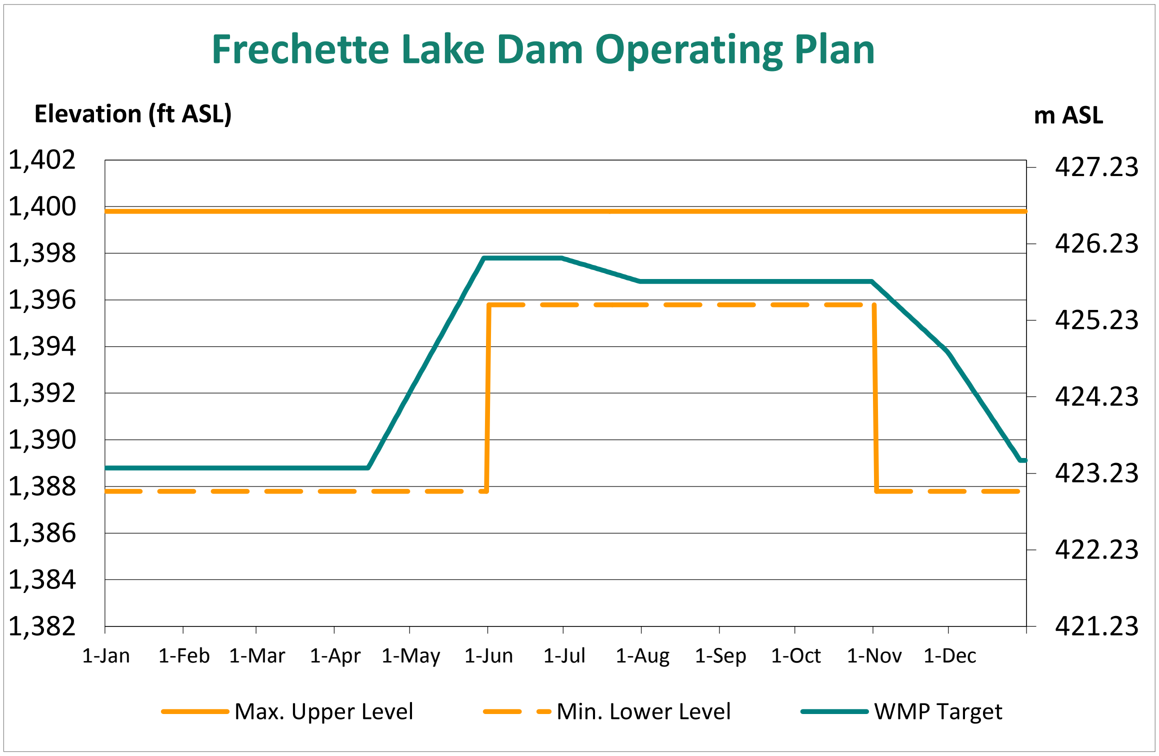

Figure 11.2.1: Frechette Lake preferred option.

11.2.2. Canoe (Bardney) Lake

No issues were raised for Canoe (Bardney) Lake during the consultation process. Therefore, normal target elevations were retained from the 1993 WMP, with high and low compliance limits applied by using the high and low water rule curves. Chapleau MNRF later provided comments expressing concern about fluctuating water levels and potential impacts on spawning activities in the lake, which contains northern pike, walleye, lake whitefish and white sucker. However, no alternative operating regimes were proposed. Data from ongoing review and reporting exercises, including levels and stakeholder feedback will continue to be monitored and evaluated under Effectiveness Monitoring.

The normal target elevation is 1394.33 ft geodetic (424.99 masl or 8 ft above sill) from June 1 until October 1, and the minimum summer level is 1391.33 ft 424.08 masl) from June 1 until November 1. The maximum upper level limit is 1395.33 ft (425.30 masl or 9 ft above sill) and the minimum lower level limit is 1389.33 ft (423.47 masl or 4 ft above sill). Target levels and limits are depicted in Figure 11.2.2.

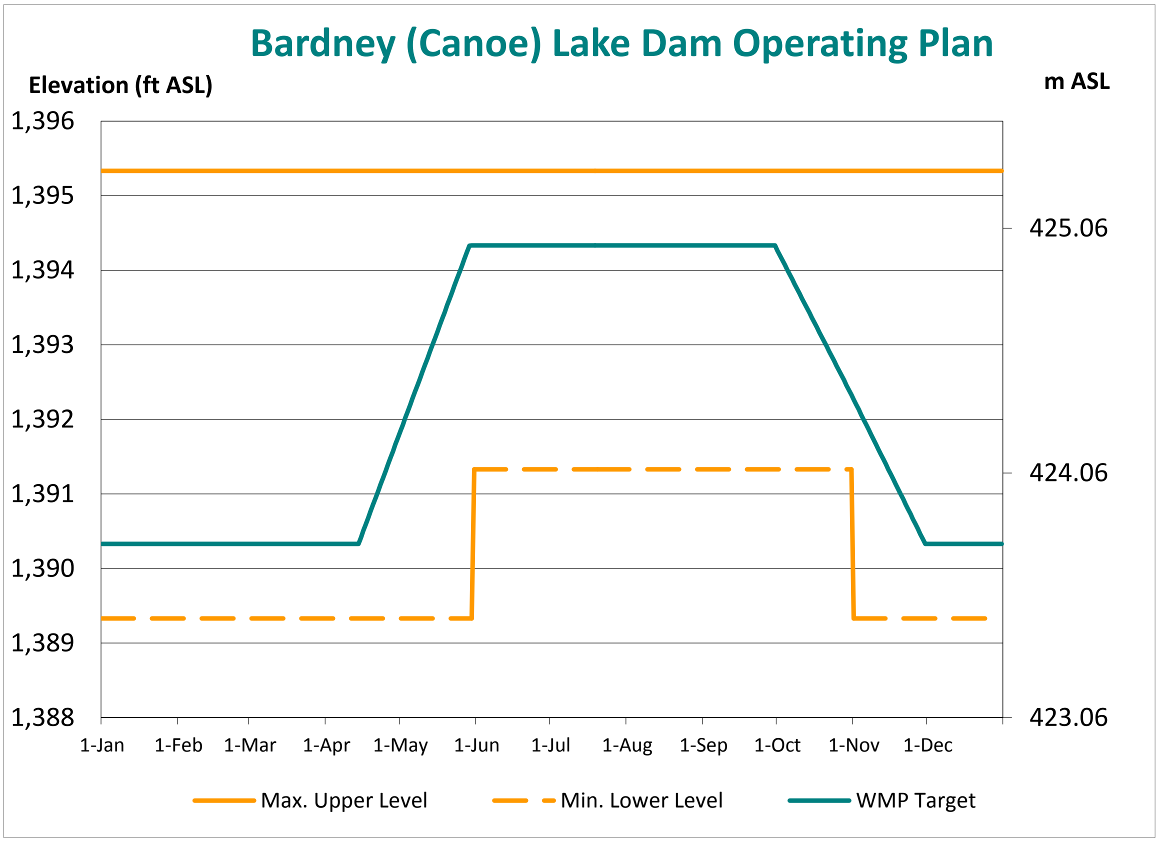

Figure 11.2.2: Canoe (Bardney) Lake Preferred Option

11.2.3. Ramsey (Chapleau) Lake Dams #7 & 8

The 1993 WMP normal conditions rule curve was maintained as the preferred option for Ramsey Lake. The new curve contains a normal target and upper and lower compliance limits derived from the 1993 rule curves for normal, high and low flow conditions.

A concern was raised by a member of the public, during scoping, related to high water levels and ice causing damage to docks and eroding the shoreline. Since the summer target elevation has been temporarily reduced by 1 ft as a precaution pending upgrading of the aging structure to safely accommodate its original design storage, the preferred option presented to the public at consultation meetings was status quo. No further feedback was received, but stakeholder feedback will be monitored and could be revisited through the ongoing planning process.

The normal target drawdown is 1334.52 ft geodetic (406.76 masl or 7.5 ft above sill) and target summer elevation 1343.02 ft (409.35 masl or 16 ft above sill). The minimum drawdown limit is 1333.52 ft (406.46 masl or 6.5 ft above sill), with a minimum summer limit of 1339.02 ft (408.13 masl or 12 ft above sill) and an overall maximum upper limit of 1344.52 ft (409.81 masl or 17.5 ft above sill). The preferred option is depicted in Figure 11.2.3.

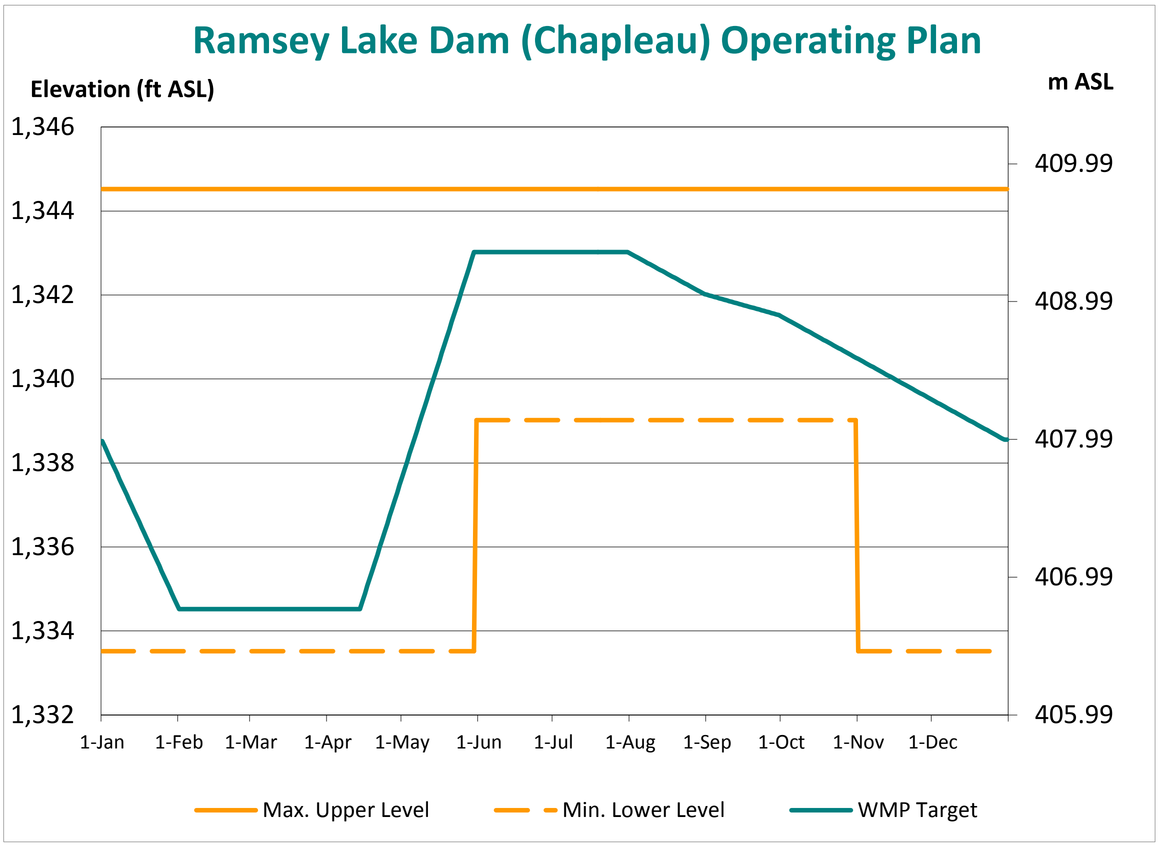

Figure 11.2.3: Ramsey Lake preferred option.

11.2.4. Mozhabong Lake

The 1993 WMP had addressed previous concerns about fisheries by stipulating that drawdown be stabilized to 1346.25 ft geodetic (5 ft above sill) by October 1st of each year. The purpose was to accommodate lake trout spawning. The Planning Team noted that a concern was received in relation to low waters causing navigation concerns in the fall, but determined that this practice should be maintained as the preferred option for normal operating target levels and the high and low flow condition curves used to set maximum and minimum elevations of the normal range for compliance purposes.

The normal target drawdown is 1346.25 ft geodetic (410.34 masl or 5 ft above sill) and target summer elevation 1350.25 ft (411.56 masl or 9 ft above sill). The minimum drawdown limit is 1345.25 ft (410.03 masl or 4 ft above sill), with a minimum summer limit of 1349.25 ft (411.25 masl or 8 ft above sill) and an overall maximum upper limit of 1352.75 ft (412.32 masl or 11.5 ft above sill). The preferred option is depicted in Figure 11.2.4.

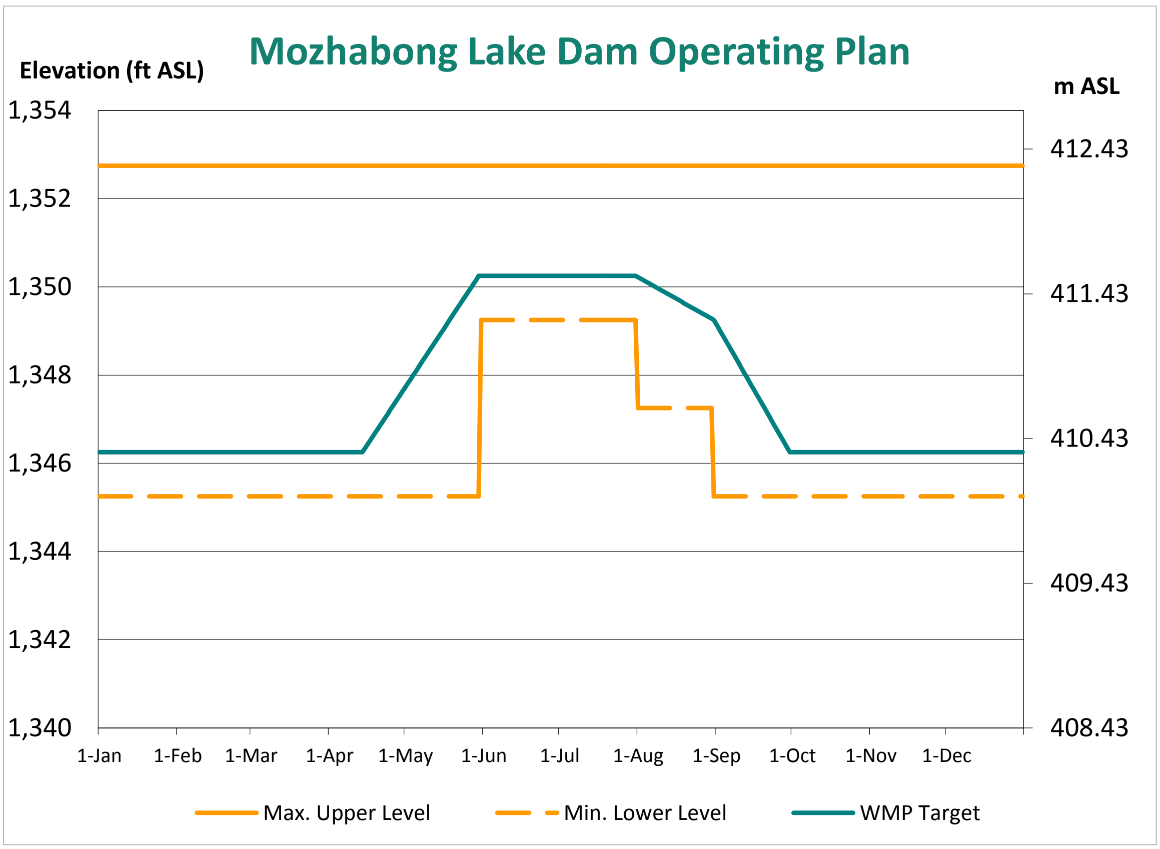

Figure 11.2.4: Mozhabong Lake preferred option.

11.2.5. Indian Lake

Pending the outcome of data gap studies and/or effectiveness monitoring to further evaluate identified concerns with high water levels and fisheries, the preferred option for Indian Lake is to adopt the 1993 WMP rule curve for normal operating conditions as the target and use the high and low flow condition curves to set maximum and minimum elevations of the normal range as compliance limits. An option to reduce the high water target by 1 ft. was presented for public comment, but no responses were received.

The normal target drawdown is 1338.26 ft geodetic (407.90 masl or 4 ft above sill) and target summer elevation 1343.26 ft (409.43 masl or 9 ft above sill). The minimum drawdown limit is 1337.26 ft (407.60 masl or 3 ft above sill), with a minimum summer limit of 1340.26 ft (408.51 masl or 6 ft above sill) and an overall maximum upper limit of 1344.50 ft (409.80 masl or 10 ft above sill). The preferred option is depicted in Figure 11.2.5.

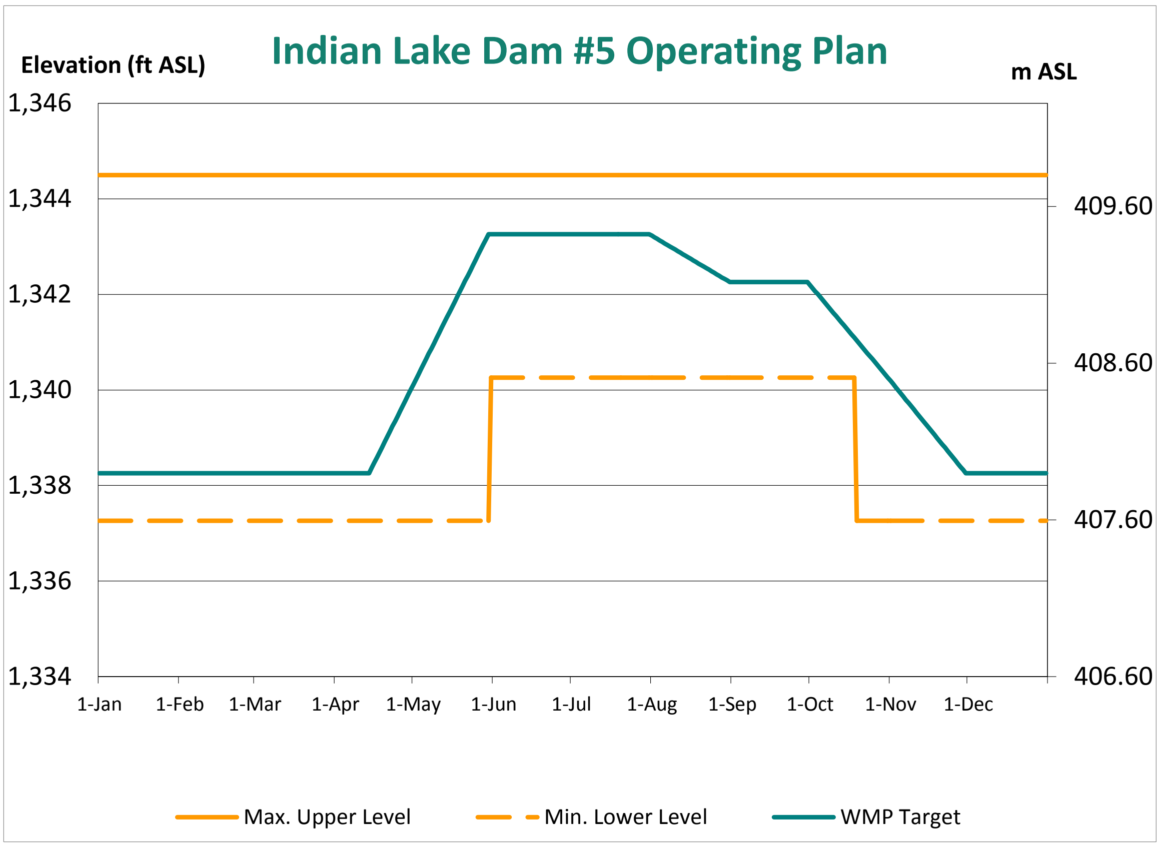

Figure 11.2.5: Indian Lake preferred option.

11.2.6. Biscotasi Lake

Pending the outcome of data gap studies and/or effectiveness monitoring to further evaluate identified issues, the preferred option for Biscotasi Lake is to adopt the 1993 WMP rule curve for normal operating conditions as the target and use the high and low flow condition curves to set maximum and minimum elevations of the normal range as compliance limits.

Options for lowering the lake level by 1 ft., increasing the lake level by 1 ft. and completing drawdown by February 1st each year were presented for public comment. Limited response (2 questionnaires returned) and a lack of clarity around preferences ultimately prevented these options from being chosen by the Planning Team. Effectiveness monitoring will provide additional information to clarify issues and determine their extent.

The normal target drawdown is 1316.08 ft geodetic (401.14 masl or 6 ft above sill) and target summer elevation 1322.58 ft (403.12 masl or 12.5 ft above sill). The minimum drawdown limit is 1315.08 ft (400.84 masl or 5 ft above sill), with a minimum summer limit of 1320.08 ft (402.36 masl or 10 ft above sill) and an overall maximum upper limit of 1324.08 ft (403.58 masl or 14 ft above sill). The preferred option is depicted in Figure 11.2.6.

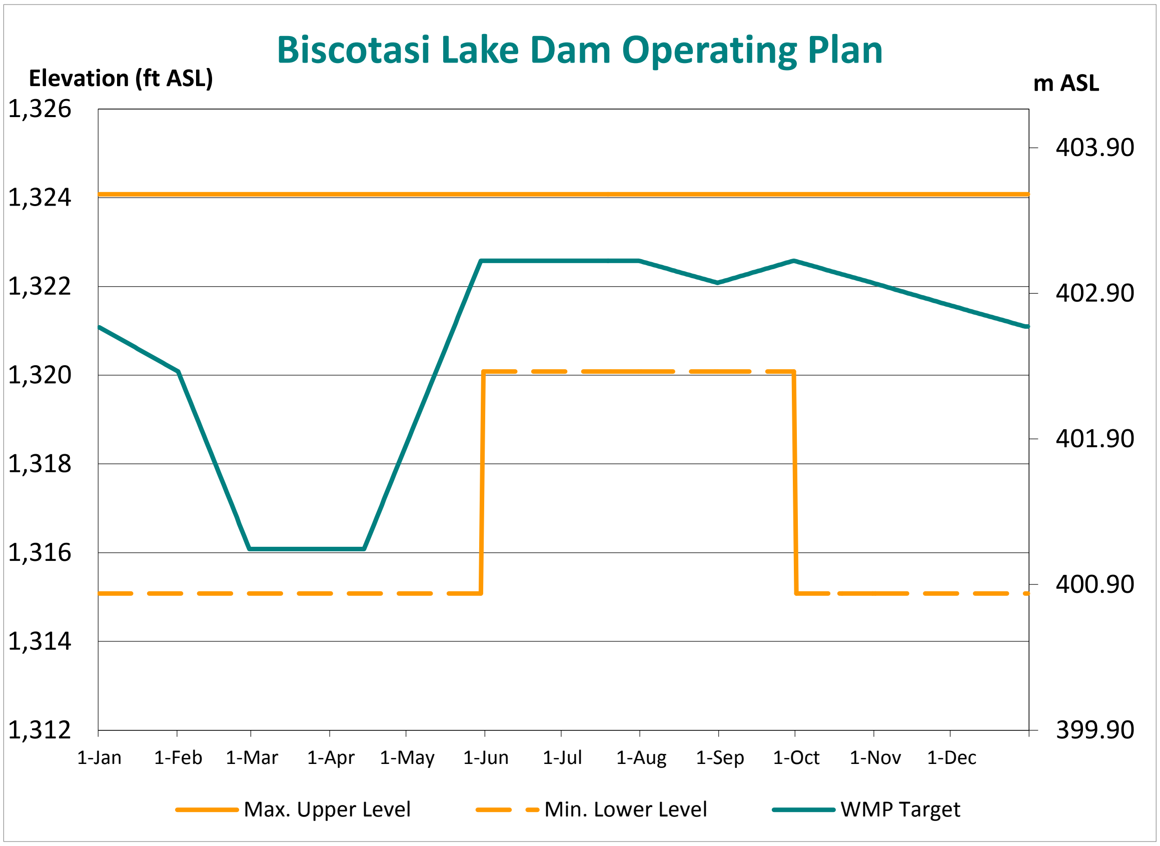

Figure 11.2.6: Biscotasi Lake preferred option.

11.2.7. Ministic Lake

Pending the outcome of effectiveness monitoring to further evaluate identified issues around dock damage, the preferred option for Ministic Lake is to adopt the 1993 WMP rule curve for normal operating conditions as the target and use the high and low flow condition curves to set maximum and minimum elevations of the normal range as compliance limits. To aid in future evaluations it was decided to increase the frequency of lake level elevation monitoring at the site from 3 to 6 times per year. The Planning Team felt that increased vigilance would also allow operators to more quickly address situations of potential high water where log movements might be necessary. No public comments were received on this option when presented at consultation sessions.

The normal target drawdown is 1205.00 ft geodetic (367.28 masl or 4 ft above sill) and target summer elevation 1207.00 ft (367.89 masl or 6 ft above sill). The minimum drawdown limit is 1204.00 ft (366.98 masl or 4 ft above sill), with a minimum summer limit of 1206.00 ft (367.59 masl or 3 ft above sill) and an overall maximum upper limit of 1209.00 ft (368.50 masl or 8 ft above sill). The preferred option is depicted in Figure 11.2.7.

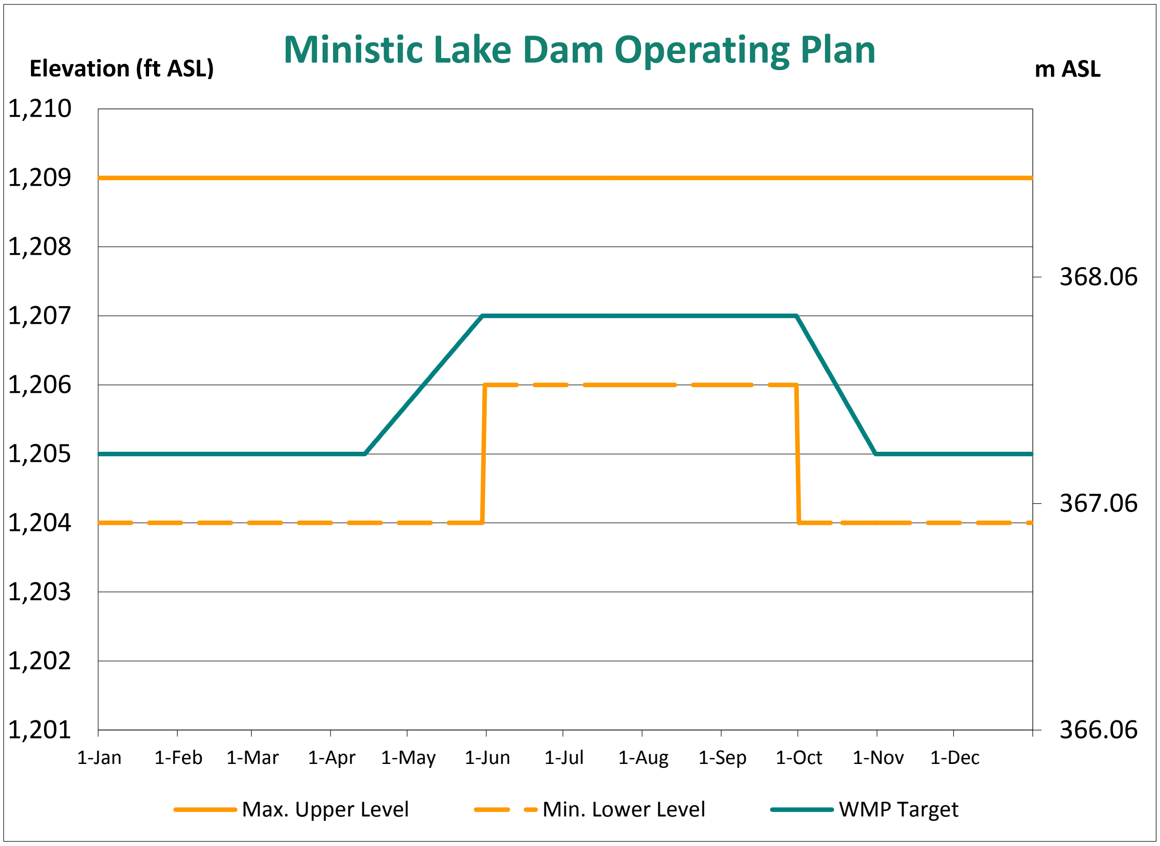

Figure 11.2.7: Ministic Lake preferred option.

11.2.8. Sinaminda Lake

The preferred option for this lake is to adopt the 1993 WMP rule curve for normal operating conditions as the target and use the high and low flow condition curves to set maximum and minimum elevations of the normal range (Figure 11.2.12). The normal drawdown is 1362 ft geodetic (415.14 masl) and target summer elevation 1365 ft (416.05 masl). The minimum drawdown limit is 1361 ft (414.83 masl), and minimum summer elevation is 1363 ft (415.44 masl) and overall maximum limit of 1366 ft (416.36 masl).

The dam is not currently operated, but acts as a self regulating weir, set permanently at 1364 ft (415.7m). It is scheduled to be rehabilitated in the future. Concerns rasied during the water management planning process will be reviewed during the permitting process for the dam rehabiltation.

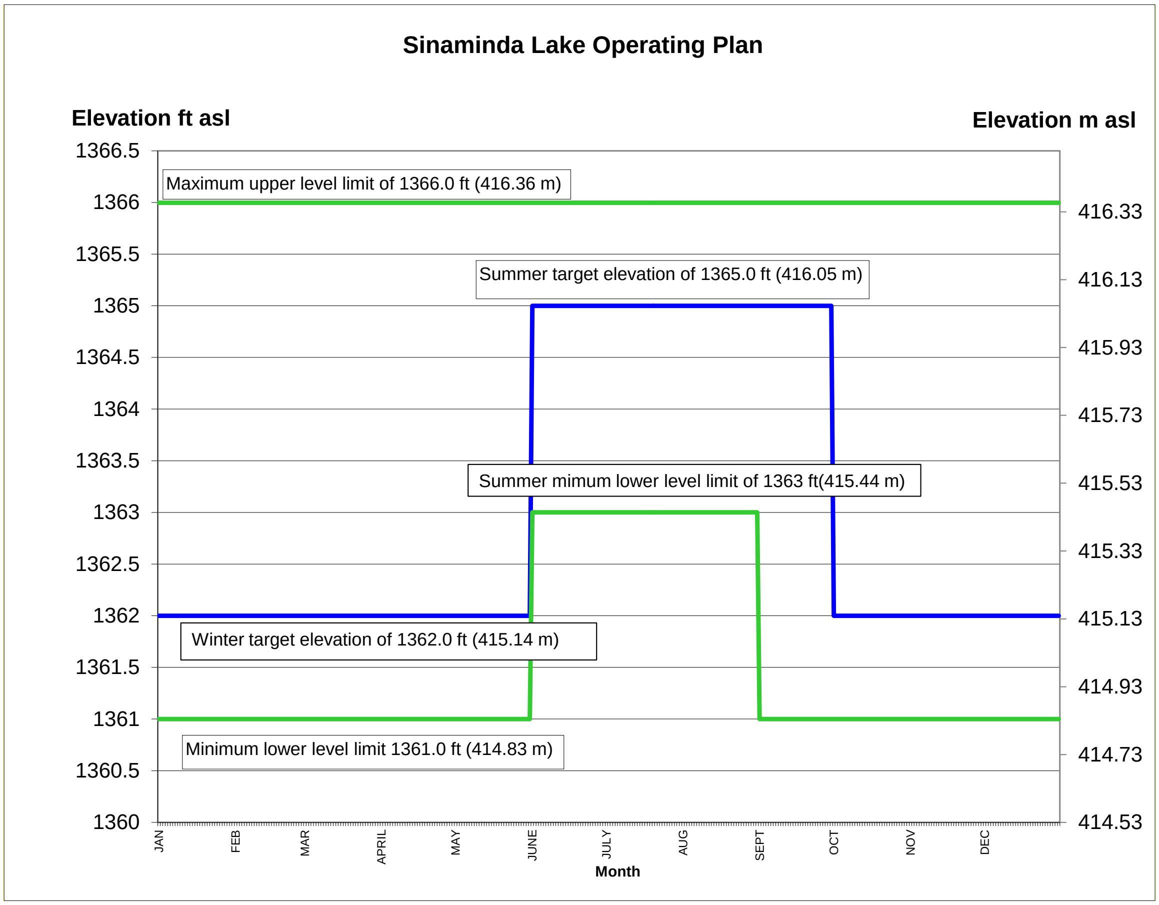

Figure 11.2.8: Sinaminda Lake preferred option

11.2.9. Vermilion Lake and River (Stobie Dam)

The preferred option for this lake is to adopt the 1993 WMP rule curve for normal operating conditions as the target and use the high and low flow condition curves to set maximum and minimum elevations of the normal range (see Figure 11.2.13). The normal target water elevation is 841.5 ft. (256.49 masl) year round, with a high flow maximum target elevation in spring of 843.5 ft. (257.10). The lake is not drawn down. The minimum overall limit is 840.3 ft (256.12 masl), and overall maximum limit of 845.0 ft (257.56 masl).

The planning team recognized the limited ability of the structure to address the issues that had been raised and because of this it was felt that no other options were required. Effectiveness monitoring will determine if further option development is warranted.

Due to concerns about flooding in the Vermilion River, Domtar consults with the Conservation Sudbury in regards to periodic utilization of the Stobie Dam for flood mitigation purposes.

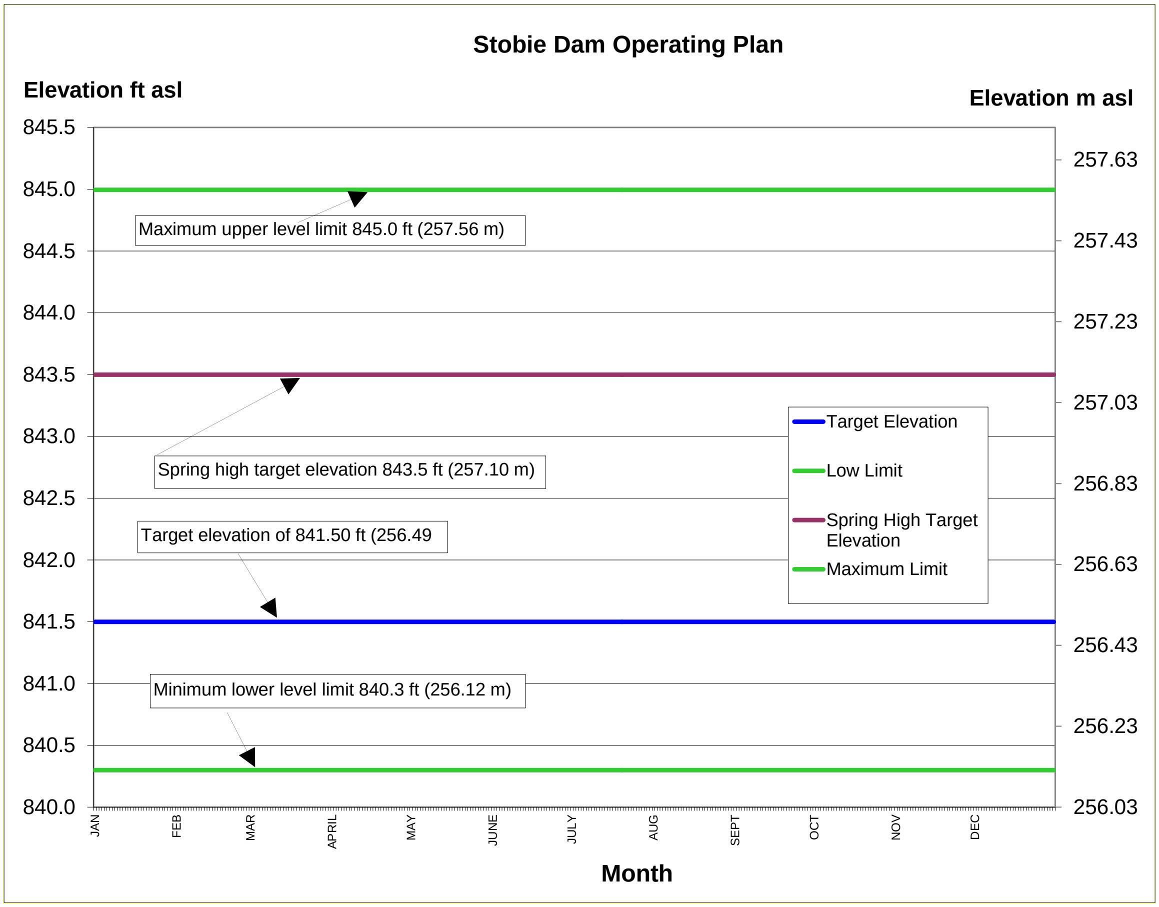

Figure 11.2.9: Vermilion Lake and River Stobie Dam Preferred Option

11.3. Facilities With Revised Normal Operating Regime

There were 3 facilities where current information was deemed sufficient for options development and where one or more preferred options were subsequently chosen for implementation in order to alleviate identified issues. Situations where the Planning Team could not reach consensus on the preferred option(s) are described along with subsequent decisions of the Steering Committee.

11.3.1. Armstrong Lake

Pending the outcome of data gap and effectiveness monitoring to further evaluate identified concerns, the preferred option for Armstrong Lake (prior to new dam construction in fall 2016) was to adopt the 1993 WMP rule curve for normal operating conditions as the target and use the high and low flow condition curves to set maximum and minimum elevations of the normal range for compliance purposes. The normal target drawdown was 1156.11 ft geodetic (352.38 masl or 4 ft above sill) and target summer elevation 1159.11 ft (353.3 masl or 7 ft above sill). The minimum drawdown limit was 1155.11 ft (352.08 masl or 3 ft above sill), with a minimum summer limit of 1158.11 (352.99 masl or 6 ft above sill) and an overall maximum upper limit of 1160.11 ft (353.60 masl or 8 ft above sill). The preferred option from the WMP consultations is depicted in Figure 11.3.1.

To aid in evaluation of potential options it was decided to increase the frequency of lake level monitoring from 3 to 6 times per year and to collect feedback through effectiveness monitoring. It was felt that increased vigilance would also allow operators to better monitor potential high water where log movements might be appropriate, as a number of the initial public concerns were in relation to high waters. **In 2013, after discussions with MNR, Vale advanced the fall drawdown completion date from October 31 to October 15th to reduce potential impacts on spawning lake trout in this stocked lake.**

A new dam was constructed in 2016 following successful completion of an MNRF Class Environmental Assessment, federal Fisheries Act, and other required approvals processes. The stop-log structure was replaced with a non-operational concrete overflow dam and weir design outfitted with a flow compensation pipe to provide a minimum flow downstream of 0.13m^3/s (4.6 cfs) at all times. The engineered design was informed by a hydrological analysis and fish habitat survey as well as public and aboriginal consultation in order to best balance multistakeholder needs for maintaining lake level against the identified need to maintain a minimum downstream flow for ecosystem health. Studies determined the minimum ecological flow to be 0.02m^3/s based on the stream characteristics and warm water fish species present. The elevation of the overflow dam (1158.55 ft/353.13m asl in an updated survey) and overflow wall (1158.00 ft/353m) was set such that, under normal weather conditions with the diversion pipe flowing, lake water levels should continue to fluctuate within the previously established range, but in a more naturalized pattern. The design also incorporates features in accordance with current dam safety guidelines – in particular those pertaining to maintaining dam stability in extreme flood events. Figure 11.3.2 shows the predicted (computer modeled) range of water fluctuations given the new dam configuration.

Follow up monitoring will occur in accordance with the EA and WMP requirements.

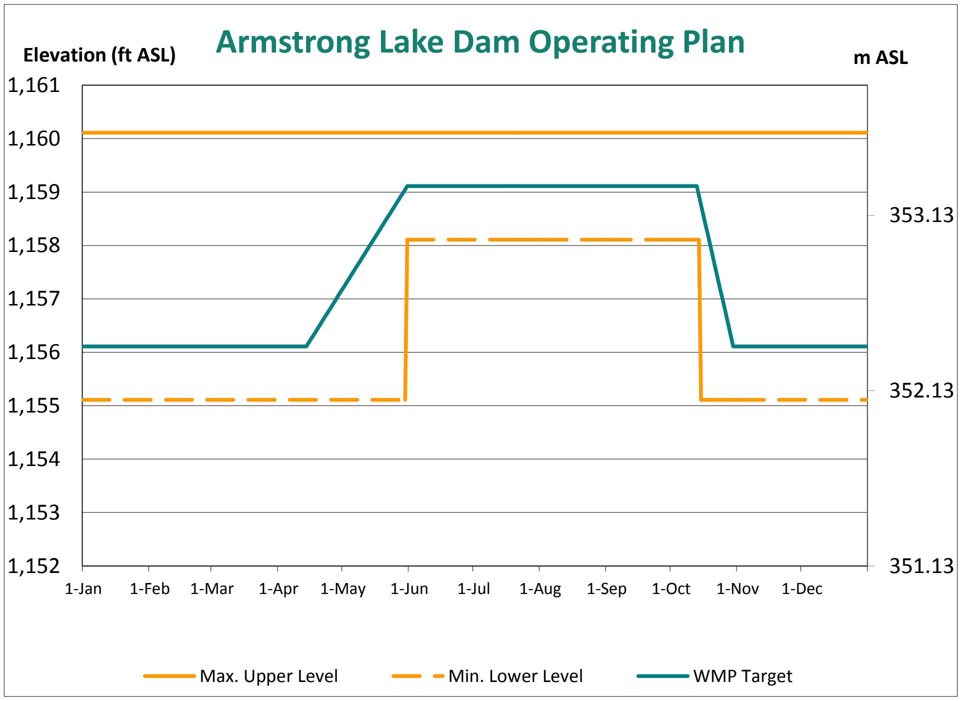

Figure 11.3.1: Armstrong Lake preferred option (prior to dam rebuild in fall 2016).

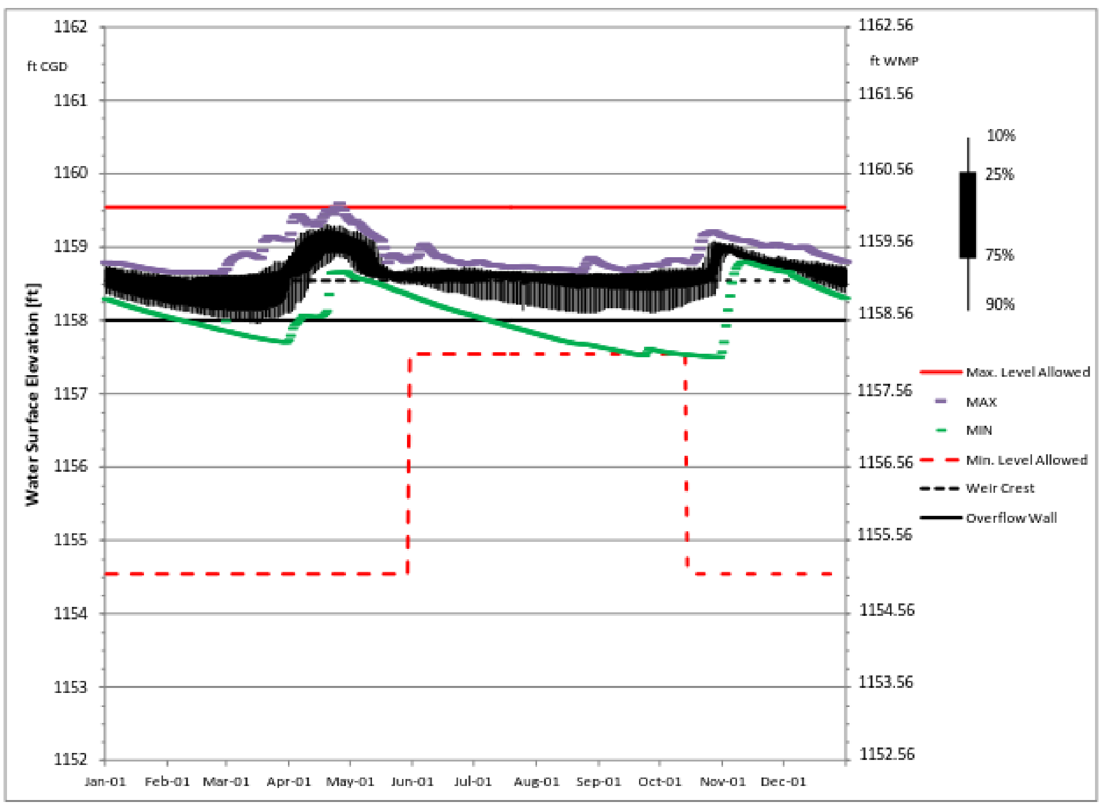

Figure 11.3.2: Range of predicted (modeled) water level fluctuations with the new non-operable concrete overflow dam configuration, under normal conditions. Note that there is a 0.56ft (0.17m) correction in the new elevation data (left side) resulting from an updated survey as compared with the old (right) data from the 1993 Spanish River WMP. The transition in survey benchmark does not impact the actual/observed lake levels that formed the basis of planning.

11.3.2. Agnew Lake (Big Eddy Generating Station)

All of the options created for this lake were presented at Public Information Sessions on July 21st, 26th and 28th 2005. Feedback concerning the options was requested from the public via questionnaires, which were distributed at these sessions.

At working sessions during the month of October 2005, the questionnaires that were submitted by the public were analyzed by the Planning Team to see if there was any information presented that may result in a clear choice for a preferred option. After reviewing the material, the Planning Team could not come to a consensus on a preferred option. The matter was then deferred to the Steering Committee for resolution.

A review was conducted at a Steering Committee meeting held October 17th 2005. After viewing and considering available information, the Steering Committee selected a preferred option. However, this selection was not unanimous. The preferred option(s), selected by the Steering Committee, includes the following (see Figure 11.3.2):

1. **Apply a <u>compliance</u> level of 846.0 ft (257.86 masl) minimum, which will allow for flood mitigation under certain environmental conditions, with a <u>best operating practice</u> target of 849.0 ft (258.78 masl).** This option assumes that all concerns with freezing and drying up of water lines, wells and points will be resolved under the WMP objective related to protection of shoreline property and infrastructure. A small benefit may be derived for erosion concerns. Theoretically, there is some anticipated benefit to aquatic ecosystems by moving the water levels closer to natural variability. However, there is an increased risk of flooding to downstream communities, including Espanola and Sagamok Anishnawbek First Nation due to potential reduced reservoir capacity in years of high volume spring freshet from the upper reaches of the watershed. Also, there is an estimated loss of approximately 3 million kwh power generating capacity in years where the lake level is not lowered to 849 ft.

   The decision to extend the draw down below the best operating practice target towards the compliance limit will be based upon the application of predictive tools used by the power generating facilities to anticipate and manage flows from the upper watershed during spring freshet. Hydrological modeling of the Spanish River watershed during the development and update of the rule curve for the Big Eddy facility has taken into account the management of flooding potential. The challenge in achieving precision in the prediction of spring freshet conditions is acknowledged.

2. **A winter drawdown that will begin December 1st (rather than December 31st) and run through to approximately April 15th.** This option is anticipated to reduce the occurrence of dock damage on Agnew Lake due to ice build-up. However, it will result in a loss of generating potential of some 86,000 kwh for the Big Eddy generating facility. There is no net change anticipated for other WMP objectives.

3. **Lake to reach full summer supply levels of 859.5 ft. (+6"/-12") or 261.98 masl (+0.15/-0.30 m) by the Victoria Day long weekend in May.** This option was developed to address the improvement of recreational interests (boat launching and navigation) during the May long weekend. There is some increased risk of downstream flooding associated with this option due to loss of freeboard for the spring freshet and also the possibility of wave damage to shoreline structures during May storms. There is a potential gain of some 115,000 kwh of power generation if filling the lake two weeks earlier.

4. **Maximum 4 inch (0.1 m) decrease in lake level at any time during the filling of the Agnew Lake reservoir and extending to June 1st.** This is an existing best

management practice by Vale to minimize the dewatering and exposure of eggs of spring spawning fish communities, specifically for walleye.

5. **Minimum daily flow of 8.5m^3/s (300 cfs).** This minimum flow was established for general aquatic ecosystem health downstream of the facility. The proposed minimum flow was not the best ecological flow that was evaluated as an option, but through the planning process was selected as a starting point to address mechanical, economic and social considerations upon plan implementation.

The proposed option of having summer levels reached by May 1st was rejected as it presented further risks of damage to shoreline property and infrastructure due to the possible presence of ice and the occurrence of storms in May. This was coupled with a significantly increased chance of flooding downstream due to loss of freeboard needed to manage spring freshet. Although this option would likely improve angling for pike and walleye in Agnew Lake, the aquatic ecosystem downstream could be negatively impacted since the flow might be reduced to nil at times in order to achieve the target lake level. There would be a potential gain of some 247,000 kwh of power generation with this option.

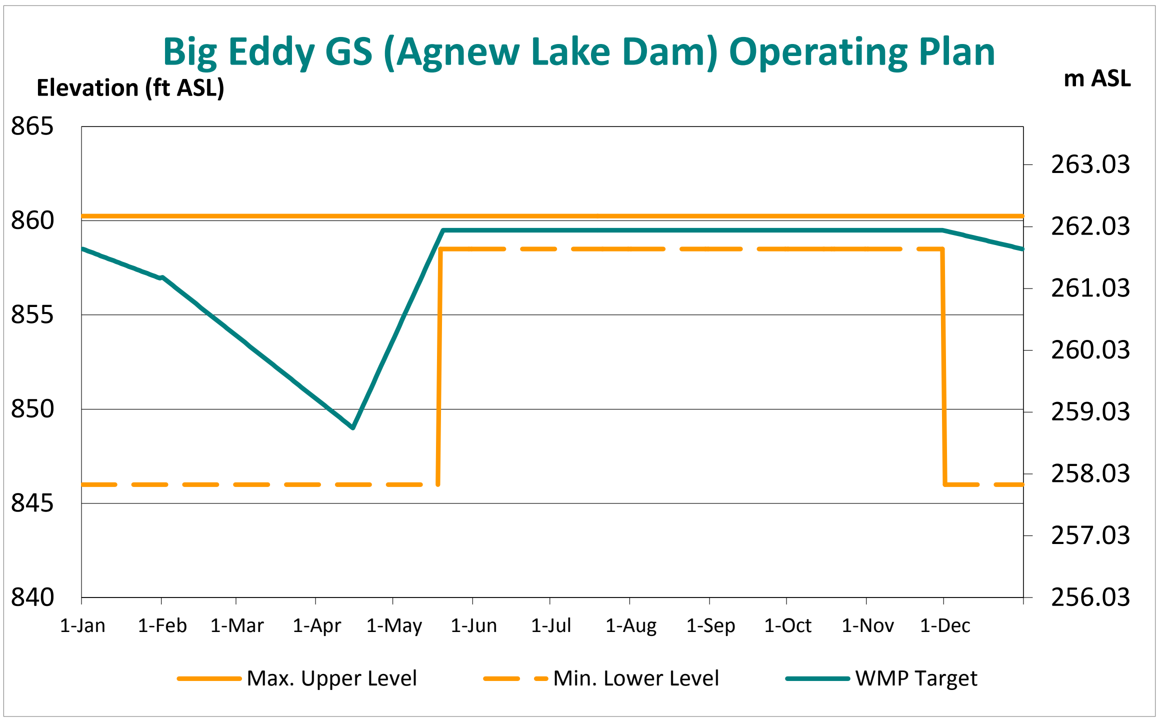

Figure 11.3.2: Agnew Lake (Big Eddy Dam and Generating Station) preferred options.

11.3.3. High Falls Generating Stations (#1 and #2)

The High Falls Generating Stations (#1 and #2) have a common forebay located in the tailrace of the Big Eddy Generating Station, forming a cascading system of power generation. They receive water that is released through Big Eddy, with their North/South Dams providing limited impoundment capability. Water that is not used for generation is passed over the spillway. Therefore the minimum flow at these facilties will be the same as that of Big Eddy GS. The normal operating target range of the forebay is between 757.74 and 760.24 ft geodetic elevation.

The preferred option for these facilities is current operating practice. However, minimum and maximum limits of the normal range have been assigned at 755.00 ft (230.12 masl) and 767.74 ft (234.01 masl), respectively (see Figure 11.3.3).

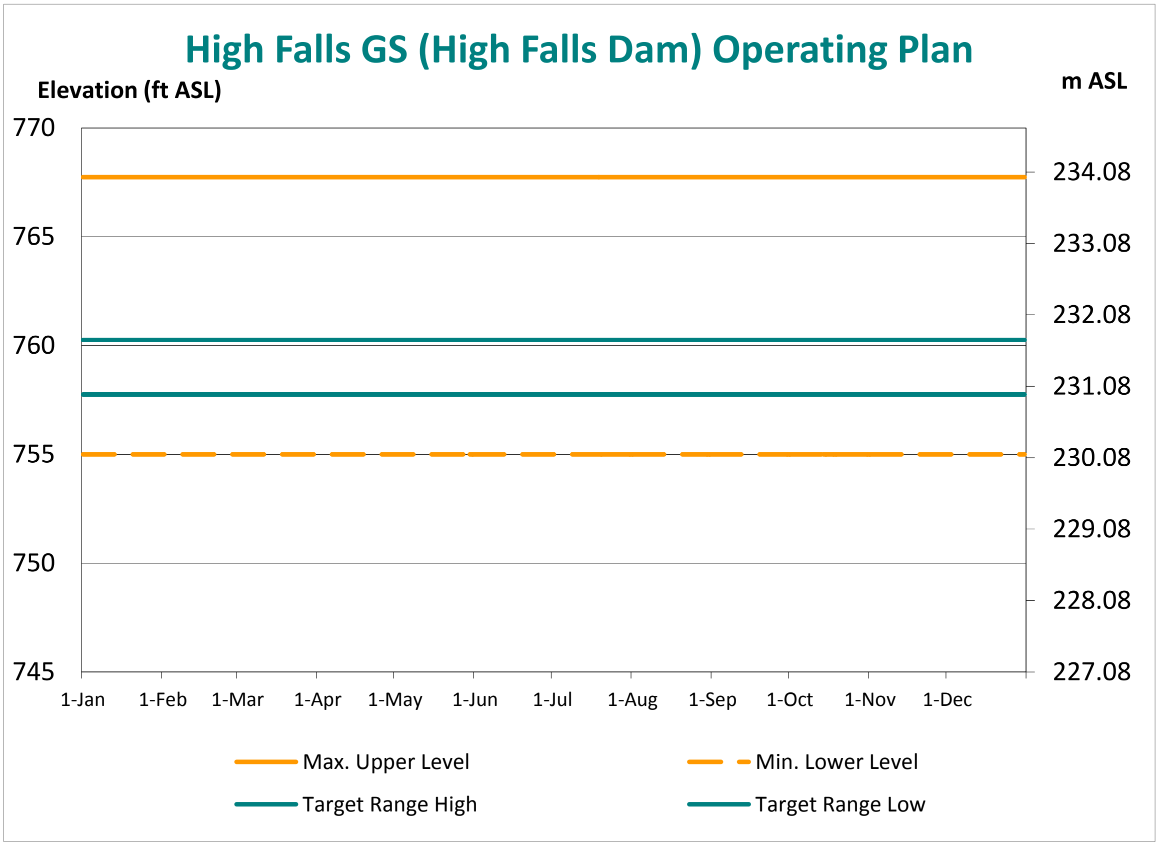

Figure 11.3.3: High Falls Dams and Generating Stations preferred option.

11.3.4. Nairn Falls Generating Station

The Nairn Falls Generating Station is a run-of-the-river facility, with its dam providing minimal storage capacity. Unlike the Big Eddy Generating Station dam on Agnew Lake, it does not have the capability to substantially impact flows on the river. Like the High Falls GS, it is part of a cascading system and the minimum flow will be that of the Big Eddy GS.

The preferred option is current operating practice where a target range has been established between 673.90 ft (205.40 masl) and 677.50 ft geodetic (206.50 masl), based on an examination of historical data. Minimum and maximum limits have been assigned at 666.15 ft (203.04 masl) and 689.60 ft geodetic (210.19 masl), respectively, to provide for normal water flow variation. The preferred option is depicted in Figure 11.3.4.

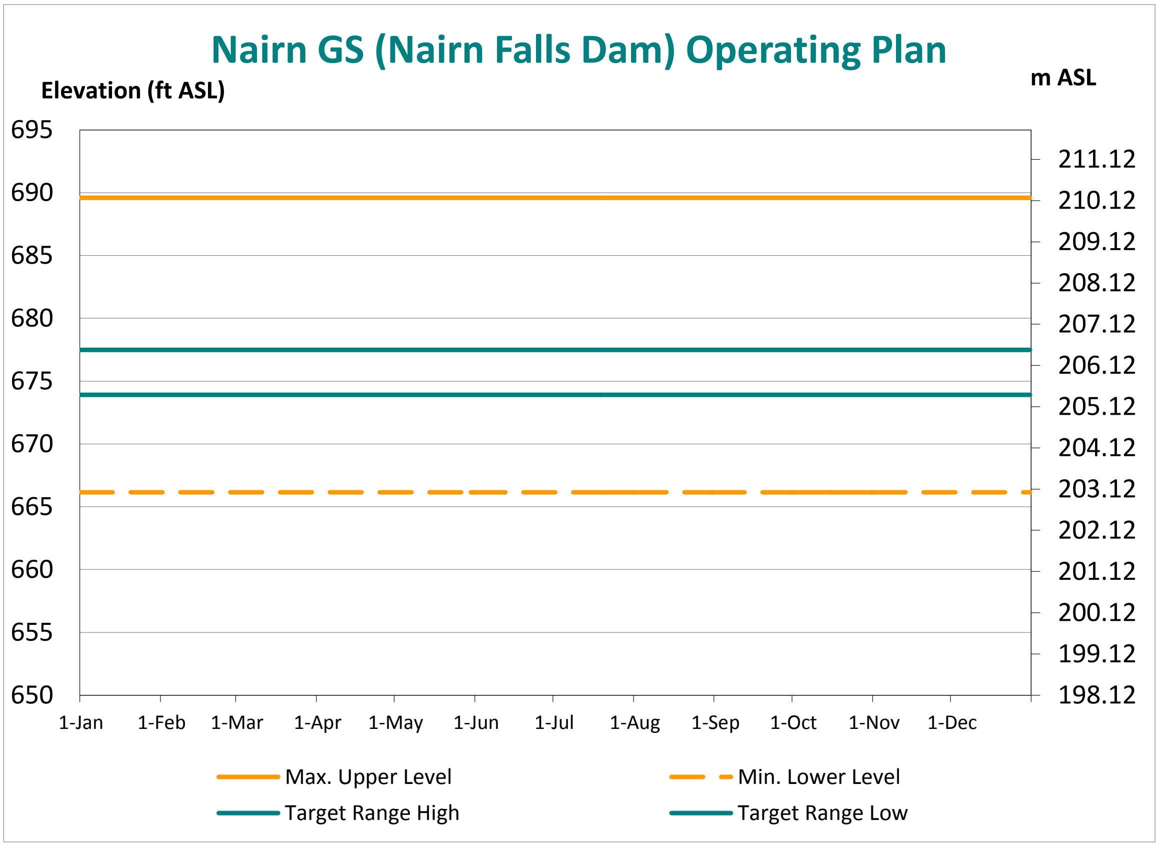

Figure 11.3.4: Nairn Falls Generating Station preferred option.

11.3.5. Wabagishik Generating Station

Wabagishik Generating Station is a run-of-the-river facility with minimal storage capacity provided by the dam. Its tailrace is located in Wabagishik Lake. The facility does not have the capacity to substantially impact daily average flows or lake level.

The preferred option is current operating practice where a target range has been established between 739.50 ft (225.40 masl) and 740.60 ft geodetic (225.73 masl), based on an examination of historical data. Minimum and maximum limits have been assigned at 738.50 ft (225.09 masl) and 740.93 ft geodetic (225.84 masl), respectively, to provide for normal water flow variation. The preferred option is depicted in Figure 11.3.5.

To support general aquatic ecosystem health, a minimum daily flow requirement of 1.4m^3/s (50 cfs) was established as a starting point for the adaptive management framework summarized in section 6.4.7. The proposed minimum flow was not the best ecological flow that was evaluated as an option, but through the planning process was selected to address mechanical, economic and social considerations upon plan implementation.

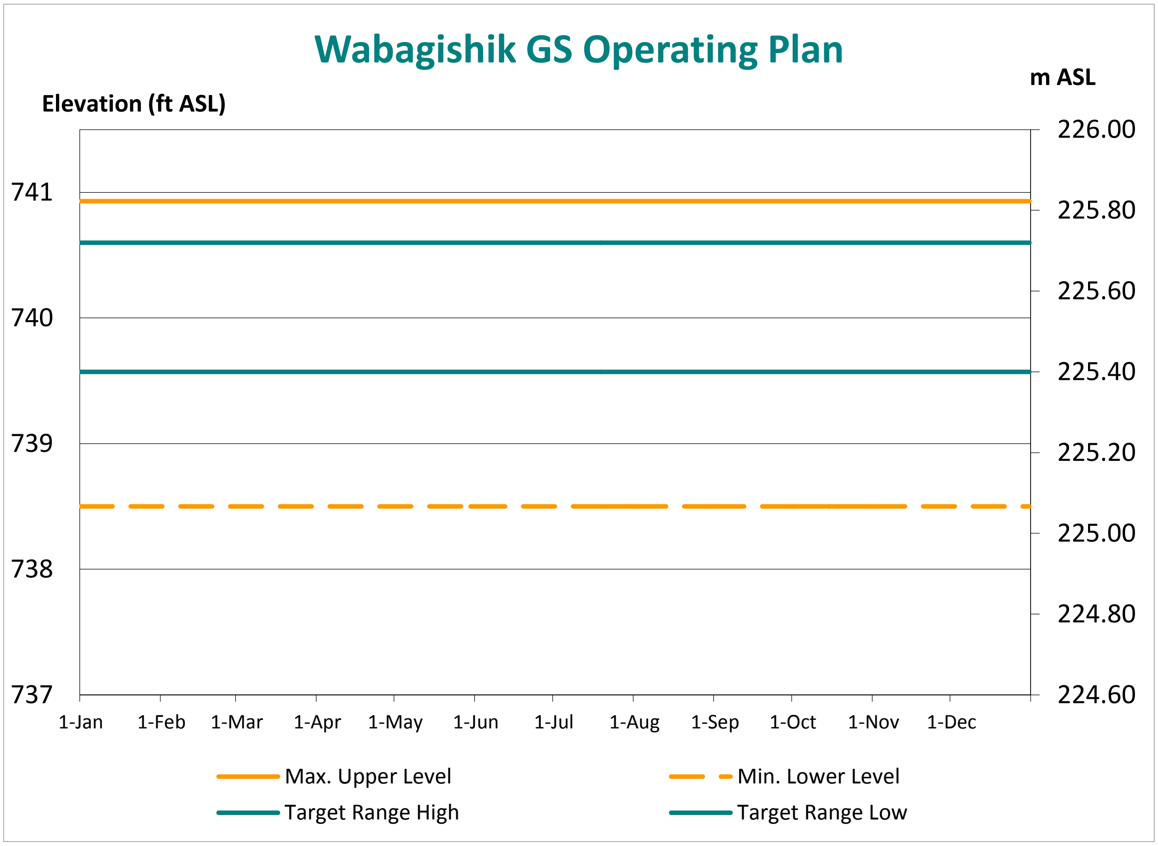

Figure 11.3.5: Wabagishik Generating Station preferred option.

11.3.6. Lower Spanish River (Espanola Dam)

Pending the outcome of data gap and effectiveness monitoring to further evaluate identified issues, the preferred option for the Espanola Generating Station is to adopt the 1993 WMP rule curve for normal operating conditions as the target and use the high and low flow condition curves to set maximum and minimum elevations of the normal range. Overall maximum level is 650 ft. geodetic (198.12 masl), and overall minimum level is 647 ft (197.21 masl). See Figure 11.3.6 for the rule curve.

For general aquatic ecosystem health a minimum flow requirement of 9.9m3/s (350 cfs), reflecting the sum of minimum flows from the upstream Big Eddy (Spanish River) and Wabageshik (Vermilion River) Generating Stations, is being applied to the facility. The proposed minimum flow was not the best ecological flow that was evaluated as an option, but through the planning process was selected as a starting point to address mechanical, economic and social considerations upon plan implementation.

Domtar observes additional flow-related requirements as a part of other provincial processes:

- The purpose of Domtar's *Spanish River Minimum Dissolved Oxygen Management Plan* is to protect the lower Spanish River (downstream of Espanola) from episodes of low dissolved oxygen that could potentially occur during periods of low river flow combined with high water temperature. This plan, related to water quality, addresses a requirement within a Ministry of the Environment and Climate Change Environmental Compliance Approval (Sewage Works).
- As a part of an Ontario Endangered Species Act (ESA) Mitigation Plan, related to Lake Sturgeon, Domtar has adopted a practice of maintaining continuity of flow from the plunge pool below the main dam to the river between May 1st and July 1st of each year. This practice also benefits walleye spawning activity.

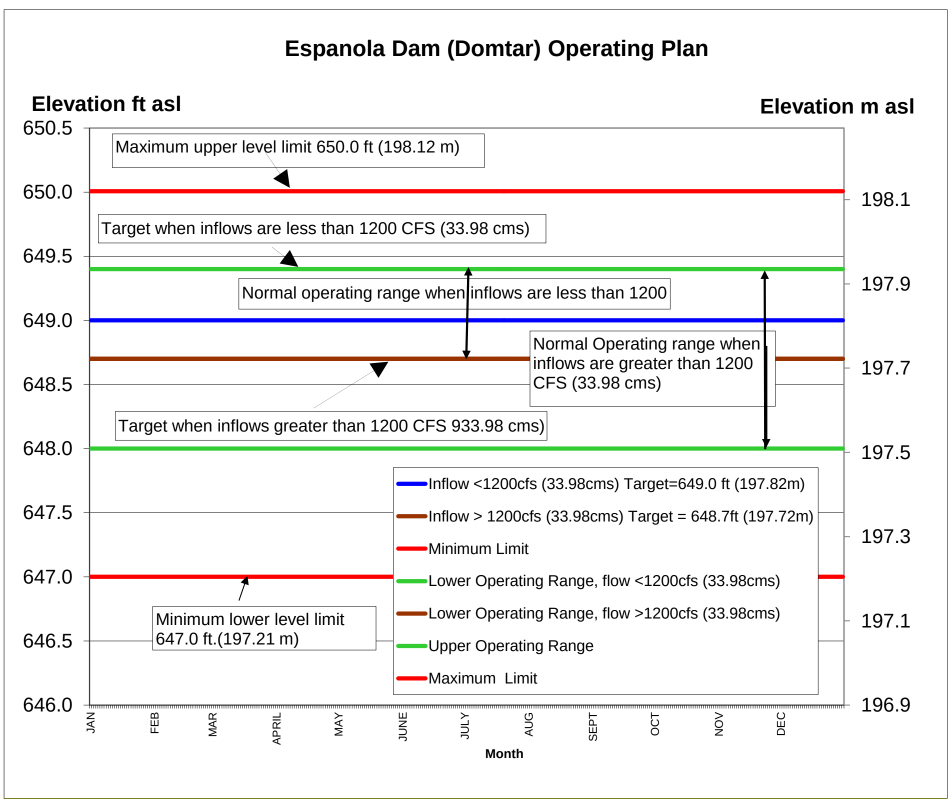

Figure 11.3.6: Lower Spanish River Espanola Dam preferred option

11.3.7. Pogamasing Lake

The planning team could not originally arrive at a consensus for a preferred option for this lake and it was changed a number of times prior to arriving at the current proposal. The evolution of the current preferred option was as follows:

- All of the options created for this lake were presented at Public Information Sessions on July 21st, 26th and 28th, 2005. Feedback concerning the options was requested from the public via questionnaires, which were distributed at these sessions.

- At working sessions during the month of October 2005, the questionnaires that were submitted by the public were analyzed by the Planning Team to see if there was any information that may result in a clear choice for a preferred option. After reviewing the material the Planning Team still could not come to consensus on a preferred option. The matter was deferred to the Steering Committee for resolution.

- A review was conducted at a Steering Committee meeting held October 17th 2005. After viewing and considering available information, the Steering Committee selected a preferred option. However, this selection was not unanimous. The preferred option selected by the Steering Committee in 2005 was current operating regime with no changes.

- During the review for the second draft of the WMP, the preferred option was changed to a combination of Options 1 and 3 (Figure 11.3.7):

    1. **Maximum allowable lake level changed from 1209 ft (368.50 masl) to 1207 ft (367.89 masl).** This option was chosen to address concerns with possible shoreline erosion at lake levels above 1207 ft. It could have some positive impact on flood risk. The frequency of occurrence of water levels above 1207 ft. was low, so this option was not anticipated to have significant negative impacts on any of the remaining WMP objectives.

A PAC recommendation to lower the summer target elevation to 1205.5 ft (367.44 masl) to address an erosion concern was not adopted as a preferred option. There were several comments received from the public regarding the potential for negative impacts on navigation if this option were to be implemented.

A recommendation to delay drawdown by one month (October 1st to October 31st) to address concerns about boat launching was not adopted as a preferred option as it was determined to have no net benefit in regards to achieving WMP objectives. The option would have a potential adverse impact on lake trout.

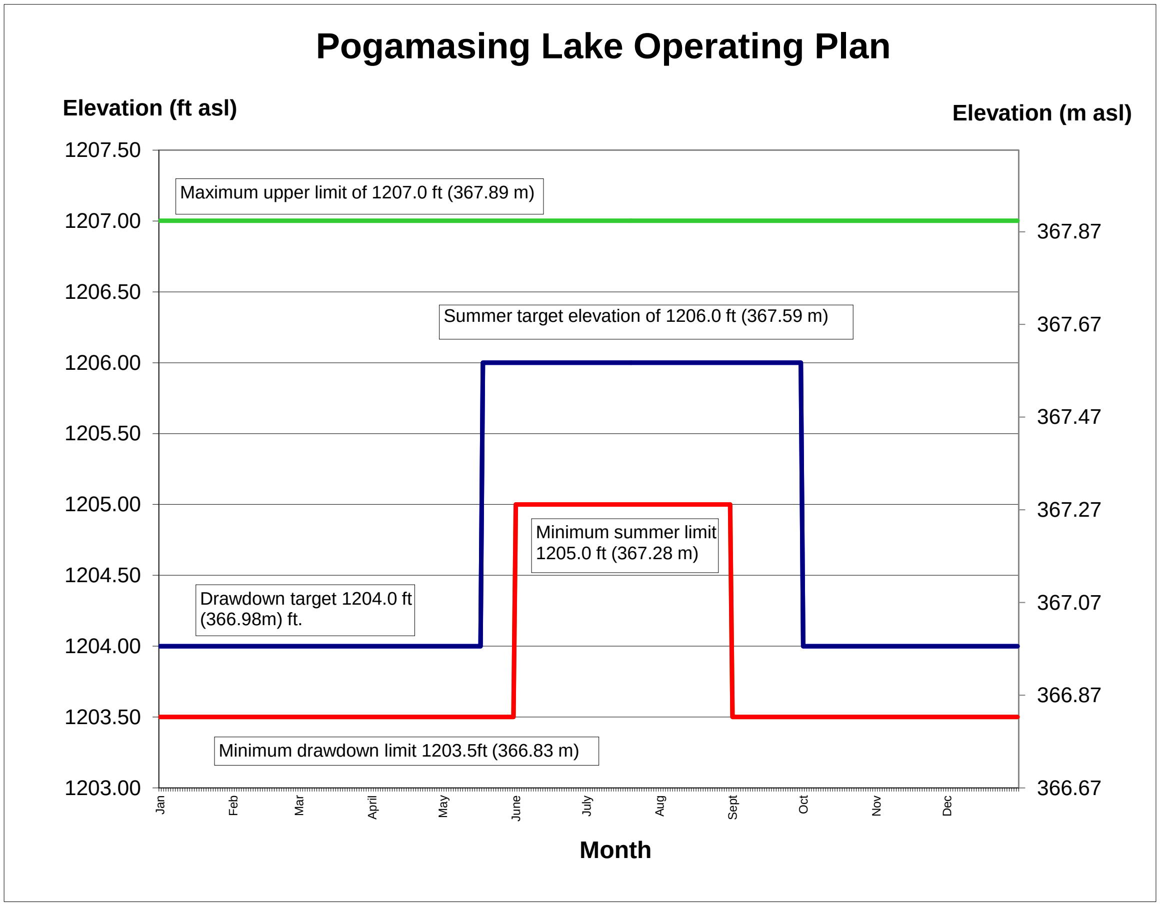

Figure 11.3.7: Pogamasing Lake preferred option.

11.3.8. Onaping Lake (Onaping Dam and Bannerman Creek Dam)

The planning team could not originally arrive at a consensus for a preferred option for this lake and it was changed a number of times prior to arriving at the current proposal. The evolution of the current preferred option was as follows:

- All of the options created for this lake were presented at Public Information Sessions on July 21st, 26th and 28th, 2005. Feedback concerning the options was requested from the public via questionnaires, which were distributed at these sessions.

- At working sessions during the month of October 2005, the questionnaires that were submitted by the public were analyzed by the Planning Team to see if there was any information that may result in a clear choice for a preferred option. After reviewing the material the Planning Team still could not come to consensus on a preferred option. The matter was deferred to the Steering Committee for resolution.

- A review was conducted at a Steering Committee meeting held October 17th 2005. After viewing and considering available information, the Steering Committee selected a preferred option. However, this selection was not unanimous.

- The preferred option was to modify Option 1 as follows: the winter drawdown will start August 15th and continue until October 15th.

- As a result of PAC information presented to the Steering Committee at a December 2nd 2005 meeting, a decision was made to change the preferred option for Onaping Lake. The selection was changed to the option of current operating regime with no modifications. This would have the winter drawdown revert to the original date of September 1st and finish October 31st.

- During the review for the second draft of the WMP, the preferred option was changed to a combination of the following and is the current preferred option (Figure 11.3.8):

1. **Maximum allowable lake level changed from 1309 ft (398.98 masl) to 1308 ft (398.68 masl).** This option was developed to address concerns of property damage due to high water levels. The benefits to property owners would be offset by an increased risk of flooding downstream and a very slight loss in power generating potential. Lake elevations of 1309 ft. occurred rarely, so the impact of this option is expected to be minimal.
2. **Summer elevation changed to a range of 1306.5 – 1307.0 ft (398.22 – 398.37 masl).** This option addresses a concern put forth by the PAC to reduce damage to shoreline structures, improve docking and launching access, and reduce erosion (thought to occur at water levels of 1307 ft or more). These benefits are balanced against potential negative impacts due to increased risk of flooding downstream in the spring, lower flows downstream in the fall, and some reduced power generating potential in the fall.
3. **Winter drawdown to commence after Labour Day long weekend in September and be completed by October 15th (drawdown lake level to 1304 ft (397.46 masl) or October 15th, whichever occurs first).** The delayed start of drawdown is expected to benefit cottagers on Labour Day weekend, but earlier completion of drawdown may be detrimental for cottagers later in the fall (October/November). The option is expected to enhance fisheries on the lake by better accommodating their life cycle requirements. The need to pass more water over a shorter period of time may increase the risk of flooding downstream and also, by reaching the target elevation sooner, result in potentially longer periods of time with no water being passed. There is some risk of wasting water that could otherwise be used for power generation.

4. **Attain summer elevation by Victoria Day long weekend and maintain that elevation until Labour Day.** This option is expected to address the boat launching and navigation concerns of recreational lake users during the spring and late summer. Some loss will occur to power generation potential. There is no net impact expected on other WMP objectives.

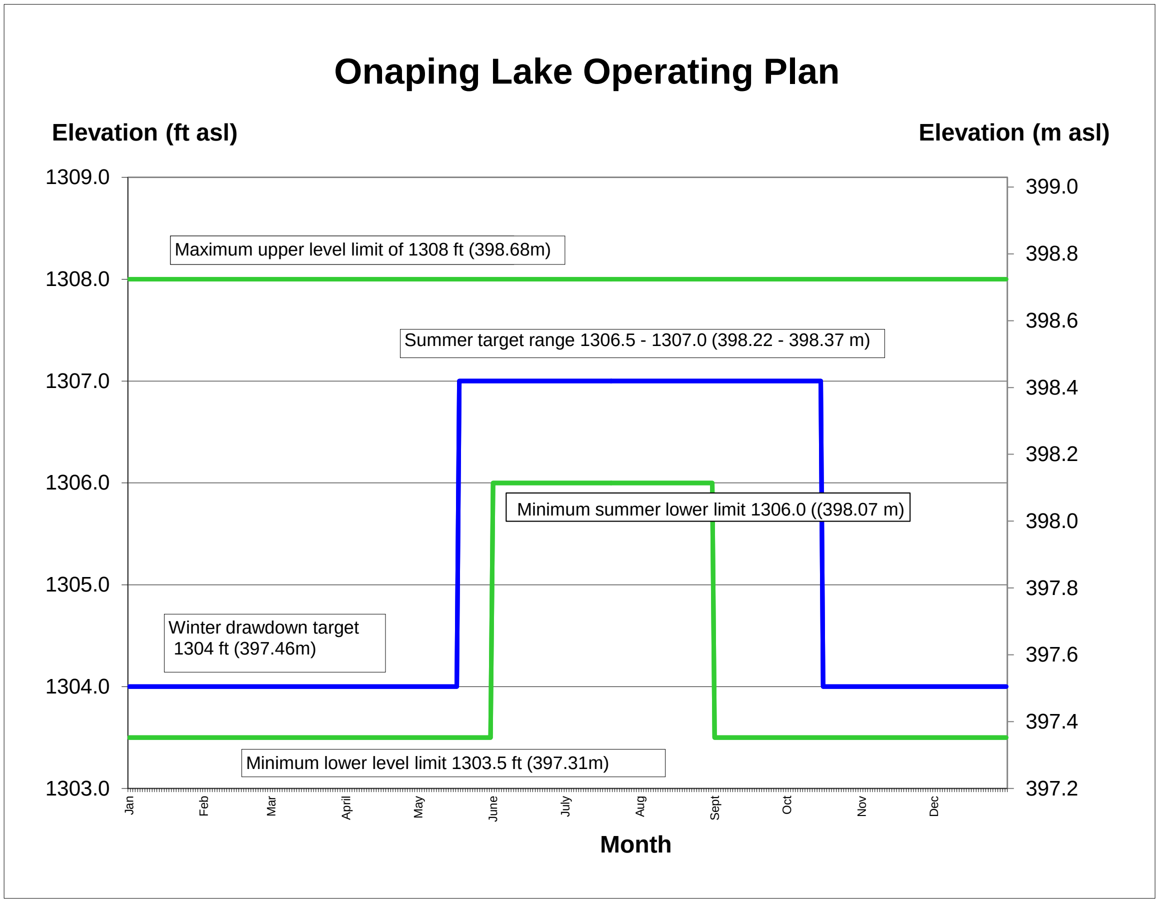

Figure 11.3.8: Onaping Lake preferred options

11.4. Description of Operating Plans

As each Water Management Plan (WMP) is completed and approved, subsection 23.1(7) of the LRIA requires the facility owners to operate in accordance with the approved plan. The WMP is intended to set targets and compliance requirements for lake elevations under normal operating conditions. Any deviation from the compliance provisions, under normal conditions, constitutes a non-compliance incident and must be reported. There are circumstances, such as flood or drought, where it may be unreasonable to expect the owner to operate within the approved range. The circumstances would be beyond the capabilities of the proponents to control and, pending a review of the incident report by MNRF, may be deemed an “Incident in Compliance with the WMP”.

11.4.1. Operating Plans for Normal Operating Conditions

Operating Plans (OP) in Appendix H detail the operating regime proposed for each individual facility to which this Spanish & Vermilion Rivers WMP applies. Each OP includes target elevations and timing along with mandatory maximum and minimum compliance limits for normal operating conditions, minimum flows (for generating stations) compliance monitoring requirements, and a description of effectiveness monitoring activities. Table 11.4.1 summarizes minimum flows while Table 11.4.2 summarizes compliance levels and timing for normal operating conditions for WMP facilities.

Table 11.4.1: Compliance minimum daily flows for WMP facilities under normal operating conditions.

FACILITY	MINIMUM DAILY FLOW
Big Eddy GS	8.5m^3/s (300 cfs)
High Falls No. 1 & No. 2 GS	Same as Big Eddy
Nairn GS	Same as Big Eddy
Wabageshik GS	1.4m^3/s (50 cfs)
Espanola Dam GS	9.9m^3/s (350 cfs)

Table 11.4.2: Compliance levels for WMP facilities under normal operating conditions. Note that the survey benchmark for Armstrong Dam was updated in 2016 during the dam rebuild. Equivalent old and new benchmark elevations are presented for reference.

FACILITY	MINIMUM SUMMER LEVEL	MAXIMUM UPPER LEVEL LIMIT	MINIMUM LOWER LEVEL LIMIT
Vale Facilities			
Frechette Lake Dam	425.44m (1395.79 ft) June 1 - Nov 1	426.66m (1399.79 ft)	422.99m (1387.79 ft) Nov 2 - May 31
Canoe (Bardney) Lake Dam	424.08m (1391.33 ft) June 1 - Nov 1	425.30m (1395.33 ft)	423.47m (1389.33 ft) Nov 2 - May 31
Ramsey Lake Dams 7 and 8	408.13m (1339.02 ft) June 1 - Nov 1	409.81m (1344.52 ft)	406.46m (1333.52 ft) Nov 2 - May 31
Mozhabong Lake Dam	411.25m (1349.25 ft) June 1 - Aug 1	412.32m (1352.75 ft)	410.64m (1347.25 ft) Aug 2 - Aug 31
			410.03m (1345.25 ft) Sept 1 - May 31
Indian Lake Dam	408.51m (1340.26 ft) June 1 – Oct 15	409.80m (1344.50 ft)	407.60m (1337.26 ft) Oct 16 - May 31

FACILITY	MINIMUM SUMMER LEVEL	MAXIMUM UPPER LEVEL LIMIT	MINIMUM LOWER LEVEL LIMIT
Biscotasi Lake Dams 1, 2, and 3	402.36m (1320.08 ft) June 1 - Oct 1	403.58m (1324.08 ft)	400.84 (1315.08 ft) Oct 2 -– May 31
Ministic Lake Dam	367.59m (1206.00 ft) June 1 - Oct 1	368.50m (1209.00 ft)	366.98m (1204.00 ft) Oct 2 - May 31
Armstrong Lake Dam	352.99m (1158.11 ft) original survey 352.82 m (1157.55 ft) updated survey June 1 – Oct 15	353.60m (1160.11 ft) original survey 353.43 m (1159.55 ft) updated survey	352.08m (1155.11 ft) original survey 351.91m (1154.55 ft) updated survey Oct 16 - May31
Lake Agnew Big Eddy GS	261.67m (858.50 ft) May long weekend – Nov. 30	262.20m (860.24 ft)	257.86m (846.00 ft) Dec 1 - May long weekend
High Falls No.1 & No.2 GS	230.96m (757.74 ft)	234.01m (767.74 ft)	230.12m (755.00 ft)
Nairn Falls GS	203.04m (666.15 ft)	210.19m (689.60 ft)	203.04m (666.15 ft)
Wabagishik Falls GS	225.09m (738.50 ft)	225.84m (740.93 ft)	225.09m (738.50 ft)
Domtar Facilities			
Pogamasing Lake Dam	367.28m (1205.00 ft) Victoria Day – Labour Day	367.89m (1207.00 ft)	366.83m (1203.50 ft) Labour Day – Victoria Day
Onaping Lake Dam & Bannerman Dam	398.07m (1306.00 ft) Victoria Day weekend in May - Labour Day (inclusive) in Sept	398.68m (1308.00 ft)	397.31m (1303.50 ft) Labour Day - Victoria Day weekend in May
Sinaminda Lake Dam	415.44m (1363.00 ft) June 1 - Sept 1	416.36m (1366.00 ft)	414.83m (1361.00 ft) Sept 2 - May 31
Stobie Dam	256.12m (840.30 ft)	257.56m (845.00 ft)	256.12m (840.30 ft)
Espanola GS	197.21m (647.00 ft)	198.12m (650.00 ft)	197.21m (647.00 ft)
MNRF Facilities			
Three Corner Lake Dam	390.00m (1279.52 ft) May 1 - Nov 15	391.30m (1283.79 ft)	389.70m (1278.54 ft) Nov 15 – Apr 30
Windy Lake Dam	339.00m (1112.20 ft) May 1 - Sept 15	339.20m (1113.51 ft)	338.40m (1110.23 ft) Sept 15 - Apr 30
Whitewater Lake Dam	265.17m (869.98 ft) May 1 - Oct 31	265.80m (872.04 ft)	264.87m (868.99 ft) Nov 1 – Apr 30
Conservation Sudbury Facilities			
Maley Dam	268.10m (879.59 ft)	273.10m (895.99 ft)	266.10m (873.03 ft)
Nickeldale Dam	265.20m (870.08 ft)	274.80m (901.90 ft)	265.20m (870.08 ft)
Lake Laurentian Dam	N/A	266.56m (874.54 ft)	265.89m (872.34 ft)
Nepahwin Lake Dam	259.18m (850.33 ft)	260.48m (854.59 ft)	259.18m (850.33 ft)
City of Greater Sudbury Facilities			
Ramsey Lake Dam	N/A	249.50m (818.60 ft)	248.70m (815.9 ft)

12.0 EFFECTIVENESS MONITORING PROGRAM

The effectiveness monitoring plan is the basis of evaluating how well the plan met the objectives identified in the Spanish & Vermilion River WMP (as opposed to the compliance monitoring which is concerned with how well the dam operators stay within the rules laid out in the operating plan). New information from effectiveness monitoring programs may also inform potential amendments to the WMP in keeping with the principle of adaptive management.

The purpose of effectiveness monitoring is to either confirm or improve target levels and flows and strategies based on their ability to meet objectives. Table 12.1 lists the effectiveness monitoring activities to be undertaken as a result of operational changes identified in the Spanish and Vermilion Rivers WMP. It identifies the operational change, specific WMP objectives from identified issues/concerns, the data required for the evaluation, and the responsible party.

Plan proponents are responsible for implementing the respective effectiveness monitoring program for their facilities. MNRF will provide technical advice and participate in the monitoring where possible. For some monitoring programs, potential partnerships are also identified. Since the availability of resources may vary from year to year, the timelines and scope of some of the projects presented herein is subject to change.

12.1. Stakeholder Feedback and Communications

The predominant effectiveness monitoring technique to be utilized is the analysis of stakeholder feedback. The monitoring of socially-based objectives (i.e. flooding, navigation, etc.) will rely on feedback from the public. It is assumed that the public will identify, to the MNRF or plan proponents, situations when they are not satisfied with water levels or flows.

As part of routine operations, all proponents will maintain a record of complaints/comments in relation to their operations. A sample Stakeholder Feedback Tracking Sheet is provided in Appendix I. This record is to be considered during the ongoing WMP review and reporting process.

The proponent should collect the following information for each comment or complaint:

1. Date of comment or complaint (and date of event occurrence if not the same day)
2. Person(s) making comment or complaint
3. Address(es) and Phone Number(s) for subsequent contact
4. Location where issue occurred or is occurring
5. Details of the issue
6. Details of operating regime around the time of the issue (lake level, flow, etc.)
7. Follow-up action undertaken by proponent (operational, communications, etc.)

Note: Provided the information provided is consistent with the above list, the record may be in a format other than the sample provided.

As a best practice, courtesy communications may be directed to select stakeholders to provide advance notification of conditions of interest. For example, advanced notification has been provided to Agnew Lake stakeholders regarding drawdown below the Best Management Practice of 849 ft. in high water years so that residents whose water systems may not function below this water elevation can prepare for the potential loss of water supply. Similarly, notification may be provided to the outfitter downstream of Biscotasi Lake regarding log movements and potential flow changes. However, it is not always possible to provide advance notification - particularly when operational changes have to be implemented quickly in response to rapidly changing weather conditions.

The **Spanish River Watershed Group** was organized around 2010 with the purpose of providing attendees with a forecast of winter/spring conditions and to anticipate the likelihood of flooding. Sudbury District MNRF coordinates a face-to-face meeting that is held annually prior to the spring freshet, usually in early April. The meeting is an open invitation to surrounding agencies, municipalities and First Nations communities which border, or are influenced by, the Spanish River; and generally consists of representatives from:

- Vale Canada Limited
- Domtar Inc.
- Town of Espanola
- Ontario Provincial Police
- Ontario Parks
- Township of Nairn-Hyman
- Municipality of Sables-Spanish
- Conservation Sudbury
- Township of Baldwin
- Sagamok Anishnawbek First Nation
- Town of Spanish

At the meeting, Vale and Domtar provide an account of their dam operations and water content in the snowpack in the headwaters of the Spanish system, and MNRF provides an update on the long-range spring forecast. Periodic updates on conditions or flood notices are sent out electronically to the group by MNRF. In the event of a serious flood, local emergency services would be activated as would the MNRF District Manager Emergency Response Team and Aviation, Forest Fire and Emergency Services.

12.2. Aquatic Ecosystem Monitoring

Aquatic ecosystem monitoring and assessment already completed as part of data gap studies is described in Section 8. The primary focus of these studies in the past 5 years (2010-2015) has been walleye and sturgeon spawning habitat in the vicinity of the generating stations. The studies provide a baseline from which to assess the need for and potential outcome of changes to the current operating regimes.

Additional ecosystem monitoring has occurred in association with permitting requirements for replacing the Armstrong Dam. The stoplog structure was replaced in fall 2016 with a non-operational overflow dam and weir, which will result in a more natural flow regime. Followup monitoring will occur in 2017 in accordance with permit requirements and the WMP.

Effectiveness monitoring involving the aquatic ecosystem at the generating stations and elsewhere will be addressed in concert with remaining data gaps.

Table 12.1: Summary of effectiveness monitoring requirements for the Spanish and Vermilion Rivers Water Management Plan.

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
Vale Facilities			
Frechette Lake Dam (#24)	Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. No feedback during consultation sessions, so no other changes at this time.	Non-specific as no comments specific to this lake were received from the public during consultations	Use Stakeholder Feedback Tracking System (Vale)
Canoe (Bardney) Lake Dam	Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. No feedback during consultation sessions, so no other changes at this time.	Non-specific as no comments specific to this lake were received from the public during consultations	Use Stakeholder Feedback Tracking System (Vale)
Ramsey Lake (Chapleau) Dams (#7&8)	Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. Also, water levels being kept 1 ft. lower than stipulated in 1993 WMP pending dam review and potential upgrades, so no other changes at this time.	Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize erosion and damage to shoreline structures (Issues 1.1 and 1.2 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to collect information on specific instances of erosion and/or damage to shoreline structures (potentially attributed to water level manipulation) as part of the ongoing WMP process
Mozhabong Lake Dam	Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. Fall drawdown timing (in place) required to meet lake trout spawning needs, and only 1 respondent to consultation on	Recreation: • Facilitate navigation by reducing debris from erosion and having adequate water levels (Issues 2.2, 2.3 and 2.4 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to collect information on specific instances of erosion (debris) and inadequate water levels as part of the ongoing WMP process

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
	potential option of reducing amount of drawdown by 1 ft., so no other changes at this time.		
Indian Lake Dam No. 5	Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. No feedback received during consultations on option to reduce water level by 1 ft., so no other changes at this time.	Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize erosion and damage to shoreline structures (Issues 3.3, 3.4, and 3.5 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to collect information on specific instances of erosion and/or damage to shoreline structures (potentially attributed to water level manipulation) as part of the ongoing WMP process
Biscotasi Lake Dams No. 1, 2 and 3	Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. Insufficient feedback received on potential options presented at consultation sessions, so no changes proposed at this time.	Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize erosion and/or damage to shoreline structures (Issue 4.3, 4.4 and 4.9 from Table 6.3.1) • Minimize disruption to water supply (Issue 4.15 from Table 6.3.1) Recreation: • Facilitate the docking and launching of boats by having adequate water levels (Issue 4.5 from Table 6.3.1) • Facilitate navigation by reducing erosion (debris) and having adequate water levels (Issues 4.6 – 4.8 from Table 6.3.1) • Improved communication with downstream business regarding dam manipulations (Issue 4.19 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to collect information on: specific instances of erosion/debris and/or damage to shoreline structures (potentially attributed to water level manipulation); details of water supply system and loss; and inadequate water levels for navigation as part of the ongoing WMP process Also, evaluate communication with downstream business regarding dam manipulations.

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
Ministic Lake Dam	Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. Increase level monitoring to a minimum of 6 times per year to assist with future assessments of water levels.	Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize damage to shoreline structures (Issue 5.1)	Use Stakeholder Feedback Tracking System (Vale) to collect information on specific instances of damage to shoreline structures (potentially attributed to water level manipulation) as part of the ongoing WMP process.
Armstrong Lake Dam	(Pre 2017) Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. Increase level monitoring to a minimum of 6 times per year to assist with future assessments of water levels. **In fall 2016 the dam was replaced with a non-operational concrete overflow dam and weir structure with a flow compensation pipe to deliver a minimum flow of 0.13m3/s (4.6 cfs) to downstream at all times. This configuration, under normal conditions, is expected to result in natural fluctuations within the range adopted during the WMP process.**	Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize erosion and damage to shoreline structures (Issue 6.1 and 6.4) • Manage water levels to address fluctuating water levels and to minimize flooding (Issues 6.6 and 6.8) Recreation: • Facilitate navigation by reducing erosion (debris) and having adequate water levels (Issues 6.2 and 6.9 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to collect information on specific instances of erosion/debris and damage to shoreline structures (potentially attributed to water level manipulation), as well as water levels associated with inadequate navigation, as part of the ongoing WMP process. **The replacement of the dam in fall 2016 discontinues active manipulation of water levels. They are now under a more natural flow regime. Follow up monitoring will occur as part of the permitting process.**

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
	Attain winter drawdown level by October 15th rather than October 31st. **As of 2017 the lake will no longer be drawn down.**	Aquatic Ecosystems (Fisheries) • Adjust timing of winter drawdown to accommodate lake trout spawning (Issue 6.5)	Based on existing literature, less drawdown during lake trout spawning is expected to have positive impact. No monitoring.
Agnew Lake – Big Eddy Dam and Generating Plant	Normal operating rule curve from 1993 WMP adopted as target with low and high operating curves adopted as compliance limits. See below for specific changes to be monitored.	Concerns not associated with specific operational changes include: Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize erosion and damage to shoreline structures (Issue 7.1 from Table 6.3.1) Recreation: • Facilitate navigation by reducing erosion (debris) and having adequate water levels (Issues 7.14 and 7.18 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to collect information on specific instances of erosion/debris and damage to shoreline structures (potentially attributed to water level manipulation), as well as water levels associated with inadequate navigation, as part of the ongoing WMP process.
	Drawdown compliance limit is 257.86 m (846 ft) with a best practice drawdown to 258.77 m (849 ft) unless environmental conditions warrant more of a drawdown.	Protection of Shoreline Property and Infrastructure: • Prevent the exposure, freezing and drying-up of water lines, wells and points (Issue 7.8 from Table 6.3.1) Aquatic Ecosystem (Fisheries): • Minimize impact to fisheries (Issue 7.4 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to evaluate effectiveness of best practice on water supply issues. Based on existing literature, less drawdown is expected to have positive impact on fisheries. No monitoring. Maintain record of rationale for drawing lake below 258.77m/849 ft (Vale)

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
	Begin winter drawdown by December 1st	Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize damage to shoreline structures (Issues 7.9 and 7.10 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to monitor reported incidents of damage that can potentially be attributed to water level manipulations, as part of the ongoing WMP process.
	Maximum 4" drawdown in lake level while filling Agnew Lake reservoir during spring freshet	Aquatic Ecosystem (Fisheries): • Minimize impact to fisheries (Issue 7.4 from Table 6.3.1)	Based on existing literature, less drawdown is expected to have positive impact on walleye spawning success. No monitoring.
	Attain summer operating levels 261.82 m, plus 0.15 m or minus 0.30 m (859.5 ft + 6"/-12") by May long weekend.	Recreation • Manage water levels to facilitate the docking and launching of boats and other recreational activities by having adequate water levels (Issues 7.11, 7.13, 7.15, 7.16 and 7.17 from Table 6.3.1)	Use Stakeholder Feedback Tracking System (Vale) to monitor reports of inadequate water levels, as part of ongoing WMP process.
	Minimum daily flow of 8.5 m^3/s (300 cfs)	General Aquatic Ecosystem Health	Consider during ongoing data gap and other studies
High Falls # 1 & 2 Generating Plants	Low and high level compliance limits set at forebay.	None	Use Stakeholder Feedback Tracking System (Vale) to track any issues development
Nairn Falls Dam and Generating Plant	Low and high level compliance limits set at forebay.	None	Use Stakeholder Feedback Tracking System (Vale) to track any issues development
Wabagishik Dam and Generating Plant	Low and high level compliance limits set at forebay.	None	Use Stakeholder Feedback Tracking System (Vale) to track any issues development
	Minimum daily flow of 1.4 m^3/s (50 cfs)	General Aquatic Ecosystem Health	Consider during ongoing data gap and other studies

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
Domtar Facilities			
Pogamasing Lake Dam	Lower the summer maximum water elevation from 368.50 m (1209 ft) to 367.89 m (1207 ft) throughout the year.	Protection of Shoreline Property and Infrastructure • Manage water levels and flow to minimize erosion and/or damage to shoreline structures (Issues 8.1, 8.2 and 8.3 from Table 6.3.1) Recreation: 1. Facilitate the docking and launching of boats by having adequate water levels (Issue 8.4) • Facilitate navigation by having adequate water levels (Issues 8.5 and 8.9)	Use Stakeholder Feedback Tracking System (Domtar) to monitor effectiveness of implemented options on alleviating identified concerns.
Onaping Lake – Onaping Dam and Bannerman Dam	Lower the maximum elevation of Onaping Lake to 398.68 m (1308 ft) throughout the year	Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize erosion and/or damage to shoreline structures (Issues 9.1 and 9.2 from Table 6.3.1) Recreation: • Facilitate navigation by having adequate water levels (Issue 9.7 & 9.9)	Use Stakeholder Feedback Tracking System (Domtar) to monitor effectiveness of implemented options on alleviating identified concerns.

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
	Lower the summer elevation target to 398.22 – 398.38 m (1306.5 – 1307.0 ft)	Protection of Shoreline Property and Infrastructure: • Manage water levels to minimize erosion and/or damage to shoreline structures (Issues 9.3 and 9.4) Recreation: • Facilitate the docking and launching of boats (Issue 9.8)	Use Stakeholder Feedback Tracking System (Domtar) to monitor effectiveness of implemented options on alleviating identified concerns.
	Attain winter drawdown levels between Labour Day and October 15th.	Aquatic Ecosystem: • To maintain or enhance the fisheries by considering sufficient water levels and flows that meet the life history requirements of different fish species (Issue 9.5)	Based on existing literature, less drawdown during the lake trout spawn is expected to have positive impact. No monitoring.
	Attain summer water level by Victoria Day long weekend and maintain level until Labour Day	Recreation: • Facilitate the docking and launching of boats by having adequate water levels (Issue 9.8)	Use Stakeholder Feedback Tracking System (Domtar) to monitor effectiveness of implemented options on alleviating identified concerns.
Sinaminda Lake Dam	Application of high and low water level compliance limits. The dam is currently inoperable and is scheduled to be rehabilitated in the future. Concerns identified will be addressed during the approval process for the dam rehabilitation.	Protection of Shoreline Property and Infrastructure: • Manage water levels and flows to minimize erosion and/or damage to shoreline structures (Issue 10.1, 10.2 and 10.5 from Table 6.3.1) • Minimize disruption to water supply (Issue 10.7 from Table 6.3.1) Recreation: • Facilitate navigation by reducing erosion (debris) and having adequate water levels (Issue 10.1, 10.3 and 10.4 from Table 6.3.1)	Concerns identified will be addressed during the approval process for the dam rehabilitation. Use Stakeholder Feedback Tracking System to monitor status of concerns.

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
Stobie Dam (Vermilion Lake and River)	Application of high and low water compliance limits. Stobie Dam is no longer operated for waterpower, but manipulation can occur, in consultation with CS, for flood control purposes.	Protection of Shoreline Property and Infrastructure: • Manage water levels to minimize erosion and/or damage to shoreline structures, and flooding (Issues 11.1, 11.2 and 11.9 from Table 6.3.1) Recreation: 2. Facilitate the docking and launching of boats and navigation by having adequate water levels (Issues 11.3, 11.4 and 11.5 from Table 6.3.1)	Record Stakeholder Feedback (Domtar) to monitor status of issues in relation to specific water level manipulations.
Espanola Generating Plant	High and low forebay level compliance limits applied. No operational changes.	Protection of Shoreline Property and Infrastructure on the Lower Spanish River: • Manage water level/flow to minimize erosion and/or damage to shoreline structures (Issues 12.1 and 12.4 from Table 6.3.1) • Manage water levels to minimize flooding (Issue 12.1) Recreation: • Facilitate the docking and launching of boats by having adequate water levels (Issue 12.2) • Facilitate navigation by having adequate water levels (Issue 12.3 and 12.6) Aquatic Habitat: • Minimize impacts of water level manipulations on habitat (Issues 12.5, and 12.8)	Use Stakeholder Feedback Tracking System (Domtar) to monitor status of issues in relation to specific water level manipulations.

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
	Maintain continuity of the pool to the river between May 1st and July 1st of each year	Aquatic Ecosystem (Fisheries) • Minimum flows for walleye spawning and incubation • Aquatic ecosystem health (Issues 12.5, 12.10, 12.11)	Based on completed studies, maintaining connectivity between the pool below the dam and the main river during the lake sturgeon and walleye spawn will have positive effects. Ongoing monitoring per Domtar's ESA Mitigation Plan.
	Minimum daily flow of 9.9 m^3/s (350 cfs) – combined minimum flow of Big Eddy and Wabageshik located upstream	General Aquatic Ecosystem Health	Consider during ongoing data gap and other studies
MNRF Facilities			
Three Corner Lake Dam	No operational change, but application of high and low water level compliance limits.	None	Use Stakeholder Feedback Tracking System (Timmins MNRF)
Windy Lake Dam	No operational change, but application of high and low water level compliance limits.	None	Use Stakeholder Feedback Tracking System (Sudbury MNRF)
Whitewater lake Dam	No operational change, but application of high and low water level compliance limits.	None	Use Stakeholder Feedback Tracking System (Sudbury MNRF)
CS Facilities			
Maley Dam	No operational change, but application of high and low water level compliance limits.	None	Use Stakeholder Feedback Tracking System (CS)
Nickeldale Dam	No operational change, but application of high and low water level compliance limits.	None	Use Stakeholder Feedback Tracking System (CS)
Lake Laurentian Dam	No operational change, but application of high and low water level compliance limits.	None	Use Stakeholder Feedback Tracking System (CS)
Nepahwin Dam	No operational change, but	None	Use Stakeholder Feedback Tracking

Facility	Operational Change	Specific Objective Identified as Requiring Monitoring as a Result of Operational Change (Bolded) or Concern Requiring Additional Information for Evaluation	Monitoring Requirement
	application of high and low water level compliance limits.		System (CS)
CGS Facilities			
Ramsey Lake Dam	No change.	None	Use Stakeholder Feedback Tracking System (CGS)

13.0 COMPLIANCE MONITORING AND REPORTING

13.1. Self Monitoring

As each WMP is completed and approved, subsection 23.1(7) of the Lakes and Rivers Improvement Act (LRIA) requires operators of hydroelectric generating station and allied structures to operate their facilities in accordance with the respective water control facilities' OPs, as described in Section 11 and Appendix H. Proponents must also demonstrate ongoing adherence to the OPs through implementation of a CMP.

The CMP includes self-monitoring for compliance, data collection and reporting, incident reporting, as well as a public involvement component. The facilities are also subject to information requests and inspection and enforcement activities undertaken by the MNRF in relation to compliance.

13.2. Mandatory Compliance

Where normal circumstances exist, it is expected that facilities are in compliance with the mandatory requirements as set out in Appendix H.

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 LRIA. Approval of this WMP does not relieve the dam owners from their responsibility to comply with any other applicable legislation.

Approval of this plan does not grant a dam owner the right to flood Crown land or the land of any other person without first obtaining the Crown's or that person's consent, nor does it authorize any infringement of the rights of the Crown or of any other person.

13.3. Exceptions (Abnormal Conditions)

13.3.1. Energy Shortages

If in instances where, due to energy imperatives (e.g. system reliability, demand/supply challenges, etc.), the IESO requests that the operator seek relief from certain provisions of this plan, MNRF will consider those requests expeditiously. After consultation with IESO and the owner, MNRF may allow short term relief from certain provisions. A copy of the IESO request must be provided to MNRF.

13.3.2. Emergencies

Mandatory provisions of this Plan will be waived, as appropriate, when the operator in conjunction with MNRF are requested to do so by a police agency or other recognized emergency organization.

In instances of unscheduled facility imperatives (e.g. emergency maintenance, etc.), MNRF will, with consideration to the relative priorities of both MNRF and owners, expeditiously consider requests for temporary relief from the plan.

13.3.3. Natural Variations in Water Supplies – Low and High Water Indicators

It is recognized that weather conditions and their impacts on water supplies are a souce of ongoing concern to the management of waterpower facilities and other control structures. Water Management Plans will recognize the expected variation of water conditions.

Some or all of the specific management practices outlined in this water management plan may not apply when a low or high water indicator has been met, signifying a drought or flood situation over which the facility may have little control. Nevertheless, owners must advise MNRF and file an incident report. Operators will not automatically be out of compliance with this WMP when they operate outside the defined operating range while these indicators exist.

Facilities with a minimum downstream flow requirement and a minimum reservoir/head pond water level will meet the **low water indicator** when all of the following conditions are met:

1. Outflow from the facility is at or below the minimum flow required in the WMP, and
2. Water level in the reservoir/head pond is at or below the minimum water level stipulated in the WMP.

Facilities with no minimum downstream flow requirement, but having a minimum reservoir/head pond water level, meet the **low water indicator** when all of the following conditions are met:

1. Outflow from the facility is at the minimum possible; and
2. Head pond/reservoir water level continues to decrease.

The above situation will likely only occur in drought conditions as defined by the ***Ontario Low Water Response Plan***. This multi-agency plan provides for drought monitoring as well as the implementation of response measures aimed at reviewing the allocation of water and balancing of upstream and downstream needs while drought conditions exist. The lead agencies for the Plan are MNRF in the Spanish River watershed area and Conservation Sudbury in the bulk of the Vermilion watershed. Where one exists, the SAC shall be convened to assess options and provide advice once a low water indicator has been met.

A **high water indicator** exists when all of the following conditions are met:

1. Water level in the head pond/reservoir is at or above the maximum water level stipulated in the WMP.
2. Head pond/reservoir water level is increasing.
3. Discharge facilities have been operated to discharge the maximum discharge possible (while minimizing upstream and downstream flood damages).

In high water (flood) situations, agency and/or proponents’ facility emergency plans, and associated procedures, are expected to engage. These situations, outside of normal conditions, do not fall within the scope of the approved WMP.

13.3.4. Spanish River Minimum Dissolved Oxygen Management Plan

A unique consideration for the Espanola Generating Station relates to the concern about potential low dissolved oxygen levels in the Spanish River due to low water flows below the Espanola Generating Station. The Spanish River Minimum Dissolved Oxygen Management Plan has been establish by Domtar, MOECC and MNRF to address periods of low dissolved oxygen. This legal plan requires the release of water from upstream reservoirs to aid in maintaining dissolved oxygen levels in the Spanish River downstream of the Espanola Generating Station effluent discharge point.

13.4. Data Collection and Record-Keeping Requirements

Routine level monitoring and data collection requirements for each facility are summarized in Table 13.4. The data shall be made available to the MNRF upon request. Further detailed data and record requirements are as follows:

- If there are any changes to the information on level monitoring in Table 13.4, the operator must outline the changes in writing to the MNRF.

- Where averages are required for compliance monitoring, facility operators/owners shall maintain records of the data used to calculate the daily average values and are required to supply this raw data upon request of the Ministry.
- Water levels and flows are to be recorded as an absolute number (water levels in feet or meters referred to a geodetic datum) and flows in cubic feet per second (cfs) or meters cubed per second (m^3/s). Although some older facilities may use imperial measurements as their operating basis, data reported to MNR is expected to be in metric units.
- Data required for compliance monitoring and reporting shall be recorded and maintained by the proponent for as long as the generating station remains in operation.
- Vale, Domtar, CS and CGS will each maintain data for their individual facilities and make it available to the MNRF upon request for audit activities as it relates to incidents or where there is information suggesting operation outside of legal operating parameters.
- The MNRF will maintain data for the MNRF facilities at its different area offices.
- It is recognized that water level measurements may be unavailable from time to time due to equipment failure or environmental conditions.
- In order for MNRF to meet its mandate to responsibly protect and maintain natural and regulated water resources in the Province of Ontario, generating stations are expected to monitor, at a minimum, hourly generated flows, hourly bypass flows and hourly headpond levels. This is also a goal for more remote dam facilities. However, these capabilities do not currently exist at some older generating stations with legacy control systems and it is a goal to move towards meeting these expectations as systems are updated.

Currently, flow through the older generating facilities is calculated at a lesser frequency (typically daily for the purpose of power generation metrics) using known generator efficiencies for operating units coupled with weir calculations for open dam sluiceways. Reservoir inflow is calculated using headpond level changes over time plus calculated flow through generators and/or dams during that time period. The availability of flow data at more frequent intervals has been identified as a high priority information gap in this WMP and steps are being undertaken to improve data collection, as described in Section 8. In the interim, data that will enable a calculation to be performed for every two hour interval will be collected at Vale generating stations and manually recorded pending upgrades of legacy control systems.

13.5. Reporting

13.5.1. Annual Compliance Reporting

Facility owner/operators will prepare and submit an Annual Compliance Report, in format requested by the MNRF, containing a summary and description of incidents reported and any remedial action(s) proposed or undertaken. In the event there were no recorded incidents of non-compliance, the report will still be submitted with the written claim that there were no incidents or non-compliance for the relevant year. The annual Compliance Report will cover the operating period October 1st to September 30th, and is due on October 31st.

13.5.2. Incident Notification

An incident is considered to have occurred whenever there is an excursion from the approved OP, or the proponent fails to comply with other mandatory conditions of the WMP. All incidents must be reported to the MNRF.

An initial verbal report is required within 24 hours of the occurrence of the incident or when the proponent first becomes aware of the incident. After business hours, sending an email to an MNRF supervisor within 24 hrs of an incident will suffice as adequate notification. The report should include:

- the date, time and nature of the deviation;
- the extent of the deviation;
- possible causes of the deviation;
- known or anticipated impacts associated with the deviation; and
- steps taken or to be taken, including the timeframe, to correct the deviation.

The report should identify the presence of a low or high water indicator and whether the circumstance may be beyond the facility's control.

The facility owner/operator is then required to provide a written report to the MNRF District Resources Management Supervisor, within 30 days, outlining the details of the incident and subsequent remediation. The report must be signed and dated.

13.5.3. Implementation Report

Plan proponents for all WMPs shall submit an Implementation Report every five years. For complex WMPs with multiple plan proponents, the report shall be a collective submission from all plan proponents.

The Implementation Report will provide status updates, transparency of dam operations and inform adaptive management considerations.

The Implementation Report will include:

- summary of all amendment requests received, including the rationale for completed amendments and how proposed amendments that did not proceed were addressed;
- status of the Standing Advisory Committee where applicable;
- report on the results of the effectiveness monitoring program (EMP), if applicable, including a summary of monitoring conducted and findings, a determination of whether operations are having a negative or unintended impact, and an assessment of whether revisions to the facility operations, or the the EMP, are required; and
- status and results of any data or information collection outlined in the WMP's data collection program, if applicable, and a determination of whether revisions to the program are required.

The Spanish and Vermilion WMP Implementation Report will be submitted on the same day as the Annual Compliance reports (October 31st) every 5th year.

Upon confirmation from the MNRF that the Implementation Report is complete, plan proponents will make the report publicly available on at least one proponents' internet website.

13.6. MNRF Inspections, Audits, Investigation and Enforcement Activities

The MNRF will, from time to time, carry out compliance inspections of the site as provided for in section 20 of the LRIA. Owner/operators will be notified within one working day for inspections and audit. The MNRF will provide a written inspection report within 30 days of each inspection. MNRF may install a gauge or portable level logger at a weir, dam, stream or lake or conduct other audit activities. The data from the gauges or level logger will be audited on a regular basis by MNRF and reconciled with data provided by proponents. The MNRF may, based on an incident or information suggesting operation outside of legal operating parameters, request data for evaluation. The proponent shall do so in the timeframe indicated in the request.

The MNRF will review each instance of alleged non-compliance with an OP, taking into account a number of factors including weather, the compliance history of the offender, the intent of the offender, failure of equipment and unforeseen events. MNRF will recognize that, in a system with a number of dams or facilities, situations caused by only one operator may affect the others.

Facility and dam owners downstream from another facility may be unable to avoid a situation where they can no longer meet their flow and/or water level requirements as a direct result of the actions of a facility or dam operator somewhere else on the system. If this occurs, this will not abrogate the downstream owner's ongoing responsibility to take the appropriate action to avoid operating outside of their approved operating ranges.

The facility operator will be provided with a fair and reasonable opportunity to explain what happened and their actions before any enforcement action is taken. However, repeat violations (even minor examples) will be reviewed with increasing concern by MNRF and met with increasingly stronger enforcement measures. The MNRF will determine the response to non-compliance in accordance with legislation.

Table 13.4: Compliance monitoring requirements.

FACILITY	DATA REQUIREMENT	MINIMUM REQUIRED FREQUENCY	LOCATION OF READING AND TYPE
Vale Facilities			
Frechette Lake Dam	Lake elevation	Once in spring, summer and fall	Staff gauge at dam
Canoe (Bardney) Lake Dam	Lake elevation	Once in spring, summer and fall	Staff gauge at dam
Biscotasi Lake Dams #1,2,3	Lake elevation	Once in spring, summer and fall	Staff gauge at dam or Bisco Shop
Indian Lake Dam	Lake elevation	Once in spring, summer and fall	Staff gauge at dam
Ramsey Lake Dams #7, 8	Lake elevation	Once in spring, summer and fall	Staff gauge at dam
Mozhabong Lake Dam	Lake elevation	Once in spring, summer and fall	Staff gauge at dam
Armstrong Lake Dam	Lake elevation	Minimum of six readings per year	Staff gauge at dam
Ministic Lake Dam	Lake elevation	Minimum of six readings per year	Staff gauge at dam
Big Eddy GS	Forebay elevation	2 hr interval readings	Electronic level indicator at dam (Agnew Lk)
	Flow (calculated)	Daily	
High Falls #1&2 GS	Forebay elevation	2 hr interval readings	Electronic level indicator at Big Eddy tailrace
	Flow (calculated)	Assumed to be same as Big Eddy	
Nairn Falls GS	Forebay elevation	2 hr interval readings	Electronic level indicator at dam
	Flow (calculated)	Assumed to be same as Big Eddy	
Wabagishik GS	Forebay elevation	2 hr interval readings	Electronic level indicator at dam
	Flow (calculated)	Daily	
Domtar Facilities			
Pogamasing Lake Dam	Lake elevation	Once in spring, summer and fall	Staff gauge at dam
Onaping/Bannerman Dams	Lake elevation	Monthly in spring, summer and fall	Staff gauge at dams
Sinaminda Lake Dam	Lake elevation	Once in spring, summer and fall	Staff gauge at dam
Stobie Dam	River elevation	Once in spring, summer and fall	Staff gauge at dam
Espanola GS	Forebay elevation	Hourly	Electronic level indicator at dam
	Flow (calculated)	Hourly	
MNRF Facilities			
Three Corner Lake Dam	Lake elevation	Bi-monthly when the dam is operational and accessible – usually April to December	Staff gauge at dam
Windy Lake Dam	Lake elevation	Minimum once per month in spring, summer and fall	Staff gauge at dam or boat launch in Provincial Park
Whitewater Lake Dam	Lake elevation	Minimum once every 2 weeks from April 1 to May 15. As needed during spring, summer and fall	Staff gauge at dam

FACILITY	DATA REQUIREMENT	MINIMUM REQUIRED FREQUENCY	LOCATION OF READING AND TYPE
CS Facilities			
Maley Dam	Elevation	Daily	Electronic level indicator at dam
Nickeldale Dam	Elevation	Minimum once in spring, summer and fall	Staff gauge at dam
Lake Laurentian Dam	Lake elevation	Minimum once in spring, summer and fall	Staff gauge at dam
Nepahwin Dam	Lake elevation	Minimum once in spring, summer and fall	Staff gauge at dam
CGS Facilities			
Ramsey Lake Dam (Sudbury)	Lake elevation	Continuous monitoring and trending on SCADA system	Electronic level indicator at David St. pump station

14.0 WMP Maintenance following MNRF Review and Approval

This WMP document describes activities completed in accordance with the *Water Management Planning Guidelines for Waterpower 2002* – as depicted in Figure 14.1. The draft WMP, as approved by the Steering Committee and initially submitted to MNRF in 2006, has undergone several revisions following an extensive MNRF-led review. Moving forward, once MNRF Approval is granted, the Implementation, Plan Amendment and Plan Review and Renewal stages as described in the 2002 Guidelines are being replaced by requirements contained in a new directive - *Maintaining Water Management Plan Technical Bulletin 2016*.

The new requirements pertaining to complex WMPs are presented Figure 14.2 and are further described in the remainder of this section. Revised reporting requirements were described in Section 13.

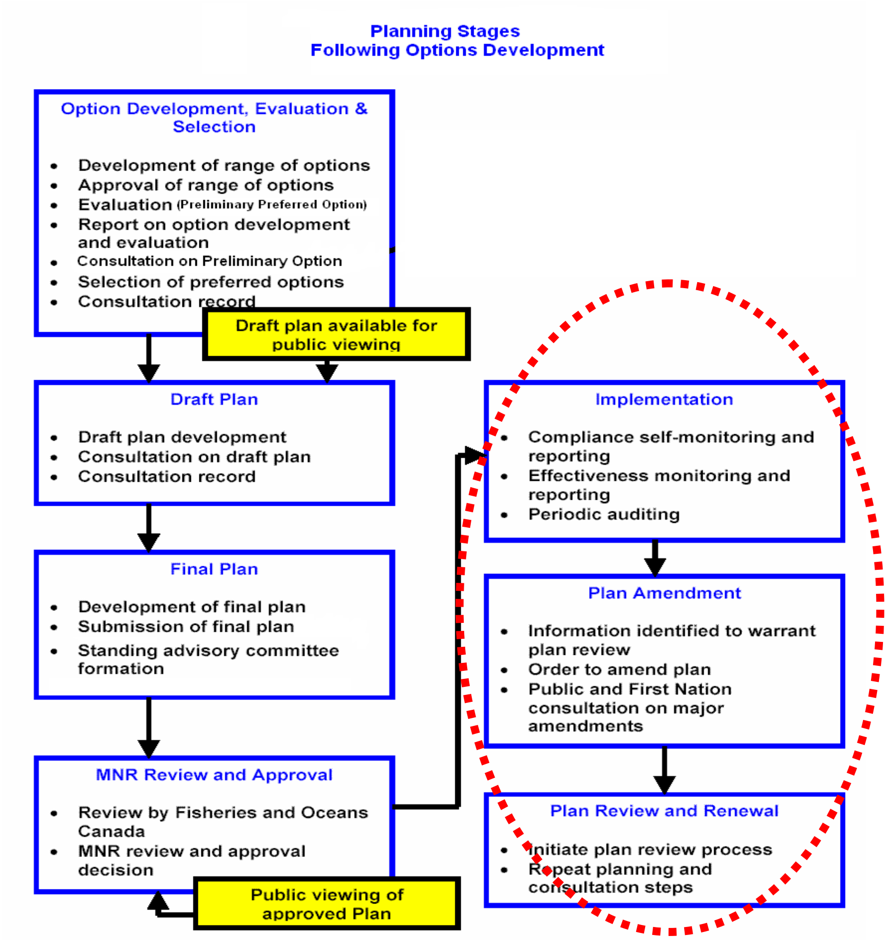

Figure 14.1: Planning Stages Following Options Development (Source: Water Management Planning Guidelines for Waterpower 2002). Red dashed line indicates sections revised by MNR Technical Bulletin Maintaining Water Management Plans 2016.

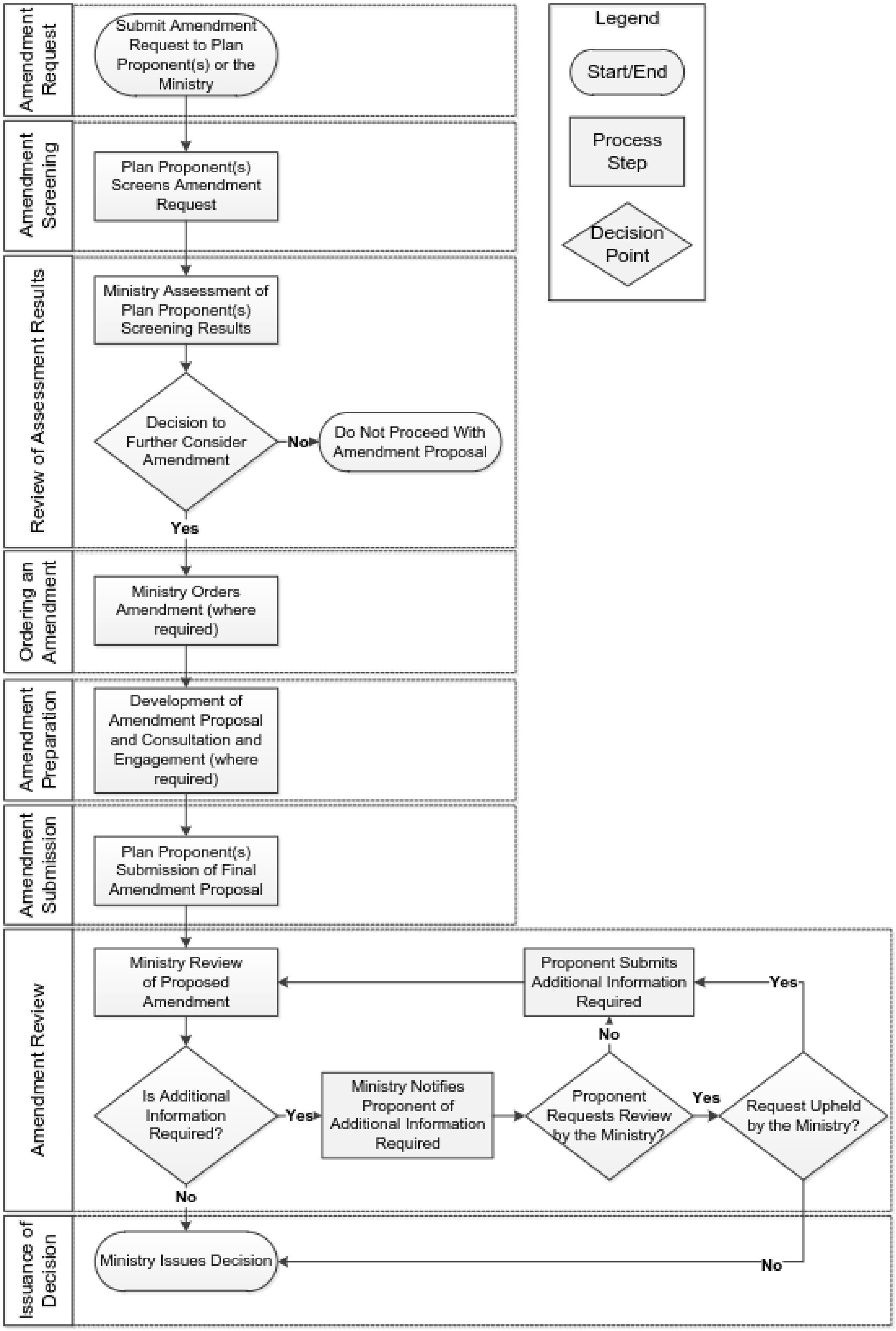

Figure 14.2: Revised process for WMP amendments per MNR Technical Bulletin Maintaining Water Management Plans 2016.

WMPs are long term resource management and regulatory documents that will not have an expiration date, a mandatory review or a plan term. However, they may require periodic amendments to: ensure that the plans remain current; implement adaptive management informed by ongoing public and First Nation and Métis community engagement or consultation; and/or provide clarity and certainty on how water levels and flows are managed.

14.1. Plan Amendments

Any change to an approved WMP requires an amendment. All amendments require approval by the MNRF. Any person may request a WMP amendment. An amendment request may be submitted as a result of matters regarding dam safety, public safety, dam operations, the results of monitoring programs, construction of new dams or alterations of existing dams, or in response to local issues related to the management of water levels and flows. Amendments to the WMP can be made at any time provided the outcomes remain consistent with the goals and objectives of the WMP.

The Spanish & Vermilion River WMP has multiple plan proponents that will work together when assessing amendment requests and preparing amendment proposals (where necessary). In circumstances where the amendment request/proposal is specific to a single plan proponent, that plan proponent will be responsible for assessing the amendment request and preparing the amendment proposal (where necessary).

The amendment process involves:

a) submission of a request for amendment
b) amendment screening
c) review of the assessment screening results
d) Order an amendment
e) Amendment preparation
f) Consultation and engagement requirements for major amendments
g) Amendment submission
h) Amendment review
i) Issuance of a decision

14.2. Amendment Framework

Changes to WMPs can range from simple text corrections to significant modifications to an operating regime. There are two categories of amendments, minor and major, that are mainly differentiated by the expected level of public interest in the proposed change to the WMP.

14.2.1. Minor Amendments

Minor amendments are changes that do not affect the operating regime, plan objectives, are not expected to generate a high level of public interest, and are not expected to adversely affect Aboriginal and treaty rights. Minor amendments will not be subject to public and First Nations and Métis community engagement or consultation beyond discussions with a SAC. Minor amendments may include:

- Changes in the presentation of information, factual or text corrections; or
- Changing a WMP to include a new dam and its associated Operating Plan (Section 2.1 of the Technical Bulletin).

14.2.2. Major Amendments

Major amendments are more significant in scale such as:

- changes to the operating regime or plan objectives,
- changes that could be expected to generate a high level of public interest or changes that might adversely affect Aboriginal and treaty rights.

A major amendment will be subject to public and First Nations and Métis community engagement or consultation. For major amendments where equivalent consultation and engagement has previously occurred through another process (e.g. previous notification that a change will be required, or amendments required after public consultation in other planning processes), the MNRF may exercise discretion to process the proposed change as a minor amendment on a case by case basis.

14.3. Amendment Procedure

Amendment process details are fully described in the 2016 Maintaining Water Management Plans Technical Bulletin. The Spanish and Vermilion WMP will adhere to the technical bulletin and associated operational guidance or procedures.

15.0 Standing Advisory Committee (SAC)

According to *Maintaining Water Management Plans Technical Bulletin 2016,* a SAC is no longer a mandatory requirement for complex WMPs but is recommended as a best management practice to provide plan proponents with a mechanism for engaging the public and Indigenous communities. There are a variety of other tools available to plan proponents to facilitate engagement (e.g. websites, public notice, information centres, etc.).

Plan proponent(s) are responsible for administering the SAC and SACs will work directly with the plan proponent(s). Proponents are required to report on the status of the SAC every five years as a component of ongoing Implemention Reports.

The role of the SAC is to serve as an advisory group, as defined through a terms of reference. The terms of reference should outline the membership, scope, duration and roles and responsibilities of the SAC and its relationship with the plan proponents.

A SAC should include representatives with a broad range of interests on the river such as Indigenous communities, riparian land owners, municipalities and interested groups.

Activities of the SAC include the following, as outlined in the Technical Bulletin:

- bring forward issues to the attention of plan proponents;
- provide feedback to proponent(s) on minor and major WMP amendment(s) in advance of amendment proposals being submitted to MNRF;
- provide feedback to proponent(s) regarding amendment requests; and
- provide recommendations on and assistance with communications in regards to the WMP and its maintenance.

Proponents of the Spanish & Vermilion Rivers WMP are committed to the practice of inclusivity in stakeholder relationships and the establishment of a SAC or other suitable alternative means of effectively engaging the public and Indigenous communities.

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16.0 LIST OF ACRONYMS

ANSI	Area of Natural and Scientific Interest
CFWIP	Community Fisheries and Wildlife Program
cfs	Cubic feet per second
CGD	Canadian Geodetic Datum
CGS	City of Greater Sudbury
cms	Cubic Metres per second
CR	Conservation Reserve
CS	Conservation Sudbury
DCP	Data Collection Platform
DFO	Fisheries and Oceans Canada
EBR	Environmental Bill of Rights
EMA	Enhanced Management Area
FNAC	First Nations Advisory Committee
FR	Forest Reserve
FWIN	Fall Walleye Index Netting
GS	Generating Station
IESO	Independent Electricity System Operator
kW	Kilowatt
IDF	Inflow Design Flood
LO	License of Occupation
LRIA	Lakes and Rivers Improvement Act
m	Metres
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of Environment and Climate Change
MSL	Meters Above Sea Level
MTO	Ministry of Transportation Ontario
MW	Megawatt
MW.h	Megawatt hour(s)
NDCA	Nickel District Conservation Authority also known as Conservation Sudbury
NRVIS	Natural Resource Values Information System
OFAT	Ontario Flow Assessment Techniques
OWA	Ontario Waterpower Association
PAC	Public Advisory Committee
PP	Provincial Park
PSW	Provincially Significant Wetland
PWGSC	Public Works and Government Services Canada
SAR	Species At Risk
SC	Steering Committee
SPOF II	Strategic Plan for Ontario Fisheries
VTE	Vulnerable, Threatened or Endangered Species
WMP	Water Management Plan
WPLA	Water Power Lease Agreement

17.0 GLOSSARY OF TERMS – WATERPOWER MANAGEMENT

Absolute Maximum Level:
The maximum safe water level at a dam with respect to dam safety. When the water level reaches this point, the Emergency Preparedness Plan provisions for a severe flood are implemented. The IDF may in some cases represent the absolute maximum level, but not necessarily.

Active Storage:
The volume of water contained between the maximum and minimum operating level within a reservoir.

Backwater Effects:
An increase in water level caused by a downstream obstruction.

Bank-full Flow Discharge:
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 of width, depth, sediment size & 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 approximately once every two years.

Bank-full Stage:
An established river stage at a certain point along a river which is intended to represent the maximum safe water level which will not overflow the river banks or cause any significant damage within the reach of the river

Baseflow:
That portion of stream flow originating in indirect runoff, that is, runoff that has reached the stream or river by first passing through the underlying aquifer, rather than by flowing directly overland as surface flow. Baseflow effectively drains the neighbouring shallow ground water reservoirs, eventually leading to their depletion in the absence of substantial recharge. This is almost always cool or cold water and does not vary much in quantity or temperature at a particular location throughout the year. Base flow is characteristically a very slow process, with strong runoff diffusion and very little variability. The presence of base flow throughout the year is an indication of a humid climate and a shallow ground water table with fast recharge potential.

Base Load:
The minimum continuous amount of power required over a long period of time (minimum of one month).

Benthic:
The region of the shore and the bottom of waters, benthic (as noun) or benthic zone (Gr. benthos depth).

Best Effort Basis:
Use of all means available to achieve a goal.

Bubbler:
A system for making air bubbles in water so the water will not freeze. The bubbler system keeps the water around sluicegates agitated so that the gates will not freeze up and will remain available to pass excess water through the dam (frozen gates would cease to operate and would have to be thawed manually, using large torches and ice-picks – a time consuming, labour intensive job.

Capacity:

The greatest load which a unit, station or system can supply. Capacity is usually measured in kilowatts, megawatts, etc.

CDG (Canadian Geodetic Datum):
Surveyed elevations above sea level based on established Canadian benchmarks.

Channel:
A long, deep portion of a river or other waterway through which water and sediment flow.

CMS Day:
One cubic meter of water passing a given point every second for one day or 24 hours. Used in the calculation of inflow for storage lakes.

Compensation Water:
That fraction of stream flow released through a hydroelectric dam specifically to meet the needs of downstream users.

Continuous Instantaneous Flow:
Continuous measurements of instantaneous flow.

CR (Conservation Reserve)
A designation under Ontario Living Legacy's Land Use Strategy. Conservation Reserves complement provincial parks in protecting representative natural areas and special landscapes.

Cubic feet per second (cfs):
A rate of the flow, in streams and rivers, for example. It is equal to a volume of water one foot high and one foot wide flowing a distance of one foot in one second. One "cfs" is equal to 7.48 gallons of water flowing each second. As an example, if your car's gas tank is 2 feet by 1 foot by 1 foot (2 cubic feet), then gas flowing at a rate of 1 cubic foot/second would fill the tank in two seconds.

Cubic metres per second (m3/s):
A unit expressing rate of discharge, typically used in measuring stream flow. One cubic metre per second is equal to the discharge in a stream of a cross section one metre wide and one metre deep, flowing with an average velocity of one metre per second.

Daily Average Minimum Flow:
The minimum flow attained on average over the course of a 24 hour time period.

Dam:
A structure built as a barrier to the flow of a stream or river.

De-control:
The reduction of market share so as to relinquish control of the market.

Demand:
In the electrical industry, “demand” is often used synonymously with “power” which is the rate at which electric energy is delivered at a given instant or averaged over some designated period of time. It is expressed in kilowatts, megawatts, etc.

Drainage Basin:
The area of land over which all runoff flows into the same river.

Drawdown:
The difference between maximum and minimum water levels in a reservoir. Also refers to the act of lowering reservoir levels.

Drawdown Zone:
Reservoir regions alternately exposed and submerged due to water level fluctuations.

Drought:
Reduced natural inflows that do not permit maintaining minimum flow requirements. Prior permission is required from MNRF to reduce the reservoir level below the legal minimum.

Ecology:
The study of the relationship of organisms to their environment (Gr. eikos house, logos discourse).

Energy Emergency:
The Independent Electricity System Operator (IESO) has the responsibility for the stability of Ontario's electrical system to:

- Match generation to load
- Maintain the frequency/voltage quality
- Ensure sufficient operating reserve for generation loss protection
- Prevent load cuts where parts of the electrical grid are not supplied with power

EMA (Enhanced Management Area):
A designation under Ontario Living Legacy's Land Use Strategy. A new land use category established to provide more detailed land use direction in areas of special features or values. Voluntary constraints may be exceeded in order to fulfill above obligations.

Epilimnion:
The turbulent superficial layer of a lake or reservoir lying above the metalimnion which does not have a permanent thermal stratification (Gr. epi on, limne lake).

Eutrophic:
Waters with a good supply of nutrients and hence a rich organic production (Gr. eu well, trophein to nourish).

Flood:
An overflow of water onto lands that are used or usable by man and not normally covered by water. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river, stream, lake, or ocean.

Flood Allowance:
The maximum allowable flood level for a reservoir as outlined in its licence of occupation for that particular facility.

Flood Frequency Curve:
A graph of annual flood peaks usually ranked in descending order and their frequency of exceedence. The graph may be interpreted as the probability of a certain discharge occurring in a given year. The annual flood frequency curve describes a sample of peak annual events only and is often misinterpreted as representing all floods.

Flood plain:
A strip of relatively flat and normally dry land alongside a stream, river, or lake that is covered by water during a flood.

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

Flood Storage Level:
The maximum level at which a reservoir can store water in a flood situation. Can be higher than the maximum allowable level outlined in a licence of occupation but must be under the maximum safety level associated with the facility responsible for the impoundment.

Flushing Flows:
Channel maintenance/flushing floods are analogous to bank full flows, the stage at which water just begins to overflow onto the flood plain and corresponding to the discharge at which channel maintenance is most effective. Flows that exceed the entrainment velocity of sediment and cause sediment bedload transport. Channel maintenance/flushing floods control natural channel structure and can be further divided into valley/flood plain flows and riparian flows.

Forebay:
A reservoir immediately upstream of a generation facilities intake.

FR (Forest Reserve):
Areas where protection of natural heritage and special landscapes is a priority, but some resource use can take place with appropriate conditions.

Freshet:
The accumulated runoff from total precipitation and snowmelt usually occurring around April but may vary on a year to year basis depending upon climatic conditions.

Full Supply Level:
Target water level for a reservoir to optimize power production balancing head (water level) and storage. Storage lakes usually also have a full supply level, particularly if there are interests on the lake other than the power producer. The summer full supply level at lakes or reservoirs that support recreational uses such as cottagers is usually dictated by this recreational concern rather than power optimization.

Head:
The difference in elevation between the water at the reservoir (forebay) and the discharge (tailrace)

Head pond:
The reservoir or area upstream of the dam where water is ponded or stored.

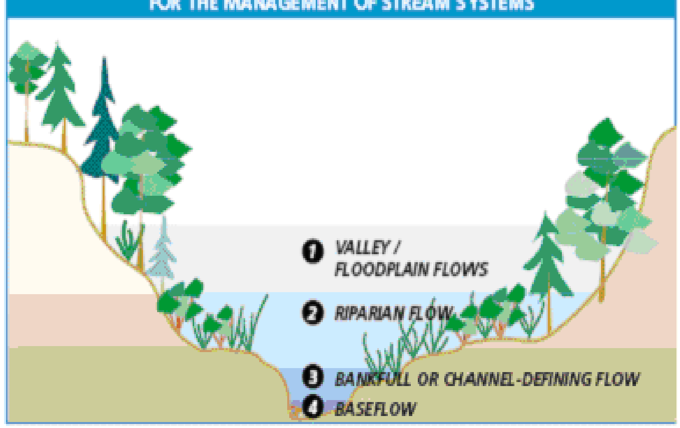
Headwater:
The section of a river or stream with the highest elevation above sea level. This is the area in a watershed that most streams begin and flow down to areas of lower elevation.

High Flow:
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:

1. Valley /Floodplain Flows,
2. Riparian Flows,
3. Bankfull Flows.

High flow variables include:

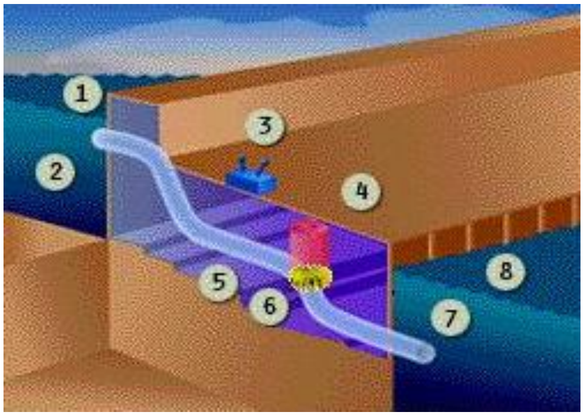
FIGURE 4-2: A CROSS-SECTIONAL VIEW OF FOUR FLOW STAGES FOR THE MANAGEMENT OF STREAM SYSTEMS



- **Bankfull Q1 - Q1.5:** . The maximum flow attained from 1-1.5 years
- **Riparian or floodplain Q2- Q20:** The maximum flow attained from 2-20 years –
- **Valley Q25- Q1:** The maximum flow attained from 25-100 years

Hydro:
The term "Hydro" is derived from the Greek Word "Hydros" Meaning Water. Hydroelectricity, therefore, means "electricity from water". "Hydro" has become a generic term in Canada meaning "electricity". This originates from the days when all of our electricity was produced by hydroelectric generators.

Hydroelectric Facility:



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

Hypolimnion:
The deep layer of lake lying below the metalimnion and removed from surface influences (Gr. hypo under, limne lake).

Inflow:
The total amount of water coming into a body of water. Water for lakes comes from precipitation, tributaries and melting snow and ice.

Inflow Design Flood (IDF) Level:
The water level at a dam, which is used to assess the safety of a dam with respect to flood passage and stability. The IDF for low hazard dams is often the same as the RF.

Instantaneous Flow:
Water, which at any instant, is flowing into the channel system from surface flow, subsurface flow, base flow, and rainfall that has directly fallen onto the channel. Minimum instantaneous flow is the minimum flow attained in an instant in time. Maximum instantaneous flow is the maximum flow attained in an instant in time.

Kilowatt-hour (KWH):
Power demand of 1,000 watts for one hour. Power company utility rates are typically expressed in cents per kilowatt-hour.

Laminar Flow:
The organized unidirectional movement of a liquid or a gas (Lat. lamina leaf, thin layer).

Littoral:
Shallow zone of a lake or river in which light penetrates to the bottom permitting plant growth.

Log Sluice Gate:

A gate which can be placed into an opening to shut off or regulate the flow of water. The gate is not permanently connected to a lifting device, and is sometimes made from squared timber, hence the term log.

Low Flows:
The periodic decline in a river's water level as a result of reduced precipitation. 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 7Q2
- Local Extinction Flow 7Q10
- Systems Extinction Flow 7Q20

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 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 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.

Macrophytes:
Large plants (Gr. macros great, phyton plant).

Mainstem:
The unimpeded, main channel of a river.

Maximum Operating Level:
The maximum water level to which the reservoir or storage lake is operated under normal operating conditions at a given time of the year.

Maximum Usable Flow:
The flow corresponding to the total capacity of a unit.

Mean Annual Flood:
The flow representing a runoff event having a probability of occurrence once every 2.33 years. This would usually occur during the spring freshet in our snow-melt dominated basins here in NE Region, but may be equaled or exceeded in a severe summer rainfall event.

Minimum Continuous
Flow: A minimum flow set as a threshold that the flow is not to go below and is maintained on a continuous basis, established below a hydro facility.

Minimum Flow:
The lowest flow on record in a flow data set.

Minimum Operating Level:
The minimum water level to which the reservoir or storage lake is operated under normal operating conditions at a given time of the year.

Mining Reservation Contour:
An impervious clay core installed upon which the dam was constructed.

Natural Resource Values Information System (NRVIS):

A mapping program used by the Ministry of Natural Resources and Forestry that contains a database of all natural resource values which can be displayed as themes and viewed in layers.

One Hundred (100) Year Flood:
Historical records allow experts to estimate the size of future floods. Estimates such as the "100 year flood" are often used. A 100 year flood is an estimate of the largest flood that will happen at a certain place once in every 100 years on average. In other words, there is 1 chance in 100 that a flood this large will happen this year. Of course, it is entirely possible that the 100 year flood might not happen for several centuries or perhaps, it could happen several times in a 100 year period. The likelihood of any one of these scenarios occurring is quite small

Ontario Flow Assessment Techniques (OFAT):
A program developed and produced by MNRF's Northeast Science and Information that enables users to delineate watershed basins and calculate watershed parameters

Ogee-Crested Dam:
The word ogee describes the shape of the curve, in profile or section, on the crest of the dam. The shape is a reverse curve, similar to the letter "S", but elongated. The shape is intended to match the natural shape of flowing water. The downstream faces of overflow dams are often made in this shape.

Oligotrophic:
Waters with a small supply of nutrients and hence a small organic production (Gr. oligos small, trophein to nourish).

Peak Demand:
The maximum rate of energy consumption that occurs within a given period of time. Peak demand can refer to the maximum demand placed on a system as a whole, individual parts of a system, or individual customers or applications.

Peaking:
Generating capability normally designed for use only during the maximum load period of a designated time interval.

Peaking Capacity:
Generating stations that are normally operated only to provide power (Peaking Station) during maximum load periods.

Peaking Plant:
Generation stations that are normally operated only to provide power during maximum demand.

Penstock:
A pipe conducting water from the forebay to the scroll case of the turbine

Percent Exceedence: (80% & 20%):
On a flow duration curve the percent of time that a specific flow is equaled or exceeded. The 80% & 20% exceedence is the flow that is equaled or exceeded 80% or 20% of the time.

Power Grid:
The network of conductors, their support towers, transformers, switches and other devices used to convey electrical energy from all the generating stations to the local electrical system whish distributes power to the consumer.

PP (Provincial Park):
An area managed to ensure its cultural and natural values are retained and enhanced. Commercial timber harvest, mining and commercial hydroelectric power development will continue to be excluded from all existing and new Provincial Parks.

Ramping Rate:
The rate of change of flow or rate of change of WSE (water surface elevation) usually measured immediately below the facility or at a specified downstream location. The time at which it takes a peaking generation station to go from near zero flow to full generating capacity. Rising ramping rate is the rate at which the flow is opened. Receding rate is the rate at which the flow is closed off.

Raise Rate (Build Rate):
The amount of water (measured in cms days or cms hours) required to raise or lower the water level by 1 cm per hour.

Rating Curve:
A graph showing the relationship between the stage, usually plotted vertically (Y-axis) and the discharge, usually plotted horizontally (X-axis).

Reach:
The distance between two specific points outlining that portion of the stream, or river for which the forecast applies. This generally applies to the distance above and below the forecast point for which the forecast is valid. Generally, a reach is a contiguous section of river where channel form is consistent i.e. a run between two waterfalls.

Reasonable Effort Basis:
Use of all reasonable means available to achieve a goal, taking into account safety and natural conditions.

Regulatory Flood (RF) Level or Maximum Flood Level:
The maximum level of a reservoir dictated by flood damage to property around the reservoir. The *regulatory flood* also applies to rivers as well as reservoirs. It is the flood level below which development restrictions apply in an organized area per MNRF's Natural Hazards Policies. A facility may have two flood levels; one where flood damage starts to happen and a higher one defining the Regulatory Flood. The Regulatory Flood is the flood represented by the higher of the following:

1. Observed historical flood
2. Flood induced by the hypothetical Timmins Storm rain event
3. 1:100 year flood.

Reserve Capacity:
The amount by which the total system capacity exceeds the peak demand within a given time period. Some reserve is required to maintain system reliability in anticipation of unexpected high demands or equipment failures. Planning reserve is the amount by which system capacity is placed to exceed forecast annual peak demand. The absolute amount of reserve capacity is usually expressed in MW; when expressed as a percentage of expected peak demand, the term “reserve margin” usually applies.

Reservoir:
An artificial water body created to store water and then deliver it to the intake system via a penstock.

Return Period:
A measurement, based on statistical analysis of historic data, denoting the average expected frequency of occurrence of an event such as rainfall or flow of a certain amount, used to assess risk or for design purposes.

Riparian:
Along the banks of rivers and streams (interface between land and stream).

Riparian Flow:
These are overbank flows that result in significant interaction between the channel and the floodplain, defined as events with a frequency between 1:2 year and 1:20 year return period (OMNRF, 1994) or covering the equivalent of the "confinement area". The high flows that access the floodplain on a fairly regular basis are described as "riparian flows," since these discharges form and sustain the complex environment adjacent to and overlapping with the channel. From a physical perspective, these frequent high flows must be able to reach the floodplain in order to dissipate energy and deposit sediment. The boundaries can be partially defined through measuring the entrenchment at a cross-section. From an ecological perspective, these flows link the stream corridor with the channel. This process enables fish to spawn on the floodplain. Nutrients and moisture are also delivered to the vegetation communities. Further, these flows help to form and sustain the pheratic zone, which includes shallow groundwater and benthic species. These functions partially illustrate how complex the riparian zone is and how essential these flows are.

Riparian Vegetation:
Non-aquatic vegetation that directly influences the stream. Its influence on the stream in inversely proportional to the stream size with first to fourth order stream tending to be strongly controlled by riparian vegetation.

Riparian Water Rights:
The rights of an owner whose land abuts water. They differ from state to state and often depend on whether the water is a river, lake, or ocean. The doctrine of riparian rights is an old one, having its origins in English common law. Specifically, persons who own land adjacent to a stream have the right to make reasonable use of the stream. Riparian users of a stream share the streamflow among themselves, and the concept of priority of use (Prior Appropriation Doctrine) is not applicable. Riparian rights cannot be sold or transferred for use on nonriparian land.

Riverine:
Of, pertaining to, or inhabiting rivers.

Rule Curve:
For reservoirs associated with water power, a rule curve is an annual schedule of level manipulations, or target elevations that, based on statistical analysis, is expected to provide a certain estimated amount of flow downstream for generation purposes.

Runoff:
(1) That part of the precipitation, snowmelt, or irrigation water that appears in uncontrolled surface streams, rivers, drains or sewers. Runoff may be classified according to speed of appearance after rainfall or melting snow as direct runoff or base runoff, and according to source as surface runoff, storm interflow, or ground-water runoff.
(2) The total discharge described in (1), above, during a specified period of time.
(3) Also defined as the depth to which a drainage area would be covered if all of the runoff for a given period of time were uniformly distributed over it.

Run-of-the-river Generating Stations:
Run-of-the-river generating stations are those in which a portion of the natural water flow is diverted through a turbine before being returned back to the stream. Water storage is not utilized to any significant extent, thus avoiding the associated negative environmental impacts of larger reservoirs. When possible, however, generation is adjusted to match river flow in an attempt to maintain a relatively constant forebay level.

Seiche:
A standing wave in a lake (perhaps from Fr. seche dry, since part of the shore is laid bare by the recession of the water).

Sluice Gate:
A gate, which can be placed into an opening to shut off or regulate the flow of water.
The gate is permanently attached to a hoist and is controlled either hydraulically or electrically at the location or remotely.

Spillway:
A structure over or through which excess or flood 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).

Spillway Capacity:
The maximum amount of water that can be passed through or over the spillway.

Spillway Gates:
see Sluice gate

Stage-Discharge:
The discharge of a facility associated with the specific water level or stage of the headpond or reservoir. The graphical representation for stage discharge for a dam will see dam discharge capabilities (x) axis and water surface elevation (y) axis.

Stage-Storage:
The relationship of reservoir storage volume (effective reservoir area (m^2) and stage (m) of volume "A" to volume "B") typically from the lower operation range to the upper operational range. The graphical representation of stage storage for a reservoir will see reservoir storage volume (y) axis and reservoir stage elevation (x) axis.

Stagnation Period:
The period of time in which through warming (or cooling) from above a density stratification is formed that prevents a mixing of the water mass (Lat. stagnum a piece of standing water)

Stop Logs:
A series of logs that acts as a gate, which can be placed into an opening at a hydro facility to regulate the flow of water. The gate is not permanently connected to a lifting device but can be manually manipulated.

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

Storage Lake:
The lake on the upstream side of a dam that does not have a hydro generating plant, but is used to store water for other plants further downstream. The dams at these lakes are almost always controlled by stoplog sluiceways. They usually are operated sporadically and have a rather sporadic record of water levels. Many remote storage lakes would only typically be operated in the spring and fall (logs out in the fall for winter drawdown to catch spring runoff - logs back in at some point during the receding part of the freshet (usually) to catch as much of the freshet as possible and bring the water level back up to summer normal level).

Storage Reservoir:
A body of water, which permits the storage of a large amount of water during periods of high flow (freshet) to be preserved for use during dry periods. Normally, the stored water is used to supplement the natural flows between the storage lake and the generating station to produce a predetermined amount of water for power production, without spilling.

Streamflow:

The water discharge that occurs in a natural channel. A more general term than runoff, streamflow may be applied to discharge whether or not it is affected by diversion or regulation

Stream Regimen:
The typical annual pattern of stream flow for a particular river.

Subsistence Fishing:
Engagement in fishing for the purpose of livelihood.

Summer Band:
Existing voluntary constraint that defines the summer operating range.

Superstorage:
Increased natural inflows that necessitate the use of the flood storage to mitigate flooding downstream. Prior permission is required from MNRF to increase the reservoir level above the Normal operating maximum.

Tailrace:
A channel carrying water away from a hydraulic generating station.

Tailwater:
The water from a generating station after it has passed through the turbine.

Thalweg:
Line following the deepest part of a streambed, channel or valley.

Trapline:
The route, usually a narrow trail, along which a fur trapper lays his traps.

Tributary:
A smaller river or stream that flows into a larger river or stream. Usually, a number of smaller tributaries merge to form a river. Also: A stream that contributes its water to another stream or body of water.

Trophic Surge:
A sudden sharp increase in nutrient levels.

Turbulence:
Unorganized movement in liquids and gases resulting from eddy formation (Lat. turba disorder).

Walleye Health:
Unhealthy Population: An unhealthy population is characterized by having no walleye in the catch that is older than 13 years, less than 6 age classes in the age composition, a Shannon diversity index of less than .5, a population rate of increase where r = 2.79 and having geometric mean catches of walleye ≥450mm total length $<2.0 \cdot net^{-1}$ and MSY biomass <0.
Stressed Population: A stressed population is characterized by having walleye >13 years of age,
greater than 6 age classes, a Shannon diversity index >.5, a population rate of increase where r> 2.79 and having geometric mean catches of walleye ≥450mm total length $<2.0 \cdot net^{-1}$ and MSY biomass <0.
Healthy Population: The only difference between a healthy and a stressed population is having geometric mean catches of walleye ≥450mm total length $>2.0 \cdot net^{-1}$ and MSY biomass >0.

Watershed:
The area (in square kilometers) drained by a river and its tributaries that collects in a common channel or lake.

Watt-hour (Wh):
An electrical energy unit of measure equal to one watt of power supplied to, or taken from, an electrical circuit steadily for one hour.

Wetted Perimeter:
The length (perimeter) of shoreline that is in contact with the water.

Winter Drawdown:
The level at which a reservoir is reduced to in order to allow for increased water volumes associated with spring freshet.

Young-of-the-Year:
Fish that hatched during the year under discussion or the year when caught.

18.0 APPENDICES

Appendix A – Approved Terms of Reference
Appendix B – Committee Membership
Appendix C – Public Consultation Records
Appendix D – First Nations Consultation Records
Appendix E – Flow Metrics Data Sheets
Appendix F – Issues Discussion Document
Appendix G – 1993 Spanish River Watershed Water Management Plan
Appendix H – Operating Plans
Appendix I – Community Feedback Tracking Template

TERMS OF REFERENCE
for the
SPANISH/VERMILION RIVER WATER MANAGEMENT PLAN

These Terms of Reference have been reviewed by the steering committee and are hereby recommended for approval by the parties below.

Ted Petrus, Domtar Inc.

Jim Cunningham, INCO Ltd.

Joe Fyfe, Falconbridge Limited

Eric Cobb, Ministry of Natural Resources

Allen Bonnis, Nickel District Conservation Authority

Paul Graham, City of Greater Sudbury

Paul Bewick, Ontario Parks

Peter Owl, Sagamok Anishnawbek Representative

Terry Nootchtai, Whitefish Lake First Nation Representative

Pete Nahwegahbo, Aundeck Omni Kaning First Nation Representative

Art Jacko, Wikwemikong Unceded Indian Reserve Representative

Rick Allaif, Spanish/Vermilion Rivers Public Advisory Committee

Terms of Reference Approved by:

Trevor Griffin
District Manager
Ministry of Natural Resources and Forestry
Sudbury District

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Introduction

On May 1, 2002, the electricity market moved to a free market system. At this time, the Ministry of Natural Resources implemented new regulations in the form of "Water Management Planning Guidelines" which specified that the owner/operator of all waterpower facilities in Ontario must develop a Water Management Plan. The plan must be submitted to the Ministry of Natural Resources for approval.

Currently, Vale. and Domtar Inc. produce power for their own operations and are not providing power to the hydroelectricity market. However, these operators of waterpower facilities have a responsibility to ensure that the operations of dams and generating stations are consistent with the needs of other water resource users, stakeholders, and the public.

The Ontario Ministry of Natural Resources (MNR) also has a key role to play in ensuring that Ontario's resources are managed in a sustainable way. The MNR, under the requirements of the *Lakes and Rivers Improvement Act*, requires an updated water management plan be prepared for the Spanish/Vermilion River to include all of the river's storage and generating facilities.

In recognition of the value of the Spanish River for outdoor recreation and resource utilization, a Water Management Plan for the Upper Spanish River was developed in the early 1990's. The plan was prepared by an interdisciplinary planning team comprised of members of the Ontario Ministry of Natural Resources, Vale and E.B. Eddy Forest Products Limited (now known as Domtar Inc.) The plan was created for the planning period 1992 – 2012.

A provision incorporated into the original plan provided for a review to occur at five-year intervals. As this is now the tenth year of the plan, MNR and the proponents (VALE and Domtar) reviewed the contents of the plan and operations related to the plan. As part of the review process, open houses were held in various communities within the Spanish River Watershed Basin. Consultations were held in conjunction with the Invitation to Participate in the Spanish River Valley Signature Site planning process. These open houses provided an opportunity for the public to provide input for the plan review process.

Domtar Incorporated, Vale, the Nickel District Conservation Authority, Xstrata plc. and the City of Greater Sudbury, along with the Ministry of Natural Resources, own and operate structures and facilities on the river systems. These facility operators will cooperatively prepare the final water management plan. The final plan will be developed through consultation with the public, First Nations, and stakeholders in an effort to achieve a plan that reflects the interests of all parties involved. Agency consultation with the Department of Fisheries and Oceans, the Ministry of the Environment, and other governmental agencies will also take place. Concerns or issues related to the current water management operating plans will be addressed in this manner.

Water Management Plan Goals and Objectives

The water levels and flows often impact activities taking place within the Spanish/Vermilion watershed. The objectives of developing a water management plan for the Spanish/Vermilion watershed are:

1. Sustainable Utilization of Hydroelectric Power
   To contribute to the environmental, social and economic well being of the people of Ontario through the sustainable utilization of waterpower resources and to manage these resources in an ecologically sustainable way for the benefit of present and future generations. To provide operational direction for normal water levels and flows, low flow and drought conditions; high flows and flood conditions.

2. Minimum Flow Augmentation
   There is an environmental need to maintain a minimum dissolved oxygen level in the section of the Lower Spanish River below the Espanola Dam and Generating Station. As a result of this need, Domtar Inc. and Vale. have signed a low flow augmentation agreement.

3. Fishery habitat protection and enhancement of aquatic ecosystems and biological diversity
   To sustain and enhance the river's aquatic ecosystems and biological diversity and protect fish and wildlife habitat. Water level and flow fluctuations can have a significant impact on fish productivity. Spawning times are critical periods when a change in water levels can drown prime habitat or expose spawning beds.

4. Water level and flow regulation to support cottager activities, recreational uses, and tourism needs
   For seasonal and permanent residents and commercial tourist operators on the lakes and rivers within the planning area, water level regulation is a key concern. Low water levels can make access to properties difficult, high water levels can damage docks or cause erosion to waterfront property. Access to outpost camps by air can also be affected by water level fluctuations. Recreation and tourism activities can be broadly affected by the fluctuation of water levels and flows through the entire watershed system. Water resources will be managed on a watershed basis to meet user requirements in recognition of flow regulation for recreational needs.

5. Public awareness, education and safety
   To foster greater public awareness and understanding of the river as an interconnected system and educate the public about the dangers associated with hydroelectric facilities. To prevent loss of life and to minimize social disruption, property damage and the loss of natural resource values from floods and erosion.

6. Improved co-operation, communication and partnerships
   To foster co-operation, partnership and improved levels of communication between waterpower producers, government and area stakeholders.
   To develop a communication strategy which will address the operation of water control structures in relation to involvement of external agencies and public information dissemination.
   To ensure a coordinated approach to the use of land and the management of water.

7. Flood damage reduction
   To minimize the potential for flooding and to give due regard to flood emergency response capabilities.

A set of general water management planning principles was developed based on the Water Management Planning Guidelines for Waterpower (MNR 2002). These include:

- Maximum net benefit to society
- Riverine ecosystem sustainability
- Planning based on best available information
- Thorough assessment of options
- Adaptive management approach
- Timely implementation of study findings
- Respect for Aboriginal and Treaty rights
- Public participation

These principles will guide planning through the preparation, review, approval and implementation stages of the water management plan. More details about these principles are outlined in the Water Management Planning Guidelines.

Definition of a Dam

Water control structures covered by this Water Management Plan include those with the ability to "influence flows and levels". Water control structures that affect the management of water levels and flows on the river system include non-waterpower control structures such as public or private dams. They also include municipal, industrial and commercial dams.

According to the *Lakes and Rivers Improvement Act*, the definition of a dam is "a structure or work forwarding, holding back or diverting water and includes a dam, tailings dam, dike, diversion, channel alteration, artificial channel, culvert or causeway". Even if a dam cannot be adjusted to change water levels and flows, it will still be considered in the Spanish/Vermilion water management plan.

Background Planning, Principles and Issues

Management Area

Spanish River Watershed

The Spanish River is situated in the northeastern part of the Province of Ontario, north of Georgian Bay on Lake Huron. It is the largest basin draining into Lake Huron, covering an area of 13,500 km^2 (5212.38 sq. miles). The river is a total of 260 km (162 miles) long, with 13 water-controlled lakes on the system. The main tributaries are the Aux Sables, Wakonassin, Snake, Agnes, Moncrieff Creek, and Vermilion River. The Aux Sables River will be covered under a separate water management plan, because it enters the Spanish River below all the other water control structures.

The Spanish River is composed of tertiary watershed 2CE and 2CF. The headwaters of the Spanish River originate at the height of land, which is the drainage divide between the Great Lakes - St. Lawrence watershed and the Arctic watershed flowing into Hudson and James Bay. The general drainage pattern of the area is through a series of parallel, elongated systems draining from north to south through a bedrock-controlled fault system. The river reaches its outlet into the North Channel at the town of Spanish.

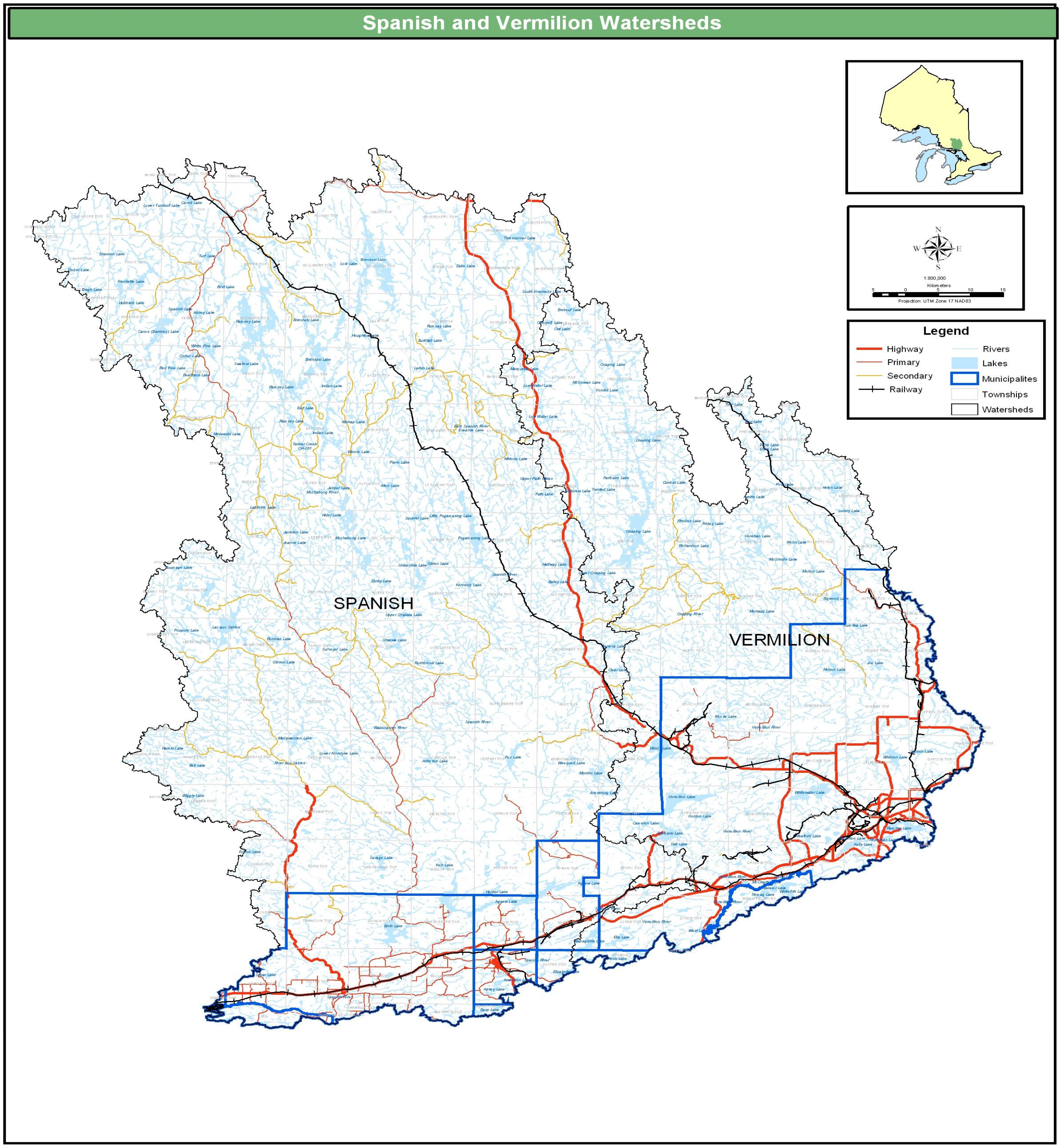
Vermilion River Watershed

The Vermilion River will also be included as part of the water management plan because it is a main tributary of the Spanish River. This system also includes the Onaping Watershed, which is tertiary watershed 2CF. Its headwaters originate in the Township of Frechette in the rugged northern Precambrian ridges of the watershed. The Vermilion River generally flows in a southerly direction and follows a meandering path to it's confluence with the Spanish River southwest of Wabageshik Lake. It has a total length along its main channel of approximately 248 km (154 miles) and encompasses a drainage area of over 4,300 km^2 (1, 687 square miles). The main channel and its primary tributaries, flow through differing geographic formations, from exposed bedrock to flat valley lands to rolling clay/silt plains. The elevation change along the main channel from the headwaters to the confluence is approximately 251 m (825 ft).

The Vermilion River has many major tributaries and sub-drainage areas, the largest being the Onaping River system. The Onaping River flows southerly for 115 km (71 miles) and forms a drainage basin of 1650 km^2 (638 square miles). This system discharges in three directions: southerly to the Vermilion River; westerly to the Spanish River; and northerly to the Mattagami River. The Onaping River meets the Vermilion River near the town of Dowling in the City of Greater Sudbury.

The other main tributaries of the Vermilion River are classified as urban/semi-urban watercourses. They exhibit characteristics of intensive development in certain areas and have experienced flooding problems. These systems include Junction Creek; and the Whitson River. Nolin Creek and Copper Cliff Creek join Junction Creek in downtown Sudbury. Junction Creek eventually enters the Vermilion River at McCharles Lake. The Whitson River sub-watershed was primarily a former glacial lake and the hydrology of this drainage area is affected by its origin. The Whitson River flows in a southwesterly direction and enters the Vermilion River in Creighton Township in the City of Greater Sudbury.

Various resource management agencies and private companies operate and maintain water management structures along the Vermilion River and its major tributaries. This includes the Ministry of Natural Resources; Nickel District Conservation Authority; City of Greater Sudbury; Xstrata plc., Vale; and Domtar. The dams are in place for various reasons including flood control; water level retention for municipal supply and recreational uses; power generation; and wastewater management. All of the agencies involved have operating plans and procedures for these structures which are constantly being upgraded and revised.



Fisheries

A variety of cold and warm water fish species can be found in the lakes and rivers within the Spanish/Vermilion watersheds. The main species include lake trout, northern pike, walleye (pickerel), lake whitefish, yellow perch, white sucker, Cisco herring, smallmouth bass, brook (speckled) trout, and burbot (ling). Lake sturgeon can be found in the lower Spanish River. Muskellunge have been stocked annually in the lower Spanish River since 1996 in an effort to restore the population. Fishing pressure on this watershed is variable with low, moderate and high angling intensities.

Recreational Use

As a challenging and scenic waterway, the Spanish River offers novice to intermediate whitewater rafting, canoeing, kayaking and backcountry travel. The river and its associated lakes have a wide variety of water uses that take place during all four seasons and include swimming, paddling, camping, sport fishing, hunting, cottaging, snowmobiling, ice fishing and other traditional activities. Other infrastructure within the planning area includes tourist lodges, cottages, campgrounds, marinas, rental cottages and cabins, commercial hunting and fishing lodges, fly-in outpost camps, and canoe outfitters.

Communities

The Spanish River passes in close proximity to a number of communities. The Upper Spanish originates at the outlet of Biscotasing Lake, near the unorganized community of Biscotasing at the north end of the watershed, and flows by the railway settlements of Sinker Creek, The Forks, Sheahan, Metagama, Pogamasing and Cartier, adjacent to the CNR Line. It continues southward to Agnew Lake, a man-made reservoir formed in 1920, which effectively divides the upper and lower segments of the Spanish River. The Lower Spanish flows through the towns of Nairn Centre, Espanola, Massey and Webbwood, and continues to the town of Spanish at its outlet into Georgian Bay. The stretch of river from Espanola to the mouth area at Spanish flows through a valley-based rural settlement that had its origins as homestead country in the mid-1800s. The Upper Spanish flows through more rugged country that remained largely undeveloped until the Canadian Pacific railway was constructed in 1884.

The river played a vital role in the opening up of the area as a transportation route, an important resource base, and an important source of hydroelectric power, which spurred the development of the mining and forest industries. Today it is a prime recreational resource, which attracts users from across the province and tourists from abroad.

First Nation Communities

A number of First Nation communities have traditional land use areas within the Spanish and Vermilion watersheds. The First Nation community of Sagamok Anishnawbek is located just south of the Lower Spanish River, at its outlet on Lake Huron. The First Nation community of Whitefish Lake is located adjacent to the Vermilion River system.

Other First Nation communities that may have traditional use within the northern part of the watershed include Mattagami First Nation (located in the northern portion of the watershed), Brunswick House First Nation near Chapleau, and Chapleau Cree and Chapleau Ojibway First Nations near Chapleau.

First Nations on Manitoulin Island which may have traditional use within the southern part of the watershed include Aundeck Omni Kaning First Nation on the northeast coast of Manitoulin Island, Wikwemikong Unceded Indian Reserve on the east coast of Manitoulin Island and Whitefish River First Nation on Birch Island.

The region has been inhabited since the end of the last ice age, with the earliest known occupation in the area being at Fox Lake, Venturi Township 7670 years ago. Archaeological work shows that the river was a transit zone and the lakes adjacent to the river were seasonal habitation areas accessed from the traditional canoe route. The lake sites were the location of fall and winter trapping, hunting and fishing camps, while in the summer people traveled down the river to tribal meeting places on the shores of Lake Huron.

Today the Spanish and Vermilion River watersheds continue to be of vital importance to the area's First Nation communities. Traditional uses of the watersheds (trapping, fishing, hunting, and gathering) still occur. The quality and availability of the water is essential for the health of the entire ecosystem.

WATER CONTROL AND MANAGEMENT

Water control by structural means has been carried out on the Upper Spanish since the 1880's. To drive timber down the Spanish, an elaborate system of dams, booms; sluices and log flumes were constructed. Water levels and flows on the Spanish and Vermilion Rivers are currently regulated by Vale., Domtar Limited, the Ministry of Natural Resources, the City of Greater Sudbury, the Nickel District Conservation Authority, and Xstrata plc. A list of existing water control structure and generating stations are described in Appendix A.

Vale Facilities

Vale operates 5 hydroelectric facilities and associated control structures, and 11 storage lake dams. VALE owns the Big Eddy Generating Station, located at the outlet of Agnew Lake; High Falls Generating Stations (1 and 2) just downstream of Big Eddy; Nairn Falls Generating Station on the Lower Spanish River; and Wabagishik Generating Station located at the outlet of Wabageshik Lake on the Vermilion River (Appendix B).

The Upper Spanish headwater lakes controlled by Vale. include Frechette, Biscotasi, Ramsay, Mozhabong, Indian, and Bardney (Canoe). Dams on these lakes provide upstream storage to ensure an available and adequate supply of water to meet hydroelectric generating demands. Vale. also manages two dams on Ministic and Armstrong Lakes in the southern portion of the watershed, which provide additional water storage capacity. The Lady Macdonald Dam and the Frood Dam are also owned/operated by Vale.

Domtar Inc. Facilities

Domtar Inc. owns a hydroelectric generating facility with 2 associated dams on the Lower Spanish River at the Town of Espanola (Appendix B). The energy from this facility is used to power its paper plant. The company also manages four storage lakes with Pogamasing Lake Dam, Bannerman Dam and Onaping Lake Dam on Onaping Lake, Sinaminda Lake Dam, and the Stobie Dam on Vermilion Lake.

MNR Facilities

The Ministry of Natural Resources (MNR) owns and operates six dams on the Spanish River system. These include Threecorner Lake Dam, Halfway Lake Dam, Whitewater Dam, Windy Lake Dam, the Fox Lake Dam and Birch Lake Dam.

City of Greater Sudbury

The City of Greater Sudbury owns the Ramsey Lake Dam and the Robinson Lake Dam, which are all within the Vermilion River watershed.

Nickel District Conservation Authority

The Nickel District Conservation Authority (NDCA) owns the Maley Dam, Nickeldale Dam, Lake Laurentian Dam, Nepahwin Dam, Frood Dam and Kelly Lake Dam. All of these dams are within the Vermilion Watershed.

Xstrata plc.

Xstrata plc. has a water control dam at the outlet of the Strathcona Treatment System. This control structure regulates the outflow of treated water from the system into Moose Creek. Moose Creek eventually drains into the Onaping River.

PROTECTED AREAS

The Ontario Ministry of Natural Resources has established several land use designations for protected Crown Land. **Provincial Parks** and **Conservation Reserves** are regulated under the *Provincial Parks Act* and *Public Lands Act* respectively. **Forest Reserves** and **Enhanced Management Areas** are not regulated.

Spanish River Valley Signature Site

The most significant protected area within the Spanish River Watershed is the Spanish River Valley Signature Site, one of nine Featured Areas that was recognized in the *Land Use Strategy* as having a range of natural and recreational values that warrant special attention. The Spanish River Valley Signature Site consists of two provincial parks (Spanish River P192 and Biscotasi Lake P1572), and three enhanced management areas (Acheson Lake E205a, Swann Lake E217a, and Sinaminda-Kennedy Lakes E192r) and one forest reserve F192.

Biscotasi Lake Provincial Park is located at the northern end of the Spanish River Watershed and is generally considered the headwaters of the Spanish River. This provincial park was originally 1,238 hectares and regulated in 1989. An addition in 2001 added 11,045 hectares to the park, which was regulated under the classification of Natural Environment. With over 300 km of shoreline within the park, the extensive aquatic habitat and large wetland complex of central Biscotasi Lake has been identified as provincially significant. The West Branch of the Spanish River begins below the Biscotasi Lake Dams operated by VALE Power.

The Spanish River Provincial Park, a 35,386-hectare Waterway Park, was regulated in 2001. This protected area includes the East Branch from the mouth of the East Sand River at Duke Lake and the West Branch at the outlet from Biscotasi Lake to their confluence at the Forks where the river system continues to Agnew Lake. Boasting one of the largest remaining continuous stands of Red and White Pine in the world, the park also includes large tracts of land west of the river including Pogamasing, Kennedy, Bluewater and Acheson Lakes. Recognized in the Land Use Strategy as a provincially significant canoe route spanning 140 linear kilometres, this whitewater river with few major portages makes this one of Ontario’s most popular wilderness paddling rivers playing host to over 1000 visitors annually. This area has been under a state of protection governed by The Spanish River Special Area Plan since 1990.

Resource extraction in the form of forestry and mining activities, as well as new hydroelectric development is not permitted within provincial parks. The Forest Reserve designation has been applied to several parcels within the Spanish River Valley Signature Site where detailed examination determined that there are existing mining claims or leases within the recommended provincial parks. The intention is that these lands will be added to the park as a claim or lease is retired through normal processes. Commercial forest harvesting, new hydroelectric power development and peat extraction will not be permitted in these areas.

Enhanced Management Area (EMA) is a new land use category that has been established in order to provide more detailed land use direction in areas of special features or values. Although a wide variety of resource and recreational uses can occur, EMAs may lead to modifications (e.g. timing, location, method, access) in resource management practices in order to recognize other land use values. The 34,461ha Sinaminda-Kennedy Lakes EMA is located west of Pogamasing Lake and is an important remote tourism, recreation and resource sector area. The EMA is classified as recreation, which recognizes the high quality remote recreation and tourism values.

Acheson Lake EMA (8,627 ha) is located west of Acheson Lake and the Spanish River. Swann Lake EMA (7,877 ha) is located north of Agnew Lake and covers areas east and west of the Spanish River. Both Acheson and Swann Lakes EMAs are classified as remote access, and recognize remote tourism and recreation values. The land use direction and resource management activities within these three EMAs will be compatible with protecting the recreational values of the proposed Spanish River Provincial Park.
There are no Conservation Reserves within the Spanish River Valley Signature Site.

Other Protected Areas Within the Spanish River Watershed

Provincial parks located within the Spanish/Vermillion River Watershed include:

- **Halfway Lake Provincial Park** is located east of the Spanish River and west of Onaping Lake along Highway 144.
- **Windy Lake Provincial Park** is located on the north shore of Windy Lake, which drains into the Onaping River north of High Falls via Windy Creek.
- **Fairbank Provincial Park** is located on Fairbank Lake, south of Vermillion Lake.
- **Mississaugi River Provincial Park** also falls within the Spanish River watershed and includes the southern portion of Biscotasi Lake as well as Ramsey, Indian, Abney, Spanish and Bardney Lakes. The height of land separating the Missisaugi and Spanish Watersheds is located between Bardney and Sulphur Lakes.
- **South Rushbrook Old Pine Provincial Park** is a 2,715 hectare park located west of the Spanish River Provincial Park and north of the Acheson Lake EMA.
- **Aux Sables River Provincial Waterway Park** (3,393 ha) flows parallel to, and west of the Spanish River. As part of the Spanish River watershed, this river flows into the Spanish River south of Massey and Chutes Provincial Park. La Cloche Provincial Park is located along the North Channel of Lake Huron south of Massey and due east of the mouth of the Spanish River.

The following are additional parks and protected areas within the Spanish River and Vermilion River Watersheds

Conservation Reserve	CLUPA Identification
Garson Forest Conservation Reserve	C 177
Kitchener Township (Morton Lake)	C 188
Venetian Creek Old Pine	C 194
Kawawia Lake Old Growth	C 195
Green Lake Old Pine	C 201
Cartier Moraine Conservation Reserve	C 202
Centre Creek Old Growth White Pine	C 206
Shakespeare Forest Conservation Reserve	C 212
Gough Outwash Forest Conservation Reserve	C 215
Flat Creek Old Pine	C 223
Archambeau Lake Forest Conservation Reserve	C 230
Spanish River Mouth/Alluvial Islands	C 241
Onaping Lake	C 322
Mozhabong Lake Conservation Reserve	C 323
Friday and Scotia Lakes	C 327
Daisy Lake Uplands	F 172
Capreol/Hanmer Delta	F 179
Spanish River Provincial Park	F 192
Centre Creek Old Growth White Pine	F 206
Cow Lake	F 207
Dowling/Fairbank	F 208

Conservation Reserve	CLUPA Identification
Shakespeare Forest	F 212
Gough Outwash Forest Conservation Reserve	F 215
Nelson Delta East Forest Reserve	F 216
River Aux Sables	F 228
Woman River Forest Provincial Park	P 1551
Biscotasi Lake Provincial Park Addition	P 1572
Spanish River Provincial Park	P 192
South Rushbrook Old Pine Provincial Park	P 199
River Aux Sables Provincial Park	P 228
Missisaugi River Additions	P 238
Halfway Lake Addition	P 321

Conservation reserves complement Provincial Parks in protecting representative natural areas and special landscapes. Statements of Conservation Interest or Resource Management Plans will provide guidance for the management of individual conservation reserves.

The Vermilion River has a provincially significant wetland. Parts of this wetland provide habitat for the endangered wood turtle.

Organization for Planning

There will be three committees involved in water management planning; a steering committee, a planning team and a public advisory committee (PAC). The length of the planning process may make it necessary for reappointment or replacement of individuals from each participating organization as the process continues. If key individuals leave the respective organizations or are no longer able to assume their role, attempts will be made to replace or reappoint them as soon as possible.

Steering Committee Members

Eric Cobb	MNR Sudbury District (Chair)
Allen Bonnis	Nickel District Conservation Authority
Paul Bewick	Ontario Parks
Jim Cunningham	Vale.
Paul Graham	City of Greater Sudbury
Art Jacko	Wikwemikong Unceded Indian Reserve
Pete Nahwegahbo	Aundeck Omni Kaning First Nation
Peter Owl	Sagamok Anishnawbek
Joe Fyfe	Xstrata plc.
Ted Petrus	Domtar Inc.
Terry Nootchtai	Whitefish Lake First Nation
Rick Allair	Spanish/Vermilion Rivers Public Advisory Committee

Planning Team Members

Bruce Tester	Domtar Inc. (Chair)
Harry Pierce	Domtar Inc.
Jim Cunningham	Vale.
Paul Sajatovic	Nickel District Conservation Authority
Amber Hamilton	MNR Sudbury District
Chad Person	Xstrata plc.
Chris Selinger	MNR Espanola Area

Julian Montpetit	MNR Sudbury Area
Jason West	City of Greater Sudbury
Rick Reynen	MNR Sudbury District
Art Jacko	Wikwemikong Unceded Indian Reserve
Heather Mandamin	Whitefish Lake First Nation
Pete Nahwegabo	Aundeck Omni Kaning First Nation
Bruce McGregor	Sagamok Anishnawbek
Rick Allair	Spanish/Vermilion Rivers Public Advisory Committee

Roles of Steering Committee, Planning Team, Public Advisory Committee and Advisors

Steering Committee Roles

- To develop a Terms of Reference for planning
- To form a planning team
- To assist with the public notice and Invitation to Participate
- To select a Public Advisory Committee (PAC)
- To educate the Public Advisory Committee and identify when PAC meetings are required
- To develop a public consultation plan
- To review and approve recommendations made by the planning team regarding priorities, objectives, data needs and collection, and options development and selection
- To evaluate progress and work of the planning team at each stage of the water management plan including issue identification, scoping, option development, option selection and draft plan stages.
- To consult with the PAC and planning team
- To ensure a consultation record for all stages of the planning process is completed as well as ensure the accessibility, transparency and adequacy of public consultations
- To name a standing advisory committee
- To assist with plan amendments if required
- To provide mediation and facilitation of conflict resolution for the planning team
- To approve plan components and planning team products prior to submission to the MNR.

Planning Team Roles

A planning team has been assigned to develop the plans. The planning team will solicit additional support and expertise from other MNR staff and outside agencies as required (i.e. Fisheries and Oceans Canada, Ministry of the Environment, Ministry of Northern Development and Mines, etc.)

The role of the planning team will be to develop a draft and final water management plan with input from the PAC and the steering committee. Planning will include the following phases:

- Description of the river system
- Identification of issues and resource values
- Identification of plan objectives
- Summary of available data
- Identification of information gaps and data collection priorities
- Establishment of a data collection program
- Development of a scoping report
- Development of a range of options

- Socio-economic evaluation
- Report on option development and evaluation
- Draft and final water management plan development
- Develop public consultation record and respond to public comments

Advisors to the planning team will include but not be limited to the following:

Aquatic Biologist, MNR NE Region Science and Technology Unit
Hydrologist, MNR NE Region Science and Technology Unit
GIS Officer, MNR Sudbury District
Engineering, MNR NE Region Science and Technology Unit
Planner, MNR Sudbury District

Public Advisory Committee Roles

A comprehensive public consultation process will take place during development of the water management plan to ensure adequate opportunities for public input to the planning process. One important mechanism for public input will be the formation and involvement of a Public Advisory Committee.

The first role of the public advisory committee is to assist the planning team in the facilitation and implementation of public consultation by:

- Jointly hosting public consultation sessions
- Receiving and recording input from various parties
- Reviewing and advising the planning team on comments received from the public and interest groups
- Ensuring that public consultation is accessible and transparent
- Ensuring that local interests are effectively communicated to all others involved in development of the WMP
- Assessing the need for additional public consultation as may be required

The second role of the PAC will be to participate in planning by:

- Having PAC representation on both the planning team and steering committee, as a participating member
- Assisting with identification of issues and resource values
- Assisting with identification of plan objectives
- Reviewing the initial issues and valued resources
- Reviewing and providing input on the scoping report, option development and evaluation, and the draft plan
- Assisting with monitoring plan implementation
- Promoting the identification and analysis of management alternatives
- Participating in an evaluation of tradeoffs and the resolution of conflicts

Other facets of the public consultation process will include but will not be limited to public registry notification on the Environmental Bill of Rights (EBR), a series of Public Open Houses in communities affected by the water management plan, public notices in local newspapers. Mail-outs of information packages will be sent to all directly affected stakeholders.

Meetings and consultations with representatives and community members of the First Nation communities involved will continue as a separate but parallel process to public consultation, and will follow the First Nation Consultation Plan developed by the First Nations and the MNR.

MNR Roles

The MNR will participate as a proponent in this plan due to the ownership of functioning dams on the river system of interest. The MNR will be responsible for the following:

- To provide direction and advice during the plan preparation to ensure statutory and regulatory obligations are fulfilled
- To issue an LRIA order
- To provide resources, technological support, and resource management information to support the planning process
- To ensure that the intent of planning guidelines are met
- To review and approve the final water management plan, and facilitate review by other agencies
- To provide the lead in First Nation consultation by assisting with First Nation Consultation Plan development and implementation
- To ensure public consultation is adequate and transparent
- To assist with the creation of a public notice and invitation to participate
- To ensure compliance and enforcement of orders and plan provisions
- To provide periodic auditing and amendment of the plan as required
- To provide a consultation record at all stages of the planning process
- To share in the cost of data collection where it meets other MNR objectives
- To produce a record of consultation with First Nations and work with proponents to develop a public consultation record

City of Greater Sudbury Roles

The City of Greater Sudbury is considered a plan proponent because it has water control structures on the rivers undergoing planning. It will participate in the planning process by:

- Providing representation on the steering committee and planning teams
- Working with other proponents on the preparation of the plan
- An additional role of the City of Sudbury is to review the final plan to ensure compliance with municipal by-laws and regulations and the Official Plan.

Nickel District Conservation Authority Roles

The Nickel District Conservation Authority is considered a proponent because it has water control structures on the rivers undergoing planning. It will participate in the planning process by:

- Providing representation on the steering committee and planning teams
- Working with other proponents on the preparation of the plan
- An additional role of the conservation authority is to review the final plan to ensure compliance with provincial policies and regulations.

Xstrata plc. Limited Roles

Xstrata plc. is considered a proponent because it has a water control structure(s) on the rivers undergoing planning. It will participate in the planning process by:

- Providing representation on the steering committee and planning teams
- Working with other proponents on the preparation of the plan

Lead Proponent Roles

According to the water management planning guidelines, Vale. and Domtar Inc. are the companies exercising principal control over water levels and are the only organizations producing hydroelectric power. They are therefore defined as co-lead proponents.

Vale. and Domtar Inc., being the primary generators on the system, and who derive a financial benefit from the operation of their dams and hydroelectric stations, have agreed to investigate and determine a cost-sharing agreement based on generating potential. Roles of the co-proponents include:

- Principal planning costs including public consultation, data collection, document preparation, research and post-plan monitoring
- To form a steering committee
- To conduct public consultation and assist with developing a public consultation record that meets the objectives of the WMP Guidelines

Some costs incurred at various stages in the planning process are the responsibility of the lead proponents and include but are not limited to the following:

- Public Consultation
- Data Collection
- Research and data collection as approved by the steering committee
- Preparation of Required WMP Documents
- Post-Plan Monitoring
- Costs associated with water management planning that are the responsibility of the lead proponents will be reviewed and approved by the steering committee.

First Nation Roles

First Nations will participate as follows:

- Representation on the steering committee and planning team
- To provide direction and an understanding of First Nation issues for the steering committee and planning team members regarding water management
- To provide input through the incorporation of First Nation values and traditional knowledge into the plan
- To lead the development and implementation of the First Nation consultation plan

Schedule

A proposed schedule for development of the water management plan is shown in Appendix C, which identifies a series of planning steps (activities). This schedule targets completion of the water management plan by late spring 2005, but is subject to adjustment, if it is deemed necessary to properly complete the planning requirements as defined by the Water Management Planning Guidelines.

Vale and Domtar staff will be responsible for preparing the plans with guidance from MNR planning team members and the steering committee. Additional support will be provided to plan authors as necessary, e.g. from Fisheries and Oceans Canada (DFO), the City of Greater Sudbury, the Nickel District Conservation Authority (NDCA) and MNR's (South Porcupine) Regional Office. In addition, public input will be solicited to the plan as outlined in Section 6. Guidelines for the major planning milestones are as follows:

Phase 1: Plan Organization-Creation of Steering Committee and Public Advisory Committee, Development of Terms of Reference, Invitation to Participate (December 2002 to July 2003)
Phase 2: Plan Scoping: Collection of Background Data and Information Gaps (July 2003 to December 2004)
Phase 3: Option Development and Evaluation (January 2005 to March 2005)
Phase 4: Draft Water Management Plan Preparation (April 2005 to May 2005)
Phase 5: Final Plan Development (June 2005)
Phase 6: Government Review and Approval (Summer 2005)

Plan Production, Review, Approval, Amendment, Renewal

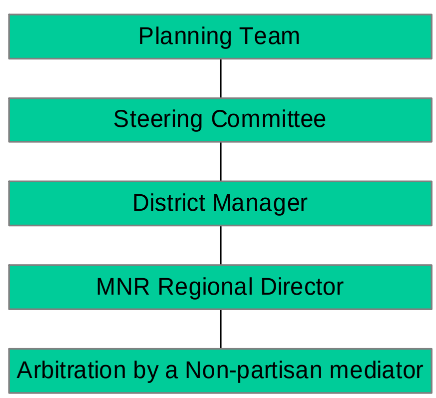
During plan review/development there will be opportunities for review of the terms of reference, plan sections, and options identified by the planning team, DFO, other relevant agencies, First Nations and the PAC. Once a draft of the final plan has been prepared, it must be made available for public and agency review. The draft and final versions of the plan must be acceptable to the planning team before they are recommended for steering committee approval. Final approval will be granted from DFO and MNR.

Once the first plan is approved by MNR, it will be subject to a review after 10 years when there will be an opportunity to make revisions and amendments. It will then be reviewed every 10 years or sooner if a key issue triggers the review process (i.e. a request to build/rebuild a dam with a different design, or significantly amend a lease). The result of any periodic review of a water management plan may trigger an extended review. This may follow the steps taken in creating an initial plan, as outlined in the Water Management Planning Guidelines. There may be no change in the plan, or review may necessitate an amendment or revision to the plan. In any event, it would be subject to public consultation prior to renewal.

When new data, information or issues arise as a result of new policies, research, studies or monitoring, the standing advisory committee should review the information, and may request a review of the operating regime of one or more waterpower facilities or associated water control structures by MNR or the steering committee. If the WMP needs to be amended, MNR will issue an order to amend the plan. Amendments may be minor (in the immediate vicinity of one dam) or major (extensive geographic areas upstream or downstream of a dam or have an impact on environmental, social or economic attributes). Amendments require that the plan development process be followed and some degree of public consultation may be required depending on the type of amendment.

Decision-making and Conflict Resolution

Decision making and conflict resolution process for water management planning



Decisions will be made by consensus. Where consensus cannot be reached, decisions will be based on the vote of the majority of the planning team or the steering committee members. If a party finds the solution or decision unacceptable, then the issue will be referred to a dispute resolution process as outlined in Appendix F of the Water Management Planning Guidelines. If a mediator needs to be appointed, all members of the steering committee will have veto power for a non-partisan mediator chosen from a list of mediators developed by the MNR.

Cost Sharing Agreement

Vale and Domtar Inc. have initiated negotiations in regard to a cost-sharing agreement that outlines how all aspects of water management planning costs will be shared between the two companies.

Terms of Reference Appendix A

Existing Water Management Structures on the Spanish River and Adjacent Watershed

Facility/Structure	Location	Flow Direction	Dam Function
Vale			
Big Eddy Generating Station Dam	Generating station and dam are located at east end of Lake Agnew	From Agnew L. into Lower Spanish R.	Hydro-electric generation. Main storage reservoir is upstream of Big Eddy.
High Falls #1 and #2 Generating Station Dams	2 Generating stations and one dam is located at east end of Lake Agnew, downstream of Big Eddy	On Lower Spanish R.	Hydro-electric generation
Nairn Falls Generating Station Dam	Generating station and dam are located on the Spanish River, upstream of Espanola, south of the town of Nairn.	On Lower Spanish R.	Hydro-electric generation
Wabagishik Generating Station Dam	Generating station and dam are located on Wabagishik Lake on the Vermilion River.	On Vermilion R.	Hydro-electric generation
Frechette Lake Dam	Northeast corner of lake	From Frechette L. into Spanish L.	Headwater storage
Canoe Lake (Bardney) Dam	North end of lake.	From Canoe L. Into Spanish L.	Headwater storage
Ramsey Lake #7 and#8 Dams	Southeast end of lake	From Ramsey L. into Biscotasi L.	Headwater storage
Biscotasi Lake Dam 1	South end of the lake.	From Biscotasi L. into Spanish R. East Branch	Headwater storage
Biscotasi Lake Dam 2	South end of the lake.	From Biscotasi L. into Spanish R. East Branch	
Biscotasi Lake Dam 3	East side of lake.	From Biscotasi L. into Spanish R., via the Dead River	
Mozhabong Lake Dam	North end of the lake.	From Mozhabong L. Into Indian L..	Headwater storage
Indian Lake Dam	North end of lake.	From Indian L. Into Biscotasi L, via Indian R.	Headwater storage
Ministic Lake Dam	South end of lake.	From Ministic L. into Armstrong L.	Headwater storage
Armstrong Lake Dam	South end of the lake.	From Armstrong L. to Agnew L., via John's Creek.	Headwater storage
Frood Lake Dam	On Nolin Creek.	Into Nolin Creek.	Mine water containment
Lady McDonald Lake Dam	South end of lake.	Into Junction Creek	Mine water containment
DOMTAR INC.			
Pogamasing Lake Dam	1 km west of Spanish R. on northeast end of lake.	From Pogamasing L. into Spanish R.	Headwater storage

Facility/Structure	Location	Flow Direction	Dam Function
Bannerman Creek Dam	Southwest corner of lake.	From Onaping L. into Spanish R., via Bannerman Ck.	Headwater storage
Onaping Dam	Southeast corner of lake.	From Onaping L. into the Onaping R.	Headwater storage
Sinaminda Lake Dam	South end of lake.	From Sinaminda L. into Spanish R., via Agnes R.	Headwater storage
Espanola Dam	Lower Spanish R. at Espanola.	Drains Vermilion and Spanish watersheds.	Hydro-electric generation
Stobie Dam	Vermilion R. downstream of Vermilion L..	On Vermilion R.	Headwater storage
MINISTRY OF NATURAL RESOURCES			
Three Corner Lake Dam	West end of lake.	From Three Corner L. into Spanish R., via East Sand R.	Level control for recreation and flood prevention purposes
Fox Lake Dam	East end of lake.	From Fox L. into Spanish R.	Level control for recreation and flood prevention purposes
Windy Lake Dam	Southeast end lake.	From Windy L. into Vermilion R., via Windy Ck.	Level control for recreation and flood prevention purposes
Birch Lake (Gough Lake) Dam	Southeast branch of lake.	From Birch L. into Lower Spanish R., via McLander Creek, near Webbwood.	Level control for recreation and flood prevention purposes
Whitewater Dam	West end of Moore L.	From Moore L. into Levey Creek	Level control for recreation and flood prevention purposes
Halfway Lake Dam	South end of Halfway L.	From Halfway L. into Bailey L.	Level control for recreation and flood prevention purposes
HISTORIC DAMS			
Shakwa	East side of lake.	From Shakwa L. into Spanish R., via Shakwa R. and then Agnes R.	Log drives
Camp 5	Wakonassin R.	Into Spanish R.	Log drives
Armstrong	North end of lake.	From Armstrong L. into the Wakonassin R.	Log drives
Gull	South end of lake.	From Labitiche L. into the Wakonassin R.	Log drives
NICKEL DISTRICT CONSERVATION AUTHORITY			
Maley Dam	East branch of Junction Ck. at Maley Drive.	From Junction Ck. into the Vermilion R.	Flood control
Nickeldale Dam	West branch of Junction Ck. north of Lasalle Blvd.	From Junction Ck. into the Vermilion R.	Flood control
Lake Laurentian Dam	At outlet of Lake Laurentian	From Lake Laurentian into Ramsey L.	Flood control
Nepahwin Dam	At outlet of Nepahwin L.	Into Lily Ck.	Flood control
Kelly Lake Dam	Weir on Kelly L.	Kelly L. flows to Vermilion R.	Flood control

Facility/Structure	Location	Flow Direction	Dam Function
Frood Dam	On Nolin Ck. (different dam from VALE's Frood L. Dam).	Into Nolin Ck.	Flood control
XSTRATA PLC			
Strathcona Treatment System Dam	At outlet of Polishing Ck.	From Strathcona Treatment System into Moose Ck.	Regulates discharge of treated water.
CITY OF GREATER SUDBURY			
Robinson Lake Dam	Robinson L.	From Robinson L. into Kelly L.	Flood control
Ramsey Lake Dam	West end of lake at Science North.	From Ramsey L. into Robinson L., via Ramsey Ck.	Flood control

Terms of Reference Appendix B

Generating Stations

1. Espanola Generating Station and Dam (Domtar Inc.)

The Espanola generating station is located in Merritt Township in the Town of Espanola, supplied by the waters of both the Spanish and Vermilion River systems. This dam was originally used for power generation and pulp grinding. It is presently used for power generation, which provides up to 30% of the power required to operate the Domtar Paper Plant. The drainage area of this dam is 11,543 km^2 and it produces 16 MW of power with an annual power output of 116 GW hours.

Two working hydro generators are located within the plant, numbers 5 and 9. Generator No. 5 has a flow of 47 cms (1650 cfs) and produces 8.25 MVA. Generator No. 9 can handle a maximum flow of 51 cms (1800 cfs) and produces 9.4 MVA of electricity. The combined MW capacity is 16 MW.

The Espanola Main dam is a reinforced concrete stop log dam and railroad bridge. It has nine control gates. The head of the dam is 19.2 m (64 feet) in height. Water not required for hydro generation passes over this dam.

The Power Canal dam is located next to the Domtar Mill and is used to drain the power canal. The dam is a reinforced concrete with four control gates that have a sill level of 188.4 m (627.92 feet) and a maximum water level elevation of 194.7 m (649 feet).

The Espanola Forebay dam is located about 91.5 m (300 feet) downstream of the Espanola Main River Dam. A reinforced concrete structure, it has two gates that operate at a sill level of 188.1 m (627 feet), with a maximum water elevation of 194.7 m (649 feet).

2. Big Eddy Generating Station and Dam (Vale)

The Big Eddy Generating Station is located in Hyman Township at the eastern outlet of Lake Agnew and was built in 1929. It is the largest hydro dam on the Spanish River. Composed of reinforced concrete, it has a gross operable head of 30.2 m (99.5 ft). It has a capacity of 29.6 MW and an optimal flow velocity of 3500 cfs. It produces 178.24 GW hours of energy per year. In order to enable the efficient operation of the power plants, it is essential that the level of Lake Agnew be rigidly regulated. Lake Agnew acts as the forebay for Big Eddy and total drainage area at this dam is 6,625 km^2.

The dam is composed of 10 stoplog sluices and two inflatable rubber dam sluices 10 feet in diameter and 70 feet in length. The spillway capacity of the dam is approximately 1200 cms (42,500 cfs). Three 300 foot long penstocks 12 feet in diameter supply the generators.

3. High Falls (No. 1 & 2) Generating Stations (Vale)

High Falls #1

High Falls #2

High Falls No. 1 and 2 generating stations are less than one kilometer downstream from Big Eddy, in Hyman Township, Espanola District and were constructed in 1904. Combined, they have a capacity of 17.9 MW and an optimal flow velocity of 2600 cfs. The drainage area of High Falls is 6630 km^2 and the operable head at the plant is 25.9 m (85 feet). Power production is 111 GW hours per year.

High Falls No. 1 Dam is a concrete gravity structure with a west dam spillway, an east dam and a north dam. The powerhouse has four units. Each unit produces 2500 KW with a plant total of 10,000 KW at 1600 cfs. High Falls No. 2 Dam has an intake structure adjacent to the High Falls No. 1 plant intake. It is also a concrete gravity structure housing one unit that produces 7,900 KW at 1300 cfs.

4. Nairn Falls Generating Station

The Nairn Falls generating station is located in Nairn Township, Espanola District, several kilometers south of the High Falls power plant on the Lower Spanish River. It has an operable head of 8.8 m (30 ft) and a drainage area of 6,904 km^2.

The powerhouse has three units, with the dam upstream wall acting as the intake structure for three concrete penstocks. A concrete gravity spillway and overflow spillway is present. The main spillway has 7 stoplog sluices. Units 1 and 2 produce 1500 kW at 900 cfs, and unit 3 produces 1750 KW at 900 cfs, with a total plant output of 4750 KW at 2700 cfs. Plant production capacity is 28.95 GW hours per year.

5. Wabagishik Generating Station

This dam, also known as the “Lorne Falls Dam”, is located in Lorne Township, Sudbury District. It has a concrete gravity intake structure with two motorized intake gates and a spillway with a motorized gate. Two 420 foot long penstocks 8 feet in diameter, lead into a concrete powerhouse with an operable head of 23.3 m (72 ft). The drainage area at the site is 4,428 km^2. Both units produce 2000 KW at 500 cfs for a total plant output of 4000 KW at 1000 cfs. The plant produces 3,581 KW (24.60 GW hours per year).

Terms of Reference Appendix C

Spanish & Vemilion River Water Management Planning Timeline

Planning Step	**2003**												**2004**											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Plan Organization (Planning Team Formed, PAC Formed, Aboriginal and Public Consultation Plan)																								
2. Plan Scoping																								
3. Option Development																								

Planning Step	**2005**										
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
2. Plan Scoping											
3. Option Development											
4. Draft WMP											
5. Final WMP											

Committee Members (original and successors)

Steering Committee

Eric Cobb	MNR Sudbury District (Chair)
Mike Chorkawy	Vale
Cindy Blancher-Smith	MNR Sudbury District (District Manager)
Allen Bonnis	Nickel District Conservation Authority
David Coulas	Ontario Parks
Al Gereghty	Vale
Paul Graham	City of Greater Sudbury
Art Jacko	Wikwemikong Unceded Indian Reserve
Pete Nahwegahbo	Aundeck Omni Kaning First Nation
Peter Owl	Sagamok Anishnawbek
Rich Rudolph	Fisheries and Oceans Canada
Joe Fyfe	Xstrata plc.
Ted Petrus	Domtar
Terry Nootchtai	Whitefish Lake First Nation
Rick Allair	Public Advisory Committee

Planning Team

Bruce Tester	Domtar (Chair)
Harry Pearce	Domtar
Sharon Semeniuk	Domtar
Jim Cunningham	Vale
Carolyn Hunt	Vale
Christine Brereton	Vale
Allison Merla	Vale
Paul Sajatovic	Nickel District Conservation Authority
Lynn Moreau	MNR Sudbury District
Eric Cobb	MNR Sudbury District
Caleigh Sinclair	MNR Sudbury District
Chad Pearson	Xstrata plc.
Christine Selinger	MNR Espanola Area
Julian Montpetit	MNR Sudbury Area
David Coulas	Ontario Parks
Tin Chee Wu	City of Greater Sudbury
Rick Reynen	Resource Liaison, MNR
Art Jacko	Wikwemikong Unceded Indian Reserve
Heather Mandamin	Atikameksheng Anishnawbek First Nation
Pete Nahwegabo	Aundeck Omni Kaning First Nation
Bruce McGregor	Sagamok Anishnawbek
Representative of PAC	Public Advisory Committee

Public Advisory Committee

Howard Fanjoy	McKerrow	(Chair) Represents - Anglers, Hunters, Recreation for Agnew Lake and Spanish River area
Ray Freeman	McKerrow	Represents – Agnew Lake Cottagers and General Public
Wayne Austin	Nairn Centre	Represents – General Public
Terry Del Bosco	Sudbury	Represents – Onaping Lake Campers Association
Richard Allair	Levack	Represents – Onaping Lake Campers Association
Hayes Kirwan	Nairn Centre	Represents – Municipal Interests
Allan Wolfgram	Lively	Represents – Lower Vermilion River, Anglers and Hunters
Sandra Kutchaw	Tehkummah	Represents – Lake Pogamasing Cottagers Association
William Blight	Espanola	Represents – Anglers and Hunters, Friends of Spanish
Yvon Picard	Sudbury	Represents – Industry Sector
Kathy LaBrash	Nairn Centre	Represents – General Public
Shane Looby	Metagama	Represents – Tourist Sector

Committee Members (original and successors)

Steering Committee

Eric Cobb	MNR Sudbury District (Chair)
Mike Chorkawy	Vale
Cindy Blancher-Smith	MNR Sudbury District (District Manager)
Allen Bonnis	Nickel District Conservation Authority
David Coulas	Ontario Parks
Al Gereghty	Vale
Paul Graham	City of Greater Sudbury
Art Jacko	Wikwemikong Unceded Indian Reserve
Pete Nahwegahbo	Aundeck Omni Kaning First Nation
Peter Owl	Sagamok Anishnawbek
Rich Rudolph	Fisheries and Oceans Canada
Joe Fyfe	Xstrata plc.
Ted Petrus	Domtar
Terry Nootchtai	Whitefish Lake First Nation
Rick Allair	Public Advisory Committee

Planning Team

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Harry Pearce	Domtar
Sharon Semeniuk	Domtar
Jim Cunningham	Vale
Carolyn Hunt	Vale
Christine Brereton	Vale
Allison Merla	Vale
Paul Sajatovic	Nickel District Conservation Authority
Lynn Moreau	MNR Sudbury District
Eric Cobb	MNR Sudbury District
Caleigh Sinclair	MNR Sudbury District
Chad Pearson	Xstrata plc.
Christine Selinger	MNR Espanola Area
Julian Montpetit	MNR Sudbury Area
David Coulas	Ontario Parks
Tin Chee Wu	City of Greater Sudbury
Rick Reynen	Resource Liaison, MNR
Art Jacko	Wikwemikong Unceded Indian Reserve
Heather Mandamin	Atikameksheng Anishnawbek First Nation
Pete Nahwegabo	Aundeck Omni Kaning First Nation
Bruce McGregor	Sagamok Anishnawbek
Representative of PAC	Public Advisory Committee

Public Advisory Committee

Howard Fanjoy	McKerrow	(Chair) Represents - Anglers, Hunters, Recreation for Agnew Lake and Spanish River area
Ray Freeman	McKerrow	Represents – Agnew Lake Cottagers and General Public
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Richard Allair	Levack	Represents – Onaping Lake Campers Association
Hayes Kirwan	Nairn Centre	Represents – Municipal Interests
Allan Wolfgram	Lively	Represents – Lower Vermilion River, Anglers and Hunters
Sandra Kutchaw	Tehkummah	Represents – Lake Pogamasing Cottagers Association
William Blight	Espanola	Represents – Anglers and Hunters, Friends of Spanish
Yvon Picard	Sudbury	Represents – Industry Sector
Kathy LaBrash	Nairn Centre	Represents – General Public
Shane Looby	Metagama	Represents – Tourist Sector

Public Consultation Records

Pages C-2 through C-4 is a listing, by chronological order, of public consultation events that have transpired during the Public Consultation Process.

Pages C-5 through C-8 is a copy of the questionnaire that was circulated during the Scoping Phase at the Public meetings that were held in Chapleau, Gogama, Chelmsford, and Espanola. These meetings were held between May 10th and May 13th 2004.

Pages C-9 through C-13 is the compilation of the information collected from the returned questionnaires during the Scoping Phase open houses.

Pages C-14 through C-25 is a copy of the questionnaire that was circulated during the Options Phase at the Public meetings that were held in Biscotasing, Chelmsford and Espanola. These meetings were held between July 21st and July 28th 2005.

Pages C-26 through C-33 is the compilation of the information collected from the returned questionnaires during the Options Phase open houses.

Pages C-34 through C-40 is a copy of the questionnaire that was circulated during the Draft Water Management Plan Phase at the Public meetings that were held in Espanola, Dowling, and Gogama. These meetings were held between December 5th and December 8th 2005.

Pages C-41 through C-48 is the compilation of the information collected from the returned questionnaires during the Draft Water Management Plan Public Presentation Phase.

Public Consultation Record - Spanish Vermilion Water Management Plan

Date	Consultation Effort
July 31, 2002	Mail-out to notify residents of Spanish River Valley re: Initiation of Water Management Planning Process
August 2002	Expanded mail-out to notify residents of Spanish River Valley re: Initiation of Water Management Planning Process
November 2002	Advertisements to notify public of open houses for the Spanish/Vermilion Water Management Planning Process placed in the following papers: · Sudbury Star · Northern Life · Le Voyageur · Chapleau Express · Midtown Monitor · Manitoulin Expositor
November 18, 2002	Open Houses at the Biscotasing Community Hall and Chapleau Royal Canadian Legion 11am – 1pm and 5 pm - 8 pm.
November 19, 2002	Open house at the Gogama MNR office 4 pm - 7 pm
November 20, 2002	Open house at the Chelmsford Knights of Columbus Hall 2 pm – 4 pm and 7 pm - 9 pm
June 27, 2003	Invitation to Participate advertisements to notify public of opportunity to sit on public Advisory Committee, placed in the following papers: · Sudbury Star · The Recorder · Timmins Daily Press
June 29, 2003	· Chapleau Express
July 2, 2003	· Mid-North Monitor · The Manitoulin Expositor · Le Voyageur
July 2, 2003	EBR Posting #xb03e2016- Invitation to Participate
July 8, 2003	Mail-out to notify stakeholders of Invitation to Participate
September 24, 2003	Steering selects Public Advisory Committee (PAC)

Date	Consultation Effort
November 5, 2003	First PAC meeting
April 5, 2004	Public Consultation Plan finalized
April 2004	Mail-out to notify stakeholders of Background/Scoping Information Sessions
April 28, 2004	Advertisements notifying public of Background/Scoping Information Sessions placed in the following papers: · Mid-North Monitor
April 30, 2004	· Sudbury Star · The Recorder · Timmins Daily Press
May 2, 2004	· Chapleau Express
May 5, 2004	· The Manitoulin Expositor · Le Voyageur
May 2004	EBR Posting #xb03e2016 - Background/Scoping Information Sessions
May 10, 2004	Open house at the Chapleau Royal Canadian Legion 3 pm - 5 pm and 7 pm - 9 pm
May 11, 2004	Open house at the Gogama MNR office 2 pm – 4 pm and 5 pm - 7 pm
May 12, 2004	Open house at Espanola Recreation and Fitness Centre 3 pm – 5 pm and 7pm - 9 pm
May 13, 2004	Open house at the Chelmsford Knights of Columbus Hall 3 pm – 5 pm and 7 pm - 9 pm
September 13, 2004	Open house at the Biscotasing Community Hall 1 pm - 4 pm
July 2005	Mail-out to notify stakeholders of Options Information Sessions
July 16, 2005	Advertisements notifying public of Background/Scoping Information Sessions placed in the following papers: · Chapleau Express
July 18, 2005	· Sudbury Star
July 19, 2005	EBR Posting #xb03e2016 - Options Information Sessions
July 20, 2005	Advertisements notifying public of Background/Scoping Information Sessions placed in the: · Mid-North Monitor

Date	Consultation Effort
	· Manitoulin Expositor · Le Voyageur · Timmins Daily Press
July 21, 2005	Open house at the Biscotasing Community Hall 1 pm - 4 pm
July 22, 2005	Advertisements notifying public of Background/Scoping Information Sessions placed in the: · Sudbury Star · The Recorder
July 26, 2005	Open House at the Northland Motel in Chelmsford 2 pm – 4 pm and 6 pm - 8 pm
July 28 2005	Open House at the Espanola Knights of Columbus Hall 2 pm – 4 pm and 6 pm - 8 pm
November 2005	Mail-out to notify stakeholders of Draft Plan Information Sessions
November 2005	Advertisements to notify public of open houses for the Spanish/Vermilion Water Management Planning Process placed in the following papers: · Sudbury Star · Le Voyageur · Chapleau Express · Midtown Monitor · Manitoulin Expositor · The Recorder · Timmins Daily Press
November 21, 2005	EBR Posting #xb03e2016 - Draft Plan Information Sessions
December 5, 2005	Open House at the Espanola Knights of Columbus Hall 2 pm – 4 pm and 6 pm - 8 pm
December 6, 2005	Open House at the Dowling Community Centre 2 pm – 4 pm and 6 pm - 8 pm
December 8, 2005	Open house at the Gogama MNR office 1 pm – 3 pm

Spanish-Vermilion River Water Management Planning Questionnaire

Currently, Vale Inco. and Domtar Inc. produce power for their own operations and are not providing power to the hydroelectricity market. However, these operators of waterpower facilities have a responsibility to ensure that the operations of dams and generating stations are consistent with the needs of other water resource users, stakeholders, and the public. The Ontario Ministry of Natural Resources (MNR) also has a key role to play in ensuring that Ontario's resources are managed in a sustainable way. The MNR, under the requirements of the Lakes and Rivers Improvement Act, requires an updated water management plan be prepared for the Spanish/Vermilion River to include all of the river's storage and generating facilities.

Your response to this questionnaire will assist in the planning process.

Note: Comments and personal information regarding water management planning are collected under the authority of the Ministry of Natural Resources to assist in making decisions and to determine further public consultation needs related to planning. Comments and opinions which do not constitute personal information as defined by the *Freedom of Information and Protection of Privacy Act* will be shared among MNR, plan proponents and committees, and other relevant ministries, and may be included in study documentation that is made available for public review. Under the *Freedom of Information and Protection of Privacy Act*, all personal information collected in this comment sheet is and will remain confidential unless

Contact Information

Name: ______________________________
Address: ______________________________
Telephone: ______________________________

Would you like to be kept informed about the water management plan and activities arising from the plan? Yes ( ) No ( )
In what language would you prefer future correspondence?
English ( ) French ( )

Please complete and return this questionnaire to:

Bruce Tester
Domtar Inc.
1 Station Road
Espanola, Ontario
P5E 1R6
For more information please contact:
Eric Cobb, Acting Fish and Wildlife Planning Biologist
Ministry of Natural Resources, Sudbury District
(705) 564-7857
Please provide your comments as soon as possible for inclusion into the water management plan.

Ontario INCO Domtar

1. How do you use the Spanish-Vermilion River System?

USE	Please check (X) all items that apply
1. Permanent residence	( )
2. Camp/Cottage	Overnight ( ) Seasonal ( ) All year ( )
3. Fishing	**What Time of Year?** Open water ( ) Ice Fishing ( ) **What species?** Walleye (pickerel) ( ) Lake trout ( ) Brook trout ( ) Whitefish ( ) Yellow perch ( ) Northern pike ( ) Largemouth and Smallmouth bass ( ) Other……………………………………
4. Hunting	**What Kind of Game?** Moose ( ) White-tail deer ( ) Black bear ( ) Waterfowl ( ) Small game ( ) species: ……………
5. Trapping	( ) species: ………………………………
6. Boating	Motor boat ( ) Sail boat ( ) Paddling (i.e. canoeing or kayaking) ( ) Jet Skis ( )
7. Swimming / Beaches	( )
8. Winter Activities	Snowmobiling ( ) Cross-Country Skiing ( ) Snowshoeing ( )
9. Off-Road / Trails	ATVs ( ) Dirt bikes ( ) Mountain bikes ( )
10. Business operator	Outfitter ( ) Guided tours ( ) Lodge ( ) Other……………………………………………
11. Source of Drinking Water	Water line ( ) Point ( ) Well ( )
12. Wildlife Viewing and Nature Photography	( ) What species?:………………………………
13. Other? Please briefly describe.	

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2. What are your concerns regarding water levels and flows?

Where appropriate, please describe how you are impacted by water levels and flows.

	Season (please check all applicable seasons)				
Concerns	**summer**	**fall**	**winter**	**spring**	**Describe**
A. Shoreline erosion					
B. Debris and sedimentation					
C. Damage to docks and other shoreline structures					
D. Boat Access					
E. Boating					
F. Fisheries					
G. Wildlife Habitat					
H. Vegetation Communities					
I. Snowmobiling					
J. Drinking Water					Elevation of Water Line: ………………………...................
K. Other?					

3. Using the corresponding and respective numbers and letters from questions 1 and 2, please mark the locations on the appropriate map(s) of the Spanish / Vermilion watershed attached to the back of the questionnaire.

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4. **Using the space provided, please describe the changes to water levels and flows you would recommend to hydro-producers regarding their operations on area lakes and rivers. Please explain why.**

Comments

Public Consultation Record

The following comments were received at the information sessions held in Chapleau (May10, 2004), Gogama (May 11, 2004), Espanola (May 12, 2004) and Chelmsford (May 13, 2004). A total of 51 people attended the sessions including:

- Chapleau – 4
- Gogama - 4
- Espanola – 20
- Chelmsford – 23

One set of photos and 20 questionnaires were submitted at the information sessions. Additional correspondence included 29 questionnaires mailed after the information session, two e-mails stating concerns and four letters from Spanish/Vermilion Public Advisory Committee.

Through the careful analysis, interpretation and recording of the information submitted through correspondence, the planning team summarized the information

With such a large planning area, it was necessary to divide the questionnaires by water body, into 16 areas. Below is a list of water bodies and the corresponding number of questionnaires referred for each area.

- Agnew Lake (25)
- Biscotasi Lake (8)
- Onaping Lake (7)
- Armstrong Lake (5)
- Pogamising Lake (4)
- Vermilion Lake and River (3)
- Spanish River (Upper and Lower) (2)
- Birch Lake (1)
- Indian Lake (1)
- Kennedy Lake (1)
- Ministic Lake (1)
- Mozhabong Lake (1)
- Ramsey Lake - southeast of Chapleau (1)
- Sinaminda Lake (1)
- Three Corner Lake (1)
- Windy Creek (1)

For the purposes of this report, two types of information documented: the use of water body and; the issues and concerns with flows and levels. Issues documented in the questionnaires that fell outside of the scope of the plan (i.e. pollution, regulations, land claim issues, vandalism, fish stocking etc.) are addressed in the document but will not be considered further.

A. Use of Water

Use	Agnew Lake	Armstrong Lake	Birch Lake	Biscotasi Lake	Indian Lake	Kennedy Lake
Permanent residence	16	1		4		
Overnight camping	2			1		
Seasonal Residence	3	2		3	1	1
All year camp or cottage	2	2		1		
Open water angling	21	5	1	9	1	1
Ice fishing	11	4	1	6		
Hunting	15	5	1	9	1	1
Trapping	1					1
Motorboating	23	5	1	9	1	1
Sailboating						
Paddling	9	5	1	6	1	1
Jet Skis	1					
Swimming	18	3		7	1	1
Snowmobiling	14	2	1	6		
Skiing	3	2		1		
Snowshoeing	3	2	1	4		
ATV/Bikes	16	2		4		
Business Operator - Outfitter				3	1	1
Business Operator – Guide	1					
Business Operator – Lodge	2			1		
Business Operator – Other		1		1		
Drinking water (well, point and water line)	19	3		6	1	1
Wilderness Viewing / Photography	12	2		6	1	1
Blueberry Picking	1					
Teaching				1		

Use	Ministic Lake	Mozhabong Lake	Onaping Lake and River	Pogamasing Lake	Ramsey Lake (near Chapleau)	Sinaminda Lake
Permanent residence			3			
Overnight camping			1			
Seasonal Residence	1		1	1	1	
All year camp or cottage		1	3	3		
Open water angling	1	1	8	4	1	
Ice fishing		1	6	2	1	
Hunting		1	7	1	1	1
Trapping				1		1
Motorboating	1	1	8	4	1	
Sailboating				1		
Paddling			6	3		
Jet Skis						
Swimming			5	4	1	
Snowmobiling		1	7	3	1	1
Skiing			4	1		
Snowshoeing			5	3		1
ATV/Bikes		1	5	2		
Business Operator - Outfitter			1			
Business Operator – Guide						
Business Operator – Lodge			2			
Business Operator – Other						
Drinking water (well, point and water line)	1	1	7	3	1	
Wilderness Viewing / Photography		1	5	2		
Blueberry Picking						
Teaching			1			

Use	Spanish River (Lower)	Spanish River (Upper)	Three Corner Lake	Vermilion Lake and River	Windy Creek
Permanent residence	1			3	
Overnight camping		1	1		
Seasonal Residence					
All year camp or cottage	1			1	
Open water angling	1	1	1	2	
Ice fishing		1	1	1	
Hunting	1	1	1	1	
Trapping					
Motorboating	1	1	1	3	
Sailboating					
Paddling	1	2	1	3	
Jet Skis					
Swimming		1	1	2	
Snowmobiling		1	1	2	
Skiing				2	
Snowshoeing		1	1	1	
ATV/Bikes					
Business Operator - Outfitter		1			
Business Operator – Guide					
Business Operator – Lodge					
Business Operator – Other					
Drinking water (well, point and water line)	2			4	
Wilderness Viewing / Photography	1	1	1	1	1
Blueberry Picking					
Teaching		1	1		1

Summary of Issues and Concerns by Water Body

Water body/Issue	Erosion (incl. sedimentation and shoreline vegetation concerns)	Fisheries	Dock Damage	Navigation	Boat Access	Water Levels (High)	Snowmobiling	Water Supply	Habitat	Water Flows	Total
Agnew	21	19	11	7	8	5	8	14	1		**94**
Armstrong	5	2	3	5	4	2	1	1			**23**
Biscotasi	2	5	3	3	3	5	3	1	1		**26**
Indian	1	1	1			1					**4**
Kennedy		1									**1**
Ministic			1	1							**2**
Mozhabong		1		1		1	1		1		**5**
Onaping Lake and River	7	6	7	5	2	7	2		1	3	**40**
Pogamasing	4	2	3	2	3		1	1	1		**17**
Ramsey	1		1								**2**
Sinaminda	1		1		1		1	1	1		**6**
Lower Spanish River[1]	5	4	3	4	5	5	2		3		**28**
Upper Spanish River				1							**1**
Vermilion Lake and River	3	1		1	3	3				1	**12**
Total	**50**	**42**	**34**	**26**	**29**	**29**	**19**	**18**	**9**	**4**	**261**

1. Includes comments received from Sagamok Anishinawbek on June 18, 2004

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

Due to new legislative requirements around power generation in Ontario, a Water Management Plan will be developed for the Spanish and Vermilion River systems. Organizations with water control structures on the Spanish and Vermilion Rivers including INCO Ltd., Domtar Inc., the City of Greater Sudbury, Falconbridge Limited, Nickel District Conservation Authority and the MNR, will cooperatively prepare a Water Management Plan for these waterways. The newly created plan will attempt to address the socio-economic and environmental concerns or issues that are related to the water management operations and how they influence water flows and levels. Your response to this questionnaire will assist in the planning process.

Contact Information

Name:________________________

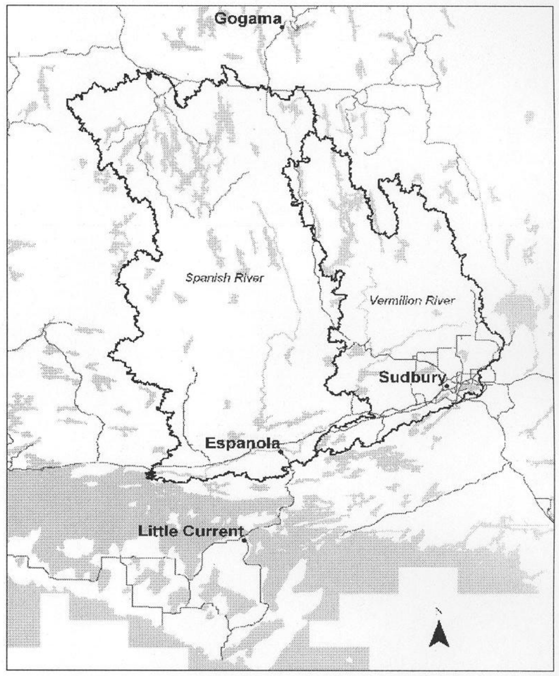
Telephone: (_____)________ - __________

E-Mail ________________________

Address:________________________

Would you like to be kept informed about the water management plan Yes ☐ No ☐

Preferred language English ☐ French ☐



Please complete and return this questionnaire to:

Eric Cobb
Ministry of Natural Resources,
Sudbury District
3767 Highway 69 South, Suite #5
Sudbury, Ontario P5G 1E7[0]
PLEASE PROVIDE COMMENTS BY AUGUST 31ST, 2005.

Note: Comments and personal information regarding water management planning are collected under the authority of the Ministry of Natural Resources to assist in making decisions and to determine further public consultation needs related to planning. Comments and opinions which do not constitute personal information as defined by the *Freedom of Information and Protection of Privacy Act* will be shared among MNR, plan proponents and committees, and other relevant ministries, and may be included in study documentation that is made available for public review. Under the *Freedom of Information and Protection of Privacy Act*, all personal information collected in this comment sheet is and will remain confidential unless prior consent is obtained. Comments expressed will form part of the public record. For further information regarding this Act, please contact Don Mark, Information Specialist, Sudbury District MNR, (705) 564-7360.

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

AGNEW LAKE (Big Eddy Generating Station)

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Draw Down Limit of 849.0 Feet	Agree ( )	Disagree ( )	Unsure ( )
Option 3: Draw Down Starts in December	Agree ( )	Disagree ( )	Unsure ( )
Option 4: Summer Level by May 24 Weekend	Agree ( )	Disagree ( )	Unsure ( )
Option 5: Lower Lake by 6 Inches	Agree ( )	Disagree ( )	Unsure ( )
Option 6: More Stable Summer Levels	Agree ( )	Disagree ( )	Unsure ( )
Option 7: Minimum Flows Through Big Eddy	Agree ( )	Disagree ( )	Unsure ( )

Comments:

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

ARMSTRONG LAKE DAM

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Increased Monitoring (Stable Levels)	Agree ( )	Disagree ( )	Unsure ( )
Option 3: Raise Lake Level 9 inches	Agree ( )	Disagree ( )	Unsure ( )
Option 4: Increase Winter Draw Down 9 inches	Agree ( )	Disagree ( )	Unsure ( )
Option 5: Lower Lake Level 9 inches	Agree ( )	Disagree ( )	Unsure ( )

Comments:

MINISTIC LAKE DAM

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Increased Monitoring (Dock Damage)	Agree ( )	Disagree ( )	Unsure ( )

Comments:

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

BIRCH LAKE DAM

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Increase Draw Down 1 foot	Agree ( )	Disagree ( )	Unsure ( )
Option 3: Complete Draw Down 1 Month Earlier	Agree ( )	Disagree ( )	Unsure ( )
Option 4: Complete Draw Down 2 Weeks Earlier	Agree ( )	Disagree ( )	Unsure ( )

Comments:

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

BISCOTASI LAKE DAMS

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Lower Lake Level 1 foot	Agree ( )	Disagree ( )	Unsure ( )
Option 3: Increase Lake Level 1 foot	Agree ( )	Disagree ( )	Unsure ( )
Option 4: Complete Draw Down by Feb. 1st	Agree ( )	Disagree ( )	Unsure ( )

Comments:

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

INDIAN LAKE DAM

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Lower Lake Level 1 foot	Agree ( )	Disagree ( )	Unsure ( )

Comments:

RAMSAY LAKE DAMS

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )

Comments:

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

MOZHABONG LAKE DAM

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Lower Lake Level 1 foot	Agree ( )	Disagree ( )	Unsure ( )

Comments:

SINAMINDA LAKE DAM

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Maintain One Lake Level Year-Round	Agree ( )	Disagree ( )	Unsure ( )
Option 3: Increase Lake Level 1 foot	Agree ( )	Disagree ( )	Unsure ( )

Comments:

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

ONAPING LAKE (Onaping Lake Dam and Bannerman Dam)

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Lower Lake Level 1 foot	Agree ( )	Disagree ( )	Unsure ( )
Option 3: Summer Levels - May 15 – Sept. 15	Agree ( )	Disagree ( )	Unsure ( )
Option 4: Complete Draw Down by October 15	Agree ( )	Disagree ( )	Unsure ( )

Comments:

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

POGAMASING LAKE DAM

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )
Option 2: Lake Level Less Than 1205 feet until June 15th	Agree ( )	Disagree ( )	Unsure ( )
Option 3: Increase Summer Levels by 1 Month	Agree ( )	Disagree ( )	Unsure ( )
Option 4: Lower Lake Level ½ feet	Agree ( )	Disagree ( )	Unsure ( )

Comments:

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

LOWER SPANISH RIVER (Espanola Dam)

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )

Comments:

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For the options listed below, please check whether you agree, disagree with, or if you are unsure.

STOBIE DAM (Vermilion Lake)

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )

Comments:

WABAGESHIK LAKE (Wabageshik Generating Station)

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure ( )

Comments:

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN
Input for Water Management Options

For many of the water control structures on the Spanish / Vermilion watershed, issues were not raised during the scoping phase of this planning process and therefore, no alternate options were developed. The preliminary preferred option for these facilities will be the status quo.

If you have any concerns with the operation of the operating structures below, please place a check beside the facility and write your specific concerns.

Canoe (Bardney) Lake Dam (INCO)	( )
Fox Lake Dam (MNR)	( )
Frechette Lake Dam (INCO)	( )
High Falls Generating Stations (INCO)	( )
Kelly Lake Dam (NDCA)	( )
Lake Laurentian Dam (NDCA)	( )
Maley Dam (NDCA)	( )
Nairn Falls Generating Station (INCO)	( )
Nepahwin Lake Dam (NDCA)	( )

Nickeldale Dam (NDCA)	( )
Ramsey Lake Dam (City of Sudbury)	( )
Robinson Lake Dam (City of Sudbury)	( )
Strathcona Creek Dam (Falconbridge)	( )
Threecorner Lake Dam (MNR)	( )
Windy Lake Dam (MNR)	( )
Whitewater Lake Dam (MNR)	( )

Comments:

Ontario INCO Domtar

Wabageshik Lake (1)

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure (1)

1. Our concern at present is that for the last 3 or 4 years, we have seen a tremendous increase in (aquatic) vegetation growth. It is almost impossible to proceed through with a boat without having motor damage. It sure would be nice to get some help to get control.

Vermilion River (McCharles Lake) (1)

2. As a resident of McCharles Lake in Walden, I wish to remind everyone of this lake, which is an "intersection" lake for two waterways from the east and north which is the Vermilion River system.

   It has become very clear over the past 10 years that they (the Nickel District Conservation Authority) have just figured out how to manage this lake's waterway over the past 2 years, and I am very concerned with any changes that would be considered to this lake's water management plan.

   (The Nickel District Conservation Authority) has been passing out aerial photographs of my property in 2002 to the public lately which show the consequences of poor management.

   In short, it greatly concerns most residents on this lake that Management plans would change anything in this waterway considering they just figured out how to get it right.

Biscotasi Lake Dams (2)

Option 1: Current Operating Regime	Agree ( )	Disagree ( )	Unsure (1)
Option 2: Lower Lake Level 1 foot	Agree (1)	Disagree ( )	Unsure ( )
Option 3: Increase Lake Level 1 foot	Agree (1)	Disagree (1)	Unsure ( )
Option 4: Complete Draw Down by Feb. 1st	Agree ( )	Disagree ( )	Unsure (1)

3. Biscotasi tourist operators and other business operators such as guides, community store and other small businesses depend on the lake for most of their livelihood and feel the summer levels should be maintained at Option 3 levels.

4. Try to maintain water level for fish spawn in spring. Lower lake level by 1 foot in summer so you can get off boat and onto some shoreline when camping, fishing and hunting.

Agnew Lake (Big Eddy Generating Station) (14)

Option 1: Current Operating Regime	Agree (1)	Disagree (10)	Unsure (1)
Option 2: Draw Down Limit of 849 feet	Agree (12)	Disagree ( )	Unsure (1)
Option 3: Draw Down Starts in December	Agree (7)	Disagree (2)	Unsure (1)
Option 4: Summer Level by May 24 Weekend	Agree (11)	Disagree (1)	Unsure ( )
Option 5: Lower Lake by 6 inches	Agree (7)	Disagree (3)	Unsure (3)
Option 6: More Stable Summer Levels	Agree (8)	Disagree (2)	Unsure (1)
Option 7: Minimum Flows at Big Eddy GS	Agree (1)	Disagree (3)	Unsure (6)

5. My biggest concern is fish spawn being washed away in spring and destroying fish habitat.

6. Require consistent flow at times most important for fish egg incubation and hatching of fry.

The highs reached for water levels is causing severe damage to shorelines, erosion and loss of shoreline property, damage to shoreline vegetation, etc. Normal, maintained water level targets should not be exceeded as much as possible.
Under (section) 11.4, the current rule curve conditions as per "Permit To Take Water" need to remain in effect (i.e. not draw lake down too quickly).

7. As a cottage owner on Agnew Lake, I am <u>very</u> concerned about the loss of our water frontage due to erosion of the shoreline. Our camper association works hard to re-stock fish into the lake while the dramatic change of water level in the spring of each year interrupts the natural process of fish spawning. The debris floating in our lake is a very dangerous situation for any and all boaters, all caused by the fluctuation of water levels.

   Although Option # 2 is the best of your choices, it still does not address all of our concerns, but it is a start.

   Please do not let money concerns destroy the beauty of this setting four our generation as well as those yet to come.

8. Very much like an Option 8 (a combination of Options 2 to 7). Due to dock damage, we like the option of draw down 1 month earlier to lessen the damage due to ice.

9. Year round residents worry about loss of potable water as well as erosion.
   Worried about the lack of concern from VALE INCOre: their responsibility.
   Worried about lack of progress being made between INCO, MNR and representatives on PAC. Is this another government tactic giving the appearance of being open to change but not allowing it to happen?

10. We lose our potable water in the spring when water level is too low.

    Cease raising and lowering water when no reason – everyday this summer seemed to be at a different level.

    Re: Issue 5 – Option # 7 – I can't believe the MNR has insufficient information on walleye requirements.

    Re; Issue 10 – When the water is low and the wind comes up, you can watch the sand disappear.

11. Our priority is to ensure that water levels do not go below 849 feet, to protect fish from being trapped in isolated bays, to reduce shoreline erosion, and to ensure that cottagers / permanent homes do not run out of water. We support Option # 3 as well to which should minimize damage to docks, etc.

12. When (water) level is high and the lake freezes, this causes dock and shore damage. Start lowering the lake slowly.

    When (water) levels are adjusted now, whether it is up or down, it is done too quickly.

    If the government and VALE INCOare so concerned in making money with hydro, why is one turbine down at Big Eddy for approximately 1 year?

    How can (water) levels be handled from Copper Cliff office properly?

13. Option # 2 is good because people on Lake Agnew will not run out of water in March/April.
    Option # 3 is good because less damage will be done to docks on Lake Agnew.

Option # 4 is good because we can put our boats at dock by May 24 weekend.
Option # 5 is good because less shoreline erosion will happen to Lake Agnew.

14. Option 3: Should have draw down 12" to 24" before freeze up as not to damage docks.
Option 4: Have water reach full supply 2 weeks prior to May long weekend.

15. I believe the greatest damage is to pickerel spawning beds with the water not reaching proper levels for spawn. This level can be monitored by water temperature since the spawning temperature is a constant.

Shore erosion is the second largest destructive factor due to water elevation change. Floating debris in the water is also a hazard as the water rises.

Sinaminda Lake Dam (2)

Option 1: Current Operating Regime	Agree (1)	Disagree ( )	Unsure ( )
Option 2: Maintain Lake Level Year-Round	Agree (1)	Disagree ( )	Unsure ( )
Option 3: Increase Lake Level 1 foot	Agree ( )	Disagree ( )	Unsure ( )

16. Present changes in water levels, the beaver are unable to adapt to the dramatic changes. For example, change of water level in the fall (occurs during) repairing new houses, putting in new feed. Low water causes beavers to starve and freeze in houses.

17. OK, as long as a structure is maintained on outlet of lake.

Mozhabong Lake Dam (1)

Option 1: Current Operating Regime	Agree ( )	Disagree (1)	Unsure ( )
Option 2: Lower Lake Level 1 foot	Agree (1)	Disagree ( )	Unsure ( )

18. As is, INCO's practice takes more than 7 feet off the lake. Logs (are taken) out in early August and sometimes are all back in until November. I will be taking pictures on a regular basis to prove my point. During a conversation with the VALE INCOrepresentative, he kept referring to not taking anymore than 5 feet. If they are going to take only 4 feet, then that is better for the fish.

Pogamasing Lake Dam (11)

Option 1: Current Operating Regime	Agree (3)	Disagree (4)	Unsure ( )
Option 2: Lake Level 1 foot Lower until June 15th	Agree (3)	Disagree (3)	Unsure ( )
Option 3: Increase Summer Levels by 1 Month	Agree (1)	Disagree (2)	Unsure (1)
Option 4: Lower Lake Level ½ feet	Agree (8)	Disagree (3)	Unsure ( )

19. This is a different lake from the one we settled on (Pog Lodge) in 1946. Water management was unbelievably inconsistent and is undoubtedly responsible for the shifting o huge quantities of sand from the beach (at the southern end of the bay – not the southern end of the lake which is 5 miles further south). This leaves them without a beach. My main reason for option 2 is that this family (neighbours but not close friends) is the best thing that happened to this community and they deserve better water management. This (option) # 2 would at least give them a beach for the summer.

20. A few years ago the property owners on Pogamasing Lake agreed as to the lake levels listed as Option 1. This has worked well and is acceptable. One group of property owners is now trying for a lowering of the lake level for their personal preference. Option 3 would be better for boating and safety however, the consensus agreement of option 1 is the best compromise for all concerned. Therefore, we recommend Option 1 even though we would prefer Option 3.

21. The current operating levels were approved originally by Domtar (E.B. Eddy), the MNR and the residents of Pogamasing Lake. At this time, neither the MNR nor Domtar have given any indication that the water levels should be changed.

    One of our concerns, of course, is the fishing and it has improved greatly with the current levels. To us, accessibility to all portions of the lake is important. Lowering water levels could cause damage to our motors as well as possibly making navigation very difficult. Therefore, our option is to keep the status quo.

22. These opinions represent 4 people (adults) in my camp. For over 50 years, we have watched the gradual erosion of our beach, banks and land on which our camps. From beaches of 40 – 50 metres and banks that were 40 – 45 degrees we now see beaches 10 – 15 metres in low water (1205 ft.) and banks at angles of 60 - 90°. This is all due to poor water management practices that caused erosion on our beaches and the destruction of a wetland to the south of our bay. We need to lower water levels in the spring to stop further bank erosion and permit plant and grass growth to stabilize further erosion from rain and wind, especially from the west and north.

    I am most supportive of the practices I have observed this past year - lower in the fall to 1204 ft. (although it could be 1204.25 ft. It was a bit too low and I was concerned for the lake trout spawn). Maintenance of that level until spring and then left at that level until the water level stabilized after the spring run-off. If it were kept at the present level (1205.5 / average -1205 ft.) then any run-off or rain would be drained off. But should there be high run-offs or rain from other lakes, then additional drops (from the log chute) could help keep the lake stable.

23. Our cottage consists of 2 adults and 2 adult children (ages 22 & 24). The banks in front of our cottage have suffered from erosion for many years resulting in the angle of the bank increasing from about 45° in the 1950s to about 80° now. We are concerned that seasonal high water will continue to erode the base of the bank and cause it to collapse, taking with it many pine trees upward of 75 feet in height. We fear these trees could fall on our building and/or continuing erosion could ultimately compromise the foundation of our building. Short of returning all of our eroded beach sand, Option 4 is the only option that may reduce the likelihood of further damage being done.

24. Twelve family members regularly use our camp. We have had serious problems here with water levels too high in the spring / too low in the fall. We have lost a lot of shoreline as well as the water washing into the bank causing serious erosion.

25. Over the years we have watched our beach disappear and our bank get smaller. This is a huge concern for me as this cottage of ours is where our family has been coming for over 60 years. We have maintained it so that the next generations will enjoy it. So we are very much in favour of option 4.

26. I am co-owner with my sister and mother of a cottage and two sleep camps located on Lake Pogamasing. There are 11 people who have unrestricted access to our location. It is used all year round except in November, December and spring break-up.

I have discussed the options for lake levels with my family and we are in favour of option number 4. In my view, none of the other options bring into fair balance the competing interests on the lake.

27. Beginning in 1941, my grandparents and their adult children began spending summers at our property on Pogamasing Lake. We are now into the fifth generation of family who continue to use and expand on what was begun 64 years ago.

We have a strong attachment to the property despite the challenges of accessing this remote site, and the “population” is no close to 80 family members who regularly ‘go to Pog’.

Over the years (particularly during the 70’s and 80’s) we watched high water levels attack and erode the sand banks on which our camps are located. We have lost large amounts of sand – both vertically and horizontally. I documented the damage in a presentation made to the PAC in May of this year (2005) and would be happy to make the presentation to the other bodies (steering and planning committees) if necessary.

It is essential that the spring and summer water levels be lower than the current plan in order to keep the water off the banks and to prevent the eventual loss of some, or all, of the camps (nine in all – plus outbuildings).

I strongly recommend Option 4 or a combination of 2 and 4 – namely 1205 ft. in the spring and 1205.5 ft. in the summer until the fall draw down.

28. When I was young, we had a beach of 40 - 50 metres wide – mostly in this bay. Now we have little beach and the sand has drifted to the next bay. 10 – 20 years ago, we walked down the beach on this new sand in the second bay. Now the sand has covered the wetland that was there and the shrubs and bush is growing in the sand. The pollywog pond is gone.

In front of our camp, the water in early spring is sometimes up the bank. It has destroyed 2 sets of stairs (25 steps each). The water comes to the edge of the bank in front of our camp and the bank is threatened by high water and windy days.

This is the first year in ages that the water level suits my family. We are still able to boat into the bays of the lake and maintain a small beach and therefore, no erosion at this time. Driving around the lake, large pine trees are seen in the water where the high water has just pulled them in. I have photos to back my info but I suggest (option) 4 suits our needs.

Onaping Lake (13)

Option 1: Current Operating Regime	Agree ( )	Disagree (11)	Unsure ( )
Option 2: Lower Lake Level 1 foot	Agree (12)	Disagree ( )	Unsure ( )
Option 3: Summer Levels - May 15 – Sept. 15	Agree ( )	Disagree (9)	Unsure ( )
Option 4: Complete Draw Down by October 15	Agree (13)	Disagree ( )	Unsure ( )

29. Combination of Options 2 and 4 to help with lake trout. If more time is needed for the draw down, start the draw down in mid to late August, if need be.

30. I’m in favour of option #4. Water levels of 1306.5 to 1307 from May 1 to August 31. There is no reason that an accurate water level can not be maintained by the present day sue of communication and technology. The water levels of 2005 summer have been pretty

good. Years ago we were told that the reason the lake trout numbers were dwindling was due to the pH level of the lake. Today there is an argument to be made that drawing down the lake beyond Oct. 15 adversely affects lake trout spawn. All users and the lake will benefit by greater co-operation and honesty.

31. As a result of continuing consultation with the property owners on the lake, the Ministry of Natural Resources and Domtar, the Onaping Lake Area Campers Association has adopted the following recommendations based on the proposed options developed by the SVRWMP planning team and presented the planning option document draft revision 22, dated July 20, 2005.

i. That the amended option # 2 be accepted with a reduction of 0.5 ft to 1306.5 ft. instead of the initial proposed reduction of 1 foot to 1306.0 ft.

ii. That option 4 also be included with a draw down to a target of 1305 ft. starting September 1st and ending October 15th, to ensure a minimum impact on the Lake Trout enhancement program currently underway.

In making these recommendations, we have reviewed the following:

i. Consulted with the members of our Association
ii. Monitoring and inspecting the effects of the high water and erosion on Onaping Lake.
iii. Consulted with MNR staff regarding the fish habitat and reproduction on Onaping Lake.

i) Consulted with Members of our Association

At our General Membership Meetings and other functions and projects, the water level on Onaping Lake is a major topic of discussion. Some of the issues that arise are as follows:

- Erosion of the shoreline
- Access to boat houses and docks during periods of the draw down and when the water is above the 1307 ft. level

ii) Monitoring and Inspecting the Effects of the High Water and Erosion on Onaping Lake

Over the past few years, the Executive of the Onaping Lake Campers Association has noticed the effects of the high water (a water level of 1307 ft. or higher) on the shoreline of Onaping Lake. We have attached 5 photographs showing the effect of a water level of 1307 ft. or higher. These photographs were taken on July 31, 2005.

Photo 1: This photo shows the effect on what is left of a small island.
Photo 2: This photograph shows survey bar and the amount of erosion that has taken place relative to a property line.
Photo 3: This photograph shows the effect of water level of 1307 ft. or higher on the shoreline of an existing cottage.
Photo 4: Thos photograph shows the effect of water level of 1307 ft. or higher on the shoreline.

iii) Consulted with MNR Staff Regarding the Fish Habitat and Reproduction on Onaping Lake.

Over the past few years, tens of thousands of Lake Trout have been planted in Onaping Lake. We are all aware that Lake Trout spawn in the late fall. The current draw down ends at the end of October.

We have been advised that ending the draw down this late in the season has the potential to kill all of the eggs laid by spawning Lake Trout. Ending the draw down on October 15 will increase the chance of survival for these eggs.

We feel that this compromise on he normal high level of the lake and the support of the MNR Lake Trout Program are in the best interest of the people of Onaping Lake and this new combined option will best address landowner and MNR concerns with minimal impact of generating capability.

We trust that you will give our recommendations serious considerations. We will look forward to hearing from you regarding these recommendations and answering any questions or concerns that you may have.

32. i) The current operating water level for the summer season is a minimum of 1 foot too high.

    ii) The level is causing severe erosion of the shoreline.

    iii) The drawdown procedure in my opinion could be completed earlier with no resident's complaints and if the early drawdown aids the fish spawning cycle, then I agree.

33. As a cottage renter, I feel the higher water levels cause erosion. I also believe the Option #4 recommendation would help to ensure the Lake Trout recovery.

34. Playing around with the water levels hurt the docks big time and screw up fish spawning beds. It also washes our shoreline at our camp.

35. I love to fish and when they lower the water, it affects the fishing. The high water levels are causing erosion and damage people's properties. The lowering of the water is also affecting the lake trout in the fall (spawning). In the spring when the water level rises, if you could keep it at 1306.60 ft. instead of 1307 ft., there will be a better chance of logs not floating from shorelines.

36. I feel that the lake level in the summer should be at 1306.6 ft. to better control the water level when it rains hard, then at 1307 ft. For the winter draw down it should be complete at October 15 or 1304 ft. to better the Lake Trout stocking and wells won't go dry. The 2004 draw down was below 1304 ft. on October 20 during the moose hunt and my well went dry and burnt the water pump.

37. Lake level at 1306 ft. is good. We know we had a very dry summer but if it had rained a lot and the lake was at 1307 ft., the Bannerman Dam does not control the lake (very well). (High water) causes a lot of erosion and it also backs up mud in the pickerel spawning beds, which we (Campers' Assoc.) have been trying to clean up every year.

    I think the MNR has to be more involved in the control otherwise this lake has a lot to lose. Since 1987, there are more surveys conducted by (the MNR) and yet nothing concrete has come out of them. We did fish surveys on the lake (checking spawning beds, setting nets, etc.) with biologists. I know Domtar and VALE INCOhave operated this lake at lower levels than now and I have lived with it, but now they want more and don't seem to give a hoot about fisheries. So again, MNR should step in and the sooner the better.

38. We believe that modifying Option #2 to bring the normal high level to 1306.5 ft. plus adding Option #4 will best address the concerns of the residents of Onaping Lake. This combined option will also support the current lake trout stocking program and will have minimal impact on power generation.

It has been stated that there is a lack of data to support the claim that high water levels contribute to erosion and the late draw down could effect the lake trout spawn. Therefore, the only logical thing to do is to err on the side of caution and implement these minor operating changes until the appropriate data has been collected and analyzed.

39. You are playing around wit the water levels too much. You are not helping fish spawning beds. Fishing would be better if water levels would be better.

If water levels would be cut off at 1306.6 ft., it would be a lot better for the shoreline erosion and it would be better if it rains hard and then have a better time of controlling the water levels.

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN 1
Input for Draft Water Management Plan

Due to new legislative requirements around power generation in Ontario, a Water Management Plan will be developed for the Spanish and Vermilion River systems. Organizations with water control structures on the Spanish and Vermilion Rivers including INCO Ltd., Domtar Inc., the City of Greater Sudbury, Falconbridge Limited, Nickel District Conservation Authority and the MNR, will cooperatively prepare a Water Management Plan for these waterways. The newly created plan will attempt to address the socio-economic and environmental concerns or issues that are related to the water management operations and how they influence water flows and levels. Your response to this questionnaire will assist in the planning process.

Contact Information

Name:____________________________

Telephone: (______)_________ - _____________

E-Mail ____________________________

Address:____________________________

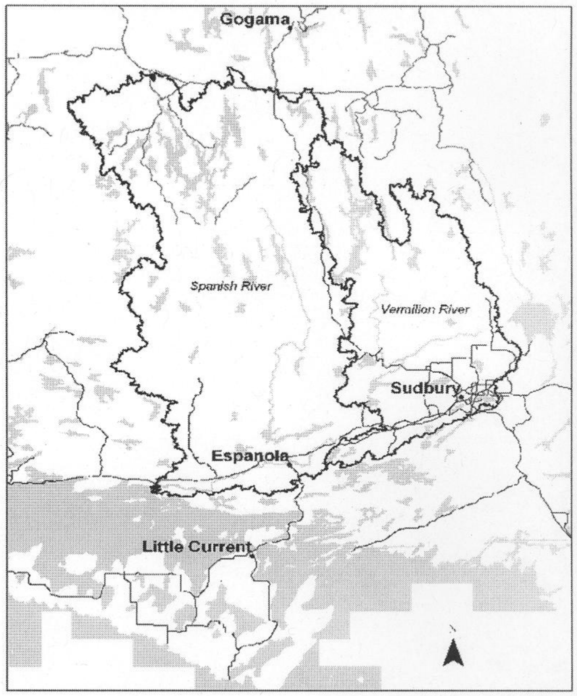
____

Would you like to be kept informed about the water management plan Yes ☐ No ☐

Preferred language English ☐ French ☐

Please complete and return this questionnaire to:

Eric Cobb
Ministry of Natural Resources,
Sudbury District
3767 Highway 69 South, Suite #5
Sudbury, Ontario P5G 1E7[0]
PLEASE PROVIDE COMMENTS BY JANUARY 8TH, 2006.



Note: Comments and personal information regarding water management planning are collected under the authority of the Ministry of Natural Resources to assist in making decisions and to determine further public consultation needs related to planning. Comments and opinions which do not constitute personal information as defined by the *Freedom of Information and Protection of Privacy Act* will be shared among MNR, plan proponents and committees, and other relevant ministries, and may be included in study documentation that is made available for public review. Under the *Freedom of Information and Protection of Privacy Act*, all personal information collected in this comment sheet is and will remain confidential unless prior consent is obtained. Comments expressed will form part of the public record. For further information regarding this Act, please contact Don Mark, Information Specialist, Sudbury District MNR, (705) 564-7360.

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN 2
Input for Draft Water Management Plan

A. Compliance Limits

For the compliance limits described on pages 2 & 3, please check whether you agree, disagree, or are unsure. Please record any specific comments on page 7.

Facility	Minimum Summer Level	Required Minimum Flow	Max Upper Level Limit	Minimum Lower Level Limit	Agree	Disagree	Unsure
Three Corner Lake Dam (MNR)	390.0 m May 1st – Nov 15th	-	391.3 m	389.7 m Nov 15th – Apr30th			
Windy Lake Dam (MNR)	339.0 m May 1st – Sept 15th	-	339.4 m	338.4 m Sept 15th – Apr 30th			
Whitewater Lake Dam (MNR)	265.17 m May 1st – Oct 31st	-	265.52 m	264.87 m Nov 1st – Apr30th			
Frechette Lake Dam (INCO)	1394.79 ft Aug 1st – Nov 1st	-	1398.79 ft June 1st – July 1st	1388.79 ft Jan 1st – Apr 15th			
Canoe (Bardney) Lake Dam (INCO)	1391.33 ft June 1st – Nov 1st	-	1395.33 ft June 1st – Nov 1st	1390.33 ft Dec 1st – April 15th			
Biscotasi Lake Dams 1,2, & 3 (INCO)	1320.08 ft June 1st – Sept 1st	-	1324.08 ft June 1st – Mar 1st	1316.08 ft Mar 1st – Apr 15th			
Indian Lake Dam (INCO)	1340.26 ft June 1st – Oct 15th	-	1343.26 ft June 1st – Dec 1st	1338.26 ft Oct 15th – Apr 15th			
Ramsey Lake Dams 7&8 (INCO)	1339.02 ft June 1st – Sept 1st	-	1344.52 ft June 1st – Aug 1st	1334.52 ft Feb 1st – Apr 15th			
Mozhabong Lake Dam (INCO)	1349.25 ft June 1st – Aug 1st	-	1352.75 ft June 1st – Aug 1st	1346.25 ft Oct 1st – Apr 15th			
Armstrong Lake Dam (INCO)	1158.11 ft June 1st – Oct 1st	-	1161.11 ft May 1st – Nov 1st	1156.11 ft Nov 1st – Apr 15th			
Ministic Lake Dam (INCO)	1206.0 ft June 1st – Oct 1st	-	1209.0 ft June 1st – Oct 1st	1205.0 ft Nov 1st – Apr 15th			
Lake Agnew - Big Eddy GS (INCO)	858.5 ft May 24th – Dec 1st	300 cfs (daily average) or lake inflow, whichever is least	860.24 ft	846.0 ft Jan 1st – May 24th			
High Falls No.1 & No.2 GS (INCO)	757.74 ft	-	762.24 ft	757.74 ft			

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN 3
Input for Draft Water Management Plan

Facility	Minimum Summer Level	Required Minimum Flow	Max Upper Level Limit	Minimum Lower Level Limit	Agree	Disagree	Unsure
Nairn Falls GS (INCO)	672.00 ft	-	677.50 ft	672.00 ft			
Wabageshik Falls GS (INCO)	738.50 ft	50 cfs (daily average) or river inflow, whichever is least	740.60 ft	738.50 ft			
Pogamasing Lake Dam (Domtar)	1205.0 ft June 1st – Aug 15th	-	1209.0 ft Apr 15th – Sept 1st	1203.5 ft Sept 15th – May 1st			
Onaping Lake Dam & Bannerman Dam (Domtar)	1306.0 ft May 1st – Sept 1st	-	1308.0 ft Apr15th – Sept15th	1303.5 ft Sept 15th – Apr 15th			
Sinaminda Lake Dam (Domtar)	1363.0 ft June 1st – Aug 1st	-	1366.0 ft May 15th – Sept 1st	1361.0 ft Oct 1st – May 1st			
Stobie Dam (Domtar)	840.30 ft	-	845.00 ft	840.30 ft			
Espanola GS (Domtar)	648.0 ft	-	649.40 ft	Inflows > 1200 cfs 648.0 ft Inflows < 1200cfs 648.70 ft			
Strathcona Creek Dam (Falconbridge)	346.39 m	-	347.62 m	346.39 m			
Maley Dam (NDCA)	268.1 m	-	273.1 m	266.1 m			
Nickeldale Dam (NDCA)	265.2 m	-	274.9 m	265.2 m			
Lake Laurentian Dam (NDCA)	-	-	266.56 m	265.89 m			
Nepahwin Lake Dam (NDCA)	259.18 m	-	260.48 m	259.18 m			
Ramsey Lake Dam (City of Greater Sudbury)	-	-	249.48 m	248.56 m			

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN

Input for Draft Water Management Plan

B. Compliance Monitoring

For the monitoring protocols described on pages 4 - 6, please check whether you agree, disagree, or are unsure. Please record any specific comments on page 7.

Facility	Data Requirement	Frequency	Gauge Location and Type	Responsibility	Agree	Disagree	Unsure
Three Corner Lake Dam (MNR)	Lake elevation	Bi-monthly	Manual reading at dam	MNR			
Windy Lake Dam (MNR)	Lake elevation	Min. once per month in spring, summer & fall. As needed during spring and fall.	Staff gauge at dam and Windy Lake Provincial Park	MNR			
Whitewater Lake Dam (MNR)	Lake elevation	Bi-weekly in spring, summer & fall. As needed during spring and fall.	Staff gauge at dam, Highway 144, and Sudbury Aviation	MNR			
Frechette Lake Dam (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO			
Canoe (Bardney) Lake Dam (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO			
Biscotasi Lake Dams 1,2, & 3 (INCO)	Lake elevation	Minimum site visit at dam of once in spring, summer & fall	Manual readings taken at Biscotasi shop dock or at dam during site visit	INCO			
Indian Lake Dam (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO			
Ramsey Lake Dams 7 & 8 (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO			
Mozhabong Lake Dam (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO			

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SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN

5

Input for Draft Water Management Plan

Facility	Data Requirement	Frequency	Gauge Location and Type	Responsibility	Agree	Disagree	Unsure
Armstrong Lake Dam (INCO)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer& fall	Manual reading at dam	INCO			
Ministic Lake Dam (INCO)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer & fall	Manual reading at dam	INCO			
Big Eddy GS (Lake Agnew) (INCO)	Forebay elevation Minimum flow daily 24 hour average	Daily	Miltronics electronic level indicator at dam Manual calculations	INCO			
High Falls No.1 & No.2 GS (INCO)	Forebay elevation at High Falls 1 & 2	Daily	Miltronics electronic level indicator at Big Eddy generating station tailrace	INCO			
Nairn Falls GS (INCO)	Forebay elevation	Daily	Miltronics electronic level indicator at dam	INCO			
Wabageshik Falls GS (INCO)	Forebay elevation Minimum flow (cfs) daily 24 hour average	Daily	Miltronics electronic level indicator at dam Manual calculation	INCO			
Pogamasing Lake Dam (Domtar)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer & fall	Staff gauge located at dam	Domtar			
Onaping Lake Dam & Bannerman Dam (Domtar)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer & fall	Staff gauge located at Bannerman dam	Domtar			
Sinaminda Lake Dam (Domtar)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer & fall	Staff gauge	Domtar			

Ontario INCO Domtar

SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN 6
Input for Draft Water Management Plan

Facility	Data Requirement	Frequency	Gauge Location and Type	Responsibility	Agree	Disagree	Unsure
Stobie Dam (Domtar)	River Elevation	Site visits vary in frequency, with increased monitoring in spring, summer, and fall	Staff gauge located at dam	Domtar			
Espanola GS (Domtar)	Forebay elevation. 24 hour average cfs	Daily	Electronic level indicator located at dam Manual calculation	Domtar			
Strathcona Creek Dam (Falconbridge)	Manual staff gauge reading during site visits. Site visits vary in frequency			Falconbridge			
Maley Dam (NDCA)	Reservoir level and precipitation	Automatically recorded every 15 minutes.		NDCA			
Nickeldale Dam (NDCA)	Manual staff gauge reading during site visits. Site visits vary in frequency	Minimum site visit of once in spring, summer & fall		NDCA			
Lake Laurentian Dam (NDCA)	Manual staff gauge reading during site visits. Site visits vary in frequency	Minimum site visit of once in spring, summer & fall		NDCA			
Nepahwin Lake Dam (NDCA)	Manual staff gauge reading during site visits. Site visits vary in frequency	Minimum site visit of once in spring, summer & fall		NDCA			
Ramsey Lake Dam (Greater City of Sudbury)	Manual staff gauge reading during site visits. Site visits vary in frequency			City of Greater Sudbury			

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SPANISH / VERMILION RIVERS WATER MANAGEMENT PLAN 7

Input for Draft Water Management Plan

If you have any comments regarding the plan, please record them below.

Ontario INCO Domtar

A. Summary of Compliance Limits Results

Facility	Minimum Summer Level	Required Minimum Flow	Max Upper Level Limit	Minimum Lower Level Limit	Agree	Disagree	Unsure
Three Corner Lake Dam (MNR)	390.0 m May 1st – Nov 15th	-	391.3 m	389.7 m Nov 15th – Apr30th	1		3
Windy Lake Dam (MNR)	339.0 m May 1st – Sept 15th	-	339.4 m	338.4 m Sept 15th – Apr 30th	2		3
Whitewater Lake Dam (MNR)	265.17 m May 1st – Oct 31st	-	265.52 m	264.87 m Nov 1st – Apr30th	1		3
Frechette Lake Dam (INCO)	1394.79 ft Aug 1st – Nov 1st	-	1398.79 ft June 1st – July 1st	1388.79 ft Jan 1st – Apr 15th	1		3
Canoe (Bardney) Lake Dam (INCO)	1391.33 ft June 1st – Nov 1st	-	1395.33 ft June 1st – Nov 1st	1390.33 ft Dec 1st – April 15th	1		3
Biscotasi Lake Dams 1,2, & 3 (INCO)	1320.08 ft June 1st – Sept 1st	-	1324.08 ft June 1st – Mar 1st	1316.08 ft Mar 1st – Apr 15th	2		2
Indian Lake Dam (INCO)	1340.26 ft June 1st – Oct 15th	-	1343.26 ft June 1st – Dec 1st	1338.26 ft Oct 15th – Apr 15th	2		2
Ramsey Lake Dams 7&8 (INCO)	1339.02 ft June 1st – Sept 1st	-	1344.52 ft June 1st – Aug 1st	1334.52 ft Feb 1st – Apr 15th	2		2
Mozhabong Lake Dam (INCO)	1349.25 ft June 1st – Aug 1st	-	1352.75 ft June 1st – Aug 1st	1346.25 ft Oct 1st – Apr 15th	1		3
Armstrong Lake Dam (INCO)	1158.11 ft June 1st – Oct 1st	-	1161.11 ft May 1st – Nov 1st	1156.11 ft Nov 1st – Apr 15th	1		3
Ministic Lake Dam (INCO)	1206.0 ft June 1st – Oct 1st	-	1209.0 ft June 1st – Oct 1st	1205.0 ft Nov 1st – Apr 15th	1		3

Facility	Minimum Summer Level	Required Minimum Flow	Max Upper Level Limit	Minimum Lower Level Limit	Agree	Disagree	Unsure
Lake Agnew - Big Eddy GS (INCO)	858.5 ft May 24th – Dec 1st	300 cfs (daily average) or lake inflow, whichever is least	860.24 ft	846.0 ft Jan 1st – May 24th	2	1	2
High Falls No.1 & No.2 GS (INCO)	757.74 ft	-	762.24 ft	757.74 ft	2		2
Nairn Falls GS (INCO)	672.00 ft	-	677.50 ft	672.00 ft	1		3
Wabageshik Falls GS (INCO)	738.50 ft	50 cfs (daily average) or river inflow, whichever is least	740.60 ft	738.50 ft	1		3
Pogamasing Lake Dam (Domtar)	1205.0 ft June 1st – Aug 15th	-	1209.0 ft Apr 15th – Sept 1st	1203.5 ft Sept 15th – May 1st	2	1	2
Onaping Lake Dam & Bannerman Dam (Domtar)	1306.0 ft May 1st – Sept 1st	-	1308.0 ft Apr15th – Sept15th	1303.5 ft Sept 15th – Apr 15th	2	5	4
Sinaminda Lake Dam (Domtar)	1363.0 ft June 1st – Aug 1st	-	1366.0 ft May 15th – Sept 1st	1361.0 ft Oct 1st – May 1st	1		3
Stobie Dam (Domtar)	840.30 ft	-	845.00 ft	840.30 ft	1		3

Facility	Minimum Summer Level	Required Minimum Flow	Max Upper Level Limit	Minimum Lower Level Limit	Agree	Disagree	Unsure
Espanola GS (Domtar)	648.0 ft	-	649.40 ft	Inflows > 1200 cfs 648.0 ft Inflows < 1200cfs 648.70 ft	1		3
Strathcona Creek Dam (Falconbridge)	346.39 m	-	347.62 m	346.39 m	1		3
Maley Dam (NDCA)	268.1 m	-	273.1 m	266.1 m	1		3
Nickeldale Dam (NDCA)	265.2 m	-	274.9 m	265.2 m	1		3
Lake Laurentian Dam (NDCA)	-	-	266.56 m	265.89 m	1		3
Nepahwin Lake Dam (NDCA)	259.18 m	-	260.48 m	259.18 m	1		3
Ramsey Lake Dam (City of Greater Sudbury)	-	-	249.48 m	248.56 m	1		3

B. Summary of Compliance Monitoring Results

Facility	Data Requirement	Frequency	Gauge Location and Type	Responsibility	Agree	Disagree	Unsure
Three Corner Lake Dam (MNR)	Lake elevation	Bi-monthly	Manual reading at dam	MNR	1		2
Windy Lake Dam (MNR)	Lake elevation	Min. once per month in spring, summer & fall. As needed during spring and fall.	Staff gauge at dam and Windy Lake Provincial Park	MNR	2		2
Whitewater Lake Dam (MNR)	Lake elevation	Bi-weekly in spring, summer & fall. As needed during spring and fall.	Staff gauge at dam, Highway 144, and Sudbury Aviation	MNR	1		2
Frechette Lake Dam (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO	1		2
Canoe (Bardney) Lake Dam (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO	1		2
Biscotasi Lake Dams 1,2, & 3 (INCO)	Lake elevation	Minimum site visit at dam of once in spring, summer & fall	Manual readings taken at Biscotasi shop dock or at dam during site visit	INCO	1		2
Indian Lake Dam (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO	1		2
Ramsey Lake Dams 7 & 8 (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO	1		2
Mozhabong Lake Dam (INCO)	Lake elevation	Minimum site visit of once in spring, summer & fall	Manual reading at dam	INCO		1	2
Armstrong Lake Dam (INCO)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer& fall	Manual reading at dam	INCO	1		2

Facility	Data Requirement	Frequency	Gauge Location and Type	Responsibility	Agree	Disagree	Unsure
Ministic Lake Dam (INCO)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer & fall	Manual reading at dam	INCO	1		2
Big Eddy GS (Lake Agnew) (INCO)	Forebay elevation Minimum flow daily 24 hour average	Daily	Miltronics electronic level indicator at dam Manual calculations	INCO	1		2
High Falls No.1 & No.2 GS (INCO)	Forebay elevation at High Falls 1 & 2	Daily	Miltronics electronic level indicator at Big Eddy generating station tailrace	INCO	1		2
Nairn Falls GS (INCO)	Forebay elevation	Daily	Miltronics electronic level indicator at dam	INCO	1		2
Wabageshik Falls GS (INCO)	Forebay elevation Minimum flow (cfs) daily 24 hour average	Daily	Miltronics electronic level indicator at dam. Manual calculation	INCO	1		2
Pogamasing Lake Dam (Domtar)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer & fall	Staff gauge located at dam	Domtar	1	2	2
Onaping Lake Dam & Bannerman Dam (Domtar)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer & fall	Staff gauge located at Bannerman dam	Domtar	3	2	2
Sinaminda Lake Dam (Domtar)	Lake elevation	Site visits vary in frequency, with increased monitoring in spring, summer & fall	Staff gauge	Domtar	1		2
Stobie Dam (Domtar)	River Elevation	Site visits vary in frequency, with increased monitoring in spring, summer, and fall	Staff gauge located at dam	Domtar	1		2

Facility	Data Requirement	Frequency	Gauge Location and Type	Responsibility	Agree	Disagree	Unsure
Espanola GS (Domtar)	Forebay elevation. 24 hour average cfs	Daily	Electronic level indicator located at dam. Manual calculation	Domtar	1		2
Strathcona Creek Dam (Falconbridge)	Manual staff gauge reading during site visits. Site visits vary in frequency			Falconbridge	1		2
Maley Dam (NDCA)	Reservoir level and precipitation	Automatically recorded every 15 minutes.		NDCA	1		2
Nickeldale Dam (NDCA)	Manual staff gauge reading during site visits. Site visits vary in frequency	Minimum site visit of once in spring, summer & fall		NDCA	1		2
Lake Laurentian Dam (NDCA)	Manual staff gauge reading during site visits. Site visits vary in frequency	Minimum site visit of once in spring, summer & fall		NDCA	1		2
Nepahwin Lake Dam (NDCA)	Manual staff gauge reading during site visits. Site visits vary in frequency	Minimum site visit of once in spring, summer & fall		NDCA	1		2
Ramsey Lake Dam (Greater City of Sudbury)	Manual staff gauge reading during site visits. Site visits vary in frequency			City of Greater Sudbury	1		2

PUBLIC COMMENTS

Is there a possibility to regulate the water levels in the spring (for walleye and pike spawn) according to water temperatures? Are there big level differences directly after spawning?

Overall I am pretty happy with the new plans.

It would appear that the variance on some of the lakes such as Onaping Lake may create high and low water problems, and possibly could be narrowed.

Although there has been significant input from the public on the 3 lakes noted, the operators have chosen to ignore all concerns raised and prepared a plan based solely on their needs without attempting to address any of the issues identified by the public. Furthermore, the MNR appears to have supported this draft plan without ensuring that the public concerns that were identified have properly been dealt with. This is evident in the complete lack of reasoning as to why any of these public issues were not included in this plan.

Onaping Lake - As for Onaping Lake, there appears to be changes that were made to this plan during the final approval stage conducted by the steering committee. These last minute changes were not identified or addressed through the 2-year process and I strongly believe that if they are adopted into the final plan that they will make a complete mockery of the entire process.

Over the years I have been involved in the development of many programs and compliance plans for these programs. I have also spent a great deal of time auditing compliance plans. It is my opinion that any plan with a stated frequency of "site visits vary in frequency" is not an acceptable plan, which shows little commitment by the author.

Onaping Lake - Maximum upper level limit and minimum lower level limits are excessive. Summer level should be ½ foot lower – 1306.5 feet for the summer.

Onaping Lake - Water is too low in the month of October for us to keep our boat in. Cannot dock it. I don't think it's fair that we are forced off our lake because of low water. Why can't you lower the water 2 feet until the end of October and then continue lowering in November. This is our home and I don't like being forced to leave and try to find an apartment one month early.

Onaping Lake

1. Present winter level of 1304 feet is too low.
2. Lowering of all water levels is too early.
3. Maximum summer level of 1308 feet is very high.
4. Frequent checks of water level are important; input from the Camper's Association is important.

Onaping Lake – I was informed at the Spanish/Vermilion Rivers water management plan open house in Gogama that the lake trout population on Onaping Lake had crashed to acidification. I believe this NOT to be true. There was documented evidence in an old file at the Sudbury MNR office citing winter draw downs on Onaping Lake adversely affected the lake trout population. Historically, the water levels were high in the fall prior to lake trout spawn and water levels would drop significantly in the winter. Prime spawning shorelines and shoals were left high and dry leaving deposited lake trout eggs to succumb year after year. Lake trout fry emerge in early to late April and I believe the draw downs took place much earlier. I remember the ice ate the shorelines sloped significantly over the years in the 70's and 80's.

If acidification was the problem, why is it that Sugarbush Lake (a small naturally reproducing lake trout lake with the same geology located just west of Onaping Lake) was never negatively affected? I have been on the lake since 1967 and it was commonplace to catch lake trout in the 60's to early 70's on Onaping Lake. I strongly believe that E.B. Eddy Forest Products and VALE INCOwere to blame for the lake trout population crash due to its poorly managed drawdown schedule. Obviously there were other factors too such as the introduction of walleye and bass in the 70's.

I am not in disagreement with the current draw down schedule for Onaping Lake. However, I do have concerns about the water levels staying consistent during the lake trout egg incubation period. MNR needs to continue to do studies and assessment to actually see if the current draw down schedule is negatively affecting lake trout recruitment. MNR should also determine whether or not suitable spawning habitat continues to exist at the lowest water level.

Onaping Lake – Dropping the water level early in the fall is not acceptable. There are about 230 camps on Onaping Lake and most owners can not go to them before October 1st. It is just too treacherous with the water level too low.

Back in the 80's and early 90's the water was dropped in the spring and caused less impact. No impact on the fish. No impact on the cottage owners and most important, less land erosion because the ground is still frozen. The shoreline is eroding into fish spawning beds when dropping the water in the fall.

The water level would be better monitored by permanent residents living now on the lower part of the lake. By the time Domtar gets to check the levels wee are usually already in trouble!

Onaping Lake - It's a shame that we have no access to our cottage on Onaping Lake after the middle of October. From then on we are at home, thinking of the nice weekends left due to global warming, at least to the end of November.

Pogamasing Lake – As long as the reasoning for lake level targets is based on ecosystem health as well as economic considerations and these targets are based on scientific data, then I have no quarrels. The biggest factor affecting these informed decisions is available data (historical) and the ability to monitor how these levels change seasonally largely affects how they need to be managed to benefit all parties. I think that the monitoring requirements for all lakes need to be increased. If this task can not be accomplished by the "owners" of the dams, then I think they should be contracted out to 3rd parties.

Mozhabong Lake – For Mozhabong Dam, MNR should have a measuring device that they could check at the landing dock at the south end access and/or the bridge on Metagama Road that crosses Indian River a few hundred upstream of this dam. VALE INCO takes more than the 4 feet they say they do, and have been doing this for the last 10 years. It is hurting the spawning shoals on Mozhabong Lake.

Aboriginal Consultation Record – Spanish & Vermilion Rivers Water Management Plan

DATE	ORGANIZATION OR FIRST NATION COMMUNITY CONTACTED	CONSULTATION EFFORTS
March 7, 2002	Whitefish River First Nations	Re: Water Management Planning and the process. Requested if interested in participating
October 1, 2002	Temagami, Henvey Inlet, Brunswick House, Mattagami, Whitefish River, Wikwemikong, Whitefish Lake and Sagamok Anishnawbek	Letter informing of planning process for both Spanish/Vermilion and Wanapitei plans
October 21, 2002	Sagamok Anishnawbek, Whitefish Lake, Wikwemikong, Whitefish River	Letter to notify of open houses to review the existing Spanish River Water Management Plan to be help in November
October 24, 2002	Brunswick House, Chapleau Cree	Letter to notify of open houses to review the existing Spanish River Water Management Plan to be help in November
November 12, 2002	Mattagami, Wikwemikong, Whitefish River, Whitefish Lake, Sagamok Anishnawbek, Brunswick House, Chapleau Cree	Letter of invitation to participate on a Steering Committee for the Spanish River Water Management Plan
November 13, 2002	Sagamok Anishnawbek	Community Open House for the SVWMP Review Process
November 18, 2002		Public Open House for the SVWMP Review Process (Biscotasing Community Hall)
November 18, 2002		Public Open House for the SVWMP Review Process (Chapleau)
November 19, 2002		Public Open House for the SVWMP Review Process (Gogama)
November 19, 2002	Brunswick House	Community Open House for the SVWMP Review Process
November 20, 2002		Public Open House for the SVWMP Review Process (Chelmsford)
November 21, 2002		Public Open House for the SVWMP Review Process (Espanola)
May 1, 2003	MNR	Facsimile for Request by Wikwemikong Unceded First Nation to have Community Mission Statement added to the Terms of Reference

DATE	ORGANIZATION OR FIRST NATION COMMUNITY CONTACTED	CONSULTATION EFFORTS
June 16, 2003	Mattagami First Nation	Verbal confirmation by Mattagami First Nation that community is not interested in being directly involved with the WMP but would like to be kept informed and be involved through normal public consultation
June 19, 2003	MNR	Mandate Statement for Aundeck Omni Kaning First Nation to be included in the Terms of Reference
September 29, 2003	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong	Invitation by e-mail to First Nations on Planning Team and Steering Committee to participate in Flow Metric workshop held in Blind River on October 15, 2003
September 30, 2003	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong	E-mail informing of opportunity to establish a First Nations advisory Committee to incorporate First Nation interests in production of WMP
October 1, 2003	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong	Re-notification by facsimile of invitation to participate in Flow Metric workshop in Blind River on October 15, 2003
October 14, 2003	Sagamok Anishnawbek	Facsimile in regards to setting up meeting to discuss the formation of a First Nation Advisory Committee
October 24, 2003	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong	Meeting at Espanola MNR office to discuss the possible formation of a First Nations Advisory Committee
November 25, 2003	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong	Terms of Reference for Mattagami/Abitibi First Nations Advisory Committee e-mailed for review
November 27, 2003	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong	Meeting at Espanola MNR office to continue discussions the possible formation of a First Nations Advisory Committee
December 1, 2003	MNR	Request from Union of Ontario Indians to be informed of all scheduled Public and First Nations WMP Open Houses
December 4, 2003	Sagamok Anishnawbek, Zhiibaahaasing, Sheshegwaning, M'Chigeeng, Aundeck Omni Kaning, Sheguiandah, Wikwemikong, Whitefish River, Whitefish Lake	Letter to inform of the opportunity to establish a First Nations Advisory Committee
January 13, 2004	MNR	Whitefish River First Nation identifies Richard Shawanda as committee member for the FNAC

DATE	ORGANIZATION OR FIRST NATION COMMUNITY CONTACTED	CONSULTATION EFFORTS
January 15, 2004	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong, Whitefish River	Teleconference to discuss formation of First Nations Advisory Committee
April 2004	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong, Whitefish River, Mattagami, Brunswick House, Union of Ontario Indians, Indian and Northern Affairs Canada, Ontario Native Affairs Secretariat	Notice mailed informing of public open houses to review the scoping document.
May 4, 2004	Sagamok Anishnawbek, Aundeck Omni Kaning, Whitefish Lake, Wikwemikong, Whitefish River	E-mail to First Nation representatives to review community profiles in scoping report.
May 10, 2004		Public information session for the scoping phase of SVWMP (Chapleau Royal Canadian Legion)
May 11, 2004		Public information session for the scoping phase of SVWMP (Gogama MNR office)
May 12, 2004		Information session for the scoping phase of SVWMP (Espanola Recreation Centre)
May 13, 2004		Information session for the scoping phase of SVWMP (Chelmsford Knights of Columbus)
May 28, 2004	Sagamok Anishnawbek	Advertisement to view SVWMP scoping report at community open house supplied
June 18, 2004	Sagamok Anishnawbek	Information booth to view SVWMP scoping report
July 19, 2004	Sagamok Anishnawbek	Consultation summary of the Sagamok Anishnawbek information session presented.
July 19, 2004	Sagamok Anishnawbek Zhiibaahaasing, Sheshegwaning, M'Chigeeng, Aundeck Omni Kaning, Sheguiandah, Wikwemikong, Whitefish River, Whitefish Lake	Letter sent to respective communities offering opportunity for additional community open houses

DATE	ORGANIZATION OR FIRST NATION COMMUNITY CONTACTED	CONSULTATION EFFORTS
July 19, 2004	Sagamok Anishnawbek Zhiibaahaasing, Sheshegwaning, M'Chigeeng, Aundeck Omni Kaning, Sheguiandah, Wikwemikong, Whitefish River, Whitefish Lake	Letter sent to respective communities to confirm that the First Nations Advisory Committee would not be implemented due to the lack of confirmed interest.
August 18, 2004	MNR	Facsimile indicating support for the formation of a First Nations Advisory Committee received from Whitefish River First Nations.
October 24 & 25, 2004	Whitefish River, Wikwemikong, Sagamok Anishnawbek, Aundeck-Omni-Kaning, Whitefish Lake	Letter requesting review of draft scoping document
June 20, 2005	Sagamok Anishnawbek	Council updated on development of SVWMP
July 15, 2005	Aundeck Omni Kaning, Brunswick House, Chapleau Cree, Mattagami, M’Chigeeng, Sagamok Anishnawbek, Sheguiandah, Sheshegwaning, Wahnapitae, Whitefish River, .Whitefish Lake, Whitefish River, Wikwemikong, Zhiibaahaasing, Union of Ontario Indians, Indian and Northern Affairs Canada, Ontario Native Affairs Secretariat	Letters notifying First Nations of Options Information Sessions and opportunity to hold open house in community.
July 21, 2005		Options Information Session (Biscotasing Community Hall)
July 25, 2005	MNR	Proposal for Sagamok Anishnawbek survey submitted by Saulteaux Enterprises (Sagamok Anishnawbek)
July 26, 2005		Options Information Session (Northland Inn – Chelmsford)
July 28, 2005		Options Information Session (Espanola Knights of Columbus)
September 9, 2005	Saulteaux Enterprises (Sagamok Anishnawbek)	Meeting at Espanola MNR office to discuss Sagamok Anishnawbek survey
September 19, 2005	MNR	Draft questionnaire for Sagamok Anishnawbek survey submitted by Saulteaux Enterprises (Sagamok Anishnawbek) for review
September 28, 2005	Aundeck Omni Kaning First Nation	Letter updating the status of the SVWMP
October 2005	Sagamok Anishnawbek	Survey conducted in community by Saulteaux Enterprises.

DATE	ORGANIZATION OR FIRST NATION COMMUNITY CONTACTED	CONSULTATION EFFORTS
November 14, 2005	MNR	Results of Sagamok Anishnawbek survey submitted by Saulteaux Enterprises
November 15, 2005	Wikwemikong, Sagamok Anishnawbek, Aundeck-Omni-Kaning, Whitefish Lake	Letter requesting review of draft plan
November 16, 2005	Aundeck Omni Kaning First Nation, Brunswick House, Chapleau Cree, Mattagami, M'Chigeeng, Sagamok Anishnawbek, Sheguiandah, Sheshegwaning, Wahnapitae, Whitefish Lake, Whitefish River, Wikwemikong, Union of Ontario Indians, Indian and Northern Affairs Canada, Ontario Native Affairs Secretariat	Letters notifying First Nations of Draft Plan Information Sessions and opportunity to hold open house in community.
December 1, 2005	Anishnawbek News	Advertisement for Draft Plan Information Session
December 5, 2005		Draft Plan Information Session (Espanola Knights of Columbus)
December 6, 2005		Draft Plan Information Session (Dowling Community Centre)
December 8, 2005		Draft Plan Information Session (Gogama MNR office)
January 26, 2006	Saulteaux Enterprises	Responses to Sagamok Anishnawbek comments provided by SVWMP planning team
January 31, 2006	Sagamok Anishnawbek	Letter from MNR to Sagamok offering to meet with Chief/Council to discuss their concerns with SVWMP for Feb 6/06. Inco & Domtar to be present.
February 24, 2006	Sagamok Anishnawbek, Wikwemikong, Whitefish River, Whitefish Lake, Aundeck Omni Kaning,	Letters sent to communities from MNR providing CD copy of SVWMP for review by March 17/06.
July 28, 2008	Sagamok Anishnawbek, Wikwemikong, Atikameksheng Anishnawbek, Aundeck Omni Kaning	Letters sent to communities from MNR welcoming continued representation in the water management planning process and notification of upcoming steering committee meeting.
August 27, 2008	Atikameksheng Anishnawbek	Response letter from community confirming representation on the steering committee, with acknowledgement by MNR on Sept. 10, 2008.

DATE	ORGANIZATION OR FIRST NATION COMMUNITY CONTACTED	CONSULTATION EFFORTS
September 26, 2008	Sagamok Anishnawbek, Wikwemikong, Aundeck Omni Kaning, Atikameksheng Anishnawbek	Follow-up letters sent to communities from offering community representation on planning team for SVWMP
November 13, 2008	Wikwemikong	Teleconference Wikwemikong's Lands and Resources Committee delegate to confirm representation on the planning team.
December 12, 2008	Sagamok Anishnawbek	MNR provided summary of concerns raised at Sagamok Anishnawbek Chief and Council meeting in 2005 and 2006, with responses to those concerns.
February 24, 2009	Sagamok Anishnawbek and Wikwemikong	Meeting with MNR to review past files and comments from community in order to ensure concerns are addressed in SVWMP.
June 8, 2009	Sagamok Anishnawbek	Letter from MNR to provide update on the SVWMP (and River Aux Sables WMP). Offer to have presentation to Chief/Council with Vale and Domtar.
February 2012	Sagamok Anishnawbek	Letter from MNR to advise of intention to proceed with presentation to Regional Director for plan approval.

Invitation to the Spanish/Vermilion River Water Management Plan Information Session

SAGAMOK ANISHNAWBEK TREATY DAY
June 18, 2004

Hydro-electricity producers with operations in the area, in association with the Ministry of Natural Resources (MNR) are examining the existing water management plan for the Spanish and Vermilion River Systems. This will lead to the development of a publicly accessible water management plan to form the framework for operation of all hydro generators on these river systems.

The goal of the Spanish/Vermilion Water Management Plan is to maximize the net environmental, social and economic benefits derived from how the water control structures on the Spanish and Vermilion Rivers are operated through the control of **flows and levels.** The plan will balance the needs of all competing interests and stakeholders affected by the Spanish/Vermilion River Systems.

An information session for the **Sagamok Anishnawbek** will take place to review the **Draft Background Scoping Document** on the date below:

DATE	LOCATION	TIME
Friday June 18, 2004	Sagamok Community Center	9:00 a.m. – 3:00 p.m.

Refreshments will be provided.

Members of the Spanish/Vermilion River Systems Water Management Plan's Planning Committee and Steering Committee will be present to discuss any issue that you may have with the management of the Spanish and Vermilion River Systems.

Bruce McGregor: (705) 865-1134; bruce@saulteauxenterprises.ca

Or the following:

Eric Cobb, Acting Fish and Wildlife Planning Biologist;
MNR Sudbury District Office,
3767 Highway 69 South, Suite 5;
Sudbury, Ontario P3G 1E7
(705) 564-7857 eric.cobb@mnr.gov.on.ca

Lynne Gibson, Domtar Inc.
1 Station Road,
Espanola, Ontario P5E 2I5
(705) 869-2035 ext. 215 lynne.gibson@domtar.com

Jim Cunningham, Inco.
18 Rink Street,
Copper Cliff, Ontario P0M 1N0
(705) 682-5203; jcunningham@inco.com

Summary: Spanish/Vermillion River Water Management Plan First Nation Consultation @ Sagamok June 18, 2004

An Information Session was held on June 18, 2004, from the Sagamok First Nation community at Sagamok. Since the information session was held on Sagamok Treaty Day, many people had the opportunity to view the information and speak to plan representatives. A total of 5 Spanish-Vermilion River Water Management Planning Questionnaires were returned by members of the Sagamok community. The community also had the opportunity to review the public Spanish-Vermilion River Water Management Planning process and documents to date.

Sagamok community usages of the Spanish-Vermilion Watershed included:

Usage	Number of comments
Permanent residence	3
Camp/Cottage	3
Fishing	Open water 4 Ice fishing 4 Species: Walleye 4, Lake trout 2, Brook trout 2, Whitefish 1, Yellow perch 2, Northern pike 5, Bass (small and largemouth) 4
Hunting	Species: Moose 3, White-tailed deer 3, Black bear 1, Waterfowl 2, Small game 4 *grouse
Trapping	Species: Beaver 1
Boating	Motor boat 4 Paddling 5
Swimming / Beaches	4
Winter Activities	Snowmobiling 5 Cross-country skiing 1 Snowshoeing 2
Off-Road / Trails	ATV 4 Dirt bike 1 Mountain bike 1
Business Operator	Guided tours 1
Source of Drinking Water	Water line 2 Point 1 Well 1
Wildlife Viewing / Nature Photography	Species: all, bald eagle, bear

Sagamok community identified concerns of the Spanish-Vermilion Watershed included:

Water Levels / Shoreline Erosion / Debris (5)

- It is indicated that there is concern with water levels, erosion and debris in the summer and spring.

Property damage (2)

- It is indicated that there is concern due to past property damage in the winter season and potentially during ice break-up.

Fisheries (4)

- Difficult to impossible to reach fishing hot spots.

Boat Access and Boating (4)

- Boat access and boating are concerns in the summer season.
- It is noted that there has been difficulty launching boats due to changing water levels.

Wildlife Habitat (3)

- It is indicated that there is concern for wildlife habitat in the summer, spring and fall seasons.

Vegetation Communities (2)

- It is indicated that vegetation communities are of concern in the summer and fall.

Snowmobiling (2)

- It is indicated that there is a winter concern for snowmobiling safety and usage in the winter season.

Comments (4)

- Changes should not be made to current standards.
- The dams should never have been allowed on the system.
- The development of a “stop over park” on the lower Spanish River has been difficult due to the frequent flooding of the area during the spring melt.
- Information, questionnaires and future correspondence regarding water management planning and activities arising form the plan should also be provided in the Ojibway language.

Sagamok Anishnawbek Survey for the Spanish-Vermilion Rivers Water Management Plan September/October 2005

Both Inco and Domtar Inc. use the Spanish and Vermilion Rivers to produce electricity for their own operations and power needs. The Ontario Ministry of Natural Resources (MNR), Nickel District Conservation Authority, and the City of Greater Sudbury also own and operate a number of dams on the watershed for the purposes of flood control and recreation.

The MNR has a key role to play in ensuring that Ontario's resources are managed in a sustainable way. A recent amendment to the *Lakes and Rivers Improvement Act* requires **hydro-producers to prepare a water management plan for the Spanish and Vermilion Rivers** that will include all water control structures on the system. The goal of the Spanish/Vermilion Rivers Water Management Plan will be to **balance the net environmental, social and economic benefits** resulting from the management of flows and levels.

The Spanish/Vermilion Rivers Water Management Plan will focus strictly on **water levels and flows** and the operator's ability to control them. Therefore, only lakes and rivers that are regulated by existing water control structures (dams and generating stations) will be addressed in this plan. Changes to the structures and the establishment of new hydro-generating stations are regulated through other processes and will not be considered in this planning process.

Below is a list of the lakes and rivers in the Spanish and Vermilion watersheds that are influenced by water control structures. Please use the accompanying maps to help locate any water bodies of interest.

- Agnes River
- Agnew Lake
- Armstrong Lake
- Bannerman Creek
- Bardney (Canoe) Lake
- Birch (Gough) Lake and Creek
- Biscotasi Lake
- Emma Lake
- Fairbank Lake and Creek
- Frechette Lake
- Halfway Lake
- Indian Lake
- Junction Creek
- Kelly Lake
- Lady McDonald Lake
- Levey Creek
- Lily Creek
- Ministic Lake
- Moore Lake
- Moose Lake and Creek
- Mozhabong Lake
- Nepahwin Lake
- Onaping Lake and River
- Pogamasing Lake
- Ramsay Lake (Chapleau)
- Ramsey Lake (Sudbury)
- Robinson Lake

- Sinaminda Lake
- Spanish River (West and East Branches)
- Vermilion Lake(s) and River
- Wabagishik Lake
- Wakonassin River
- Whitson Lake and River
- Windy Lake

For the lakes and rivers where issues have been identified, a range of options may be developed to assess what operating plans may be the best one to balance water uses. The planning team is currently looking at certain lakes where issues have been raised and are evaluating alternative operating strategies to address these concerns.

The best available information on watershed values and uses are required to select the preferred operating strategies for the water control structures. **Your response to this questionnaire will assist in the planning process.**

Please take a few moments to answer the questions in the accompanying survey. The planning team is looking for information on **current and traditional uses** of the appropriate water bodies; any **issues or concerns** that you may have with the way the rivers and lakes are being managed; and what **changes in water levels and flows** you would like to see. This information will be used to update the planning team's knowledge of values, uses, and issues, which will be considered during the evaluation of options.

Based on the input received, a draft plan will be prepared describing the selected operating plans for each water control facility. Completion of the draft plan is anticipated late fall. Community members will have the opportunity to review the draft plan and comment on it. Input at the draft plan stage will be used to develop the final water management plan for the Spanish and Vermilion river systems.

Note: Comments and personal information regarding water management planning are collected under the authority of the Ministry of Natural Resources to assist in making decisions and to determine further public consultation needs relating to planning. Comments and opinions which do not constitute personal information as defined by the Freedom of Information and Protection of Privacy Act will be shared among MNR, plan proponents and committees, and other relevant ministries, and may be included in study documentation that is made available for public review. Personal information will remain confidential unless prior consent to disclose is obtained. However, this information may be used by the Ministry of Natural Resources to seek public input on other resource management surveys and projects. For further information regarding this Act, please contact Don Mark, District Information Specialist, Sudbury District MNR, (705) 564-7360.

Contact Information

Name:____

Address:____

____

Telephone: (________) __________ - _____________

Would you like to be kept informed about the water management plan and activities arising from the plan? Yes ( ) No ( )

How would you like to be kept informed?
Mail ( ) Community Newsletter ( ) Community Open House ( )

Please complete and return this questionnaire to:

Bruce McGregor
Saulteaux Enterprises
89 River Road
Sagamok Anishnawbek

For more information please contact:

Bruce McGregor, Fisheries Coordinator, Saulteaux Enterprises
(705) 865-1134
or
Eric Cobb, Acting Fish and Wildlife Planning Biologist
Ministry of Natural Resources, Sudbury District
(705) 564-7857

Please circle your responses or comment where required. If you require additional room for your response, please use the comments section on the last page.

1. **Do you use the Spanish/Vermilion River System? Yes No**

2. **What do you use the Spanish-Vermilion River System for?**

   Recreation (e.g. swimming, motor boating, paddling, snowmobiling, etc.): _____
   ____
   ____
   ____

   Trapping: ____
   ____

   Hunting: ____
   ____
   ____

   Fishing: ____
   ____
   ____

   Gathering: ____
   ____
   ____

   Water supply (e.g. water lines, wells and points): _______________________
   ____
   ____

   Cottaging: ____
   ____
   ____

   Residential: ____
   ____
   ____

   Other: ____
   ____
   ____
   ____

3. **Which affected lakes and rivers within the Spanish and Vermilion watersheds do you use? Please list below and use accompanying maps to show locations.**
   ____
   ____
   ____
   ____

4. **Do the water levels and flows impact on your use of the Spanish/Vermilion River system? Please circle and briefly explain.**

   Erosion and Damage to Shoreline (i.e. docks, retaining walls, boathouses, break wall, properties, homes, roads, etc.): ______________________________
   ____
   ____

Boating and Access: ____

Harvesting (i.e. hunting, fishing, gathering, trapping, etc.): ________________

Ecosystem (i.e. fish, wildlife, wetlands, etc.): ___________________________

Water Supply / Drinking Water (e.g. water lines, wells and points): __________

Snowmobiling: ____

Other: ____

5. **Please record any recommendations you have for hydro-producers and their operations regarding water levels and flows to be considered for the draft water management plan.**

6. **Additional Comments**

Spanish/Vermilion Rivers WMP
Sagamok Anishnawbek Survey (September 2005)

Survey Results

A total of 325 households were sampled. There were 99 surveys submitted in total.

1. Do you use the Spanish/Vermilion River System?

   Yes - 42 answered YES
   No – 57 answered NO

2. What do you use the Spanish-Vermilion River System for?

   Recreation (e.g. swimming, motor boating, paddling, snowmobiling, etc.): 28 Selected
   Trapping: 4 selected
   Hunting: 17 selected
   Fishing: 36 selected
   Gathering: 13 selected
   Water supply (e.g. water lines, wells and points): 5 selected
   Cottaging: 2 selected
   Residential: 5 selected
   Other: 1 selected - Life

3. What lakes and rivers do you use within the Spanish River Watershed?

   Summary of Water Bodies Identified:

   Spanish River - 50
   Birch Lake - 6
   Agnew Lake - 6
   Indian lake - 2
   Vermillion Lake & River - 2
   Biscotasi Lake-1
   Pogamasing-1
   City Of Greater Sudbury Lakes - 1
   Lake Huron - 1
   Georgian Bay – 1
   Swallow Lake (Ramsey Lake) - 1

   The scope of the Spanish/Vermilion Rivers Water Management Plan only includes lakes and river that are impacted by water control structures on the Spanish and Vermilion watershed. Some of the water bodies identified in the questionnaires received do not fall with in the planning area, and include:

   - La Cloche Watershed Lakes drain directly into the North Channel:
   - LaCloche Lake
   - Moose Lake (Evangeline Lake)

   Serpent River Watershed:
   - Whiskey Lake
   - Crazy Lake
   - West Lake
   - Bell Lake

- Sugar Lake
- Horseshoe Lake

Whitefish River Watershed:

- Lake Panache
- Elizabeth Lake
- Long Lake
- Silver Lake

Areas beyond the mouth of the Spanish River such as Oak Bay / Little Detroit (North Channel) and Georgian Bay are outside the scope of undertaking although the effects from water management operations on the watershed could extend into these areas (i.e. sediment transport). Water levels in Lake Huron will not be affected by hydro-electric operations on the Spanish/Vermilion watershed.

4. Do the water levels and flows impact on your use of the Spanish/Vermilion River system? Please check box and briefly explain.

    Erosion and Damage to Shoreline (i.e. docks, retaining walls, boathouses, break wall, properties, homes, roads, etc.): 36 selected

    Boating and Access: 17 selected

    Harvesting (i.e. hunting, fishing, gathering, trapping, etc.): 24 Selected

    Ecosystem (i.e. fish, wildlife, wetlands, etc.): 13 selected

    Water Supply / Drinking Water (e.g. water lines, wells and points): 8 selected

    Snowmobiling: 6 selected

    Other: (Specify): 1 Selected - Life

5. Comments Received and Responses

A. COMMENTS WITHIN SCOPE OF WATER MANAGEMENT PLAN

Comments re: General Health of River System

- *Environment could be improved for the benefit of all, prior to development*
- *Myself, I do not use these waters much, but I would like to see these areas maintained for the use of future generations*
- *Would like to see these areas preserved for use of my children/grandchildren*
- *You see how fast our water source disappears and you want to do something to the water*
- *We have messed up the water enough lets do something good for our water, and not just manage it*

The goal of water management planning is to maximize the net social, economic and environmental benefits of water resources. An important principle of water management planning includes no further degradation to the environment and where possible, improvement to system. MNR's Aquatic Ecosystem Guidelines are used during planning in order to determine if certain natural flow characteristics can be integrated into water control operations.

Comments re: Water Flows and Levels

- *Have it safe for boaters and sightseers*
- *Keep the water at a constant level, maintain level*
- *Keep water level up*
- *Open dams more often*
- *Open the dams more often so the water levels can be higher*
- *Open the dams more often for constant water levels*
- *Very low water level on the Spanish River, should be kept at a higher level*
- *We need more water flows from the hydro dams to open*

Current operations on a number of reservoirs on the watershed include a draw down to capture the spring run-off. These draw downs help minimize downstream flooding and conserve water for summer time use. Without the draw downs or the dams, most of this water flow to Lake Huron in the spring, leaving less water for use during the summer. Hydro-power facilities on the Spanish and Vermilion Rivers allow for a more gradual release of water throughout the year.

In recent years, water levels in Lake Huron are lower than normal. Waters from the North Channel can affect water levels upstream the Spanish River, outside the control of hydro-producers, although it is not certain how far upstream this influence would extend. Current hydro-power operations on the Spanish/Vermilion Rivers do include daily and weekly variations in water use.

The effect of fluctuating water levels and flows on navigation and safety will be documented as a concern to be reviewed the planning team.

Comments re: Erosion

- *Keep river at a adequate level to prevent landslides*
- *Keep the water level steady because it causes road erosion along the rivers.*
- *Systems should be set in place to control the flow to prevent further soil erosion to the Spanish River.*
- *Concerned about our roads due to cave-ins*

In addition to natural causes of erosion, water hydro-power operations that cause substantial water level fluctuations and changes in flows may contribute to shoreline erosion. Operations on the Spanish/Vermilion Rivers do include daily, weekly, and seasonal variations in water levels and flows. However, at this time it is not known to what extent these operations are contributing to overall erosion on the river system. This issue has been identified as a data gap for the Spanish/Vermilion Rivers Water Management Plan that will require additional information to make decisions regarding changes to current operations.

Comments re: Fish Spawning

- *Just to make sure water levels are at an adequate level during spawning seasons*
- *Spawning fish should also be considered*
- *Raise the water levels during spawning season*

Water level and flow requirements for spawning fish were reviewed by the planning team to determine possible impacts of waterpower operations on fish populations. On certain regulated lakes in the Spanish and Vermilion watershed, water levels are managed to address spawning concerns. A review of existing water levels and flows on the lower Spanish River during the spring is underway to determine if sufficient spawning and incubation requirements are being met for walleye.

Comment re: Monitoring

- *Monitor water levels, consider for future generations*

The monitoring of water levels and flows will be an important component of the Spanish / Vermilion Rivers Water Management Plan. Monitoring will include the compliance monitoring of how well operators adhere to their legal limits, and effectiveness monitoring of how the operations impact certain values and uses.

Comment re: Communications / Information

- *Erect an Information booth @ the Indian Head park location in Sagamok*
- *More info would be greatly appreciated*
- *There was no map with this survey. I could not give my honest answers if I do not have any visual, as my family and I are active outdoors. I am not familiar with the names of lakes and rivers and how they are connected.*

For more information on water management planning, contact the Ministry of Natural Resources Eric Cobb (705) 564-7857.

For more information on INCO Ltd. operations, contact Jim Cunningham: (705) 682-5203.

For more information on Domtar Inc. operations, contact Ted Petrus: (705) 869-2020 (switchboard will direct call)

Additional consultation opportunities on the Spanish/Vermilion Rivers Water Management Plan will be considered as per the recommendations of the Sagamok Anishnawbek Band Council.

Reference maps will be included to assist in future questionnaires.

B. CONCERNS OUTSIDE SCOPE OF WATER MANAGEMENT PLANNING

Comments re: Pollution and Water Quality

- *Clean it*
- *Clean the river out, and stop the Espanola Paper Mill from polluting it anymore*
- *Clean the water so that our grandchildren will have a safe place to live, and live off the land without having to worry about poisoned food from our waters*
- *Clean up for future generations*
- *Cleaning up the water systems for future generations to use and restock with fish*
- *Come do a presentation on the process of sludge cleaning, because people think there are more pollutants going into the river*
- *Different location for sludge and storage, so it doesn't enter into the river, polluting it*
- *Keep the rivers clean and re-stock with fish for future generations*
- *Keep the water clean for fish and animals*
- *No need to dump toxins into the river*
- *Please clean the river – for our children and eco-system*
- *Prevent any accidental spills*
- *Should clean out the water for fish and animals*
- *I think all things should be considered in this management plan. I would like to see more testing of water that flows into the Spanish River on both sides of the river, maybe ½ mile apart.*
- *It shows where all the dams are but you have to show the wastewater treatment plant along the watershed. Why would you hold back all this waste? It should be continuously flowing. I would like to know how much and where these are trailing from INCO,, DOMTAR, and other companies*
- *Please quit polluting the water*
- *Spanish River to be kept clean for future generations. The river was used when I was younger, but stopped due to pollution*
- *The mining companies and logging companies have left the rivers polluted. The companies are not interested in cleaning up after themselves*. This is the way it was in England so they came here and do that here in Canada. In conclusion the present dams should be removed and let the water flow naturally
- *You see how fast our water source disappears and you want to do something about the water. I think it's about time these big companies put back big bucks to repair what they have done*

Water management planning involves the operations of existing water control structures on the Spanish and Vermilion watersheds and how they affect water levels and flows. Water quality issues involving the discharge of pollutants into a water system are not addressed in this planning process.

Water quality concerns are handled by the Ontario Ministry of the Environment. This agency is responsible for the investigation and enforcement of provincial water quality standards. The quantity and type of effluent discharged into the water is regulated by a Certificate of Approval (C of A). Water treatment facilities, Domtar Inc., and mining companies such as INCO Ltd and Falconbridge, have C of A's.

The Watershed Source Protection planning was initiated in 2005. The scope of this project is to establish a multi-barrier system to protect drinking water in the province of Ontario. The Nickel District Conservation Authority is the lead agency responsible for implementing this project for the Spanish and Vermilion River watersheds.

Domtar Inc. continues to monitor the health of the lower Spanish River. Anyone who wants more information on Domtar's operations and river monitoring, can contact Lynne Gibson: (705) 869-2020 (switchboard will direct).

Comments re: the Use Other Sources of Energy

- *Alternative measures maybe: Windmill or Solar Energy*
- *Install wind generators*
- *Use windmills*
- *Don't build hydro dams*

Water management planning involves the operations of existing water control structures on the Spanish and Vermilion watersheds. Proposals for new hydro-generating facilities are not considered in this process but are addressed by the new waterpower site release policy PL 4.10.05.

Proposals for new wind power generators in Ontario are being reviewed under the wind power policy for Crown land PL 4.10.04

Comments re: Dam Removal

- *Break all dams that you don't use*
- *Break old dams*
- *The river should not be dammed. The beavers are the ones that have permission from the Creator to do this.*
- *In conclusion the present dams should be removed and let the water flow naturally*

Dams within the Spanish and Vermilion watersheds identified for planning are functioning structures. However, it is possible that older, historic dams may still exist and have escaped the attention of the planning team. If someone wishes to inquire about a specific dam, they can contact the local MNR office for information.

The removal dams or changes to water levels on a reservoir may affect the use of habitat by fish. In these cases, Fisheries and Oceans Canada (DFO) would need to investigate any potential impacts and authorize these activities.

Water management planning involves the operations of existing water control structures on the Spanish and Vermilion watersheds and how they affect water levels and flows. Alterations, replacements and removal of these water control structure is not addressed in this planning process.

Comment re: Fish Stocking

- *Re-stock with fish*

Water management planning involves the operations of existing water control structures on the Spanish and Vermilion watersheds and how they affect water levels and flows, and does not address fish stocking requests.

The Spanish River Muskellunge Reintroduction Program was implemented to 1996 to help re-establish muskellunge population to the lower Spanish River. Since then approximately 11,000 fish have been released into the river. Adult spawning index survey were carried out in 2004 and 2005 and an electro-fishing survey for juvenile that showed natural recruitment occurring

Comment re: use of Electricity

- *Electricity should be utilized by people living in the area of the river*

In general, energy produced by generating stations in Ontario is supplied to a network or grid. Because energy is "pooled" so that people with access to this grid can use this electricity regardless of how close they are to a generating station.

Both INCO and Domtar supplement their energy use with electricity generated at their hydro-stations. Although they do not normally provide power to the grid, by generating their own energy they reduce their use of the grid and overall energy demand in the province.

Comment re: Re-vegetation

- *The wild life that eat the foliage around the shore should be redeveloped, even improve for vegetation*

Water management planning involves the operations of existing water control structures on the Spanish and Vermilion watersheds and how they affect water levels and flows. Projects such as shoreline stabilization and re-vegetation are not addressed in this planning process however, the erosion concerns caused by the regulation of water levels and flows will be documented and reviewed in the water management plan.

Additional Comments

- *Big companies and cities should leave the water system alone, leave it the way the Creator wanted it*
- *Elders say, "someday the grocery stores will be empty – shelves will not be stocked." This may be true, very soon, with all the natural disasters happening in other parts of the world*
- *Quit claiming our rivers*
- *Since they use natural resources for free why are all these prices so high?*
- *Quit claiming our rivers*

DRAFT

VERMILION RIVER AT WABAGESHIK REGULATED FLOW METRICS DATA SHEET

Station Information	
Site ID	2CF1
River Name	VERMILION RIVER
Site Name	WABAGESHIK
Region	NORTHEASTERN
District	Sudbury
Drainage Area	4339.99 (DEM) km²
Owner	INCO
Plant Capacity	3.74 MW
Spill Capacity	

Flow metrics are provided for the waterpower facility based on regulated flows measured by the facility owner. The target metrics provided are described in the *Aquatic Ecosystem Guidelines* (MNR 2002) and the *Waterpower Science Strategy* (MNR 2002). Metrics are based on regulated daily flow from 1996 to 2004 (9 yrs). Other descriptive metrics have been included in the data sheet to provide a more complete description of the ranges of streamflow on the river system and to facilitate comparisons between river systems.

Annual (1996 - 2004):

I. Streamflow Time Series

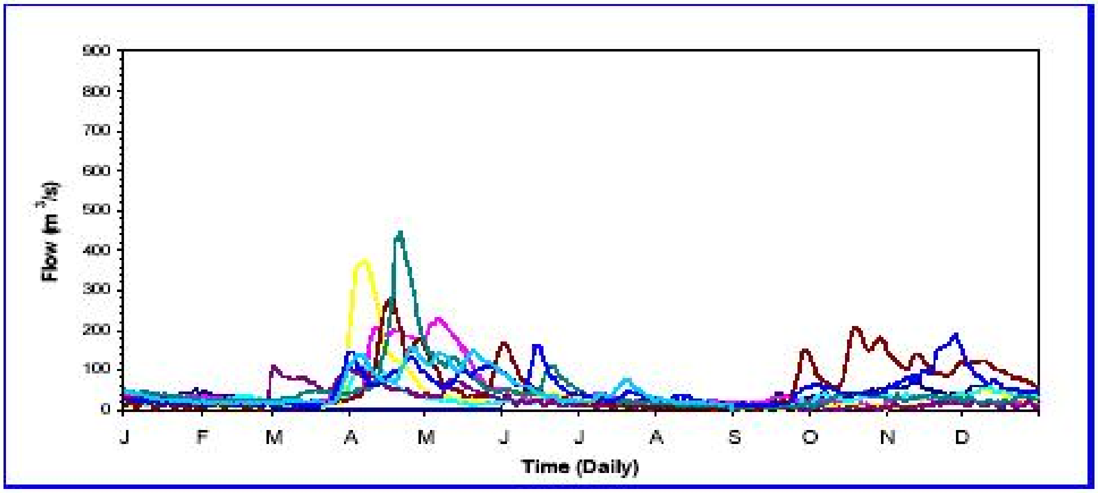

Figure 1: Annual daily flow hydrographs from 1996 to 2004.

Descriptive Metric	Value
Mean Annual Flow	44.4077 m³/s
20% Time Exceeded Flow	39.1 m³/s
Median Flow	25.4 m³/s
80% Time Exceeded Flow	12.4 m³/s
Month of Max. Median Flow	April
Month of Min. Median Flow	September
Mean Rising Rate of Change of Flow	6.7 m³/s/day
Mean Falling Rate of Change of Flow	-5.1 m³/s/day

Target Metrics	Value
Riparian Flows (Q_2 - Q_{10})	189 - 501 m³/s
Bankfull Flows ($Q_{1.1}$ - $Q_{1.2}$)	145 - 185 m³/s

Table 1: Annual flow metrics based on 9 years of data.

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VERMILION RIVER AT WABAGESHIK REGULATED FLOW METRICS DATA SHEET

II. Flow Duration

Time Exceeded %	Flow m^3/s
0.10	426.00
1.00	227.90
5.00	137.80
10.00	99.06
20.00	54.31
30.00	39.07
40.00	31.62
50.00	25.40
60.00	20.30
70.00	16.39
80.00	12.45
90.00	6.77
95.00	3.40
99.00	0.00
99.90	0.00

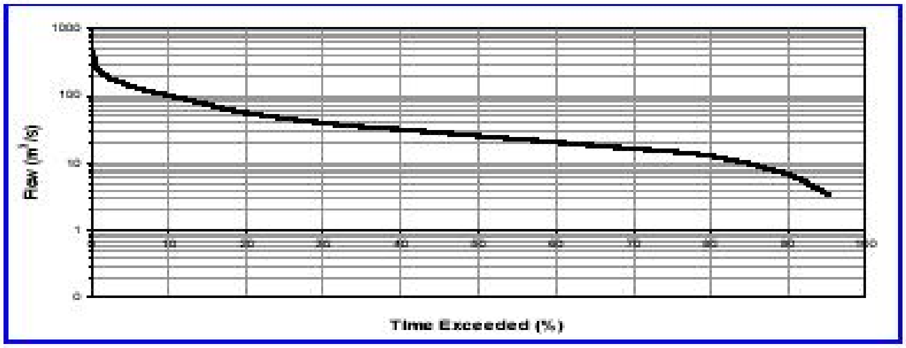

Table 2 & Figure 2: Flow duration table and curve displaying flow vs. percent time exceeded over 9 years.

III. Flood Frequency Analysis

Return Period yrs	Flow m^3/s
1.05	67.5
1.25	113
1.50	146
1.70	165
2	189
5	313
10	405
20	501
50	635
100	742

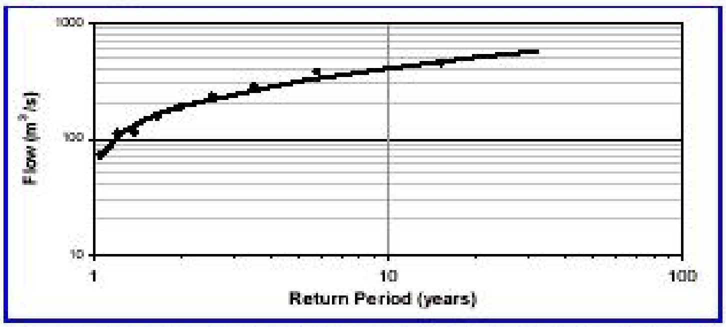

Table 3 and Figure 3 : Flood frequency analysis and curve fitted by the *Log Pearson Type III* probability distribution.

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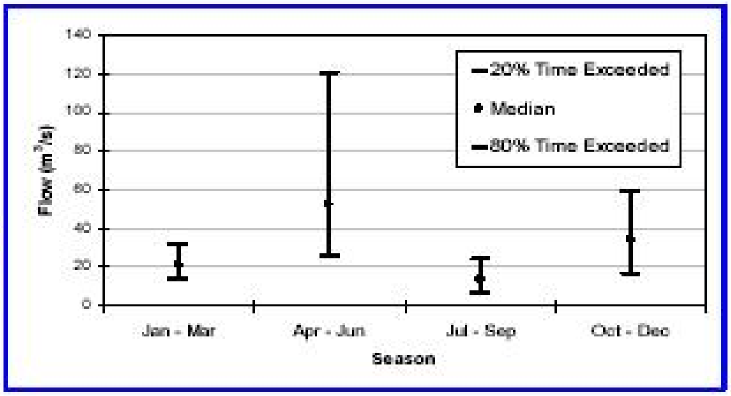
VERMILION RIVER AT WABAGESHIK REGULATED FLOW METRICS DATA SHEET

Seasonal:

I. Flow Duration

Table 5 and Figure 5: Seasonal median flow duration for determining minimum flow targets.

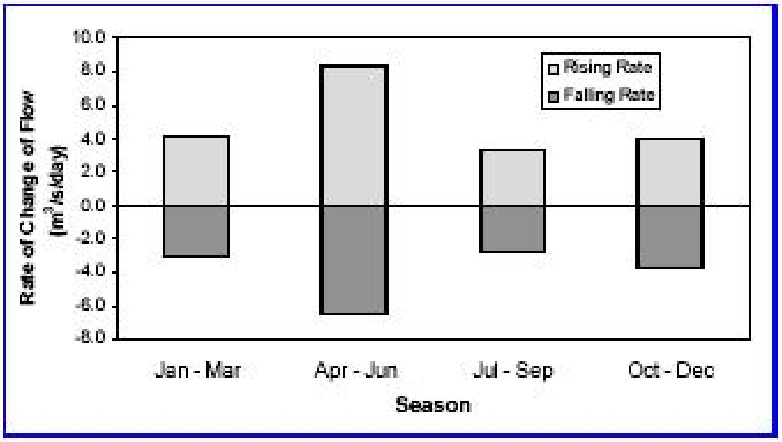
Season	20% Time Exceeded	Median	80% Time Exceeded
	m^3/s	m^3/s	m^3/s
Jan - Mar	31.9	21.2	13.8
Apr - Jun	120.7	52.7	25.9
Jul - Sep	23.9	14.0	6.8
Oct - Dec	59.6	34.2	16.8



II. Rate of Change of Flow

Figure 6 and Table 6: Seasonal rising and falling rates of change of flow for determining ramping rate targets.

Season	Rising Rate	Falling Rate
	$m^3/s/day$	$m^3/s/day$
Jan - Mar	4.2	-3.0
Apr - Jun	8.3	-6.5
Jul - Sep	3.3	-2.8
Oct - Dec	4.0	-3.8



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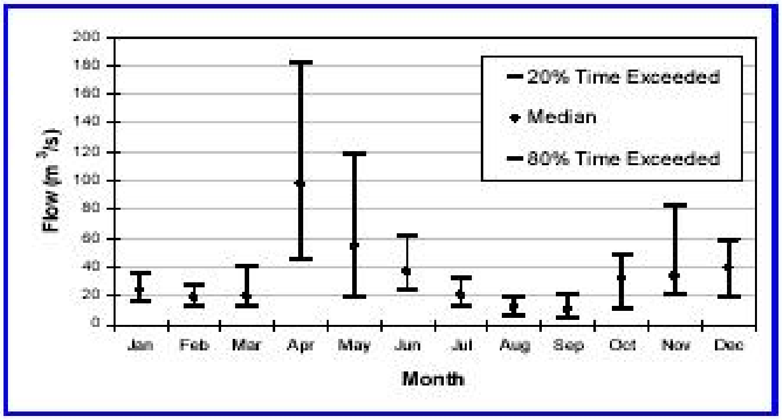
VERMILION RIVER AT WABAGESHIK REGULATED FLOW METRICS DATA SHEET

Monthly:

I. Flow Duration

Table 7 and Figure 7: Monthly median flow duration for determining minimum flow targets.

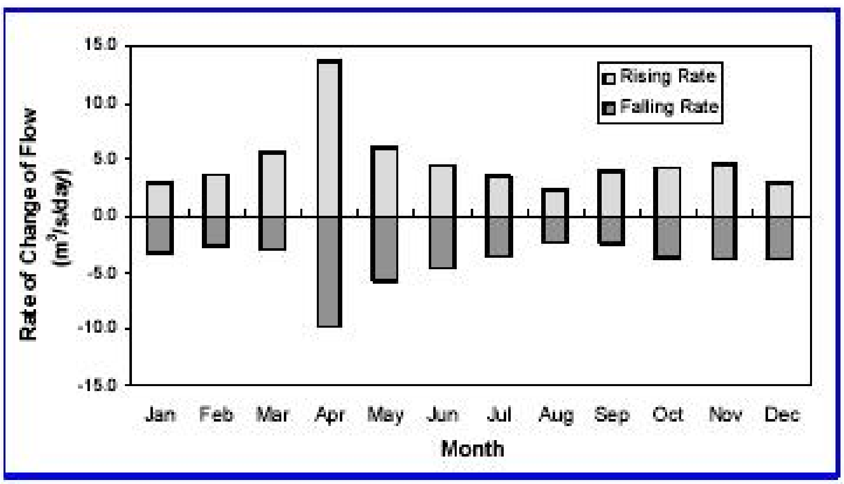
Month	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan	35.0	23.4	15.7
Feb	27.4	19.2	13.2
Mar	40.2	20.0	13.4
Apr	181.8	97.3	44.9
May	118.9	54.7	19.6
Jun	61.3	36.8	23.8
Jul	31.8	20.2	12.3
Aug	20.0	12.1	5.7
Sep	21.5	10.4	5.3
Oct	49.0	32.2	10.7
Nov	82.9	33.6	20.6
Dec	59.0	39.6	19.3



II. Rate of Change of Flow

Figure 8 and Table 8: Monthly rising and falling rates of change of flow for determining ramping rate targets.

Month	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan	3.0	-3.2
Feb	3.7	-2.6
Mar	5.7	-2.9
Apr	13.7	-9.7
May	6.1	-5.7
Jun	4.6	-4.6
Jul	3.5	-3.5
Aug	2.3	-2.3
Sep	4.0	-2.3
Oct	4.2	-3.6
Nov	4.6	-3.8
Dec	3.0	-3.8



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VERMILION RIVER AT WABAGESHIK (LORNE) FALLS NATURAL FLOW METRICS DATA SHEET

Station Information	
Site ID	2CF1
River Name	Vermilion River
Site Name	Wabageshik Falls
Region	Northeastern
District	Sudbury
Drainage Area	4339.99 km²
Owner	INCO
Plant Capacity	
Spill Capacity	

Flow metrics are provided for the waterpower facility based on simulated natural flows as described in the draft *Waterpower Science Transfer Report 1.0* (MNR 2003). The target metrics provided are described in the *Aquatic Ecosystem Guidelines* (MNR 2002) and the *Waterpower Science Strategy* (MNR 2002). Metrics are based on simulated natural daily flow from 1970 to 1999 (30 yrs). Other descriptive metrics have been included in the data sheet to provide a more complete description of the ranges of streamflow on the river system and to facilitate comparisons between river systems.

Annual (1970 - 1999):

I. Streamflow Time Series

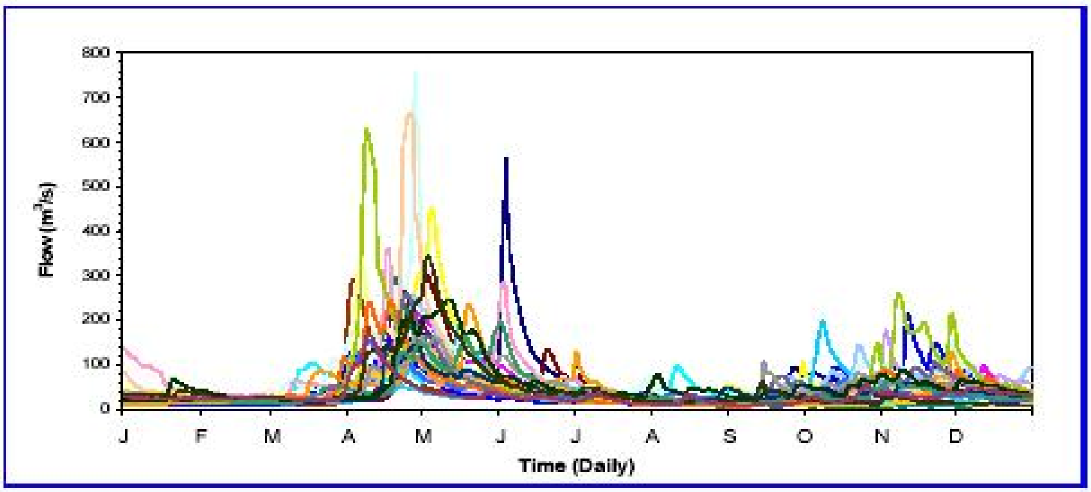

Figure 1: Annual daily flow hydrographs from 1970 to 1999.

Descriptive Metric	Value
Mean Annual Flow	44.4 m³/s
20% Time Exceeded Flow	59.4 m³/s
Median Flow	27.9 m³/s
80% Time Exceeded Flow	16.3 m³/s
Month of Max. Median Flow	April
Month of Min. Median Flow	August
Mean Rising Rate of Change of Flow	8.7 m³/s/day
Mean Falling Rate of Change of Flow	-3.9 m³/s/day
Extreme Low Flow Conditions:	
7-day-average low flow in 2-year return period, $7Q_2$	11.5 m³/s
7-day-average low flow in 10-year return period, $7Q_{10}$	7.3 m³/s
7-day-average low flow in 20-year return period, $7Q_{20}$	6.3 m³/s
Target Metrics	**Value**
Riparian Flows (Q_2 - Q_{20})	185 - 492 m³/s
Bankfull Flows ($Q_{1.5}$ - $Q_{1.7}$)	130 - 144 m³/s

Table 1: Annual flow metrics based on 30 years of data.

VERMILION RIVER AT WABAGESHIK (LORNE) FALLS NATURAL FLOW METRICS DATA SHEET

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II. Flow Duration

Time Exceeded %	Flow m^3/s
0.10	563.00
1.00	246.00
5.00	136.00
10.00	93.40
20.00	59.40
30.00	44.00
40.00	34.30
50.00	27.90
60.00	23.10
70.00	19.60
80.00	16.30
90.00	12.80
95.00	10.10
99.00	7.25
99.90	5.28

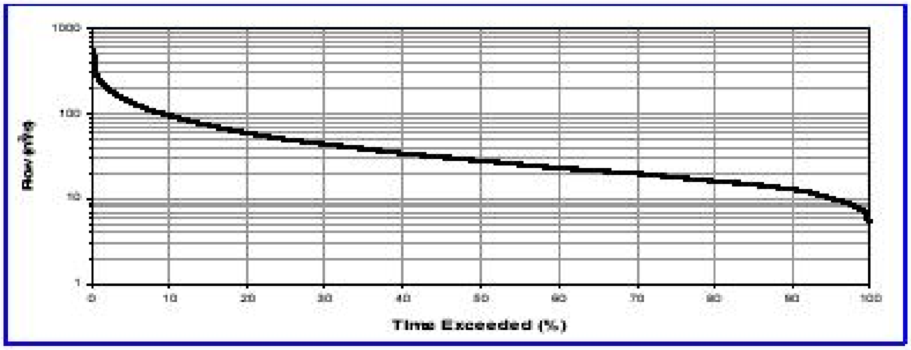

Table 2 & Figure 2: Flow duration table and curve displaying flow vs. percent time exceeded over 30 years.

III. Flood Frequency Analysis

Return Period yrs	Flow m^3/s
1.05	68.6
1.25	112
1.50	130
1.70	144
2	165
5	251
10	389
20	492
50	601
100	755

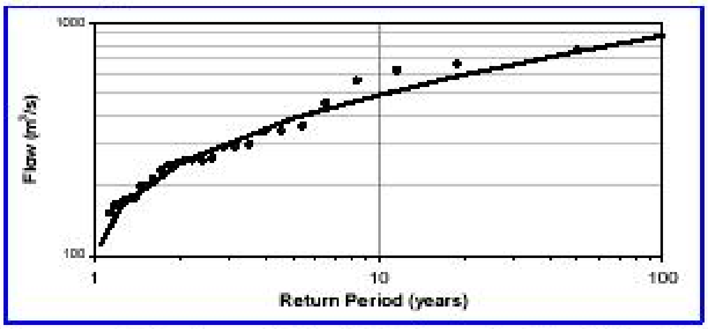

Table 3 and Figure 3 : Flood frequency analysis and curve fitted by the *Log Pearson Type III* probability distribution.

IV. Low Flow Frequency Analysis (Performed using 7-day-average low flow)

Return Period yrs	Flow m^3/s
1.005	21.2
1.01	20.3
1.11	16.3
1.25	14.7
2	11.5
5	8.6
10	7.3
20	6.3
50	5.3
100	4.8

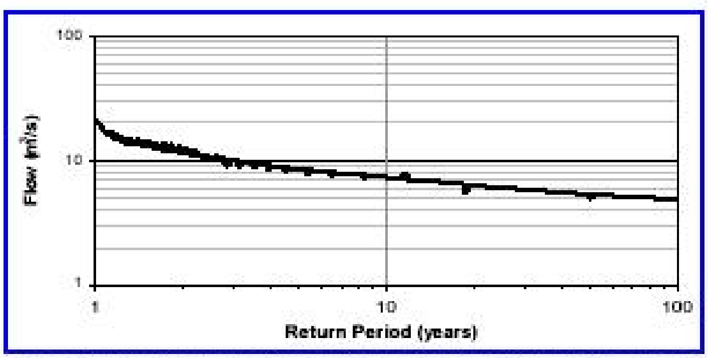

Table 4 and Figure 4: 7-day-average low flow frequency analysis and curve fitted by the *Gumbie III* probability distribution.

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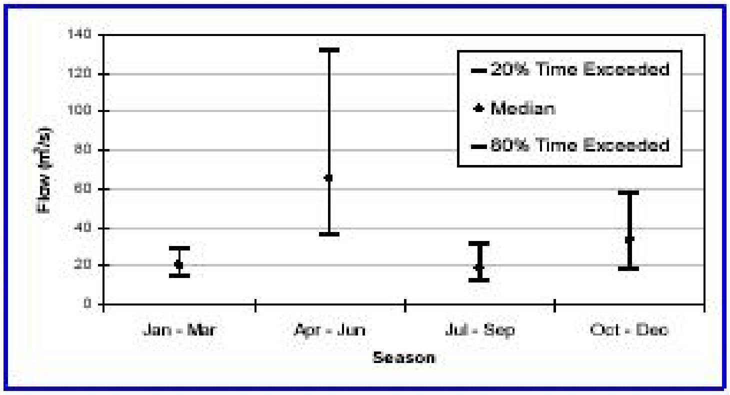
VERMILION RIVER AT WABAGESHIK (LORNE) FALLS NATURAL FLOW METRICS DATA SHEET

Seasonal:

I. Flow Duration

Table 5 and Figure 5: Seasonal median flow duration for determining minimum flow targets.

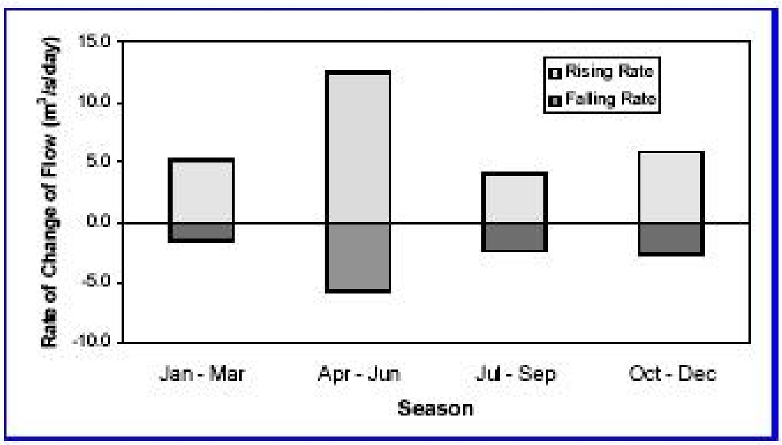
Season	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan - Mar	29.3	20.5	15.1
Apr - Jun	132.0	65.8	36.6
Jul - Sep	31.2	19.4	12.7
Oct - Dec	58.5	34.0	19.0



II. Rate of Change of Flow

Figure 6 and Table 6: Seasonal rising and falling rates of change of flow for determining ramping rate targets.

Season	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan - Mar	5.2	-1.4
Apr - Jun	12.5	-5.7
Jul - Sep	4.1	-2.4
Oct - Dec	5.9	-2.6



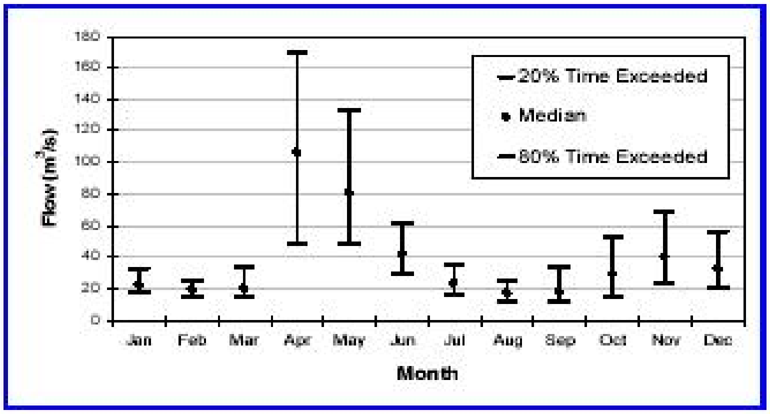
VERMILION RIVER AT WABAGESHIK (LORNE) FALLS NATURAL FLOW METRICS DATA SHEET

Monthly:

I. Flow Duration

Table 7 and Figure 7: Monthly median flow duration for determining minimum flow targets.

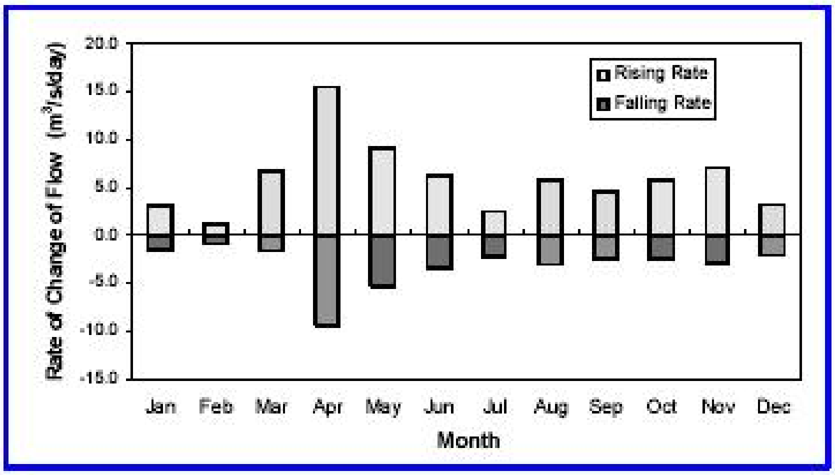
Month	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan	32.4	22.5	18.9
Feb	24.4	19.0	14.4
Mar	33.9	19.8	14.9
Apr	169.0	106.0	47.9
May	133.0	80.3	48.6
Jun	61.3	42.0	29.2
Jul	34.8	23.8	16.5
Aug	24.0	18.7	11.3
Sep	33.1	17.5	10.7
Oct	52.8	28.9	15.0
Nov	68.3	39.5	23.7
Dec	55.8	32.7	20.8



II. Rate of Change of Flow

Figure 8 and Table 8: Monthly rising and falling rates of change of flow for determining ramping rate targets.

Month	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan	3.0	-1.4
Feb	1.1	-0.9
Mar	6.7	-1.7
Apr	15.5	-9.4
May	9.2	-5.3
Jun	6.1	-3.4
Jul	2.4	-2.1
Aug	5.8	-3.1
Sep	4.5	-2.5
Oct	5.7	-2.5
Nov	7.1	-2.9
Dec	3.3	-2.0



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SPANISH RIVER AT BIG EDDY REGULATED FLOW METRICS DATA SHEET

Station Information	
Site ID	2CS43
River Name	SPANISH RIVER
Site Name	BIG EDDY
Region	NORTHEASTERN
District	Sudbury
Drainage Area	6847.47 (DEM) km²
Owner	INCO
Plant Capacity	27.58 MW
Spill Capacity	

Flow metrics are provided for the waterpower facility based on regulated flows measured by the facility owner. The target metrics provided are described in the *Aquatic Ecosystem Guidelines* (MNR 2002) and the *Waterpower Science Strategy* (MNR 2002). Metrics are based on regulated daily flow from 1996 to 2004 (9 yrs). Other descriptive metrics have been included in the data sheet to provide a more complete description of the ranges of streamflow on the river system and to facilitate comparisons between river systems.

Annual (1996 - 2004):

I. Streamflow Time Series

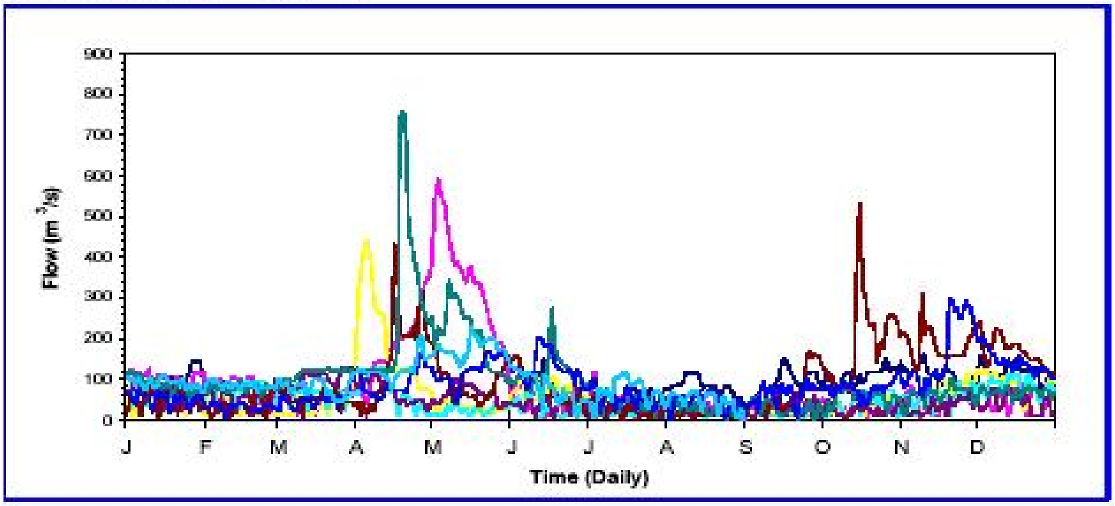

Figure 1: Annual daily flow hydrographs from 1996 to 2004.

Descriptive Metric	Value
Mean Annual Flow	83.38734 m³/s
20% Time Exceeded Flow	88.6 m³/s
Median Flow	63.3 m³/s
80% Time Exceeded Flow	22.4 m³/s
Month of Max. Median Flow	April
Month of Min. Median Flow	August
Mean Rising Rate of Change of Flow	13.6 m³/s/day
Mean Falling Rate of Change of Flow	-12.0 m³/s/day
Target Metrics	**Value**
Riparian Flows (Q_2 - Q_{20})	301 - 905 m³/s
Bankfull Flows ($Q_{1.1}$ - $Q_{1.5}$)	223 - 257 m³/s

Table 1: Annual flow metrics based on 9 years of data.

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SPANISH RIVER AT BIG EDDY REGULATED FLOW METRICS DATA SHEET

II. Flow Duration

Time Exceeded %	Flow m^3/s
0.10	725.10
1.00	356.40
5.00	197.00
10.00	133.80
20.00	109.20
30.00	86.64
40.00	75.03
50.00	63.25
60.00	50.23
70.00	35.56
80.00	22.42
90.00	13.50
95.00	10.25
99.00	0.00
99.90	0.00

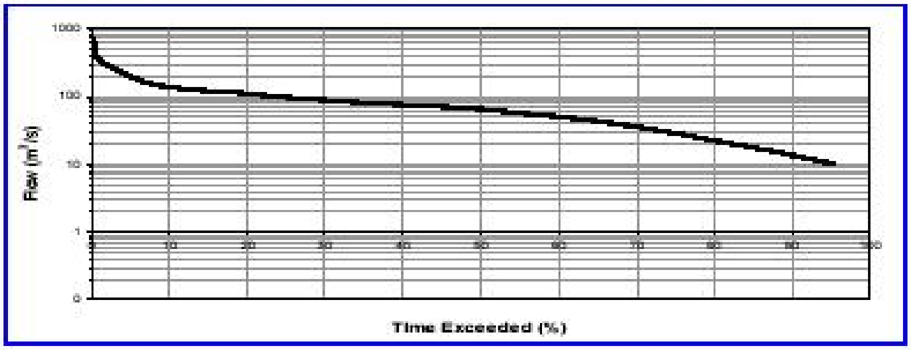

Table 2 & Figure 2: Flow duration table and curve displaying flow vs. percent time exceeded over 9 years.

III. Flood Frequency Analysis

Return Period yrs	Flow m^3/s
1.05	94.3
1.25	168
1.50	223
1.70	257
2	301
5	531
10	712
20	906
50	1180
100	1410

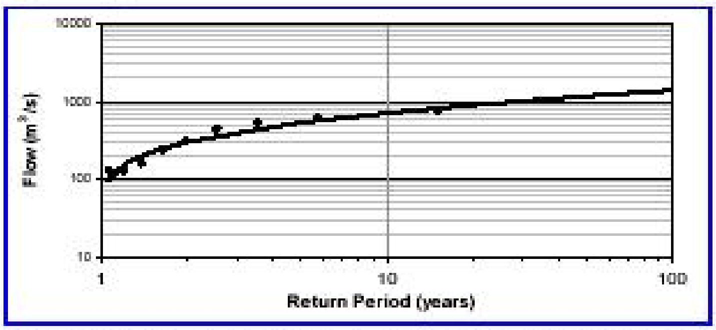

Table 3 and Figure 3 : Flood frequency analysis and curve fitted by the *Log Pearson Type III* probability distribution.

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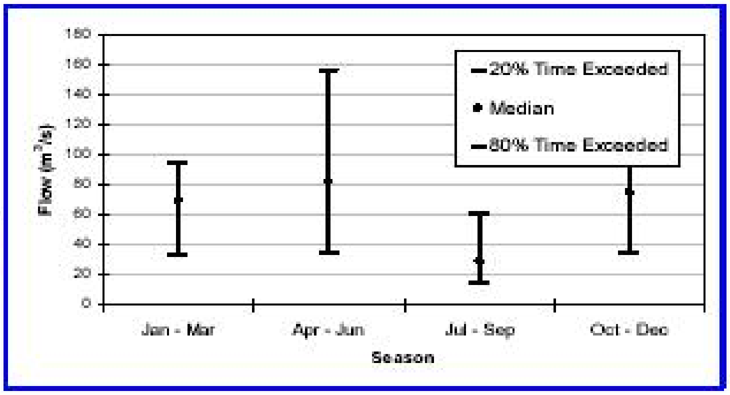
SPANISH RIVER AT BIG EDDY REGULATED FLOW METRICS DATA SHEET

Seasonal:

I. Flow Duration

Table 5 and Figure 5: Seasonal median flow duration for determining minimum flow targets.

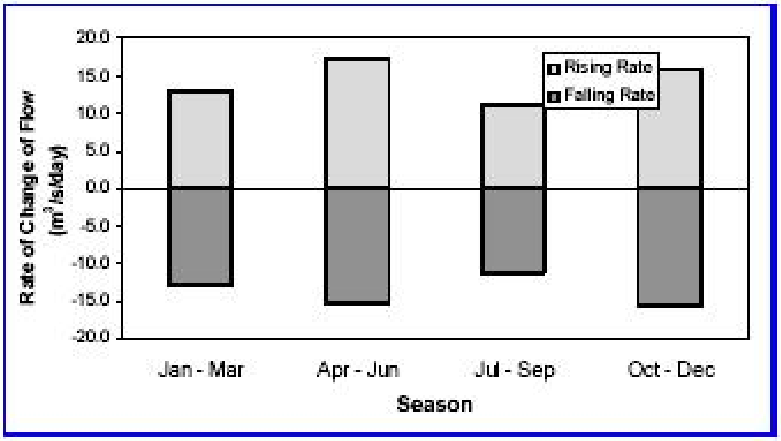
Season	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan - Mar	94.5	70.1	33.2
Apr - Jun	156.7	82.7	34.4
Jul - Sep	61.0	28.5	14.1
Oct - Dec	122.4	75.0	34.2



II. Rate of Change of Flow

Figure 6 and Table 6: Seasonal rising and falling rates of change of flow for determining ramping rate targets.

Season	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan - Mar	13.0	-12.8
Apr - Jun	17.2	-15.2
Jul - Sep	11.0	-11.2
Oct - Dec	15.8	-15.6



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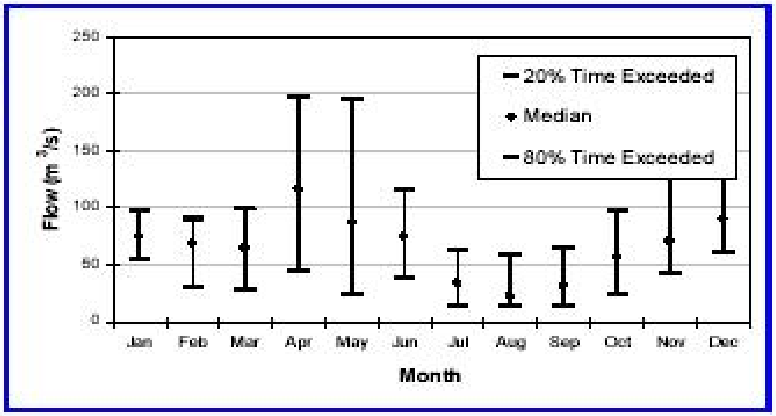
SPANISH RIVER AT BIG EDDY REGULATED FLOW METRICS DATA SHEET

Monthly:

I. Flow Duration

Table 7 and Figure 7: Monthly median flow duration for determining minimum flow targets.

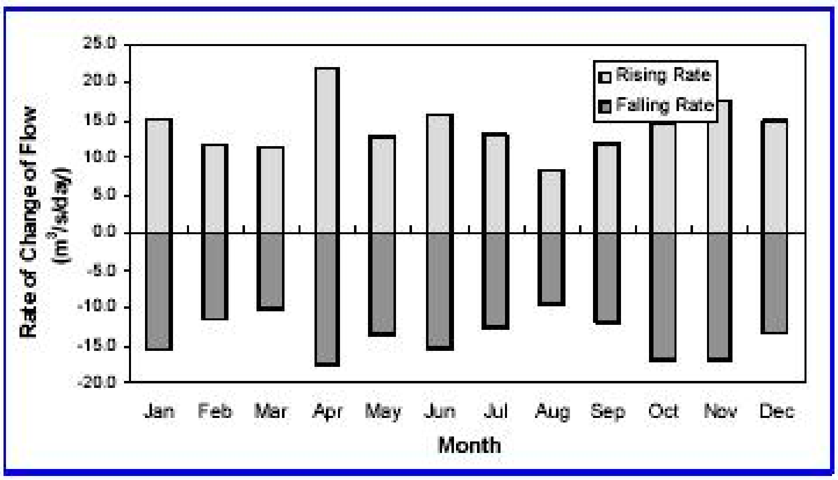
Month	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan	97.5	75.2	53.9
Feb	90.4	68.8	31.1
Mar	98.4	64.2	28.1
Apr	197.0	115.7	45.2
May	194.4	87.0	24.9
Jun	114.9	74.3	38.8
Jul	62.2	33.7	14.6
Aug	58.3	22.9	13.8
Sep	64.1	31.9	13.8
Oct	96.2	56.7	24.8
Nov	124.5	70.8	42.5
Dec	130.5	90.2	60.5



II. Rate of Change of Flow

Figure 8 and Table 8: Monthly rising and falling rates of change of flow for determining ramping rate targets.

Month	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan	15.1	-15.4
Feb	11.7	-11.5
Mar	11.4	-10.1
Apr	21.9	-17.6
May	12.9	-13.5
Jun	15.7	-15.2
Jul	13.1	-12.7
Aug	8.3	-9.4
Sep	12.0	-11.9
Oct	14.6	-16.9
Nov	17.6	-17.0
Dec	14.9	-13.4



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SPANISH RIVER AT BIG EDDY NATURAL FLOW METRICS DATA SHEET

Station Information	
Site ID	2CE43
River Name	Spanish River
Site Name	Big Eddy
Region	Northeastern
District	Sudbury
Drainage Area	6847 km^2
Owner	INCO

Flow metrics are provided for the waterpower facility based on simulated natural flows as described in the draft *Waterpower Science Transfer Report 1.0* (MNR 2003). The target metrics provided are described in the *Aquatic Ecosystem Guidelines* (MNR 2002) and the *Waterpower Science Strategy* (MNR 2002). Metrics are based on simulated natural daily flow from 1970 to 1999 (30 yrs). Other descriptive metrics have been included in the data sheet to provide a more complete description of the ranges of streamflow on the river system and to facilitate comparisons between river systems.

Annual (1970 - 1999):

I. Streamflow Time Series

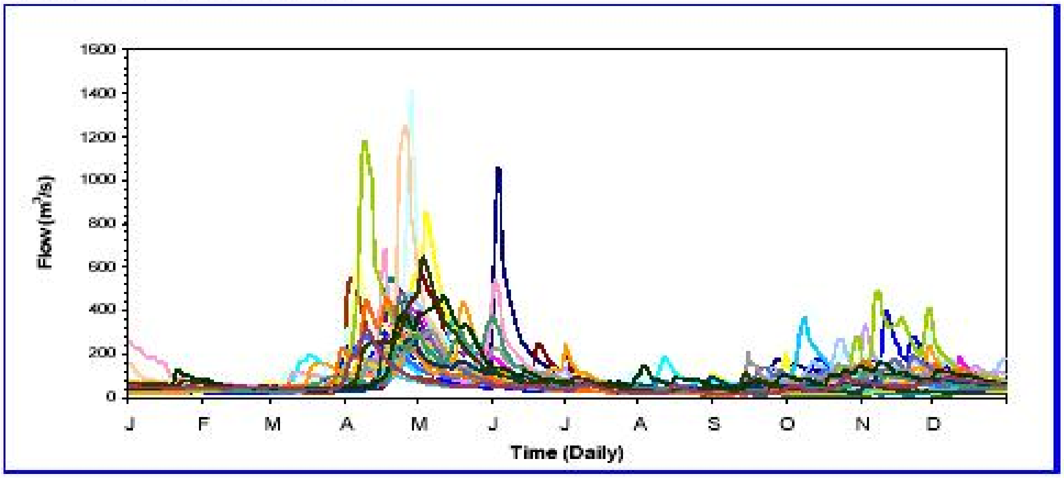

Figure 1: Annual daily flow hydrographs from 1970 to 1999.

Descriptive Metric	Value
Mean Annual Flow	83.4 m^3/s
20% Time Exceeded Flow	111.0 m^3/s
Median Flow	52.3 m^3/s
80% Time Exceeded Flow	30.7 m^3/s
Month of Max. Median Flow	April
Month of Min. Median Flow	August
Mean Rising Rate of Change of Flow	16.5 m^3/s/day
Mean Falling Rate of Change of Flow	-7.3 m^3/s/day
Extreme Low Flow Conditions:	
7-day-average low flow in 2-year return period, $7Q_2$	21.6 m^3/s
7-day-average low flow in 10-year return period, $7Q_{10}$	13.6 m^3/s
7-day-average low flow in 20-year return period, $7Q_{20}$	11.8 m^3/s
Target Metrics	**Value**
Riparian Flows (Q_2 - Q_{50})	472 - 1130 m^3/s
Bankfull Flows ($Q_{1.5}$ - $Q_{1.67}$)	385 - 408 m^3/s

Table 1: Annual flow metrics based on 30 years of data.

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SPANISH RIVER AT BIG EDDY NATURAL FLOW METRICS DATA SHEET

II. Flow Duration

Time Exceeded %	Flow m^3/s
0.10	1057.00
1.00	482.00
5.00	255.00
10.00	175.00
20.00	111.00
30.00	82.50
40.00	64.40
50.00	52.30
60.00	43.40
70.00	36.90
80.00	30.70
90.00	24.00
95.00	18.90
99.00	13.60
99.90	9.91

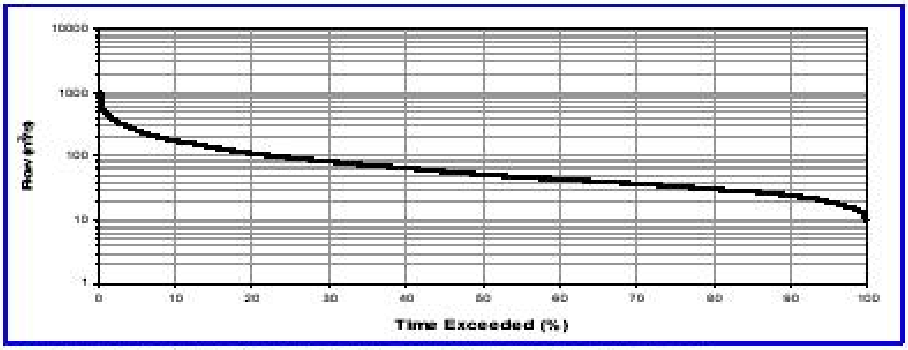


Table 2 & Figure 2: Flow duration table and curve displaying flow vs. percent time exceeded over 30 years.

III. Flood Frequency Analysis

Return Period yrs	Flow m^3/s
1.05	209
1.25	311
1.50	365
1.70	408
2	472
5	731
10	925
20	1130
50	1420
100	1650

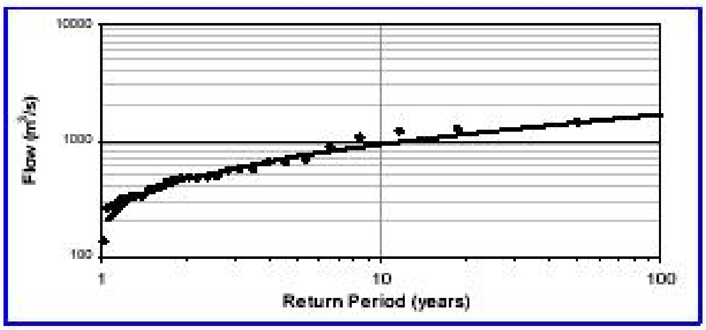


Table 3 and Figure 3 : Flood frequency analysis and curve fitted by the *Log Pearson Type III* probability distribution.

IV. Low Flow Frequency Analysis (Performed using 7-day-average low flow)

Return Period yrs	Flow m^3/s
1.005	39.8
1.01	38.1
1.11	30.7
1.25	27.5
2	21.6
5	16.2
10	13.6
20	11.8
50	10.0
100	9.1

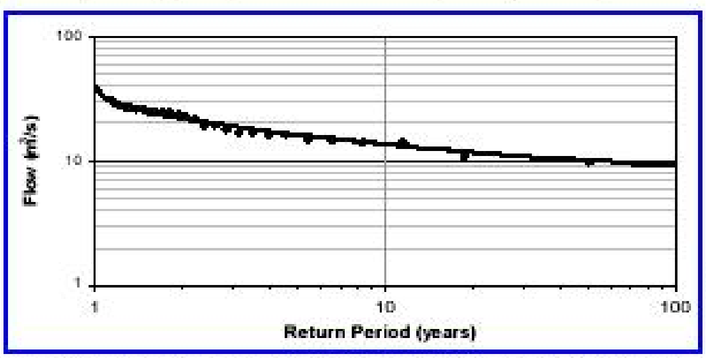


Table 4 and Figure 4: 7-day-average low flow frequency analysis and curve fitted by the *Gumble III* probability distribution.

DRAFT

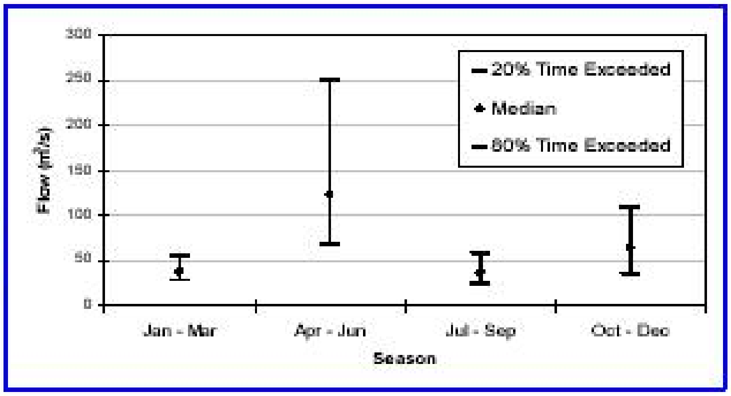
SPANISH RIVER AT BIG EDDY NATURAL FLOW METRICS DATA SHEET

Seasonal:

I. Flow Duration

Table 5 and Figure 5: Seasonal median flow duration for determining minimum flow targets.

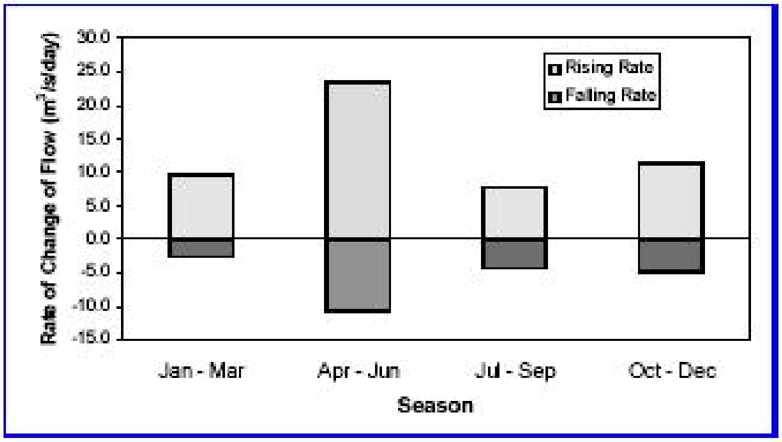
Season	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan - Mar	55.0	38.5	28.3
Apr - Jun	248.0	123.0	68.6
Jul - Sep	58.6	36.4	23.8
Oct - Dec	109.0	63.8	35.6



II. Rate of Change of Flow

Figure 6 and Table 6: Seasonal rising and falling rates of change of flow for determining ramping rate targets.

Season	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan - Mar	9.7	-2.6
Apr - Jun	23.5	-10.7
Jul - Sep	7.7	-4.4
Oct - Dec	11.3	-5.0



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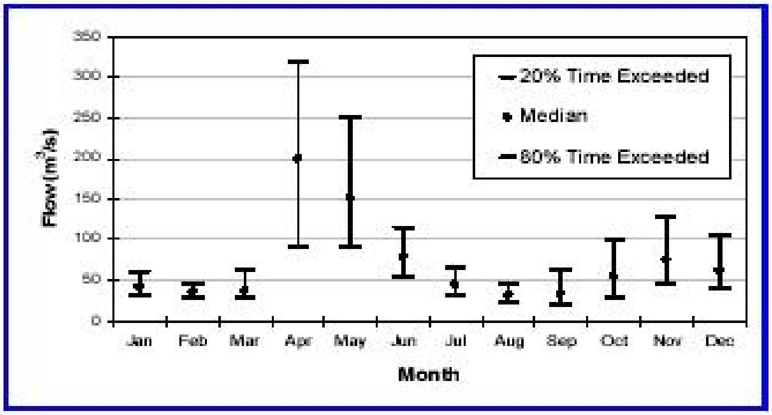
SPANISH RIVER AT BIG EDDY NATURAL FLOW METRICS DATA SHEET

Monthly:

I. Flow Duration

Table 7 and Figure 7: Monthly median flow duration for determining minimum flow targets.

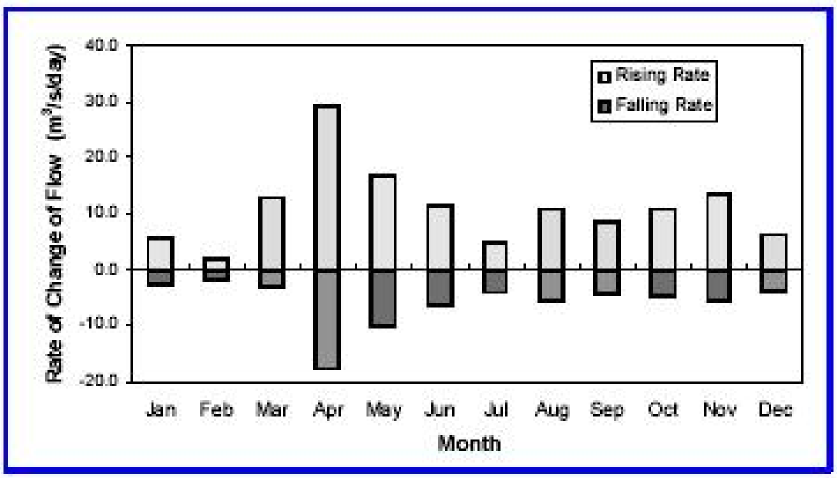
Month	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan	60.9	42.3	31.7
Feb	45.7	35.6	27.1
Mar	63.6	37.3	27.9
Apr	318.0	200.0	89.9
May	251.0	150.0	91.2
Jun	115.0	78.8	54.8
Jul	65.3	44.8	31.0
Aug	45.1	31.4	21.3
Sep	62.1	32.8	20.2
Oct	99.1	54.2	28.1
Nov	128.0	74.2	44.4
Dec	104.0	61.3	39.1



II. Rate of Change of Flow

Figure 8 and Table 8: Monthly rising and falling rates of change of flow for determining ramping rate targets.

Month	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan	5.6	-2.6
Feb	1.9	-1.8
Mar	12.6	-3.2
Apr	29.3	-17.6
May	16.7	-10.1
Jun	11.5	-6.3
Jul	4.7	-4.0
Aug	10.9	-5.7
Sep	8.5	-4.5
Oct	10.9	-4.7
Nov	13.6	-5.5
Dec	6.2	-3.8



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SPANISH RIVER AT ESPANOLA NATURAL FLOW METRICS DATA SHEET

Station Information	
Site ID	2CE46
River Name	Spanish River
Site Name	Espanola
Region	Northeastern
District	Sudbury
Drainage Area	11610 km^2
Owner	Domtar

Flow metrics are provided for the waterpower facility based on simulated natural flows as described in the draft *Waterpower Science Transfer Report 1.0* (MNR 2003). The target metrics provided are described in the *Aquatic Ecosystem Guidelines* (MNR 2002) and the *Waterpower Science Strategy* (MNR 2002). Metrics are based on simulated natural daily flow from 1970 to 1999 (30 yrs). Other descriptive metrics have been included in the data sheet to provide a more complete description of the ranges of streamflow on the river system and to facilitate comparisons between river systems.

Annual (1970 - 1999):

I. Streamflow Time Series

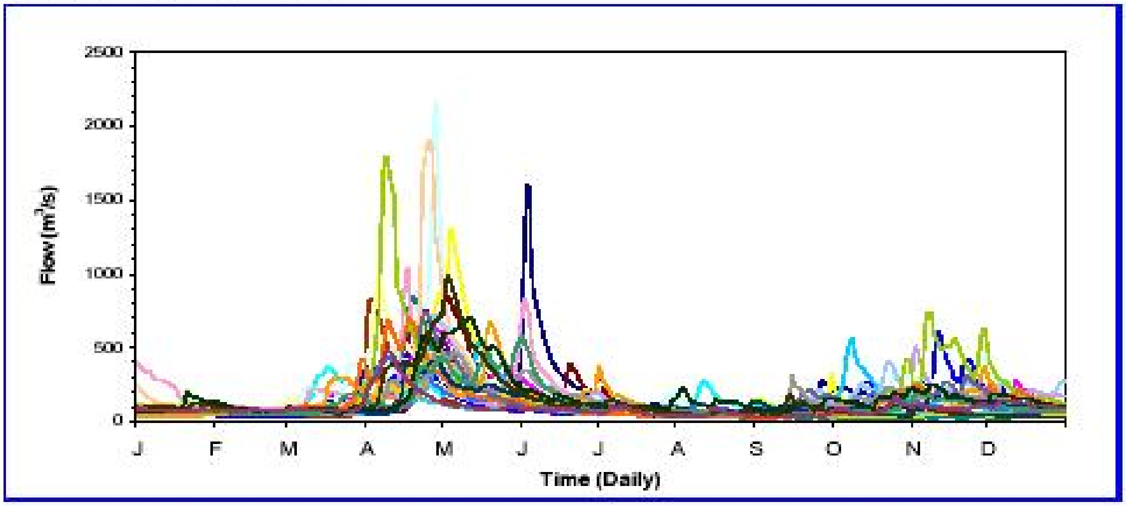

Figure 1: Annual daily flow hydrographs from 1970 to 1999.

Descriptive Metric	Value
Mean Annual Flow	128.3 m^3/s
20% Time Exceeded Flow	172.0 m^3/s
Median Flow	81.3 m^3/s
80% Time Exceeded Flow	47.8 m^3/s
Month of Max. Median Flow	April
Month of Min. Median Flow	August
Mean Rising Rate of Change of Flow	25.3 m^3/s/day
Mean Falling Rate of Change of Flow	-11.3 m^3/s/day
Extreme Low Flow Conditions:	
7-day-average low flow in 2-year return period, $7Q_2$	33.4 m^3/s
7-day-average low flow in 10-year return period, $7Q_{10}$	20.8 m^3/s
7-day-average low flow in 20-year return period, $7Q_{20}$	17.9 m^3/s
Target Metrics	**Value**
Riparian Flows (Q_2 - Q_{20})	719 - 1720 m^3/s
Bankfull Flows ($Q_{1.5}$ - $Q_{1.7}$)	555 - 621 m^3/s

Table 1: Annual flow metrics based on 30 years of data.

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SPANISH RIVER AT ESPANOLA NATURAL FLOW METRICS DATA SHEET

II. Flow Duration

Time Exceeded %	Flow m^3/s
0.10	1610.00
1.00	704.00
5.00	390.00
10.00	269.00
20.00	172.00
30.00	126.00
40.00	99.00
50.00	81.30
60.00	67.90
70.00	58.00
80.00	47.80
90.00	36.90
95.00	28.90
99.00	20.70
99.90	15.10

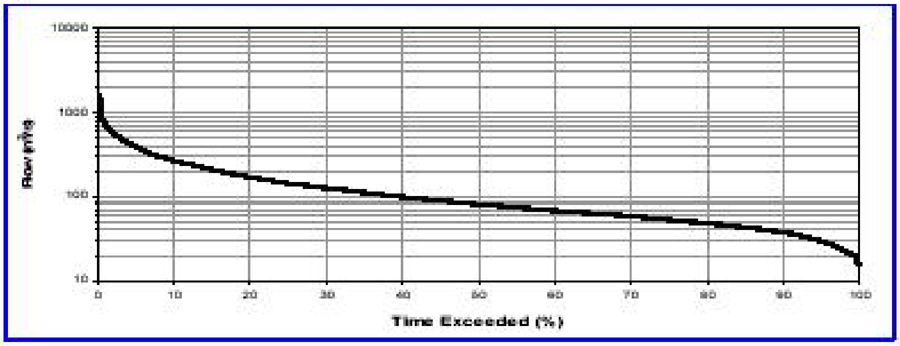

Table 2 & Figure 2: Flow duration table and curve displaying flow vs. percent time exceeded over 30 years.

III. Flood Frequency Analysis

Return Period yrs	Flow m^3/s
1.05	319
1.25	473
1.50	556
1.70	621
2	719
5	1110
10	1410
20	1720
50	2160
100	2520

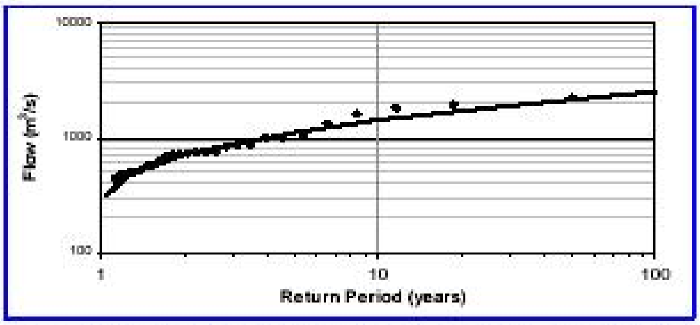

Table 3 and Figure 3 : Flood frequency analysis and curve fitted by the *Log Pearson Type III* probability distribution.

IV. Low Flow Frequency Analysis (Performed using 7-day-average low flow)

Return Period yrs	Flow m^3/s
1.005	61.7
1.01	59.0
1.11	47.5
1.25	42.6
2	33.4
5	24.8
10	20.8
20	17.9
50	15.2
100	13.7

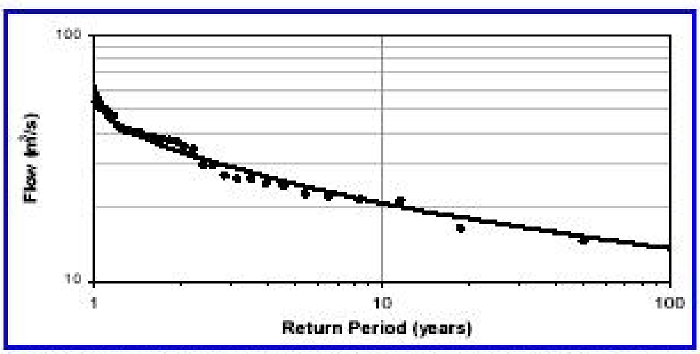

Table 4 and Figure 4: 7-day-average low flow frequency analysis and curve fitted by the *Gumbie III* probability distribution.

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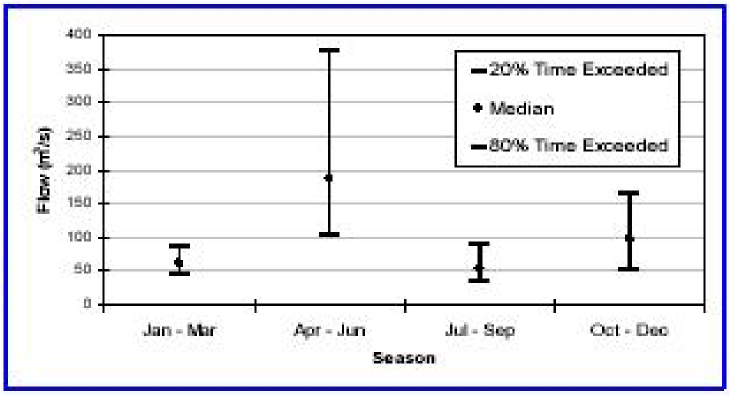
SPANISH RIVER AT ESPANOLA NATURAL FLOW METRICS DATA SHEET

Seasonal:

I. Flow Duration

Table 5 and Figure 5: Seasonal median flow duration for determining minimum flow targets.

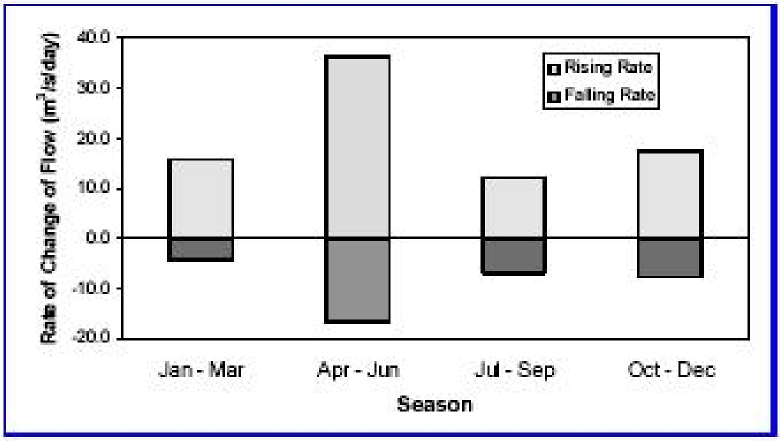
Season	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan - Mar	88.3	62.2	46.5
Apr - Jun	377.0	188.0	104.0
Jul - Sep	89.3	55.4	36.2
Oct - Dec	167.0	97.2	54.2



II. Rate of Change of Flow

Figure 6 and Table 6: Seasonal rising and falling rates of change of flow for determining ramping rate targets.

Season	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan - Mar	15.9	-4.1
Apr - Jun	36.3	-16.5
Jul - Sep	12.1	-6.9
Oct - Dec	17.5	-7.7



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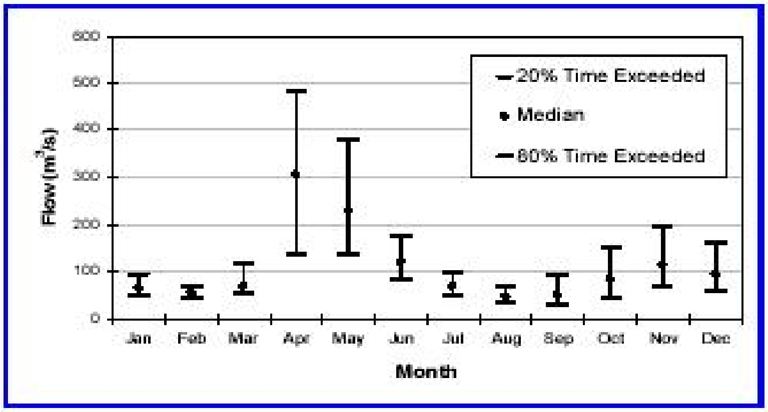
SPANISH RIVER AT ESPANOLA NATURAL FLOW METRICS DATA SHEET

Monthly:

I. Flow Duration

Table 7 and Figure 7: Monthly median flow duration for determining minimum flow targets.

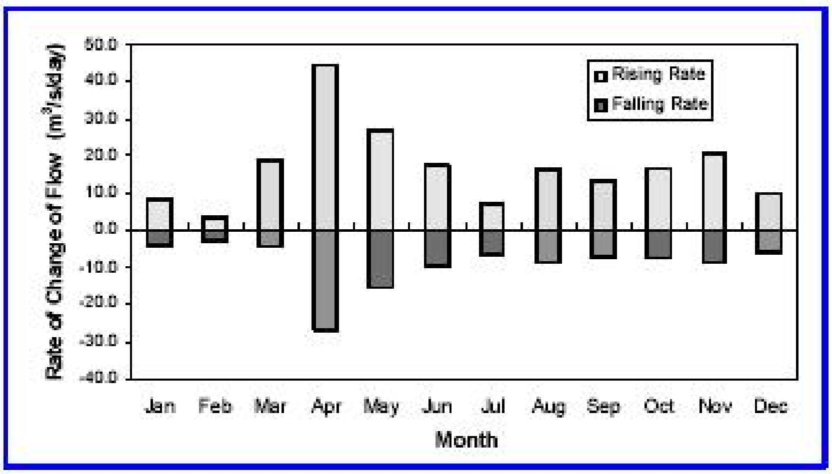
Month	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan	92.7	64.5	48.3
Feb	69.8	54.3	41.3
Mar	117.0	68.9	51.6
Apr	485.0	304.0	138.0
May	382.0	229.0	138.0
Jun	175.0	120.0	83.5
Jul	99.4	68.2	47.2
Aug	68.7	47.8	32.4
Sep	94.5	49.9	30.7
Oct	150.0	82.5	42.7
Nov	195.0	113.0	67.6
Dec	159.0	93.4	59.5



II. Rate of Change of Flow

Figure 8 and Table 8: Monthly rising and falling rates of change of flow for determining ramping rate targets.

Month	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan	8.3	-4.2
Feb	3.5	-2.8
Mar	18.9	-4.5
Apr	44.7	-26.7
May	27.0	-15.4
Jun	17.8	-9.8
Jul	7.3	-6.2
Aug	16.5	-8.8
Sep	13.4	-7.2
Oct	16.8	-7.3
Nov	20.9	-8.5
Dec	9.9	-6.0



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SPANISH RIVER AT ESPANOLA REGULATED FLOW METRICS DATA SHEET

Station Information	
Site ID	2CE46R
River Name	SPANISH RIVER
Site Name	ESPANOLA
Region	NORTHEASTERN
District	Sudbury
Drainage Area	11610 km²
Owner	Domtar
Plant Capacity	
Spill Capacity	

Flow metrics are provided for the waterpower facility based on regulated flows measured by the facility owner. The target metrics provided are described in the *Aquatic Ecosystem Guidelines* (MNR 2002) and the *Waterpower Science Strategy* (MNR 2002). Metrics are based on regulated daily flow from 1972 to 2002 (31 yrs). Other descriptive metrics have been included in the data sheet to provide a more complete description of the ranges of streamflow on the river system and to facilitate comparisons between river systems.

Annual (1972 - 2002):

I. Streamflow Time Series

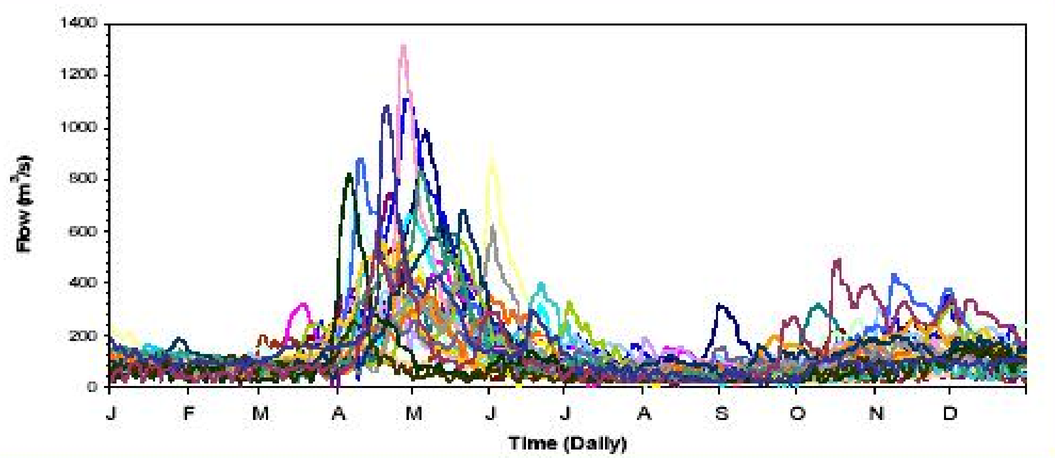

Figure 1: Annual daily flow hydrographs from 1972 to 2002.

Descriptive Metric	Value
Mean Annual Flow	125.12 m^3/s
20% Time Exceeded Flow	161.9 m^3/s
Median Flow	91.6 m^3/s
80% Time Exceeded Flow	53.2 m^3/s
Month of Max. Median Flow	April
Month of Min. Median Flow	August
Mean Rising Rate of Change of Flow	15.6 $m^3/s/day$
Mean Falling Rate of Change of Flow	-13.7 $m^3/s/day$
Extreme Low Flow Conditions:	
7-day-average low flow in 2-year return period, $7Q_2$	32.7 m^3/s
7-day-average low flow in 10-year return period, $7Q_{10}$	20.3 m^3/s
7-day-average low flow in 20-year return period, $7Q_{20}$	18.2 m^3/s
Target Metrics	**Value**
Riparian Flows (Q[illegible] - Q[illegible])	586 - 1110 m^3/s
Bankfull Flows (Q[illegible] - Q[illegible])	449 - 504 m^3/s

Table 1: Annual flow metrics based on 31 years of data.

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SPANISH RIVER AT ESPANOLA REGULATED FLOW METRICS DATA SHEET

II. Flow Duration

Time Exceeded %	Flow m^3/s
0.10	1065.00
1.00	621.10
5.00	353.00
10.00	252.60
20.00	161.90
30.00	124.00
40.00	103.80
50.00	91.60
60.00	79.90
70.00	68.50
80.00	53.20
90.00	37.90
95.00	27.70
99.00	18.00
99.90	14.70

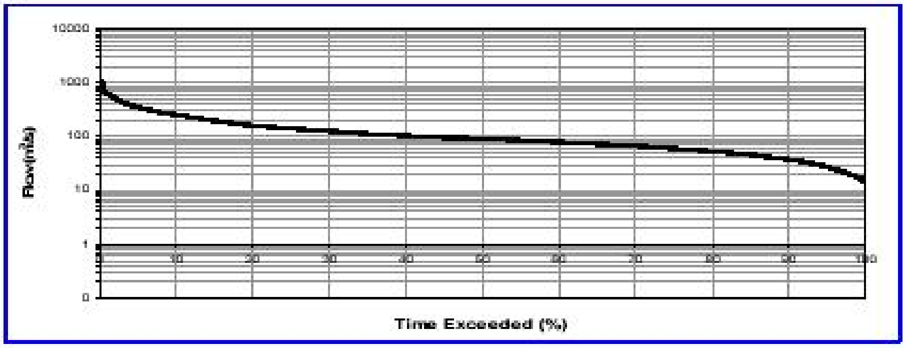

Table 2 & Figure 2: Flow duration table and curve displaying flow vs. percent time exceeded over 31 years.

III. Flood Frequency Analysis

Return Period *yrs*	Flow m^3/s
1.05	230
1.25	380
1.50	449
1.70	504
2	586
5	838
10	984
20	1110
50	1250
100	1350

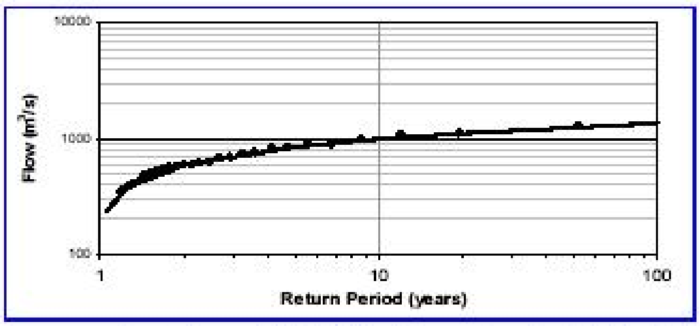

Table 3 and Figure 3 : Flood frequency analysis and curve fitted by the *Log Pearson Type III* probability distribution.

IV. Low Flow Frequency Analysis (Performed using 7-day-average low flow)

Return Period *yrs*	Flow m^3/s
1.005	75.5
1.01	70.7
1.11	51.8
1.25	44.5
2	32.7
5	23.7
10	20.3
20	18.2
50	16.5
100	15.7

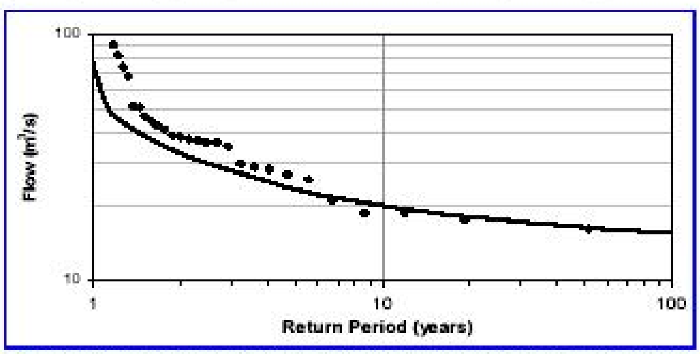

Table 4 and Figure 4: 7-day-average low flow frequency analysis and curve fitted by the *Gumble III* probability distribution.

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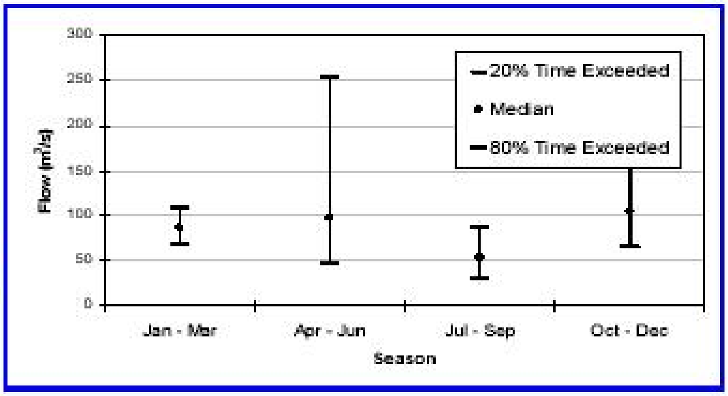
SPANISH RIVER AT ESPANOLA
REGULATED FLOW METRICS DATA SHEET

Seasonal:

I. Flow Duration

Table 5 and Figure 5: Seasonal median flow duration for determining minimum flow targets.

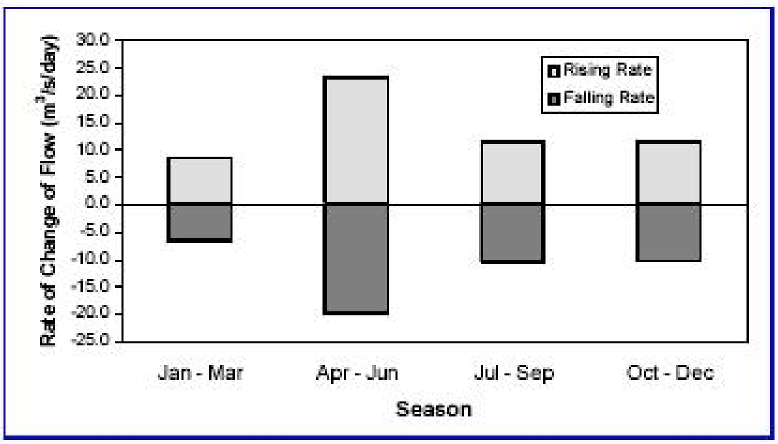
Season	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan - Mar	108.9	86.5	67.1
Apr - Jun	255.3	98.1	47.3
Jul - Sep	87.5	54.2	31.2
Oct - Dec	162.7	105.4	65.0



II. Rate of Change of Flow

Figure 6 and Table 6: Seasonal rising and falling rates of change of flow for determining ramping rate targets.

Season	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan - Mar	8.5	-6.5
Apr - Jun	23.3	-20.0
Jul - Sep	11.7	-10.5
Oct - Dec	11.4	-10.2



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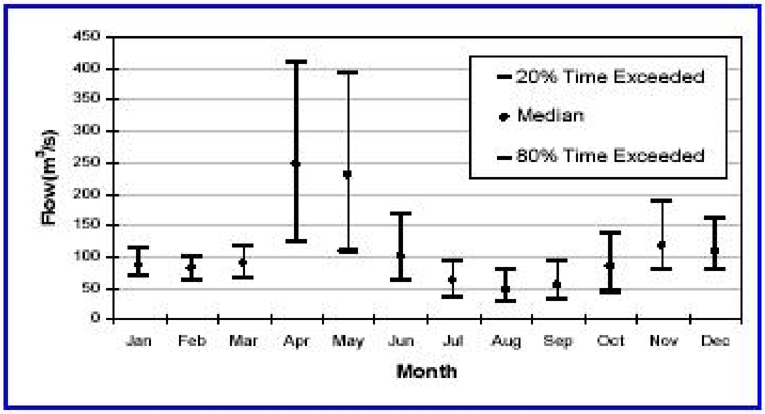
SPANISH RIVER AT ESPANOLA REGULATED FLOW METRICS DATA SHEET

Monthly:

I. Flow Duration

Table 7 and Figure 7: Monthly median flow duration for determining minimum flow targets.

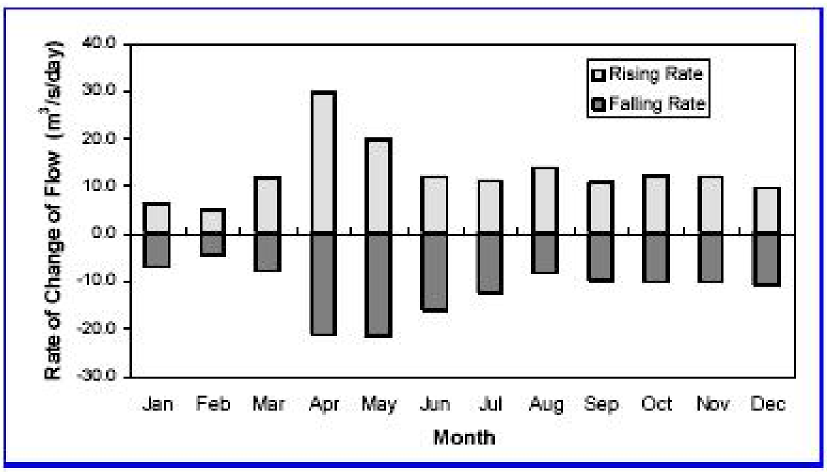
Month	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan	113.0	87.5	70.7
Feb	100.3	82.8	65.3
Mar	118.5	89.6	65.8
Apr	408.7	246.8	124.0
May	392.9	231.0	109.7
Jun	169.0	101.3	63.2
Jul	92.7	62.3	37.7
Aug	79.6	48.0	28.2
Sep	93.3	54.9	31.4
Oct	138.8	85.7	44.2
Nov	189.8	118.0	78.5
Dec	162.5	108.1	81.7



II. Rate of Change of Flow

Figure 8 and Table 8: Monthly rising and falling rates of change of flow for determining ramping rate targets.

Month	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan	6.5	-6.8
Feb	4.9	-4.3
Mar	11.8	-7.6
Apr	29.7	-21.1
May	19.9	-21.3
Jun	12.1	-15.8
Jul	11.0	-12.4
Aug	13.9	-8.2
Sep	10.8	-9.7
Oct	12.4	-10.0
Nov	12.2	-9.9
Dec	9.7	-10.6



Public Consultation Document

The issues/concerns listed in this document follow Table 6.3.1 and detail how each concern submitted with completed questionnaires was considered and subsequently, where applicable, incorporated into the WMP process.

All public comments received through questionnaires and open houses (see Appendix C for Records of Public Consultation) pertained either to water bodies whose level/flow is regulated by Vale or Domtar facilities. No comments were received for water bodies whose level/flow is directly or substantially influenced by MNRF, Conservation Sudbury or CGS.

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Discussion of Specific Comments by Water body

No comments were received during public consultation for Frechette Lake or Canoe (Bardney) Lake which are located at the top of the Spanish River (main branch) watershed and whose levels are controlled by Vale dams.

1.0 Ramsey Lake (Chapleau District)

1.1. Shoreline Property and Property Infrastructure Damage (high water levels)

Comment/Concern: High water levels and ice damages docks.

Background: Damages to docks were reported to result from:

- High water levels and wave action resulting from storms in the spring, summer and fall.
- Ice accumulating on docks when water levels are high, and then collapse the docks when the water is lowered.

Normal target levels in the 1993 WMP have full supply level 1343.02 feet (406.3m) ASL maintained from end of May to end of July. The draw down begins in August and is discontinued by late January at a target elevation of 1334.52 feet (406.76 m). The lake is currently managed 1 foot (0.3 m) lower than normal due to structural constraints.

Is This Concern Within the Scope of the Water Management Plan?: Yes

Strategies to Address Issue:

1. Data Gap: There is a data gap is in regards to specific elevations that cause issues and to what degree issues are related to water management practices and/or events that are beyond Vale's control. This information can be collected from compliance monitoring and stakeholder feedback in effectiveness monitoring.
2. Options Development: The application of high water compliance limits in this new WMP discourages high water levels unless there are flood conditions. The new WMP will require that proponents report when levels reach the compliance limits and it is expected that these high waters should only occur during abnormal conditions which may be beyond proponents' control. Since the lake is currently being managed 1 foot lower than normal until identified structural limitations are addressed, the current operating regime was proposed as the preferred option for the time being. No further feedback was received during later public consultations which presented the status quo option along with proposed new compliance limits.
3. Effectiveness Monitoring: Data, identified as a gap above, will continue to be collected and reviewed annually through compliance monitoring and the stakeholder feedback mechanism of effectiveness monitoring.

1.2. Erosion (high water levels)

Comments or Concerns: High water levels are eroding the shoreline.

Background: Normal target levels in the 1993 WMP have full supply level 1343.02 feet (406.3m) ASL maintained from end of May to end of July. The draw down begins in August and is discontinued by late January at a target elevation of 1334.52 feet (406.76 m). However, the lake is currently managed 1 foot (0.3 m) lower due to structural constraints.

Is This Concern Within the Scope of the Water Management Plan?: Yes

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: The application of high level compliance limits in this new WMP will require that proponents report high water levels to MNRF. It is expected that these high waters will only occur during abnormal conditions which may be beyond proponents' control.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

Comments and Recommendations for Plan:

1. Lake level should be maintained at 13.5 ft above the sill (1340.52 m).
2. Weekly dam sets and elevations should be posted at the Biscotasing General Store.
3. Would like to see regular meetings with Vale, MNRF and stakeholders.

Response:

1. There is no rationale provided for the first suggestion, so it is difficult to evaluate. Ongoing recording and review of stakeholder feedback in effectiveness monitoring should assist in clarifying the issues around this type of comment.
2. Information on water levels is available from Vale's Biscotasi Shop.
3. Meetings of the Standing Advisory Committee (SAC) will occur regularly to discuss water management concerns including stakeholder feedback.

2.0 Mozhabong Lake

2.1. Aquatic Ecosystem – Fisheries (winter drawdown)

Comment/Concern: The start of the winter draw down in the fall drives fish populations into deeper water.

Background: As per the 1993 WMP, the lake is at full supply level until the end of July. Winter draw down begins in August. The lake is lowered until a target elevation of 1346.25 feet (410.34 m) or September 30th, whichever comes first. This timing was determined in conjunction with MNRF and is specific to protecting the lake trout population by stabilizing water levels prior to the spawn. During the fall turnover, water temperatures begin to invert and the warmer water temperatures are found at the bottom of water bodies. Fish begin to move to deeper parts of the lake when water temperatures drop in the fall.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Chapleau MNRF has identified that the lake has diverse populations of fish species and that more information could be gained, through data gap study, on potential impacts of water manipulations.
2. Options Development: None proposed at this time. The timing of the drawdown at Mozhabong Lake is specific to assisting lake trout. Consideration of any further options development on this lake should take into account the findings of data gap studies above.
3. Effectiveness Monitoring: None specific to this issue proposed at this time.

2.2. Recreation – Navigation (high water levels)

Comment/Concern: High water levels wash trees and debris into the lake during the spring and summer.

Background: The 1993 WMP contains a high water operating target level of 1352.75 feet (412.32 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: The application of compliance limits in this new WMP will require that proponents report high water levels to MNRF. It is expected that these high waters will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

2.3. Recreation - Navigation

Comment/Concern: A low water level in the fall makes navigation difficult.

Background: The 1993 WMP takes into account the need to stabilize water levels in the fall during lake trout spawning. Depending on conditions and beginning in August, the lake can lowered from 3 to 6.5 feet until a target elevation of 1346.25 feet (410.34 m) or September 30th, whichever comes first, is reached. Given the potential extent of the drawdown, impacts to recreational boating and navigation are possible.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Knowledge about the locations, depths and dates of lake trout spawning would assist in assessing options for timing, duration and extent of drawdown that would continue to also support waterpower activities.
2. Options Development: The planning team proposed an option to the public to reduce the extent of the winter drawdown by 1 foot. There was a single questionnaire received in regards to this option when this was presented at public meeting and it was in favour of the option. The planning team felt that since there was only one respondent, further feedback would be required to determine the extent of the impact to lake visitors and the potential means by which recreational needs could be balanced against fisheries habitat and waterpower requirements. The data gap exercise and additional stakeholder feedback would provide more information in this respect.
3. Effectiveness monitoring: Additional stakeholder feedback specific to this issue was identified as requiring follow up for potential options development.

2.4. Recreation - Snowmobiling

Comment/Concern: Winter drawdown creates unsafe snowmobiling conditions.

Background: As per the 1993 WMP, Mozhabong Lake is lowered and maintained at a winter elevation of 1346.25 feet (410.34 m) from late September to April. The timing of drawdown completion is necessary to accommodate lake trout spawning.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: No data gap was identified for this issue.
2. Options Development: No options were developed for this issue. Winter draw down is completed by September 30th, before the lake freezes. For safety reasons, snowmobilers are advised to consult their local snowmobile club for established routes and to stick to marked trails.
3. Effectiveness Monitoring: Feedback received from stakeholders in regards to this concern will be logged and reviewed as a part of effectiveness monitoring.

2.5. Aquatic Ecosystems - Wildlife Habitat (shorelines)

Comment/Concern: Fluctuation in water levels is harmful to wildlife habitat and shoreline vegetation.

Background: As per the 1993 WMP, Mozhabong Lake is maintained at summer elevations between 1349.25 feet (411.25 m) and 1352.75 feet (412.32 m) from late May to late July. The elevation depends on flow conditions for that year. The winter draw down begins in August and continues until the lake is lowered to an elevation of 1346.25 feet (410.34 m) or September 30th, whichever comes first. The level is maintained until spring melt (est. April).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Annual fluctuations of 1 m (3 feet) can be normal for unregulated lakes (Krezek *et al*. 2004). However, on this lake, the draw down can be up to 2m and the timing may differ from that of natural fluctuations. A data gap study to identify and evaluate shoreline area vegetation and habitat such wetlands, waterfowl areas, and moose aquatic feeding areas has been included in the data gap section of this WMP as a follow up action to the concern stated above.
2. Options Development: No options were developed for this issue at this time.
3. Effectiveness Monitoring: No effectiveness monitoring specific to this issue is proposed at this time.

3.0 Indian Lake

3.1. Aquatic Ecosystem – Fisheries (walleye and northern pike spawning)

Comment/Concern: Fluctuations in water levels on Indian Lake affect walleye and northern pike spawning.

Background: As described in the 1993 WMP, lake levels on Indian Lake are maintained at target elevations between 1340.26 feet (408.51 m) and 1343.26 feet (409.43 m) from May to October, depending on flow conditions. A winter draw down elevation of 1338.26 feet (407.90 m) may be maintained from the end of November until April. Onset of the draw down depends on flow conditions during the year. In normal flow years, the draw down begins in August, while in low and high flow years the draw down begins in October.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategy to Address Issue:

1. Data Gap: Northern pike and walleye, which spawn in spring, are able to tolerate moderate increases in water levels but are negatively affected when spawning habitat becomes dewatered. In general, Indian Lake level is increasing during spawning season and achieves full supply by late May It remains at the summer level until at least late July. A study was proposed to determine spawning areas and depths for these species.
2. Options Development: No options were developed for this issue at this time.
3. Effectiveness Monitoring: None specific to this issue is proposed at this time.

3.2. Aquatic Ecosystem – Fisheries (lake trout)

Comment/Concern: The start of the winter draw down in the fall harms the lake trout population.

Background: No lake trout have been reported on file for Indian Lake. However, lake whitefish are present and are fall spawners. As outlined in the 1993 WMP, in normal years the winter draw down begins in July at a target elevation of 1343.26 feet and finishes in November at an elevation of 1338.26 feet (407.90 m). In high flow years, the draw down begins in October and finishes in December. In low flow years, the draw down begins in October at a target elevation of 1340.26 feet (408.51 m) and finishes by late November.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: It is possible that a later fall drawdown could impact spawning lake whitefish. A data gap has been identified, in relation to whitefish spawning locations and depths, in order to provide information for potential options development in future.
2. Options Development: None at this time for this specific issue.
3. Effectiveness Monitoring: None specific to the issue is proposed at this time.

3.3. Recreation – Navigation (debris)

Comment/Concern: High water levels washes trees and debris into the lake.

Background: In the spring, water levels are increased from the draw down target elevation of 1338.26 feet (407.90 m) in April to a summer maximum target elevation of 1343.26 feet (409.43 m) during high flow years.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Depending upon the year, the increase in water level in Indian Lake can vary from 2 to 5 feet. The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.

2. Options Development: The application of compliance limits in this new WMP will require that proponents report high water levels to MNRF. It is expected that these high waters will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time for this specific issue.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

3.4. Shoreline Property and Infrastructure Property Damage (high water)

Comment/Concern: High water levels damages docks

Background: High water levels and wave action resulting from storms in the spring, summer and fall are reported to damage docks on this lake. From the 1993 WMP, during high flow years, the target summer elevation of 1343.26 feet (409.43 m) is planned to be maintained until the end of October and drawdown completed by end of December. In normal years, the target summer elevation from May to end of July is the same, but drawdown begins at end of July and is targeted for completion by the end of November.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None identified for this issue.
2. Options Development: An option to decrease the maximum water level by one foot was presented to the public for feedback. No feedback was received from public consultation sessions, so the normal operating targets of the 1993 WMP were recommended for adoption in the new WMP. Going forward, the collection of water level data and more detailed stakeholder feedback on the occurrence of high water levels and dock damage in compliance and effectiveness monitoring will assist in determining if options development should be revisited.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of dock damage.

3.5. Erosion (high water)

Comments or Concerns: High water levels are eroding the shoreline.

Background: During high flow years, the lake is maintained at a summer elevation of 1343.26 feet (409.43 m) until October.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Annual fluctuations of 1 m (3 feet) can be normal for unregulated lakes (Krezek *et al*. 2004). Depending upon the year, the increase in water level in Indian Lake can vary from 2 to 5 feet. The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.

2. Options Development: The application of compliance limits in this new WMP will require that proponents report high water levels to MNRF. It is expected that these high waters will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time for this specific issue.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

Comments and Recommendations for Plan

1. Weekly dam sets and elevations should be posted at the Biscotasing General Store

Response: Water level information can be obtained from Vale's Bisco shop (located near the Biscotasing General Store).

4.0 Biscotasi Lake

4.1. Aquatic Ecosystems – Fisheries (northern pike spawning)

Comments or Concerns: Water levels are too low in the spring for northern pike spawning.

Background: According to the 1993 Spanish River Water Management Plan, the lake level is increased from a target elevation of 1316.08 feet (401.14 m) in April to a target summer elevation between 1320.08 feet (402.36 m) and 1324.08 feet (403.58 m) by late May. The summer elevation depends on flow conditions in the spring. The Spanish River Valley Signature Site Strategy has identified potential spawning areas for pike in wetland areas along the central peninsula and in Flying Post Bay.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Northern pike, which spawn in spring, are able to tolerate moderate increases in water levels but are negatively affected when spawning habitat becomes dewatered. In general, Biscotasi Lake level is increasing during spawning season and achieves full supply by late May It remains at the summer level until at least late July. In years when northern pike spawn in April, accessibility of potential habitat may be reduced. A study was proposed to determine spawning areas, depths and dates of northern pike spawning.
2. Options Development: No options were developed for this issue at this time.
3. Effectiveness Monitoring: None specific to this issue is proposed at this time.

4.2. Aquatic Ecosystems – Fisheries (fish spawning)

Comment/Concern: Fluctuations in water levels on Biscotasi Lake affect fish spawning.

Background: According to the 1993 Spanish River Water Management Plan, Biscotasi Lake is maintained at target summer elevations between 1320.08 feet (402.36 m) and 1324.08 feet (403.58 m), depending on flow conditions, from late May to late October. The lake is then drawn down to a target elevation of 1316.08 feet (401.14 m) by February and maintained at this level until April.

Spring spawners such as walleye and northern pike are able to tolerate moderate increases in water levels but are negatively affected when spawning habitat becomes dewatered. In general, Biscotasi Lake achieves full supply by late May and remains at the summer level until at late October. In normal and high flow years, the lake level may decrease in late July. By this time, most spring spawners including white sucker and bass will have finished spawning. There are no lake trout in Biscotasi Lake, however, lake whitefish are present. Lake whitefish generally begin to spawn in November. The potential 6.5 foot (2 m) drop in water levels between November and February may negatively impact whitefish productivity.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Northern pike and walleye, which spawn in spring, are able to tolerate moderate increases in water levels but are negatively affected when spawning habitat becomes dewatered. In general, Biscotasi Lake level is increasing during spawning season and achieves full supply by late May It remains at the summer level until at least late July. In years when northern pike spawn in April, accessibility of potential habitat may be reduced. Lake whitefish, a fall spawner, may potentially be impacted by a coincidental drawdown. A study was proposed to determine spawning areas, timing and depths for these species.
2. Options Development: No options were developed for this issue at this time.
3. Effectiveness Monitoring: None specific to this issue is proposed at this time.

4.3. Recreation – Navigation (high water)

Comment/Concern: High water levels wash trees and debris into the lake.

Background: According to the 1993 Spanish River Water Management Plan, during high flow years, Biscotasi Lake is maintained at elevation of 1324.08 feet (403.58 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Depending upon the year, the increase in water level in Biscotasi Lake can vary by 3.5 to 7.5 feet. The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: The application of compliance limits in this new WMP will require that proponents report high water levels to MNRF. It is expected that these high waters will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time for this specific issue.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

4.4. Shoreline Property and Property Infrastructure Damage (high water)

Comment/Concern: High water levels and ice damages docks.

Background: Damages to docks were reported to result from:

- High water levels and wave action resulting from storms in the spring, summer and fall.

- Ice accumulating on docks when water levels are high, then collapse docks when lowered.

According to the 1993 Spanish River Water Management Plan, during high flow years target summer elevations on Biscotasi Lake may be kept an elevation as high as 1324.08 feet (403.58 m), and then lowered to an elevation of 1322.58 (403.12 m) by late October. The winter draw down continues in November and the lake is lowered further to a target elevation of 1316.08 feet (401.14 m) by February.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None identified for this issue.
2. Options Development: An option to decrease the water level by one foot was presented to the public for feedback. One respondent was in favour of this option. Going forward, the collection of water level data and more detailed stakeholder feedback on the occurrence of high water levels and dock damage in compliance and effectiveness monitoring will assist in determining if options development should be revisited.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of dock damage.

4.5. Recreation - Boat Launching (low water)

Comment/Concern: Water levels too low in the spring, summer and fall to launch boats.

Background: According to the 1993 Spanish River Water Management Plan, Biscotasi Lake is maintained at target summer elevations between 1320.08 feet (402.36 m) and 1324.08 feet (403.58 m), depending on flow conditions, from late May to August when the lake can be lowered another 0.5 feet (0.15 m) to 1.5 feet (0.46 m). In the fall, the lake is then drawn down to a target elevation of 1316.08 feet (401.14 m) by February and maintained at this level until April when the spring freshet raises water levels to summer elevations. During low flow years, lake levels may be maintained at elevations as low as 1320.08 feet (402.36 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None identified for this issue.
2. Options Development: An option to increase the water level by one foot was presented to the public for feedback. One respondent was not in favour of this option. The planning team did not think it appropriate to recommend the option for implementation based on a single response. Going forward, the collection of water level data and more detailed stakeholder feedback on the occurrence of low water levels and boat launching in compliance and effectiveness monitoring will assist in determining if options development should be revisited.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of issues with boat launching.

4.6. Recreation – Navigation (low water)

Comment/Concern: Low water levels in the spring, summer and fall makes navigation difficult.

Background: According to the 1993 Spanish River Water Management Plan, Biscotasi Lake is maintained at target summer elevations between 1320.08 feet (402.36 m) and 1324.08 feet (403.58 m), depending on flow conditions, from late May to August when the lake can be lowered another 0.5 feet (0.15 m) to 1.5 feet (0.46 m). In the fall, the lake is then drawn down to a target elevation of 1316.08 feet (401.14 m) by February and maintained at this level until April when the spring freshet raises water levels to summer elevations.

Lake levels are dependant upon the amount of spring freshet and precipitation available. During low flow years, lake levels may be maintained at elevations as low as 1320.08 feet (402.36 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: A bathymetric survey was discussed as a potential data gap, but was deferred in favour of the need for more feedback from stakeholders on specific instances where navigation is a concern.
2. Options Development: An option to increase the water level by one foot was presented to the public for feedback. One respondent was in favour of this option. The planning team did not think it appropriate to recommend the option for implementation based on a single response. Going forward, the collection of water level data and more detailed stakeholder feedback on the occurrence of high water levels and dock damage in compliance and effectiveness monitoring will assist in determining if options development should be revisited.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of navigational problems.

4.7. Recreation – Navigation (high water)

Comments or Concerns: At times, water levels are too high to navigate safely.

Background: According to the 1993 Spanish River Water Management Plan, during high flow years lake levels may be maintained at target elevations as high as 1324.08 feet (403.58 m). Summer lake levels are dependant upon the amount of spring freshet and precipitation available. The Biscotasi Lake dams are manually operated. Response times to heavy rain events or quick thaws are limited due to their remote locations.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None were identified for this issue.
2. Options Development: An option to decrease the water level by one foot was presented to the public for feedback. One respondent was not in favour of this option. The planning team did not think it appropriate to recommend the option for implementation based on a single response. Going forward, the collection of water level data and more detailed stakeholder feedback on the occurrence of high water levels and dock damage in compliance and effectiveness monitoring will assist in determining if options development should be revisited. Further, the application of high water compliance limits and reporting to MNRF of occurrences of high water levels is a feature of the new WMP. It is expected that occurrences of high water will only be in conjunction with events where WMP proponents have limited control.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed

annually in an effort to provide more information on specific occurrences of navigational problems in high water conditions.

4.8. Recreation – Snowmobiling (winter drawdown)

Comment/Concern: Winter drawdown creates unsafe snowmobiling conditions.

Background: According to the 1993 Spanish River Water Management Plan, Biscotasi Lake is lowered from a target elevation of 1322.58 feet (403.12 m) in November to a target elevation of 1316.08 feet (401.14 m) by February. The draw down does continue after the ice has formed on the lake.

Is This Concern Within the Scope of the Water Management Plan?: Yes. Snowmobilers are responsible for their own safety and should assess ice conditions before traveling across any water body.

Strategies to Address Issue:

1. Data Gap: No data gap was identified for this issue.
2. Options Development: No options were developed for this issue. The ability of a waterbody to facilitate snowmobiling activities depends on many factors that must be assessed at the time of travel. For safety reasons, snowmobilers are advised to consult their local snowmobile club for established routes and to stick to marked trails.
3. Effectiveness Monitoring: Feedback received from stakeholders in regards to this concern will be logged and reviewed as a part of effectiveness monitoring.

4.9. Erosion (high water)

Comments or Concerns: High water levels are eroding the shoreline.

Background: According to the 1993 Spanish River Water Management Plan, during high flow years, summer elevations on Biscotasi Lake may be kept at an elevation of 1324.08 feet (403.58 m), and then lowered to an elevation of 1322.58 (403.12 m) by late October. The winter draw down begins in November and is lowered to an elevation of 1316.08 feet (401.14 m) by February.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Depending upon the year, the increase in water level in Biscotasi Lake can vary by 3.5 to 7.5 feet. The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: The application of compliance limits in this new WMP will require that proponents report high water levels to MNRF. It is expected that these high waters will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time for this specific issue.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

4.10. Aquatic Ecosystem – Wildlife Habitat (beavers)

Comment/Concern: Winter drawdown lowers water in the winter and spring, dewatering beaver lodges and freezing the beavers out.

Background: According to the 1993 Spanish River Water Management Plan, Biscotasi Lake begins its draw down in November, from an elevation of 1322.58 feet (403.12 m) and ending at an elevation of 1316.08 feet (401.14 m) in February. The draw down does continue after ice has formed on the lake.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Need to confirm with local trapper that this is an issue on Biscotasi Lake specifically. If confirmed, then monitoring of beaver activity throughout a winter should be undertaken.
2. Option Development: None proposed at this time.
3. Effectiveness Monitoring: None proposed at this time.

4.11. Aquatic Ecosystem – Wildlife Habitat (moose feeding)

Comment/Concern: Fluctuations in water levels negatively affects moose aquatic feeding locations.

Background: The Spanish River Valley Signature Site Strategy has identified significant moose aquatic feeding areas on Biscotasi Lake, along east side of the central peninsula. In general, summer water levels on Biscotasi Lake should remain stable at an elevation between 1320.08 feet (402.36 m) to 1324.08 feet (403.58 m). However, during normal flow and high flow years, lake levels sometimes decrease in July and August, and may coincide with peak moose aquatic feeding times.

Is This Concern Within the Scope of the Water Management Plan?: Yes. Water management operating regimes may select for certain tolerant plant species. Some species of aquatic vegetation preferred by moose could be negatively impacted.

Strategies to Address Issue:

1. Data Gap: Monitor moose aquatic feeding areas on Biscotasi Lake for quality and use and potential impacts of water management practices.
2. Option Development: None proposed at this time.
3. Effectiveness Monitoring: None proposed at this time.

4.12. Aquatic Ecosystems – Wildlife Habitat (birds)

Comment/Concern: Biscotasi Lake contains large and diverse wetlands that are home to a wide variety of bird species.

Background: Bird species such as American bittern, red-winged blackbirds, Virginia rail, swamp sparrow, snipe, mallards, black duck and other waterfowl use the Biscotasi Lake wetlands as staging and breeding areas have been identified in the Spanish River Valley Signature Site Strategy. Bald eagles are known to nest on the central peninsula and Floating Cattail Marsh.

According to the 1993 Spanish River Water Management Plan, Biscotasi Lake is drawn down to a target elevation of 1316.08 feet (401.14 m) by February and maintained at this level until April when the spring freshet raises water levels to summer elevations between 1320.08 feet (402.36 m) to 1324.08 feet (403.58 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Monitoring of bird breeding habitat on Biscotasi Lake to determine if there are any impacts from water management practices.
2. Option Development: None proposed at this time.
3. Effectiveness Monitoring: None proposed at this time.

4.13. Aquatic Ecosystems – Wildlife Habitat (low water and wetlands)

Comment/Concern: Low water levels kill shoreline vegetation and wetlands.

Background: Several wetlands on Biscotasi Lake include those located in Scarp Creek Bay, Flying Post Bay, the Floating Cattail Marsh and along the east shore of the central peninsula have been identified in the Spanish River Valley Signature Site Strategy. These wetlands represent a diverse array of wetland types in this region, including provincially significant open and treed fen, submersed, emergent and floating–leafed aquatic marshes and cattail marshes.

According to the 1993 Spanish River Water Management Plan, Biscotasi Lake is drawn down to a target elevation of 1316.08 feet (401.14 m) by February and maintained at this level until April when the spring freshet raises water levels to summer elevations between 1320.08 feet (402.36 m) to 1324.08 feet (403.58 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Monitoring of shoreline vegetation and wetlands to determine if there are any impacts from water management practices.
2. Option Development: None proposed at this time.
3. Effectiveness Monitoring: None proposed at this time.

4.14. Aquatic Ecosystems – Wildlife Habitat (high water and water quality)

Comment/Concern: High water levels in the spring degrade water quality.

Background: According to the 1993 Spanish River Water Management Plan, summer water levels are maintained at an elevation of 1324.08 feet (403.58 m) during high flow years.

Is This Concern Within the Scope of the Water Management Plan?: No. There are no reports suggesting impaired water quality on Biscotasi Lake. If water quality is suspected of being degraded, then the Ministry of Environment should be contacted.

4.15. Shoreline Property and Infrastructure – Water Supply (low water)

Comment/Concern: Low water levels in the winter result in frozen water lines.

Background: According to the 1993 Spanish River Water Management Plan, beginning in November Biscotasi Lake is lowered from an elevation of 1322.58 feet (403.12 m) to an elevation of 1316.08 feet (401.14 m) by February.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Additional information such as foot valve elevation and the type of water line (i.e. heated vs. non-heated) will be required to make an assessment. This type of information should be collected as a part of stakeholder feedback in effectiveness monitoring.
2. Option Development: None proposed at this time. The comment was expressed by one stakeholder only.
3. Effectiveness Monitoring: The monitoring and reporting of water levels in conjunction with notification of instances of stakeholder water supply problems due to low water will enable more comprehensive evaluation of this issue.

4.16. Recreation – Navigation (low water paddling)

Comment/Concern: Minimum flows for paddling on Spanish River below Biscotasi Lake.

Background: The Spanish River Valley Signature Site Strategy identifies the Spanish River below Biscotasi Lake as a destination for recreational paddling.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Information on minimum flow from the lake and its ability to support positive recreational experiences is required to assess this issue.
2. Option Development: None considered at this time.
3. Effectiveness Monitoring: None considered at this time.

4.17. Aquatic Ecosystems (minimum flows)

Comment/Concern: Minimum flows for ecosystem health.

Background: The Spanish River Signature Site Strategy identifies significant water features on the Spanish River below Biscotasi Lake and the mandate of the Ontario Parks system is to preserve such sites.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Information on minimum flow and its ability to support ecosystem health is required to assess this issue.
2. Option Development: None considered at this time.
3. Effectiveness Monitoring: None considered at this time.

4.18. Aquatic Ecosystems – Wildlife Habitat (Blanding's turtle)

Comment/Concern: Blanding's Turtle, an endangered species in the province, have been reported in the area.

Background: Water manipulations may impact this endangered species (see section 3.3.6 of the main report).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Information on the presence and breeding success of a Blandling's Turtle population on Biscotasi Lake is required in order to evaluate the potential impacts of specific water management practices.

2. Option Development: None at this time.
3. Effectiveness Monitoring: None at this time.

4.19. Recreation (short term flow fluctuations)

Comment/Concern: Short-term changes in river flows on the Spanish River can result in lost equipment of outfitter located downstream of Biscotasi Lake.

Background: Log movements on the Biscotasi Dams can result in a rapid increase in downstream flows on the Spanish River. Equipment such as canoes and outfitter goods can be washed away.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Option Development: Attempts are being made to improve communications with the originator of this concern in regards to notification of flow adjustments at the Biscotasi dams.
3. Effectiveness Monitoring: None at this time.

Comments and Recommendations for Plan

1. Weekly dam sets and elevations should be posted at the Biscotasing General Store

   Response: Water level information will be posted at the Vale shop (located near the Biscotasing General Store).

5.0 Ministic Lake

5.1. Shoreline Property and Infrastructure Property Damage

Comment/Concern: Fluctuating water levels damages docks.

Background: Ice accumulates on docks when water levels are high. The weight of the ice may collapse the docks when the water is lowered. Rising lake levels in the spring with significant ice cover can damage docks as well.

As per the Spanish River Water Management Plan (1993), winter draw down starts on Ministic Lake in early October from a target elevation between 1206.0 feet (367.59 m) and 1209.0 feet (368.50 m), and is lowered to a target elevation of 1205.0 feet (367.28 m) by the end of October. The winter draw down elevation is maintained until April. The lake is brought up to summer levels by the end of May, depending on the timing of spring freshet.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Option Development: The winter drawdown is completed by freeze-up, so no option was considered in that respect. The general rising of waters and timing of spring freshet, along with the amount of ice cover on the lake when freshet occurs are not within Vale's control. However, it was speculated that increased monitoring of lake level might enable Vale to consider adjustments to log settings where the situation exists that Vale might have some influence over this issue. No feedback was received from the public when presented with this option, but it was nevertheless retained as a recommendation of the planning team for the new WMP.

3. Effectiveness Monitoring: The recording of stakeholder feedback on specific occurrences of dock damage will assist in evaluating the ability of Vale to influence this issue along with the effectiveness of increased level monitoring.

5.2. Recreation - Navigation

Comment/Concern: A decrease from existing summer levels would impede navigation.

Background: A decrease in the summer levels would restrict access for approximately 40 cottagers in the north part of the lake (Otter Lake). It was recommended that no options for lower lake levels be considered.

As per the Spanish River Water Management Plan (1993), summer levels on Ministic Lake range from target elevations of 1206.0 feet (367.59 m) and 1209.0 feet (368.50 m), depending on flows for the year.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Background: This concern was that summer lake levels might be changed and the consideration of options was discouraged.

Strategies to Address Issue:

1. Data Gap: None.
2. Option Development: The concern is one that is against options development for summer levels, therefore no option was considered for this issue.
3. Effectiveness Monitoring: None.

5.3. Shoreline Property and Infrastructure - Water Supply

Comments or Concerns: A decrease from existing summer levels would force cottagers to reset water lines.

Background: As per the Spanish River Water Management Plan (1993), summer levels on Ministic Lake range from target elevations of 1206.0 feet (367.59 m) and 1209.0 feet (368.50 m), depending on flows for the year. A winter draw down elevation of 1205.0 feet (367.28 m) is maintained from late October to April. It was recommended that no options for lower lake levels be considered.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Background: This concern was that summer lake levels might be changed and the consideration of options was discouraged.

Strategies to Address Issue:

1. Data Gap: None.
2. Option Development: The concern is one that is against options development for summer levels, therefore no option was considered for this issue.
3. Effectiveness Monitoring: None.

6.0 Armstrong Lake

The original Armstrong Dam rock-filled timber crib structure, with removable stoplogs (last rebuilt by Vale in 1964), was replaced in 2016 following a multi-year engineering and Waterpower Class Environmental Assessment (EA) process involving the MNRF and other permitting agencies, as well as public and aboriginal consultation. The chosen option was informed by engineering, hydrological and aquatic studies.

The new structure is a non-operable concrete overflow dam (elevation 1158.55 ft/353.13 m), located immediately downstream of the original dam location, which incorporates a concrete sidewall overflow at elevation 1158.00 ft/353m. A diversion pipe through the dam passes a minimum flow of water at all times to the downstream waterway. The design takes into account current dam safety standards for stability and extreme weather events as well as the provision of a minimum flow for downstream aquatic ecosystem health. The lake level will no longer be actively manipulated but will follow a natural (weather-driven) regime that, based on hydrological modeling, is anticipated to remain within the range of the existing operational plan under normal weather conditions. Although baseline studies established the minimum required ecological flow at 0.02m^3/s, the hydrological model predicted that an outflow of 0.13m^3/s is required to balance the lake level within the desired range. Follow-up monitoring will occur in 2017 to verify modeled predictions used in the dam design and minimum flow determination.

The following items 6.1 through 6.10 describe, for the record, concerns raised in the original WMP consultation process and the approach taken by the planning team prior to the 2016 dam rebuild. The rebuild has largely addressed issues associated with dam manipulation by moving to a non-operable structure which is limited only to some minor potential variation in minimum flow rate through the diversion pipe. Lake level fluctuations will now be driven primarily by natural weather processes and conditions. However, compliance monitoring and reporting will still occur in accordance with the parameters established during the WMP process.

6.1. Erosion

Comment/Concern: High water levels as well as seasonal fluctuations in water levels are eroding the shoreline.

Background (prior to dam rebuild described in 6.0): According to the 1993 Spanish River Water Management Plan, water levels are maintained at target elevations between 1158.11 feet (352.99 m) and 1160.11 feet (353.60 m) between late May to mid-October, depending on flow conditions. During high flow years, the lake level is maintained at a target elevation of 1160.11 feet (353.60 m) while during low flow years, the lake level is maintained at an elevation of 1158.11 feet (352.99 m).
Beginning in early October, the lake is drawn down to an elevation of 1156.11 feet (352.38 m) by the end of October.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: The application of compliance limits in this new WMP will require that proponents report high and low water levels to MNRF. It is expected that these high and low levels will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time for this specific issue.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

6.2. Recreation - Navigation

Comment/Concern: High water levels in the spring wash trees and debris into the lake, creating navigation hazards.

Background (prior to dam rebuild described in 6.0): According to the 1993 Spanish River Water Management Plan, water levels are maintained at target elevations between 1158.11 feet (352.99 m) and 1160.11 feet (353.60 m) between late May to mid-October, depending on flow conditions. During high flow years, the lake level is maintained at a target elevation of 1160.11 feet (353.60 m) while during low flow years, the lake level is maintained at an elevation of 1158.11 feet (352.99 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: Depending upon the year, the increase in water level in Armstrong Lake can vary by 2 to 4 feet. The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: The application of compliance limits in this new WMP will require that proponents report high and low water levels to MNRF. It is expected that these high and low levels will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time for this specific issue.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

6.3. Recreation - Boat Launching

Comments or Concerns: Water levels too low in the summer and fall to launch boats

Background (prior to dam rebuild described in 6.0): According to the 1993 Spanish River Water Management Plan, during low flow years the summer target elevation of the lake can be as low as 1158.11 feet (352.99 m). The lake may be drawn down by 2 feet (0.6 m) in October.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: None.
2. Option Development: An option to raise the summer season lake level by 9 inches was presented to the public. No completed questionnaires were received in response to this option. In regards to the fall drawdown, the timing is such that winter levels are stabilized prior to lake trout and lake whitefish spawning activity.
3. Effectiveness Monitoring: None.

6.4. Shoreline Property and Infrastructure Property Damage

Comments or Concerns: High water levels in the fall and spring damages docks.

Background (prior to dam rebuild described in 6.0): According to the 1993 Spanish River Water Management Plan, water levels are maintained at target elevations between 1158.11 feet (352.99 m) and 1160.11 feet (353.60 m) between late May to mid-October, depending on flow conditions. Whether under low, normal or high flow years, the drawdown is scheduled to occur in October.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: None identified.
2. Option Development: The winter drawdown is completed by freeze-up, so no option was considered in that respect. The general rising of waters and timing of spring freshet, along with the amount of ice cover on the lake when freshet occurs are not within Vale's control. However, it was speculated that increased monitoring of lake level might enable Vale to consider adjustments to log settings where the situation exists that Vale might have some influence over this issue. No feedback was received from the public when presented with this option, but it was nevertheless retained as a recommendation of the planning team for the new WMP.
3. Effectiveness Monitoring: The recording of stakeholder feedback on specific occurrences of dock damage will assist in evaluating the ability of Vale to influence this issue along with the effectiveness of increased level monitoring.

6.5. Aquatic Ecosystems - Fisheries

Comment/Concern: The start of the winter draw down in the fall harms the lake trout population.

Background (prior to dam rebuild described in 6.0): Lake trout are listed as extirpated from Armstrong Lake, but their presence historically has been questioned. However, MNRF has undertaken a re-stocking program whose success is being monitored. Lake whitefish, which also spawns in the fall, is also present in this lake.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: Information on success of the lake trout stocking program is required.
2. Option Development: The winter drawdown is completed in advance of expected lake trout and lake whitefish spawning, so no option was considered in the original public consultations. In 2013, in consultation with MNRF, Vale moved the annual drawdown completion date from October 31st to October 15th to ensure lake level stabilization prior to expected spawning.
3. Effectiveness Monitoring: None proposed.

6.6. Shoreline Property and Property Infrastructure Damage

Comments or Concerns: Water levels are too high in the spring and after heavy rains in the summer and fall. Shoreline structures such as boathouses are flooded. High water levels in the spring also degrade water quality and contaminate well water.

Background (prior to dam rebuild described in 6.0): According to the 1993 Spanish River Water Management Plan, during high flow years, the lake is maintained at a target elevation of 1160.11 feet (353.60 m). Armstrong Dam is a manually operated dam. Due to the relative inaccessibility of the dam, response times to heavy rains or quick thaws are limited.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: None.
2. Option Development: The winter drawdown is completed by freeze-up, so no option was considered in that respect. The general rising of waters and timing of spring freshet, along with the amount of ice cover on the lake when freshet occurs are not within Vale's control. However, an option to decrease the lake level by 9" was presented to the public during consultations. No completed questionnaires were received in response to this option. Also, it was speculated that increased monitoring of lake level might enable Vale to consider adjustments to log settings where the situation exists that Vale might have some influence over this issue. No feedback was received from the public when presented with this option, but it was nevertheless retained as a recommendation of the planning team for the new WMP.
3. Effectiveness Monitoring: The recording of stakeholder feedback on specific occurrences of damage will assist in evaluating the ability of Vale to influence this issue along with the effectiveness of increased level monitoring.

6.7. Aquatic Ecosystems

Comment/Concern: Low water levels in the summer increases water temperatures and promotes aquatic vegetation growth.

Background (prior to dam rebuild described in 6.0): One person commented that they had observed increased abundance of vegetation in the lake over the past number of years.

Is This Concern Within the Scope of the Water Management Plan?: No. While water temperature may be a factor in aquatic plant growth, it is not solely a function of water manipulations. Other variables such as nutrient loading and air temperatures, over which Vale has no control, are significant contributing factors. New aquatic plant species may also be introduced and colonize water bodies through transportation by waterfowl and/or boats.

6.8. Recreation

Comment/Concerns: Request to maintain stable water levels.

Background (prior to dam rebuild described in 6.0): One person commented that they would like to see fewer fluctuations in water levels. According to the 1993 Spanish River Water Management Plan, water levels between May and September are maintained between target elevations of 1158.11 feet (352.99 m) and 1160.11 feet (353.60 m) depending on flow conditions. During high flow years, the lake level is maintained at 1160.11 feet (353.60 m) while during low flow years, the lake level is maintained at 1158.11 feet (352.99 m). The lake is drawn down to 1156.11 feet (352.38 m) by the end of October to mitigate spring flooding. Armstrong Dam is a manually operated dam. Due to the relative inaccessibility of the dam, response times to heavy rains or quick thaws are limited.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: None identified.
2. Options Development: The application of high and low water targets from the 1993 WMP as compliance limits in this new WMP will require that proponents report high and low water levels to MNRF. It is expected that these high and low levels will only occur during abnormal conditions which may be beyond proponents' control. However, it was speculated that increased monitoring of lake level might enable Vale to consider adjustments to log settings where the situation exists that Vale might have some influence over this issue. No feedback was received from the public when presented with this option, but it was nevertheless retained as a recommendation of the planning team for the new WMP.
3. Effectiveness Monitoring: The recording of stakeholder feedback on water fluctuations will assist in evaluating the ability of Vale to influence this issue along with the effectiveness of increased level monitoring.

6.9. Recreation - Snowmobiling

Comment/Concern: Winter drawdown creates unsafe snowmobiling conditions.

Background (prior to dam rebuild described in 6.0): According to the 1993 Spanish River Water Management Plan, Armstrong Lake is drawn down to an elevation of 1156.11 feet (352.38 m) by mid-October, and maintained at this level until late April (spring freshet).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: No data gap was identified for this issue.
2. Options Development: No options were developed for this issue. The drawdown is completed prior to freeze up. The ability of a waterbody to facilitate snowmobiling activities depends on many factors that must be assessed at the time of travel. For safety reasons, snowmobilers are advised to consult their local snowmobile club for established routes and to stick to marked trails.
3. Effectiveness Monitoring: Feedback received from stakeholders in regards to this concern will be logged and reviewed as a part of effectiveness monitoring.

6.10. Aquatic Ecosystem

Comment/Concern: A minimum flow is required for ecosystems health in John's Creek.

Background (prior to dam rebuild described in 6.0): According to the 1993 Spanish River Water Management Plan, Armstrong Lake is drawn down to an elevation of 1156.11 feet (352.38 m) by mid-October, and maintained at this level until late April (spring freshet).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue – stemming from the original WMP process and prior to the dam rebuild in 2016):

1. Data Gap: A data gap was identified for this issue in regards to the aquatic ecosystem below Armstrong Lake and corresponding anticipated minimum flow requirements. Studies were completed in 2014 to support an Environmental Assessment (in progress) for replacing the dam with a weir structure.

2. Options Development: No options were developed for this issue at the time of the original WMP consultations but will be evaluated as part of the EA for dam replacement.
3. Effectiveness Monitoring: None currently proposed.

Other Comments and Recommendations for Plan

1. The lake should be managed on a more consistent basis
2. An emergency flood plan for the lake needs to be developed

Response: Increased compliance monitoring of operations is proposed for this dam in order to address high water level concerns on Armstrong Lake. The monitoring of stakeholder feeback throughout the term of the plan will evaluate the effectiveness of this proposal. As the water management plan only addresses the normal range of level and flow conditions, emergency flooding measures is outside the scope of the plan. However, high flow or level limits that, when reached, must be reported to MNRF will be identified in the plan.

7.0 Agnew Lake

7.1. Erosion

Comment/Concern: Fluctuations in water levels are eroding the shoreline.

Background: From June 1st to December 31st, Agnew Lake is maintained on a weekly rule curve elevation of 859.50 ft (+/- 6 inches) (261.98 +\- 0.15 m). The lake is drawn down to an elevation as low as 846.00 ft (257.86 m) from January 1st to April 15th. The rate at which the lake is lowered depends on the amount of water forecasted for the spring freshets. Under high flow predictions, the lake is drawn down at a faster rate.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: The application of compliance limits in this new WMP will require that proponents report high and low water levels to MNRF. It is expected that these high and low levels will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time for this specific issue.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

7.2. Erosion between High Falls and Nairn

Comment/Concerns: Erosion of banks downstream from Big Eddy and High Falls Generating Facilities.

Background: High Falls and Nairn Falls Generating Stations are part of a cascading system utilizing water released from the Big Eddy facility on Agnew Lake. Water flows and levels fluctuate according to operations at Big Eddy.

Agnew Lake can be drawn down as much as 13.5 ft. (4.1 m) from January 1st to April 15th. During the winter months, median flows downstream in the Spanish River are approximately 70 m^3/s while a natural flow metric model predicts a median of 38.5 m^3/s during this season.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: An erosion study was conducted by Trow Engineering in 2004 at two specific sites of erosion between Big Eddy and Nairn. Considering the shoreline substrate characteristics present and modelled natural flow regime water velocities, they concluded that natural processes would cause erosion at those sites.
2. Options Development: None.
3. Effectiveness Monitoring: None.

7.3. Aquatic Ecosystem – Fisheries (Spring Spawning in Lake)

Comment/Concern: Rising water after fish spawn in the spring may result in egg mortality due to cooler temperatures and siltation. In some years, high water and flooding can wash emerged fry over the dam.

Background: Depending on the expected timing and intensity of freshet, Vale begins to fill Agnew Lake after April 15th until a summer rule curve elevation of 859.50 ft (261.98 m) is reached by June 1st (changed to May long weekend). During this period, which generally coincides with the walleye spawn, increasing water levels are not to be drawn down by more than 3 inches (0.08 m) from the highest attained elevation as the lake/reservoir is filled to summer levels. In years that fish begin to spawn by mid-April, lake levels may increase and cover the eggs up to 13.5 ft (4.1 m) of water before hatching.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Determine if increasing water levels may harm fish spawn. Determine if fish are actually being washed over the dam during high flow years (note: this would be logistically challenging and a safety risk.
2. Options Development: None considered.
3. Effectiveness Monitoring: None at this time.

7.4. Aquatic Ecosystem – Fisheries (Spring Spawning in Lake)

Comment/Concern: Low water or decreasing water levels in the spring increases egg mortality of spring spawners.

Background: There were concerns that when fish spawning begins, water levels are lowered thus exposing the eggs and killing them. By April 1st, lake levels can be as low as 846.00 ft (257.86 m), depending on the timing and expected intensity of flows during spring freshet. In years when fish begin to spawn in early April, water levels could potentially be dropping before the lake begins to fill to summer levels. Potential habitat for pike spawning may not be accessed due to low water levels at this time. During the walleye spawn, Vale voluntarily tries not to decrease the water level more than 4 inches, for power generation purposes, as the lake/reservoir is replenished to summer levels.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Identify spawning locations for pike and potential impacts of water management practices and timing.
2. Options Development: An option to reduce the amount of drawdown (except in high flow years when downstream flooding could be an issue) by 3 ft (1m) was proposed to reduce the chances of falling water levels coinciding with spawning. However, the need to maintain this additional drawdown for flood mitigation was also deemed important. Subsequently, a compromise was reached whereby drawing down to the lower level is reserved for years with high potential for flooding.
3. Effectiveness Monitoring: Evaluate voluntary efforts to minimize impacts to walleye spawning success unless change is typically associated with improvements (thus requiring no evaluation).

7.5. Aquatic Ecosystem – Fisheries (Downstream)

Comment/Concern: Walleye and lake sturgeon spawning beds are located downstream from the Vale generating facilities.

Background: There were concerns that spawning walleye and sturgeon downstream of Agnew Lake do not receive sufficient flows during spawning and incubation. High Falls and Nairn Falls are part of a cascading system utilizing water released from the Big Eddy facility. Water flows and levels fluctuate according to operations at Big Eddy. Median flows of 82.7 m^3/s are passed from the Big Eddy facility from April to June. The natural flow metric model for this facility predicts median flows of 123 m^3/s during this time period.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Identify spawning habitat locations and depths, and the levels and flows required for walleye and sturgeon spawning. Studies were completed throughout 2012 – 2014 indicating no significant impacts on habitat for spawning sturgeon or walleye from water management activities in comparison with a more naturalized flow regime.
2. Options Development: None at this time.
3. Effectiveness Monitoring: None at this time.

7.6. Aquatic Ecosystem – Fisheries

Comment/Concern: Fluctuations in water levels on Agnew Lake are detrimental to fish populations.

Background: The weekly range of operations is between 858.50 feet (261.67 m) and 859.50 feet (261.98 m) so that there is a possibility that some littoral habitat is exposed on a weekly basis. From June 1st to December 31st Agnew Lake is maintained at a target elevation of 859.50 ft (261.98 m). The lake may be drawn down to an elevation as low as 846.00 ft (257.86 m) from January 1st to April 15th during which time some of the littoral zone is exposed.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategy to Address Issue:

1. Data Gap: Study to identify critical fish habitat on Agnew Lake. Bathymetric model to determine loss of littoral zone and habitat with water level fluctuations.
2. Options Development: None at this time.
3. Effectiveness Monitoring: None at this time.

7.7. Aquatic Ecosystem - Fisheries

Comment/Concern: The winter drawdown "fragments" Agnew Lake, leaving fish trapped in small bays, possibly with little forage or oxygen.

Background: Agnew Lake has a winter draw down up to 13.5 ft (4.1 m); and is lowered from a target elevation of 859.50 ft (261.98 m) beginning January 1st to a target elevation of 846.00 ft (257.86 m) by April 15th. There are no documents or reports that substantiate claims of fish kill due to fragmentation on Agnew Lake. However, the current bathymetric mapping for the lake is in 20 foot (6.1 m) intervals, which is more than the operating range.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Bathymetric mapping to determine if some areas lose connectivity with the rest of Agnew Lake during the drawdown.
2. Options Development: None at this time.
3. Effectiveness Monitoring: None at this time.

7.8. Shoreline Property and Infrastructure - Water Supply

Comment/Concern: Water levels are too low in spring, summer and/or winter for point, well and/or water lines.

Background: Some residents of the lake experience loss of water supply when water is lowered below a certain elevation. Some cannot access water due to frozen water lines. One person stated that they lose water at a point 10 feet (3 m) below high water mark. Another person stated that they lose potable water at an elevation of 846 feet (257.86 m). Agnew Lake is maintained at a rule curve elevation of 859.50 ft (261.98 m) from June to December, and may be lowered to a target elevation as low as 846.00 ft (257.86 m) between January and April 15th. Recommendations from the public to ensure water supply included:

- Keeping water levels above the water table
- Keeping water levels above 849 feet (258.78 m)
- Reducing the draw-down to no more than 8-10 feet (2.4 – 3 m)

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None at this time.
2. Option Development: Develop option to set limit of drawdown to 849 ft (258.78 m) during normal operating conditions. This option received 12 favourable responses (one additional respondent unsure) during public consultations. However, the planning team was concerned in relation to the beneficial impact of a more extensive drawdown on flood control downstream during high flow years. Subsequently, there was a recommendation that drawdown to the lower level of 846 ft (257.86m) could be implemented, but would be limited to only those years with high downstream flood potential.
3. Effectiveness Monitoring: Monitor effectiveness of option implementation through recording and reviewing stakeholder feedback.

7.9. Shoreline Property and Infrastructure – Property Damage

Comment/Concern: High water levels in the fall and spring damages docks.

Background: Damages to docks were reported to result from:

- High water levels and wave action resulting from fall storms

- Maintaining water levels until ice formation, and then dropping the levels. The weight of the ice on the docks may collapse the structure.
- Raising the lake levels in early spring with significant ice cover. Moving ice floes can damage docks.

Agnew Lake has a winter a draw down up to 13.5 ft (4.1 m) beginning in January until April 15th. The lake is then filled to a summer elevation of 859.50 ft (261.98 m) by June 1st and maintained until December 31st.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option to initiate drawdown one month earlier (December 1st) was presented to the public for feedback. It was anticipated that having some drawdown prior to freeze up would help prevent damage due to ice buildup on docks. A total of 10 responses were received, with 7 in favour, 2 against and 1 unsure about the option. Vale does not have control over the timing of freshet, the presence of ice or the occurrence of storms, therefore there was no option presented for springtime conditions.
3. Effectiveness Monitoring: Monitor effectiveness of option implementation through stakeholder feedback on specific instances of dock damage and associated water level and ice conditions.

7.10. Shoreline Property and Infrastructure – Property Damage

Comment/Concern: Fluctuating water levels are eroding break wall.

Background: From June 1st to December 31st Agnew Lake is maintained at a rule curve elevation of 859.50 ft +/- 6 inches (261.98 m +/- 0.15m). The lake may be drawn down to an elevation as low as 846.00 ft (257.86 m) from January 1st to April 15th. Short-term and frequent fluctuations of water levels may erode the shorelines.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: None at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

7.11. Recreation - Boat Launching

Comment/Concern: Water levels too low in the spring and summer to launch boats

Background: Agnew Lake has a summer rule curve elevation of 859.50 ft (261.98 m), which is achieved by June 1st and maintained until December 31st. Between April 15th and June 1st, water levels increase from an elevation as low as 846.00 ft (257.86 m). However, Vale will try to accommodate boaters whenever possible by having the summer elevation reached by May 24th.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option was developed to have summer water elevations reached by the May long weekend. This option was presented to the public at consultation sessions and subsequently adopted. There were 11 favourable responses and 1 respondent disagreed with the option. An option to reach summer levels by May 1st was also evaluated by the planning team, but ultimately was not presented to the public.
3. Effectiveness Monitoring: Monitor stakeholder feedback to determine effectiveness of chosen option.

7.12. Recreation - Snowmobiling

Comment/Concern: Winter drawdown creates unsafe snowmobiling conditions.

Background: Agnew Lake has a draw down as much as 13.5 feet (4.1 m) that begins January 1st and continues until April 15th. There is an official snowmobile trail that runs east – west across Agnew Lake. The trail is maintained and marked by the Nairn Snowmobile Club. The trail is accessed at the east end of the lake through a gate. If the gate is closed, then ice conditions are unsafe and no one should be using the trail.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: No data gap was identified for this issue.
2. Options Development: No options were developed for this issue. The ability of a waterbody to facilitate snowmobiling activities depends on many factors that must be assessed at the time of travel. For safety reasons, snowmobilers are advised to consult their local snowmobile club for established routes and to stick to marked trails. On this lake, there is an official snowmobile trail that runs east – west across Agnew Lake. It is maintained and marked by the Nairn Snowmobile Club and is accessed at the east end of the lake through a gate. If the gate is closed, then ice conditions are unsafe and the trail should not be used.
3. Effectiveness Monitoring: Feedback received from stakeholders in regards to this concern will be logged and reviewed as a part of effectiveness monitoring.

7.13. Recreation - Navigation

Comments or Concerns: Water levels too low in the spring and summer.

Background: As stated in the 1993 WMP, Agnew Lake has a summer rule curve elevation of 859.50 ft (261.98 m) that is achieved by June 1st and maintained until December 31st. Between April 15th and June 1st, water levels increase from an elevation as low as 846.00 ft (257.86 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option was developed to have summer water elevations reached by the May long weekend. This option was presented to the public at

consultation sessions and subsequently adopted. There were 11 favourable responses and 1 respondent disagreed with the option. An option to reach summer levels by May 1st was also considered by the planning team.
3. Effectiveness Monitoring: Monitor stakeholder feedback to determine effectiveness of chosen option.

7.14. Recreation – Navigation (debris)

Comment/Concern: High water levels in the spring wash trees into the lake, creating navigation hazards.

Background: Agnew Lake has a summer rule curve elevation of 859.50 ft (261.98 m) that is achieved by June 1st and maintained until December 31st. Between April 15th and June 1st, water levels increase from an elevation as low as 846.00 ft (257.86 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.
Strategies to Address Issue:
1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: None at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

7.15. Recreation

Comment/Concern: Open water levels too high.

Background: Some comments were received stating that water levels are too high, resulting in the loss of beach. Another person commented that high water levels destroy vegetation (contributing to erosion). Summer elevations on Agnew Lake are maintained at 859.50 ft +/- 6 inches (261.98 m +/- 0.15m) between June 1st and December 31s.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:
1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: An option was developed to lower the lake level by 6 inches. Feedback received during consultation was mixed with 7 respondents in favour of the option, 3 against and 3 unsure, so the option was not chosen for further consideration.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion

and to get more feedback on summer water levels. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

7.16. Recreation

Comment/Concern: Water levels too low in the spring and summer.

Background: One comment was received stating that the summer level in 2004 was not achieved until later in the season. Another person had a request to have summer levels reached by May 1st of each year. Summer elevations on Agnew Lake are maintained at 859.50 ft +/- 6 inches (261.98 m +/- 0.15m) between June 1st and December 31st, and then drawn down to an elevation as low as 846.00 ft (257.86 m) until April 15th.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option was developed to have summer water elevations reached by the May long weekend. This option was presented to the public at consultation sessions. There were 11 favourable responses and 1 respondent disagreed with the option. An option to reach summer levels by May 1st was also considered by the planning team.
3. Effectiveness Monitoring: Monitor stakeholder feedback to determine effectiveness of chosen option.

7.17. Recreation

Comment/Concern: Requests to maintain stable water levels

Background: A person commented that they would like to have stable water levels year round. Another person recommended a 3-inch (0.08 m) range during the summer. Summer elevations on Agnew Lake are maintained at 859.50 ft +/- 6 inches (261.98 m +/- 0.15m) between June 1st and December 31st, and then may be lowered to 846.00 ft (257.86 m) until April 15th.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option was developed to have summer water elevations reached by the May long weekend. This option was presented to the public at consultation sessions. There were 11 favourable responses and 1 respondent disagreed with the option. An option to reach summer levels by May 1st was also considered by the planning team, but was not chosen as there were potential increased issues with flooding, ice and wave damage and concern about reducing the amount of water (in order to fill the lake) going downstream in the spring freshet when fish are spawning.
3. Effectiveness Monitoring: Monitor stakeholder feedback to determine effectiveness of chosen option.

7.18. Shoreline Property and Infrastructure

Comment/Concerns: Rising and falling water in the spring, and drawdown beginning in the fall deposits material on the shoreline.

Background: Winter drawdown on Agnew Lake begins January 1st and ends by April 15th. During the spring freshet, the lake may rise from an elevation as low as 846.00 ft (257.86 m) up to 859.50 ft (261.98 m). The drawdown is required to mitigate flooding.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (and associated debris) versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: None at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

7.19. Aquatic Ecosystem – Wildlife Habitat

Comment/Concern: Winter drawdown lowers water in the winter and spring, dewatering beaver lodges and freezing the beavers out.

Background: The winter draw down on Agnew Lake is as much as 13.5 ft (4.1 m), beginning January 1st. There are no reports of this issue for Agnew Lake. A local trapper indicated that beaver may be able to dig through the lake bed to access water. However, feed piles may be left dewatered, making the beaver vulnerable to predators.

Concern Within the Scope of the Water Management Plan?: Yes.

Is This Strategies to Address Issue:

1. Data Gap: Need to confirm with local trapper that this is an issue on Agnew Lake specifically. If confirmed, then monitoring of beaver activity throughout a winter should be undertaken.
2. Option Development: None proposed at this time.
3. Effectiveness Monitoring: None proposed at this time.

Other Comments and Recommendations for Plan

1. Vale should notify residents of drawdowns anticipated going below 849 feet (258.78 m).

Response: Vale is notifying identified stakeholders when drawdown is anticipated to go to the lower level. Stakeholder feedback will be monitored for effectiveness.

8.0 Pogamasing Lake (Domtar)

8.1. Erosion

Comment/Concern: High water levels eroding the shoreline and damaging shoreline structures.

Background: According to the 1993 Spanish River Water Management Plan, Pogamasing Lake is maintained at a target elevation of 1206.0 feet (367.59 m) from the end of May to the end of August. During high flow years, the target elevation in the summer is 1209.0 feet

(368.50 m). However, this maximum target level has been lowered to a target elevation of 1207 feet (367.89 m) in the last few years to address complaints about high water levels. In the fall, the lake is lowered to a target elevation of 1204.0 feet (366.98 m) or until September 30th, whichever comes first. Significant shoreline loss in a section of sand bluffs on the east side of Pogamasing Lake has been documented.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:
1. Data Gap: There has been a specific request by a group of cottagers to lower the summer lake level by 6 inches. Domtar has agreed to undertake a survey of all land owners to gather input on this proposed option (high priority data gap).
2. Options Development: An option was developed to lower the maximum allowable lake level from 1209 to 1207 ft. This was to address concerns with possible shoreline erosion in spring. The option has been implemented.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of the adopted option in addressing the above concern.

8.2. Erosion

Comment/Concern: Erosion of shoreline adds sand and particles into the lake.

Background: Sediment is being deposited in a small bay located on the east side of the lake, about half-way down the north-south axis of the lake. Lake trout spawning grounds are located in the Pogamasing esker and wetland complex located in the southeast portion of the Pogamasing Lake known as the "Lost Channel". It was reported that access into this bay was increasingly difficult for lake trout after the draw down, possibly due to sedimentation of this channel. Impacts to the wetland functions are not known.

Is This Concern Within the Scope of the Water Management Plan?: Possibly.

Strategies to Address Issue:
1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: The application of compliance limits in this new WMP will require that proponents report high and low water levels to MNRF. It is expected that these high and low levels will only occur during abnormal conditions which may be beyond proponents' control. No other option is proposed at this time for this specific issue. However, the option developed for 8.1 may help to alleviate the concern.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion (and debris) in this lake. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

8.3. Shoreline Property and Infrastructure – Property Damage

Comment/Concern: High water levels causes damage to docks and buildings.

Background: High water levels in association with wind and wave action resulting from spring storms were blamed for damages sustained to shoreline structures such as docks and boathouses.
According to the 1993 Spanish River Water Management Plan, Pogamasing Lake is maintained at a target elevation of 1206.0 feet (367.59 m) from the end of May to the end of August. During high flow years, the target elevation in the summer is 1209.0 feet (368.50 m). However, this maximum target level has been lowered to a target elevation of 1207 feet (367.89 m) in the last few years to address complaints about high water levels.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: There has been a specific request by a group of cottagers to lower the summer lake level to 1205.5 ft. (367.44m). Domtar has agreed to undertake a survey of all land owners to gather input on this proposed option (high priority data gap).
2. Options Development: An option was developed to lower the maximum allowable lake level from 1209 to 1207 ft. This was to address concerns with possible shoreline erosion in spring. The option has been implemented.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of the adopted option in addressing the above concern.

8.4. Recreation - Boat Launching

Comment/Concern: Low water levels in the fall make it difficult to launch boats.

Background: According to the 1993 Spanish River Water Management Plan, beginning September 1st Pogamasing Lake is lowered to a target elevation of 1204.0 feet (366.98 m) or until September 30th, whichever comes first.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: Development of an option to delay drawdown from September 30th to October 31st was considered by the Planning Team, but was rejected due to lake trout spawning requirements. Lake trout are known to spawn in the fall, beginning in October.
3. Effectiveness monitoring: Concerns about boat launching will continue to be monitored through stakeholder feedback.

8.5. Recreation - Navigation

Comment/Concern: Frequent changes in water levels make navigation dangerous.

Background: Fluctuations in water levels during the boating season makes it difficult to anticipate hazards. A drop in water levels will expose rocks and "dead-heads" that were adequately submerged before. According to the 1993 Spanish River Water Management Plan, Pogamasing Lake is maintained at a target elevation of 1206.0 feet (367.59 m) from the end of May to the end of August. During high flow years, the summer elevation is 1209.0 feet (368.50 m). However, this maximum target level has been lowered to a target elevation of 1207 feet (367.89 m) in the last few years to address complaints about high water levels. The lake is lowered to an elevation of 1204.0 feet (366.98 m) or until September 30th, whichever comes first.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

1. Data Gap: There has been a specific request by a group of cottagers to lower the summer lake level to 1205.5 ft. (367.44m). Domtar has agreed to undertake a survey of all land owners to gather input on this proposed option (high priority data gap).
2. Options Development: An option was developed to lower the maximum allowable lake level from 1209 to 1207 ft. This was to address concerns with possible shoreline erosion in spring, but will also help to address this concern. The option has been implemented.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed.

8.6. Aquatic Ecosystems - Fisheries

Comment/Concern: Changes in water levels on Pogamasing Lake affects spawning in the spring and fall.

Background: According to the 1993 Spanish River Water Management Plan, Pogamasing Lake is maintained at a target elevation of 1206.0 feet (367.59 m) from the end of May to the end of August. During high flow years, the target summer elevation is 1209.0 feet (368.50 m). Beginning September 1st the lake is lowered to a target elevation of 1204.0 feet (366.98 m) or until September 30th, whichever comes first. The draw down elevation is maintained until late April.

Since the winter draw down occurs before lake trout spawning in mid-October, the lake trout should not be affected unless important habitat is lost from the draw down. However, lake trout spawning grounds are located in the Pogamasing esker and wetland complex located in the southeast portion of the Pogamasing Lake known as the "Lost Channel". It was reported that access into this bay was difficult for lake trout after the draw down. Lake levels rise in April during the period of spring spawning activity. Fish species such as walleye can tolerate rising water levels of a few feet. Northern pike is not listed as a species present in Pogamasing Lake.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Verification of accessibility and use of the "Lost Channel" for lake trout spawning is a data gap which would require a more refined bathymetry study than currently exists. Ensuring the fall drawdown is completed by September 30th meets the needs of spawning lake trout as spawning typically occurs in October. With the adoption of a lower maximum lake level, water fluctuations are now managed within a 3 ft. variation, which is not expected to impact spring spawners,
2. Options Development: None at this time.
3. Effectiveness Monitoring: None at this time.

8.7. Aquatic Ecosystems – Wildlife Habitat

Comment/Concern: High water levels negatively affects waterfowl habitat.

Background: According to the 1993 Spanish River Water Management Plan, beginning April 1st water levels on Pogamasing Lake rise from a winter level of 1204.0 feet (366.98 m), to be maintained at a target elevation of 1206.0 feet (367.59 m) from the end of May to the end of August. During high flow years, the summer elevation is 1209.0 feet (368.50 m).

Many waterfowl species can begin nesting and laying eggs in April, with chicks being hatched by late May. The rising water levels during this period may flood nests that were built close to the water in April.

Is This Concern Within the Scope of the Water Management Plan?: Yes. There is no documentation to support the concern that waterfowl are being adversely impacted by water management practices on Pogamasing Lake. The maximum target level has been lowered to a target elevation of 1207 feet (367.89 m) in the last few years to address complaints about high water levels, which may also address potential impacts to waterfowl nests.

Strategies to Address Issue:

1. Data Gap: A study to determine nesting times and locations of waterfowl on Pogamasing Lake has been identified as a low-priority data gap. A reduction of maximum allowable water level in recent years may assist in alleviating this concern.
2. Options Development: An option was developed to lower the maximum allowable lake level from 1209 to 1207 ft. This was to address concerns with possible shoreline erosion in spring, but will also help to address this concern. The option has been implemented.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed.

8.8. Aquatic Ecosystems – Wildlife Habitat

Comment/Concern: High water levels damages wetland habitats.

Background: High water levels, particularly from the spring freshet, can benefit wetlands species by providing more habitat and accessing additional nutrients not previously available.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: A study to characterize and map out the extent of wetland habitats is required to determine whether high water levels are having an impact to wetland habitats. A reduction of maximum allowable water level in recent years may assist in alleviating the concern over high water levels. Subsequently, this study has been identified as a low priority.
2. Options Development: An option was developed to lower the maximum allowable lake level from 1209 to 1207 ft. This was to address concerns with possible shoreline erosion in spring, but will also help to address this concern. The option has been implemented.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed.

8.9. Recreation - Snowmobiling

Comment/Concern: Winter drawdown creates unsafe snowmobiling conditions.

Background: According to the 1993 Spanish River Water Management Plan, the lake is lowered to a target elevation of 1204.0 feet (366.98 m) or until September 30th, whichever comes first, before the onset of freezing.

Is This Concern Within the Scope of the Water Management Plan?: Yes. The draw down is completed prior to ice-up. There are generally no log movements until April, unless weather conditions warrant it (i.e. early thaw, rains).

Strategies to Address Issue:

1. Data Gap: No data gap was identified for this issue.

2. Options Development: No options were developed for this issue. Winter draw down is completed by September 30th, before the lake freezes. For safety reasons, snowmobilers are advised to consult their local snowmobile club for established routes and to stick to marked trails.
3. Effectiveness Monitoring: Feedback received from stakeholders in regards to this concern will be logged and reviewed as a part of effectiveness monitoring.

Comments and Recommendations for Plan

- Maintain lake at a constant level.
- Lower lake level earlier in spring to minimize erosion.
- Accurately monitor and record lake levels.
- Inform cottagers of changes in lake levels

Response: The maximum target level has been lowered from 1209 ft to a target elevation of 1207 feet (367.89 m) in the last few years to address complaints about high water levels and shoreline loss from erosion. This reduces the normal operating range to 3 ft (0.9m). Options to improve monitoring frequency and response times, and communications with lake residents have been implemented and include minimum monthly lake level readings during open water season and communication via email with interested residents.

9.0 Onaping Lake

9.1. Erosion

Comment/Concern: Fluctuations in water levels and high water levels are eroding the shoreline.

Background: Onaping Lake will become part of the Onaping Lake Conservation Reserve. In addition to protection of the area and addressing the concerns of lake residents, sedimentation from erosion may be filling in fish habitat.

Onaping Lake is maintained at a target elevation of 1307 feet (398.37 m) from late May to late August. Based on the 1993 Spanish River Water Management Plan, in high flow years the summer target elevation can be as high as 1309 feet (398.98 m). However, in recent years this high water target has been lowered 1 foot to a target elevation of 1308 feet (398.68 m) to address concerns that water levels on Onaping Lake are too high.

The winter draw down begins in September. The lake is lowered to an elevation of 1304 feet (397.46 m) or discontinued on October 15th, whichever comes first. The winter level is maintained until April when the spring freshet refills the lake. The target summer elevation is obtained by the May long weekend.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (which can produce debris) versus erosion induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue. .
2. Options Development: An option was developed to reduce the maximum level from 1309 ft to 1308 ft. to address concerns associated with high water levels. This option has been implemented.

3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

9.2. Shoreline Property and Infrastructure – Property Damage

Comment/Concern: Winter drawdown and high water levels in the spring damages docks.

Background: Damages to docks were reported to result from:

- High water levels and wave action resulting from fall storms
- Maintaining water levels until ice formation, and then dropping the levels. The weight of the ice on the docks may collapse the structure.
- Raising the lake levels in early spring with significant ice cover. Moving ice floes can damage docks.
- Specific comments received included that these problems didn't occur until Bannerman Dam was built. Another person stated that they have had to raise their dock three times due to high water levels.

Based on the 1993 Spanish River Water Management Plan, Onaping Lake is lowered to a target elevation of 1304 feet (397.46 m) or stopped at October 31st, whichever comes first. Lowering of the lake begins September 1st, and is lowered to its lowest levels before any ice accumulation occurs. The winter draw down elevation is maintained until late April, and then raised to a summer target elevation between 1307 feet (398.37 m) – 1308 feet (398.68 m) by the end of May. Significant ice cover normally thaws by the early May.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option was developed to reduce the maximum water level from 1309 ft to 1308 ft. to address concerns associated with high water levels. This option has been implemented. Also, an option to complete the fall drawdown by October 15th rather than October 31st could potentially alleviate concerns about dock damage from fall storms as well as ice formation prior to drawdown.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of changes to the operational plan in alleviating the concern.

9.3. Recreation

Comment/Concern: Open water levels too high.

Background: Some comments were received stating that water levels are too high, putting docks and boat houses under water. Another commented that water levels are 1 foot too high.

Onaping Lake is maintained at a target elevation of 1307 feet (398.37 m) from late May to late August. Based on the 1993 Spanish River Water Management Plan, in high flow years the summer target elevation can be as high as 1309 feet (398.98 m). However, in recent years this high water target has been lowered 1 foot to a target elevation of 1308 feet (398.68 m) to address concerns that water levels on Onaping Lake are too high.

The Public Advisory Committee has made a recommendation to have an elevation of 1306 feet (398.07 m) as the normal maximum target elevation during the spring and summer months.

Is This Concern Within the Scope of the Water Management Plan?: Yes

Strategies to Address Issue:
1. Data Gap: None.
2. Options Development: An option was developed to reduce the maximum water level from 1309 ft to 1308 ft. to address concerns associated with high water levels. This option has been implemented. An option was developed to maintain summer water levels between 1306.5 ft to 1307.0 ft.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of changes to the operational plan in alleviating the concern.

9.4. Recreation

Comments or Concerns: Requests to maintain stable water levels.

Background: It was stated that the range of water levels on Onaping Lake is too large throughout the year. According to the 1993 Spanish River Water Management Plan, Onaping Lake is lowered to an elevation of 1304 feet (397.46 m) or stopped at October 31st, whichever comes first. This level is maintained until April when the lake is filled to a normal target elevation of 1307 feet (398.37 m) by late May. Onaping Lake has a normal annual elevation range of 3 feet (0.9 m). In high flow years, this range is increased to 4 feet (1.2 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:
1. Data Gap: None.
2. Options Development: An option was developed to reduce the maximum water level from 1309 ft to 1308 ft. to address concerns associated with high water levels. This option has been implemented. An option was developed to maintain summer water levels between 1306.5 ft to 1307.0 ft.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of changes to the operational plan in alleviating the concern.

9.5. Aquatic Ecosystems - Fisheries

Comment/Concern: Fluctuations in water levels on Onaping Lake affects fish spawning.

Background: Onaping Lake has an elevation range of 3 feet (0.9 m). In high flow years, the range is 4 feet (1.2 m). According to the 1993 Spanish River Water Management Plan, Onaping Lake is lowered to a target elevation of 1304 feet (397.46 m) or stopped at October 31st, whichever comes first. This level is maintained until April. Summer elevations are achieved by the end of May.

In Onaping Lake, Lake trout have been observed spawning shortly after Thanksgiving in mid-October when the draw down is still occurring. In general, by mid-October the water should only need to be lowered about another 6 inches (0.15 m). It is not known if lake trout are being adversely affected by this draw down.

Walleye and pike can spawn as early as the beginning of April. At this time, Onaping Lake may still at the draw down target elevation of 1304 feet (397.46 m). Both walleye and pike eggs can tolerate rising water levels and an increase of 3 – 4 feet (0.9 m – 1.2 m) should not have any adverse impact on spawning.

Summer levels are achieved by late May and maintained until late August. Delaying the peak of lake levels until late May could decrease the amount of potential spawning habitat for pike, but it is not known to what degree this occurs. Late spring spawners such as smallmouth bass should not be affected by this operating regime.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option was developed to reduce the maximum water level from 1309 ft to 1308 ft. to address concerns associated with high water levels. An option was developed to maintain summer water levels between 1306.5 ft to 1307.0 ft. An option was developed to complete fall drawdown by October 15th rather than October 31st. These options have all been implemented.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of changes to the operational plan in alleviating the concern.

9.6. Aquatic Ecosystems - Minimum Flows

Comment/Concern: Sufficient flows should be maintained in the Onaping River in late summer.

Background: Flows in the Onaping River are often reduced during low water conditions, and sometimes reported to be negligible in late July and August. There is a concern that the flows were insufficient to support fish in the river.

Concerns about water quality were also raised due to the two sewage treatment plants are located downstream of Onaping Lake in Levack and Dowling. Both of these plants discharge effluent into the river. Conditions on the Certificates of Approval state that the facilities cannot discharge effluent into the river unless diluted to concentrations specified by the Ministry of the Environment. To date, the City of Greater Sudbury has not had a problem meeting the conditions of their Certificates of Approval, as these water treatment facilities have the ability to store and regulate the amount of treated sewage that is to be assimilated by the Onaping River.

The majority of the flows are passed through the Bannerman Creek Dam toward the Spanish River, which is utilized by all of the generating stations listed in the water management plan except for the Wabageshik facility located on the Vermilion River. The Onaping Lake Dam is not regularly operated except in high flow or flooding conditions. Directing the flows to the Spanish River also reduces the risk of flooding downstream, along the Vermilion River.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Generate natural and regulated flow metric sheets for Onaping River, and compare summer flow data for Onaping River.
2. Options Development: After step 1, develop option for a minimum flow condition in the Onaping River.
3. Effectiveness Monitoring: None at this time.

9.7. Recreation - Navigation

Comment/Concern: High water levels in the spring and summer wash trees into the lake, creating navigation hazards.

Background: According to the 1993 Spanish River Water Management Plan, Onaping Lake is maintained at a target elevation of 1307 feet (398.37 m) from late May to late August. In high flow years, the summer target elevation is 1308 feet (398.68 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option was developed to reduce the maximum water level from 1309 ft to 1308 ft. to address concerns associated with high water levels. This option has been implemented. An option was developed to maintain summer water levels between 1306.5 ft to 1307.0 ft.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of changes to the operational plan in alleviating the concern.

9.8. Recreation - Boat Launching

Comment/Concern: Water levels too low in the spring and fall to launch boats

Background: According to the 1993 Spanish River Water Management Plan, a summer elevation of 1307 feet (398.37 m) was reached by late May during low flow and normal flow years, and maintained until the end of August. The draw down began in September and finished by October 31st or when an elevation of 1304 feet (397.46 m) was reached, whichever came first.

The Public Advisory Committee recommended that a lake level of 1306 feet (398.07 m) be reached by May 1st.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: An option was developed to reach summer target levels by the May long weekend instead of June 1st and was implemented. Also, an option to delay the drawdown was considered by the Planning Team. As a result, an option to maintain summer water levels from the May long weekend until Labour Day was developed and adopted. An option was chosen and implemented whereby drawdown would be completed by October 15th rather than October 31st or when an elevation of 1304 feet (397.46 m) is reached, whichever comes first.
3. Effectiveness monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of changes to the operational plan in alleviating the concern.

9.9. Recreation - Snowmobiling

Comments or Concerns: Winter drawdown creates unsafe snowmobiling conditions.

Background: The winter draw down is completed by the end of October and maintained until late April.

Is this Concern a Water Management Planning Issue? Yes. The draw down is completed prior to ice-up. There are generally no log movements until April, unless weather conditions warrant (it (i.e. early thaw, rains.)

Strategies to Address Issue:

1. Data Gap: No data gap was identified for this issue.
2. Options Development: No options were developed for this issue. Winter draw down is completed by October 15th, before the lake freezes. For safety reasons, snowmobilers are advised to consult their local snowmobile club for established routes and to stick to marked trails.
3. Effectiveness Monitoring: Feedback received from stakeholders in regards to this concern will be logged and reviewed as a part of effectiveness monitoring.

9.10. Aquatic Ecosystems – Wildlife Habitat

Comment/Concern: Fluctuating water levels negatively affect nesting loons.

Background: Loons begin to nest in reedy parts of lake shorelines shortly after ice-out. The eggs incubate for about 29 days and abandon the nest when their down is dry (Birds of Canada 1986).

According to the 1993 Spanish River Water Management Plan, water levels in the spring rise from the draw down target elevation of 1304 feet (397.46 m) in April to the summer elevation of 1307 feet (398.37 m) (1308 feet (398.68 m) under high flow conditions) by late May.

Is This Concern Within the Scope of the Water Management Plan?: Yes. Ice-out has been observed to be early May for Onaping Lake. If water levels continue to increase over the month, then it is possible that loon reproduction is negatively impacted.

Strategies to Address Issue:

1. Data Gap: Identify loon nesting locations and success.
2. Options Development: An option was developed to reduce the maximum water level from 1309 ft to 1308 ft. to address concerns associated with high water levels. This option has been implemented. An option was developed to maintain summer water levels between 1306.5 ft and 1307.0 ft. These revisions to the operational plans may assist in alleviating this concern.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on the effectiveness of changes to the operational plan in alleviating the concern.

9.11. Aquatic Ecosystems

Comment/Concern: Water flows into Bannerman Creek Delta Nature Reserve.

Background: According to the 1993 Spanish River Water Management Plan, water levels in the spring rise from the draw down target elevation of 1304 feet (397.46 m) in April to the summer elevation of 1307 feet (398.37 m) (1308 feet (398.68 m) under high flow conditions) by late May.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Regulated and Natural Flow Metrics Sheets should be generated and the data utilized to assess the influence of water-level manipulations on the Nature Reserve and on recreational paddling in the Spanish.
2. Options Development: None at this time. Review findings of data gap studies when available.
3. Effectiveness Monitoring: None at this time.

Comments and Recommendations for Plan

1. Water flowing through the Bannerman Creek Dam contributes to flows for navigation of the Spanish River.
2. A meeting with Onaping representatives is required to develop a lake/dam operating plan.
3. Public needs to be advised in advance when water will be lowered.

Response: Input into the water management plan has involved a series of open houses and the participation of a public advisory committee that included representatives from Onaping Lake. Information from the Onaping Lake Campers' Association has been presented to the steering committee and planning team via the public advisory committee.

Domtar has ongoing communications with Onaping Lake Camper's Association. The monitoring of complaints will be reviewed on a regular basis to determine the effectiveness of the operating regime in addressing social and environmental issues.

10.0 Sinaminda Lake

The dam is not currently operated, but acts as a self-regulating weir, set at 1364 ft (415.7m). It is scheduled to be rehabilitated in the future. Concerns raised during the water management planning process will be reviewed during the permitting process for the dam rehabilitation.

10.1. Recreation - Navigation

Comment/Concern: There is floating debris in the lake.

Background: During the spring freshet or periods of high precipitation, debris and material may be washed into the lake. Historically, during high and normal flow years, Sinaminda Lake was maintained at a target elevation of 1365.00 feet (416.05 m), from the end of May until late August. The lake no longer has a winter drawdown but permanently set to 1364 ft (415.7m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (and associated debris) versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: None at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

10.2. Shoreline Property and Infrastructure - Property Damage

Comment/Concern: Fluctuating water levels damages docks.

Background: Historically, during high and normal flow years, Sinaminda Lake was maintained at a target elevation of 1365.00 feet (416.05 m), from the end of May to late August. During low flow years the summer elevation may have been as low as a target elevation of 1364.00 feet (415.74 m). The lake no longer has a winter drawdown as the dam is permanently set to 1364 ft (415.7m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:
1. Data Gap: None identified for this issue.
2. Options Development: An option to maintain water level year round was presented to the public for feedback. Two responses were received during the first round of public consultation on options, one to maintain current operating regime and one to maintain constant water level year round. No feedback was received from subsequent public consultation sessions, so the normal operating targets of the 1993 WMP were recommended for adoption in the new WMP. Going forward, the collection of water level data and more detailed stakeholder feedback on the occurrence of high water levels and dock damage in compliance and effectiveness monitoring will assist in determining if options development should be revisited.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of dock damage.

10.3. Recreation - Boat Launching

Comment/Concern: Low water levels in the summer hinder access to Sinaminda Lake.

Background: Sinaminda Lake is maintained at a target elevation of 1365.00 feet (416.05 m), from the end of May to late August. During low flow years the summer elevation may be as low as a target elevation of 1364.00 feet (415.74 m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:
1. Data Gap: None identified for this issue.
2. Options Development: An option to increase water level by 1 ft. during summer was presented to the public for feedback. No respondents chose this option. Two responses were received during the first round of public consultation on additional options, one to maintain current operating regime and one to maintain constant water level year round. No feedback was received from subsequent public consultation sessions, so the normal operating targets of the 1993 WMP were recommended for adoption in the new WMP. Going forward, the collection of water level data and more detailed stakeholder feedback on the occurrence of low levels in compliance and effectiveness monitoring will assist in determining if options development should be revisited.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences low water levels.

10.4. Recreation - Snowmobiling

Comment/Concern: Winter draw down creates unsafe snowmobiling conditions.

Background: Historically, the lake was lowered to an elevation of 1362.00 feet (415.14 m) or drawdown discontinued by September 30th, whichever came first. The draw down was completed before ice up and the level maintained until late April. The lake no longer has a winter drawdown as the dam is permanently set to 1364 ft (415.7m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: No data gap was identified for this issue.
2. Options Development: No options were developed for this issue. Winter draw down is completed by September 30th, before the lake freezes. For safety reasons, snowmobilers are advised to consult their local snowmobile club for established routes and to stick to marked trails.
3. Effectiveness Monitoring: Feedback received from stakeholders in regards to this concern will be logged and reviewed as a part of effectiveness monitoring.

10.5. Erosion

Comment/Concern: Erosion along the shoreline is noticeable.

Background: Historically, during high and normal flow years, Sinaminda Lake was maintained at a target elevation of 1365.00 feet (416.05 m) from the end of May to late August. During low flow years the summer elevation may have been as low as a target elevation of 1364.00 feet (415.74 m). The lake was lowered to a target elevation of 1362.00 feet (415.14 m) or discontinued by September 30th, whichever came first. The draw down level was maintained until late April. The lake no longer has a winter drawdown as the dam is permanently set to 1364 ft (415.7m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (and associated debris) versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: None at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

10.6. Aquatic Ecosystems – Wildlife Habitat

Comment/Concern: Water levels are too low for beaver.

Background: Historically, during high and normal flow years, Sinaminda Lake was maintained at a target elevation of 1365.00 feet (416.05 m) from the end of May to late August. During low flow years the summer elevation may have been as low as a target elevation of 1364.00 feet (415.74 m). The lake was lowered to a target elevation of 1362.00

feet (415.14 m) or drawdown discontinued by September 30th, whichever came first. The draw down level was maintained until late April. The lake no longer has a winter drawdown as the dam is permanently set to 1364 ft (415.7m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Need to confirm with local trapper that this is an issue on Sinaminda Lake specifically. If confirmed, then monitoring of beaver activity throughout a winter should be undertaken.
2. Option Development: None proposed at this time.
3. Effectiveness Monitoring: None proposed at this time.

10.7. Shoreline Property and Infrastructure - Water Supply

Comments or Concerns: Low water levels in the summer expose water lines.

Background: Historically, during high and normal flow years, Sinaminda Lake was maintained at a target elevation of 1365.00 feet (416.05 m) from the end of May to late August. During low flow years the summer elevation may have been as low as a target elevation of 1364.00 feet (415.74 m). The lake no longer has a winter drawdown as the dam is permanently set to 1364 ft (415.7m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None identified for this issue.
2. Options Development: An option to increase water level by 1 ft. during summer was presented to the public for feedback. No respondents chose this option. Two responses were received during the first round of public consultation on additional options, one to maintain current operating regime and one to maintain constant water level year round. No feedback was received from subsequent public consultation sessions, so the normal operating targets of the 1993 WMP were recommended for adoption in the new WMP. Going forward, the collection of water level data and more detailed stakeholder feedback on the occurrence of low levels in compliance and effectiveness monitoring will assist in determining if options development should be revisited.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences low water levels.

10.8. Aquatic Ecosystems - Fisheries

Comments or Concerns: Lowered lake levels would affect lake trout population.

Background: Historically, the lake was lowered to an elevation of 1362.00 feet (415.14 m) or drawdown discontinued by September 30th, whichever came first. The draw down level was maintained until late April. Although the draw down was completed before lake trout began to spawn, it was recommended that the water levels not be lowered any more than the minimal elevation of 1361.00 feet (414.83 m). The lake no longer has a winter drawdown as the dam is permanently set to 1364 ft (415.7m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Ensuring the fall drawdown is completed by September 30th meets the needs of spawning lake trout as spawning typically occurs in October. A survey to determine lake trout spawning locations and timing is a low priority data gap.
2. Options Development: None at this time.
3. Effectiveness Monitoring: None at this time.

10.9. Aquatic Ecosystems - Fisheries

Comments or Concerns: Water level regulation may affect walleye and northern pike

Background: Historically, during high and normal flow years, Sinaminda Lake was maintained at a target elevation of 1365.00 feet (416.05 m), from the end of May to late August. During low flow years the summer elevation may have been as low as a target elevation of 1364.00 feet (415.74 m). The lake was lowered to a target elevation of 1362.00 feet (415.14 m) or drawdown discontinued by September 30th, whichever came first. The lake no longer has a winter drawdown as the dam is permanently set to 1364 ft (415.7m).

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategy to Address Issue:
1. Data Gap: Northern pike and walleye, which spawn in spring, are able to tolerate moderate increases in water levels but are negatively affected when spawning habitat becomes dewatered. In general, Sinaminda Lake level is increasing during spawning season and achieves full supply by late May. A low priority data gap study was proposed to determine spawning areas and depths for these species.
2. Options Development: No options were developed for this issue at this time.
3. Effectiveness Monitoring: None specific to this issue is proposed at this time.

11.0 Vermilion Lake and River

11.1. Erosion

Comment/Concern: High water levels on Vermilion Lake are eroding the shoreline.

Background: Stobie dam is kept at a target rule curve elevation of 841.5 feet (256.49 m) all year.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:
1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: None at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

11.2. Shoreline Property and Infrastructure

Comment/Concern: High water and flow levels washes trees, vegetation, garbage and other debris onto the shore.

Background: Due to increased flows and water levels from the spring freshet at this time of year, trees and other items may be washed into the river and lake.

Vermilion Lake operates with limited storage capacity and passes water received from the upper Vermilion River and from Onaping Lake.

Is This Concern Within the Scope of the Water Management Plan?: Yes. Floating debris and/or trees also occurs on unregulated lakes due to increased water levels during the spring freshet.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (and associated debris) versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: None at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

11.3. Recreation - Boat Launching

Comment/Concern: Requests for lower levels in the spring and higher levels in the summer to launch boats in the lower Vermilion River.

Background: Vermilion Lake operates with limited storage capacity and passes water received from the upper Vermilion River and from Onaping Lake. Fixed weir height provides limited ability to develop options. Continual flow is provided through the dam via one 8 ft. (2.44m) sluiceway at all times.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Options Development: There is limited ability to meet this request. There is a fixed weir height at Stobie Dam to allow passage of water during spring freshet to prevent flooding upstream. Continual flow is provided throughout the summer at the dam via one 8 ft. (2.44m) sluiceway at all times. This provides a balance between maintaining lake level and providing minimum flow to downstream users.
3. Effectiveness Monitoring: Ongoing review of stakeholder feedback will occur to monitor this issue.

11.4. Recreation – Boat Launching

Comment/Concern: Water levels too low in the summer for use of dock.

Background: Stobie dam controls levels on Vermilion Lake. Stobie dam is kept at a target rule curve elevation of 841.5 feet (256.49 m) all year.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

The target elevation for Vermilion Lake is kept constant yearly. Log movements are infrequent.

Strategies to Address Issue:

1. Data Gap: The location of the dock is unknown, ie. is it upstream or downstream of the dam?
2. Options Development: There is a fixed weir height at Stobie Dam to allow passage of water during spring freshet to prevent flooding upstream. Continual flow is provided throughout the summer at the dam via one 8 ft. (2.44m) sluiceway at all times. This provides a balance between maintaining lake level and providing minimum flow to downstream users.
3. Effectiveness Monitoring: Ongoing review of stakeholder feedback (including more specific information on location) will occur to monitor this issue.

11.5. Recreation - Navigation

Comment/Concern: Water levels are too low in the summer and too high in the spring and fall.

Background: Stobie dam controls levels on Vermilion Lake. Stobie dam is kept at a target rule curve elevation of 841.5 feet (256.49 m) all year. Vermilion Lake operates with limited storage capacity and passes water received from the upper Vermilion River and from the Onaping Lake.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

High water levels in during the spring freshet and low water levels in the summer occur naturally on unregulated lakes. The target lake level of 841.5 feet (256.49 m) is maintained throughout the year and very little log moves are made on Stobie dam.

Strategies to Address Issue:

1. Data Gap: The location at which this concern arises is unknown, ie. is it upstream or downstream of the dam?
2. Options Development: There is a fixed weir height at Stobie Dam to allow passage of water during spring freshet to prevent flooding upstream. Continual flow is provided throughout the summer at the dam via one 8 ft. (2.44m) sluiceway at all times. This provides a balance between maintaining lake level and providing minimum flow to downstream users.
3. Effectiveness Monitoring: Ongoing review of stakeholder feedback (including more specific information on location) will occur to monitor this issue.

11.6. Aquatic Ecosystems - Fisheries

Comment/Concern: Low water levels in the summer dewater spawning beds.

Background: Many fish such walleye and northern pike spawn in the spring when the spring freshet generally provides adequate water for spawning and incubation. Species such as bass spawn during the summer and may be impacted by low water levels or flows.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: Determine what the regulated and natural flow metric data for Vermilion River. Determine fish spawning locations and flow requirements.

2. Options Development: None at this time.
3. Effectiveness Monitoring: None at this time.

11.7. Aquatic Ecosystem – Fisheries

Comment/Concern: Walleye spawning downstream of Wabagishik (Lorne Falls) Generating Station.

Background: Walleye spawn in the spring when the spring freshet generally provides adequate water for spawning and incubation.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: A high priority data gap was identified in regards to determining the regulated and natural flow metric data for Vermilion River, as well as fish spawning locations and flow requirements.
2. Options Development: None at this time.
3. Effectiveness Monitoring: None at this time.

11.8. Aquatic Ecosystems – Water Quality

Comment/Concern: Sufficient flows should be maintained in the Vermilion River to address discharge of sewage treatment plants.

Background: Retention of upstream water can potentially impact the assimilation of sewage treatment plant wastes that are discharged into surface waters and potentially result in quality issues such as oxygen depletion.

Is This Concern Within the Scope of the Water Management Plan?: No. Water quality issues such as this are not within the scope of this Water Management Planning exercise, but are covered under other legal instruments.

Strategies to Address Issue: There are no such strategies specific to this WMP. However, Ontario's Low Water Response Plan is designed to incorporate such considerations under certain low flow conditions as defined in the Plan. In these circumstances, a multistakeholder team may be assembled to examine water flow strategies.

11.9. Shoreline Property and Infrastructure – Property Damage

Comment/Concern: High flows in the Vermilion River can back up Blackwater Creek and spill over into Panache Lake on the Whitefish River Watershed, causing flooding on that system. McCharles Lake on the Vermilion system can also experience significant flooding at times.

Background: While the operation of waterpower dams can mitigate downstream flood conditions, to some degree, by holding water in reservoirs, extreme high flows that cause flooding can be beyond the ability of these structures to control.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.

2. Options Development: Domtar routinely consults with the Conservation Sudbury to determine the status of water levels downstream of Domtar's dam facilities on the Vermilion River prior to any release of water, including during spring freshet.
3. Effectiveness Monitoring: Monitoring of the effectiveness of the strategy to alleviate this issue will be achieved through stakeholder feedback.

Comments and Recommendations for Plan

1. MNRF should conduct annual inspections of boat launches to determine if sufficient water levels permit launching as well as inspect dock or shoreline structure damage.

Response: The monitoring of public comments and complaints, and the review of these comments at steering committee and Standing Advisory Committee meetings will allow MNRF to assess the effectiveness of water management practices on the Spanish and Vermilion Rivers.

12.0 Lower Spanish River

12.1. Shoreline Property and Infrastructure – Property Damage

Comment/Concern: High flows flood and damage property.

Background: High river flows during the spring in some years has resulted in:

- Flooding of the Espanola golf course.
- Flooding of the wastewater sewage treatment plant in Espanola.
- Flooding along the shoreline in the community of Sagamok Anishnawbek.
- Flooding of Domtar's downstream foam pond.
- Flooding along River Road.
- Damages to shoreline structures such as docks.
- Floating debris
- Flooding of Beaudin Creek from Spanish River back flows
- In some late winters and early springs, higher than normal flows was blamed for damages to shoreline structures due to moving ice floes.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: None.
2. Option Development: A comparison of regulated and natural flow metrics sheets for Site 2CE46 at Espanola Generating Station indicates that median regulated flow during the spring freshet (April to June) is approximately 98 m3/s compared with an estimated natural median flow of 188 m3/s). The regulated system provides substantial mitigation of flooding that would occur in a natural system. Vale and Domtar monitor developing watershed melt conditions (snowpack, temperature, etc.) in advance of spring freshet to plan operations such that flooding potential is minimized. They also participate in spring freshet preparation meetings held by local agencies such as the NDCA and City of Greater Sudbury.
3. Effectiveness Monitoring: Ongoing collection and review of stakeholder feedback in regards to flooding issues and effectiveness of planning and response.

Flooding issues are outside the scope of water management planning as the plan applies only to the normal range of water levels and flows. Flooding issues should be dealt with through emergency response plans.

12.2. Recreation - Boat Launching

Comment/Concern: Low water levels make it difficult to launch boats.

Background: A comparison of regulated median flows (Regulated Flow Metrics Data Sheet for Site 2CE46 - 2004) to modelled natural flows (Natural Flow Metrics Data Sheet for Site 2CE46 – 2003) indicates that river flows in the summer are similar to what they would be naturally. However, these calculations are based on averaged data, which may obscure incidences where ramping has resulted in shallow water levels for short periods of time. Issues related to drought conditions are outside the scope of water management planning as the plan applies only to the normal range of water levels and flows.

Is This Concern Within the Scope of the Water Management Plan?: Yes. It is not clear from the comments where these concerns are occurring. Boat launches located closer to the mouth of the Spanish River will be affected by the water level of Lake Huron, but it is not clear at what point on the river this occurs.

Strategies to Address Issue:
1. Data Gap: A study is required to determine the zone of influence of regulated flows in regards to impacts on boat launches on the lower Spanish River.
2. Options Development: None at this time.
3. Effective Monitoring: Monitoring of stakeholder feedback will provide more specific information on timing, location and extent of this issue.

12.3. Recreation - Navigation

Comment/Concern: Low water levels make it difficult to access parts of the river.

Background: A comparison of regulated median flows (Regulated Flow Metrics Data Sheet for Site 2CE46 - 2004) to modelled natural flows (Natural Flow Metrics Data Sheet for Site 2CE46 – 2003) indicates that river flows in the summer are similar to what they would be naturally. However, these calculations are based on averaged data, which may obscure incidences where ramping has resulted in shallow water levels for short periods of time.

Is This Concern Within the Scope of the Water Management Plan?: Yes. It is not clear from the comments where these concerns are occurring. Navigating parts of the river located closer to the mouth will be affected by the water level of Lake Huron, but it is not clear at what point on the river this occurs.

Strategies to Address Issue:
1. Data Gap: A study is required to determine the zone of influence of regulated flows in regards to impacts on boat launches on the lower Spanish River.
2. Options Development: None at this time.
3. Effective Monitoring: Monitoring of stakeholder feedback will provide more specific information on timing, location and extent of this issue.

12.4. Erosion

Comment/Concern: Erosion along sections of the lower Spanish River has been observed.

Background: Regulated flows on the Spanish River (Regulated Flow Metrics Data Sheet for Site 2CE46 - 2004) differ from naturally predicted flows Natural Flow Metrics Data Sheet for Site 2CE46 (Draft 2003) in magnitude and frequency of peak flow conditions. Regulated flows during the spring freshet are reduced and are generally higher during the winter months. These deviations from the natural condition may alter the morphology of the river channel.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: The planning team has determined that there is a data gap which prevents comprehensive evaluation of the issue at this time. Naturally-occurring water level fluctuations and erosion (and associated debris) versus that induced by water management practices can only be determined by qualified experts, which are limited in number, at significant effort and cost. The planning team recommends that MNRF consider developing province-wide guidance on this issue.
2. Options Development: None at this time.
3. Effectiveness Monitoring: Data from compliance monitoring of water levels and stakeholder feedback from effectiveness monitoring will be recorded and reviewed annually in an effort to provide more information on specific occurrences of erosion. Any relevant information collected could be evaluated in light of the guidance mentioned in item 1.

12.5. Aquatic Ecosystems – Wildlife Habitat

Comment/Concern: Regulated flows may damage wildlife habitat, wetlands and shoreline vegetation.

Background: The Lower Spanish River is a federally designated Area in Recovery on the Great Lakes, and the Spanish River Delta is a provincially significant wetland home to many species of plants and animals. Regulated flows may affect the wetland ecosystem in the Lower Spanish River, but influences from Lake Huron water level fluctuations may be significant – especially in the Spanish River Delta area.

Is This Concern Within the Scope of the Water Management Plan?: Possibly. The Spanish River Delta is showing sign of recovery, but it is not know what impacts, if any, regulated flows in the Spanish River have on this area.

Strategies to Address Issue:

1. Data Gap: A study is required to determine the zone of influence of regulated flows in regards to impacts on habitat of the lower Spanish River.
2. Options Development: None at this time.
3. Effective Monitoring: Monitoring of stakeholder feedback will provide more specific information on timing, location and extent of this issue.

12.6. Recreation - Snowmobiling

Comment/Concern: Safety concerns for snowmobiling on the river in the winter.

Background: Snowmobiling on rivers is not recommended as moving water can result in less stable ice conditions than what would occur on a lake. A comparison of regulated flows (Regulated Flow Metrics Data Sheet for Site 2CE46 - Draft 2004) to modelled natural flows (Natural Flow Metrics Data Sheet for Site 2CE46 - 2003) shows that river flows during the winter are more than they would be naturally, and therefore possibly more dangerous.

Is This Concern Within the Scope of the Water Management Plan?: Yes. Snowmobilers are responsible for their own safety and should assess ice conditions before traveling across any water body.

Strategies to Address Issue:

1. Data Gap: No data gap was identified for this issue.

2. Options Development: No options were developed for this issue. For safety reasons, snowmobilers are advised to consult their local snowmobile club for established routes and to stick to marked trails.
3. Effectiveness Monitoring: Feedback received from stakeholders in regards to this concern will be logged and reviewed as a part of effectiveness monitoring.

12.7. Aquatic Ecosystems - Fisheries

Comment/Concern: The shorthead redhorse is a provincially uncommon fish species inhabiting the lower Spanish River. Increased siltation of habitat is considered the largest threat to this species.

Background: Population monitoring of this species by Domtar demonstrates an increase in numbers over the years. The initial decrease is assumed to have been a result of habitat loss due to tree bark from historic log drives.

Is This Concern Within the Scope of the Water Management Plan?: Yes. There is no evidence that current water management practices have an impact on this species.

Strategies to Address Issue:

1. Data Gap: Since this concern was raised Domtar has completed a study of river siltation and determined that historic deposits of fibre have been flushed downstream.
2. Options Development: No options were developed for this issue as it has been determined that the threat posed by tree bark deposition has been alleviated. Further, the population of this species has been determined to be on the rise in recent years.
3. Effectiveness Monitoring: None.

12.8. Aquatic Ecosystems - Fisheries

Comment/Concern: Muskellunge restoration efforts in the lower Spanish River.

Background: Muskellunge were once abundant in the lower Spanish River but the population declined due to water quality and over-exploitation. Beginning in 1992, fingerlings were stocked into the lower Spanish River on an annual basis to attempt to restore the population. Minimum flow requirements for spawning and incubation are considered important to the success of this project.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address This Issue:

1. Data Gap: Recent assessments have demonstrated that stocking efforts have been successful and that recruitment is occurring. Muskellunge habitat is primarily in the Spanish River Delta area, and therefore more dependent on Lake Huron levels than flows from the Spanish River.
2. Options Development: None.
3. Effectiveness Monitoring: The results of any studies completed by MNRF, DFO or other parties will be reviewed as they come available.

12.9. Aquatic Ecosystems - Fisheries

Comment/Concern: Algae growth, due to low water flows, covers walleye spawning beds.

Background: A significant walleye spawning ground is located below the Espanola Dam. Diversion of water for hydropower generation around this spawning bed has reduced the flows over the dam and increased summer algal growth on the spawning substrate. Success rate for walleye eggs may decline due to diminished interstitial spacing required for incubation.

Spring and summer regulated flows (Regulated Flow Metrics Data Sheet for Site 2CE46 - 2004) are less than those predicted for natural flows Natural Flow Metrics Data Sheet for Site - 2003), and flows that pass over the spawning shoals may be further reduced due to the diversion of water for power generation.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: A data gap was identified to gather information on the impacts of algae growth on walleye spawning and the influence of water management practices.
2. Option Development: None at this time.
3. Effectiveness Monitoring: None at this time.

12.10. Aquatic Ecosystems - Fisheries

Comment/Concern: Minimum flows and levels for walleye spawning and incubation.

Background: A significant walleye spawning ground is located below the Espanola Dam. Diversion of water for hydropower generation around this spawning bed reduces the flows over the dam. In some low flow years, these flows may be insufficient and result in poor success rates for walleye eggs.

Espanola dam has limited storage and generally passes the water it receives from the Spanish and Vermilion Rivers.

Is This Concern Within the Scope of the Water Management Plan?: Yes.

Strategies to Address Issue:

1. Data Gap: A high priority data gap was identified pertaining to minimum flows and levels required for walleye spawning.
2. Options Development: None at this time.
3. Effectiveness Monitoring: None at this time.

12.11. Aquatic Ecosystem - Minimum Flows

Comment/Concern: Minimum flows required for aquatic ecosystem health.

Background: In August 1982, a fish kill in the lower Spanish River resulted from decreased dissolved oxygen concentrations. A low spring runoff, with lower than normal precipitation and higher than normal temperatures and evapo-transpiration, resulted in low summer flows and an oxygen sag occurred in the lower Spanish River.

When flow through the Espanola facility decreases to 600 cubic feet per second (cfs) (17 m^3/s), Domtar informs Vale and may request additional water. The Domtar Spanish River Minimum Dissolved Oxygen Management Plan is activated.

Is This Concern Within the Scope of the Water Management Plan?: No. This water quality issue is already dealt with through MOE's Certificate of Approval, and a low flow augmentation plan. The flow at which these plans are triggered (17 m^3/s) are well below the minimum flow recommended by MNRF's Aquatic Ecosystem Guidelines for this site in August (32 m^3/s), and therefore, outside the scope of this water management plan.

13.0 Birch (Gough) Lake

During the scoping phase, comments on the operation of Birch Lake in Gough Township were sought. No public comments regarding this lake were received at that time, but the local MNRF office in Espanola is aware of a few concerns, through normal operations of the dam, and through a history of complaints.

Since the scoping phase, the steering committee agreed to remove Birch Lake from the Spanish/Vermilion Rivers Water Management Plan due to the fact that it is a non-hydro water control structure located downstream of the last hydro-generating station in Espanola. The list of concerns identified by the MNRF will be kept on file and reviewed at such a time when a water management plan for Birch Lake is required. Should a waterpower facility be established in the future, an amendment will be required to include this facility in this WMP.

Spanish River Watershed

Water Management Plan

prepared by

INCO
STRONGER FOR OUR EXPERIENCE

E. B. EDDY FOREST PRODUCTS LTD.

in co-operation with

Ministry of Natural Resources
Ontario

February 26, 1993

FOREWORD

The Spanish River Water Management Plan has been prepared and adopted in recognition of the value of the Spanish River for outdoor recreation and resource utilization in the planning period to the year 2012.

The Spanish River Water Control Dams will be operated in accordance with the framework established to ensure cooperative multiple use.

This approach was taken in recognition of the high level of public interest in water level and flow management.

The management objectives and operational strategies will be used to direct operation of the water control and power generation facilities.

To realize the objectives of the water management plan efforts will be directed to:

- integrating water management activities within the Area;
- exercising control over water levels and flows in the basin to minimize impacts on recreation and fisheries
- monitoring the development of flood or drought conditions in the watershed and acting to minimize impacts where possible
- working cooperatively with interest groups, local residents, and members of the public in general; and,
- liaising regularly with other government agencies.

Al Stewart
Regional Director
Central Region

Richard Hunter
Regional Director
Northeast Region

PREFACE

INCO Limited and E.B. Eddy Forest Products Limited have prepared this plan to optimize Water Management in the Spanish River Basin.

This plan is intended to inform the resource users of the watershed on water level limits and drawdown schedules for the associated lakes.

INCO Limited

E.B. Eddy Forest Products Limited

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**** Note Appendix III has not been included in this report (if you require a list of Associated Users contact Ministry of Natural Resources, 199 Larch St., Sudbury, Ontario P3E 5P9 Attn: Susan Hallikainen (705) 675-4120 Ext 361)

FIGURES

FIGURE **PAGE**

TABLES

INTRODUCTION

The Spanish River Water Management Plan (SRWMP) was prepared in response to a Provincial directive requesting INCO Limited and E. B. Eddy Forest Products Limited to establish formalized operating policies and directives for water resource management within the Spanish River watershed. The SRWMP was prepared by an inter-disciplinary planning team comprised of members from the Ministry of Natural Resources, INCO Limited and E.B. Eddy Forest Products Limited. Public participation and input has been an integral component of this plan.

The SRWMP will be reviewed by individuals, agencies and organizations (associated users) interested in water resource management.

The management directives have been formulated to address the concerns of the associated users. The operating policies have been established to ensure the management directives are maintained.

OBJECTIVES

The plan objectives are:

1) to provide management directives and operational strategies

for water resource management;

2) to supply information to individuals, agencies and organizations as determined by the operational requirements;

3) to provide operating ranges for normal, low and high flow conditions;

4) to consider the environmental requirements for fish and wildlife habitat; and

5) optimization of hydro electric generation.

The following sections give detailed information on the objectives.

Operational strategies, nominal lake levels and a list of associated users are appended.

PUBLIC INVOLVEMENT

The purpose of public involvement was to ensure the associated users were consulted and involved early at key stages in the planning process. Public involvement is an integral component of this plan.

Public involvement has been a coordinated effort between the associated users and the planning team.

To develop the SRWMP it was necessary to determine the associated users of the watershed. This was completed through the use of the advertising media and acquisition of a preliminary mailing list from the Ministry of Natural Resources.

Secondly, information packages were mailed informing the users that INCO limited and E.B. Eddy Forest Products Limited in conjunction with the Ministry of Natural Resources were preparing a Water Management Plan for the Spanish River Watershed. Comments and concerns were solicited from the public.

Background information meetings were held with the users of the watershed to identify preliminary problems and issues, and to illustrate past water resource operations within the watershed. Public information meetings were held at the following locations.

LOCATION	INTERESTED GROUPS	DATE AND TIME
Biscotasi	Residents of Biscotasi	1988/11/02 13:00
Copper Cliff	Sand Bay Campers Assoc.	1988/11/06 13:30
Webbwood Community Centre	Agnew Lake Property Owners	1988/11/08 19:00
Copper Cliff	Baldwin Campers Assoc.	1988/11/15 19:00
Copper Cliff	Ministic Lake Property Owners	1988/12/01 19:00
Copper Cliff	Armstrong Lake Property Owners	1988/12/06 19:00
Copper Cliff	Onaping Lake Property Owners	1989/06/06 19:00
Copper Cliff	Pogamasing Lake Property Owners	1989/06/07 19:00
Copper Cliff	General Public	1989/06/20 9:00
Biscotasi	Residents of Biscotasi	1989/07/06 12:00

General comments and concerns of the associated users and interest groups are given below. Solutions to the users needs were required to develop the operational guidelines.

WATERBODY	GENERAL COMMENTS
Agnew Lake	- fisheries habitat - dock damage - lake fluctuations
Biscotasi Lake	- fisheries habitat - milfoil/algae problem - lake fluctuations
Indian Lake	- fisheries habitat - lake fluctuations
Mozhabong Lake	- good operational strategy
Ramsay Lake	- fisheries habitat
Frechette Lake	- navigation of waterbody during trapping season

WATERBODY	GENERAL COMMENTS
Frechette Lake	- higher water levels later in the season to accommodate fly in camps - no major drawdown of lake during recreational season to accommodate canoeists
Canoe Lake (Bardney)	- navigation of waterbody during trapping season - no major drawdown of lake during the canoeing period
Pogamasing Lake	- lake fluctuations - bank erosion - fisheries habitat
Ministic Lake	- drawdown in October - more responsible control of lake levels
Onaping Lake	- fisheries habitat - lake fluctuations

WATERBODY	GENERAL COMMENTS
Armstrong Lake	- drawdown in October - more responsible control of lake levels

Taking into consideration the associated user comments the planning team proposed new lake levels of operation for conditions of normal, low, and high flows. Fisheries habitat was a major concern in establishing these levels of operations. Open house meetings were then held to solicit comments on the proposed limits of operation and newly established lake operating levels. Meetings and attendees are listed below.

LOCATION	INTERESTED GROUPS	DATE AND TIME
Copper Cliff	Onaping Lake Property Owners, General Public	1990/06/25 19:00
Copper Cliff	Pogamasing Lake Property Owners,. General Public	1990/06/26 19:00
Copper Cliff	Sand Bay Campers Assoc. Baldwin Campers Assoc. Agnew Lake Property Owners, General Public	1990/06/27 19:00
Copper Cliff	Ministic Lake and Armstrong Lake Property Owners, General Public	1990/06/28 19:00

LOCATION	INTERESTED GROUPS	DATE AND TIME
Biscotasi	Residents of Biscotasi General Public	1990/07/30 13:00

The comments and concerns were similar to those received during the Background Information meetings.

MANAGEMENT DIRECTIVES/POLICIES

The management directives have been established to consider present day legislation.

For water resource management all parties must act in the overall interest of the watershed. Under high water conditions protect the dams and structures to prevent or minimize the impacts of flooding. Under low water conditions conserve water, maintain lake levels and water quality (low flow augmentation agreement) in the Spanish River system. Generally moderate the impact of natural extremes.

The priority for regulation is to protect life, prevent damage to personal property while having due regard for environmental and recreational interests. Hydro electric generation is secondary to the above.

SIGNIFICANT ISSUES/MANAGEMENT DIRECTION

The following management directives will be carried out unless superseded by the above policy. The management directives address the significant issues expressed during public consultation.

ISSUES	MANAGEMENT DIRECTION
Fisheries habitat	- no major drawdown of any lake during the critical period of fish spawn - minimize the depth of lake drawdown thereby providing a greater area of spawning substrate - minimize lake fluctuations to maintain adequate protection of eggs
Lake fluctuations	- increased public involvement to notify companies of fluctuating water levels - increased monitoring of lake levels - gradual drawdown of lake levels, no major drawdowns
Dock damage	- increased public notification of water levels through the water management information line - increased public involvement to notify companies of impending damages

ISSUES	MANAGEMENT DIRECTION
Navigation of waterbody	- no major drawdown of lakes during the recreational period - lakes traditionally used to accommodate the fly in camps and trappers will remain near full supply level until December unless fisheries management indicate an earlier drawdown

OPERATIONAL STRATEGIES

The proposed operational limits have been prepared to consider the existing user groups, reduce the impact of flood damage on people and property and minimize the potential impact from water level fluctuations on the environment, including fish and wildlife habitat.

The following users have been given information concerning the operational strategies:

1) cottage owners;
2) lodge owners and tourist outfitters;
3) anglers and hunters;

4) trappers;

5) general public; and

6) Governmental agencies.

The Spanish River System is generally managed by following the water levels shown on the Cumulative Rule Curves. These curves show desired monthly lake elevations for conditions of low, normal and high flows. They also provide an integral decision making process in establishing hydro monthly peaks and environmental balance while recognizing local and traditional users.

It should be noted that the Ministry of Natural Resources Biologists have agreed in principle to the new limits of operation.

Figures 1, 2 and 3 show the Spanish River Area Cumulative Rule Curves for normal, low and high flow operating conditions. Approximate storage elevations, storage volumes and water levels in feet above sill are shown. The total volume of water remaining is with respect to the months end. The Spanish River system will be managed to maintain lake levels within the operating ranges shown in these Figures.

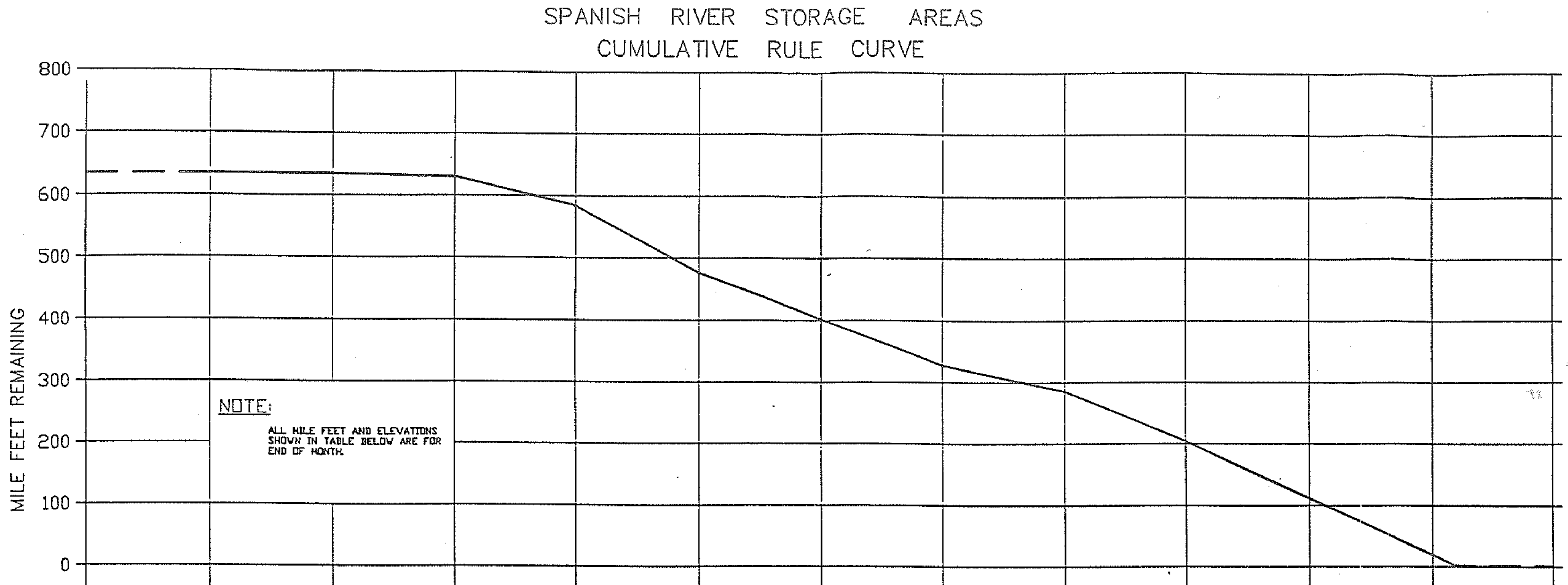
A water management information line has been established to inform the associated users on lake levels and flows on the Spanish River.

Information may be solicited by telephoning (705) 866-2880. The water management information line is updated weekly.

PLAN REVIEW

This plan will be reviewed by the planning team at five year intervals. Amendments to stated policy significantly affecting limits of operation, management directives or public reaction will follow the same approval process as this SRWMP document.

Amendments not affecting limits of operation, stated management directives or public reaction requires a note to file at time of the planning review.



STORAGE AREAS	MAY PLANNED STORAGE VOLUME (M.FT.)	MAY STORAGE ELEV. (FT.)	MAY ABOVE SILL (FT.)	JUNE PLANNED STORAGE VOLUME (M.FT.)	JUNE STORAGE ELEV. (FT.)	JUNE ABOVE SILL (FT.)	JULY PLANNED STORAGE VOLUME (M.FT.)	JULY STORAGE ELEV. (FT.)	JULY ABOVE SILL (FT.)
FRECHETTE LAKE	32.7	1397.79	13.0	32.7	1397.79	13.0	28.0	1396.79	12.0
CANOE LAKE	9.4	1394.33	8.0	9.4	1394.33	8.0	9.4	1394.33	8.0
MOZHABONG LAKE	28.4	1350.25	9.0	28.4	1350.25	9.0	28.4	1350.25	9.0
INDIAN LAKE	27.5	1343.26	9.0	27.5	1343.26	9.0	27.5	1343.26	9.0
RAMSAY LAKE	147.8	1343.02	16.0	147.8	1343.02	16.0	147.8	1343.02	16.0
BISCOTASI LAKE	129.4	1322.58	12.5	129.4	1322.58	12.5	129.4	1322.58	12.5
ARMSTRONG LAKE	3.6	1159.11	7.0	3.6	1159.11	7.0	3.6	1159.11	7.0
MINISTIC LAKE	4.3	1207.00	6.0	4.3	1207.00	6.0	4.3	1207.00	6.0
AGNEW LAKE	139.8	859.50		139.8	859.50		139.8	859.50	
ONAPING LAKE	80.0	1307.00	12.0	80.0	1307.00	12.0	80.0	1307.00	12.0
SINAMINDA LAKE	19.0	1365.00	11.0	19.0	1365.00	11.0	19.0	1365.00	11.0
POGAMASING LAKE	6.3	1206.00	7.0	6.3	1206.00	7.0	6.3	1206.00	7.0
TOTAL M.FT. REMAINING	628.2			628.2			623.5		

STORAGE AREAS	AUGUST PLANNED STORAGE VOLUME (M.FT.)	AUGUST STORAGE ELEV. (FT.)	AUGUST ABOVE SILL (FT.)	SEPTEMBER PLANNED STORAGE VOLUME (M.FT.)	SEPTEMBER STORAGE ELEV. (FT.)	SEPTEMBER ABOVE SILL (FT.)	OCTOBER PLANNED STORAGE VOLUME (M.FT.)	OCTOBER STORAGE ELEV. (FT.)	OCTOBER ABOVE SILL (FT.)
FRECHETTE LAKE	28.0	1396.79	12.0	28.0	1396.79	12.0	28.0	1396.79	12.0
CANOE LAKE	9.4	1394.33	8.0	9.4	1394.33	8.0	3.8	1392.33	6.0
MOZHABONG LAKE	22.0	1349.25	8.0	0.0	1346.25	5.0	0.0	1346.25	5.0
INDIAN LAKE	22.3	1342.26	8.0	22.3	1342.26	8.0	11.1	1340.26	6.0
RAMSAY LAKE	124.6	1342.02	15.0	112.9	1341.52	14.5	89.1	1340.52	13.5
BISCOTASI LAKE	118.9	1322.08	12.0	129.4	1322.58	12.5	118.9	1322.05	12.0
ARMSTRONG LAKE	3.6	1159.11	7.0	3.6	1159.11	7.0	0.0	1156.11	4.0
MINISTIC LAKE	4.3	1207.00	6.0	4.3	1207.00	6.0	0.0	1205.00	4.0
AGNEW LAKE	139.8	859.50		139.8	859.50		139.8	859.50	
ONAPING LAKE	80.0	1307.00	12.0	26.2	1305.00	10.0	0.0	1304.00	9.0
SINAMINDA LAKE	19.0	1365.00	11.0	0.0	1362.00	8.0	0.0	1362.00	8.0
POGAMASING LAKE	6.3	1206.00	7.0	0.0	1204.00	5.0	0.0	1204.00	5.0
TOTAL M.FT. REMAINING	578.2			475.9			390.7		

STORAGE AREAS	NOVEMBER PLANNED STORAGE VOLUME (M.FT.)	NOVEMBER STORAGE ELEV. (FT.)	NOVEMBER ABOVE SILL (FT.)	DECEMBER PLANNED STORAGE VOLUME (M.FT.)	DECEMBER STORAGE ELEV. (FT.)	DECEMBER ABOVE SILL (FT.)	JANUARY PLANNED STORAGE VOLUME (M.FT.)	JANUARY STORAGE ELEV. (FT.)	JANUARY ABOVE SILL (FT.)
FRECHETTE LAKE	12.8	1393.79	9.0	0.0	1388.79	4.0	0.0	1388.79	4.0
CANOE LAKE	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0
MOZHABONG LAKE	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0
INDIAN LAKE	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0
RAMSAY LAKE	67.3	1339.52	12.5	48.7	1338.52	11.5	0.0	1334.52	7.5
BISCOTASI LAKE	107.7	1321.58	11.5	96.3	1321.08	11.0	76.0	1320.08	10.0
ARMSTRONG LAKE	0.0	1156.11	4.0	0.0	1156.11	4.0	0.0	1156.11	4.0
MINISTIC LAKE	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0
AGNEW LAKE	139.8	859.50		139.8	859.50		127.8	858.50	
ONAPING LAKE	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0
SINAMINDA LAKE	0.0	1362.00	8.0	0.0	1362.00	8.0	0.0	1362.00	8.0
POGAMASING LAKE	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0
TOTAL M.FT. REMAINING	327.6			284.8			203.8		

STORAGE AREAS	FEBRUARY PLANNED STORAGE VOLUME (M.FT.)	FEBRUARY STORAGE ELEV. (FT.)	FEBRUARY ABOVE SILL (FT.)	MARCH PLANNED STORAGE VOLUME (M.FT.)	MARCH STORAGE ELEV. (FT.)	MARCH ABOVE SILL (FT.)	APRIL PLANNED STORAGE VOLUME (M.FT.)	APRIL STORAGE ELEV. (FT.)	APRIL ABOVE SILL (FT.)
FRECHETTE LAKE	0.0	1388.79	4.0	0.0	1388.79	4.0	0.0	1388.79	4.0
CANOE LAKE	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0
MOZHABONG LAKE	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0
INDIAN LAKE	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0
RAMSAY LAKE	0.0	1334.52	7.5	0.0	1334.52	7.5	0.0	1334.52	7.5
BISCOTASI LAKE	0.0	1316.08	6.0	0.0	1316.08	6.0	0.0	1316.08	6.0
ARMSTRONG LAKE	0.0	1156.11	4.0	0.0	1156.11	4.0	0.0	1156.11	4.0
MINISTIC LAKE	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0
AGNEW LAKE	110.6	857.00		18.4	848.00		0.0	846.00	
ONAPING LAKE	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0
SINAMINDA LAKE	0.0	1362.00	8.0	0.0	1362.00	8.0	0.0	1362.00	8.0
POGAMASING LAKE	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0
TOTAL M.FT. REMAINING	110.6			18.4			0.0		

NO.	REFERENCE DRAWINGS	NO.	REFERENCE DRAWINGS

REV.	DESCRIPTION	DATE	BY	REV.	DESCRIPTION	DATE	BY
6.				1.	ONAPING LAKE GEODETIC ELEVATION	91/6/13	D.V.
7.				2.	POGAMASING LAKE LEVEL	92/1/9	D.V.
8.				3.			
9.				4.			
10.				5.			

INCO LIMITED
ONTARIO DIVISION, CANADA

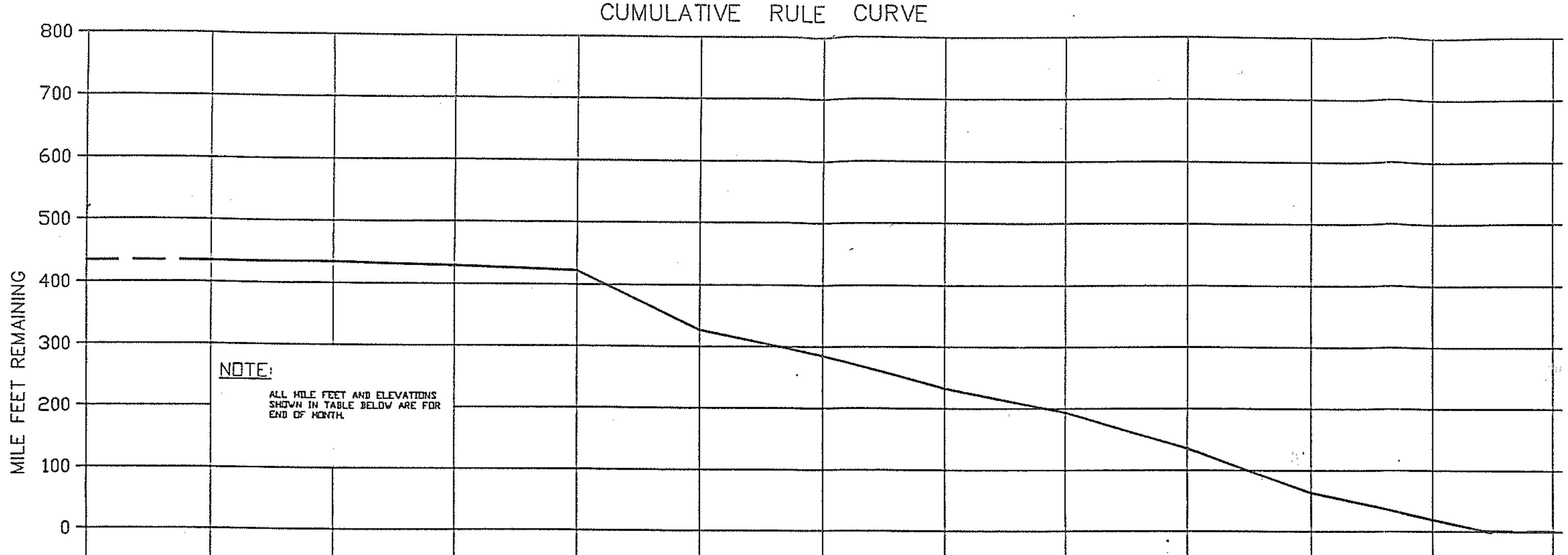
CHECKED | DRAWING | DATE
APPROVED | DESIGN | DATE
REVIEWED | DRAWING | DESIGN
CADD DWG FILE NO. DRAWIN7

TITLE SPANISH RIVER SYSTEM
ALL STORAGE AREAS
CUMULATIVE RULE CURVE
SCALE N/A DRAWN BY D.S.BRADY DATE 90/11/12

Figure 1:
NORMAL OPERATING CONDITIONS

REV. 9B

SPANISH RIVER STORAGE AREAS
CUMULATIVE RULE CURVE



STORAGE AREAS	MAY			JUNE			JULY			AUGUST			SEPTEMBER			OCTOBER		
	PLANNED			PLANNED			PLANNED			PLANNED			PLANNED			PLANNED		
	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)
FRECHETTE LAKE	22.5	1395.79	11.0	22.5	1395.79	11.0	17.4	1394.79	10.0	17.4	1394.79	10.0	17.4	1394.79	10.0	17.4	1394.79	10.0
CANOE LAKE	1.8	1391.33	5.0	1.8	1391.33	5.0	1.8	1391.33	5.0	1.8	1391.33	5.0	1.8	1391.33	5.0	1.8	1391.33	5.0
MOZHABONG LAKE	22.0	1349.25	8.0	22.0	1349.25	8.0	22.0	1349.25	8.0	14.7	1348.25	7.0	0.0	1346.25	5.0	0.0	1346.25	5.0
INDIAN LAKE	11.1	1340.26	6.0	11.1	1340.26	6.0	11.1	1340.26	6.0	11.1	1340.26	6.0	11.1	1340.26	6.0	11.1	1340.26	6.0
RAMSAY LAKE	57.6	1339.02	12.0	57.6	1339.02	12.0	57.6	1339.02	12.0	57.6	1339.02	12.0	39.7	1338.02	11.0	28.7	1337.02	10.0
BISCOTASI LAKE	76.0	1320.08	10.0	76.0	1320.08	10.0	76.0	1320.08	10.0	76.0	1320.08	10.0	85.7	1320.58	10.5	85.7	1320.58	10.5
ARMSTRONG LAKE	2.7	1158.11	6.0	2.7	1158.11	6.0	2.7	1158.11	6.0	2.7	1158.11	6.0	2.7	1158.11	6.0	0.0	1158.11	4.0
MINISTIC LAKE	2.1	1206.00	5.0	2.1	1206.00	5.0	2.1	1206.00	5.0	2.1	1206.00	5.0	2.1	1206.00	5.0	0.0	1205.00	4.0
AGNEW LAKE	139.8	859.5		139.8	859.50		139.8	859.50		139.8	859.50		139.8	859.50		139.8	859.50	
ONAPING LAKE	80.0	1307.00	12.0	80.0	1307.00	12.0	80.0	1307.00	12.0	80.0	1307.00	12.0	26.2	1305.00	10.0	0.0	1304.00	9.0
SINAMINDA LAKE	12.6	1364.00	10	12.6	1364.00	10.0	12.6	1364.00	10.0	12.6	1364.00	10.0	0.0	1362.00	8.0	0.0	1362.00	8.0
POGAMASING LAKE	6.3	1206.00	7.0	6.3	1206.00	7.0	6.3	1206.00	7.0	6.3	1206.00	7.0	0.0	1204.00	5.0	0.0	1204.00	5.0
TOTAL M.FT. REMAINING	434.5			434.5			429.4			422.1			326.5			284.5		

STORAGE AREAS	NOVEMBER			DECEMBER			JANUARY			FEBRUARY			MARCH			APRIL		
	PLANNED			PLANNED			PLANNED			PLANNED			PLANNED			PLANNED		
	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)
FRECHETTE LAKE	9.0	1392.79	8.0	0.0	1388.79	4.0	0.0	1388.79	4.0	0.0	1388.79	4.0	0.0	1388.79	4.0	0.0	1388.79	4.0
CANOE LAKE	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0
MOZHABONG LAKE	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0
INDIAN LAKE	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0
RAMSAY LAKE	17.0	1336.02	9.0	5.7	1335.02	8.0	0.0	1334.52	7.5	0.0	1334.52	7.5	0.0	1334.52	7.5	0.0	1334.52	7.5
BISCOTASI LAKE	66.5	1319.58	9.5	47.5	1318.58	8.5	26.5	1317.58	7.5	0.0	1316.08	6.0	0.0	1316.08	6.0	0.0	1316.08	6.0
ARMSTRONG LAKE	0.0	1158.11	4.0	0.0	1158.11	4.0	0.0	1158.11	4.0	0.0	1158.11	4.0	0.0	1158.11	4.0	0.0	1158.11	4.0
MINISTIC LAKE	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0
AGNEW LAKE	139.8	859.50		139.8	859.50		105.1	856.50		62.3	852.50		18.4	848.00		0.0	846.00	
ONAPING LAKE	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0
SINAMINDA LAKE	0.0	1362.00	8.0	0.0	1362.00	8.0	0.0	1362.00	8.0	0.0	1362.00	8.0	0.0	1362.30	8.0	0.0	1362.00	8.0
POGAMASING LAKE	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0
TOTAL M.FT. REMAINING	232.3			193.0			133.6			62.3			18.4			0.0		

NO.	REFERENCE DRAWINGS	NO.	REFERENCE DRAWINGS	REV.	DESCRIPTION	DATE	BY	REV.	DESCRIPTION	DATE	BY
				6.				1.	ONAPING LAKE GEODETIC ELEVATION	91/6/17	D.V.
				7.				2.	POGAMASING LAKE LEVEL	92/1/9	D.V.
				8.				3.			
				9.				4.			
				10.				5.			

INCO LIMITED
ONTARIO DIVISION, CANADA

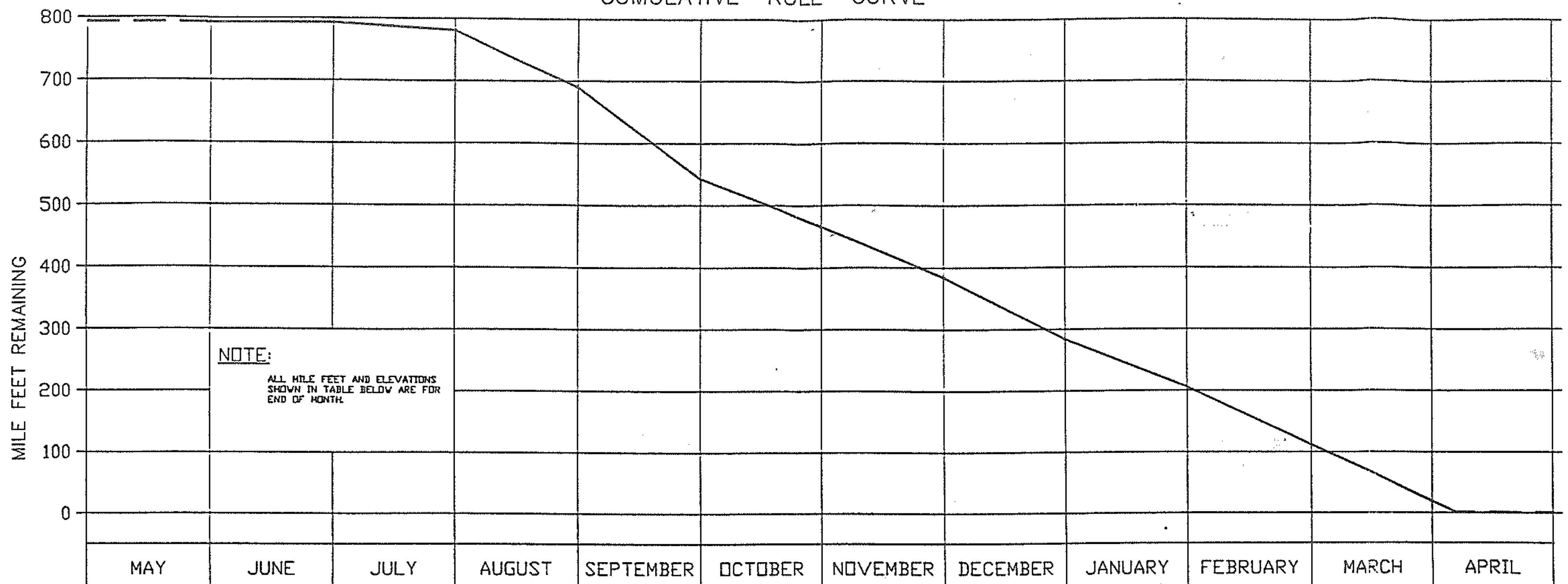
CHECKED / DRAWING | APPROVED / DESIGN | REVIEWED / DRAWING / DESIGN | DATE | CAD DWG FILE NO. DRAWING

TITLE SPANISH RIVER SYSTEM
ALL STORAGE AREAS
CUMULATIVE RULE CURVE
SCALE N/A DRAWN BY D.S.BRADY DATE 90/11/12

FIGURE 2: LOW FLOW OPERATING CONDITIONS

REV. 10B

SPANISH RIVER STORAGE AREAS
CUMULATIVE RULE CURVE



STORAGE AREAS	MAY PLANNED			JUNE PLANNED			JULY PLANNED			AUGUST PLANNED			SEPTEMBER PLANNED			OCTOBER PLANNED		
	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)
FRECHETTE LAKE	41.1	1398.79	14.0	41.1	1398.79	14.0	32.7	1397.79	13.0	32.7	1397.79	13.0	32.7	1397.79	13.0	32.7	1397.79	13.0
CANOE LAKE	12.9	1395.33	9.0	12.9	1395.33	9.0	12.9	1395.33	9.0	12.9	1395.33	9.0	12.9	1395.33	9.0	6.4	1393.33	7.0
MOZHABONG LAKE	47.6	1352.75	11.5	47.6	1352.75	11.5	44.0	1352.25	11.0	38.7	1351.25	10.0	0.0	1346.25	5.0	0.0	1346.25	5.0
INDIAN LAKE	27.5	1343.26	9.0	27.5	1343.26	9.0	27.5	1343.26	9.0	27.5	1343.26	9.0	27.5	1343.26	9.0	27.5	1343.26	9.0
RAMSAY LAKE	187.9	1344.52	17.5	187.9	1344.52	17.5	187.9	1344.52	17.5	159.5	1343.52	16.5	148.0	1343.02	16.0	130.2	1342.02	15.0
BISCOTASI LAKE	165.2	1324.08	14.0	165.2	1324.08	14.0	165.2	1324.08	14.0	129.4	1322.58	12.5	142.2	1323.08	13.0	129.4	1322.58	12.5
ARMSTRONG LAKE	3.9	1160.11	8.0	3.9	1160.11	8.0	3.9	1160.11	8.0	3.9	1160.11	8.0	3.9	1160.11	8.0	0.0	1156.11	4.0
MINISTIC LAKE	8.7	1209.00	8.0	8.7	1209.00	8.0	8.7	1209.00	8.0	8.7	1209.00	8.0	8.7	1209.00	8.0	0.0	1205.00	4.0
AGNEW LAKE	139.8	859.50		139.8	859.50		139.8	859.50		139.8	859.50		139.8	859.50		139.8	859.50	
ONAPING LAKE	113.1	1308.00	13.0	113.1	1308.00	13.0	113.1	1308.00	13.0	113.1	1308.00	13.0	26.2	1305.00	10.0	0.0	1304.00	9.0
SINAMINDA LAKE	19.0	1365.00	11.0	19.0	1365.00	11.0	19.0	1365.00	11.0	12.6	1364.00	10.0	0.0	1362.00	8.0	0.0	1362.00	8.0
POGAMASING LAKE	25.9	1209.00	10.0	25.9	1209.00	10.0	25.9	1209.00	10.0	12.6	1207.00	8.0	0.0	1204.00	5.0	0.0	1204.00	5.0
TOTAL M.FT. REMAINING	792.6			792.6			780.6			689.4			541.9			466.0		

STORAGE AREAS	NOVEMBER PLANNED			DECEMBER PLANNED			JANUARY PLANNED			FEBRUARY PLANNED			MARCH PLANNED			APRIL PLANNED		
	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)	STORAGE VOLUME (M.FT.)	STORAGE ELEV. (FT.)	ABOVE SILL (FT.)
FRECHETTE LAKE	12.6	1393.79	9.0	0.0	1388.79	4.0	0.0	1388.79	4.0	0.0	1388.79	4.0	0.0	1388.79	4.0	0.0	1388.79	4.0
CANOE LAKE	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0	0.0	1390.33	4.0
MOZHABONG LAKE	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0	0.0	1346.25	5.0
INDIAN LAKE	11.1	1340.26	6.0	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0	0.0	1338.26	4.0
RAMSAY LAKE	101.0	1341.02	14.0	67.3	1339.52	12.5	39.5	1338.02	11.0	0.0	1334.52	7.5	0.0	1334.52	7.5	0.0	1334.52	7.5
BISCOTASI LAKE	119.2	1322.08	12.0	76.0	1320.08	10.0	38.0	1318.08	8.0	0.0	1316.08	6.0	0.0	1316.08	6.0	0.0	1316.08	6.0
ARMSTRONG LAKE	0.0	1156.11	4.0	0.0	1156.11	4.0	0.0	1156.11	4.0	0.0	1156.11	4.0	0.0	1156.11	4.0	0.0	1156.11	4.0
MINISTIC LAKE	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0	0.0	1205.00	4.0
AGNEW LAKE	139.8	859.50		139.8	859.50		127.8	858.50		110.6	857.00		18.4	848.00		0.0	848.00	
ONAPING LAKE	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0	0.0	1304.00	9.0
SINAMINDA LAKE	0.0	1362.00	8.0	0.0	1362.00	8.0	0.0	1362.00	8.0	0.0	1362.00	8.0	0.0	1361.00	7.0	0.0	1362.00	8.0
POGAMASING LAKE	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0	0.0	1204.00	5.0
TOTAL M.FT. REMAINING	383.9			283.1			205.3			110.6			18.4			0.0		

NO.	REFERENCE DRAWINGS	NO.	REFERENCE DRAWINGS	REV.	DESCRIPTION	DATE	BY	REV.	DESCRIPTION	DATE	BY
				6.				1.	ONAPING LAKE GEODETIC ELEVATION	91/6/17	D.V.
				7.				2.	POGAMASING LAKE LEVEL	92/1/9	D.V.
				8.				3.			
				9.				4.			
				10.				5.			

INCO LIMITED
ONTARIO DIVISION, CANADA

CHECKED | DRAWING | DATE
APPROVED | DESIGN | DATE
REVIEWED | DRAWING | DESIGN
CAD DWG FILE NO. DRAWING

TITLE SPANISH RIVER SYSTEM
ALL STORAGE AREAS
CUMULATIVE RULE CURVE
SCALE N/A DRAWN BY M. STEVENSON DATE 90/11/12

FIGURE 3: HIGH FLOW OPERATING CONDITIONS

REV. 11B

APPENDIX I

NOMINAL LAKE LEVELS

GENERAL

The following figures show the end of month nominal lake levels in feet above sill or feet geodetic.

It should be noted that large variations in climatic conditions such as rain storms and extreme dry periods may cause lake levels to change. This change may be as much as 1 foot.

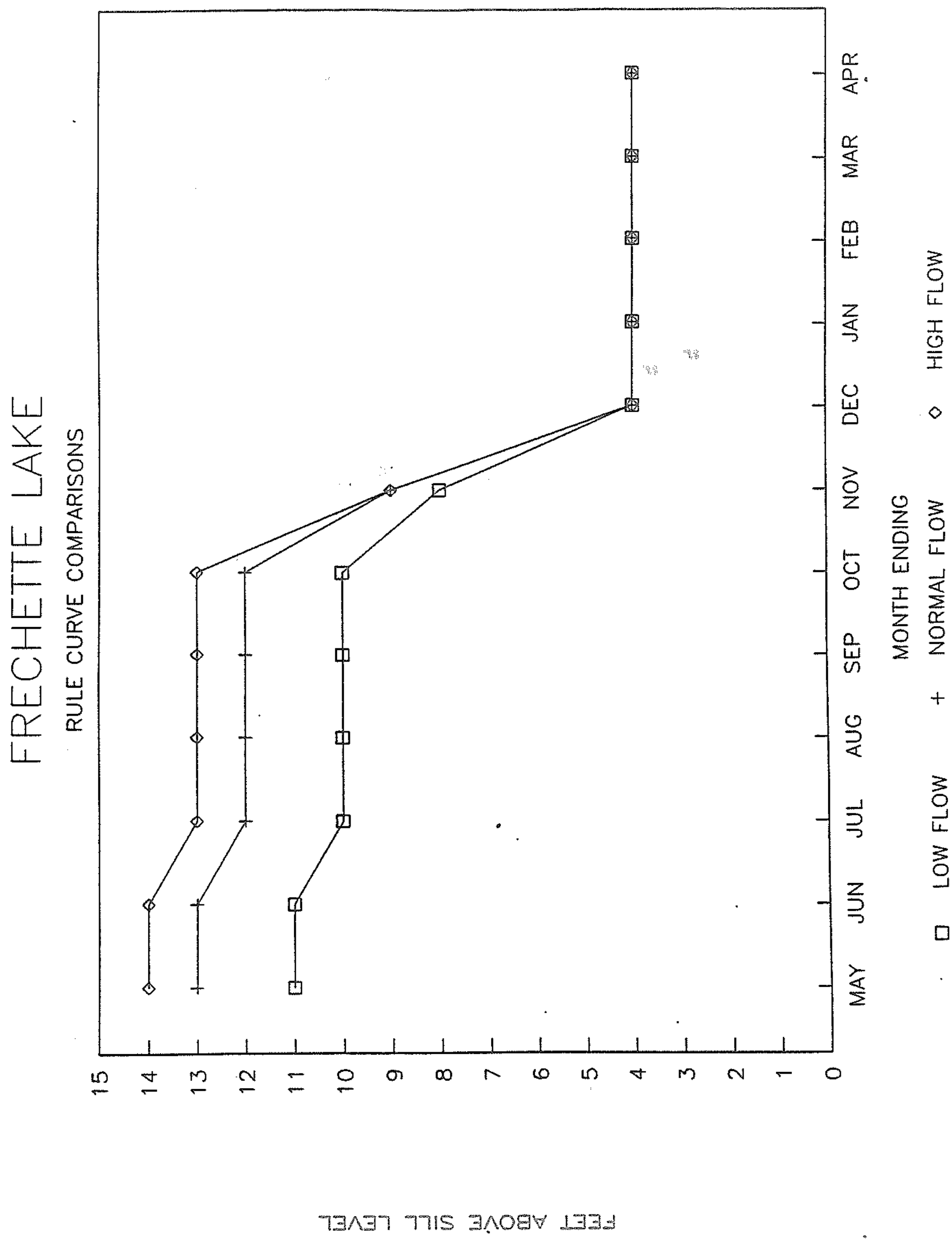
Generally lake levels will be maintained to follow the normal flow curve.

Water levels will be controlled and maintained to:

1) consider the associated user groups;
2) reduce the impact of flood damage on people and property; and
3) to minimize the potential impact from water fluctuations on the environment, including fish and wildlife habitat.

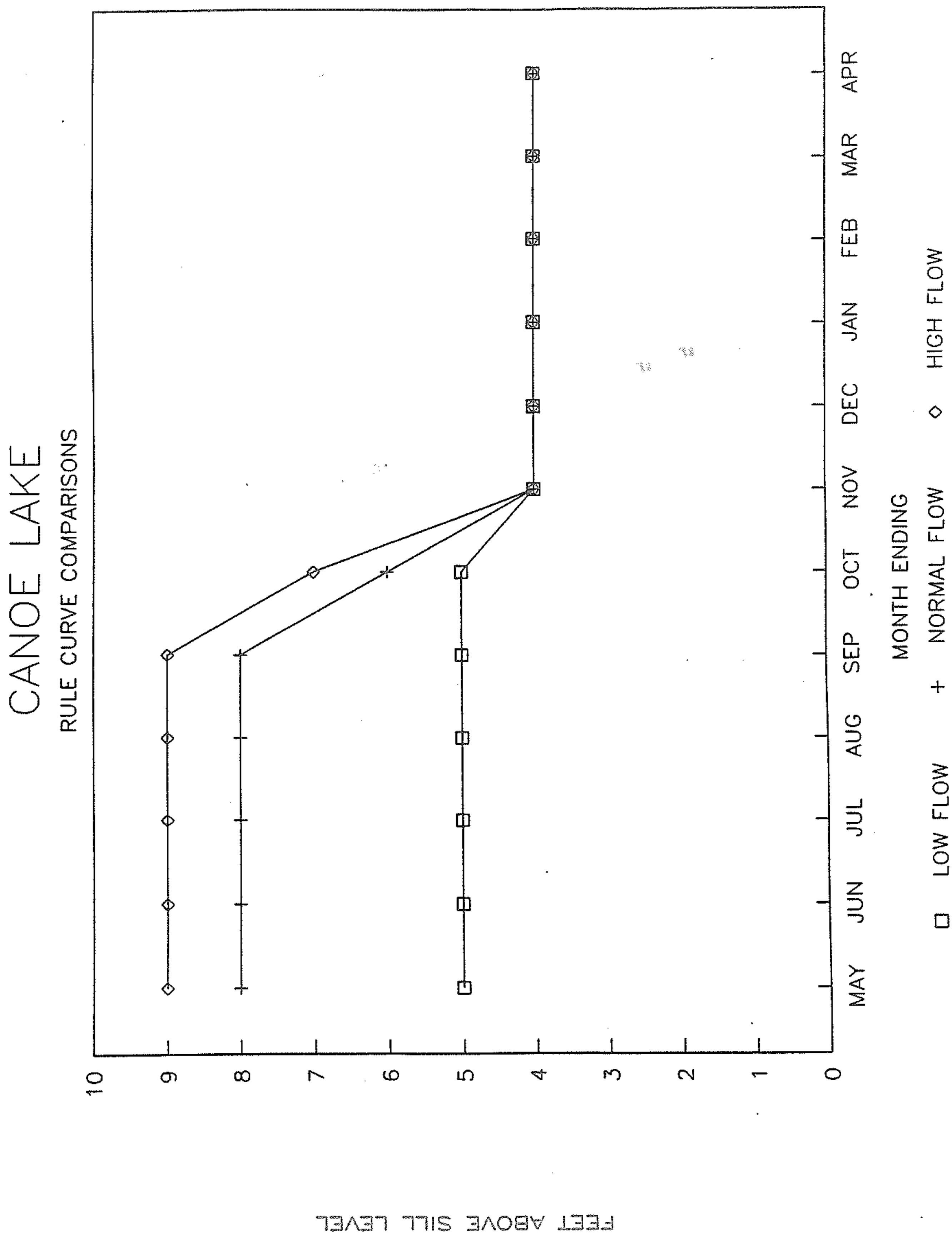
FRECHETTE LAKE

Generally under normal conditions Frechette Lake will remain at full supply level from the end of May to the end of October. Drawdown of Frechette Lake begins in November and ends in December.


FRECHETTE LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

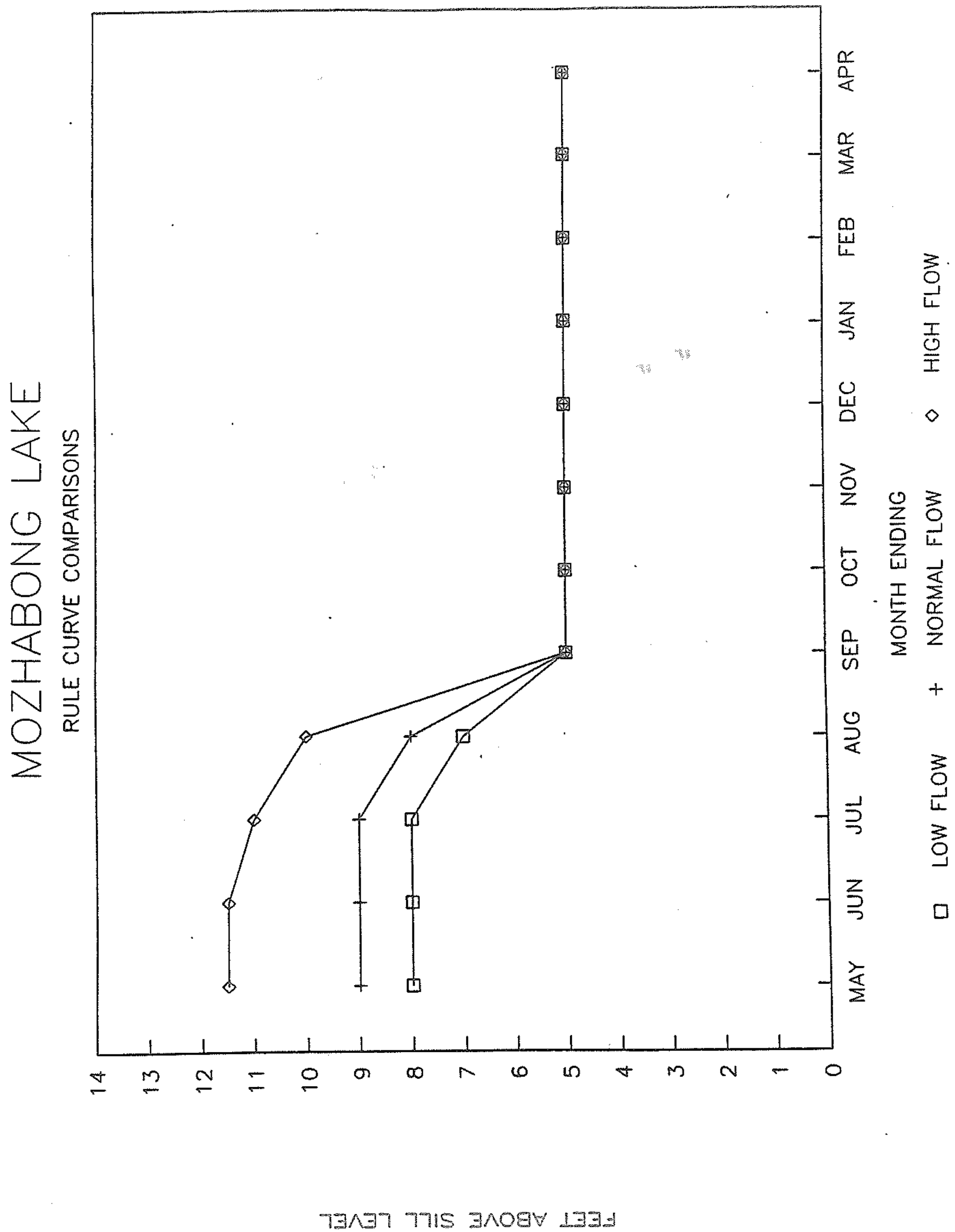
CANOE (BARDNEY) LAKE

Generally under normal conditions Canoe Lake will remain at full supply level from the end of May to the end of September. Drawdown will begin in October and end in November.


CANOE LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
0
1
2
3
4
5
6
7
8
9
10
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
□ LOW FLOW
+ NORMAL FLOW
◇ HIGH FLOW

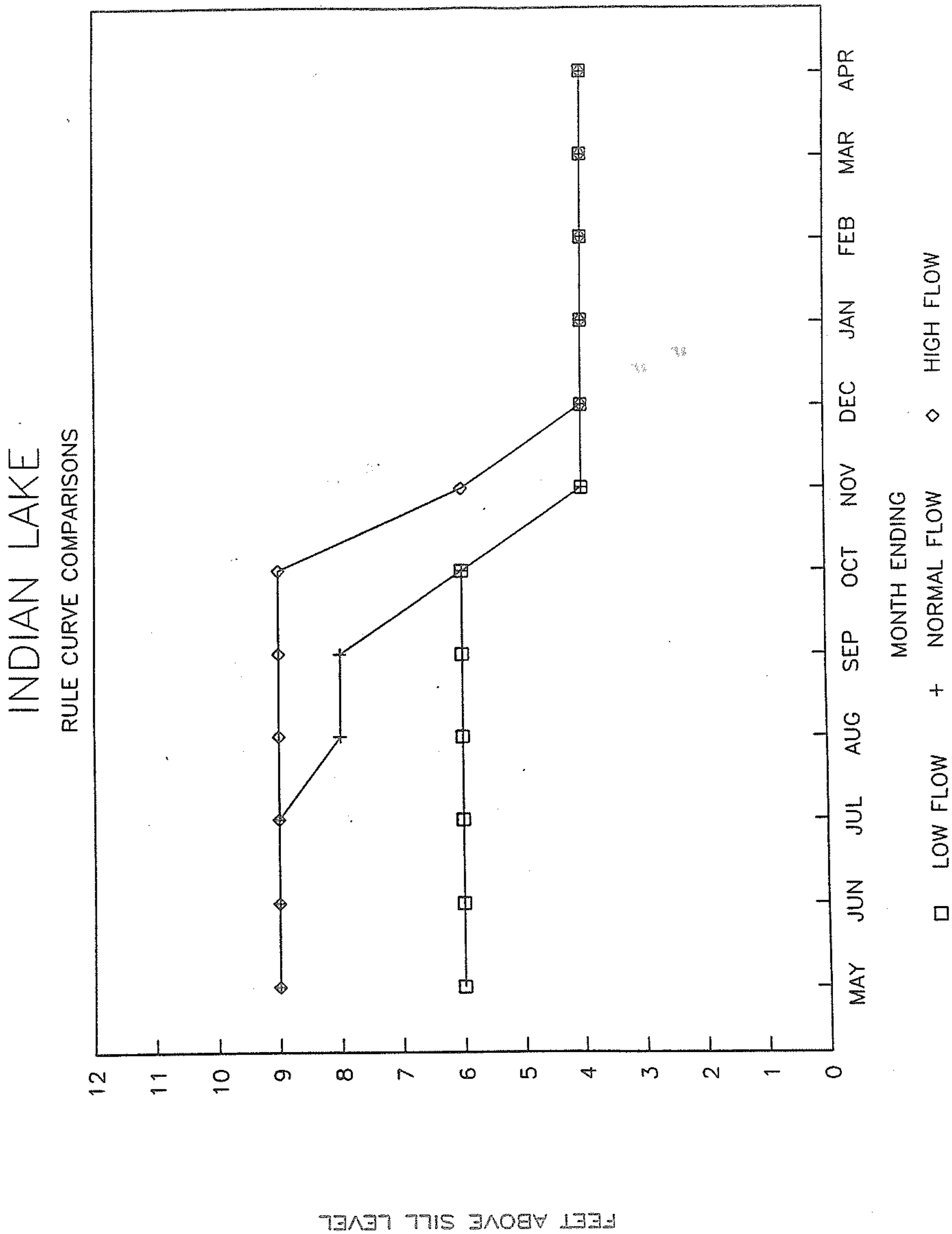
MOZHABONG LAKE

Generally under normal conditions Mozhabong Lake will remain at full supply level from the end of May to the end of July. Drawdown will begin in August and discontinue when the lake obtains a level of 5 feet above sill or September 30th whichever comes first.


MOZHABONG LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

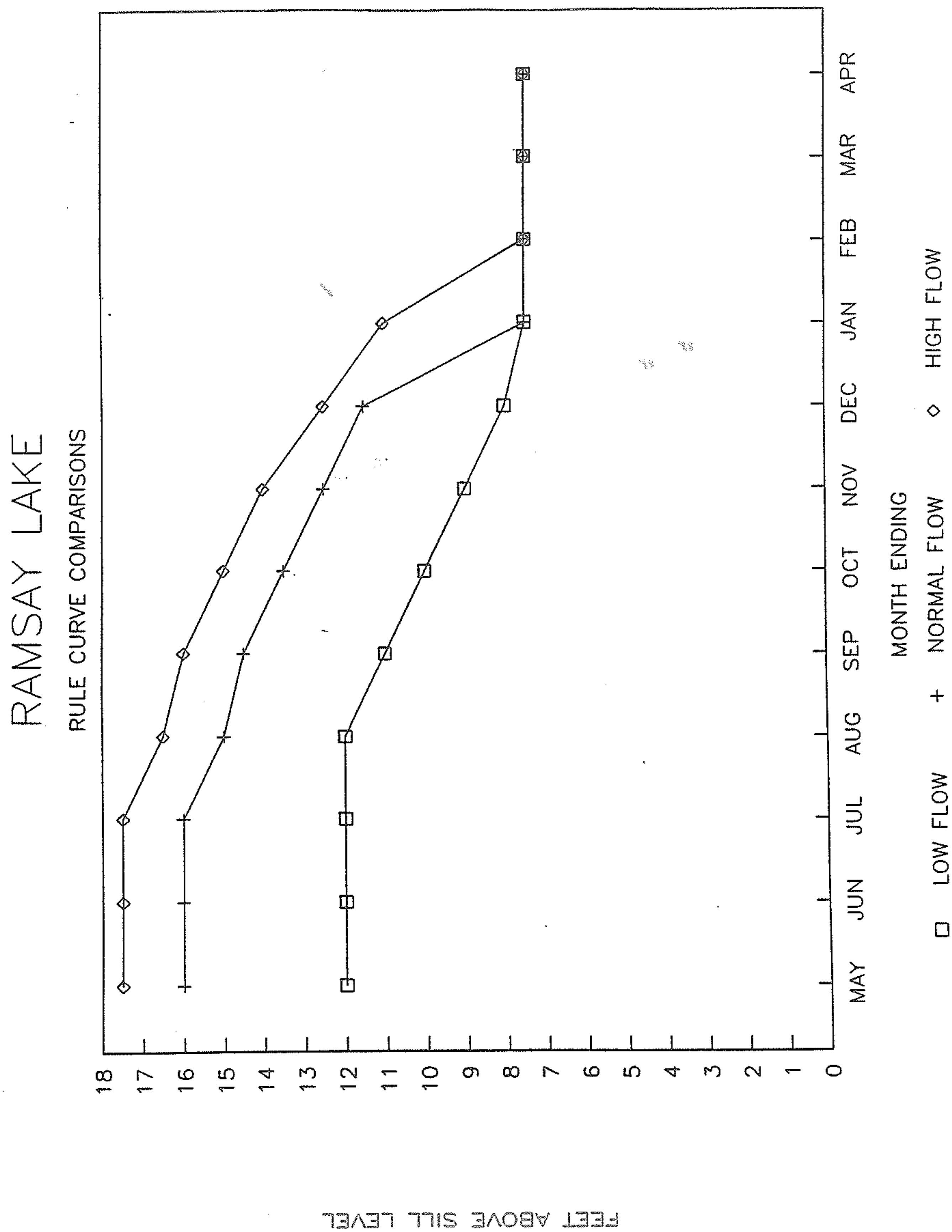
INDIAN LAKE

Generally under normal conditions Indian Lake will remain at full supply level from the end of May to the end of July. Drawdown will begin in August and discontinue in November.


INDIAN LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
0
1
2
3
4
5
6
7
8
9
10
11
12
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

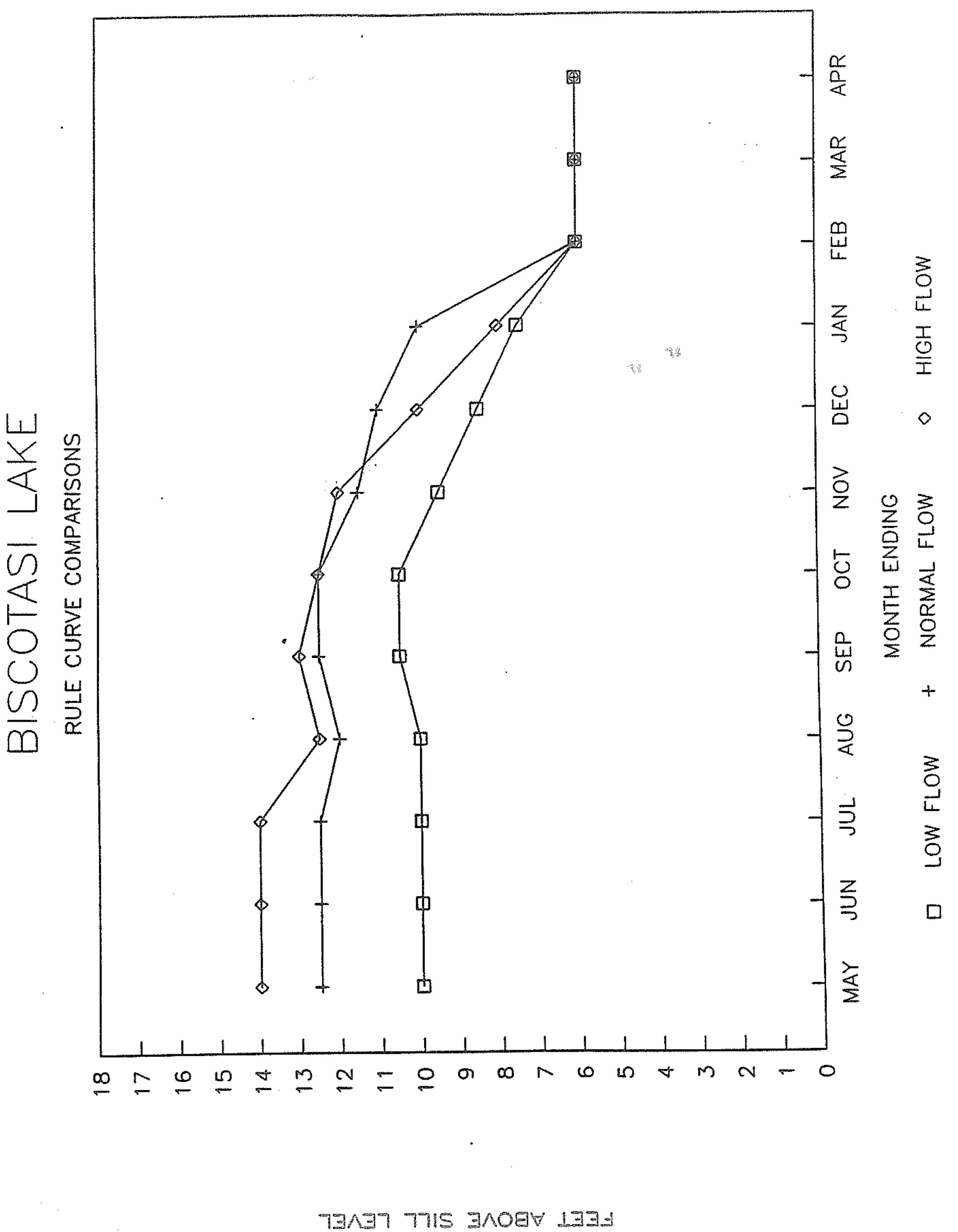
RAMSAY LAKE

Generally under normal conditions Ramsay Lake will remain at full supply level from the end of May to the end of July. Drawdown will begin in August and discontinue in January.


RAMSAY LAKE
RULE CURVE COMPARISONS
MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR
MONTH ENDING
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
FEET ABOVE SILL LEVEL
□ LOW FLOW
+ NORMAL FLOW
◇ HIGH FLOW

BISCOTASI LAKE

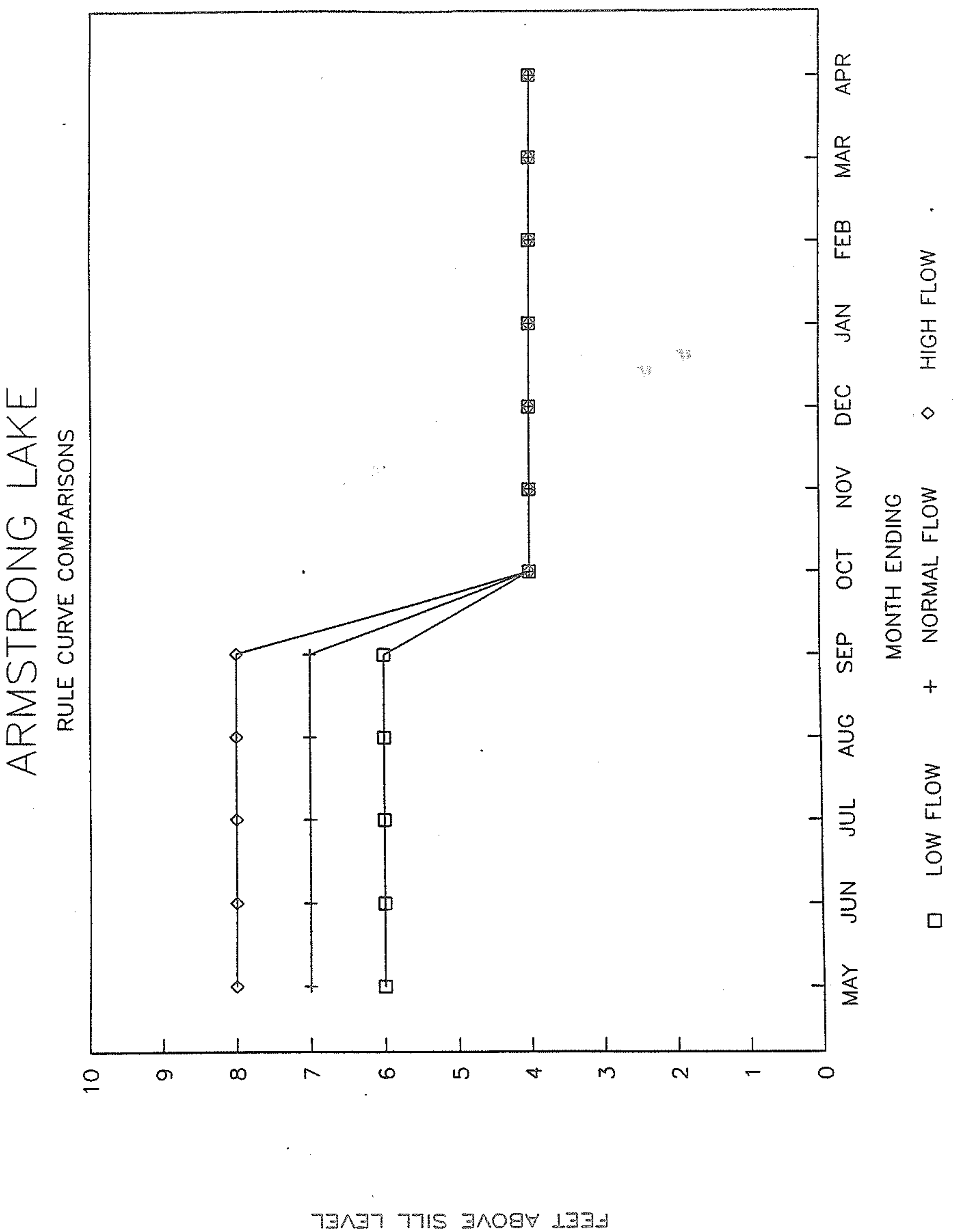
Generally under normal conditions Biscotasi Lake will remain at full supply level from the end of May to the end of October. Drawdown will begin in November and discontinue in February.


BISCOTASI LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

ARMSTRONG LAKE

Generally under normal conditions Armstrong Lake will remain at full supply level from the end of May to mid October. Drawdown will begin in October and discontinue in October.

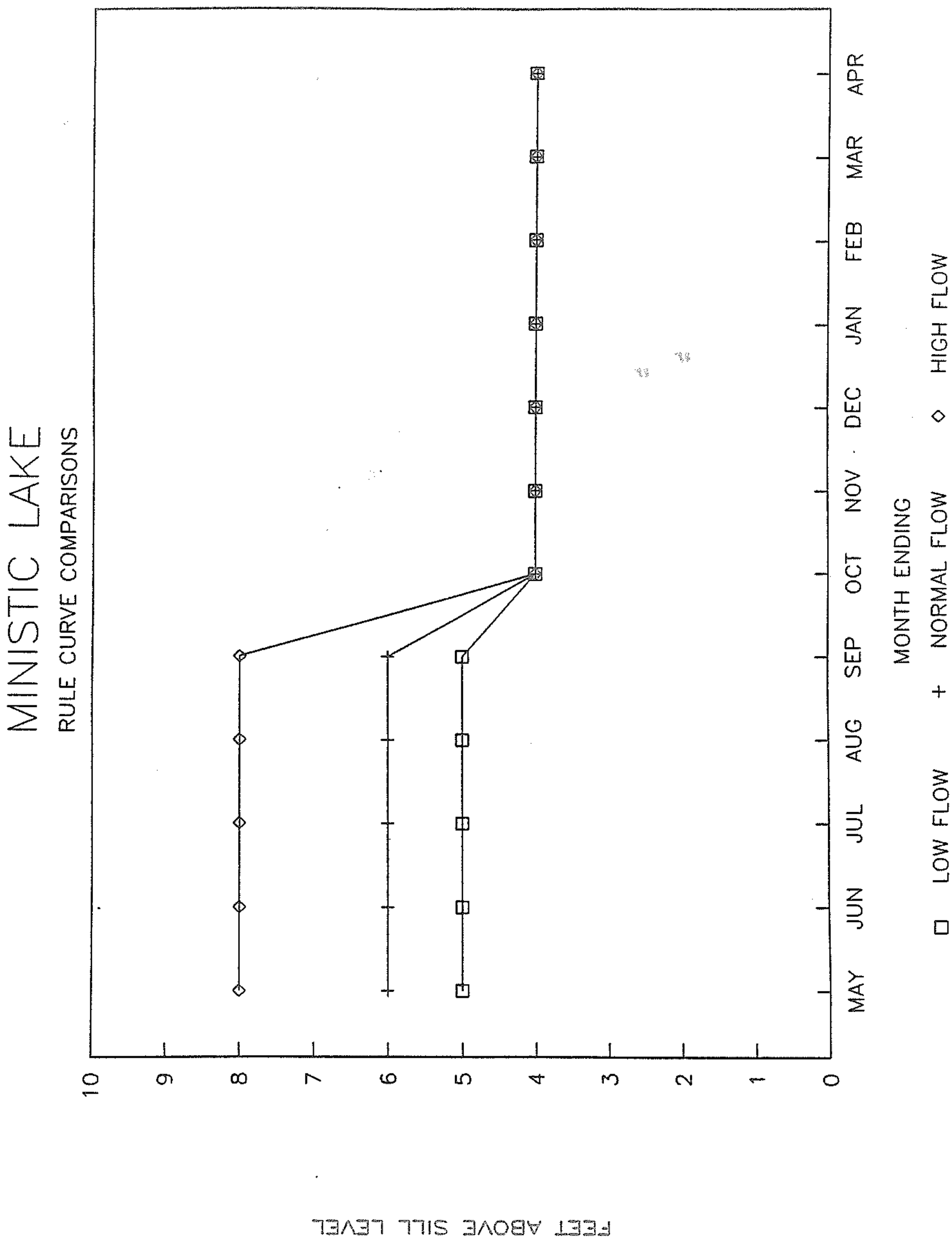
Armstrong Lake will receive increased monitoring of lake level during periods of increased precipitation and spring run-off.


ARMSTRONG LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
0
1
2
3
4
5
6
7
8
9
10
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

MINISTIC LAKE

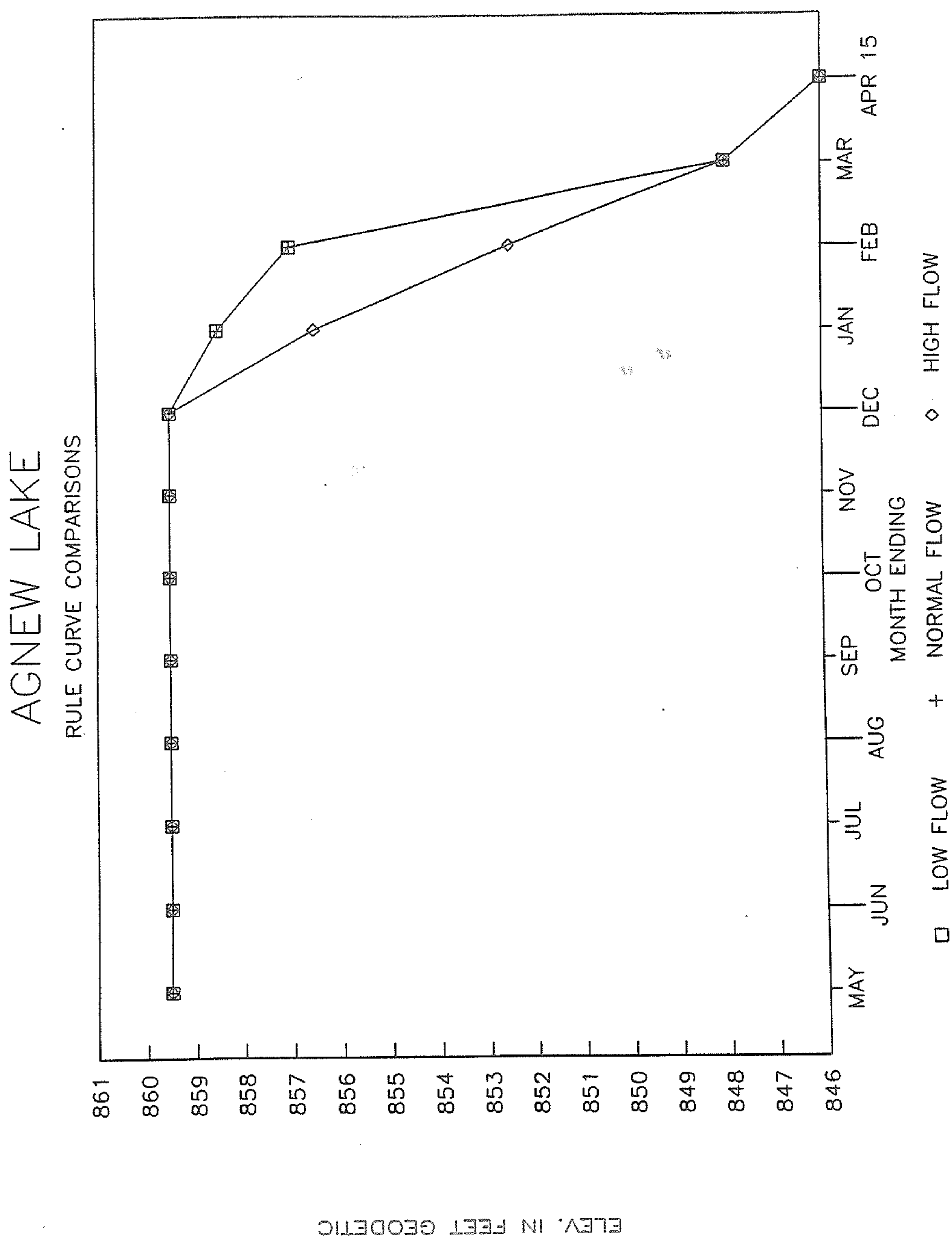
Generally under normal conditions Ministic Lake will remain at full supply level from the end of May to mid October. Drawdown will begin in October and discontinue in October.

Ministic Lake will receive increased monitoring of lake level during periods of increased precipitation and spring run-off.


MINISTIC LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
0
1
2
3
4
5
6
7
8
9
10
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
□ LOW FLOW
+ NORMAL FLOW
◇ HIGH FLOW

AGNEW LAKE

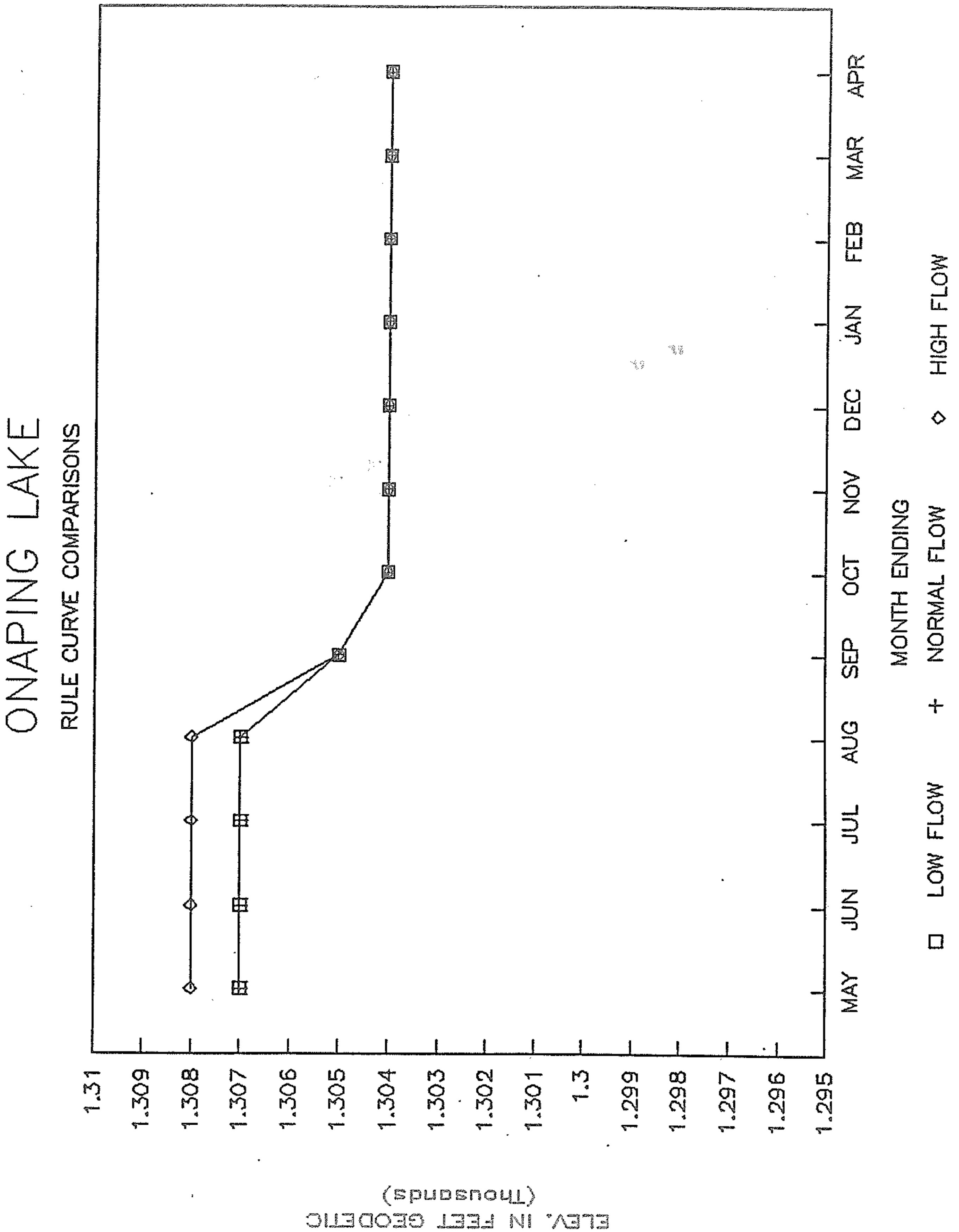
Generally under normal conditions Agnew Lake will remain at full supply level from the end of May to the end of December. Drawdown will begin in January and end April 15.


AGNEW LAKE
RULE CURVE COMPARISONS
861
860
859
858
857
856
855
854
853
852
851
850
849
848
847
846
ELEV. IN FEET GEODETIC
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR 15
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

ONAPING LAKE

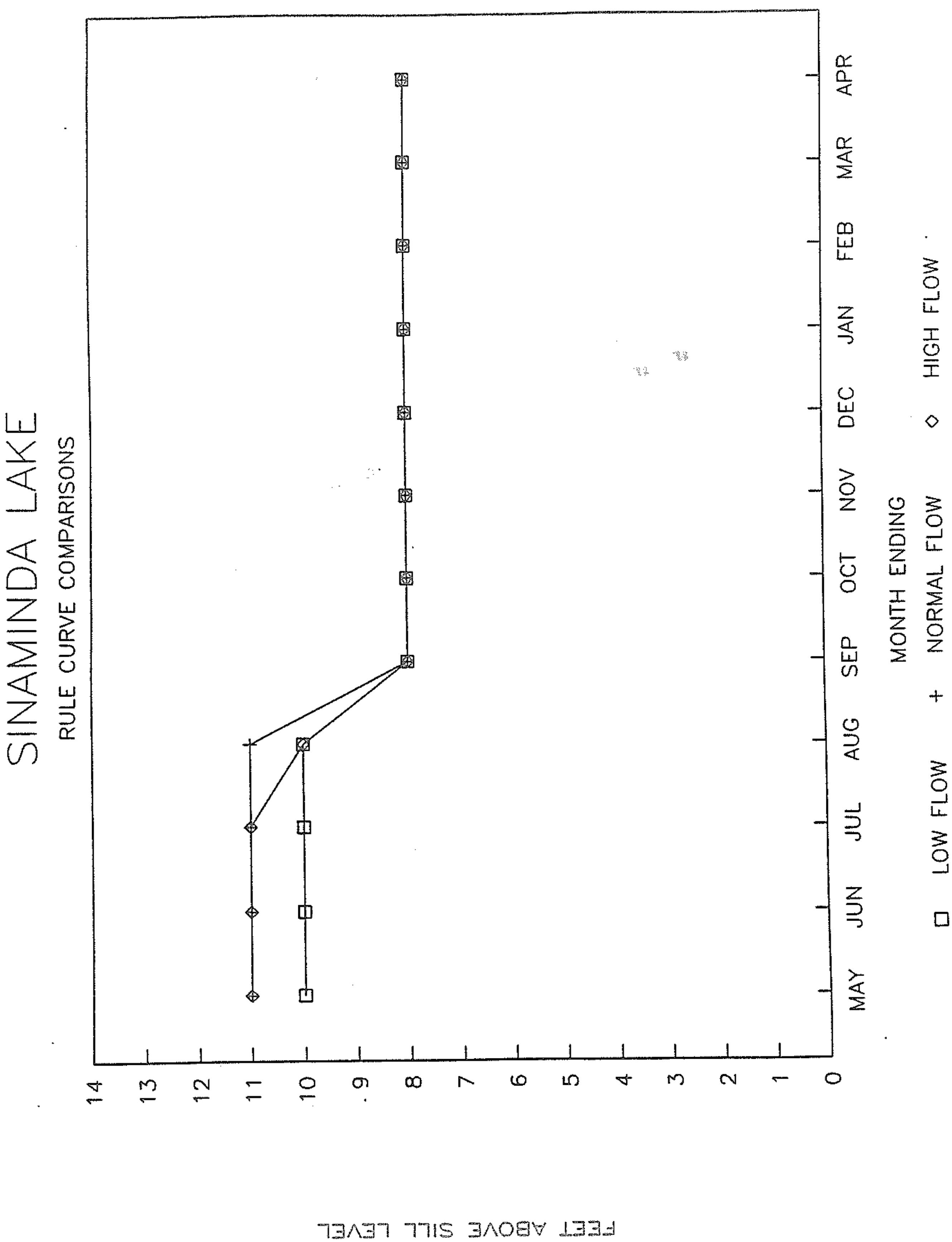
Generally under normal conditions Onaping Lake will remain at full supply level from the end of May to the end of August. Drawdown will begin in September and discontinue when the lake obtains a level of 9 feet above sill (Bannerman Dam, estimated 1304 feet geodetic), or discontinue on October 31st whichever comes first.

Onaping will receive increased monitoring of lake levels during critical periods of increased precipitation and spring run-off.


ONAPING LAKE
RULE CURVE COMPARISONS
1.31
1.309
1.308
1.307
1.306
1.305
1.304
1.303
1.302
1.301
1.3
1.299
1.298
1.297
1.296
1.295
ELEV. IN FEET GEODETIC
(Thousands)
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

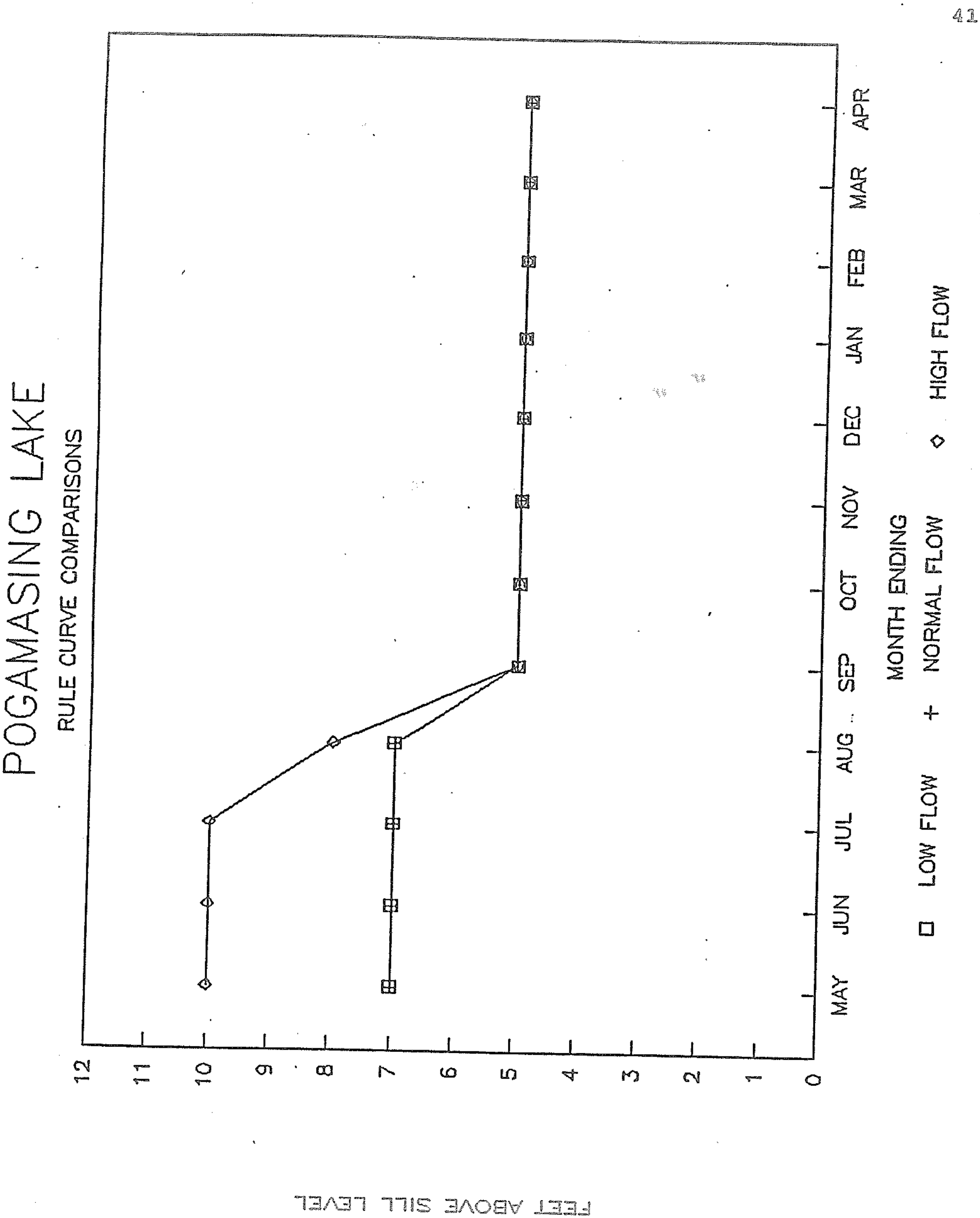
SINAMINDA LAKE

Generally under normal conditions Sinaminda Lake will remain at full supply level from the end of May to the end of August. Drawdown will begin in September and discontinue when the lake obtains a level of 8 feet above sill or September 30th whichever comes first.


SINAMINDA LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

POGAMASING LAKE

Generally under normal conditions Pogamasing Lake will remain at full supply level from the end of May to the end of August. Drawdown will begin in September and discontinue when the lake obtains a level of 5 feet above sill, or discontinue on September 30th whichever comes first.


POGAMASING LAKE
RULE CURVE COMPARISONS
FEET ABOVE SILL LEVEL
0
1
2
3
4
5
6
7
8
9
10
11
12
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MONTH ENDING
LOW FLOW
NORMAL FLOW
HIGH FLOW

APPENDIX II

OPERATING STRATEGY

TABLE 1

NORMAL FLOW OPERATING STRATEGY

DATE	LAKE	REMARKS
July 1	Frechette #24 Dam	Remove one stoplog from each sluiceway, approximate minimum time to drawdown to "expected" elevation 1396.79 feet geodetic is 20 days.
Aug. 1	Mozhabong #6 Dam	Remove two stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1349.25 feet geodetic is 13 days. Once the above elevation is obtained replace one stoplog.
	Indian #5 Dam	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1342.26 feet geodetic is 26 days. Once the above elevation is obtained replace two stoplogs.
	Ramsay #8 Dam	Using the bottom opening from one sluiceway create a 12 inch opening, approximate minimum time to drawdown to "expected" elevation 1342.02 feet geodetic is 24 days. Once the above elevation is obtained close the bottom opening.
	Bisco #1 Dam	Remove two - two foot stoplogs from each sluiceway. Three - two foot stoplogs and one - four foot stoplog remain in each sluiceway.
	Bisco #2 Dam	Remove five stoplogs (three stoplogs remain in sluiceway) approximate minimum time to drawdown to "expected" elevation 1322.08 feet geodetic is 24 days.
		OPTIONAL OPERATION ON BISCO LAKE:
	Bisco #1 Dam	Using the bottom opening from one sluiceway create a 26 inch opening, approximate minimum time to drawdown to "expected" elevation 1322.08 feet geodetic is 25 days.

DATE	LAKE	REMARKS
Sept. 1	Mozhabong #6 Dam	Remove five stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1346.25 feet geodetic is 20 days. Once the above elevation is obtained replace two (2)stoplogs.
	Indian #5 Dam	In order to pass the water from Mozhabong Lake to Bisco lake remove five stoplogs from the sluiceway, replace the stoplogs systematically to stabilize the lake level to "expected" elevation 1342.26 feet geodetic.
	Ramsay #8 Dam	Using the same bottom opening from the month of August create a five inch opening, approximate minimum time to drawdown to "expected" elevation 1341.52 feet geodetic is 30 days.
	Bisco #2 Dam	Remove all stoplogs from the sluiceway and periodically replace six stoplogs systematically to stabilize the lake level to "expected" elevation 1322.58 feet geodetic.
	Onaping Bannerman Dam	Remove seven stoplogs from the sluiceway (three stoplogs remaining), approximate minimum time to drawdown to "expected" elevation 1305.00 feet geodetic is 30 days.
	Pogamasing	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1204.00 feet geodetic is 16 days. Once the above elevation is obtained replace one stoplog. Drawdown will discontinue when the lake level is 1204.00 feet geodetic or September 30th whichever comes first.
	Sinaminda	Remove five stoplogs from one sluiceway, approximate minimum time to drawdown to "expected" elevation 1362.00 feet geodetic is 20 days. Once the above elevation is obtained replace two stoplogs. Drawdown will discontinue when the lake level is 1362.00 feet geodetic or September 30th whichever comes first.

DATE	LAKE	REMARKS
		OPTIONAL OPERATION BISCO LAKE:
	Bisco	Using the same bottom opening from the month of August create a 12 inch opening, approximate minimum time to "expected" elevation 1322.58 feet geodetic is 26 days.
Oct. 1	Canoe #23 Dam	Remove two stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1392.33 feet geodetic is 27 days.
	Indian #5 Dam	Remove three stoplogs from the sluiceway (five stoplogs remain), approximate minimum time to drawdown to "expected" elevation 1340.26 feet geodetic is 18 days. Once the above elevation is obtained replace one stoplog.
	Ramsay #8 Dam	Using the same bottom opening from the month of September create a 12 inch opening, approximate minimum time to drawdown to "expected" elevation 1340.52 feet geodetic is 26 days.
	Bisco #1 Dam	Using the same bottom opening from the month of September create a 28 inch opening, approximate minimum time to "expected" elevation 1322.08 feet geodetic is 25 days.
	Ministic	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1205.00 feet geodetic is 26 days.
	Armstrong	Remove six stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1156.11 feet geodetic is 30 days.
	Onaping Bannerman Dam	Once the "expected" elevation of 1304.00 feet geodetic is obtained or October 31st whichever comes first, replace six stoplogs to stabilize the lake.

DATE	LAKE	REMARKS
Nov. 1	Frechette #24 Dam	Remove three stoplogs from each sluiceway, approximate minimum time to drawdown to "expected" elevation 1393.79 feet geodetic is 28 days.
	Ramsay #8 Dam	Same bottom opening as October and remove four - two foot stoplogs from one sluiceway. Approximate minimum time to drawdown to "expected" elevation 1339.52 feet geodetic is 22 days.
	Canoe #23 Dam	Remove two stoplogs from the sluiceway approximate minimum time to drawdown to "expected" elevation 1390.33 feet geodetic is 20 days.
	Bisco #1 Dam	Using the same bottom opening from the month of October create a 28 inch opening.
	Bisco #2 Dam	Remove all stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1321.58 feet geodetic is 22 days.
	Bisco #3 Dam	Remove all stoplogs from the sluiceway.
	Indian #5 Dam	Remove two stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1338.26 feet geodetic is 23 days.
Dec. 1	Frechette #24 Dam	Remove five stoplogs from one sluiceway, approximate minimum time to "expected" elevation 1388.79 feet geodetic is 19 days.
Jan. and Feb.		Adjustments in dam openings may be required pending review of lake levels. Drawdown during this period will discontinue when the lake level reaches the initial level of fish spawn or, drawdown level specified in the rule curve.
March 1 to March 30		Partial closure of Canoe, Frechette, Mozhabong, Indian, Ramsay, Biscotasi, Armstrong, Ministic, Onaping, Sinaminda and Pogamasing Lake Dams.

TABLE 2

LOW FLOW OPERATING STRATEGY

DATE	LAKE	REMARKS
July 1	Frechette #24 Dam	Remove three stoplogs from each sluiceway, approximate minimum time to drawdown to "expected" elevation 1394.79 feet geodetic is 19 days.
Aug. 1	Mozhabong #6 Dam	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1348.25 is 13 days. Once the above elevation is obtained replace two stoplogs.
	Indian #5 Dam	In order to pass the water from Mozhabong Lake to Bisco Lake remove three stoplogs from the sluiceway, replace the logs systematically to maintain the lake at a near constant elevation of 1340.26 feet geodetic.
	Bisco #2 Dam	Remove seven stoplogs from the sluiceway replace the logs systematically to maintain the lake at a near constant elevation of 1320.08 feet geodetic.
		OPTIONAL OPERATION ON BISCO LAKE:
	Bisco #1 Dam	Using the bottom opening from one sluiceway, create a six inch opening to maintain the lake at a near constant elevation of 1320.08 feet geodetic.
Sept. 1	Mozhabong #6 Dam	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1346.25 feet geodetic is 24 days. Once the above elevation is obtained replace one stoplog.
	Indian #5 Dam	In order to pass the water from Mozhabong Lake to Bisco Lake remove three stoplogs from the sluiceway, replace the stoplogs systematically to stabilize the lake level to "expected" elevation 1340.26 feet geodetic.

DATE	LAKE	REMARKS
	Ramsay #8 Dam	Using the bottom opening from one sluiceway, create a 12 inch opening, approximate minimum time to drawdown to "expected" elevation 1338.02 feet geodetic is 25 days.
	Bisco #2 Dam	Remove all stoplogs from the sluiceway, replace the stoplogs systematically to stabilize the lake level to "expected" elevation 1320.58 feet geodetic. Approximate minimum time is 25 days.
		OPTIONAL OPERATION ON BISCO LAKE:
	Bisco #1 Dam	Using the same bottom opening, from the month of August create a 14 inch opening approximate time to "expected" elevation 1320.58 feet geodetic is 25 days.
	Onaping Bannerman Dam	Remove seven stoplogs from the sluiceway (three stoplogs remaining), approximate minimum time to drawdown to "expected" elevation 1305.00 feet geodetic is 30 days.
	Pogamasing	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1204.00 feet geodetic is 16 days. Once the above elevation is obtained replace one stoplog. Drawdown will discontinue when the lake level is 1204.00 feet geodetic or September 30th whichever comes first.
	Sinaminda	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1362.00 feet geodetic is 26 days. Drawdown will discontinue when the lake level is 1362.00 feet geodetic or September 30th whichever comes first.
Oct. 1	Ramsay #8 Dam	Using the same bottom opening from the month of September create a six inch opening, approximate minimum time to drawdown to "expected" elevation 1337.02 is 27 days.

DATE	LAKE	REMARKS
	Bisco #1 Dam	Remove three - two foot stoplogs from one sluiceway (two - two foot stoplogs and one- four foot stoplog remain). Replace one - two foot stoplog (approximate minimum time 25 days) to stabilize lake at "expected" elevation 1320.58 feet geodetic.
	Ministic	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1205.00 feet geodetic is 26 days.
	Armstrong	Remove six stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1156.11 feet geodetic is 30 days.
	Onaping Bannerman Dam	Once the "expected" elevation of 1304.00 feet geodetic is obtained or October 31st (whichever comes first) replace the stoplogs to stabilize the elevation of the lake.
		OPTIONAL OPERATION ON BISCO LAKE:
	Bisco #1 Dam	Using the same bottom opening from the month of September create a six inch opening to stabilize the lake at "expected" elevation 1320.58 feet geodetic.
Nov. 1	Frechette #24 Dam	Remove two stoplogs from each sluiceway, approximate minimum time to drawdown to "expected" elevation 1392.79 feet geodetic is 20 days.
	Canoe #23 Dam	Remove four stoplogs from the sluiceway, approximate minimum time to "expected" elevation 1390.33 feet geodetic is 13 days.
	Ramsay #8 Dam	Close the bottom opening and remove four - two foot stoplogs from one sluiceway. Two - two foot stoplogs and one four foot stoplog remain. Approximate minimum time to drawdown to "expected" elevation 1336.02 feet geodetic is 26 days.

DATE	LAKE	REMARKS
	Ramsay #7 Dam	Remove seven stoplogs from the sluiceway, five stoplogs remain.
	Bisco #2 Dam	Remove all stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1319.58 is 27 days.
	Bisco #1 Dam	Replace all two foot stoplogs in the sluiceway. Using the bottom opening from one sluiceway create a 4 inch bottom opening.
	Bisco #3 Dam	Remove all stoplogs from the sluiceway.
	Indian #5 Dam	Remove two stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1338.26 feet geodetic is 23 days.
Dec. 1	Frechette #24 Dam	Remove four stoplogs from one sluiceway, approximate minimum time to "expected" elevation 1388.79 feet geodetic is 16 days.
Jan. and Feb.		Adjustment in dam openings may be required pending review of lake levels. Drawdown during this period will discontinue when the lake level reaches the initial level of fish spawn or, the minimum level of drawdown as specified in the rule curve.
March 1 to March 30		Partial closure of Canoe, Frechette, Mozhabong, Indian, Ramsay, Biscotasi, Armstrong, Ministic, Onaping, Sinaminda and Pogamasing Lake Dams.

TABLE 3

HIGH FLOW OPERATING STRATEGY

DATE	LAKE	REMARKS
July 1	Frechette #24 Dam	Remove one stoplog from each sluiceway, approximate minimum time to drawdown to "expected" elevation 1397.79 feet geodetic is 21 days.
	Mozhabong #6 Dam	Remove one stoplog from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1352.25 feet geodetic is 21 days.
	Indian #5 Dam	In order to pass the water from Mozhabong Lake to Biscotasi lake remove one stoplog, replace the stoplog when required to stabilize the lake level to "expected" elevation 1343.26 feet geodetic.
Aug. 1	Mozhabong #6 Dam	Remove two stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1351.25 feet geodetic is 15 days. Once the above elevation is obtained replace one stoplog.
	Indian #5 Dam	In order to pass the water from Mozhabong Lake to Biscotasi Lake remove two stoplogs, replace the stoplogs systematically to stabilize the lake level to "expected" elevation 1343.26 feet geodetic.
	Ramsay #8 Dam	Using the bottom opening from one sluice-way create a fourteen inch opening, approximate minimum time to drawdown to "expected" elevation 1343.52 feet geodetic is 25 days.
	Bisco #1 Dam	Remove two - two foot stoplogs from each sluiceway, three - two foot stoplogs and one - four foot stoplog remain in each sluiceway. Approximate minimum time to drawdown to "expected" elevation 1322.58 feet geodetic is 27 days.
	Pogamasing Dam	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to

DATE	LAKE	REMARKS
Aug 1	Pogamasing Dam	"expected" elevation 1207.00 feet geodetic is 24 days.
	Sinaminda Dam	Remove four stoplogs from one sluiceway, approximate minimum time to drawdown to "expected" elevation 1364.00 feet geodetic is 20 days.
		OPTIONAL OPERATION ON BISCOTASI LAKE:
	Bisco #1 Dam	Using the bottom opening from one sluiceway create a 36 inch opening, approximate minimum time to drawdown to "expected" elevation 1322.58 feet geodetic is 27 days.
Sept. 1	Mozhabong #6 Dam	Remove seven stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1346.25 feet geodetic is 23 days. Once the above elevation is obtained or September 30th whichever comes first replace the stoplogs to stabilize the lake level.
	Indian #5 Dam	In order to pass the water from Mozhabong Lake to Biscotasi Lake remove seven stoplogs from the sluiceway, replace the logs systematically to stabilize the lake level at "expected" elevation 1343.26 feet geodetic.
	Ramsay #8 Dam	Using the same bottom opening from the month of August create a 6 inch opening, approximate minimum time to drawdown to "expected" elevation 1343.02 feet geodetic is 23 days.
	Bisco #1 Dam	Same operation as per the month of August.
	Onaping Bannerman Dam	Remove 9 stoplogs from the sluiceway.
	Onaping Dam	Remove three stoplogs from each sluiceway, approximate minimum time to drawdown to "expected" elevation 1305.00 feet geodetic is 30 days.

DATE	LAKE	REMARKS
Sept. 1	Pogamasing Dam	Remove four stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1204.00 feet geodetic is 24 days. Once the above elevation is obtained replace one stoplog to stabilize the lake level. Drawdown will discontinue when the lake level is 1205.00 feet geodetic or September 30th whichever comes first.
	Sinaminda Dam	Remove five stoplogs from one sluiceway, approximate minimum time to drawdown to "expected" elevation 1362.00 feet geodetic is 20 days. Once the above elevation is obtained replace stoplogs to stabilize the lake level. Drawdown will discontinue when the lake level is 1362.00 feet geodetic or September 30th whichever comes first.
		OPTIONAL OPERATION BISCOTASI LAKE:
	Bisco #1 Dam	Using the same bottom opening from the month of August create a 19 inch opening, approximate minimum time to "expected" elevation 1323.08 feet geodetic is 26 days.
Oct. 1	Canoe #23 Dam	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1393.33 feet geodetic is 16 days.
	Ramsay #8 Dam	Using the same bottom opening from the month of September create a 12 inch opening, approximate minimum time to drawdown to "expected" elevation 1342.02 feet geodetic is 25 days.
	Bisco #1 Dam	Replace one - two foot stoplog in one sluiceway only.
	Bisco #2 Dam	Remove four stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1322.58 feet geodetic is 22 days.

DATE	LAKE	REMARKS
Oct. 1	Ministic Dam	Remove five stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1205.00 feet geodetic is 13 days.
	Armstrong Dam	Remove eight stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1156.11 feet geodetic is 26 days.
	Onaping Bannerman Dam	Remove one stoplog from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1304.00 feet geodetic is 20 days. Once the "expected" elevation of 1304.00 feet geodetic is obtained or October 31st whichever comes first, replace stoplogs to stabilize the lake level.
	Onaping Dam	Replace all stoplogs in the dam.
		OPTIONAL OPERATION ON BISCOTASI LAKE:
	Bisco #1 Dam	Using the same bottom opening from the month of September create a 20 inch opening approximate minimum time to drawdown to "expected" elevation 1322.58 feet geodetic is 26 days.
Nov. 1	Frechette #24 Dam	Remove four stoplogs from each sluiceway, approximate minimum time to drawdown to "expected" elevation 1393.79 feet geodetic is 30 days.
	Canoe #23 Dam	Remove three stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1390.33 feet geodetic is 22 days.
	Indian #5 Dam	Remove four stoplogs from the sluiceway, approximate minimum time to drawdown to "expected" elevation 1340.26 feet geodetic is 22 days.
	Ramsay #7 Dam	Remove four stoplogs from the sluiceway.
	Ramsay #8 Dam	Close the bottom opening and remove four - two foot stoplogs from one sluiceway. Two - two foot stoplogs and one - four

DATE	LAKE	REMARKS
Nov. 1	Ramsay # 8 Dam	foot stoplog remains. Approximate minimum time to drawdown to "expected" elevation 1341.02 feet geodetic is 17 days.
	Bisco #1 Dam	Replace all stoplogs in the sluiceway. Using the bottom opening create a 48 inch opening in one sluiceway and a 24 inch bottom opening in the other sluiceway.
	Bisco #2 Dam	Remove all logs from the sluiceway, approximate minimum time to obtain "expected" elevation 1322.08 feet geodetic is 30 days.
	Bisco #3 Dam	Remove all stoplogs from the dam.
Dec. 1	Frechette #24 Dam	Remove five stoplogs from one sluiceway, approximate minimum time to drawdown to "expected" elevation 1388.79 feet geodetic is 33 days.
Jan. and Feb.		Adjustment in dam openings may be required pending review of lake levels. Drawdown during this period will discontinue when the lake level reaches the initial level of fish spawn or, the minimum level of drawdown as specified in the rule curve.
March 1 to March 30		Partial closure of Canoe, Frechette, Mozhabong, Indian, Ramsay, Biscotasi, Armstrong, Ministic, Onaping, Sinaminda and Pogamasing Lake Dams.

APPENDIX IV

LOW FLOW AUGMENTATION AGREEMENT

The following information concerning the low flow augmentation agreement between E. B. Eddy Forest Products and INCO Limited is directly reproduced from the Spanish River Water Management Background Information document.

" An issue of major concern affecting the Lower Spanish occurred during the summer of 1982. For years E.B. Eddy Forest Products Limited and its predecessors had been discharging their mill effluent into the lower Spanish River below the Espanola dam. The effluent requires oxygen for aerobic decomposition and this is done by exposing it to the river water. As the river water temperature increases and flow levels decrease, the oxygen content in the water decreases. The effluent consumes the available oxygen in the water, which may result in progressive loss of dissolved oxygen. When conditions deteriorate to levels of insufficient oxygen content in the water to support fish life, fish kills occur.

In the late 1970's the Ministry of the Environment had ordered E.B. Eddy to reduce their effluent discharge by almost 85%, in order to improve water quality in the river downstream. A new Pollution Control System was to be part of the Mill Expansion in the early 1980's.

In 1981, E.B. Eddy asked INCO to guarantee a minimum flow of some 1,200 CFS throughout the summer months. INCO replied that it could not guarantee any minimum flow, as drought conditions could cause the natural flow on the Spanish to drop below 400 CFS. INCO maintained that INCO should not be responsible to draw water from its own reservoirs in order to solve E.B. Eddy's pollution problems, and that additional water required by E.B. Eddy should come from E.B. Eddy's reservoirs.

The summer of 1982 was extremely hot and dry. Both E.B. Eddy's and INCO's reservoirs were at lower than normal elevations. This was due to an unusually low spring runoff, lower than normal precipitation and higher than normal evapo-transpiration. The control dams were all closed and the unregulated flows into Agnew Lake dipped to 389 CFS.

Due to the low flows and higher than normal water temperature, an oxygen sag developed in the Lower Spanish during early August resulting in an extensive fish kill.

The M.O.E. ordered both E.B. Eddy and INCO to participate with the M.O.E. and M.N.R. on a Low Flow Augmentation Study, to try to resolve water quality problems due to periodic low flows in the Lower Spanish.

McClaren Plansearch was retained to model the water system and develop an optional operating strategy to meet specified target flows at Espanola, subject to competing water demands for hydro power generation, recreational use, and pulp and paper mill operations. McClaren concluded that, under simulated low flow conditions, target flows at Espanola could be met with the implementation of the co-ordinated operation of Biscotasi, Onaping and Agnew Lakes. Operating the system in a co-ordinated manner would reduce the amount of power generated in a low flow and average conditions. Changing lake elevations and river flow during drought conditions may also have an impact on recreational activities and tourist operations.

In September 1984, the Low Flow Augmentation Committee recommended the following:

1. The establishment of a Spanish River Management Committee to review the operation of the Spanish River System.

2. E.B. Eddy and INCO complete development of a real-time predictive flow model for year round operation that could be used in conjunction with the McClaren model.

3. INCO and E.B. Eddy develop a joint Water Management Program to ensure the co-ordinated operation of the existing system of reservoirs in the Spanish River Basin. The plan must be submitted and acceptable to the M.N.R., by the end of 1985 (this data was later deferred by the

M.N.R. until completion of the Spanish River Special Area Plan).

4. Improvement of the existing field monitoring network for the collection of hydro-meteorological data.

5. Correction of flow discrepancies between High Falls and Espanola.

6. Confirmation of the stage-storage relationship for the various reservoirs.

7. INCO and E.B. Eddy may wish to carry out further studies to determine the value of hydro power lost due to implementation of the joint water management.

During the interm period before implementation of the Water Management Plan, an agreement was made between INCO and E.B. Eddy defining the conditions under which INCO would agree to provide additional flow for low flow augmentation. These conditions are summarized below:

1. If additional flow on the Spanish is required, action is to be initiated by E.B. Eddy.

2. INCO's purpose for controlling water on the Spanish is for hydro-electric generation. During the summer any water not required to maintain the normal level of Lake Agnew is used for generation and discharged downstream into the Lower Spanish.

3. INCO cannot guarantee a specific minimum flow on the Lower Spanish, due to the possibility of extreme drought condition and obligation to maintain reasonable lake levels for other users.

4. If E.B. Eddy requests additional water, INCO will discharge additional water from Agnew Lake provided that E.B. Eddy agrees to replace this additional water with an equivalent volume from their storage lakes (Onaping, Sinaminda or Pogamasing).

5. If E.B. Eddy opens one of their dams in advance of an anticipated low flow weekend, INCO will pass an equivalent volume plus the natural unregulated flow during the weekend.

6. Weekly contact to be maintained between INCO and E.B.Eddy representatives during the summer months.

This agreement was to be renewed annually until the Water Management Plan was implemented.

A record fish kill occurred downstream of Espanola in the summer of 1983, due to technical problems at the Mill. INCO provided additional water during the incident.

Since the establishment of the Low Flow Augmentation Committee, there have been no further serious incidents on the Lower Spanish.

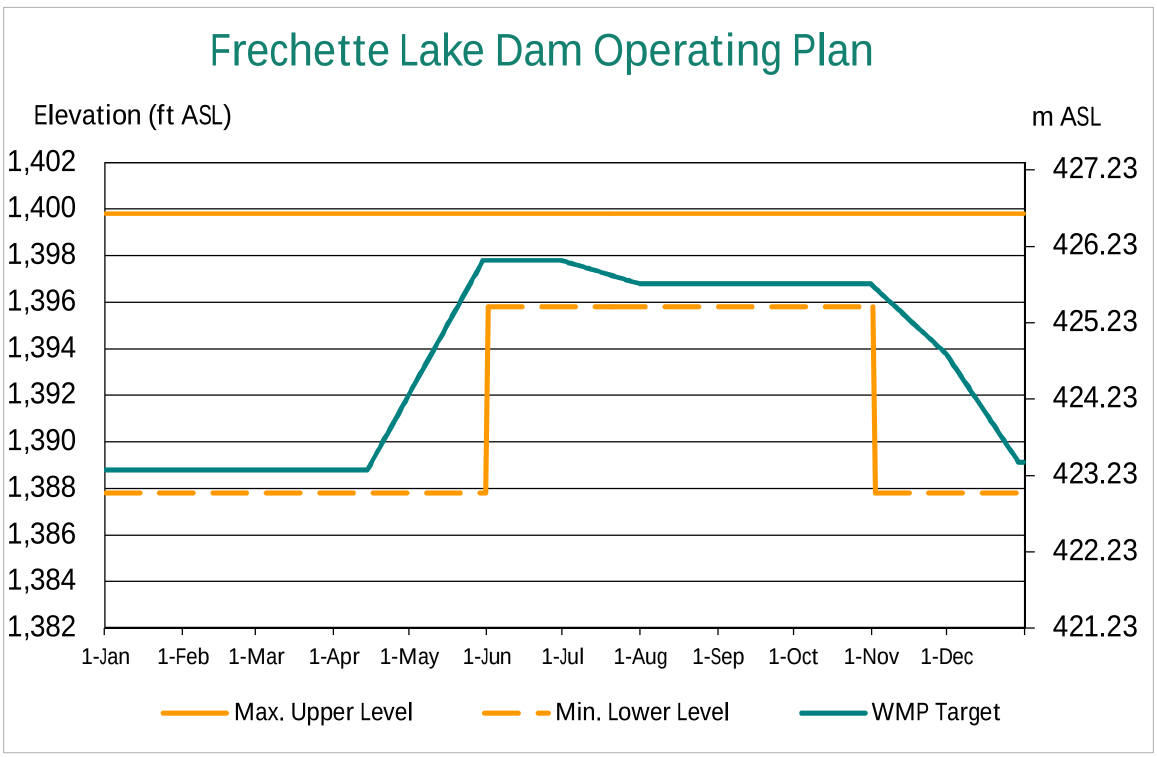
During the spring runoff of 1985, extensive flooding occurred on the Spanish and Vermilion River systems due to a sudden snow melt in late April. Record peak flows were recorded both at Big Eddy and at Espanola. Because of extensive preliminary work on the S.S.A.R.R. predictive flow model by INCO and their consultant S.A. Kirchhefer Limited, the peak flow and time of peak were accurately predicted. Both companies weathered the flooding without major incidents, due primarily to good communications between each other. Of significance was the fact that INCO had drawn down its reservoirs to near their minimum limits, creating room for substantial storage. The Upper Spanish did not suffer from flooding at all".

OPERATING PLANS
TABLE OF CONTENTS

Vale Facilities

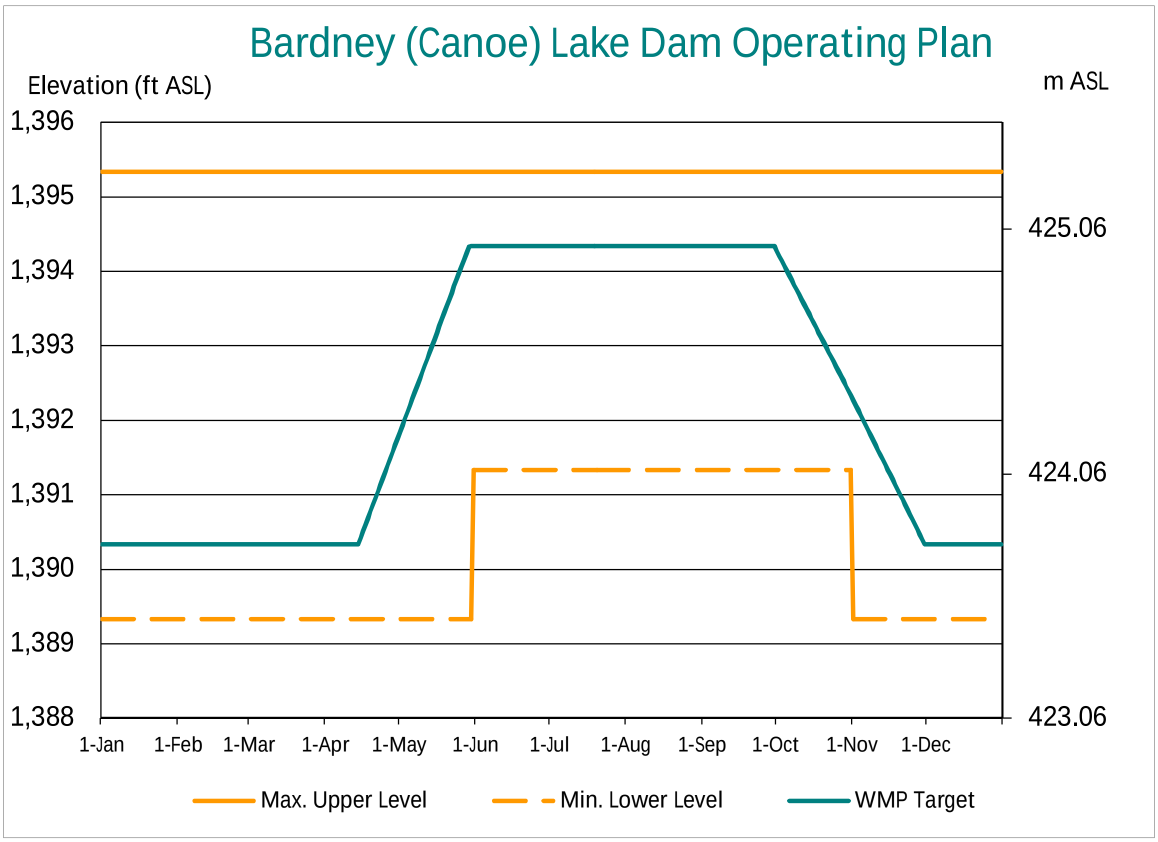
Frechette Lake Dam (#24)

Operating Plan (OP) COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	425.44m (1395.79 ft.) from June 1 to November 1
	Minimum Lower Level	422.99m (1387.79 ft.) from November 2 to May 31
	Maximum Upper Level	426.66m (1399.79 ft.)
Compliance Monitoring	Monitoring Location	Observed level on staff gauge at dam
	Monitoring Frequency	Minimum once in each of spring, summer and fall
Effectiveness Monitoring	Record Stakeholder Feedback	Non-specific (no issues identified in WMP)



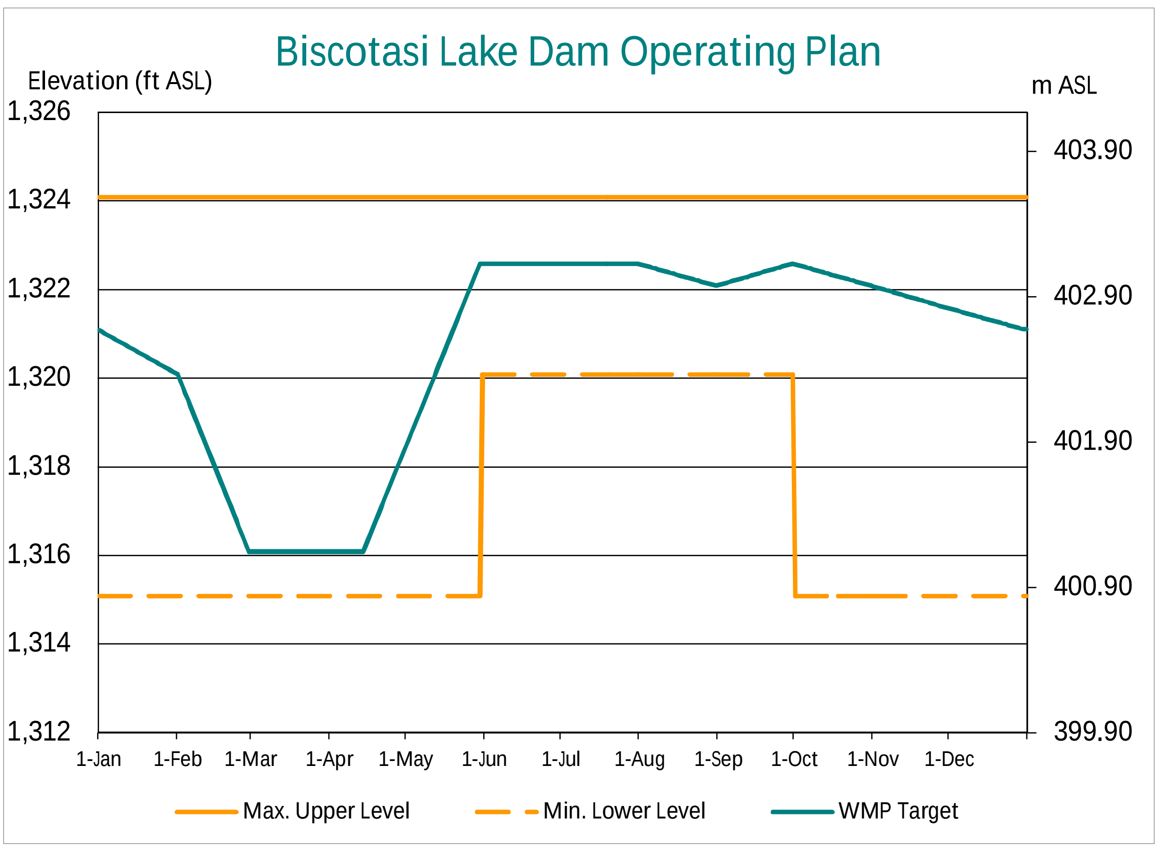
Canoe (Bardney) Lake Dam

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	424.08m (1391.33 ft.) from June 1 to November 1
	Minimum Lower Level	423.47m (1389.33 ft.) from November 2 to May 31
	Maximum Upper Level	425.30m (1395.33 ft.)
Compliance Monitoring	Monitoring Location	Observed level on staff gauge at dam
	Monitoring Frequency	Minimum once in each of spring, summer and fall
Effectiveness Monitoring	Record Stakeholder Feedback	Non-specific (no issues identified in WMP)



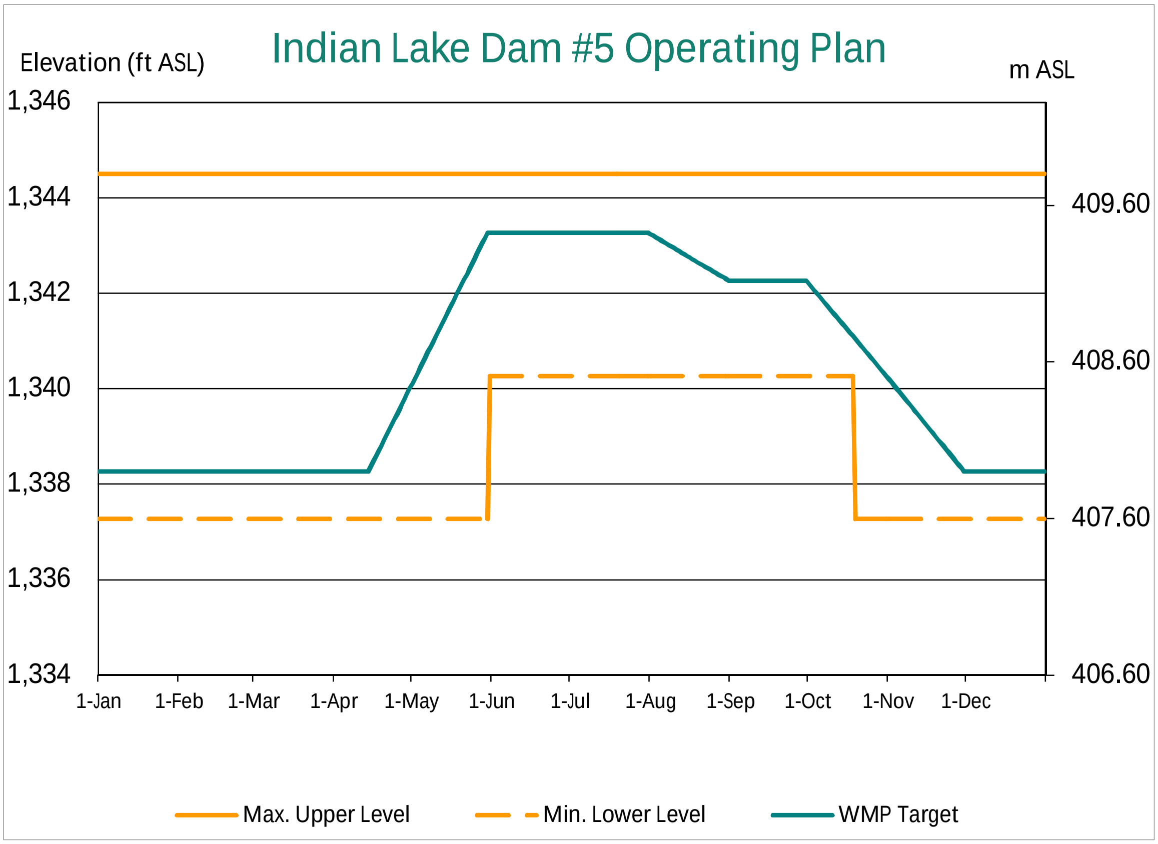
Biscotasi Lake (Dams #1,2,3)

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	402.36m (1320.08 ft.) from June 1 to October 1
	Minimum Lower Level	400.84m (1315.08 ft.) from October 2 to May 31
	Maximum Upper Level	403.58m (1324.08 ft.)
Compliance Monitoring	Monitoring Location	Observed level on staff gauge at Bisco shops dock or dams
	Monitoring Frequency	Minimum once in each of spring, summer and fall
Effectiveness Monitoring	Record Stakeholder Feedback	Navigation and frozen water lines identified as issues to be monitored



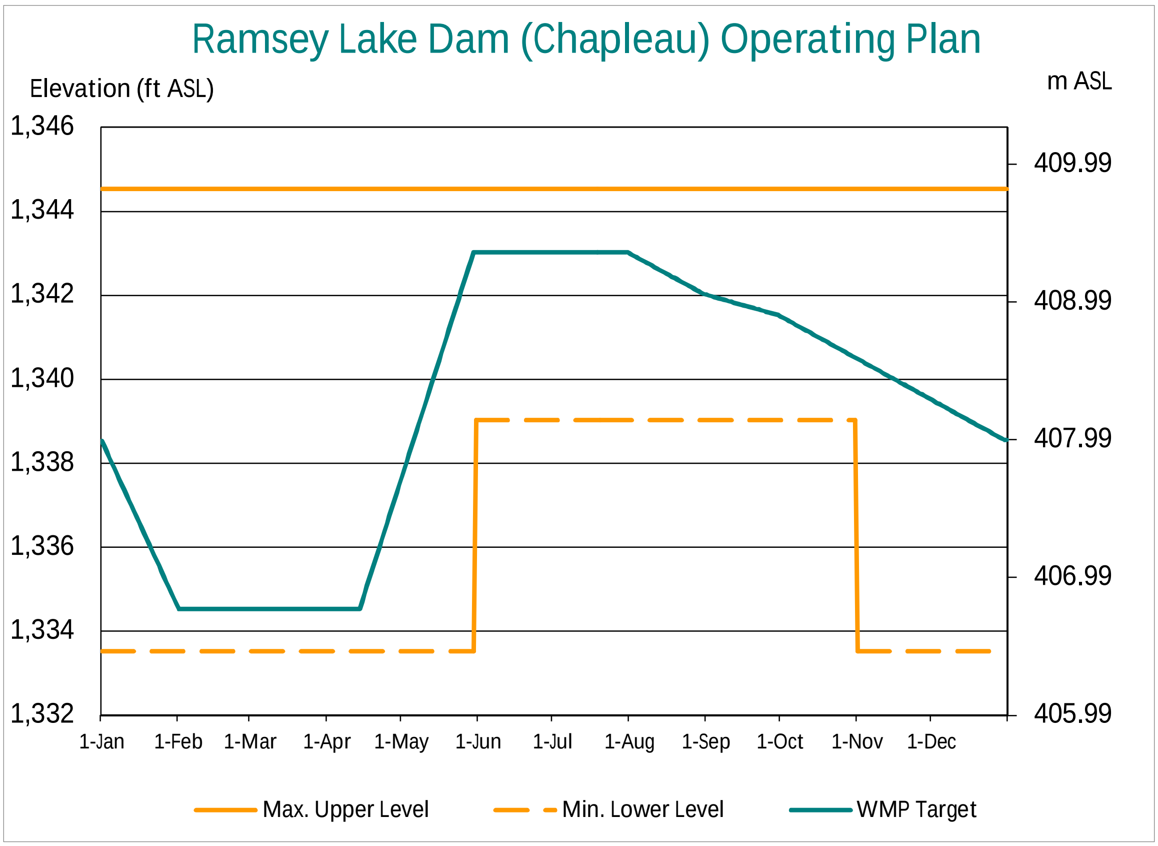
Indian Lake Dam (#5)

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	408.51m (1340.26 ft.) from June 1 to October 15
	Minimum Lower Level	407.60 (1337.26 ft.) from October 16 to May 31
	Maximum Upper Level	409.80m (1344.50 ft.)
Compliance Monitoring	Monitoring Location	Observed level on staff gauge at dam
	Monitoring Frequency	Minimum once in each of spring, summer and fall
Effectiveness Monitoring	Record Stakeholder Feedback	Dock damage during high water levels (storms) identified as issue to be monitored



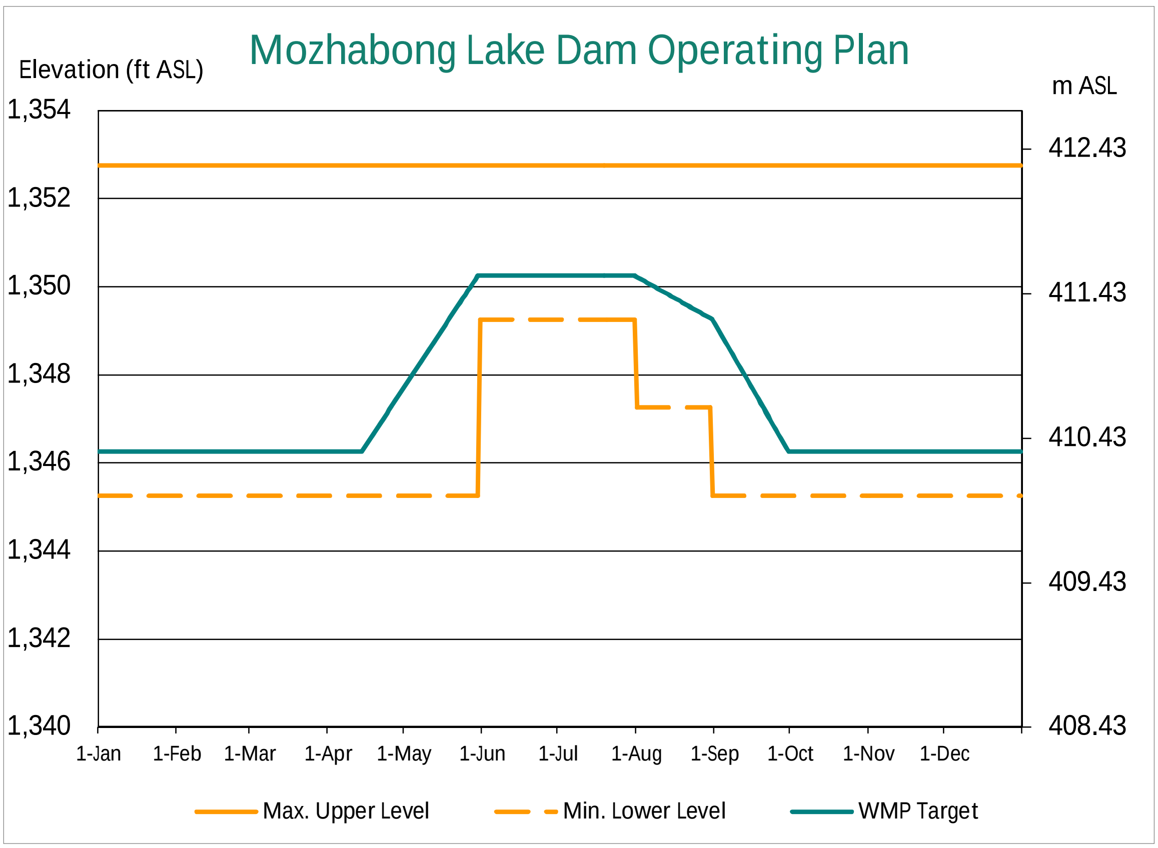
Ramsey Lake (Chapleau) Dams (#7,8)

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	408.13m (1339.02 ft.) from June 1 to November 1
	Minimum Lower Level	406.46m (1333.52 ft.) from November 2 to May 31
	Maximum Upper Level	409.81m (1344.52 ft.)
Compliance Monitoring	Monitoring Location	Observed level on staff gauge at dam #8
	Monitoring Frequency	Minimum once in each of spring, summer and fall
Effectiveness Monitoring	Record Stakeholder Feedback	No specific issue to be monitored



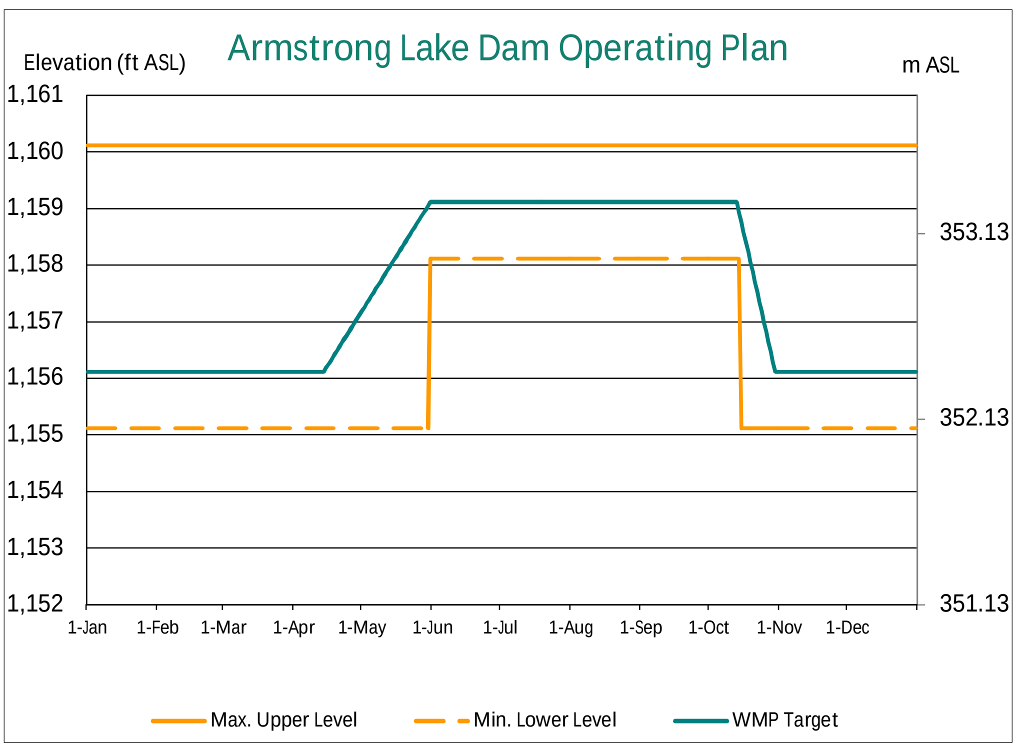
Mozhabong Lake Dam

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	411.25m (1349.25 ft.) from June 1 to August 1
	Minimum Lower Level	410.64m (1347.25 ft.) from August 2 to August 31
		410.03m (1345.25 ft.) from September 1 to May 31
	Maximum Upper Level	412.32m (1352.75 ft.)
Compliance Monitoring	Monitoring Location	Observed level on staff gauge at dam
	Monitoring Frequency	Minimum once in each of spring, summer and fall
Effectiveness Monitoring	Record Stakeholder Feedback	Navigation during low water level in fall identified as issue to be monitored

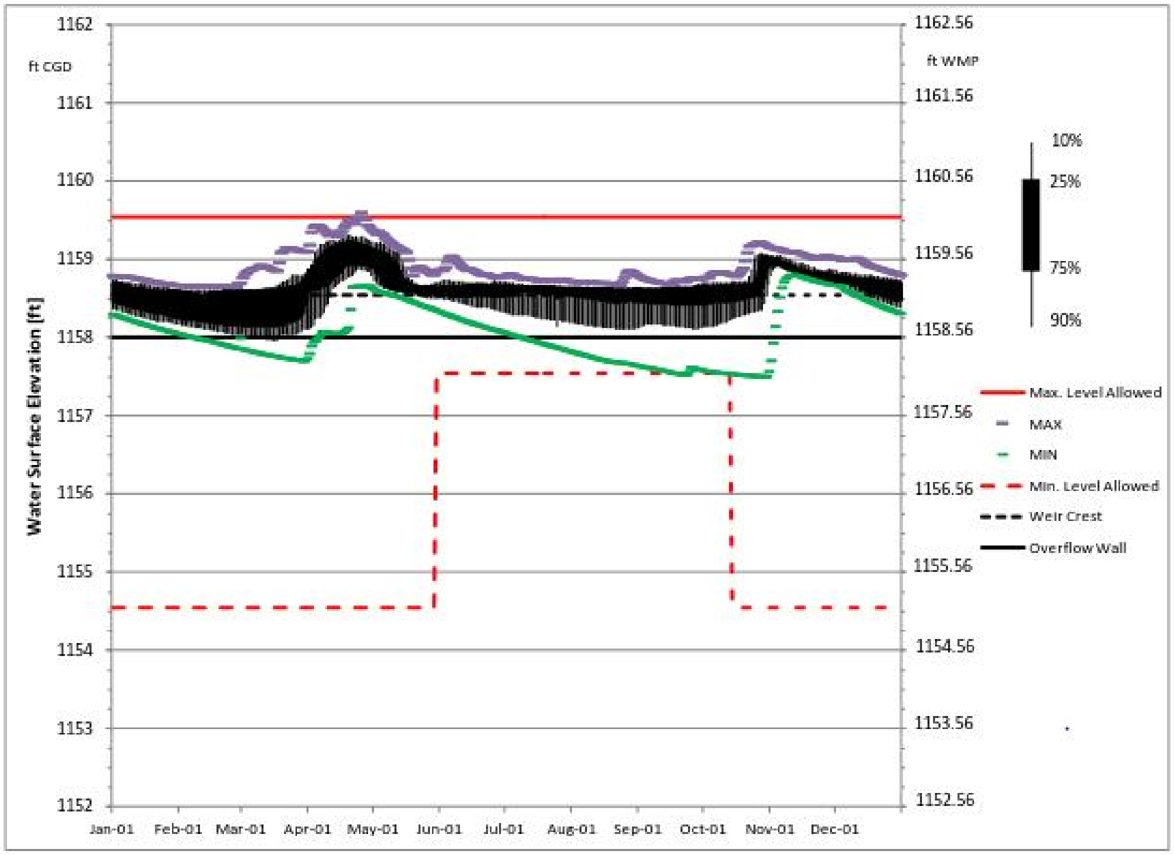


Armstrong Lake Dam

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	352.99m (1158.11 ft) original survey 352.82m (1157.55 ft) updated survey June 1 – Oct 15
	Minimum Lower Level	352.08m (1155.11 ft) original survey 351.91m (1154.55 ft) updated survey Oct 16 - May31
	Maximum Upper Level	353.60m (1160.11 ft) original survey 353.43m (1159.55 ft) updated survey
Compliance Monitoring	Monitoring Location	Observed level on staff gauge at public landing
	Monitoring Frequency	Minimum 6 per year
Effectiveness Monitoring	Record Stakeholder Feedback	Lake level (boat launching, dock damage, flooding) identified as issues to be monitored



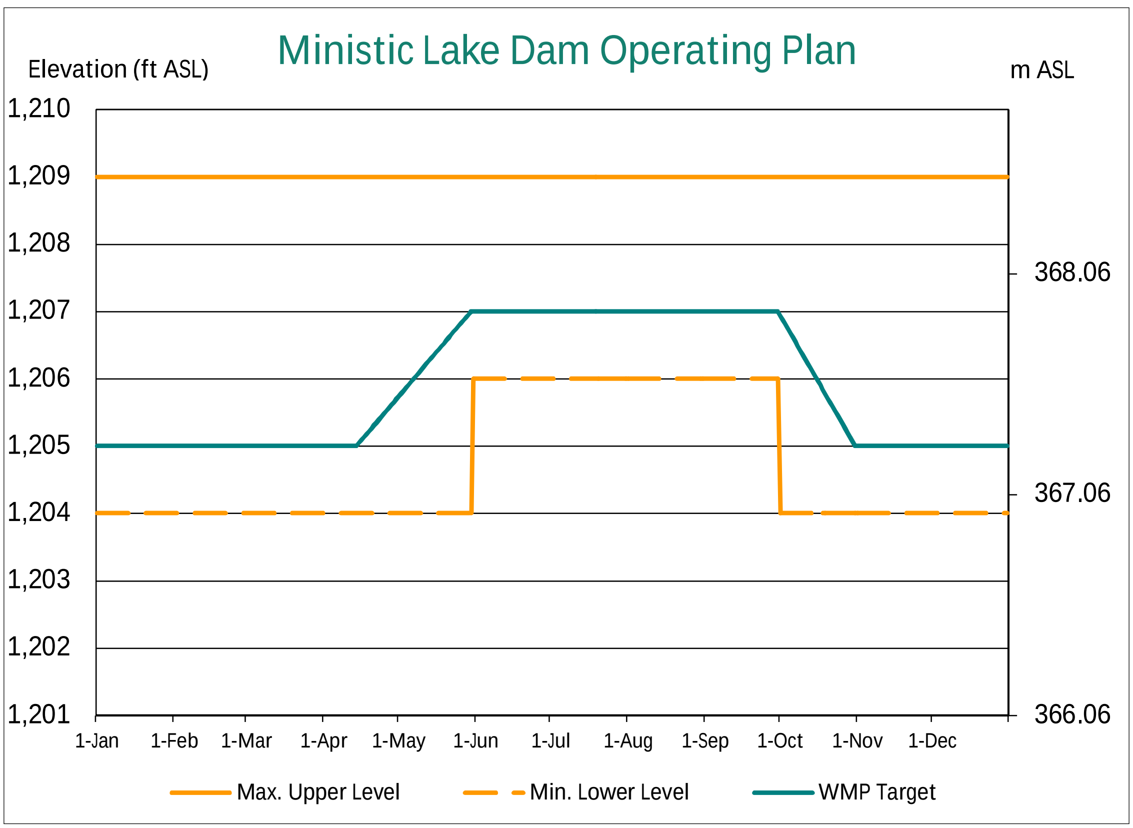
Operating plan developed prior to the dam replacement in fall 2016. Elevations shown are based on the original data contained in the1993 Spanish River WMP.



Armstrong Dam operating plan showing original elevation survey data (right) and elevation data from 2016 updated survey (left side) obtained during construction of the new dam. Also shown are elevations of the new dam (weir) crest, overflow wall crest, and predicted (computer modeled) range of natural water elevation fluctuations under normal conditions The updated survey elevations and benchmark will be used moving forward in relation to the new dam.

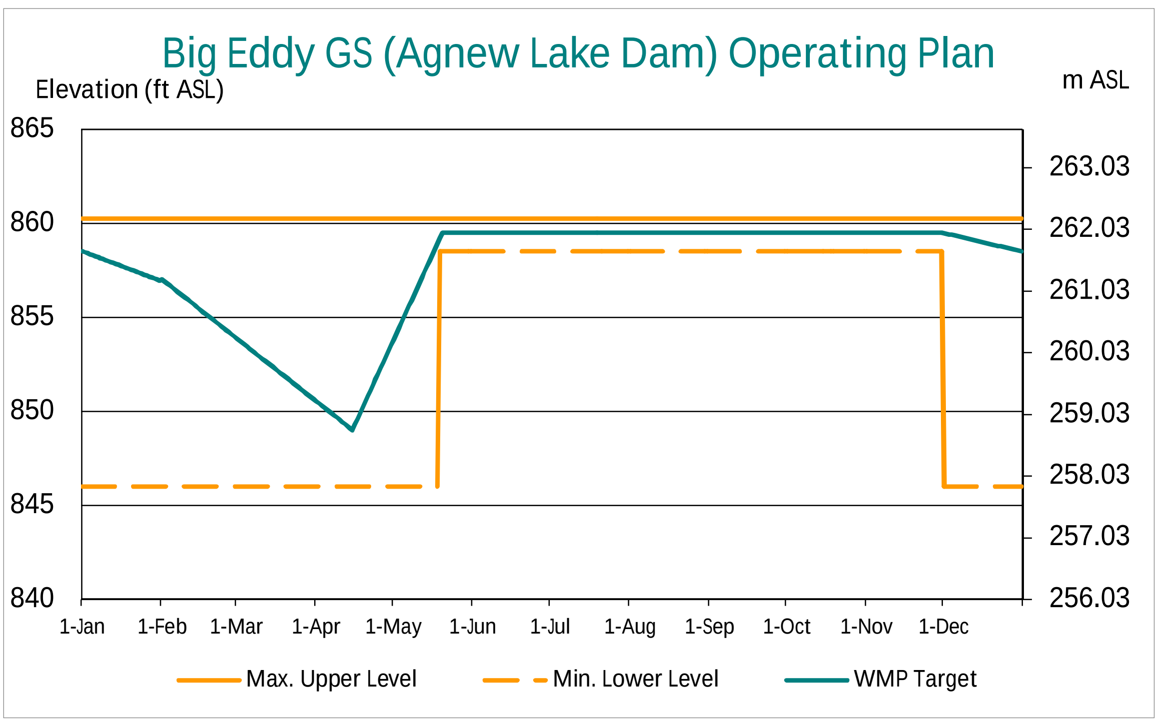
Ministic Lake Dam

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	367.59m (1206.0 ft.) from June 1 to October 1
	Minimum Lower Level	366.18m (1204.0 ft.) from October 2 to May 31
	Maximum Upper Level	368.50m (1209.0 ft.)
Compliance Monitoring	Monitoring Location	Observed level on staff gauge at public landing or dam
	Monitoring Frequency	Minimum 6 per year
Effectiveness Monitoring	Record Stakeholder Feedback	Lake level (dock damage) identified as issue to be monitored



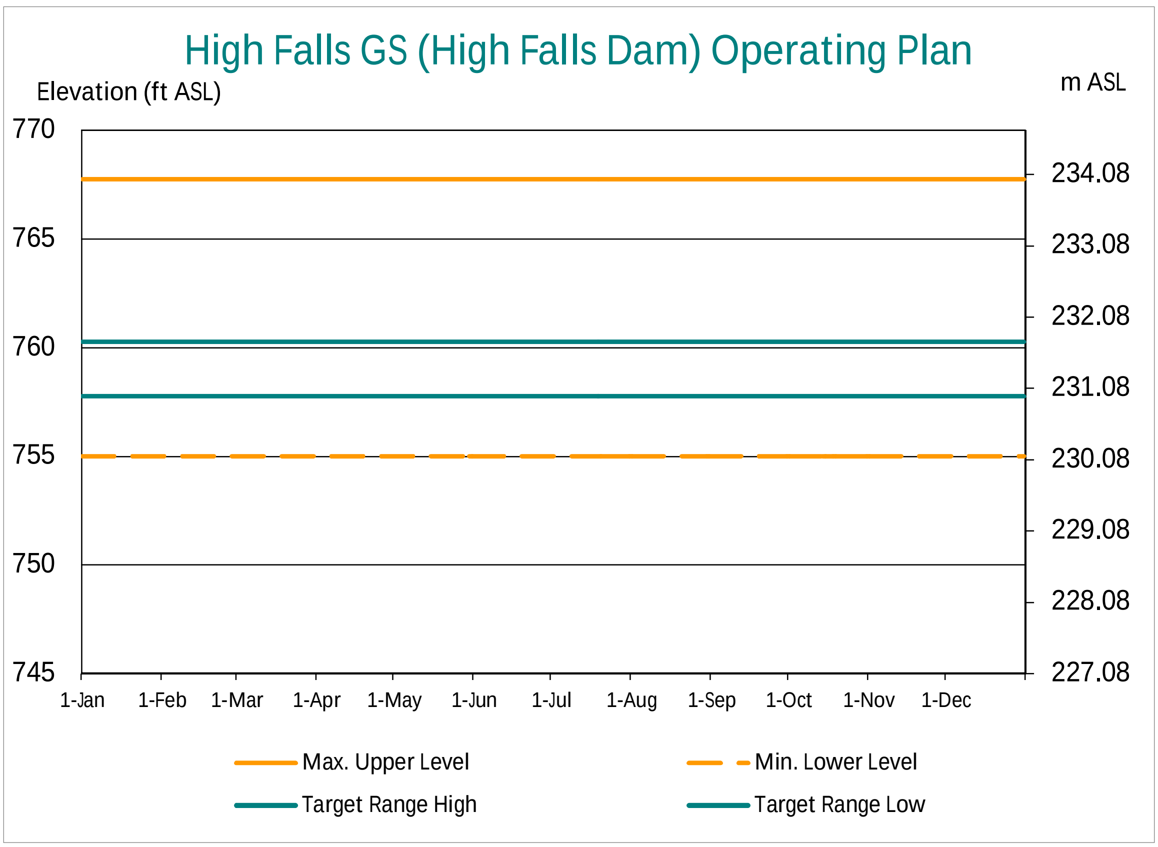
Agnew Lake Dam (Big Eddy GS)

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	261.67m (858.5 ft.) from Victoria Day long weekend in May to Nov. 30
	Minimum Lower Level	257.86m (846.0 ft.) from Dec. 1 to Victoria Day long weekend in May. *Note: Best Operating Practice of 849.0 ft unless weather conditions warrant lower level.*
	Maximum Upper Level	262.20m (860.24 ft.)
Compliance Monitoring	Monitoring Location	Electronic water level reader at forebay
	Monitoring Frequency	Observed reading at 2 hr intervals
	Flow Calculation	Daily
Effectiveness Monitoring	Record Stakeholder Feedback	Monitor effectiveness of changes to operating levels and timing



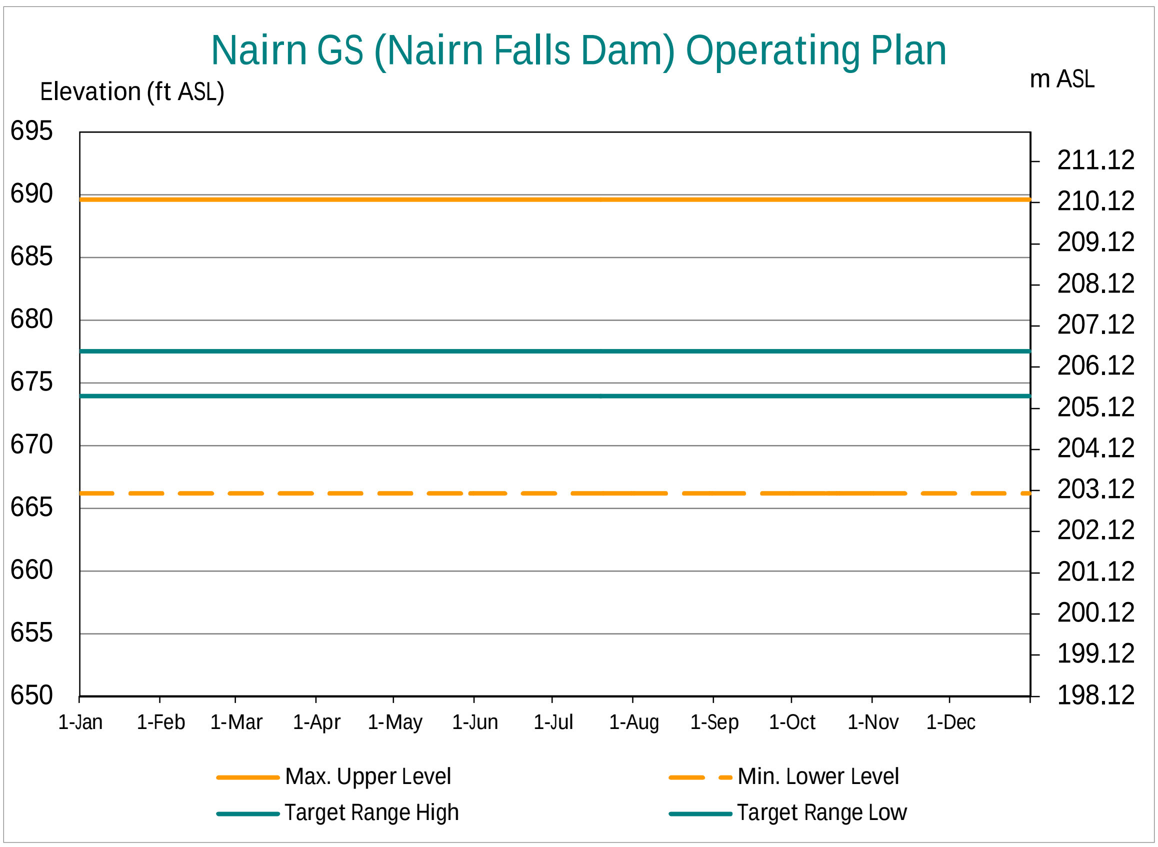
High Falls GS Dam

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	230.96m (757.74 ft.)
	Minimum Lower Level	230.12m (755.00 ft.)
	Maximum Upper Level	234.01m (767.74 ft.)
Compliance Monitoring	Monitoring Location	Electronic water level reader at Big Eddy tailrace
	Monitoring Frequency	Observed reading at 2 hr intervals
Effectiveness Monitoring	Record Stakeholder Feedback	No specific issue to be monitored



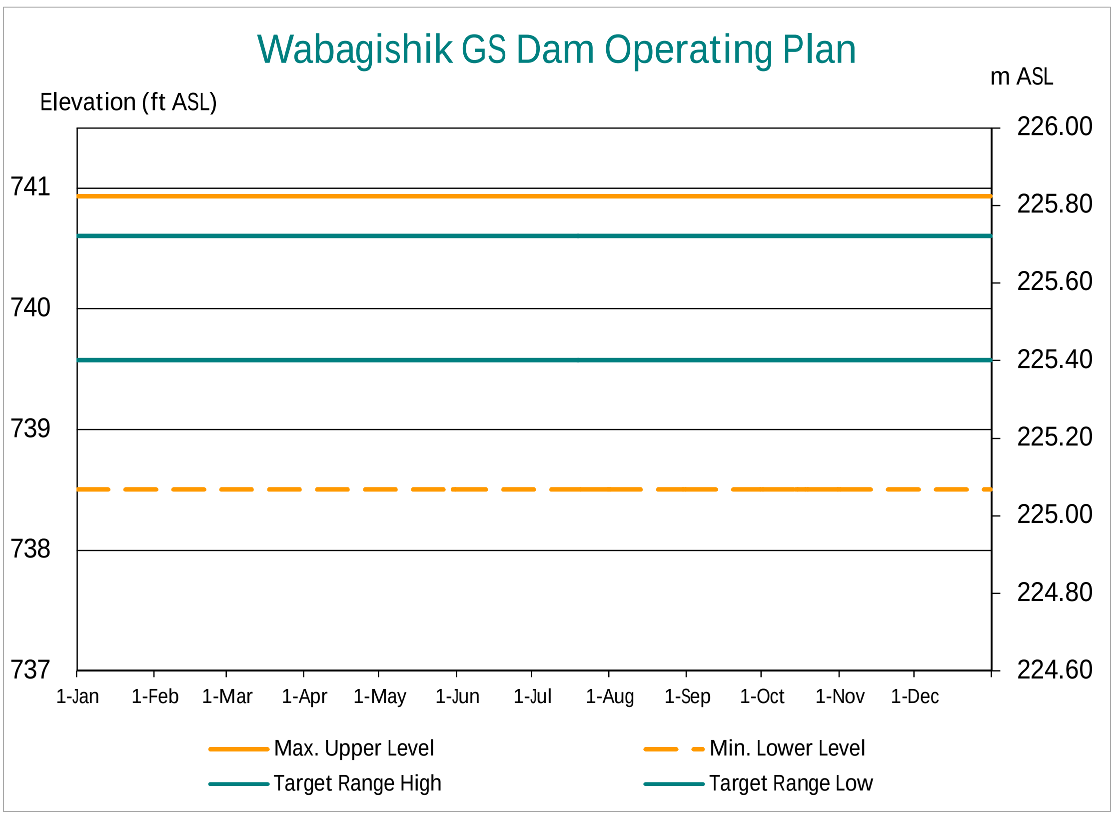
Nairn Falls GS Dam

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	203.04m (666.15 ft.)
	Minimum Lower Level	203.04m (666.15 ft.)
	Maximum Upper Level	210.19m (689.60 ft.)
Compliance Monitoring	Monitoring Location	Electronic water level reader at forebay
	Monitoring Frequency	Observed reading at 2 hr intervals
Effectiveness Monitoring	Record Stakeholder Feedback	No specific issue to be monitored



Wabagishik (Lorne Falls) GS Dam

OP COMPONENT	ITEM	DETAIL
Compliance Limits (Normal Operating Conditions)	Minimum Summer Level	225.09m (738.50 ft.)
	Minimum Lower Level	225.09m (738.50 ft.)
	Maximum Upper Level	225.84m (740.93 ft.)
Compliance Monitoring	Monitoring Location	Electronic water level reader at Big Eddy tailrace
	Monitoring Frequency	Observed reading at 2 hr intervals
	Flow Calculation	Daily
Effectiveness Monitoring	Record Stakeholder Feedback	No specific issue to be monitored



Domtar Facilities

Pogamasing Lake Dam

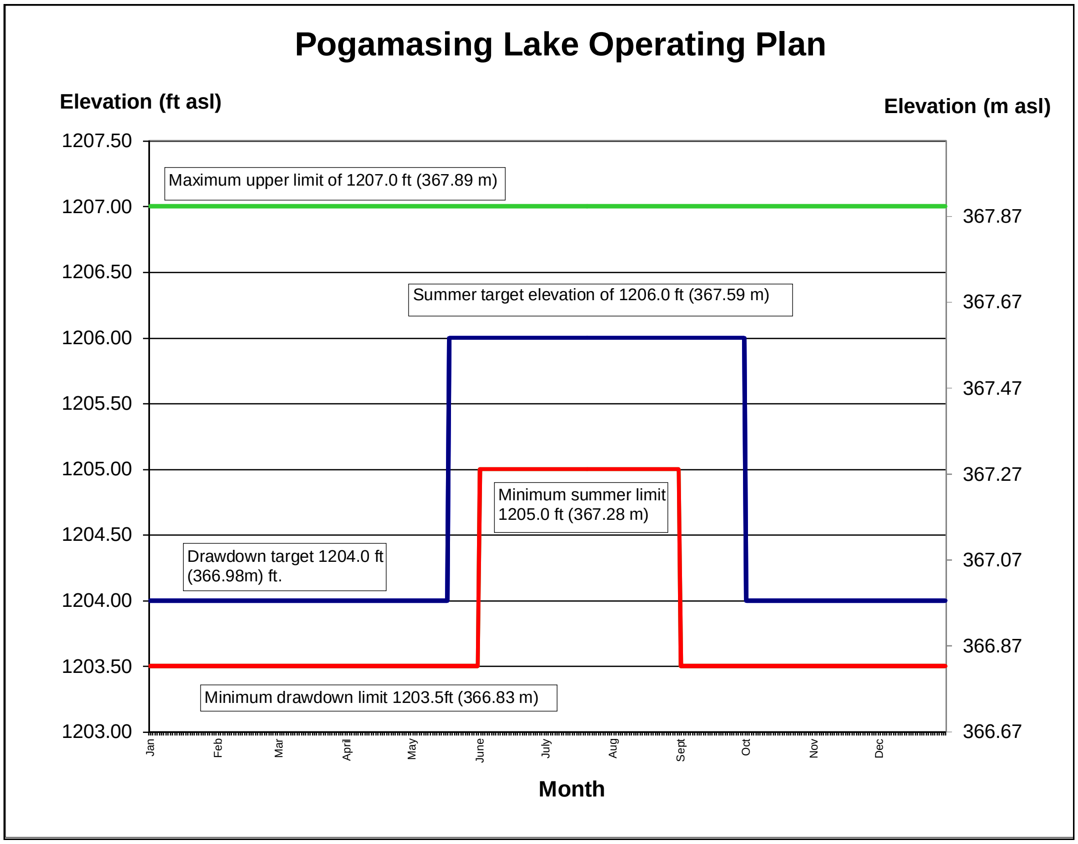
Minimum Summer Limit: 1205.0 ft / 367.28 m asl from Victoria Day in May to Labour Day in September

Maximum Upper Level Limit: 1207.0 ft / 367.89 m asl

Minimum Lower Level Limit: 1203.5 ft / 366.83 m asl from after Labour Day in September to Victoria Day in May

Summer Target: 1206.0 ft / 367.6 m asl

Winter Target: 1204.0 ft / 366.9 m asl

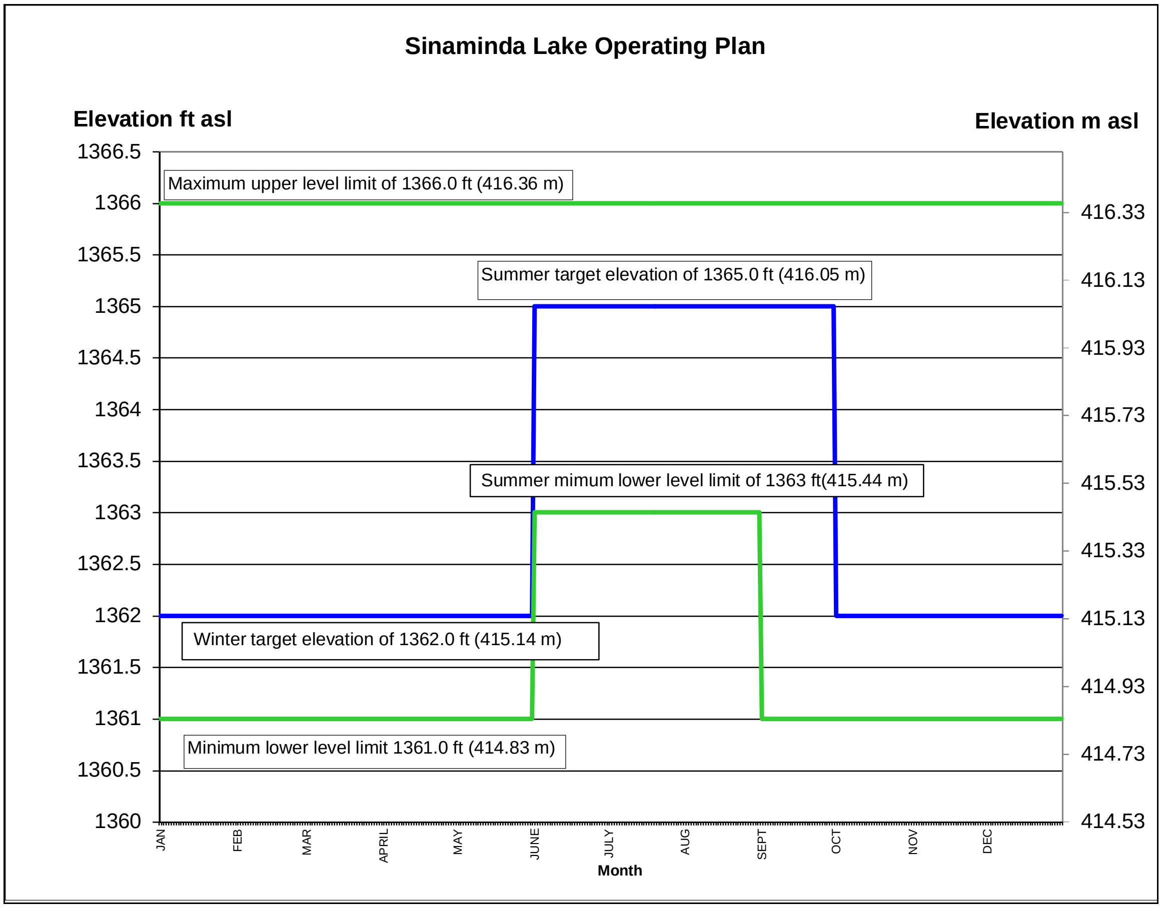


Cumulative Rule:

Typically, only the 15 foot sluiceway is operated. Upon commencement of the spring melt, levels are checked at the dam. Timing and frequency of these checks will be weather dependent (less frequent during a slow cool spring, more frequent during a warm spring). One block is removed from the dam upon commencement of the spring melt, usually at the end of April. This same block will be reinserted within a few weeks to allow lake level to build to summer levels, without causing localized flooding. After the spring rains, another 2-3 blocks will be inserted to maintain level in the dryer summer months, usually the end of June or beginning of July (weather dependent). Fall drawdown commences soon after Labour Day Monday. The 2-3 blocks inserted over the summer are removed to allow the lake level to lower over the month. No movements are typically required until spring, weather dependent.

Sinaminda Lake Dam

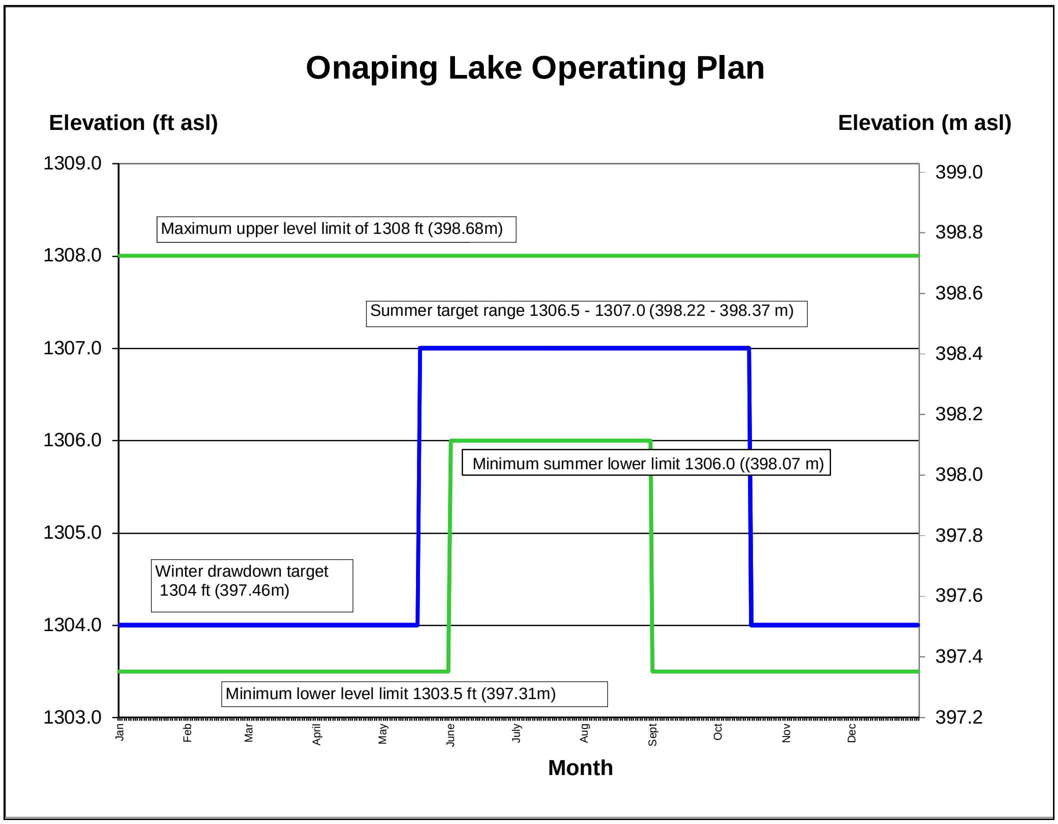
Minimum Summer Limit: 1363.0 ft / 415.44 m asl from June 1 to September 1
Maximum Upper Level Limit: 1366.0 ft / 416.36 m asl
Minimum Lower Level Limit: 1361.0 ft / 414.83 m asl from September 2 to May 31
Summer Target: 1365.0 ft / 416.1 m asl
Winter Target: 1362.0 ft / 415.1 m asl



Cumulative Rule:
The lake level, throughout the year, is currently maintained by natural flow regime, as the dam is not operational. The dam is permanently set to operate at 1364.0 ft/ 415.7 m asl year round. Generally under normal conditions, Sinaminda Lake will be at full supply level at the end of May, 1365 ft / 416.1 m asl.

Onaping Lake – Bannerman Dam

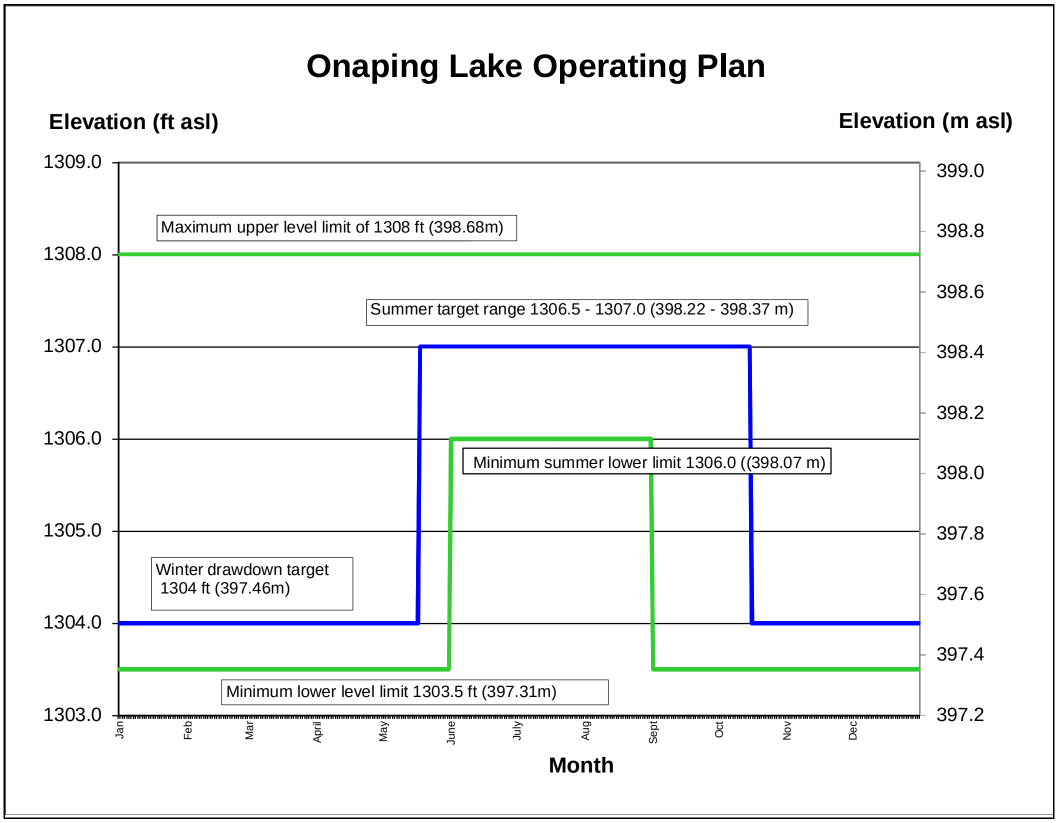
Minimum Summer Limit:	1306.0 ft / 397.9 m from Victoria Day weekend in May to Labour Day (inclusive) in September
Maximum Upper Level Limit:	1308.0 ft / 398.7m asl
Minimum Lower Level Limit:	1303.5 ft / 397.2 m asl from after Labour Day in September to Victoria Day weekend in May
Summer Target:	1306.5-1307 ft / 398.2-398.4 m asl
Winter Target:	1304.0 ft / 397.5 m asl



Cumulative Rule:
Upon commencement of the spring melt, levels are checked at the dam. Timing and frequency of these checks will be weather dependent (less frequent during a slow cool spring, more frequent during a warm spring). One double block is removed from the dam upon commencement of the spring melt, usually at the beginning of April. More doubles will be removed, to fully open the dam during spring runoff (note that the bottom single block is never removed from the dam to ensure proper positioning of all blocks). Blocks will be reinserted during May to allow lake level to build to summer levels, without causing localized flooding. After the spring rains, another 1-3 double blocks will be inserted to maintain level in the dryer summer months, usually the end of June or beginning of July (weather dependent). Weather conditions are watched in case of heavy rainfall that may require removal of blocks to maintain summer elevation range. Fall drawdown commences soon after Labour Day Monday. Two double blocks are removed after Labour Day to allow the lake level to lower gradually over the month. At the end of September, more blocks are removed to ensure lake level is down by October 15th. A drawdown calculator is used to determine outflow required to reach winter elevation. Onaping dam is set to winter levels at the end of September to help lower lake level. No movements are typically required until spring, weather dependent. It is critical to maintain lake level consistently after October 15th to accommodate the fall trout spawn.

Onaping Lake – Onaping Dam

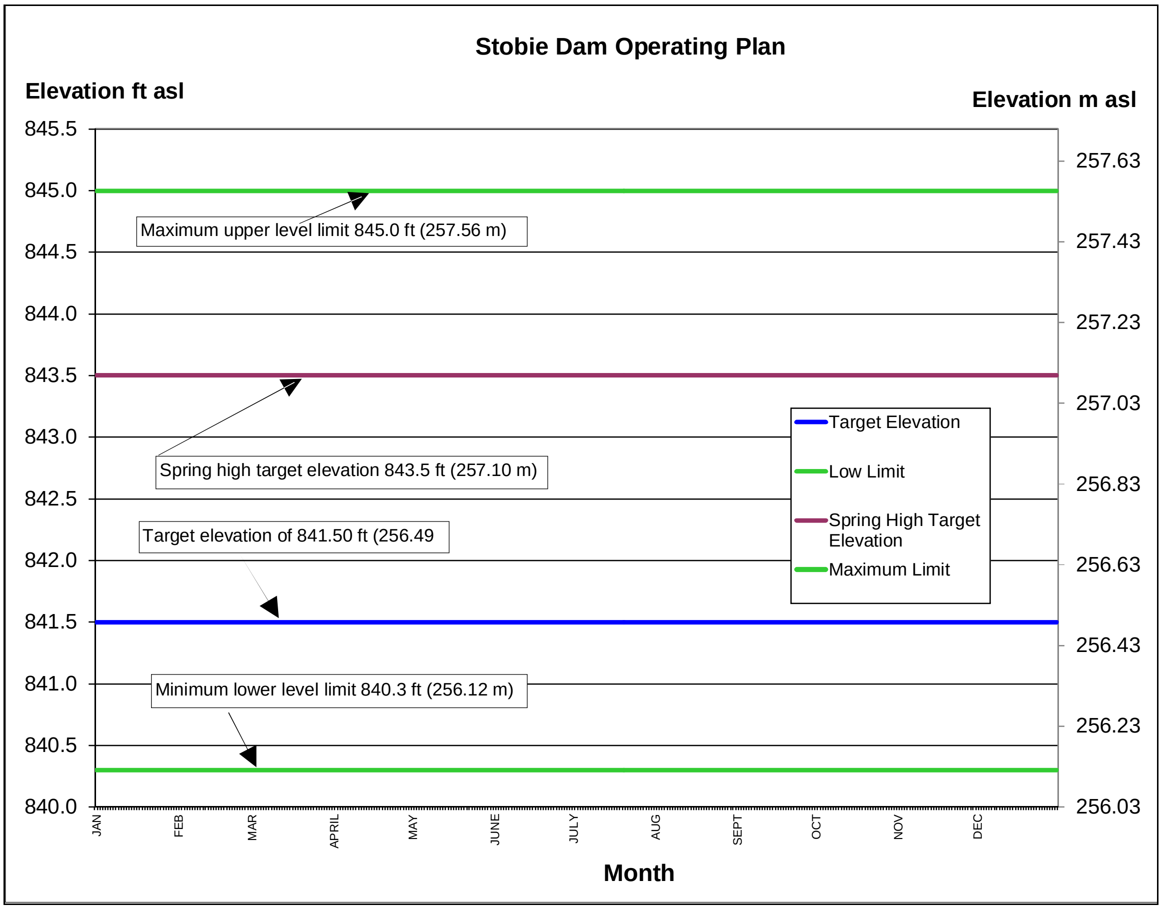
Minimum Summer Limit:	1306.0 ft / 397.9 m from Victoria Day weekend in May to Labour Day (inclusive) in September
Maximum Upper Level Limit:	1308.0 ft / 398.7m asl
Minimum Lower Level Limit:	1303.5 ft / 397.2 m asl from after Labour Day in September to Victoria Day weekend in May
Summer Target:	1306.5-1307 ft / 398.2-398.4 m asl
Winter Target:	1304.0 ft / 397.5 m asl



Cumulative Rule:
Upon commencement of the spring melt, levels are checked at the dam. Timing and frequency of these checks will be weather dependent (less frequent during a slow cool spring, more frequent during a warm spring). If Bannerman dam cannot easily handle spring run-off, Onaping dam will be opened pending analysis of flooding impact downstream in the Vermilion River system. One to two blocks may be removed from the dam upon commencement of the spring melt, usually at the beginning of May. These blocks will be reinserted during May, plus an additional 3 blocks in each gate, to allow lake level to build to summer levels, without causing localized flooding. Weather conditions are watched in case of heavy rainfall that may require removal of blocks to maintain summer elevation range, however, Bannerman Dam is typically used for these fine tuning movements. Fall drawdown of Onaping Lake commences after Labour Day Monday. Three blocks are removed at the end of September from Onaping Dam to facilitate lowering of the Lake level by October 15th. A drawdown calculator is used to determine outflow required to reach winter elevation. No movements are typically required until spring, weather dependent. It is critical to maintain lake level consistently after October 15th to accommodate the fall trout spawn.

Stobie Dam

Maximum Upper Level Limit:	845.0 ft / 257.6 m asl
Minimum Lower Level Limit:	840.3 ft / 256.1 m asl
Year Round Target:	841.5 ft / 256.5 m asl
Spring Maximum Target:	843.5 ft / 257.1 m asl



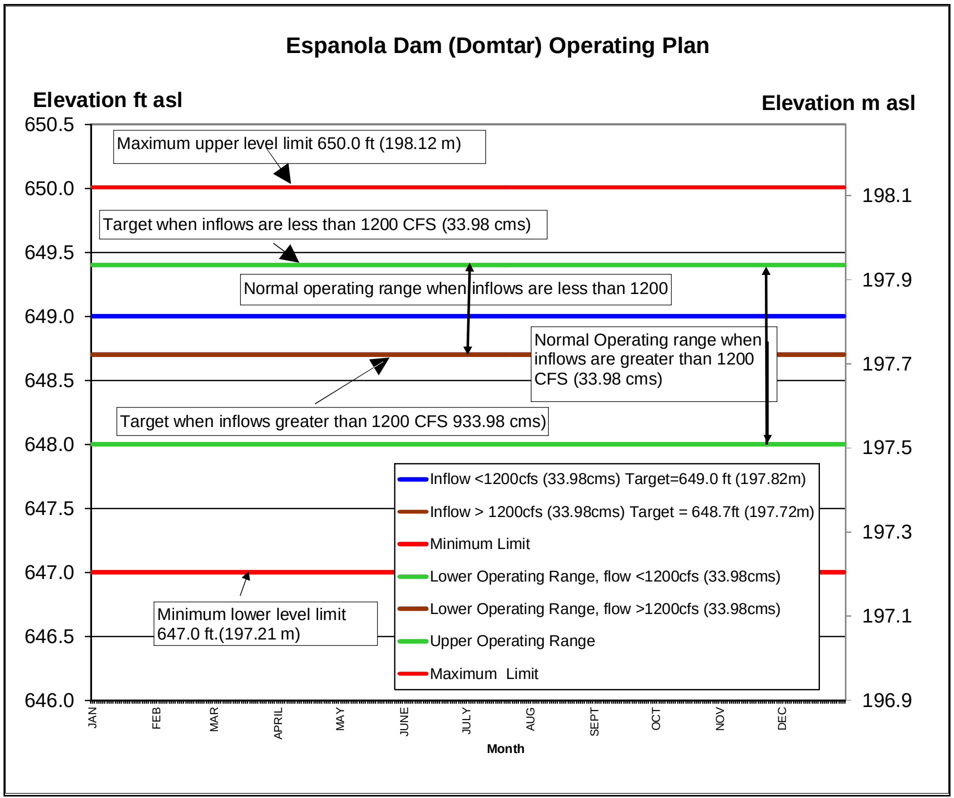
Cumulative Rule:

Due to the large weirs associated with this dam, the operational portion requires infrequent changes. In years of exceptional spring run off the dam will need to be opened. Opening of the dam must be done in communication with Conservation Sudbury to minimize further flooding of downstream landowners.

Espanola Generating Station

Espanola Generating Station Forebay

Maximum Upper Level Limit: 650.0 ft / 198.1 m asl
Minimum Lower Level Limit: 647.0 ft / 197.2 m asl
When flow >1200 cfs (365.8 cms)
Target: 648.7 ft / 197.7 m asl
Operating Range: 648.0 – 649.4 ft / 197.5 – 197.9m asl
When flow <1200 cfs (365.8 cms)
Target: 649.0 ft / 197.8 m asl
Operating Range: 648.7 – 649.4 ft / 197.7 – 197.9 m asl



Cumulative Rule:
The Espanola hydro generating facility is a run of the river facility, with little capacity for withholding water. When river flows are less than 3600 cfs / 1097.3 cms, the majority of river flow will be bypassed through the hydro generators. Any flows in excess of 3600 cfs / cms will be spilled over the Main Dam.

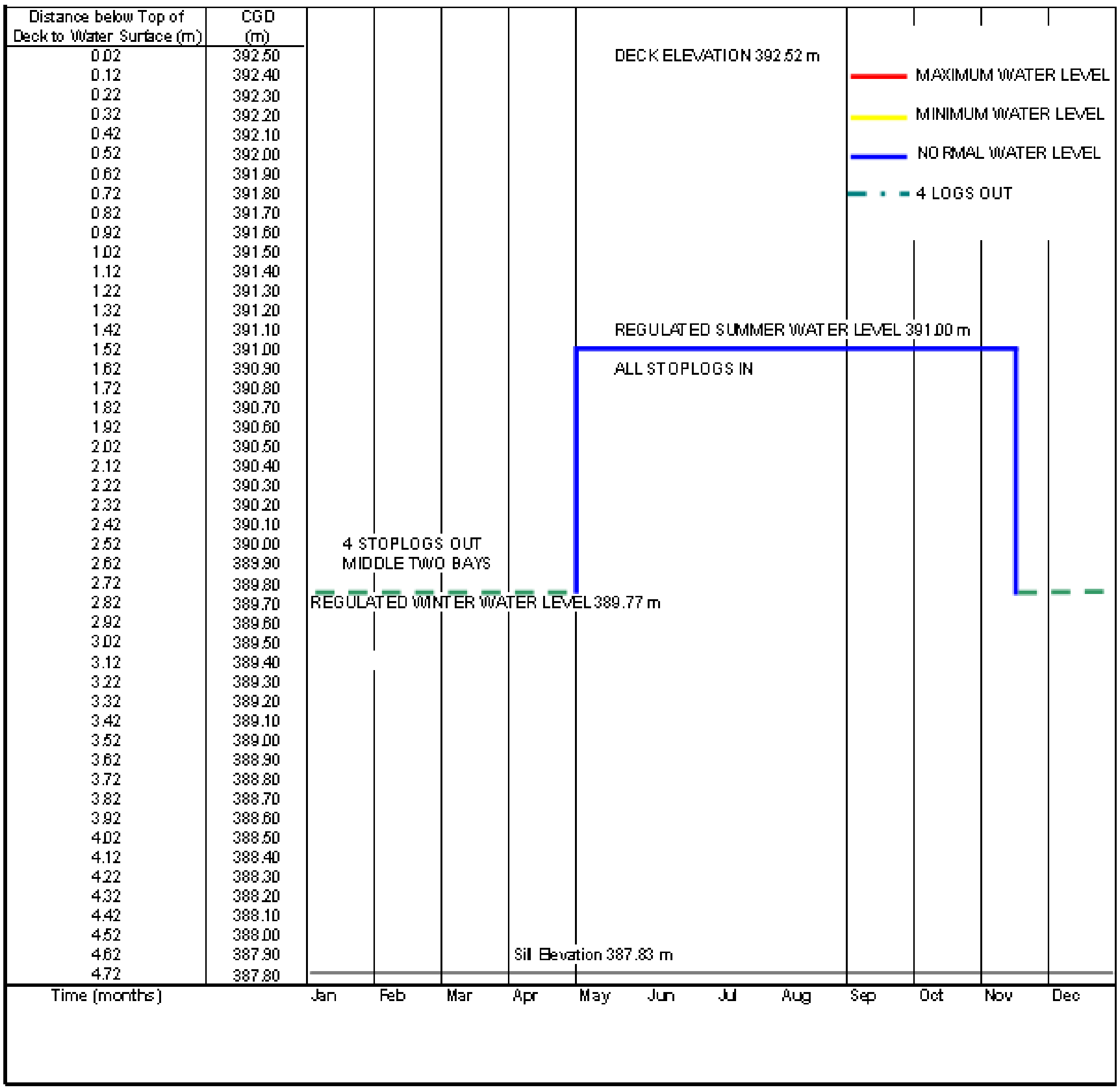
The hydro generators have automatic gates that control the amount of water feeding the turbines. Therefore the upper river level flow will be controlled by these gates when river flow is less than 3600 cfs. When river flows are predicted to exceed 3600 cfs, the Main Dam is manually set using stop logs to allow any excess water to spill.

Daily weather conditions play a significant role in the day to day operation of the Main Dam. Sudden rainfall can significantly increase river flows thus requiring immediate action to open the Main Dam. As well, any upstream withholding or release of water from other facilities can also dramatically impact operation. Communication between Domtar and upstream operators occurs on a frequent basis, as well as weather forecast checks.

MNR Facilities

Three Corner Lake Dam

Three Corner Lake Dam Rule Curve



Notes:

1. A typical stoplog is 0.3 m (12 inches) high.
2. Dates are approximate.
3. Communicate operations to lake residents.
4. Extra log(s) removal may be required to pass the spring flood
5. If water level reaches the maximum allowable level, removing stop logs to pull the level down
6. All headwater level measurements are taken as positive downwards from deck surface

Windy Lake Dam

The Windy Lake Dam was rebuilt in 1999 with almost identical head-discharge characteristics as the original dam. This dam is currently operated as per objectives and procedures shown on the attached chart and outlined as follows: and should be operated with the same basic objectives and procedures as the existing dam. These objectives and procedures are shown on the attached chart and outlined as follows:

Summer Level: 337.74m
Summer Max: 337.84m
Summer Low: 337.64m

Flood: 337.93m
Low Water: 337.24m

Objective of Operation

The Windy Lake Dam should be operated with the objective of minimizing the water level fluctuation on the lake and in downstream channels and controlling discharge from the structure throughout the annual runoff cycle.

Whitewater Lake Dam

__Existing Operating Plan__

	Gauge Reading		**DAM/LAKE**	
	Feet	Metres	GSC	GSC
	Dam	Lake	Feet	Metres
Fall Operating Range	1.1	.37	869.98	265.17
Winter Operating Range	1.1	.37	869.98	265.17
Summer Operating Range	2.1	.67	870.98	265.48

Fall Operation

The fall draw down of the lake begins in November (prior to freeze-up) with the removal of 1 log from each of the stop log bays, leaving 6 stop logs in each bay

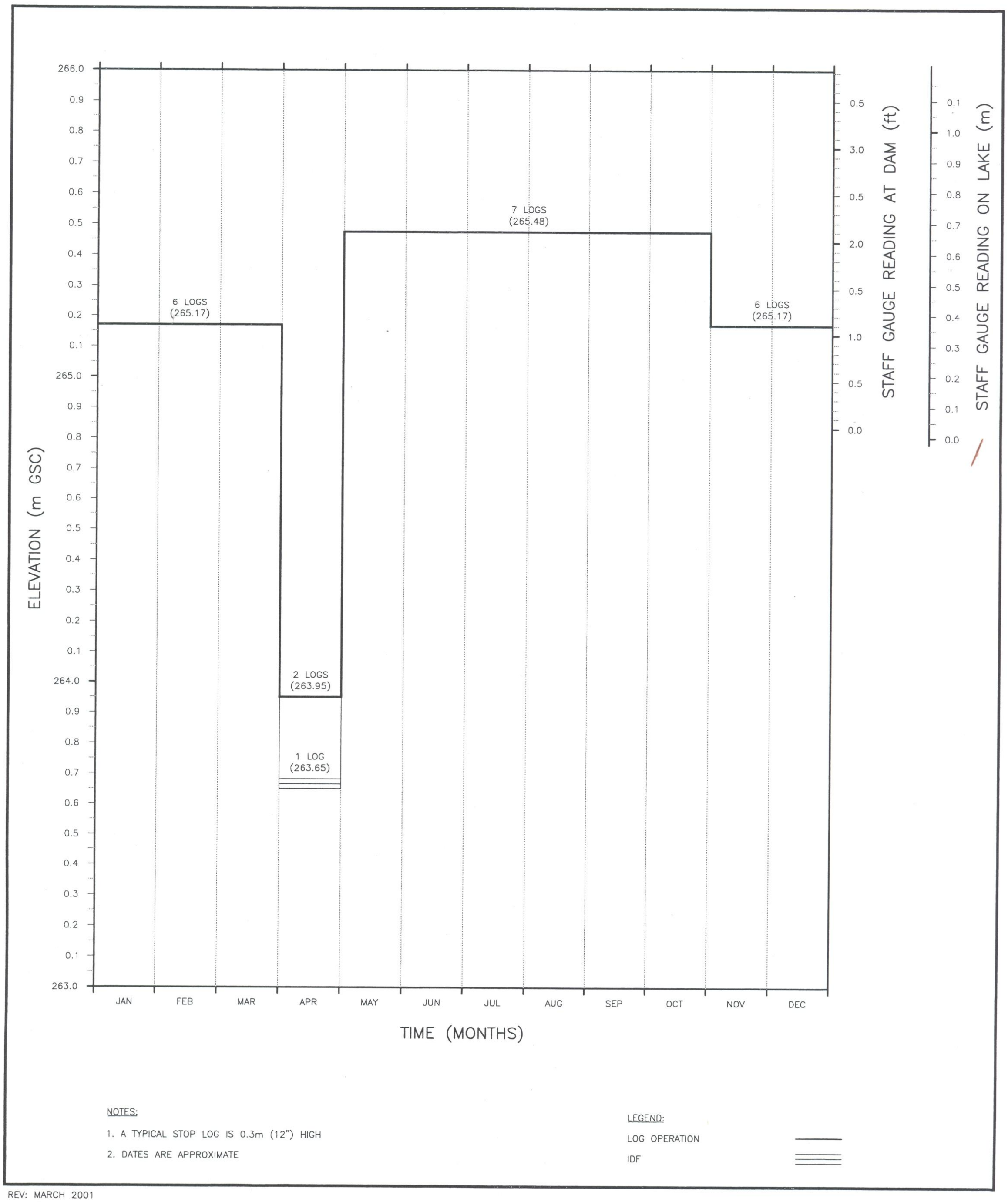
Spring Operation

In late March or early April, 4 logs are removed from each stop log bay to accommodate the spring freshet, thereby leaving 2 logs in each stop log bay.

Summer Operation

Once the spring runoff has passed, all 7 logs are placed in each of the stop log bays. The dam is untouched throughout the summer season. When necessary, logs are removed and replaced to accommodate normal lake water level of 265.48 m GSC.

RULE CURVE: WHITEWATER LAKE DAM



Conservation Sudbury Facilities

Maley Dam

<u>Background Information</u>

Name of Dam & Purpose:	Maley Dam; Flood Control
Owner of Dam:	Conservation Sudbury
Tenure of Land:	under lease from Ontario Hydro (now Hydro One)
Construction:	Built in 1971
Location:	See attachment (Garson Township Map 3), City of Greater Sudbury
Last Inspection:	Annual; Dam Safety Review & Structural Integrity Report to be completed in fall, 2003
Access:	The dam can be reached by taking Maley Drive east from Barrydowne Road to the gated access road entrance. The dam is approximately one kilometre north of Maley Drive. The dam is located on the east branch of Junction Creek.
Watershed:	Upper Junction Creek
Drainage Area: 18 sq. kms.	
Dam Co-ordinates:	Easting - 505942 Northing 5154203
Control:	Earth fill type dam with a core of impervious clay; dam has a main 1.5 metre x 1.5 metre concrete sluice gate and a 36 cm overflow discharge conduit built into the control structure; water level and precipitation gauge is installed on-site.
Significant Fish Species Ident:	minnows, suckers; no known spawning sites
Fishway Passage:	Possible if main gate not fully closed for flood control purposes
Minimum Sill Elevation:	266.09 m
Top of Dam Elevation:	273.10 m
Dam Height:	7 m
Dam Length:	242 m
No. of Stoplog Bays:	4
No. of Overflow Weirs/Spillways:	4

<u>Operations Plan:</u> See below

Conservation Sudbury

Manual of Operation Procedures
for Maley Dam and Reservoir

on East Branch of Junction Creek

City of Greater Sudbury

Purpose

The purpose of this manual is to outline basic operation procedures for routing floods through the George S. Jarrett Dam, more commonly known as the Maley Dam, which will ensure the safety of the structure, while at the same time, use the flood storage capacity of the reservoir as effectively as possible to protect downstream property.

1. Summer & Fall Operation

The conservation pool level of the reservoir through the summer months will be 268.4 metres.

As soon as the spring freshet has passed, the reservoir will be drawn down to the conservation pool level. The main gate will then be closed. The reservoir level will be maintained normally by adjustment of the 36 cm diameter low flow conduit. Heavy runoff from rainstorms will require the main gate to be opened when the water level in the reservoir rises above 268.5 m. The discharge from the dam will be limited to approximately 2.8 C.M.S. (.3 m gate opening) depending on the available flow capacity downstream on the main branch of Junction Creek. When the water level in the reservoir rises above 270.4 m the basic operation procedures for snowmelt runoff will be followed.

Normally when the reservoir level drops to 268.5 m, the gate will be closed. Further drawdown to the conservation pool level, 268.4 m, will be handled through the low flow conduit.

As soon as a rainstorm occurs the operator will check the dam and maintain a standby watch to ensure that all operations are proceeding normally, and reservoir levels are properly regulated.

The storage capacity of the reservoir is such that the runoff from an individual rainstorm should be retainable in the reservoir without discharge through the gate. However, to ensure that a succession of storms does not overtax the reservoir, the water level must be lowered to 268.5 m as soon as possible. This drawdown discharge though should not exceed the discharge capacity of the downstream channel.

2. Winter & Spring Breakup - Operation

The reservoir must be drawn down to the winter holding level, 266.1 m, about mid-October, that is, before the arrival of the cold weather. The small (36 cm) gate must then be fully opened and the main gate set at one metre open. This will ensure that the gates will not freeze up in the closed position and remove the need for operation of the dam during the winter months.

The storage capacity of the reservoir is insufficient to store the normal spring snowmelt runoff without discharges higher than the 2.8 CMS. The gates, during the spring runoff, must be manually operated!

A fixed opening of 1 metre should adequately handle the spring runoff for all but very severe flood conditions. Adjustments under these conditions will be made on the basis of the following Basic Operation Procedures.

These procedures permit higher rates of drawdown when the drawdown discharge does not exceed the discharge capacity of the downstream channel, or when insufficient storage capacity is available to handle projected runoff conditions.

Basic Operation Procedures for Snowmelt Runoff

Prior to spring runoff, ensure that the main gate is set open 1 metre. Permit water level in the reservoir to rise to 270.4 m without alteration of the gate setting.

WATER LEVEL RANGE	REQUIRED ACTION (MAIN GATE)
266.1 m - 270.4 m	Set gate at 1 metre open
270.4 m - 271.3 m	If the water level rises more than 15 cm in any 6 hour period, increase the gate opening by 18 cm. If rate of rise is less than this amount, no change in gate opening is required.
271.3 m - 271.6 m	If water level rises more than 3 cm in 2 hours, increase gate opening by 18 cm. If rate of rise is less than this amount, no change in gate opening is required.

NOTE: Regular readings of the reservoir water level and the gate setting are recorded from the dam throughout the year.

SUMMARY SHEET	
Drainage Area	18 square kilometres
Regional Storm	17 cm
Regional Runoff	11.1 cm
Peak Design Flow	135.6 C.M.S.
Probable Maximum Rainfall	40 cm
Probable Maximum Runoff	25 cm
Probable Maximum Peak Flow	419.1 C.M.S.
Top of Dam	273.1 m
Top of Flashboards	271.6 m
Spillway	270.4 m
Main Gate Invert	266.1 m
36 cm dia. Gate Invert	266.1 m
Conservation Level	268.4 m
STORAGE IN CUBIC METRES	
Top of Flashboards	3,367,236.6
Spillway Crest	1,677,535.5
Conservation Level	320,705.3
2.54 cm Runoff from 18 sq. kms.	736,388.8
FLASHBOARDS ARE DESIGNED TO FAIL IN:	
Bay 1 When Reservoir Level	271.9 m
Bay 2 when Reservoir Level	272. m
Bay 3 when Reservoir Level	272.1 m
Bay 4 when Reservoir Level	272.3 m

1. Summer and Fall Operation (Alternative)

As soon as the spring freshet has passed, the reservoir will be drawn down to the 266.1 m holding level. The main gate will then be closed and the 36 cm diameter low flow conduit fully opened. Heavy runoff from rainstorms will cause the water level in the reservoir to rise. The discharge from the dam will be .5 C.M.S. or less, depending on the reservoir level.

As soon as a rainfall occurs, the operator will check the dam and maintain a standby watch to ensure that all operations are proceeding normally, and reservoir levels are properly regulated. The storage capacity of the reservoir is such that the runoff from any individual rain storm to the limit of the Timmins Storm can be retained in the reservoir without discharge through the gate. However, to ensure that a succession of storms does not overtax the reservoir, the water level must be lowered to 266.1 m as soon as possible. This drawdown discharge though should not exceed the discharge capacity of the downstream channel.

Nickeldale Dam

Background Information

Name of Dam & Purpose:	Nickeldale Dam; Flood Control
Owner of Dam:	Conservation Sudbury
Tenure of Land:	Owned by Conservation Sudbury
Construction:	1980
Location:	See attachment (McKim Township Map 14.4), City of Greater Sudbury
Last Inspection:	Annual
Access:	The dam can be reached north of Lasalle Blvd., and the municipal cemetery in Sudbury and is located on the west branch of Junction Creek.
Watershed:	Upper Junction Creek
Drainage Area:	4.5 sq. kms.
Dam Co-ordinates:	Easting - 501768 Northing - 5152472
Control:	Earth fill type dam with a core of impervious clay, with 120 cm main discharge pipe and 36 cm overflow discharge conduit located in centre of uncontrolled concrete spillway; water level and precipitation gauge on site
Significant Fish Species Ident:	Minnows, suckers, no known spawning sites
Fishway Passage:	possible if main gate not fully closed.
Minimum Sill Elevation:	264.98 m.
Top of Dam Elevation:	272.80 m.
Dam Height:	9 m.
Dam Length:	381 m.
No of Stoplog Bays:	0
No. of Overflow Weirs/Spillways:	1

Operations Plan: Except in extreme spring runoff or rainfall events, the main discharge pipe flows at full open. The control gate on the main discharge pipe has to be closed to within 15 cm in order to begin achieving maximum water retention within the reservoir. If the reservoir is ever full to capacity, the water will go, uncontrolled, over the concrete spillway and through the overflow discharge conduit built into the spillway. This dam is operated in co-ordination with the Maley Dam in order to provide maximum flood protection on a major portion of Junction Creek.

Frood Dam

<u>Background Information</u>

Name of Dam & Purpose:	Frood Reservoir; Flood Control
Owner of Dam:	Conservation Sudbury
Tenure of Land:	under lease from Inco
Latest Construction:	1965 - rock fill type with clay core wall
Location:	See attachment (McKim Township Map 17), City of Greater Sudbury
Last Inspection:	November, 2002 (annual)
Access:	The dam is located approximately one-half mile west of the Lasalle Extension on the north branch of Nolin Creek.
Watershed:	Upper Junction Creek
Drainage Area:	2.59 sq. kms.
Dam Co-ordinates:	Easting - 497634 Northing - 5150503
Control:	Rock fill impoundment with 30 inch diameter ungated discharge pipe; no gauge onsite
Significant Fish Species Ident:	No known species in area
Minimum Sill Elevation:	284.6 m
Top of Dam Elevation:	288.6 m
Dam Height:	4 m
Dam Length:	46 m
No. of Stoplog Bays:	0
No. of Overflow Weirs:	0

Operations Plan: The discharge pipe is open at all times to permit flow in the creek and keep the reservoir virtually drained. During the spring run-off and periods of heavy continuous rain, the reservoir impounds excess inflows while the discharge is gradually released. Peak discharge flows are dispersed downstream of the reservoir before reaching any developed areas along Nolin Creek in the City of Greater Sudbury.

Known Problems: None

Lake Laurentian Dam

Background Information

Name of Dam & Purpose:	Lake Laurentian Backwater Dam; Flood Control/Recreation
Owner of Dam:	Conservation Sudbury
Tenure of Land:	Owned by Conservation Sudbury
Latest Construction:	1982 - concrete wingwalls, stop logs rehabilitated
Location:	See attachment (McKim Township Map 1.1), City of Greater Sudbury
Last Inspection:	Annual
Access:	The dam can be reached by taking Ramsey Lake Road to South Bay Road and then into the Lake Laurentian Conservation Area Nature Chalet building parking lot.
Lake Perimeter Area:	14.9 kms; no residences around lake
Watershed:	Lake Ramsey
Drainage Area:	14 sq. kms.
Dam Co-ordinates:	Easting - 504027 Northing 5144410
Control:	6 - 4" stop logs installed at discharge outlet which is concrete wingwall structure; no gauge on site
Significant Fish Species Ident:	pike, perch, minnows; no known spawning sites
Fishway Passage:	only possible at peak outflow periods
Minimum Sill Elev:	265.89 m
Top of Dam Elev:	266.56 m
Dam Height:	.67 m
Dam Length:	1.25 m
No. of Stoplog Bays:	1
No. of Overflow Weirs/Spillways:	1

Operations Plan

In the fall, beginning in mid-October, one log is removed. If heavy rains occur in November, a second log is removed and the discharge is left to occur over the winter.

At the onset of spring runoff, if water levels rise rapidly, a third log is removed and excess flows can then also be handled in the concrete overflow weir/spillway. Once the spring runoff peaks, the logs are installed as required, to bring the lake back up to a near normal summer operating level. Heavy rainfall events in the summer could necessitate removing one log and handling the excess flows through the concrete overflow weir/spillway.

Known Problems: None

Nepahwin Lake Dam

Background Information

Name of Dam & Purpose:	Lake Nepahwin Backwater Dam; Flood Control/Recreation
Owner of Dam:	Conservation Sudbury
Tenure of Land:	Owned by Conservation Sudbury
Latest Construction:	1996 - rehabilitated wooden stop logs
Location:	See attachment (McKim Township Map 3.2), City of Greater Sudbury
Last Inspection:	Annual
Access:	The dam is located at the outlet of Nepahwin Lake on the east side of Paris Street in the City of Greater Sudbury.
Lake Perimeter Area:	11.8 kms; 280 ± residences around lake
Watershed:	Lake Ramsey
Drainage Area:	744 ha
Dam Coordinates:	Easting - 499900 Northing - 5144835
Control:	3 - 6" stop logs installed in three bays at discharge outlet which is concrete wingwall structure; manual staff gauge on south wingwall
Significant Fish Species Ident:	Splake; trout; no information on possible spawning sites
Fishway Passage:	only possible at peak flow periods
Minimum Sill Elev:	259.18 m
Top of Dam Elev:	260.48 m
Dam Height:	1.3048 m
Dam Length:	11.2 m
No. of Stop Log Bays:	3
No. of Overflow Weirs:	0

Operations Plan

The stoplogs are not removed at any time during the year. The only exceptions would be due to severe spring runoff conditions or extremely heavy and continuous rainfall which could produce water levels which would damage adjacent residential properties.

Known Problems: None

City of Greater Sudbury Facilities

Ramsey Lake Dam

January 12, 2004

Name & Purpose of Dam:	Ramsey Lake Backwater Dam, Flood Control / Recreation
Owner of Dam:	City of Greater Sudbury
Tenure of Land:	City of Greater Sudbury
Latest Construction:	1972
Location:	See attachment (McKim Township Map 2.4) City of Greater Sudbury
Last Inspection:	Summer 2003
Access:	Dam can be reached via Paris Street at Lilly box culvert crossing beneath Paris Street
Lake Perimeter:	34 kms
Contributing Watersheds:	Bethel Lake, Minnow Lake & Ramsey Lake
Lake Surface Area:	792.2 Ha
Drainage Area:	12.7 sq. kms
Peak Flows:	13 CMS
No. of Cottages / Residents on Lake:	405 - based on 1990 survey
Dam Co-ordinates:	Northing: 5146344 Easting: 500293 (based on UTM Zone 17 Coordinates)
Control:	7 visible stop logs 4.58m L x 0.2m W x 0.2m H at each discharge outlet which is at the upstream end of a double bay concrete box culvert wing-wall structure - no gauge on site
Significant Fish Species Ident:	black crappie, brown bullhead, northern pike, pumpkinseed, rock bass, smallmouth bass, walleye, white sucker & yellow perch
Fish Passage:	Only possible during peak outflow periods
Top of Dam Elev:	249.37m (Dec. 12, 2003)
Dam Heights:	Downstream side: 2.0m (invert - downstream concrete box culvert 247.95m) Upstream side: 1.33m
Dam Length:	4.3m fronting each of two (2) bays

No. of Stop Log Bays:	Seven (7) visible
Down Stream Culv. Size & Length:	Twin cast-in-place box culverts - each 3.7m (w) x 2.9m (h) x 34.0m (l)
No. of Overflow Weirs / Spillways:	None
Water Levels:	Downstream side: 249.35 (Dec. 12, 2003) Upstream side: 249.37 (Dec. 12, 2003)
Known Problems:	None
Operations Plan:	See next page

RAMSEY LAKE DAM – OPERATIONS PLAN
January 12, 2004

Operations Plan: To control Ramsey Lake water level and yet meet the terms and conditions of the Permit to (1991- 07- 23) Take Water No. 88P5691.

1) To control the level of Ramsey Lake such that the lake level following Spring runoff is between 249.35m & 249.48m.

2) To minimize pumpage at the David Street Water Treatment Plant remembering that two pumps normally will be operating to provide adequate pressure to the south end of the city.

3) To supply the balance of the water demand from the Wanapitei Water Treatment Plant until higher demands or operational conditions force additional pumping at David Street Water Treatment Plant.

4) Should Ramsey Lake level drop below 247.72m the City must notify the MOE and the public that the lake level has fallen below minimum operating levels and that efforts must be made to reduce water consumption.

5) Should Ramsey Lake level drop below 248.56m the City will ban the use of water for external uses, as required, in a effort to reduce the pumpage at David Street Water Treatment Plant to the two base pumps necessary to sustain pressures in the south end of the City.

6) To take all practical steps to refill Ramsey Lake during subsequent periods of rainfall and Spring runoff including applications to divert Lily Creek flows into Ramsey Lake, if necessary.

Note: It is the City's intention to modify the existing lake level controls at this dam site by replacing the stop logs with a mechanical type leveling control system which it hopes to have in place in the near future.

SEP-20-2000 14:46 MINISTRY OF ENVIRONMENT P.08/09

The Regional Municipality of Sudbury
La Municipalité Régionale de Sudbury

Bag 3700 Station 'A' Sudbury, Ontario P3A 5W5
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RM05
88P5691

1991-07-23

RECEIVED JUL 26 1991

Ministry of Environment
199 Larch Street,
Sudbury, Ontario

Attn: Eric T.Smith
Water Resources Technologist

Dear Mr. Smith:

Re: Operating Plan for Ramsey Lake & David Street Water Treatment Plant

We are pleased to submit our "Operating Plan for Ramsey Lake and David Street Water Treatment Plant", as requested in the recently issued amended terms and conditions of Permit to Take Water No. 88P5691.

Our Plan is as follows:

1) To control level of Ramsey Lake such that the Lake has a water level after spring runoff of 818.1 to 818.5 ft.

2) To minimize pumpage at the David Street Plant remembering that two pumps normally will be operated to provide adequate pressure in the south end of the City.

3) To supply the balance of the water demand from the Wanapitei Plant until higher demands or operational conditions force additional pumping at David St.

4) Should Ramsey Lake drop below the elevation of 816.0 ft., to notify the Ministry of Environment and the public that the Lake has fallen below normal minimum operating levels and that efforts must be made to reduce water consumption.

...2

Ministry of Environment
Page - 2
1991-07-25

5) Should Ramsey Lake drop below the elevation of 815.5 ft. the Region will ban the use of water for external uses, as required, in an effort to reduce the pumpage at David St. to the two base pumps necessary to sustain pressures in the south end of the city.

6) To take all practical steps to refill Ramsey Lake during subsequent periods of rainfall and spring runoff including applications to divert Lily Creek flows into Ramsey Lake, if necessary.

We trust that you will find this Plan satisfactory.

Yours truly,

REGIONAL MUNICIPALITY OF SUDBURY,

J. P. Graham, P. Eng.,
Operations Engineer.

JPG/pt

c.c. P. J. Morrow
c.c. L. A. Moustgaard

Stakeholder Feedback Tracking

Date/Time	Comment/Concern Received From	Contact Information (Address, phone, email)	Received by:	Waterbody	Comment/Concern and Location of Concern	Level/Flow at Time of Concern	Follow-up Action and By Whom