Seine River Water Management Plan Implementation Report

October 14, 2004 to December 31, 2022

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Ministry of Natural Resources and Forestry

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1/BACKGROUND

The Seine River watershed is located in the Thunder Bay, Atikokan and Fort Frances Ministry of Natural Resources and Forestry districts of northwestern Ontario. The Seine River has its source in Lac Des Milles Lacs, west of Thunder Bay between Highways 11 and 17, and drains into the Rainy River watershed at Rainy Lake, along the International Border. The Seine River watershed has been developed and managed to produce waterpower for nearly a century. Infrastructure is in place at multiple points in the watershed to support hydroelectric generation at three facilities, including:

- Valerie Falls Generating Station: A 10-MW facility operated by Evolugen by Brookfield Renewable, Valerie Falls Limited Partnership (VFLP)
- Calm Lake Generating Station: A 9.5-MW facility operated by H20 Power Limited Partnership
- Sturgeon Falls Generating Station: A 8.4-MW facility operated by H20 Power Limited Partnership

Figure 1 provides an overview map of the Seine River watershed, including the locations of control structures, separator dams and hydroelectric generating facilities.

The Seine River Water Management Plan (WMP) was approved on October 14, 2004. This Implementation Report (IR) fulfills the requirements of the Ontario Ministry of Natural Resources and Forestry's (MNRF) 2016 technical bulletin *Maintaining Water Management Plans*. This document is the first IR for the Seine River WMP and covers the period from October 14, 2004 to December 31, 2022. Future IRs will cover ensuing five-year periods.

The objective of this IR is to provide status updates, transparency of dam operations, and inform adaptive management considerations, including:

- A summary of all amendment requests received
- The status of the watershed Standing Advisory Committee (SAC)
- The requirements and results of the watershed Effectiveness Monitoring Program (EMP)
- The status and results of the watershed Data and Information Collection Program (DICP)

The conclusion and recommendations related to the WMP commitments will be summarized in this document to provide guidance, considerations and milestones of achievement for future IRs. Overall, this IR supports dam operators' conclusions that waterpower generation is not having negative or unintended impacts on the Seine River watershed. A comprehensive overview of facility operations and components of the WMP, including the Effectiveness Monitoring Plan and Data and Information Collection Program, are achieving established targets.

This IR was compiled and developed by Evolugen by Brookfield Renewable. It is

important to note that the Seine River WMP includes infrastructure maintained by two separate renewable energy companies. IR details regarding facilities owned and operated by H20 Power were provided by the company to the authors and integrated into the text. Text in blue reflects material that was submitted by the MNRF. Refer to the Seine River WMP document for additional background information.

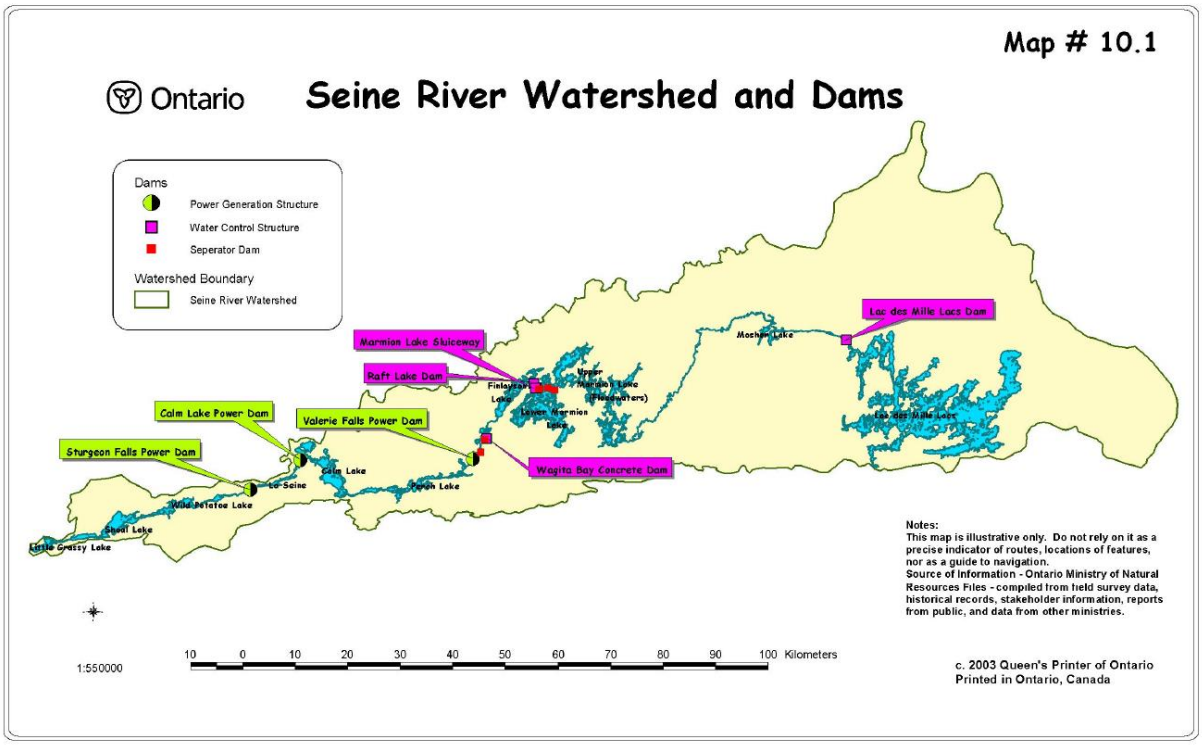

Figure 1: Seine River watershed in northwestern Ontario. Source: Seine River WMP, Map # 10.1, pg. 35

2/AMENDMENTS

This section summarizes all amendment requests pertinent to VFLP and H20 Power facilities in the Seine River watershed, as well as amendments to the Seine River WMP. Nine amendments were completed during this reporting period, as follows. The rationale for each completed amendment is provided; explanations of why certain proposed amendments did not proceed is also offered, where applicable.

Summary of Amendments

- Two minor amendments requested by H20 Power in 2006 for changes to the maximum level of Raft Lake
    - Amendment 1: The maximum level of Raft Lake during the period May 17th to June 15th should be 415.50m. In the period June 16th to July 15th, the maximum level would transition at a graduated rate to 415.33m. Found in Appendix 1.
    - Amendment 2: The maximum level of Raft Lake during the period April 20th to May 15th should transition at a graduated rate from 414.48m on April 20th to 415.04m on April 30th to 415.50m on May 7th through to May 15th. Found in Appendix 2.
- Representatives of MNRF, Lac des Milles Lacs First Nation, Seine River First Nation, H20 and VFLP participated in a Scoping Review during 2015-16. While no requested changes were made with respect to the Plan objectives, four administrative changes were completed (see Appendix 3) to update the plan and to address minor issues of plan performance, including:
    - Amendment 3-1: Administrative change to align the WMP with new policy requirements under the Lakes and Rivers Improvement Act, 2016 (Maintaining Water Management Plans Technical Bulletin), including the removal of the expiry date.
    - Amendment 3-2: Administrative change to update the status of monitoring projects described in Seine River WMP: Ch. 13 Effectiveness Monitoring, pp. 176 and Appendix 12. Schedule of Effectiveness Monitoring Projects.
    - Amendment 3-3: Two updates, including the administrative addition of a standard reporting template to be used by operators to report incidents on non-compliance and updates to Table 7 Compliance Monitoring Requirements Table, (WMP Sect. 12, pp. 169). Both updates reflect changes to organization and Regional Operations Division structure.
    - Amendment 3-4: Administrative change to replace company specific names with the generic “Dam Operator” was made, should the WMP be reprinted to eliminate confusion stemming from the past changes.
- Results of the scoping review and the proposed amendment were presented to the Standing Advisory Committee on May 3, 2016.

    - The MNRF proposed an administrative amendment in 2014 to extend the term of the Seine River WMP for an additional two years to October 13, 2016. See Appendix 4.
- Due to a clerical error in numbering, amendment no. 4 was skipped between amendment no. 3-4 and no. 5. Therefore amendment no. 4 does not exist, and no amendments are tied to this number.
- Administrative amendment no 5. On March 3, 2017 was ordered by MNRF to align the WMP with new policy (2016 Maintaining Water Management Plans Technical Bulletin). See Appendix 5. This amendment included the following changes:
    - Removal of the expiry date, plan term, and mandatory review;
    - New amendment classification, processes, and proponent roles and responsibilities;
    - New compliance monitoring and data processes; and
    - Details of the newly required Implementation Report.

Summary of Amendments Not Proceeding

- The 2015-16 Seine River WMP Scoping Review, reviewed the compliance minimum Winter water level for the Lower Marmion Sluiceway. After inquiry from a stakeholder representative in 2019, VFLP stated that the “winter band” (WMP: Ch. 11.1, pp. 156, minimum 414.80 m, maximum 415.5 m Nov. 15) is not sufficient to protect OPG’s needs for their cooling-water intake. This required compliance water level change required for OPG operations is not classified as an Administrative Amendment. Consultation achieved the current process in which VFLP submits an annual winter operating plan in a Non-Compliance Report for review and approval by the Atikokan MNRF will continue.

3/STANDING ADVISORY COMMITTEE (SAC)

The Seine River SAC has actively served since the inception of WMP in 2004. The SAC provides a mechanism for public involvement and transparency for compliance monitoring. The committee monitors the implementation of the plan and reviews annual status reports. The committee also reviews all data collected and provides a communications link with the public and First Nations to foster and maintain good relationships. Public concerns about flows and water levels in the Seine River watershed are also addressed through the SAC.

The Terms of Reference of the Seine River WMP establishes the role and responsibilities of the SAC, reflecting the diversity of the watershed:

> *"The Steering Committee decided that two existing Public Advisory Committees (Seine River Water Level Technical Committee* [SRWLTC] *and Lac Des Milles Lacs Advisory Committee* [LDMLAC]) *would serve to support the water management planning exercise, rather than creating a single entity."*
> - WMP Terms of Reference, Section 2.3, May 28, 2004

The SAC includes the following representatives:

- First Nation communities (Seine River First Nation, Lac des Milles Lacs First Nation),
- Ontario Ministry of Natural Resources and Forestry
- Valerie Falls Limited Partnership (Evolugen by Brookfield Renewable)
- FirstLight (formerly H2O Power, AbitibiBowater Inc, Abitibi-Consolidated Company of Canada, Abitibi Consolidated Hydro)
- General Public (Upper Marmion, Seine Chain of Lakes, Lower Seine River Lakes)

As part of Effectiveness Monitoring, an annual report is presented to SAC members on a yearly basis. The full report is presented to the SRWLTC around mid-May, prior to walleye season opening.

In early 2007, the District Manager of the Ministry of Natural Resources (Thunder Bay District) transferred the reporting requirement of the LDML annual report from the LDMLAC to the Dog River-Matawin Citizens Advisory Committee (DRMCAC).

Annual meetings for SRWLTC have occurred as follows:

Table 1: Summary of SRWLTC Meeting Dates

Date	Location
Spring 2005	OMNR Atikokan Office Boardroom
Spring 2006	OMNR Atikokan Office Boardroom
Spring 2007	OMNR Atikokan Office Boardroom
Spring 2008	OMNR Atikokan Office Boardroom
May 14, 2009	OMNR Atikokan Office Boardroom
Spring 2010	OMNR Atikokan Office Boardroom
Spring 2011	OMNR Atikokan Office Boardroom
May 10, 2012	OMNR Atikokan Office Boardroom
May 7, 2013	OMNR Atikokan Office Boardroom
May 13, 2014	OMNRF Atikokan Office Boardroom
May 30, 2015	OMNRF Atikokan Office Boardroom
Spring 2016	OMNRF Atikokan Office Boardroom
May 31, 2017	OMNRF Atikokan Office Boardroom
June 12, 2018	OMNRF Atikokan Office Boardroom
May 7, 2019	OMNRF Atikokan Office Boardroom
May 19, 2020	Virtual Conference via MS Teams due to COVID-19 Pandemic
May 5, 2021	Virtual Conference via MS Teams due to ongoing COVID-19 Pandemic
June 28, 2022	OMNRF Atikokan Office Boardroom – meeting held as an information session due to poor attendance.

The SAC has an active membership and anticipates to continue with annual meetings (i.e., Spring of each year), which are organized by the proponents of the Seine River WMP.

Meeting minutes, presentations and annual reports are publicly available and can be requested from: ontario.info@evolugen.com or info@h2opower.com

4/EFFECTIVENESS MONITORING PLAN

The Effectiveness Monitoring Plan (EMP, Section 13 in the Seine WMP) is the basis of assessing and confirming that waterpower operations are effectively meeting the ecological and socioeconomic objectives of the WMP. This is different from the compliance monitoring plan (Section 12), which assesses how well dam operators stay within the compliance levels laid out in the operational plan. EMP data provides information to confirm that the plan is achieving objectives or to propose modifications to the target levels, flows and strategies in the next planning cycle based on current performance.

The EMP (Seine River WMP, Section 13, pp. 175-181) provides objectives and sub-objectives and includes what data is required, who is responsible for gathering the data, how the evaluation will be conducted, and when and how the results will be reported. The EMP also describes reporting requirements to be presented annually to the SAC.

The monitoring of social objectives (such as flooding and navigation) is based on response from the public to conditions that occur during the period of the plan. To facilitate effective communication, the plan proponents developed a website that posts water level and flow data for the system as well as a user-friendly comment page for public participation. These comments are forwarded to the MNRF and the SAC. The website offers a controlled access page with only MNRF having the password to access that portion of the site. Comments are protected by the Ontario *Freedom of Information Act*.

The EMP is designed to integrate environmental, social and economic values across the entire watershed. In accordance with the overall goal of sustainable management, dam operators do not address the economic impacts of operating within the specified parameters of the WMP (see EMP sub-objective 13.3).

The EMP components continue to provide feedback that supports adaptive management, however changes to some components have been recommended to better fit current policy frameworks. Since the inception of this Plan, MNRF priorities, workload and strategic direction have shifted. Work undertaken by MNRF must always be considered relative to the current established priorities, resourcing, and workload. In some cases, MNRF commitments have not been met, are considered ongoing, or have been accomplished through other initiatives which began after the development of this Plan. Some commitments may be met based on future work planning. In situations where objectives are out of date or cannot reasonably be accomplished, MNRF may consider Plan amendments. Fort Frances District/Dryden/Atikokan was wholly or partially responsible for developing, implementing, and reporting on studies linked to goals and objectives outlined in Section 13 of the SRWMP. Thunder Bay/Ignace District is the lead for MNRF reporting requirements related to Lac des Mille Lacs within the SRWMP**.**

This section of the implementation report is divided into each sub-objective of the EMP. It will report on the following:

- A summary and/or graph of results related to the collected information;
- A summary of commitments and activities conducted and its findings;
- Determination of whether operations are having a negative or unintended impact; and
- An assessment of whether revisions to the facility operations, or to the EMP, are required.

A Scoping Review for the Seine River WMP was undertaken in 2015-16 and Amendment 3-2 was approved in 2016. This Administrative Amendment updated the status of monitoring projects described in Section 13 (EMP) as many of the projects were completed. See Appendix 3 for the updated Schedule of Effectiveness Monitoring Projects Table (Seine River WMP Appendix 12).

Effectiveness Monitoring for the Seine River WMP is divided into multiple categories:

- 4.1 Flood
- 4.1.6 Drought
- 4.1.7 Communication
- 4.2 Navigation, Recreation, Social
- 4.3 Power Generation
- 4.4 Aquatic Ecosystem

The following offers a summary of EMP requirements and results in all categories.

4.1: Effectiveness Monitoring for Issue Category 1. Flood

The plan contains a number of objectives to minimize flood risk and the impacts of flooding to address social issues such as public safety and property damage, which are described in section 7.2 of the plan. These objectives are the result of complied reports of issues and concerns that were received by the public and the planning team during previous planning and consultation.

4.1.2: Minimize Flooding at Lac Des Milles Lacs

Sub-Objective: 1a

Description: VFLP is responsible for reporting water levels on Lac Des Milles Lacs in relation to the WMP maximum water level of 456.99 m (Seine River WMP, Section 11.2, pp. 167). This objective is meant to (a) evaluate whether the WMP maximum water level is causing damage, including the location(s) and magnitude; and (b) evaluate the effectiveness of water management actions at the Lac Des Milles Lacs dam before and during high water events. MNRF is responsible for compiling input that is directed to the MNRF from the webpage and other sources and providing it to plan proponents, and surveying residents immediately after high water events (See Section 4.2.6).

The following table provides an annual summary of years with water levels when minimum or maximum water levels were exceeded. Asterisks indicate years when high water conditions occurred, and are described in detail below.

Table 2: Annual water levels at Lac Des Milles Lacs in relation to Seine River WMP level of 456.99 m

Above Maximum Water Level	Below Minimum Water Level
2022 *described below	
2021	2021
	2020
2019	2019
	2018
2017	2017
2016	2016
2015	2015
2014	2014
2013	2013
2012 *described below	
	2011
	2010
2009	2009
2008	2008
2007	2007
2006	2006
2005	2005
2004	2004

Summary: Table 2 reflects the annual deviations in water levels at Lac Des Milles Lacs in response to melting snowpack and precipitation events. In addressing these fluctuations the dam operator (VFLP) strives to regulate levels within the tolerances of compliance as efficiently as possible. However, there are limitations to the operator's control imposed by natural events and available equipment. Two examples described below illustrate steps taken to mitigate water levels that exceeded the WMP maximum:

- In 2012, the elevation at Lac Des Milles Lacs exceeded the WMP maximum level of 456.99 m, from May 31 to June 3. This came after an extended period of heavy rainfall (155 mm of precipitation was recorded at a gauge located 75 km southeast of Lac Des Milles Lacs between May 19 and May 28). Snowmelt did not contribute to this flood event. In response, the dam operator removed stoplogs to increase discharge to the maximum capacity of the Lac Des Milles Lacs dam (about 70 m^3/s) between May 25 and May 29. Outflow increases were staged in accordance with the "Flood Flow" ramping rates (+20 m^3/s per day) prescribed in the Seine River WMP. However, it is clear that inflows exceeded discharge, with water levels cresting on June 2 with a 5 cm increase in the water level—despite the operator following best practices. This flow rate and stoplog position was held for 28 days (May 29–June 25). There were no reported incidents of flood damage during this event. The details of the event were reported to the Seine River SAC in the Fall of 2012 and the Spring of 2013.

- In 2022, the delayed onset of spring runoff resulted in the headwater level falling below the minimum operating band, with a measured water level of 456.28 m on March 29. This occurred despite outflows being held at 2.1 m^3/s, as close to the prescribed 1.5 m^3/s minimum flow as possible. The freshet was not observed until May 1, when inflows to the system were documented to increase from 17 m^3/s to 57 m^3/s. The headwater elevation reached the operating band level of 456.62 m on May 7. At the same time, inflows increased rapidly, reaching a maximum daily average of 192 m^3/s on May 8. The dam operator responded to mitigate a possible flood situation by removing stoplogs on May 10 to increase outflows from 10.1 m^3/s to 39.7 m^3/s. Even with these efforts, the elevation of Lac Des Milles Lacs increased and the operator further increased the dam's discharge to the maximum capacity of 70 m^3/s. per day). Inflows peaked at a daily average of 251 m^3/s on May 13. Lac Des Milles Lacs elevation exceeded the maximum level of 456.99 m on May 14 and ultimately crested at 457.1 m on May 20, 11 cm above the WMP flood level. Water levels started to decline on May 23 and reached the normal operating band on June 24. There were no reported incidents of flood damage during this event.

Status: VFLP has submitted water level data annually as per Table 7, Section 12 of the Seine River WMP, to the MNRF and the Seine River Water Level Technical Committee (SAC). MNRF has not provided the dam operator with a comment log. Water levels and flow rates, as well as high water notices, are updated regularly on the Seine River WMP website.

MNRF Contribution: The evaluation of plan flood level and the quantification for the magnitude of flood damage was not completed by the Thunder Bay/Ignace District. At this time, it is unlikely that Thunder Bay District will actively survey residents following a high-water event. Information will continue to be gathered from complaints received by MNRF and the proponent and reported in the proponent's annual report (Section 4.2.6 for more information on compiling input from webpage and other sources). Lac des Milles Lacs went through a 100-year flood in 2022, exceeding the 456.99 level, and no complaints from residents were received by Thunder Bay District. Thunder Bay/Ignace District recommends removing the strategies to quantify flood damage and survey residents immediately following flood events from the effectiveness monitoring plan (EMP).

This objective is considered Partially Complete and is recommended to be removed from the effectiveness monitoring plan.

4.1.3: Minimize Flooding on Upper River (Sapawe Road)

Sub-Objective: 1b

Description: The SRWMP currently suggests that the Sapawe-Upsala road floods when river flows range between 120 and 140 m3/s. There are several stretches between kilometer 12 and 19 along the Sapawe-Upsala Road that are known to be prone to seasonal flooding. VFLP must report annually on the number of times water floods the Sapawe Road to investigate the relationship between controlled and uncontrolled flows. *See Data and Information Collection Program 14.2.12 and 14.2.33 for additional information.* MNRF is responsible for compiling input directed to the MNRF from the webpage and other sources and providing them to plan proponents (See Section 4.2.6).

Summary: Daily average flow data for Lac Des Milles Lacs is not enough to provide a comprehensive overview of water levels in the upper watershed. Uncontrolled inflows, such as the Firesteel River, also contribute to the watershed. The lack of data for uncontrolled inflows into the upper stretches of Seine River system (i.e., Firesteel River) make it difficult to assess the effects of discharges from LDML as the flooding of the Sapawe Road is dependant on the relationship between uncontrolled basin flows as well as LDML discharges. Inflows from uncontrolled sources (Firesteel and Mercutio River) account for 56% of the watershed area of Upper Marmion Lake.

Working with the MNRF, the dam operator explored the possibility of installing water level gauges on tributaries to provide more accurate inflow data. In

2009, Water Survey of Canada staff and Brookfield staff completed a hydrometric site reconnaissance looking at suitability of 11 locations around Lac Des Milles Lacs for water level and flow monitoring. VFLP completed a site reconnaissance study for the upper Seine River, upstream of Raft Lake to Lac des Milles Lacs in 2009. The subsequent report (Hyde 2009) documented field observations and recommendations for each site, which included a proposed monitoring plan. Brookfield applied to install a standard hydrometric staff gauge at the forest access bridge over the Firesteel River in 2010. Permission was not granted for gauge installation from property owners, after discussions with MNRF, it was determined there were no suitable locations for a flow gauge station at that time.

Status: VLFP submits data annually as per Table 7, Section 12 of the Seine River WMP, to the MNRF and the Seine River Water Level Technical Committee (SAC). MNRF has not provided the dam operator with a comments log related to Sapawe Road flooding. Water levels and flow rates, as well as high water notices, are updated regularly on the Seine River WMP website. It has been determined that the best practice for assessing this EMP objective is to actively monitor water levels in the upper watershed and observe flooding conditions on Sapawe Road. Releases from the Lac Des Milles Lacs dam are timed to mitigate flooding at both Lac Des Milles Lacs and the Seine River floodplain at Sapawe Road. Year by year details are available through the MNRF in the Seine River SAC annual reports.

MNRF Contribution: To date, no additional action has been taken to address this objective and contributing flows from the Firesteel River into the Seine River remain unknown. This objective is considered Incomplete - Ongoing. In order to further the understanding of the effects of outflows from LDML on flooding of the Sapawe Road, ways to quantify flows from the Firesteel River could be re-visited as considerable time has passed since the original assessment was made.

The MNRF Atikokan collects and uses information from road users such as the forestry industry, resource harvesters and recreationalists monitor the road during the open water months, and in particular the spring months. To date, MNRF has not kept a log of this information for effectiveness monitoring purposes, but will consider this moving forward.

When flood conditions do exist, road hazards are marked with signage and/or barricades until the safety concern has passed or is repaired. In extreme high water or high flow events, the MNRF has closed portions of the Sapawe-Upsala road due to unsafe driving conditions as a result of flooding and/or water related road erosion. This objective is considered Incomplete - Ongoing. For further information see comments in Section 4.2.6 (re: compiling input from webpage and other sources).

4.1.4: Minimize impacts of Seine River flooding on the Town of Atikokan (Especially during Atikokan River flood events)

Sub-Objective: 1c

Description: FirstLight must report annually on the number of instances when Seine River flows impacted Atikokan River water levels in Atikokan. As part of this objective, H2O is directed to evaluate its water management actions taken at the Raft Lake dam before and during flood events, as well as research the relationship between Seine River flows and Atikokan River flood events. MNRF is responsible to research relationship between Seine River flows and Atikokan flood events.

Summary: The dam operator is responsible for recording daily average flow data for the Raft Lake dam, as well as taking into account stoplog information. This data is cross-referenced with water levels on the Atikokan River at the Town of Atikokan.

Status: There have been no documented comments or complaints regarding Seine River flooding in the Town of Atikokan.

MNRF Contribution: The SRWMP indicates that past flood inundation studies have shown that the Seine River has no effect on the Atikokan River except for when the Seine River and the Atikokan River are in coincident flood. While it is acknowledged that flooding events are outside of the scope of the water management plan, the SRWMP indicates that management of the Seine River levels and flows prior to and during a coincident flood on the Atikokan River are thought to help lower the peak duration of a flood event in the town of Atikokan.

This objective is considered Incomplete - Ongoing. To date, MNRF has not thoroughly researched the relationship between the Seine River flows and Atikokan flood events. Some preliminary work such as bathymetry of the Atikokan River and assimilation of Atikokan River characteristics (inflows, physical features, natural processes, etc.) has been completed. MNRF also monitors the flow and water level data captured from the Water Survey of Canada station located just upstream of the Town of Atikokan (station number 05PB018) to understand the typical levels and flows of the river.

Currently it is unclear what effects flooding of the Seine River have on the Atikokan River during coincident floods. Currently, there is insufficient data for water levels in the western reaches of the Atikokan River as the Water Survey of Canada Station located on the east side of the Town of Atikokan is at a higher elevation than the confluence of the Atikokan and Seine River, west of the Town of Atikokan. It is recommended that MNRF continue to monitor water levels in the Atikokan River and consider options available to better

understand the possible backflow effects from the Seine River into the Atikokan River during coincident flood events.

4.1.5: Minimize flooding on Perch Lake and Minimize flooding on Lower Seine River

Sub-Objective: 1d and 1e

Description: FirstLight must report annually on the number of instances when Perch Lake experienced flooding (sub-objective d) and (sub-objective e) the Lower Seine River flooded, particularly at Seine River First Nation. As part of this objective, H2O is directed to evaluate its water management actions taken at the Raft Lake dam before and during flood events. MNRF is responsible for compiling input that is directed to the MNRF from the webpage and other sources and providing them to plan proponents (See Section 4.2.6).

It should be noted that about 20% of the inflows into the Calm Lake Dam Reservoir result from the uncontrolled flows from the Atikokan and Eye River, and there is currently no mechanism to measure water levels and flows in the lower Seine Chain of Lakes. Therefore, it is difficult to quantify with absolute certainty what flow rate creates a backflow effect at the Chub Narrows.

Summary:

Discharges from the Raft Lake dam have been monitored and cross-referenced to weather events since the beginning of the Seine River WMP. Notable events occurred in 2007 and 2014, as follows:

- Significant above-average precipitation in September and October 2007 forced the dam operator to respond by increasing discharges from Raft Lake to accommodate inflows and maintain the reservoir level within the WMP band. Dam outflows between October 14 and October 22 exceeded the WMP normal maximum flow of 150 m3/s for the period. Once water level control was established, discharges were reduced as much as possible to utilize all available reservoir storage and minimize the impact of high flows downstream. During this period, comments from residents along the lower Seine River Chain of Lakes were received regarding the high levels and flows. Stoplog operations at Calm Lake and Sturgeon Falls dams included removal of 67 stoplogs in October, resulting in discharges approaching 200 m3/s, to accommodate upstream flows.

- Flooding occurred across Northwestern Ontario and Northern Minnesota due to significant rainfall in the spring of 2014. Raft Lake dam was operating near minimum discharge flows on April 9. The dam operator (FirstLight) notified the Atikokan MNRF that it anticipated a late freshet, projecting that the elevation level of Raft Lake would exceed

the WMP prescribed lower level by April 24. The water level dipped below this standard as predicted, pushing operations into non-compliance. Meanwhile, lingering, heavy snowpack throughout the region contributed to a large freshet beginning April 27. Raft Lake inflows more than doubled overnight. The natural effects of freshet had brought the Raft Lake elevation within compliance on May 12. Six days of daily stoplog operations around May 13 endeavoured to stabilize the water level near the mid-band prescribed by the WMP. The weather forecast on May 29 predicted 60 mm of precipitation over a period of five days. By June 3, daily log operations were being conducted to prevent the forebay from rising near or above 415.5 m. Outflows peaked near 165 m^3/s on June 11. FirstLight and MNR (Atikokan) agreed to adopt the following strategy on June 13: if Raft Lake elevation remained below 415.5 m, the dam discharge would be held below 150 m^3/s; if Raft Lake elevation exceeded 415.50m, the dam discharge would be held below 180 m^3/s until all stop logs are installed and the discharge from the dam is uncontrolled over the weir. This strategy was to be employed until inflows dissipated and trended downwards, or the Raft lake elevation was within the operating range of the WMP. Conditions were normal by July 15.

- FirstLight operations at Calm Lake and Sturgeon Falls also faced high water in Spring 2014. The peak period of inflows greater than the riparian flow of 150 m^3/s occurred from May 25 to June 25. Best management targets were applied at Calm Lake by lowering the forebay elevation near the minimum operating level. Section 11.2 of the Seine River WMP states that a flood condition is in effect when the Calm Lake outflow is greater than 200 m^3/s AND water levels are above 382.9 m. In the Spring of 2014, flows at Calm Lake reached a peak discharge of 212.6 m^3/s but remained well below the 382.9 m elevation threshold (maximum of 382.357 m and mean 382.285 m).

Status: FirstLight conducted reconnaissance studies in 2012 and 2014 to select a site for staff gauge, and is considering Perch Lake for a gauge location. MNRF will specify the final location and provide the elevation benchmark. Installation details will be documented in the next Seine River Implementation Report. Based on the minimal number of inquiries and complaints received, FirstLight concludes that the WMP, in its current form, is designed to minimize the impacts of flooding in Atikokan, the Marmion reservoirs, the Seine Chain of Lakes and the Lower Seine River.

MNRF Contribution: This objective is considered Partially Complete - Ongoing. It is recommended that MNRF remain a contact on the website and continue in the role outlined in this objective. See comments in Section 4.2.6 (re: compiling input from webpage and other sources). Additionally, an increased knowledge of the contribution of flow from uncontrolled sources

would support informed decision-making during times when conditions are outside of the operational plans for the dams (i.e., drought and flood events).

4.1.6: Drought

While it is acknowledged that drought events are outside of the scope of the water management plan, the intent of this objective is to understand if the lower thresholds of the operating bands are appropriate (i.e., do drought conditions exist when water levels are still within the operating band).

Description:

The Drought sub-objective in the Seine River EMP requires operators to make annual evaluations of the water management actions taken at dams before and during periods of drought, and to evaluate the overall effectiveness of minimum water level regulations in mitigating the impacts of drought. MNRF is responsible for compiling input directed to the MNRF from the webpage and other sources and providing them to plan proponents, and surveying residents immediately after low water events (See Section 4.2.6).

Summary: Table 2 (above) reveals the significant fluctuations in water levels observed in the Seine River from year to year, in response to melting snowpack and precipitation events. From this data it is apparent that low water is just as prevalent as periods of high water. In addressing these fluctuations the dam operators strive to regulate levels within the tolerances of compliance as efficiently as possible. However, there are limitations to the operator's control imposed by natural events, WMP guidelines and available equipment. Several examples illustrate the complexities facing dam operators in managing drought in the Seine River watershed:

<u>2010 Drought</u>

- Raft Lake inflows were significantly below normal during the spring freshet and the lake did not attain its minimum elevation until early August. The dam operator (FirstLight) kept Raft Lake dam outflows at the absolute minimum of 8 m^3/s to restore the lake elevation to its operating band. Meanwhile, WMP-mandated peaking restrictions were implemented in April and May to protect fisheries concerns. During this period Calm Lake and Sturgeon Falls were operated at or near minimum flows on a continuous basis through early June. Precipitation increased inflows to the system later in the summer and water levels returned to normal levels on Raft Lake and Calm Lake in September.

- VFLP also faced drought-related challenges in 2010. Data showed the spring freshet to be entirely absent, with peak discharges significantly less than previous spring/summer periods in terms of intensity and duration. VFLP responded by operating its facilities within the lower compliance level while keeping reservoir outflows at a minimum value, with water levels below the minimum elevation specified by the Seine River WMP, from April 2 to July 7.

Furthermore, discharge from the Lac Des Milles Lacs dam was reduced under MNRF direction to leakage flow levels from May 21 to July 5, with an estimated outflow of 0.8 m^3/s. WMP-compliant minimum flows were re-established on July 6 following a relatively significant precipitation event which saw the Lac Des Milles Lacs level rise 19 cm from July 3 to July 7. At this point water levels attained WMP minimums. During the same year, VFLP opened the Lower Marmion Lake sluiceway on August, 9, approximately three months later than usual, and closed the sluiceway on December 23. The Valerie Falls Generating Station, meanwhile, was operated successfully during the steady-or-rising period. The Valerie Falls headpond (Colin Lake) trended below the WMP minimum water level from August 19 to September 14. The generating station remained offline from August 18 to September 16 with minimum flow spilled due to exceptionally low water.

2016 Drought

- The elevation of Lac Des Milles Lacs fell below the minimum level of the operating band from July 31 to November 17, due to low precipitation during the late summer and fall period. During this time the dam operator (VFLP) maintained outflows as close as possible to the prescribed minimum to help mitigate the drought conditions.

2018 Drought

- A delayed spring freshet caused drought conditions on Lac des Milles Lacs, with the elevation falling below the operating band and trending downward from March 26 to April 22. VFLP coordinated its response with the MNRF to keep stoplogs in place until inflow conditions changed. This action restricted outflows, with values falling to 1.4 m^3/s (slightly below the prescribed 1.5 m^3/s minimum) from April 12 to 24.

2020 Drought

- The timing of the spring freshet was normal but flows were much lower than normal. FirstLight documented Raft Lake inflows to peak slightly above the 25th percentile during freshet. Freshet inflows decreased to between the 10th and 25th percentile for most of the year. Raft Lake elevation breached the lower operating band from April 26 to June 8. H2O reduced outflows to the minimum level of 10 m^3/s starting in mid-April and maintained this level until Raft Lake elevation returned to the operating band in June. Outflows were maintained near minimum into August to remain in the operating band. Elevations at Calm Lake and Sturgeon Falls remained within the operating curve during the year. Spring elevation at Calm Lake was lowered to absorb freshet. Elevations remained lower than normal during the spring due to the low-intensity freshet. Calm Lake returned to a more normal elevation during May.

- VFLP operated assets faced similar conditions during spring 2020. Lac Des Milles Lacs reached a mid-band drawdown level of 456.32 m as outflows were reduced (as close as possible) to the prescribed minimum flow of 1.5 m^3/s. Minimum flows were maintained throughout the drawdown period. A weak spring freshet due to limited snowpack and below average rainfall prevented Lac Des Milles Lacs from reaching mid-band levels. Lac Des Milles Lacs peaked at 456.70 m on June 11 and the elevation remained below the operating band until November 16. Overall low water levels throughout the season were attributed to limited spring precipitation. Lower Marmion Lake saw minimal impacts during the 2020 drought, with the navigable sluiceway kept open from May 28 to November 17. Meanwhile, peaking operations at Valerie Falls Generating Station were limited due to low inflows. There were no major impacts to elevation or the dam operator's ability to maintain minimum flow.

2021 Drought

- FirstLight maintained the elevation of Raft Lake at a higher level leading up to the spring freshet, anticipating below-average inflows. Snowmelt was mostly complete by the end of March. Timing of the freshet was near-normal. Rain in April increased Raft Lake inflows to the 90th percentile. Inflows decreased to the 10th percentile by July and remained near this level for the rest of the year. As a result, the dam operator reduced Raft Lake outflows to near-minimum values by mid-July. The Raft Lake elevation breached the lower operating band on August 13. MNRF was notified of the potential breach two days in advance. MNRF directed FirstLight to maintain minimum outflows of 10 m^3/s from Raft Lake during the breach. This equated to increasing Raft Lake outflows on two occasions as elevations decreased. Elevations returned within the operating band in late-September after precipitation temporarily increased inflows to the 75th percentile. Standard elevations and outflows were maintained at Calm Lake and Sturgeon Falls within operating guidelines during the reporting period, despite the abnormally low Raft Lake inflows.

- VFLP observed a typical spring freshet at Lac Des Milles Lacs, and managed water level elevation using multiple stoplog changes. Flow reductions were staged through June, with a minimum elevation of 456.68 m, near the middle of the operating band. Water levels continued to trend down through early summer, with water levels breaching the lower limit of the band on July 10. Lac Des Milles Lacs elevation remained below the operating band minimum until December 28, well into the winter drawdown period. According to its requirements under the EMP, the dam operator assessed the impacts of maintaining a minimum flow at Lac Des Milles Lacs to have little impact on the

overall water level, with a decrease of 4 cm. The total water lost in the reservoir averaged 0.9 cms, primarily due to evaporation. The drought had a minimal impact at Lower Marmion Lake, with water levels slightly below the operating band and the navigable sluiceway opened as usual (May 14 to December 2). VFLP worked with MNRF to determine best practices at the Valerie Falls Generating Station during drought. Minimum flows were maintained throughout the season and the elevation did not breach the minimum operating level.

Status: Table 2 demonstrates the significant deviations in water levels experienced in the Seine River watershed from year to year. Drought occurs due to below-normal precipitation, minimal snowmelt and high evaporation across the watershed. During periods of drought, evidence shows that effective consultation and proactive water management decisions are effective in minimizing the impacts of low water. It can also be concluded that operating bands should be interpreted as optimal guidelines, with adaptive management being the key strategy to effectively addressing the challenge of drought. FirstLight receives frequent inquiries from residents and businesses during periods of low flow, particularly from Banning Lake, Perch Lake and Calm Lake. The dam operator has committed to purchasing and installing a staff gauge on Banning Lake in order to obtain data from local stakeholders regarding preferred water levels. H2O plans to install the gauge in the future. The data on low-water complaints on Calm Lake suggests that stakeholders prefer the Calm Lake elevation to be held near 382.50 m. Maintaining an elevation at this level during the open water season reduces the ability to hedge against significant precipitation and the risk of flood. Additional data is required to fully evaluate a balanced approach to meet the interest of all stakeholders and fulfill the requirements of the EMP.

MNRF Contribution: Information from complaints and inquiries directed at MNRF will continue to be received and communicated to dam operators. This information will continue to be reported in the proponent's annual report. MNRF has not completed a survey of residents following a low water event and it is unlikely this will be completed in the future as residents are able to use the website as a means to provide feedback. It is recommended that the component of the strategy related to immediately surveying residents following a low water event be removed from the WMP. More information on compiling input from webpage and other sources can be found in section 4.2.6. This objective is considered Partially Complete – Ongoing.

4.1.7: Communication

Description: This sub-objective involves applying and evaluating communication strategies to ensure the public is kept adequately aware of significant water level and flow changes in the Seine River watershed. MNRF is responsible for compiling input

directed to MNRF from the webpage and other sources and providing them to plan proponents (See Section 4.2.6).

Summary: The Seine River WMP website (seineriverwmp.com) was commissioned on February 14, 2005 by FirstLight and VFLP and continues to receive public use. Figure 2 shows summary statistics for web traffic since 2007.

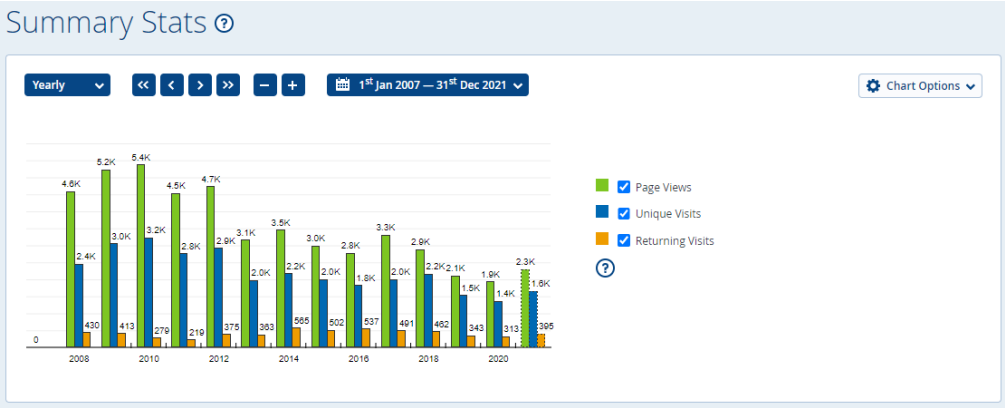

Figure 2: Summary of web traffic at www.seineriverwmp.com for Jan. 1, 2007-Dec. 31, 2021

The website provides WMP objectives, system conditions and compliance (specifically notices of changes in water levels and flows), and other information of interest to stakeholders. It also displays graphs of actual and historical reservoir water levels and flows, history of the watershed, and descriptions of the dams. The website also has a contact page that can be used to send comments, questions, or suggestions to FirstLight, VFLP, and/or the MNRF.

During extreme events dam operators post public advisories. Additionally, FirstLight has established an email notification system for stoplog operations conducted at the Raft Lake Dam. This involves:

- Notifying stakeholders of any upcoming flow changes with details of flows pre-log operation, flow post-log operation and anticipated date of operation; and
- Upon completion of a log operation, notifying stakeholders that the log operation was completed and the outflow from the dam.

Status: Dam operators have submitted annual reports about overall watershed conditions to the MNRF and a review of the report is conducted annually during the SAC meeting. Specifically, VFLP has submitted data annually as per Table 7, Section 12 of the WMP (Compliance Monitoring Requirements). Data is offered to the Seine River Water Level Technical Committee for annual review. Besides the WMP website, VFLP has also implemented public relations efforts to communicate information to the public by way of radio and newspaper announcements. Dam operators are committed to responding to public comments received through all means of communication, including the MNRF.

FirstLight intends to improve notifications along the river system to stakeholders affected by operations at Calm Lake GS. These could include email notifications to a distribution list including the SAC and stakeholders as well as posting to the FirstLight website of when intentional drawdowns will occur. This could also include a follow up email to notify stakeholders that an event is occurring and has been posted to the H2O website as well as outlining the details of the event. Radio broadcasts are also a potential avenue to convey this information. FirstLight will table this issue at an upcoming SRWLTC meeting to survey the best way to communicate this information to all affected stakeholders which may result in another method not considered at this time.

MNRF Contribution: The district will continue to receive public feedback either directly, or through the website and relay it to dam operators. A review of communication records received by MNRF demonstrates that the residents in the lower chain of lakes have expressed a need for more communication around regular dam log operations that result in significant changes to water levels in the lower chain of lakes. The installation of the gauge at Banning Lake will help to inform how outflows from the Calm Lake Dam influence water levels in this part of the system and could potentially help determine thresholds for notifications to improve communication between the plan proponents and the public. It is recognised that an information gap may exist during times of higher flows, as the constriction at the narrows between Chub Lake and Banning Lake results in higher water levels in Perch, Chub and McCaulay Lakes than in Calm or Banning Lake. For more information see comments in Section 4.2.6 (re: compiling input from webpage and other sources).

In addition to public notices issued by plan proponents in local media during extreme events, MNRF's flood forecasting and warning system also serves as a public notification mechanism as they are sent to media outlets and are often shared on social media. Company proponents also provide a summary of comments and inquiries received by the public that are included in annual reports during the annual Standing Advisory Council meeting.

This objective is considered Ongoing.

4.2: Effectiveness Monitoring for Issue Category 2. Navigation, Recreation, Social

Cottagers, tourism facilities and other riparian area users are abundant throughout the river system. These user groups enjoy use of the river system year -round. Many seasonal cottages have been converted to year-round residencies over the years.

The overall objective to maintain navigational, recreational and social opportunities through the river system is supported by a number of sub-objectives and associated targets identified in the plan. Generally, these sub-objectives are in place to mitigate potential negative effects of water management activities, such as boating hazards, ice damage, impacts to access points and private docks, the Atikokan-Minaki waterway and water intakes (cottaging and Seine River First Nation). The SRWMP outlines a plan to monitor the effectiveness of the targets related to flooding, the results of this monitoring

as well as current status and/or recommendations are summarized in the supplemental text below.

4.2.1: Maintain stable water levels on Lac des Milles Lacs during the open water season.

Sub-Objective: 2a

Description: This sub-objective involves an annual review of any issues related to fluctuating water levels on Lac des Milles Lacs during the summer months, taking into account water management actions taken at the Lac des Milles Lacs dam and the economic impact of high-water levels on the lake's tourist operators. MNRF is responsible for compiling input directed to the MNRF from the webpage and other sources and providing them to plan proponents (See Section 4.2.6).

Summary: Monitoring by MNRF includes gathering input from the Seine River WMP website and soliciting feedback by other means, including mail and phone surveys, as well as documenting instances of water level-related damage to boats, motors and docks. VFLP is responsible for tracking stoplog data on Lac des Milles Lacs to cross-reference with public input.

Status: VFLP has submitted data annually as per Table 7, Section 12 of the WMP (Compliance Monitoring Requirements). Data is reviewed by the Seine River Water Level Technical Committee and presented during SAC meetings. Reservoir levels and flows, as well as high-water notifications, are updated regularly on the Seine River WMP website. MNRF survey responses have not been received by the dam operator. Stoplog change information for Lac des Milles Lacs is provided in Appendix 6.

MNRF Contribution: Surveys were completed and results have been summarized in Section 4.2.6 (re: compiling input from webpage and other sources). Additionally, MNRF did present information on the surveys during the 2007 SAC meeting. No additional surveys were completed by Thunder Bay District to assess the economic impact on camps due to high water levels. Any comments received by the district office should be reported in the proponents' annual reports. Thunder Bay/Ignace District has recommended that the strategy to conduct surveys be removed from the SRWMP.

This objective is considered Partially Completed.

4.2.2: Minimize damage to shoreline structures due to rising levels in winter.

Sub-Objective: 2b

Description: This sub-objective involves an annual review of any issues related to rising water levels on Lac des Milles Lacs during the winter, taking into account water management actions taken at the Lac des Milles Lacs dam. MNRF is responsible for compiling input directed to MNRF from the webpage and other sources and providing them to plan proponents (See Section 4.2.6).

Summary: Monitoring by MNRF includes gathering public input from the Seine River WMP website and soliciting feedback by other means. VFLP is responsible for tracking stoplog data on Lac des Milles Lacs to cross-reference with public input.

Status: VFLP has submitted data annually as per Table 7, Section 12 of the WMP (Compliance Monitoring Requirements). Data is reviewed by the Seine River Water Level Technical Committee and presented during SAC meetings. Reservoir levels and flows, as well as high-water notifications, are updated regularly on the Seine River WMP website. MNRF has not provided any public comments to the dam operator. Stoplog change information for Lac des Milles Lacs is provided in Appendix 6.

MNRF Contribution: This objective is considered Ongoing as the district will continue to receive public feedback either directly, or through the website and relay information to dam operators. However, the portion of the data requirement related to conducting mail surveys is recommended to be removed from the EMP. Surveys were completed as per discussion in Section 4.2.6 (compiling input from webpage and other sources). Additionally, any comments received by the district office are reported in the proponents' annual reports.

4.2.3: Maintain water levels on the upper river to allow access from Reserve 22A2 to Mosher Lake

Sub-Objective: 2c

Description: This sub-objective involves an annual review of the number of times access from Reserve 22A2 to Mosher Lake has been restricted due to low water flow, taking into account water management actions taken at the Lac des Milles Lacs dam. MNRF is responsible for compiling input directed to the MNRF from the webpage and other sources and providing them to plan proponents (See Section 4.2.6).

Summary: Monitoring by MNRF includes gathering input from the Seine River WMP website and soliciting feedback by other means. VFLP is responsible for tracking stoplog data on Lac des Milles Lacs to cross-reference with public input.

Status: VFLP has submitted data annually as per Table 7, Section 12 of the WMP (Compliance Monitoring Requirements). Data is reviewed by the Seine River Water Level Technical Committee and presented during SAC meetings. Reservoir levels and flows, as well as high-water notifications, are updated regularly on the Seine River WMP website. MNRF has not provided any public comments to the dam operator and access concerns have not been defined. Stoplog change information for Lac des Milles Lacs is provided in Appendix 6.

MNRF Contribution: The current access route from Reserve 22A2 to Mosher Lake traverses a floodplain on the south side of the Firesteel crossing. MNRF is responsible for compiling information related to whether access from reserve 22A2 has been restricted as a result of high-water flow. The existing access road to Reserve 22A2 would likely not be affected by the outflows of LDML as there are a series of rapids, etc. on the Firesteel River upstream from the confluence with the Seine River. It is

understood that backwatering effects shouldn't be substantial enough to increase the Firesteel River elevation at the location of the bridge crossing.

During a recent 100-year flood event, access was not restricted therefore it is not anticipated to become a concern. Furthermore, an annual review of access to 22A2 is no longer needed because it has not been an issue since the plan inception. It is recommended that this commitment be removed from the SRWMP. The commitment of the annual review is considered complete, but MNRF will continue to monitor comments and should a concern arise related to access to 22A2, annual review may be considered in the future.

This objective is considered Complete. MNRF recommends removing this strategy from the effectiveness monitoring plan (EMP). However, MNRF will continue to log comments provided to them from the webpage and other sources and relay that information to dam operators. For further information on compilation of comments through webpage and other sources see Section 4.2.6.

4.2.4: Maintain water levels suitable for access and navigation on Upper Marmion and Lower Marmion during open water season

Sub-Objective: 2d

Description: This sub-objective involves an annual review of any access and navigation issues resulting from water levels on Upper Marmion and Lower Marmion during the open water season, including documenting the number of days the access points at Reserve Bay and Upper Seine are usable and the number of days the Marmion Sluiceway is navigable. MNRF is responsible for compiling input directed to the MNRF from the webpage and other sources and providing them to plan proponents (See Section 4.2.6).

Summary: To ensure public safety, the navigation sluiceway is opened when Raft Lake's water level is raised above 414.80 m. Once this level is achieved, VFLP can open the navigation sluiceway located between the Lower Marmion and Upper Marmion reservoirs (Raft Lake). During the open water season between 2005 and 2022, navigation access amid the two reservoirs were made available to the public 96 per cent of the time. Navigation on the Upper Marmion and Lower Marmion reservoirs was minimally disrupted in 2007, 2010, 2015, 2018 and 2020 due to the timing of the spring freshet and drought conditions, which delayed the opening of the Marmion Sluiceway. It should be noted that a late spring freshet delayed the opening of the Marmion Sluiceway three years between 2015 and 2022, these years included 2015, 2018, and 2020.

Status: Given the fact that the Marmion Sluiceway has been navigable 96 percent of the time since the implementation of the Seine River WMP, plan proponents do not recommend revising water management operations. Dam operators are committed to responding to public comments regarding this sub-objective received through all means of communication, including the MNRF. Annual hydrologic data for Lower Marmion is provided in Appendix 7.

MNRF Contribution: This objective is considered Ongoing. MNRF will continue to communicate any comments received by the public on concerns related to sluiceway navigation to the operators. See comments in Section 4.2.6 for further information on compiling input from webpage and other sources.

4.2.5: Maintain water levels suitable for access and navigation on Calm and Perch Lakes during open water season

Sub-Objective: 2e

Description: This sub-objective involves an annual review of access and navigation issues resulting from water levels on Calm and Perch lakes during the open water season, including documenting the number of days the access points at Calm and Perch lakes are usable, taking into account water management actions at Calm Lake dam and upstream operations, as well as considering the occupancy rates of tourist camps and navigation costs. MNRF is responsible for compiling input directed to the MNRF from the webpage and other sources and providing them to plan proponents (See Section 4.2.6).

Summary: Monitoring by MNRF includes gathering input from the Seine River WMP website and soliciting feedback by other means related to navigation between Valerie Falls dam and Calm Lake dam, and tracking the number of guests at tourist camps. FirstLight is responsible for tracking the number of days the access is usable, and tracking stoplog data on Raft Lake and at the Calm Lake dam. Additionally, VFLP is required to document stoplog data on Lac des Milles Lacs dam. This data serves as a cross-reference for public input.

Status: Dam operators have submitted data annually as per Table 7, Section 12 of the WMP (Compliance Monitoring Requirements). Data reviewed by the Seine River Water Level Technical Committee and the MNRF. See Appendix 11 for Calm Lake hydrologic data.

MNRF Contribution: MNRF will continue to communicate any comments received by the public on concerns related to access to Calm and Perch Lakes to the operators. See comments below (Section 4.2.6) for further information on compiling input from webpage and other sources.

MNRF recommends removing targeted surveys (related to high and/or low water events) commitments from the WMP. The public has a mechanism (website or calling the district office) to provide ongoing feedback about water levels and flows.

4.2.6: Compiling input from web page and other sources and surveying residents immediately downstream following high and low water events.

The plan intends for the monitoring of social focused objectives (i.e. flood and navigation/recreation/social) to be based on response from the public. The effectiveness monitoring plan outlines several means to capture public comments: the website, individual comments (phone calls, in office walk-ins), the Standing Advisory

Committee (SAC), specific meetings that may be called as well as surveys post high and low water events

Another mechanism for public engagement is through MNRF's flood forecasting and warning system, which is activated in anticipation of changing watershed conditions. An Incident Management Team (IMT) is activated during flood events. Frequent touchpoints between the IMT and key stakeholders, groups and organisations is maintained throughout a flood incident to understand the impacts of water levels. Along the Seine River, these groups include but are not limited to, the Town of Atikokan, the Perch Lake Local Roads Board and Indigenous Communities.

For operations within the scope of the plan, MNRF forwards complaints and inquiries that are received from the public onto plan proponents for response, or MNRF responds to inquiries directly and forwards the response to the plan proponents. The majority of the complaints and inquiries that the MNRF receives directly through the website or individual comments are related to water levels (high and low) on Lac Des Milles Lacs and the lower Seine River Chain of Lakes. These complaints and/ or inquiries are forwarded on to plan proponents and subsequently documented in the annual reports. To date, inquiries that were received by telephone or as a result of in-office walk ins were not documented in a log. Feedback received by email is maintained in office records and is forwarded to dam operators as it is received. It is recommended that MNRF continue to forward feedback to dam operators as it is received and will consider maintaining a log to better track feedback received.

Interested stakeholders, such as Lac Des Mille Lacs and Seine River First Nations as well as private property owners and tourism operators are represented on the SAC and also provide an important feedback loop into water management activities.

MNRF has not traditionally completed surveys of residents immediately following a low or high-water event. However, MNRF conducted a series of surveys that targeted the tourism industry on each reach of the Seine River to get feedback on water levels. All known tourism operations along the Seine River and associated lakes were contacted, and thirteen opted to participate. The survey was led by the Atikokan MNRF and consisted of a twenty five-minute telephone survey where thirty-one questions captured business details such as services offered, how water levels and flows may be affecting business services along with other data such as occupancy rates and navigation costs. These surveys are discussed in more detail below.

In 2003, prior to the Plan completion, an initial survey was conducted to establish a baseline that would be followed up on in future years. Of the nine businesses surveyed on Lac Des Mille Lacs in 2003, only one business reported it lost revenue due to low water, and only one business rated water level satisfaction at a one out of ten. The other eight businesses rated water level satisfaction at a five or higher. Two of the three participating businesses on the upper flood waters reported no loss in revenue because of low water and overall water level satisfaction of eight or higher. In the

Perch/Banning/Calm Lakes chain one business reported no loss of revenue due to low water and a water level satisfaction of six.

In 2006 MNRF emailed and phoned the businesses that participated in 2003 and only received responses from two of the thirteen. Both of these businesses were on Lac Des Mille Lacs. One reported two years where revenue was lost due to water levels and an increase in satisfaction in water levels (from one to four). The other business reported no lost revenue due to water levels and an increase in water levels satisfaction (from eight to ten).

In 2010, it was determined that engagement was achieved through contact with the Standing Advisory Committee and a survey wasn't completed.

In 2014 the plan was extended and completing the surveys again in preparation for the next planning cycle was being contemplated. However, surveys were not undertaken as there was no subsequent planning cycle as a result of changes to the LRIA in 2016 and the resulting Technical Bulletin "Maintaining Water Management Plans", which directs that existing WMPs do not expire.

These objectives are considered Partially Complete – Ongoing. To date, MNRF has not completed any additional surveys, or further investigation into whether the lower levels of the rule bands are causing issues (i.e., are we in a drought but still in the band?). It is recommended that effectiveness monitoring strategies related to conducting targeted surveys during high and/or low water events be removed from the water management plan.
The public has a mechanism (website, calling the district office, reaching out to the SAC) to provide ongoing feedback about water levels and flows and it is assumed that the public will identify situations when they are satisfied or not satisfied with water levels and flows. Additionally, it is anticipated that a staff gauge will be installed in this part of the system in the spring of 2023 that will provide valuable data to assess the effectiveness of the lower and upper bands moving forward.

Providing opportunities for public opinion and feedback on water management of the system continues to be an important component of effectiveness monitoring. MNRF will continue to receive individual comments from the website or through direct contacts to the local office.

4.3: Effectiveness Monitoring for Issue Category: 3. Power Generation

4.3.1: Lac des Milles Lacs, Upper Marmion, Lower Marmion, Valerie Falls Generating Station, Perch to Calm lakes, Calm Lake Generating Station, Sturgeon Falls Generating Station

Sub-Objective: 3a, 3b, 3c, 3d, 3e, 3f and 3g

Description: Evaluate the impact of water management practices on power production on an annual basis. This section will help explain how the system is managed and how the reservoirs are used to increase efficiency and power generating in the Seine River system, while ensuring opportunity for ecological and social uses of the waterway.

Summary: Dam operators (VFLP and FirstLight) measure how the Seine River WMP influences the economic efficiency of renewable energy generation.

Status: The Seine River WMP supports the sustainable development of water resources for waterpower and other uses, such as recreation and tourism, while protecting and enhancing natural ecosystems. As such, the economic efficiency of power generation must be considered as part of a larger system of values. Below outlines the primary purpose of each water system and their contribution to power generation.

VFLP primarily manages Lac Des Mille Lac to fulfill the terms of the water management plan to ensure minimum flows are upheld as well as maintaining water levels within the operating band. In the interest of power generation, input from Lac Des Mille Lac is nominal, although winter drawdown allows an extended generating season into late fall and winter which generally has low inputs from precipitation. VFLP has an agreement with the MNRF to manage this dam and will continue to do so within these bounds.

VFLP operates the Lower Marmion as an additional reservoir in the Marmion lake system. The existence of this additional reservoir space allows for increased efficiency in the system to provide storage for high water events instead of requiring increased spilling. The reservoir also increases the size of the watershed, capturing more rain to feed the system resulting in increased power generation. The dams between Upper and Lower Marmion is primarily operated to fulfill the responsibilities in the Water Management Plan as well as other attached agreements. This primarily surrounds the maintenance of water levels when possible to maintain the sluiceway as well as maintain water levels within the operating bounds, which includes an absolute minimum water level for an Ontario Power Generation intake.

VFLP operates Valerie Falls Generating Station for the purpose of power generation. Valerie Falls does not peak from April 15th to June 15th as an aspect of this Water Management Plan to avoid disruption to spring spawning. Valerie Falls uses peaking during the weekdays outside of this season to effectively provide power when it is needed to make the most out of the resource. During the weekends Valerie Falls runs steady at a lower rate to build up the reservoir to provide energy for higher demand during the weekdays the following week.

FirstLight operates Raft Lake dam within the constraints of the WMP while attempting to minimize spill downstream at Calm Lake GS and Sturgeon Falls GS. These generating sites have minimal storage capacity but there is some opportunity to pond and peak during higher demand hours using the overnight hours to rebuild forebays. Historical outflow data shows outflows at or below plant efficiency for most months, excluding May-July and part of November. These months show potentially higher outflows from the dams requiring spill but are mostly driven by the magnitude of spring or fall freshet. Due to the construction of the Raft Lake dam spillway crest spilling water at an elevation of 415.17m, there is no ability to store excess water during these higher inflow periods and the additional water must be passed downstream as potential spill. FirstLight believes that water storage and hydroelectric generation are well optimized along the Seine River watershed but sees potential to increase storage in summer by maintaining the upper operating curve at 415.50m to assist with managing water when a larger precipitation event occurs.

4.4: Effectiveness Monitoring for Issue Category: 4. Aquatic Ecosystem

With a few exceptions, the MNRF is primarily responsible for collecting, analysing, and reporting on data to support the Aquatic Ecosystem sub-objectives of the EMP. Dam operators are required to provide logistical and financial support of monitoring efforts. This section provides a summary of Aquatic Ecosystem monitoring strategies and the status of reporting. See Seine River WMP, Appendix 12 (Schedule of Effectiveness Monitoring Projects) for more details.

The aquatic ecosystem objectives were developed primarily with the goal of minimizing impacts on fish populations. Other aquatic ecosystem components that were identified in the Seine River Water Management Plan (SRWMP) included wetland plant communities and beaver populations. Aquatic ecosystem monitoring was designed to follow a top-down approach by evaluating species identified as Valued Ecosystem Components (see Section 4.3 of the SRWMP). Valued Ecosystem Components (VEC) are assessed at a population level to try and determine whether water level management is resulting in impacts at this scale. If impacts are found at the population level, the expectation was further work may be required to identify what specific management action is responsible for these changes.

Fall Walleye Index Netting (FWIN) was identified as the methodology for monitoring plan achievement. At the time, FWIN was the standard gill netting protocol in Ontario and the most common assessment technique used on coolwater fisheries. FWIN surveys followed standard methods for the collection of biological information to support management of a percid fishery dominated by walleye, using overnight sets of multi-mesh gillnet (Morgan, G.E., 2002).

In 2008, the ministry began to fully implement the Ecological Framework for Fisheries Management (EFFM) with the goal of improving the way recreational fisheries are managed in Ontario. Under the EFFM, the ministry moved away from individual lake management to a landscape approach, where management, planning and monitoring

occurs in 20 Fisheries Management Zones (FMZs) across the province. The Broad Scale Fish Community Monitoring (BSM) protocol was developed in response to the EFFM. BSM surveys use a combination of large and small mesh gill nets, set overnight to a maximum proportion of the entire fish community (OMNRF, 2015).

As a result of the shift in the Ministry's approach to fisheries management, many of the lakes identified in the SRWMP objectives were selected to be sampled under the BSM program, either as a trend lake or a state lake. A trend lake is sampled once in each monitoring cycle. Trend lakes must contain brook trout, lake trout, or walleye. State lakes are sampled once in a 5-year cycle and may or may not be sampled again in future sampling cycles. Trend through time comparisons should only be made for trend lakes, not state lakes. As such, during the 2016 SRWMP scoped review, MNRF determined FWIN assessments would no longer be conducted. Therefore, FWIN is no longer the identified methodology for monitoring plan achievements and BSM should be reflected in the SRWMP moving forward.

During the transition from FWIN to BSM some of the waterbodies, regulated under the SRWMP, were no longer targeted for monitoring (e.g., Laseine, Lower Steep Rock and the Lower Seine Lakes). Finlayson and Calm Lake were selected as trend lakes and sampled in Cycle 1 but have since then been removed from the BSM program. See table 3 for a summary of surveys completed by MNRF (District and BSM) on waterbodies referenced within the SRWMP.

Table 3: Summary of surveys completed by MNRF (District and BSM) on waterbodies referenced within the SRWMP.

Lake	***FWIN / Year***	***BSM / Year***
Finlayson Lake	2005	Trend 2010 (Cycle 1)
Calm Lake	2006	Trend 2007 (Cycle 1)
Perch Lake	2006	Trend 2010 (Cycle 1) & 2015 (Cycle 2)
Upper Marmion	N/A	Trend 2010 (Cycle 1) & 2015 (Cycle 2)
Lower Marmion	N/A	Trend 2010 (Cycle 1) & 2015 (Cycle 2)
Laseine Lake	N/A	N/A
Lower Seine Lakes * *Partridge Crop, Shoal Lake, and Wild Potato*	2011	N/A
Steep Rock Lake	N/A	State 2017 (Cycle 2)
Lac des Mille Lacs	2005, 2008, 2011 & 2016	Trend 2008 (Cycle 1), 2013 (Cycle 2) & 2018 (Cycle 3)

** BSM Monitoring Bulletins can be found on the Ontario FishONLine website - Fish ON-Line (gov.on.ca)*

4.4.1: Improve aquatic ecosystem health on Upper Marmion Lake by reducing winter drawdown. - Assess beaver populations by determining beaver overwinter survival.

Sub-Objective: 4a

Description: One of the objectives of the Seine River Water Management Plan (SRWMP) was to improve aquatic ecosystem health on Upper Marmion Lake by reducing over-winter drawdown. To evaluate the effectiveness of the Plan at achieving this objective, beaver was chosen as an indicator species. Specifically, this strategy aimed to assess the overwinter survival of beaver populations on the Upper Marmion reservoir versus survival on a similar waterbody with reduced draw-down. The lakes chosen for the study were Upper Marmion Lake and Lower Marmion Lake.

Summary: The study was designed to identify the locations and occupancy of beaver houses on Upper and Lower Marmion during the fall. Trapper harvest would need to be recorded for each of the beaver houses during the season. A second visit to the houses in the spring would be required to determine whether the houses were still active. This would have allowed a comparison of several different aspects of beaver ecology between the two water management regimes (Jackson, 2006).

Status: This objective is considered Incomplete. The partnerships required between the Ministry of Natural Resources and Forestry (MNRF), local trapper and Atikokan High School GIS class and/or Lakehead University to complete the project were not feasible. To date no addition action has been taken to address this objective. Further investigation is required by MNRF to determine the feasibility of continuing this project. Particularly to determine if there is a need for GIS support outside the ministry and if a renewed partnership with the local trapper is possible. No Plan amendments or modifications to target levels, flows and strategies within the SRWMP are proposed at this time.

4.4.2: Improve aquatic ecosystem health on Upper Marmion Lake by reducing winter drawdown / Maintain spring spawning opportunities by having steady or rising flows throughout the system from April 15 to June 15 / Improve aquatic ecosystem health by maintaining minimum flows throughout the system / Maintain Natural Rates of Flow Changes in Rivers - Upper Marmion, Lower Marmion, Finlayson Lake, Perch Lake, Calm Lake, Laseine Lake and Lower Seine Lakes.

Sub-Objective: 4a, 4b, 4d, and 4f

Description:

Objectives from the Seine River Water Management Plan that involve assessing fish populations include:

- 4a) Improve aquatic ecosystem health on Upper Marmion Lake by reducing winter drawdown

- 4b) Maintain spring spawning opportunities by having steady or rising flows throughout the system (April 15–June 15)
    - fisheries assessments on LDML, upper floodwaters, lower Marmion Lake, Finlayson Lake, Perch Lake, Calm Lake, Laseine Lake and Lower Seine Lakes.
    - Sturgeon population assessment from Lower Seine River.

- 4d) Improve aquatic ecosystem health by maintaining minimum flows throughout system,
    - Compare wetlands between lakes (Upper Floodwaters, Lower Marmion, Little Falls and Calm Lake).

- 4f) Maintain natural rates of flow changes in rivers,
    - Fisheries assessments focusing on year class failures

The strategies identified to address these objectives were to assess fish populations and determine year class failures not related to broader environmental conditions (temperatures, period of ice cover, growing degree days, etc.), while differentiating habitat impacts from other stressors on fish population such as exploitation. At the time of plan implementation in 2004, walleye (*Sander vitreus*) was selected as the most appropriate indicator species. This species was chosen with consideration for distribution, habitat requirements, ease of assessment and abundant enough numbers to make collection of a statistically valid sample feasible.

Methods:

MNRF completed fisheries summaries of the extent to which aquatic ecosystem-related flow and level regulations, outlined in the SRWMP operating plans were met (on an annual basis), dating back to the early 2000s. Regulations that were considered, included - maintaining minimum flows, levels, and steady/stable-or-rising flows or levels during the spring spawning period. Summary graphs are listed in Appendix 13. While operating plans for most structures in the SRWMP specify that minimum flows, levels, and steady/stable-or-rising flows or levels must be maintained, in practice it has often been challenging to maintain all three conditions over the spawning period during high or low water conditions. MNRF and plan proponents have thus focused on maintaining flows and levels and treated “steady/stable-or-rising” as a best management practice, to be implemented as long as it does not prevent regulated flows or levels from being met. When low water conditions prevent both flows and levels from being met at the same time, conditions are considered to be “out-of-plan”, and MNRF typically recommends focusing on maintaining minimum flows.

Available BSM fisheries data for walleye was assessed for year class strength on controlled (influenced by dam management) and uncontrolled waterbodies. The purpose of the exercise was, to the extent possible, to observe trends and determine if weaker or missing year classes could be attributed to dam management, or if they are reflective of factors present on the broader landscape.

Where possible, BSM results have been compared to available data, on the extent to which flow and level regulations described in the SRWMP were met. Year class strength for walleye on uncontrolled lakes, based on fish sampled during surveys completed by the MNRF BSM program are listed in Appendix 14. Ages were used to construct year class strength diagrams. Year class strength diagrams are a good means of assessing spawning success over time, as they illustrate the year that all adult fish captured on a survey hatched, and can indicate problems with spawning in certain years, if any year classes are not present or severely diminished. As the primary goal was to determine if walleye are reproducing effectively on lakes managed under the SRWMP operational plan, general fish population health metrics that could be more reflective of harvest pressure were not considered at this time.

Results:

Lower Marmion Lake (Levels controlled by the Marmion Sluiceway)

The 2010 survey of Lower Marmion showed that all year classes of walleye from 2004 (when the SRWMP was implemented) to 2008 (two years before the first survey) were present. This indicates and provides reassurance of successful walleye reproduction during this period. The survey found no clear relationship between year class strength and the number of days the “stable-or-rising” level regulation was not met. However, several year classes were missing from the 2015 survey, likely due to a poor sample size, so these results should be interpreted with caution. Additionally, the daily average outflow requirement of 0.2 m^3/sec, as specified in the Operational Plan for Lower Marmion Sluiceway, could not be evaluated during this reporting period.

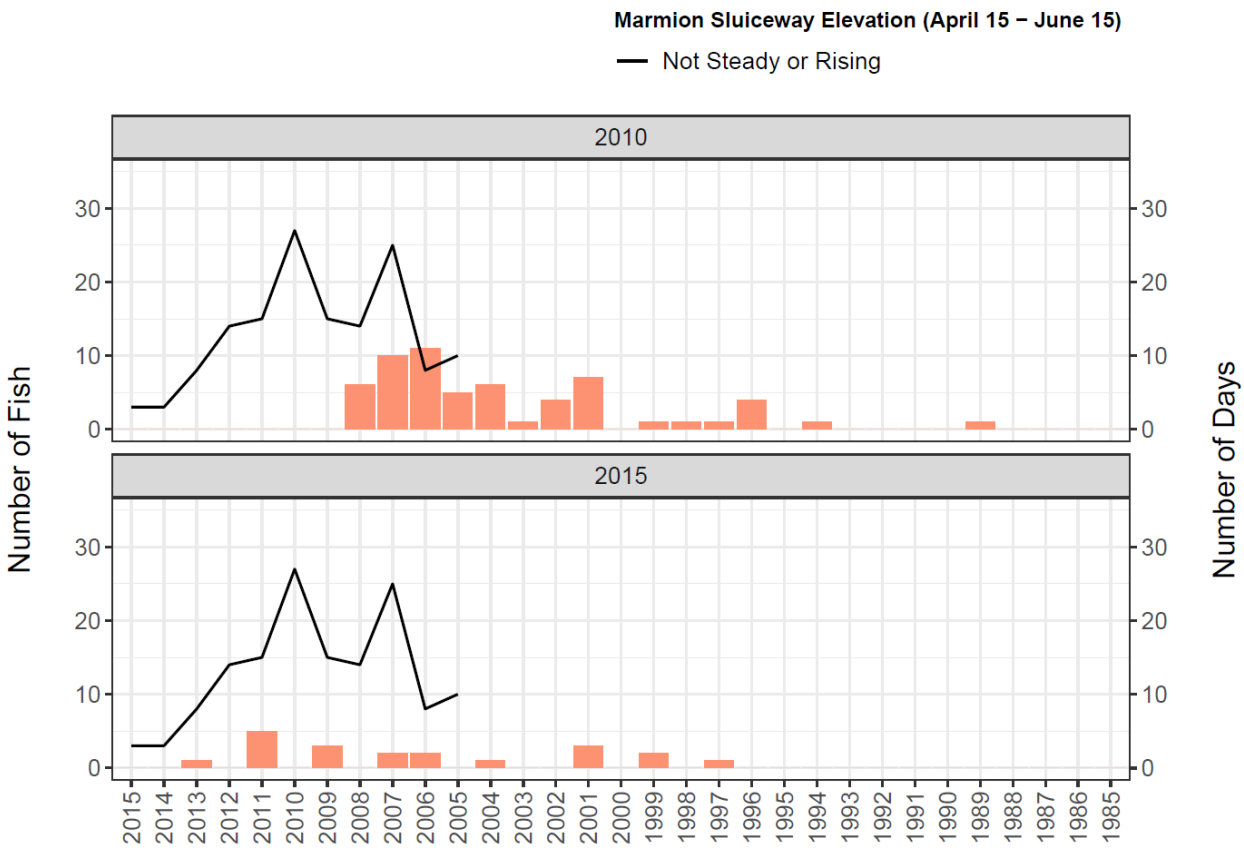

Figure 3. Year Class Strength for walleye in Lower Marmion, based on fish sampled during surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2015. The bar graph is overlayed with the number of days lake levels were not stable or rising during the spring spawning period, calculated using daily average.

Upper Marmion (Levels controlled by Raft Lake Dam)

All year classes of walleye between 2004 (when the SRWMP was implemented) and 2013 (2 years before the most recent survey) were represented on at least one of the two surveys completed on Upper Marmion (Figure 4). 2010 indicated a diminished year class with 10 days lake levels were not stable or rising during the spring spawning period. However, 2010 was a known drought year with levels on Upper Marmion operated out of the lower operating band by mid-April, not returning to the lower operating band until late July. Upon review of the year class strength diagrams on uncontrolled lakes, 2010 also indicated a diminished year class on several waterbodies. Thus, these results can likely be attributed, at least in part, to broader environmental conditions. In contrast, 2011 indicated a strong year class, although levels were not stable-or-rising on 15 days during the spring spawning period. In 2011 levels and minimum flows were maintained and flows were relatively high during the spring spawning period. Uncontrolled waterbodies also showed a relatively strong year class in 2011. Overall, the lack of missing year classes over the study period is a positive reassurance that walleye are successfully reproducing in Upper Marmion.

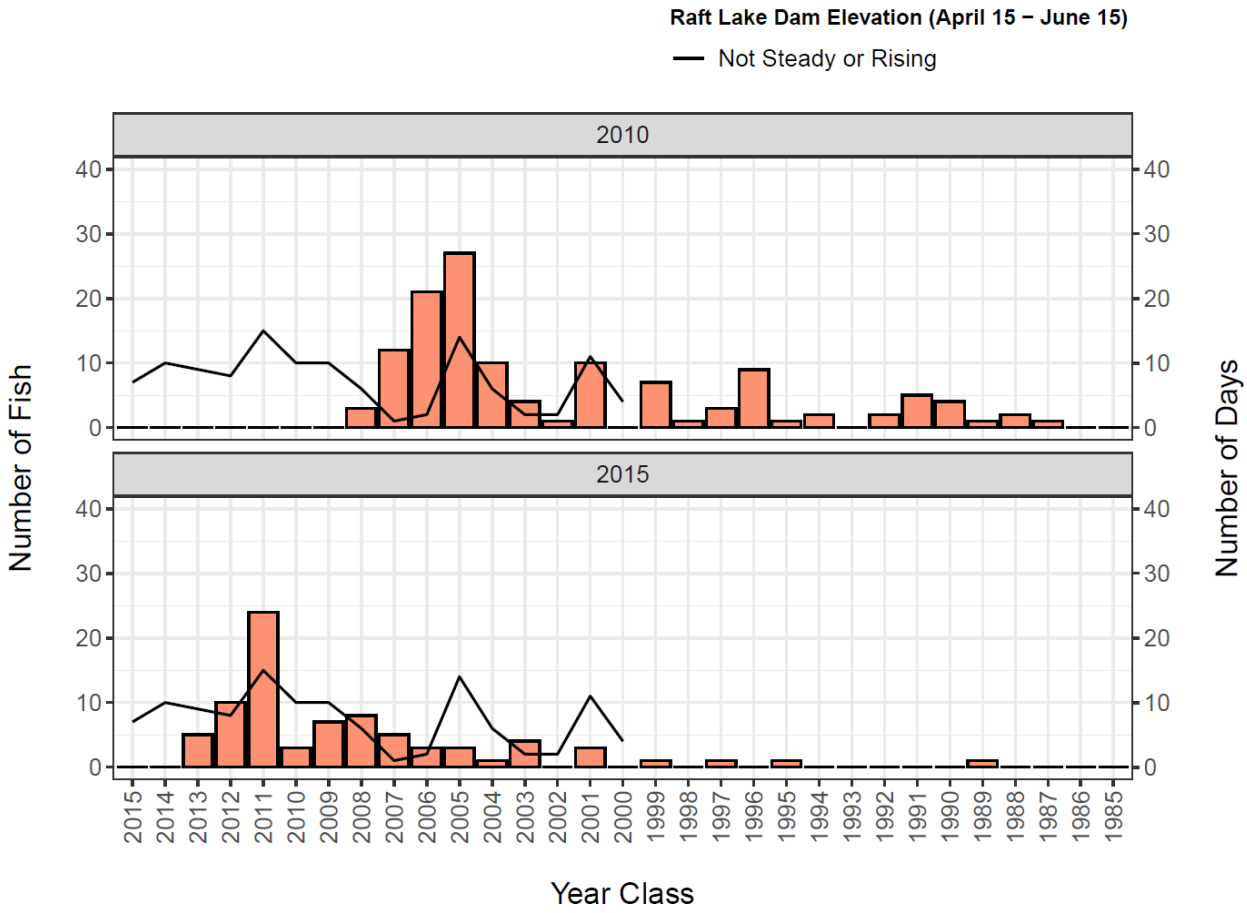

Figure 4. Year Class Strength for walleye in Upper Marmion, based on fish sampled during surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2015. The bar graph is overlayed with the number of days lake levels were not stable or rising during the spring spawning period, calculated using daily average.

Finlayson Lake (Controlled by Outflows from Raft Lake Dam)

All year classes of walleye between 2004 (when the SRWMP was implemented) and 2008 (2 years before the most recent survey) were represented on Finlayson Lake. The year 2006 indicated a strong year class but identified 27 days outflows were not steady-or-rising during the spring spawning period. Upon review of year class strength diagrams on uncontrolled lakes, 2006 also indicated a strong year class. Minimum flows were maintained, and levels operated within the band during the spawning period (possibly levels only slightly breaching the upper band mid-April). This example suggests prioritizing flows and levels remains the priority, at least during typical to high water years. While it is not possible to distinguish between fish that were a product of shoal spawning vs. those that were a product of riffle spawning below the Raft Lake Dam, the lack of missing year classes over the study period is a positive reassurance that current outflow regulations are not preventing walleye from successfully reproducing on Finlayson Lake.

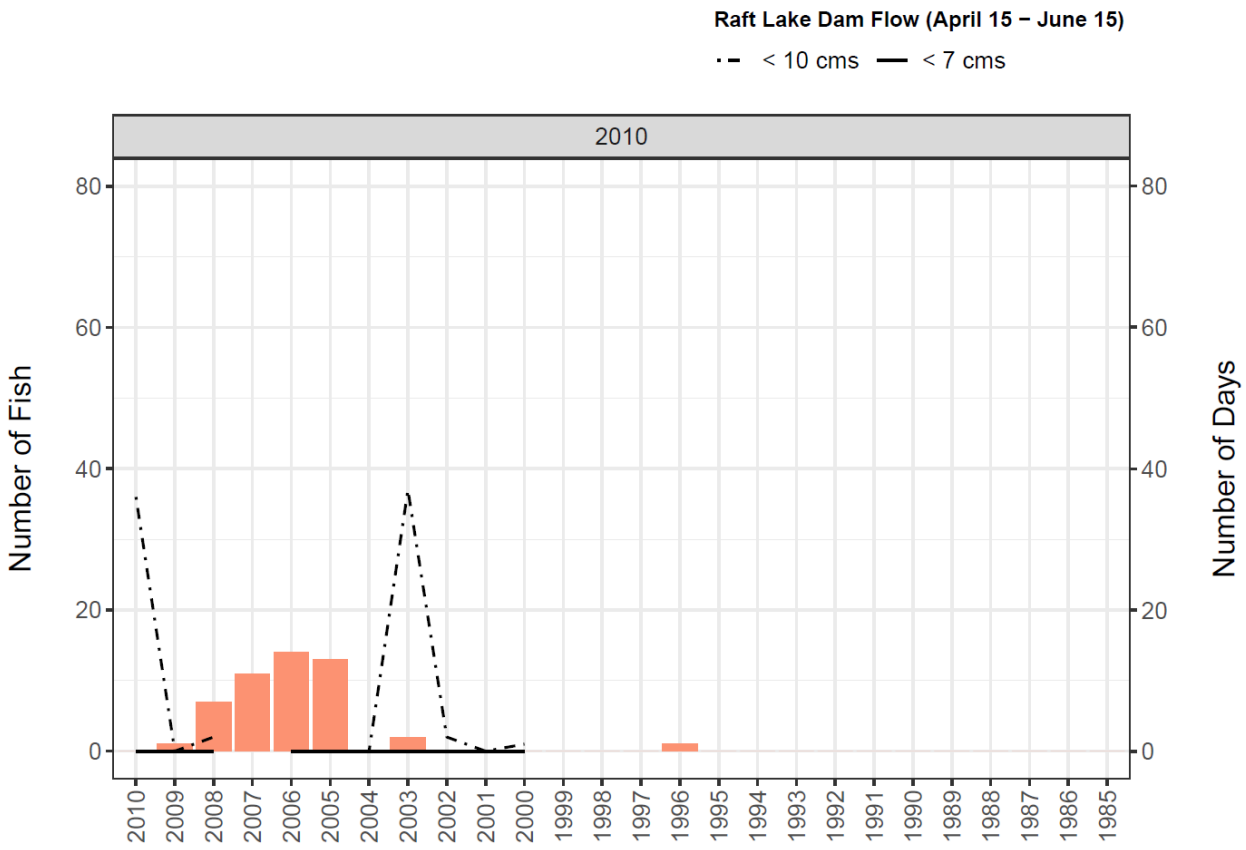

Figure 5. Year Class Strength for walleye in Finlayson Lake, based on fish sampled during a survey completed by the MNRF Broad Scale Monitoring Program in 2010. The bar graph is overlayed with the number of days minimum outflows were not met during the spring spawning period, calculated using daily average.

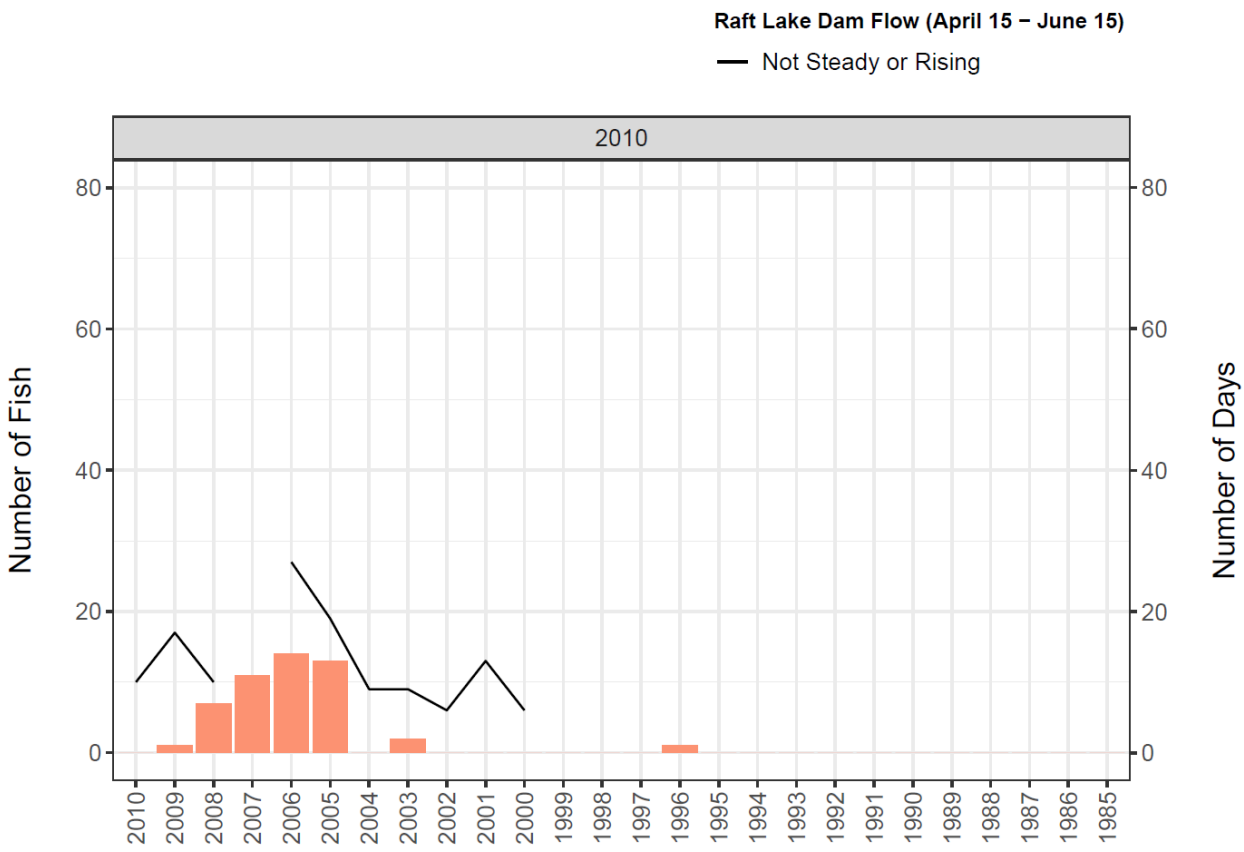

Figure 6. Year Class Strength for walleye in Finlayson Lake, based on fish sampled during a fish survey completed by the MNRF Broad Scale Monitoring Program in 2010. The bar graph is overlayed with the number of days lake levels were not steady or rising during the spring spawning period, calculated using daily average.

Perch Lake (Controlled, in part, by Outflows from Valerie Falls Dam)

All year classes of walleye between 2004 (when the SRWMP was implemented) and 2013 (2 years before the most recent survey) were represented on Perch Lake (7 and 8). The lack of missing year classes over the study period is a positive reassurance that walleye are successfully reproducing in Perch Lake. 2007 indicated a diminished year class with 21 days outflows were not steady-or-rising during the spring spawning period. In addition, 2007 identified 21 days minimum outflows were not met. Levels operated within band, while outflows did not remain consistently at/or above minimum requirements until mid-June, making it difficult to determine which factors, if any, may have contributed to this result. In addition, Perch Lake is only partially controlled by dam management, as there are uncontrolled inflows between Valerie Falls Dam and Perch Lake (e.g., the Atikokan River and Eye River). Upon review of year class strength diagrams from uncontrolled lakes, half these waterbodies also indicated a diminished year class in 2007 while the other half indicated a good year class strength. This diminished year class was likely related, at least in part, to a broader environmental condition (delayed/no freshet). In contrast, 2011 appeared to be a strong year class, although outflows from Valerie Falls Dam were not steady-or-rising on 24 days during

the spring spawning period. Minimum flows were maintained in 2011 throughout the spawning period, with relatively high flows throughout the system.

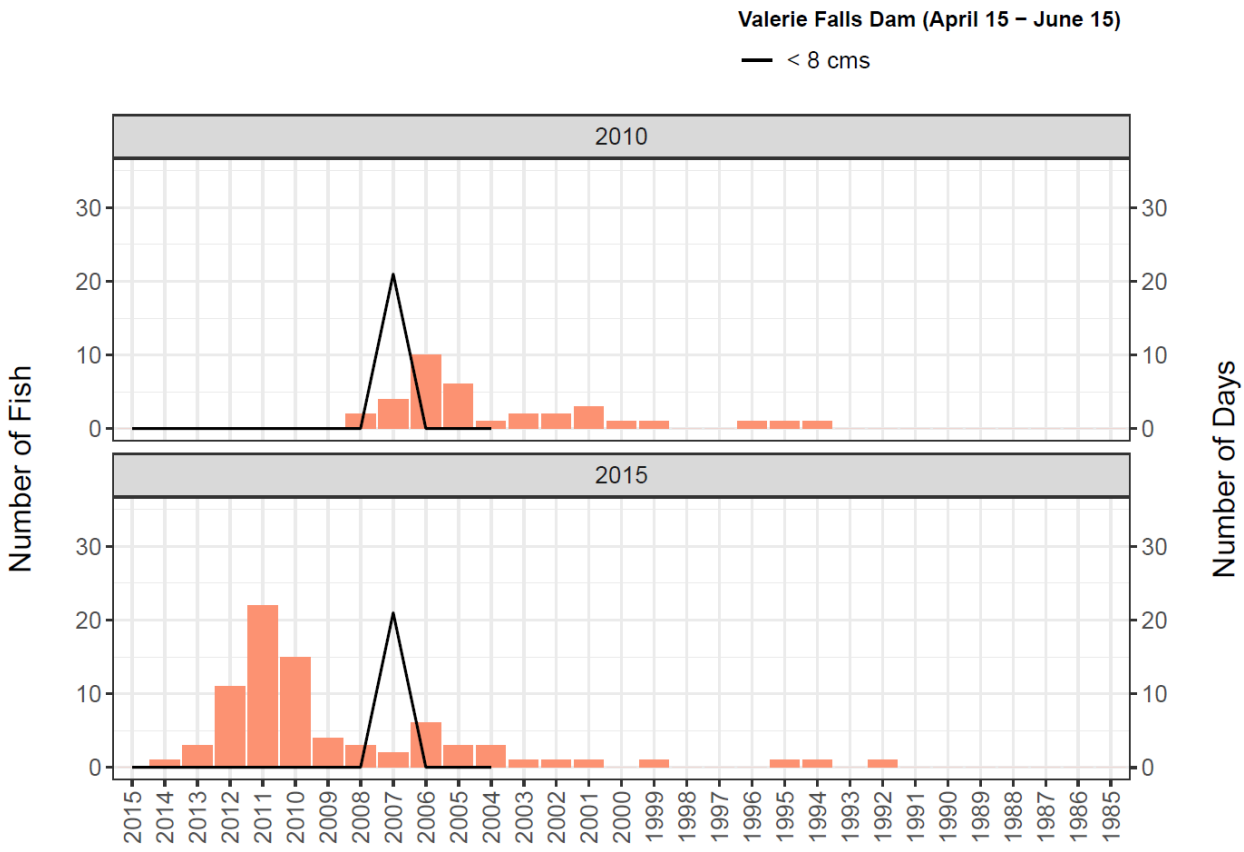

Figure 7. Year Class Strength for walleye in Perch Lake, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2015. The bar graph is overlayed with the number of days minimum outflows were not met during the spring spawning period, calculated using daily average.

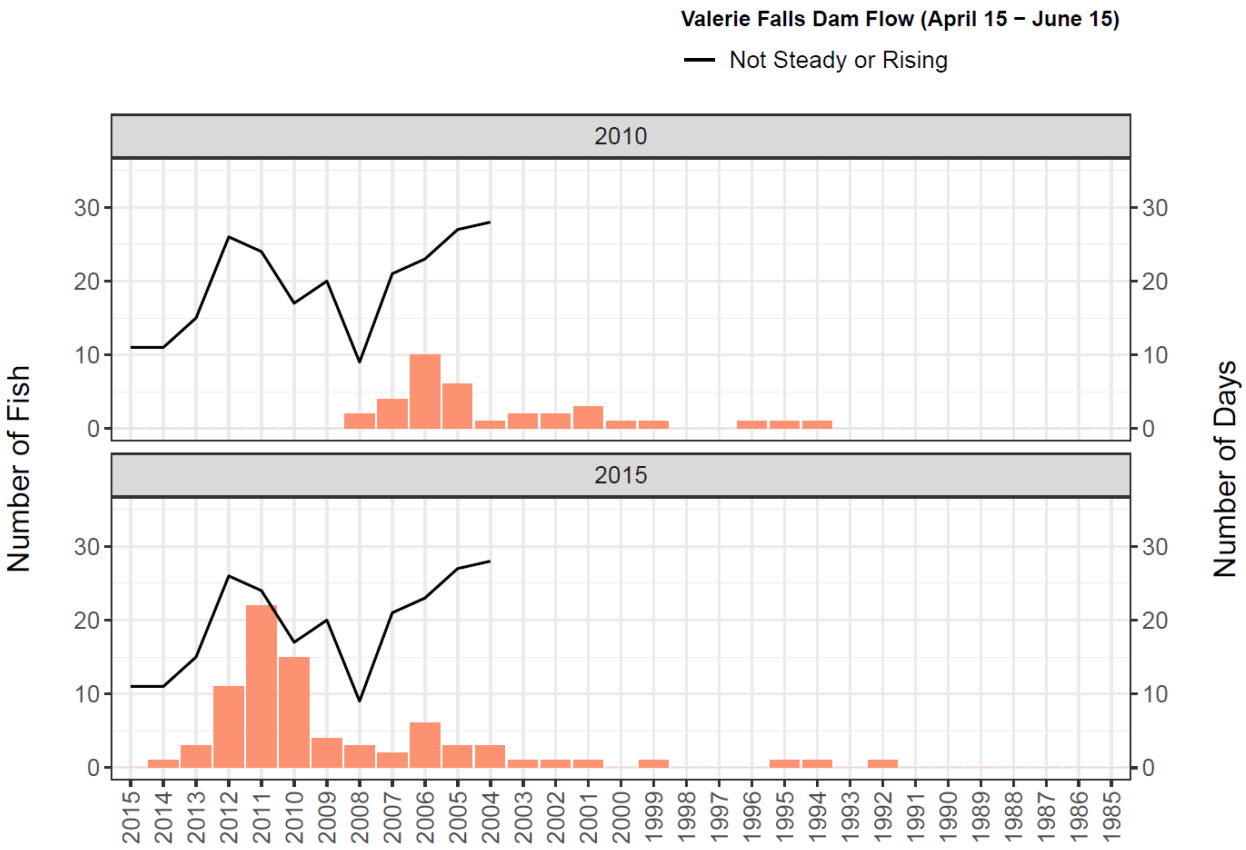

Figure 8. Year Class Strength for walleye in Perch Lake, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2015. The bar graph is overlayed with the number of days lake levels were not steady or rising during the spring spawning period, calculated using daily average.

Summary:

After review of the available fisheries data from the BSM program, a few interesting patterns have emerged. In particular, a few strong year classes were identified in years when stable-or-rising level and steady-or-rising outflow regulations were not met on a number of days. However, these were typical or high-water years when minimum flows were met (or exceeded), and uncontrolled waterbodies also showed strong year classes. In diminished year classes, steady/stable-or-rising conditions were also often not met on a number of days but flows or levels were similarly often not met in those years, and year classes were often also diminished on uncontrolled waterbodies, making it challenging to determine which factors most strongly influenced year class strength. Taken together, these results suggest that the current approach of prioritizing minimum flows and levels should remain the focus, as the steady/stable-and-rising condition may become less important for successful reproduction of walleye during high-water scenarios, when it is challenging to meet all three conditions.

However, additional effort is needed to ensure that information exists on all waterbodies referenced within the SRWMP, at the correct frequency, to appropriately evaluate the

fisheries data. It is also important to note that fish stocks in the Seine River watershed are influenced by a variety of factors other than water management (resource use, uncontrolled watershed sources, species introduction, and environmental conditions). For instance, the Raft Lake dam controls the water levels and outflows of Upper Marmion Lake. Besides water from the other two reservoirs, there is significant inflow to Upper Marmion Lake from uncontrolled sources including the Firesteel River and the Mercutio River. Altogether, uncontrolled inflows account for 56% of the watershed area (Boileau, 2004). The Calm Lake dam controls water levels in the reach from Calm Lake to Perch Lake under normal flows. There are significant uncontrolled inflows to this dam (20% of total inflow area) from the Atikokan River and Eye River systems (Boileau, 2004). Approximately 80% of the inflow area to Calm Lake dam is controlled by the Raft Lake dam. At low flows, the Calm Lake dam controls water levels over the entire headpond up to Perch Lake. At higher flows (flows above about 75 m3/sec), the narrows between Chub Lake and Banning Lake acts as a constriction, resulting in events when water levels are much higher in Perch Lake, Chub Lake and Little McCaulay Lake than in Calm or Banning Lake. At these times, the Calm Lake dam has less control over water levels in Perch Lake, Chub Lake and Little McCaulay Lake (Boileau, 2004).

Status:

This objective is considered Partially Complete. MNRF's future work planning will look to consider additional surveys on all waterbodies referenced in the SRWMP that are not currently surveyed under the BSM program. Further work is required by MNRF to evaluate year class strength from both existing and future BSM survey results for non-walleye species within the Seine River watershed, and to compare these results to the summarized operating procedures. As new data and research become available, assessing year classes may not remain the best indicator of plan performance, and more targeted approaches to fisheries assessments may need to be pursued. MNRF recommends a minor amendment to reflect the updated BSM survey methodology for monitoring plan achievement. Stable-or-rising levels was the only metric that could be evaluated at Marmion Sluiceway during this implementation reporting period, although the plan sets a target of 0.2 m^3/sec for a daily average outflow. Currently, obtaining accurate measurements of outflows at Marmion Sluiceway is not possible. MNRF recommends that plan proponents look to assess the applicability of this metric for the next reporting period. At this time, MNRF does not recommend any modifications to target levels, flows, or strategies within the SRWMP.

4.4.3: Improve extent and diversity of aquatic wetlands by lowering water levels throughout the summer months on all lakes and reservoirs

Sub-Objective: 4c

Description: One of the objectives in the Seine River Water Management Plan (SRWMP) was to improve the extent and diversity of aquatic wetlands by lowering water levels throughout the summer months on all lakes and reservoirs.

Summary: In 2005, a study was proposed to assess the impact of the Water Management Plan (WMP) on wetland communities. The study design was based on a similar wetland monitoring program on Rainy Lake, Namakan Lake and Lac la Croix (Meeker and Harris 2004). The objective was to monitor changes in wetland communities in the Seine River system caused by altered water level regulation, to assess the effects of the current water level regime on wetlands and to inform recommendations. The aim was to evaluate several different management scenarios occurring in the Seine River system from stable all year round to large winter drawdowns.

It was anticipated by Harris et al (2005) that waterbodies of the Seine River water system were being impacted differently by changes in the water regime. The most significant deviations from a natural system expected were:

1) Winter drawdown on Upper Marmion Lake, probably causing decreased macrophyte diversity and abundance and creation of an isoetid (small, mat-forming plant) community (Wilcox and Meeker 1991).

2) Narrow drawdown zone on Little Falls and Laseine lakes likely causing encroachment of trees and shrubs on the shoreline, reduced germination of seedbank species, and reduced nutrient pulse.

3) Significant daily water level fluctuations on Little Falls and Colin lakes. This regime has no natural analogue and will presumably result in an impoverished plant community, potentially with significant areas of exposed substrate.

Figure 9 shows a hypothetical model of the anticipated relationship between the water level regulation and wetland vegetation on the Seine River system.

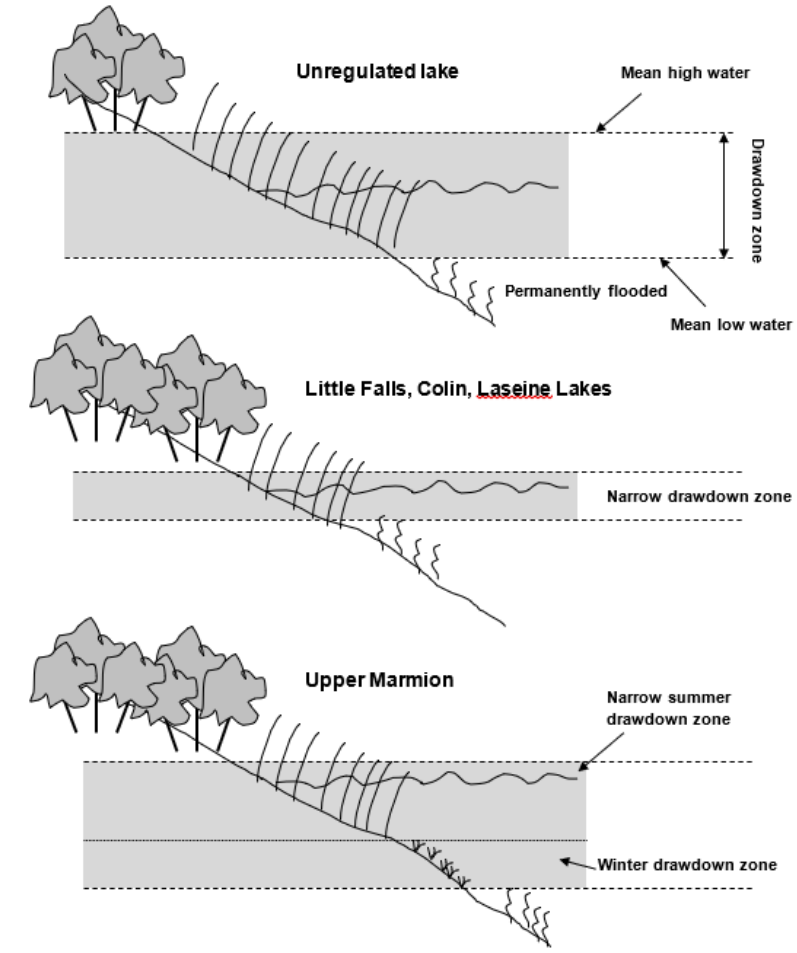

Figure 9. A hypothetical model of the anticipated relationship between the water level regulation and wetland vegetation on the Seine River system, based on Wilcox and Meeker (1991) and Keddy (2000) and developed by Harris et al. 2005.

The study was designed to consist of two components:

1) Extensive Analyses: Changes in gross wetland community as measured by aerial photo or satellite data. This technique is suited for monitoring changes in thicket swamp and meadow marsh vegetation and invasion or spread of cattail (*Typha* spp.).

2) Intensive Sampling Analyses: Plant species composition and abundance as measured by quadrats. Effort would be focused on the vegetation zones expected to incur the most change with the changed water regime. Sampling effort would then be stratified by vegetation zone and water body.

For both components, the plan was to collect baseline data, and later compare results to subsequent re-measurements.

In 2010, a draft report was completed by Northern Bioscience Ecological Consulting, in partnership with Ministry of Natural Resources and Forestry (MNRF). This study largely completed the Extensive Analyses aspect of the study design.

Details of this project can be found in Harris and Foster, 2010.

Status: Findings from Harris and Foster (2010) revealed that wetlands are relatively uncommon on Finlayson and Lower Marmion lakes (0.3 to 0.4 ha of wetland/of shoreline). These lakes are largely bedrock-controlled with steep shorelines and little soil, and wetlands are mainly confined to small patches in sheltered bays. More extensive wetlands are found at the south end of Lower Marmion on sand deposits. Little Falls Lake and its surrounding wetlands had already been classified as Provincially Significant by Harris and Foster (2002) under the 1993 Ontario Wetland Evaluation System (OWES) Northern Manual. During the 2002 evaluation the wetland consisted of a large floating mat with abundant cattail (*Typha sp*.) as well as submergent communities and peatlands. Although quantitative data is lacking, Harris and Foster (2010) reported that *Typha* appears to have increased substantially at the Little Falls Lake wetlands since 2002. In contrast, there are few wetlands on Colin Lake, even though it is a continuous reservoir with Little Falls Lake. It is unknown whether the position of Colin Lake immediately above the dam or the substrate conditions influence wetland development on that lake. Wetlands are abundant on Modred Lake, particularly Ecosite 45 (floating mat) on the north bay off the main flowage. Fringing marshes are abundant on the sandy substrate of Perch Lake, but wetlands are uncommon on Banning and Little McCaulay lakes. All three lakes are essentially widenings of the Seine River. Calm Lake has few wetlands, despite apparently suitable substrates. In contrast, Little Joe Lake, separated from Calm Lake by a long narrow channel, has extensive marshes (Harris and Foster 2010).

Ultimately, the study revealed that the Seine River system has a wide range of flow conditions, substrate types, and degree of influence from dams, all of which affect wetland composition and distribution. Wetlands were generally most common on deeper soils, rather than bedrock-controlled landforms, but the influence of dams on the composition and distribution is suggested, especially on Calm and Colin lakes (Harris and Foster 2010). In addition, the Seine River above Island Falls was found to support one of the largest wetland complexes in the study area, consisting of fen, swamp, marsh, and open water marsh communities. This wetland is on an active floodplain, and apparently nourished by deposition of sediment eroded farther upstream. The wetland extends to the estuary below Island Falls. Although it has not been evaluated, based on its size and diversity of community types, it is suggested by Harris and Foster (2010) that this wetland would likely rank as Provincially Significant under the OWES Northern Manual. Recommendations were made by Harris and Foster (2010) that additional effort, to verify the classification of mapped polygons, be completed by MNRF before using the database for monitoring future wetland changes.

This objective is considered Partially Complete. To date no additional action has been taken to address this objective. Further investigation is required by MNRF to determine the feasibility of continuing this project. New research and technology, designed to monitor wetland status over time and at various water levels, should also be explored if

available. To date only baseline information has been collected for this commitment and a change detection remains to be completed. Therefore, it is unknown at this time whether operations are having negative unintended impacts on the wetland distribution and composition for waters within the SRWMP.

4.4.4: Maintain current flows at Wagita Dam to maintain the West Arm of Steep Rock Lake while avoiding high volume discharges because of suspended silt concerns.

Sub-Objective: 4e

Description: One of the objectives of the Seine River Water Management Plan (SRWMP) was to maintain current flows at Wagita dam to maintain Steep Rock Lake while avoiding high volume discharges because of suspended silt concerns.

Summary: The Wagita Dam is owned by Ministry of Natural Resources and Forestry (MNRF) and maintained primarily by MNRFs Steep Rock Mine Rehabilitation Project. The Wagita Bay Dam is primarily a block dam that serves to separate the Seine River diversion from Steep Rock Lake. It does not act as an effective level control for the Valerie Falls headpond (Colin Lake-Little Falls Lake). However, it does perform important Aquatic Ecosystem functions. These include providing minimum flow for walleye spawning on Steep Rock Lake and water coverage of Steep Rock dredge material.

The location where the outflow from Little Falls Lake enters Steep Rock Lake through the Wagita Dam is a known walleye spawning location, and thus adequate flows during the spring spawning season are required. Steep Rock Lake is infilled with 60 vertical meters of dredged lake-bottom sediment that was placed there during the development of the former Steep Rock Iron Mine. The sediment has a very low shear strength (Trow associates Inc, 2008) making it very mobile, and even small increases in flow have been known to cause it to move downstream causing environmental and social issues. For these reasons, it was determined that flows should be maintained at a rate sufficiently high to provide suitable spawning habitat for walleye, without being so high as to stir up sediment from the bottom of Steep Rock Lake.

Prior to the development of the SRWMP, spacers had been placed below the bottom log of the Wagita Dam to allow a relatively constant outflow. These flow levels seemed to be sufficient to address the above-described environmental objectives. However, a need was identified to quantify the outflows so they could be replicated if any construction or rehabilitation activities were ever completed on the dam, and to confirm quantitatively that flows were not causing any issues regarding turbidity or fish spawning.

Three effectiveness monitoring strategies were identified to address this objective, the results and current status relating to these strategies are outlined below.

Strategy 1: Determine current flows

In 2004, shortly after the Seine River Water Management Plan was developed, an initial attempt was made to quantify flows from the Wagita dam. In a joint initiative completed Valerie Falls Limited Partnership (VFLP) and MNRF, a temporary plywood weir was placed below the dam approximately 20m from where it enters Steep Rock Lake, as described in Jackson, 2004. Based on data collected from the weir, MNRF estimated flows from Wagita Dam to be 0.085 m3/sec (3 ft3/sec). During the preparation of the Seine River Water Management Plan, it was estimated that 0.1 m3/sec was flowing through the dam. Based on the results of this survey, this value was determined to remain a reasonable estimate of outflow (Jackson, 2004).

In 2013, rehabilitation work on the Wagita Dam was completed in which the wood stop logs were replaced with steel stop logs. One steel stop log was fabricated with a 25 mm (1") steel spacer, to allow for seepage through the stop logs, to maintain flows. An intent of this design was to ensure that flows remained consistent with the previous design. As the stop log configuration did not change, it is unlikely that the flow regime from the Wagita dam would have changed significantly.

The initial measurement of 0.085m3/sec to 0.1 m3/s, based on work completed in 2004, likely remains a good estimate of current flows from the Wagita dam. However, to obtain a more accurate measurement of flows through time, and given the recent upgrades to the dam, additional monitoring is recommended to capture flows from Wagita over the course of the year. This will allow MNRF to more accurately characterize, and thus maintain, current flows present at Wagita both during the spring spawning period, and at other times of the year when flows may be slightly different. Accurately characterizing flows throughout the year from the Wagita dam will ensure that engineering designs of any dam remediation measures can adequately replicate current conditions and ensure that turbidity (see Strategy 2) and walleye spawning (see Strategy 3) in Steep Rock Lake are unimpacted by dam operations.

Significant repairs on the Wagita dam are planned over the period from 2023 – 2026. Flows will be measured before, during and after construction of the selected rehabilitation design. The selected rehabilitation design will aim to maintain current SRWMP objectives. The design will include operational flexibility to ensure that adjustments can be made, should monitoring efforts indicate a need to do so. The commitment to determine current flows at the Wagita Dam is therefore Partially Complete - Ongoing.

Strategy 2: Assess turbidity in lake

In 2019, water samples were collected by MNRF's Steep Rock Mine Rehabilitation Project Staff from three locations on Steep Rock Lake (where suspended dredge sediment could potentially be a concern), and four locations on Apungisisagen Lake (which contains no dredge sediment), and analyzed for several water quality parameters, including Total Suspended Solids (TSS). TSS is a direct measure of the quantity of particles (e.g., clay or silt) suspended in the water column and collected in the water samples and is thus a reasonable means of assessing the extent to which dredge sediment at the bottom of Steep Rock Lake was suspended in the water

column, which could lead to turbidity concerns. At each sample location, water samples were collected from the surface and 1m above the bottom of the lake.

In the three sample locations on Steep Rock Lake, TSS in water samples ranged from <2mg/L to 2.8mg/L, which is considered on the low end of the range for other lakes in the region. For comparison, in the water samples taken the same week from four locations on Apungsisagen lake, TSS ranged from 3.2mg/L to 8.8mg/L.

These results indicate that under current outflows from the Wagita Dam, suspension of dredge sediment is likely not a concern. As a result, current operations at the Watiga Dam are not having unintended negative impacts on turbidity in Steep Rock Lake.

Strategy 3: Assess fish populations to determine year class failures not related to broader environmental conditions

Fish surveys were completed on Steep Rock Lake by MNRF's Broad Scale Monitoring Program (BSM) in 2011 and 2017, and year class strength diagrams were constructed for walleye, as described in section 1.3.4.3 (Figure 10). As flows were not measured on an annual basis and were assumed to remain relatively consistent, year class strength was not directly compared to outflows.

All year classes of walleye between 2004 (when the SRWMP was implemented) and 2016 (the year before the most recent survey) were represented on at least one of the two surveys completed on Steep Rock Lake. Strong year classes were present both before and after the most recent rehabilitation upgrades to the Wagita dam in 2013, indicating that adjustments to the design did not appear to affect fish spawning. These results suggest that flows from the Wagita Dam were sufficient to allow walleye to spawn and successfully reproduce over the plan period. While it is not possible to distinguish between fish that were a product of shoal spawning vs. those that were a product of riffle spawning below the Wagita Dam, the lack of missing year classes over the study period is a positive reassurance that current outflows from the Wagita Dam are not preventing walleye from successfully reproducing in Steep Rock Lake.

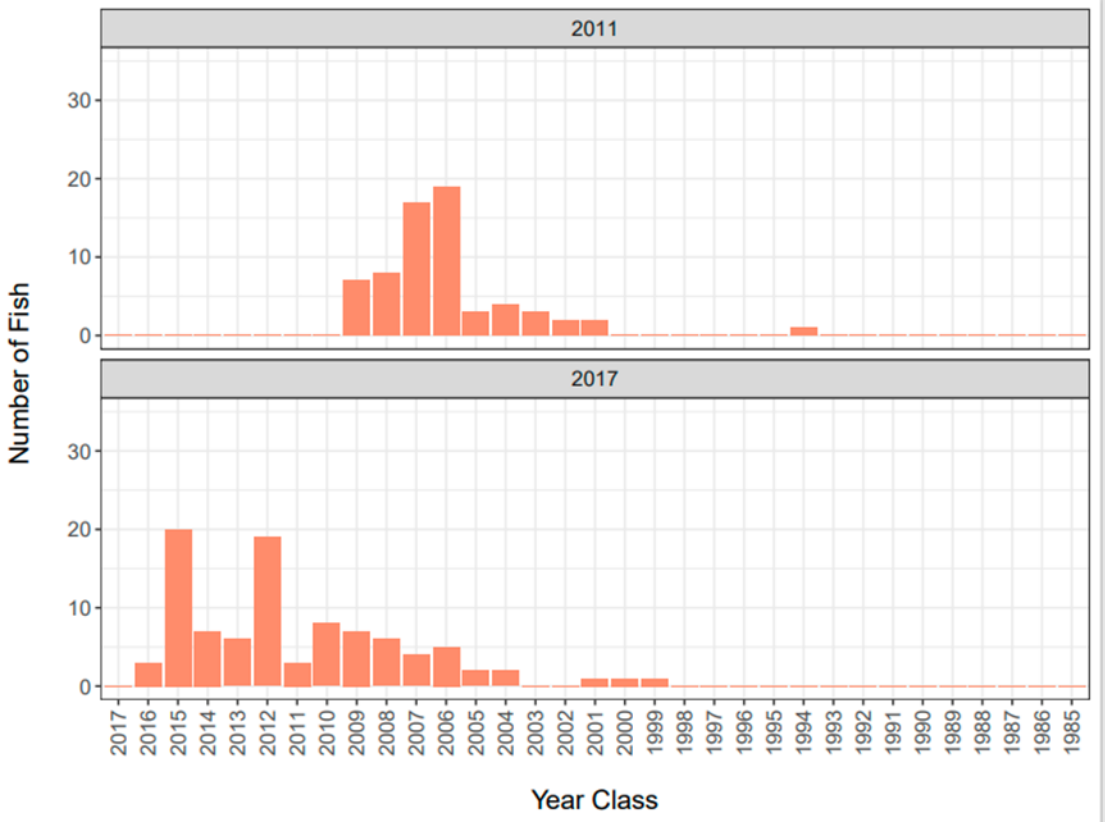

Figure 10. Year Class Strength for walleye in Steep Rock Lake, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2011 and 2017.

Status: Sub-objective 4e) is considered Partially Complete. Ongoing monitoring is recommended to refine estimates of current outflows from Wagita dam, before and after the completion of future rehabilitation efforts on the dam. Ongoing monitoring of water quality and fish populations in Steep Rock Lake is also recommended, to ensure that flows from the Wagita dam continue to meet this objective.

4.4.5: Maintain spring spawning opportunities by having steady or rising flows throughout the system from April 15 to June 15 / Improve aquatic ecosystem health by maintaining minimum flows throughout the system - Lac des Mille Lacs

Sub-Objective: 4b and 4d

Description: Objectives from the Seine River Water Management Plan that involve assessing fish populations for Lac des Mille Lacs include:

- 4b) Maintain spring spawning opportunities by having steady or rising flows throughout the system (April 15–June 15)
- 4d) Improve aquatic ecosystem health by maintaining minimum flows throughout system

Summary: Results of FWIN surveys suggest that the walleye population in Lac des Milles Lacs is stable and healthy with an abundance consistently above the FWIN benchmark values (Figure 11).

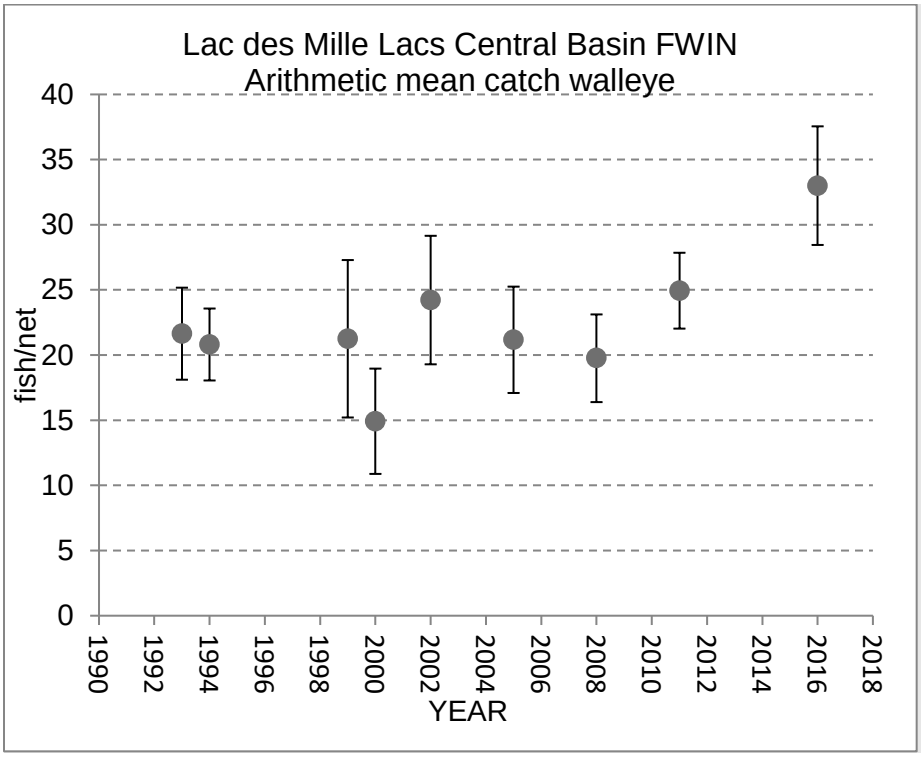

Figure 11. Mean abundance (fish per net) for walleye on Lac des Mille Lacs (FWIN surveys from 1993 to 2016). The regional benchmark for walleye abundance is identified in Morgan et al. (2003). Note that the Seine River water management plan was approved in 2004.

Status: Given the narrow water level fluctuations associated with normal operations on Lac des Mille Lacs, water levels and flows are not likely to be a major factor affecting fish populations. MNRF recommends revaluating the commitment to assess fish populations in Lac des Mille Lacs as the results are of limited value to the Seine River water management plan. Note that broadscale monitoring on Lac des Mille Lacs will continue indefinitely as part of the provincial fisheries program.

4.4.6: Maintain spring spawning opportunities by having steady or rising flows throughout the system from April 15 to June 15 – Sturgeon population assessment from Lower Seine River

Sub-Objective: 4b

Description: The Seine River Water Management Plan (SRWMP) considers lake sturgeon a valued ecosystem component (VEC) and outlines objectives to manage water levels and flows to maintain conditions necessary for sturgeon spawning in the

spring. From 2010 to 2014, the MNRF in partnership with the Seine River First Nation and FirstLight, assessed sturgeon population status and collected data to assess the effectiveness of current water management to provide successful spawning and recruitment.

Summary:

The project focussed on three information needs.

- To determine the current adult population status on the Seine River as compared to neighbouring waterbodies within the Rainy River watershed
- Identify appropriate technique to monitor the juvenile sturgeon population within the Seine River with the intent to assess recruitment in the future.
- To identify adult sturgeon movement patterns in relation to water temperature and water levels during the spawning period.

Details of this project can be found in Jackson and Godwin, 2015.

Adult population status

Between 2011 and 2013 netting of adult sturgeon occurred during the spring spawning window and again in the fall to gather information about the adult spawning population located in the lower Seine River. A total of 48 different adult sturgeon were captured using gill nets. Fish were measured, weighted and a sample of the pectoral fin was taken for ageing. All fish were released alive after sampling. Results indicate that the adult catch rate within the Seine River was comparatively lower, the population was younger and had fewer age classes than neighbouring waterbodies in the Rainy River watershed. This suggests that the population is less healthy and more at risk than other populations in the Rainy River watershed.

Juvenile sturgeon monitoring and recruitment

Juvenile sturgeon were netted during the spring of 2012, spring and fall of 2013 and fall of 2014. All fish were measured (length, weight, fork length), aged (leading pectoral fin ray) and fitted with a Passive Integrated Transponder tag. Nets set between 10 and 20m in depth had the most success capturing juvenile sturgeon, and those nets located further downstream had the most. A total of 112 juvenile sturgeon were captured, with the majority of captures located downstream of Shoal Lake. There was considerable variation in year/size class representation, although it was not clear how much was influenced by the vulnerability of youngest age/size groups to the capture gear and how much was due to differences in annual recruitment. However, it was noted that 2009 and 2008 appeared to be strong age classes as compared to 2010. This work confirmed that focussing netting efforts on deep pools (>10m) is an effective method to monitor juvenile sturgeon (ages 0-6years) and can be used to assess year class strength as an approach to assess impacts of Sturgeon Falls dam operation on recruitment of lake sturgeon in the Seine River.

Adult sturgeon movement patterns

The movements of 23 adult sturgeon were monitored in the Seine River from 2011-2014 in relation to four receivers placed along the lower Seine River at Devil's Elbow, Wild Potato Shoal, Hwy 11 bridge and below Sturgeon Falls Dam). This work confirms that most lake sturgeon (originally captured in the lower Seine River) spend the late summer to winter months within Rainy Lake but travel upstream into the Seine River to spawn below Sturgeon Falls generating station or at the Highway 11 bridge. Water flow during the spawning period varied over the study and movement to spawning areas was observed where Sturgeon Dam outflows ranged from 60 to160m^3/sec. The peak number of sturgeon detected at the Highway 11 bridge spawning location corresponded to a water temperature of approximately 10^{o}C, which corroborates with the beginning of the spawning period for lake sturgeon in Ontario as identified by Golder (2011). The date of water temperatures reaching 10^{o}C varied during the study period, ranging from May 11th to June 4th.

Status: This information assisted in defining when Sturgeon Falls generating station operations were most likely to impact sturgeon populations. This objective is considered Complete in relation to MNRF's role and responsibilities.

As of 2019, the responsibility for species at risk designated as Threatened or Endangered was transferred to the Ministry of the Environment, Conservation and Parks (MECP). As a result, the Seine River Water Management Plan (SRWMP) is out of date and does not reflect Ministry of Natural Resources and Forestry's (MNRF) role. MNRF recommends a minor amendment to reflect the change in responsibility of endangered or threatened species at risk to MECP.

Although much was learnt from MNRF's historic involvement, the effects of the current water management regime on lake sturgeon populations are still required to be studied more intensely. As a result, FirstLight procured North/South Consultants Inc. to conduct a monitoring program to assess the effectiveness of the SRWMP.

In 2014, FirstLight registered its first five-year (2014-2028) Lake Sturgeon Mitigation and Effectiveness Monitoring Plan (MEMP) (hereafter referred to as 'the Plan') for the SFGS, Seine River, Ontario, with the Ontario Ministry of Natural Resources and Forests Species at Risk Branch. The second five-year MEMP was registered in 2019 and was in effect from 2019 to 2023. The Plan was prepared to meet regulatory requirements in accordance with Section 23.12 of Ontario Regulation 242/08 under Ontario's Endangered Species Act (ESA) (2007). It provides the rationale, objectives, and approach to Lake Sturgeon Mitigation and Effectiveness Monitoring for the SFGS over a 5-year period.

For each year of the five-year Plan, H2O Power is to prepare an Annual Report by March 31 of the following year. The annual report is to include:

- Details on the steps taken to minimize (mitigate) adverse effects of the station on the listed species (in this case Lake Sturgeon) and an assessment of its effectiveness. For the SFGS, this assessment is based on:
    - Compliance/non-compliance with the discharge requirements described in the SRWMP; and
    - An assessment of how the SRWMP may be mitigating adverse effects of station operation on Lake Sturgeon;
- Information collected during Lake Sturgeon monitoring;
- Records of any activities carried out in accordance with the Plan; and
- Details of any encounters with members of the species (i.e., Lake Sturgeon).

Below is a summary of the findings from 2014 until 2022:

Compliance with the SRWMP was based on regulatory requirements discussed with the Ontario Ministry of Natural Resources and Forestry (OMNRF) before June 30, 2013 (NSC 2014). The SRWMP requires an instantaneous minimum total outflow for the SFGS of ≥10 m3/s during the spring spawning and larval drift period (April 15 – July 15), and a minimum of 2.5 m3/s for the remainder of the year (July 16 – April 14).

FirstLight monitors hourly discharge and water temperature at the SFGS. Results of monitoring from January 1, 2014 through December 31, 2022 are summarized below in Tables 4 and 5.

Table 4: Lake Sturgeon MEMP Plan monitoring results (SFGS operations) during the defined spawning and larval drift period, April 15 to July 15

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Discharge, headwater elevation, tailwater elevation, and tailwater temperature were recorded hourly	✓	✓	✓	✓	✓	✓	✓	✓	✓
The instantaneous outflow was greater than 10 m3/s	✓ min 16.9	✓ min 26.5	✓*2 min 22.6	✓ min 54.9	✓*3 min 19.00	✓*4 min 37.7	✓ min 10.9	✓*5 min 12.0	✓ min 25.81
The Forebay elevation level did not fall below 357.200	✓ min 357.24	✓ min 357.267	✓ min 357.256	✓ min 357.263	✓ min 357.266	✓ min 357.415	✓ min 357.272	✓ min 357.282	✓ min 357.302
The Forebay elevation level did not rise above 357.750	✓ max 357.654	✓ max 357.621	✓ max 357.667	✓ max 357.489	✓ max 357.579	✓ max 357.604	✓ max 357.531	✓ max 357.564	✓ max 357.656
Peaking operations did not occur at the station during the Lake Sturgeon spawning and larval drift period.	✓*1	✓	✓	✓	✓	✓	✓	✓	✓

*1 - Between April 22-24, 2014, modified peaking occurred within the requirements of the SRWMP (i.e. above 50% of daily average inflow off-peak and below 150% of daily average inflows on-peak). Peaking operations was not re-instated until August 30.

*2 - Outflows were steady or rising as nature allowed with the exception of one non-compliance event. A non-compliance report was submitted to OMNRF Atikokan for a non-compliance event on April 25th, 2016 due to an electrical outage.

*3 - With the exception of a brief period on July 11, 2018, instantaneous discharge remained above 10 m3/s. A brief non-compliance event occurred on July 11, 2018. Total outflow was reduced to 4.0 m3/s for approximately eight hours. Given the short duration and timing of the event (i.e., the event occurred relatively late in the spring spawning period), this event is not expected to have any impact on Lake Sturgeon larval drift. A similar non-compliance event occurred on April 25, 2016 due to a power outage.

*4 - The instantaneous outflow was greater than 10 m3/s at all times with one exception. On April 19, 2019, the instantaneous outflow was reduced to 4 m3/s due to an external power disturbance. The total duration of the power outage was 2 hours and 23 minutes.

*5 - The instantaneous outflow was greater than 10 m3/s at all times with the exception of the last two days. On July 14, 2021 outflow was reduced to 4.00 m3/s and on July 15, outflow was 6.84 m3/s.

Table 5: Lake Sturgeon MEMP Plan monitoring results (SFGS operations) during periods outside of the spawning period (January 1 to April 14 and July 16 to December 31):

	2014	2015	2016	2017	2018	2019	2020	2021	2022
The Forebay elevation levels did not fluctuate more than 55 cm	✓ max 20.0	✓ max 21.5	✓ max 26.2	✓ max 38.3	✓ max 46.3	✓ max 39.0	✓ max 21.0	✓ max 15.0	✓ max 21.8
Mean daily discharge remained above 2.5 m3/s	✓ min 16.9	✓ min 13.4	✓ min 15.8	✓ min 4.6	✓ min 7.6	✓ min 23.4	✓ min 7.8	✓ min 4.0	✓ min 4.0
The Forebay elevation level did not fall below 357.200 m	✓ min 357.237	✓ min 357.234	✓ min 357.237	✓ min 357.214	✓ min 357.227	✓ min 357.276	✓ min 357.270	✓ min 357.297	✓ min 357.304
The Forebay elevation level did not rise above 357.750 m	✓ max 357.600	✓ max 357.632	✓ max 357.655	✓ max 357.597	✓ max 357.690	✓ max 357.666	✓ max 357.585	✓ max 357.539	✓ max 357.628
Monthly reports including the data records were submitted to OMNRF Atikokan field office	✓	✓	✓	✓	✓	✓	✓	✓	✓

Figure 12 below provides a visual of the Min/Max Forebay elevation levels presented in Tables 4 and 5 confirming that the Forebay elevation level at SFGS remained between the regulatory band [357.2-357.75].

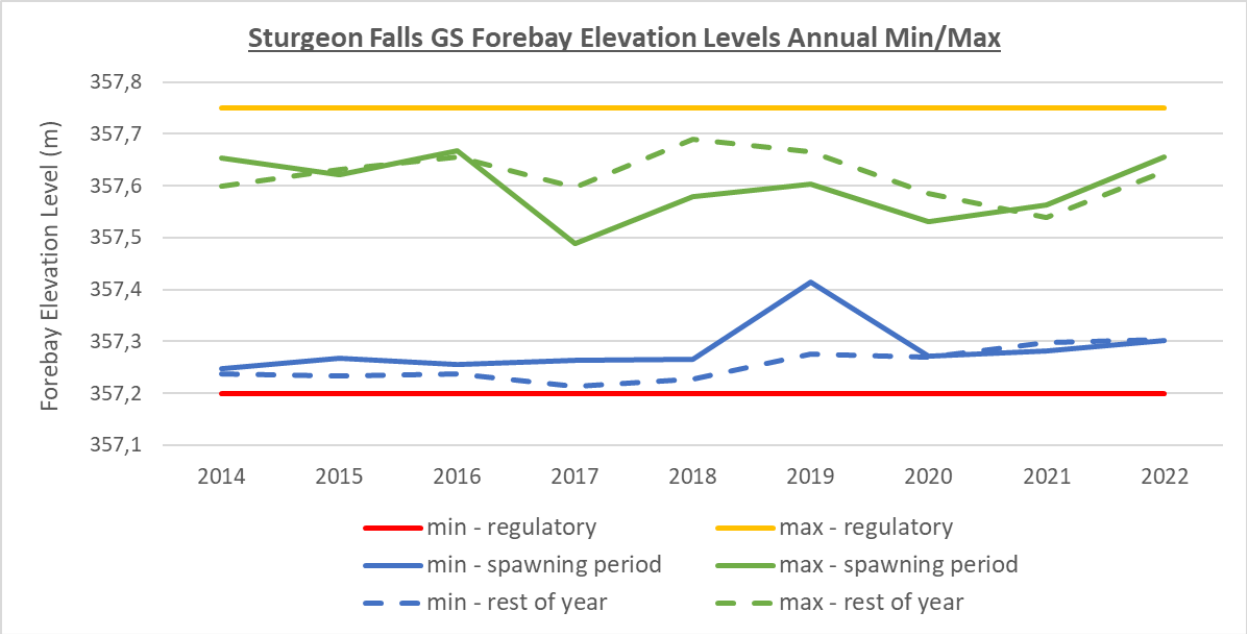

Figure 12. Sturgeon Falls GS Forebay Elevation Level Yearly Minimum and Maximum for the spawning and larva drift period (April 15 to July 15) and for the rest of the year (July 16 to April 14) compared to the SRWMP requirements for 2016 until 2022.

FirstLight is committed to: (i) operating in accordance with the SRWMP, and (ii) scheduled monitoring to assess Lake Sturgeon recruitment due to spawning downstream of the SFGS when the station is operated as per conditions described in the SRWMP. Recruitment monitoring is scheduled at three-year intervals using a consistent methodology. Monitoring under the first Lake Sturgeon MEMP (2014-2018) was conducted in 2016, while monitoring under the second Plan (2019-2023) occurred in 2019 and was next scheduled for 2022. However, in light of two consecutive years of weak recruitment or possible year-class failures, monitoring took place a year earlier, during fall 2021.

One of the key questions posed in the 5-year MEMP relates to linking recruitment with discharge of the SFGS or other environmental factors. The assessment of the Seine River flow and cohort strength indicates that some of the stronger cohorts are from years with higher discharge while some are from years with below average discharge. Specifically, cohorts from 2009, 2012, 2013, and 2014 were hatched in years when average flows were between the 71.8 and 92.8 percentile. Conversely, cohorts from 2015, 2016, and 2017 were hatched in years when average flows were between the 27.5 and 52.4 percentile. The weakest cohorts in the last 12 years were from 2010,

2011, 2018, 2019, 2020, 2021 that were hatched during years when average flows were between the 6.5 and 68.3 percentile. Results of correlation analyses suggest that recruitment (using both maximum and mean cohort estimates) was most positively correlated with flows during the post-spawning period. This result should be interpreted with caution (given that only 12 years were included in the analysis); the analysis will become more robust as additional years are added to the data set.

Based on data collected in 2015, 2016, 2019 and 2021, there has been no observed change in the growth of juvenile Lake Sturgeon (age 2 – 5) in the Seine River study area. Similar to other years, juvenile Lake Sturgeon captured in the Seine River showed highly variable growth patterns.

The Seine River recruitment monitoring data (since 2015), results from 2015 and 2016 suggested that Lake Sturgeon recruitment (due to spawning downstream of the Sturgeon Falls GS) occurred each year from 2006 to 2016, when the SFGS was operated as per conditions identified in the SRWMP. In contrast, results of the 2019 and 2021 monitoring studies suggest that recruitment has been either weak or absent over the past four consecutive years (2018 to 2021), also while the station is operated as per conditions prescribed in the SRWMP.

Although there has been little or no recruitment to the Rainy Lake population as a result of spawning downstream of the Sturgeon Falls GS from 2018 to 2021, concerns regarding the sustainability of the Lake Sturgeon population of the Seine River/Rainy Lake system and/or operation of SFGS (SRWMP) would be premature. It has been suggested that the life history of Lake Sturgeon (delayed maturation and long lifespan) makes them well-suited to withstand periodic year-class failures, and contemporary juvenile Lake Sturgeon research has demonstrated that recruitment can be highly variable or erratic in systems with healthy Lake Sturgeon populations. Interestingly, weak or absent year-classes have frequently been observed since 2016 in Winnipeg River populations (including the English River), such as the Pointe Du Bois Reservoir, Slave Falls Reservoir, the lower portion of the Seven Sisters Reservoir, the Great Falls Reservoir and the Pine Falls Reservoir. Although further study and data analyses are needed, it is possible that an unknown biological or environmental factor (or combinations of factors) may be influencing recruitment (e.g., temperature) in these proximal populations. Furthermore, successful Lake Sturgeon recruitment occurred in the Slave Falls, Great Falls and Pine Falls reservoirs in 2022 (Manitoba Hydro unpublished data), as well as the Pointe du Bois Reservoir in 2022 and 2023 (OPG unpublished data).

In summary, since the SRWMP was implemented at the SFGS in 2004, recruitment has occurred in at least 12 out of the 19 years it has operated in accordance with the plan. As such, there are no immediate plans to modify operations of the SFGS or the SRWMP at this time. Lake Sturgeon recruitment monitoring in the Seine River downstream of the SFGS is planned for fall 2024.

5/DATA AND INFORMATION COLLECTION PROGRAM

The Data and Information collection programs identified below are needed to better inform water management on the Seine River.

In some cases, MNRF has not fulfilled commitments identified in the approved WMP. Some commitments may be met based on future work planning. Over time, and since the approval of the WMP, ministry priorities, structure and approaches have shifted including those for WMPs. Where ministry priorities and approaches have changed, and data collection commitments were not met MNRF will consider amending the WMP to reflect these updates.

Data and Information Collection Program (DICP) requirements are outlined in Chapter 14 of the Seine River WMP. The purpose of the DICP is to gather data and information to respond to gaps identified in the preparation of the draft Seine River WMP to improve watershed management. Some of this data is captured in the Effectiveness Monitoring Program. This section of the Implementation Report offers a summary of DICP requirements and results, including priority rating and responses, in the following categories:

- 5.1-5.14: Water Data Required
- 5.15-5.25: Other Data Required
- 5.25-2.39: Information Required

5.1: Tailwater deflections, Lac des Milles Lacs Dam; Raft Lake Dam; Valerie Falls Dam; Calm Lake Dam; Sturgeon Falls Dam

Description: It is an immediate priority to measure tailwater deflections (0 - full gate) at control structures in the Seine River watershed.

Responsibility: MNRF is responsible for gathering data at Lac des Milles Lacs dam; FirstLight is responsible for gathering data at Raft Lake dam, Calm Lake dam and Sturgeon Falls dam; and VFLP is responsible for gathering data at Valerie Falls.

Status: Currently, VFLP has submitted tailwater deflection values as per Table 7, Section 12 of the Seine River WMP.

VFLP reviewed the relationship between flow and tailwater elevation using 2022 as a data set due to the extremes in flow experienced that year to find the full extent of tailwater elevation with high flows. Figure 13 shows an ongoing change throughout the year, which for the most part directly relates Flow and Tailwater Elevation to each other, other than a small portion surrounding day 265 of the year (late September) where elevation dipped slightly for a few days with increased flow. The cause of this is unknown but followed a prolonged period of minimum flows with a short-term increase in outflows.

In Figure 14 Flow and Tailwater Elevation are compared directly against each other finding there is a strong positive linear relationship between tailwater elevation and flow, which is a gradual increase without any peaks or hard changes in this relationship even during exceptionally high outflows.

Valerie Falls GS has not experienced downstream impacts from increased elevations or flows in the past due to the relatively short path between the tailwaters of Valerie Falls GS and Modred Lake (2.5km) with no buildings or structures on said path. Although these relationships have been quantified between tailwater elevation and outflows, neither factor is connected to downstream impacts. Due to this VFLP recommends this data gap be considered complete and removed.

FirstLight has not completed any tailwater deflection assessments at the Raft Lake dam. The WMP prescribed maximum ramp rate of 15m^3/s is likely mitigating extreme tailwater deflections. It is also not common practice to have a water level gauge below a control structure dam. Similarly, as mentioned below with Calm Lake GS and Sturgeon Falls GS, Valerie Falls GS regulation within the WMP is likely contributing to mitigating tailwater deflections at Raft Lake dam.

FirstLight has included graphs (figure 15 and 16) of tailwater deflection based on observed historical data from between 2008-2022 for both Calm Lake GS and Sturgeon Falls GS. Calm Lake tailwater does not increase as much as Sturgeon Falls tailwater in similar outflow conditions. This difference is likely due to the fact that the Calm Lake tailwater is essentially the Sturgeon Falls headwater which is required to be maintained within the WMP minimum and maximum of 357.20m and 357.75m. This results in less tailwater deflection as Sturgeon Falls GS operation is affecting the tailwater at Calm Lake GS as well. Measurements with the dams fully open have not been completed as it is not practical to complete this work outside of extremely high inflow conditions as well as the WMP regulating outflows from Raft Lake dam. When these inflow conditions occur, the data will be acquired as the dam approaches full open.

Tailwater deflection is more linear at Sturgeon Falls and increases along with outflows.

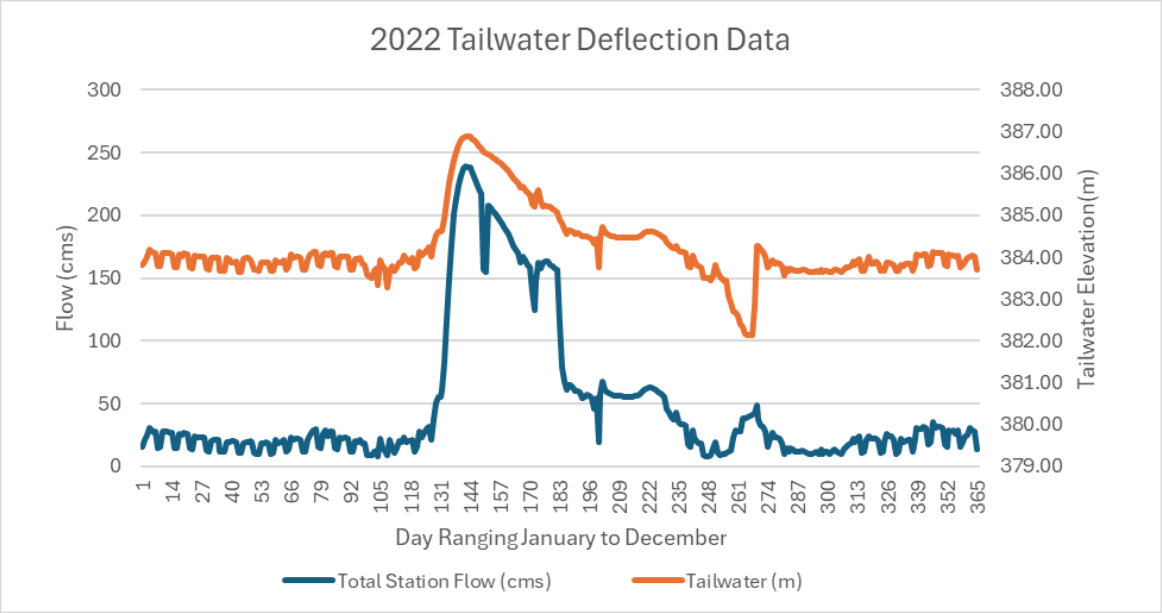

Figure 13: Tailwater Elevation and Flow through out the year of 2022 with days ranging from January to December of 2022.

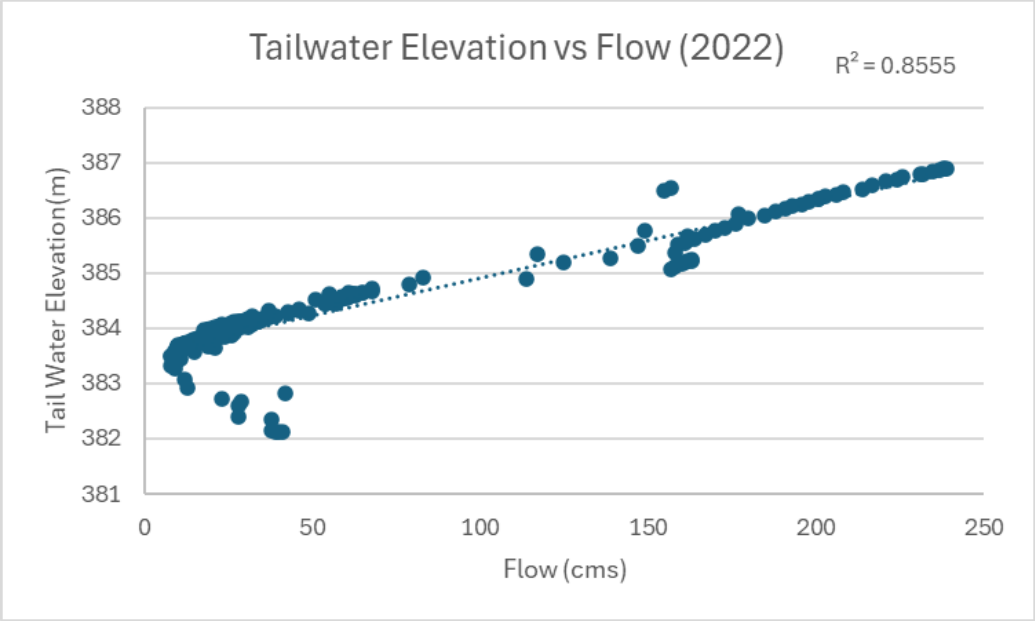

Figure 14: Tailwater and Flow compared against each other with a linear trendline gradually increasing tailwater elevation with increased flow.

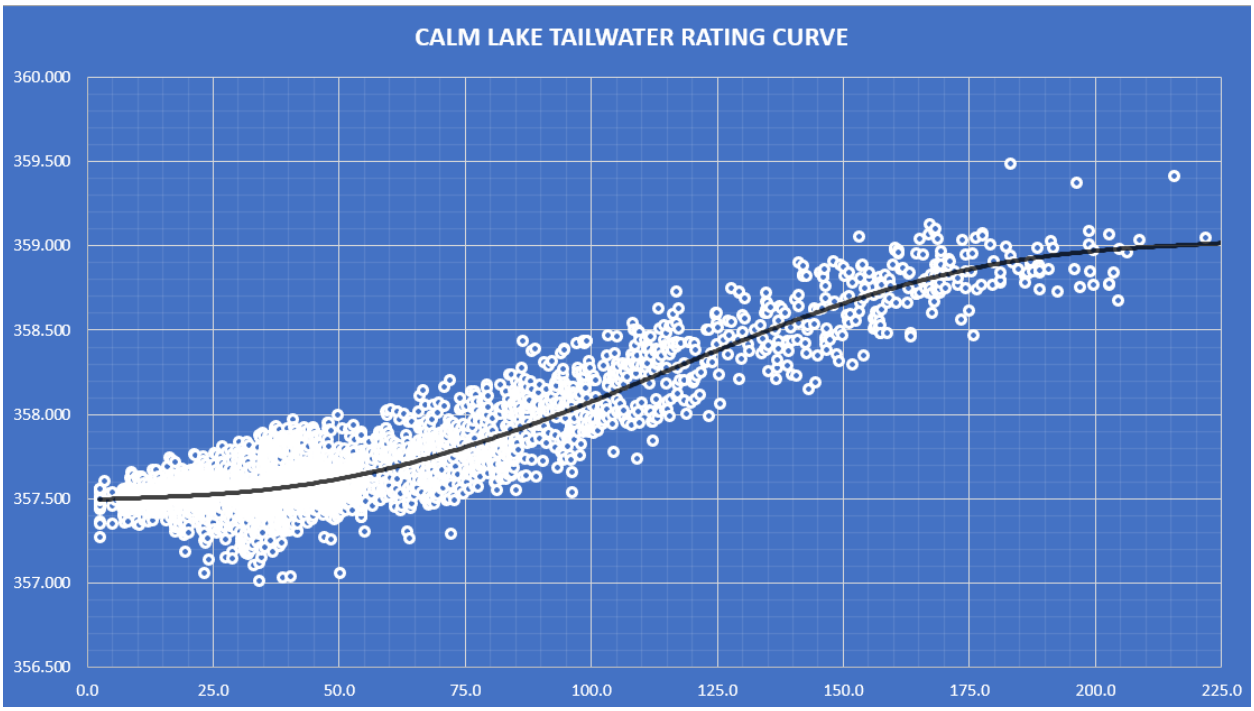

Figure 15: Calm Lake GS tailwater and flow compared against each other with a line of best fit.

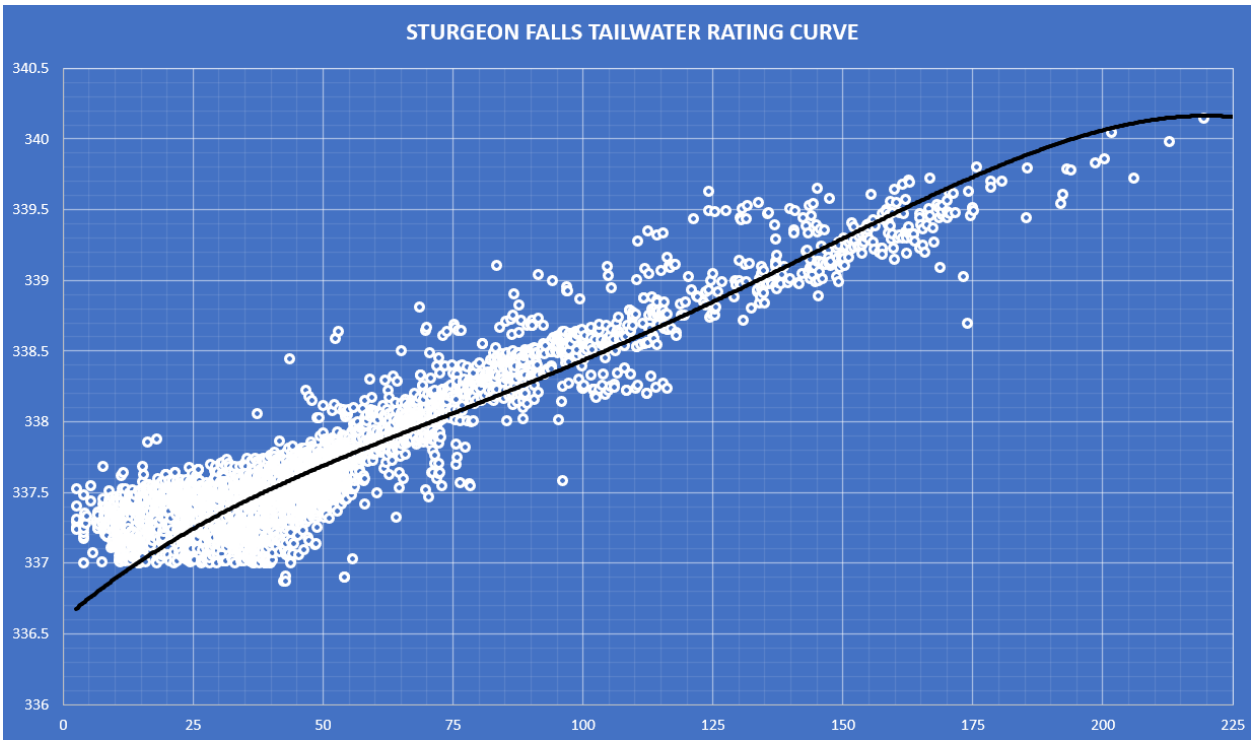

Figure 16: Sturgeon Falls GS tailwater and flow compared against each other with a line of best fit.

MNRF Contribution: The MNRF was unable to locate any records of tailwater deflection values collected for the LDML dam as part of the SRWMP data requirements. It is unclear if this objective was met. It is recommended to revaluate the rationale or need for this data requirement.

5.2: Assess stoplog seepage and if to be used to meet minimum flows, quantify: Lac des Milles Dam; Raft Lake Dam; Valerie Falls Dam; Calm Lake Dam; Sturgeon Falls Dam

Description: It is an immediate priority to measure and assess stoplog seepage, vis-a-vis minimum flow requirements under the Seine River WMP.

Responsibility: MNRF is responsible for gathering data at Lac des Milles Lacs dam; FirstLight is responsible for gathering data at Raft Lake dam, Calm Lake dam and Sturgeon Falls dam; and VFLP is responsible for gathering data at Valerie Falls (see Appendix 8).

Status: Valerie Falls dam does not contain a stoplog discharge structure. VFLP recommends the removal of this commitment to assess stoplog seepage for Valerie Falls Generation Station. FirstLight does not rely on stop log seepage in order to maintain minimum outflows from the Raft Lake dam. Outflows are maintained above minimum using the log sluices. There may be some value to assess stop log seepage at Raft Lake dam to determine if the log sluice outflow could be reduced further including the measured seepage values to reach minimum outflows in extreme drought conditions. FirstLight recommends the removal of this commitment to assess stoplog seepage for Raft Lake dam.

Calm Lake GS and Sturgeon Falls GS stoplog seepage has not been measured so this data gap still exists. Through operations of the sites, FirstLight estimates stoplog seepage values to be 2.5m^3/s at Calm Lake GS and 4m^3/s at Sturgeon Falls GS. FirstLight would need to enhance their monitoring responsibilities to further validate that minimum outflow requirements are being met. FirstLight recommends that this data requirement remains within the plan for Calm Lake GS and Sturgeon Falls GS.

MNRF Contribution: It was determined that seepage is not the appropriate mechanism to establish minimum flows at the Lac Des Mille Lac Dam and it is recommended that this data requirement be removed from the plan.

5.3: Water levels required to make access points usable (Upper Marmion)

Description: Assess minimum water levels required to retain access points on Upper Marmion for recreational values.

Responsibility: VFLP and FirstLight are jointly responsible for measuring and assessing data.

Status: VFLP installed a navigation sluice in the West Arm dam in 1997 to enhance water storage and navigation opportunities. This resulted in a new minimum winter water level at 414.8 m. This value has been established as the minimum value to ensure usable access points between Upper Marmion and Lower Marmion lakes, and is reflected in current operational plans.

5.4: Determine relationship between Lac des Milles Lacs outflows, Firesteel River flows and flooding of access roads to Seine River Reserve 22A2

Description: Gather data to determine how outflows from the Lac des Milles Lacs dam and the natural flow of the Firesteel River influence flooding on Seine River access roads, including Sapawe Road. *See EMP 13.1b and DICP 14.2.33 for additional information*.

Responsibility: MNRF is responsible for assessing this data in relation to desired outcomes.

Status: MNRF has not provided the dam operator with a comments log related to Sapawe Road flooding. Water levels and flow rates, as well as high water notices, are updated regularly on the Seine River WMP website.

MNRF Contribution: MNRF was unable to locate any records of work completed to determine the relationship between Lac des Milles Lacs Outflows and Firesteel River Flows. However, the existing access road to Reserve 22A2 would likely not be affected by the outflows of LDML as there are a series of rapids, etc. on the Firesteel upstream from the confluence with the Seine. Backwatering shouldn't be substantial enough to increase the Firesteel River elevation at the location of the bridge crossing. The current access route traverses a floodplain on the south side of the Firesteel crossing.

In addition, recent 100 year flooding did not restrict access therefore it is not anticipated that this will be a concern. Therefore, it is recommended this data gap be considered completed.

There is currently no tracking mechanism or formal information sharing for Sapawe Road flooding. For this reason, MNRF has not provided the dam operator with a comments log related to Sapawe Road flooding. Section 4.1.3 contains more information related to Sapawe Road flooding. At this time, information on road conditions are relayed to dam operators in a transitory manner and if flooding conditions cause a threat to public safety, MNRF can take action to notify the public of flood conditions through the Flood Forecasting and Warning system and works with dam operators to ensure consistent messaging. Additional actions such as through road closures can be taken as appropriate.

5.5: Watershed capacities: Long-term flow average

Description: Long-term data collection will establish baselines and track changes in the average flows of the Seine River watershed.

Responsibility: Dam operators (VFLP and FirstLight) are responsible for tracking water level and flow values for the Seine River watershed on an ongoing basis.

Status: Dam operators supply water level and flow data to the MNRF on an on-going basis for analysis.

Below in Figure 17 and 18 an analysis was done by VFLP to understand if there was a change over time in average flow in the system. No correlation to a change over time was found and therefore VFLP does not recommend any revisions to water management in the Seine River water system at this time. Although this data does indicate a large amount of variability in system between wet and dry years.

VFLP will continue to monitor long-term flows and make recommendations if a trend becomes apparent requiring a change to water management.

FirstLight data at Raft Lake, Calm Lake GS, and Sturgeon Falls GS suggests a slight decline in overall outflows between 2005 and 2022, but this timeframe may be too short to determine any long-term trend changes along the Seine River. 2020 and 2021 being back-to-back low flow years have had some influence on this data set. Daily data can be reviewed in graphical form in appendix 10.

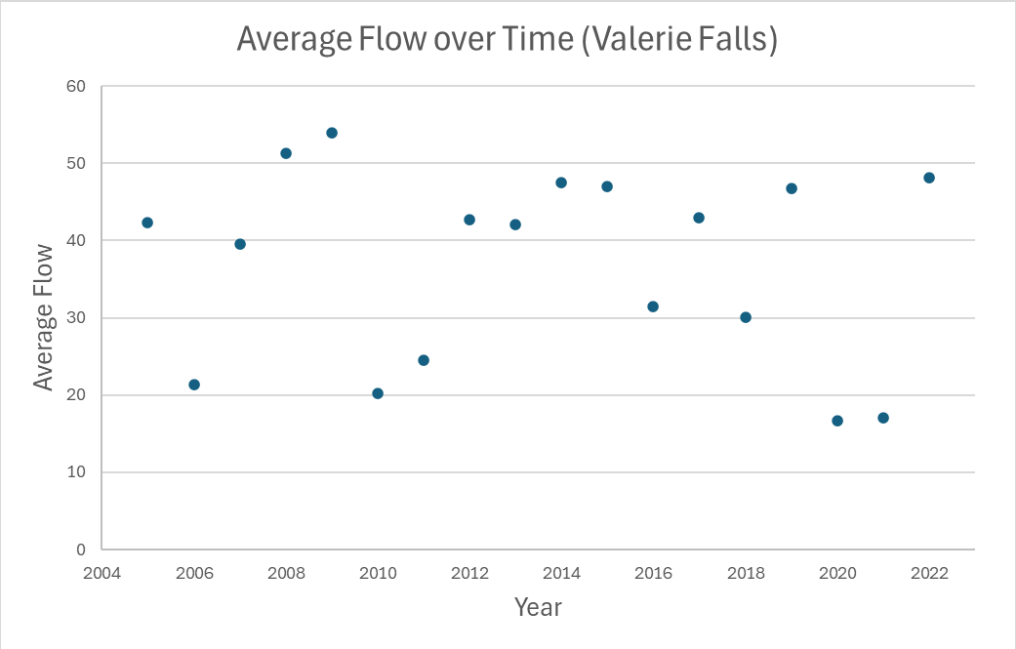

Figure 17: Average flow over time for Valarie Falls from 2005 to 2022. No correlation to a change over time was found.

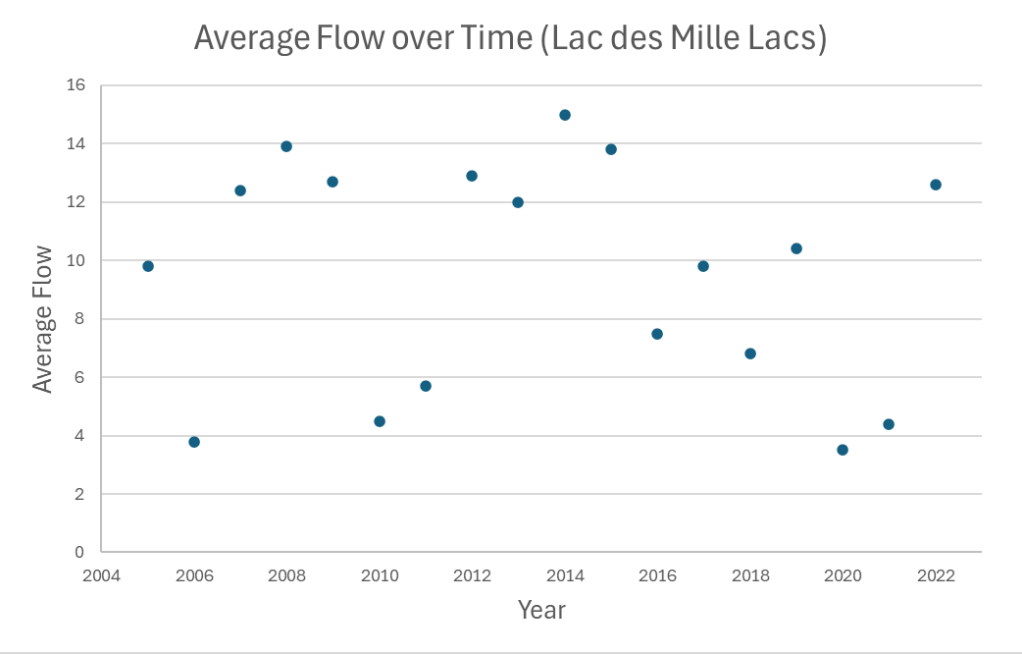

Figure 18: Average flow over time for Lac des Mille Lacs from 2005 to 2022. No correlation to a change over time was found.

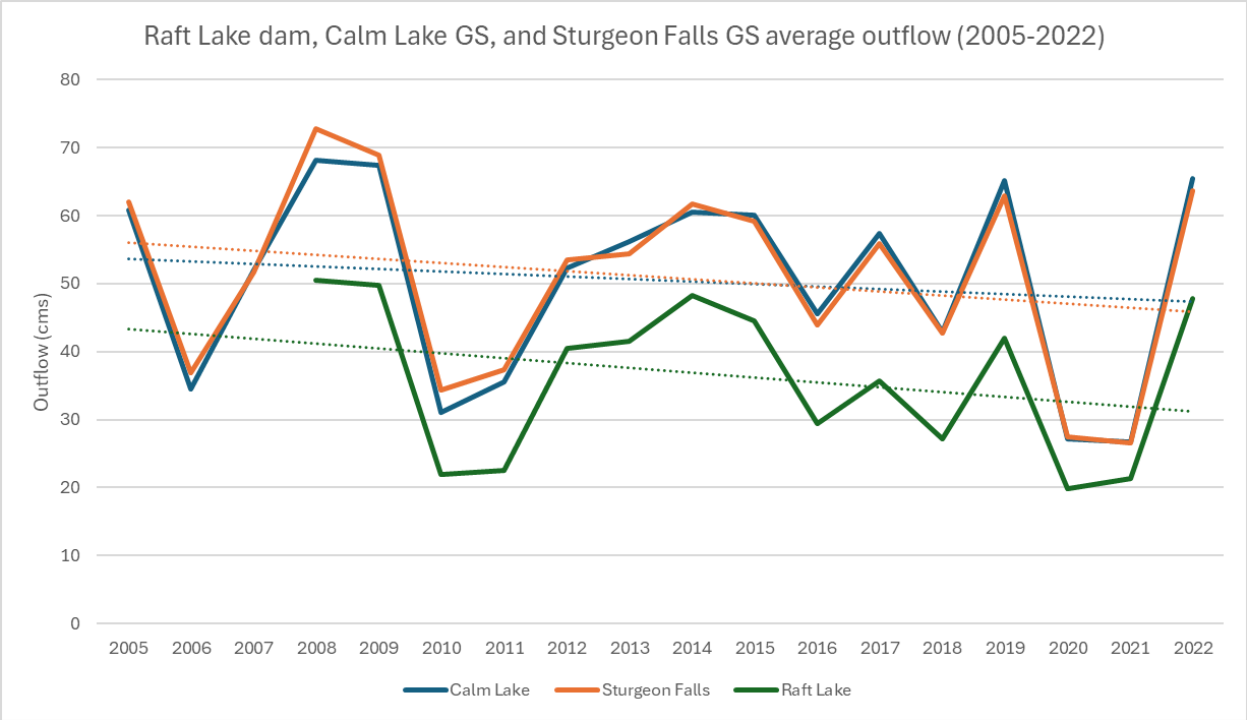

Figure 19: Average outflow over time at Raft Lake dam, Calm Lake GS and Sturgeon Falls GS.

5.6: Storage capacity of the watershed

Description: Long-term data collection will establish baselines and track changes in reservoirs on the Seine River watershed.

Responsibility: VFLP and FirstLight are responsible for managing reservoir storage volume to balance water levels and flows to optimize renewable energy production at all generating stations within the parameters of the Seine River WMP.

Status: Long-term monitoring has observed the following patterns:

- Raft Lake: when the reservoir level is less than or equal to 414.8 m, elevation has been determined to change 1 cm in 24 hours with the difference between inflow and outflow is 6.598 cms. When the reservoir level is greater than 414.8 m, elevation has been determined to change 1 cm in 24 hours with the difference between inflow and outflow is 11.35 cms. Storage tables for Raft Lake are provided in Appendix 9.
- Calm Lake: the elevation will change 1 cm in 24 hours with the difference between inflow and outflow at 2.936 cms.
- Sturgeon Lake: elevation will change 1 cm in 24 hours with the difference between inflow and outflow at 0.585 cms.

5.7-5.9: Netting Data, Perch Lake; Upper Marmion Lake; Lac des Milles Lacs

Description: Netting data for Perch and Upper Marmion lakes were immediate priority items prior to the completion of the Seine River WMP. Long-term monitoring of Lac des Milles Lacs is an ongoing priority throughout operations.

Responsibility: VFLP was responsible for supplying netting data for Perch and Upper Marmion lakes to the Atikokan MNRF; MNRF Thunder Bay is responsible for gathering and supplying netting data for Lac des Milles Lacs to the Atikokan MNRF.

Status: VFLP submitted its netting data for Perch and Upper Marmion lakes in 2002. MNRF Thunder Bay continues to gather netting data for Lac des Milles Lacs as part of long-term data collection.

MNRF Contribution: FWIN surveys were completed in 2005, 2008, 2011 and 2016 and 3 cycles of Broad Scale Monitoring have been completed. Survey summaries have been shared with Atikokan office. For more information on these survey results, see section 4.4.5. (Lac De Milles Lacs) and section 4.4.2 (Perch Lake). MNRF recommends removing this commitment from the SRWMP. This objective is considered to be complete.

5.10: Requests to increase power production during plan period

Description: Any requests to adapt the operating bands of the Seine River WMP to increase power production must be documented.

Responsibility: Requests are made to the MNRF and Seine River Standing Advisory Committee (SAC) by dam operators.

Status: VFLP identified an opportunity to increase the operating storage at Lower Marmion Reservoir. The proposal was made to the MNRF and the SAC and opposition from one stakeholder has been identified to date. FirstLight did not make any requests to increase power production through the means of increasing head, increasing storage capacity in reservoirs, or increasing range of reservoirs. Overall, FirstLight has been satisfied with the operating bands outlined in the WMP.

5.11-12: Schedule for maintenance work on water control dams for the period of the WMP, Industry and MNRF

Description: Maintenance work on infrastructure must be properly documented by dam operators and the MNRF, according to facilities.

Responsibility: VFLP and FirstLight must regularly maintain all water power assets and infrastructure, including stoplog lifters, generators, balance of plant systems,

electrical switches, breakers, transformers, etc., as well as inspecting dams. MNRF has similar requirements for its water control infrastructure.

Status: Both dam operators fulfilled and documented their maintenance and inspection requirements. H2O dams were all subject to periodic inspection under FirstLight's Dam Safety Management Plan, which is overseen by the Engineering Department. Between 2004 and 2022, FirstLight did not pursue any work that required approvals under section 16 of the *Ontario Lands and Rivers Improvement Act*. VFLP inspects and maintains the dam, powerhouse, and other water conveyance and control structures regularly in accordance with its robust Dam Safety Program and industry-leading best practices. VFLP had no exceptional maintenance needs during the reporting period.

MNRF Contribution: MNRF owned water control dams along the Seine River Diversion are currently monitored on a regular basis (daily – monthly, depending on flows and season) and maintenance work is completed as required. Monitoring and maintenance of MNRF owned structures on the Seine River Diverson is coordinated through MNRFs Steep Rock Rehabilitation Project Team. The Steep Rock Team has identified a need to formalize monitoring and maintenance schedules by developing Operations Maintenance and Surveillance (OMS) plans for all major structures, with the aim to complete this work by 2025.
It is recommended that monitoring and maintenance schedules for MNRF water control structures be formalized through the development of OMS plans for all major MNRF-owned structures on the Seine River Diversion.

This data gap commitment is considered to be ongoing.

5.13: Company proposals for upgrades and repairs to waterpower generating dams that will fall within the period of this WMP

Description: Any requests to upgrade and repair waterpower generating dams must be documented.

Responsibility: Requests are made to the MNRF and Seine River Standing Advisory Committee (SAC) by dam operators.

Status: VFLP made no proposals for upgrades or repairs to its generating facilities during the reporting period. Between 2015 and 2017, FirstLight refurbished one generator at Calm Lake Generating Station and both generators at Sturgeon Falls Generating Station. Turbine runners at each facility were also replaced. Notices were submitted to MNRF, approval was granted and it was concluded that no further approvals were required.

5.14: Review video footage taken to assess the degree and location of stumping and erosion on the Seine River

Description: Video taken in 2001 will be used to determine and assess stumping and erosion prior to the enactment of the Seine River WMP.

Responsibility: MNRF-Atikokan is responsible for immediately reviewing and assessing this data.

MNRF Contribution: Video footage does not appear to have been reviewed and assessed prior to the 2004 adoption of the Seine River WMP. The intent of the video was to serve as a baseline of river conditions should future changes need to be assessed (i.e. erosion and slumping). However, impacts from recent flooding events will make it difficult to tie erosion to dam operations. This data gap is considered to be incomplete for the reason that this assessment was not completed and it is recommended that this data gap be removed from the WMP.

5.15: Habitat survey for Red-disked Alpine and Macoun's Arctic butterflies

Description: Perform a long-term survey of potential habitat for endangered butterflies (Red-disked Alpine and Macoun's Arctic) in the Seine River watershed.

Responsibility: MNRF-Atikokan is responsible for developing and performing long-term habitat studies.

Status: Section 4.3 of the water management plan speaks to the biota that can be found within the Seine River system and acknowledges that there are likely numerous invertebrates that are not accounted for. To date, no action has been taken by MNRF to fulfill the data requirement to "Survey suitable habitat for endangered species of butterflies (Red-disked Alpine and Macoun's Arctic)" within the SRWMP.

MNRF recommends updating the SRWMP to clarify that MECP is responsible for species at risk.

5.16: Examine Baril Bay portage to Baril Lake

Description: Determine if a watercourse exists along the Baril Bay portage to Baril Lake during periods of high water.

Responsibility: MNRF-Thunder Bay is responsible for long-term monitoring and data collection as water levels change from year to year.

MNRF Contribution: In 2004 plan proponents carried out an elevation survey at the Baril Lake LDML portage to determine whether a channel exists between the lake and LDML through which water might flow during high water events. The report indicated there was no obvious channel, however further research of the historic water levels of

LDML would be required to determine if there was a historic connection (Boileau and Perry 2004). This data requirement is considered to be complete and it is recommended this requirement be removed from the plan. Note that public feedback opportunities still exist though the plan website.

5.17: Effects of flooding on transformers

Description: Consider Hydro One information on how flooding impacts transformers.

Responsibility: VFLP is responsible for immediately applying this data in the Seine River watershed.

Status: Completed. Reservoir levels and flows, as well as high-water notices, are updated regularly on the Seine River WMP website. VFLP considers this data gap as being complete and recommends its removal.

5.18-20: Long-term ecosystem studies, waterfowl; ecosystem health; wetland health

Description: Long-term data collection to assess waterfowl nesting patterns on the reservoirs of the Seine River; the impacts of winter drawdown on overall ecosystem function; and how managed water levels impact wetlands.

Responsibility: MNRF-Atikokan and MNRF Science branch are responsible for long-term monitoring and data collection.

MNRF Contribution: This work was not completed. Baseline data from unmanaged areas would be helpful to make a meaningful comparison to reservoirs along the Seine River

MNRF recommends re-evaluating the data gap to better scope the questions and identify specific research/monitoring goals.

5.21: Public education and safety

Description: Developing educational material on waterpower generation, winter drawdown and ice safety is an immediate priority in the Seine River WMP.

Responsibility: VFLP and FirstLight are responsible for communicating general information and safety material to the public.

Status: VFLP has implemented a number of public safety media to communicate water levels and reservoir information over the duration of the WMP, including radio announcements, newspaper advertisements, trade shows, open houses and regular updates to the Seine River WMP website. A new Seine River WMP website is currently being developed.

FirstLight has not developed any educational material on waterpower generation, winter drawdown and ice safety, however the SRWLTC annual meeting has been an effective forum to communicate and educate the members of the committee. Additionally, FirstLight published public notices on their website during high levels and flows to caution the public from recreational activities. Furthermore, FirstLight has established a Public Safety Around Dams program, which follows Canadian Dam Association guidelines and best practices while ensuring that Ontario *Lakes and Rivers Improvement Act* requirements are met. Signage and buoys have been installed at both Calm Lake and Sturgeon Falls GS with future plans to install signage at Raft Lake dam.

5.22: Literature review on impacts of flow rate on walleye spawning

Description: Long-term data collection to assess the impact of changing flow rates on walleye spawning in the Seine River watershed.

Responsibility: MNRF Science branch is responsible for long-term monitoring and data collection.

MNRF Contribution: No action was undertaken to fufill this data gap and therefore this data gap is considered to be incomplete. It is recommended that this commitment be removed from the water management plan.

5.23: Literature/Information on Power Industry Demand Changes – New Open Market

Description: Dam operators must make the public aware of industry-related changes.

Responsibility: VFLP and FirstLight work with the Independent Electricity System Operators (IESO) to communicate current practices and changes.

Status: The IESO publishes regular updates on power generation, transmission, energy demand (history and forecasts) for Ontario. Updates and changes are publicly available on the IESO website (ieso.ca). Furthermore, the IESO has pursued a Market Renewal program to introduce fundamental reforms to the province's electricity markets to improve how electricity is supplied, scheduled, and priced to meet Ontario's future needs at the lowest cost. Details regarding Market Renewal can be found on the IESO's website. Due to IESO providing regular updates this data gap should be considered complete and be removed from the WMP.

5.24: Floating docks

Description: Information for waterfront property owners on how to install and maintain floating docks in the Seine River watershed.

Responsibility: MNRF-Atikokan.

MNRF Contribution: MNRF has not produced a pamphlet for property owners and continues to address requests for information from its local offices. For this reason, the commitment to fufil this data gap is considered to be incomplete. However, it is recommended that this data gap be considered addressed and removed from the WMP as there is ample information on floating docks available that was not as widely available when the plan was first implemented. Floating docks are advantageous as they are adaptable to fluctuating water levels, Modern day work permit requirements (Crown land work permits | ontario.ca) and Ontario Regulation 161/17 defines when work permits and occupational authority is required for floating structures. Other agency approvals may be required. It is advised that cottagers follow manufacturer directions when constructing floating docks.

With Permission from DFO, the dock primer could be posted on the SRWMP website along with the shoreline primer.

5.25: Flow gauging station - Firesteel River

Description: Investigate the possibility of installing a flow gauge on the Firesteel River at the confluence of the Seine River, below the Lac des Milles Lacs dam. *See Section 13 of the Water Management Plan, Effectiveness Monitoring for Issue Category: 1.Flood sub objective 1b) Minimizing flooding on Upper River and Section 14.2 Water Data Requirements Line 12 Determine relationship between Lac des Mille Lacs outflows, Firesteel R. flows and flooding of access roads to Seine River reserve 22A2 for additional information*.

Responsibility: MNRF-Atikokan with support from VFLP.

Status: VFLP completed a site reconnaissance study for the upper Seine River, upstream of Raft Lake to Lac des Milles Lacs in 2009 and forwarded its results to MNRF. Permission was not granted for gauge installation from property owners. After discussions with MNRF, it was determined there were no suitable locations for a flow gauge station at that time.

MNRF Contribution: For more information, please see section 4.1.3

5.26: Flow gauging station below Wagita Dam

Description: Investigate the possibility of installing a flow gauge (V-notch gauge or staff gauge) below the Wagita Dam.

Responsibility: MNRF-Atikokan.

MNRF Contribution: A V-notch weir was installed by VFLP in March 2004. This data gap has been addressed and MNRF recommends removing it from the WMP. Please refer to discussion in section 4.4.4 for more information.

5.27: Establishing future turbine and spillway charts

Description: Dam operators will test data and collect information to develop turbine and spillway charts to be used in the Seine River system.

Responsibility: VFLP and FirstLight are responsible for gathering long-term data to contribute to establish accurate flow charts.

Status: A universal intake current-meter system test was completed by a third party engineering firm to validate the turbine flow for each unit as part of a refurbishment and turbine replacement project at H2O's Calm Lake and Sturgeon Falls Generation Stations. No new turbine or spillway structures have been implemented by VFLP during the report period. The company regularly reviews existing turbine and spillway charts for accuracy and precision.

5.28: Water level measurement publication

Description: Develop and employ a system of reliably measuring water levels and sharing this data with the public.

Responsibility: Dam operators (VFLP and FirstLight) work with the MNRF in data collection and distribution.

Status: To facilitate effective communication, the plan proponents developed a website that posts water levels and flow rates, as well as high water notices. It also displays graphs of actual and historical reservoir water levels and flows, history of the watershed, and descriptions of the dams. The website also has a contact page that can be used to send comments, questions or suggestions to FirstLight, VFLP, and/or the MNRF.

5.29: Install a water level gauge at Finlayson Lake

Description: Employ technology to measure and track water levels at Finlayson Lake.

Responsibility: Dam operators (VFLP and FirstLight) work with the MNRF in determining a proper location and installing a gauge.

Status: A water level gauge was never installed as permission was not granted. With the cooperation of Finlayson Lake Lodge prior to the start of the reporting period, the Lodge owners agreed to self-monitor the gauge for significant changes after the implementation of the WMP. No additional actions on this matter have been requested.

MNRF Contribution: MNRF has taken no action on this data gap. MNRF recommends dam operators further investigate the benefits and feasibility of having a gauge on Finlayson Lake so that a recommendation on whether this data gap needs to be filled can be made in the next implementation report.

5.30: Mining claims conversion to subdivisions

Description: Gather information of the development of mining claims into subdivisions.

Responsibility: MNR-Atikokan.

MNRF Contribution: This objective was not completed. This is considered to be out of scope of the water management plan as MNRF is not the approving authority for development proposals, rather only a commenting agency. It is recommended that this data gap be removed. It is advised that applicants are directed to MMAH to understand this process.

5.31: Ensure water level and flow rate information for the Seine River is available on a Water Management Plan website

Description: Develop and maintain a website to share accurate reservoir and flow rate information on the Seine River with the public.

Responsibility: Dam operators (VFLP and FirstLight) are responsible for developing and maintaining a website.

Status: FirstLight and VFLP launched seineriverwmp.com on February 14, 2005. The website is in the process of being redeveloped. H2O Power's corporate website also includes water level and flow details for the Seine River.

6/CONCLUSION

The Seine River watershed is unique in that it supports two private renewable energy operators at multiple sites with an array of supporting infrastructure in supplying waterpower to the Ontario electrical grid, with regulatory oversight provided by the Ontario Ministry of Natural Resources and Forestry. From this Implementation Report, it is evident that industry and government are cooperating to achieve desirable outcomes. Objectives and safeguards within the Seine River Water Management Plan ensure that economic benefits are maintained within strict ecological and social parameters, which have been informed by science and public input. At the same time, dam operators are effectively communicating watershed data to the public and responding to stakeholder interests. As a result, the WMP is effectively meeting overall objectives of sustainability in meeting environmental, social and economic targets.

Overall, this IR supports dam operators' conclusions that waterpower generation is not having negative or unintended impacts on the Seine River watershed. A comprehensive overview of facility operations and components of the WMP, including the Effectiveness Monitoring Plan and Data and Information Collection Program, are achieving established targets.

Granted, this inaugural IR covers an extended, 18-year time period. Moving forward, future IRs will cover ensuing five-year periods, enabling even better management of operations and integration of values.

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Appendices

Appendix 1: 2006 Amendment 1 Approval Seine River WMP

Amendment Approval
Seine River Water Management Plan
October 14, 2004 to October 13, 2014

Amendment #: 1

Amendment Type: Minor

Amendment Requested by: Abitibi-Consolidated Company of Canada

Amendment Effective Date: April 20, 2006

Amendment Details: The maximum level of Raft Lake during the period May 17th to June 15th should be 415.5m. In the period June 16th to July 15th, the maximum level would transition at a graduated rate to 415.33m.

Amendment Rationalization: This amendment will allow the Raft/Marmion Reservoir to meet the Water Management Plan objective of "constant and/or rising level" for the spawning period, April 15th to June 15th, by delaying the start of the reservoir decline from May 17th to June 15th. During the years with early high water flows this will minimize the requirements to unnecessarily spill extra water to start Raft's decline on May 17th; this saved water could then be utilized for power production later in the summer, thus helping meet the waterpower generation objective.

Amendment Consultation (15 day opportunity to review and comment)
MNR – Atikokan Area, Fort Frances
SRWMP – Steering Committee Members
First Nations: Seine River
Lac des mille Lacs
Seine River Water Level Committee
Lac des mille Lacs Advisory Committee
Atikokan Resource Management Advisory Committee
Community members in receipt of the Atikokan Progress and Fort Frances Times newspapers
220 Individuals with interests in/or around the river sections affected by the amendment

Comments/Concerns received: NONE

Amendment Approval recommended by:

W. R. Darby, MNR Fort Frances District Manager — April 19, 2006 Date

Amendment Approved by:

Charles Laurer, MNR Regional Director, NW Region — April 19, 2006 Date

Appendix 2: 2006 Amendment 2 Approval Seine River WMP

Amendment Approval
Seine River Water Management Plan
October 14, 2004 to October 13, 2014

Amendment #: 2

Amendment Type: Minor

Amendment Requested by: Abitibi-Consolidated Company of Canada

Amendment Effective Date: April 20, 2006

Amendment Details: The maximum level of Raft Lake during the period April 20th to May 15th should transition at a graduated rate from 414.48m on April 20th to 415.04m on April 30th to 415.5m on May 7th through to May 15th.

Amendment Rationalization: This amendment will help ensure meeting WMP navigational/recreation and aquatic/ecosystem objectives on a more consistent basis, without impacting the flood mitigation objective of having Raft's level below 413.7m by April 1st. Capturing even a portion of early freshets into storage, between April 20th and May 15th, by minimizing the requirement to spill water at this very early stage will improve reservoir recovery, especially during years where the freshet occurs early, and then stalls, or is followed by dry conditions. During dry years this "captured" water will help sustain minimum spawning flows with less impact to reservoir levels.

Amendment Consultation (15 day opportunity to review and comment)
MNR – Atikokan Area, Fort Frances
SRWMP – Steering Committee Members
First Nations: Seine River
Lac des mille Lacs
Seine River Water Level Committee
Lac des mille Lacs Advisory Committee
Atikokan Resource Management Advisory Committee
Community members in receipt of the Atikokan Progress and Fort Frances Times newspapers
220 Individuals with interests in/or around the river sections affected by the amendment

Comments/Concerns received: NONE

Amendment Approval recommended by:

W. R. Darby, MNR Fort Frances District Manager — April 19, 2006 Date

Amendment Approved by:

Charles Laurer, MNR Regional Director, NW Region — April 19, 2006 Date

Appendix 3: 2016 Amendment 3 Approval Seine River WMP

Amendment Approval
Seine River Water Management Plan (WMP)

Date:	October 3, 2016
Title:	Seine River Water Management Plan Scoping Review
Amendment Type:	Administrative
Amendment Number:	3
Request By:	MNRF

Overall Amendment Rationalization:

The Seine River Water Management Plan (SRWMP) expires on October 13, 2016. Scoped review of the SRWMP to identify and address areas where Plan performance could be improved was undertaken in 2015 and completed in early 2016. Representatives of MNRF, hydropower operators, Lac de Mille Lacs First Nation and Seine River First Nation participated in a number of meetings over the course of the exercise to discuss the Plan and what improvements could be made within the existing objectives of the SRWMP. While no changes were made with respect to Plan objectives, a number of administrative changes were proposed to update the Plan and to address minor issues of Plan performance. Results of the scoped review and the proposed amendments were presented to the Standing Advisory Committee on May 3rd, 2016. No serious concerns regarding the results of the scoped review were raised.

Title:	Seine River Water Management Plan Term Extension
Amendment #:	3-1
Amendment Type:	Administrative
Request By:	MNRF

Amendment Details:

The amendment will remove the expiry date from the Seine River Management Plan (SRWMP) to align with Lakes and Rivers Improvement Act Policy (Technical Bulletin, Maintaining Water Management).

Amendment Rationalization:

The Seine River Water Management Plan expires on October 13, 2016. Policy released under the auspices of the Lakes and Rivers Improvement Act on October 7, 2016 requires removal of expiry dates from all WMP's.

Amendment Consultation Summary:

Consultation is not required for administrative amendments.

Comments/Concerns received:

No concerns were raised.

Contact:
Tim Cano
A/Renewable Energy Coordinator
Northwest Region
807-475-1242

Date: October 3, 2016
Title: Effectiveness Monitoring Update
Amendment #: 3-2
Amendment Type: Administrative
Request By: MNRF

Amendment Details:

The amendment will update the status of monitoring projects described in Section 13 (Effectiveness Monitoring) of the SRWMP, notably results of index netting efforts on a number of lakes within the system, assessment of furbearer populations within the system, water depth monitoring and wetland assessment.

Amendment Rationalization:

The Seine River Water Management Plan was completed in 2004 and a number of monitoring commitments were made by its authors. While much of this work has been completed, it is not currently captured in the SRWMP for reference in future discussions of adaptive management actions. A request by one of the operators on the system was made during a scoped review of the Plan to update this information.

Amendment Consultation Summary:

Consultation is not required for administrative amendments. A scoped review of the SRWMP was completed in 2016 by Regional Operations Division (Northwest Region). The SAC was provided with an overview of monitoring results and analysis at a meeting on May 3, 2016 in Atikokan.

Comments/Concerns received:

No concerns were raised.

Contact:
Tim Cano
A/Renewable Energy Coordinator
Northwest Region
807-475-1242

Replacement Text

Chapter 10, p. 176, Paragraph 4 (change identified in *italics*)

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

Appendix 9

Table to be updated as appears next page

2004

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	*Project Status (2016)*
Bathymetry of Lower Marmion Lake and Upper Floodwaters	Use computer and GPS to collect bathymetry data for Marmion Lakes (may take longer than 1 season)	Staff, boats, computer, GPS support $			*Lower Marmion - complete Upper Floodwaters - partially complete*
Assessment of water flow from Wagita Dam	Install v-notch weir below dam to assess flow from dam		Weir materials and flow measurement		*Complete*
Steep Rock water quality assessment	Collect water				*Complete*
Firesteel River flow assessment	Installation of gauge at Firesteel River bridge on Hwy.17	Elevation data benchmark	Provide and install staff gauge at bridge site		*Elevation data benchmark not installed, required for gauge to function. Complete*
Perch Lake water level assessment	Installation of staff gauge on Perch Lake	Elevation data benchmark	Provide and install staff gauge at bridge site	Perch Lake cottagers' association will identify site and report data to Seine River website.	*Suitable site not identified, incomplete*
Website	Implement website for communication tool		Develop and implement website		*Complete, available at seineriverwmp.com*

2005

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	*Project Status (2016)*
Finlayson FWIN	Assessment of fish populations	Staff, boats, nets	$3000 for support, aging costs, gas etc.		*Complete, incorporated as trend lake in MNRF Broadscale Monitoring (BSM) Program*
Lac des Mille Lacs FWIN	Assessment of fish populations	Staff, boats, nets, support and report preparation			*Complete*
Beaver population assessment	Compare overwinter survival of beaver between Lower Marmion and Upper Floodwaters (methodology to be developed)	Methodology development and project support		Trapper to provide beaver harvest data. Possible partnership with Lakehead University	*Not completed*
Tourist industry survey related to water levels	Repeat modified 2003 phone survey to assess impacts of Plan on tourist industry	MNR to conduct survey (FOI implications)			*Complete*

2006

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	*Project Status (2016)*
Lower Marmion FWIN	Assessment of fish populations			OPG to complete project (contract)	*Complete, incorporated into MNRF Broadscale Monitoring Program*
Calm/Perch FWIN	Assessment of fish populations	Staff, boats, nets and report preparation	$2000 for support, aging costs, gas, etc.		*Complete, incorporated into MNRF Broadscale Monitoring Program*
2007					
Project	**Description**	**MNR Contribution**	**ACCC/VFLP Contribution**	**Other Contribution**	***Project Status (2016)***
Lower Seine Lakes FWIN	Assessment of fish populations	Staff, boats, nets and report preparation	$2000 for support, aging costs, gas, etc.		*Complete*
Sturgeon assessment	Assessment of sturgeon populations in Seine River	Staff, boats, nets and report preparation	$2000 for support, aging costs, gas, etc.		*Complete*

2008

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	*Project Status (2016)*
Aquatic vegetation assessment	Assess aquatic vegetation status of Upper Floodwaters, Lower Marmion, Colin Lake and Calm Lake using transect surveys (same methodology as on Rainy/Namakan)	Staff to assist consultants, boats, report preparation	$4000 for consultants with knowledge and experience required for project		*Partially complete - photo interpretation complete, report available; Upper Floodwaters and Little Falls Lake sampling plots started*
Lac des Mille Lacs FWIN	Assessment of fish populations	Staff, boats, nets and report preparation			*Complete*

2009

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	*Project Status (2016)*
Finlayson FWIN/BSM	Assessment of fish populations	Staff, boats, nets and report preparation	$2000 for support, aging costs, gas, etc.		*Broadscale Monitoring project completed in 2010*

2010

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	*Project Status (2016)*
Laseine FWIN	Assessment of fish populations	Staff, boats, nets and report preparation	$1500 for support, aging costs, gas, etc.		*Not completed*
Tourist industry survey related to water levels	Repeat modified 2003 phone survey to assess impacts of Plan on tourist industry	MNR to conduct survey (FOI implications)			*Engagement achieved through contact with Standing Advisory Committee*

2011

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	*Project Status (2016)*
Lower Seine Lakes FWIN	Assessment of fish populations	Staff, boats, nets and report preparation	$2000 for support, aging costs, gas, etc.		*Complete*
Lac des Mille Lacs FWIN	Assessment of fish populations	Staff, boats, nets and report preparation			*Complete*

2012

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	*Project Status (2016)*
Steep Rock (West Arm) FWIN	Assessment of fish populations	Staff, boats, nets and report preparation			*Broadscale Monitoring project completed in 2011*
Plan preparation	Review information collected during Plan and prepare new Plan.				*Scoped review of Plan completed in 2016*

2013

Project	Description	MNR Contribution	ACCC/VFLP Contribution	Other Contribution	Project Status (2016)
Plan preparation	Review information collected during Plan and prepare new Plan.				*Scoped review of Plan completed in 2016*

Date: October 3, 2016
Title: Compliance Reporting
Amendment #: 3-3
Amendment Type: Administrative
Request By: MNRF

Amendment Details:

The amendment will add a standard reporting template to be used by operators to report incidents of non-compliance, their cause and remedy within the SRWMP. Update of Table 7 will also reflect updated organizational structure within Regional Operations Division

Amendment Rationalization:

During the initial Plan term, a number of compliance reports have consisted of a brief email sent to the District office without sufficient detail to understand the issue or respond to any public inquiry in a meaningful way. An updated form to address this issue has been created and will be appended to the SRWMP and provided electronically to operators for use.

Amendment Consultation Summary:

Consultation is not required for administrative amendments. A scoped review of the SRWMP was completed in 2016 by Regional Operations Division (Northwest Region). The SAC was provided with an overview of monitoring results and analysis at a meeting on May 3, 2016 in Atikokan.

Comments/Concerns received:

No concerns were raised.

Contact:
Tim Cano
A/Renewable Energy Coordinator
Northwest Region
807-475-1242

Replacement Text

Chapter 10, p 169, Paragraph 4

The operators, through monitoring, will take preventive action to avoid situations which will result in the levels and flows being outside of the approved operating plans. The dam operators are responsible for self-monitoring and must report to the Ministry of Natural Resources *and Forestry*, within 24 hours of becoming aware of the occurrence, when out of compliance. The operator will return levels and flows to the approved range in the operating plans, as soon as conditions reasonably allow. *Operators will use the Incident Report Form found in Appendix 8 to report any occurrences of non-compliance.*

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

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

Appendix 8

Form to be added after Table

WATER MANAGEMENT PLAN : Seine River WMP

DAM OPERATOR or FACILITY OWNER :

MNR DISTRICT OFFICE :

Date: _____ *YYYY-MM-DD*

NOTIFICATION NO. 0 ____ - ____ *YYYY - #*

The following non-compliant condition:

INCIDENT STATUS: Non-Emergency

has occurred at the following site:

due to a(n):

for the Period: to

YYYY-MM-DD hh:mm (EST) *YYYY-MM-DD hh:mm (EST)*

☐ Normal operating conditions have resumed and the site is now within Compliance.

The following Corrective Action was/will be taken to bring the site to Normal Operating Conditions:

This section to be completed and submitted by Operator within 24 hours of the discovery of the incident

☐ This report contains a complete record of the occurrence. Additional detail is not attached.

☐ The site remains in the possible non-compliant condition and is expected to return to compliant conditions on/by:

☐ Additional investigation of this incident is necessary or follow-up actions are outstanding. A follow-up report will be submitted.

☐ Additional information was required to assess the occurrence:

This section to be completed and submitted by Operator within 30 days after the discovery of the incident

Incident Serial # : _____ Date Received : ____ /____ /____ *MNRF use only*

Print Form

Date:	October 3, 2016
Title:	Reference to 'Operator' in place of specific company name throughout WMP
Amendment #:	3-4
Amendment Type:	Administrative
Request By:	MNRF

Amendment Details:

The amendment will replace specific company names in the WMP with the generic term 'Dam operator' should the WMP be reprinted. This will eliminate confusion stemming from past changes in dam ownership and any that may occur in the future.

Amendment Rationalization:

A request by one of the operators on the system was made during a scoped review of the Plan to update this information. To reflect changes in dam ownership and to reduce confusion, company names with be removed throughout the document should it be reprinted and reference made to 'Dam Operator' in place of specific company names.

Amendment Consultation Summary:

Consultation is not required for administrative amendments. A scoped review of the SRWMP was completed in 2016 by Regional Operations Division (Northwest Region). While this issue was not raised until after the process was complete, it is not expected to cause any concern.

Comments/Concerns received:

No concerns are expected.

Contact:
Tim Cano
A/Renewable Energy Coordinator
Northwest Region
807-475-1242

Amendment Number: 3-1 to 3-4
Amendment Approval recommended by:

Rik Aikman
District Manager
Thunder Bay District

Oct 11, 2016
Date

Greg Chapman
District Manager
Fort Frances District

Oct 11, 2016
Date

Amendment Approved by:

Amanda Holmes
Regional Director
Northwest Region

Oct. 12/2016
Date

Appendix 4: 2016 Seine River WMP Extension Approval

Water Management Plan for Waterpower

for the

Seine River

Ministry of Natural Resources and Forestry

For the 2 year period October 14, **2014 to** October 13, 2016 ~~2014~~

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

Oct 3/14

Frank Miklas Date
District Manager, Thunder Bay
Ministry of Natural Resources and Forestry

Greg Chapman Date Oct 3, 2014
District Manager, Fort Frances
Ministry of Natural Resources and Forestry

Approved by:

Oct 1/2014

~~Jim~~ Fry Date
A/Regional Director, Northwest Region
Ministry of Natural Resources and Forestry

Ontario

Northwest Region
Ontario Government Building
435 James Street South, Suite 221A
Thunder Bay, Ontario P7E 6S8

Ministry of Natural Resources and Forestry
Ministère des Richesses naturelles et des Forêts
Tel: (807) 475-1269
Fax: (807) 473-3023

October 7, 2014

Brookfield Renewable Energy Group
243 Industrial Park Crs.
Sault Ste. Marie, ON P6B 5P3

Attention: Bruce Welbourne

Re: Extension to the Seine River Water Management Plan

This letter is to inform you the Ministry of Natural Resources and Forestry, under the authority of section 23.1(6) of the *Lakes and Rivers Improvement Act*, has conducted an administrative amendment to the Seine River Water Management. The effect of the amendment is to extend the term of the existing water management plan from October 14, 2014 to October 13, 2016. No other changes to the content of the plan have been made at this time. A copy of the renewed water management plan approval page is attached for your records.

MNRF (Thunder Bay District), under separate letter, also proposes to extend to the existing MOU between MNRF and Brookfield for the operation and maintenance of the Lac des Mille Lacs Dam.

The Ministry of Natural Resources and Forestry looks forward to working with Brookfield and others over the next two years to identify any other necessary amendments to the Seine River Water Management Plan.

If you have any questions or concerns about the status of the plan, please contact Emily Hawkins, Regional Renewable Energy Coordinator at emily.hawkins@ontario.ca.

Sincerely,

Jim Fry
A/Regional Director
Northwest Region

Appendix 5: 2017 Amendment 5 Approval Seine River WMP

Amendment Approval
Seine River Water Management Plan (WMP)

Date:	March 3, 2017
Title:	Alignment with Lakes and Rivers Act Technical Bulletin entitled 'Maintaining Water Management Plans'
Amendment Type:	Administrative
Amendment Number:	5
Request By:	MNRF

Overall Amendment Rationalization:

The Technical Bulletin 'Maintaining Water Management Plans' was approved in October, 2016 and provides new Policy direction under the LRIA. The Bulletin replaces 'Water Management Planning Guidelines for Waterpower' (OMNR, 2002); it removes expiry dates and mandatory reviews from Water Management Plans, makes changes to amendment procedures (increased role for plan authors) , compliance (increased self-reporting, changes to data reporting requirements) and effectiveness monitoring (new five year Implementation Report). A number of changes to the Seine River WMP are required to align with this Policy Direction.

Title: Alignment with Lakes and Rivers Act Technical Bulletin entitled 'Maintaining Water Management Plans'
Amendment #: 5
Amendment Type: Administrative
Request By: MNRF

Amendment Details:

The amendment will align procedures and reporting in the Seine River Management Plan (SRWMP) with recent Lakes and Rivers Improvement Act Policy (Technical Bulletin, Maintaining Water Management) released October 7, 2016. This will include the removal of the 'administrative' category of amendments while outlining requirements for both 'minor' and 'major' amendments and changes in responsibility for processing amendments to plan proponents. New text will clarify requirements for self-reporting of compliance at both the time of occurrence and annually, as well as describing the replacement of 10 year reviews with a five year Implementation Report. The Bulletin also describes a new reporting relationship for Standing Advisory Committees as well as giving the proponent the option to dissolve a SAC via amendment.

Amendment Rationalization:

Recently released 'Maintaining Water Management Plans Technical Bulletin' replaces 'Water Management Planning Guidelines for Waterpower' (2002), necessitating changes to WMP planned under the now rescinded policy. Several plan sections describing the amendment process, compliance and reporting need to be replaced with wording reflecting the new technical bulletin

Amendment Consultation Summary:

Consultation is not required for administrative amendments. Districts were informed of changes via email (7 October 2017) and provided with template letters to distribute to both proponents (17 November 2016) and Standing Advisory Committees (19 December 2016).

Comments/Concerns received:

No concerns were raised.

Contact:
Tim Cano
A/Renewable Energy Coordinator
Northwest Region
807-475-1242

Replacement Text

12 Compliance Monitoring Plan

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

Data will be provided ~~for the identified reporting period, no later than 3 months after the end of the reporting period~~, in an electronic spreadsheet format as agreed to by MNRF upon request ~~by the Ministryof Natural Resources~~. The data is to be sent to the location identified as responsible for compliance in the following table (Table 7).

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

The operators, through monitoring, will take preventive action to avoid situations that will result in the levels and flows being outside of the approved operating plans. The dam operators are responsible for self-monitoring and must report to the Ministry of Natural Resources, within 24 hours of becoming aware of the occurrence, when out of compliance. The operator will return levels and flows to the approved range in the operating plans, as soon as conditions reasonably allow. **A follow up report describing the event in greater detail as described in the Technical Bulletin will be provided within 10-30 days to MNRF**

Table 7: Compliance Monitoring Requirements

Dam	Data required	Data collection responsibility	Reporting period	Compliance responsibility
Lac des Mille Lacs	-daily average water level (m) - daily average outflow (m3/sec)	Dam Operator	**~~monthly~~ upon request**	MNR Thunder Bay district
Lower Marmion Weir	-daily average water level	Dam Operator	**~~monthly~~ upon request**	MNR Fort Frances District
Raft Lake dam	-daily average water level (m) - daily average outflow (m3/sec)	Dam Operator	**~~monthly~~ upon request**	MNR Fort Frances District
Wagita dam	-flow at time of inspection(m3/sec)	Dam Operator	**~~Quarterly (approximately April 15, August 15, November 15, February 15)~~ upon request**	MNR Fort Frances District

Valerie Falls dam	-daily average water level (m) - daily average outflow (m3/sec) - minimum daily flow	Dam Operator	~~**monthly**~~ **upon request**	MNR Fort Frances district
	-average hourly flow for period from April 15 to June 15. - average hourly tailwater elevations for period from April 15 to June 15 - average hourly headwater elevations for period from April 15 to June 15			
Calm Lake dam	-daily average water level of Calm Lake (m) - daily average outflow (m3/sec) -minimum daily flow - average hourly flow for period from April 15 to June 15 - average hourly tailwater elevations for period from April 15 to June 15 - average hourly headwater (Calm Lake) elevations for period from April 15 to June 15	Dam Operator	~~**monthly**~~ **upon request**	MNR Fort Frances district
Sturgeon Falls dam	-daily average water level of Laseine Lake headpond (m) - daily average outflow (m3/sec) - minimum daily flow - average hourly flow for period from April 15 to June 15 - average hourly tailwater elevations for period from April 15 to June 15 - average hourly headwater (Laseine Lake) elevations for period from April 15 to June 15	Dam Operator	~~**monthly**~~ **upon request**	MNR Fort Frances district

In the event of water level or flow being outside of the operational plan, it will be deemed an occurrence of non-compliance and the events leading up to the occurrence will be reviewed by a compliance committee made up of Ontario Ministry of Natural Resources district staff and Ontario Ministry of Natural Resources regional engineer in consultation with input from the operator of the structure. If it is determined that the reason for the event is due to natural conditions beyond the control of the operator (e.g. flood, drought, ice build-up, wind effects, vandalism or other causes beyond the reasonable control of the operator) no charges will be laid and the occurrence and related events will be documented in the annual report to be submitted to the Atikokan Area office of the Ministry of Natural Resources **and Forestry** by April 15 of each year of the plan. The report will summarize previous years data from April 1 to March 31. This information will **also** be used **as part of the 5 year Implementation Report**~~during operational plan review during the preparation of the next plan~~. In most cases, it is expected

that occurrences due to drought and, to some extent flood events, will be apparent before they actually occur and the Ontario Ministry of Natural Resources and dam operator will already be in discussion about them. If it is felt by the compliance committee that the occurrence is due to management action, the event will be deemed non-compliance and the issue will be passed to Ontario Ministry of Natural Resources enforcement staff for their review for potential of laying charges under the Lakes and Rivers Improvement Act.

13 Effectiveness Monitoring Plan

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

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

Implementation Report

Plan proponents for all WMPs shall submit an Implementation Report every five years. For complex WMPs with multiple plan proponents, the Implementation Report shall be a collective submission from all plan proponents. The Implementation Report shall provide plan proponents, MNRF and interested parties with a status update on the WMP. The Report will also help to provide transparency of dam operations and help to inform adaptive management considerations. The Implementation Report is not intended to initiate a fundamental review of the WMP.

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;**
- **a report on the results of the effectiveness monitoring program (EMP), 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 to the EMP, are required; and**
- **status and results of any data or information collection outlined in the WMP's data collection program and a determination of whether revisions to the program are required**

The Implementation Report will be submitted to the Fort Frances District Manager. MNRF will review the report for completeness. If the Report is not complete, MNRF will request that

additional information be provided. MNRF may audit records used by the proponent to prepare the Implementation Report and may request any additional information to verify the information presented. Upon confirmation from MNRF that the Implementation Report is complete, plan proponent(s) will make the Report publicly available.

15 ~~Provision for~~ Plan ~~Reviews,~~ Amendments ~~and Renewals~~

~~15.1 Term of the Plan~~

~~The Water Management Planning Guidelines make provisions for amendments of Plans described in the Guidelines. The term of this Plan will be 10 years from date of approval by the Minister or designate (e.g. April 1, 2004, to April 1, 2014). An assessment of the need for a formal public review will be carried out no later than 8 years from the date of plan approval by the Minister of Natural Resources or his designate. The outcome of this assessment will be one of the following:~~

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

15.~~2~~1 Plan Amendments

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

Types of Plan Amendments

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

~~1. Administrative~~

1. Minor

2. Major

~~The amendment process involves:~~

~~1. submission of a request for an amendment~~

~~2. review of the request by the Minister or his designate with advice from the recognized public advisory committees~~

~~3. acceptance or denial of request~~

~~4. if acceptance, assignment of a category to the amendment~~

~~5. completion of all application planning requirements, including public consultation~~

~~6. record-keeping requirements~~.

15.2.1 Amendment Request

~~Any request must be accompanied by sufficient information to allow the Minister or his designate to determine whether the proposed amendment should proceed, and whether the amendment should be treated as administrative, minor or major.~~
~~The amendment request must contain the following information:~~
~~1. a brief description of the proposed amendment~~
~~2. the rationale for the proposed amendment and a discussion of its significance~~
~~3. if new operations are proposed:~~
~~a) a brief description of the proposed operation and a description of the previously approved operations in the Water Management Plan that will be changed by the proposed amendment~~
~~b) an outline of the applicable planning requirements for the proposed operations, including public consultation, based on the planning requirements for similar operations in a Water Management Plan.~~

Any request for an amendment must be accompanied by sufficient information to allow the proponent, in cooperation with MNRF, to determine whether the proposed amendment should proceed and whether the amendment should be treated as administrative, minor or major .

The amendment request must contain the following information:

- **A brief description of the changes being requested**
- **The rationale for the changes being requested**
- **Results of any pre-consultation completed with potentially affected parties; and**
- **Where changes in operations are proposed, a description of how the proposed operation changes may impact other dams subject to the WMP.**

15.2.2 Review of Amendment Request and Categorization of Amendment

~~The Minister or his designate is responsible for determining whether an amendment should proceed and for categorizing the amendment as administrative, minor or major.~~
~~In making this determination, the Minister or his designate, in consultation with the plan proponents, will decide on the appropriate degree of public consultation for the plan amendment. The Minister or his designate considers the following factors in determining whether to grant the request for an amendment and in determining the appropriate category for the amendment:~~
~~• whether there are legitimate time constraints which must be met for reasons of public safety, biological or industrial necessity, or public convenience and necessity~~
~~• whether there has been previous notification that the requested amendment will be required, and the degree to which planning and public consultation has taken place previously (e.g. decision deferred in the Water Management Plan; amendment required after public consultation in other planning processes)~~
~~• the adequacy of the information concerning the resources features, land uses and values potentially affected and the anticipated potential effects of the requested operations~~
~~• the number of previous requests for similar amendments~~
~~• whether the amendment is justifiable based on public safety, biological or commercial reasons.~~

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

~~categorization of the amendment will be recorded in that written decision.~~

The proponent is responsible for screening amendment requests and for categorizing the amendment as minor or major. This determination will ensure the appropriate degree of public consultation for the plan amendment.
The assessment will consider the following criteria:

a) **Is the amendment consistent with this Technical Bulletin?**
b) **Is the amendment consistent with WMP objectives, or does the amendment propose a change to WMP objectives?**
c) **Is there an alternative method to deal with the request rather than amending the WMP?**
d) **Is the request within the scope of the WMP?**
e) **Is the request related to any ongoing data or effectiveness monitoring commitments?**
f) **Is the request supported by other potentially affected parties?**
g) **Is the amendment required to comply with other regulatory requirements?**
h) **Has the amendment request been considered previously?**
i) **Does the amendment have the potential to negatively affect dam safety/public safety?**
j) **Does the amendment have potential impacts on socio-economic or environmental considerations?**

Where an amendment request does not contain sufficient information to complete an assessment or make a recommendation to the MNRF, the plan proponent will return the proposed amendment to the third party with a request for additional information.
When a plan proponent(s) has completed the screening of the amendment request, written notification will be provided to the MNRF. The notification will include: a summary of the amendment request and supporting rationale, results of the assessment, a recommendation of whether the request should be further considered, and if so, the appropriate category for the amendment.

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

~~**15.2.3 Administrative Amendments**~~
~~If the Minister or his designate decides that a proposed amendment should proceed, and that the appropriate category of amendment is administrative, the Minister or his designate will approve the amendment when the necessary planning has been completed. (Note: There are no formal public consultation requirements for the preparation of an administrative amendment.)~~
~~Administrative amendments will not affect the implementation of the plan (e.g. a change in the presentation of information in the plan, a typographical error, and a missing word in a sentence).~~
~~Documentation requirements for administrative amendments include:~~
~~• the amendment request~~
~~• replacement text for the changes to the approved Water Management Plan~~
~~• a map of the area affected by the amendment, if applicable~~

~~• all documentation associated with the planning of operations, if applicable, including any associated supplementary documentation~~
~~• recommendations from the recognized public advisory committees (Lac des Mille Lacs Advisory Committee and the Seine River Water Level Technical Committee).~~

~~15.2.~~4 15.2.3 Minor Amendments

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

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

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

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

~~If an issue arises during the preparation and review of the minor amendment, the issue resolution procedure described in the Water Management Planning Guidelines Appendix F will apply, with whatever modifications are necessary in the circumstances. Minor amendments will be changes that are anticipated to affect a small geographic scale (i.e. in the immediate vicinity of one dam) and where MNR and the Steering Committee agree that it will not have an anticipated significant impact. Documentation requirements for minor amendments include the same requirements as for administrative amendment (15.2.3), as well as documentation of the results of the formal public consultation opportunity for inspection of the amendment.~~

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 the SAC. Minor amendments may include:

- **Changes in the presentation of information, factual or text corrections;**
- **Changing a WMP to include a new dam and its associated Operating Plan**

~~15.2.5~~ **15.2.4 Major Amendments**

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

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

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

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

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

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

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

~~If an issue arises during the preparation of a major amendment, the issue resolution procedure described in Water Management Planning Guidelines Appendix F will apply, with whatever modifications are necessary in the circumstances.~~
~~Major amendments may involve a significant geographic scale (i.e. extensive areas up and/or downstream of the dam and/or dams) or have a significant impact on the balancing of the environmental, social and economic attributes.~~
~~Documentation requirements for major amendments include the same requirements as for administrative amendments (see section 15.2.3), as well as documentation of the results of pubic consultation. A brief description of how MNR's Statement of Environmental Values (SEV) under the Environment Bill of Rights (EBR), as amended from time to time, have been considered in the development of the major amendment must also be produced, in the form of an SEV briefing note.~~

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 Ministry may exercise discretion to process the proposed change as a minor amendment on a case by case basis.

~~**15.3 Plan Review and Renewal Stage**~~
~~The term of this Seine River Water Management Plan is 10 years (see Section 15.1 Term of Plan). The plan review process should be initiated 18–24 months prior to the end of the term. The plan review process should mirror the steps involved in plan preparation, as appropriate, with new data and information considered during the review as a basis for continuing with the status quo or recommending changes.~~

Amendment Number: 5
Amendment Approval recommended by:

Rik Aikman
District Manager
Thunder Bay District

Date

Greg Chapman
District Manager
Fort Frances District

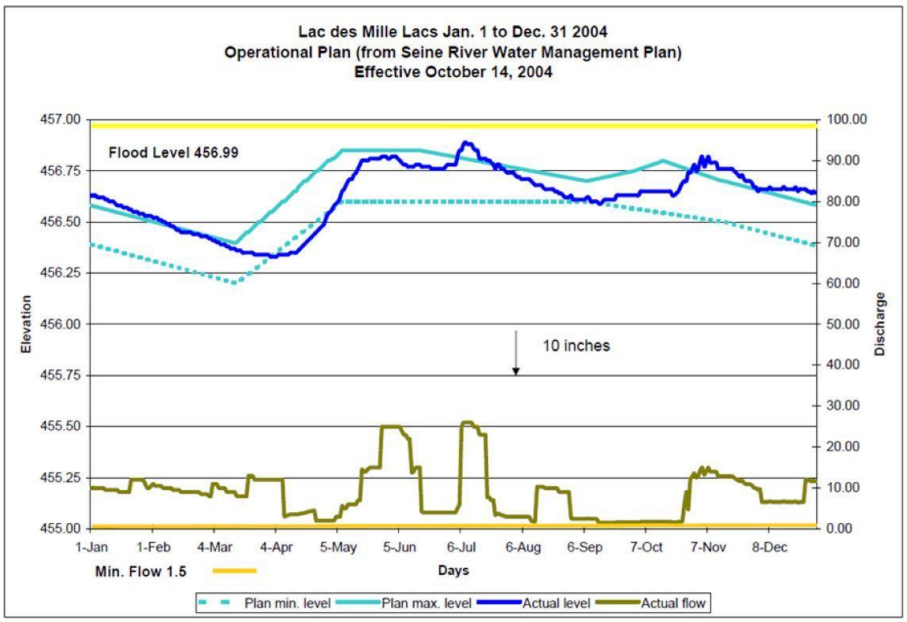
March 13, 2017
Date

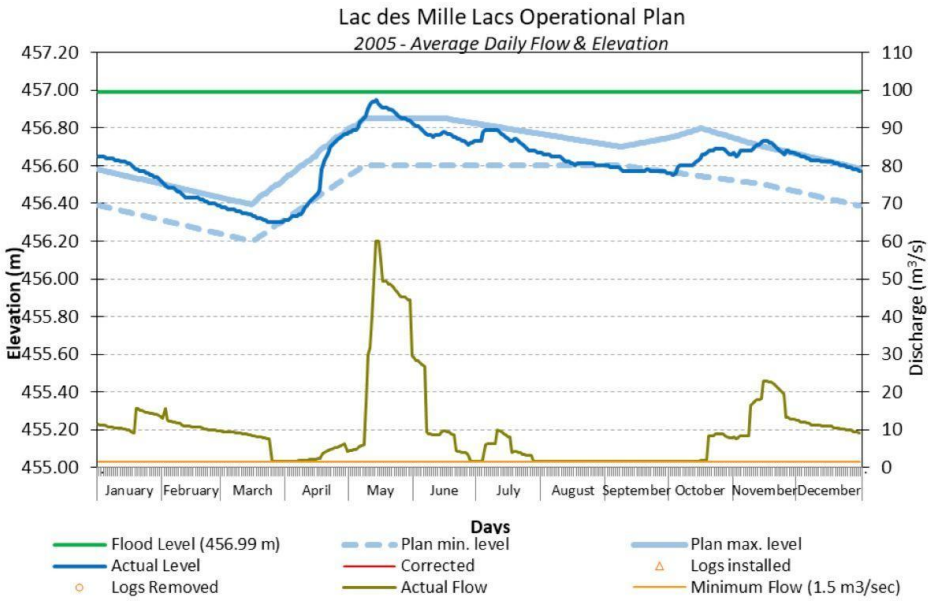
Amendment Approved by:

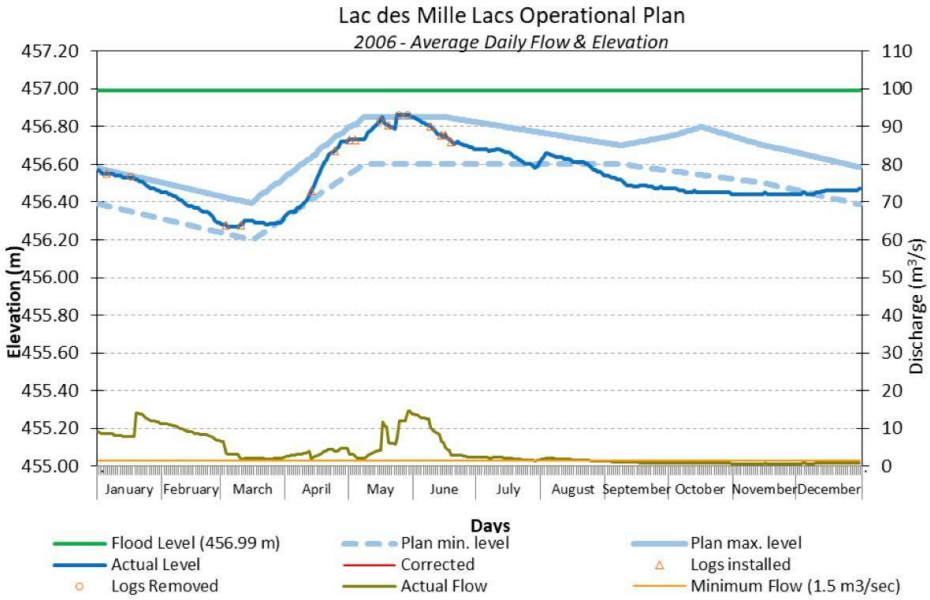
Amanda Holmes
Regional Director
Northwest Region

Date

Appendix 6: Lac des Milles Lacs Average Daily Flow & Elevation Graphs






Lac des Mille Lacs Operational Plan
2006 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
456.60
456.40
456.20
456.00
455.80
455.60
455.40
455.20
455.00
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30
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10
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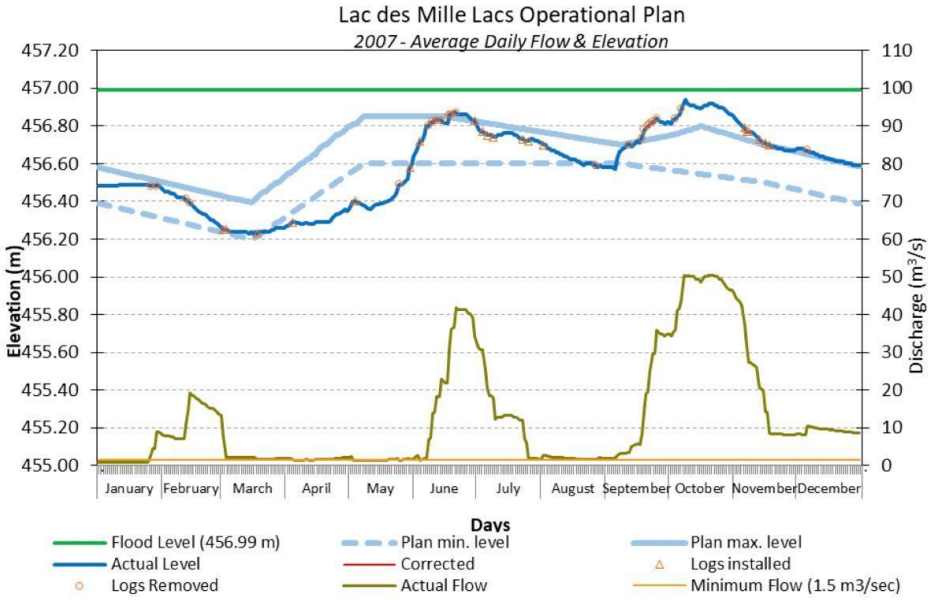
January
February
March
April
May
June
July
August
September
October
November
December
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2007 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
456.60
456.40
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456.00
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January
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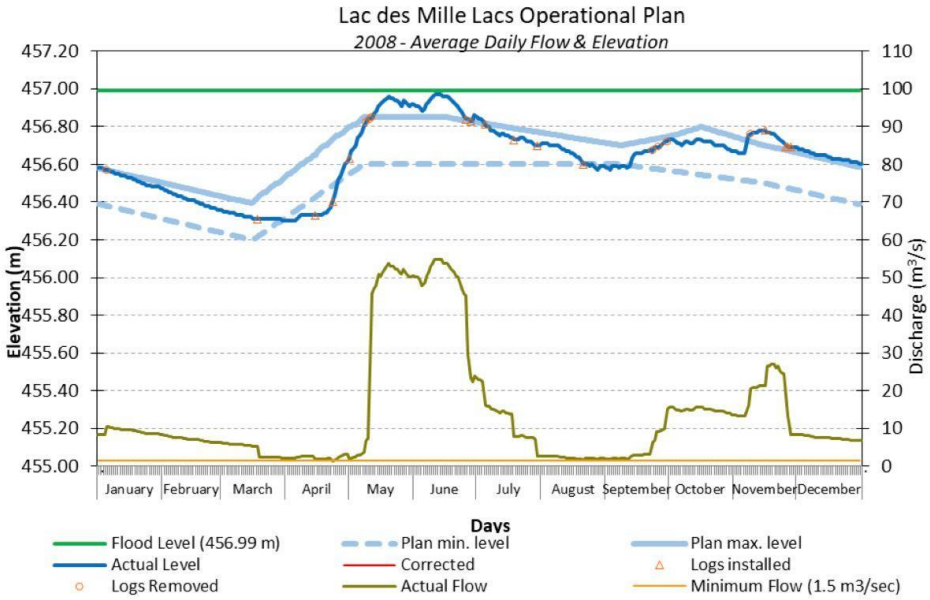
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2008 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
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457.00
456.80
456.60
456.40
456.20
456.00
455.80
455.60
455.40
455.20
455.00
110
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January
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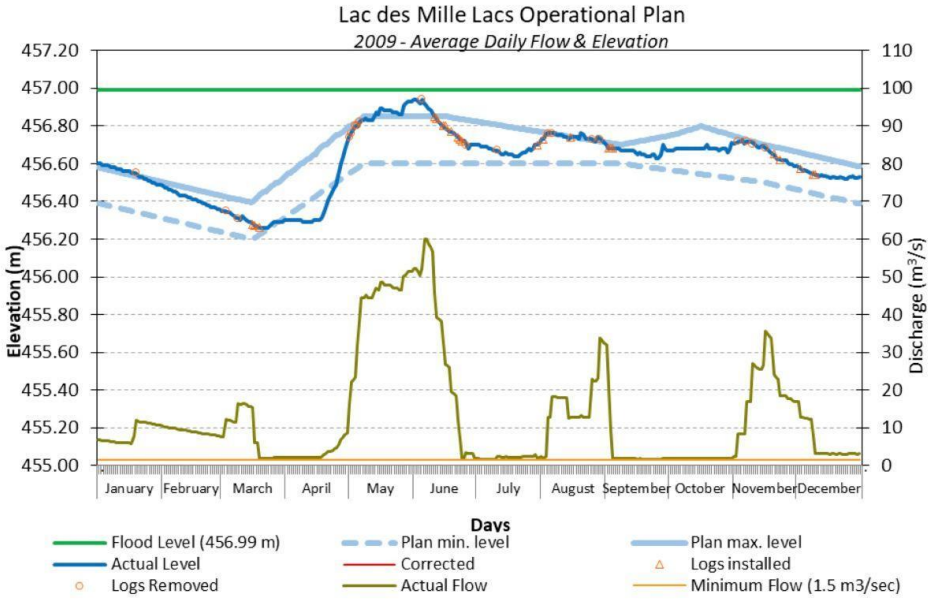
September
October
November
December
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2009 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
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456.40
456.20
456.00
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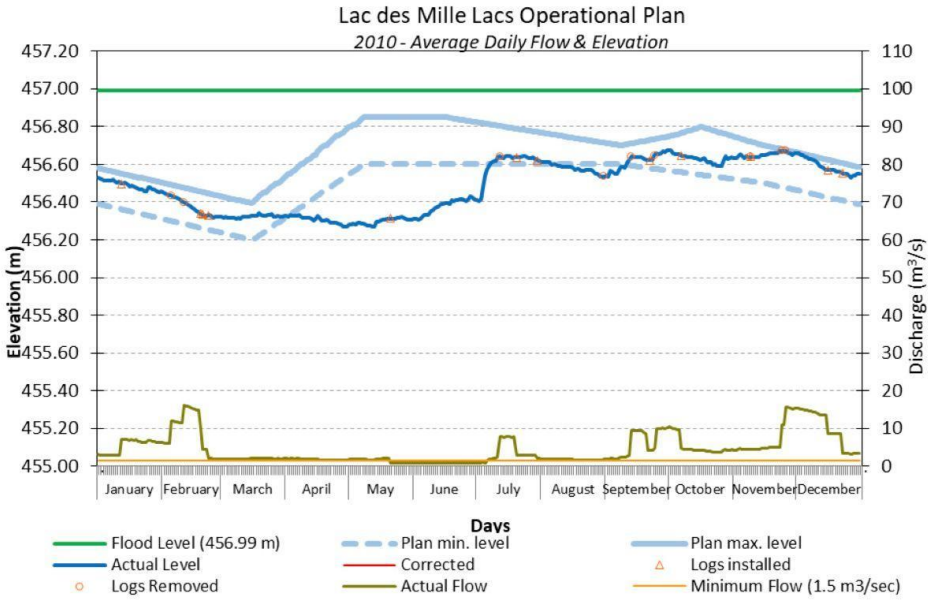
December
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2010 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
456.60
456.40
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456.00
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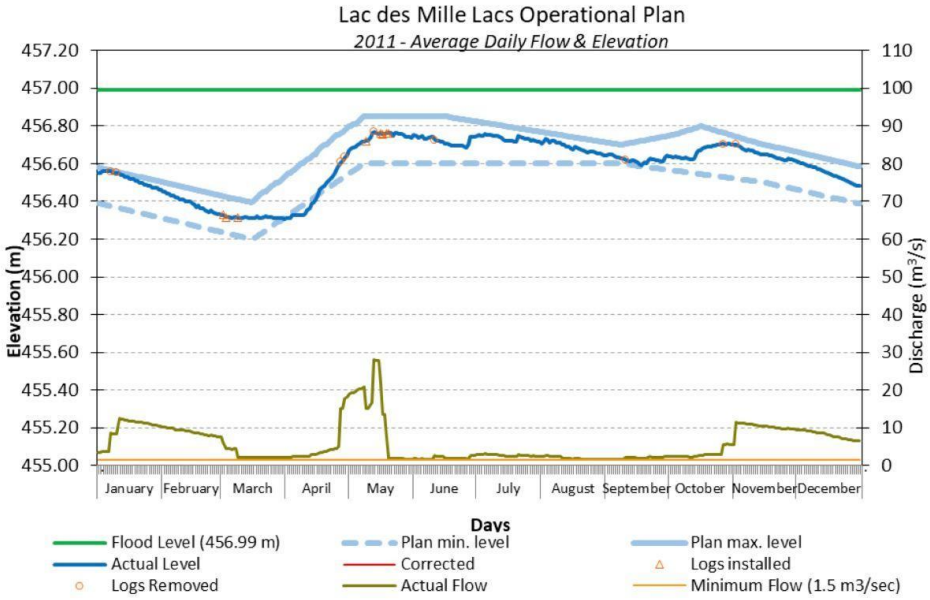
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2011 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
456.60
456.40
456.20
456.00
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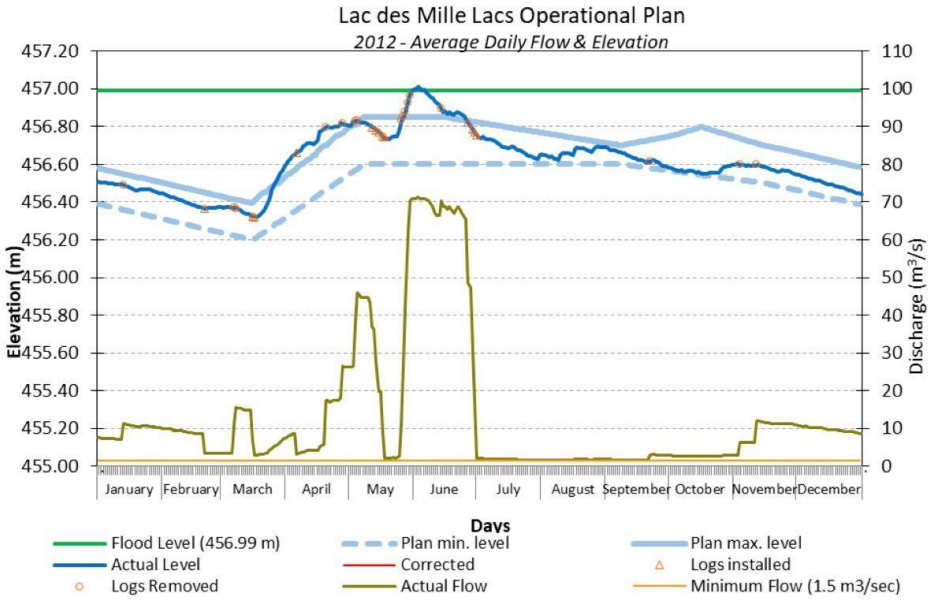
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2012 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
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456.20
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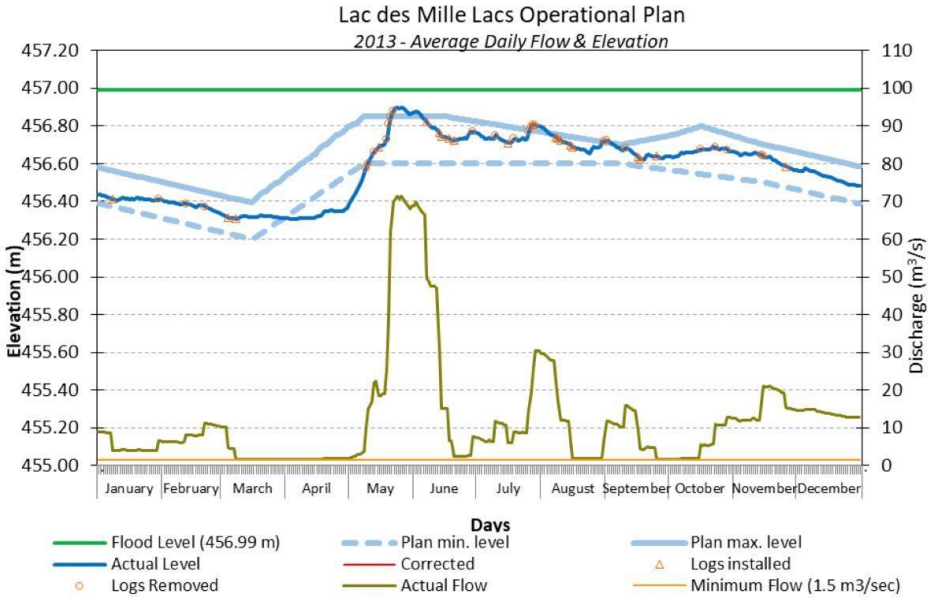
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2013 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
456.60
456.40
456.20
456.00
455.80
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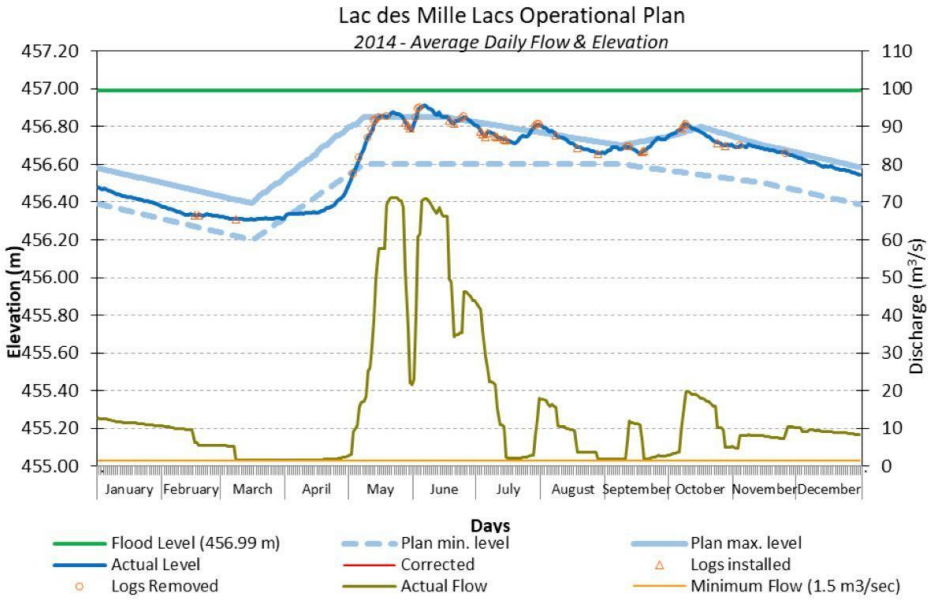
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2014 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
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457.00
456.80
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456.40
456.20
456.00
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455.20
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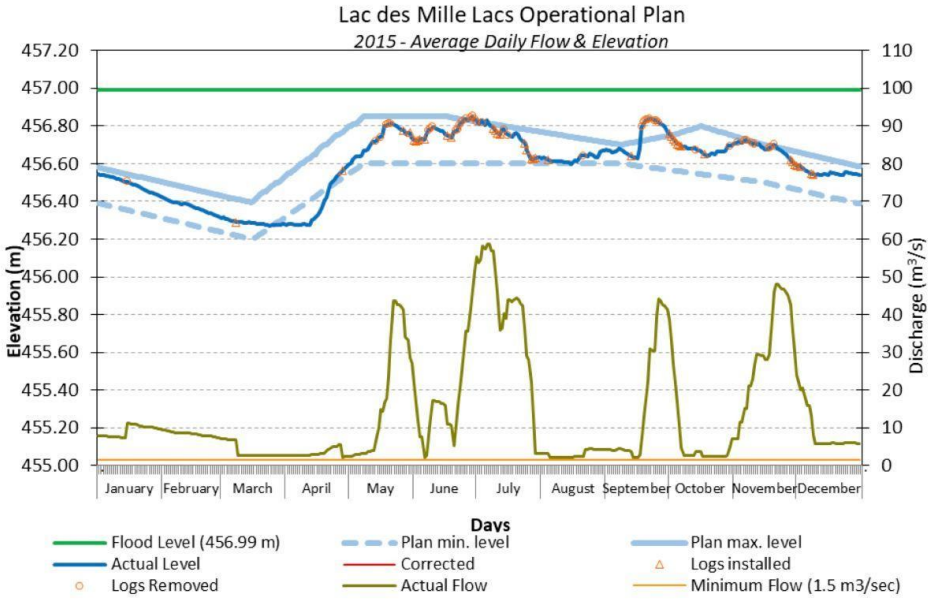
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2015 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
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457.00
456.80
456.60
456.40
456.20
456.00
455.80
455.60
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455.20
455.00
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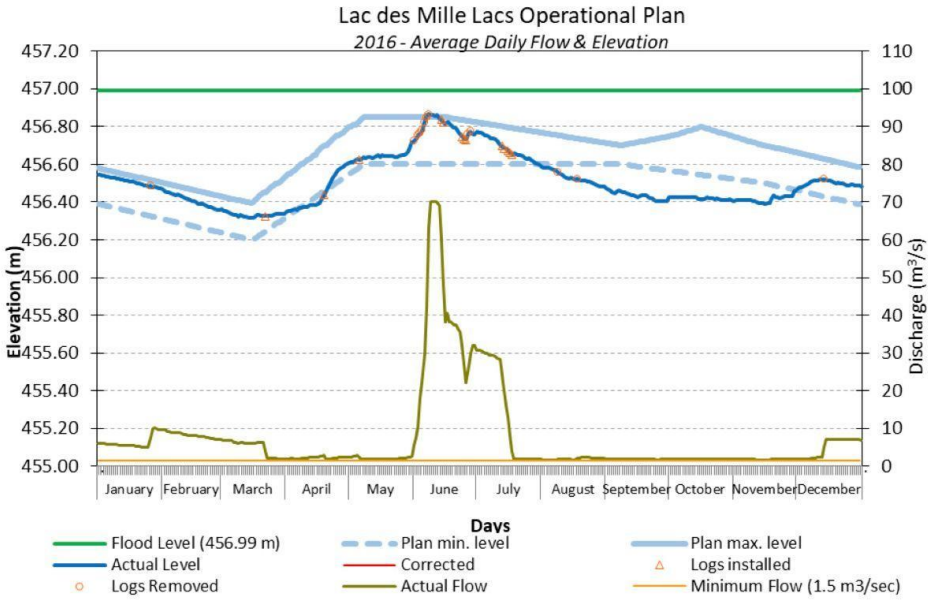
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2016 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
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456.80
456.60
456.40
456.20
456.00
455.80
455.60
455.40
455.20
455.00
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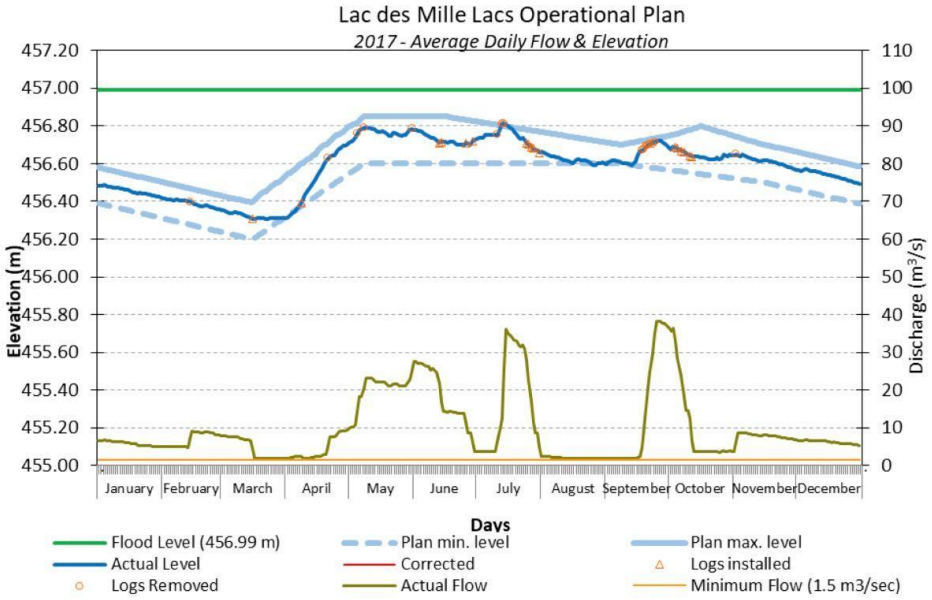
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2017 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
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456.80
456.60
456.40
456.20
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455.60
455.40
455.20
455.00
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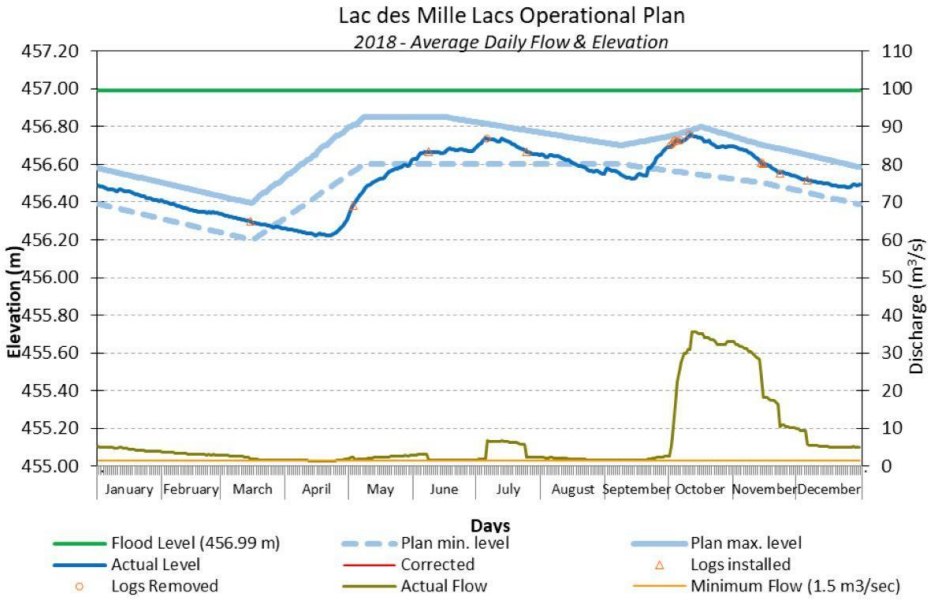
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2018 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
456.60
456.40
456.20
456.00
455.80
455.60
455.40
455.20
455.00
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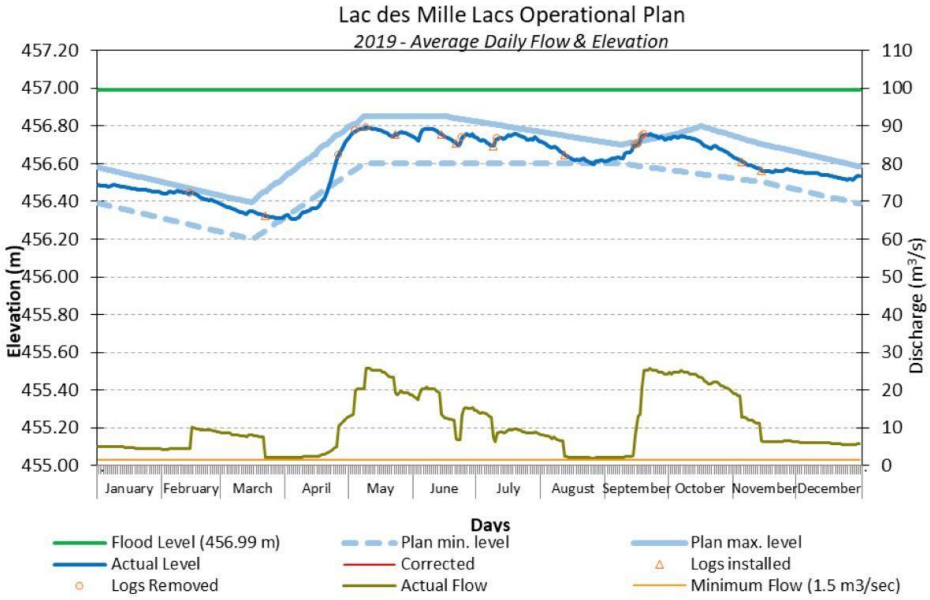
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2019 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
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456.80
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456.40
456.20
456.00
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455.60
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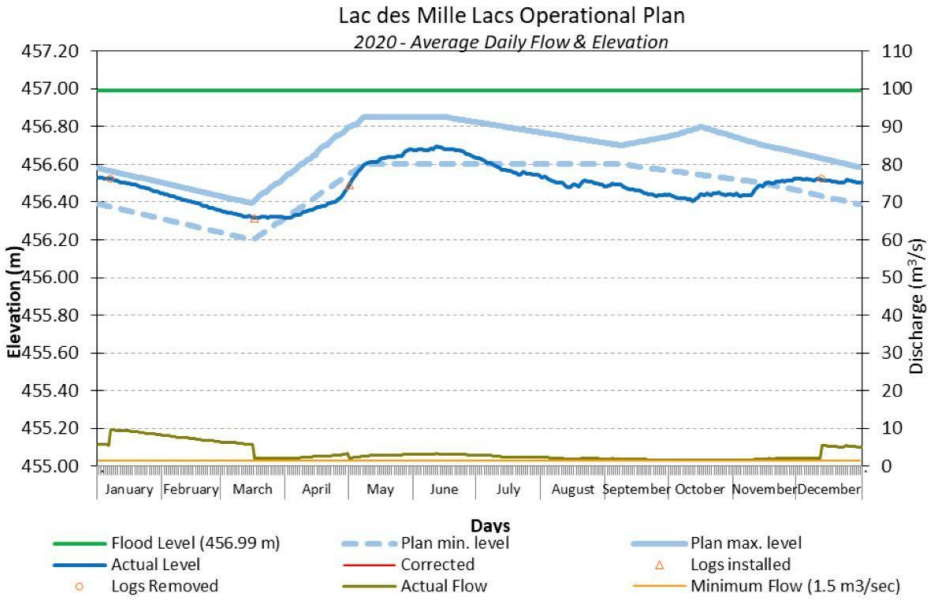
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2020 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
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456.80
456.60
456.40
456.20
456.00
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455.60
455.40
455.20
455.00
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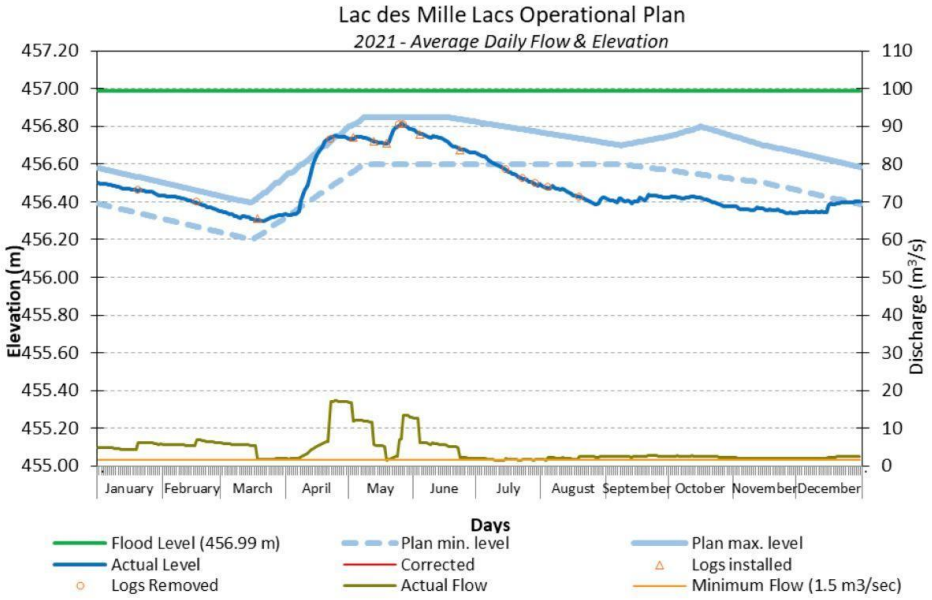
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2021 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
456.60
456.40
456.20
456.00
455.80
455.60
455.40
455.20
455.00
110
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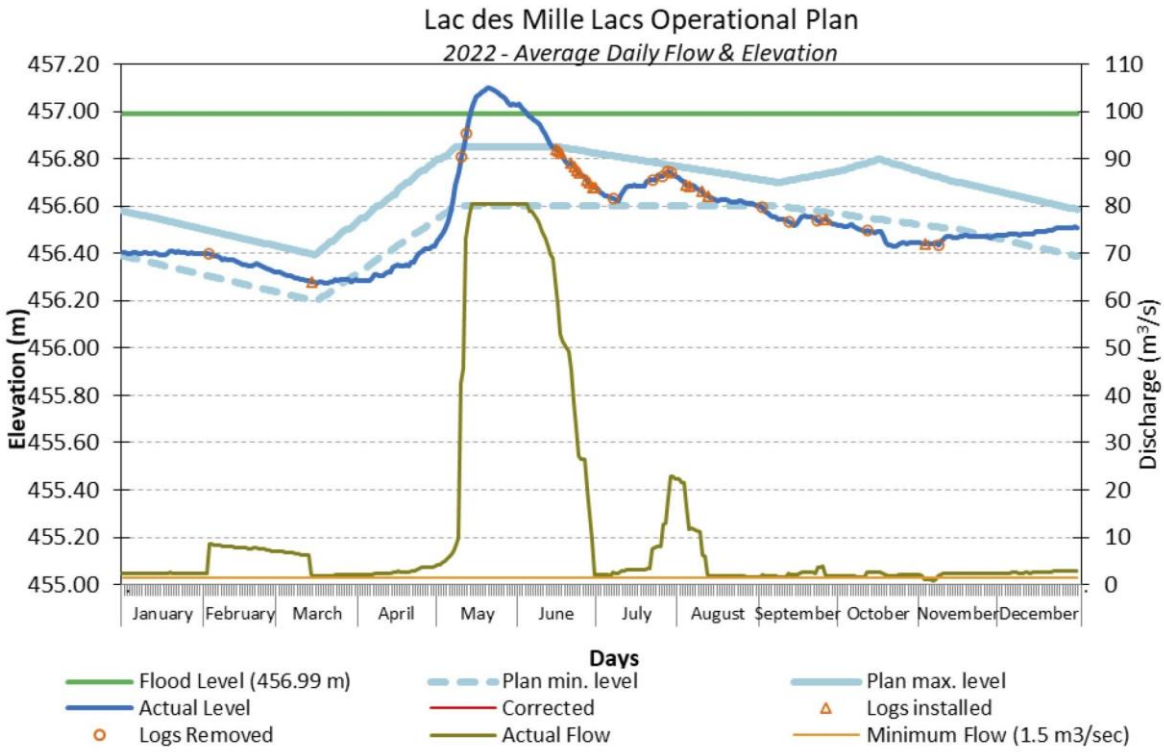
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)


Lac des Mille Lacs Operational Plan
2022 - Average Daily Flow & Elevation
Elevation (m)
Discharge (m³/s)
457.20
457.00
456.80
456.60
456.40
456.20
456.00
455.80
455.60
455.40
455.20
455.00
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January
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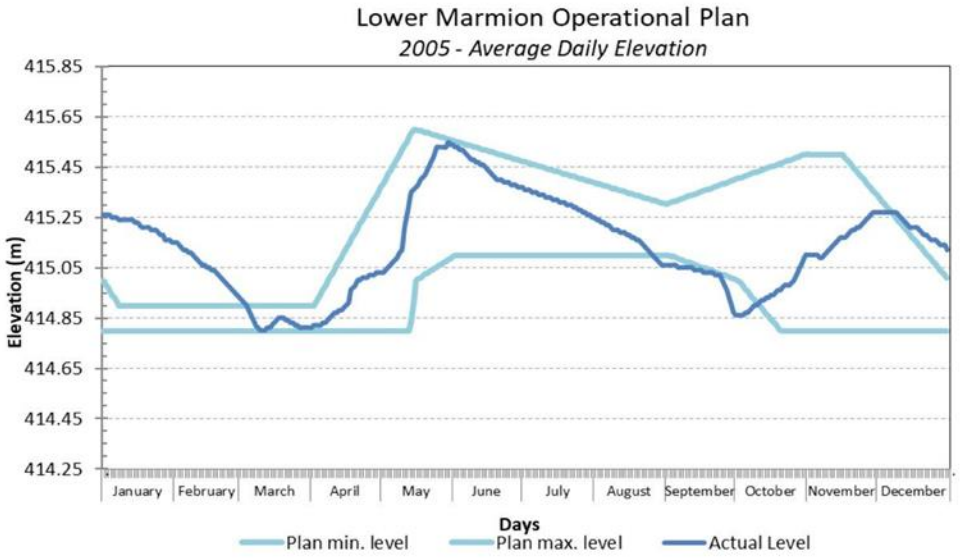
November
December
Days
Flood Level (456.99 m)
Plan min. level
Plan max. level
Actual Level
Corrected
Logs installed
Logs Removed
Actual Flow
Minimum Flow (1.5 m3/sec)

Appendix 7: Lower Marmion Average Daily Elevation Graphs




Lower Marmion Operational Plan
2007 - Average Daily Elevation
415.85
415.65
415.45
415.25
415.05
414.85
414.65
414.45
414.25
Elevation (m)
January
February
March
April
May
June
July
August
September
October
November
December
Days
Plan min. level
Plan max. level
Actual Level


Lower Marmion Operational Plan
2008 - Average Daily Elevation
415.85
415.65
415.45
415.25
415.05
414.85
414.65
414.45
414.25
Elevation (m)
January
February
March
April
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July
August
September
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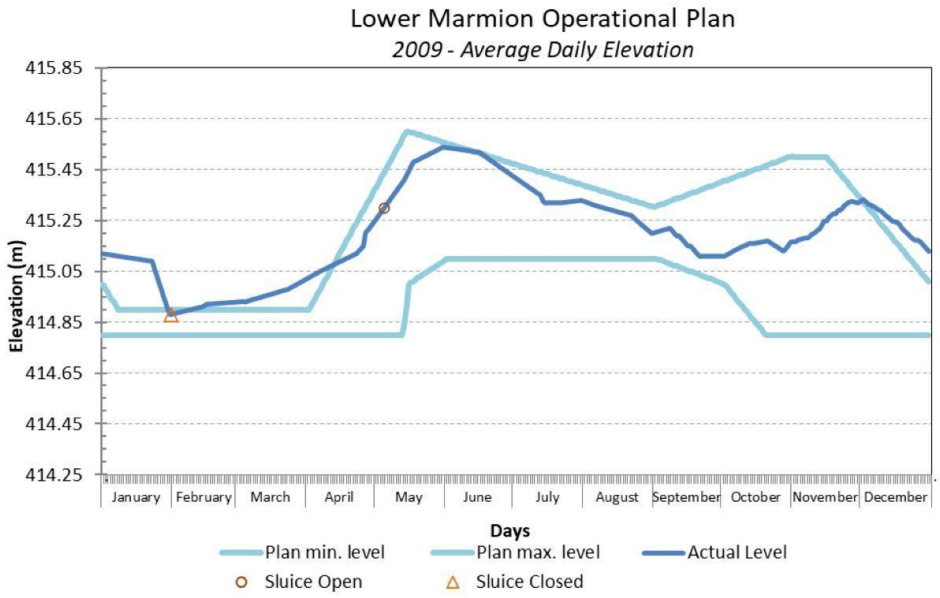
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed


Lower Marmion Operational Plan
2009 - Average Daily Elevation
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414.65
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414.25
Elevation (m)
January
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September
October
November
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed


Lower Marmion Operational Plan
2010 - Average Daily Elevation
415.85
415.65
415.45
415.25
415.05
414.85
414.65
414.45
414.25
Elevation (m)
January
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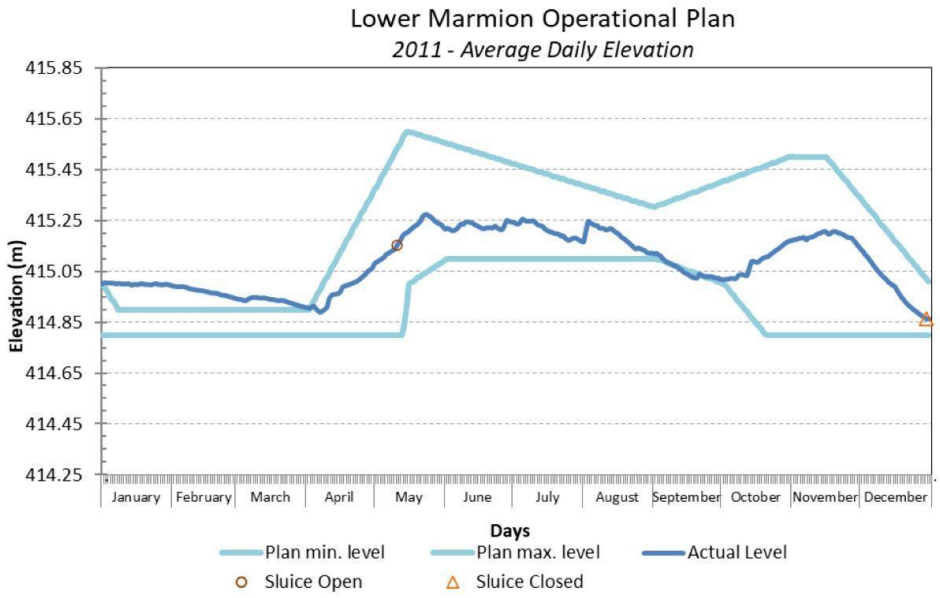
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed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2011 - Average Daily Elevation
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Elevation (m)
January
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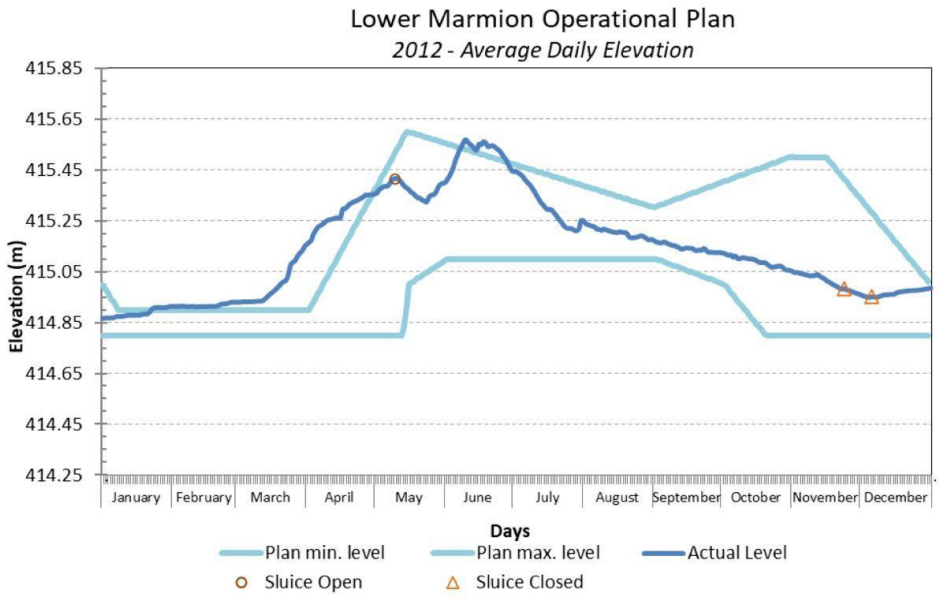
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed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2012 - Average Daily Elevation
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Elevation (m)
January
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December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed


Lower Marmion Operational Plan
2013 - Average Daily Elevation
415.85
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415.05
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414.65
414.45
414.25
Elevation (m)
January
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November
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed


Lower Marmion Operational Plan
2014 - Average Daily Elevation
415.85
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415.45
415.25
415.05
414.85
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414.45
414.25
Elevation (m)
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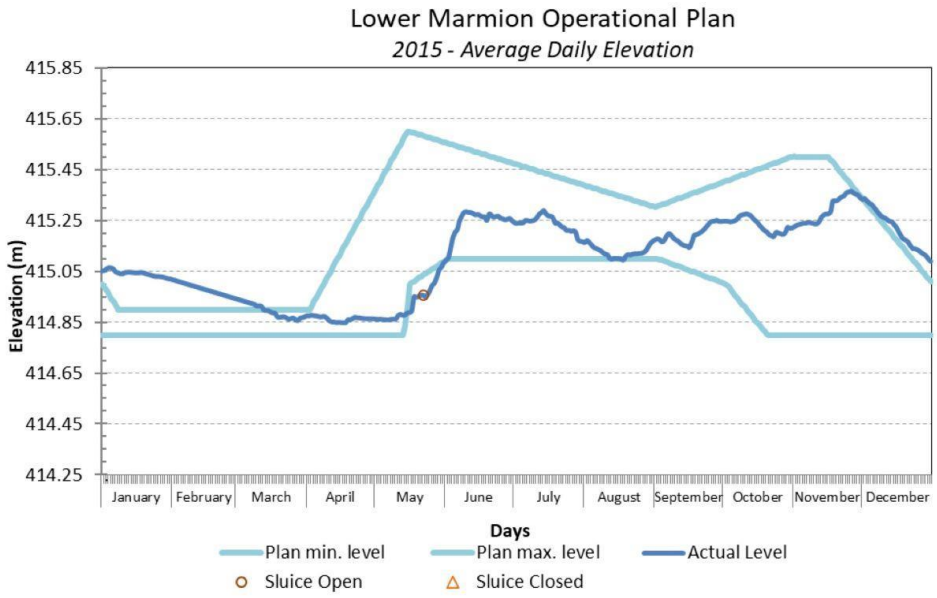
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed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2015 - Average Daily Elevation
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414.25
Elevation (m)
January
February
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October
November
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed


Lower Marmion Operational Plan
2016 - Average Daily Elevation
415.85
415.65
415.45
415.25
415.05
414.85
414.65
414.45
414.25
Elevation (m)
January
February
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August
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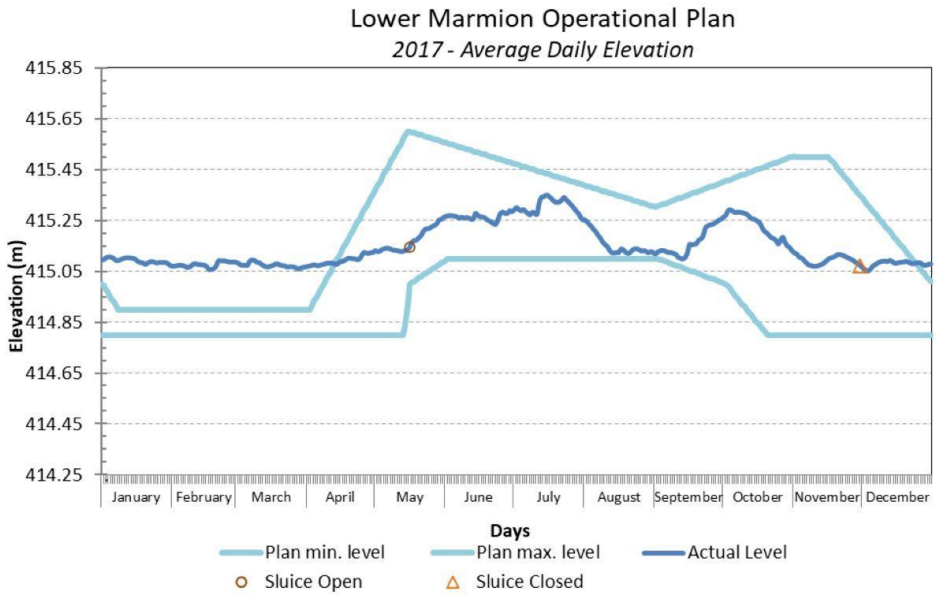
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed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2017 - Average Daily Elevation
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Elevation (m)
January
February
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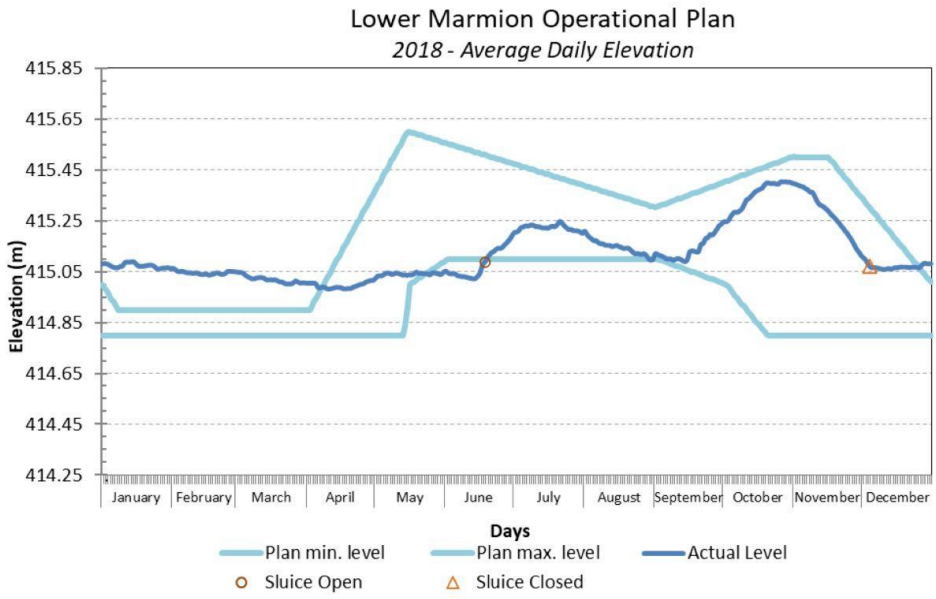
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed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2018 - Average Daily Elevation
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Elevation (m)
January
February
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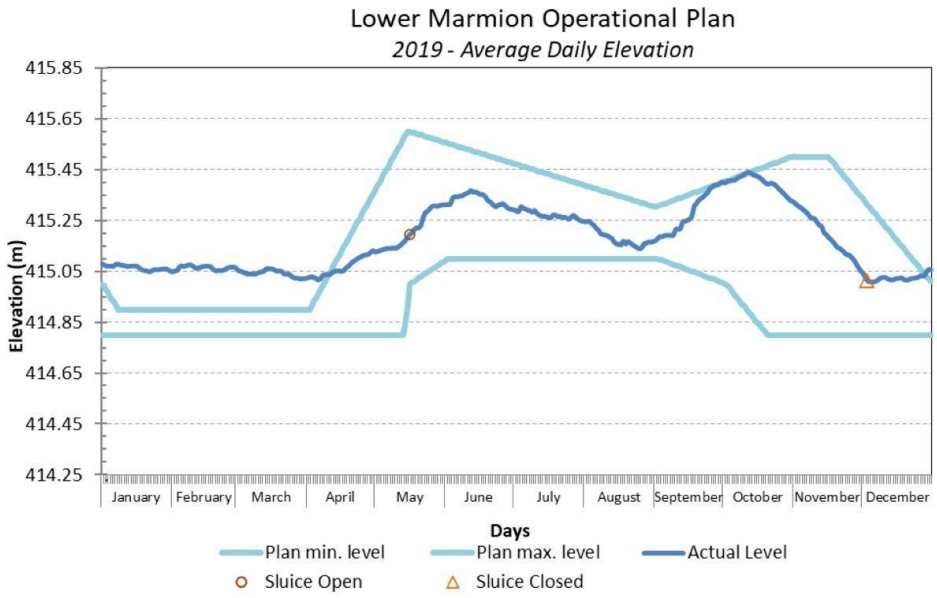
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed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2019 - Average Daily Elevation
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415.25
415.05
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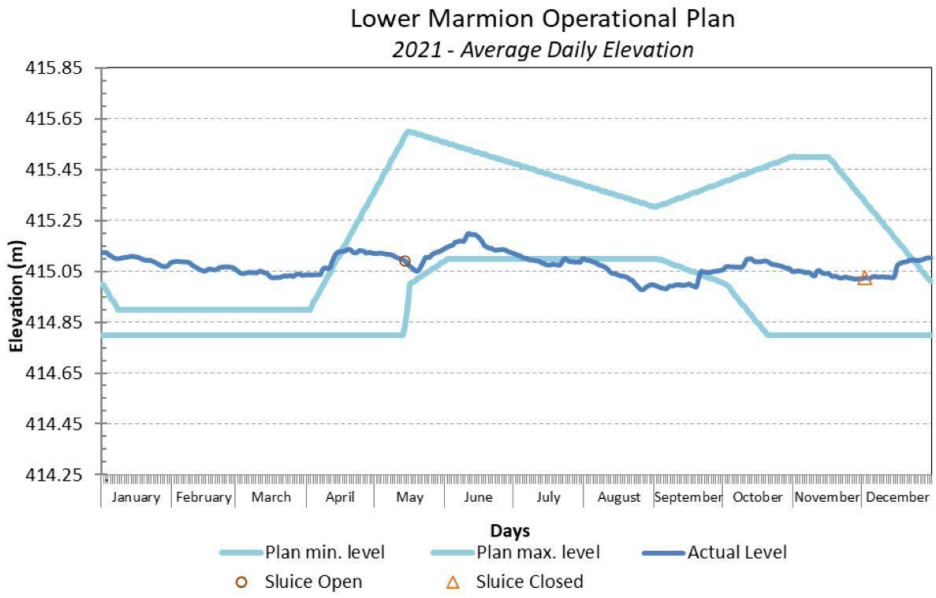
414.65
414.45
414.25
Elevation (m)
January
February
March
April
May
June
July
August
September
October
November
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed


Lower Marmion Operational Plan
2020 - Average Daily Elevation
415.85
415.65
415.45
415.25
415.05
414.85
414.65
414.45
414.25
Elevation (m)
January
February
March
April
May
June
July
August
September
October
November
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed


Lower Marmion Operational Plan
2021 - Average Daily Elevation
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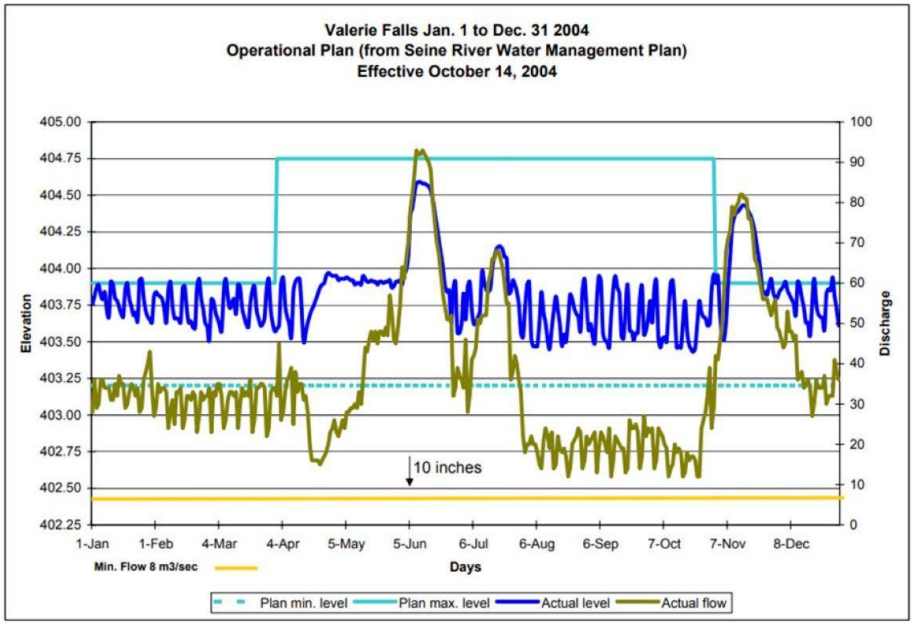
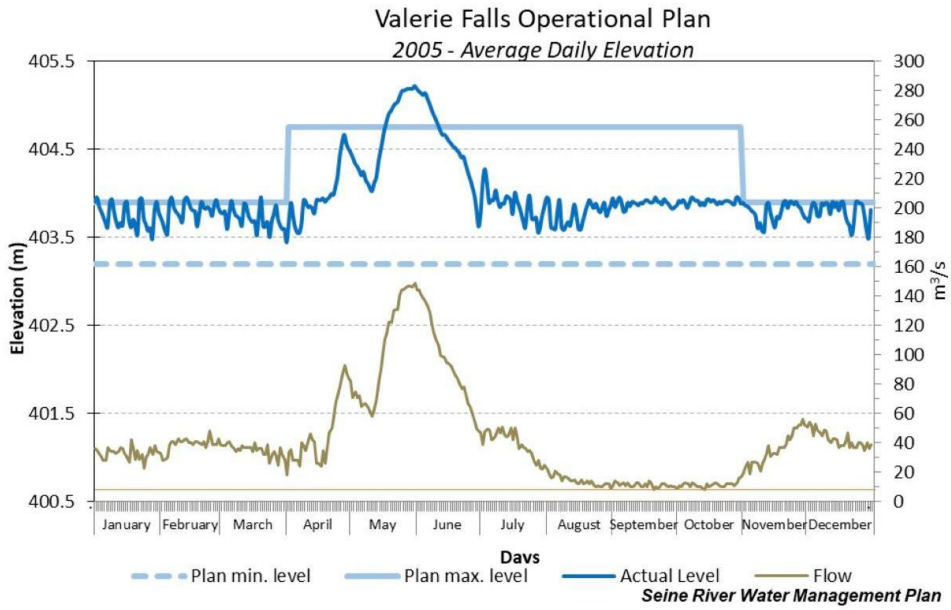
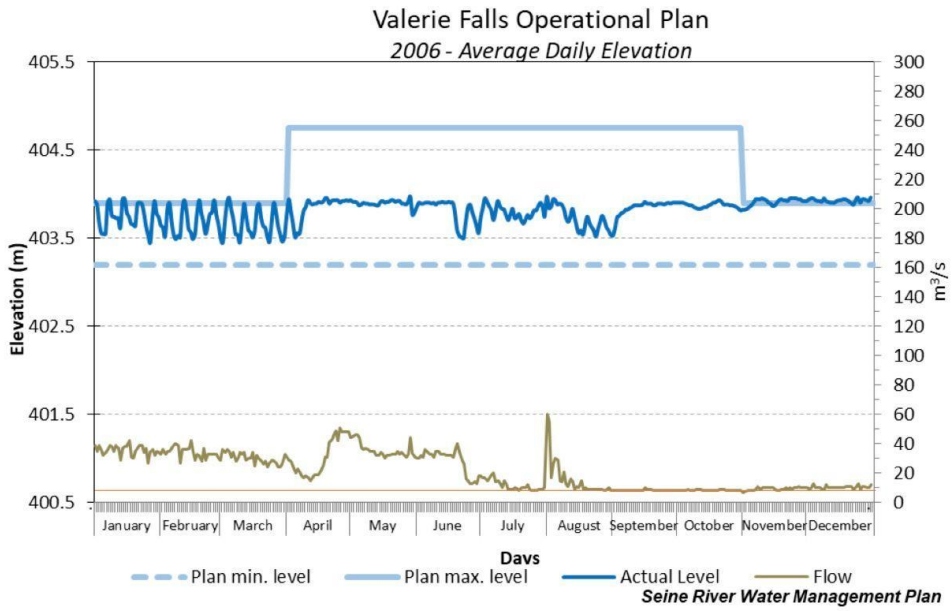
415.65
415.45
415.25
415.05
414.85
414.65
414.45
414.25
Elevation (m)
January
February
March
April
May
June
July
August
September
October
November
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed

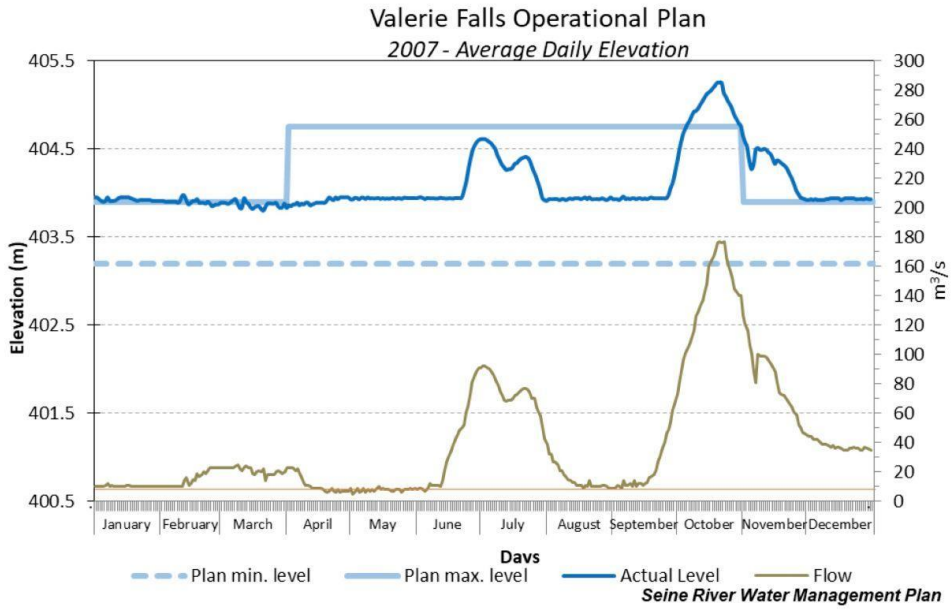

Lower Marmion Operational Plan
2022 - Average Daily Elevation
416.05
415.85
415.65
415.45
415.25
415.05
414.85
414.65
414.45
414.25
Elevation (m)
January
February
March
April
May
June
July
August
September
October
November
December
Days
Plan min. level
Plan max. level
Actual Level
Sluice Open
Sluice Closed

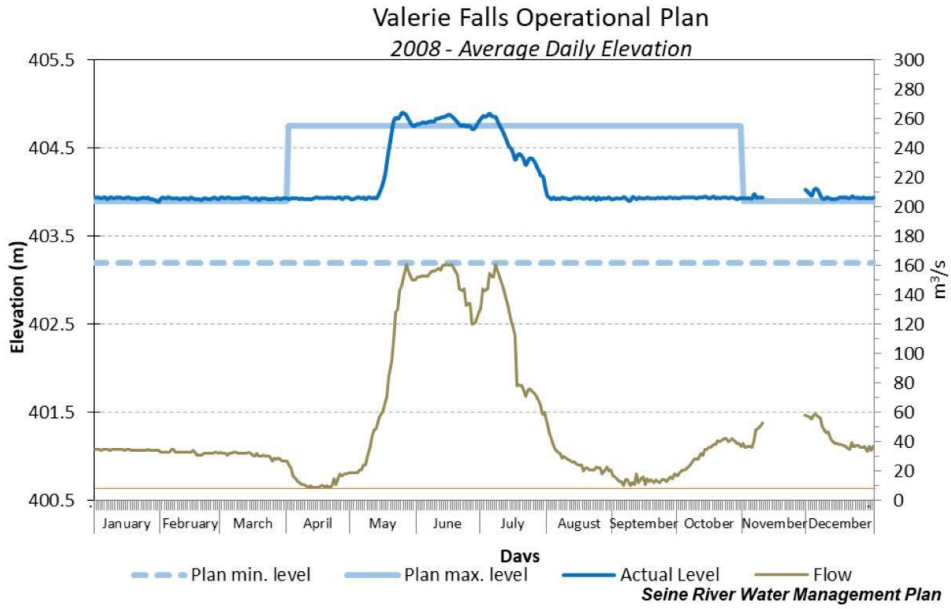
Appendix 8: Valerie Falls Operational Plan

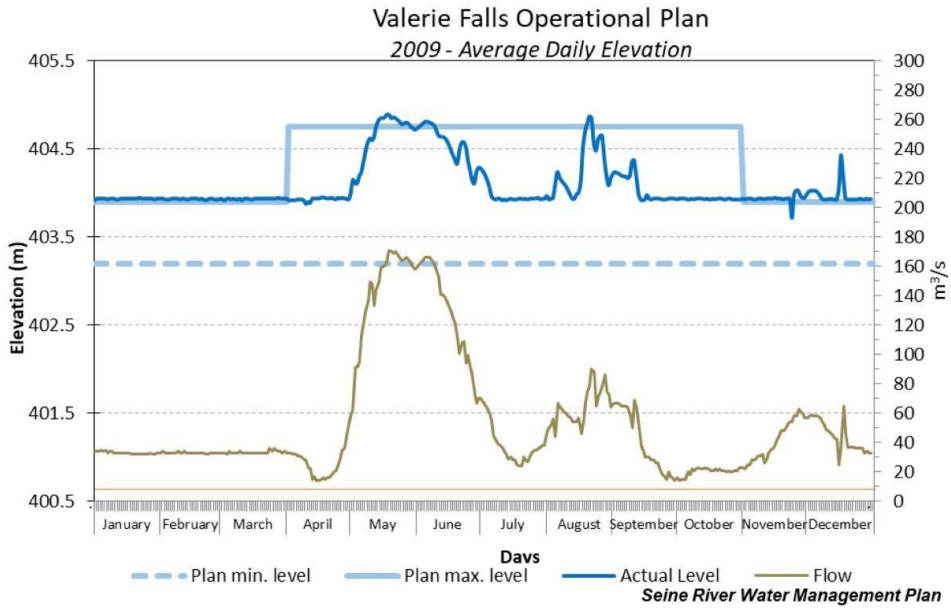





Valerie Falls Operational Plan
2006 - Average Daily Elevation
405.5
404.5
403.5
402.5
401.5
400.5
Elevation (m)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
m³/s
January
February
March
April
May
June
July
August
September
October
November
December
Davs
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2007 - Average Daily Elevation
405.5
404.5
403.5
402.5
401.5
400.5
Elevation (m)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
m³/s
January
February
March
April
May
June
July
August
September
October
November
December
Davs
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2008 - Average Daily Elevation
Elevation (m)
405.5
404.5
403.5
402.5
401.5
400.5
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
m³/s
January
February
March
April
May
June
July
August
September
October
November
December
Davs
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2009 - Average Daily Elevation
Elevation (m)
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403.5
402.5
401.5
400.5
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
m³/s
January
February
March
April
May
June
July
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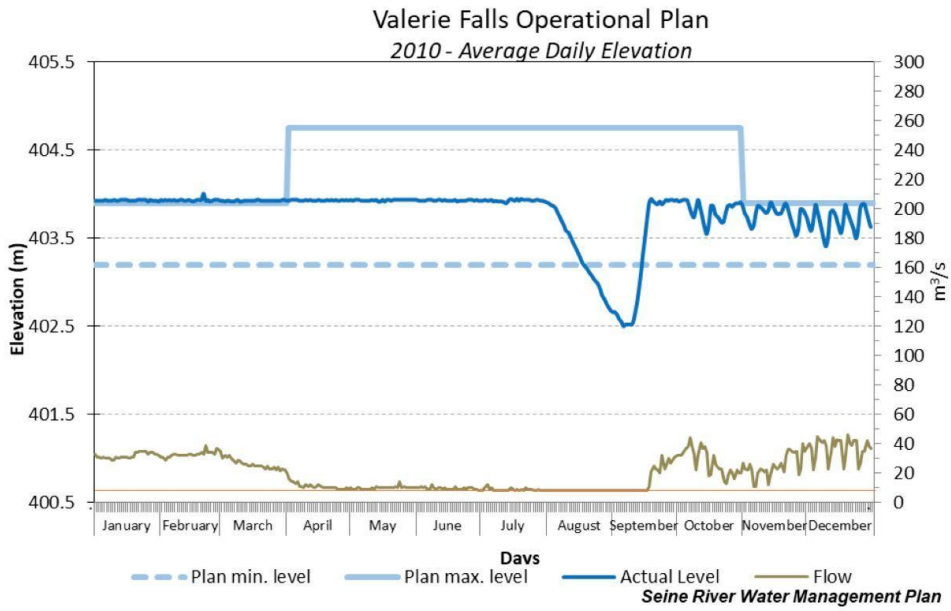
September
October
November
December
Davs
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2010 - Average Daily Elevation
405.5
404.5
403.5
402.5
401.5
400.5
Elevation (m)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
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m³/s
January
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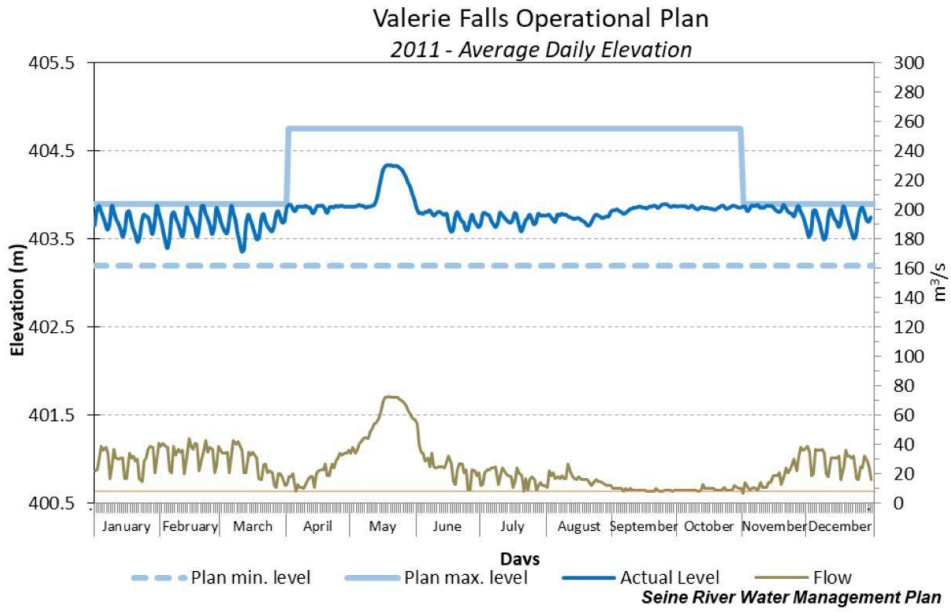
November
December
Days
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2011 - Average Daily Elevation
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402.5
401.5
400.5
Elevation (m)
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280
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240
220
200
180
160
140
120
100
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60
40
20
0
m³/s
January
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October
November
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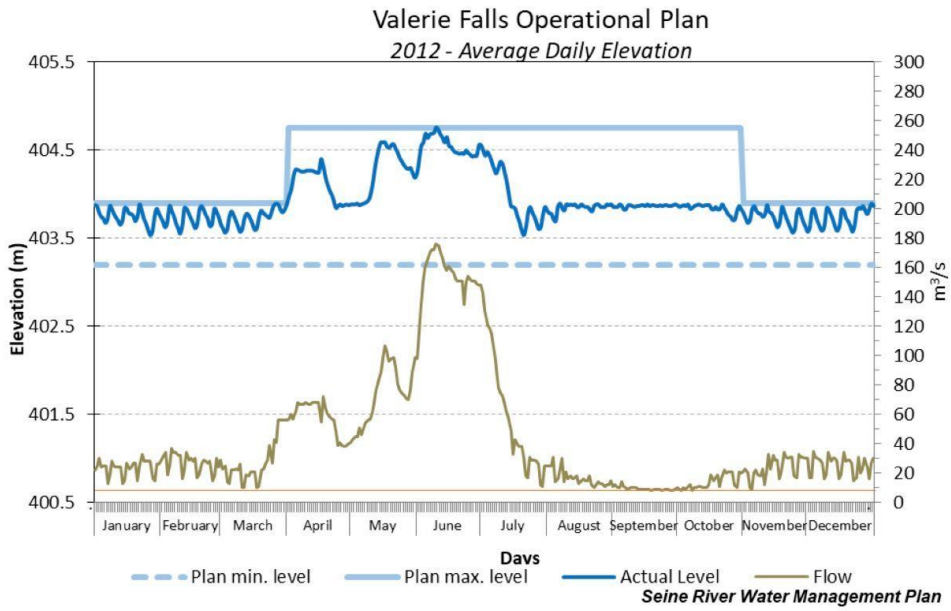
Days
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2012 - Average Daily Elevation
Elevation (m)
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402.5
401.5
400.5
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280
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240
220
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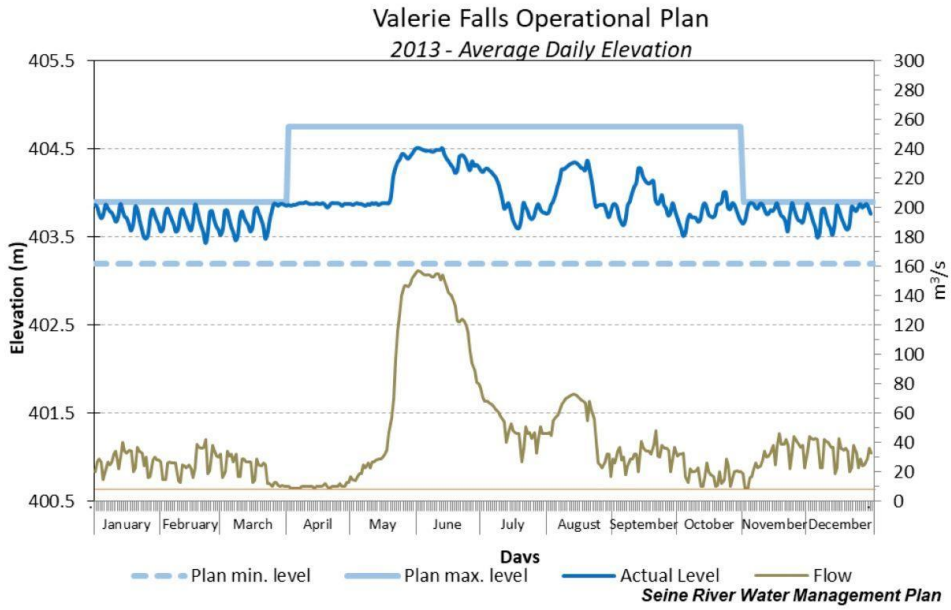
Days
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan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2013 - Average Daily Elevation
Elevation (m)
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220
200
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160
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m³/s
January
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September
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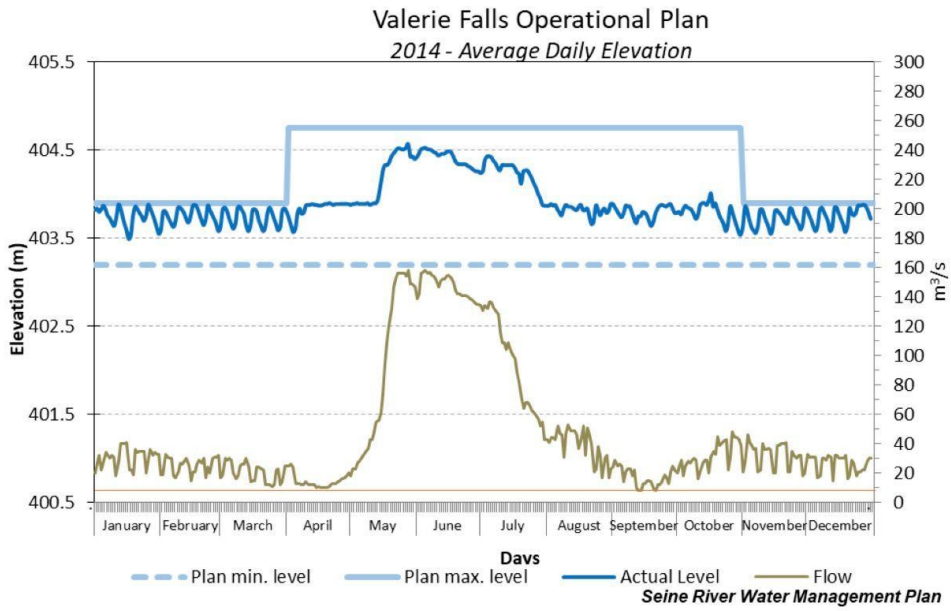
Days
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2014 - Average Daily Elevation
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400.5
Elevation (m)
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280
260
240
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200
180
160
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20
0
m³/s
January
February
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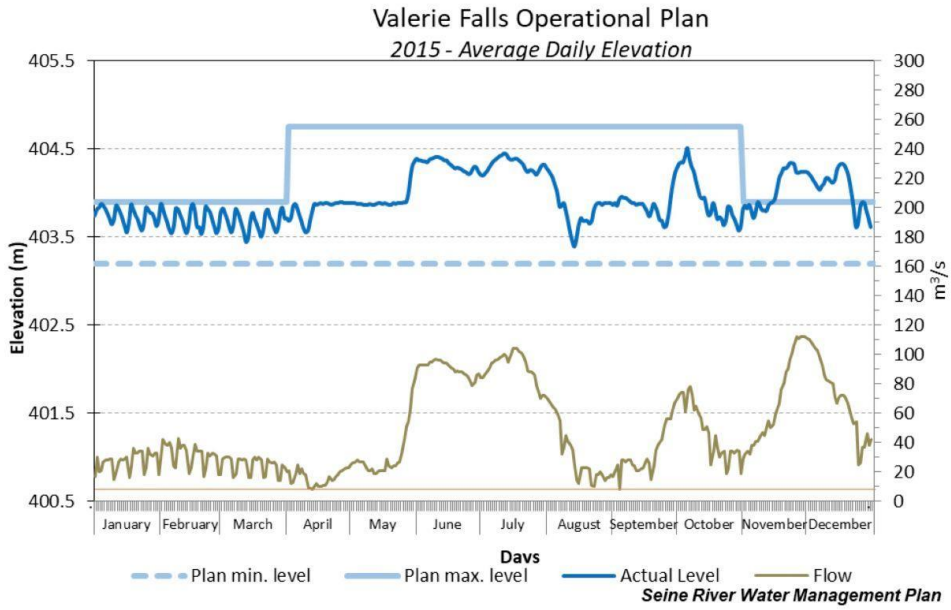
Days
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan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2015 - Average Daily Elevation
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Elevation (m)
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m³/s
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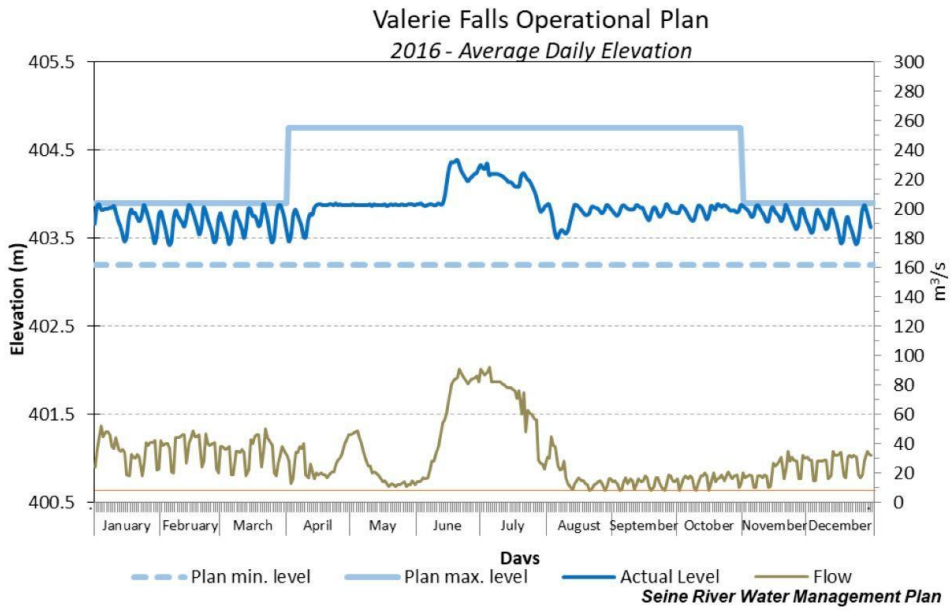
Days
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan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100
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20
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m³/s
January
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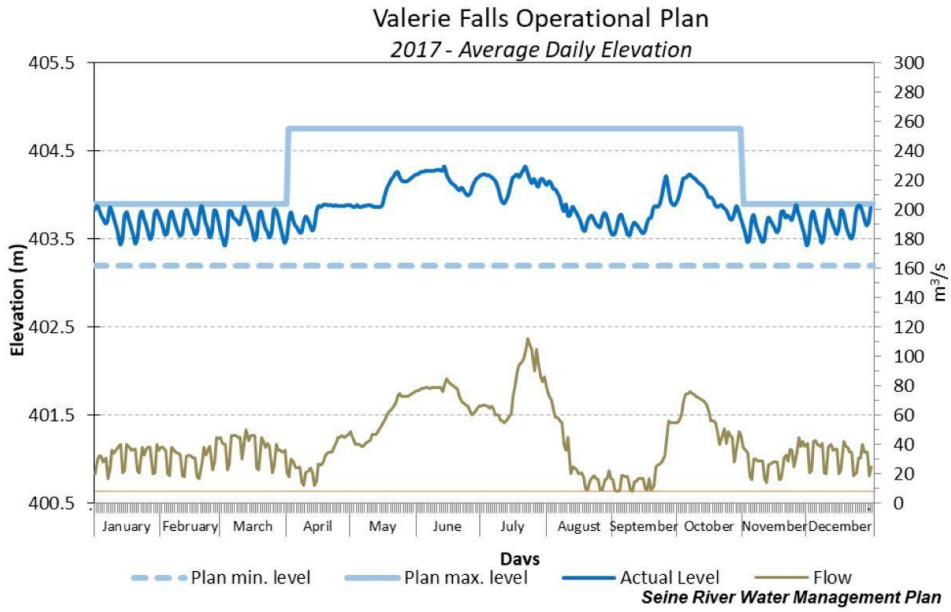
Days
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan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0
m³/s
January
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Days
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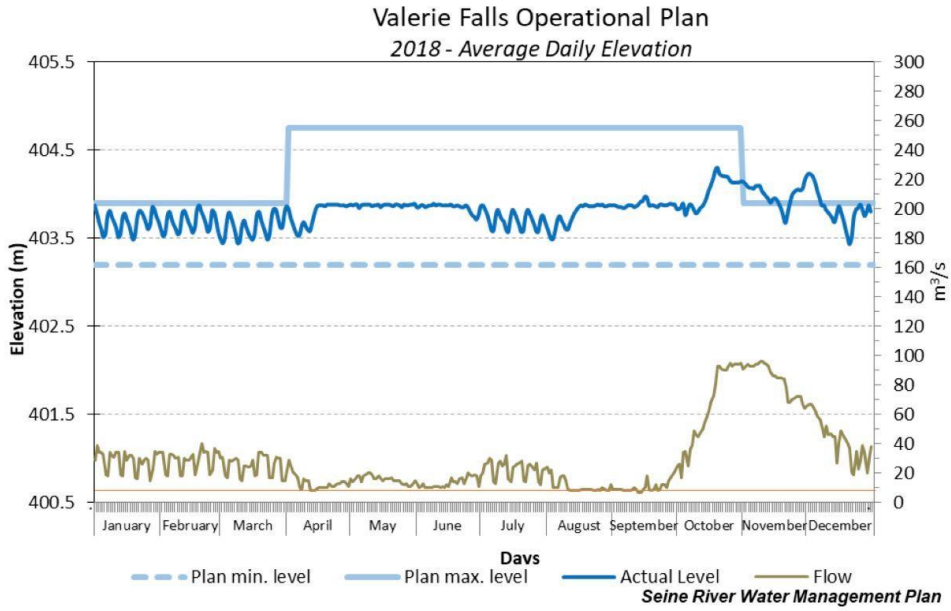
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
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0
m³/s
January
February
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November
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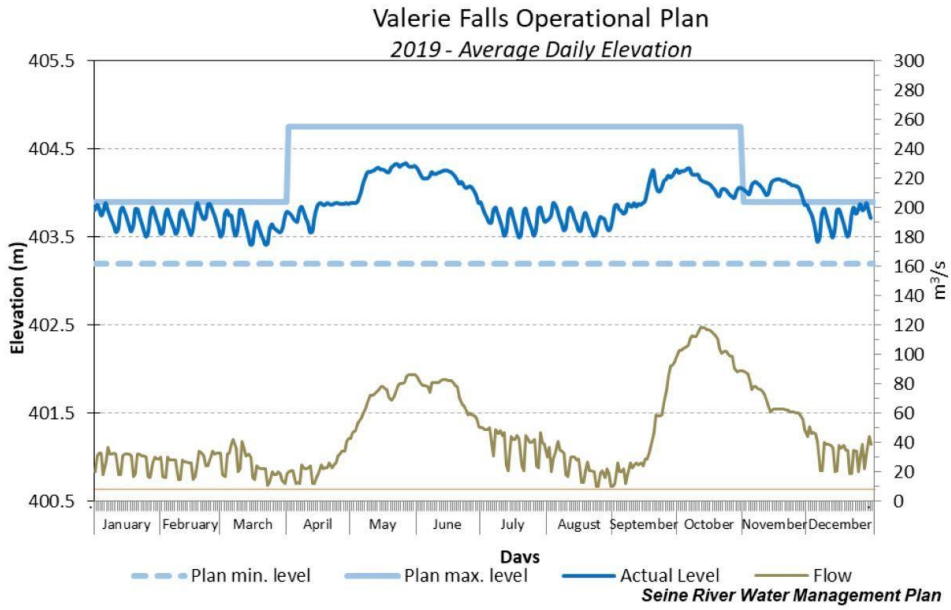
Davs
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2019 - Average Daily Elevation
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m³/s
January
February
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November
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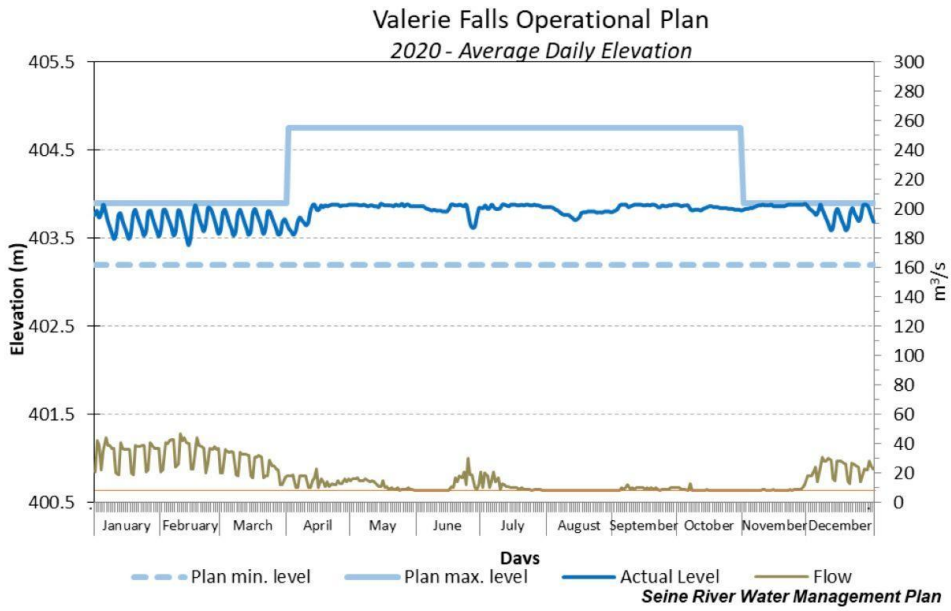
Davs
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan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m³/s
January
February
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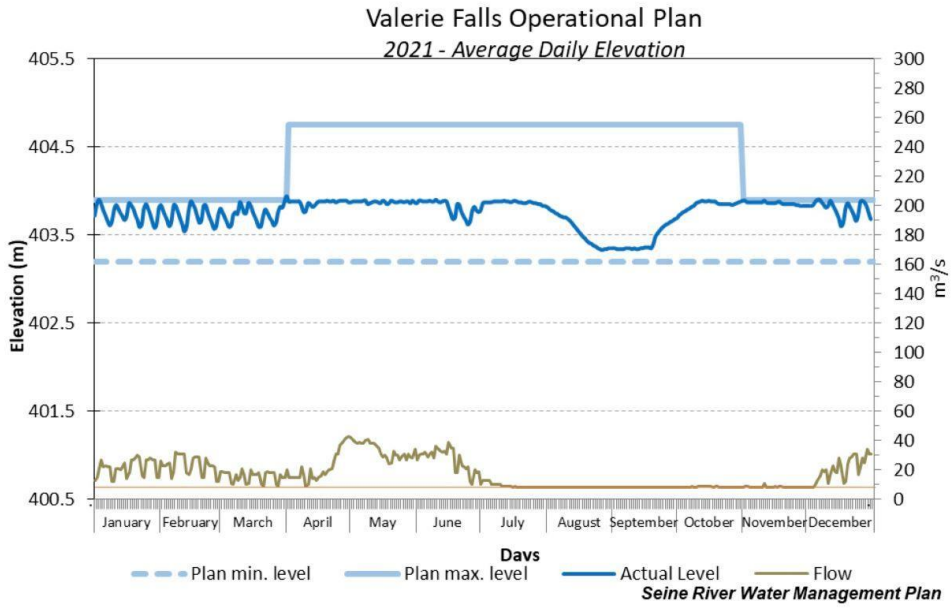
Davs
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2021 - Average Daily Elevation
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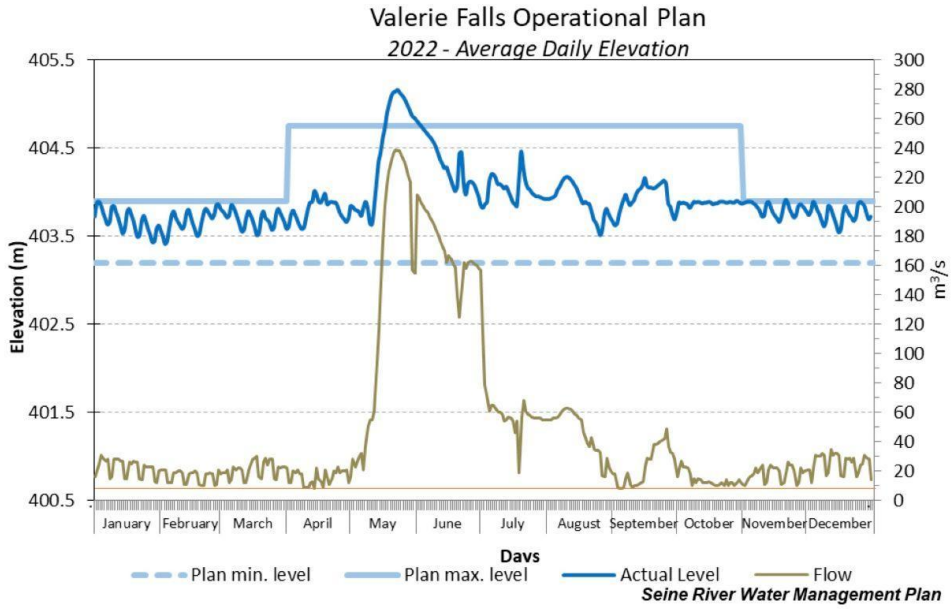
403.5
402.5
401.5
400.5
Elevation (m)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
m³/s
January
February
March
April
May
June
July
August
September
October
November
December
Davs
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan


Valerie Falls Operational Plan
2022 - Average Daily Elevation
405.5
404.5
403.5
402.5
401.5
400.5
Elevation (m)
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
m³/s
January
February
March
April
May
June
July
August
September
October
November
December
Days
Plan min. level
Plan max. level
Actual Level
Flow
Seine River Water Management Plan

Appendix 9: Raft Lake Storage Volumes

Elevation [m]	Upper Marmion [m^3/day]	Lower Marmion [m^3/day]	Total Storage [m^3/day]
412.50	0.0	0.0	0.00
412.51	6.6	0.0	6.59
412.52	13.2	0.0	13.19
412.53	19.8	0.0	19.78
412.54	26.4	0.0	26.38
412.55	33.0	0.0	32.97
412.56	39.6	0.0	39.57
412.57	46.2	0.0	46.16
412.58	52.8	0.0	52.76
412.59	59.4	0.0	59.35
412.60	65.9	0.0	65.95
412.61	72.5	0.0	72.54
412.62	79.1	0.0	79.14
412.63	85.7	0.0	85.73
412.64	92.3	0.0	92.33
412.65	98.9	0.0	98.92
412.66	105.5	0.0	105.52
412.67	112.1	0.0	112.11
412.68	118.7	0.0	118.71
412.69	125.3	0.0	125.30
412.70	131.9	0.0	131.90
412.71	138.5	0.0	138.49

412.72	145.1	0.0	145.09
412.73	151.7	0.0	151.68
412.74	158.3	0.0	158.28
412.75	164.9	0.0	164.87
412.76	171.5	0.0	171.47
412.77	178.1	0.0	178.06
412.78	184.7	0.0	184.66
412.79	191.3	0.0	191.25
412.80	197.8	0.0	197.85
412.81	204.4	0.0	204.44
412.82	211.0	0.0	211.04
412.83	217.6	0.0	217.63
412.84	224.2	0.0	224.23
412.85	230.8	0.0	230.82
412.86	237.4	0.0	237.42
412.87	244.0	0.0	244.01
412.88	250.6	0.0	250.61
412.89	257.2	0.0	257.20
412.90	263.8	0.0	263.80
412.91	270.4	0.0	270.39

Elevation [m]	Upper Marmion [m^3/day]	Lower Marmion [m^3/day]	Total Storage [m^3/day]
412.92	277.0	0.0	276.99
412.93	283.6	0.0	283.58
412.94	290.2	0.0	290.18
412.95	296.8	0.0	296.77

412.96	303.4	0.0	303.37
412.97	310.0	0.0	309.96
412.98	316.6	0.0	316.56
412.99	323.2	0.0	323.15
413.00	329.7	0.0	329.75
413.01	336.3	0.0	336.34
413.02	342.9	0.0	342.93
413.03	349.5	0.0	349.53
413.04	356.1	0.0	356.12
413.05	362.7	0.0	362.72
413.06	369.3	0.0	369.31
413.07	375.9	0.0	375.91
413.08	382.5	0.0	382.50
413.09	389.1	0.0	389.10
413.10	395.7	0.0	395.69
413.11	402.3	0.0	402.29
413.12	408.9	0.0	408.88
413.13	415.5	0.0	415.48
413.14	422.1	0.0	422.07
413.15	428.7	0.0	428.67
413.16	435.3	0.0	435.26
413.17	441.9	0.0	441.86
413.18	448.5	0.0	448.45
413.19	455.0	0.0	455.05
413.20	461.6	0.0	461.64
413.21	468.2	0.0	468.24
413.22	474.8	0.0	474.83
413.23	481.4	0.0	481.43

413.24	488.0	0.0	488.02
413.25	494.6	0.0	494.62
413.26	501.2	0.0	501.21
413.27	507.8	0.0	507.81
413.28	514.4	0.0	514.40
413.29	521.0	0.0	521.00
413.30	527.6	0.0	527.59
413.31	534.2	0.0	534.19
413.32	540.8	0.0	540.78
413.33	547.4	0.0	547.38

Elevation [m]	Upper Marmion [m^3/day]	Lower Marmion [m^3/day]	Total Storage [m^3/day]
413.34	554.0	0.0	553.97
413.35	560.6	0.0	560.57
413.36	567.2	0.0	567.16
413.37	573.8	0.0	573.76
413.38	580.4	0.0	580.35
413.39	586.9	0.0	586.95
413.40	593.5	0.0	593.54

413.41	600.1	0.0	600.14
413.42	606.7	0.0	606.73
413.43	613.3	0.0	613.33
413.44	619.9	0.0	619.92
413.45	626.5	0.0	626.52
413.46	633.1	0.0	633.11
413.47	639.7	0.0	639.71
413.48	646.3	0.0	646.30
413.49	652.9	0.0	652.90
413.50	659.5	0.0	659.49
413.51	666.1	0.0	666.08
413.52	672.7	0.0	672.68
413.53	679.3	0.0	679.27
413.54	685.9	0.0	685.87
413.55	692.5	0.0	692.46
413.56	699.1	0.0	699.06
413.57	705.7	0.0	705.65
413.58	712.2	0.0	712.25
413.59	718.8	0.0	718.84
413.60	725.4	0.0	725.44
413.61	732.0	0.0	732.03
413.62	738.6	0.0	738.63
413.63	745.2	0.0	745.22
413.64	751.8	0.0	751.82
413.65	758.4	0.0	758.41
413.66	765.0	0.0	765.01
413.67	771.6	0.0	771.60
413.68	778.2	0.0	778.20

413.69	784.8	0.0	784.79
413.70	791.4	0.0	791.39
413.71	798.0	0.0	797.98
413.72	804.6	0.0	804.58
413.73	811.2	0.0	811.17
413.74	817.8	0.0	817.77
413.75	824.4	0.0	824.36

Elevation [m]	Upper Marmion [m^3/day]	Lower Marmion [m^3/day]	Total Storage [m^3/day]
413.76	831.0	0.0	830.96
413.77	837.6	0.0	837.55
413.78	844.1	0.0	844.15
413.79	850.7	0.0	850.74
413.80	857.3	0.0	857.34
413.81	863.9	0.0	863.93
413.82	870.5	0.0	870.53
413.83	877.1	0.0	877.12
413.84	883.7	0.0	883.72
413.85	890.3	0.0	890.31
413.86	896.9	0.0	896.91
413.87	903.5	0.0	903.50

413.88	910.1	0.0	910.10
413.89	916.7	0.0	916.69
413.90	923.3	0.0	923.29
413.91	929.9	0.0	929.88
413.92	936.5	0.0	936.48
413.93	943.1	0.0	943.07
413.94	949.7	0.0	949.67
413.95	956.3	0.0	956.26
413.96	962.9	0.0	962.86
413.97	969.5	0.0	969.45
413.98	976.0	0.0	976.05
413.99	982.6	0.0	982.64
414.00	989.2	0.0	989.24
414.01	995.8	0.0	995.83
414.02	1,002.4	0.0	1002.42
414.03	1,009.0	0.0	1009.02
414.04	1,015.6	0.0	1015.61
414.05	1,022.2	0.0	1022.21
414.06	1,028.8	0.0	1028.80
414.07	1,035.4	0.0	1035.40
414.08	1,042.0	0.0	1041.99
414.09	1,048.6	0.0	1048.59
414.10	1,055.2	0.0	1055.18
414.11	1,061.8	0.0	1061.78
414.12	1,068.4	0.0	1068.37
414.13	1,075.0	0.0	1074.97
414.14	1,081.6	0.0	1081.56
414.15	1,088.2	0.0	1088.16

414.16	1,094.8	0.0	1094.75
414.17	1,101.3	0.0	1101.35

Elevation [m]	Upper Marmion [m^3/day]	Lower Marmion [m^3/day]	Total Storage [m^3/day]
414.18	1,107.9	0.0	1107.94
414.19	1,114.5	0.0	1114.54
414.20	1,121.1	0.0	1121.13
414.21	1,127.7	0.0	1127.73
414.22	1,134.3	0.0	1134.32
414.23	1,140.9	0.0	1140.92
414.24	1,147.5	0.0	1147.51
414.25	1,154.1	0.0	1154.11
414.26	1,160.7	0.0	1160.70
414.27	1,167.3	0.0	1167.30
414.28	1,173.9	0.0	1173.89
414.29	1,180.5	0.0	1180.49
414.30	1,187.1	0.0	1187.08
414.31	1,193.7	0.0	1193.68
414.32	1,200.3	0.0	1200.27
414.33	1,206.9	0.0	1206.87
414.34	1,213.5	0.0	1213.46

414.35	1,220.1	0.0	1220.06
414.36	1,226.7	0.0	1226.65
414.37	1,233.2	0.0	1233.25
414.38	1,239.8	0.0	1239.84
414.39	1,246.4	0.0	1246.44
414.40	1,253.0	0.0	1253.03
414.41	1,259.6	0.0	1259.63
414.42	1,266.2	0.0	1266.22
414.43	1,272.8	0.0	1272.82
414.44	1,279.4	0.0	1279.41
414.45	1,286.0	0.0	1286.01
414.46	1,292.6	0.0	1292.60
414.47	1,299.2	0.0	1299.20
414.48	1,305.8	0.0	1305.79
414.49	1,312.4	0.0	1312.39
414.50	1,319.0	0.0	1318.98
414.51	1,325.6	0.0	1325.57
414.52	1,332.2	0.0	1332.17
414.53	1,338.8	0.0	1338.76
414.54	1,345.4	0.0	1345.36
414.55	1,352.0	0.0	1351.95
414.56	1,358.5	0.0	1358.55
414.57	1,365.1	0.0	1365.14
414.58	1,371.7	0.0	1371.74
414.59	1,378.3	0.0	1378.33

Elevation [m]	Upper Marmion [m^3/day]	Lower Marmion [m^3/day]	Total Storage [m^3/day]
414.60	1,384.9	0.0	1384.93
414.61	1,391.5	0.0	1391.52
414.62	1,398.1	0.0	1398.12
414.63	1,404.7	0.0	1404.71
414.64	1,411.3	0.0	1411.31
414.65	1,417.9	0.0	1417.90
414.66	1,424.5	0.0	1424.50
414.67	1,431.1	0.0	1431.09
414.68	1,437.7	0.0	1437.69
414.69	1,444.3	0.0	1444.28
414.70	1,450.9	0.0	1450.88
414.71	1,457.5	0.0	1457.47
414.72	1,464.1	0.0	1464.07
414.73	1,470.7	0.0	1470.66
414.74	1,477.3	0.0	1477.26
414.75	1,483.9	0.0	1483.85
414.76	1,490.4	0.0	1490.45
414.77	1,497.0	0.0	1497.04
414.78	1,503.6	0.0	1503.64
414.79	1,510.2	0.0	1510.23
414.80	1,516.8	0.0	1516.83
414.81	1,523.4	4.77	1528.18

414.82	1,530.0	9.53	1539.54
414.83	1,536.6	14.30	1550.90
414.84	1,543.2	19.06	1562.25
414.85	1,549.8	23.83	1573.61
414.86	1,556.4	28.60	1584.96
414.87	1,563.0	33.36	1596.32
414.88	1,569.5	38.13	1607.68
414.89	1,576.1	42.90	1619.03
414.90	1,582.7	47.66	1630.39
414.91	1,589.3	52.43	1641.75
414.92	1,595.9	57.19	1653.10
414.93	1,602.5	61.96	1664.46
414.94	1,609.1	66.73	1675.81
414.95	1,615.7	71.49	1687.17
414.96	1,622.3	76.26	1698.53
414.97	1,628.9	81.03	1709.88
414.98	1,635.4	85.79	1721.24
414.99	1,642.0	90.56	1732.59
415.00	1,648.6	95.32	1743.95
415.01	1,655.2	100.09	1755.31

Elevation [m]	**Upper Marmion [m^3/day]**	**Lower Marmion [m^3/day]**	**Total Storage [m^3/day]**

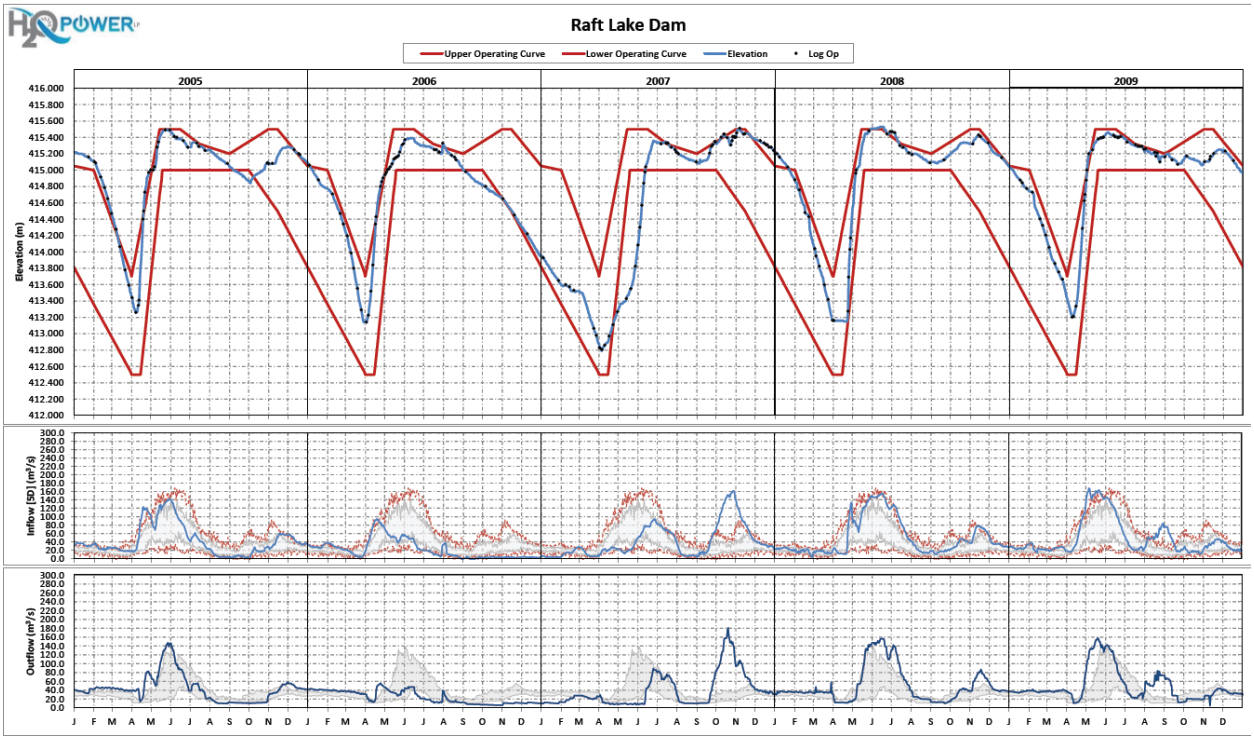
415.02	1,661.8	104.86	1766.66
415.03	1,668.4	109.62	1778.02
415.04	1,675.0	114.39	1789.38
415.05	1,681.6	119.16	1800.73
415.06	1,688.2	123.92	1812.09
415.07	1,694.8	128.69	1823.44
415.08	1,701.3	133.45	1834.80
415.09	1,707.9	138.22	1846.16
415.10	1,714.5	142.99	1857.51
415.11	1,721.1	147.75	1868.87
415.12	1,727.7	152.52	1880.23
415.13	1,734.3	157.28	1891.58
415.14	1,740.9	162.05	1902.94
415.15	1,747.5	166.82	1914.29
415.16	1,754.1	171.58	1925.65
415.17	1,760.7	176.35	1937.01
415.18	1,767.2	181.12	1948.36
415.19	1,773.8	185.88	1959.72
415.20	1,780.4	190.65	1971.08
415.21	1,787.0	195.41	1982.43
415.22	1,793.6	200.18	1993.79
415.23	1,800.2	204.95	2005.14
415.24	1,806.8	209.71	2016.50
415.25	1,813.4	214.48	2027.86
415.26	1,820.0	219.25	2039.21
415.27	1,826.6	224.01	2050.57
415.28	1,833.1	228.78	2061.92

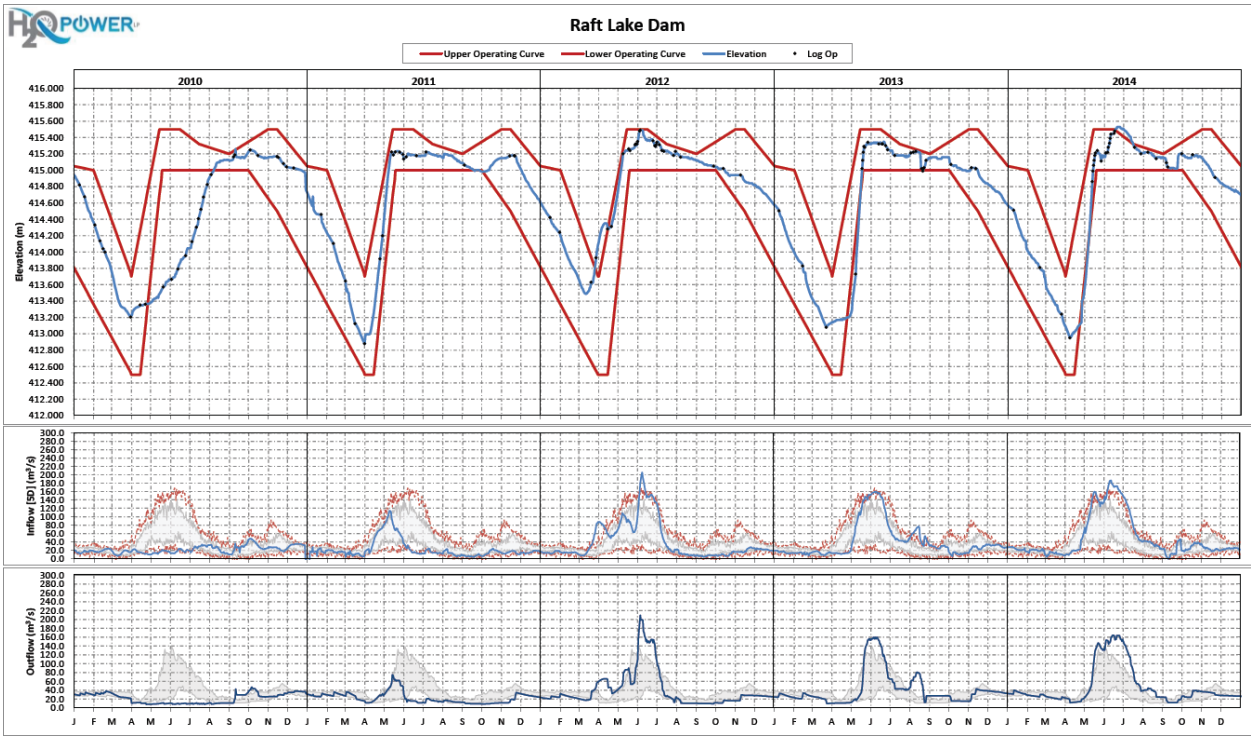
415.29	1,839.7	233.54	2073.28
415.30	1,846.3	238.31	2084.64
415.31	1,852.9	243.08	2095.99
415.32	1,859.5	247.84	2107.35
415.33	1,866.1	252.61	2118.71
415.34	1,872.7	257.37	2130.06
415.35	1,879.3	262.14	2141.42
415.36	1,885.9	266.91	2152.77
415.37	1,892.5	271.67	2164.13
415.38	1,899.0	276.44	2175.49
415.39	1,905.6	281.21	2186.84
415.40	1,912.2	285.97	2198.20
415.41	1,918.8	290.74	2209.56
415.42	1,925.4	295.50	2220.91
415.43	1,932.0	300.27	2232.27

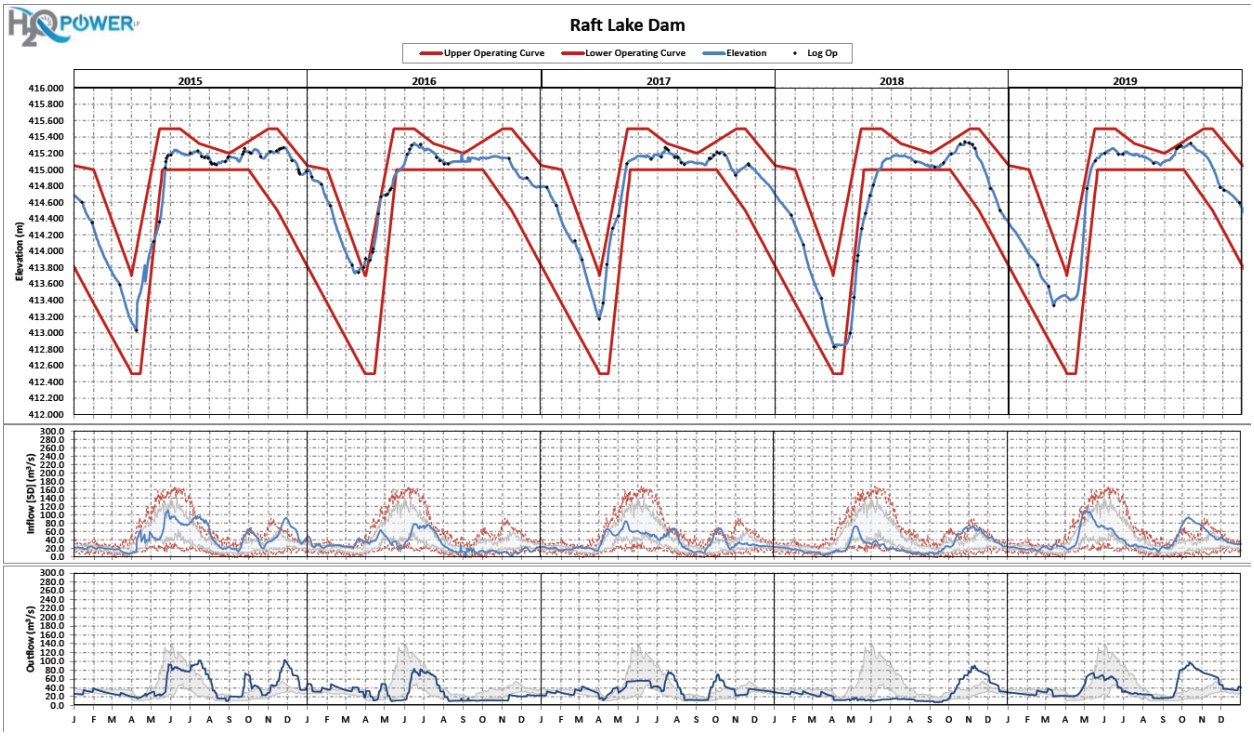
Elevation [m]	Upper Marmion [m^3/day]	Lower Marmion [m^3/day]	Total Storage [m^3/day]
415.44	1,938.6	305.04	2243.62
415.45	1,945.2	309.80	2254.98
415.46	1,951.8	314.57	2266.34
415.47	1,958.4	319.34	2277.69

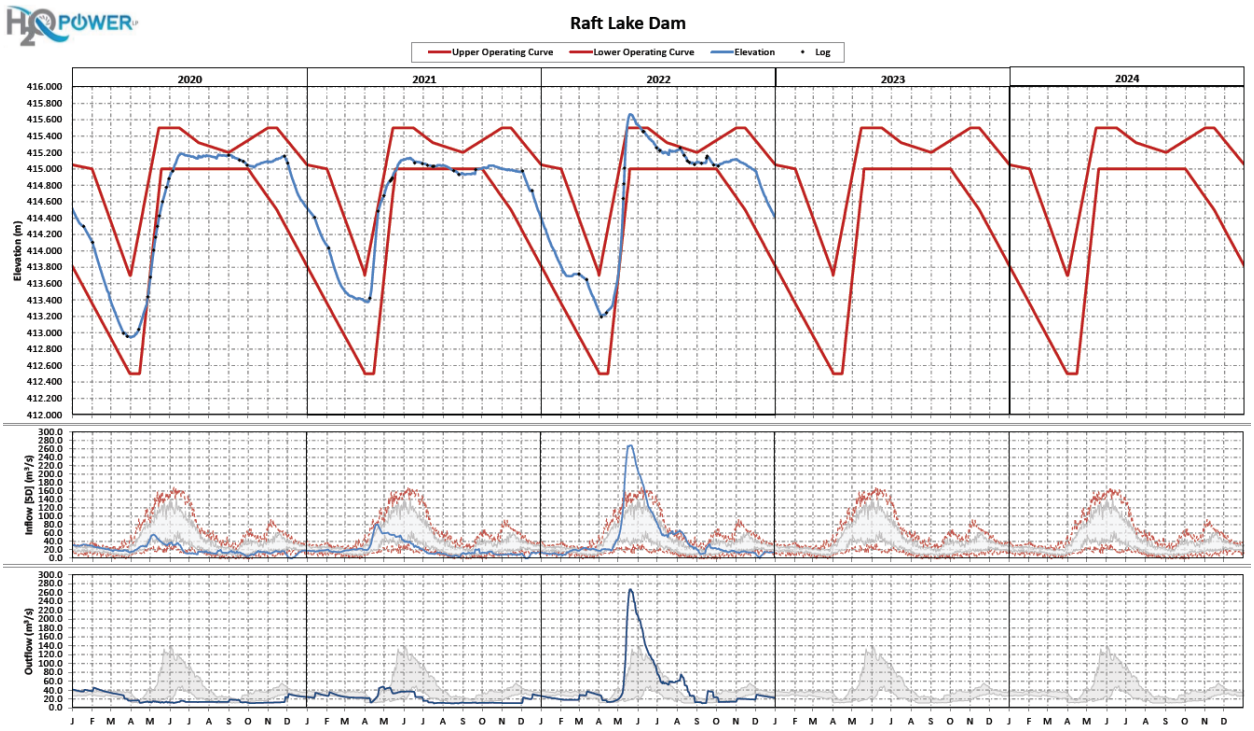
415.48	1,964.9	324.10	2289.05
415.49	1,971.5	328.87	2300.40
415.50	1,978.1	333.63	2311.76

Appendix 10: Raft Lake Hydrologic Data

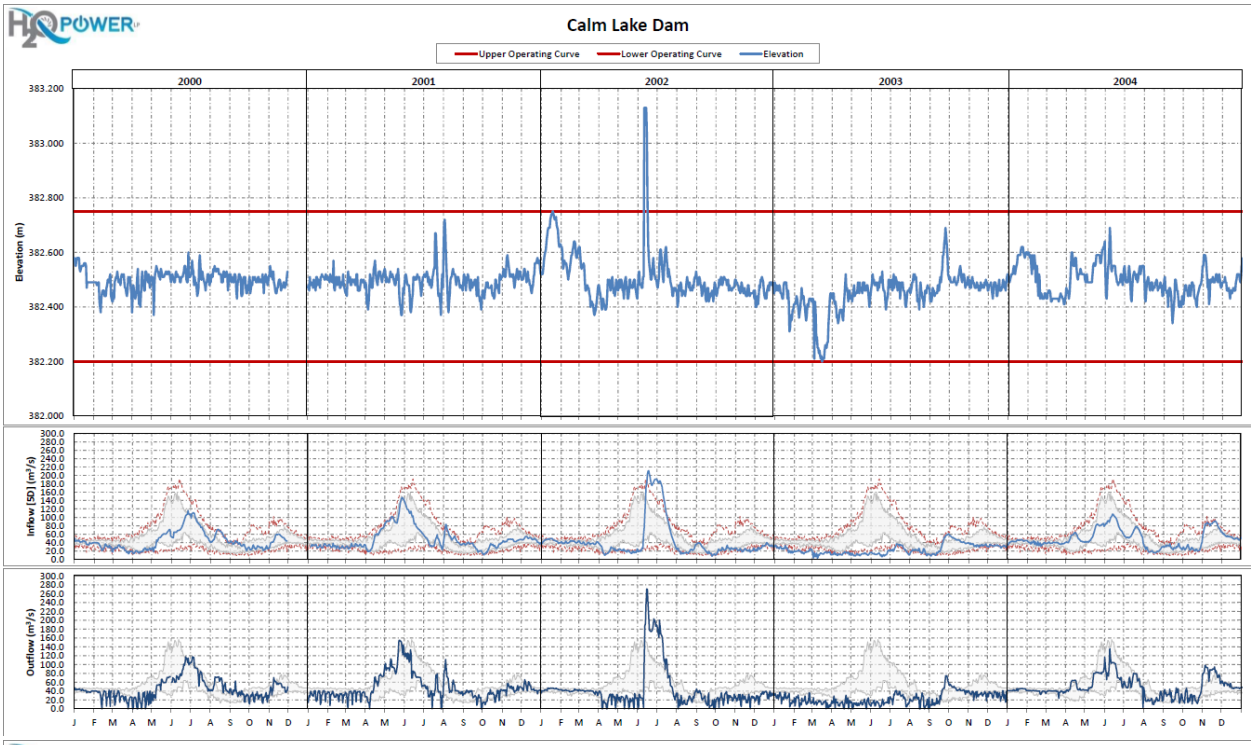


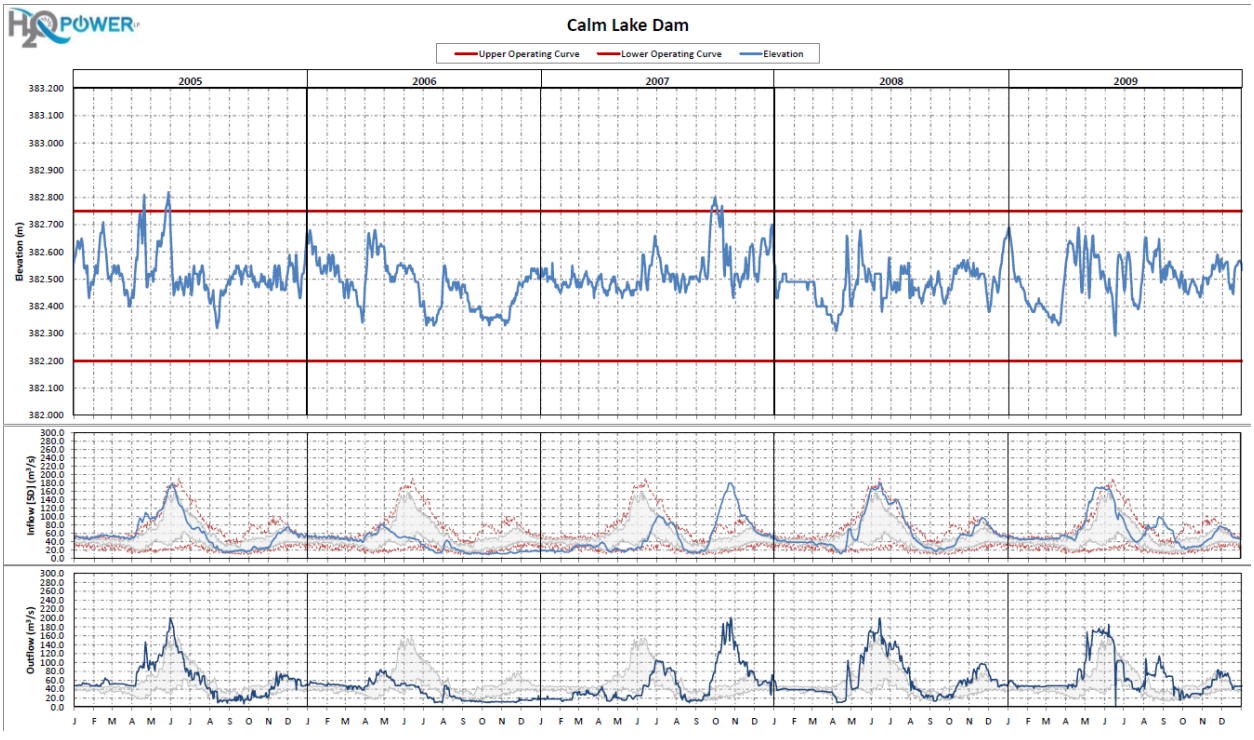


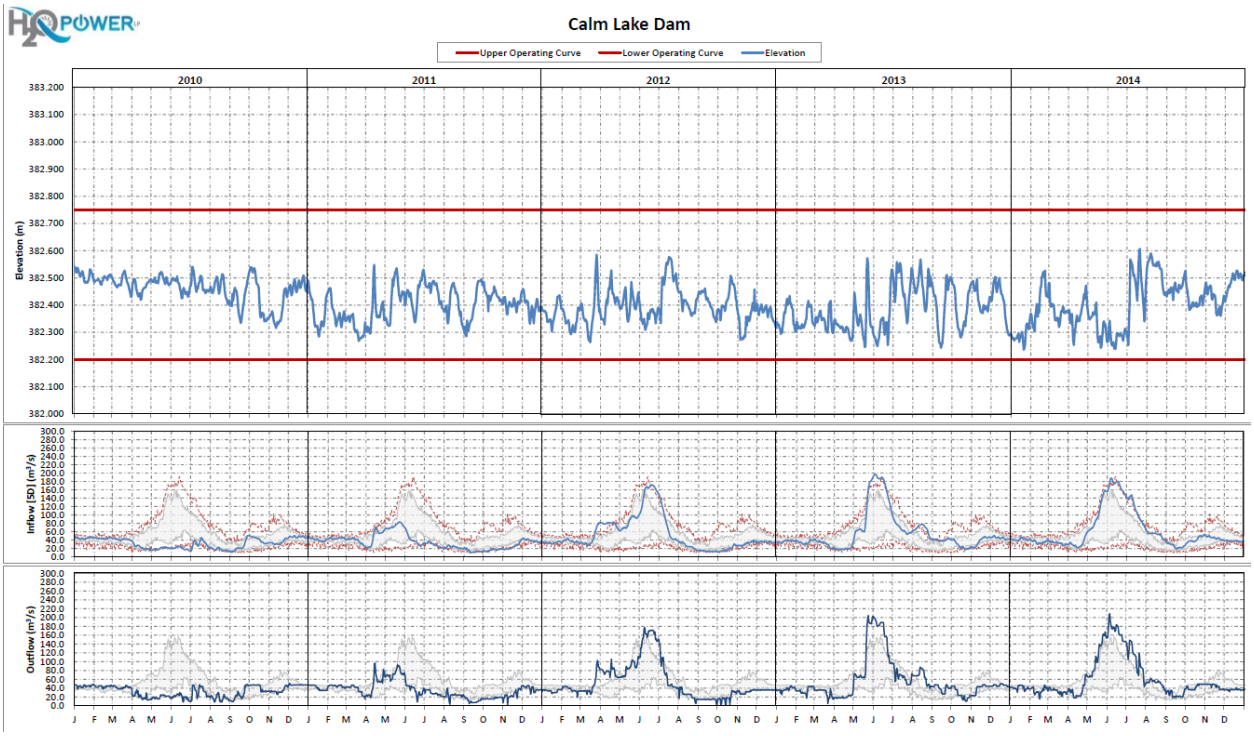

Raft Lake Dam
Upper Operating Curve
Lower Operating Curve
Elevation
Log Op
2015
2016
2017
2018
2019
Elevation (m)
Inflow [SD] (m³/s)
Outflow (m³/s)
J F M A M J J A S O N D

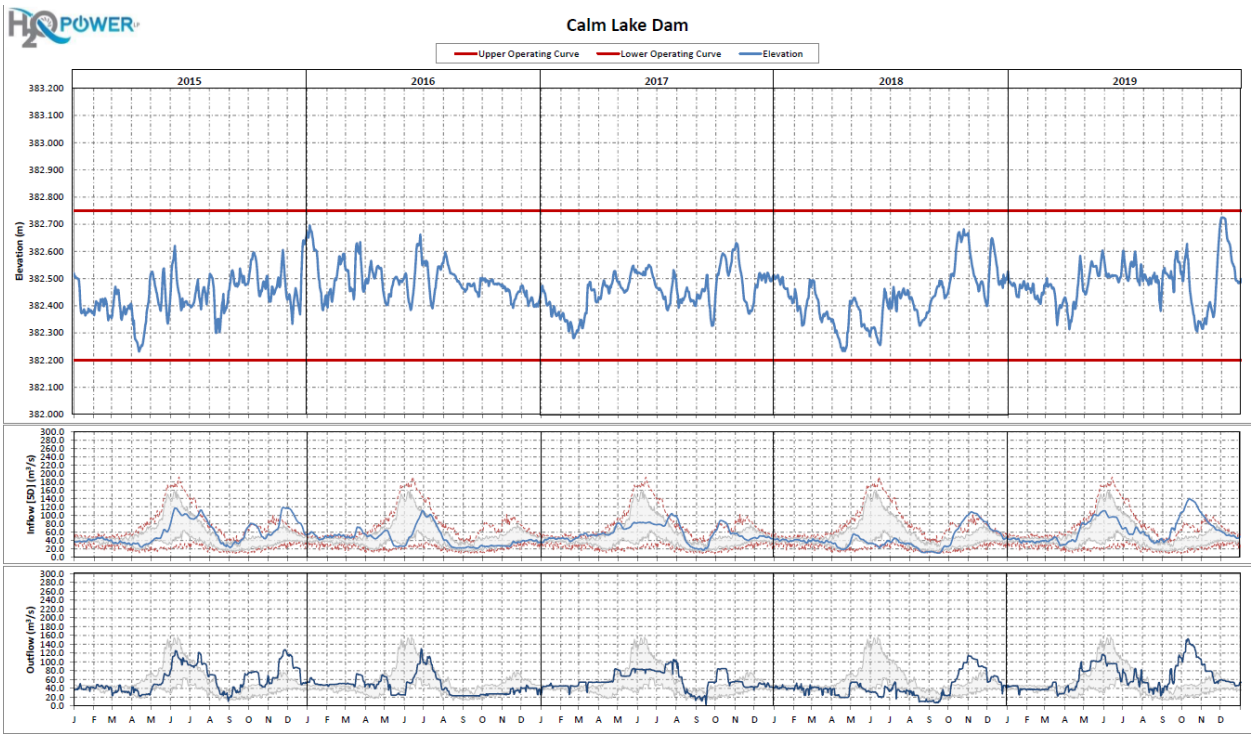

Raft Lake Dam
Upper Operating Curve
Lower Operating Curve
Elevation
Log
2020
2021
2022
2023
2024
Elevation (m)
Inflow [SD] (m³/s)
Outflow (m³/s)
J F M A M J J A S O N D

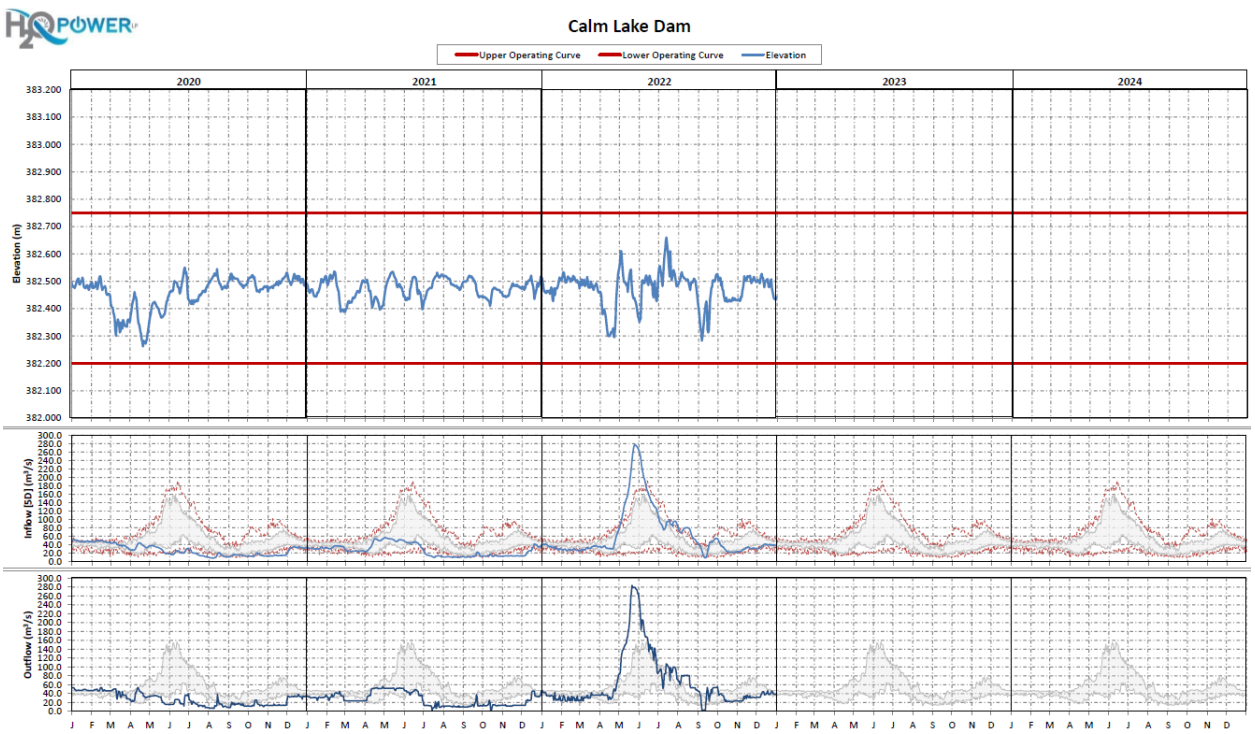
Appendix 11: Calm Lake Hydrologic Data



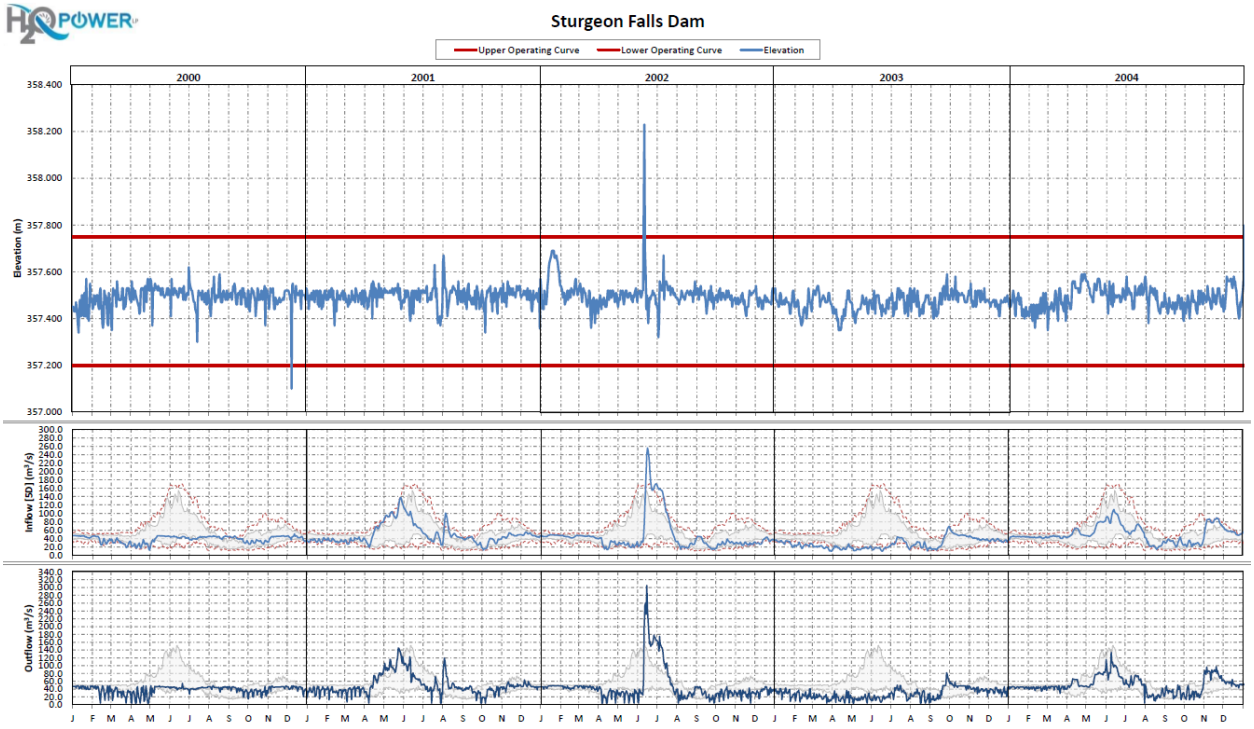


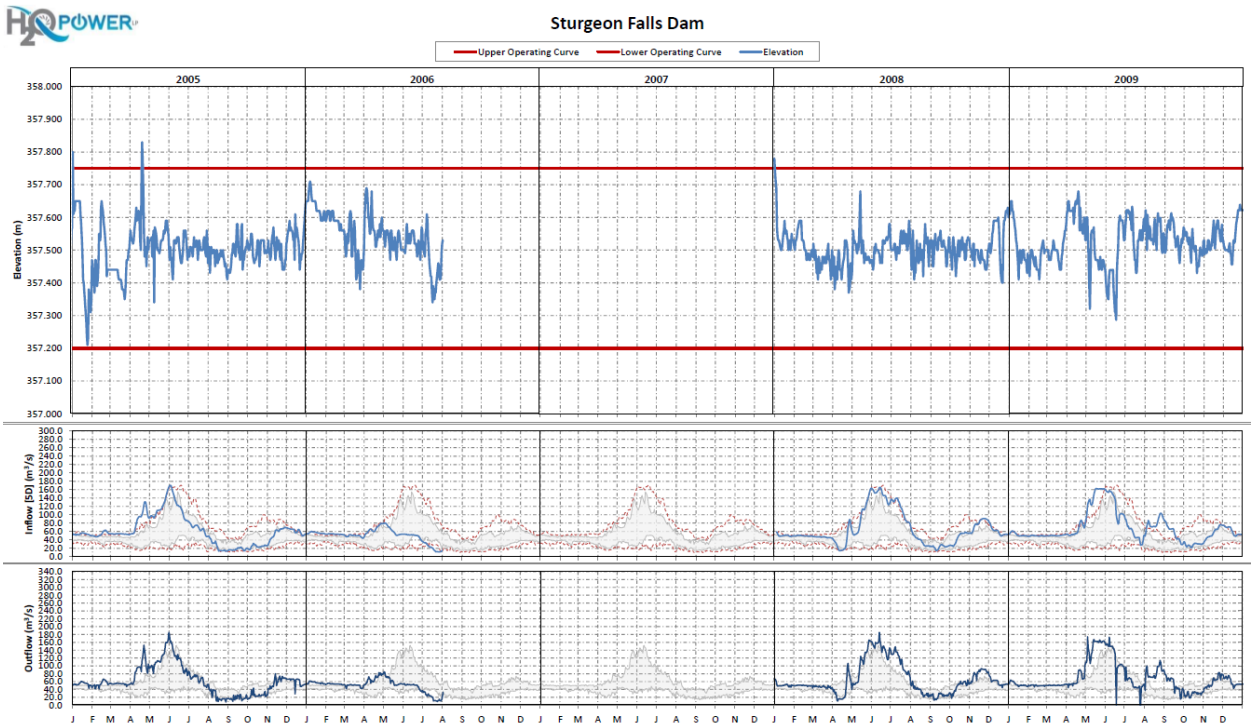

Calm Lake Dam
Upper Operating Curve
Lower Operating Curve
Elevation
2010
2011
2012
2013
2014
Elevation (m)
Inflow (SD) (m³/s)
Outflow (m³/s)
J F M A M J J A S O N D

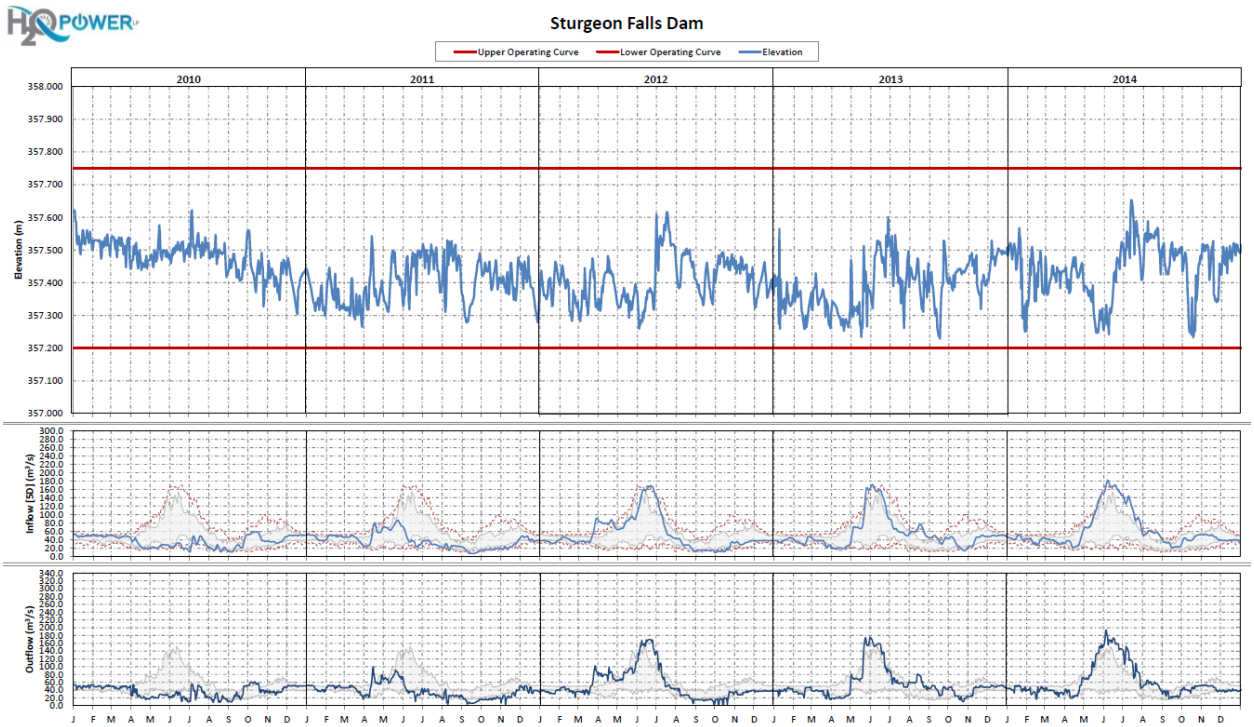

Calm Lake Dam
Upper Operating Curve
Lower Operating Curve
Elevation
2015
2016
2017
2018
2019
Elevation (m)
Inflow (SD) (m³/s)
Outflow (m³/s)
J F M A M J J A S O N D

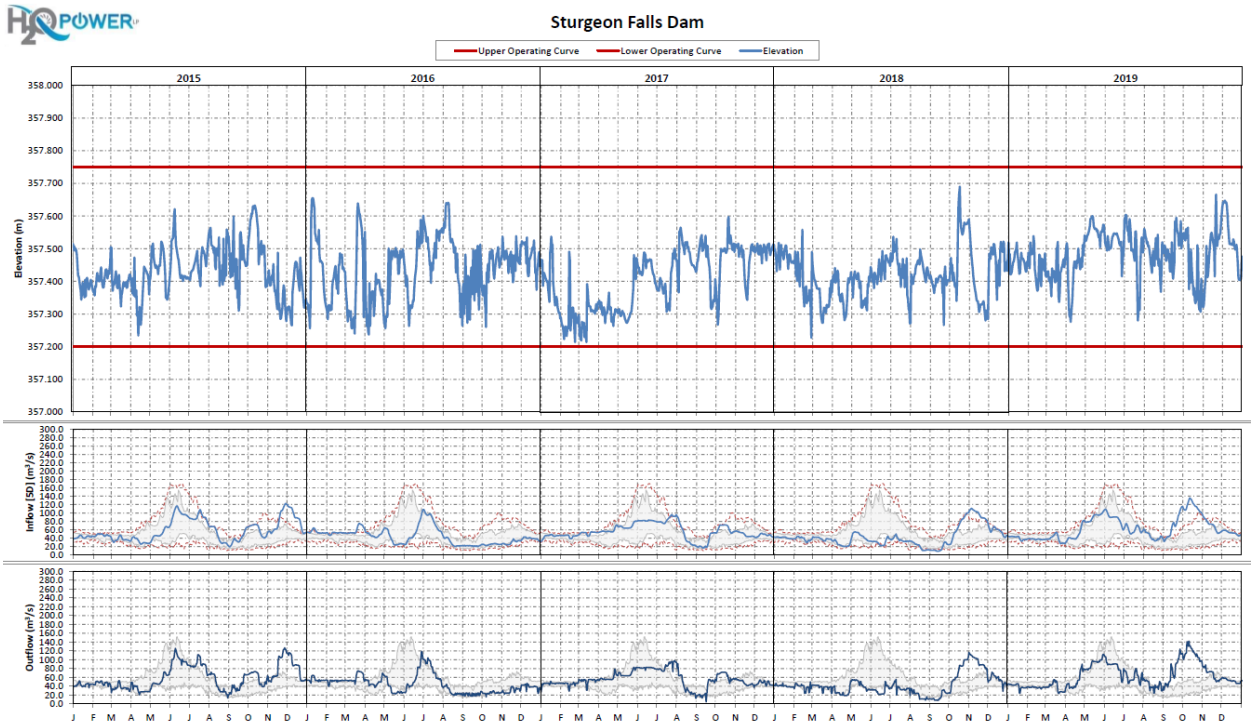

Calm Lake Dam
Upper Operating Curve
Lower Operating Curve
Elevation
2020
2021
2022
2023
2024
Elevation (m)
383.200
383.100
383.000
382.900
382.800
382.700
382.600
382.500
382.400
382.300
382.200
382.100
382.000
Inflow [5D] (m³/s)
Outflow (m³/s)
300.0
280.0
260.0
240.0
220.0
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
J F M A M J J A S O N D

Appendix 12: Sturgeon Falls Hydrologic Data

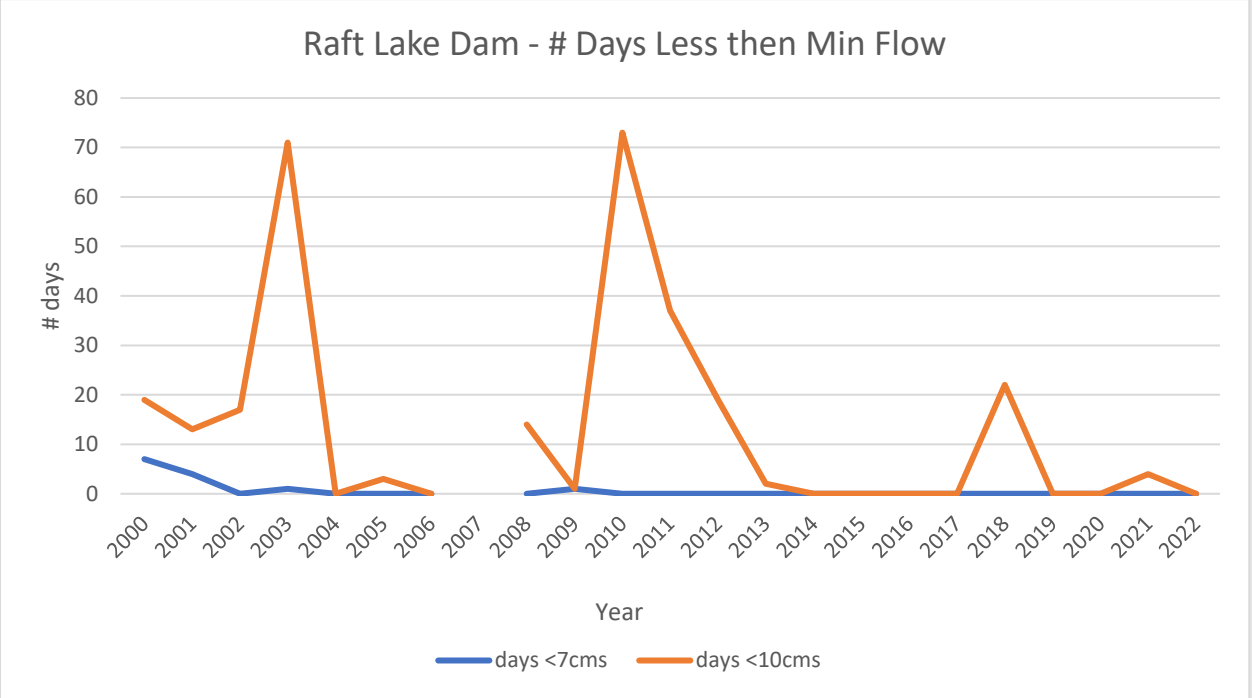


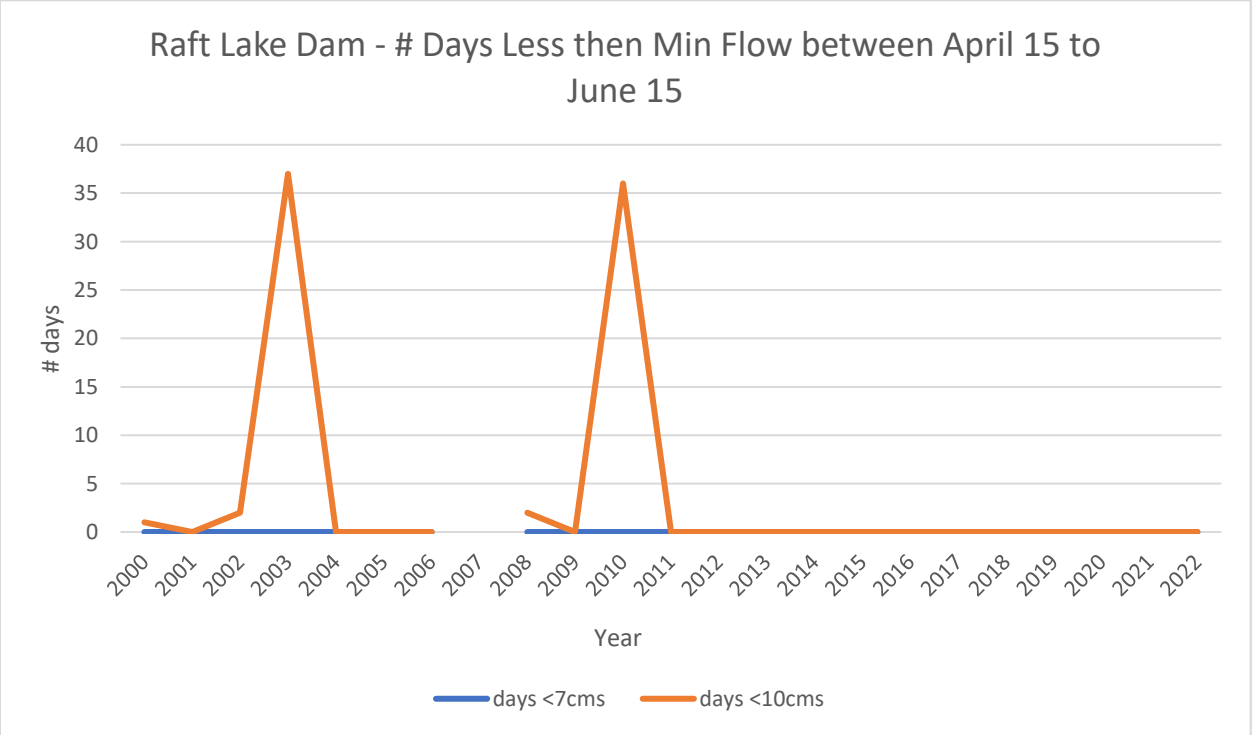


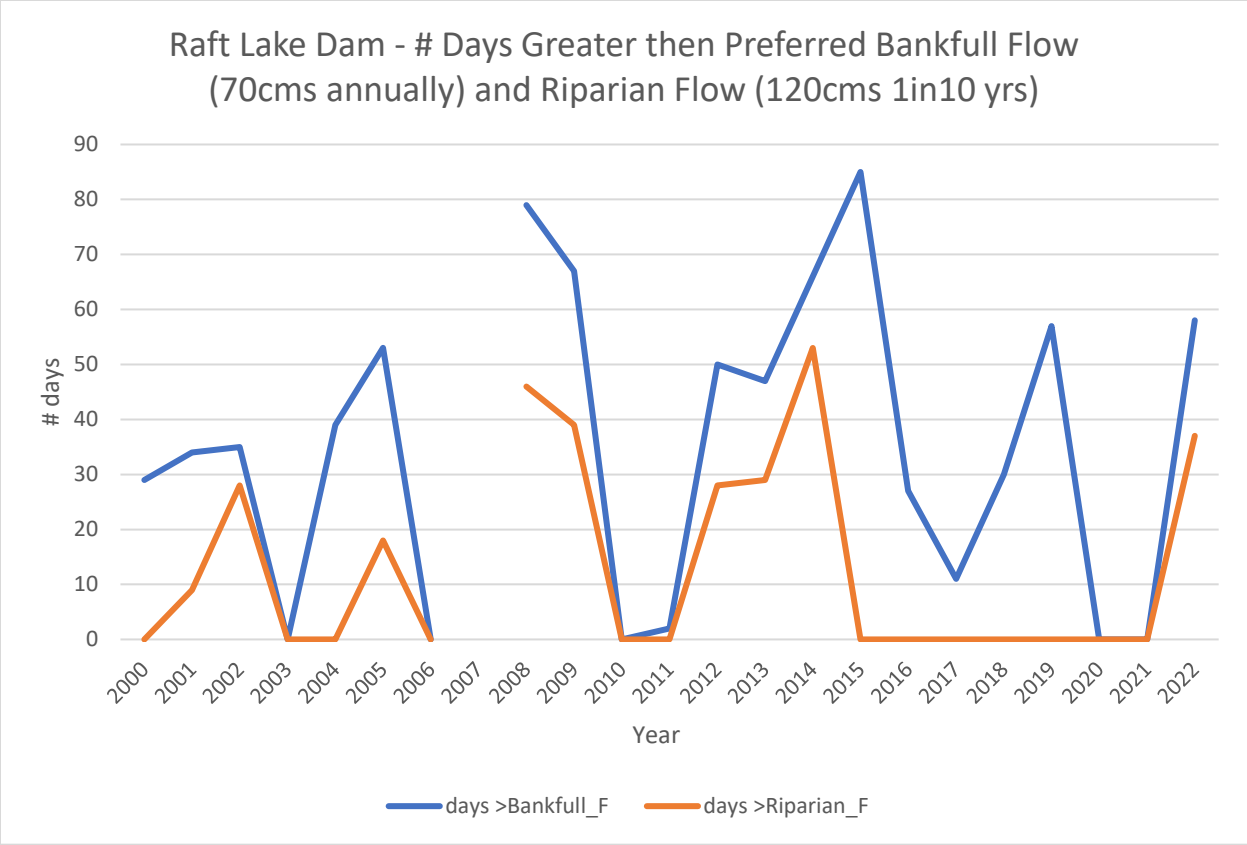

Sturgeon Falls Dam
Upper Operating Curve
Lower Operating Curve
Elevation
2010
2011
2012
2013
2014
Elevation (m)
Inflow (SO) (m³/s)
Outflow (m³/s)
J F M A M J J A S O N D

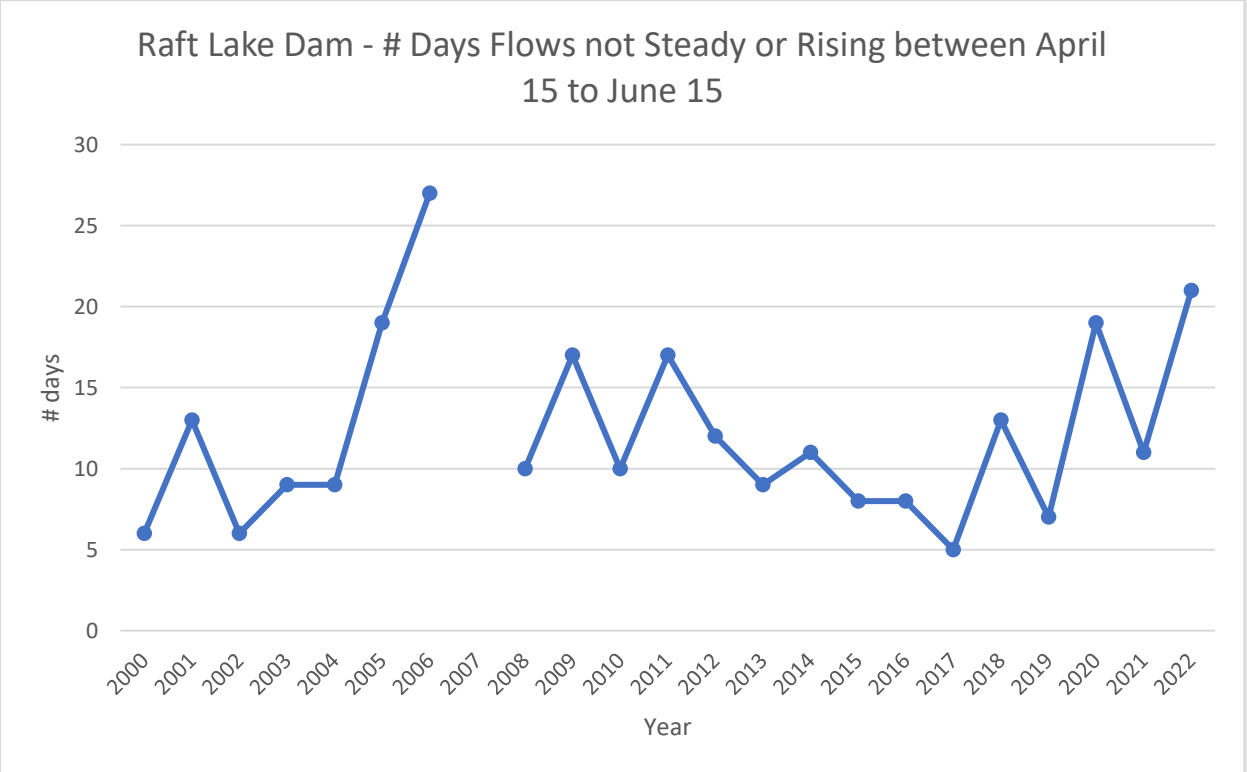

Sturgeon Falls Dam
Upper Operating Curve
Lower Operating Curve
Elevation
2015
2016
2017
2018
2019
Elevation (m)
Inflow (SO) (m³/s)
Outflow (m³/s)
J F M A M J J A S O N D

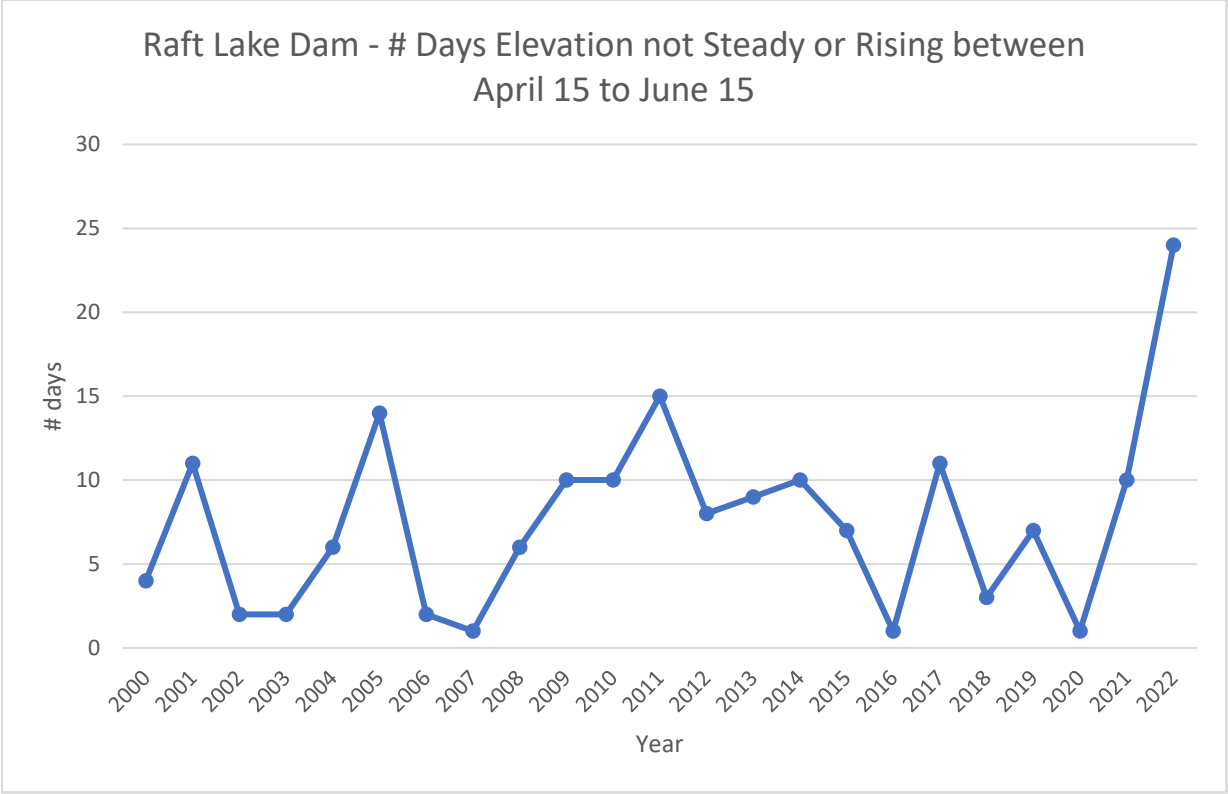
Appendix 13: Aquatic ecosystem-related flow and level regulations – Summary Graphs

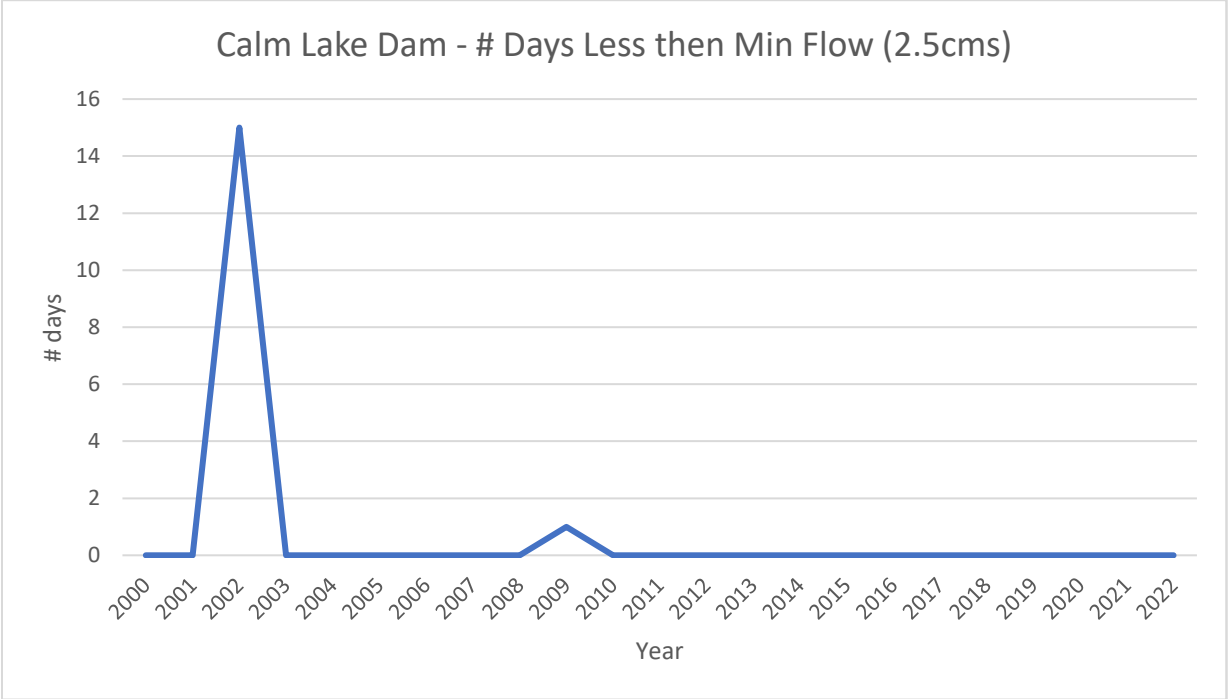


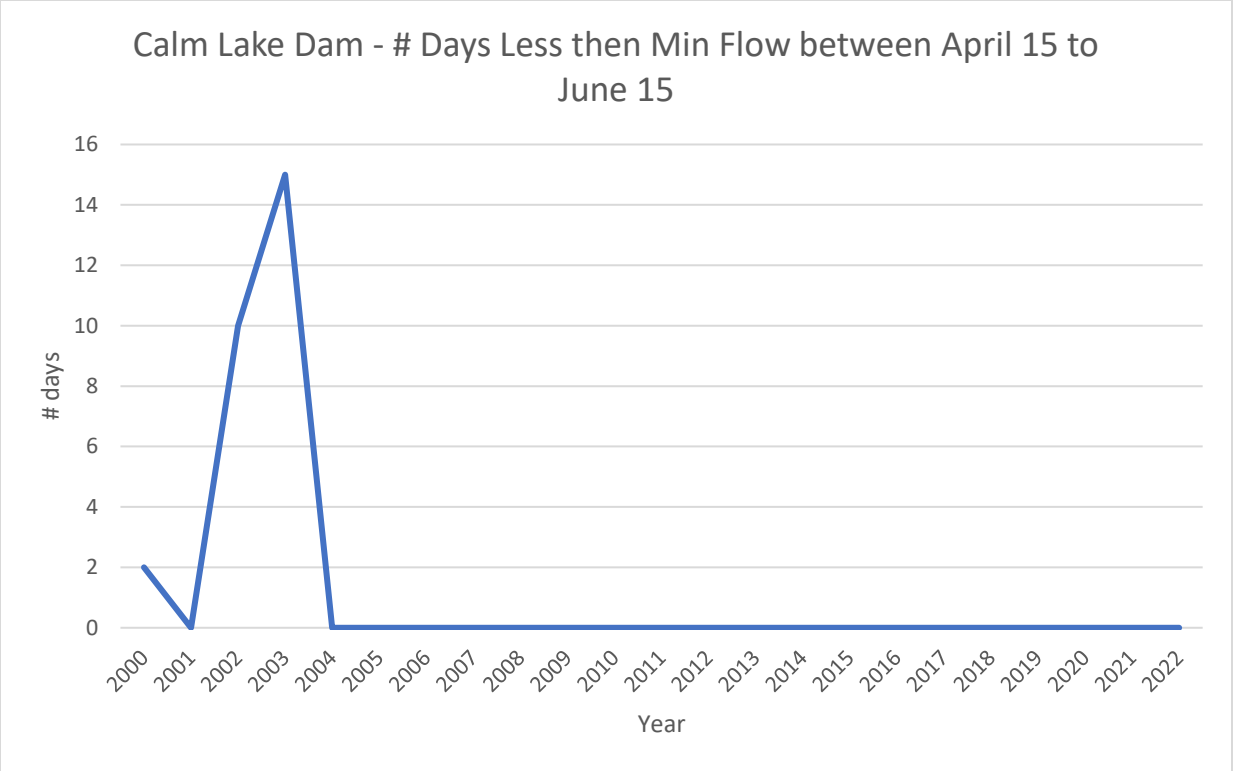


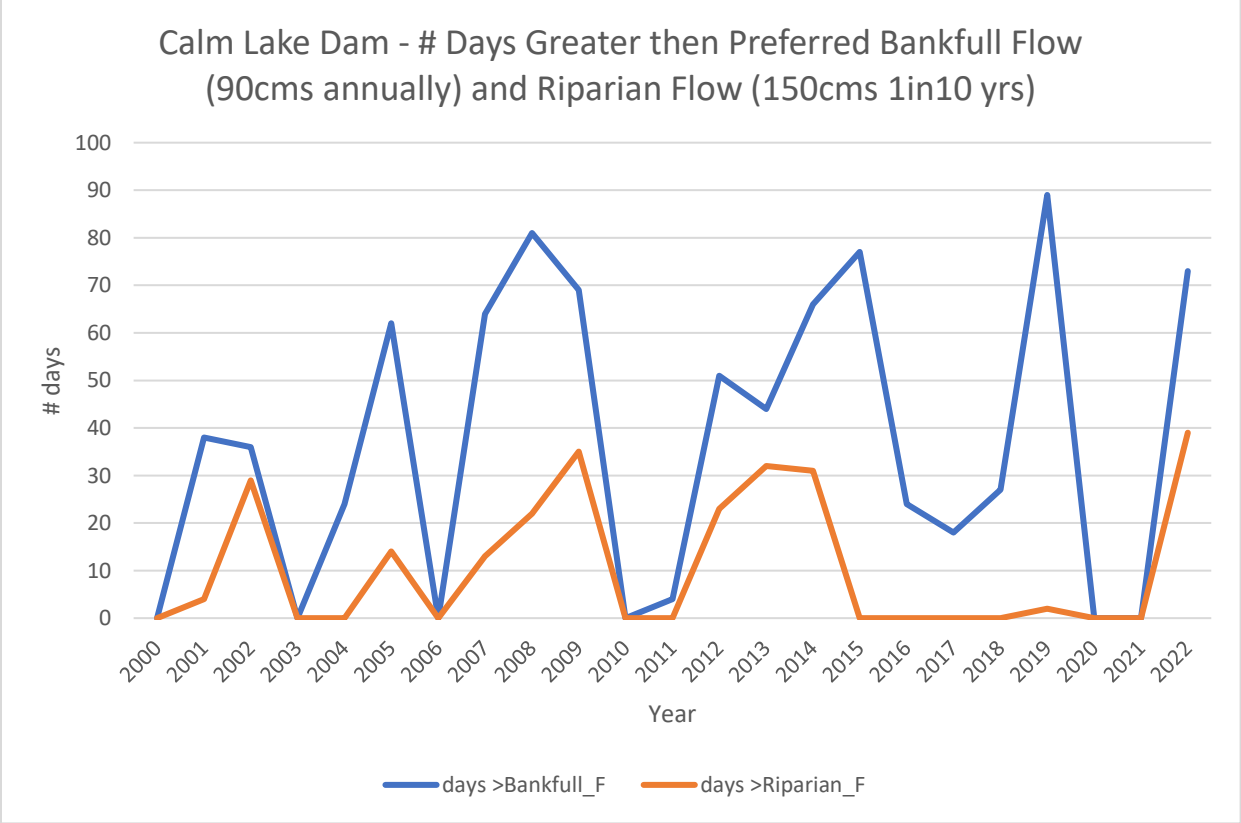

Raft Lake Dam - # Days Greater then Preferred Bankfull Flow (70cms annually) and Riparian Flow (120cms 1in10 yrs)
days
Year
days >Bankfull_F
days >Riparian_F

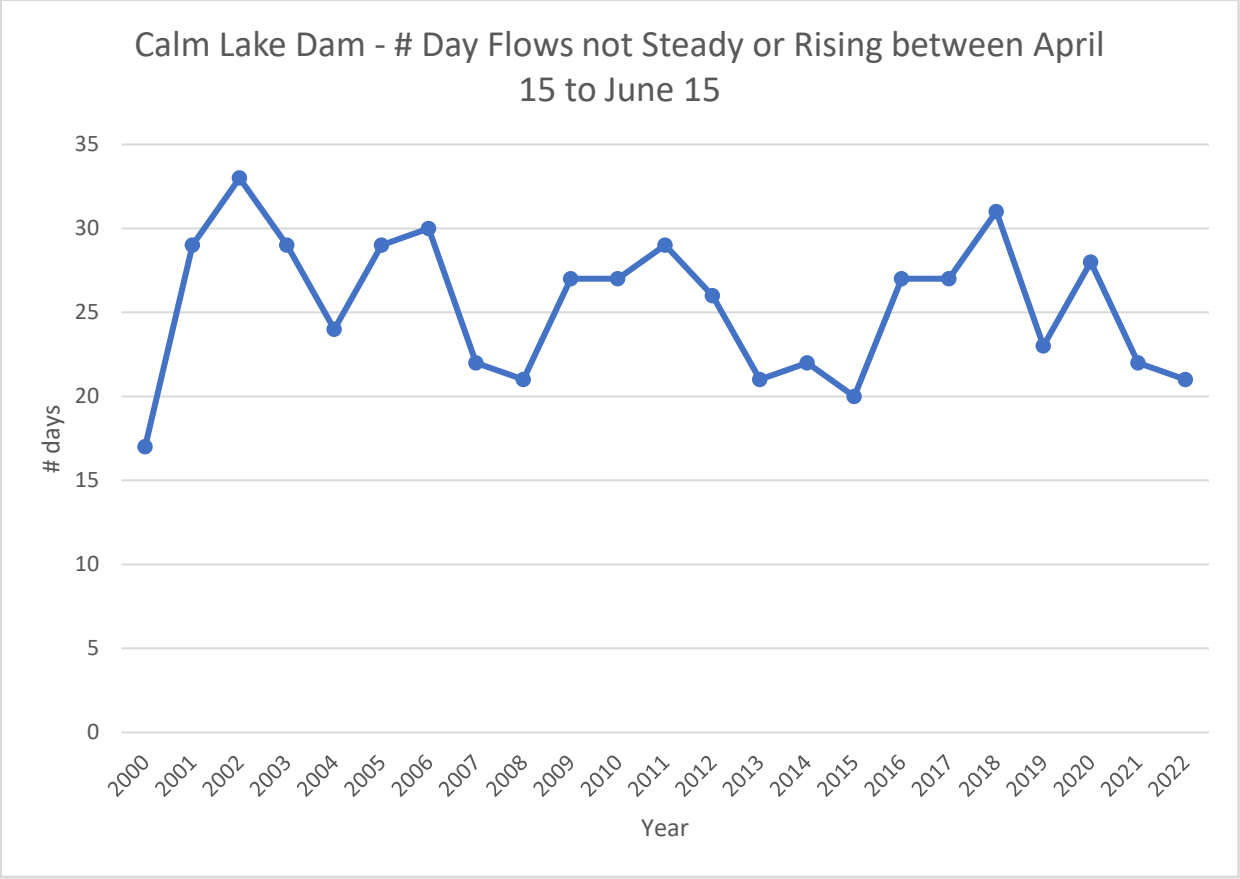

Raft Lake Dam - # Days Flows not Steady or Rising between April 15 to June 15
days
Year

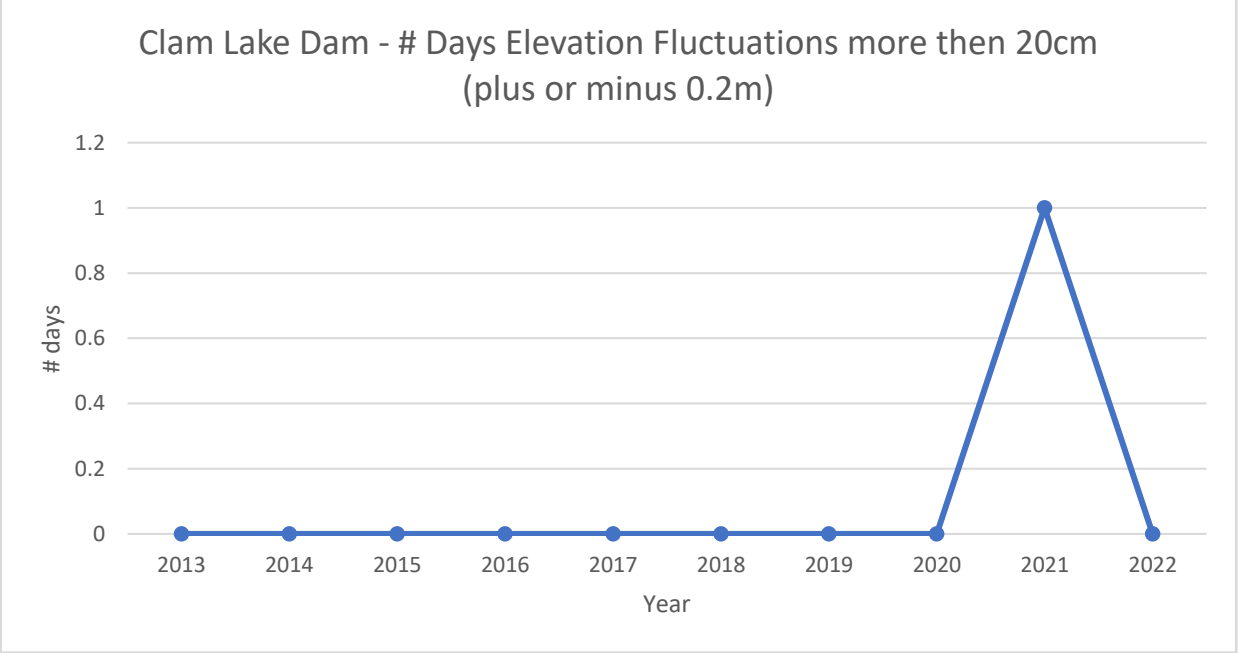

Raft Lake Dam - # Days Elevation not Steady or Rising between April 15 to June 15
days
30
25
20
15
10
5
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year

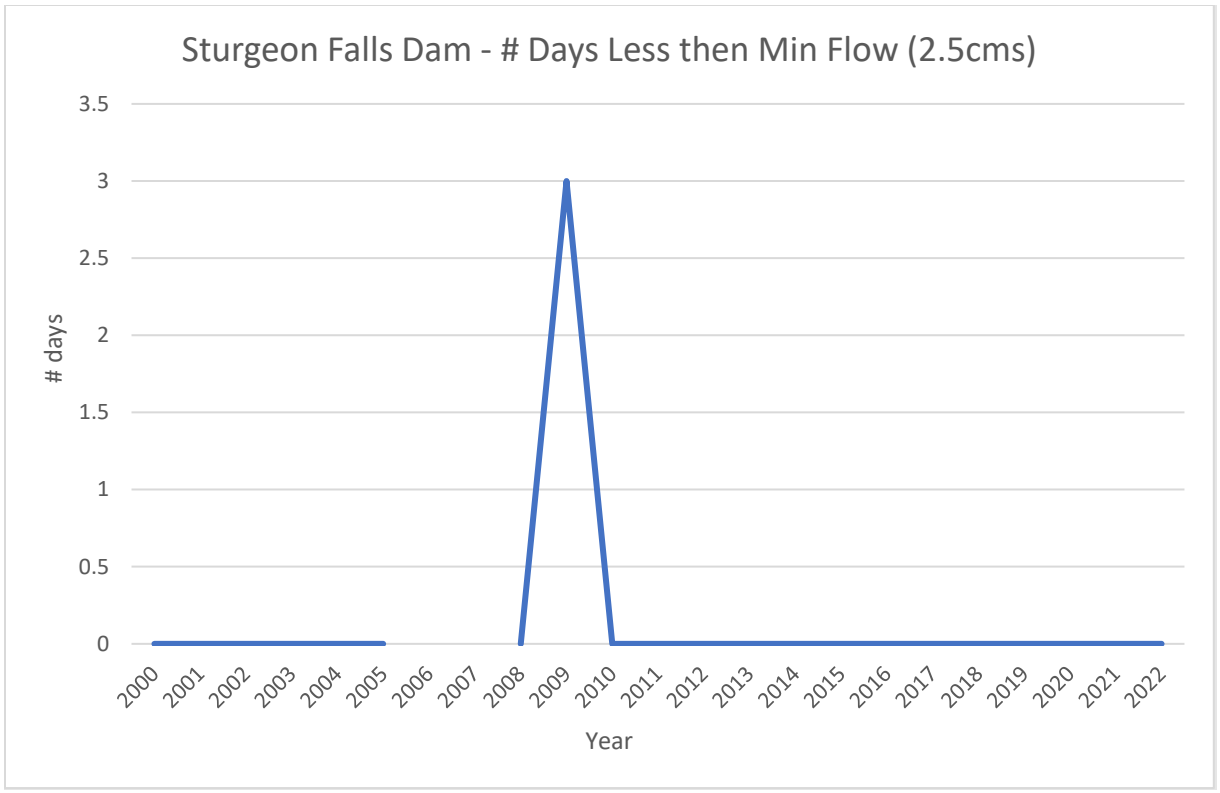

Calm Lake Dam - # Days Less then Min Flow (2.5cms)
days
16
14
12
10
8
6
4
2
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year

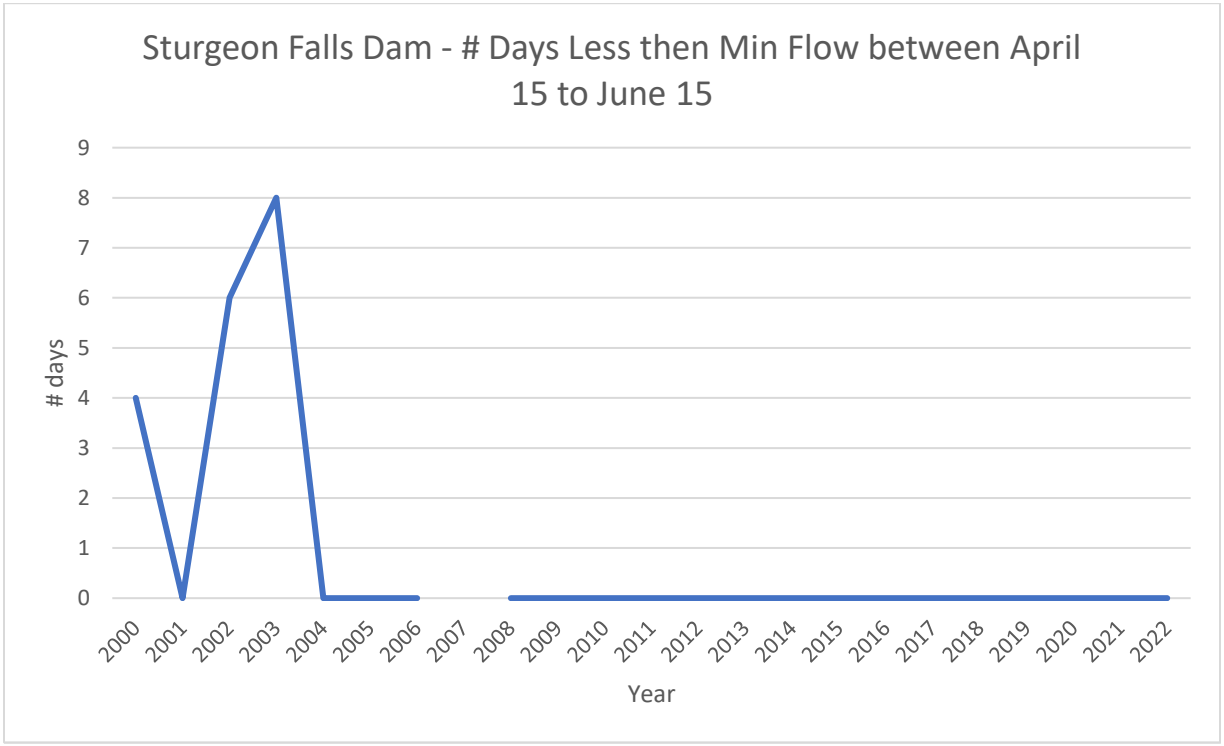

Calm Lake Dam - # Days Less then Min Flow between April 15 to June 15
days
Year
0
2
4
6
8
10
12
14
16
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

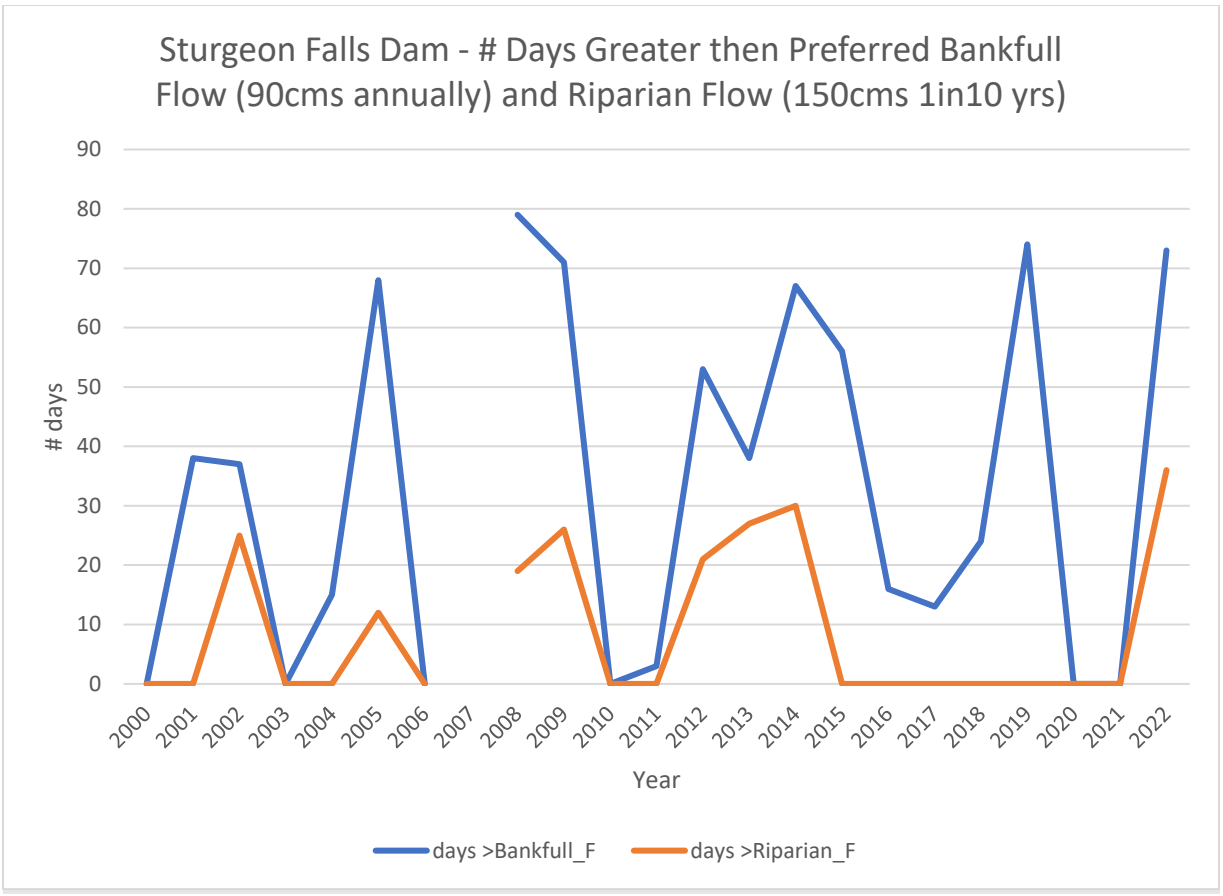

Calm Lake Dam - # Days Greater then Preferred Bankfull Flow (90cms annually) and Riparian Flow (150cms 1in10 yrs)
days
Year
0
10
20
30
40
50
60
70
80
90
100
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
days >Bankfull_F
days >Riparian_F

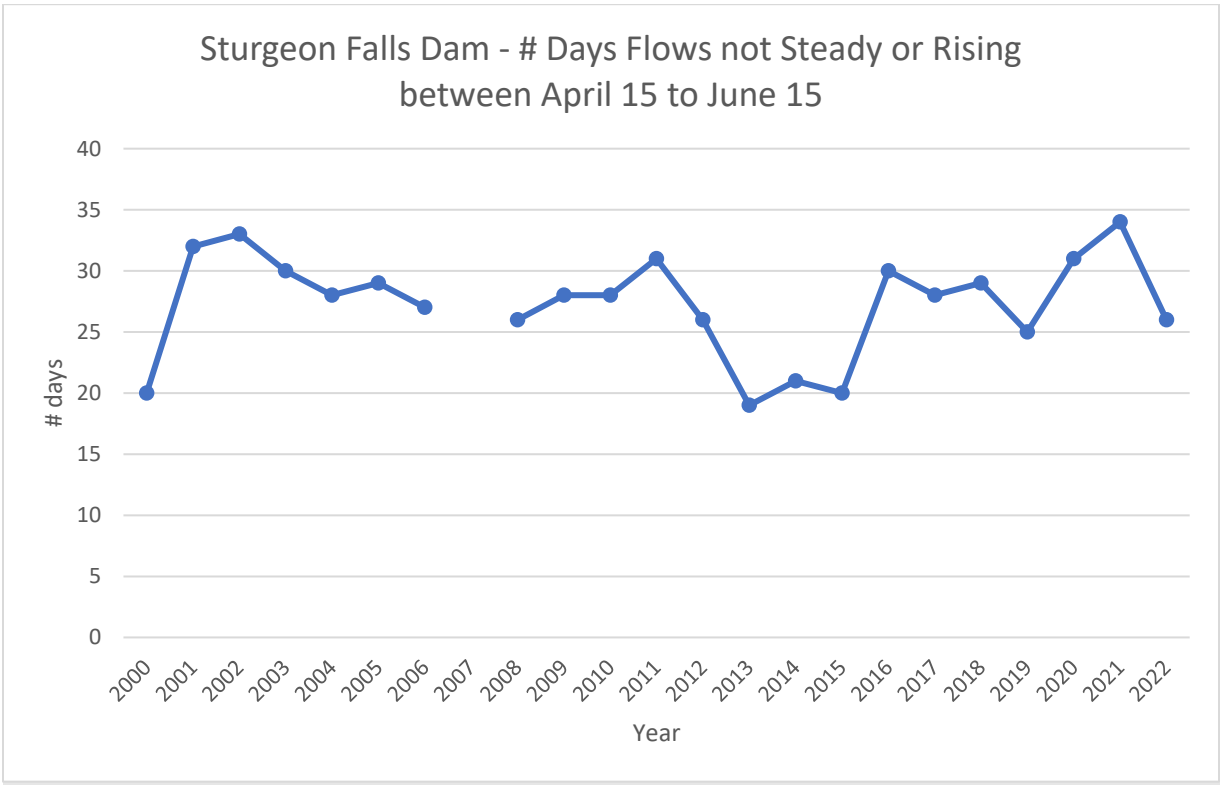

Calm Lake Dam - # Day Flows not Steady or Rising between April 15 to June 15
days
35
30
25
20
15
10
5
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year

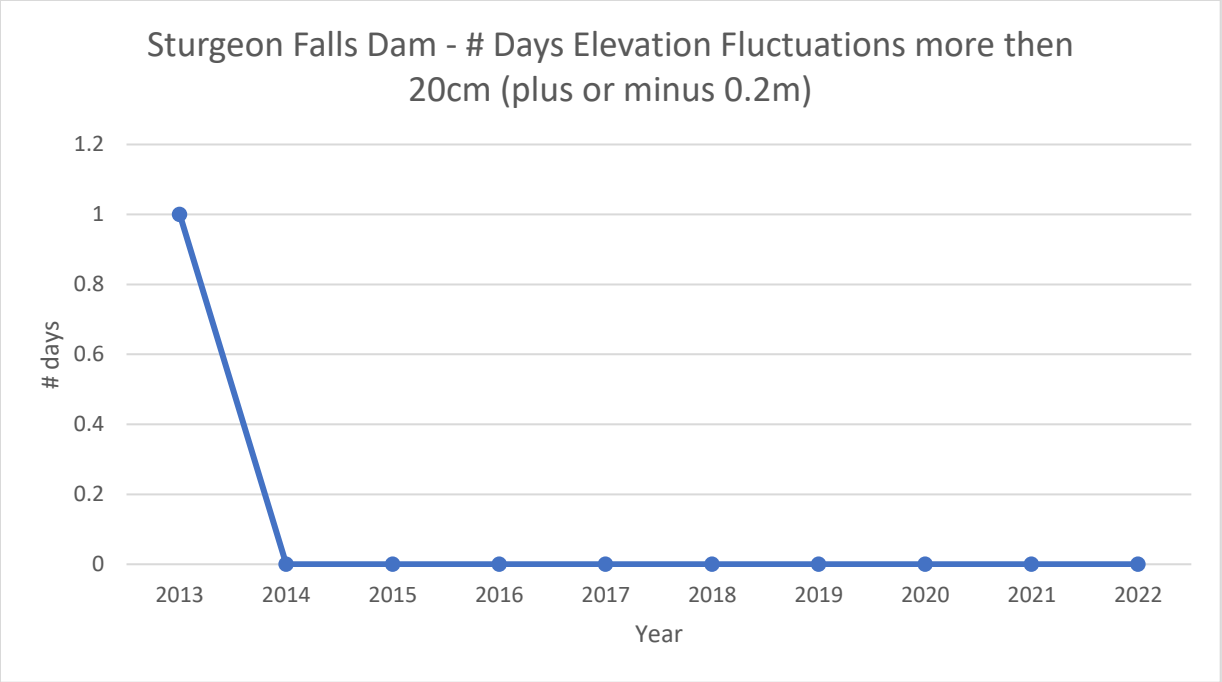

Clam Lake Dam - # Days Elevation Fluctuations more then 20cm (plus or minus 0.2m)
days
1.2
1
0.8
0.6
0.4
0.2
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year

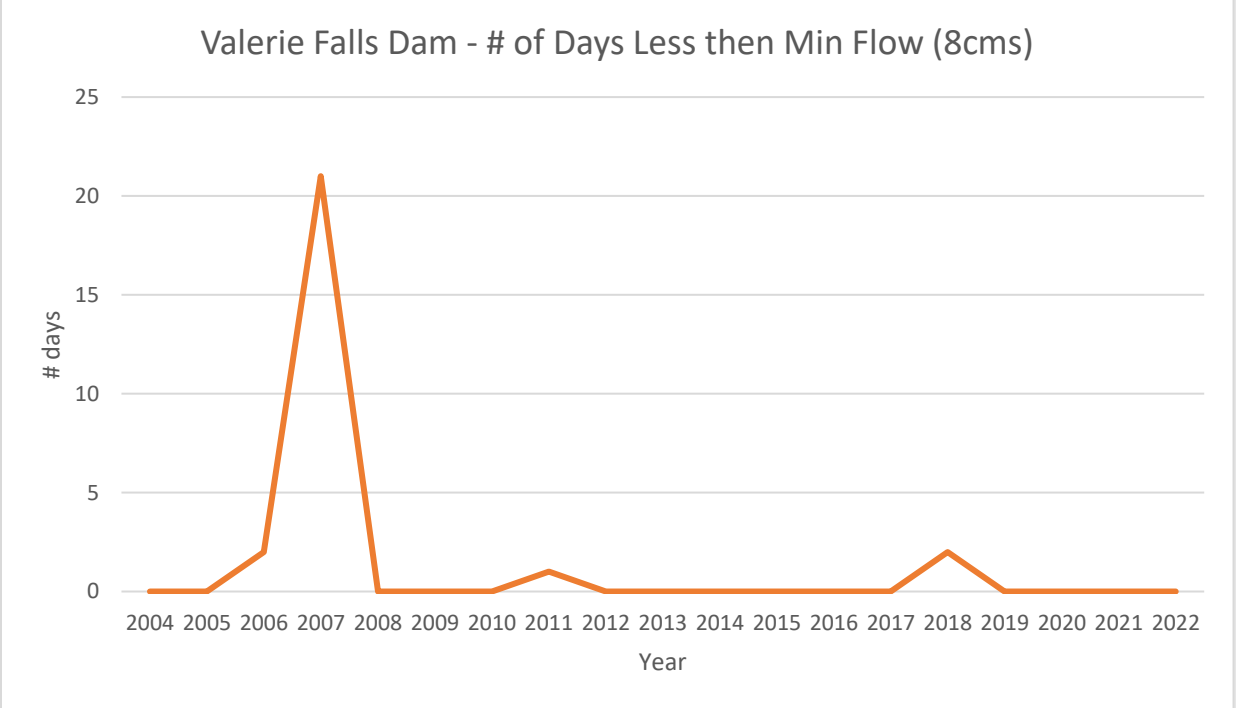

Sturgeon Falls Dam - # Days Less then Min Flow (2.5cms)
3.5
3
2.5
2
1.5
1
0.5
0
days
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year

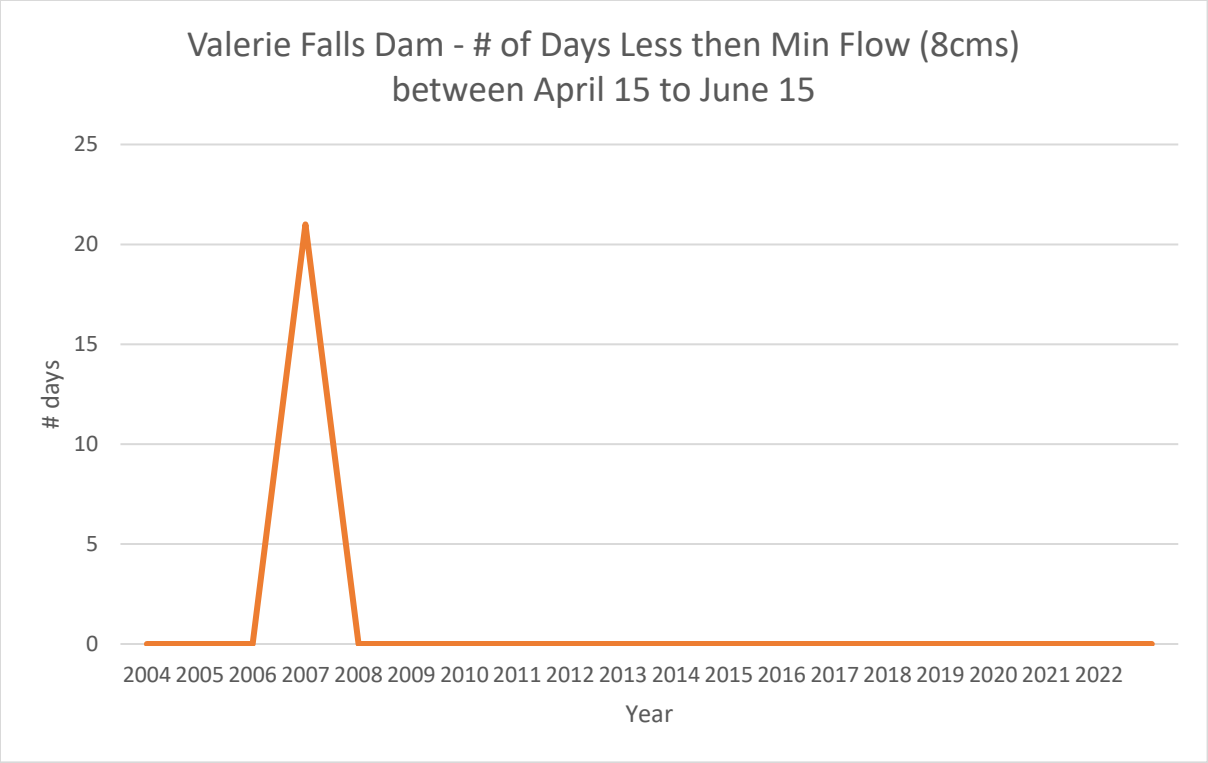

Sturgeon Falls Dam - # Days Less then Min Flow between April 15 to June 15
9
8
7
6
5
4
3
2
1
0
days
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year

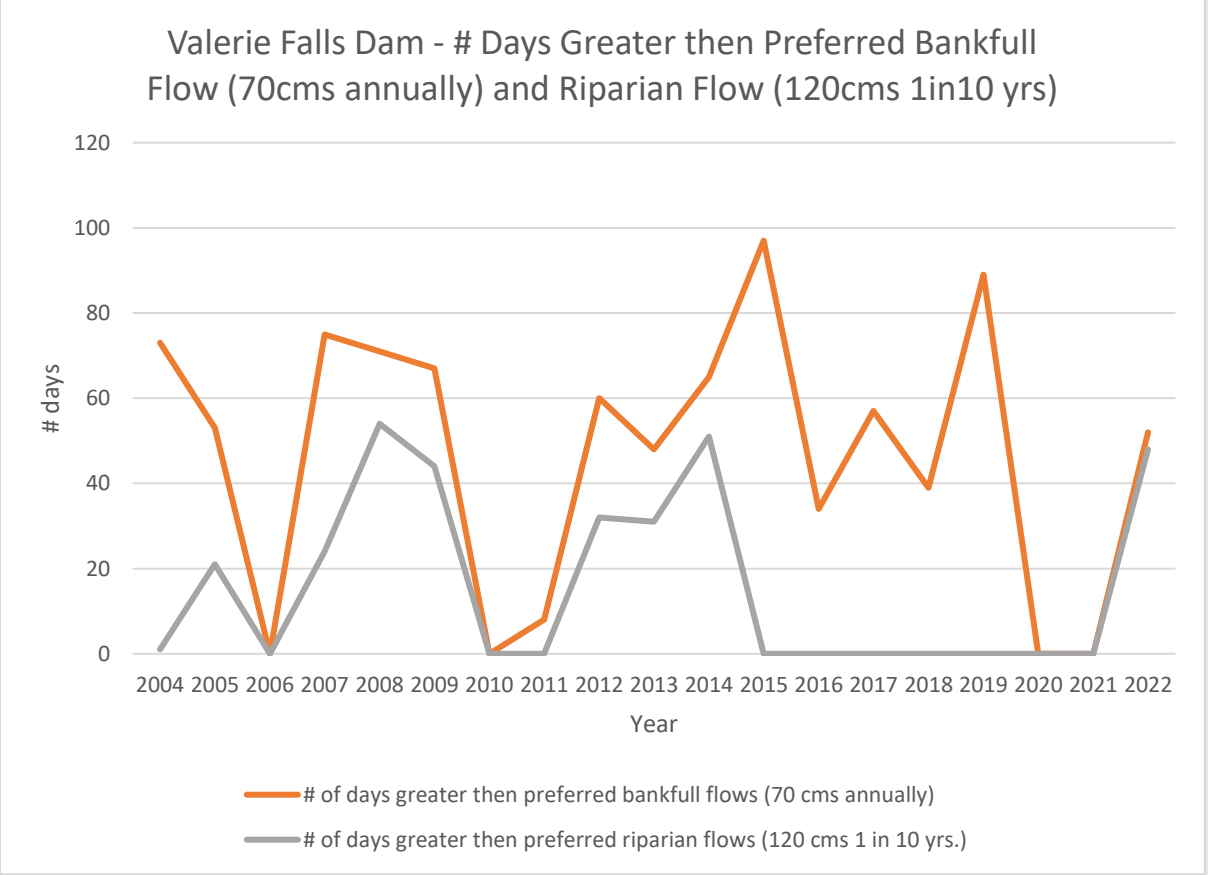

Sturgeon Falls Dam - # Days Greater then Preferred Bankfull Flow (90cms annually) and Riparian Flow (150cms 1in10 yrs)
days
Year
days >Bankfull_F
days >Riparian_F

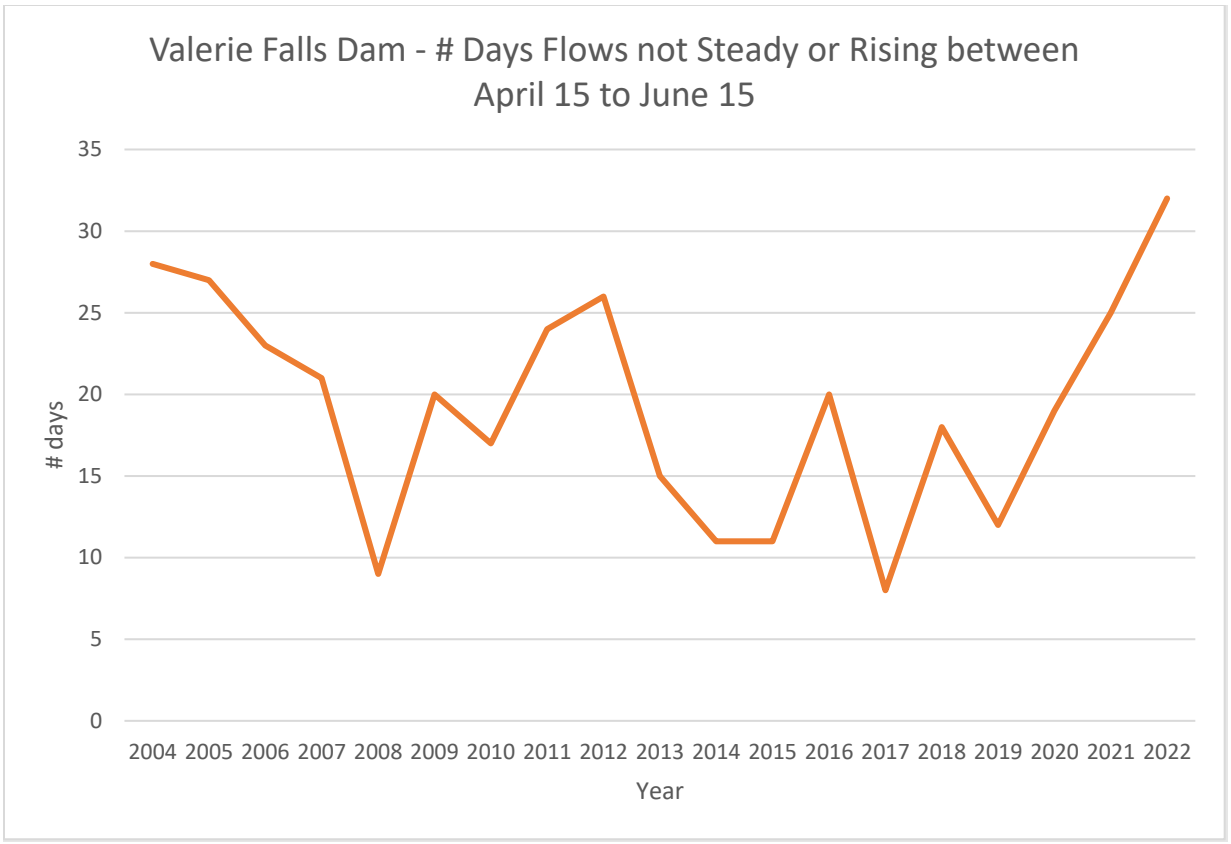

Sturgeon Falls Dam - # Days Flows not Steady or Rising between April 15 to June 15
days
Year

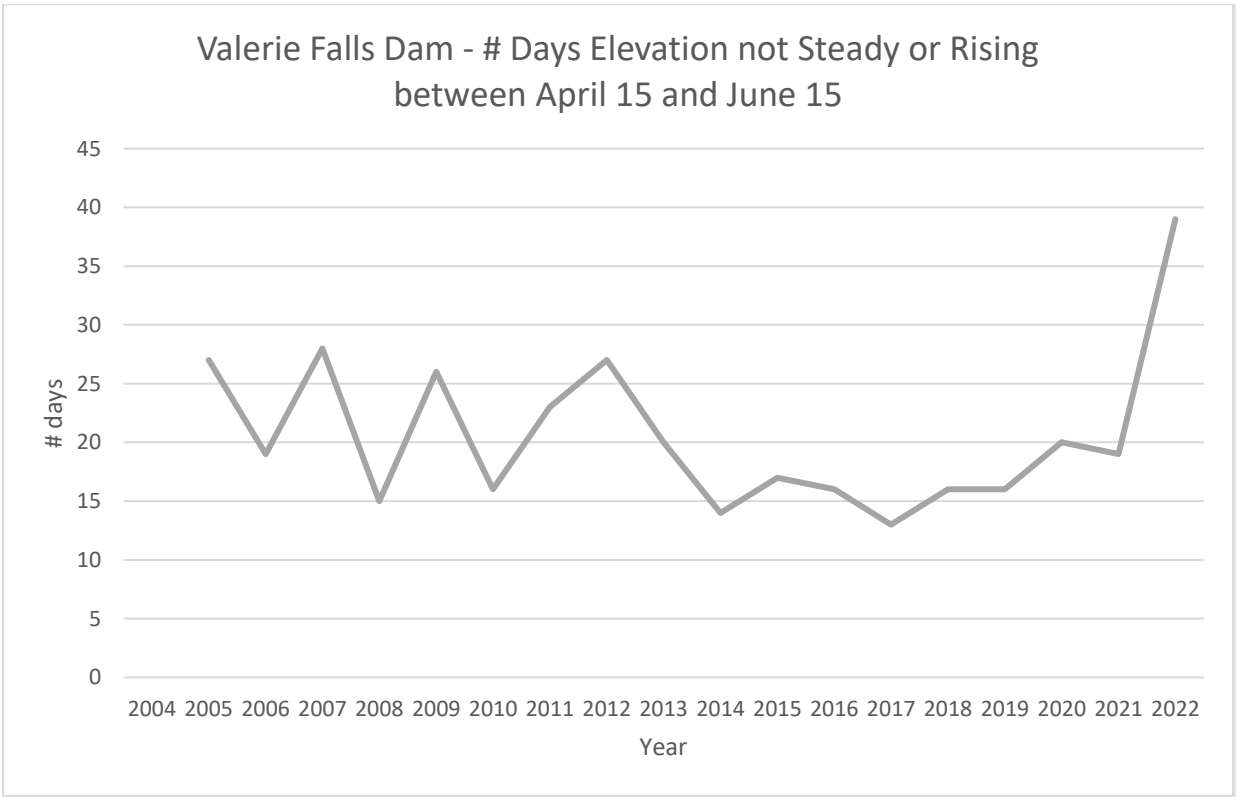

Sturgeon Falls Dam - # Days Elevation Fluctuations more then 20cm (plus or minus 0.2m)
1.2
1
0.8
0.6
0.4
0.2
0
days
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year

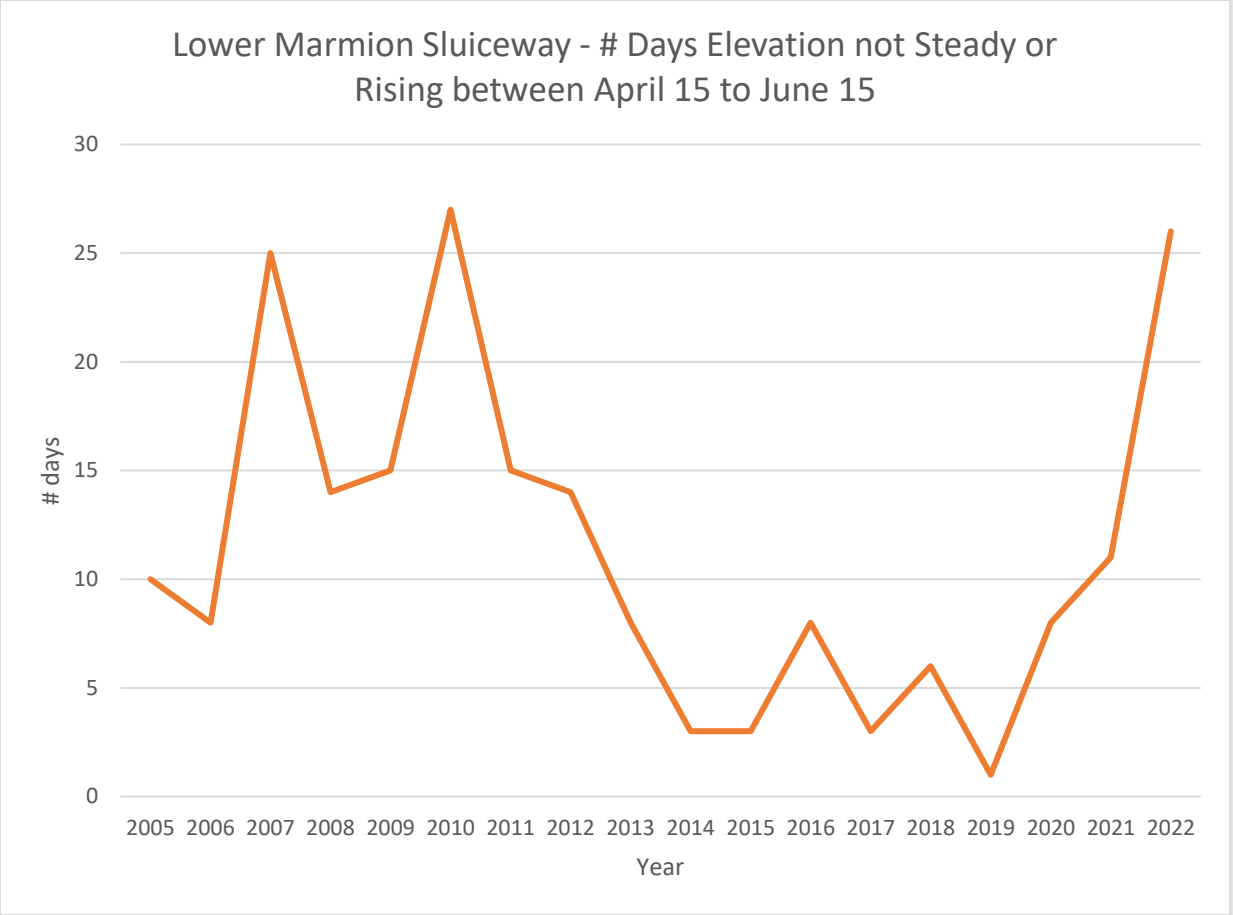

Valerie Falls Dam - # of Days Less then Min Flow (8cms)
25
20
15
10
5
0
days
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Year


Valerie Falls Dam - # of Days Less then Min Flow (8cms) between April 15 to June 15
25
20
15
10
5
0
days
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Year


Valerie Falls Dam - # Days Greater then Preferred Bankfull Flow (70cms annually) and Riparian Flow (120cms 1in10 yrs)
120
100
80
60
40
20
0
days
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Year
# of days greater then preferred bankfull flows (70 cms annually)
# of days greater then preferred riparian flows (120 cms 1 in 10 yrs.)


Valerie Falls Dam - # Days Flows not Steady or Rising between April 15 to June 15
35
30
25
20
15
10
5
0
days
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Year


Valerie Falls Dam - # Days Elevation not Steady or Rising between April 15 and June 15
45
40
35
30
25
20
15
10
5
0
days
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Year


Lower Marmion Sluiceway - # Days Elevation not Steady or Rising between April 15 to June 15
30
25
20
15
10
5
0
days
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Year

Appendix 14: Year class strength for walleye on uncontrolled lakes

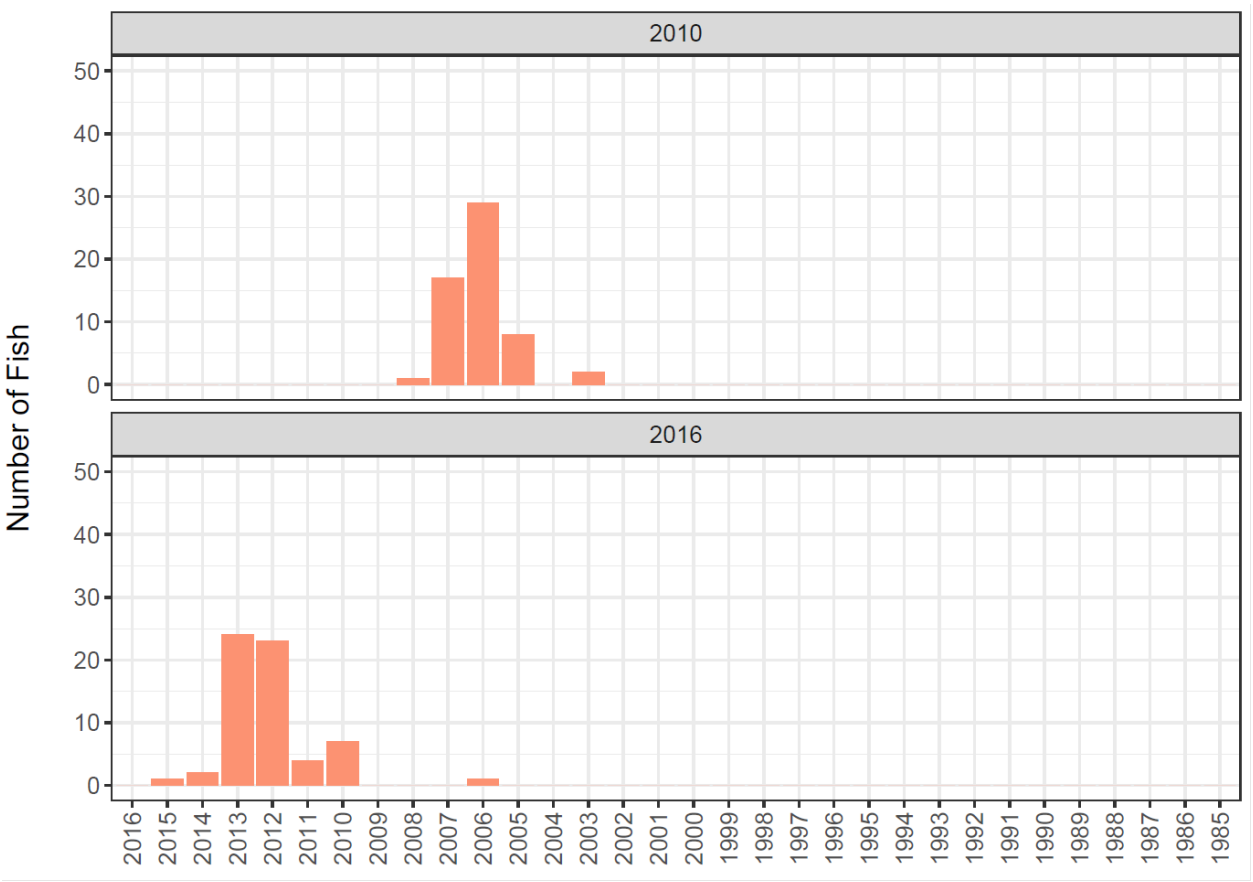


Figure 20. Year Class Strength for walleye in Little Turtle River, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2016.

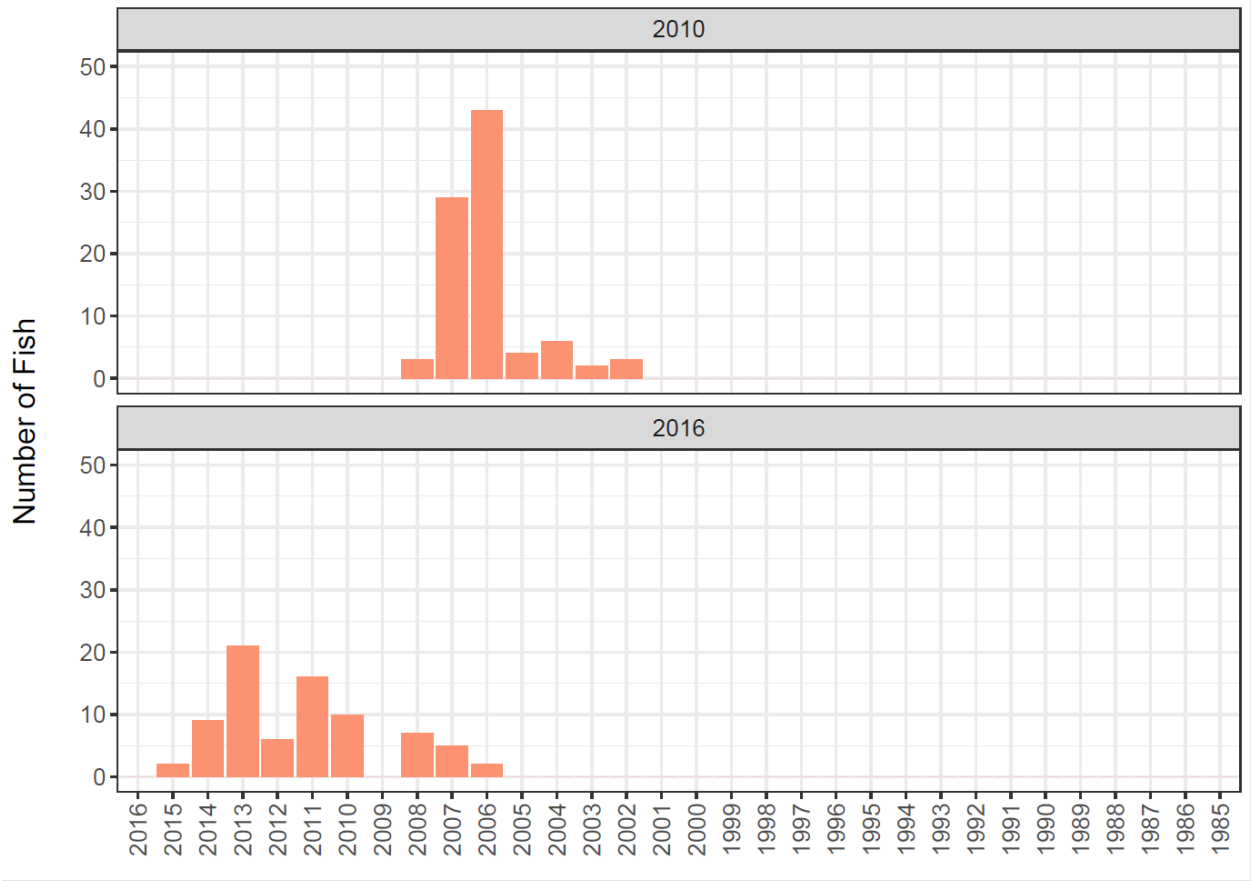


Figure 21. Year Class Strength for walleye in Manion Lake, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2016.

Figure 22. Year Class Strength for walleye in Mercutio Lake, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2016.

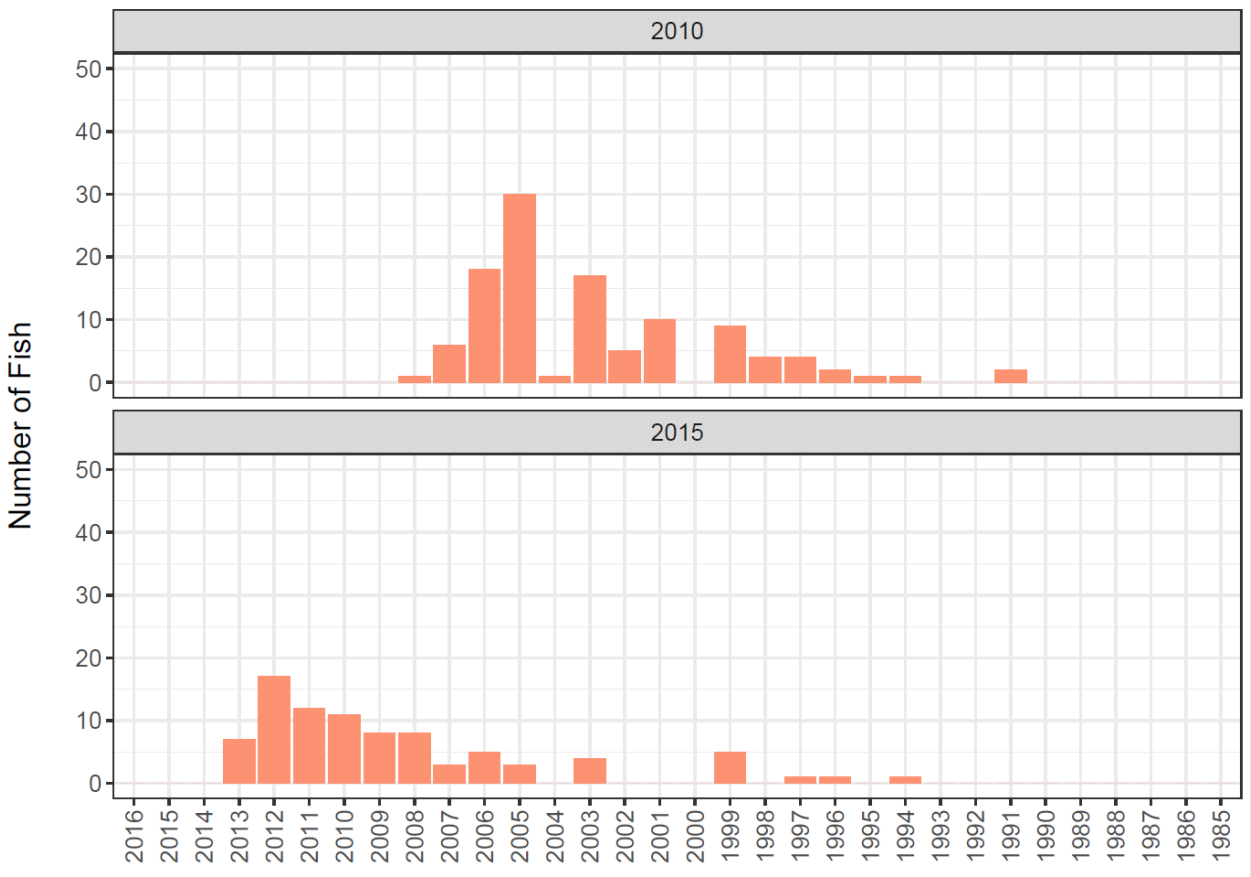


Figure 23. Year Class Strength for walleye in Pickerel Lake, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2015.

Figure 24. Year Class Strength for walleye in Turtle Lake, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2010 and 2015.

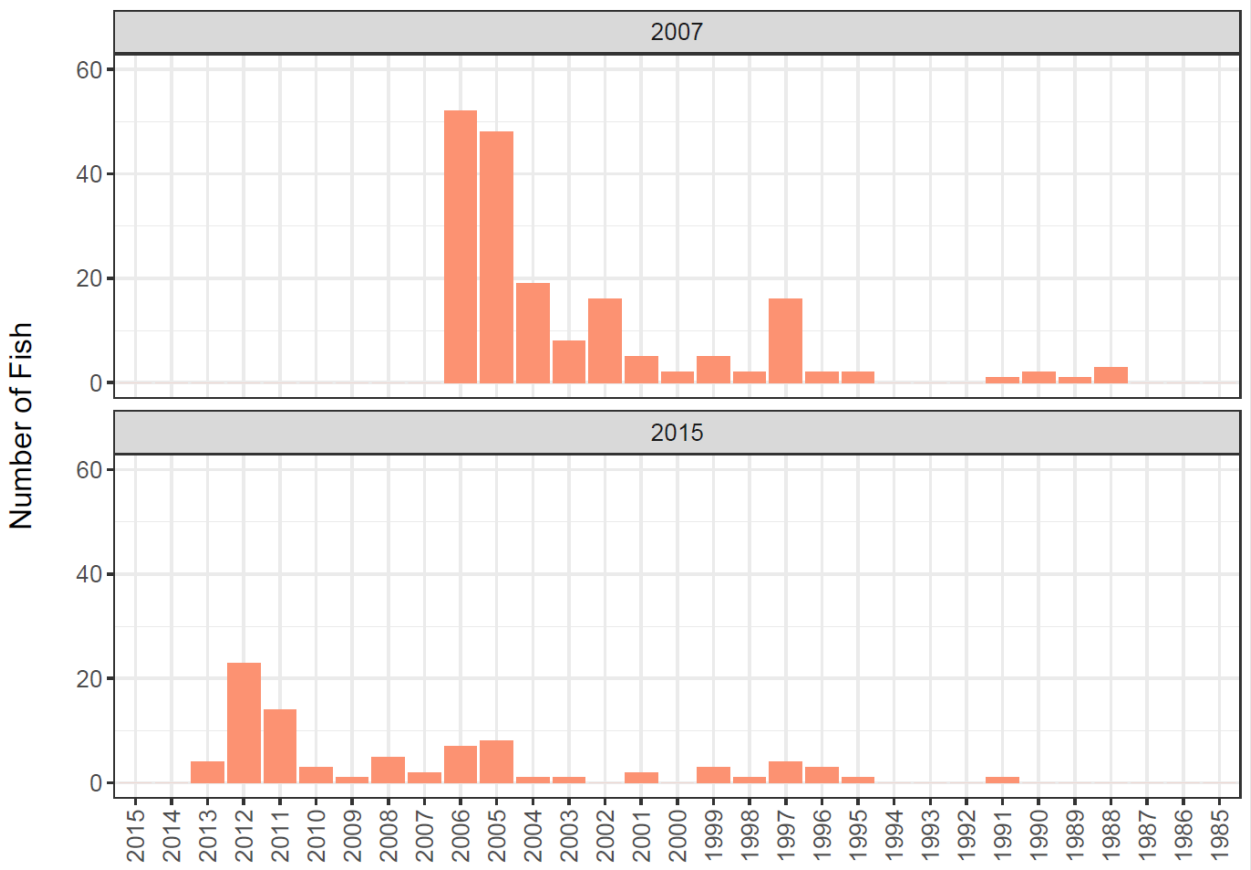


Figure 25. Year Class Strength for walleye in White Otter Lake, based on fish sampled during fish surveys completed by the MNRF Broad Scale Monitoring Program in 2007 and 2015.