



Community Development – Ag Center

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To: St. Croix County Community Development Committee

From: St. Croix County Community Development, Land and Water division

ISSUE: A request is made by the Lake Mallalieu Association (LMA) and prepared by Stantec Consulting Services Inc. to sign an authorization to allow a draw down of 1 Hudson Lower Power Dam on Lake Mallalieu by 7.5 feet from September 1, 2026, to May 1, 2027, to remove sediment that has accumulated.

A similar request was made in 2025 and the subsequent application to WI DNR was withdrawn. Extensive documentation related to the 2025 proposal and process are on the WI DNR permitting site.

Background:

The Hudson Lower Power Dam was established in 1866 with updates made in 1934 and 1998. It creates Lake Mallalieu which is a 289-acre shallow eutrophic flowage with a maximum depth of 17 feet and an average depth of 5-foot depth. The dam creating the lake is at the bottom of the 175 square mile Willow River Watershed and empties into Lake St. Croix. There are two dams upstream from Lake Mallalieu approximately 2.5 and 15 miles upstream. Breaches at the Little Falls Lake Dam in Willow River State Park 2015 – 2019 have caused sedimentation in upper reaches of Lake Mallalieu. However, data obtained in a 2024 bathymetric and soft sediment deposit survey performed in northeast Lake Mallalieu, show that over the past 54 years, from 1970 to 2024, the water depths in northeast Lake Mallalieu have changed very little due to sediment deposits. A few areas of northeast Lake Mallalieu are now shallower by one to six inches, and only a few areas are a maximum of 24 inches shallower. Those areas were shallow to begin with and now preclude boating with conventional power boats.

Initially the LMA was pursuing a dredging application to remove up to four feet of sediment totaling 220,000 yards of sediment from a 100-acre area. That drawdown proposal was brought forward due to the low likelihood of successfully obtaining permission to dredge the lake. It was also difficult finding locations to deposit that quantity of dredged materials.

A similar dam drawdown proposal was brought forward in 2025 and was withdrawn when authorization of all four owners of the Lower Power Dam could not be obtained. Extensive documentation related to the 2025 proposal and process are on the WI DNR permitting site:

<https://permits.dnr.wi.gov/water/SitePages/DocSetView.aspx?DocSet=IP-WC-2025-56-01948&Loc=undefined>

Additional history and background can be found at:

<https://lakemallalieudredging.info/>

The Current Proposal:

Basically, the decision to be made is whether to sign off on the 7.5-foot, 9 month draw down of the lake. The four owners of the dam need to authorize the drawdown for the permitting process to proceed. If approved by landowners and WI DNR - the dam gate would be opened 7.5' in September 2026 and closed 9 months later.

The decision to authorize a dam drawdown is complex with 124 documents submitted with the 2025 drawdown proposal to the WI DNR permitting site. More have been submitted to WI DNR for the 2026 application, but these are not yet available for review.

Water quality remains a significant public concern for residents of St. Croix County as documented through County Planning surveys. A drawdown may only move a fraction of the initially proposed 220,000 cubic yards of sediment that was originally proposed to be removed through dredging. Navigability may not be significantly improved using a drawdown and water quality in Lake Mallalieu will not be greatly improved. Lastly, the proposed drawdown only provides localized benefits within Lake Mallalieu. The proposal only shifts the water quality impacts by transferring the accumulated sediment and phosphorus downstream to Lake St Croix, an impaired interstate resource subject to a federally approved TMDL for phosphorus.

Concern 1: There is a high potential for significant phosphorus release into Lake St. Croix.

Stantec's modeling indicates that from 9,500 to 24,500 cubic yards of sediment would be released into Lake St. Croix with a 7.5-foot extended drawdown. Based on sediment core sampling and analysis completed by Stantec in 2024 this sediment could contain an estimated 5,536 to 14,280 lbs. of phosphorus based on core samples and subsequent analysis completed by Stantec in 2024 (Appendix 1). The P content calculated from Stantec's samples was 0.58 lbs. P per cubic yard of sediment which is consistent with a conservative value for P content of sediment (www.lacrossecounty.org). The wide range of predicted sediment and phosphorus release from modeling results indicates that the drawdown process is somewhat unpredictable. The process is driven by weather events that occur during the drawdown period. Importantly, no "shutoff" criteria were outlined in the proposal that are based on downstream water quality monitoring or other factors. Any approved drawdown should include enforceable operational thresholds tied to turbidity, total suspended solids, phosphorus concentrations, dissolved oxygen, and downstream monitoring results, with authority to pause or terminate the drawdown if impacts exceed predicted conditions.

Since Lake St. Croix was listed as impaired for phosphorus in 2012, local, state, and federal agencies and groups have invested substantial public resources to reduce phosphorus loading Lake St. Croix. Since 2013 St. Croix County alone implemented 373 conservation contracts at an expense of \$4.4 million to reduce phosphorus losses to Lake St. Croix. These ongoing restoration efforts should be carefully considered before approving a project with the potential to release a significant phosphorus load downstream.

Dredging or using a water draw down may not improve water quality within Lake Mallalieu significantly. Water flowing in from the Willow River is below the “river” water standard of 0.075 µg/l but above the 0.04 µg/l “lake” standard (Appendix 2). The P content to produce algae blooms is lower in a lake than in a river. Conservation work is ongoing to reduce the river P inflow and significant progress has been made but this is challenging on a 175 square mile watershed covering multiple counties.

Concern 2: Impacts on Lake St. Croix are unknown.

The proposed drawdown is scheduled to begin September 1, 2026. Lake St. Croix water quality monitoring is based on lake sampling data collected during June through September. Phosphorus content in Lake St. Croix is currently close to acceptable levels during this period. A significant release during September could disrupt the consistent water quality data being collected as part of the existing TMDL. Any draw down should avoid a September release.

In 2025 the City of Hudson choose not to authorize the 2025 lake drawdown seeking better information on the impacts on Lake St. Croix water quality. This information has not yet been submitted for review.

Concern 3: Are draw downs how we plan to address sediment going forward?

The North Bay area on Lake St. Croix is already heavily impacted by sediment. There was significant citizen concern about this area in 2025. In materials supplied by Stantec for the 2026 drawdown proposal it was stated that the way to deal with North Bay is to use the secondary dam on Lake Mallalieu opportunistically throughout the year to flush North Bay. No further details were provided with this proposed solution. If this approach were used there would be multiple flushing events impacting Lake St. Croix within a short period – possibly magnifying the impacts on water quality and lake ecology parameters such as vegetation and fish populations.

Concern 4: There is not adequate monitoring proposed surrounding the drawdown event.

Reviewing the E-Permitting file records for the 2025 drawdown – no monitoring plan was found to document impacts of the drawdown. With the many pages of predicted results based on modeling it would be prudent to obtain some actual field verification.

A monitoring plan that documents upstream and downstream impacts needs to be submitted for review. The effectiveness of the drawdown on improving Lake Mallalieu should be measured and reported after the treatment and reported back to the owners of the dam.

Appendix 1. Range of sediment and phosphorus delivery to Lake St. Croix from three Lake Mallalieu 7.5-foot drawdowns scenarios lasting 1, 3, and 9 months of duration.

Modeled Sediment Delivery to Lake St. Croix from Stantec 2025 submission to WI DNR

Modeled Scenario	1 Month Drawdown	3 Month Drawdown	Extended Drawdown
	<i>Cubic Yards of Sediment Lost to Lake St. Croix</i>		
Lowest Result	5,500	6,500	9,500
Median Result	15,000	15,000	18,000
Highest Result	22,000	22,000	24,500

Modeled Phosphorus Delivery to Lake St. Croix using above sediment losses and sediment lab testing.

Modeled Scenario	1 Month Drawdown	3 Month Drawdown	Extended Drawdown
	<i>Lbs. of Phosphorus Lost in Sediment to Lake St. Croix</i>		
Lowest Result	3,206	3,789	5,537
Median Result	8,743	8,743	10,491
Highest Result	12,823	12,823	14,280

Calculation of phosphorus content in sediment using sediment samples (8) collected in 2024.

Lbs. of Phosphorus Delivered to Lake St. Croix = Cubic Yards Delivered to Lake x 0.535 x 27 x 75 x 0.000538

Sediment samples averaged 53.5% dry matter (46.5% water)

1 cubic yard of sediment – dried down – would equal 0.535 cubic yards dry matter

There are 27 cubic feet in a cubic yard so multiply by 27

Sediment is composed of sand, silt, clay and some organic material – it is heavier than water causing it to sink. Water has a bulk density of 1.0. Bd of 1.2 = 75 lbs./cubic foot was used for the calculation

Samples averaged 538 ppm Total P which equates to 0.0538%, Multiply by .000538

NOTE: 0.6 lbs. P per cubic yard of sediment is a conservative standard value

Appendix 2. TP concentration in the Willow River and in Lake St. Croix.

Willow River has been meeting the phosphorus standard but is still higher than what is needed to improve Lake St. Croix. Lake St. Croix has multiple monitoring stations that are all just below or just above the 0.04 P standard for Phosphorus within the past few years.

