

MEMORANDUM

TO: Cedar Lake Restoration Review Team

FROM: Mark Christenson: CERPIT, PE (Lic. MN)

DATE: May 15, 2026

RE: Cedar Lake Wild Rice Restoration Design Memo
SEH No. SEHDB 186202 14.00

INTRODUCTION AND BACKGROUND

This project is a critical opportunity to support and protect manoomin, a sacred resource for the Fond du Lac Band of Lake Superior Chippewa and a vital part of their culture, identity, and way of life. We recognize that restoring this landscape requires more than engineering – it requires sensitivity and a shared understanding that we are working in service to people, place, and tradition.

Cedar Lake has a long tradition as a location to collect manoomin as well as teach youth about the process. Over the last 20 – 30 years the lakes' water levels have been higher than desired for manoomin growth. The goal of this project is to identify potential causes for the elevated water levels, determine methods to best lower that level, and for these tasks to be sustainable into the future.

DATA COLLECTION

Survey Data

Survey data for Simian Creek was collected by the MnDNR in 2015, which included cross-sections of the creek from the outlet of Cedar Lake to Kultala Road. These cross-sections are limited in detail and not necessarily taken at geomorphic features but are useful in determining rough channel dimensions along the creek.

In 2025, SEH collected survey points along the main beaver dam, Twin Lakes Drive (including culvert inverts and creek cross sections along the road), and near the lake outlet. Surveyors could not access the impoundment area for cross-sections.

Data Loggers

Three data loggers were placed to collect continuous water level data:

- at Cedar Lake,
- upstream of the beaver dam, and
- downstream of the Beaver Dam.

Locations of the data loggers are shown in Figure 1. The output from the data loggers shows the water levels at Cedar Lake and below the beaver dam are nearly constant, while the water level above the dam steadily fell by 0.5 ft over the entire monitoring period. The monitoring data for all three wells is presented in Figure 2.

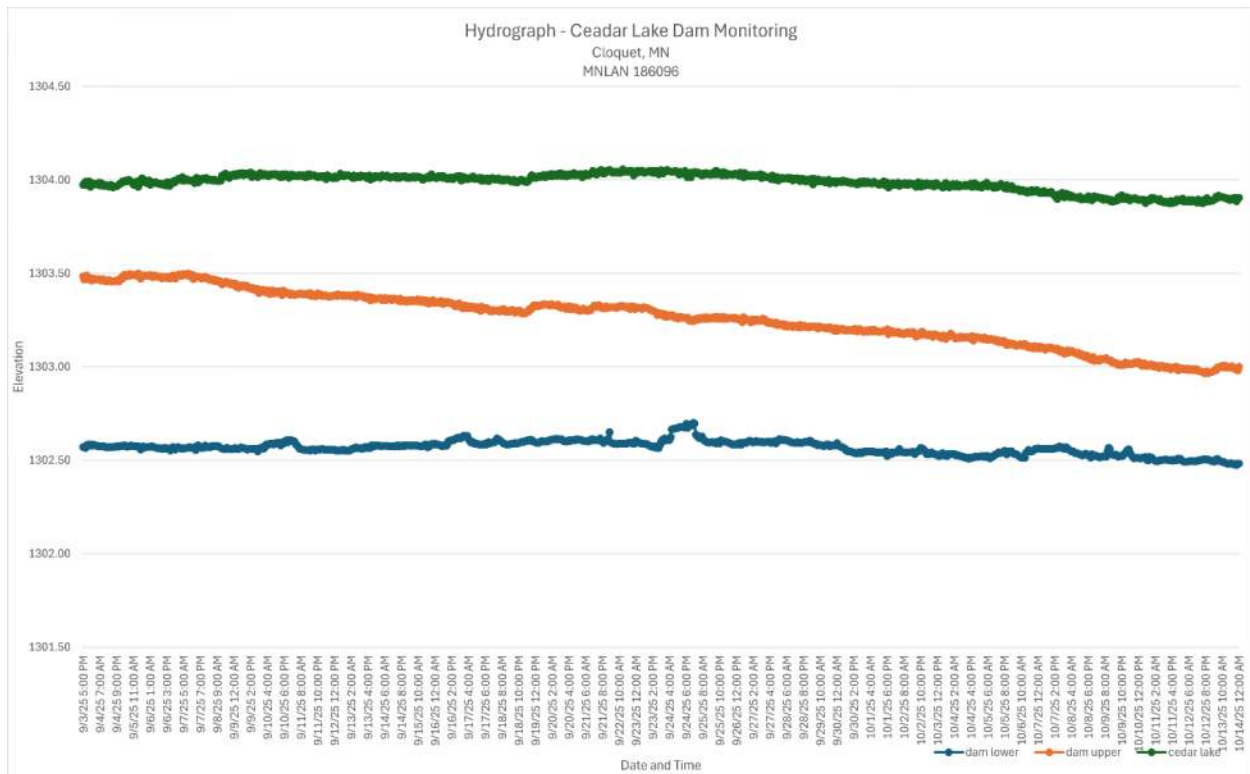


Figure 2: Data Logger Data

Water levels at the dam are approximately 0.5 ft lower than they are at Cedar Lake. Channel velocities were measured at Twin Lakes Road and showed velocities of 0.5 feet per second (fps). Channel velocities at Twin Lakes Road were measured at 0.5 fps; velocities at the dam were not measured, but no obvious flow was observed indicating similar small velocity. The higher water level at Cedar Lake suggests another upstream obstruction is holding water, meaning the main dam is not the only major flow obstruction.

HYDROLOGIC AND HYDRAULIC MODELING

United States Army Corps of Engineers Model

In 2017, the United States Army Corps of Engineers (USACE) developed a 1D/2D HEC-RAS model to inform wild rice restoration in Cedar Lake. The study area included the headwaters upstream of Cedar Lake to just downstream of Kultala Road, over 20 square miles of drainage area. The model used 2015 precipitation data and water level gage data to calibrate the model to replicate 2015 water levels in Cedar Lake. This model was then used to model different scenarios that would lower lake levels to the target elevation range of 1301.0 - 1301.5. The most effective scenario involved removing the main beaver dam and excavating Simian Creek to a width of 12 ft and depth of 1 ft. It should be noted that the USACE model only modeled 1 beaver dam even though it does identify another potential dam near the outlet of Cedar Lake. Thus, when one beaver dam is removed, lake levels are only improved moderately, which leads to the proposed solution of lowering and widening the channel.

The lake level calibration of the report provides hydrographs from the model output and shows how the system responds to rainfall events. One particularly notable precipitation event occurred on July 5, 2015, where over an inch of rain fell over a 24-hr period. The lake levels see a subsequent spike of approximately 0.2 ft shortly after (approximately 1-2 days) and within one week lake levels return to pre rain event levels (See Figure 3). This indicates that when lake levels get above a certain elevation, flow out of the lake is relatively quick and does not appear to be hindered by inefficient hydraulics of the channel. The main cause of higher water levels is more likely due to channel obstructions that are holding water at specific elevations. If these obstructions are removed it is likely that water will be able to flow freely without improvements to the channel.

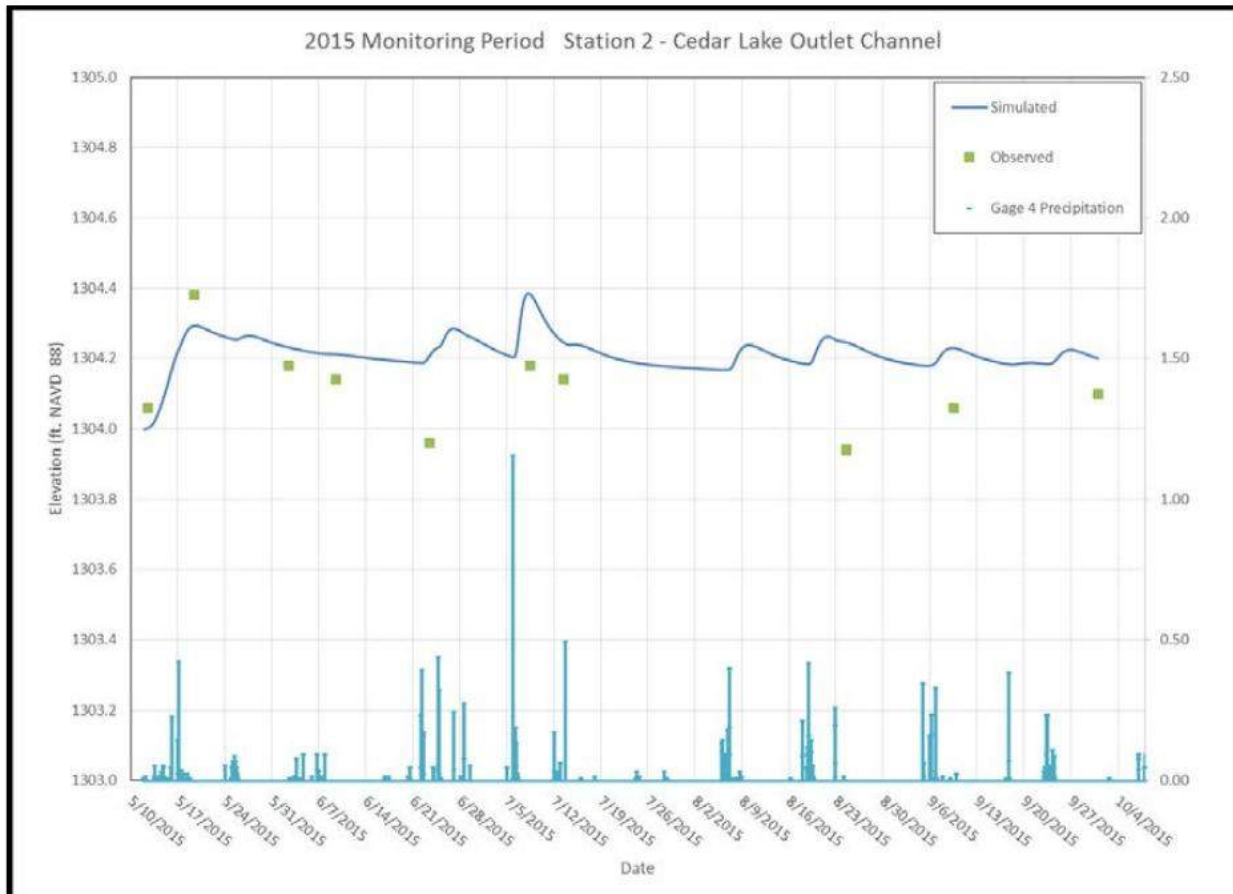


Figure 3: Observed and Simulated gages just downstream of Cedar Lake during 2015 monitoring period (Fig 18 from USACE 2017 report)

HydroCAD Model

Because of the complexity and sensitivity of the USACE model, making modifications to test additional scenarios was determined to be impractical due to instabilities and long run-times. Therefore, SEH developed a HydroCAD model to analyze additional scenarios with an attempt to identify appropriate outlet elevations and test different channel geometries.

Model Development

An existing conditions scenario was developed first and determined the overall structure of the model. The model was structured around four major impoundments (or basins):

1. Cedar Lake
2. Main beaver dam
3. Twin Lakes Drive (with 24" culvert), and
4. Downstream basin

Cedar Lake is the most upstream basin. The outlet of Cedar Lake is assumed to be the potential upstream beaver dam. The outlet elevation was determined by using measured lake levels from the staff gages and the installed monitoring wells. This elevation was determined to be approximately 1304. The middle basin is created by the main beaver dam with the outlet set at 1303.5 per survey data of the dam. The third basin in the model was set with Twin Lakes Drive as the outlet and includes the 24" culvert as the primary outlet and Twin Lakes Drive as the secondary overflow. The final basin was included to provide the tailwater effect seen in the field by the beaver dam downstream of Twin Lakes Drive and was set at 1297.4 per gage monitoring data and survey shots of water elevations. One element not included in the HydroCAD model are the culverts at Hardwood Lake Road. These culverts were left out because they are already sized appropriately and the hydraulics are controlled by the beaver dam further downstream.

The primary intent of this model was to assess the drawdown response of breaching the beaver dams and what impact they might have on the 24" culvert. However, a drainage area was added to the upstream end of the model and calibrated to approximate design flows determined by the United State Geological Survey (USGS) web application StreamStats. This was done to determine how the proposed system might respond to rain events and what impact the proposed project would have on the culvert at Twin Lakes Drive. The StreamStats flows and approximated HydroCAD flows are summarized in Table 1.

Table 1: Summary of Design Flow Events

Design Event	StreamStats [cfs]	HydroCAD [cfs]
2-year	25.5	12.9
10-year	42.5	36.5
25-year	51.2	58.4
50-year	57.8	79.0
100-year	64.2	102.8

Model Results

Three main analyses were performed with the developed HydroCAD models. The first was aimed at assessing if the channel geometry would have an impact on draining down lake levels. Four separate channels were analyzed with varying widths from 8 ft to 12 ft. Each channel had the same depth of 1.4 ft. These channel dimensions were determined by a preliminary analysis of a proposed channel geometry that will be discussed further in the Channel Morphology section of this memo. This analysis was performed by specifying a trapezoidal notch in the dams of the Cedar Lake basin and the main Beaver Dam basin, each with a 2 ft bottom and side slopes of 2H:1V. Both basins were started as full and both basins then drained out simultaneously. This was performed for 4 channel widths: 6 ft, 8 ft, 10 ft, and 12 ft. As stated previously, the depths for all four channels were the same at 1.4 ft deep. The resulting hydrographs for the lake level in Cedar Lake are presented in Figure 4.

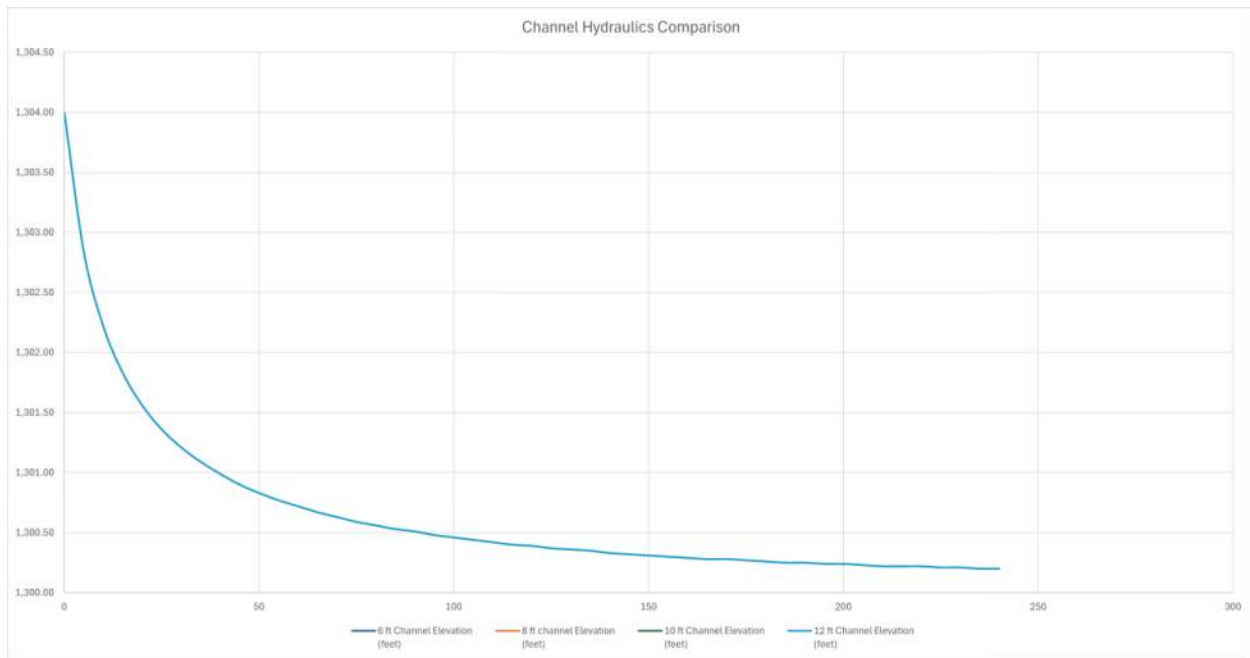


Figure 4: Channel Hydraulics Comparison Hydrographs

Figure 4 shows that the drawdown hydrograph for all 4 channel widths are exactly the same curve and are stacked on top of each other in the above graph. This demonstrates that channel capacity is not contributing to the lake levels and reinforces the assessment that channel obstructions are the primary cause of elevated lake levels.

The second analysis (Figure 5) performed was to determine if breaching the dams would overwhelm the 24" culvert at Twin Lakes Drive and cause flooding of the road. The previously described analysis assumed instantaneous breaching of all obstructions and simultaneous drawdown of any impounded water. In this scenario the road would be overtopped. However, this is not a realistic scenario. The stream length between Twin Lakes Drive and the outlet to Cedar Lake is over 1-mile in length and breaching all of the potential obstructions cannot be performed either simultaneously or instantaneously. Thus, a dam breach analysis was performed on the two basin outlets. First the main beaver dam was breached over a 48-hour period and then the Cedar Lake outlet was breached several days later, once the water from the first impoundment had mostly drained out. In this scenario Twin Lakes Drive does not overtop and reaches a peak elevation of 1298.52 (Overtopping elevation is 1300.7). This analysis was also performed with the culvert at Twin Lakes Drive upsized to a 36" X 72" box culvert.

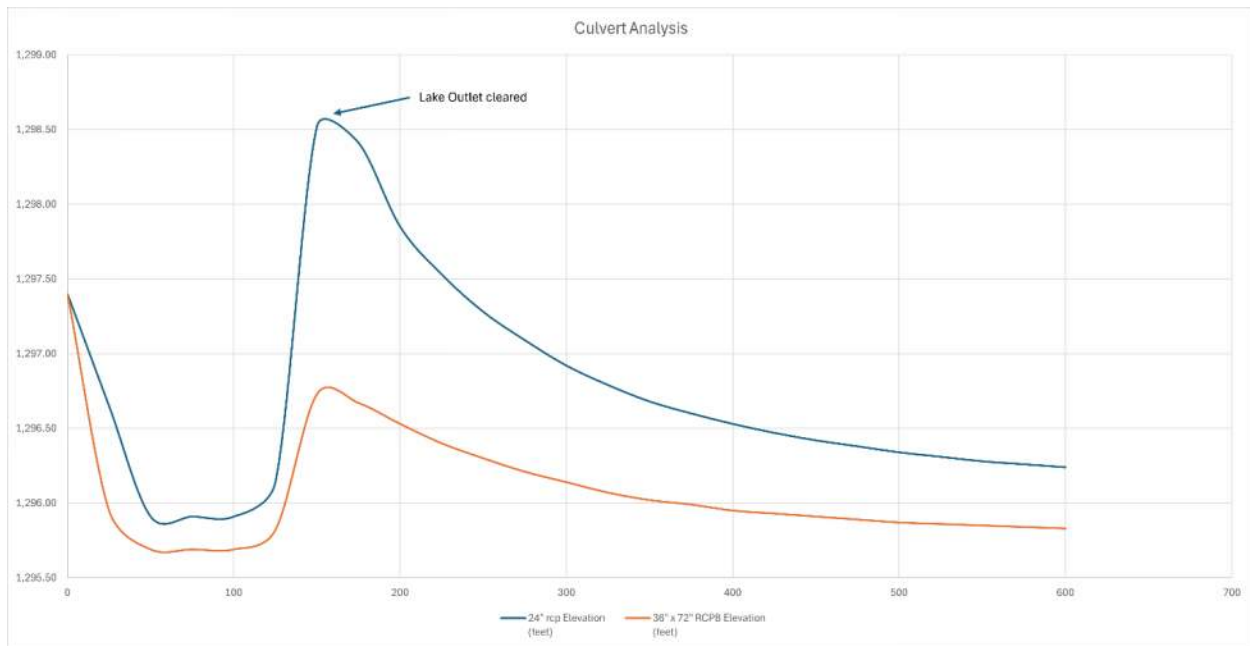


Figure 5: Staged Release Culvert Analysis

The final analysis performed was to analyze what impact a rain event would have on the Twin Lakes Drive culvert with the proposed, cleared system. The question to be answered is whether or not the proposed condition would have an adverse impact on the flows to the culvert, and would the culvert be overwhelmed more or less frequently than it is now. This analysis included three conditions for the 5 design flows described in Table 1: Existing conditions, drained conditions with existing 24" culvert, and drained conditions with upsized 36" X 72" Box Culvert. The results are summarized in Table 2.

Table 2: Summary of Overtopping Frequency Analysis

Design Flows	Existing Conditions	Channel Cleared No culvert improvement	Channel cleared + Culvert Improvement (36" X 72")
Overtopping Elevation	1300.7	1300.7	1300.7
2-yr WSEL	1297.89	1297.4	1297.4
10-yr WSEL	1300.56	1300.01	1297.4
25-yr WSEL	1300.82	1300.78	1297.88
50-yr WSEL	1300.9	1300.83	1298.47
100-yr WSEL	1301.26	1300.87	1299.09

As the table shows, the proposed drawdown of lake levels will not cause an adverse impact on the Twin Lakes Drive culvert. If funds allow, there could be a benefit to improve connectivity in higher flows by upsizing the culvert, but upsizing is not necessary to draw down the lake level.

CONCLUSIONS AND PROPOSED SOLUTIONS

Analysis of the available data shows that the cause for elevated lake levels in Cedar Lake is obstructions to flow primarily due to beaver activity. Lowering the lake level to 1301 would significantly increase the area of suitable water depths for wild rice growth (Figure 6a through Figure 6d). Lowering the lake level by the proposed 3 ft would reduce the overall area of the lake from 59.6 acres to 54.6 acres. This reduction will bring the lake back to its historic wild rice producing and likely pre-beaver dam influence lake elevation. Impact on the lake shore or surrounding wetlands is not expected and will be monitored by the Fond du Lac Natural Resource team. The overall lake area reduction and wild rice habitat increase for all interim lake levels are summarized in Table 3. The modeling indicates capacity of the channel is not a factor and the best course of action to return lake levels to those appropriate for wild rice growth is to remove these obstructions along the alignment of Simian Creek. The most effective course of action is to travel upstream from Twin Lakes Drive and remove channel obstructions as they are found. Minor obstructions like logs, branches and vegetation can be cleared and major obstructions like beaver dams should be breached along the channel alignment.

Table 3: Summary of Lake Level Lowering Metrics

Lake elevation	Total Lake Area [Acres]	Area of Wild Rice Habitat [Acres]	Loss of Total Lake Area [Acres]	Increase in Wild Rice Habitat [Acres]
1304	59.6	3.5	0	0
1303.5	58.1	4.58	1.5	1.08
1303	57.6	6.3	2	2.8
1302.5	56.8	10.4	2.8	6.9
1302	56.3	18.5	3.3	15
1301.5	55.7	29.7	3.9	26.2
1301	54.6	38.42	5	34.92

A desktop analysis was performed to estimate the level of effort that may be involved in clearing the obstructions and to develop design details for the proposed work.

Identification of Simian Creek Alignment and Profile

The first step is to identify the alignment of Simian Creek through the wetland complex. This was achieved by referencing aerial photographs, drone footage, and cross checked with historic aerial photographs from 1939 obtained from Minnesota Historical Aerial Photographs Online Library. The proposed alignment is shown on the drone aerial photograph and the historic aerial photograph in figure 7a and figure 7b respectively. The alignment of Simian creek appears to be largely the same since 1939 indicating a stable stream channel.

A channel profile has been identified using a combination of survey points of the thalweg (deepest point of the channel) from the MnDNR survey and SEH survey. It is not the goal of this project to alter the creek either in alignment or profile. These are the best available data on the stream profile and will be used to define the bounds of channel clearing with regards to the depth of clearing along the alignment. The proposed channel profile is shown in figure 8.

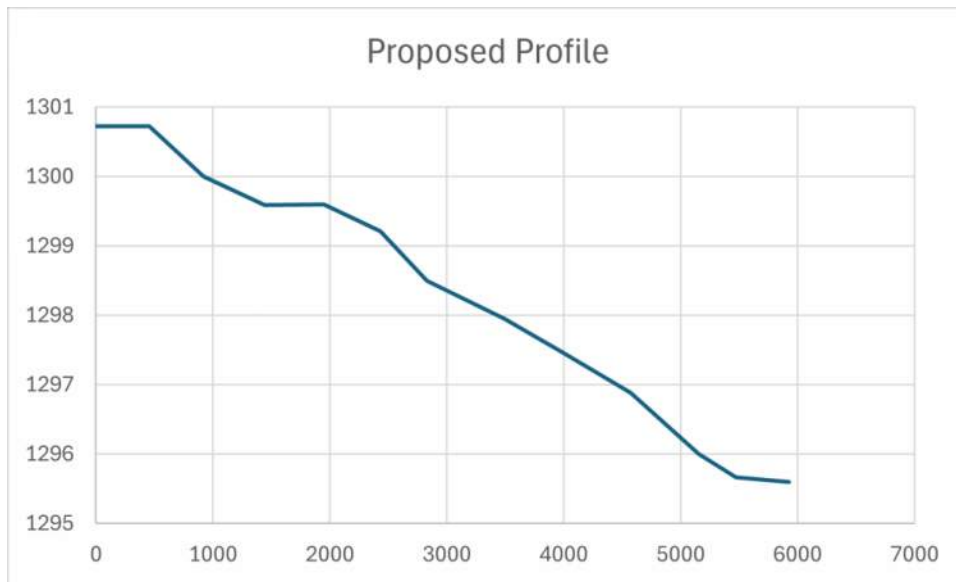


Figure 8: Proposed Profile for Channel Clearing

Identification of Major Obstructions

There is one known major obstruction, which is the main beaver dam located approximately halfway between the outlet of Cedar Lake and Twin Lakes Drive (Figure 9). This dam has been in place for many years and is approximately $\frac{1}{4}$ of a mile long. As the analysis indicates, it is assumed that there are other obstructions to flow along the creek. Some may be smaller obstructions but there are likely other beaver dams that may need to be breached.

A desktop analysis was performed to identify any additional beaver dams or other major obstructions to flow along Simian Creek. This analysis identified two other potential beaver dams that may need to be breached. The first is between the main dam and Twin Lakes Drive (Figure 9). This potential dam is less obvious than the main dam but does show similar attributes where there is an area of open water running perpendicular to the channel alignment that ends with a line of vegetation on the downstream side. The crest elevation of this potential beaver dam is unknown. A breach could be designed by assuming an flow line elevation of the breach based on the average slope of the channel and specifying a bottom width and side slopes to open up the dam.

The second potential beaver dam is located at the outlet of the lake (Figure 9). The same open water areas running perpendicular to the channel alignment are apparent in this location as well. The crest elevation of this potential dam can be assumed based on the lake level of 1304.0.

Breaching of Major Obstructions

Breaching of the beaver dams is planned to be completed at the same time as cleaning out of the channel. A determination of beaver activity and use of the area should be completed to determine the post-breaching activities. If the dam appears historic with minimal to no activity and/or minimal availability of beaver food sources, it can be breached in the same widths and depths as the channel on either side of the dam. This method would be used when there does not appear to be a high probability that beavers will immediately repair the dam.

Channel Clearing

Along with breaching major flow obstructions, it is proposed to clear out any smaller obstructions within the channel, including brush, logs or excess vegetation. Simian creek has not functioned as a creek in this area in many years and currently exists as a remnant channel in a wetland impoundment. Because of this it is assumed that the creek would benefit from some maintenance while equipment is on site to breach the major obstructions. The modeling shows that the channel dimensions are likely not a determining factor in drawing down lake levels in Cedar Lake. It is not desirable, however, to send equipment in without constraints on how far from the center alignment can be cleared.

Table 4: Channel Clean-out Estimates Summary

Name	Estimated Clean-out Length [LF]	Estimated Clean-out Area [SF]
Area 1	682	6,820
Area 2	186	1,860
Area 3	37	370
Area 4	26	260
Area 5	31	310
Area 6	843	8,430
Area 7	396	3,960
Area 8	339	3,390
Total	2,540	25,400

Geomorphic Assessment

The project location is in an unconfined valley type: likely either a glacial till or alluvial deposition. Stable stream types for both fluvial landscapes include type E or C channels. The cross sections surveyed by the MnDNR in the study area were analyzed and showed channel widths ranging from 4 ft to 15 ft. The inconsistency shown is attributed to the fact that at the time these cross sections were surveyed, the creek had already been impounded for many years and identifying the channel was likely difficult due to accumulation of vegetation and organic matter obscuring the channel. However, the width to depth ratio of most of these cross sections was <12 ft, which is in line with an E channel. Cross-sections further downstream, outside of the influence of beaver activity, were analyzed and the channel widths corresponded well with the North Shore curve (Obtained from Rosgen Level I: Applied Fluvial Geomorphology) for C channels. Considering the valley is not the same in this location, it is possible that the stream is a different type here.

Regional curves for eastern Minnesota and the north shore were consulted along with the “E-channel Calculator” tool available from the “Watercourse Morphology Dataset” website. The E-channel Calculator includes the regional curve for western MN, so this was changed to reflect the North Shore regional curve data. Table 5 summarizes the values obtained from the 2 regional curves and the E-channel Calculator compared with the cross-section averages.

Table 5: Summary of Regional Curve Analysis

Bankfull Metric	Eastern MN	North Shore (E channel)	E Channel Calculator (NS curve)	Cross Section Averages
Area [sf]	15.9	20.8	20.8	21.9
Width [ft]	13.4	13.2	10.2	10.3
Average Depth [ft]	1.2	1.6	2.0	2.0

Based on this data, it was determined that the North Shore curve is the most appropriate reference for Simian Creek. It is proposed that the channel clearing limits are set by the values from the E channel calculator. Brush and obstructions cleared from 5 ft on either side of the proposed channel alignment clearance route and to a depth no greater than 2 ft is being proposed. It should be reiterated that the channel itself is not being reconstructed here, that this assessment is being used to determine limits on channel maintenance and clearing of flow obstructions.

Post-Project Maintenance

The identified cause of the high lake levels for Cedar Lake are channel obstructions likely due to beaver activity. The recommendations laid out in this report are to meet the goal of returning Cedar Lake surface elevations to the historic levels that supported the growth of wild rice. However, if the beaver activity is left unchecked the lower lake levels are unlikely to last. The Fond du Lac Band Natural Resources department will take on the necessary maintenance of vegetation and beaver management that will be needed in perpetuity for the long-term success of the project.

FEMA FLOODPLAIN ANALYSIS

Simian Creek is a designated FEMA flood zone type AE as indicated on FIRM Panel 27017C0276D dated 3/13/2024. Any project that proposes work in the floodway requires a floodplain analysis.

The effective model was obtained from the Minnesota Department of Natural Resources (MnDNR) so that the impacts of the project on the base flood elevation (BFE) could be analyzed. Upon reviewing the effective model it was determined that the beaver dam is not represented in the model.

Additionally, the cross sections in the model between the outlet of Cedar Lake and Twin Lakes Drive indicate a channel that is wider and deeper than the channel clean-out dimensions that are being proposed by the project. Figure 10 shows the cross-sections from the model and the proposed channel clean-out dimensions overlain on the model cross-section.

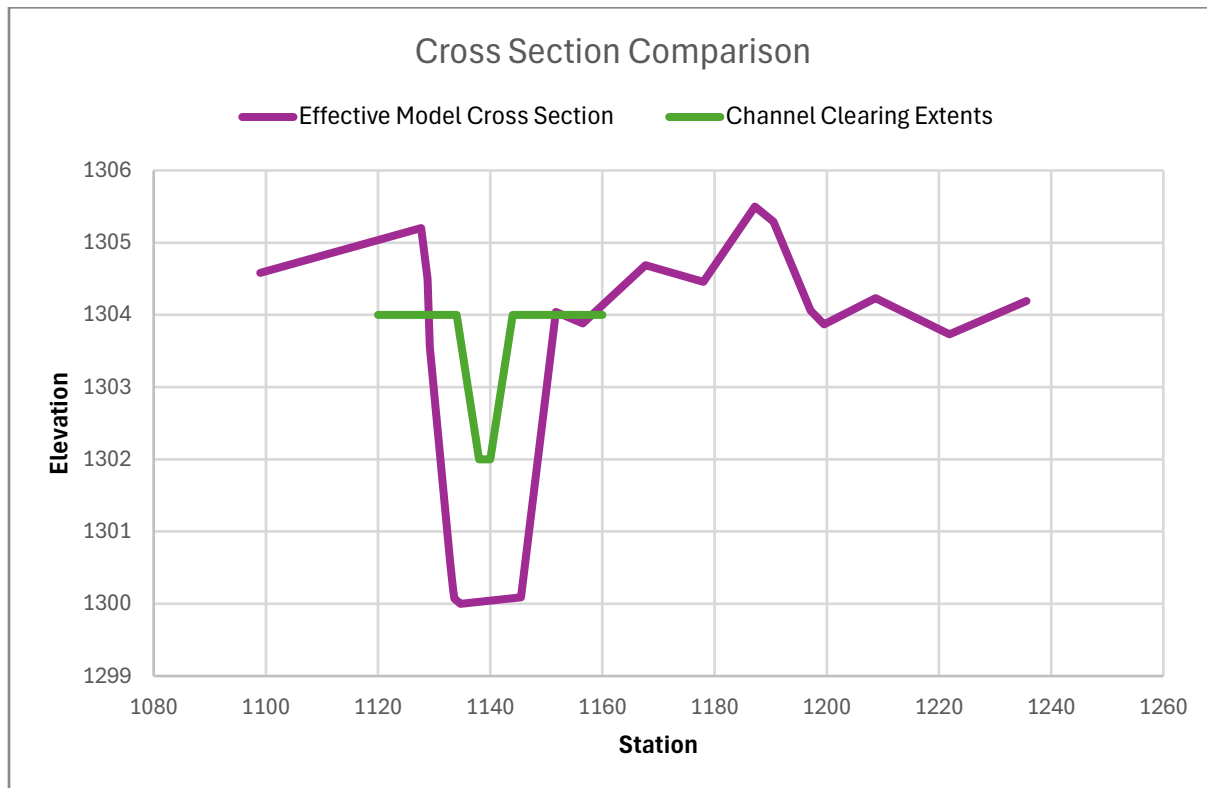


Figure 10: Cross Section Comparison

Peak Flow Analysis

A peak flow analysis was performed using a 1D XPSWMM model using XPSWMM version 2024.2. The goal of this modeling effort was to gain a quantitative understanding of how the project might affect peak discharge rates and ensure that the project will not increase flood risk downstream. XPSWMM was chosen rather than expanding on the HydroCAD model, as it is a more robust model that is better equipped to handle the complexities involved with the project.

Two versions of the model were run, one with runoff inputs and one without that is only running the FEMA effective model 100-yr flow (198 cfs).

Runoff Version of Model

The model used the EPA runoff method to calculate runoff from the direct drainage area. Inputs from upstream of Cedar Lake were inputted as a constant flow of 40.1 cfs based on values obtained from the United States Geological Survey (USGS) web application StreamStats. The existing conditions model includes the area upstream of the beaver dam as a storage node and a higher starting elevation for Cedar Lake to represent the beaver dam at the lake outlet.

The proposed conditions model removes the beaver dam and removes the area upstream of the beaver dam as a storage node. The storage here is still accounted for in the natural section shape cross sections of the model. The runoff inputs were not changed from existing to proposed. The EPA runoff method requires an impervious percentage and an infiltration model. For this model the SCS Curve number method was used as the infiltration input which allows a single pervious area curve number. Even though the project will drain the impoundment upstream of the beaver dam, it is expected that the area

will remain wetland and thus not have a significantly improved capability to absorb more water. Peak discharge rates for the existing and proposed runoff version of the model are found in Table 6.

Table 6: Peak Discharge Rate Comparison Summary

Runoff Model [Peak Discharge Rate]		
Location	Existing Conditions [cfs]	Proposed Conditions [cfs]
Downstream of Beaver Dam	338.4	279.4
Downstream of Twin Lakes Drive	154.9	65.0

As the results show, the peak discharge rates are reduced from the existing to the proposed conditions models. The discharge rates differ from the FEMA effective model (198 cfs) which is not unexpected as the FEMA model is a steady-state model and this model is dynamic.

Steady State Version of Model

Because the peak discharge rates differed from the FEMA model, a second version was run where the runoff inputs were removed and only a user defined inflow of 198 cfs at the upstream end of the model was run. This was done to analyze the project from a different perspective that more closely resembled the FEMA model. Table 7 summarizes the water surface elevations (WSELs) downstream of the beaver dam and downstream of Twin Lakes Drive.

Table 7: Summary of Peak Water Surface Elevations

Steady State Model [Water Surface Elevation]		
	Existing Conditions [ft]	Proposed Conditions [ft]
Downstream of Beaver Dam	1301.36	1301.36
Downstream of Twin Lakes Drive	1300.74	1300.74

Table 7 shows that there will not be an increase in WSELs because of the project. Looking at the flow hydrographs for the link downstream of the beaver dam gives perspective as to why.

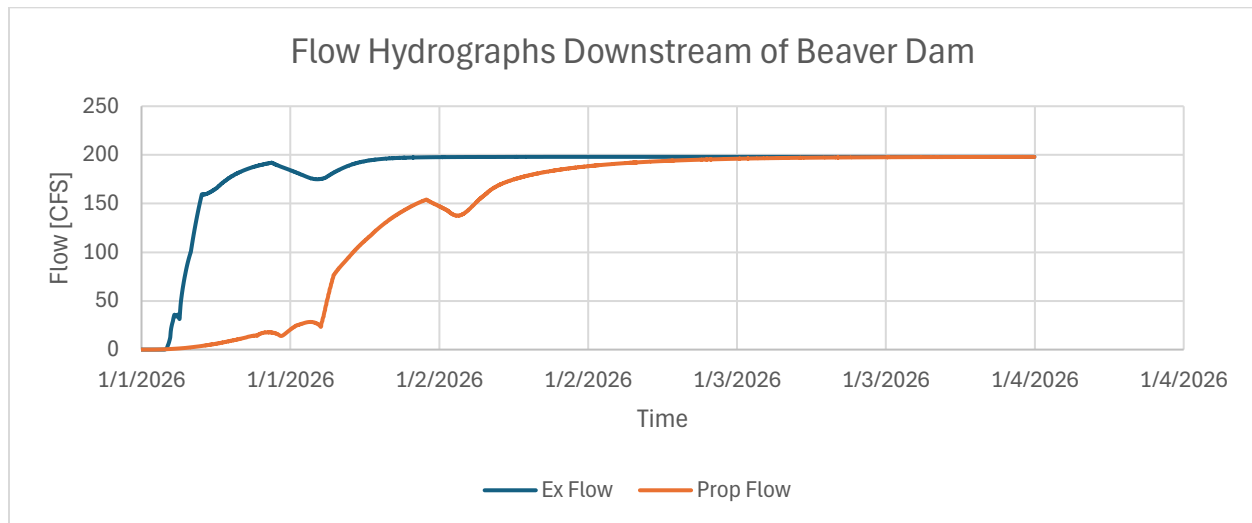


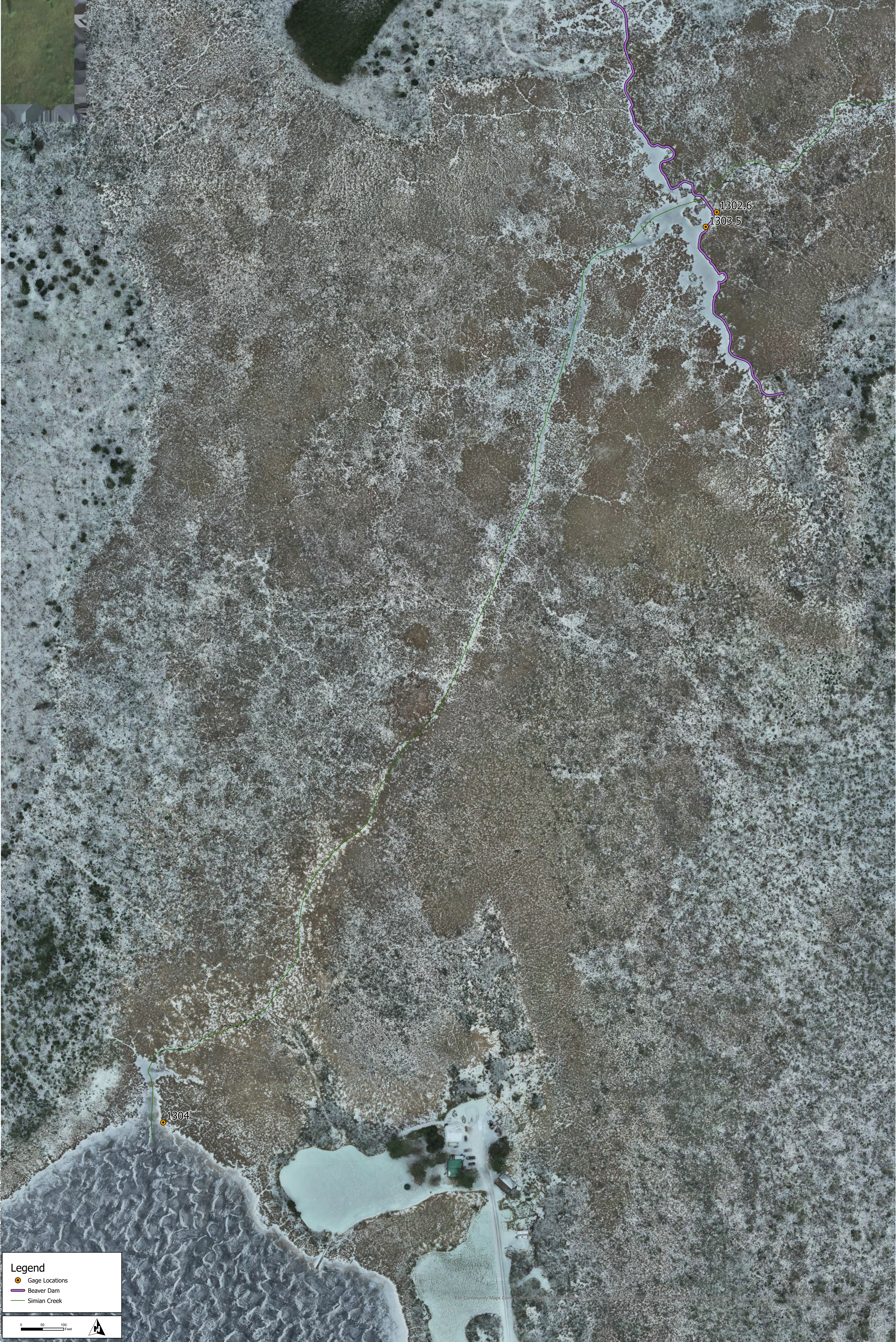
Figure 11: Flow Hydrograph Downstream of Dam

The model downstream of the dam takes significantly longer to reach the steady state input of 198 cfs. This is because before the dam was removed there was a large amount of storage that was already full due to the impoundment. With the dam breach, and that impoundment drawdown, the storage in the floodplain is available in these larger events to attenuate flows which is why we see decrease in the runoff version of the model.

The proposed project will not decrease the cross-sectional area of the channel, which will not cause a decrease in hydraulic capacity of the system and will not cause an increase in the 100-yr water surface elevation.

A No-Rise Certification is attached to this memorandum. The No-Rise Certification is based on the hydraulic evaluation described above.

Attachment: Figure 1. Figure 6a, Figure 6b, Figure 6c, Figure 6d, Figure 7a, figure 7b, Figure 9, No Rise Certification



Legend

- Gage Locations
- Beaver Dam
- Simian Creek

0 50 100 Feet

CEDAR LAKE
MANOOMIN HABITAT RESTORATION

FIGURE 1
Data Logger Locations

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Legend

feet

0.0 - 0.5

0.5 - 3 (Ideal for wild rice)

+3.0

050100

Feet

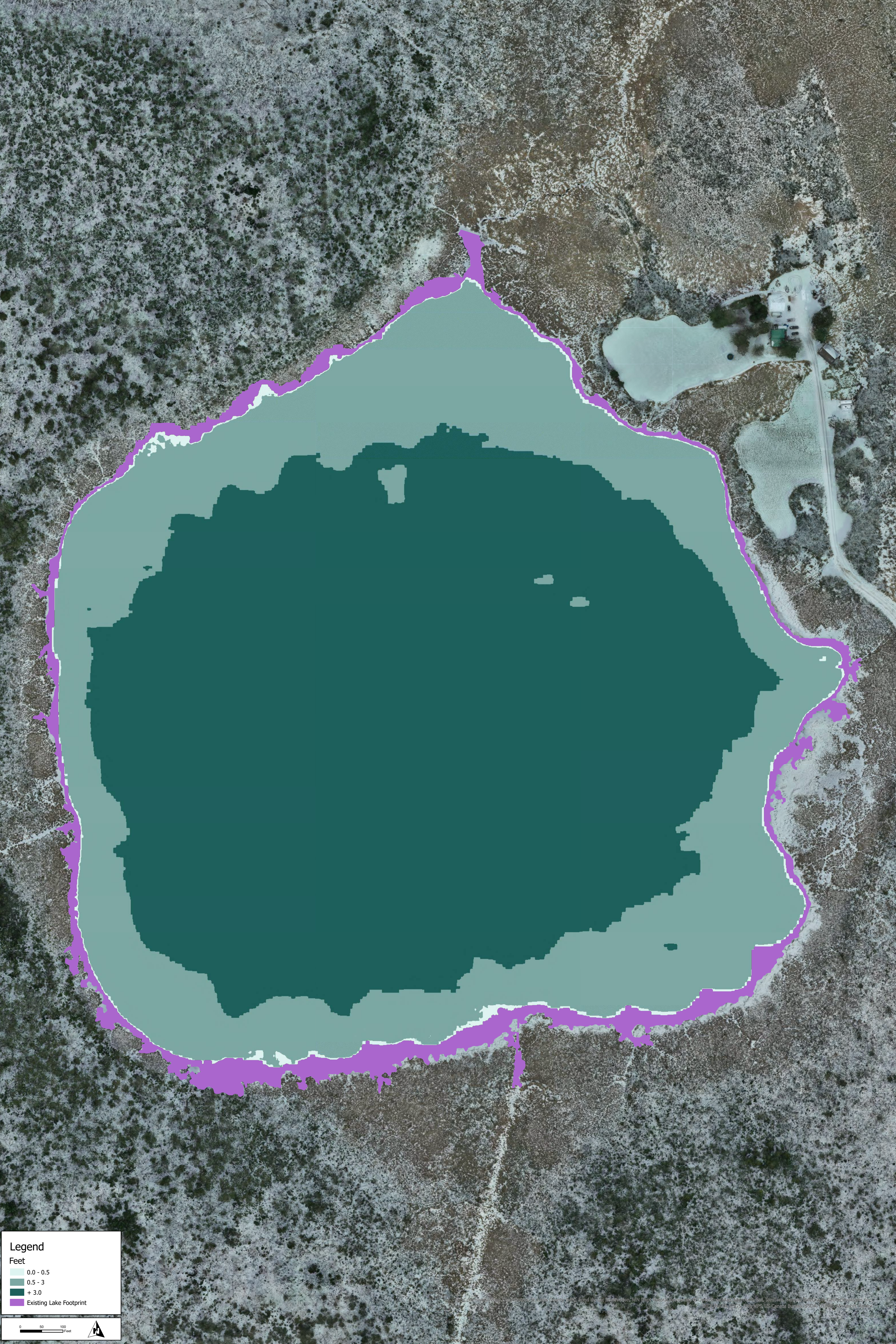
CEDAR LAKE

MANOOMIN HABITAT RESTORATION

FIGURE 6a

Cedar Lake Existing Water Levels

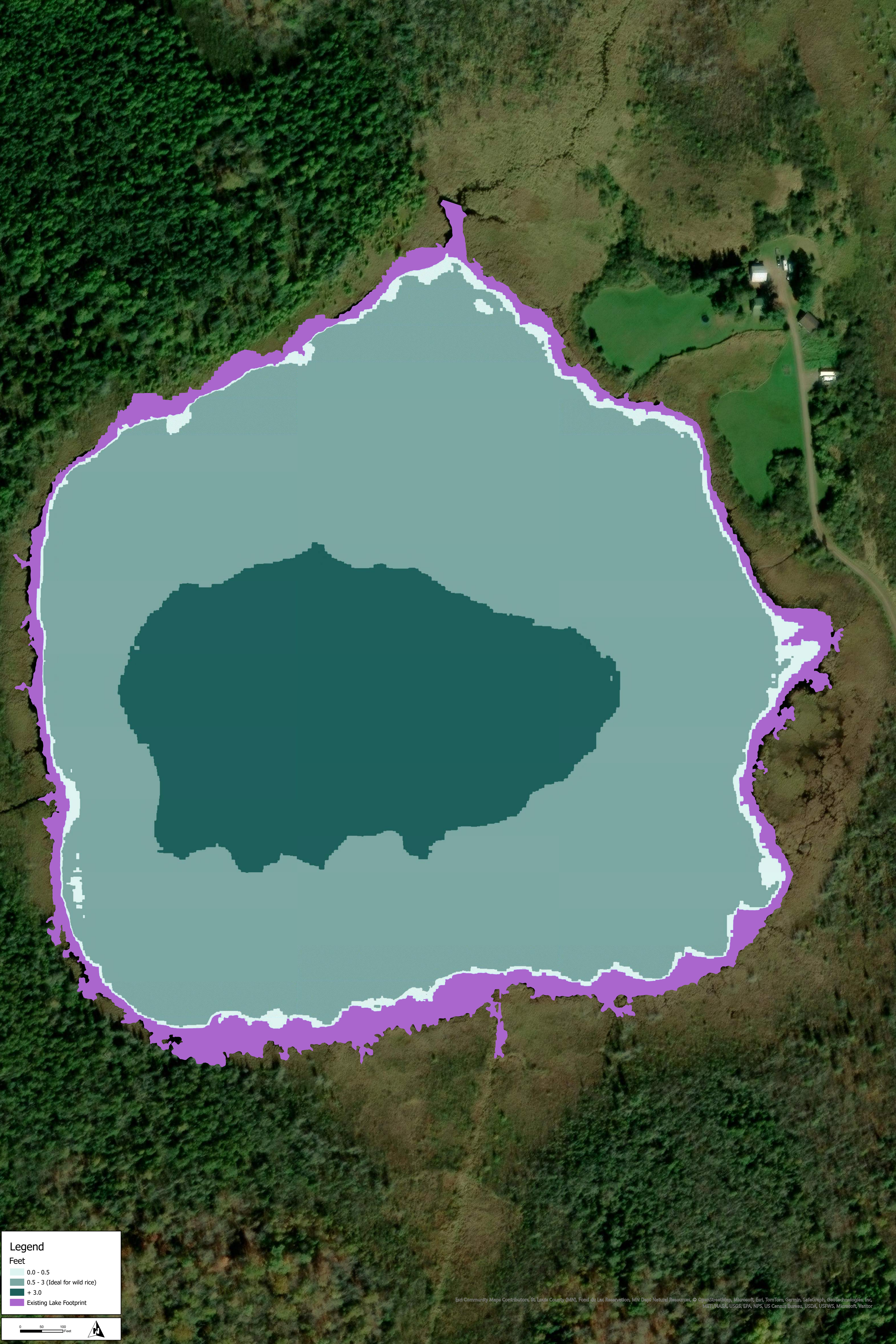
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CEDAR LAKE
MANOOMIN HABITAT RESTORATION

FIGURE 6b
Cedar Lake Proposed Lake Level: 1302





Legend

Feet

0.0 - 0.5

0.5 - 3 (Ideal for wild rice)

+ 3.0

Existing Lake Footprint

050100

Feet

Eri Community Maps Contributors, St. Louis County (MN), Fond du Lac Reservation, MN Dept Natural Resources, © OpenStreetMap, Microsoft, Eri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, (METI/AASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, Microsoft, Vantor



CEDAR LAKE MANOOMIN HABITAT RESTORATION

FIGURE 7a
Proposed Route Overview

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



CEDAR LAKE
MANOOMIN HABITAT RESTORATION

FIGURE 7b
Proposed Route Overview
1939 Aerial

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

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Area 7	396	3960
Area 8	339	3390
Total	2540	25400



Legend

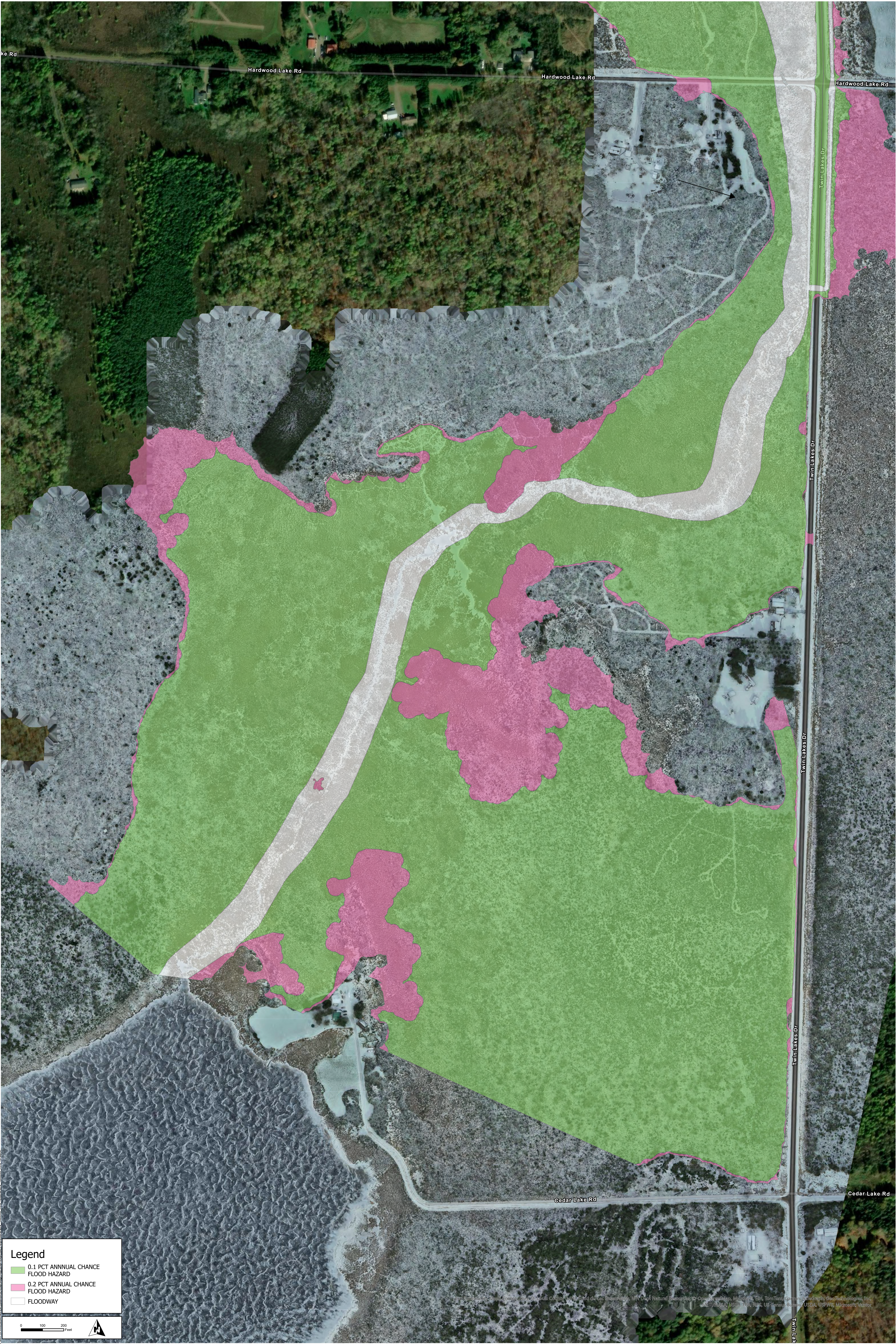
- Channel Clean Out
- Potential Beaver Dams
- Proposed Creek Route
- Beaver Dam

0 50 100 Feet

CEDAR LAKE
MANOOMIN HABITAT RESTORATION

FIGURE 9
Potential Barriers and Clearing

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Project: MNLAN 186096
Print Date: 3/13/2026
Map by: SEH
Projection: NAD 1983 2011 StatePlane Minnesota North FIPS 2201 F1 US
Source: SEH

CEDAR LAKE MANOOMIN HABITAT RESTORATION

FIGURE 11
FEMA Floodplain

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

MINNESOTA "NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified professional engineer licensed to practice in the State of Minnesota.

It is further to certify that the attached technical data supports the fact that the proposal to Lower lake levels in Cedar Lake by removing beaver dams and clearing channel obstructions in Simian Creek.

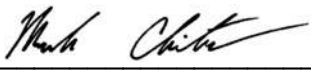
_____ (*development name / short project description*)

will not impact the floodway width or 100-year flood elevation (will not raise or lower by more than 0.00 feet) on Simian Creek (*Name of stream*) at published sections in the Flood Insurance Study for Carlton County (*Name of Community*) dated 3/13/2024 (*Study Date*) and will not impact the 100-year flood elevation (will not raise or lower by more than 0.00 feet) at unpublished cross-sections in the vicinity of the proposed development / project.

Attached are the following documents that support my findings:

Project Narrative Memo

Date: 3/11/2026

Signature: 

{SEAL}

Title: PE #62963