Ecological & Water Resources,
1601 Minnesota Drive
Brainerd, MN 56401

December 27, 2023 Sent Via Email

Windemere Township Board of Supervisors
91546 Military Road
Sturgeon Lake, MN 55783

Chairman Alan Overland
Supervisor Tony Bakhiari
Supervisor Heidi Kroening

RE: MN DNR's Review of Sturgeon Lake (DOW# 58006700) High Water Outlet Investigation Engineer's Conceptual Report

Dear Windermere Township Board of Supervisors,

This correspondence is in response to the letter dated 9/14/2023, requesting review of the Sturgeon Lake High Water Outlet Investigation Report prepared by Houston Engineering 11/15/2023, focusing on the impacts of proposed alternatives on water levels and downstream.

Your dedication to these important matters is greatly appreciated. If there are specific details that necessitate further clarification or additional aspects you would like us to address, please do not hesitate to reach out.

We remain committed to providing comprehensive information and support to ensure a thorough understanding of the implications outlined in the report.

Thank you for your understanding and ongoing collaboration.

Best regards,

Nayere Ghazanfarpour
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MN DNR Review Sturgeon Lake (DOW# 58006700) High Water Outlet Investigation Engineer's Conceptual Report

The MN DNR acknowledges ongoing concern relating to water levels, shoreline erosion, property damage and potential losses on Sturgeon Lake (DOW# 58006700). We appreciate the chance to assess the report thoroughly. We concur with the pursuit of an approach that explores various alternatives and recognize feasibility of each alternative. Following extensive review by various DNR divisions and programs, summarized findings from the assessment of the Sturgeon Lake High Water Outlet Engineer's Conceptual Summary Report (Nov. 2022) are provided below.

History of outlet(s)

The DNR has gathered diverse evidence concerning the "outlet" of Sturgeon Lake. Historical data and accounts suggest that Sturgeon Lake and its linked waters have conventionally been considered a closed system meaning there is no natural surface water outlet. There have been assertions indicating the presence of a potential surface water outlet on the lake's south side towards Rush Lake (DOW# 58007800), connecting to the Willow River before it was presumably filled in for development purposes. While low-lying wetlands exist between Sturgeon and Rush Lake, indicating a potential drainage route along with local resident accounts indicating the presence of a drainage culvert and possible flow at this location, there is no conclusive evidence that indeed was a regular occurrence nor is there evidence that surface flows would have been able to leave Rush or Lower Rush (DOW #007900) Lakes toward the Willow River as a surface drainage.

In 1952, a channel was excavated near the western shore of Sturgeon Lake, establishing a surface connection between Sturgeon Lake and Dago Lake (DOW# 58007300) through the downstream Unnamed Basin (DOW# 58007200). This channel links to the downstream Unnamed basin then Dago Lake via a culvert situated beneath Lakeland Road. Then, in 1954, an investigation by the DNR identified this excavation as being conducted illegally and contemplated the possibility of its closure. Discussions within the county at that time revolved around the potential inclusion of the ditch into the public ditch system, but this proposal did not materialize as we understand it. During higher water events exceeding the Sturgeon Lake ordinary high-water level (OHWL) elevation of 1069.1 ft NGVD 29 (ft), there is a surface water connection near the shoreline between Sturgeon Lake and the excavated channel leading to Unnamed Basin 58007200. However, this connection merely redirects water to Dago Lake during such periods and does not allow surface flow further downstream towards the Willow River.

General Comments

Infested Waters

Sturgeon Lake harbors a widespread and robust population of Eurasian watermilfoil, categorized as a prohibited invasive species. The presence of Eurasian watermilfoil in Sturgeon Lake was confirmed in 2008, prompting regular herbicide treatments in problematic areas, which have been consistently administered through 2023. MN Rule 6216.0500 outlines the prohibition of transferring infested waters into non-infested waters without implementing filters or other treatments aimed at preventing the spread of invasive species. The MN DNR does have a history of permitting infested water transfers with appropriate treatment, most recently on Lake Shamineu (DOW#49012400), Morrison County in which the DNR authorized a water level drawdown with specific conditions, including stipulations for particular

filtration requirements to address high water. Importantly, any new infestation may require additional requirements and/or finer filtration to address other prohibited invasive species such as zebra mussels, spiny water flea, starry stonewort or others. The goal remains preventing the transfer of infested waters into non-infested areas.

Operation and Maintenance Plan

An operation and maintenance (O&M) plan will be an essential component of any future proposal. Such a plan must encompass detailed information concerning the activation and deactivation criteria for the system, including contingencies for periods of flooding, high water, or other critical situations affecting downstream lakes, rivers, and properties. Of significant concern are the potential impacts on downstream properties, encompassing both public and private landowners within Unnamed Basin 58007200, Dago Lake, Big Slough, and along the Willow River. Consequently, any proposed plan needs to clearly outline the responsible parties entrusted with operating, monitoring, and maintaining the pump stations, force main pipelines, and associated existing and new ditched channels. This O&M plan will play a crucial role in ensuring the system's effective functioning while mitigating potential adverse effects on downstream areas, requiring comprehensive strategies and clear delineation of responsibilities.

Other Alternatives Not Considered

It is imperative to comprehensively evaluate the extent of property damage resulting from the high-water levels. The DNR emphasizes the significance of integrating floodproofing measures and exploring the feasibility of relocating affected structures. Additionally, it's vital to assess the potential costs associated with acquiring impacted properties. While these measures may not represent preferred alternatives, they contribute significantly to understanding the breadth of impacts caused by high water levels on properties and structures and the importance of proper shoreland zoning administration.

Impacts to State Administered Land and Other Resources

The DNR continues to express concerns about the proposal involving Dago Lake as a receiving body for waters from Sturgeon Lake, both with and without a pumping mechanism. Elevated water levels in Dago Lake are anticipated to adversely impact valuable red pine and other species of trees whose habitat is more ‘upland’, along with public and private use of the surrounding lands in the vicinity of Dago Lake.

Another issue of concern arises due to the potential downstream impacts resulting from increased stream flows in the Willow River, specifically concerning the Willow River Dam situated north of the town of Willow River. The DNR is apprehensive about the dam's capability to manage the anticipated surge in water flow within the Willow River system without further evaluation. Additionally, other critical areas of concern include various bridges and culverts along the Willow River, notably the new culverts on Hwy 61 below the dam, the Willard Munger Trail bridge just downstream of Hwy 61, and the bridges/culverts in the City of Willow River below the Willard Munger bridge. These structures require careful evaluation and consideration to address potential risks associated with heightened water flow in the Willow River system. A comprehensive evaluation is essential to determine potential impacts and ensure measures to avoid adverse effects.

All proposed routes involve channeling or piping water alongside a roadway, and specifically, the pump solutions originating from Dago Lake would require substantial acquisition of right-of-way, establishment of easement and/or purchase/transfer of lands. Such use would require additional

consideration on if or how this could be accomplished. This process is also likely to impact numerous mature trees situated in those areas.

Environmental Review

It's indicated in Section 5.1.4 of the report that a mandatory EAW (Environmental Assessment Worksheet) might not be necessary for the alternatives and routes identified. However, it's crucial to provide detailed justification for this statement, specifically delving into an analysis of relevant thresholds as outlined in the subparts of Minn. R. 4410.4300.

The document should offer an in-depth exploration of how each potential alternative aligns with the stipulated thresholds in Subparts 26 and 27. If calculations and evaluations regarding the applicability under the Minnesota Environmental Protection Act (MEPA) were previously conducted, a detailed explanation for each alternative should be provided. This should encompass the specific points where these alternatives could potentially surpass or remain below the outlined thresholds, offering a comprehensive analysis to justify the conclusion regarding the requirement for a mandatory EAW.

Alternatives Analysis – Proposed Outlet Routes

Route 1A & 1B: Dago Lake outlet to Willow River – Piped & Ditched

Routes 1A and 1B leverage the current connection between Sturgeon Lake and Unnamed basin 58007200, or alternatively, involve pumping water out of Dago Lake. From there, ditched channels and pumping stations would be directed toward the Willow River.

- All proposed routes involve or force main pipelines alongside a roadway, and the pumping solutions originating from Dago Lake would necessitate substantial right-of-way acquisition or easements through state owned land and private properties potentially impacting numerous mature trees along the route.
- Routes 1A & 1B substantially increase the impact on State Land managed by the DNR Division of Forestry compared to other proposed routes. Further investigation is required to understand if the proposed use aligns with the current management or allowances for these state lands.
- The proposed Dago Lake route raises concerns, as it may result in damage and loss of productive timberland and recreational areas due to the installation of a pump, filtration system, and drainage. This system could potentially obstruct access to areas actively managed forestland, affecting essential management activities including assessments of forest health and timber harvest operations.
- Further details on the proposed ditched channels are necessary as they might create obstacles or barriers to the widely enjoyed designated motorized and non-motorized recreational activities, including roads and OHV trails, in the General Andrews State Forest.
- It appears that all designated pump locations specified in the plan may lack sufficient depth for accommodating a pump intake and filter system that would remain unscathed by ice or prevent becoming a navigation hazard. This includes the probable shallow depth areas on Dago Lake (under low water conditions), the south shore of Sturgeon Lake, and a specific off point on the southeastern side of Sturgeon Lake identified for all three routes.
- Per discussions held during field visit on Oct 13th, 2023, observations suggest that Dago Lake previously maintained a notably higher water level, likely at an elevation on par with that of Sturgeon Lake during past high-water events. A visual assessment revealed historic water marks upon the boat ramp and along the shoreline, indicating the level the water reached during such

events. Presently, there isn't a discernible location suitable for a pump on Dago Lake and discussions included the prospect of conducting a survey to determine historic water levels of Dago Lake as it relates to how it those level may impact the adjacent forest community, Sturgeon Lake's OHWL and the highest known water levels from past flooding events. While this endeavor could be beneficial to better understand impacts from varied water levels a specified purpose would help better determine the scope of such work.

Route 2A & 2B: Sturgeon Lake outlet to Willow River – Piped & Ditched

Routes 2A and 2B involve an in-lake pump situated on the southern side of Sturgeon Lake, which pumps water through a combination of force mains and/or ditched channels toward the Willow River.

- Please refer to the comments provided under Route 1A & 1B regarding the potential use of state lands for ditched channels or force main pipelines within the context of Route 2A.
- The site identified as a pump location for Routes 2A & 2B appear to lack sufficient depth for accommodating a pump intake and filter system that would remain unscathed by ice or prevent becoming a navigation hazard without a being a significant distance from shore.
- The report lacks information regarding the necessary depth for a pump and filter intake, the feasibility of the site for a pump intake, and the required invasive species filtering system. Shallow depths of boat moorings extending more than 300 feet from shore and aquatic plant beds extending up to 1,000 feet from shore are observed in this immediate area and can help understand the ability to place a pump and filtration system in this area.

Route 3: East Bound outlet to Willow River Tributary – Piped

- Similar to the pump location identified for Routes 2A & 2B, the site proposed for Route 3 seems to lack sufficient depth to accommodate a pump intake and filter system. It's essential that these systems remain unaffected by ice and don't pose safety or navigation hazards, due to their installation located a considerable distance from the shore. The report hasn't specified the required depth for a pump and filter, the feasibility of the site for a pump intake, or the necessary invasive species filtering system.
- This proposal involves pumping and piping the drainage to the east towards the Big Slough drainage and was met with skepticism and was not deemed infeasible by some local residents along with DNR on our Oct 13th, 2023, site visit. The proposed force main pipeline alongside a roadway would necessitate substantial right-of-way acquisition or easements through properties potentially impacting numerous mature trees along the route with limited room for placement.

Other Routes

During the site visit on October 13th, 2023, other alternatives were discussed. Among these, two are briefly mentioning while a third proposal, which involves enhancing an existing ditch from the Lakeland Road culvert eastward, potentially extending into Unnamed Basin 58007200 included follow up comments as requested.

1. **Proposed alternative 1**: The first identified other route is like Route 3 but proposes a pump location near Sturgeon Lake Island in northeast end of the lake and directs water into a wetland complex 1,500 feet to the east. Water would then flow south to Highway 46 and enter Big Slough Lake before reaching the Willow River. This alternative potentially requires less infrastructure and, based on

first-hand information from those who attended the site visit, water depths near the island are deeper and may be better suited for a pump and filter system.

2. **Proposed alternative 2:** The second identified route utilizes Rush Lake as a conduit to Passenger Lake and then channels the water to Big Slough Lake and eventually to the Willow River. However, Rush\Lower Rush appear to be closed basins despite the existence of an outlet from Passenger Lake to Big Slough Lake. Considering this and given the presence of numerous landowners around these lakes, it might be challenging to persuade them to accept water from Sturgeon Lake, especially considering the need for an additional pump system to push water from Rush Lake to Passenger Lake.

3. **Proposed alternative 3:** The third identified route aims to enhance the existing ditch in the southwest corner of Sturgeon Lake, directing drainage towards the Lakeland Road culvert, ultimately leading to Unnamed Basin 58007200 then Dago Lake. Unlike Routes 1A & 1B, this alternative does not involve pumping water out of Dago.
    - Current landowners situated to the east of the Lakeland Road are proposing to clear out and reinforce the ditch with riprap. Meanwhile, DNR has heard from those located to the west of the highway on Unnamed Bain 58007200 and Dago Lake expressing concerns about potential flooding issues.
    - The DNR remains concerned with an anticipated rise in water levels on Dago Lake and its potential impact on the valuable red pine timber, as well as other productive tree species. The forest encompassing Dago Lake has been consistently planted and managed for the past 60-80 years, aiming to yield high-value forest products that hold significant importance for Minnesota's fifth-largest manufacturing sector. Presently, the trees have reached an age and size where they are entering their most valuable stage of growth and maturity. The pine trees in question necessitate a stable drainage of at least 3 feet in sandy soils to sustain their optimal growth and overall health. An elevation increase in water levels within Dago Lake is projected to diminish the growth and vitality of these trees, potentially resulting in tree mortality. Moreover, this situation could lead to an upsurge in bark beetle populations, posing a threat to nearby timber as these beetles have the potential to spread and cause further damage.
    - We anticipate notable effects on both access to and the integrity of private property situated on the western side of Dago Lake due to the proposed changes in water levels or related alterations.
    - The County Engineer asserts authority to clear the ditch or remove beaver dams within a 300-foot radius to protect the road infrastructure. It's important to note that while the county holds this authority for the culvert, the ditch itself lacks legal status as a drainage system so has limited protections other than those at the lake edge in where the lake or outlet bottom control water flow at the OHWL elevation.
    - The DNR has been made aware of an interest in excavating an area from Lakeland Road to the west toward the open water of Unnamed Basin 58007200. Nearly this entire northeast corner of Unnamed Basin 58007200 toward Lakeland Road is part of the public water basin and excavation, clearing or aquatic plant removal would require DNR permitting and/or permission. The DNR does not endorse efforts to enhance drainage west of Lakeland Road, as we believe it may not effectively improve the existing drainage conditions in the area.

Permit Requirements

- **Routes 1A, 1B, 2A, 2B, 3, and proposed alternatives 1 and 2 would all require the following DNR permits and/or licenses:**
    - public water work permit(s),
    - water appropriation permit(s) for movement of water,
    - water appropriation permit(s) for construction dewatering,
    - infested water permit and
    - potentially a DNR Lands & Minerals Utility license

- **Proposed alternatives 3 - enhance existing ditch in SW corner of Sturgeon Lake**
    - Cleaning fill material from within the culvert under Lakeland Road and within close proximity of the culvert openings is unlikely to require a DNR public waters work permit as long as the work is performed by Pine County Highway Department. It's important to consider the specific nature and extent of such cleaning activities so as not to change existing drainage upon Sturgeon Lake or Unnamed Basin 58007200.
    - Any alterations at the Sturgeon Lake outlet that may change the runout elevation and/or cross section, such as installing\repairing riprap, necessitate obtaining a DNR public waters work permit. This area must not be modified without a DNR public water permit.
    - Modifications on the ditched channel between the Sturgeon Lake outlet near the shoreline and the culvert under Lakeland Road may not require a DNR public waters work permit.
        a) Armoring and widening the channel might be permissible if the outlet elevation is maintained consistently throughout the process and does not change during or at any time after construction.
        b) The landowner holds responsibility for addressing and managing any impacts that might occur downstream and upon Sturgeon Lake because of the modifications or alterations made on the ditch through their property.
        c) If while working on the ditch or after construction is completed the outlet elevation or cross section is modified due to the work directly or from erosional downcutting back to the outlet the landowner is responsible to fully restore outlet to its current cross section and OHWL elevation.