

EXECUTIVE SUMMARY – LAKE SINISSIPPI

LAKE MANAGEMENT PLAN

Lake Sinissippi, centrally located in Dodge County, Wisconsin, is a 2,855-acre impoundment on the Rock River. The lake was created back in 1845 when John Hustis built a 12-foot dam on the Rock River, flooding low valleys and wetlands. In 1939 the elevation of the dam was raised an additional 1.43 feet, which is 856 feet above sea level. The lake has a maximum depth of eight feet, with an overall average depth of four feet. Over the last 170 years, the lake has filled with sediments being brought down the Rock River, from runoff from agricultural lands, flowing through the Horicon Marsh and depositing into the lake. This sediment load contains high amounts of nutrients (nitrogen and phosphorus). The source of these nutrients comes from agricultural land use activities in the Rock River watershed. This has led to sediment laden areas of the lake impacting navigation, fishing, recreation, water clarity and quality, and is generally undesirable to lake users and local property owners.

In 2002, the Lake Sinissippi Improvement District (LSID) established a water quality monitoring program to assess the conditions of the lake. Water quality data collected to date shows that Sinissippi Lake is eutrophic due to loading of nitrogen and phosphorus. Additionally, water quality data and Secchi depth measurements show that the lake carries a high suspended solids load, resulting in reduced clarity. These eutrophic conditions contribute to water quality degradation, impair fish habitat, and negatively impact recreational opportunities on the lake. However, water quality data shows that indicators (levels of *Escherichia coli* bacteria) that protect full-body contact recreation are typically below water quality standards.

The Lake Sinissippi Improvement District (LSID) has advocated for assistance in the appropriate management of the sedimentation and water quality in the lake, and through the assistance of the Wisconsin Department of Natural Resources (WDNR), has developed this lake management plan (LMP). A lake management plan is a strategic and dynamic document that outlines the goals, strategies, and actions needed to effectively manage and preserve the ecological, recreational, and aesthetic qualities of a lake and its surrounding watershed. LSID was awarded a Surface Water Grant (SWG) in March 2022 to develop a LMP to address the issues that are affecting lake health and recreational activity. The focus of this lake management plan is to build an overall consensus, process and understanding around these issues and identify the appropriate pathway to obtain progress to managing in-lake and watershed sediment sources and water quality, while managing the expectations of the diverse cross section of stakeholders that visit and



Figure ES-1. Lake Management Plan Goals

live in the watershed and on the lake. Lake Sinissippi is a valuable natural resource to the area, particularly Hustisford, neighboring communities, Dodge County, and an extension of the Horicon Marsh. The need to maintain, improve, and preserve the lake and surrounding support ecosystems is

imperative to the region and the State of Wisconsin. The LMP will focus on four goals that were developed by the LSID and are shown in Figure ES-1.

GOALS

1) **Establish Function Lake Mana**

address the issues in the LMP, by leveraging input from representative, nonpartisan stakeholders to successfully manage the lake's issues and achieve positive outcomes. The purpose of a working group would realize the value that Lake Sinissippi brings to both lakefront property

owners and watershed residents alike, serving as a multipurpose resource for all. It will be key to be able to consistently communicate with this working group in a way that is efficient, clear, and consistent. LSID further recognizes that the lake and watershed consist of a geographically large, diverse, and at times segregated stakeholder group. This group will be essential in achieving any degree of success in Lake Sinissippi both in the water and on the land. To realize the benefits of in water projects while improving conditions within the greater watershed, appropriate actions will be needed to consolidate the communications to all stakeholders to pull in a common direction. While not meant to be disassociate the stakeholder group, for the purpose of further discussion the following groups and sub-groups have been identified (ES-2) as potential sources of candidates for the LWMG.

- 2) **Focused Sediment Management Plan:** Lake residents have had a long growing concern regarding the buildup of sediment in the lake. Sediment has accumulated within the northernmost portions of Lake Sinissippi to the point where navigation has been limited to various forms of watercraft. Due to the reduced depths in these areas, the sediment is also prone to resuspension and transport when currents persist in the Rock River connecting the Horicon Marsh with Lake Sinissippi, and furthermore Lake Sinissippi to the Rock River at the outlet of the lake. Discussions around dredging date back over 20 years, with some dredging success tied to smaller projects. The LMP provides a summary of the existing repository of documents that addresses how sediments can be managed in the lake. Additionally, the LMP provides a detailed discussion on a variety of ways (e.g., dredging) and techniques that can be considered for managing in-lake sediments. LSID hopes to continue its evaluation of the rock ledge which could be affecting the movement of sediments in the lower portion of the lake. Additional studies still need to be conducted to determine the rock ledge's exact location, thickness of the formation and whether removing the structure will add value to sediment management activities. Regardless of the proposed sediment management approaches, and a thorough reviewing of studies and side projects undertaken of the years, LSID, through the LMWG must ultimately decide on an approach informed by the information within the LMP. The final recommendations must take into consideration a realistic budget which will likely



ES-2. Lake Management Working Group Participants

consist of the annual budget, raised stakeholder dollars, and potentially grant dollars. No approach will be perfect, and the best approach may not be an alternative that LSID can immediately afford, therefore the chosen approach may be balanced, aggressive towards land management, or focused on a large sediment removal project that improves navigation with the lake.

- 3) **Develop Shoreline Improvement and Protection Plan (SHIPP):** LSID recognizes the importance of enhancing and preserving the value of the shoreline and nearshore areas of Lake Sinissippi. The shoreline not only contributes to the aesthetic appeal of the lake but also provides numerous ecological benefits. There are 42 miles of shoreline within Lake Sinissippi (WDNR, 1971), of which only 10 miles have been developed (Hey, 2005). This represents a significant asset to the stakeholders of the lake and provides a positive impact on property values, as many residents and visitors value the scenic beauty and tranquility of a lake with an unspoiled shoreline. By maintaining the natural state of the shoreline, the LSID ensures that property owners can continue to enjoy the ecological, physical, and aesthetic benefits associated with a healthy shoreline. By developing a Shoreline Habitat Improvement and Protection Plan, LSID demonstrates its commitment to sustainable lake management and the long-term health of the lake, not only for property owners, but the associated ecological community as well. This plan will hopefully provide a roadmap for preserving and enhancing the shoreline's ecological value, ensuring that future generations can continue to enjoy the benefits it provides. Working with the LMWG, LSID will recommend that a scoring criteria system be developed to evaluate those shoreline areas which are contributing to sediment erosion into the lake. For those high scoring areas, LSID, along with grant funding, could provide financial support to correct shoreline problem areas.
- 4) **Water Lake level management:** As a large shallow impoundment, Lake Sinissippi has considerable littoral area for which can be greatly impacted due to water elevation fluctuation. Water level plays an important part in the management of Lake Sinissippi, not only in the management of projects, but the function and ecology of the shoreline and near shore areas and recreational activities. Due to the landscape and topography of Lake Sinissippi, small fluctuations in water level can inundate and impact significant amounts of shoreline property. Information provided in the Horicon NWR Water Resource Inventory and Assessment (USFWS, 2014) highlights the impact of changing climate on the ecology of the Horicon Marsh, and the hydraulic changes beginning to occur in Lake Sinissippi. The LSID wishes to better understand protocols for managing water levels of the lake, with one immediate outcome of interest being the drawdown timing prior to ice formation to better manage piers, boat removal and shoreline care. The LMP has recommended two approaches that the LMWG should consider regarding water levels in the lake. The first is to obtain and install a water level gage (or suitable device) to record water level observations in the upstream proximity of the Hustisford Dam. The cost and upkeep of the gage will be highly dependent on the selected unit, location of installation, and degree of desired automation. The gage would record water surface elevation readings and discharge can be ascertained by correlating that same elevation at the Hustisford Dam. Secondly a pilot program for assessing a higher pre-winter pool elevation, once established, would be useful to evaluate the benefits or impacts associated with higher water level in the lake before ice formation. The goal of this pilot program is to benefit lake residents in removing piers, boats, and shoreline management activities. The evaluation of this pilot program would be for 5 years.

The development of this program will also serve as a demonstration project for managing the protocols for making a change to and ordered water level.

For each of the goals in the LMP, the plan identifies potential tasks and projects that could be undertaken to achieve objectives. Table ES-1 summarizes these activities along with a corresponding timeline.

TABLE ES-1. TIMELINE FOR GOALS AND TASKS/PROJECTS IDENTIFIED IN THE LMP

Goal	Tasks	Timeline
Goal 1 -Establish functional Lake Management Work Group (LMWG)	1. Identify preferred individuals to serve on LMWG (method of selection can be vote, open discussion, other).	1. September 2023
	2. Issue letter (email, call, other) to preferred individual requesting their assistance and means to address or answer questions pertaining to LMWG intent and function.	2. October 2023
	3. Address questions and solidify commitments.	3. November 2023
	4. Confirm commitments and identify or recruit additional advocates as needed.	4. December 2023
	5. Inform individuals for assignment and upcoming schedule with meeting schedule intended to be quarterly or bi-monthly.	5. January 2024
	6. Hold first LMWG meeting	6. March 2024
Goal 2 -Focused Sediment Management Plan	1. Island Development	1. Year 1 – Use existing concept as proof of design Year 2 – 60% design, permitting Year 3 – Final design, bidding: Year 4 – Construction
	2. Rock Ledge Modification	2. Year 1 – Collect data, conceptual approach, and design. Upon acceptance continue to 60% design Year 2 - Permitting and final design, bidding, and construction
	3. Sediment removal traditional-navigation dredging	3. Year 1 – Collect data, conceptual approach, and design (WDNR acceptance). Upon acceptance continue to 60% design Year 2 – Permitting and final design, bidding: \$55K Year 3 – Construction: 2.6M
	4. Sediment removal hybrid	4. Year 1 – Collect all data, conceptual approach/design (WDNR acceptance): \$115K Year 2 – 60% design, permitting for SDF: \$75K Year 3 – 60% design and permitting for dredging activities, final design, and bidding for SDF: \$75K Year 4 – Construction of SDF, final design, and bidding for dredging activities: \$715K Year 5 – Construction (in-lake dredging activities): \$2M

Goal 3 -Shoreline and habitat restoration and protection	<ol style="list-style-type: none"> 1. Develop GIS version of shoreline by type (based on LSID volunteer inventory) 2. Host Map online through website: <i>LSID Cost</i> (N/A). 3. Host informal meeting for property owners identified in prioritized shoreline area(s). 4. Discuss opportunity for LSID sponsored bulk shoreline or large shoreline grant with WDNR (LSID would sponsor the application and serve as fiscal agent, but not fund the projects). 5. Prepare application for identified property owners (optional). 6. Finalize decision for shoreline projects. 7. Submit for DNR Surface Water Grants to support identified prioritized shoreline projects. 	<ol style="list-style-type: none"> 1. January 2024 2. March 2024 3. May 2024 4. July 2024 5. August 2024 6. October 2024 7. November 2024
Goal 4 - Develop Water Management Level Guide Monitoring Equipment (Items 1-5) Pilot Program (Items 6-12)	<ol style="list-style-type: none"> 1. Meet with WDNR to determine eligibility for monitoring equipment for lake level recording. 2. Meet with Village of Hustisford (as dam owner) to facilitate application for Municipal Dam Grant. 3. Prep Municipal Dam Grant package. 4. Submit Municipal Dam Grant package prior to March deadline. 5. Follow up with alternate program if Municipal Dam Grant is not suitable program based on discussion with WDNR. 6. Meet and have preliminary discussion with WDNR staff. 7. Prep and develop petition support. 8. Submit formal petition to WDNR staff Will Disser. 9. Submit permit application. 10. Anticipated meeting and follow up materials needed. 11. Issue public notice. 12. Coordinate change in operation with Village of Hustisford 	<ol style="list-style-type: none"> 1. December 2023 2. January 2024 3. February 2024 4. March 2024 5. May 2024 6. January 2024 7. February 2024 8. March 2024 9. May 2024 10. July 2024 11. August 2024 12. October 2024