Shakopee Lake Management Plan
DOW # 12003000
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DEPARTMENT OF NATURAL RESOURCES

Prepared By:

Josh Kavanagh[1] and Cory Netland

[1]Wildlife Lake Specialist Minnesota
Department of Natural Resources
398 Sibley Park Road NE, New London, MN
56273 Phone: (320) 354-5530
Email: Joshua.Kavanagh@state.mn.us

General Lake Information

- County: Chippewa
- Location: T119N, R38W, Section(s) 6, 7
- Size: approximately 286 - 439 acres depending on pool elevation.
- Access: via a County Park or a State Wildlife Management Area on the East side of the lake.
- Watershed: Shakopee Creek Watershed
    - Watershed Area: Approximately 202 sq. miles or around 129,510 acres
    - The Shakopee Lake dam was built in 1960 as part of a flood reduction project.
    - Land Use: Primarily row crop agriculture.
- Depth: The average depth is around 2.0 ft. at normal summer pool, with a maximum depth closer to 3.0 ft. Depths can fluctuate significantly throughout the year due to the large watershed size.
- Outlet: Low hazard dam with a concrete principal spillway and a vegetated emergency spillway. The structure includes both a low flow and high flow runout.
    - Run out elevation (low flow): 1019.0 feet with a 6.0 ft. weir length
    - Run out elevation (high flow): 1024.65 feet with an additional 12.0 ft. of weir length
    - Drawdown sluice gate invert elevation: 1012.0 feet
    - Top of earthen embankment 1030.5 feet
    - Emergency spillway: 1025.5 feet and is approximately 100.0 ft. wide
    - When water levels exceed 1029.35 feet there are three additional high water outlets.
- Ordinary High Water Level: 1024.1 (NAVD 88)

*Local Datum of Shakopee Lake Dam = NAVD88 -.44 feet.

Water Quality

There has been only one wildlife lake survey (2013) conducted on Shakopee Lake. This survey identified only sparse submersed aquatic plant growth. Plants were present at less than 20% of the 75 sample stations. Plant diversity was also low with only a few submersed aquatic plant species observed (sago pondweed, leafy pondweed). A water sample was taken during the survey and tested for Total Phosphorous (TP) and Chlorophyll A (Chl-A). Water quality indicators were much higher than the Minnesota Pollution Control Agency impairment thresholds for aquatic recreation in this part of the state, albeit only one sample was taken. TP was measured at 365 ppb, approximately 4 times greater than the threshold of 90 ppb. Chl-A was measured at 61 ppb, which is double the impairment threshold of 30 ppb.

The Chippewa River Watershed Project had spent decades monitoring water quality in and around Shakopee Lake. They concluded that the lake itself is likely a source of nutrients during flooding or high water events and that it could be linked to up to 39% of the TSS being contributed by the Shakopee Creek Watershed. The Minnesota Pollution Control Agency has additional sampling information from Shakopee Lake that can be obtained as needed.

Fish and Wildlife Habitat

Shakopee Lake is located in Chippewa County, approximately 7.0 miles south of DeGraff, MN. This is one of only a few lakes contained within the County. The lake has been modified and acts as a flood reservoir along Shakopee Creek, and has provided valuable wildlife habitat at times over the years. Shakopee WMA, a 40-acre unit directly adjacent to the lake along the Shakopee Creek inlet, provides recreational access and establishes priority management consideration under the MN DNR Shallow Lakes Plan.

Historically, Shakopee Lake has provided important habitat resources for wildlife, this is especially true as it relates to both spring and fall waterfowl migration habitat. In a reservoir such as this, habitat conditions and available food resources can fluctuate greatly between years. The lack of lakes and wetlands in the landscape around Shakopee Lake makes it a critical resource to manage for water quality and wildlife in order to provide important food resources for migrating and nesting waterfowl.

Wildlife Use

Wildlife use on Shakopee Lake can vary depending on water levels and habitat conditions. During the 2013 DNR shallow lake survey, several waterfowl were observed, including Canada geese, mallards, and wood ducks. American white pelicans, cormorants, and various species of terns, herons, and gulls were also documented. Given the lack of shallow lake habitat in Chippewa County, Shakopee Lake is a crucial stop-over habitat for several water dependent birds. Beaver, muskrat, mink otters, and other furbearers also rely on this critical habitat resource.

Fishery

There is no active managed fishery within Shakopee Lake. The lake can be utilized for occasional bowfishing. Common carp are abundant within the system as are other undesirable (rough) fish species.

Management Goals and Objectives

Goal: Consolidate bottom sediments and stimulate aquatic plant growth using temporary water level drawdown as dictated by existing conditions.
Special Note: There will be limited opportunities to successfully manage water levels on Shakopee Lake due to watershed size. Climatic conditions will dictate management success and failure as it relates to the goals set forth in this management plan.

- **Objective 1:** Re-establish submersed aquatic vegetation and improve water clarity when possible through active temporary water level drawdown.
- **Objective 2:** Improve aquatic habitat and food resources for wildlife, especially migrating waterfowl.

Proposed Management Actions to Achieve Objectives

Action 1: Obtain legal authority to temporarily lower water levels.

Collaborate with local citizens, lakeshore property owners, the Joint Ditch #18 Drainage Authority (Swift-Chippewa-Kandiyohi County), and MN DNR to obtain the legal authority (Minnesota Statute 103G.408) to conduct periodic, temporary water level drawdowns on Shakopee Lake.

Action 2: Install a water control structure.

Collaborate with the Joint Ditch #18 Drainage Authority to install a water control structure at the outlet of Shakopee Lake. The water control structure will be added to the outlet dam structure and consist of two 36” x 36” sluice gates with lifts. A Joint Powers Agreement will be established to formalize management and maintenance responsibilities for this structure. MN DNR will be responsible for operating the sluice gates during drawdown attempts. All drawdown attempts will be agreed upon jointly between MN DNR and the Joint Ditch #18 Drainage Authority. The Joint Ditch #18 Drainage Authority will maintain all other responsibilities of the outlet structure and will have the ability to stop drawdowns in case of an emergency.

Action 3: Conduct periodic temporary drawdowns.

A lake drawdown is the temporary lowering of a lake’s water level. Drawdowns are used to mimic natural droughts, which are occurring less frequently than in the past. Shallow lake ecosystems are adapted to periods of low water (i.e., drought), and the ecosystem naturally deteriorates during periods of high water (i.e., absence of drought). Therefore, drawdowns are an effective tool for shallow lakes management.

Drawdowns on shallow lake basins enhance the abundance and diversity of aquatic vegetation. Bottom sediments hold a large, viable seed bank from the aquatic plants that historically grew in a basin. Drawdowns help consolidate bottom sediments and accelerate decomposition of organic material, which can provide a more suitable substrate for aquatic plant growth. Drawdowns can also be used to reduce or manage the fish community within a basin. These conditions (i.e., dense beds of aquatic vegetation and a reduced population of rough fish) typically improve water quality and clarity, increase aquatic invertebrate abundance within the basin, and provide sufficient habitat resources for a variety of wildlife species.

Important Legal Considerations: ***A drawdown is a temporary lowering of a lake's water level. Shakopee Lake's water level will be returned to a normal managed pool elevation following a controlled drawdown. Drawdowns would not, and could not, be done at times that would cause any downstream flooding damage to private property or roads (M.R. 6115).***

Replacement of the outlet structure will require a DNR Public Waters Work Permit. All drawdowns will be contingent on existing habitat conditions, precipitation patterns, and downstream flooding conditions. In order to prevent negative impacts to downstream receiving waters, stream banks and landowners, drawdowns may only be attempted when water levels are at or below elevation 1020.0 feet . Lake drawdowns will not be initiated during periods of flooding or high water and Staff from both DNR and the Drainage Authority will respond to events during drawdown as possible. The historic control elevation for Shakopee Lake is elevation 1019.0 feet which is not being changed and water flowing through the proposed structure can be controlled; therefore, neither upstream nor downstream properties will be adversely impacted as a result of this project.

The proposed water control structure invert elevation (1012.0 feet) is below the lake bottom. The DNR will only attempt drawdowns in agreement with the Joint Ditch #18 Drainage Authority. It is anticipated most drawdowns will occur from late summer/fall through spring. Given the watershed size, spring and summer drawdowns are not likely to be successful. The specific drawdown timeline may vary from year to year. The new water control sluice gates will be used to release water during managed drawdown periods as agreed upon between MN DNR and the Joint Ditch #18 Drainage Authority. The sluice gates may only be operated for water level management purposes related to wildlife habitat and water quality improvement, and may not be used in response to flooding or drainage concerns upstream or downstream. Sluice gates may also be operated for short durations during annual inspections and/or maintenance activities. Close coordination and communication between DNR and the Joint Ditch #18 Drainage Authority during operation of the water control sluice gates will be critical. In addition, the DNR Area Hydrologist in the Spicer Office will be notified at least 10 days prior to any operation of the sluice gates.

Ongoing and Long Term Procedures and Management Thresholds

Shallow lake conditions are not static. Additional management will be needed to promote improved habitat and water quality conditions, especially within Shakopee Lake as we anticipate significant challenges due to the large watershed size. These management actions when possible will help promote increased aquatic plant growth, which in turn will help enhance water clarity and provide critical wildlife habitat.

Action 4: Conduct additional drawdowns to promote water clarity and habitat objectives, when possible.

MN DNR will monitor water quality, aquatic plants, and habitat conditions periodically to track management response and determine when additional management actions should be considered. When these considerations are necessary, DNR will approach the Joint Ditch #18 Drainage Authority with a recommendation for management.

Management actions may be considered when at least two of the following criteria are observed:

- Average summer Secchi disk reading falls below 2.3 feet;
- Submersed aquatic plant coverage observed at less than 50% of the lake using present day systematic point sample stations;
- Climatic conditions are conducive to a drawdown attempt.

Desired Outcomes of Drawdown:

- Average summer Secchi disk reading exceeds 2.3 feet; (MPCA impairment threshold for shallow lakes in this ecoregion)
- Average summer Total Phosphorous and Chlorophyll-a levels meet MPCA standards for aquatic recreation;

- Aquatic plant diversity and lake wide plant species richness of 3 species or more;
- Submersed aquatic plants cover at least 75% of the lake using present day systematic point sample stations.
- Increased waterfowl use, especially during spring/fall migration.

The DNR Section of Wildlife will provide the DNR Area Hydrologist with a written notice at least 10 days prior to any sluice gate operation/maintenance activity (email is acceptable). The DNR Area Hydrologist, and representatives of the Joint Ditch #18 Drainage Authority, must agree with the Section of Wildlife that conditions in the watershed are appropriate for a drawdown attempt, before sluice gates are opened so that a drawdown can commence. Coordination between MN DNR and Joint Ditch #18 Drainage Authority will be required to successfully manage and improve conditions on Shakopee Lake.

The primary intent of a drawdown is to consolidate sediments and promote aquatic plant growth. However, it's important to also consider existing habitat conditions, migration patterns, and the needs of game and nongame species to limit unintended adverse impacts when determining the drawdown timeline. For example, if pursuing late season drawdown, the DNR should consider providing a shallow pool area as refuge for hibernating reptiles and amphibians. When refilling a basin after a drawdown, DNR personnel should consider the impact that changing water levels might have on wildlife and the flow to downstream areas.

Monitoring

When conditions deteriorate, the proposed management actions will be considered and implemented as agreed upon by MN DNR staff and the Joint Ditch #18 Drainage Authority. If degradation of aquatic vegetation is suspected, MN DNR Area Wildlife Staff will conduct wildlife lake surveys with assistance from the DNR Shallow Lakes Program. Wildlife lake surveys will use systematic point sampling methodology to calculate aquatic plant distribution, diversity, and abundance. The DNR may also monitor water quality parameters periodically using an approved water quality-sampling regime. In addition, DNR Area Wildlife Staff with assistance from DNR Shallow Lakes Program, will conduct both pre- and post-drawdown monitoring to determine drawdown success. A water level gage also will be installed on Shakopee Lake to monitor water levels and measure downstream conditions during drawdown (stipulated by M.R 6115.0221).

Management Plan Revisions

Shakopee Lake's Management Plan will be reviewed as necessary to assess the effectiveness of the plan and determine if changes and/or updates are required. Modifications to this management plan will be made in cooperation with the Joint Ditch #18 Drainage Authority and stakeholders.

Shakopee Lake Project
Chippewa County
T119N, 38W, Sec 6, 7

(EXHIBIT B)

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