Indian Lake Management Plan
DOW #72006600

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Or

MN DNR Shallow Lakes

35365 800th Ave.

Madelia, MN 56062

General Lake Information

Location: Sibley County, Minnesota

Township: 113 **Range**: 29 **Section**: 20, 21, 28, 29

From Winthrop, approximately 2.5 miles north on State Hwy 15 then 2.5 miles east on County Hwy 10.

Size: 377 acres

Shoreline: 3 miles of shoreline in a predominately agricultural landscape.

Access: A DNR Division of Fish and Wildlife public access is located on the north-central part of the lake off Co. Hwy 10.

Watershed Area: 1,030 acres (1.6 square miles)

Watershed Ratio: approximately 3:1

Inlets: Inlet is a 24" concrete pipe through Co. Hwy 10 on the north side of the lake, as well as a ditch entering the west side of the lake, both from field drainage. Additional inlets to the lake include natural surface flows and several agricultural field tiles at various points around the perimeter.

Land Use: Primarily row crop agriculture.

Maximum Depth: 5.5 feet (2014)

Average Depth: 4.2 feet (2014)

Outlet: Historically likely a closed basin. Existing outlet is a natural overflow located on the south side of the lake. Overland flows enter a restored wetland basin and thereafter into county tile (Lateral 1 of County Ditch 56) for approximately 1,600 feet south of Township Road 201 before Lateral 1 becomes open ditch; eventually merging with CD 56 downstream.

Runout Elevation: 1028.8 (1969), 1028.6 (1984), 1029.1 (2015), 1029.2 (2018) (all NGVD 1929)

Ordinary High Water Level (OHWL): 1029.9 (NGVD 29)

Proposed Drawdown Elevation: 1024.6 (NGVD 29)

Reference Materials: Game Lake Survey Reports (1951, 1958), DNR Hydrographic Reports (1984, 2018), DNR Shallow Lake Survey (2014), Ducks Unlimited Engineering Design Plans and Report.

The Minnesota Department of Natural Resources wishes to work with partners to designate and manage Indian Lake pursuant of M.S. 97A.101. The proposal would include construction of a new water control structure with a variable-crest outlet capable of allowing temporary water level drawdown.

Water Quality

The 1951 lake survey found good water quality with an average Secchi disk reading of 3.0' with the average lake depth also 3.0' at that time. It was noted that algae density was light and turbidity was not a limiting factor for the growth of aquatic plants. Water quality had decreased by 1958, when a lake survey found poor water clarity with an average Secchi disk reading of 1.0'; average lake depth was not recorded but maximum depth was 2.0'. High turbidity was observed at that time with abundant blue-green algae.

A DNR Shallow Lakes Program survey in 2014 again recorded poor water quality conditions. Water clarity in the main east basin was poor with a mean Secchi disk reading of 1.4' (MPCA standard > 2.3'). Water clarity in the western basin appeared to be better from observation, though not measured directly due to limited access. The survey water sample showed elevated total phosphorus levels of .201 ppm (MPCA standard < .090); both measurements below standards for southern Minnesota.

Fish and Wildlife Habitat

Indian Lake is partially surrounded by the 580-acre Indian Lake WMA to the north and south, a restored prairie and wetland complex (Fig. 1). Habitat conditions and water levels have fluctuated within the basin due to its shallow nature and impacts from the immediate watershed. Without an adequate outlet, water levels in recent years have remained high, negatively impacting vegetation and available habitat. Creating a formal outlet along with a variable-crest structure will allow for active habitat management.

Indian Lake can resemble a hemi-marsh type basin and does provide excellent waterfowl habitat at times. According to the 1951 lake survey, Indian Lake contained a diverse variety of duck food (submersed vegetation); emergent vegetation however, was limited to a narrow perimeter strip and a small patch in the center of the lake. Brood cover was noted as nearly absent and nesting cover was fair to poor. The survey also noted the lake was dry during the drought years but by 1944 the lake level was restored naturally by precipitation.

The 1958 lake survey found lower water levels, with the recorded water surface 25" less than the 1951 survey. Diversity of submersed vegetation remained high, along with an increase in emergent cover; it was noted that approximately 45% of the area below the OHWL had emergent cover. Waterfowl nesting and brood cover habitat were noted as excellent at that time.

The 2014 lake habitat survey found aquatic plant abundance was very high in the main (eastern) basin. However, the plant diversity was poor with coontail and flat-stem pondweed the dominant submerged

species. The main basin contained a cattail fringe with many floating cattail bogs and islands scattered throughout. Some bulrush was noted, but was not abundant. The western basins could not be completely accessed due to the channel being plugged with cattails and cattail bogs. Minnows were the only fish observed as in previous surveys. Shrimp and scuds appeared to be very abundant, especially within the sampled vegetation.

Submersed Vegetation Species	**2014 Habitat Survey Report Frequency**
Coontail	95.8%
Flat-stem Pondweed	58.3%
Sago Pondweed	4.2%
Small Pondweed	4.2%
No Vegetation Observed	2.1%

The existing natural outlet is limited in capacity and ability for active lake management. We propose formalizing a new lake outlet utilizing the existing ditch system in cooperation with the Ditch Authority, along with construction of a variable-crest water control structure to allow for active management. Active management will mimic natural water level fluctuations that likely took place in the lake prior to changes in the watershed. Given the hydrologic changes that have impacted Indian Lake, the ability to manage water levels will enhance wildlife habitat and water quality.

Wildlife Use

Indian Lake has a tradition of being a popular hunting and trapping lake in the Winthrop, Minnesota area. According to the 1951 lake survey, Indian Lake normally had heavy waterfowl utilization during periods of migration, along with heavy hunting pressure. Although nesting cover was fair to poor and brood cover was nearly absent, some waterfowl were produced annually on the lake. Due to the lack of emergent vegetation muskrat populations were limited. The 1958 lake survey found much higher waterfowl utilization due to improved habitat conditions. Over 700 blue-wing teal were observed, along with greater than 100 mallards and pintails each, including a number of broods for all species.

Indian Lake currently provides habitat for a number of wildlife species including waterfowl, furbearers, and other nongame species. Several species of waterfowl were observed during the 2014 lake survey, including 4 Canada geese, 14 mallards, 6 wood ducks, 2 blue-winged teal, and 1 ruddy duck. Indian Lake can provide critical migration habitat for waterfowl and has potential to provide good breeding and brood rearing habitat with the recent expansion of the surrounding WMA and ongoing habitat

restoration efforts. This habitat is also beneficial for various nongame species including terns, grebes, herons, egrets and kingfisher. Black Terns were observed during the 2014 survey, along with double-crested cormorants, Forester's terns, and ring-billed gulls.

Fishery

There is no established fishery or past history of recreation fishing due to the shallow nature of Indian Lake and relative lack of connectivity to other basins. Various minnow species have been observed during each lake survey. Undesirable fish such as fathead minnows, carp, and bullheads can flourish in the basin in-between winterkill events thus impacting habitat and water quality conditions. Presumably, fish are able to access Indian Lake during flood conditions through the ditch system from downstream sources. CD 56 downstream connects directly to Mud Lake south of Gaylord, and thereafter the Rush River further downstream. Completely preventing fish from accessing the lake is not feasible. We plan to control fish populations via the proposed water control structure and induced winterkill events.

At this time it is not believed that stocking native, piscivorous (fish-eating) fish (i.e. biomanipulation) would be necessary as a secondary tool for controlling undesirable fish populations. If for some reason drawdown is found to be unsuccessful in achieving a winterkill in the future, stocking of predator fish may be another option considered. The goal of any biomanipulation effort would be to benefit wildlife and waterfowl habitat by helping maintain clear water and submerged aquatic vegetation. Any future lake stocking plans will be coordinated and agreed upon between Area Fisheries and Wildlife Managers. Shallow lake habitat management must be supported in any future lake stocking plans.

Management Goal

Enhance wildlife habitat and water quality on Indian Lake.

Management Objectives

Our objectives are to improve waterfowl, wildlife and water quality conditions on Indian Lake by increasing water clarity, stimulating the growth of emergent and submersed aquatic vegetation, and reducing undesirable populations of fish. These objectives can be accomplished through the use of active water level management following the design and installation of a new variable crest water control structure.

A new outlet structure will allow for periodic temporary water level drawdowns. This structure will consist of a concrete box weir with removable stop-logs. Under this management plan, area wildlife staff would do water level manipulations in response to biotic and abiotic conditions, such as those outlined in the "Management Thresholds Section" below.

DNR Wildlife would be responsible for operation and maintenance of the water control structure, and will install a water level gage on the upstream side of the water control structure to monitor water levels (stipulated by M.R 6115.0221). Water level measurements will be recorded regularly during active water level drawdown and refill periods. Water level measurements will also be recorded during non-management periods, as possible.

Downstream water level conditions will be monitored prior to initiating a temporary drawdown, and the basin will not be drawn down when the downstream area is experiencing flooding or high water. Minnesota Rules (Chapter 6115.0221) do not allow drawdowns to adversely affect downstream resources. If the area is experiencing heavy rainfall or high flows, drawdown efforts will be slowed or stopped until downstream channels can handle the additional flow.

Managed drawdowns will not occur for longer than two consecutive years as defined in M.R. 6115.0271, Subp. C, item 4. Future drawdowns will require notification from the area wildlife manager to the area hydrologist and include the intent to initiate drawdown and the extent of drawdown planned. Sibley County would also be informed prior to any active water management actions.

Keeping Indian Lake in a relatively undeveloped, natural state with minimal disturbance is a priority. There is concern of elevated surface use activity on Indian Lake leading to increased disturbance and overall degradation of lake qualities. To address this concern, motorized restrictions would be promoted to protect the existing aquatic plant community, as well as minimize disturbances to feeding and resting wildlife during various life stages including both spring and fall migration.

Proposed Management Actions

Action 1: Install drawdown structure and outlet pipeline

The Minnesota DNR has partnered with Ducks Unlimited (DU) to design and install a new water control structure and outlet pipeline, pending all necessary agreements and permits. Installing the structure will require permitting from the MNDNR Division of Ecological and Water Resources (EWR), US Army Corps of Engineers (Corps), and Sibley County. DNR and DU will work with these agencies to meet all permit

requirements and address questions as necessary. Drawdown implementation will be contingent on existing habitat conditions, precipitation patterns and downstream water levels.

The new outlet structure will be located at the site of the natural lake overflow on the existing WMA. The structure will consist of a 4' x 6' concrete box weir with a single bay of removable stop-logs and 24" outlet culvert. Flows from the outlet thereafter will discharge into a new 24" pipeline proceeding south approximately 3,800', ending at open ditch of Lateral 1 of CD 56 (south of Sibley Township Road 201).

The new structure will stabilize the existing natural runout while providing an outlet of adequate capacity; also taking into consideration the ditch system downstream while allowing for temporary periodic drawdown. The bottom sill of the new structure will be set at 1024.6' (NGVD 29), which will leave approximately 0.5' of water remaining in the lake under a full drawdown scenario. The remaining pool will discourage some cattail germination and provide some refuge for hibernating amphibians and reptiles but should not allow undesirable fish to overwinter. Under normal conditions water levels will be managed at elevation 1029.1' (NGVD 29). See final DU design plans for construction and elevation details.

<u>Action 2</u>: Implement drawdown as necessary to promote a clear water condition

Growing season drawdown: When conditions warrant, DNR will incorporate a gradual drawdown beginning in late summer (early to mid-August) and extending into early summer (mid to late June) the following year. Ideally, the basin will be dry by mid-September and remain dry until the stop logs are replaced. However, the basin will likely become temporarily inundated following heavy rains and spring runoff. This timeframe will promote germination of native cool season emergent plants such as hard and soft stem bulrushes, while inhibiting further expansion of undesirable hybrid cattail. It will also consolidate loose sediment and tie up excessive nutrients with new plant growth. Drawdown timing should allow other wildlife to relocate as/if necessary.

In early summer, following germination of native plants and prior to evidence of cattail germination on mud flats, stop logs will be gradually replaced to full service level. Upon re-flooding, the basin should see an immediate pulse in biodiversity.

It is anticipated that growing season drawdowns could be initiated up to every 5-8 years depending on existing conditions. Water levels will be returned to normal elevation after no more than two growing seasons.

Winter drawdown: This would require gradually drawing water levels down beginning in August and leaving lake levels down through winter. Water levels would be gradually restored in spring. This

technique would be used to help induce fish winterkill. We anticipate this being a more common management approach. This approach could be considered up to every 3-5 years.

To ensure no downstream impacts and to maximize ecological benefits, drawdowns will be done gradually. The *active drawdown* phase will only be conducted when the downstream channel and culverts have enough capacity to mitigate any additional flow as a result of the drawdown. This includes any heavy rain events that occur during the active drawdown (the active drawdown phase is the time frame from when we remove the first stop log and before the last log is pulled).

At the conclusion of each drawdown period, stop logs will be replaced gradually. This will allow the basin to slowly refill which will prevent damage to newly established aquatic vegetation and maintain some intermittent flow downstream to help preserve stream and channel functions.

Action 3: Restrict open-water surface use to non-motorized watercraft only

These restrictions apply to watercraft use only and would be effective lake-wide during the open water season. Restrictions would not apply to driving motorized vehicles on the ice during winter. Boat motors have been shown to negatively impact aquatic vegetation. These negative impacts are through direct uprooting by motors and indirectly through increases in turbidity caused by motors in shallow water. Protecting aquatic plants is critical to maintaining the quality of wildlife habitat and water quality on Indian Lake. This protection can be achieved by restricting the use of motorized watercraft on the entire lake including electric trolling motors. In addition, motorized boat traffic causes disturbances to nesting and feeding wildlife. The proposed restriction would protect breeding waterfowl and their broods, and minimize disturbances to feeding and resting wildlife during various life stages including both spring and fall migrations.

Management Thresholds

The decision to initiate any drawdown will be based on the condition of the lake, along with upstream and downstream water levels. Prior to and following all drawdowns, DNR will monitor water clarity, water quality, plant abundance, plant diversity, fish presence and wildlife use. The frequency of drawdowns will be adjusted as needed and may be conducted when lake conditions deteriorate such that at least two of the following criteria are observed:

Total Phosphorus (TP) > 90 ppb (MPCA impairment standards).

Secchi disk readings in summer (June-August) are < 2.3’ (MPCA impairment standards).

Chlorophyll-a (Chl-a) > 30 ppb (MPCA impairment standards).

Submersed aquatic plants are found at < 60% of the lake-wide point sample stations.

Fewer than four submersed plant species present.

Emergent vegetation coverage decreases to < 50% of the basin.

Presence of bullhead, carp or other undesirable fish species.

Desired Outcomes – Full Drawdowns

Average summer Secchi disk reading greater than 2.3' (MPCA impairment standards).

TP and Chl-a levels well within impairment standards established by MPCA.

Submersed aquatic plants at 100% of established sample points.

Submersed aquatic plant species richness greater than five.

Re-establishment of diverse emergent vegetation with $\geq$ 50% coverage of basin.

Partial Drawdowns

Occasional partial drawdowns that maintain waterfowl habitat and water quality may reduce the need for more costly and time-consuming full drawdowns. This would be an intermediate management action and beneficial tool to sustain the effects of a full drawdown for a longer period of time. A partial drawdown could be employed during the fall/winter or during the growing season depending on management needs. Populations of undesirable fish should be nearly eliminated after a full drawdown but may eventually re-establish in the following years. If conducted during the fall/winter, partial drawdowns increase the likelihood and severity of a natural winterkill event. Water levels are lowered to the point where winter ice would form to the bottom or very near the bottom of the shallow lake, eliminating refuge areas for fish. Additionally, lowering the lake (winter and/or growing season) would expose a portion of the bottom substrate stimulating the spring/summer germination of hardstem bulrush and other emergent plants.

Partial drawdowns will be considered when one of the following criteria is met relative to decreases from the best values recorded following the last full drawdown:

Summer Secchi disk readings decrease by more than 25% average lake depth during summer.

Submersed aquatic plants are found at < 80% of the lake-wide point sample stations.

Submersed plant species richness decreases more than 25%.

Presence of bullhead, carp or other undesirable fish species.

Desired Outcomes – Partial Drawdowns

Average summer Secchi disk reading increases ≥ 25%.

Submersed aquatic plants at 90% of established sample points.

Submersed aquatic plant species richness increases ≥ 25%.

No undesirable fish species verified.

Drawdown Notification and Reporting

Prior to commencing any drawdown, the area wildlife manager will notify the DNR area hydrologist, and the Sibley County Drainage Authority. Notification will be provided at least 5 days in advance of commencing drawdown. During drawdowns, water level measurements will be recorded regularly (weekly water level monitoring is advised). Water level measurements will also be recorded during non-management periods as possible (annual inspection and monitoring is recommended). A summary report of the water level readings will be submitted to the DNR area hydrologist upon request.

Action 3: Continue to promote conservation and collaborate on watershed projects.

Conservation work within the watershed is an important tool in shallow lake management. The protection of existing habitats and restoration of critical areas within the watershed are vital to sustaining water quality and habitat conditions within the lake. DNR will continue to support efforts to target conservation programs and land stewardship improvements within the Indian Lake watershed. Opportunities will be utilized to educate citizens about aquatic invasive species and private land holistic conservation.

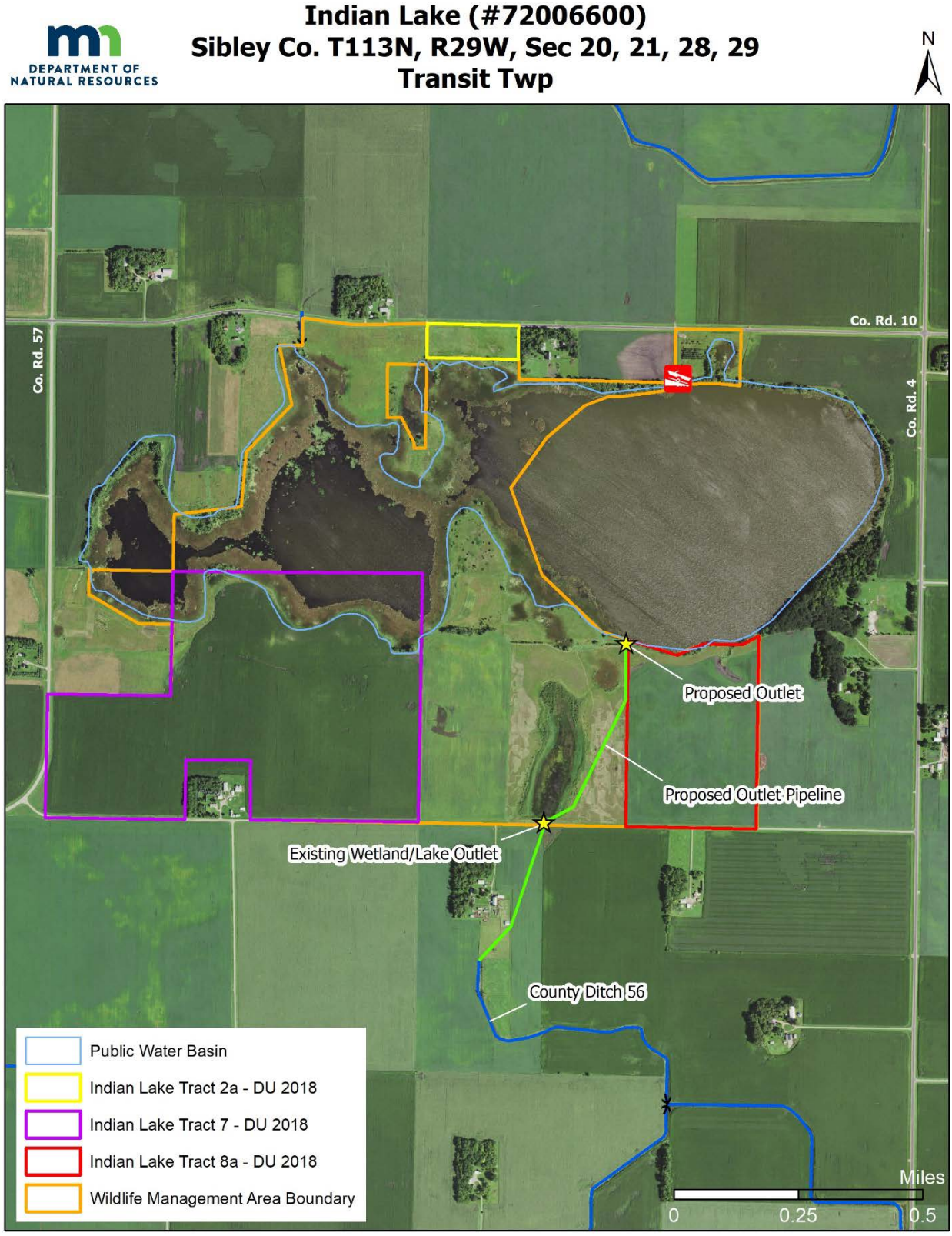
Monitoring

When conditions fall below the outlined thresholds, the proposed management actions will be evaluated and if necessary, implemented. To determine conditions, vegetation can be monitored as needed by conducting shallow lake surveys, using systematic point sampling, calculating aquatic plant distribution, diversity and abundance. Water clarity and water quality parameters can be monitored periodically using an approved water quality sampling regime and fish presence can be verified by periodic test netting. Minnesota DNR will install a water level gauge to closely monitor water levels on the basin as well as monitor downstream conditions during any active drawdown (stipulated by M.R 6115.0221).

Management Plan Revisions

The management plan will be revisited every 10 years to assess effectiveness and determine if changes or updates need to be made. Landowners and LGU's would be included in the revision process through notification by letter.

Figure 1: Indian Lake Project Overview Map



Indian Lake, Sibley County

DOW #72006600

MANAGEMENT PLAN (DECEMBER 2019)

SIGNATURE/APPROVAL SHEET

_____Date_____

Area Wildlife Manager, Stein Innvaer

_____Date_____

Regional Wildlife Manager, David Trauba

_____Date_____

Interim Section Chief, Mike Larson

_____Date_____

Division Director, Dave Olfelt