

Corey Lake Intercounty Drain Hearing of Necessity

December 4, 2019

Corey Lake Intercounty Drain Drainage Board

Michigan Department of Agriculture & Rural Development

Cass County Drain Commissioner

St. Joseph County Drain Commissioner



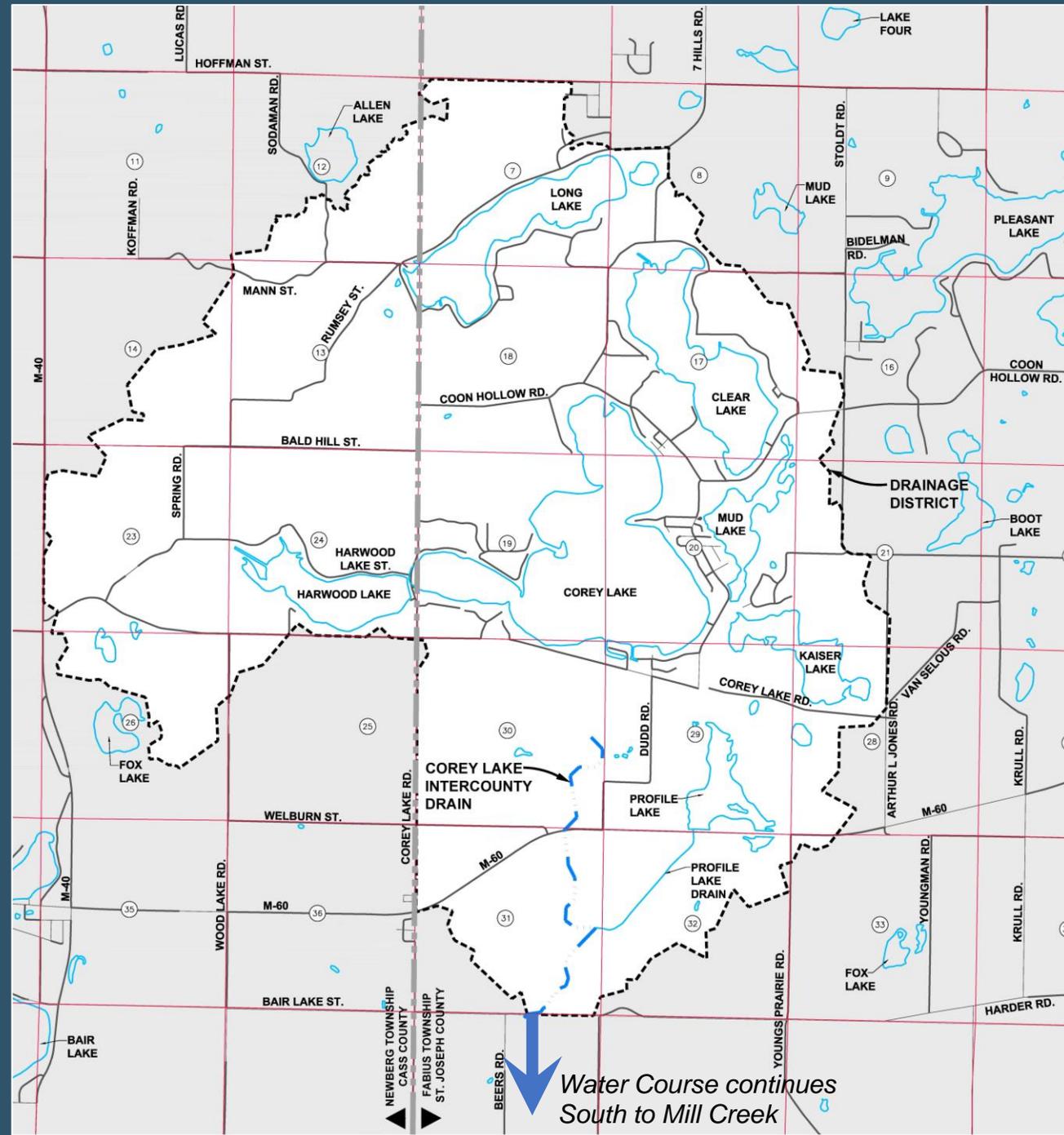
Presentation Overview

- Drain Overview
- Drain History
- Lake History
- Drainage District Revisions
- Study Purpose
- Drainage Issues (Existing Conditions)
- Evaluation of Potential Alternatives
- Next Steps



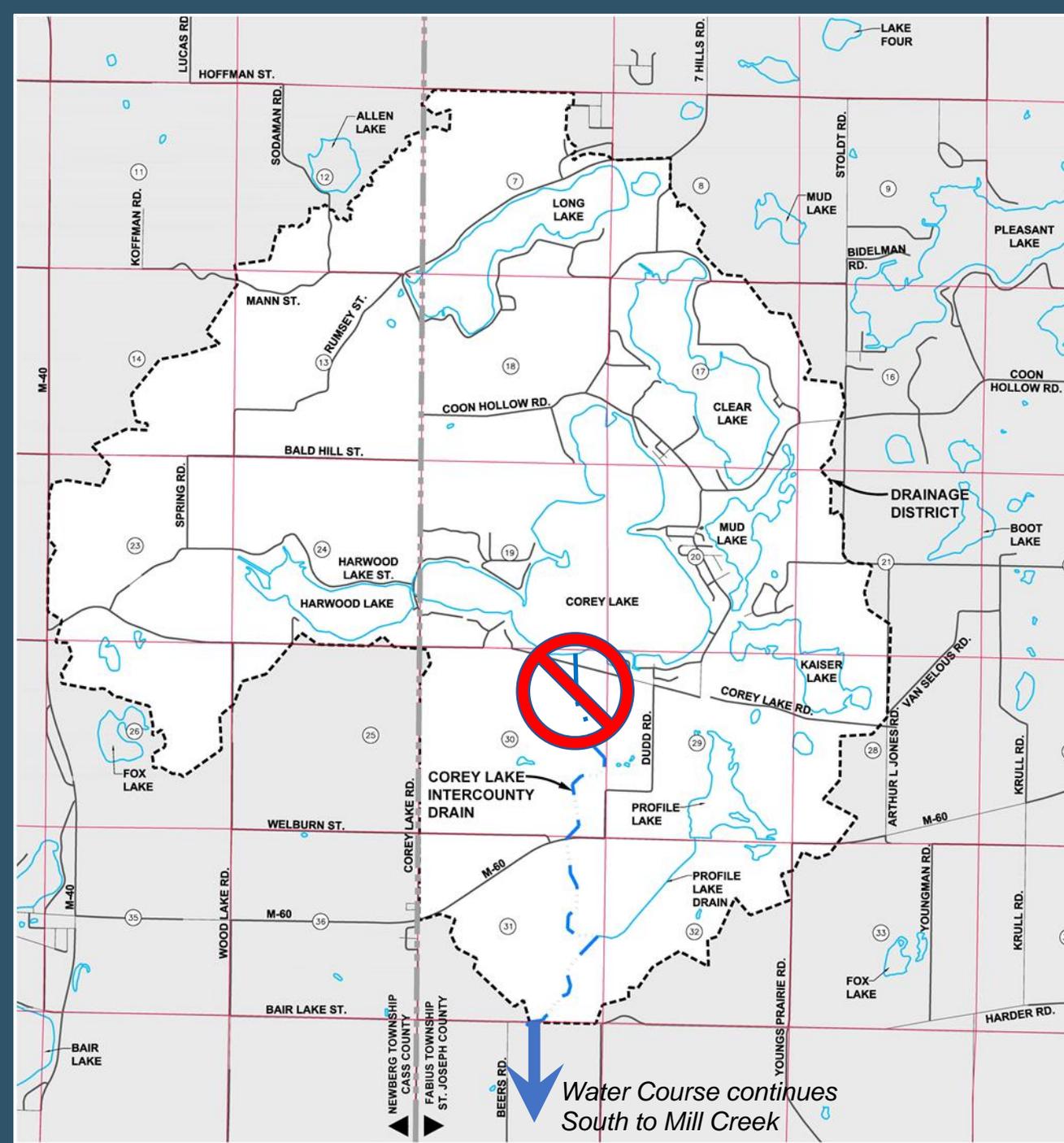
Drain Overview

- Tributary to Mill Creek / St. Joseph River
- Drain Length – Less than 2 Miles
- 8,563.9 Acre Watershed
- Newberg Twp. (Cass County), Fabius Twp. (St. Joseph County)
- Includes Long, Clear, Mud, Kaiser, Corey, Harwood and Profile Lakes
- Sand / Loam Soils
- Mix of Agriculture, Forest, Residential
- Groundwater Flows toward Southeast (toward Kaiser Lake)



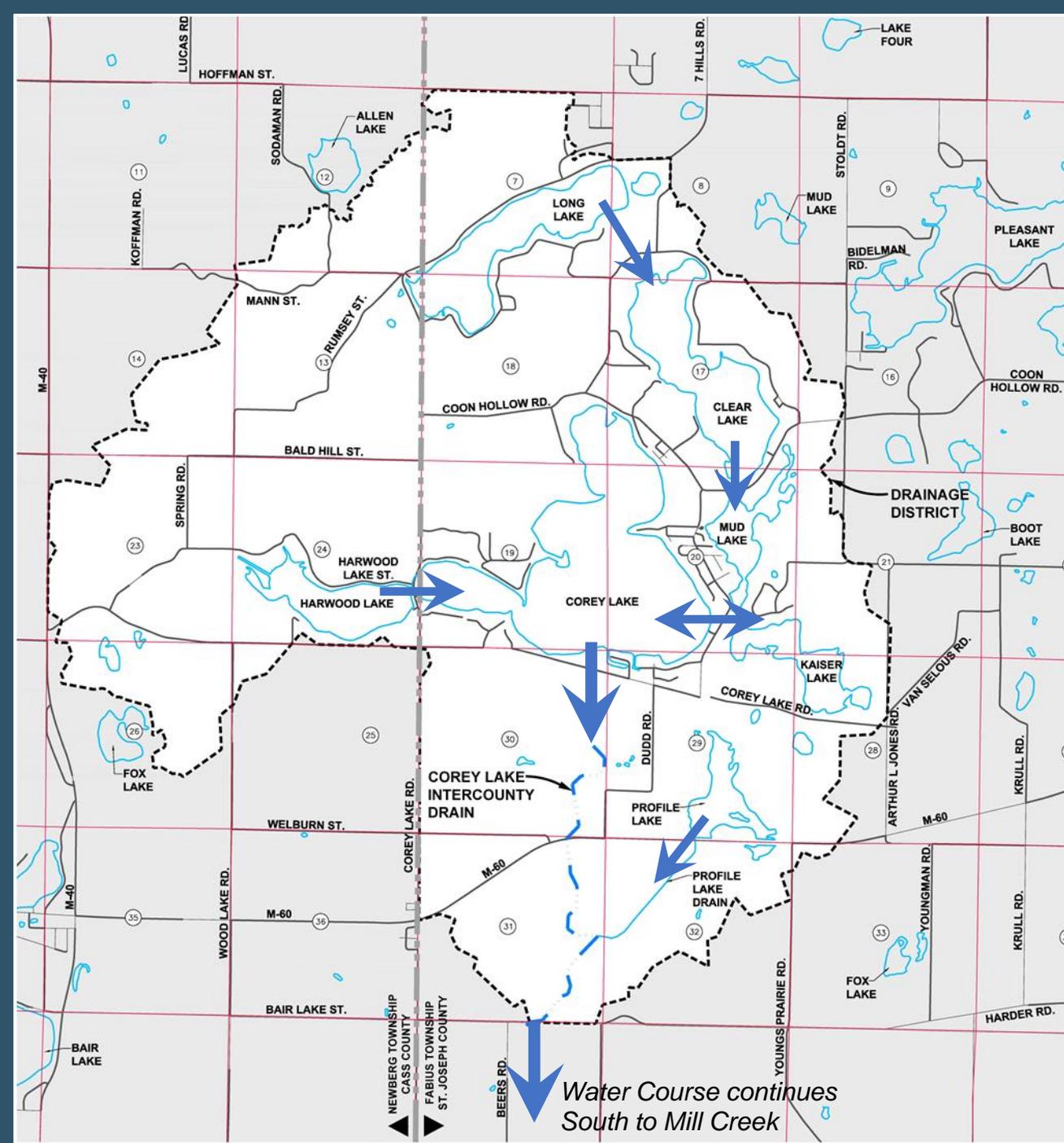
Drain History

- 1867 Peterson Drain Established (St. Joseph County)
- 1883 Corey Lake Intercounty Drain Established (Cass / St. Joseph Counties)
- 1903 petition resulted in St. Joseph County Circuit Court decreeing that portion of Drain lying north of east-west quarter line of Section 30, Fabius Township, St. Joseph County “*cease to be of any public utility and is therefore void and abandoned so far as being a public or County drain*”
- 1950 petition attempted to reverse 1903 Circuit Court ruling but ultimately determined not necessary at Hearing of Necessity



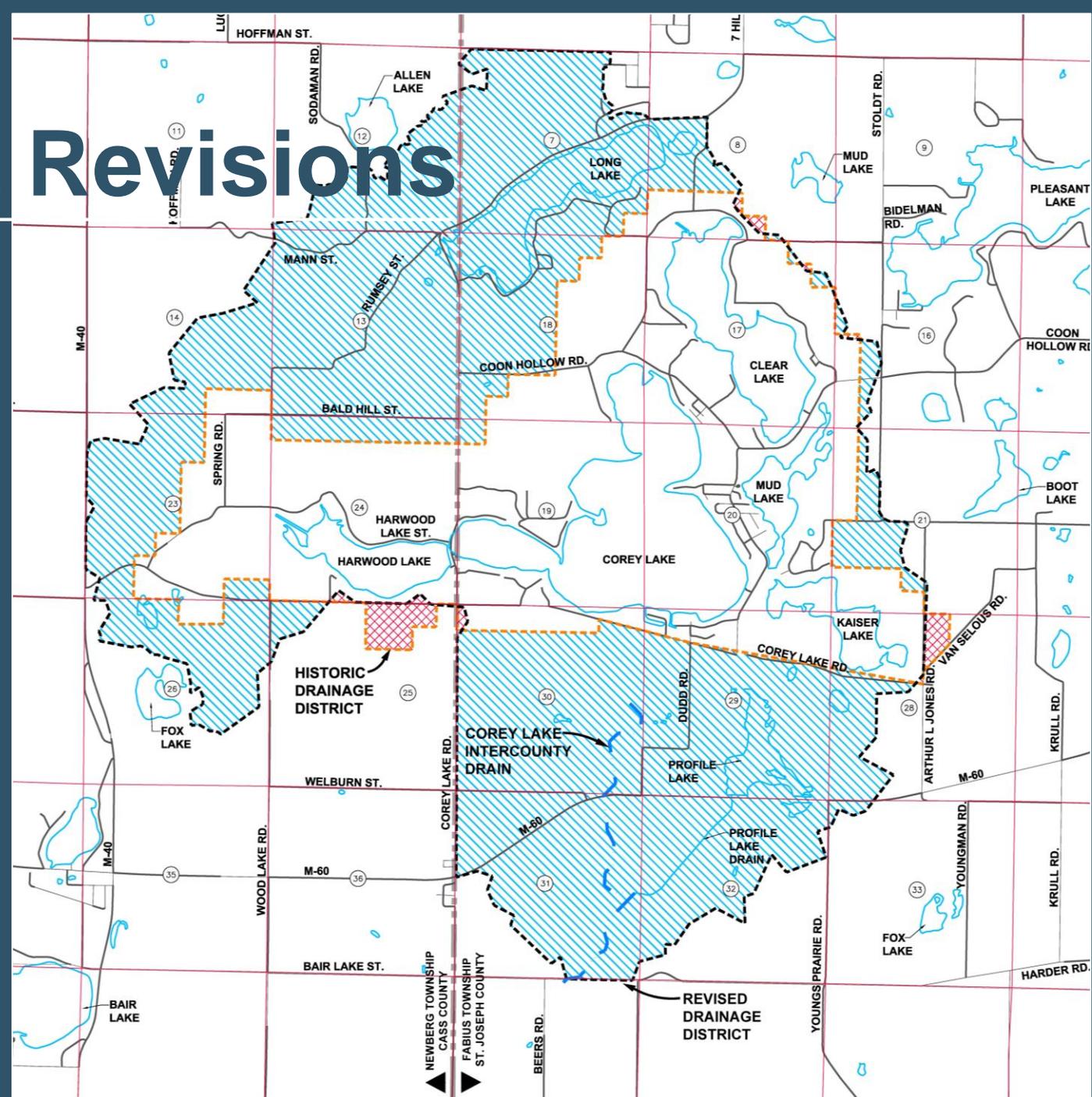
Lake History

- 1951 Corey Lake outlet improvement project undertaken by St. Joseph County Board of Supervisors
- 1952 Long Lake pump system to Clear Lake constructed
- 1974 Corey – Kaiser “dam” (control structure) constructed and legal level of Corey Lake lowered 874.5’ to 874’
- Legal Lake Levels (NGVD 29)
 - Corey Lake 874’ (1974)
 - Kaiser Lake 874.5’ (1953)
 - Clear Lake 874.75’ (1953)
 - Long Lake 887’ (1952)
 - Harwood Lake 877’ (1932)



Drainage District Revisions

- Historic Drainage District: 3,790.2 acres
- Recommendations:
 - Add 4,862.7 acres
 - Remove 89 acres
- Revised Drainage District: 8,563.9 acres
 - 2,590.9 acres Cass County (30%)
 - 5,973.0 acres St. Joe County (70%)
 - Approximately 1,600 parcels



Study Purpose

Comments from Hearing of Practicality (8/20/19):

- High water levels in Corey, Clear and Long Lakes
- Lack of adequate outlet(s) for Corey, Clear and Long Lakes
- Failing infrastructure (lake control structures and drainage outlets)
- Long Lake interested in a reliable (preferably gravity) outlet
- Clear Lake concerned about volume and quality of water being pumped from Long Lake
- Kaiser Lake generally below legal lake level
- Hardwood Lake indicated no issues with water levels, adamantly against receiving any additional drainage (from Long Lake)

Study Purpose

Goals of Engineering Study:

- Assess condition / capacity of the Corey Lake Intercounty Drain as well as connecting lake control structures
- Evaluate Improvement Alternatives to:
 - Ensure Corey Lake Intercounty Drain provides an adequate outlet for District
 - Better manage water levels within Corey Lake and connecting lakes
 - Provide a gravity outlet for Long Lake

Drainage Issues

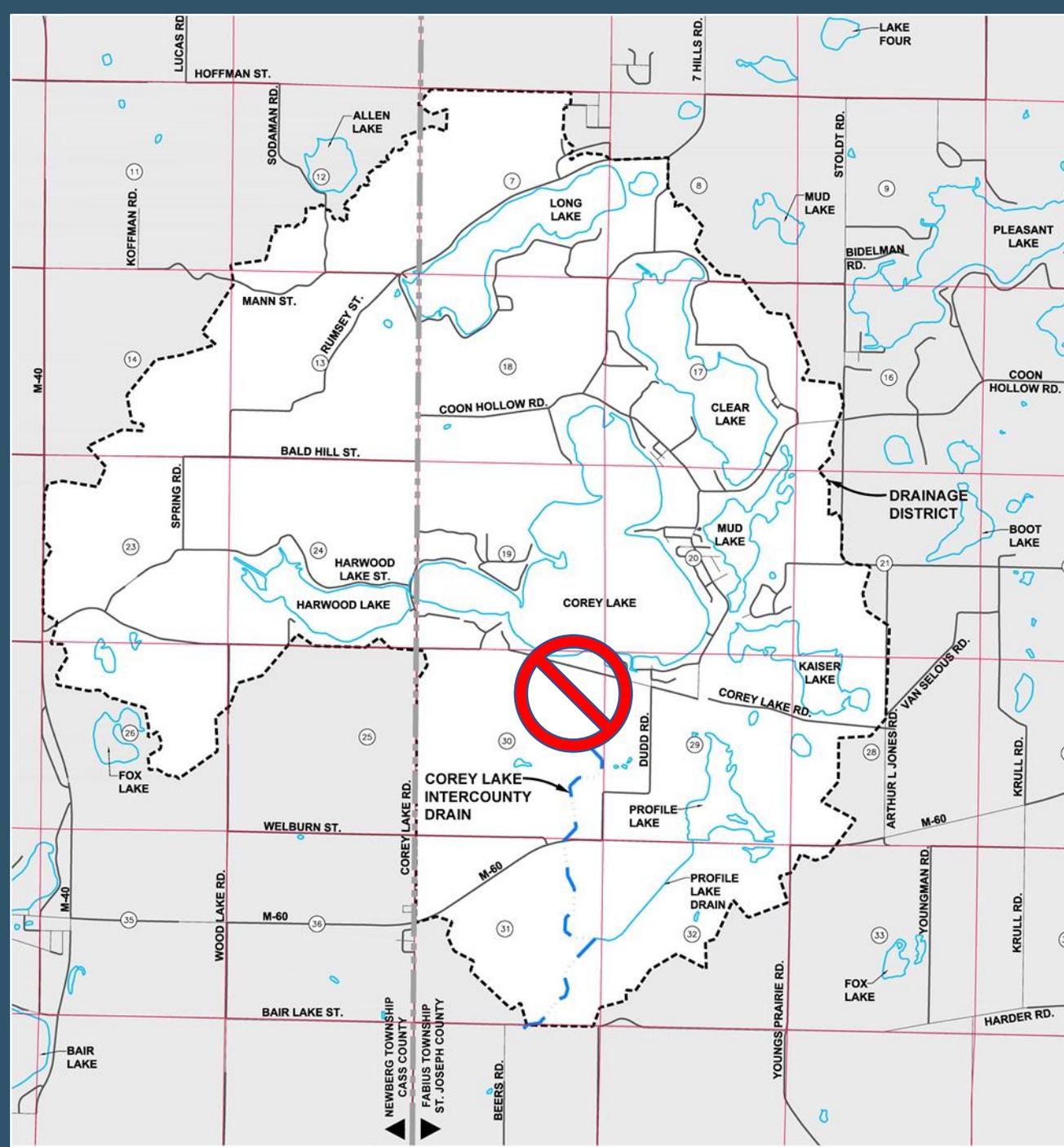
Public Health, Convenience or Welfare Issues:

- Flooding / property damage due to high lake levels caused by hydraulic restrictions
- Aging / failing Infrastructure
- Emergency access becomes difficult when pipes / culverts fail or floodwaters overtop driveways and public roads
- Poor drainage can elevate groundwater levels thereby impacting performance of septic fields

Drainage Issues

Corey Lake Intercounty Drain:

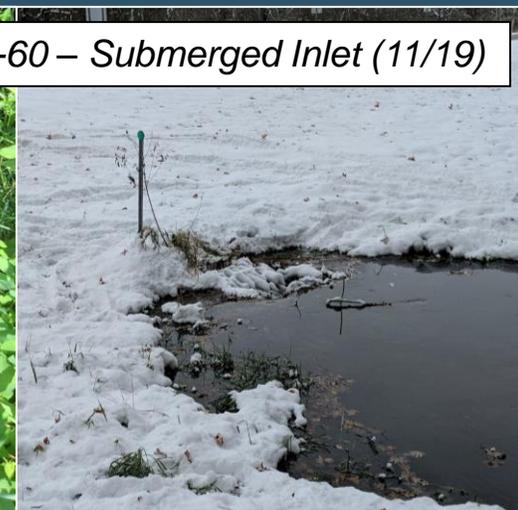
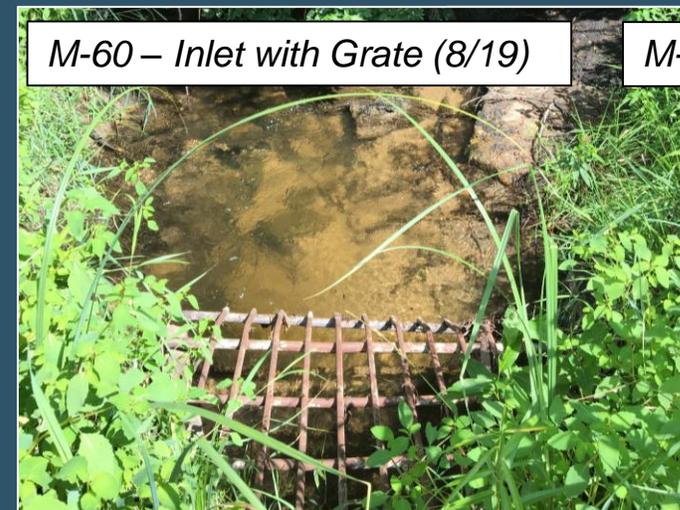
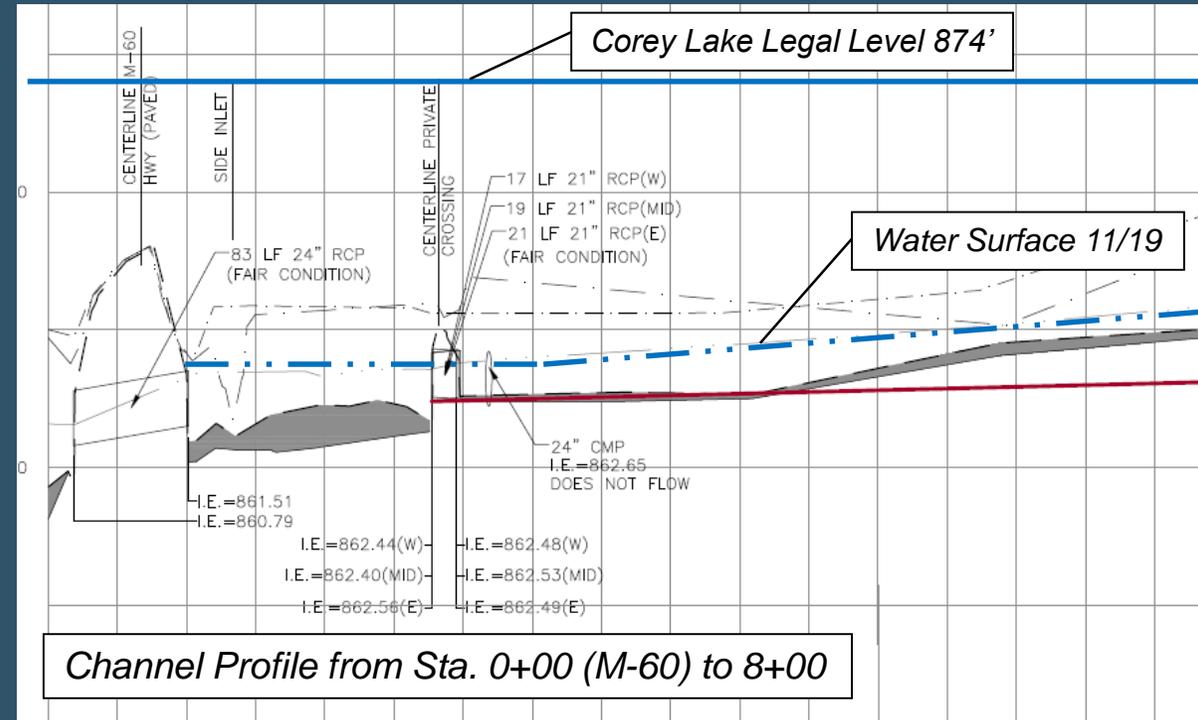
- Currently stops ½ mile downstream (south) of Corey Lake
- Upstream obstructions including sediment, debris, failing pipe / culverts, etc. are not under the jurisdiction of the Intercounty Drain Drainage Board



Drainage Issues

Corey Lake Intercounty Drain:

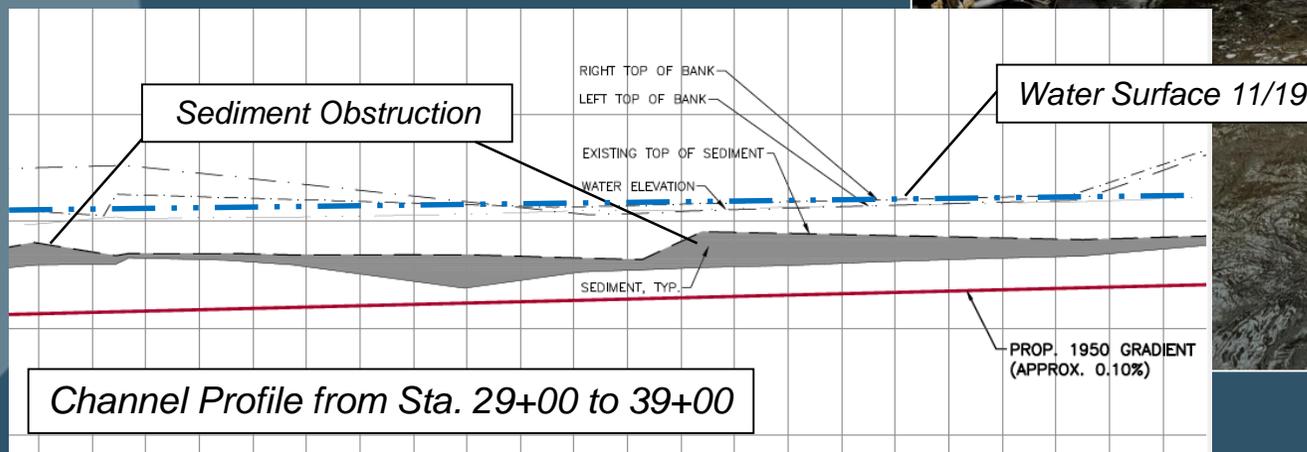
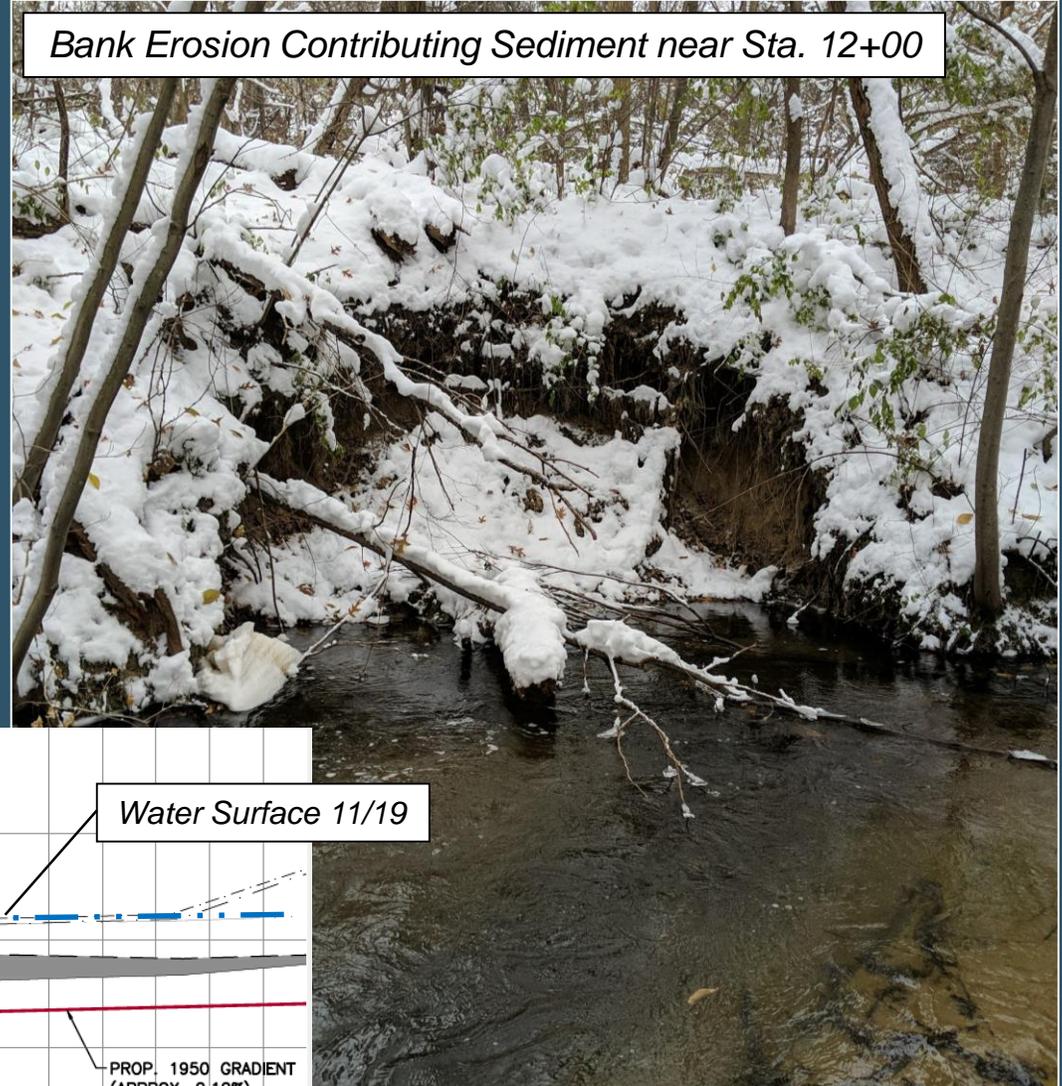
- Sufficient Grade Exists:
 - M-60 24-in RCP invert is more than 12.5-ft below Corey Lake
 - Centerline of M-60 is more than 7-ft below Corey Lake
 - Harder Road 6-ft x 5-ft Box Invert Elevation is 853.5-ft NGVD 29 (more than 20 ft below Corey Lake)
- Drain capacity currently 20 CFS (9,000 gpm) +/-



Drainage Issues

Corey Lake Intercounty Drain:

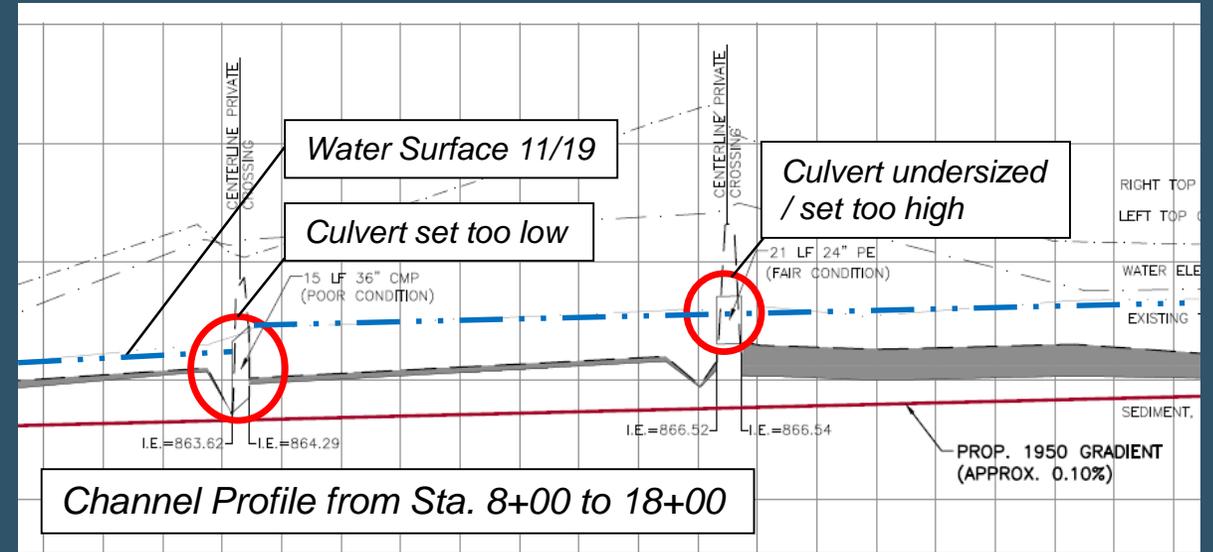
- More than 2-feet of sediment deposition, reducing hydraulic capacity of Drain and obstructing flow, thereby, increasing frequency of flooding



Drainage Issues

Corey Lake Intercounty Drain:

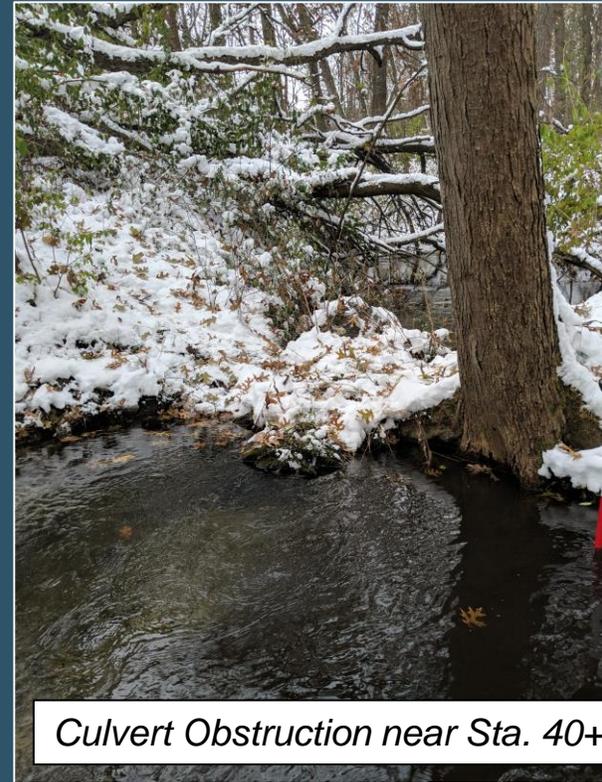
- Several private culverts are improperly set (too high or low) and restricting flow / backing up water in the Drain, thereby, increasing frequency of flooding
- M-60 Culvert is prone to clogging with debris and obstructing flow (causing localized flooding)



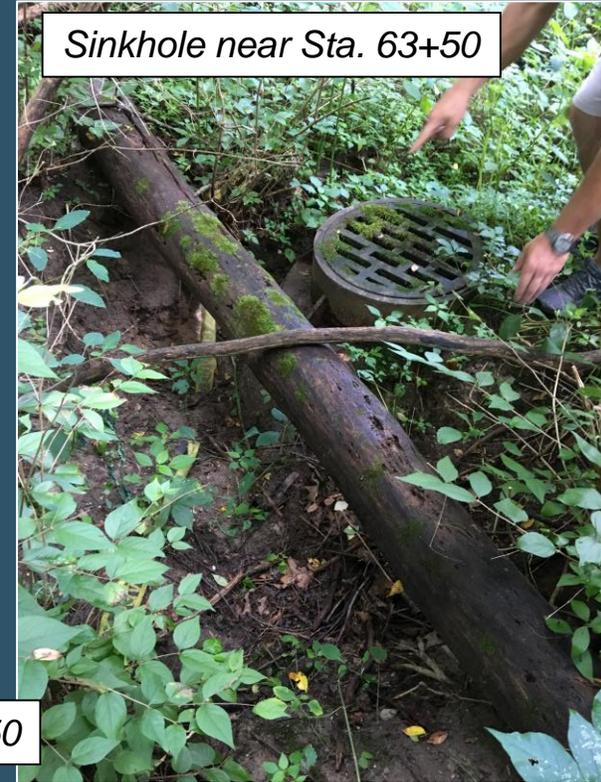
Drainage Issues

Corey Lake Outlet:

- 1950's project completed by St. Joseph County Board of Supervisors
- Current outlet consists of weir control structure, 760 LF of 36-in x 22-in, 24-in, 36-in CMP, and open channel
- Outlet pipe in poor condition – sinkholes, joint failures, corrosion, sediment, etc.



Culvert Obstruction near Sta. 40+50



Sinkhole near Sta. 63+50



Submerged Outlet near Sta. 60+00

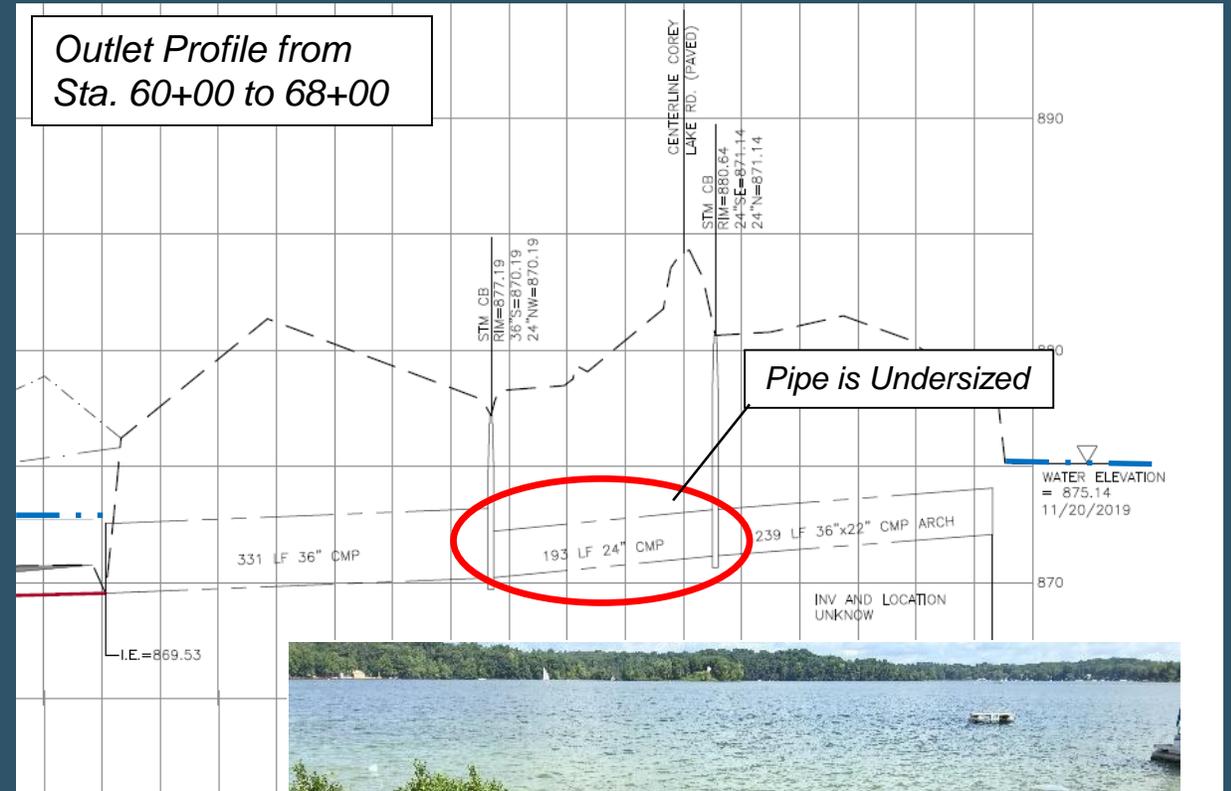


Basin near Sta. 63+50

Drainage Issues

Corey Lake Outlet:

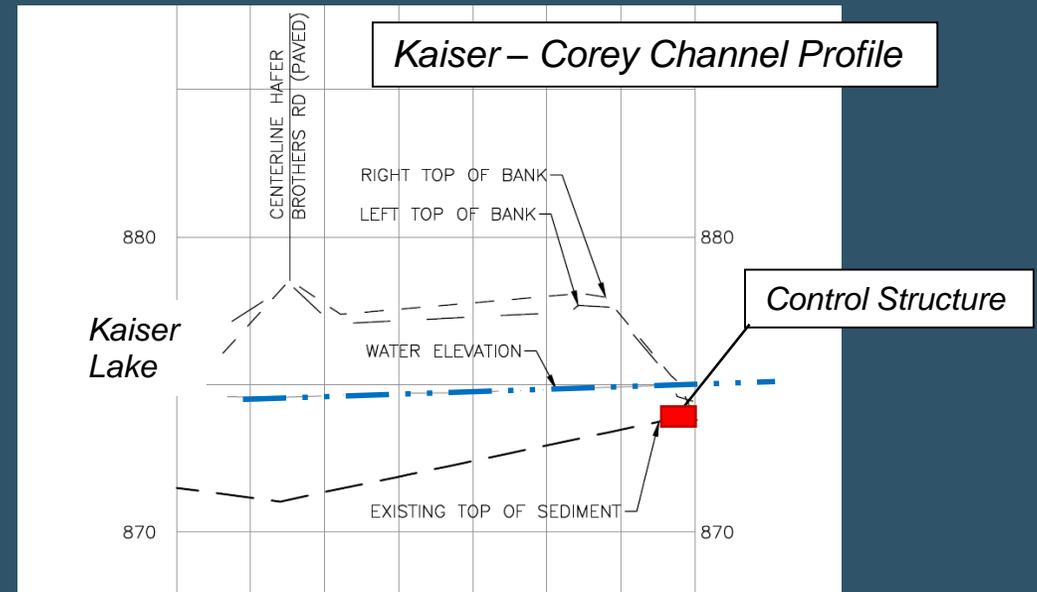
- Control structure set too high
 - Surveyed level of Corey Lake was at 875.1-ft +/- NGVD 29 on 11/18/19 (more than 7-inches above legal lake level)
 - Weir steel boards (stop logs) crest elevation set at 874.5-ft +/- NGVD 29 (6-in above legal lake level)
- Pipe inlet controls water levels above 15 CFS (6,750 gpm) +/-
- Estimated discharge on 11/18/19 was 15 CFS (6,750 gpm) +/-



Drainage Issues

Corey-Kaiser Channel:

- Concrete control structure covered in sediment / debris – obstructing flow
- Bottom of 8-ft wide concrete channel set at 873.8-ft NGVD 29
- Observed flow from Corey Lake (875.1-ft) to Kaiser Lake (874.5-ft) NGVD 29 on 11/18/19 estimated at 5 CFS (2,250 gpm) +/-
- Difficult to manage Kaiser Lake above Corey Lake due to groundwater flow (infiltration)



Drainage Issues

Clear Lake Outlet:

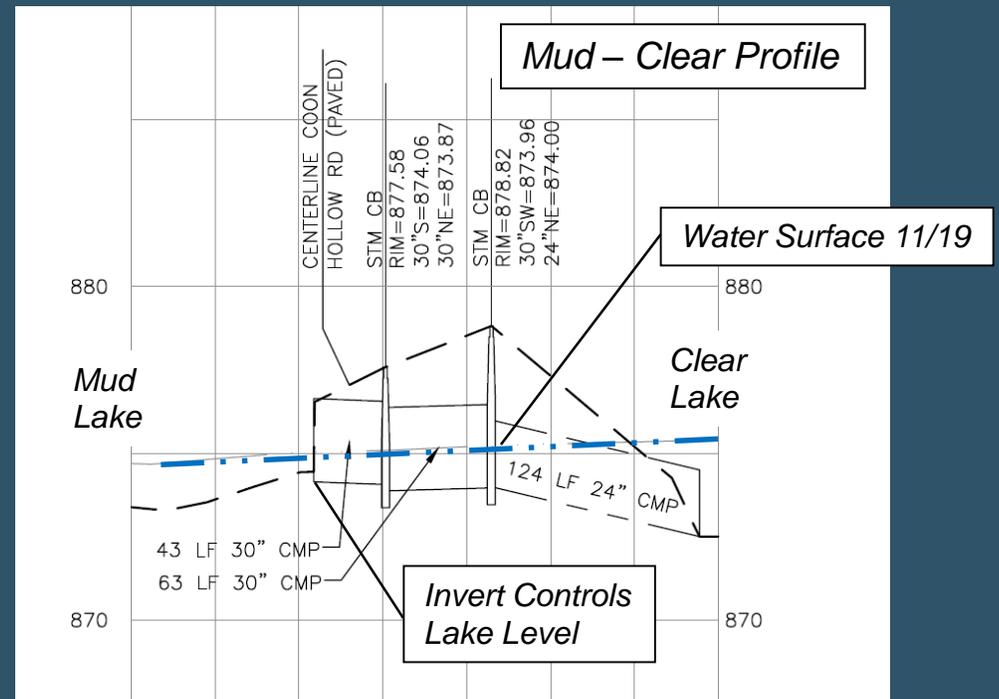
- Control structure consists of a submerged 20-in x 20-in orifice set at 872.5-ft NGVD 29 that discharges south of Coon Hollow Road via 24-in and 30-in CMP
- Outlet pipe in poor condition (corrosion, failures / sinkholes, etc.)



Drainage Issues

Clear Lake Outlet:

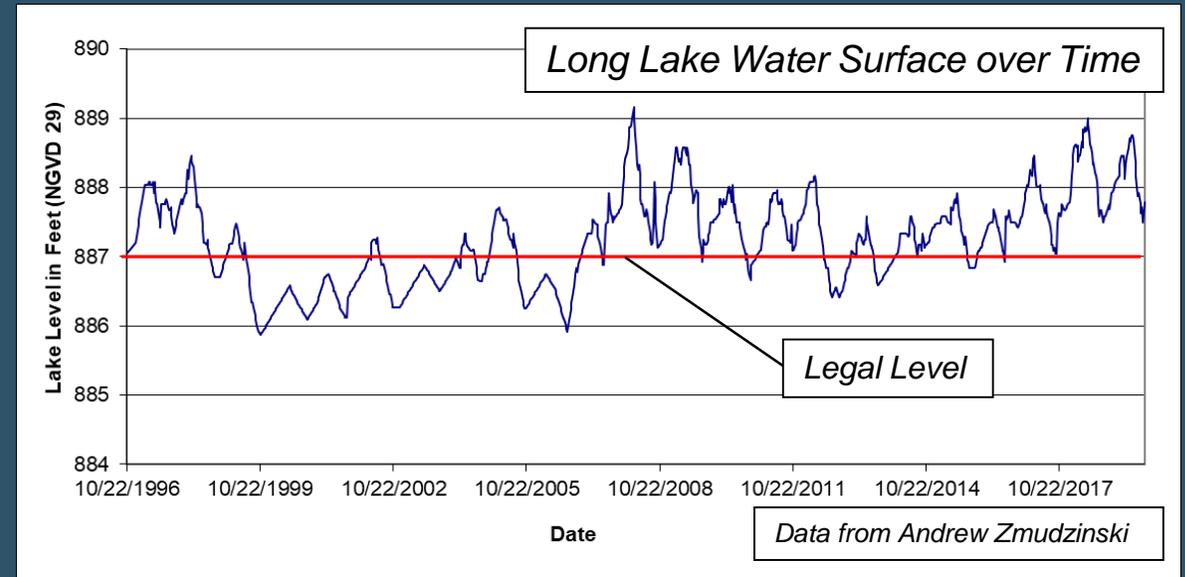
- Controlling elevation is set by downstream 30-in CMP invert 874.14-ft NGVD 29 (Poor Design)
- Current outlet configuration can only convey up to 1 CFS (450 gpm) while maintaining legal lake levels
- Surveyed level of Clear Lake was 875.4-ft +/- NGVD 29 on 11/18/19 (8-in above legal lake level)
- Estimated outflow on 11/18/19 was 4 to 5 CFS (1,800 to 2,250 gpm)



Drainage Issues

Long Lake:

- Chronic Flooding: water levels fluctuate as high as 889-ft NGVD 29 (April 2008) and just under in June 2019
- Surveyed level of Long Lake on 11/18/19 was 887.2-ft +/- NGVD 29 (approximately 2-in above legal lake level)
- Lack of reliable outlet due to pumping restrictions



Drainage Issues

Harwood Lake:

- Control structure set too high
 - Surveyed level of Harwood Lake on 11/18/19 was 878.7-ft +/- NGVD 29 (approximately 20-in above legal lake level)
 - Weir crest elevation set at 878.4-ft +/- NGVD 29 (17-in above legal lake level)
- Estimated outflow on 11/18/19 less than 5 CFS (2,250 gpm) +/-

Harwood Lake Control Structure on 11/14/19



Evaluation of Alternatives

Evaluate Improvement Alternatives to:

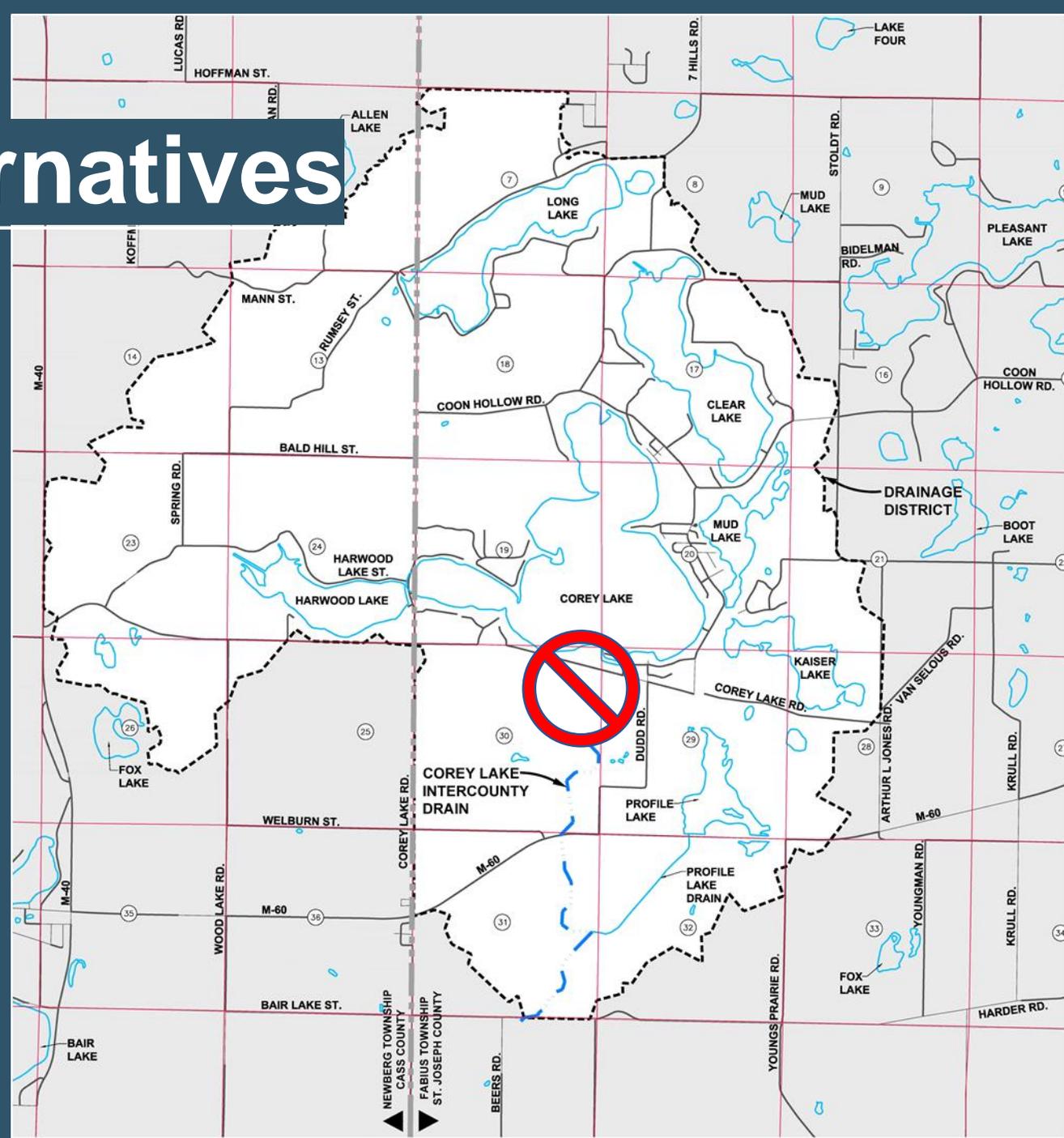
- Ensure Corey Lake Intercounty Drain provides an adequate outlet for the District
- Better manage water levels within Corey Lake and connecting lakes
- Provide a gravity outlet for Long Lake

Note – lake level adjustments (if necessary) shall be and lake control structure improvements may be performed / financed separately under Part 307, Inland Lake Levels, of Natural Resources & Environmental Protection Act , PA 451 of 1994

Evaluation of Alternatives

Alternative 1: Do Nothing

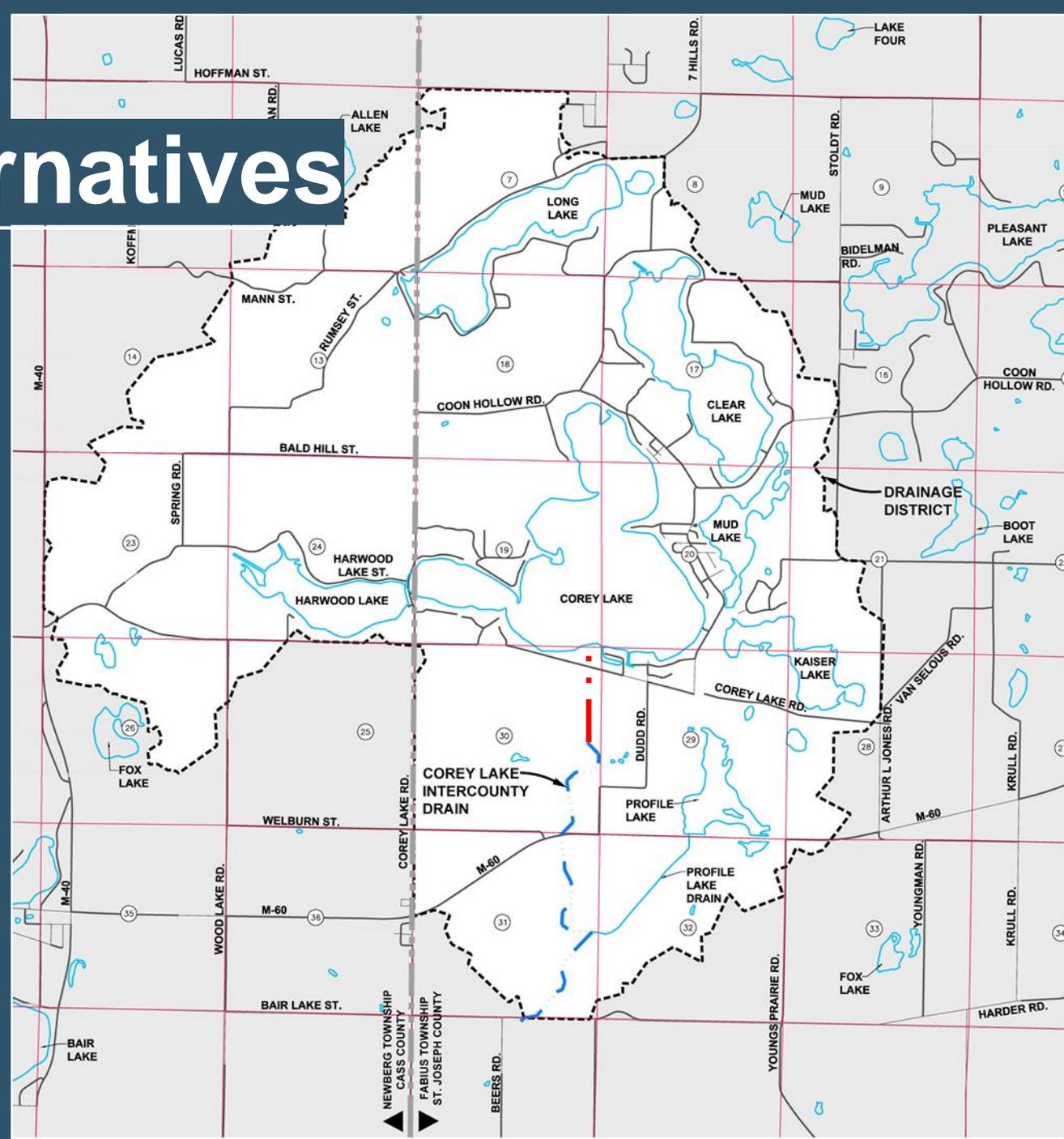
- Intercounty Drain Drainage Board continues to conduct routine maintenance (limited to \$10k annually) along established Drain
- Corey Lake outlet and other lake control structures remain beyond the jurisdiction of the Intercounty Drain Drainage Board
- Individual lake associations continue to be responsible for maintaining and operating their respective control structures and outlets



Evaluation of Alternatives

Alternative 2: Extend Drain to Corey Lake

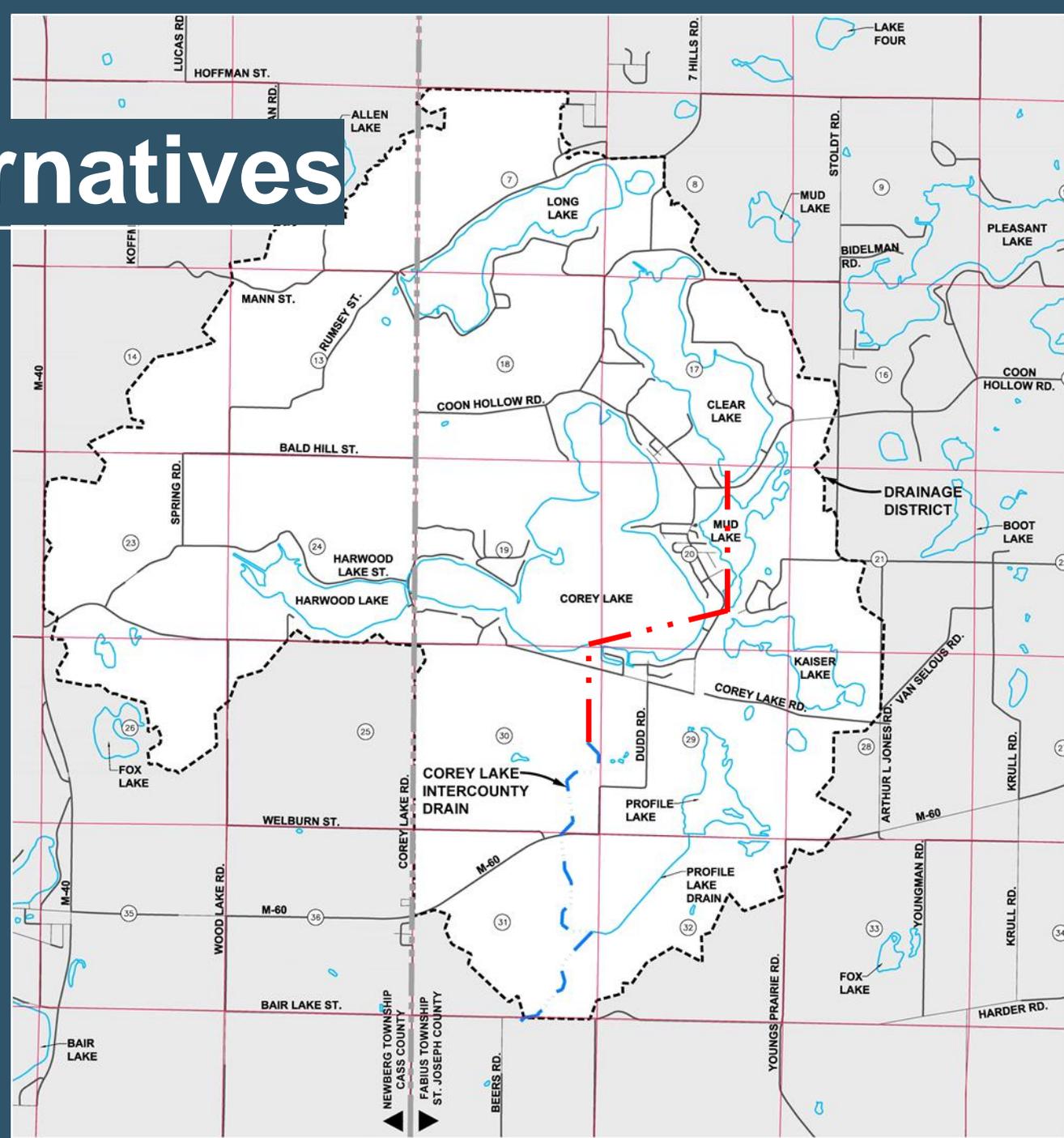
- Goal is to provide an adequate outlet for Corey Lake to help better manage Corey Lake level
- Includes the following:
 - Extend Drain to Corey Lake
 - More than one mile of open channel excavation from M-60 to Corey Lake
 - Culvert / pipe replacement
 - Control structure improvements (possibly under Part 307)
- Estimated cost: \$520k (excluding administrative, land/easement acquisition or financing costs)



Evaluation of Alternatives

Alternative 3: Extend Drain and Improve Lake Connections

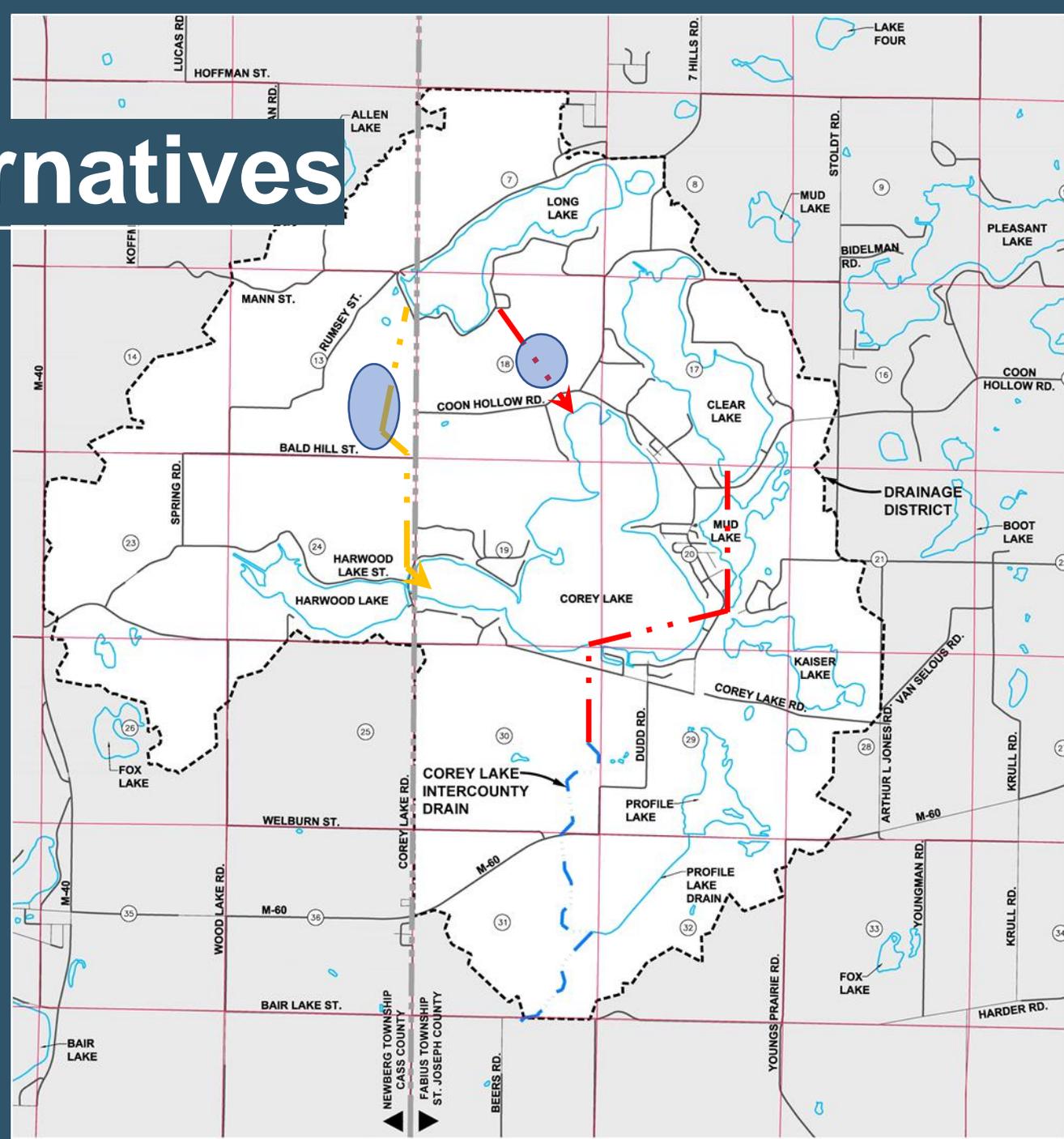
- Goal is to provide an adequate outlet for the District and improve lake connections to better manage lake levels
- Includes the following:
 - Alternative 2 Improvements
 - Extend Drain to Clear Lake
 - Improve Corey-Kaiser Connection
 - Improve Clear-Mud Connection
 - Control structure improvements (possibly under Part 307)
- Estimated cost: \$695k (excluding administrative, land/easement acquisition or financing costs)



Evaluation of Alternatives

Alternative 4: Alternative 3 + Long Lake Gravity Outlet

- Goal is to provide an adequate outlet for the District and improve lake connections to better manage lake levels
- Includes the following:
 - Alternative 3 Improvements
 - Extend Drain to Long Lake
 - Gravity outlet from Long Lake to Corey Lake (cuts up to 45-ft)
 - Control structure improvements (possibly under Part 307)
- Estimated cost: \$1.6M (excluding administrative, land/easement acquisition or financing costs)



Next Steps

Board to decide if petition is necessary:

- If the Board finds that the petition is not necessary, the project ceases immediately and no petition can be heard for the same project until 12 months have passed.
- If the Board finds that the petition is necessary based on health, welfare or convenience, the Board proceeds with a project (the scope of which will be defined later). Each project is unique, however, in accordance with the Drain Code, the following tasks must be completed:
 1. Complete Engineering Design
 2. Obtain Easements (if necessary)
 3. Apply for Permits (if necessary)
 4. Bid Project
 5. Hold “Day of Review”
 6. Construct Project

The End

THANK YOU

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