

**Overall Strategy:**

Improve Water Quality

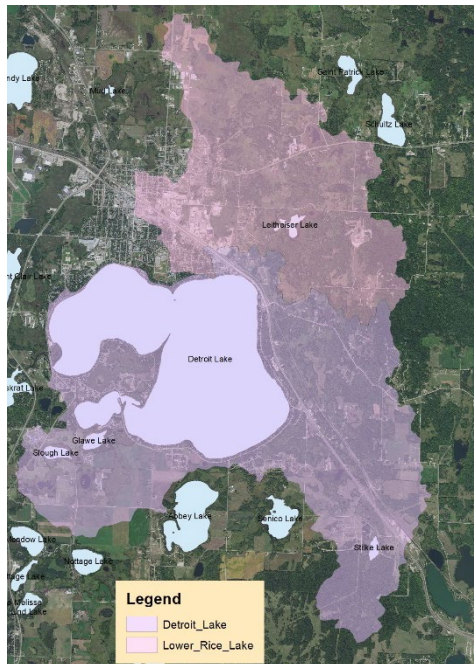
**Impairment:** Listed as impaired for mercury;

**Shoreland**

**Classification:** General Development

**Catchment Area Land Cover:**

33.6% open water, 5.5% wetlands, 3.1% cropland, 18.0% grassland, 27.8% forest, 12% developed land



| Water Quality "Big Detroit" | 10-Year Average (2008-2017) | Trend            |
|-----------------------------|-----------------------------|------------------|
| Secchi                      | 10.2 ft.                    | Stable           |
| Total Phosphorus            | 25 µg/L                     | Slight Degrading |
| Ortho Phosphate             | 4.7 µg/L                    | Stable           |
| Chlorophyll-a               | 8.4 µg/L                    | Stable           |

| Water Quality "Little Detroit" | 10-Year Average (2008-2017) | Trend     |
|--------------------------------|-----------------------------|-----------|
| Secchi                         | 12 ft.                      | Improving |
| Total Phosphorus               | 17 µg/L                     | Improving |
| Ortho Phosphate                | 5.0 µg/L                    | Stable    |
| Chlorophyll-a                  | 4.3 µg/L                    | Stable    |

*Note: Zebra Mussel infested water listing in 2016*

**Short Term Goals - Year 2025**

- Maintain a 5-year mean summer phosphorus concentration at or below 25 µg/L
- Maintain mean summer Secchi depth no less than 9 ft

**Long Range Goals – Year 2035**

- Achieve a 5-year mean summer phosphorus concentration at or below 20 µg/L ± 4%
- Maintain mean summer Secchi depth no less than 10 ft

**Basic Facts**

|                                      |   |
|--------------------------------------|---|
| <b>DNR ID /Becker No</b>             | MN03-0381-00 / 381  |
| <b>Township(s)</b>                   | Lake View (Sec 1-4, 9-15), Detroit (Sec 34-36)  |
| <b>Classification</b>                | General Development   |
| <b>Lake Area</b>                     | 3067.1 acres  |
| <b>Littoral Area</b>                 | 1895 acres (61.78%)   |
| <b>Sub-watershed Area</b>            | 9769.6 acres  |
| <b>Shoreline Length</b>              |   |
| <b>Big Detroit</b>                   | 7.7 miles/40,900 ft.  |
| <b>Little Detroit</b>                | 4.8 miles/ 25,295 ft.   |
| <b>Inlet(s)</b>                      | Pelican River, Sucker Creek,  |
| <b>Outlet(s)</b>                     | Pelican River   |
| <b>Control Structures</b>            | None  |
| <b>Highest Recorded*</b>             | 1335.78 feet (7/11/1998)  |
| <b>Lowest Recorded*</b>              | 1333.34 feet (9/13/1970)  |
| <b>Ordinary High* Water Level*</b>   | 1334.3 feet   |
| <b>Recorded Range</b>                | 2.44 feet   |
| <b>Maximum Depth</b>                 |   |
| <b>Big Detroit</b>                   | 89 feet   |
| <b>Little Detroit</b>                | 16 feet   |
| <b>Residence Time</b>                |   |
| <b>Big Detroit</b>                   | 2287 days   |
| <b>Little Detroit</b>                | 487 days  |
| <b>Main Fish Species</b>             | Walleye, Muskellunge, Northern Pike, Largemouth Bass, Bluegill, Black Crappie                       |
| <b>Secondary Fish Species</b>        | Hybrid Sunfish, Pumpkinseed, Yellow Perch, Lake Sturgeon, White Sucker, Black/Brown/Yellow Bullhead |
| <b>MN DNR/ Private Fish Stocking</b> | Walleye, Muskellunge, Lake Sturgeon   |
| <b>Aquatic Invasive Species</b>      | Flowering rush, Curly -leaf pondweed, Chinese mystery snail, Zebra Mussels                          |
| <b>Public Access Sites</b>           | 4 sites; SW Shore (DNR), NE Shore (City), N Shore "Little" Detroit" (City)                          |
| <b>Marinas</b>                       | J & K Marine, Long Bridge, Holiday Inn, Several Private   |
| <b>Public Beach</b>                  | North Shore "Little" Detroit  |
| <b>References</b>                    | DNR Lake Finder, Becker County  |

\*Datum: NGVD 1929 (ft.)    \*\* Elevations NAVD 88

## Overall Assessment

At 3,067 acres, Detroit Lake is the largest lake within the PRWD, and lies entirely within the City of Detroit Lakes municipal boundaries. As typical with urban lakes, its shoreline is extensively developed with residential homes, commercial businesses and some industrial buildings. The lakes are heavily used for game fishing, boating, and other summer and winter recreational activities. The drainage area of Detroit is 9770 acres in size, which is comprised primarily of Forest (42%), Grassland (27%), and Developed Land (18%).

Detroit Lake, locally known as Big Detroit and Little Detroit, has two distinct basins that are separated by a shallow gravel bar. The larger of the two basins, Big Detroit has a maximum depth of 82 feet (18.4-foot average) with 37.5 % of its surface in the littoral area (< 15 ft depth) and has 7.84 miles of shoreline. Little Detroit littoral area (< 15ft depth) encompasses the entire water basin, with a lake depth average of 8.5 feet and a maximum depth of 16 feet, with 4.9 miles of shoreline.

There two water public accesses on Big Detroit, located on the north and south sides. The north side public water access is owned by the City of Detroit Lakes, however, there are short term plans to construct a new access and biking trail head by the MN DNR, west of the Holiday Inn. The south public water access on Big Detroit is owned by the MN DNR and in 2016 was expanded and reconstructed to increase the parking area, provide stormwater management enhancements, and to include a designated area to clean and decontaminate water related equipment. There is one commercial marina on Big Detroit, operated by the Holiday Inn which is currently permitted for XXXX slips.

Little Detroit has a City Park mile long public beach from Washington Avenue to Legion Road. Within the public beach area, the City of Detroit Lakes owns a public water access which is located at the intersection of Roosevelt Avenue and West Lake Drive. Little Detroit has two commercial marinas - J & K Marina and Long Bridge which have XXX and XXX slips respectively. There are XXX PUD's with water access totally XXXXX slips.

Big Detroit and Little Detroit. The two basins are separated by a shallow gravel bar with an area to the north which which was last dredged in 1984 to provide watercraft passage.

The primary inlet and outlet for Detroit Lake is the Pelican River, flowing into the north side of "Big" Detroit and exiting the southwest side of "Little" Detroit. In addition to the Pelican River, Sucker Creek drains to the Lake along with two small wetland flowages, all on the southeast portion of "Big" Detroit. There are no water control structures, however, the lake level is controlled further downstream by the rock rapids located between Muskrat and Sallie lakes and by Buck's Mill Dam on Mill Lake. In 1984, the PRWD dredged a watercraft channel between Big and Little Detroit lake at a cost of \$80,000.

Big Detroit is a dimictic lake while "Little" Detroit is polymictic, however, both exhibit mesotrophic characteristics with moderately clear water and is supportive for all recreation/aesthetic uses. Occasionally, after large rain event or during hot late summer months, the lake becomes borderline eutrophic with visible algal blooms. This is due, in part, to Rice Lake, an upstream degraded wetland complex which releases phosphorous following large rain events. Urban and residential stormwater runoff are also contributors of nutrients to the lake.

The two waterbodies typically have consistently different water clarity and nutrient levels. "Little" Detroit has been observed to have better water quality results than the larger and deeper "Big" Detroit. Over the past 10 years, Little Detroit has been observed to have a slight increase in both transparency and total phosphorous. Big Detroit has exhibited stable water transparency with a slight increase in total phosphorous levels.

With the continued development of Detroit Lake, there has been an increase in lakeshore alteration activities including the removal of natural shoreline vegetation and replacing it with rock rip-rap. Along with the removal of shoreline vegetation, there has also been a noticeable increase in the removal of aquatic vegetation by both manual and mechanical means.

Aquatic invasive species have a large effect on lake health and in turn, lakeshore property value. Because of the high level of recreational use of Detroit Lake, this makes it very susceptible for inadvertent invasive species introduction. The aquatic invasive plants Flowering Rush and Curly-leaf pondweed are both present in the lake, along with invasive invertebrates Zebra Mussels and Chinese Mystery snail. Both Flowering Rush and Curly-leaf Pondweed are assessed and managed via herbicide annually. The City of Detroit Lakes recognizes the economic values to that lake and assists the District manage invasive plants.

The MN DNR is very active in the fisheries management of Detroit Lake. The lake supports a healthy game fish population including pan fish, Walleye, Bass, Northern Pike, and Muskellunge. MN DNR focuses fish stocking efforts in Detroit Lake for Walleye, Muskellunge, and Lake Sturgeon.

- 1992 diag study outlined a goal of 20ppb

### Past Studies

- Ulteig Engineers Inc. 2009. North Side Stormwater Treatment Study
- K-V Associates Inc. 1980. Septic Leachate Survey, Detroit Lakes, MN
- Hecock, R. 1993. Diagnostic and Feasibility Study and Management Alternatives for Lake Sallie and Detroit Lake
- Larson Peterson and Associates. 1998. 1998 Quality Assurance Plan: Lakes Sallie and Detroit
- Larson, Peterson, and Ulteig. 2004. Wastewater Treatment Facility Effluent Discharge Feasibility Study; City of Detroit Lakes Preliminary Engineering Report
- Pelican River Watershed District and City of Detroit Lakes. 1971. The Effectiveness of Advanced Waste Treatment Methods and the Recovery Rate of an Enriched Lake following Nutrient Cut-Off
- A.W. Research Laboratories. 1996. Proposal for Locating Ground Water in the Wetland West of Detroit Lake
- McComas, Steve. Blue Water Science. 1999. Pelican River Watershed District Aquatic Plant Harvesting Program Evaluation
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- Larson Peterson and Associates. 1987. 1987 Monitoring Plan: Lakes Sallie and Detroit
- Larson Peterson and Associates. 1990. Clean Lakes Study of Lakes Sallie and Detroit: 1988 and 1989 Data Collection Summary
- Larson Peterson and Associates. 1992. Diagnostic Feasibility Study: Management Alternatives for Lakes Sallie and Detroit
- Larson Peterson and Associates. 1998. 1998 Monitoring Plan: Lakes Sallie and Detroit
- Larson Peterson and Associates. 2001 Diagnostic Management Alternatives for Lake Sallie and Detroit Lake
- Iverson, Steven W. 1992. The Pelican River Navigation Restoration Project
- Larson Peterson and Associates. 2001. Stormwater Drainage Plan: Storm Sewer Drainage Districts, Detroit Lakes, MN

### Implementation

**Planned/Potential Projects:**

**Capital Improvement Projects:**

### Projects & Programs

**Ongoing Programs:**