

HIGGINS LAKE

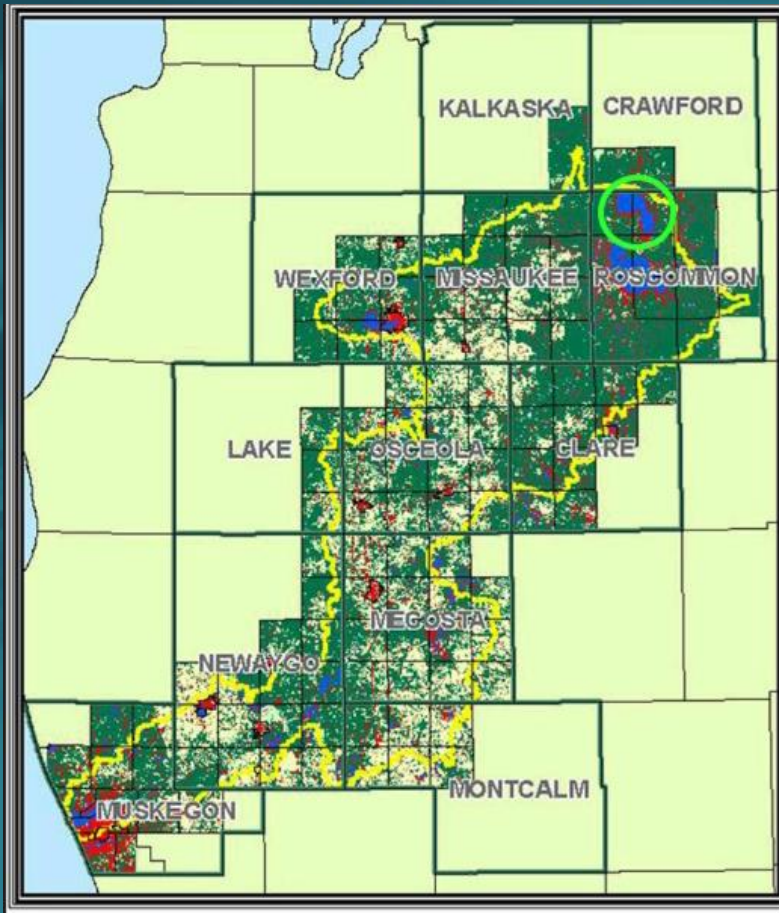
A significant body of water



- Located in Roscommon County
- 9,900 acres
- 10th largest in state
- National Geographic – 6th most beautiful lake in World
- Supports regions tourist driven economy

HIGGINS LAKE

HEADWATERS OF THE MUSKEGON RIVER WATERSHED



- The Muskegon River Watershed encompasses 9 counties.
- A source of water for over 1200 lakes and ponds.
- Drains approximately 2,723 square miles of land
- Empties into Lake Michigan
- 2nd largest watershed in the State of Michigan
- What goes into Higgins Lake affects everything downstream

HIGGINS LAKE

HEAVILY USED



- **1,000,000 + visitors annually**
- **Two State Parks (only inland lake with two)**
- **South Park is 2nd largest in the State of Michigan (632 sites)**
- **11 Watercraft Access Points**
- **~ 90 Public Road Ends**
- **Considered by DNR as High-Use Recreation Lake**
- **Comparable to a large downstate city**

THE HIGGINS LAKE WATERSHED IS CONTAMINATED

Higgins Lake watershed

Excessive Algae Growth



THE HIGGINS LAKE WATERSHED IS CONTAMINATED

- Dense population surrounding Higgins Lake
- 68% of all septic systems failing (CMDHD)
- Septic systems leeching nutrients into watershed
- Phosphates, Nitrates, Nitrites, Pharmaceuticals (antibiotics), endocrine emulators, viruses
- Drinking Wells contaminated
 - 122 random wells tested
- Algae Blooms some toxic
- Underwater Vegetation (weeds)
- Deep water becoming Hypoxic
- Black muck layer below sand has sewage odor

HIGGINS LAKE

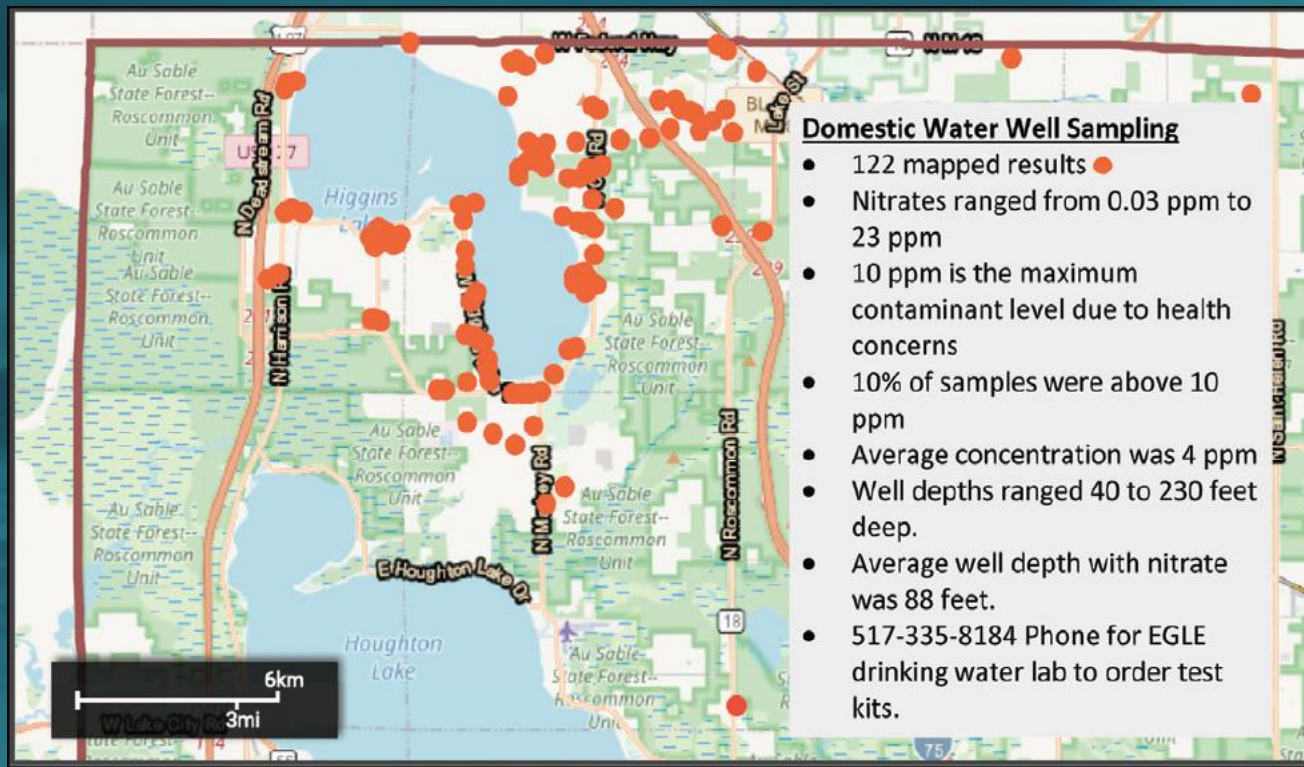
Nutrient loading

Table 3: Modified annual phosphorus loading estimates for six source categories described in the 2007 Watershed Management Plan.

Source	Phosphorus (lbs-	Proportio
Shoreline erosion	80	1.3%
Road/stream crossing	28	0.4%
Road end erosion	105	1.7%
Septic systems	4,965	79.2%
Fertilizer usage	56	0.9%
Watershed runoff	1,032	16.5%
TOTAL	6,266	

- Phosphates in the water stimulate algae growth
- Septic Systems contribute the majority of phosphorous
- Data Source –
Limnotech 2021

THE HIGGINS LAKE WATERSHED IS CONTAMINATED

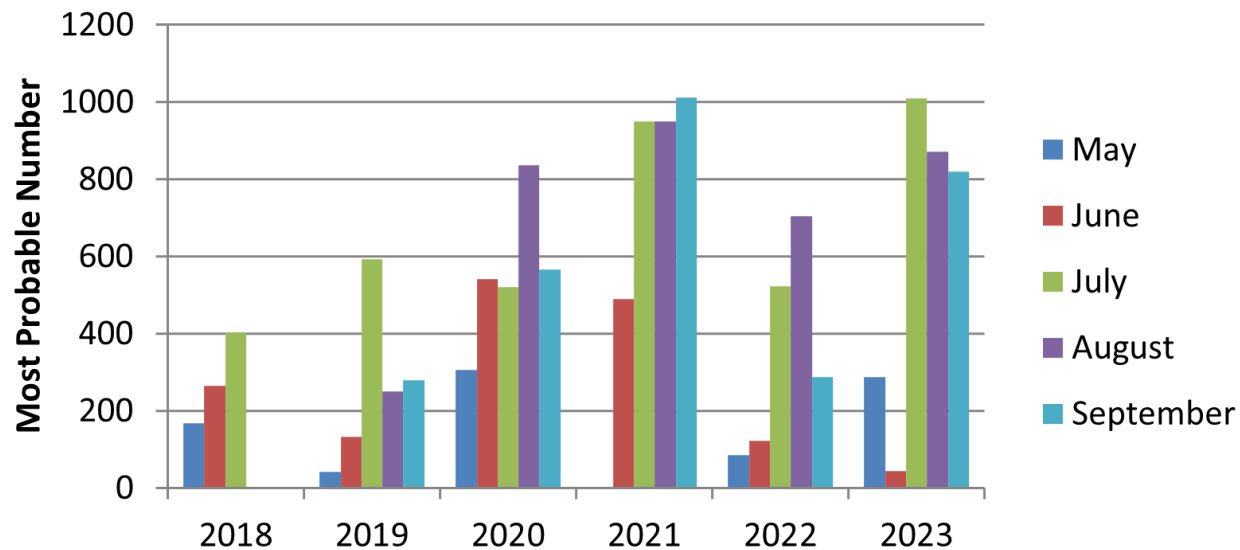


Drinking Wells are contaminated

- 122 random wells tested
- All of the wells tested positive for nitrates.
- 10% tested above the 10PPM threshold for safe drinking water.
- Average well depth 88 feet

THE HIGGINS LAKE WATERSHED IS CONTAMINATED

**Total Coliform
Year Averages**



- Coliform Averages steadily increasing in the last 6 years.
- **1000 MPN/100 mL closes beaches**
- **235 - 1000 MPN/100 mL beach advisory issued**

THE HIGGINS LAKE WATERSHED IS CONTAMINATED

- Decades of Hydrological testing beginning in the 1930's
 - Moffett and Brown (1940; data collected 1930's)
 - Schultz and Fairchild (1983; data collected 1970s-1980s)
 - King et al. 1991;
 - Minnerick 2001;
 - Martin et al. 2014;
 - Dr. Jermalowicz-Jones 2020
 - Dr. Mark Luttenton, GVSU 2020

THE HIGGINS LAKE WATERSHED SEWER SOLUTION

A Centralized Sewer System has been Recommended by the following organizations and individuals.

- Central Michigan District Health Department
- Michigan Department of Natural Resources (DNR)
- Dr. Jennifer Jemolowicz-Jones, PhD Restorative Lakes Sciences
- Dr. Mark Luttenton, PhD, GVSU Director of Annis Water Quality institute
- Dr. Joan Rose, PhD, MSU Center for Advancing Microbial Risk Assessment (CAMRA)
- Muskegon River Watershed Assembly
- Huron Pines, Michigan Lakes and Streams
- Higgins Lake Property Owners Association
- Higgins Lake Foundation

THE HIGGINS LAKE WATERSHED SEWER SOLUTION

Marc Tonello

MDNR Fisheries Management Biologist,

“I can unequivocally say that I would 100% support it (a sewer). If not, you’re dooming yourself to a future of no oxygen down deep in Higgins. Goodbye cold-water fish. Hello massive algae blooms. If I owned property in the Higgins Lake watershed, I’d be fighting like hell to make sure the sewers go through.”

THE HIGGINS LAKE WATERSHED

THERE IS A PROVEN SOLUTION

- 2010 AMERICAN LEGION LOW PRESURE SEWER SYSTEM INSTALLED
- Data collected by several studies proved:
- Wastewater plant substantially improved water quality . . . due mainly to groundwater inputs.
- Total Phosphate concentrations greatly decreased ;
- Nitrate (NO₃) and nitrite (NO₂) dropped below detection limits.
- Boron exhibited a significant decline
- The specific conductivity in this area was the lowest in the shoreline survey.

THE HIGGINS LAKE WATERSHED

WHAT WE HAVE DONE

- Lyon and Gerrish Townships working together to find a solution to septic contamination.
- Gerrish Lyon Utility Authority (GLUA) board created
- USDA SEARCH Grant used for Feasibility Study
- Service Area defined
- Financing of the project via Public Act 188 (PA188)

THE HIGGINS LAKE WATERSHED IS CONTAMINATED

- GLUA Research determined:
 - STEP sewer system is the best choice
 - Affordable – Significantly less than gravity system
 - Effective – eliminates ALL human waste
 - Extensive History of Successful Installations
 - Least invasive to residents (horizontal boring)

THE HIGGINS LAKE WATERSHED

STEP SOLUTION

Typical STEP System Installation

- All Sewage emptied to septic tank
- Solids settle to bottom of tank
- Liquids pumped via low pressure small diameter pipe to Wastewater Treatment Plant



THE HIGGINS LAKE WATERSHED COLLECTION AREA

Defined Special Assessment District (SAD) area in ORANGE

- Complies with PA188
- Covers approximately 4,000 acres and includes:
- 3,700 residences; 70 businesses.
- 3,800 onsite wastewater pumping systems,
- 70 miles of low-pressure sewer lines
- New wastewater treatment plant



THE HIGGINS LAKE WATERSHED

Wastewater Treatment Plant

Location of Wastewater Treatment Plant

- Isolated from Residential area
- Property to be obtained from the DNR



THE HIGGINS LAKE WATERSHED SEWER SOLUTION

Residents of Gerrish and Lyon Townships Support a Sewer

- Also Highly endorsed by:
 - Higgins Lake Property Owners Association
 - Central Michigan District Health Department
 - Michigan Lakes and Streams Association
 - Higgins Lake Foundation
 - Michigan Department of Natural Resources
 - Muskegon River Watershed Assembly

THE HIGGINS LAKE WATERSHED **THERE IS A PROVEN SOLUTION**

A Lake-Wide STEP Sewer System is the solution

- An economical low impact long term solution
- Pumping effluent without solids increases systems efficiency and reduces the cost for system
- Other systems (gravity and low pressure grinder pumps) were evaluated and found to be less cost effect.

THE HIGGINS LAKE WATERSHED SEWER SOLUTION

It is clear Higgins Lake needs a sewer.

- The data reveals contaminants
- Scientists identify the primary source
- We see the effects
- The health department tells us the solution
- We are compelled to ACT

HIGGINS LAKE STEP SEWER SYSTEM ESTIMATED COSTS

GLUA Project Budgets			
	Lyon Township	Gerrish Township	Total
Total Project Cost	\$ 35,440,000.00	\$ 79,560,000.00	\$ 115,000,000.00
WWTP and LP System to ROW	\$ 18,990,000.00	\$ 47,130,000.00	\$ 66,120,000.00
Step Tanks/Control Panel	\$ 10,780,000.00	\$ 21,250,000.00	\$ 32,030,000.00
Lateral Installation ROW to Structure	\$ 5,670,000.00	\$ 11,180,000.00	\$ 16,850,000.00
	\$ 35,440,000.00	\$ 79,560,000.00	\$ 115,000,000.00

HELP US MAKE THIS AFFORDABLE

HIGGINS LAKE



- 8 counties downstream of Higgins Lake
- What goes into Higgins Lake affects everything downstream