

# OLIVER LAKE WATERSHED DIAGNOSTIC STUDY

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Arion Consultants

## TODAY'S GOALS

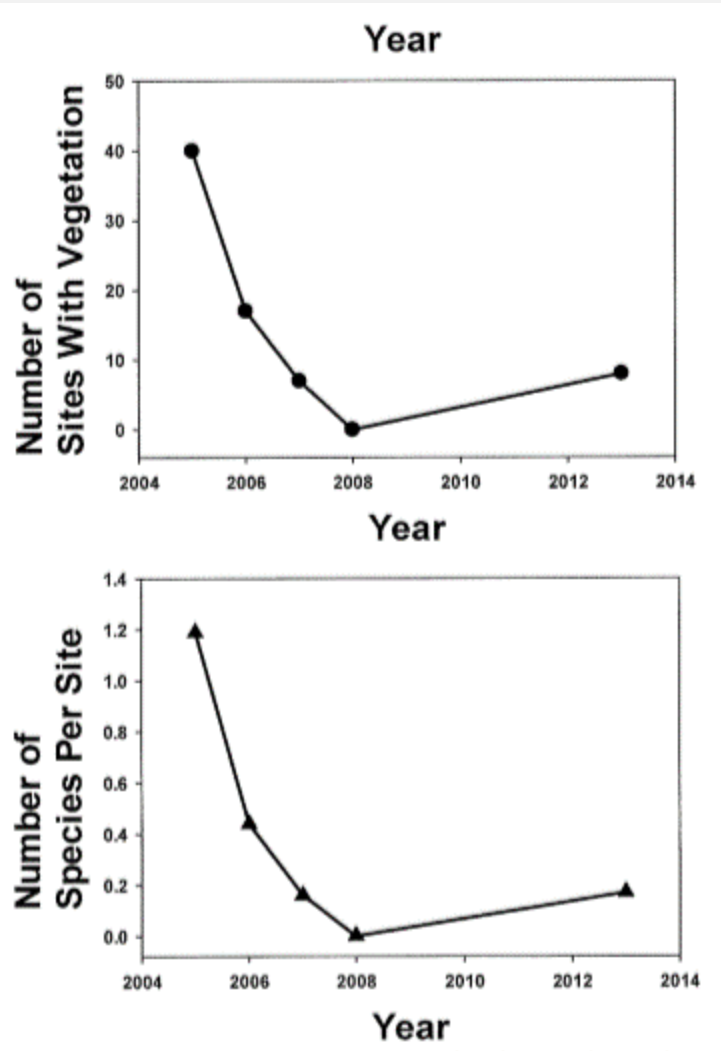
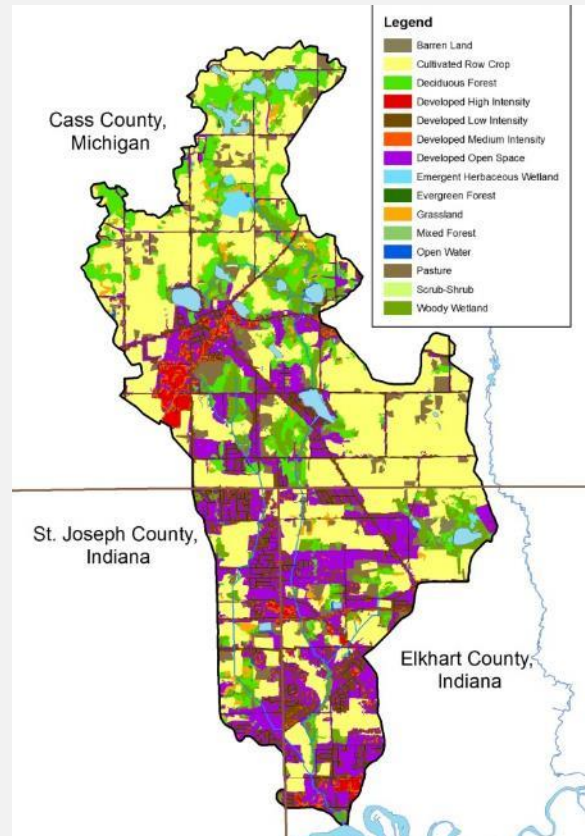
- Outline the three main phases of the watershed diagnostic study
- Highlight the data we've collected to date
- Solicit input from you and your knowledge of Oliver Lake and its drainage

# PROJECT PURPOSE

- Describe conditions and trends in Oliver Lake & its watershed
- Identify potential sources of water quality problems in the Oliver Lake Watershed
- Propose specific directions for future work in the watershed
- Prioritize potential watershed improvement projects

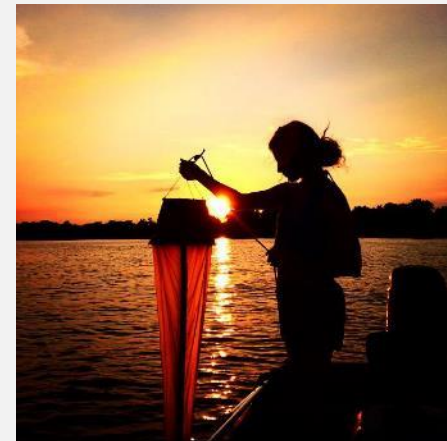
# TASK I: DATA COLLECTION AND REVIEW

- Desktop Mapping
- Historic Data Collection



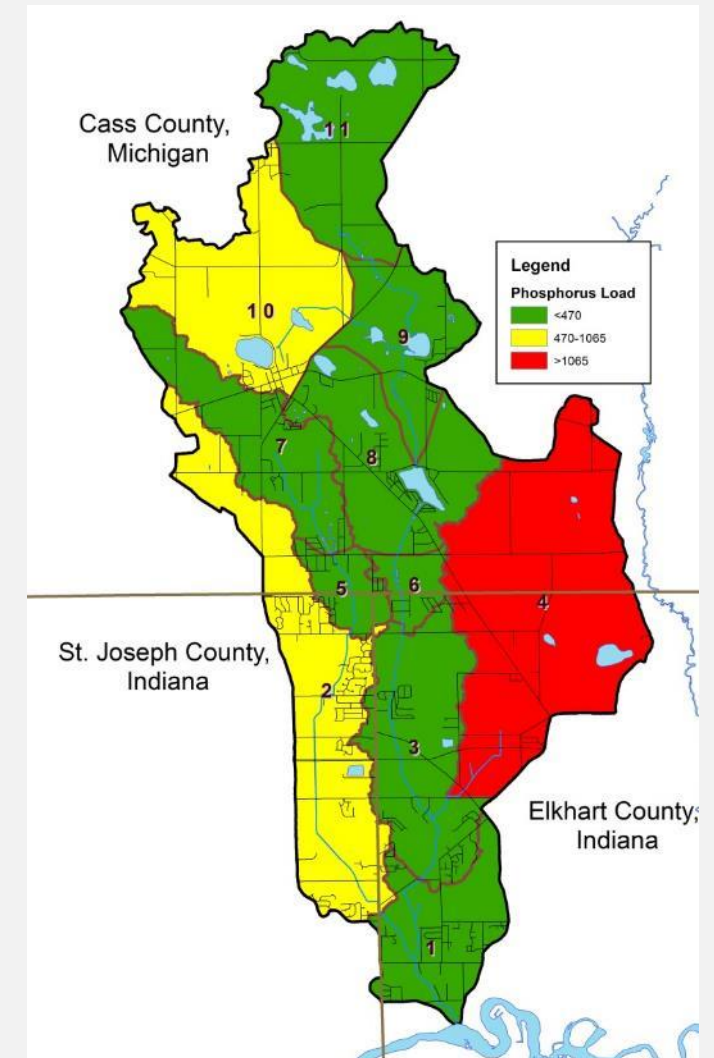
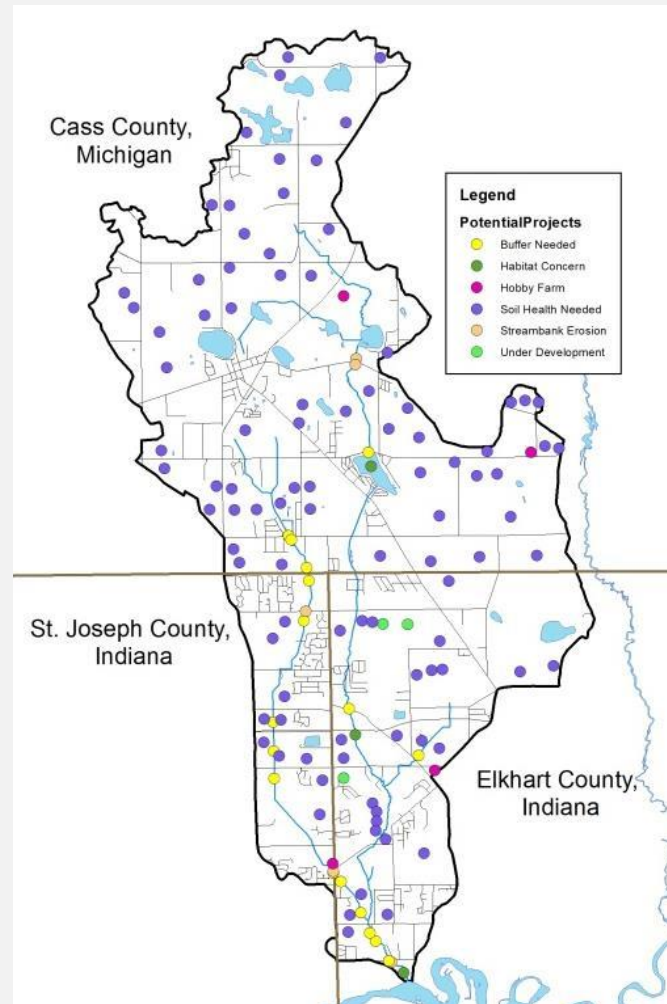
## TASK 2: TRIBUTARY AND LAKE DATA COLLECTION

- Storm Flow Stream Sampling (12 sites)
- Stream habitat and aquatic bug sampling (7 sites)
- In-lake monitoring (1 time – deepest point all three lakes)
- Watershed inventory – map concern areas and identify potential solutions



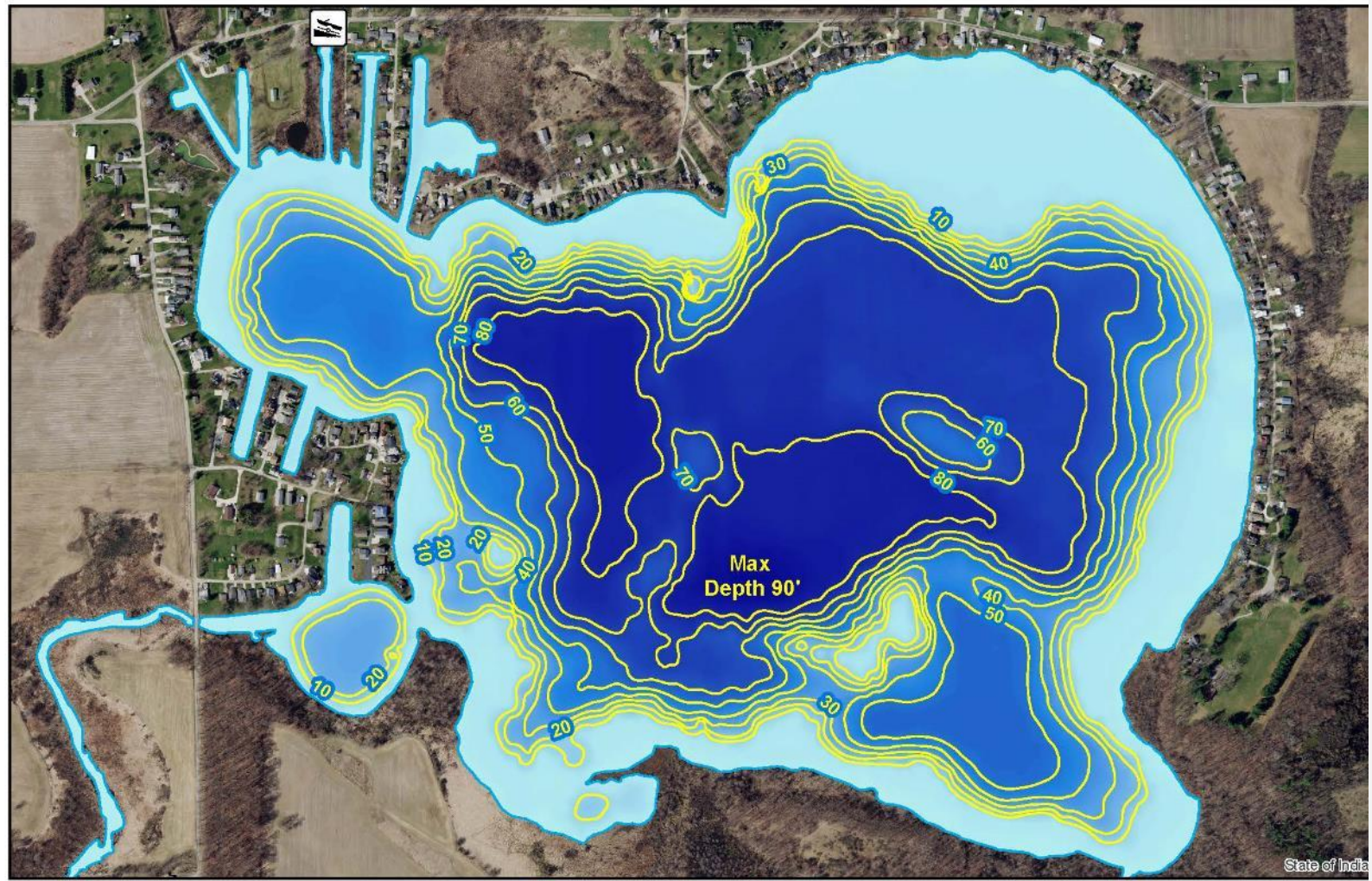
# TASK 3: RESULTS ANALYSIS AND INTERPRETATION

- Data Assessment
- Nonpoint Source Pollution Modeling
- Future Effort Prioritization



# OLIVER LAKE WATERSHED: DATA COLLECTION & MAPPING

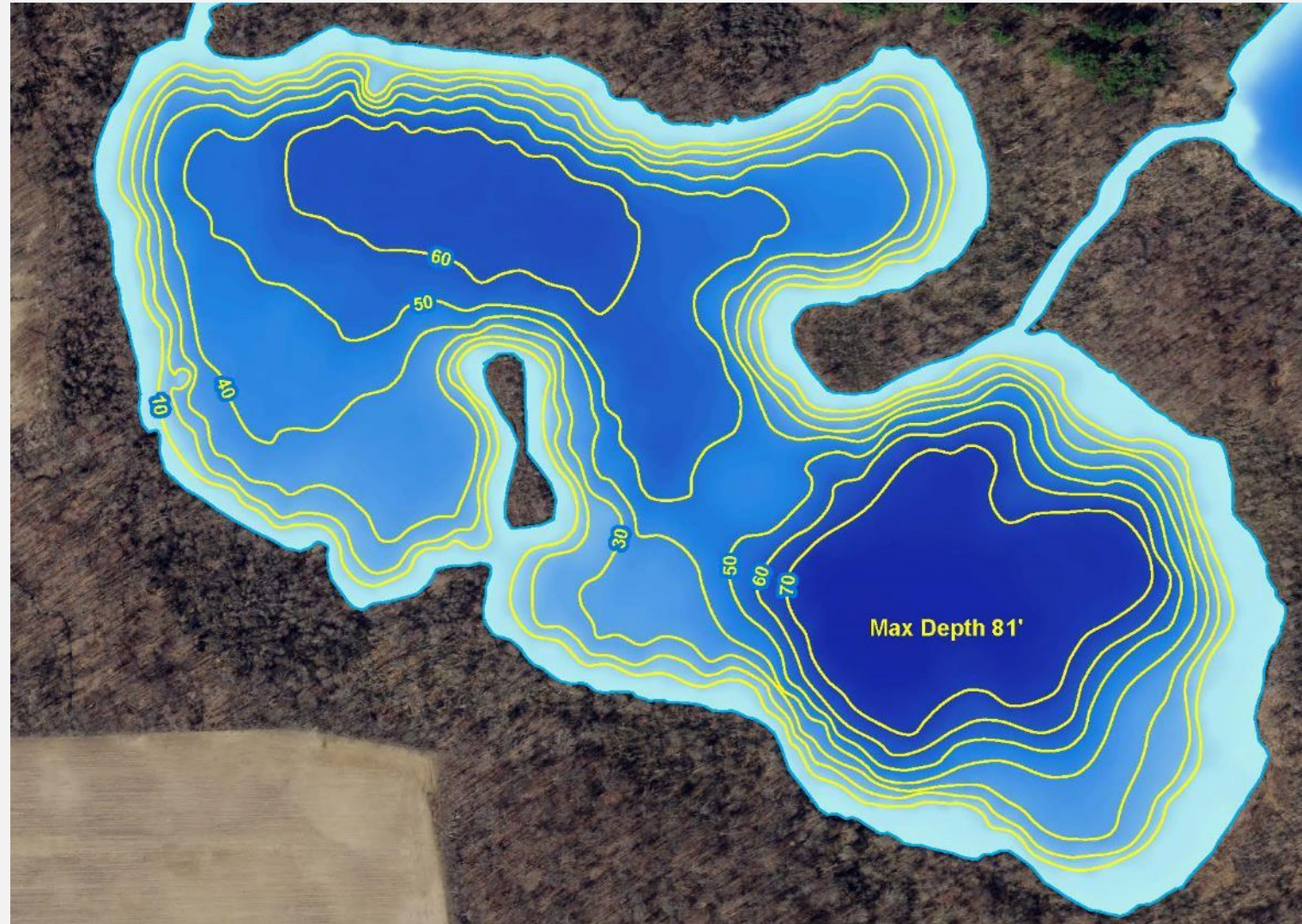
# OLIVER LAKE



- 394 acres
- 90 feet max depth (2018); 93 feet (1956)
- 40 feet mean depth

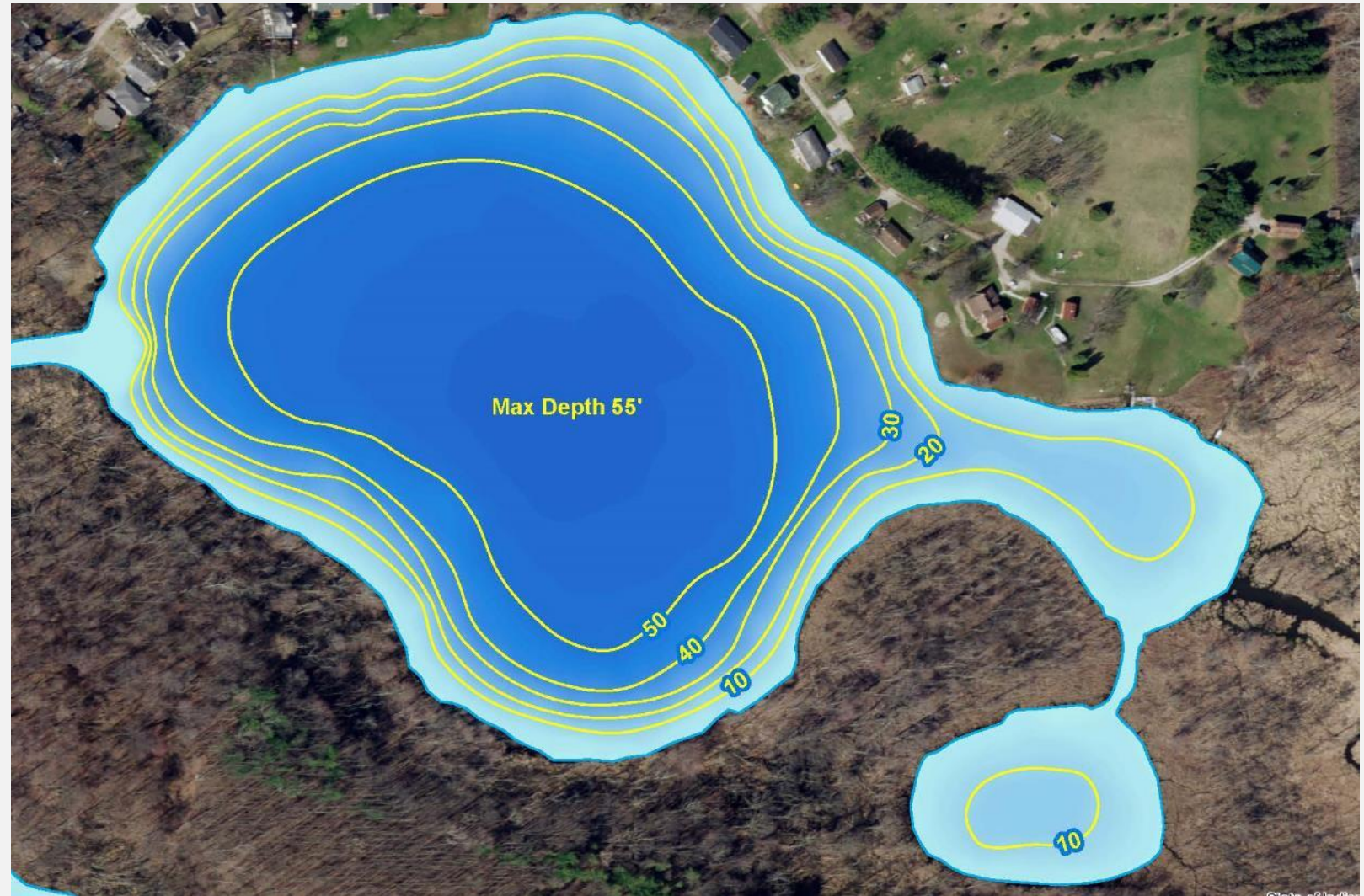


# OLIN LAKE



- 394 acres
- 81 feet max depth (2018); 82 feet (1956)
- 38 feet mean depth

# MARTIN LAKE



- 26 acres
- 55 feet max depth (2018); 56 feet (1956)
- 34 feet mean depth

# A Watershed



# OLIVER LAKE WATERSHED TRIBUTARIES

## Tributaries (Oliver):

- Dove Creek/Colwell Drain
- Unnamed (CR 450 S)
- Bert Hart Drain
- Winling Creek

## Tributaries (Olin):

- Stoner Drain

## Tributaries (Martin):

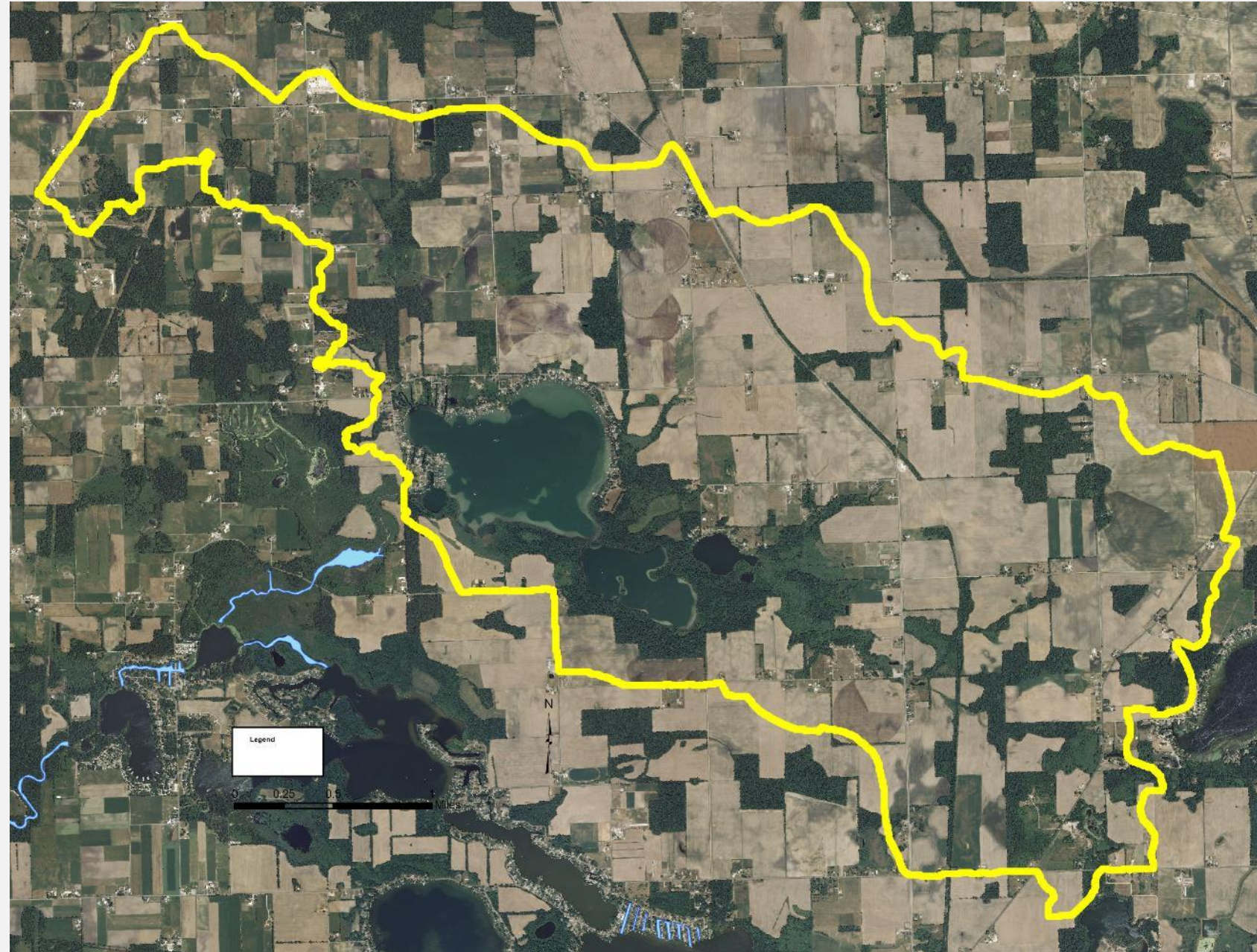
- Truman Flint Drain
- Broughton Drain



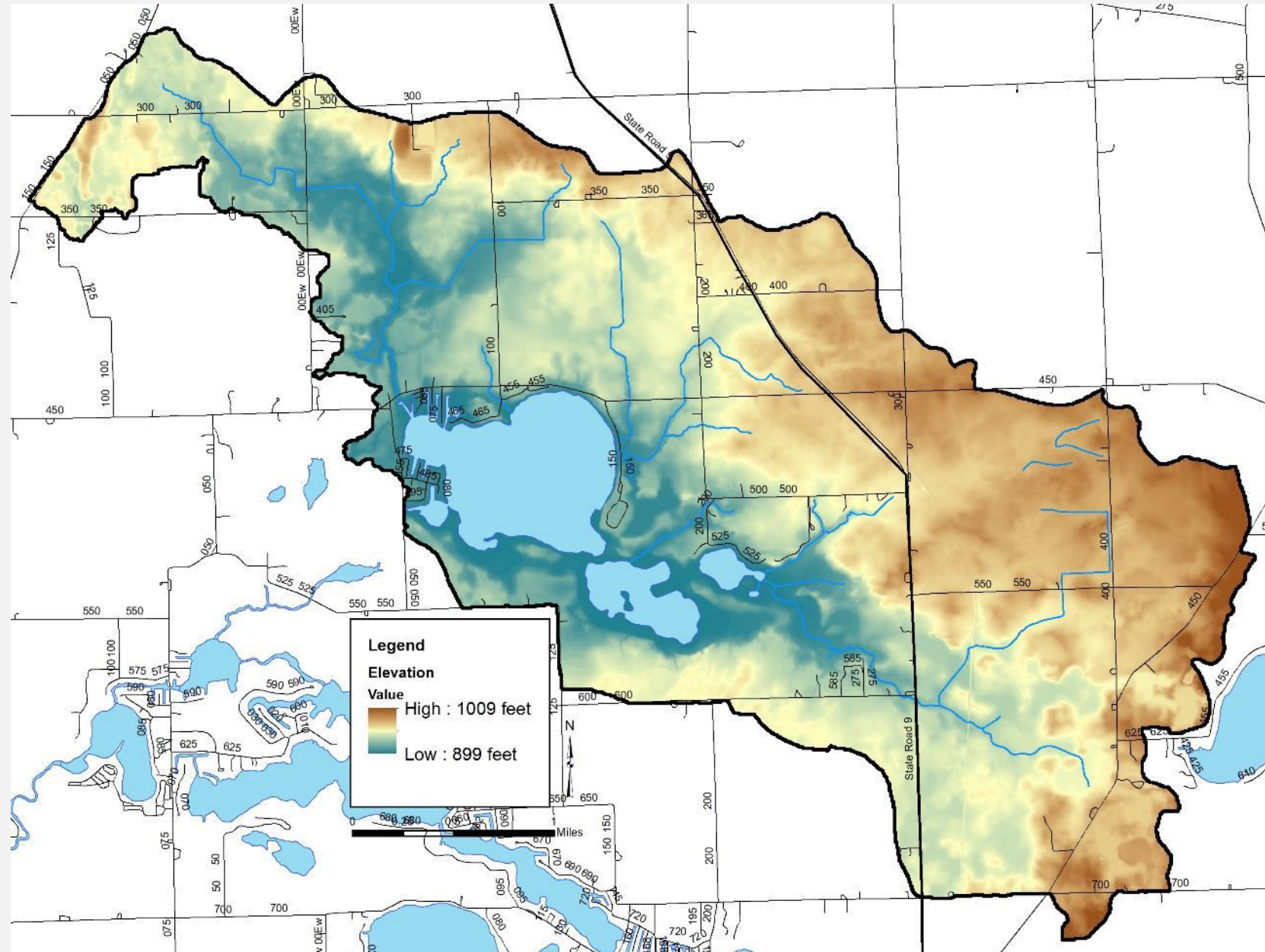
# OLIVER LAKE WATERSHED

- 7,268 acres
- Watershed area: Lake area =  
Oliver: 17.5:1  
Olin: 34:1  
Martin: 112:1

(For Oliver Lake ~18 acres of watershed for each acre of lake)



# ELEVATION



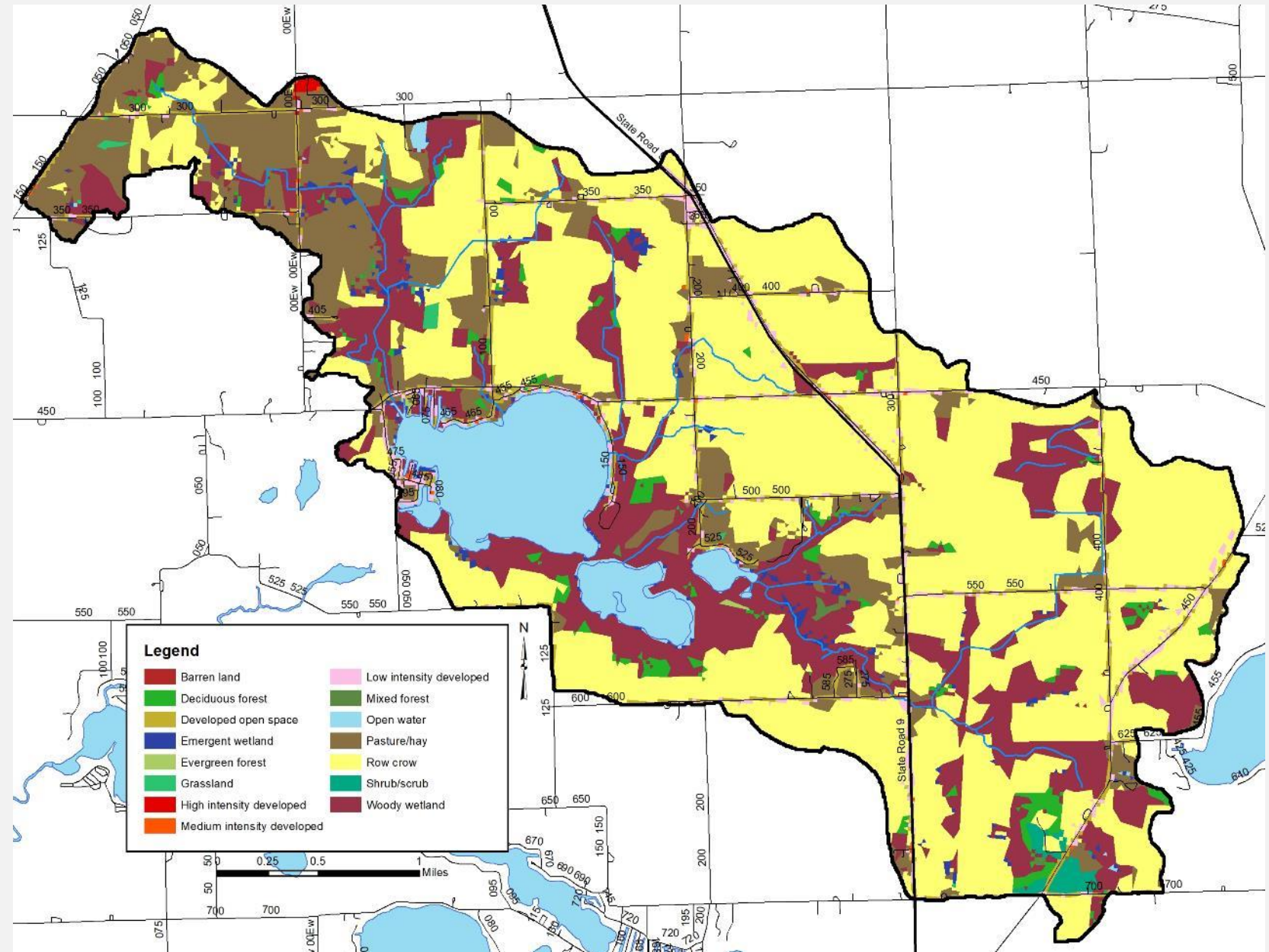
# LAND USE

2006 data:

- 70% agriculture (pasture, row crop)
- 15% natural (forested, wetland)
- 11% open water
- 4% developed (residential, commercial)

2022 data:

- 59% agriculture
- 22% natural
- 7% open water
- <1% developed

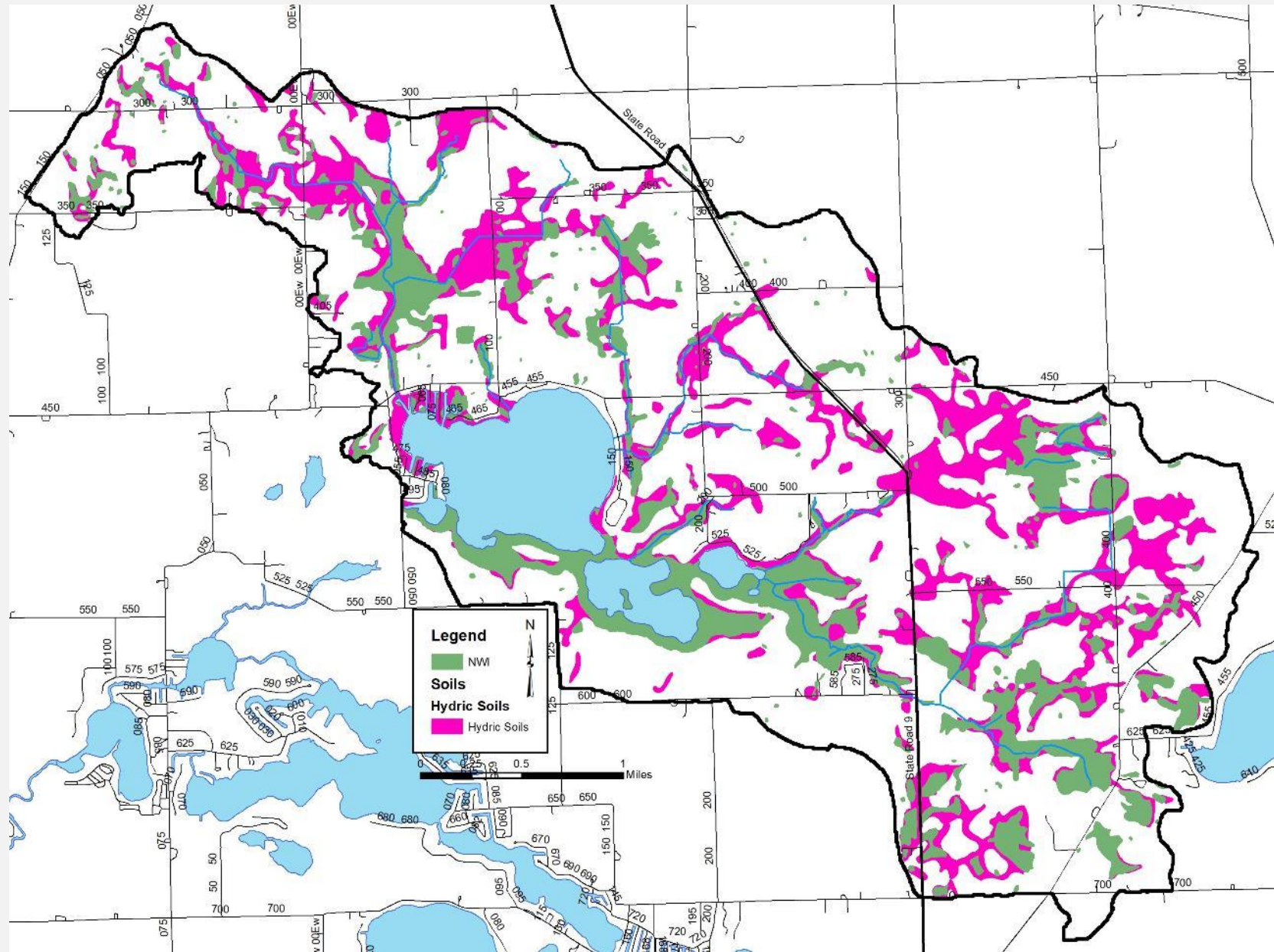


# WETLANDS AND WETLAND SOILS

Wetland (hydic) soils: 1,900 acres (26%)

Wetlands: 1,497 acres

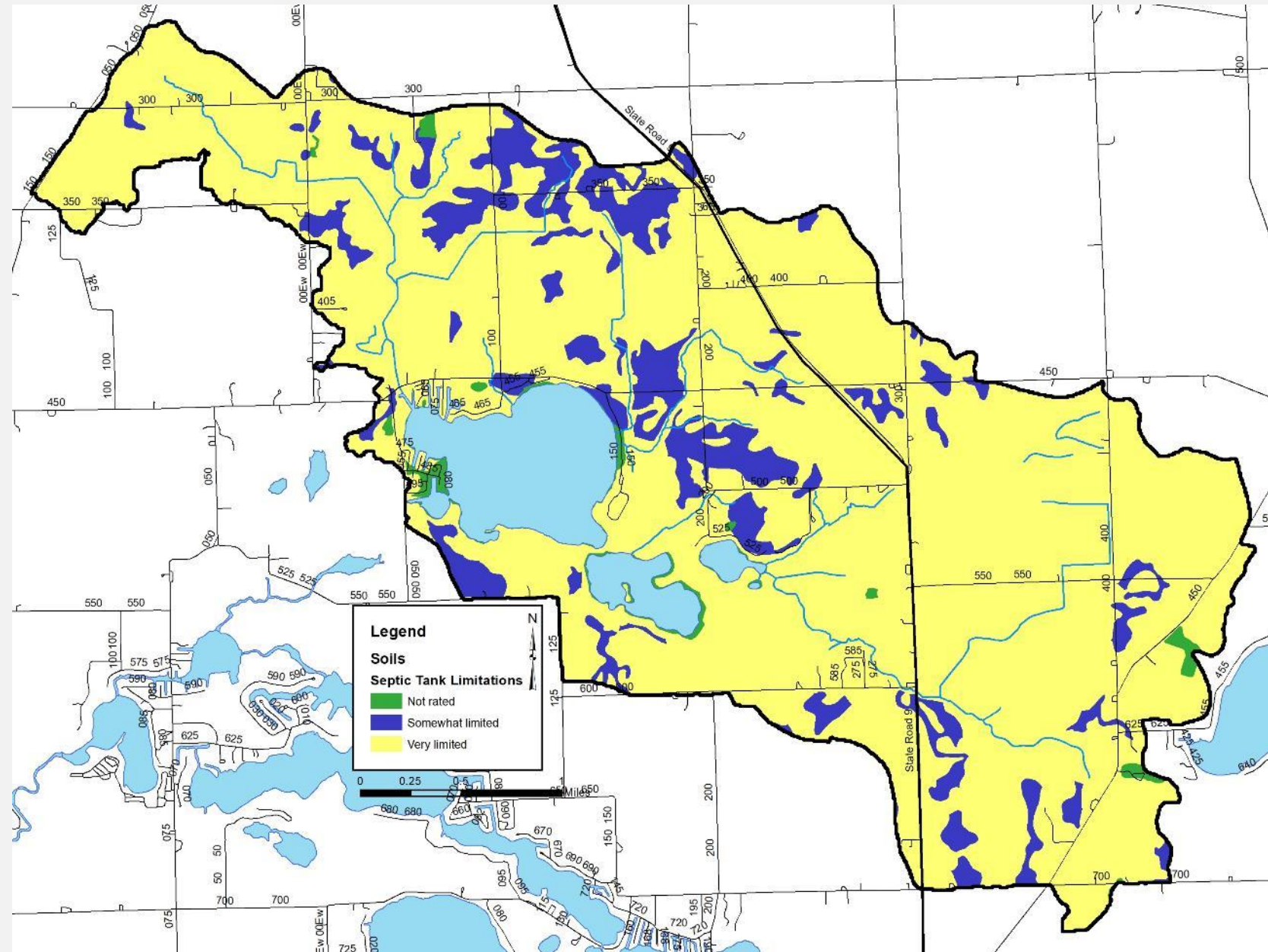
403 acres lost or 21%





# SEPTIC SOILS

- 5,932 acres of 82% very limited
- 4,409 acres (64%) VL in 2018

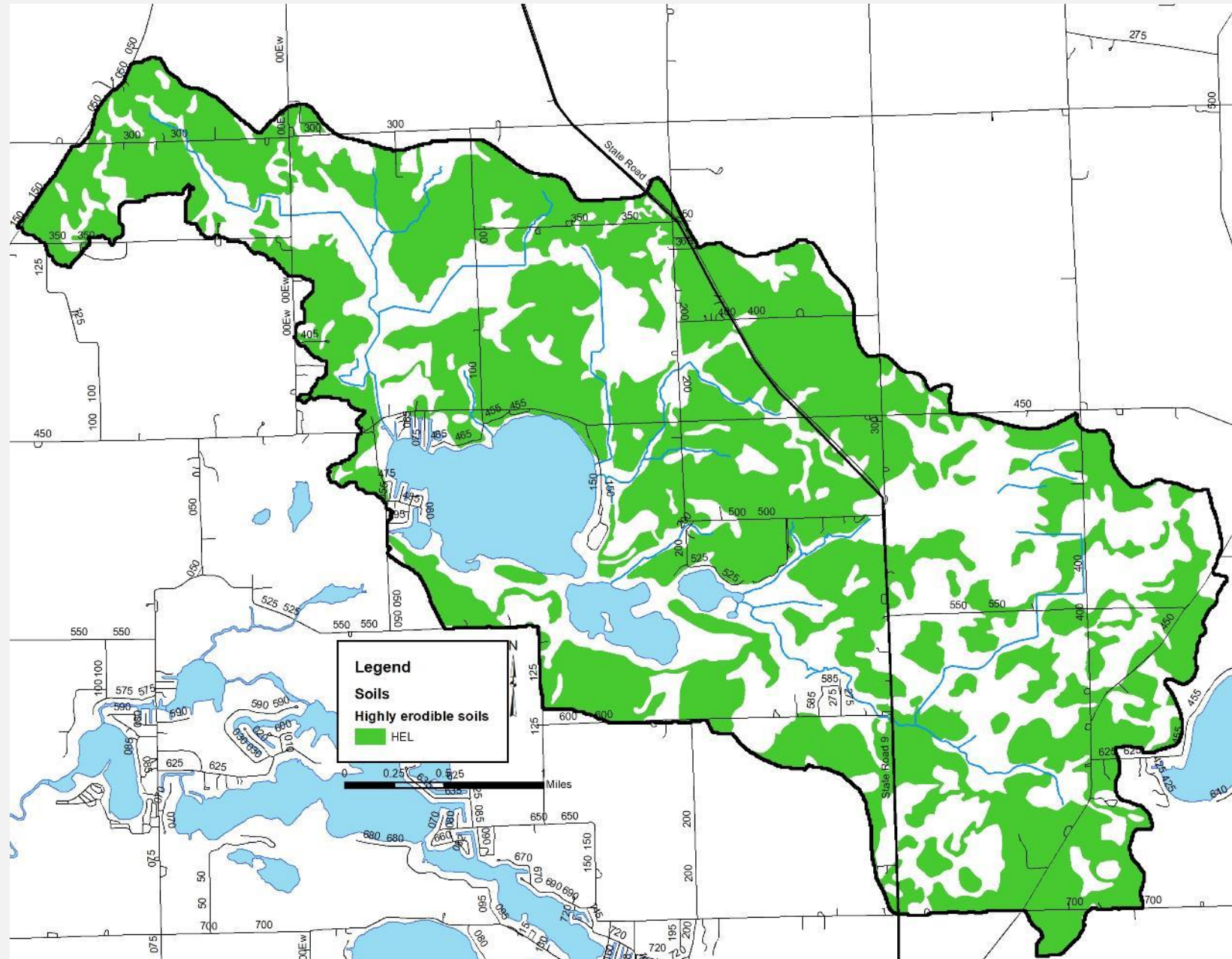


# SOIL ERODIBILITY

- 3,945 acres or 54% highly erodible

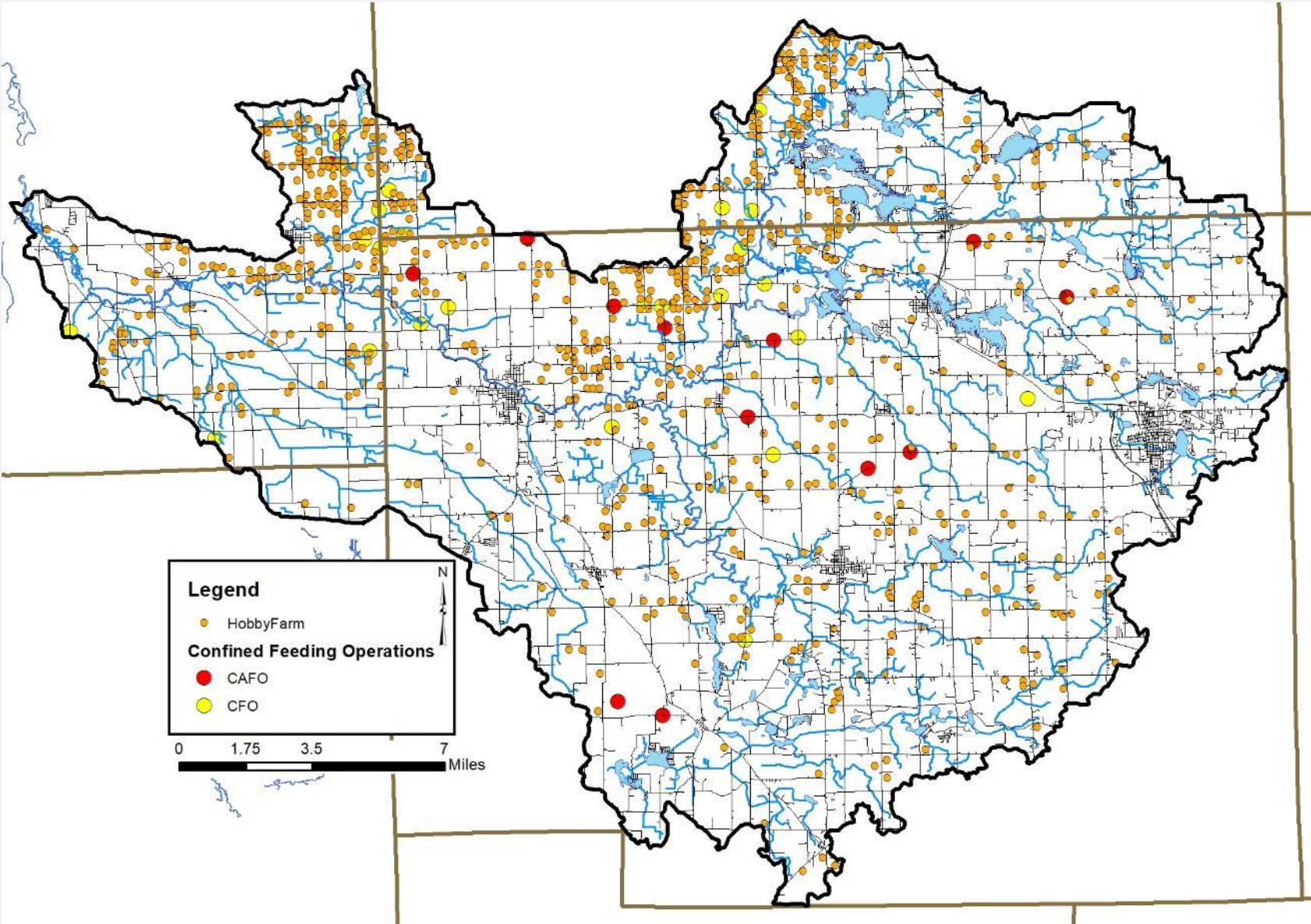
2008 diagnostic study:

- 15 acres highly erodible (0.2%)
- 519 acres potentially highly erodible (8%)

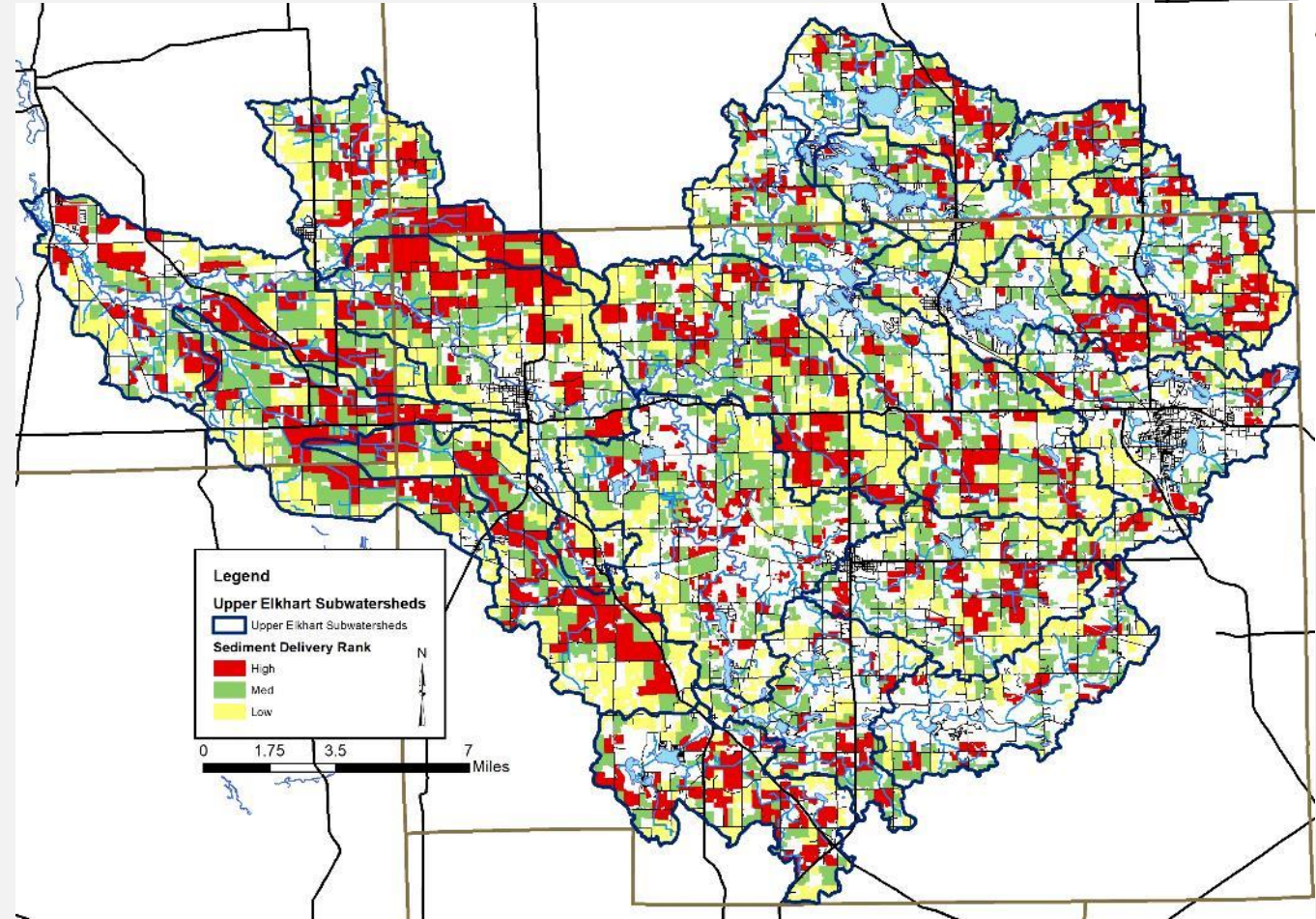
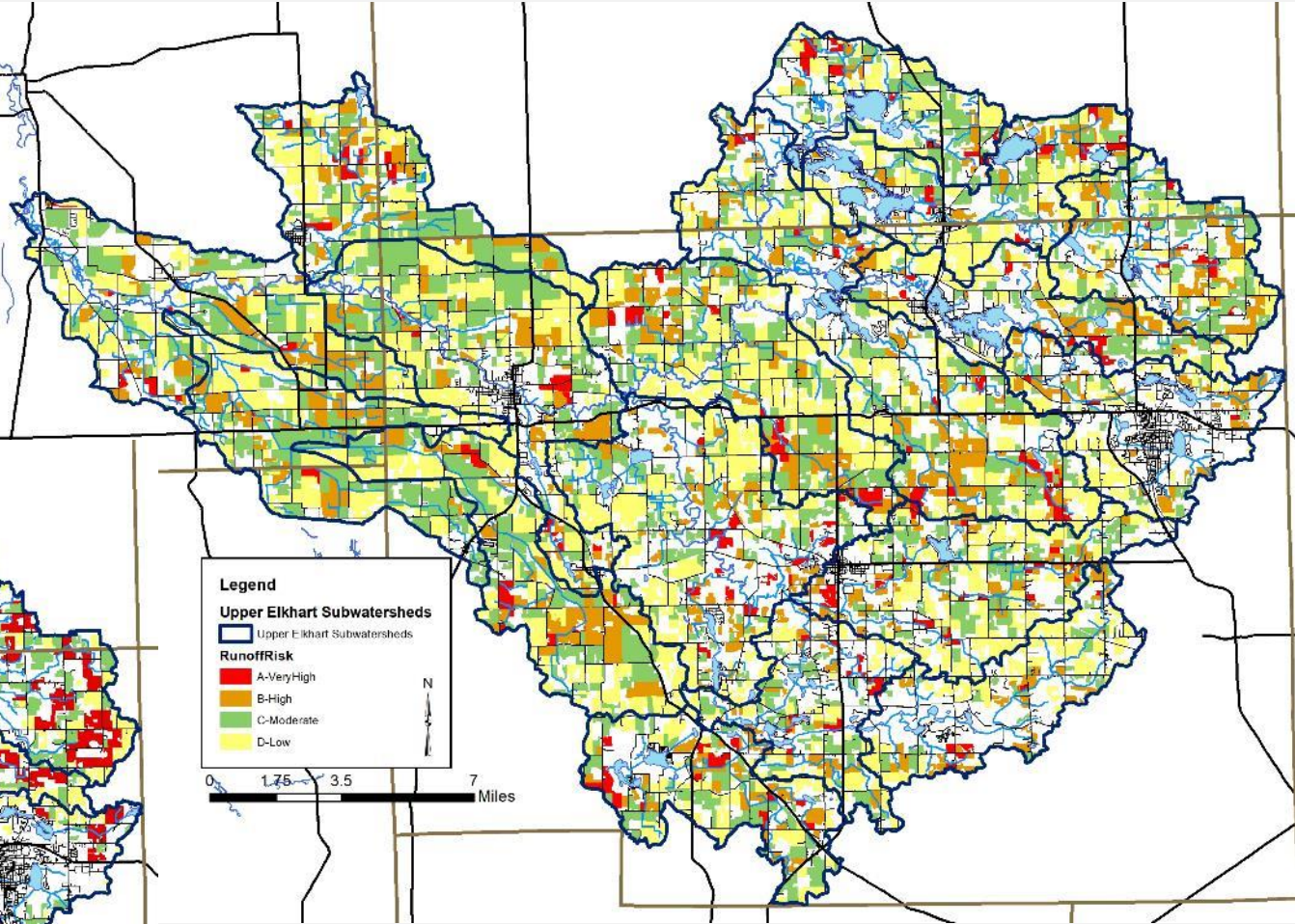


**OLIVER LAKE WATERSHED: DATA &  
MAPS FROM UPPER ELKHART RIVER  
WATERSHED PLAN**

WATERSHED  
INVENTORY (FROM  
UPPER ELKHART  
WMP)



# SEDIMENT DELIVERY RANK (FROM UPPER ELKHART WMP)



Water	Sub-Watershed	Project/Improvement	Source of Funds	Year	Month	Long-FL	Location Description	Date/Current Status
Martin	Oliver Lake-Little Elkfork Creek	Wide buffer on pasture adjacent to dike	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10	41.585475142382216 ; 85.3428452728532	West side of 5400E North of E5585 Martin-Truman Dike	Not Complete. Site should
Martin	Oliver Lake-Little Elkfork Creek	Install grassed swale, revegetate hill	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10	41.58331173674835 ; 85.34547387285716	North and South side of E5585 East of SR3 Martin-Truman Dike	Not Complete. Site should
Martin	Oliver Lake-Little Elkfork Creek	Remove brush adjacent to dike	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10	41.583335342733434 ; 85.37688418844382	North side of E5885 West of SR3 Martin-Truman Dike	Not Complete. Site should
Martin	Oliver Lake-Little Elkfork Creek	Revegetate existing grass waterways	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10	41.583335342733434 ; 85.37688418844382	South side of E5885 West of SR3 Martin Tr. adjacent to dike	Not Complete. Site should
Martin	Oliver Lake-Little Elkfork Creek	Create two small wetlands adjacent to pasture	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10	41.583335342733434 ; 85.37688418844382	North side of E5255 at end of the road	Not Complete. Site should
Martin	Oliver Lake-Little Elkfork Creek	Revegetate bank erosion County Rwy Dike #450 on CR E5585	Engineering, Feasibility & Design, Project 1	Donor Resource Group	2014-02	41.58833847322541 ; 85.3523148332125	E5585 West of 5400E on South side of road	Completed all construction published 4/18/2012/2015.
Martin	Oliver Lake-Little Elkfork Creek	Revegetate bank erosion County Rwy Dike #45 on E5885	Engineering, Feasibility & Design, Project 2	Donor Resource Group	2014-02	41.58833847322541 ; 85.3523148332125	E5585 West of 5400E on South side of road	Completed all construction published 4/18/2012/2015.
Martin	Oliver Lake-Little Elkfork Creek	Wetlands Hydrological Enhancement	LARE 2010 Engineering, Feasibility & Design Project 5	Donor Resource Group	2014-02	41.5828488233761 ; 85.37885732878435	32 acre tract east of Martin Lake owned by WCBES land trust	Not completed. Wetland on isolated adjacent private. Also currently on road eas.
Olin	Oliver Lake-Little Elkfork Creek	Stabilize existing easement in Olin Preserve	Engineering, Feasibility & Design Project 3	IN DNR DHP	2014-03	41.58248554522855 ; 85.3338742824232	Olin Nature Preserve	Completed installation of abutments in 2010 by DNR done.
Oliver	Oliver Lake-Little Elkfork Creek	Dredge mouth of Deer Creek and adjacent channels	Feasibility Studies of The LaGrange County Lake	F. X. Dwyer Associates, Inc.	1992-02	41.5726629178848 ; 85.4848326543553	On E4585 between E585 and E1585 in LaGrange Co.	Limited dredging project a section of Deer Creek den adjacent channels.
Oliver	Oliver Lake-Little Elkfork Creek	Extend existing dike to E4585 and design all waterway station	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10	41.5874181441845 ; 85.3341882144327	West of 5200E North of E4585 adjacent to dike	Not Complete. Site should
Oliver	Oliver Lake-Little Elkfork Creek	Install erosion control on embankments at old sand mining operation	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10		E4585 East of 5100E on South side.	Not Complete. Site should
Oliver	Oliver Lake-Little Elkfork Creek	Extend buffer along E/W dike adjacent to corn/soy field	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10		East of West side of 5100E 1/2 mile South of E5585	Not Complete. Site should
Oliver	Oliver Lake-Little Elkfork Creek	Revegetate existing dike river and outlet damaged by livestock	Oliver-Olin-Martin Lake Diapneptic Study	Cardon/JF How	2005-10		North side of E5585 1/4 mi. East of 5100E	Not Complete. Site should
Oliver	Oliver Lake-Little Elkfork Creek	Sediment Removal	Sediment Removal Project					There is an implementation corresponding with this project. Resuspension confirmed by Resource Character and use.
Oliver	Oliver Lake-Little Elkfork Creek	Streambank stabilization	Engineering, Feasibility & Design Project 4	Private Owner	2014-03	41.5772356387755 ; 85.488329242582	Small isolated field inlet to Oliver Lk at E200 E4585	Completed. Property owner believe all work done in 2012
Oliver	Oliver Lake-Little Elkfork Creek	Deer Creek Sediment Removal Project	Sediment Removal Project	Superior Dredging & Dredging, Inc.	2014-03	41.5774355277827 ; 85.458235478735	100 yards East of 5850E at E4585 on North side.	Completed dredging Deer Creek. Sediment removal on the North side of E4585. Not complete. 10-12 acres along parallel to dike. Not Oliver Lk. Video done with WCBES and private property owner. Work done in 2017. WCBES designed a more robust grass filter and rock splash barrier to slow water down but property owner declined to install. Not associated with area available to sediment, nutrient and pesticide runoff. Needs a long range plan with erosion control and some grassed lake out of stream on the road side.
Oliver	Oliver Lake-Little Elkfork Creek	Ag Field erosion control	Engineering, Feasibility & Design Project 6 and 2016 GLC NDER Impl Project	Donor Resource Group	2014-03	41.57855218222616 ; 85.3333424525619	North side of 4585 and East of 180E	Not complete. 10-12 acres along parallel to dike. Not Oliver Lk. Video done with WCBES and private property owner. Work done in 2017. WCBES designed a more robust grass filter and rock splash barrier to slow water down but property owner declined to install. Not associated with area available to sediment, nutrient and pesticide runoff. Needs a long range plan with erosion control and some grassed lake out of stream on the road side.
Oliver	Oliver Lake-Little Elkfork Creek	Pollinating animal success incentives	Pollinating water sampling and testing.	GOLC/Sue Hill	2020-2023	41.578884475888384 ; 85.33281163813884	North side of 4585 and West of E200E.	Water testing on Winding Creek on East side of Oliver (the Southern of the two creeks) yield essentially high (5,200-6,200 u.S.G.). Cells results. A new pasture line near the headwaters of this stream and meadow may be breaking underground along the break where a large tile is buried. Longitudinal and aprone grasses leading may be necessary to isolate meadow and mitigate.

FE&D Study projects 1 & 2 (reference lines 9 and 10 on the sheet and pages 10 & 13 of the Study) were completed by the Lake Association using LARE land improvement grants in the Fall of 2015.

Project 3 (Line 18 and Page 17) was completed by the DNR division of nature preserves in 2018 using the design/engineering info contained in our LARE-funded feasibility study.

Project 4 (line 25 and page 21) was completed by a property owner adjacent to the inlet on the North side of the lake. A similar stream-bank stabilization project was completed later on the East side of the lake on what is called Krauss Creek.

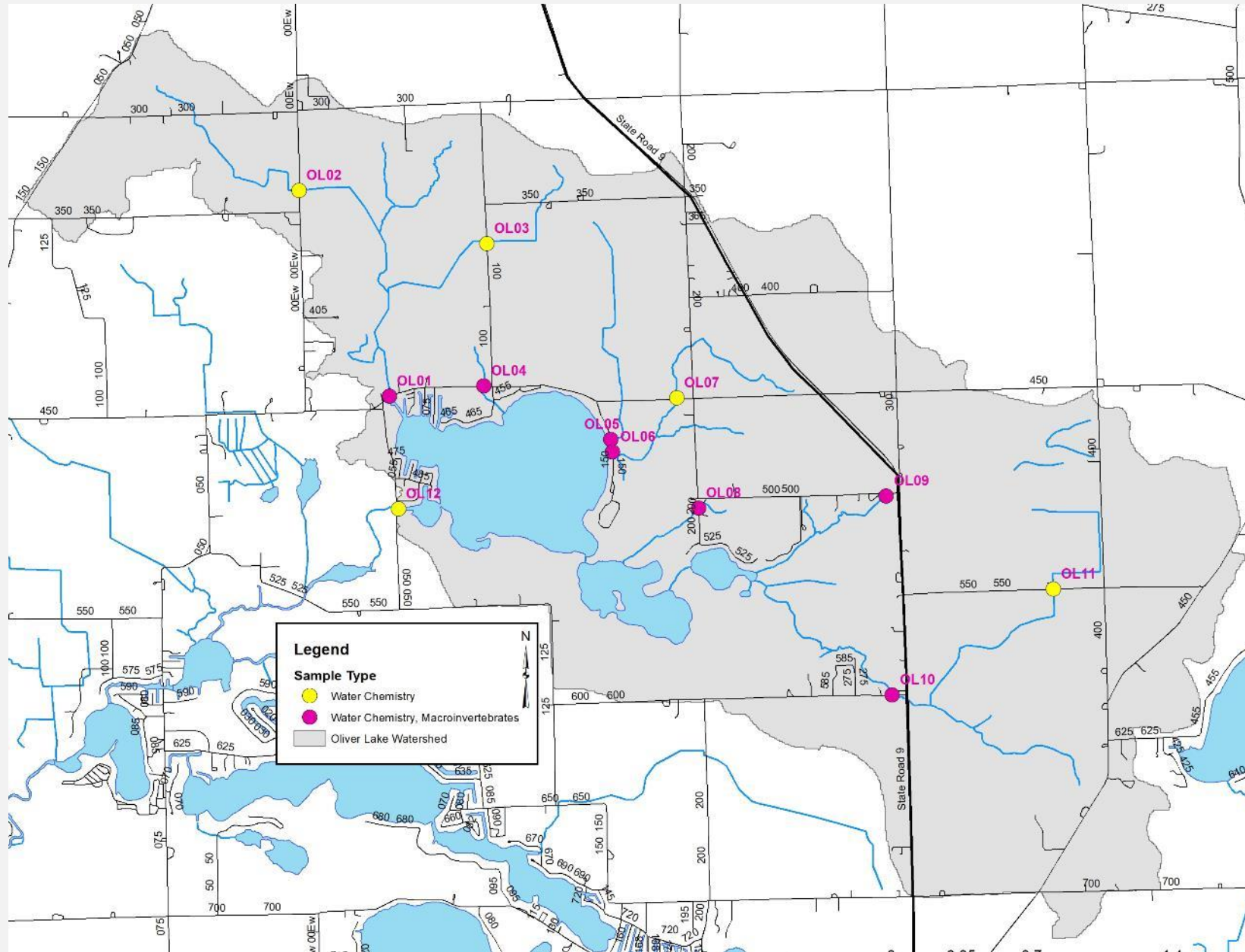
Project 5 (line 11 and Page 21) has not been completed. This parcel of 32 acres is on the East side of Martin Lake and was formerly owned by The Nature Conservancy and later transferred to ACRES Land Trust. ACRES has little interest in pursuing wetland restoration projects in general, much less one on a parcel that is landlocked. Also, after the F&E project DNR gave us some feedback questioning the efficacy of the design that was done. That was before Steve Vaughan's time.

Project 6 (line 27 and Page 28) is not complete. It addresses a sediment/nutrient sheet runoff problem on a 100 or so acre irrigated seed corn/bean field North of Oliver Lake, owned by the Sears family (David & Margaret Sears also own a lakefront home on the East side of Oliver Lake). LaGrange Co SWCD obtained a Great Lakes Restoration Grant in 2016 for the North Branch ER in LaGrange Co in 2016 and this improvement opportunity was a key focus. A grass waterway or WASCOD/retention basin was designed by the consulting firm on the project (SNRT, Inc., formerly of LaGrange Co and no longer in business) but Mr. Sears declined to implement it despite 75% cost-share by the grant. His position was that the lake association needed to prove that his

**OLIVER LAKE WATERSHED: DATA  
COLLECTION  
WATER QUALITY DATA**

# STREAM SAMPLE SITES

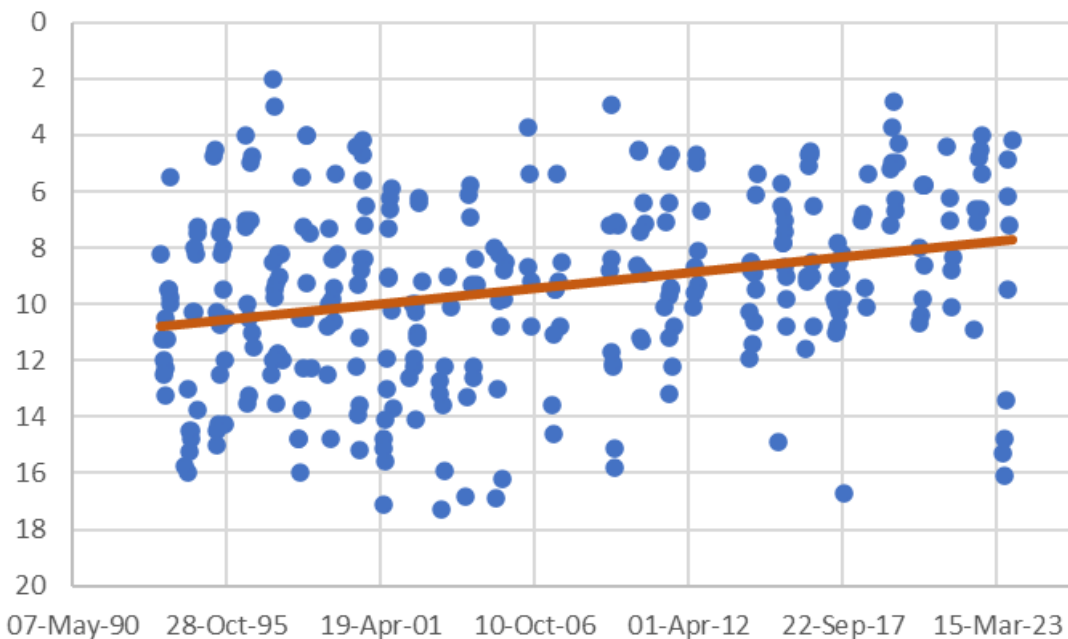
- Base and Storm Flow Stream Sampling (12 sites)
- Macroinvertebrate (bug) and habitat assessment July/August



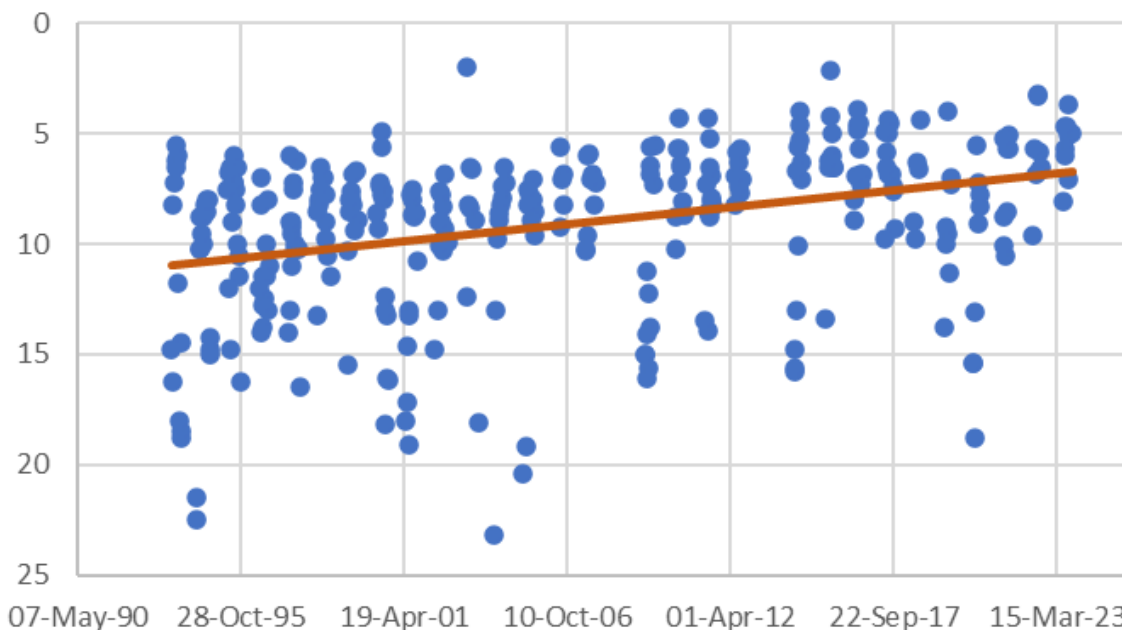
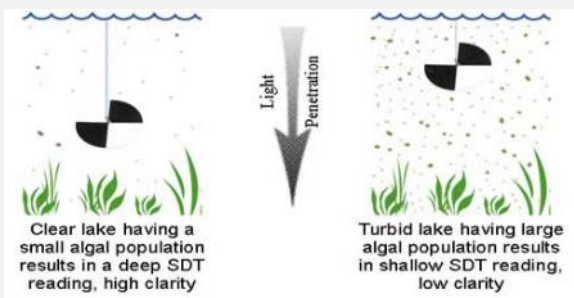
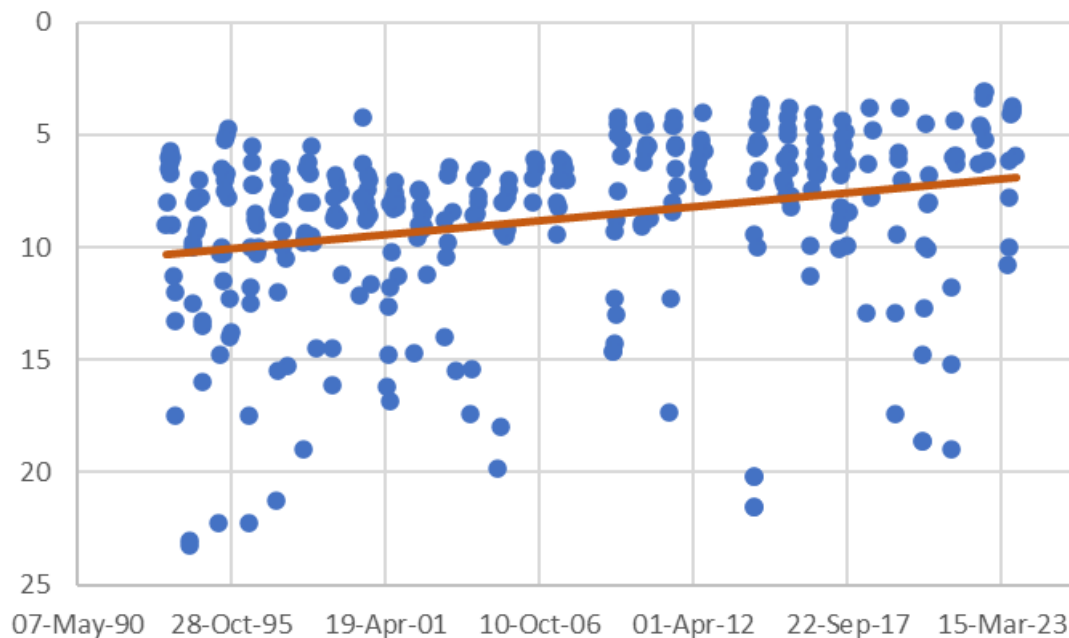


# HISTORIC LAKE WATER QUALITY DATA TRANSPARENCY

Martin Lake Transparency (volunteer only)



Oliver Lake Transparency (volunteer only)



# OLIN, OLIVER, MARTIN LAKE: HISTORIC WATER QUALITY DATA

	Martin Lake			Olin Lake			Oliver Lake		
Year	Secchi (ft)	TP average	Chl a	Secchi (ft)	TP average	Chl a	Secchi (ft)	TP average	Chl a
1990	11.8	0.016							
1993	12.5	0.175		8.2	0.028	3.03	5.6	0.010	4.08
2000	12.1	0.042	1.02	3.9	0.046	1.22	6.9	0.023	1.14
2003	12.1	0.014	0.10	5.6	0.010	3.40	6.6	0.010	1.43
2006							8.2	0.018	4.86
2008	11.2	0.034	0.89	6.9	0.175	2.00	5.2	0.115	2.60
2010				5.9	0.015	1.15			
2011	12.1	0.021	2.00						
2012							5.6	0.021	3.34
2015	4.6	0.059	20.33				5.6	0.030	5.94
2019				10.2	0.025	1.59	11.5	0.019	4.08
2021				6.7	0.012	2.30			
IN Avg	5.4	0.093	7.25	5.4	0.093	7.25	5.4	0.093	7.25

# NEXT STEPS

- Continue to analyze mapped and historic water quality data
  - Indiana Clean Lakes Program, diagnostic study and DNR fisheries report data; locally collected stream data
  - Plant survey data (historic) and recommendations
- Stream base and storm sampling – June for base sampling and when it rains next
- Base flow biological stream sampling (bugs!)
- In lake monitoring – July or August (worst case condition)
- Utilize data gathered as part of the Upper Elkhart Watershed Planning project to supplement this effort
- Inventory – what should this look like in the Oliver Lake Watershed?
- Identify problem areas and develop future projects suggestions (prioritize)
- Calculate potential impacts
- Fall 2024/Spring 2025 public meeting to share findings
- January 2025 – application due for Implementation
- Fall 2025 – IMPLEMENT!

# HOW YOU CAN HELP?

- Provide feedback
  - What are we missing?
  - Are there known problem areas in the lakes (shoreline erosion, aquatic plant problems, etc)?
  - What about the watershed (streambank erosion, ravine erosion, narrow buffers, logjams, livestock access, areas where dumping occurs, etc)?
  - Any available water quality data?
  - Are updates or repairs needed for previously-installed projects?

# QUESTIONS?

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