Agenda

- Project progress
- Data update
  - Algal bloom events - Health Department
  - Water quality - Conservation District
  - Restorative Lake Sciences
- Fisheries
- Critical areas
- Open discussion

Project Progress

- **Agriculture inventory**
  - Completed:
  - Next: Animal feeding operation survey, field prioritization scoring
- **Water quality inventory**
  - Completed: *E. coli* sampling, monthly tributary sampling
  - Next: final tributary and lake samples, *E. coli* MST, septic analysis
- **Watershed management plan**
  - Completed: Project webpage
  - Next: Final loading estimations, draft water quality objectives and recommendations

2024 Confirmed Bloom Events

Muskrat Lake

- 8/4/24*

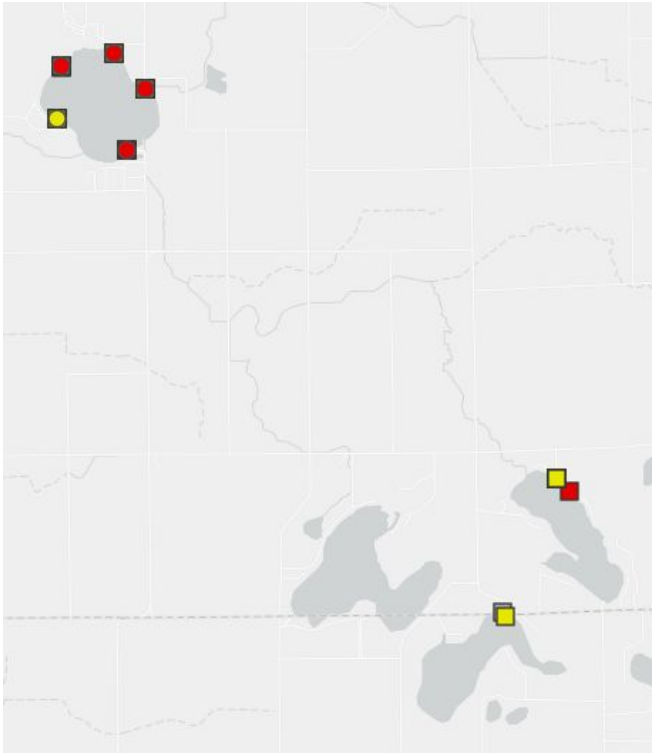
Duck Lake

- 4/25/24
- 5/8/24
- 6/4/24*
- 7/19/24
- 7/26/24*

Swan Lake

- 8/12/24*
- 9/10/24
- 9/18/24
- 10/2/24
- 10/9/24

*Cyanobacteria confirmed, but cyanotoxins were not detected or not sampled

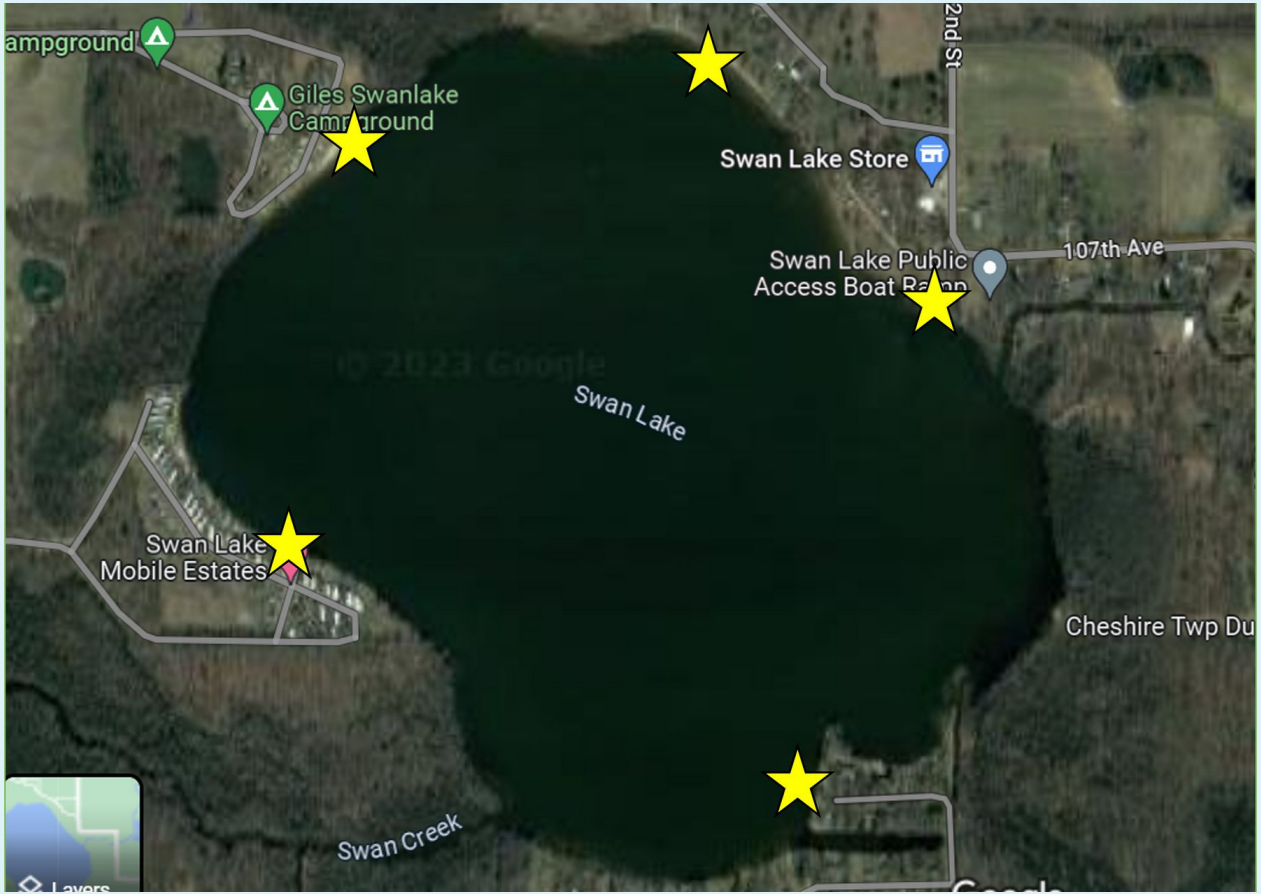


SAMPLING & TESTING PROCESS

- **Morning: Sample**
  - Collect 100 ml of water from each sampling location. Store in cooler
- **Afternoon: Run rapid tests**
  - I can do this at the health department
  - Takes 1 to 2 hours
  - Any positive samples are stored in the sample freezer
- **Next day: Shipping**
  - Samples are packaged and shipped overnight to the state lab
- **7-? Days later: Results are in!**
  - Sample results are emailed back to us.

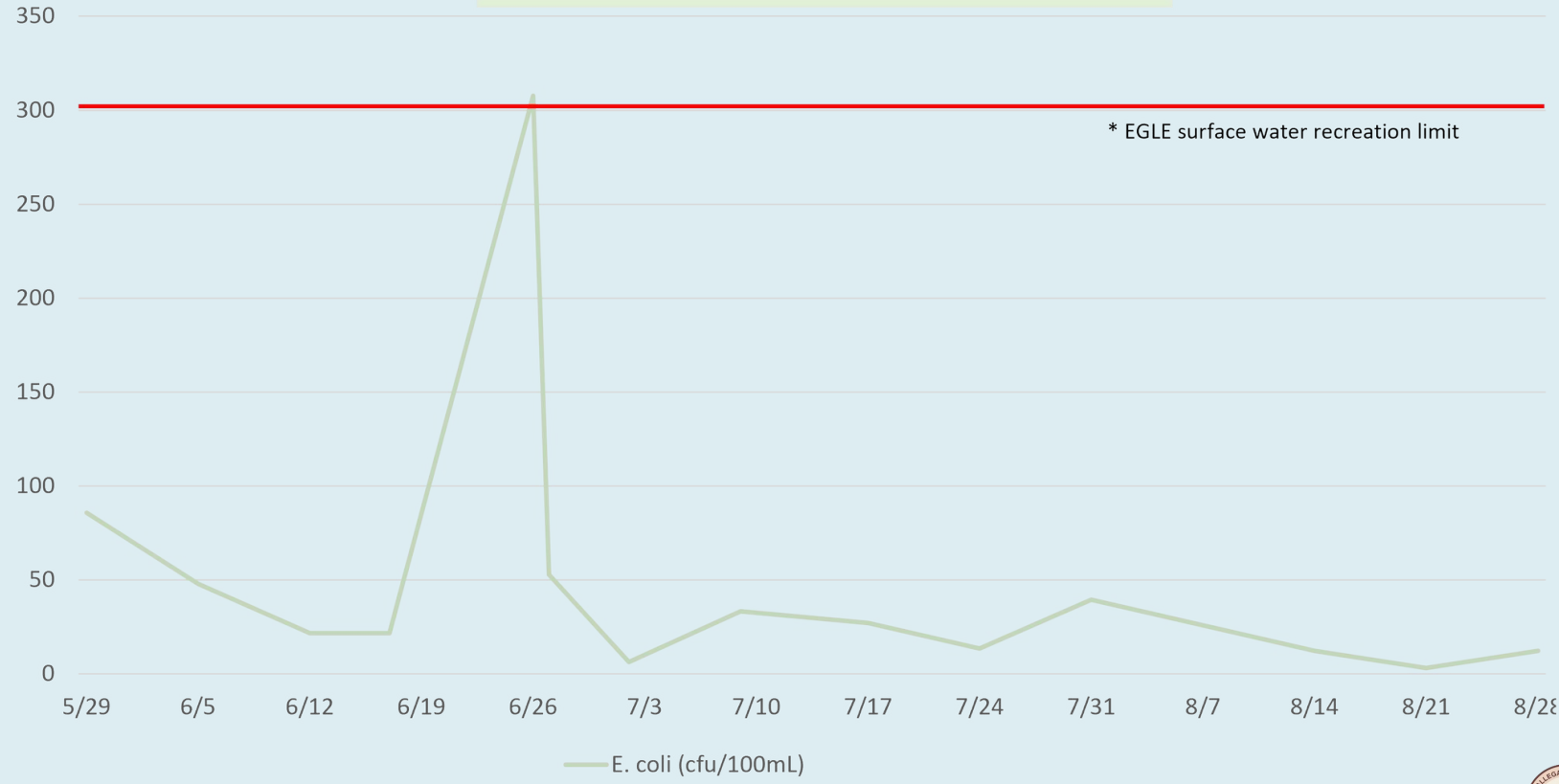
HEALTH Department

Sampling Locations: 2024



HEALTH Department

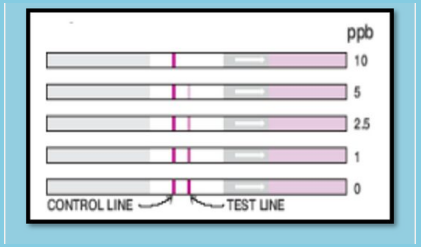
Boat Launch: E. coli



HEALTH Department

Microcystin

- Rapid Tests & Lab Tests
- Rapid Tests results are based on line darkness



- EPA Limit is 8 ppb
- Present in 18 of 30 (60%) samples taken
- Exceedances in 10 of 30 (30%) samples taken

Anatoxin-A

- Lab Tests only
- No EPA limit, any amount is considered unsafe
- Neurotoxin
- Present in of 5 of 23* (21.7%) samples taken

*7 sample results pending from lab

Cylindrospermopsin

- Lab Tests only
- No EPA limit, any amount is considered unsafe
- Present in of 0 of 23* (0%) samples taken

*7 sample results pending from lab

HEALTH Department

CURRENT PROJECTS

Swan Creek Watershed Septic Inventory

- System type
- Age
- Distance to surface water
- Depth to water table

Reapply for funding when it's available

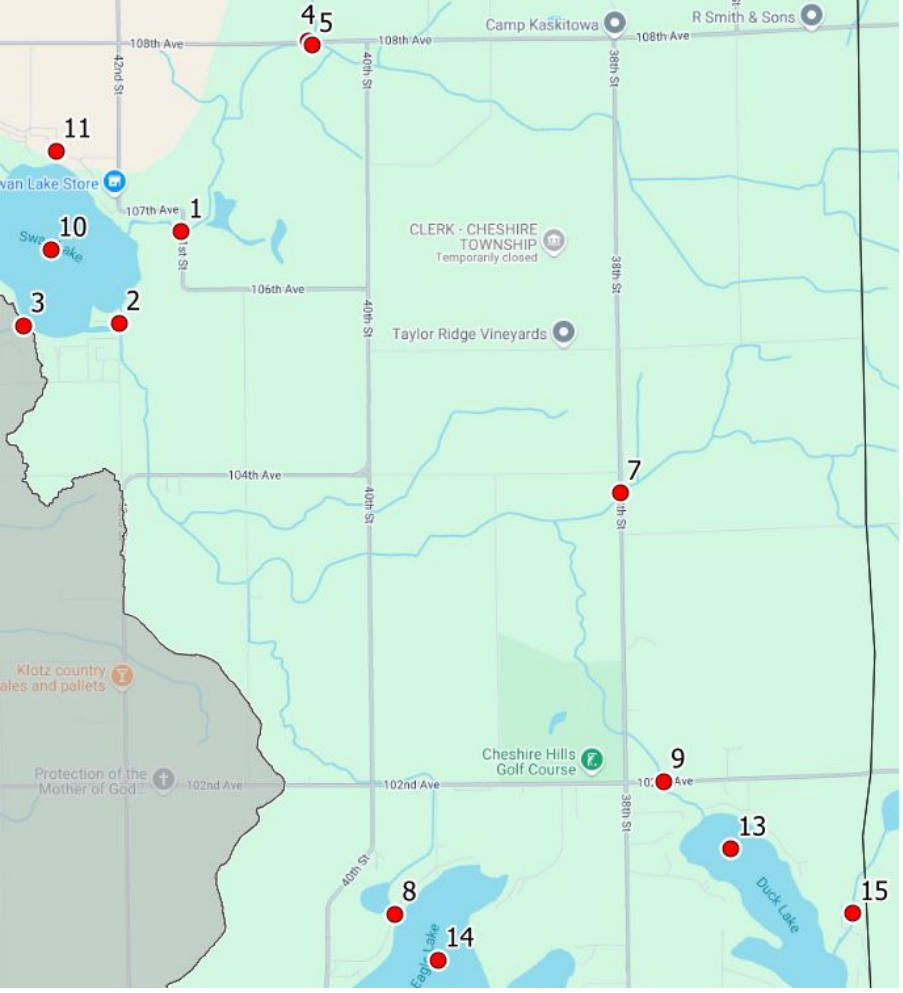
- Inland Lake Monitoring Grant (E. coli sampling)
- HAB Program (covers testing costs)

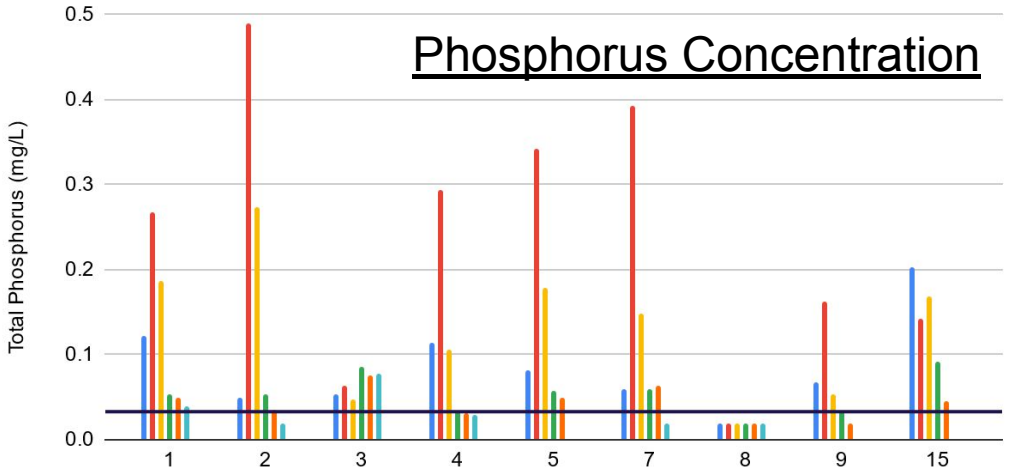
Education

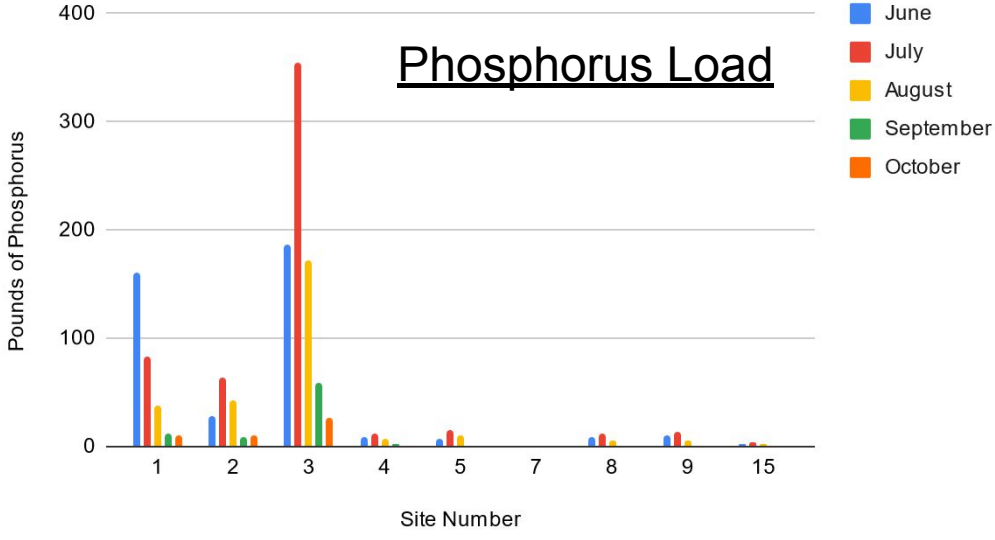
- Septic system self-check information

HEALTH Department

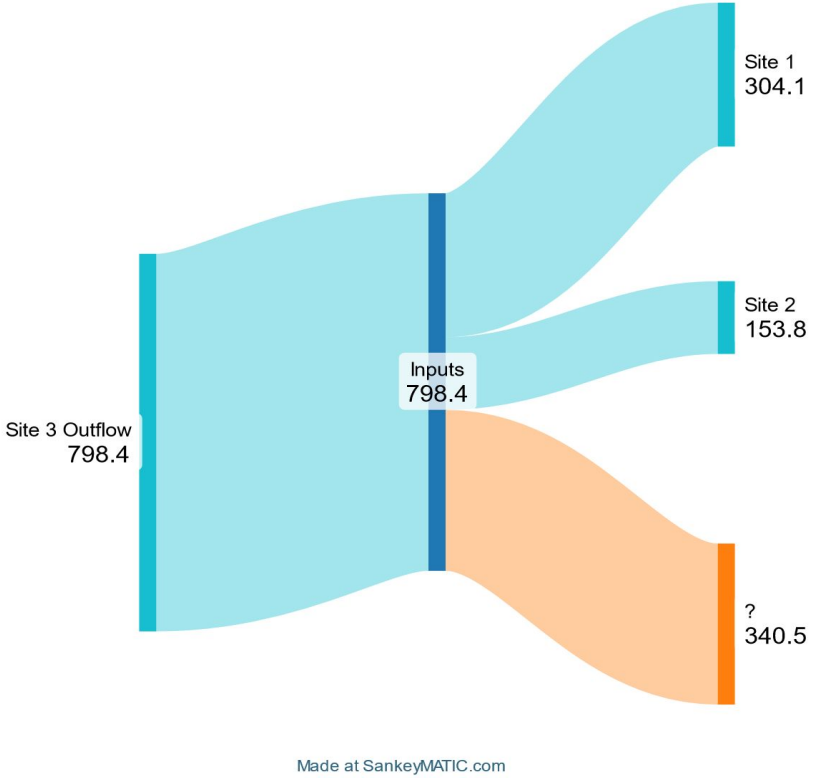
Water Quality Monitoring

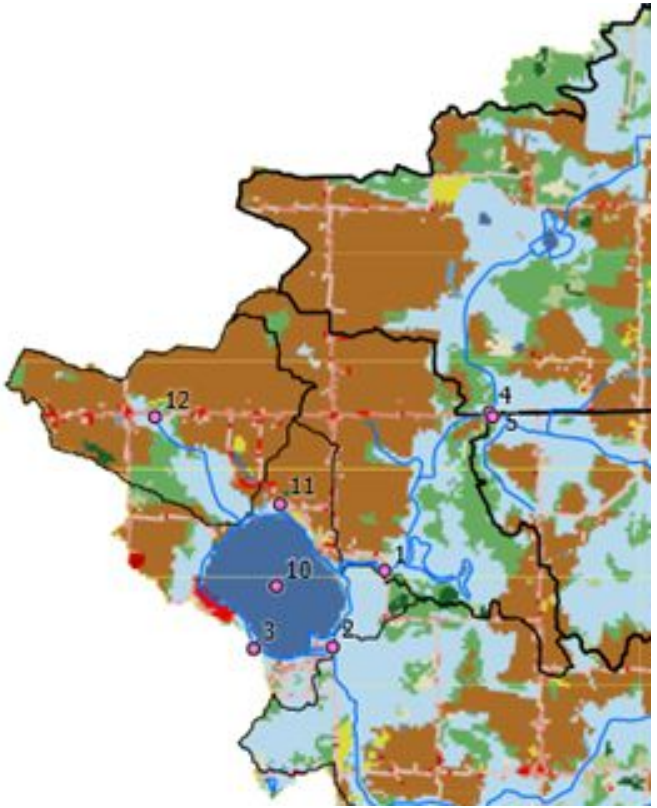

4
5
11
10
1
3
2
7
9
13
8
14
15
Camp Kaskitowa
R Smith & Sons
CLERK - CHESHIRE TOWNSHIP
Temporarily closed
Taylor Ridge Vineyards
Cheshire Hills Golf Course
Protection of the Mother of God
Klotz country
ales and pallets
Duck Lake
108th Ave
107th Ave
106th Ave
104th Ave
102nd Ave
42nd St
40th St
38th St
1st St


Phosphorus Concentration
Total Phosphorus (mg/L)
0.5
0.4
0.3
0.2
0.1
0.0
1
2
3
4
5
7
8
9
15

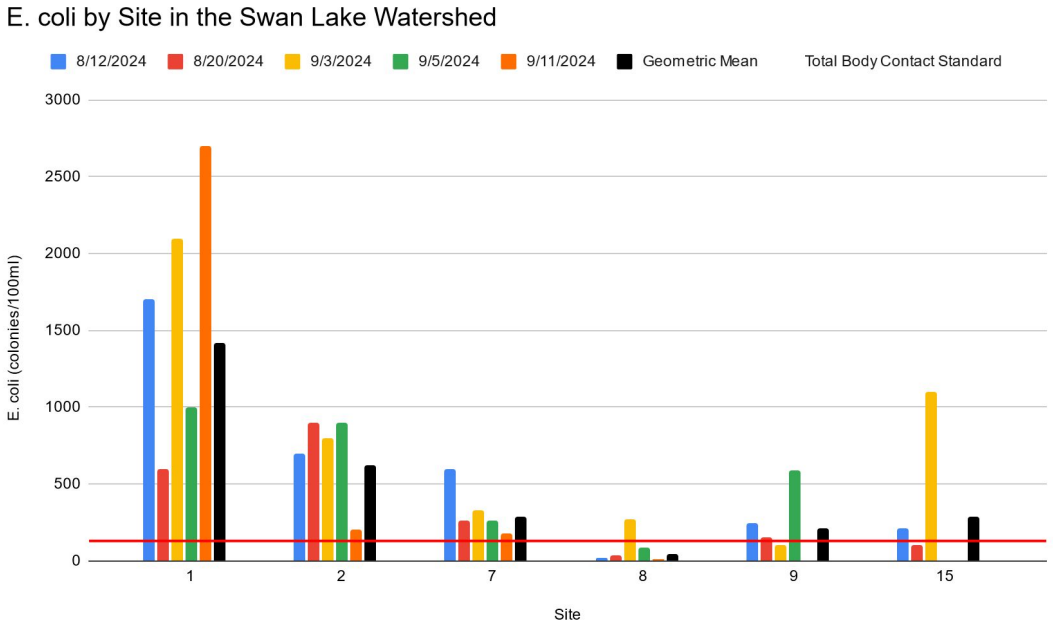

Phosphorus Load
Pounds of Phosphorus
400
300
200
100
0
1
2
3
4
5
7
8
9
15
Site Number
June
July
August
September
October

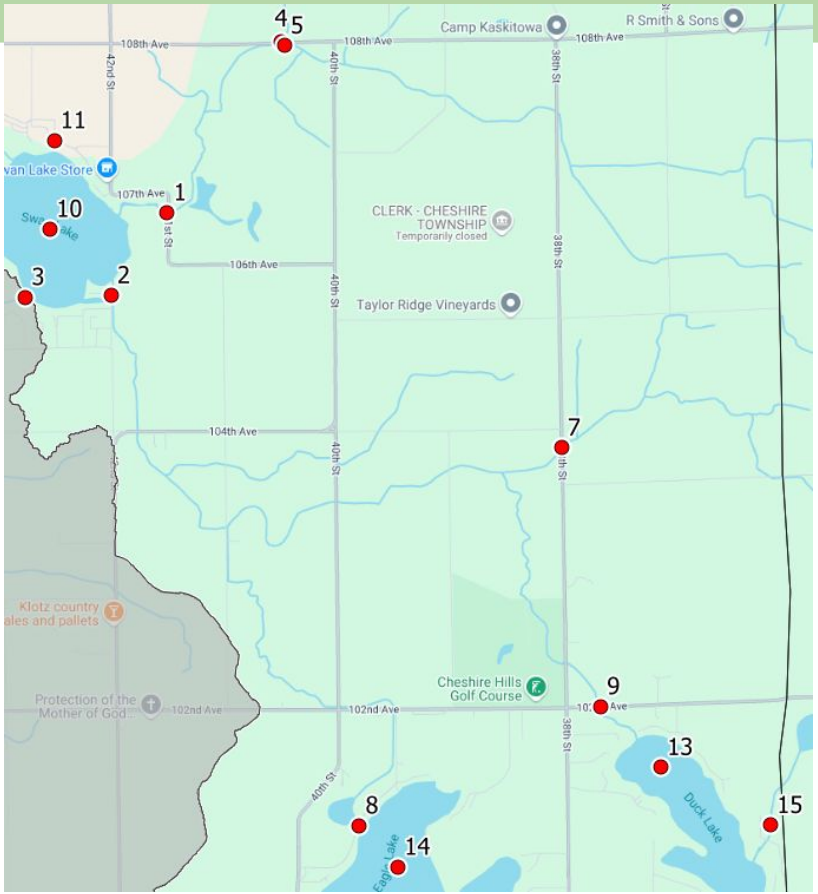
Dry Weather Phosphorus Loading to Swan Lake





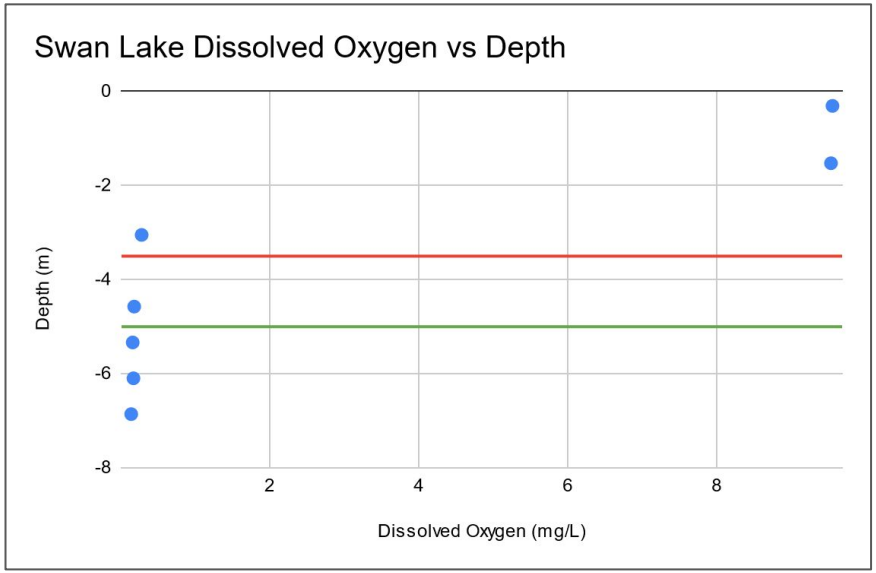
Tributaries

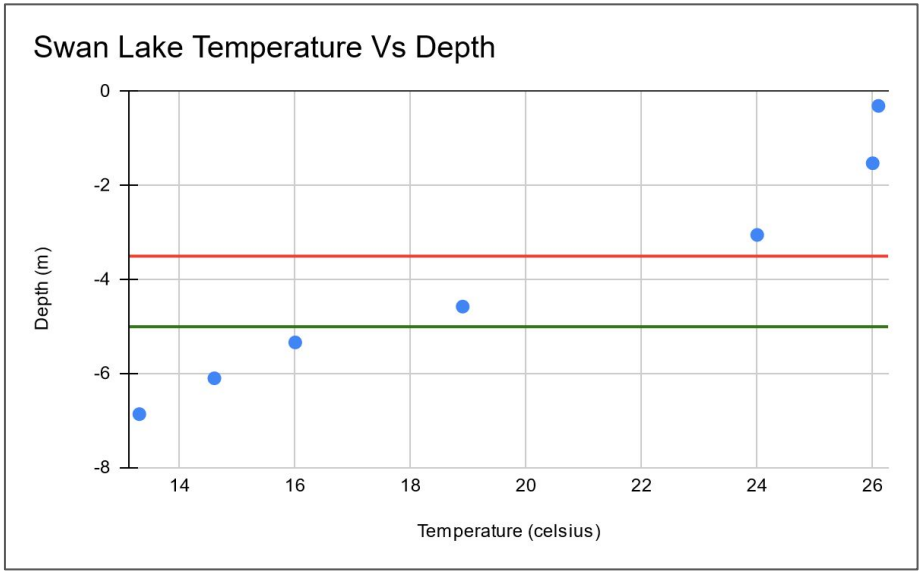




Swan Lake

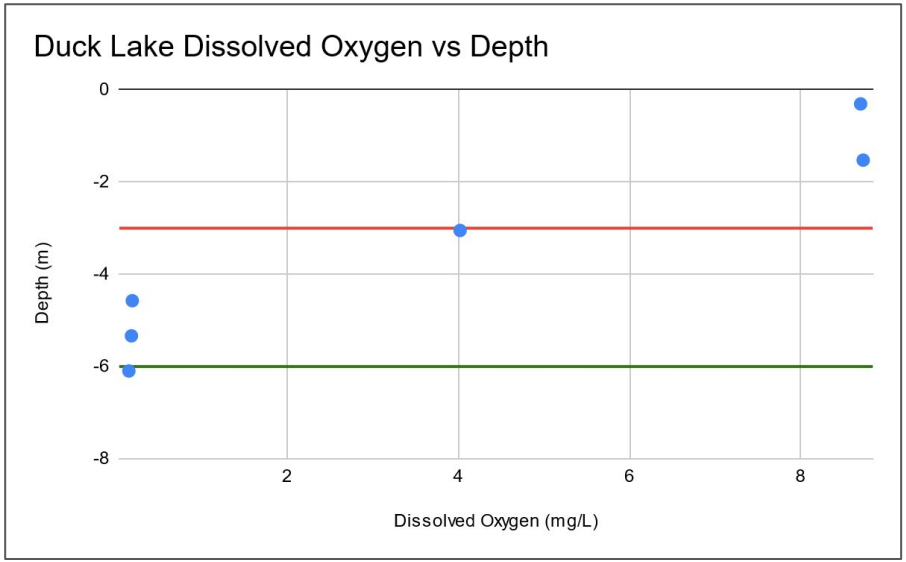
	Nitrite	Nitrate	Ammonia	TKN	Ortho P	Total P
Top	<0.1	<0.1	0.0572	1.52	<0.02	<0.02
Middle (3.5 m)	<0.1	<0.1	0.0533	3.38	<0.02	0.113
Bottom (5 m)	<0.1	<0.1	0.493	2.4	0.107	0.165

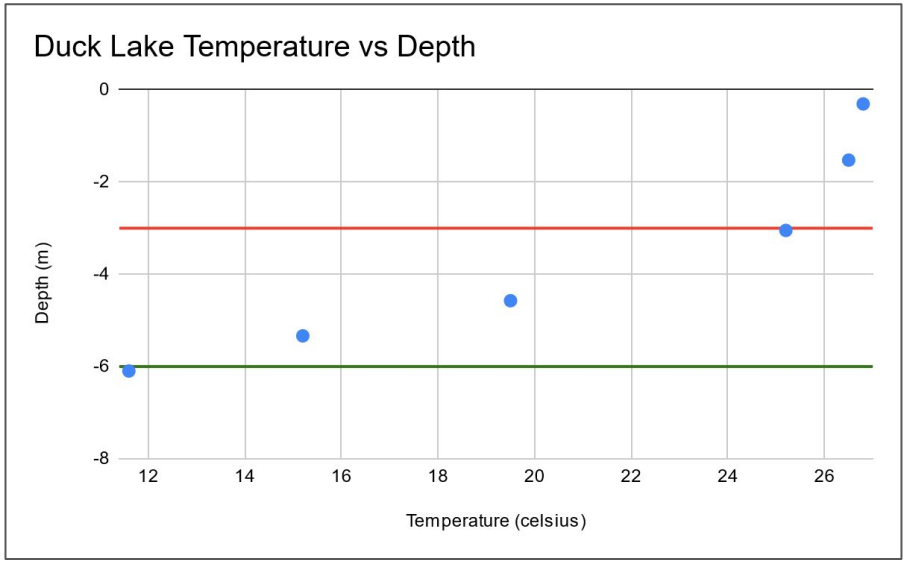




Duck Lake

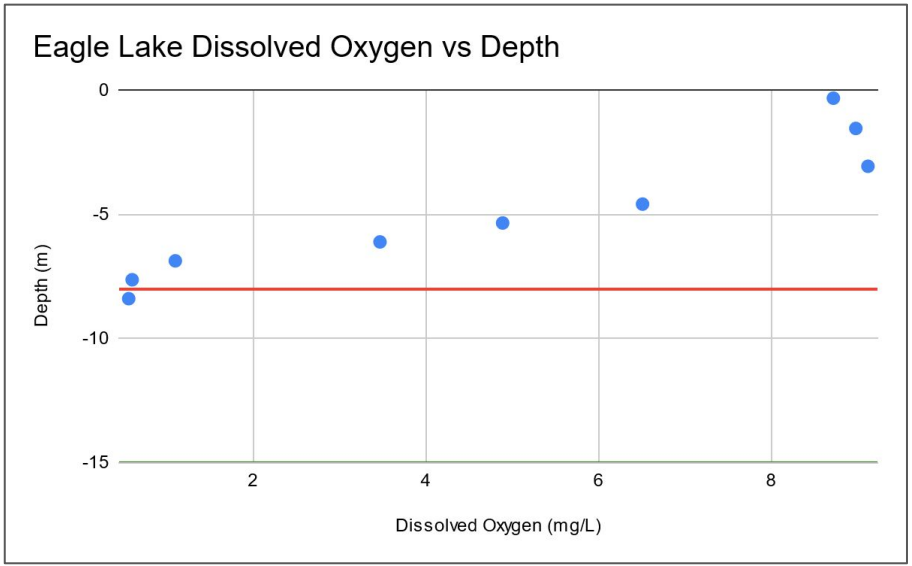
	Nitrite	Nitrate	Ammonia	TKN	Ortho P	Total P
Top	<0.1	<0.1	0.0393	2.85	<0.02	<0.02
Middle (3 m)	<0.1	<0.1	0.0386	1.93	<0.02	0.024
Bottom (6 m)	<0.1	<0.1	1.1	2.63	0.14	0.21

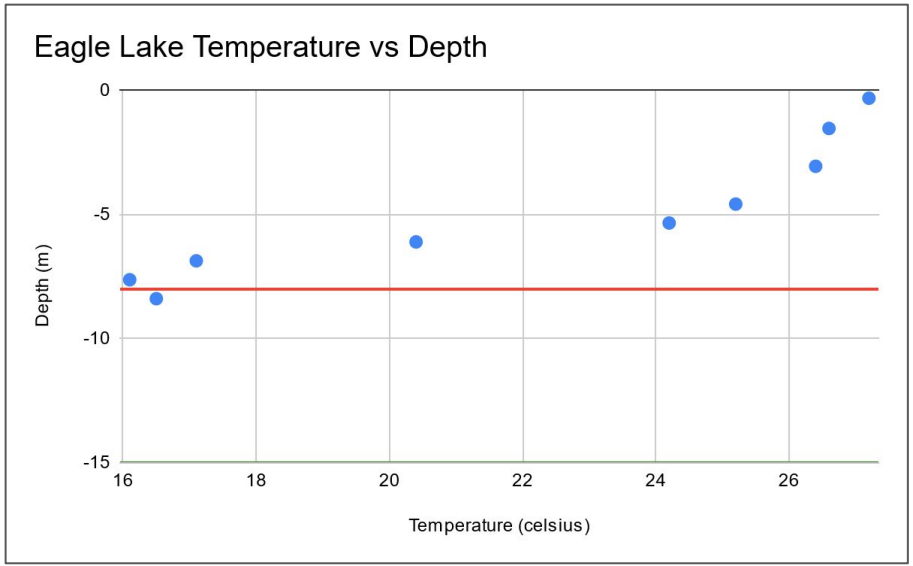




Eagle Lake

	Nitrite	Nitrate	Ammonia	TKN	Ortho P	Total P
Top	<0.1	<0.1	0.0924	1.51	<0.02	<0.02
Middle (8 m)	<0.1	<0.1	0.0586	1.48	<0.02	<0.02
Bottom (15 m)	<0.1	<0.1	0.623	1.7	0.147	<0.02

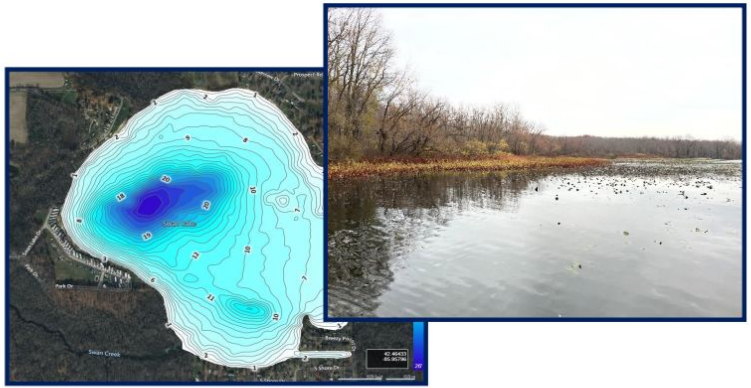




Restorative Lake Sciences

Restorative Lake Sciences

Swan Lake Evaluation Study and Restoration Plan
Allegan County, Michigan



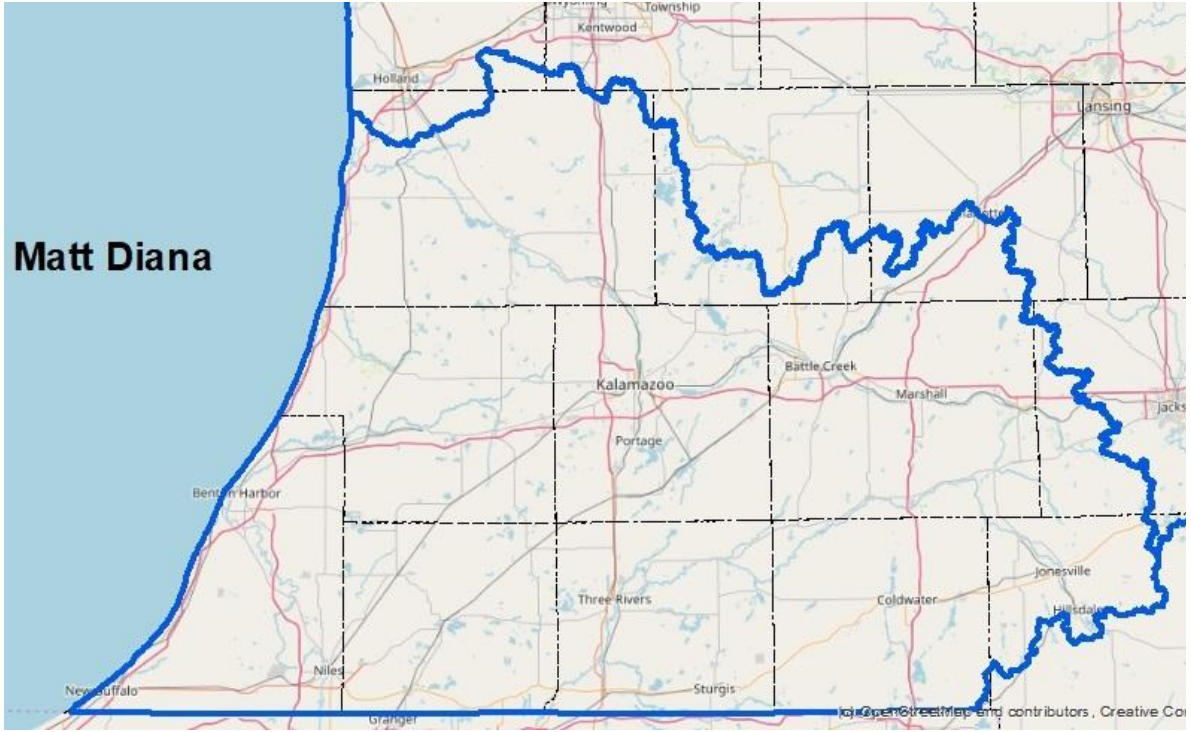
Provided for: Swan Lake Riparians

Swan Creek/Swan Lake Watershed Fisheries Management

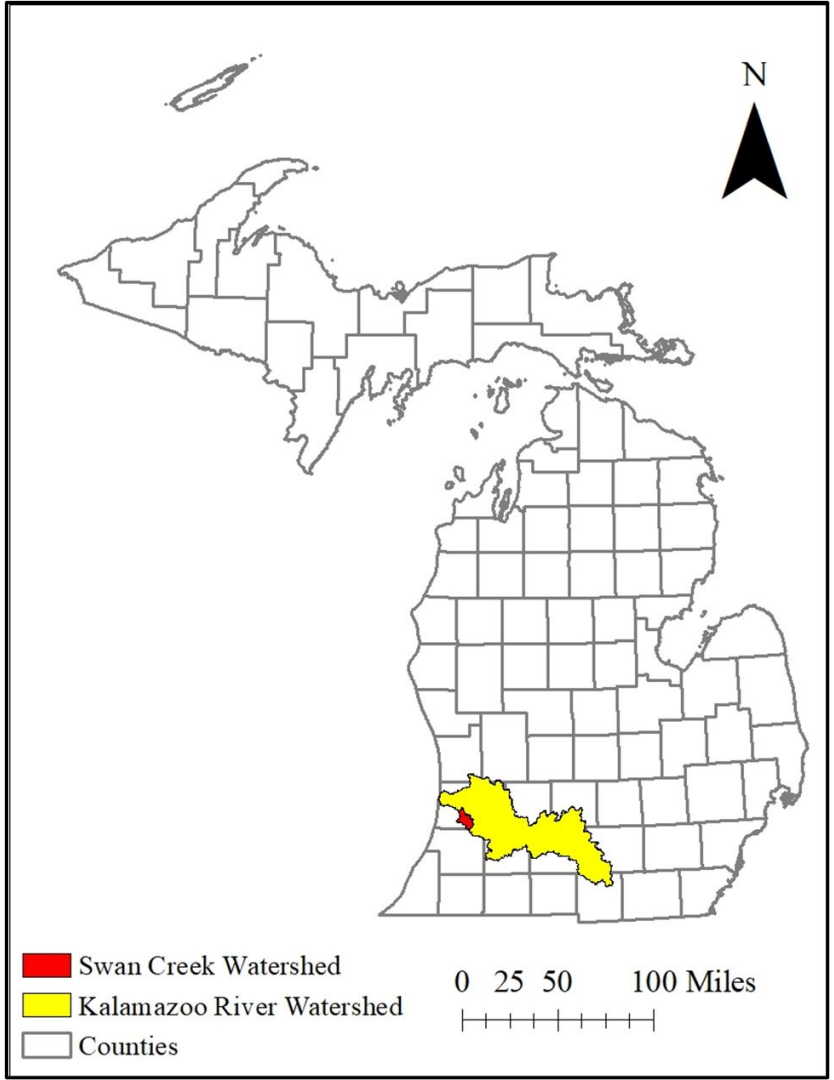
Matt Diana - DNR Fisheries Division

DNR Role

- Resource manager
  - Public Trust
  - Fish, mussels, turtles, amphibians, aquatic invertebrates, navigation, river function
- Permitting
- Threatened and Endangered Species
- Scientific Collectors Permits
- Public Access

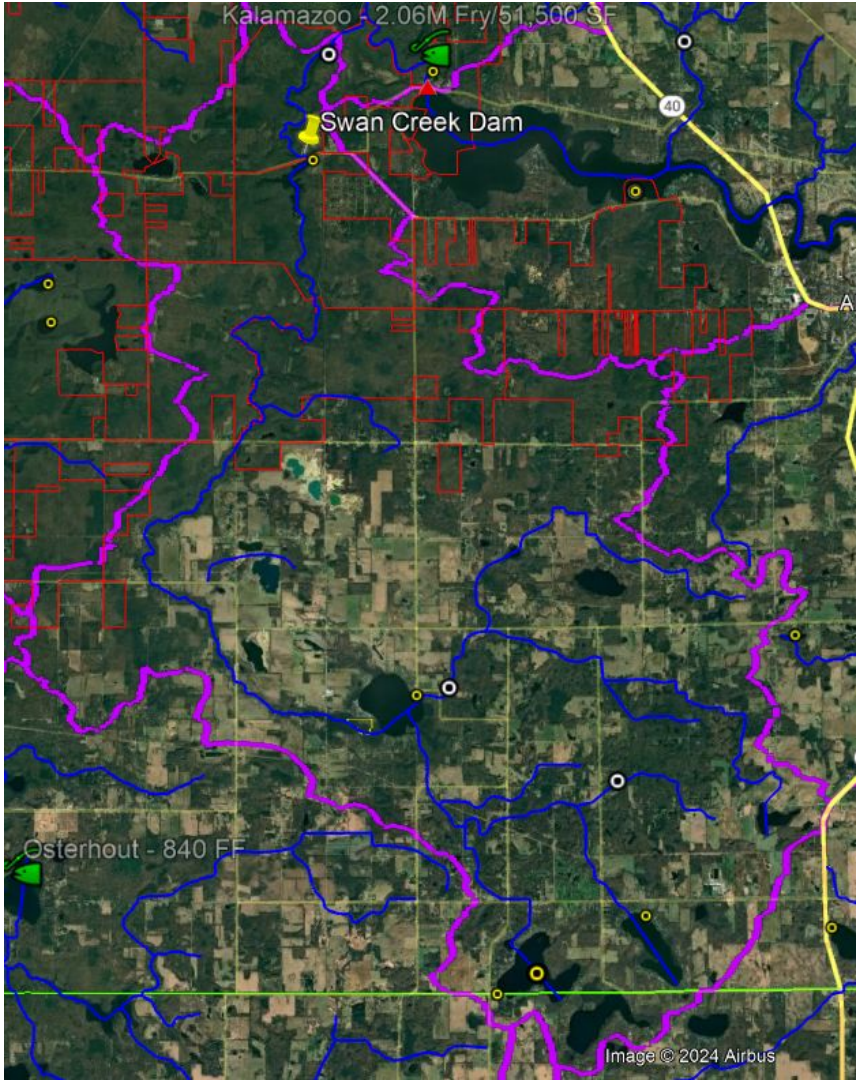


Watershed


N
Swan Creek Watershed
Kalamazoo River Watershed
Counties
0 25 50 100 Miles

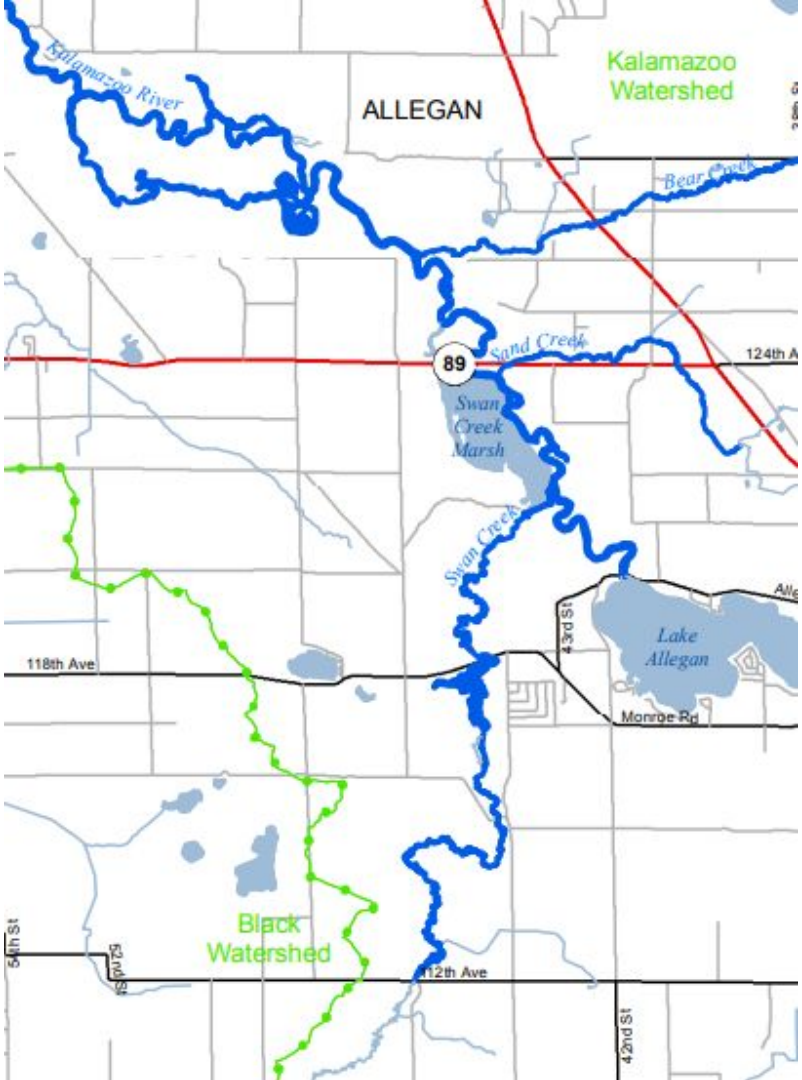
Watershed

- Kalamazoo River Tributary
- Split between Kalamazoo and Black
- Lakes
  - Swan Lake
  - Eagle
  - Duck
  - Emerson
  - Several small and



Natural River

- Swan Creek designated Natural River from 112th down to the confluence
- Restricted riparian cutting
- Restricted construction in the water
- Natural materials



Temperature

- Cold Transitional
- Warm transitional below Swan Creek Dam
- Mean July Temp
  - 116th 2021: 66.9 nF
  - 116th 2023: 59.2 F
  - Impoundment 2023: 71.5 F
  - 118th 2021: 71.5 F

Biota

- Mussels in lower river
- Blanchard’s Cricket Frog
- Karner Blue
- Eastern Massasauga
- Eastern Box Turtle
- Warm Water fishery in lake
    - Spotted Gar (SC)
    - Weed Shiner (old)
- Coldwater fishery in stream

Trout Management

- Type 4 trout stream from 109th to confluence
  - Open all year
  - No harvest Oct 1 through last sat in April
  - MSL 10” Brown Trout, 7” Brook Trout; 5 fish bag, no more than 3 trout 15” or larger
- Type 1 trout stream in 2 tributaries
  - Closed Oct 1 through last sat in April
  - MSL 10” Brown Trout, 7” Brook Trout; 5 fish bag, no more than 3 trout 15” or larger
- Below Dam: restricted to only one single-pointed, unweighted hook no larger than 1/2" from point to shank.

Fish

1993 Swan Lake Survey

- 20 species caught
- 4,234 total fish
- Growth
  - In the low range of average for Black Crappie, Bluegill, Largemouth Bass, and Yellow Perch

Species	Number	Length range (in.)*	Average length (in.)
Black crappie	783	2-12	7.0
Bluegill	2,645	2-8	5.2
Bluntnose minnow	3	2-2	2.5
Bowfin	21	16-30	22.5
Bullhead Catfishes (Family)	73	4-13	9.7
Carps and Minnows (Family)	23	22-31	27.1
Channel catfish	1	20-20	20.5
Creek chubsucker	1	7-7	7.5
White sucker	43	9-19	16.7
Golden shiner	155	4-9	7.2
Grass pickerel	2	3-5	4.5
Green sunfish	4	2-4	3.5
Hybrid Sunfish Hybrid	15	4-8	6.2
Johnny darter	1	2-2	2.5
Largemouth bass	51	1-18	11.3
Northern pike	20	22-35	26.2
Pumpkinseed	97	2-7	5.2
Spotted gar	19	22-31	26.7
Warmouth	18	3-7	5.2
Yellow Perch	259	1-9	6.2
All species totals:	4,234		

Fish
2023 Swan Creek Survey - Upstream

- Brown Trout dominate biomass
- Coldwater fish (e.g. mottled sculpin) abundant

Species	Number	Size Range
Brown Trout	29	5 to 20
Mottled Sculpin	154	1 to 4
Northern Pike	1	12
White Sucker	8	1 to 11
Johnny Darter	6	2
Black Crappie	1	4
Grass Pickerel	5	2 to 6
Lamprey (spp)	10	5 to 7
Pumpkinseed	1	4

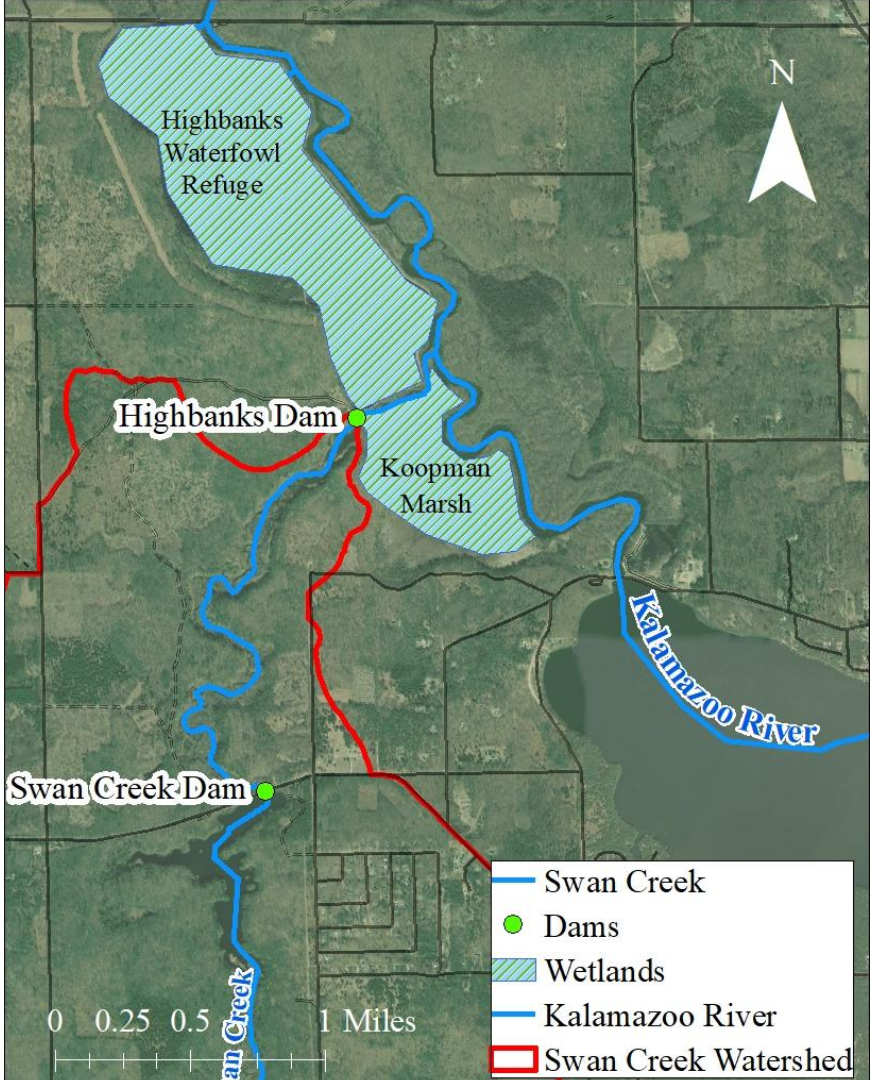
Fish
2023 Swan Creek Survey – Downstream

- Brown Trout limited
- More warmwater species
- Great Lakes connectivity (e.g. Coho)

Species	Number	Length range (in.)*	Average length (in.)
Brown trout	10	3-7	5.9
Blackside darter	19	2-3	3.2
Coho salmon	2	2-3	3.0
Creek chub	12	1-2	1.6
White sucker	22	1-11	2.9
Johnny darter	51	1-3	2.5
Largemouth bass	5	1-3	2.5
Mottled sculpin	18	1-3	2.0
Pumpkinseed	1	3-3	3.5
Rock bass	1	6-6	6.5
Smallmouth bass	1	10-10	10.5
Spotted sucker	1	4-4	4.5
All species totals:	143		

Habitat Improvement

- Trout Habitat
- Dam removal
- Sea Lamprey
- DNR Fisheries Habitat Grant $270k
- EGLE Dam Risk Reduction Grant $500k
- NRDA Grant $50k



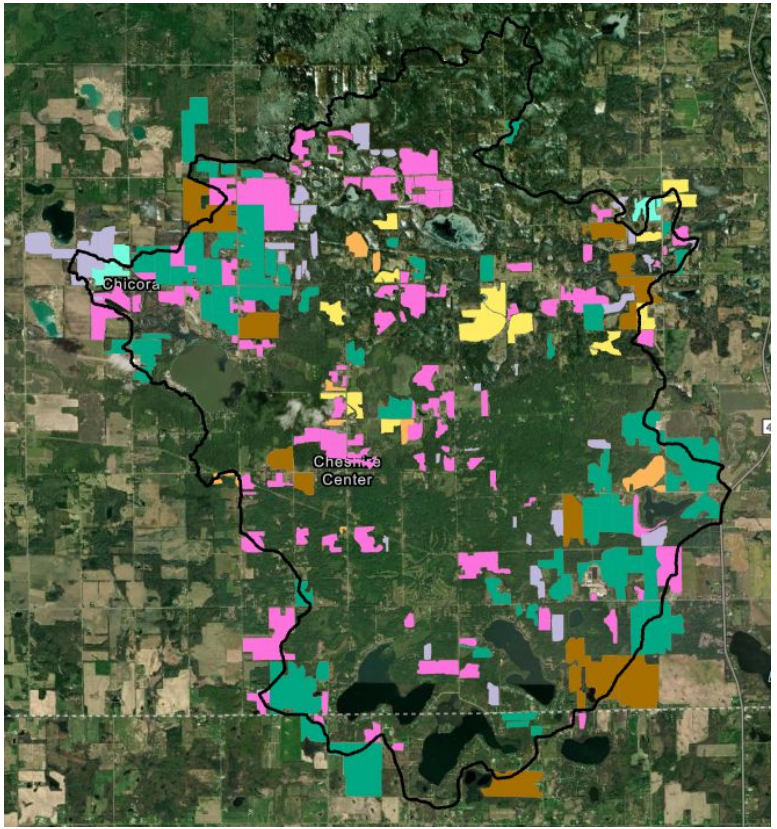
Thanks!

Matt Diana
269-910-0157
dianam@michigan.gov

Critical Areas - Agriculture Scoring Criteria

Fields will be identified as funding priorities based on:

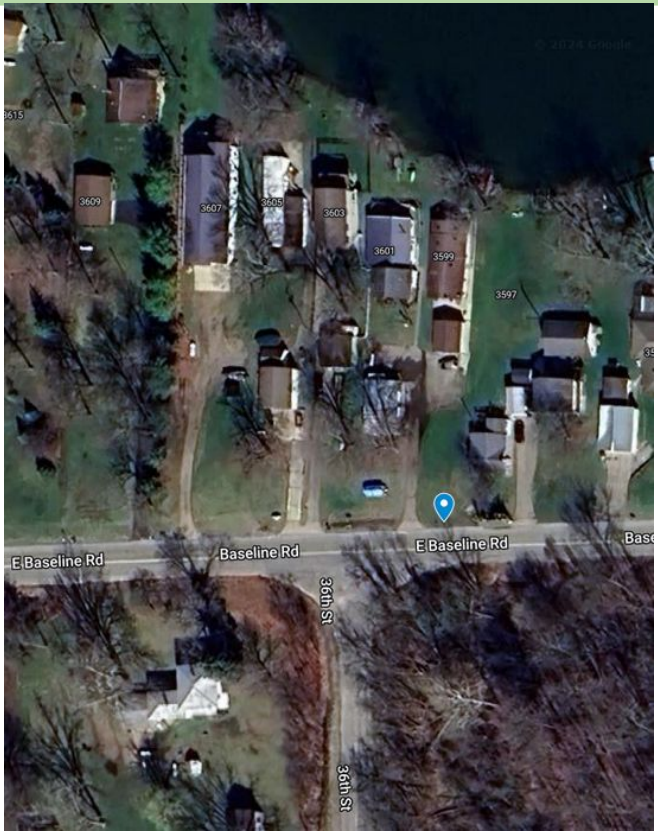
1. Cover crop absence
2. Low residue
3. Utilization of manure
4. Proximity to surface water
5. Soil erodibility



Critical Areas

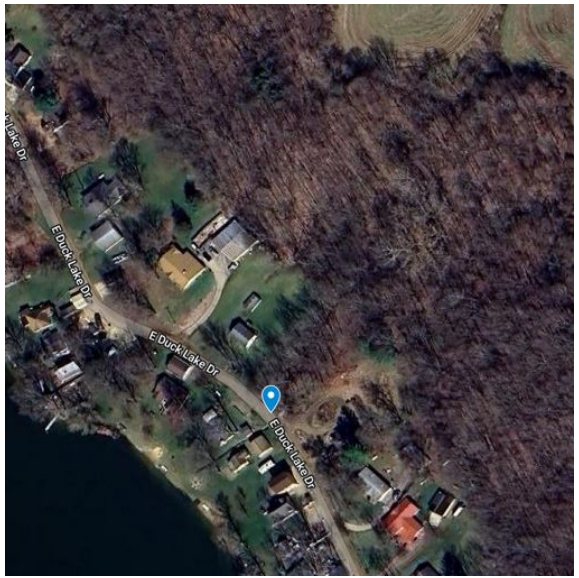
MacDougal St - Overland field runoff entering Duck Lake.

36th St/Baseline - Overland drain runoff entering Duck Lake.

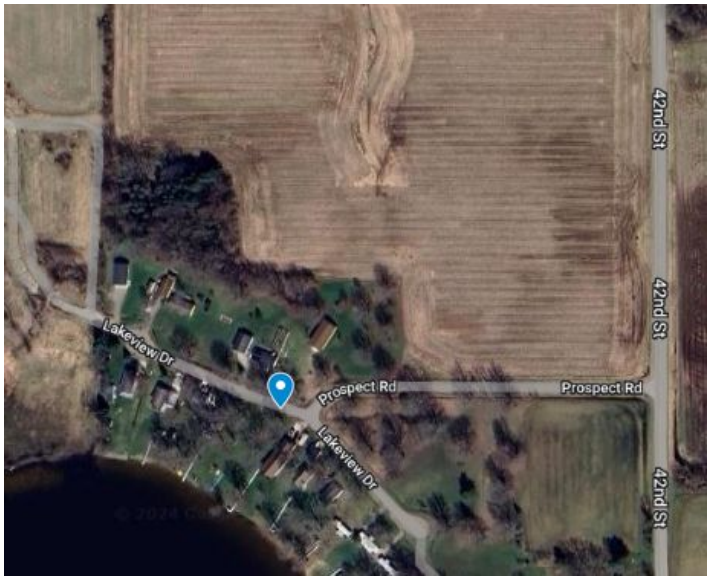


Critical Areas

Peterson Dr (E Duck Lake Dr) - field runoff directly entering Duck Lake.



Lakeview Dr - field runoff directly entering Swan Lake.



Critical Areas

Field off 38th that may have surface runoff reaching Eagle Lake.

Stakeholder Concerns Received to Date

- Leaking pump and haul septic holding tanks
- Runoff into Duck Lake over farm field and road at MacDougall St
- Runoff into Duck Lake from 36th St. drain at Baseline Rd
- Runoff into Burke Drain/Duck Lake from large livestock operation at 102nd
- Field runoff discharged through culvert under E Duck Lake Dr.
- Field runoff discharged into Swan Lake through culvert under Lakeview Dr.

Questions and Open Discussion

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ALLEGAN CONSERVATION DISTRICT

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