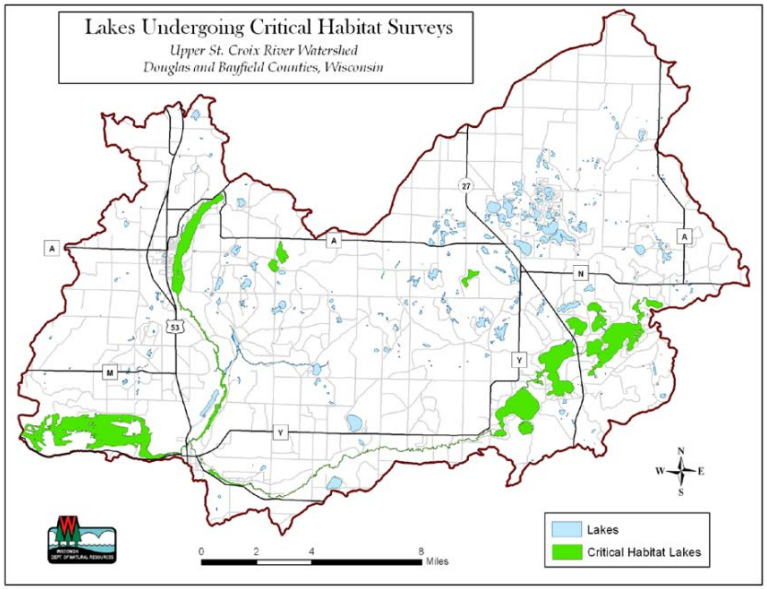
Five Studies (2007-2010)

Upper St. Croix Watershed
- 300 square mile area:
  Solon Springs–Barnes–Gordon/Wascott
  (Watershed Alliance & Army Corps of Engineers)

Critical Habitat Areas
- 13 lakes and one river in watershed area
  (DNR)

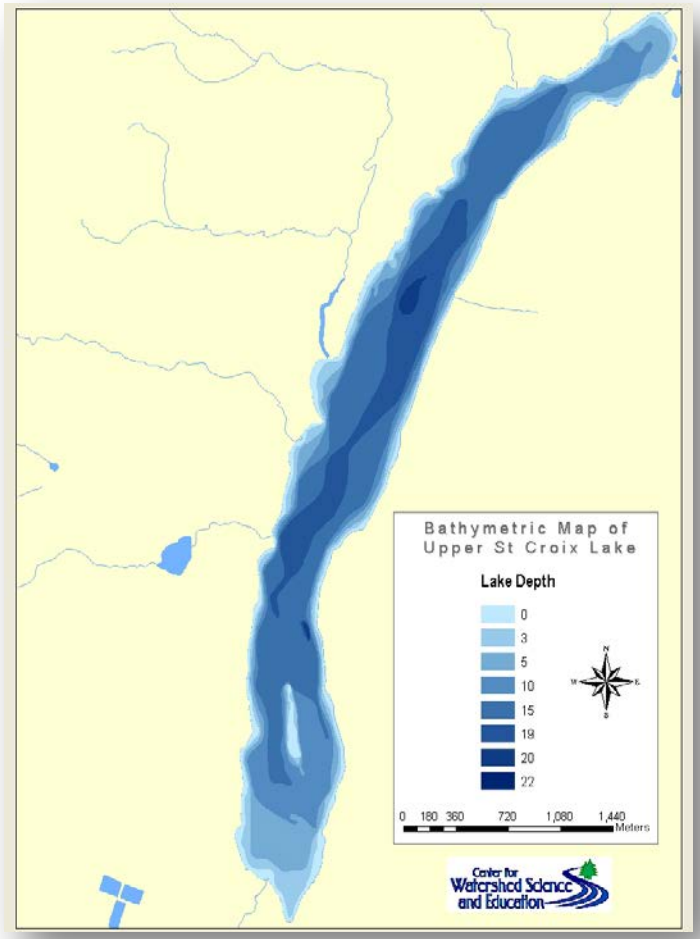
Aquatic Invasive Species
- Upper St. Croix Lake and St. Croix River
  (Friends of the St. Croix Headwaters)

Upper St. Croix Lake
- Lake and surrounding area
- Blue green algae
  (Upper St. Croix Lake Association)

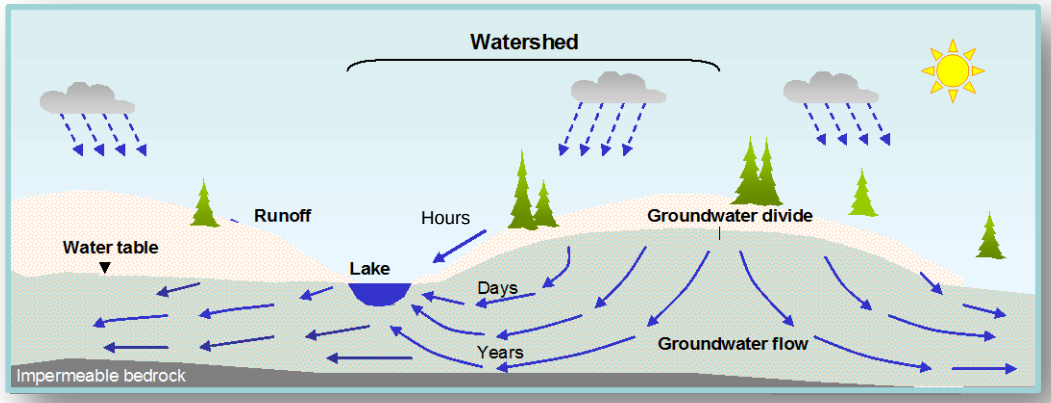


"The upper St. Croix River area has great natural, historic, and cultural significance at the state and national levels."

Upper St. Croix Lake (is unique)



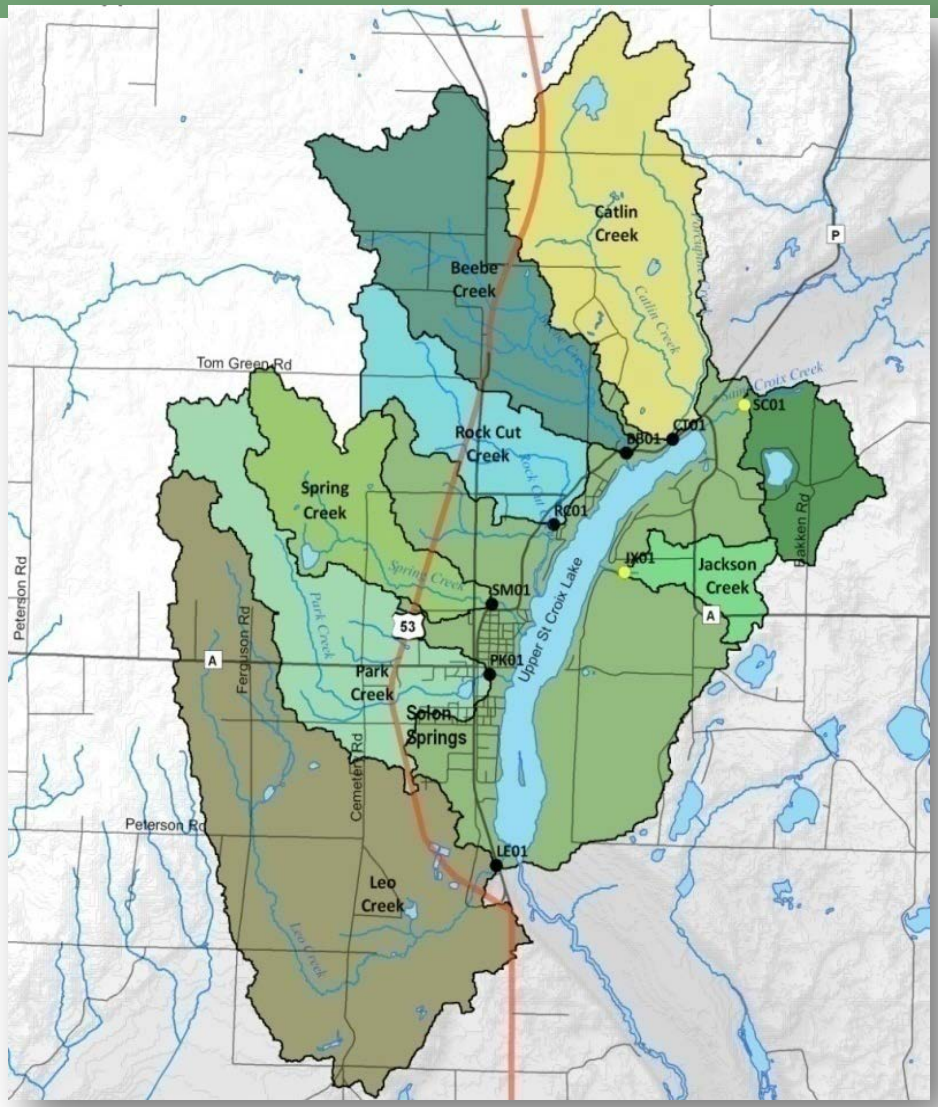
- 855 acres in size with some chronic challenges
- Maximum depth is 22 feet (shallow)
- North-south alignment (prevailing winds stir water)
- Natural phosphorus in groundwater
- High phosphorus levels grow algae (vs. plants)
- Above average chloride levels (human source)



Water cycle

- Surface flow: stream to lake in one day
- Groundwater flow: 10 feet in one day

Upper St. Croix Lake Contributing Area



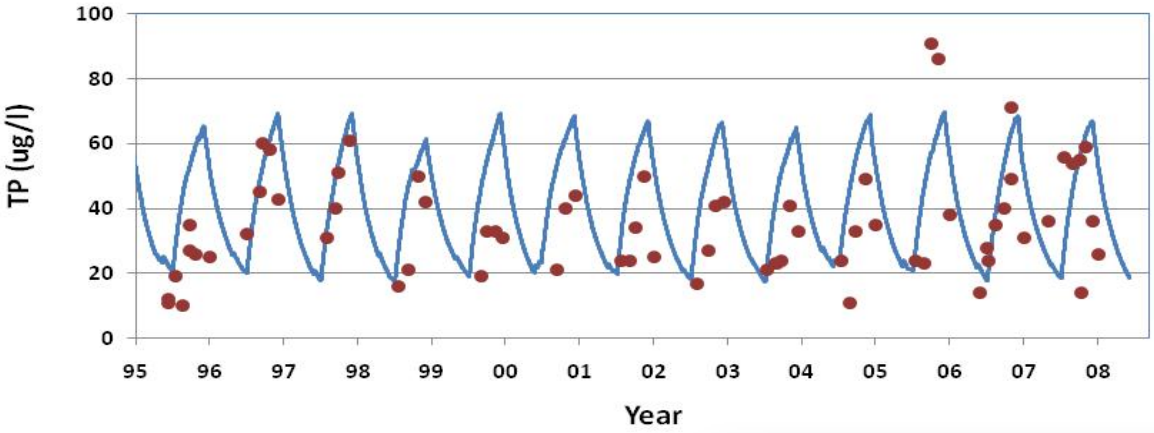
"Both surface runoff and groundwater can carry nutrients (nitrogen and phosphorus) and pollutants (sediment, chloride, and others) to the lake."

Park Creek has elevated chloride: 22 mg/L
vs. St. Croix Creek: 2 mg/L

Likely cause is road salt.

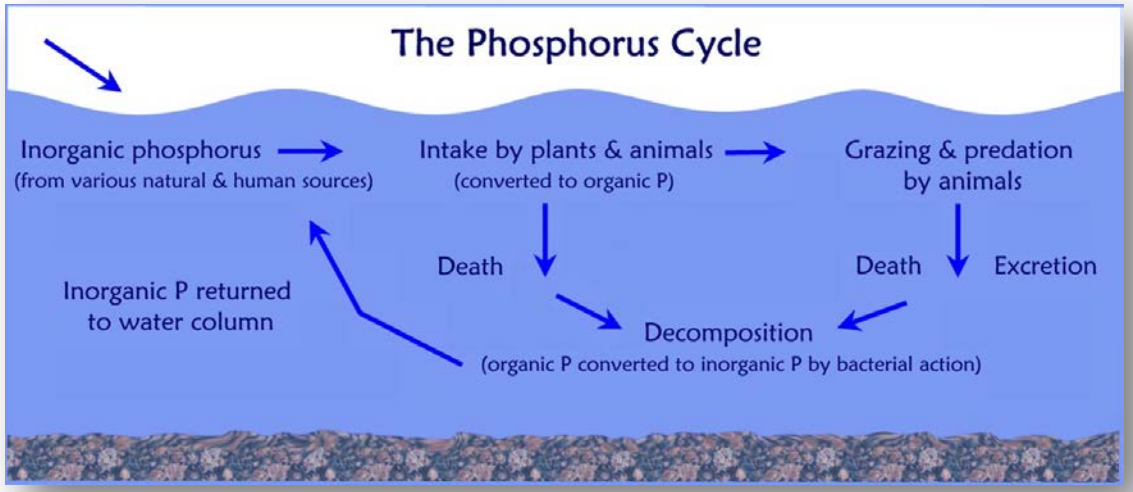
Phosphorus & Blue Green Algae

In the summer, USCL has high concentrations of phosphorus

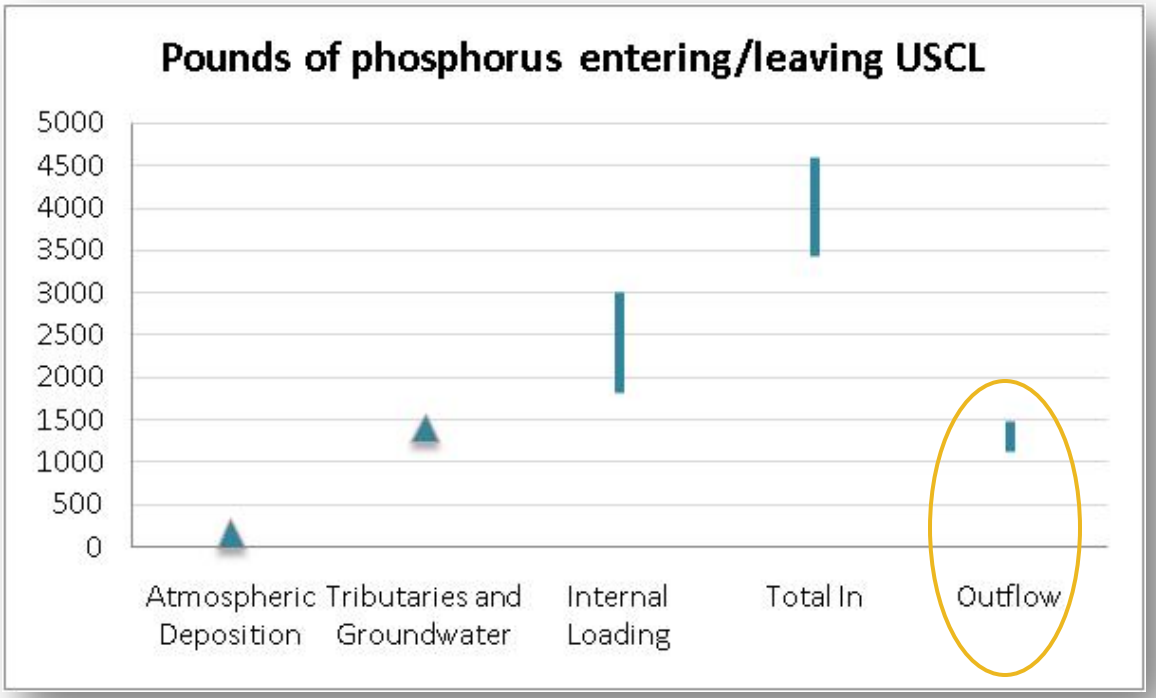


As a reference:
- *Proposed Standard: 40*
- *Eau Claire Lakes: 18*
- *Gordon Dam: 17*

Warmer summers increase the likelihood of toxic blue green algae blooms.



USCL Phosphorus – In & Out



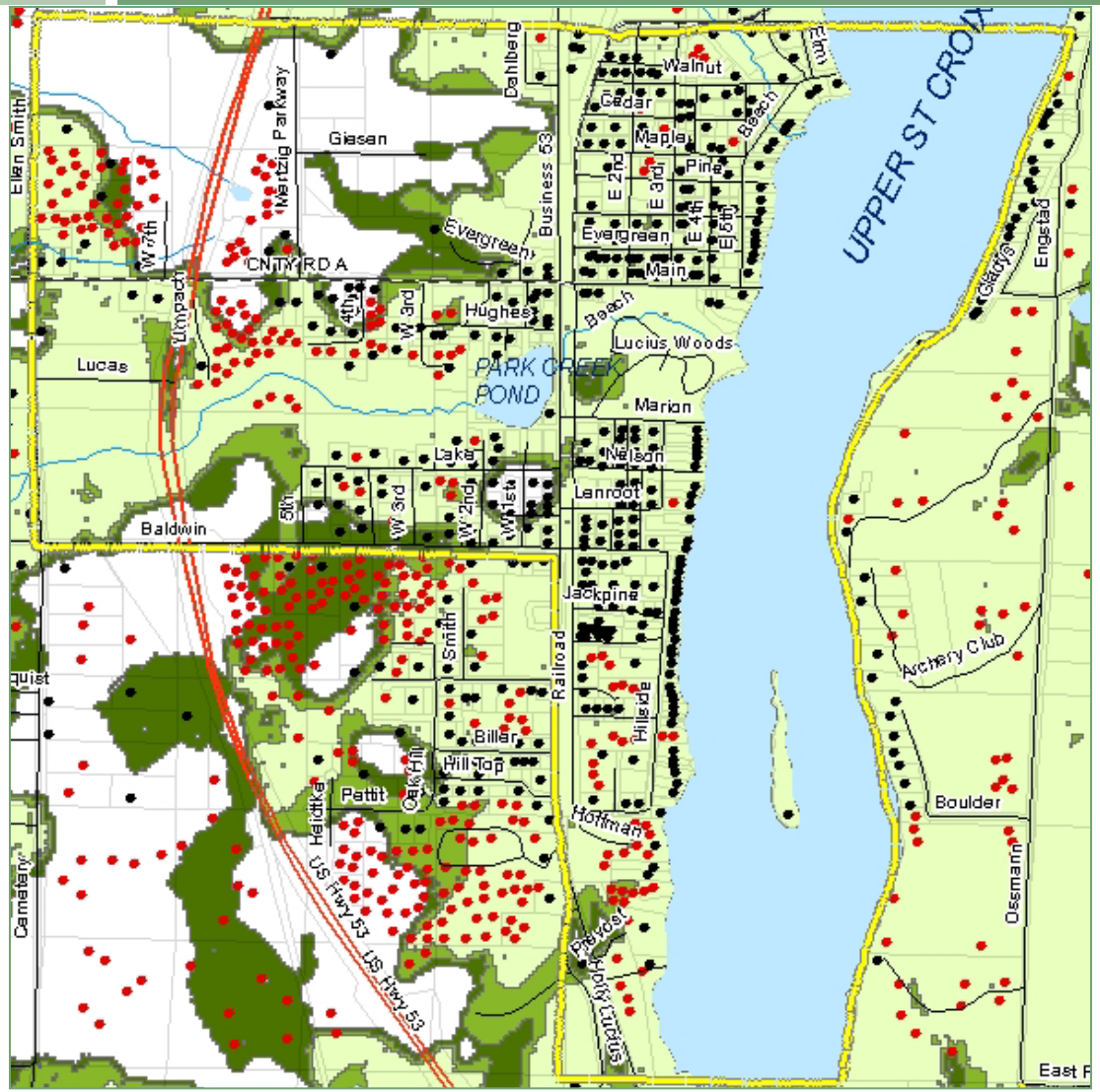
Source	P Quantity pounds/year
Atmospheric Deposition	172
Streams and Groundwater	1423
Internal Release	1828-2994
Total Entering Lake	3437-4589
Total Leaving Lake in Outflow	1115-1481

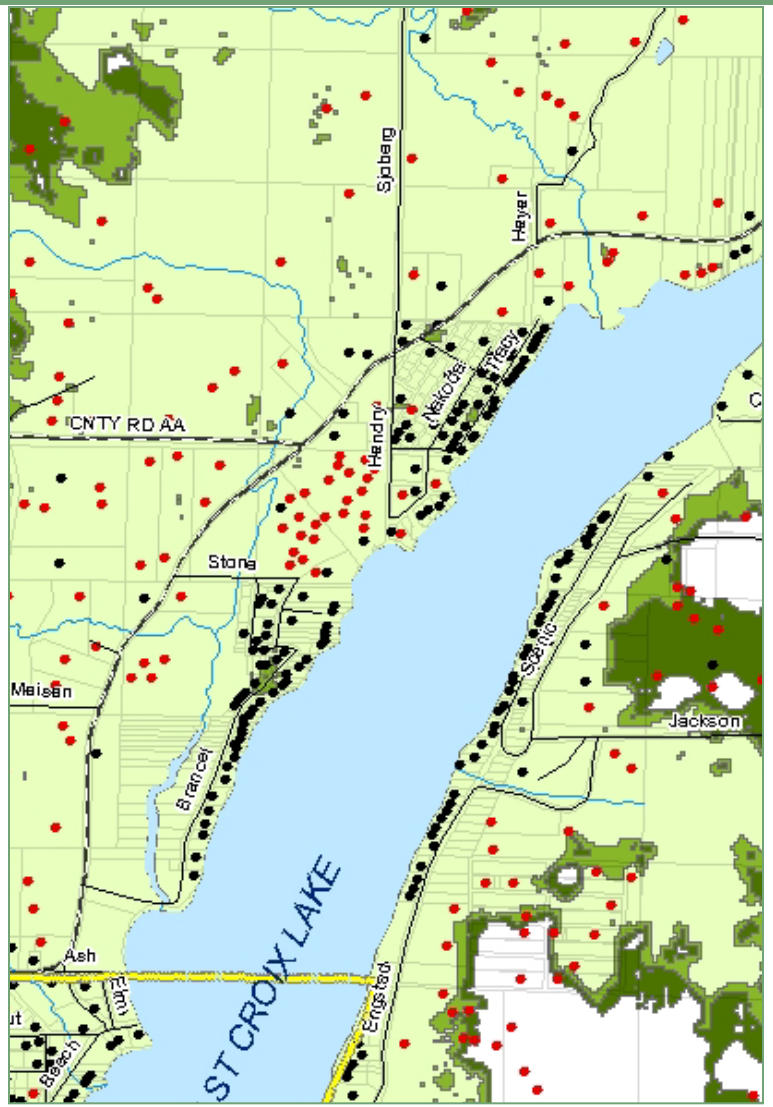
"Internal loading is clearly the primary source of phosphorus in USCL. This is phosphorus that is being released from sediments."

Lake Outflow (2009)

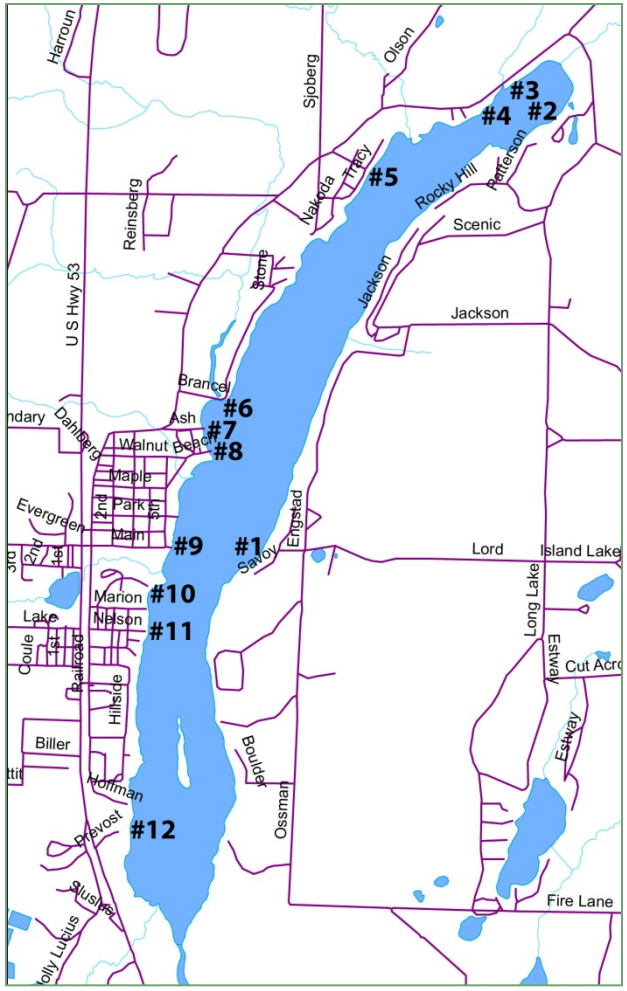
"One of the driving forces behind the increase in lake levels is that the relatively high-gradient tributaries to Upper St. Croix Lake provide good conduits for water, while the low-gradient [0.2 feet/mile] St. Croix River is a poor conduit for water."

Build-out & Impervious Surfaces





Public Access Points (AIS & Erosion)



1	Lord Road @ Lake (east side)
2	Palmer's Landing - County A
3	Soft Pines Resort - 9925 E Cty Rd A
4	Lakeview Lodge - 9902 E Cty Rd A
5	Hendry Rd @ the Lake
6	Brancel Rd @ the Lake
7	Ash Street @ the Lake
8	Beach Street @ the Lake
9	Main Street
10	Lucius Woods Park
11	Nelson Avenue @ the Lake
12	Prevost's Road

Shoreland Buffers & Rain Gardens

- Village Comprehensive Plan Natural Resource Goal – ACNR1(c): The Village of Solon Springs will encourage (re)establishment of buffering shoreline vegetation to a minimum width of 40 feet around at least 80% of Village lake shoreline.
- Rain gardens convert surface water flows in to ground water flows.

Summary

Major Challenges to the lake

- Physical characteristics and historic residential build-out
- Chronic Blue Green algae blooms caused by high phosphorus levels
- Run-off brings nutrients, pollutants, and sediment into the lake
- As impervious surfaces increase, stream flows increase during rain events (as does the likelihood of lake flooding) bathtub: big faucets, slow drain

Potential Next Steps

- Run-off management (Main Street and boat ramps) rain garden
- More extensive boat monitoring and/or reduction in access points will better protect lake from aquatic invasive species (AIS)
- Restricting power boat speeds in shallow waters will reduce phosphorus churning (and internal loading) closed throttle areas, no wave-riders
- Establish Village shoreland buffer and building set-back rules
- Store snow away from Park Pond and Park Creek contains de-icer

Satellite View of Area