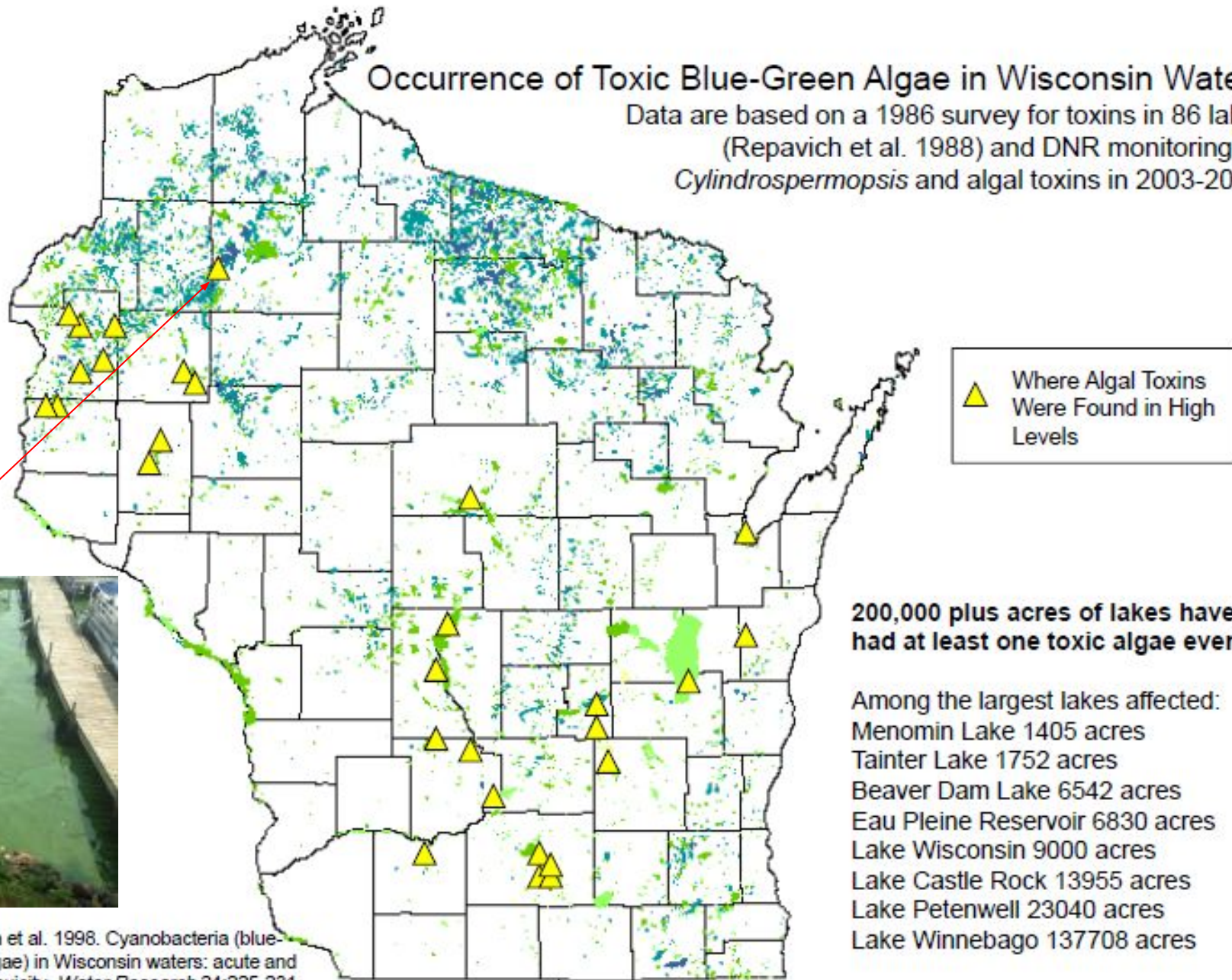


Why worry about phosphorus?



Occurrence of Toxic Blue-Green Algae in Wisconsin Waters

Data are based on a 1986 survey for toxins in 86 lakes (Repavich et al. 1988) and DNR monitoring for *Cylindrospermopsis* and algal toxins in 2003-2006.



Repavich et al. 1998. Cyanobacteria (blue-green algae) in Wisconsin waters: acute and chronic toxicity. *Water Research* 24:225-231.



Chapter NR 102

WATER QUALITY STANDARDS FOR WISCONSIN SURFACE WATERS

Subchapter I — General

NR 102.01	Purpose.
NR 102.02	Applicability.
NR 102.03	Definitions.
NR 102.04	Categories of surface water uses and criteria.
NR 102.05	Application of standards.
NR 102.06	Phosphorus.
NR 102.10	Outstanding resource waters.
NR 102.11	Exceptional resource waters.
NR 102.12	Great Lakes system.
NR 102.13	Fish and aquatic life waters.
NR 102.14	Taste and odor criteria.

Subchapter II — Water Quality Standards For Temperature

NR 102.20	Purpose.
NR 102.22	Definitions.
NR 102.23	Categories of standards applicable to temperature.
NR 102.24	General water quality criteria for temperature.
NR 102.245	Temperature criteria for limited aquatic life communities.
NR 102.25	Ambient temperatures and water quality criteria for the protection of fish and other aquatic life.
NR 102.26	Site-specific ambient temperatures.
NR 102.27	Site-specific water quality criteria.
NR 102.28	Cold shock standard.
NR 102.29	Rate of temperature change standard.
NR 102.30	Variances to water quality standards for temperature.

Note: Chapter NR 102 as it existed on September 30, 1973 was repealed and a new chapter NR 102 was created, effective October 1, 1973. Corrections made under s. 13.93 (2m) (b) 7., Stats., Register, August, 1997, No. 500.

Subchapter I — General

NR 102.01 Purpose. (1) The purpose of this chapter is to establish, in conjunction with chs. NR 103 to 105, water quality standards for surface waters of the state pursuant to s. 281.15, Stats. This chapter describes the designated use categories for such waters and the water quality criteria necessary to support these uses. This chapter and chs. NR 103 to 105 constitute the water quality standards for the surface waters of Wisconsin.

(2) The long-range goal of Wisconsin water quality standards is to protect the use of water resources for all lawful purposes. Water quality standards shall protect the public interest, which includes the protection of public health and welfare and

physical and chemical characteristics of a water or the course in which it flows.

(4) “Natural temperature” means the normal existing temperature of a surface water including daily and seasonal changes outside the zone of influence of any artificial inputs.

(5) “Resource management” means the application of control techniques to enhance or preserve a surface water in accordance with statutory provisions and in the general public interest.

(6) “Sanitary survey” means a thorough investigation and evaluation of a surface water including bacteriological sampling to determine the extent and cause of any bacterial contamination.

(7) “Surface waters” means all natural and artificial named and unnamed lakes and all naturally flowing streams within the boundaries of the state, but not including cooling lakes, farm ponds and facilities constructed for the treatment of wastewaters (the term waters as used in this chapter means surface waters).



Chapter NR 102 - P Criteria

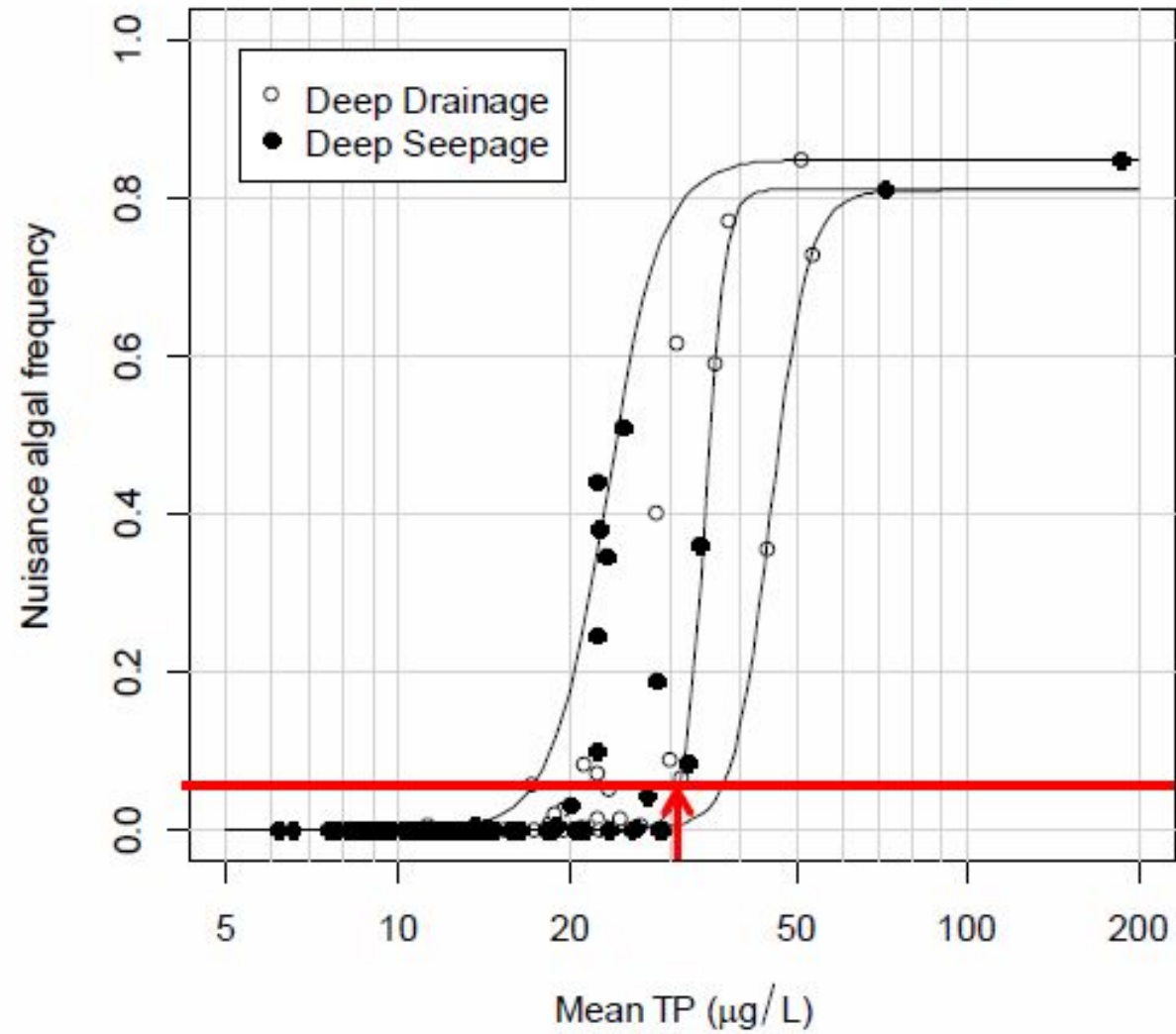
- Rivers - 100 ug/l
- Streams - 75 ug/l
- Lakes and Reservoirs - 15 - 40 ug/l
- Lake Michigan - 7 ug/l
- Lake Superior - 5 ug/l
- No ephemeral streams, wetlands, LAL waters



Specific Lake Criteria

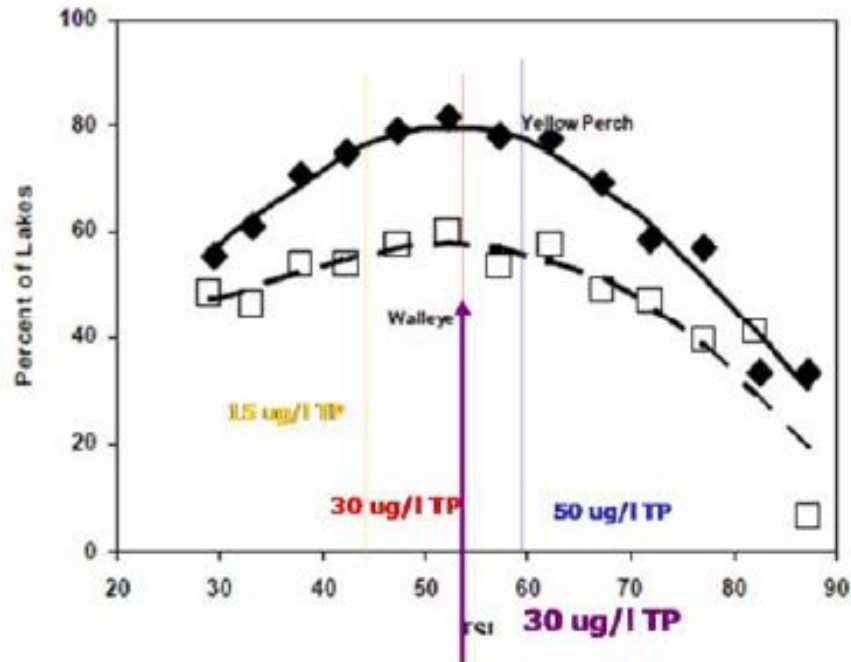
- 2-story fishery lakes - 15 ug/l
- Stratified seepage lakes - 20 ug/l
- Stratified drainage lakes - 30 ug/l
- Stratified reservoirs - 30 ug/l
- Non-stratified lakes - 40 ug/l
- Non-stratified reservoirs - 40 ug/l

Preventing nuisance algal blooms

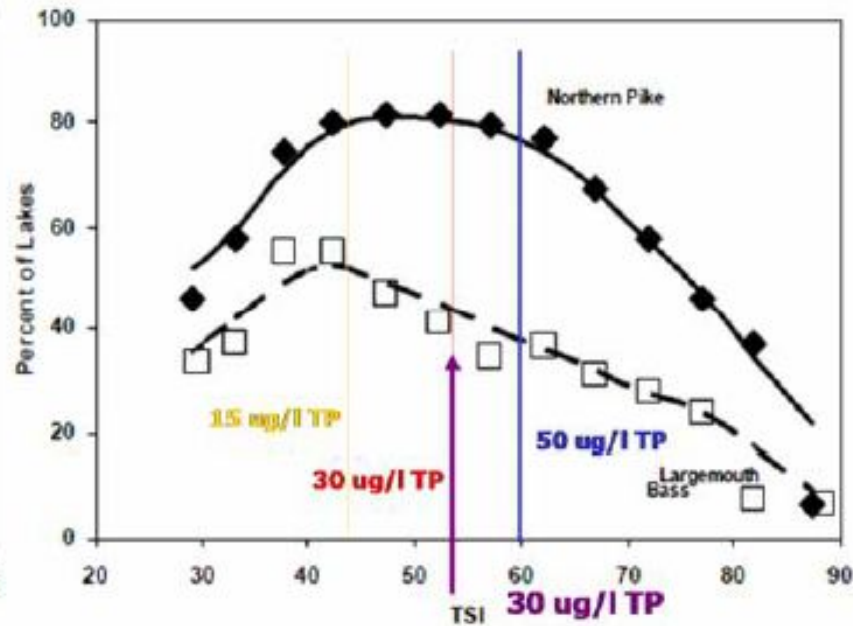




Protecting Fish and Aquatic Life



Cool water species



Warm water species

Source "Minnesota Lake Water Quality Assessment Report: Developing Nutrient Criteria", Third Edition, September 2005, Minnesota Pollution Control Agency; based on work by Schupp (MDNR) and Wilson (MPCA), 1992 and Schupp (MDNR) unpublished data.



Adaptive Management

Roles of citizens

- Monitor phosphorus concentrations to document water quality problems.
- Encourage your water utility board to consider the option.
- Monitor phosphorus concentrations to document water quality improvements.



<http://dnr.wi.gov/to>

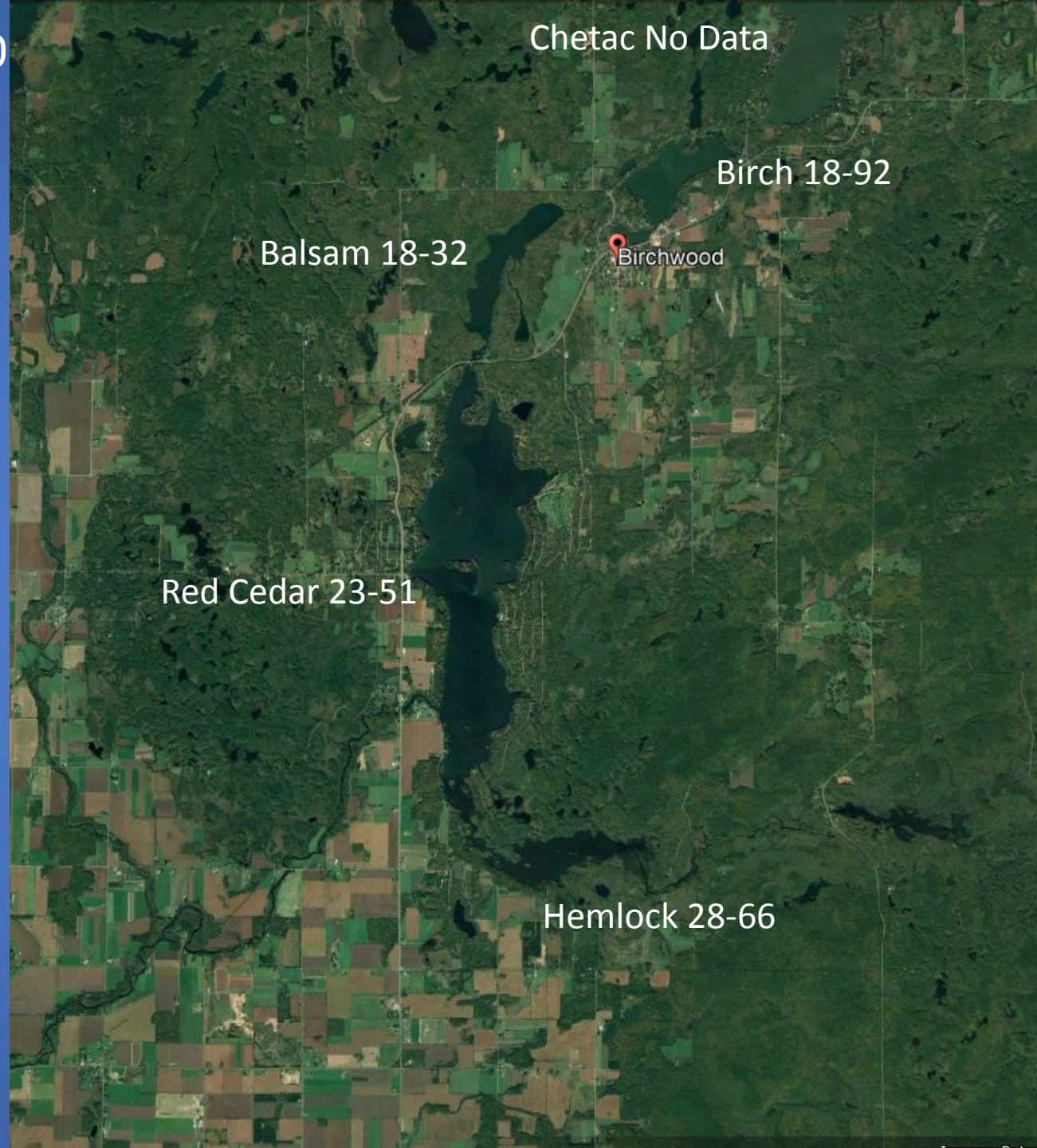
ment.html



Data Requirements

- 6 samples collected over a minimum of two years
- June 1 - September 15
- Surface grab or integrated samples from top 2 m
- Chemical analysis by state-certified laboratory

$\mu\text{g P/liter}$ 2019 & 2020

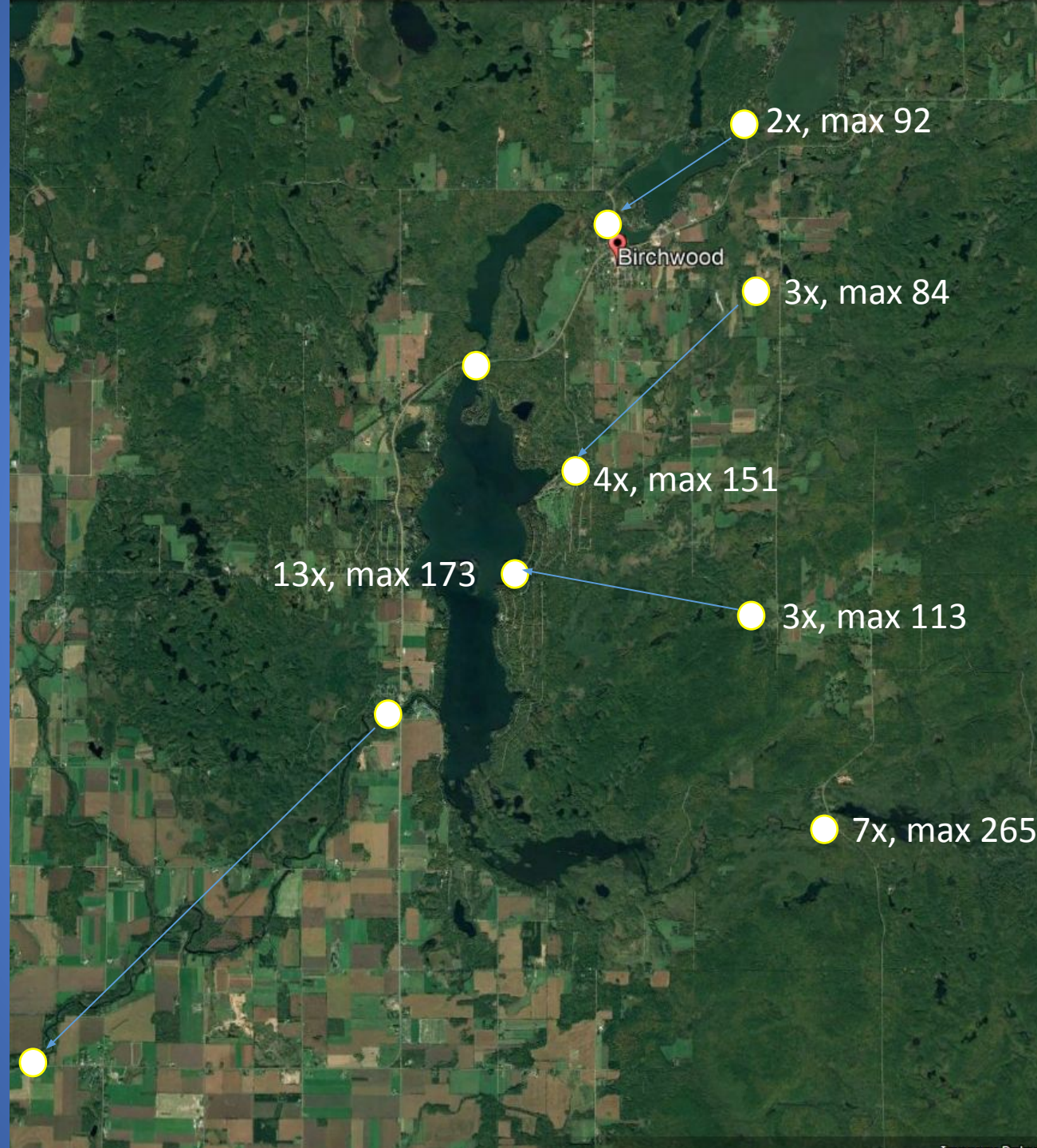


Not to exceed 15-40 $\mu\text{g/L}$
Fish suffer above 30 $\mu\text{g/L}$

Rice Lake 23-51

$\mu\text{g P/liter}$ 2018 - 2020

Not to exceed $75 \mu\text{g/L}$



Pounds of Phosphorus Per year

