

LAKE SERENE WATER QUALITY UPDATE



Lake Ecology

Epilimnion (Top)

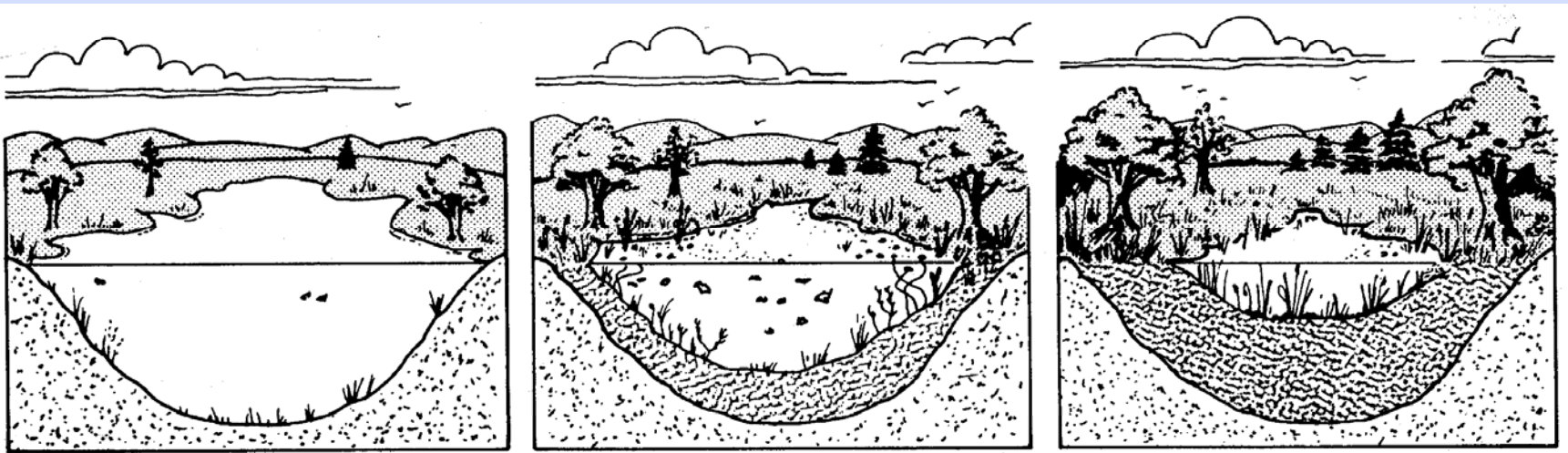
- Warm
- Mixed
- High Oxygen
- Lots of Algae

Hypolimnion (Bottom)

- Dark, Cold
- Low Oxygen
- Lots of Debris/Bacteria
- Higher Nutrient Availability



Natural Eutrophication Process of a Lake

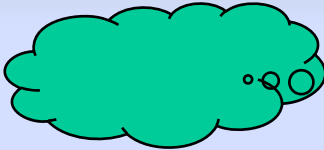


Oligotrophic

Mesotrophic

Eutrophic

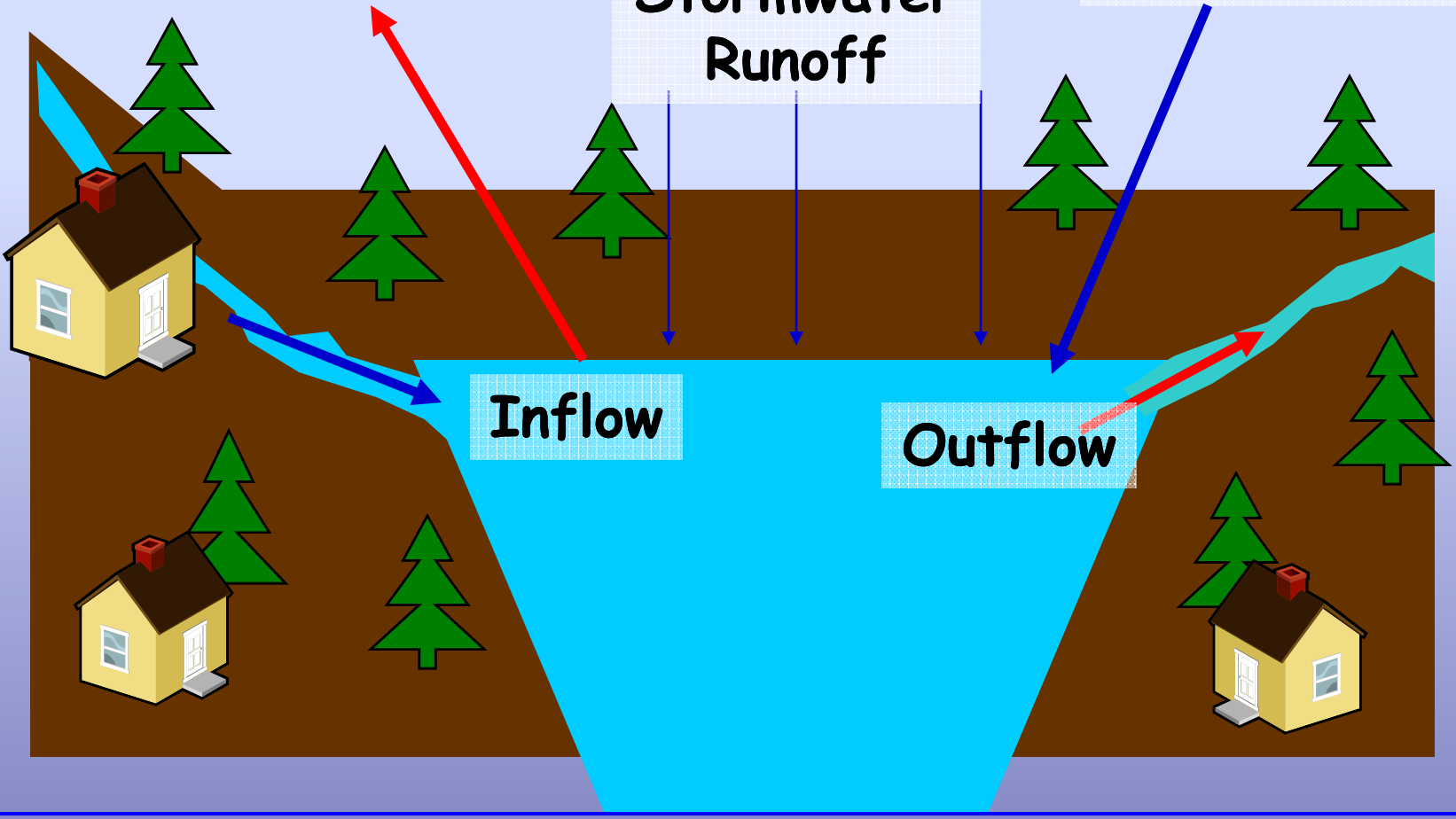
Watershed



Evaporation

Stormwater
Runoff

Precipitation



Inflow

Outflow

Lake Serene & Watershed

Lake Size:

45 acres

Lake Depth:

Max – 7 m (23 feet)

Average 4.3 m (14 feet)

Watershed Size:

223 acres (178 w/o lake)

Lake to Watershed Ratio:

5.0 - one of smallest in county

Level of Development:

High – 99% parcels developed. Majority of watershed developed



Water Clarity

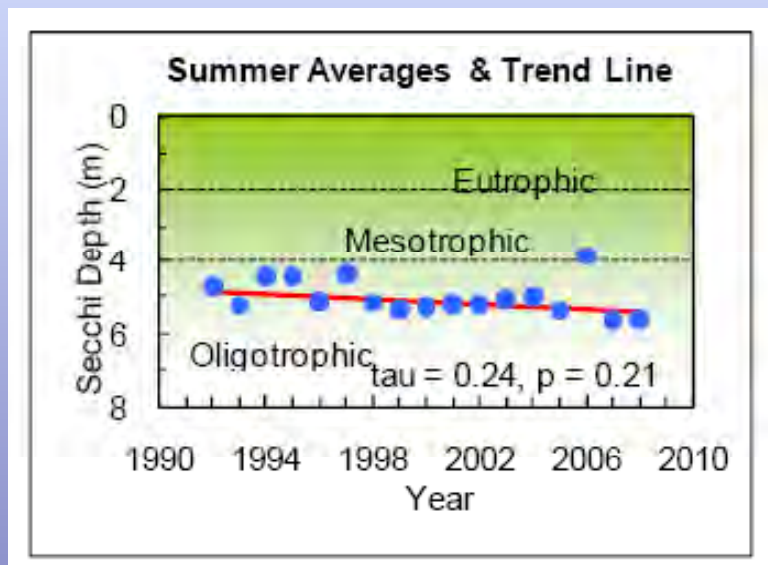
Secchi Disk

- A measure of the water quality in a lake
- Shallow secchi readings may indicate an excess of algae or sediment in the water



Lake Serene Water Clarity

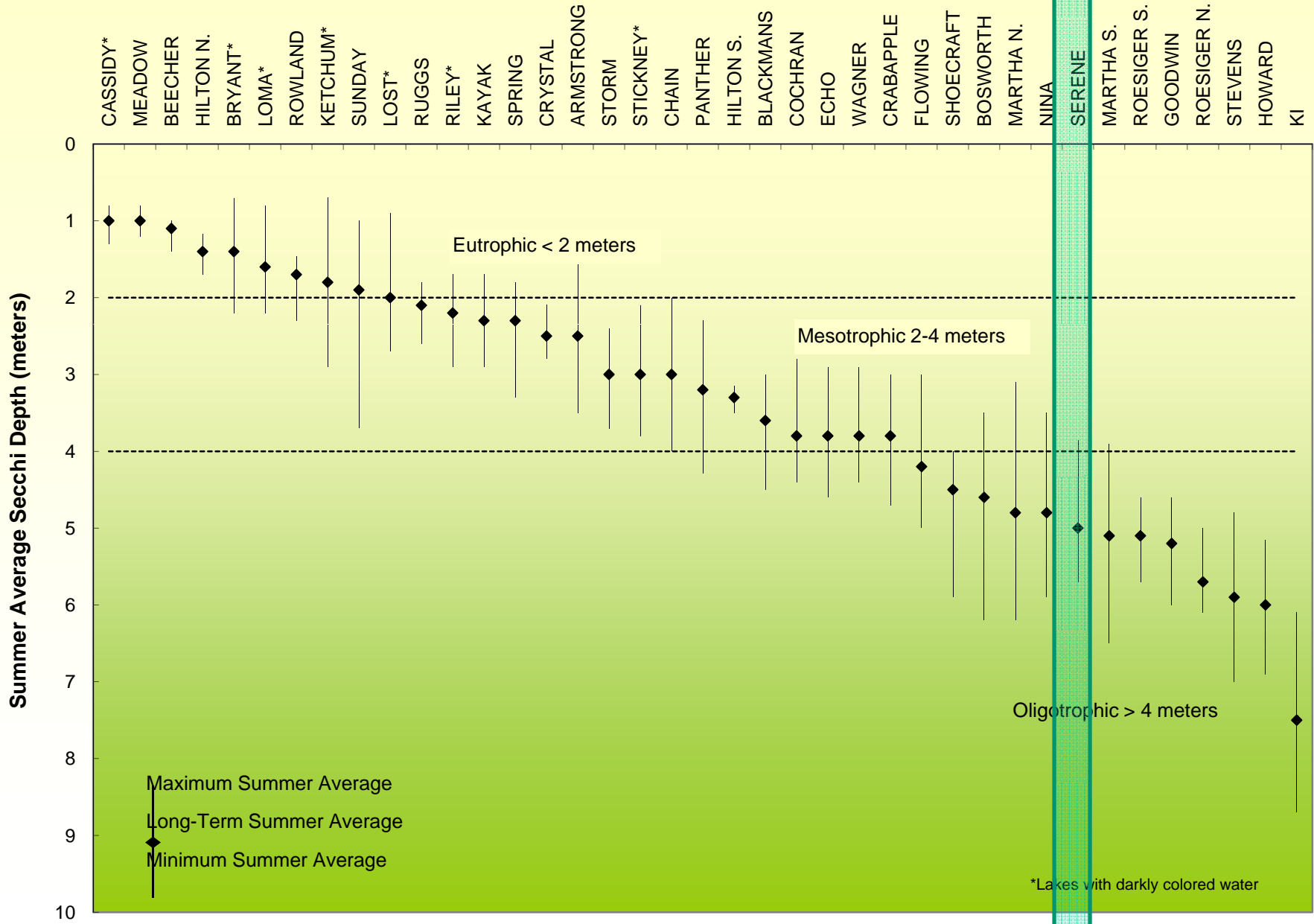
- Good water clarity
- Average is 5 meters (16.4 feet)
- No significant changes since 1992





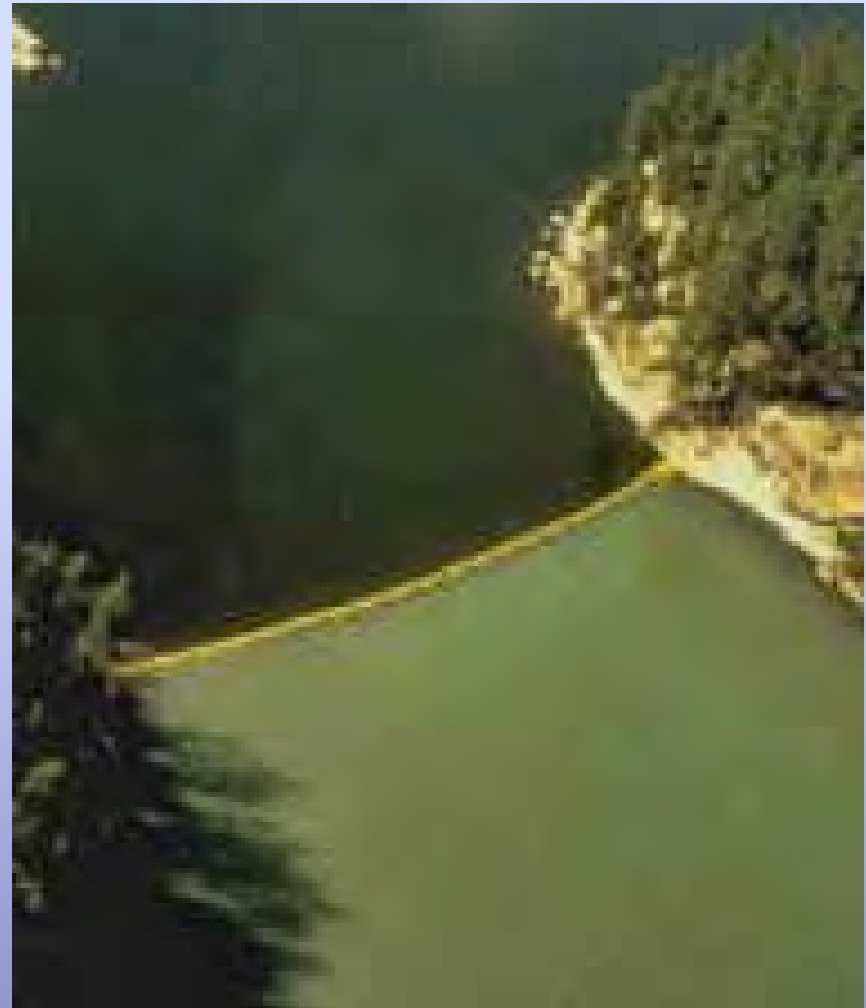
Our dedicated
volunteer lake
monitor, Mark
Fussell

SUMMER WATER CLARITY AVERAGES 1990-2008



Nutrients - Phosphorus

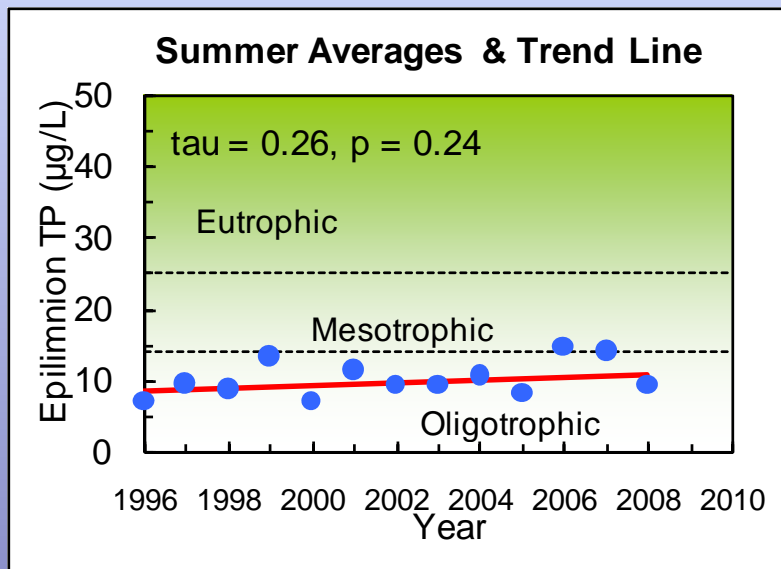
- Phosphorus is limiting nutrient in most lakes
- Increase productivity
 - More frequent and severe algal blooms
 - 1 pound of phosphorus can feed 300 - 500 lbs of algae
 - Potential higher frequency of toxic algae blooms
- Speed eutrophication
 - May fill in faster (both from sediment input and decaying organic matter)
- Change ecology of lake – clarity etc.



Total Phosphorus (TP)

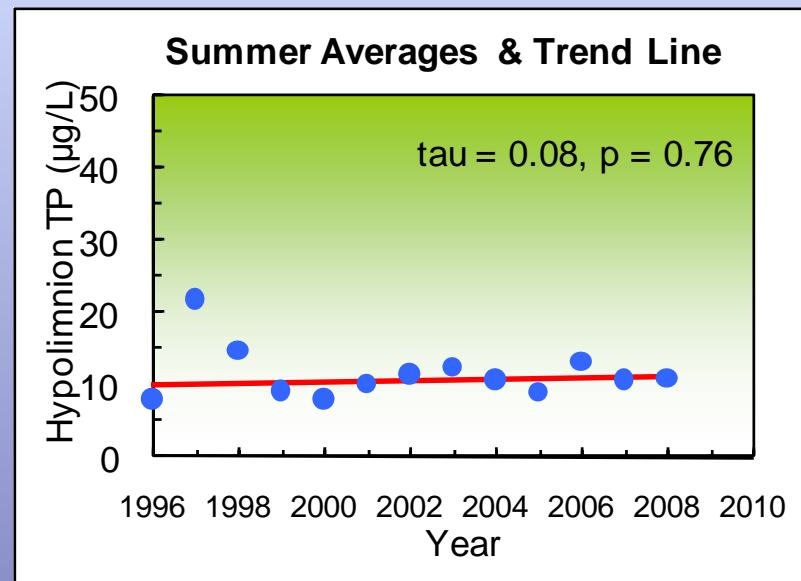
Upper Waters

- Indicates watershed sources or recent pollution
- Low Average (10 ug/l)
- High in 2006 & 2007
- No significant trends

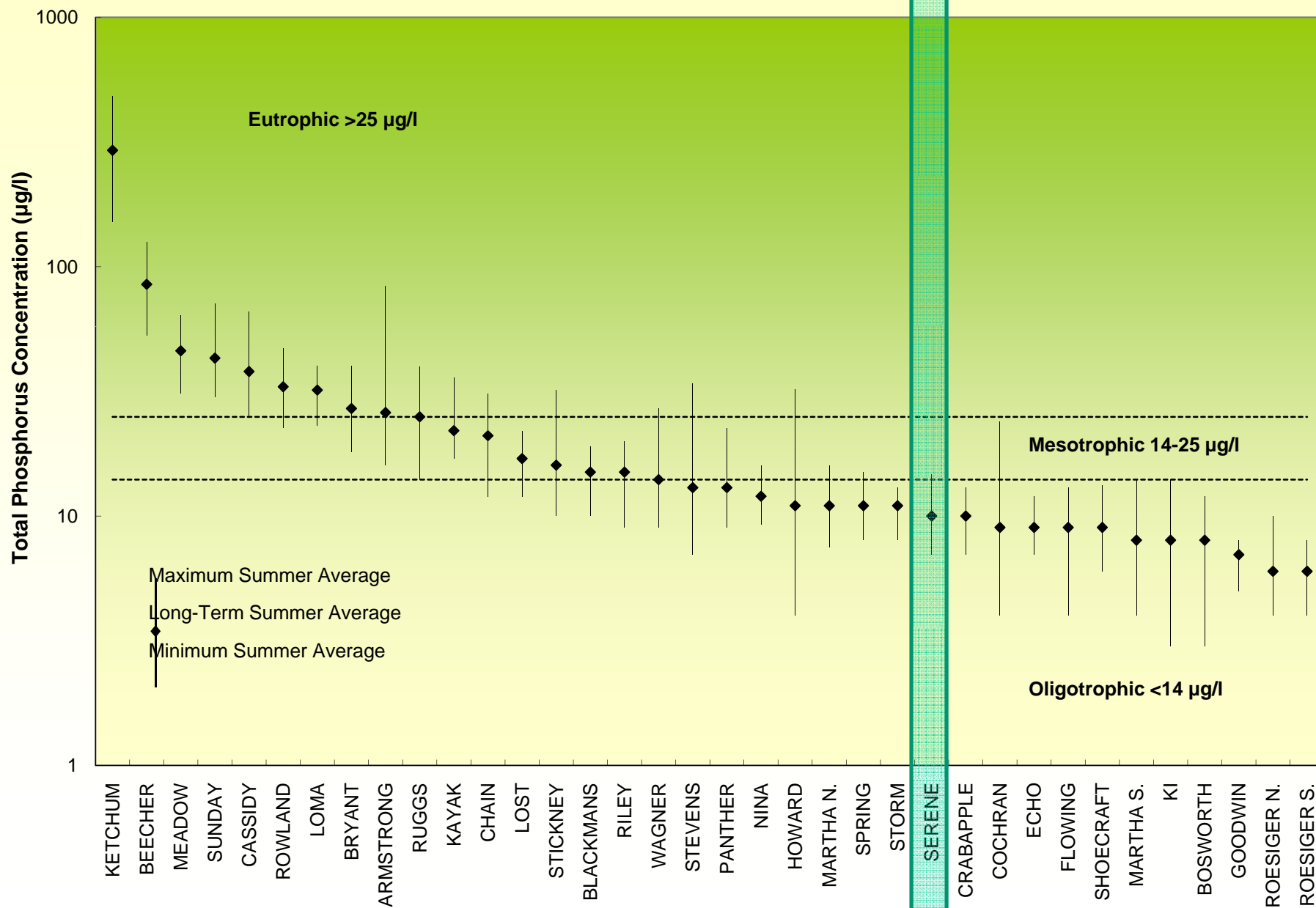


Lower Waters

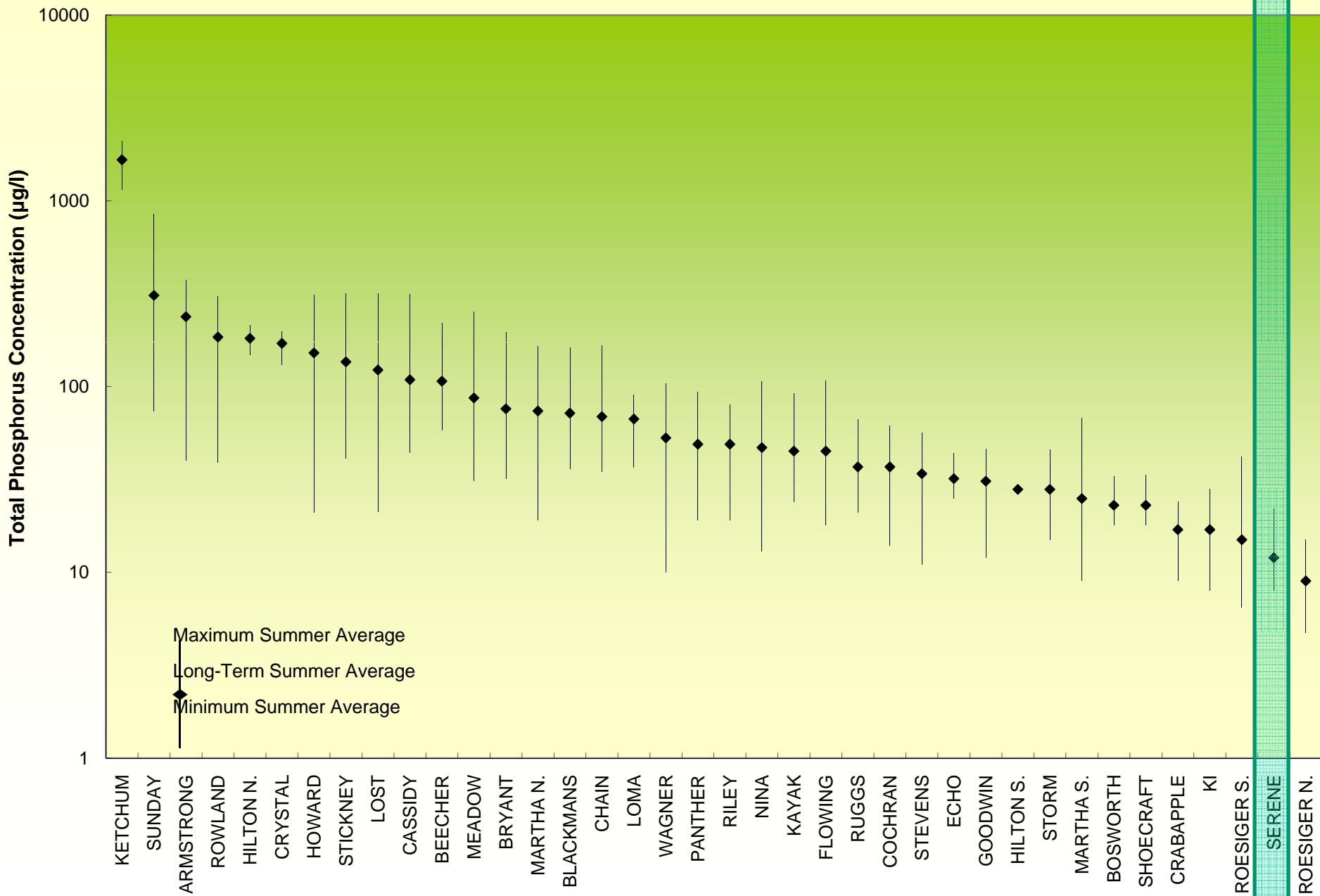
- Indicates internal sources or past pollution
- Low Average (12 ug/L)
- No significant trends



SUMMER AVERAGE EPILIMNION TOTAL PHOSPHORUS 1996-2008



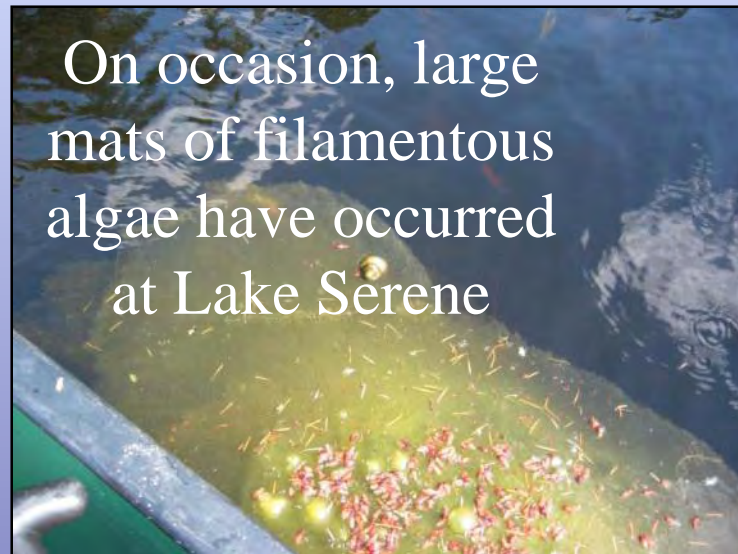
SUMMER AVERAGE HYPOLIMNION TOTAL PHOSPHORUS 1996-2008



Chlorophyll *a*

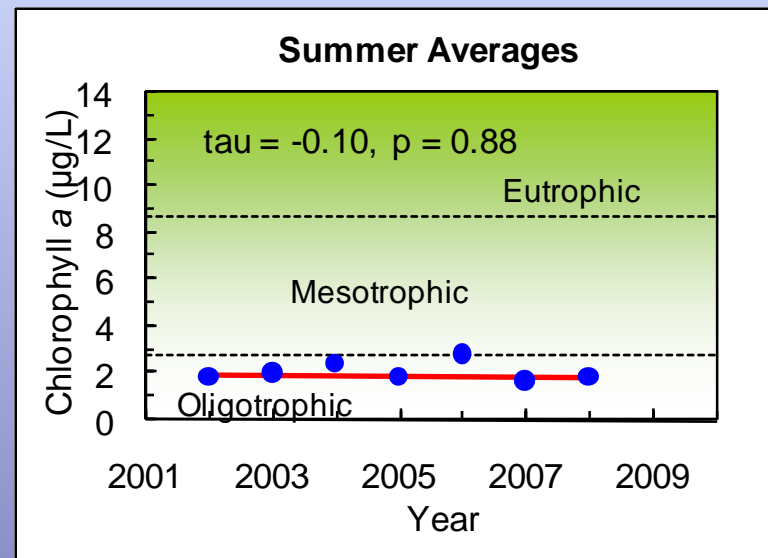
Measure of Algae

- Present in all algae
- An important component of algal growth
- Used as a measure of algae biomass

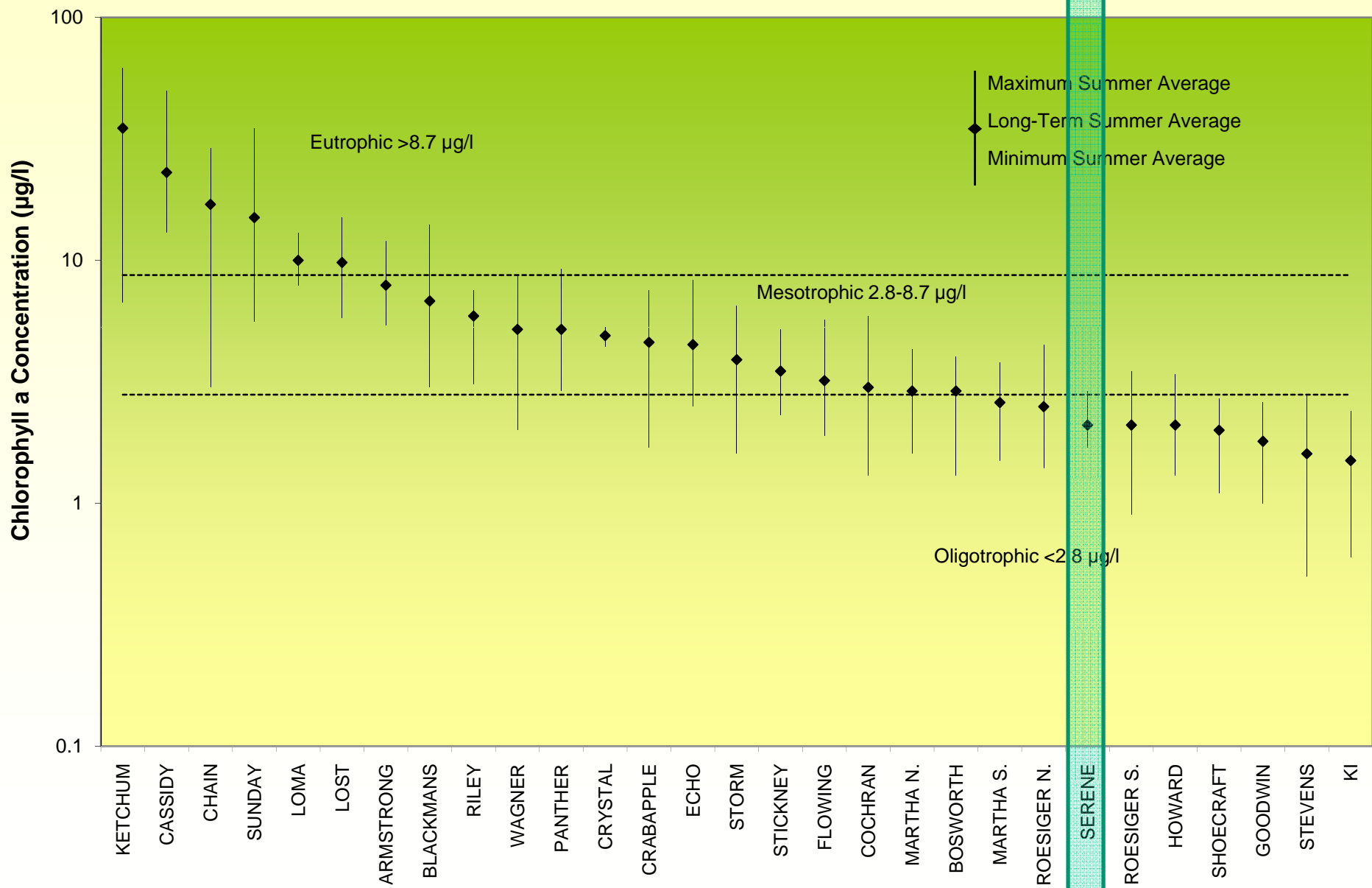


Lake Serene Chl *a*

- Low (2.1 $\mu\text{g/l}$)
- Short dataset
- Do not appear to be any trends

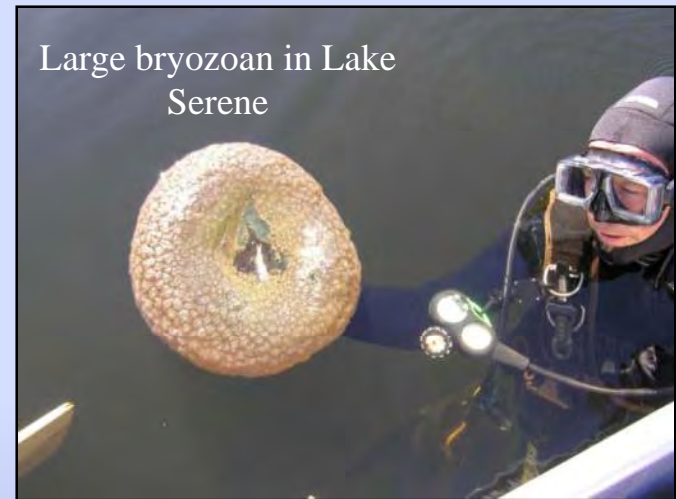


SUMMER AVERAGE CHLOROPHYLL A 2002-2008



Lake Serene Overview

- Mesotrophic Shallow Lake
 - High Water Clarity
 - Low Phosphorus Levels
 - Low Chlorophyll *a* Levels
 - Highly Productive in Aquatic Plants
 - Experiences occasional filamentous algae blooms
- Water Quality Trends
 - Meeting goal of improving water quality



Keep Lake Serene Healthy By Reducing Nutrients From Watershed

- **Adjust Lawn Care Methods**
 - Skip the fertilizer or use zero phosphorus fertilizer or organic
 - Avoid weed-n-feed products
 - Keep grass longer
- **Plant Buffers of Native Vegetation**
 - Any width helps to filter pollution
 - Helps keep geese out of your yard
 - Can be planted or just stop mowing
 - Also great for wildlife
- **Clean Up Pet Wastes**
- **Control Storm Runoff**
 - Minimize hard surfaces
 - Route pipes away from lake into vegetation
 - Limit Erosion



Lakeshore with large buffer of vegetation

Some more
aquatic life
found in
Lake Serene



Bryozoan



Another Bryozoan species

Freshwater Sponge





Another type
of sponge?

QUESTIONS?

Contact Snohomish County SWM

425-388-3464

Gene Williams

Marisa Burghdoff

www.lakes.surfacewater.info

For More Information on Invasive Aquatic Plants

Ecology's Aquatic Plant Program

<http://www.ecy.wa.gov/programs/wq/links/plants.html>

Washington State Noxious Weed Control Board

<http://www.nwcb.wa.gov/>