HOW OUR LAKE WORKS

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(with thanks to creators of previous drafts, especially Tim Asplund & Pamela Toshner, WDNR)

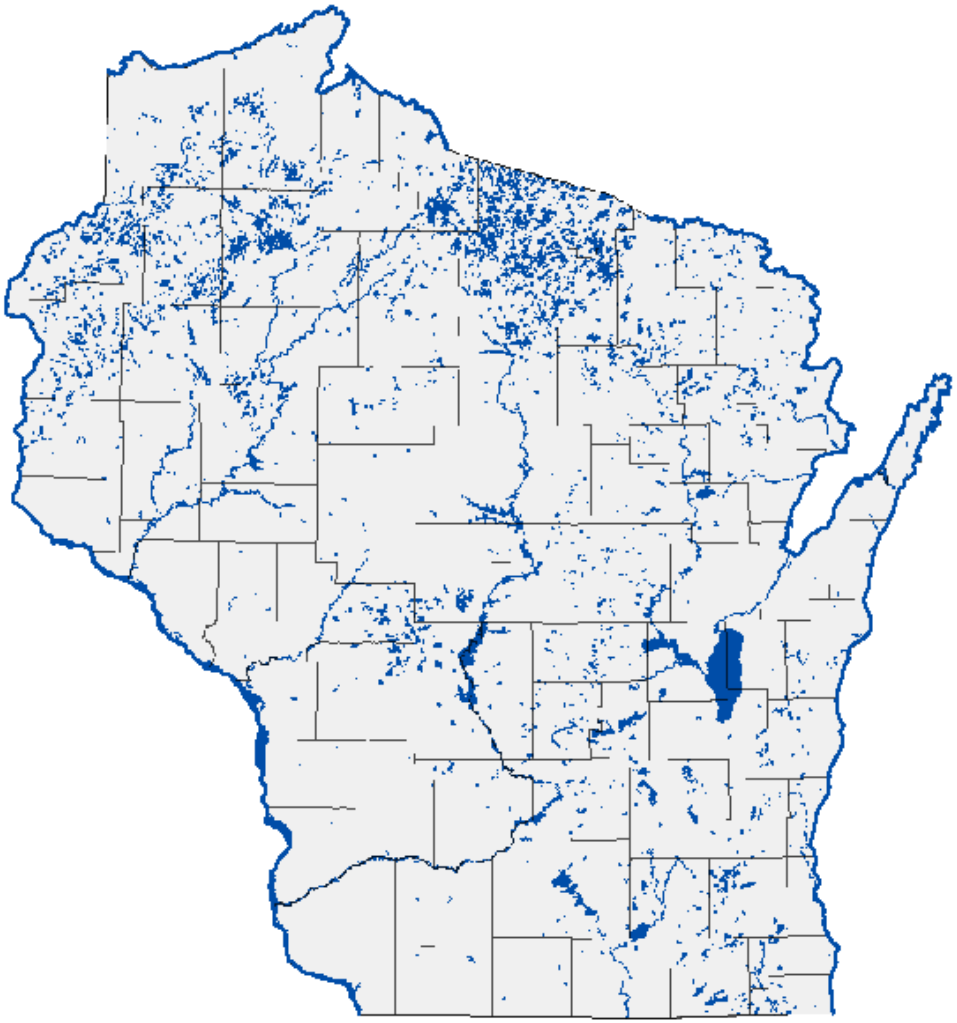
Courtesy of the WI Lakes Partnership and Jefferson County

OVERVIEW

What Makes a Lake?

- Physical characteristics
- Chemistry
- Biology

Aquatic plants: Drawbacks + Benefits

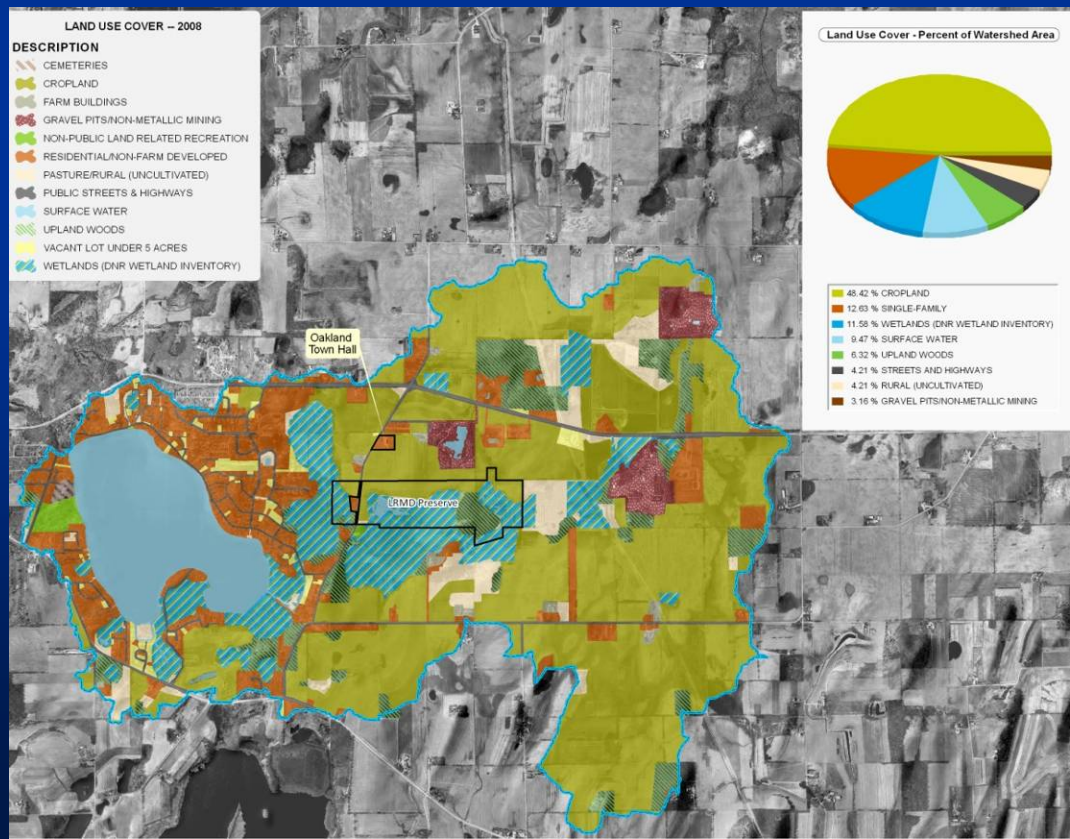


WISCONSIN’S LAKES

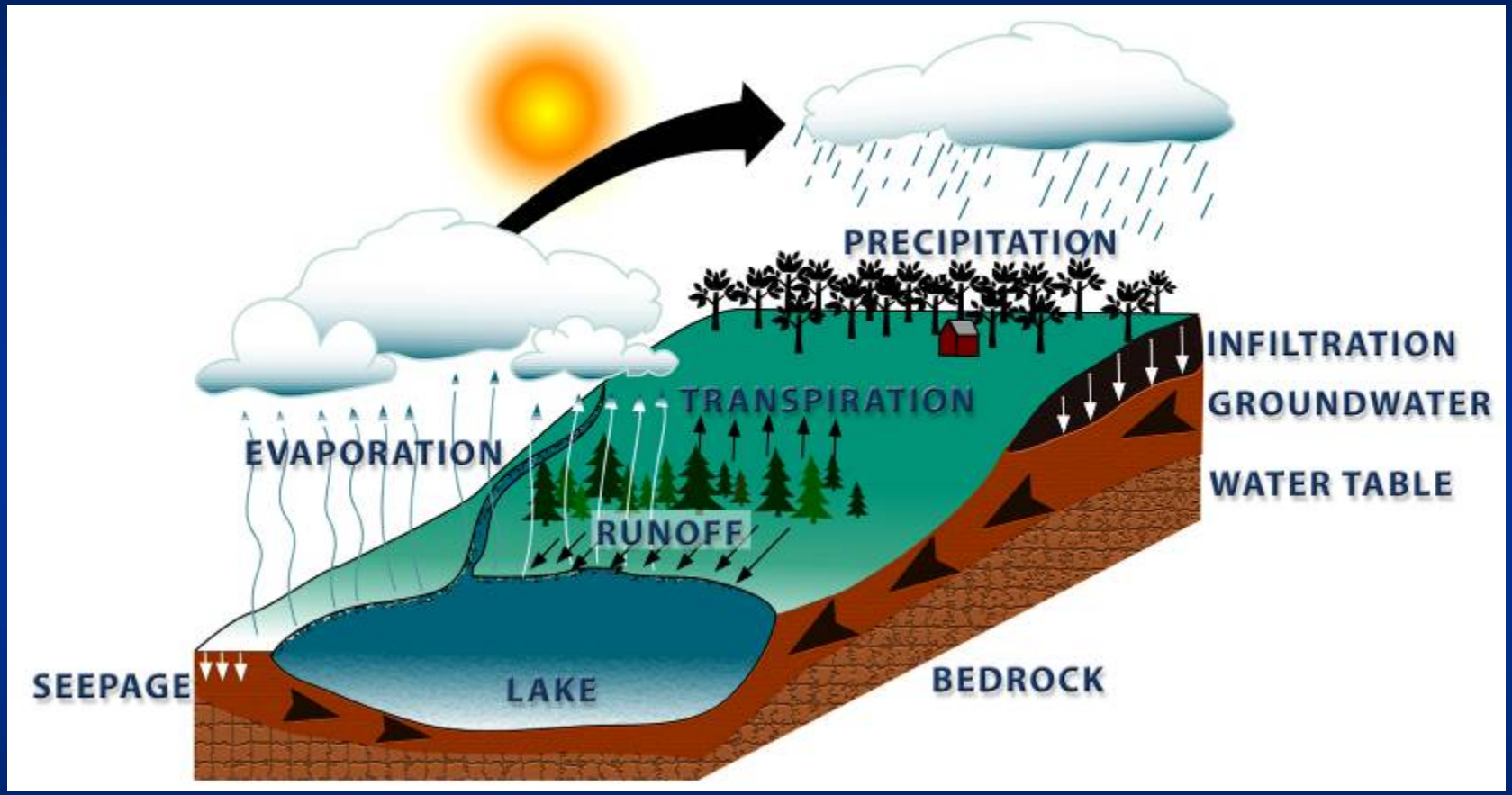
Wisconsin has one of the largest concentrations of fresh water glacial lakes on the planet.

PHYSICAL CHARACTERISTICS

- Landscape Position
- Drainage Basin / Lake Area Ratio
- Land Use
- Lake Depth
- Mixing / Stratification
- Retention Time

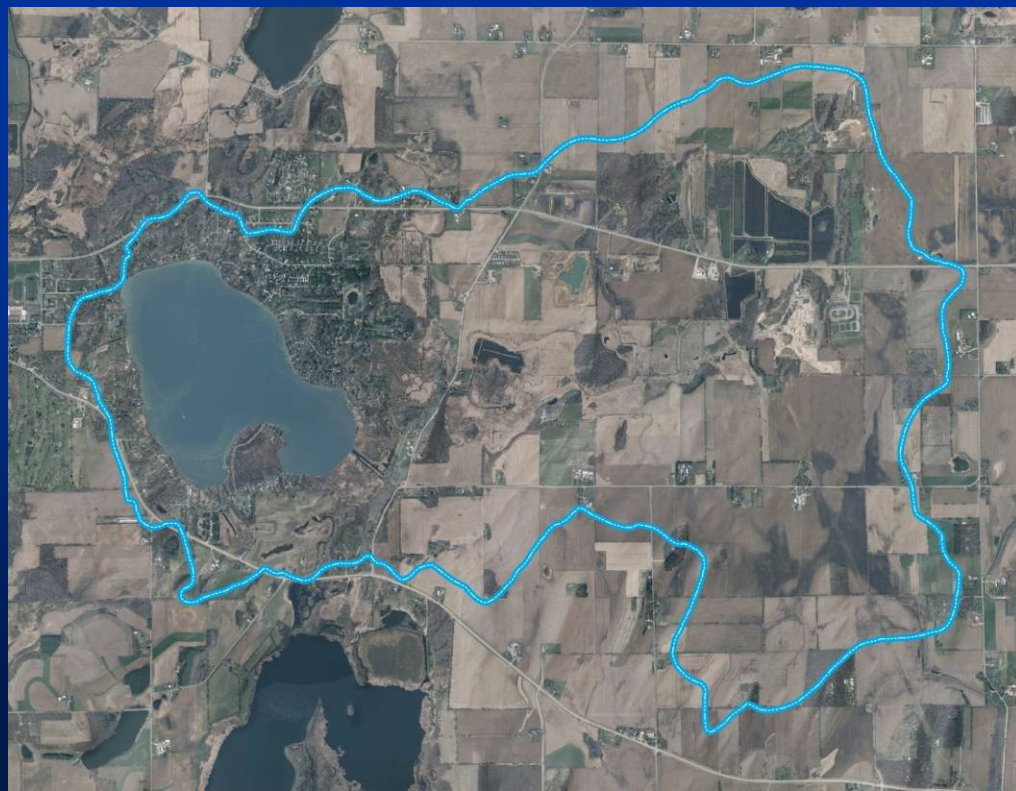


Hydrologic Cycle

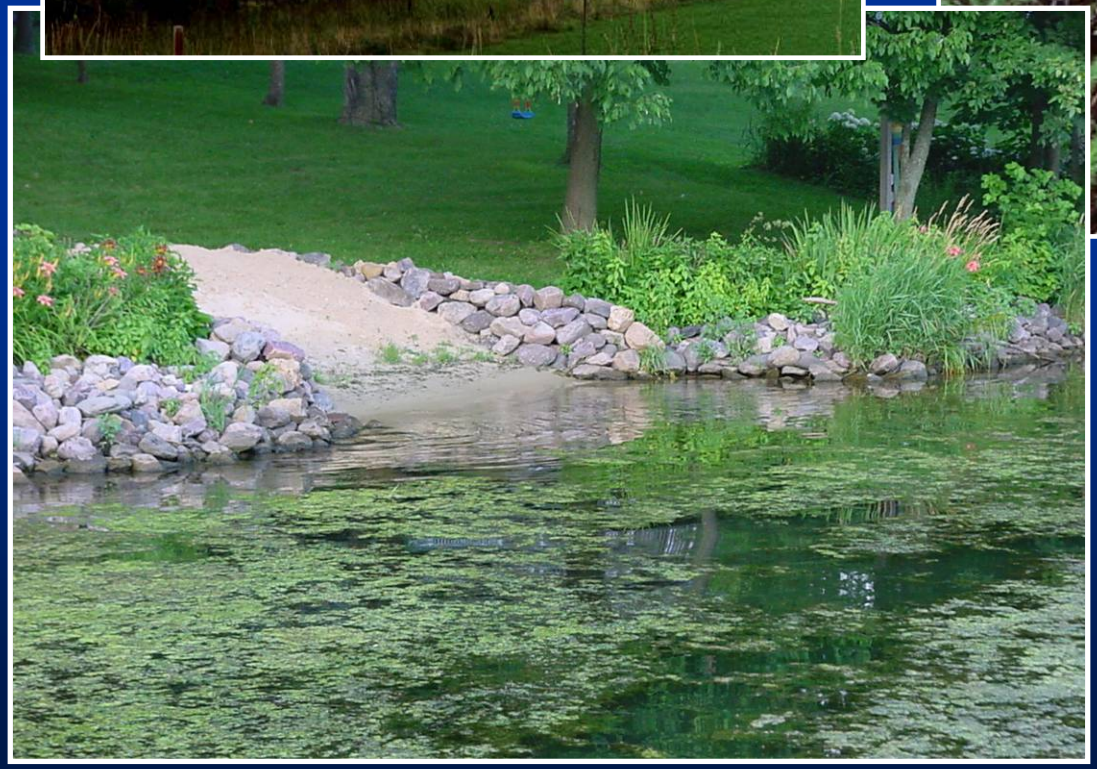


Ratio of lake size to watershed size influences water quality

- Lake Ripley has 11:1 watershed-to-lake area ratio
- Lakes >10:1 more often experience water quality problems
- Lake Ripley benefits from wetlands, which generally filter pollutants
- Lake Ripley benefits from calcium carbonate

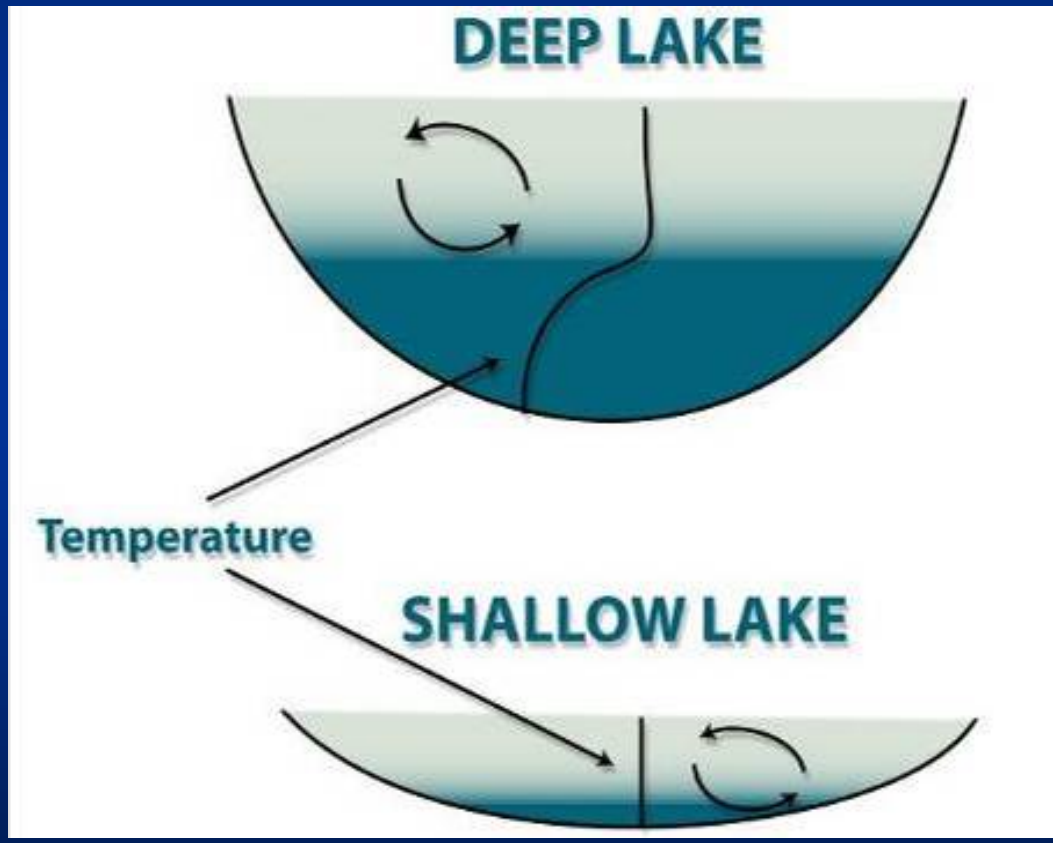


Land use determines pollution loading

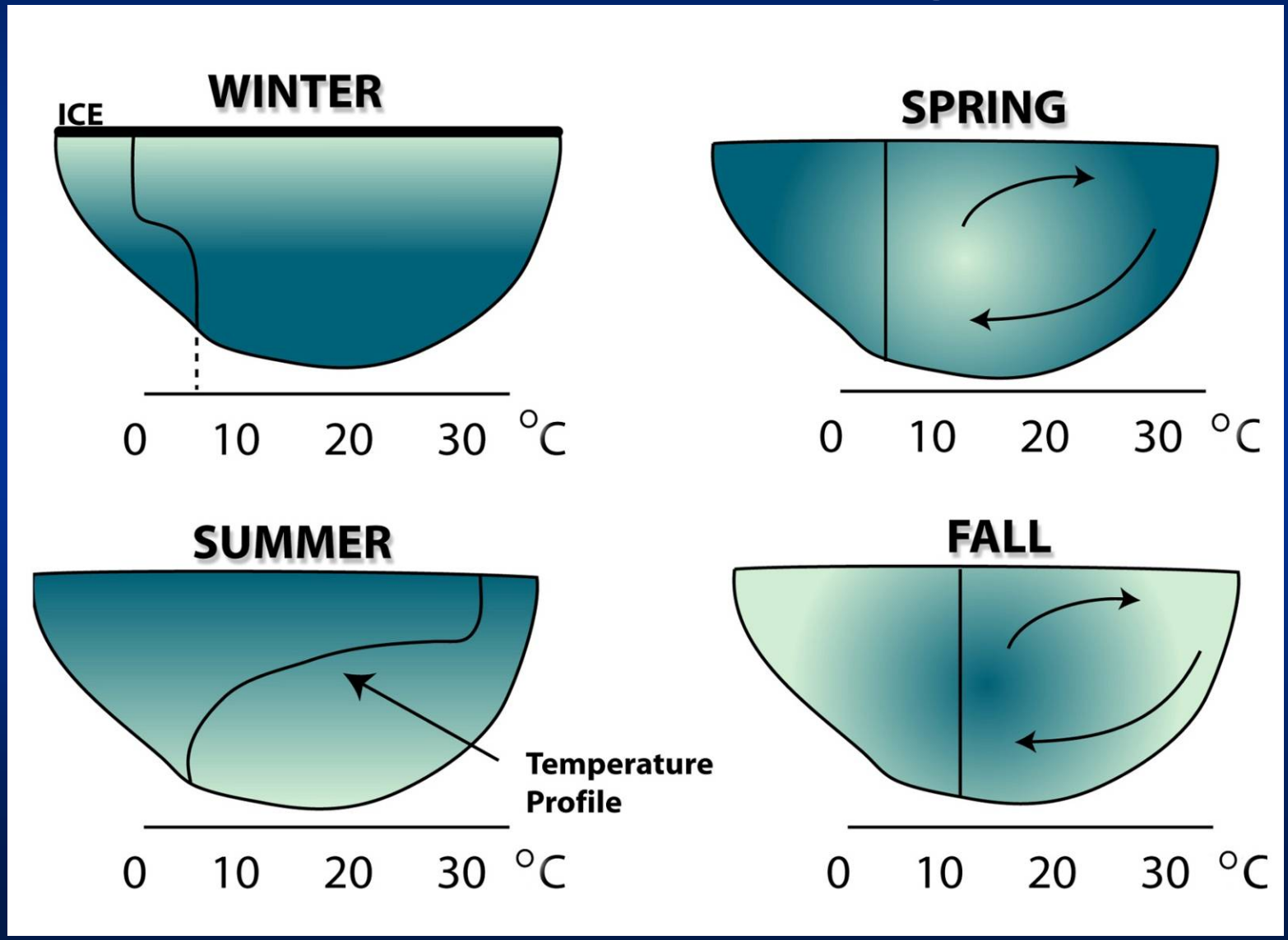


Lake Depth Matters

- **Deep Lakes, like Lake Ripley (max depth = 44 ft), stratify**
- **Shallow Lakes, like Lake Koshkonong (max depth = 7 ft), mix continuously.**

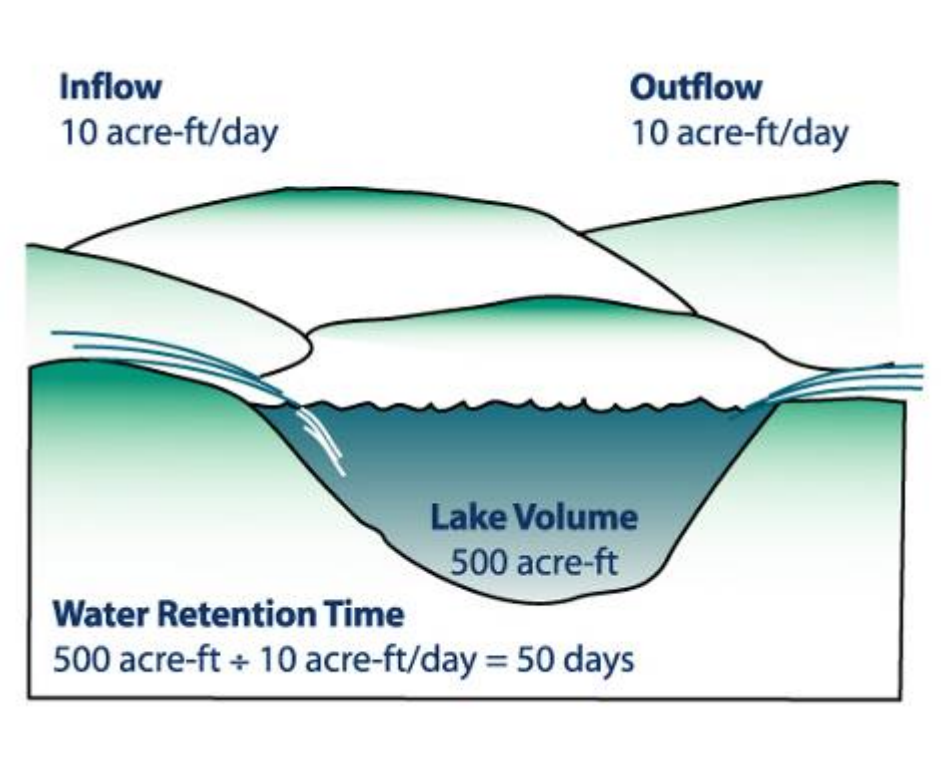


Mixing & Stratification are Seasonal Changes



Retention Time

- Retention time is the time it would take to fill the drained lake



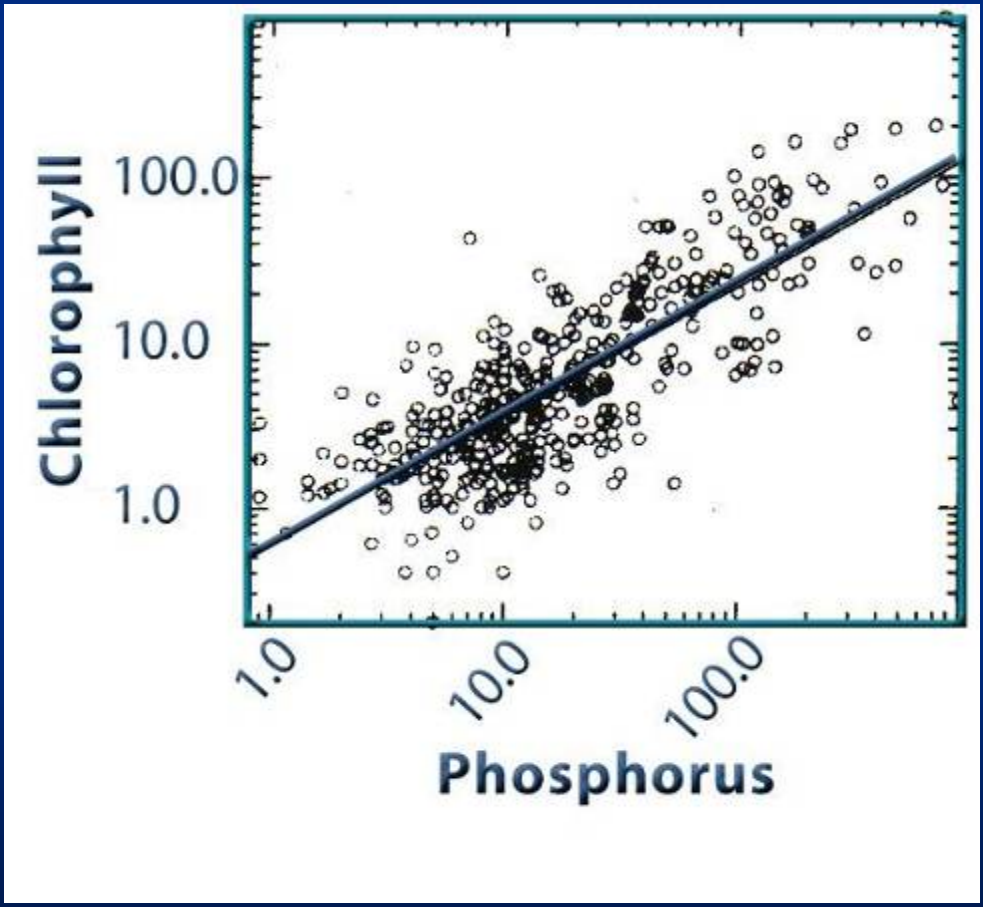
- Memory Lake, Burnett Co., 6 hours
- Lake Ripley, 2.9 years
- Lake Superior, 191 years

CHEMISTRY

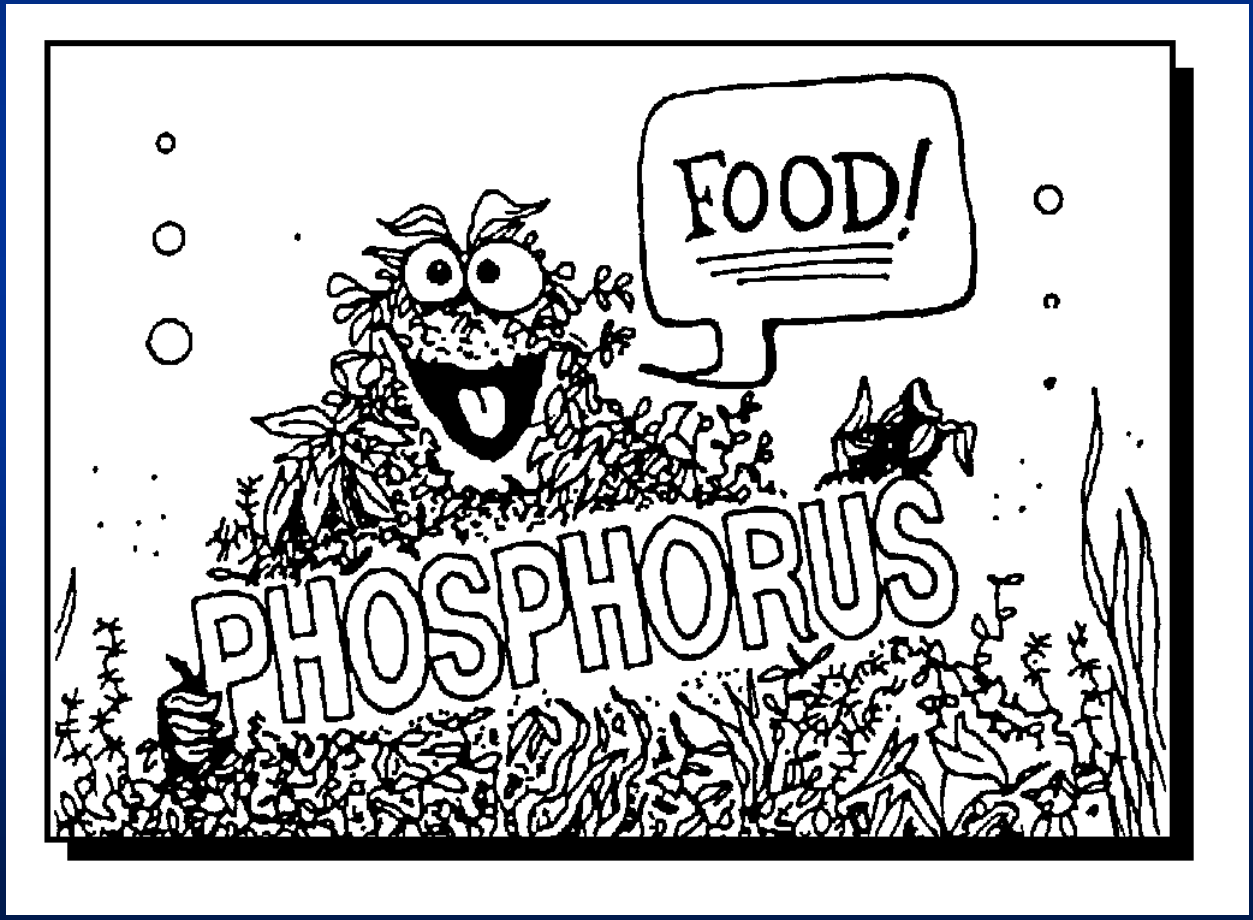
- Nutrients
  - Phosphorous**
  - Nitrogen
- Dissolved Oxygen (optimum 5 ppm)

Total Phosphorus to Chlorophyll a Relationship

- Phosphorus causes excess algae & plants to grow
- Chlorophyll a is a measure of algal growth

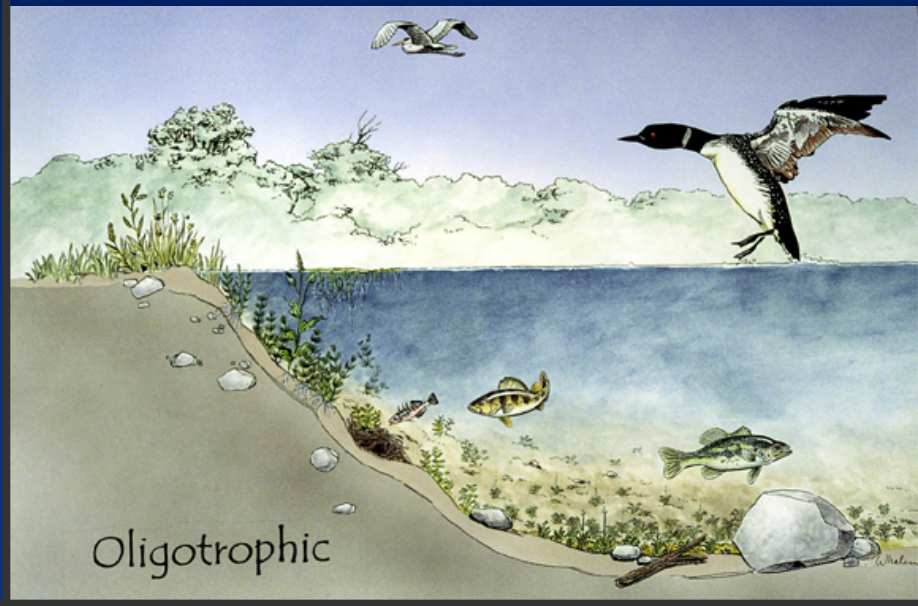


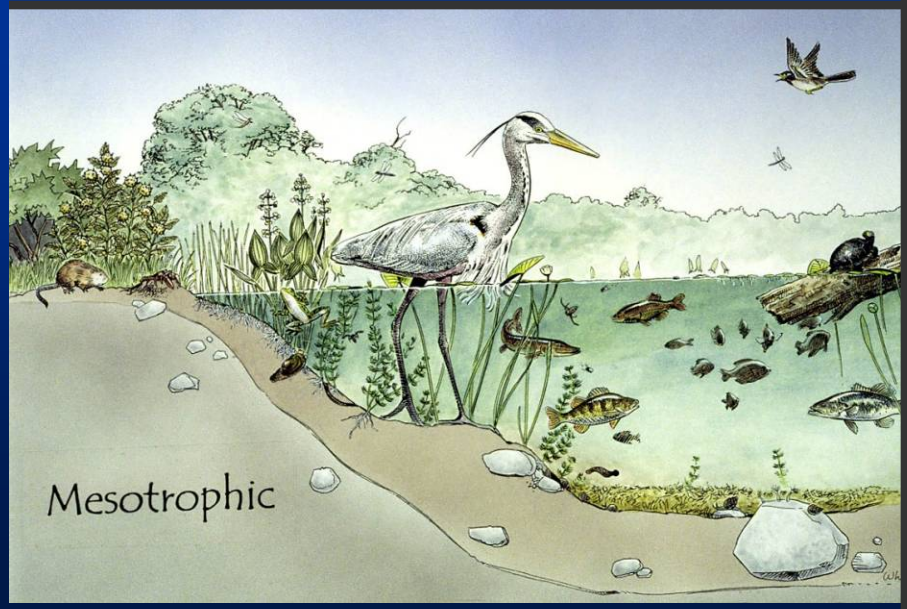
Total Phosphorus and Chlorophyll a Relationship

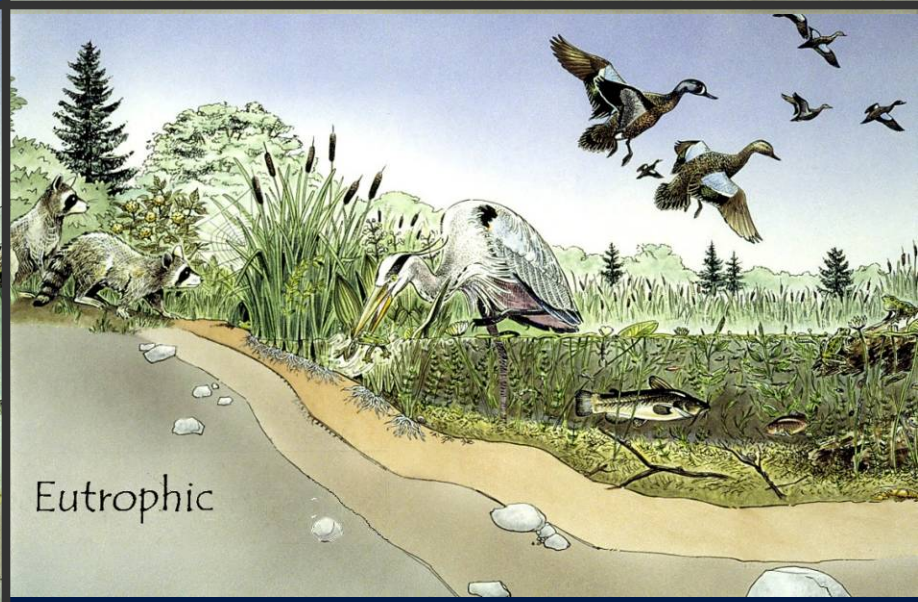


Trophic States

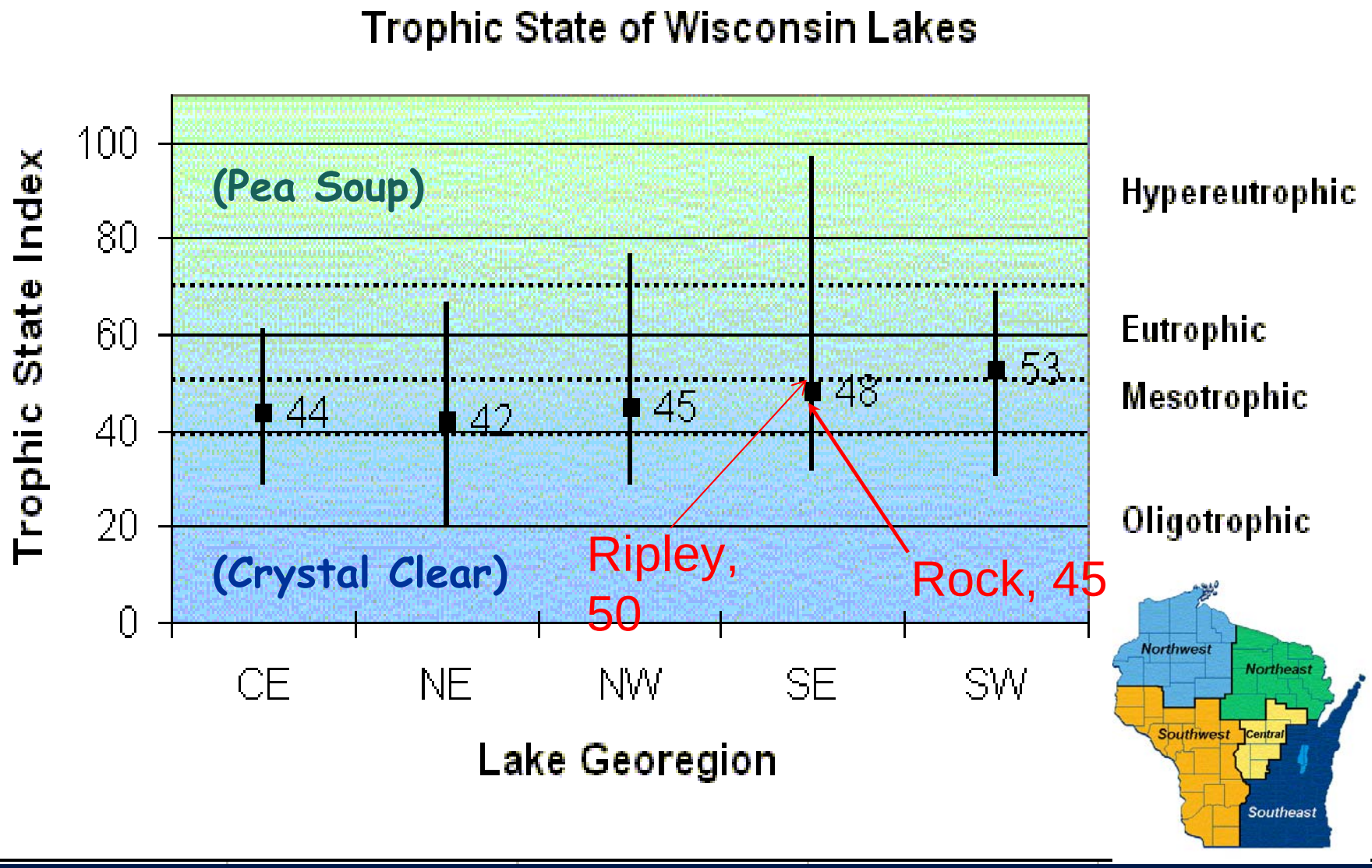
Are determined by measuring water clarity, chlorophyll and phosphorus







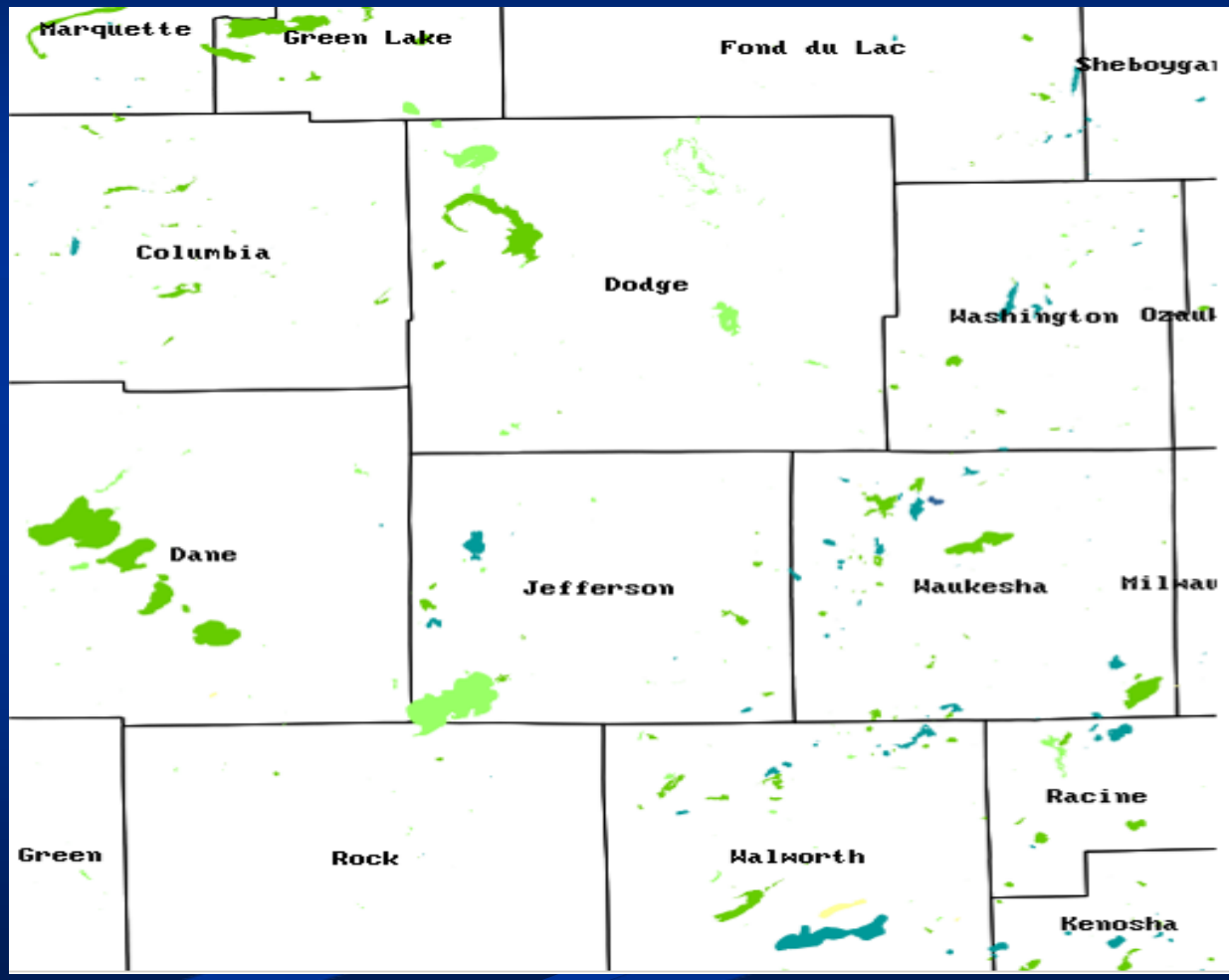
Regional Lake Report



Wisconsin Lake Clarity

Trophic State From Space

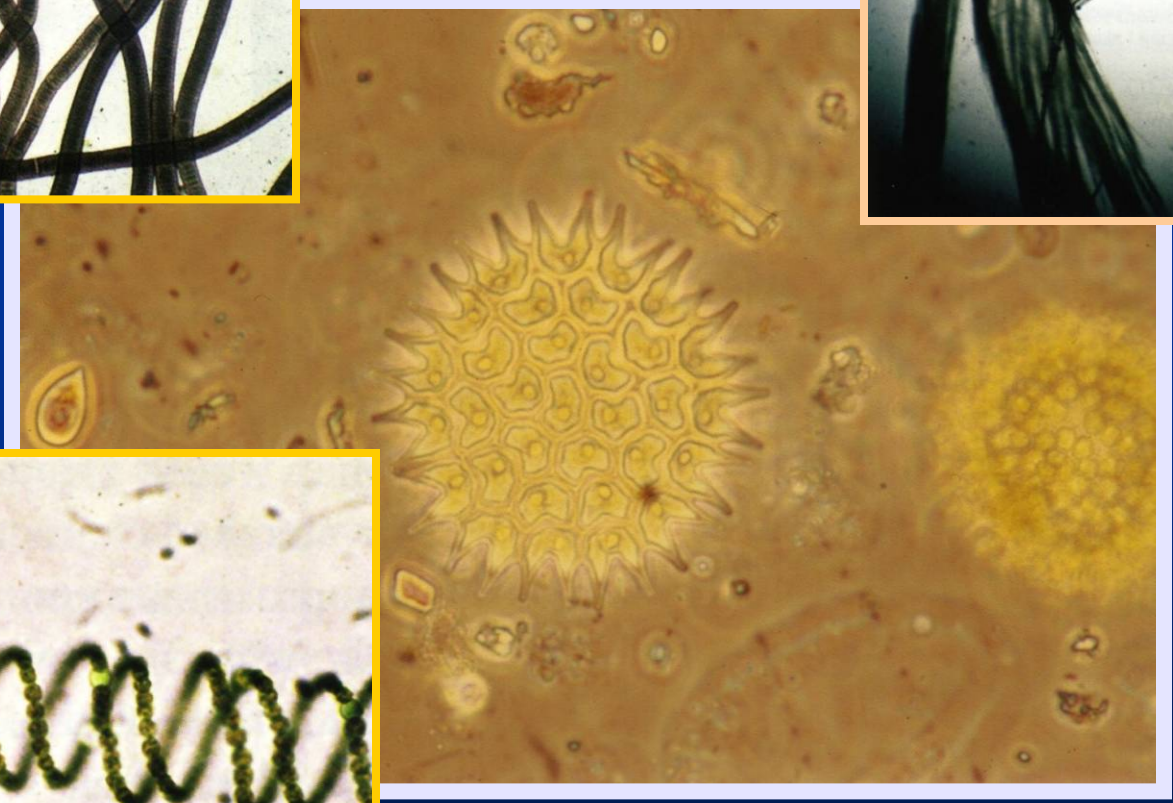
Trophic State Index	Estimated Secchi Depth
> 80	< 0.25 m (< 0.8 ft)
70 to 80	0.25 - 0.5 m (0.8 - 1.6 ft)
60 to 70	0.5 - 1 m (1.6 - 3.3 ft)
50 to 60	1 - 2 m (3.3 - 6.6 ft)
40 to 50	2 - 4 m (6.6 - 13.1 ft)
30 to 40	4 - 8 m (13.1 - 26.2 ft)
< 30	> 8 m (> 26.2 ft)



BIOLOGY

- What lives in lakes
- Aquatic Invasive Species (AIS)

Algae, Bacteria



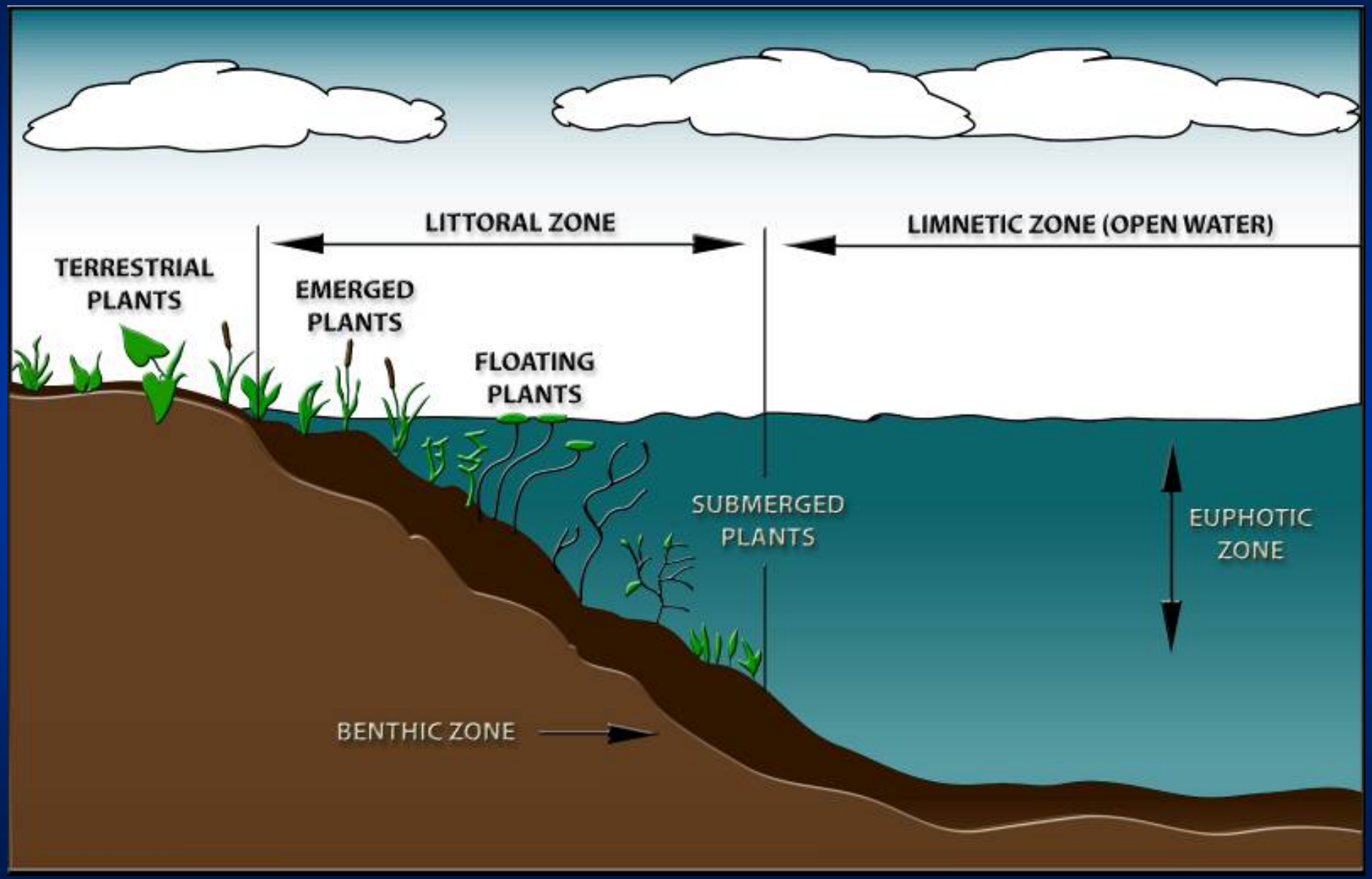
Zooplankton & Aquatic Invertebrates

Aquatic Plants

Fish

Aquatic Invasive Species (AIS)

Littoral Zone



90% of all lake life is born, raised and fed in the area where land and water meet. *(Ontario, Ministry of Natural Resources)*

WHAT'S THE BIG DEAL ABOUT AQUATIC PLANTS?

Drawbacks of Dense Aquatic Plants*

- Tangle on props or keels
- Discourage swimming
- Cause bad odors
- Control costs money and effort

*Most of Lake Ripley does not support dense aquatic plants.

Benefits of Aquatic Plants

- Stabilize sediment
- Dampen wave energy
- Reduce shoreline erosion

Benefits of Aquatic Plants

Attached algae and bacteria

Host tiny bugs and snails

Hiding places for fish

Benefits of Aquatic Plants

Spawning surfaces

Necessary habitat for fish and frogs

UW-Extension Lakes Program

Benefits of Aquatic Plants

Homes for birds and insects

Photos by UW-Extension Lakes Program

Benefits of Aquatic Plants

Keep water cool on hot days

Suppress algae (several ways)

Aquatic Plants and Algae are KEY to Healthy Lakes!