

How Does My Lake Work?

Limnology 101



Courtesy of the WI Lake Partnership

Wisconsin Department of Natural Resources

Wisconsin Association of Lakes

University of Wisconsin Extension



UW
Extension

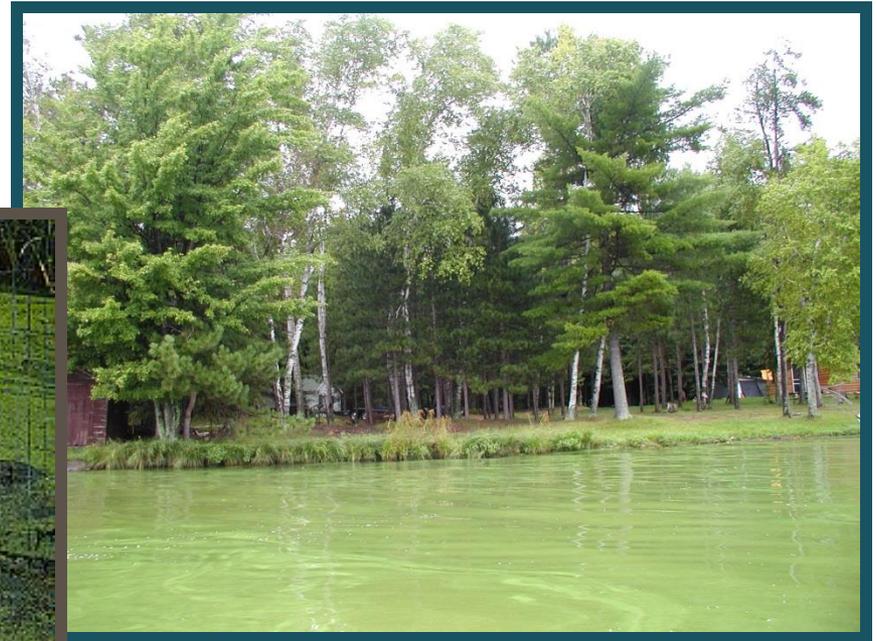


Healthy lakes are balanced ecosystems.

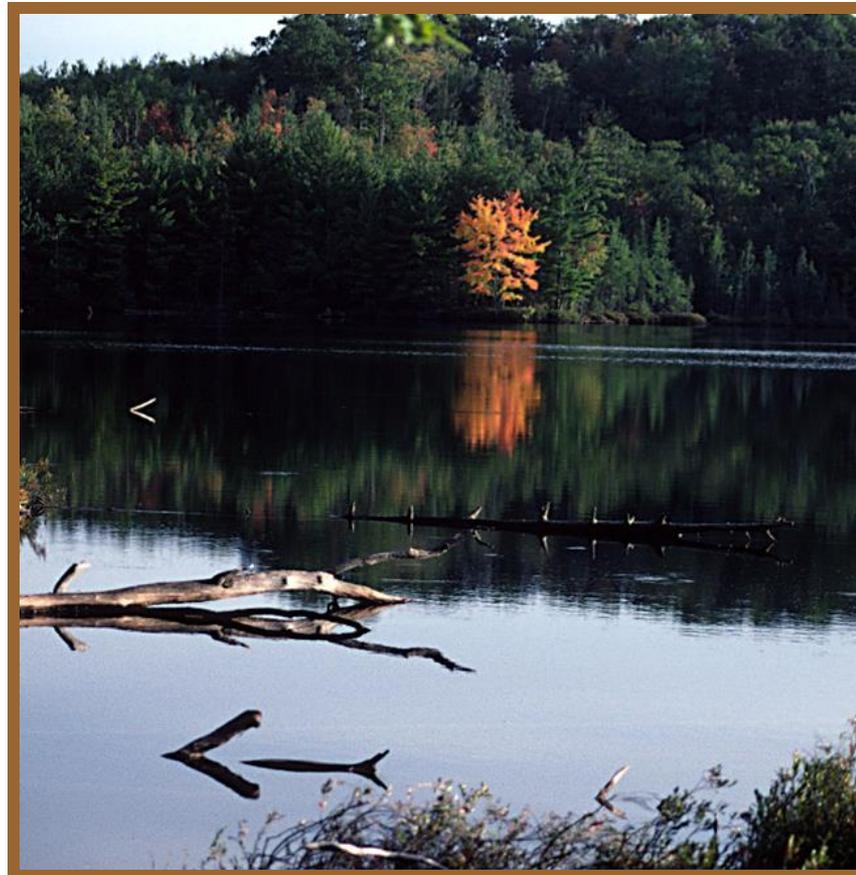




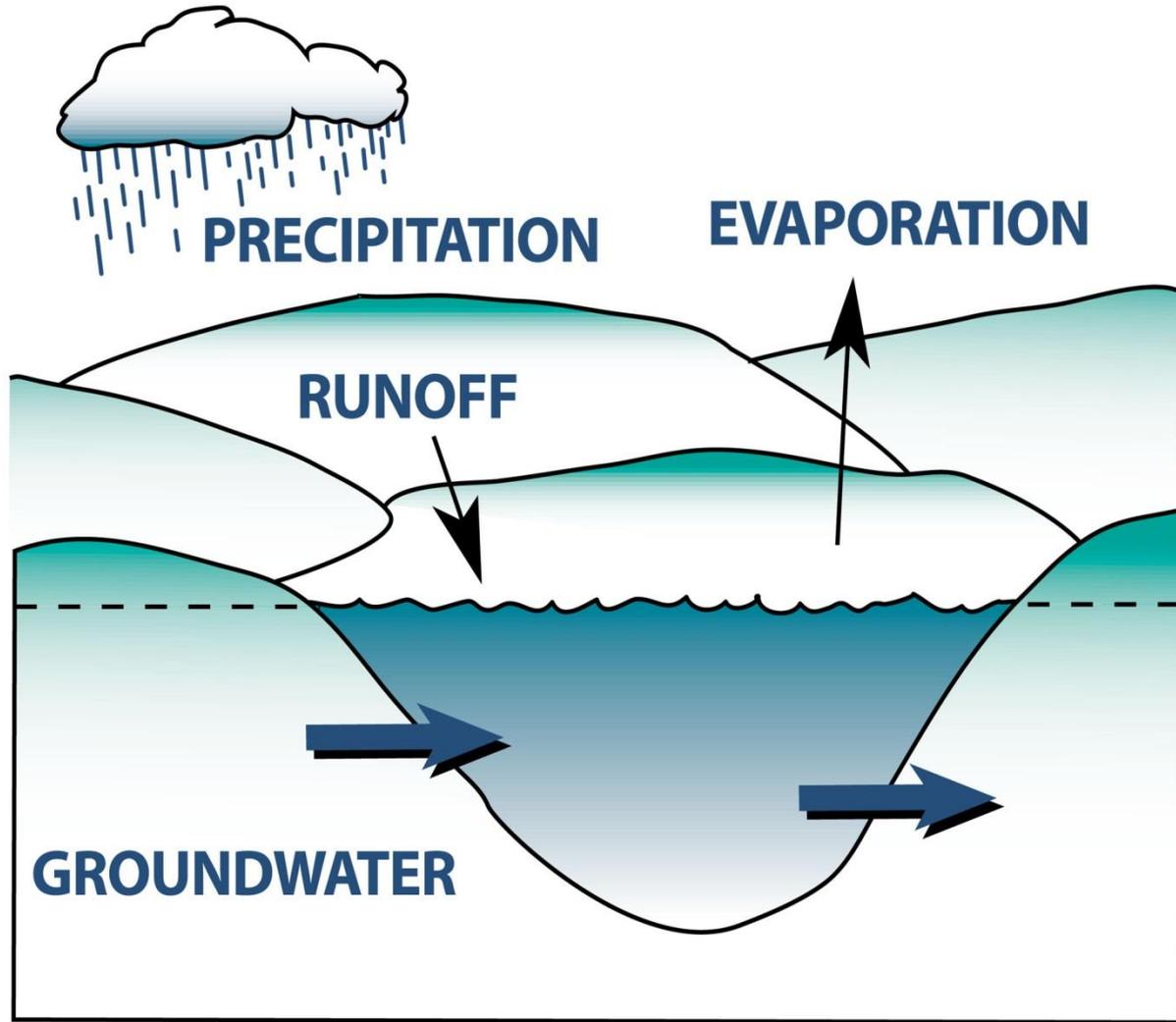
Small impacts can add up to undesirable outcomes...



What are the different types of lakes?



Seepage Lake

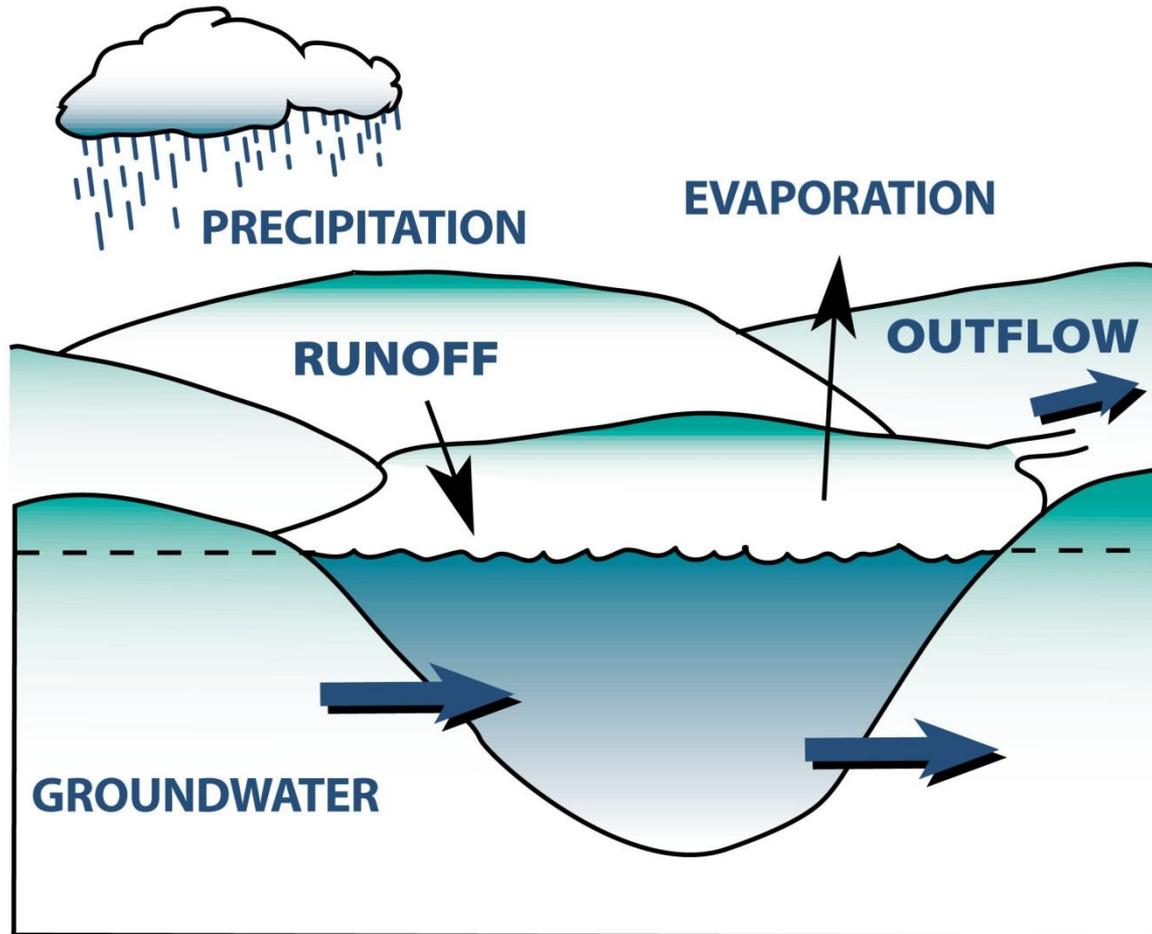


Seepage Lake



Booth Lake

Groundwater Drainage Lake (Spring Lake)

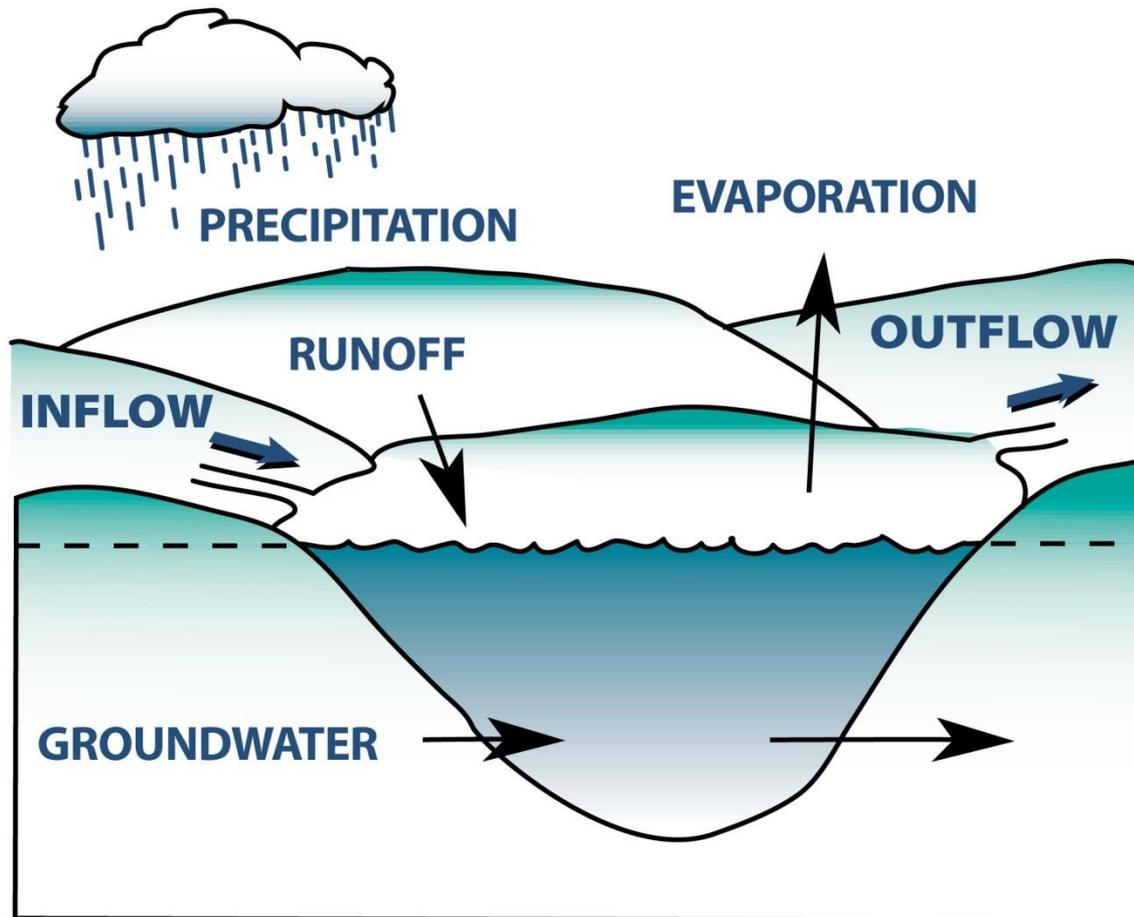


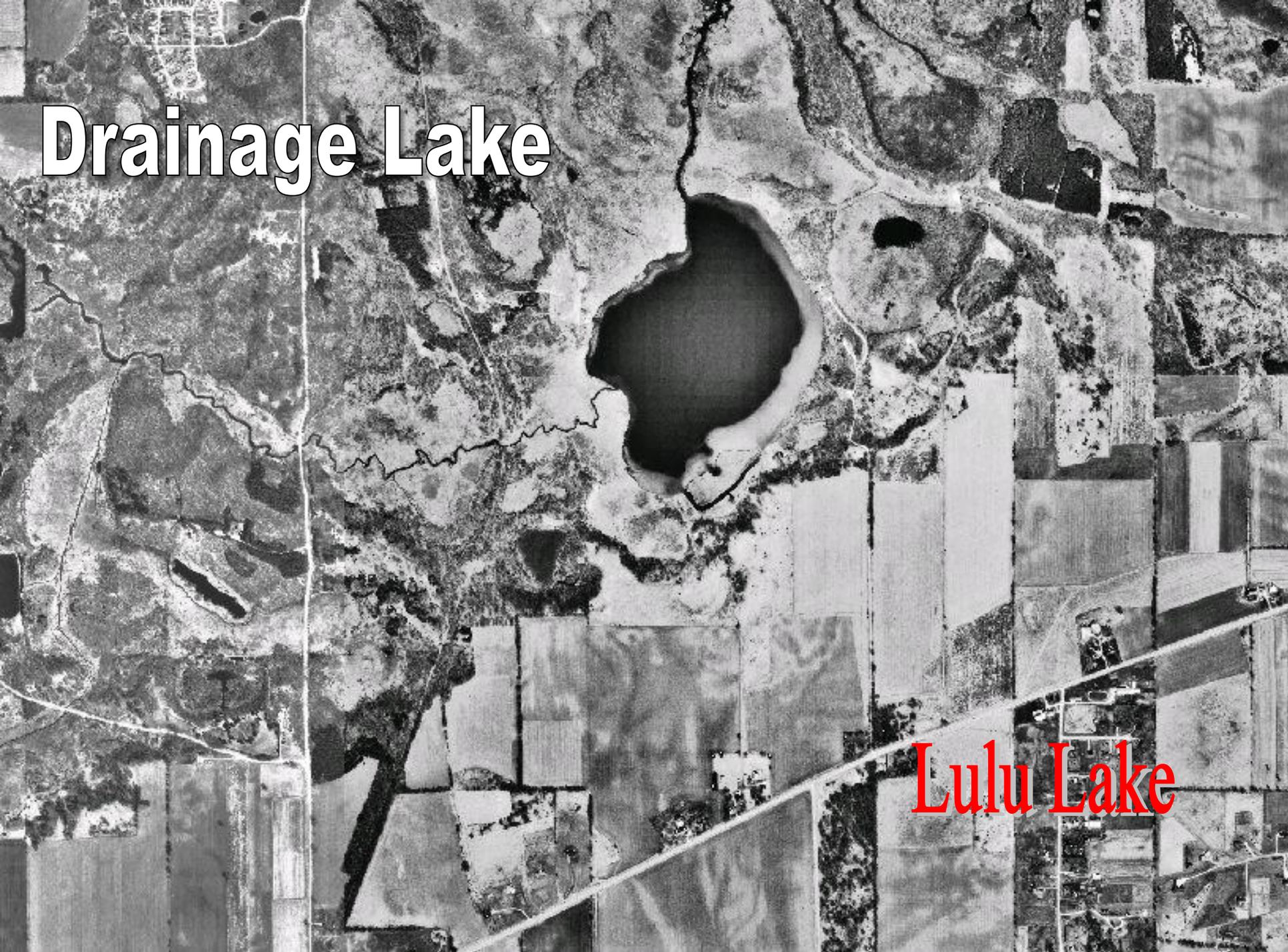


Spring Lake

Turtle Lake

Drainage Lake

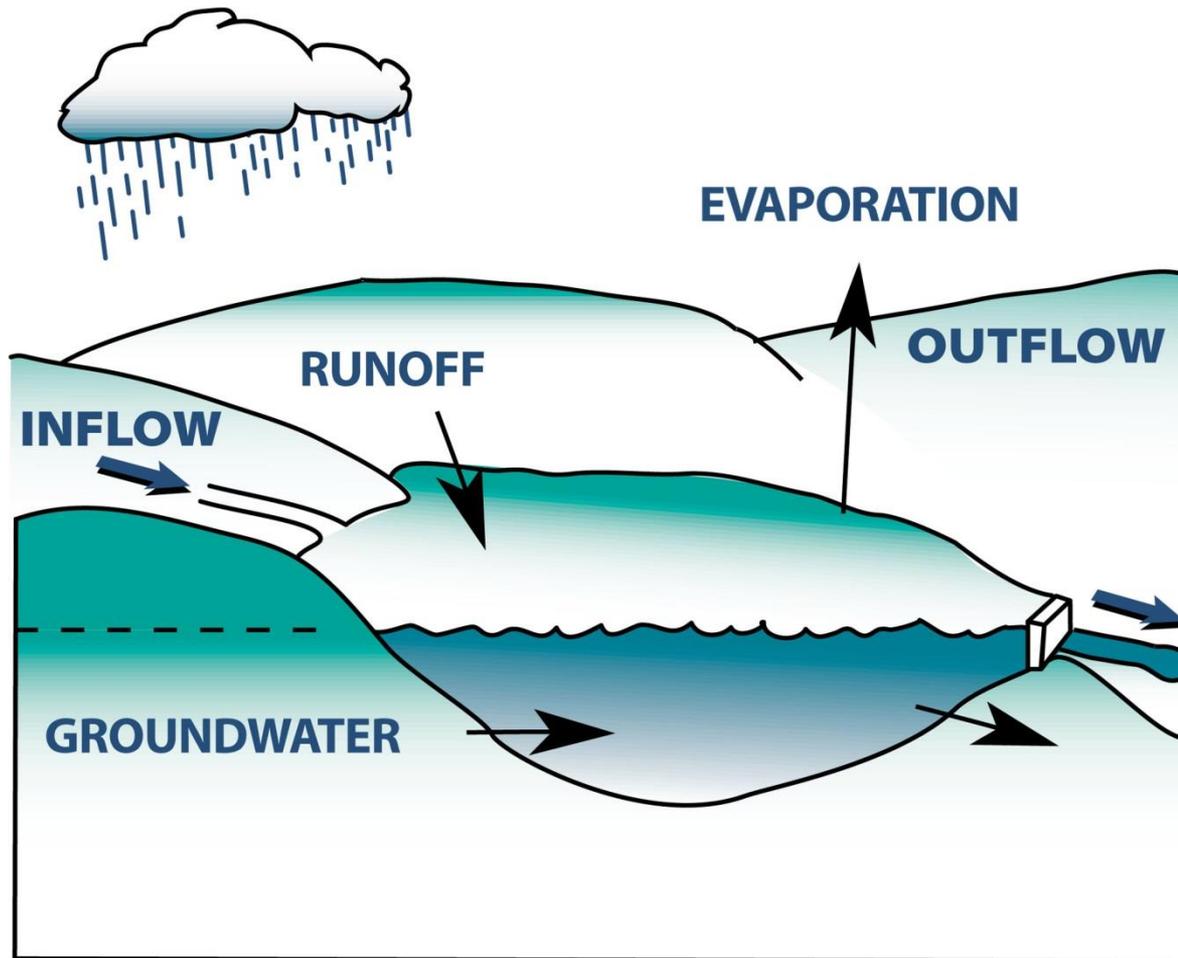


An aerial photograph showing a central, dark, irregularly shaped lake. The surrounding area is a patchwork of agricultural fields, some appearing as light-colored rectangles and others as darker, more textured areas. A prominent, winding road or path is visible on the left side of the image. The overall scene depicts a rural landscape with a central water body.

Drainage Lake

Lulu Lake

Impoundment



An aerial photograph showing a river winding through a landscape. A red dashed line is drawn across the river, indicating an impoundment. The area upstream of the dam is a reservoir. The surrounding land is a mix of agricultural fields and residential areas.

Impoundment

Comus Lake



Impoundments versus Raised Lakes

Impoundment

A man-made lake from a dammed river or stream

Raised lake

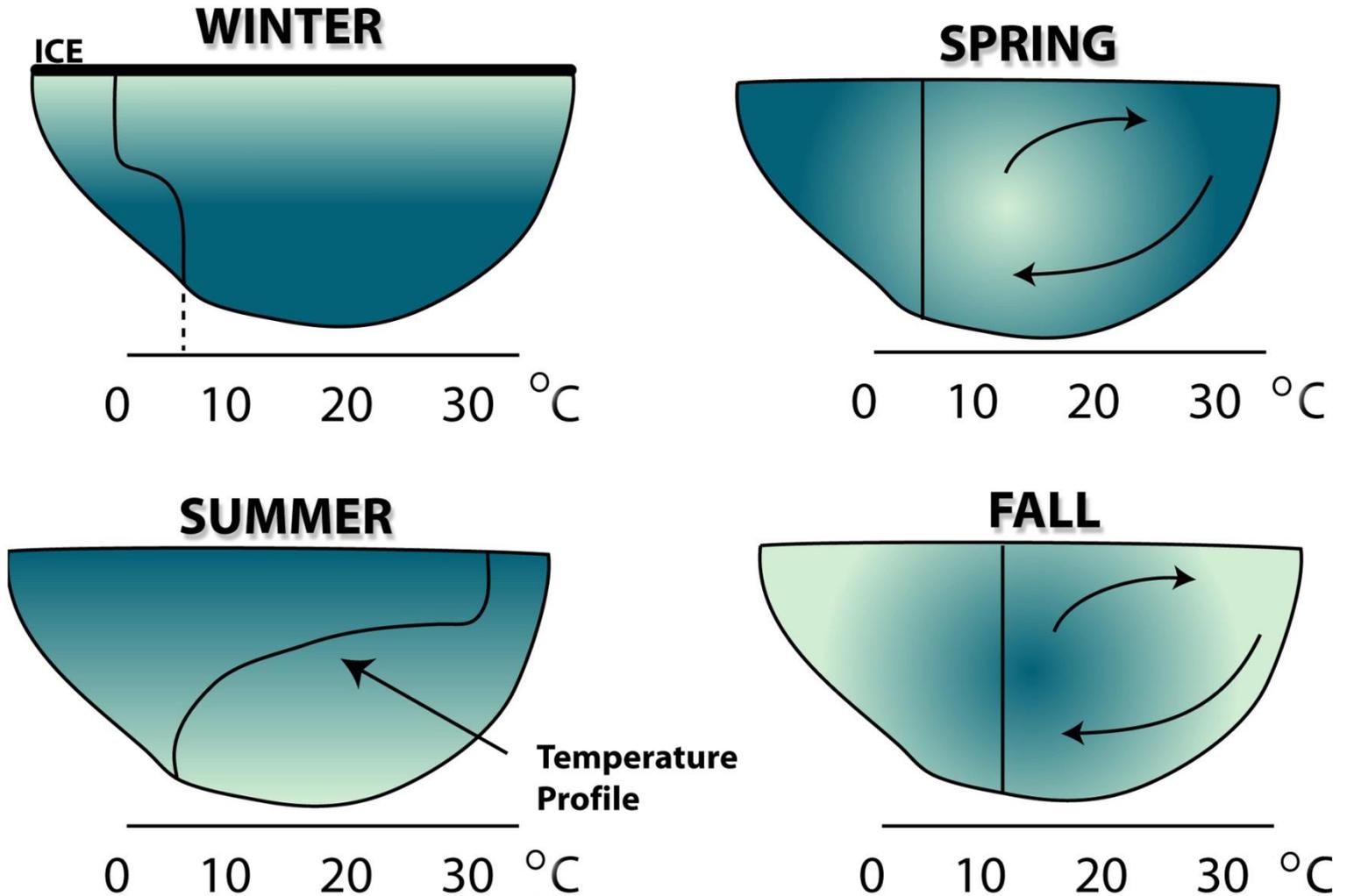
A natural lake artificially raised by a dam or water control structure

Physical Characteristics

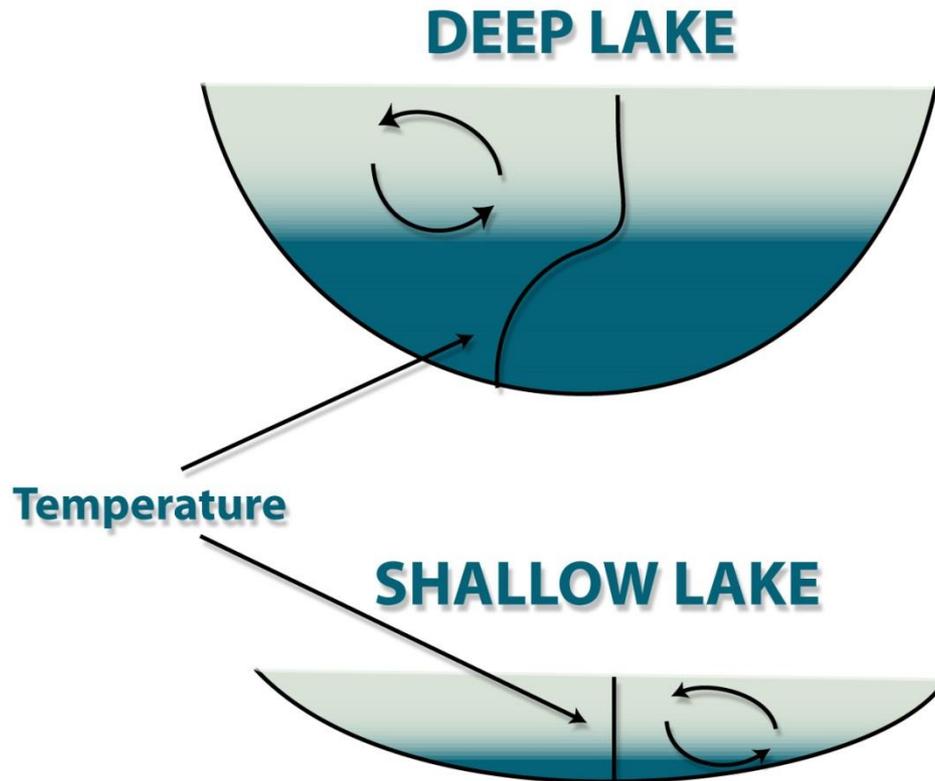
- Seasonal changes
- Lake depth
- Retention time
- Drainage basin & lake area ratio
- Influence of watershed runoff



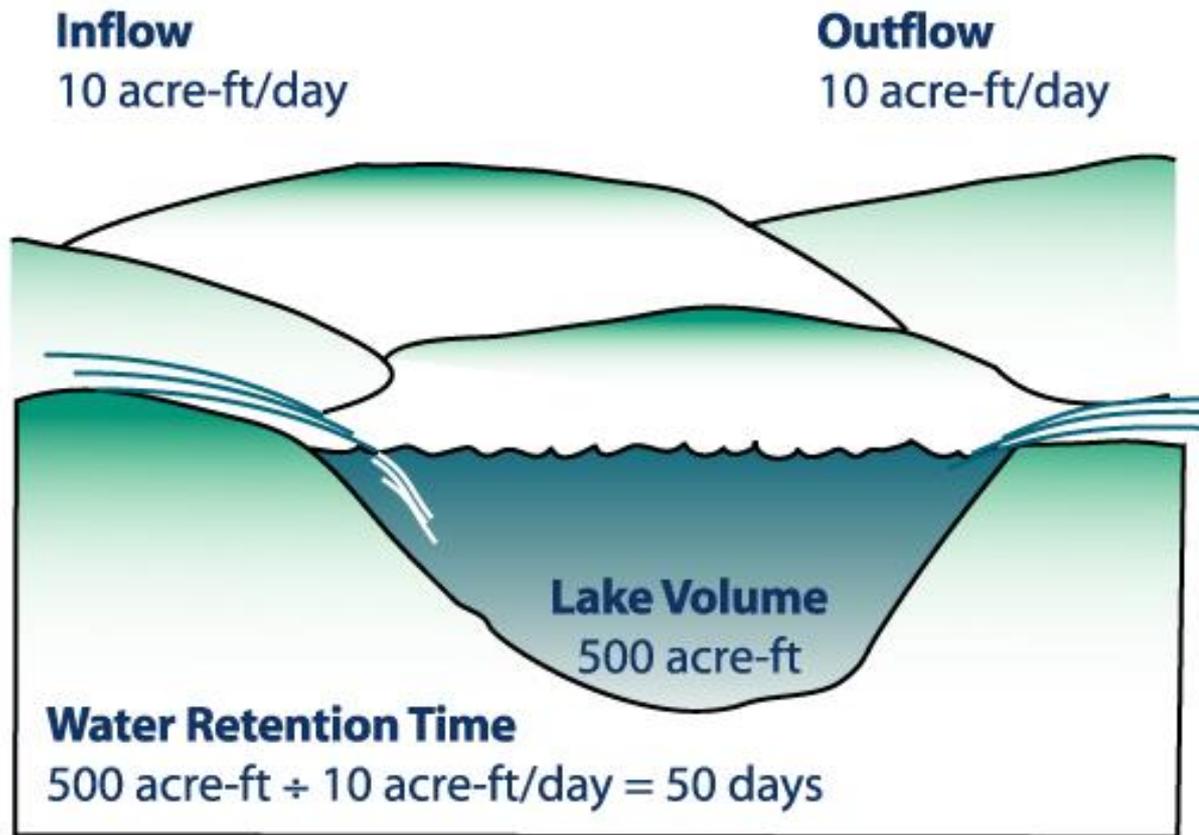
Stratification - Seasonal Changes



Lake depth determines lake characteristics.



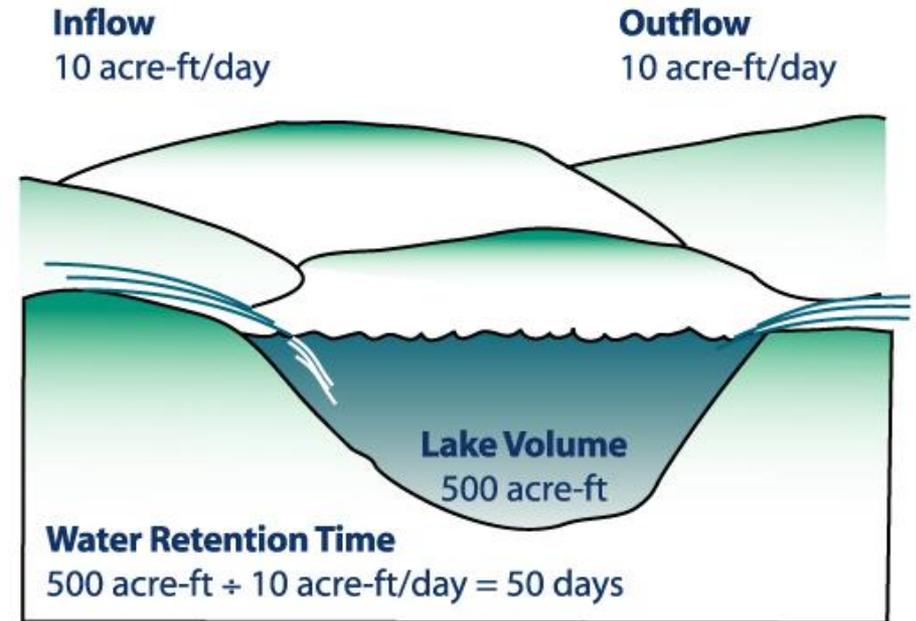
Retention Time



Retention Time

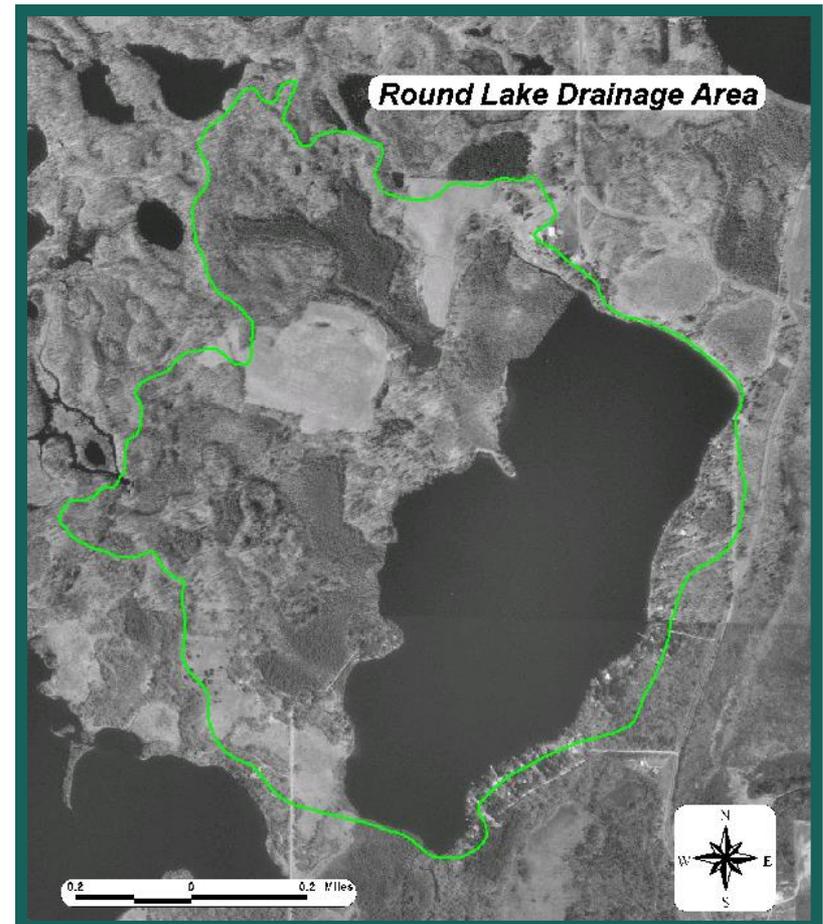
Lots of variability

- Geneva, 13.9 years
- Delavan, 2 years
- George, 66 days
- Comus, 15 days

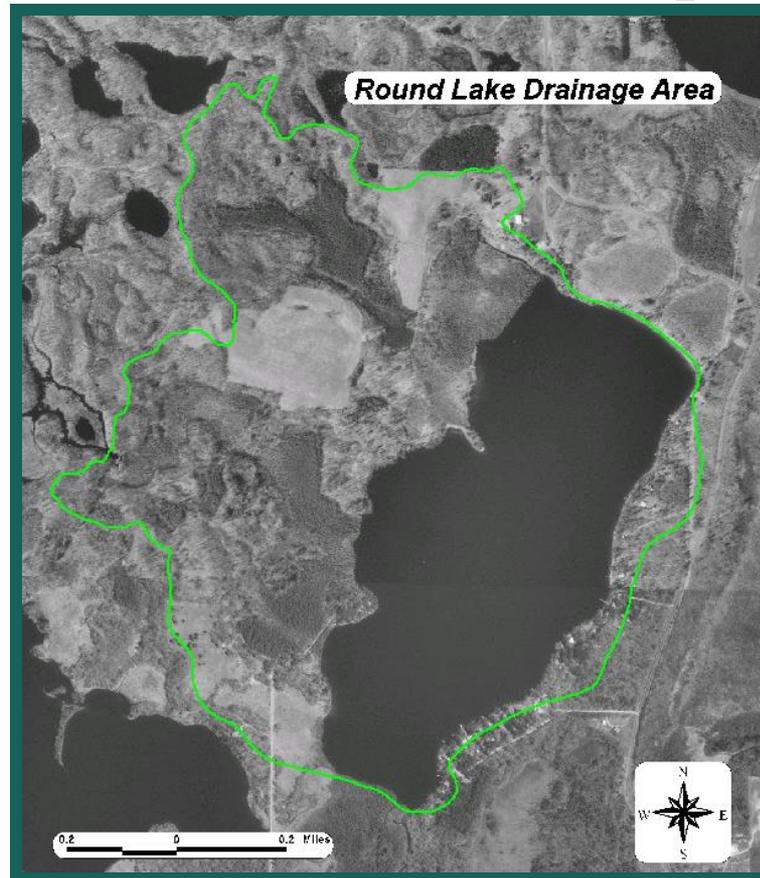


Lakes are a reflection of their watershed.

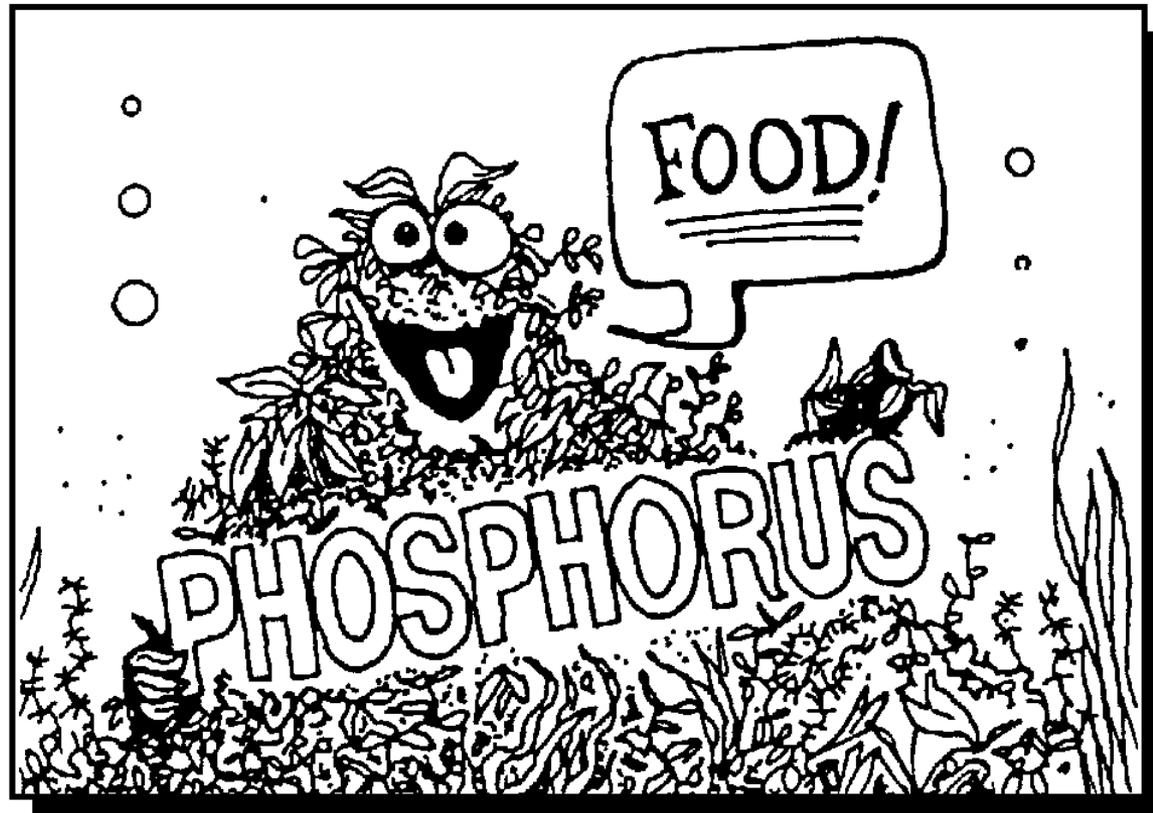
- Small watersheds = less runoff and pollution
- Large watersheds = more runoff and increased pollution levels



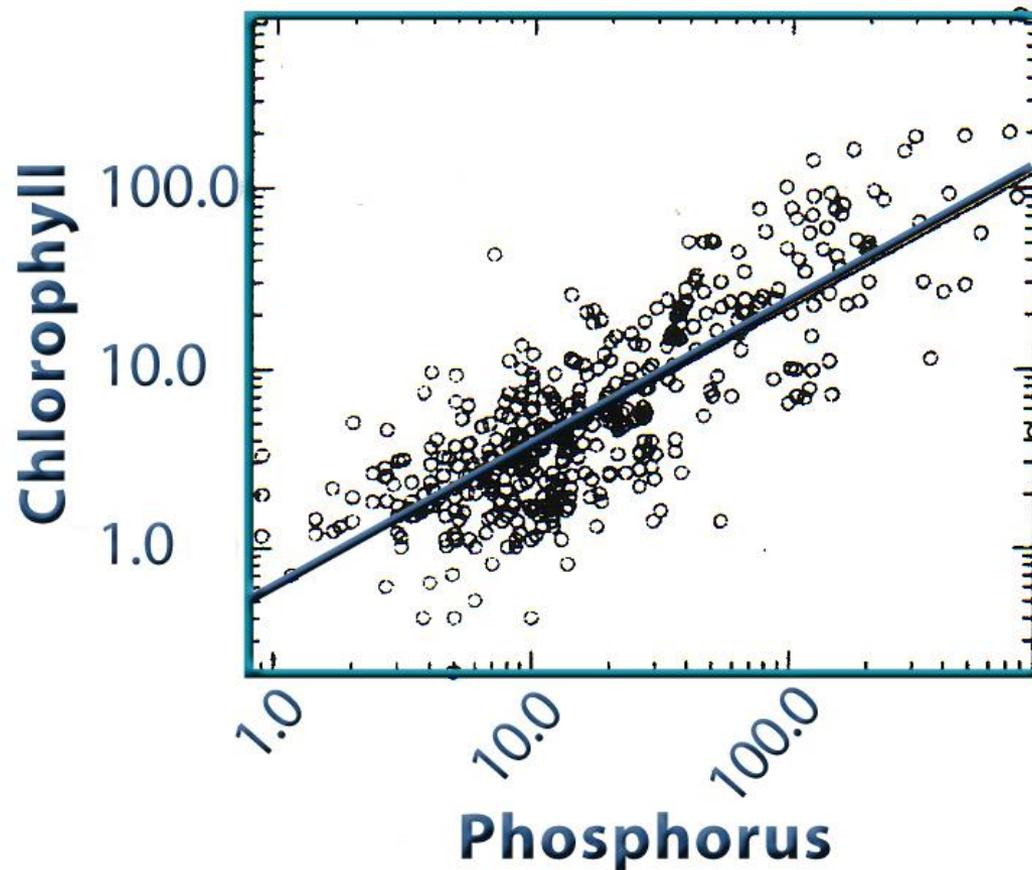
The ratio of lake size to watershed size influences impacts to water quality.



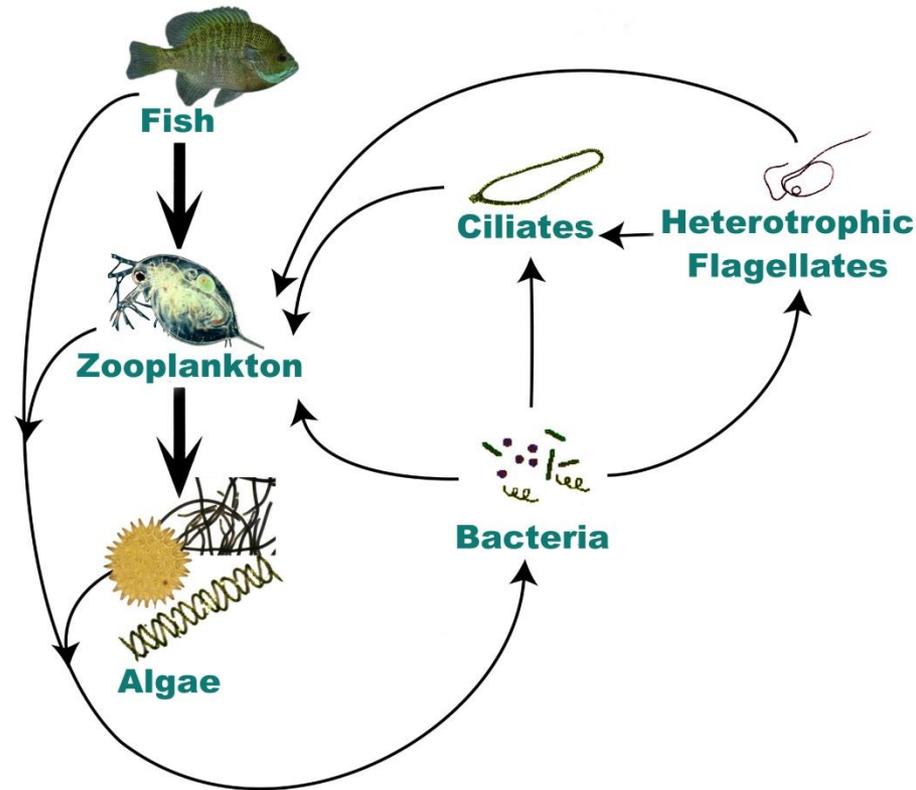
Total Phosphorus and Chlorophyll a Relationship



Total Phosphorus and Chlorophyll a Relationship



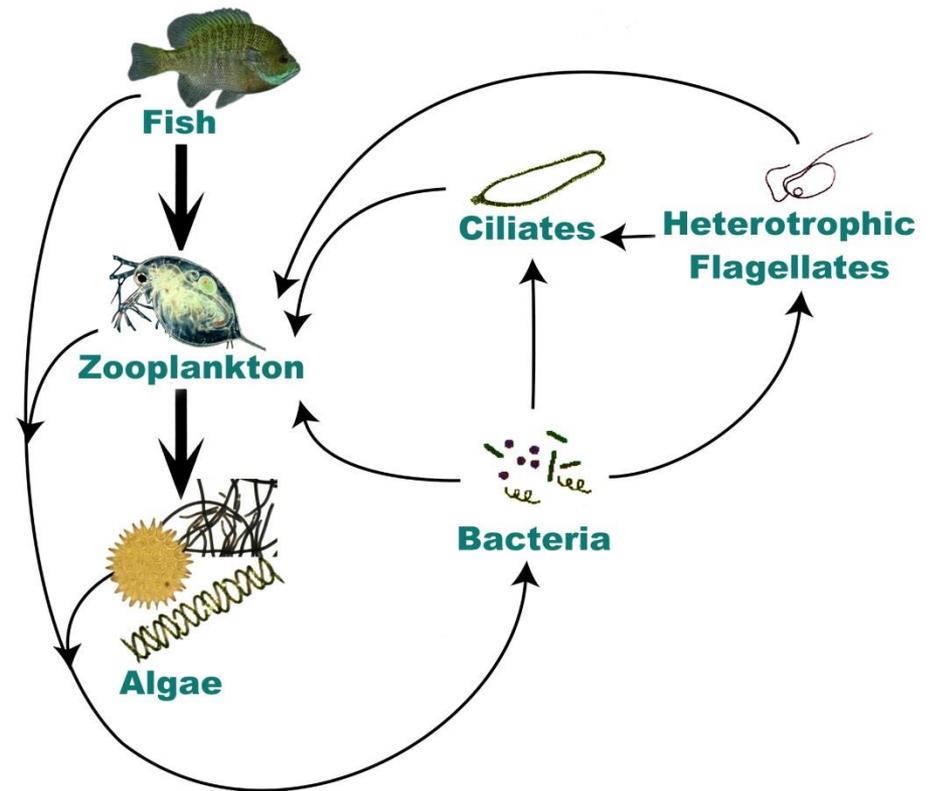
Interactions within lakes are complex.



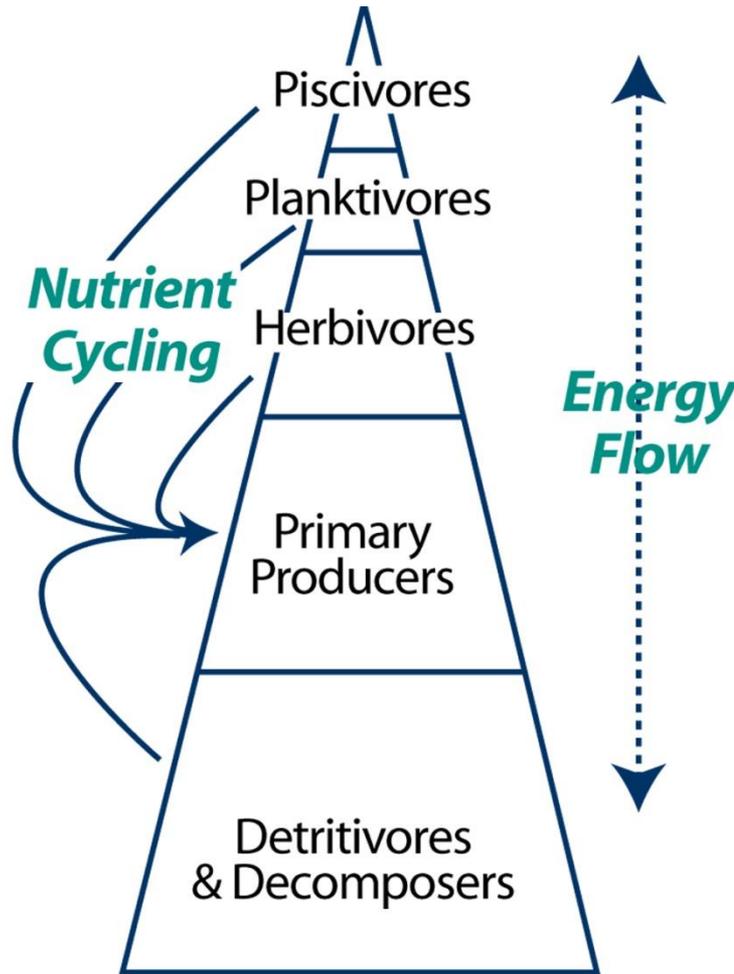
Knowing some basic principles can help you make good choices.

Biological Characteristics

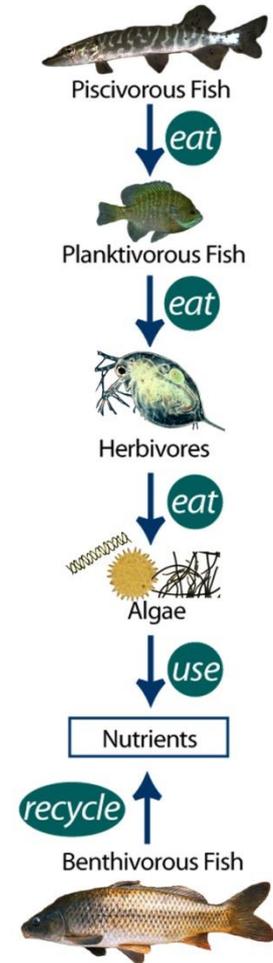
- Trophic pyramid
- Primary producers
- Primary consumers
- Fish
- Trophic state
- Lake habitat zones



Trophic Pyramid



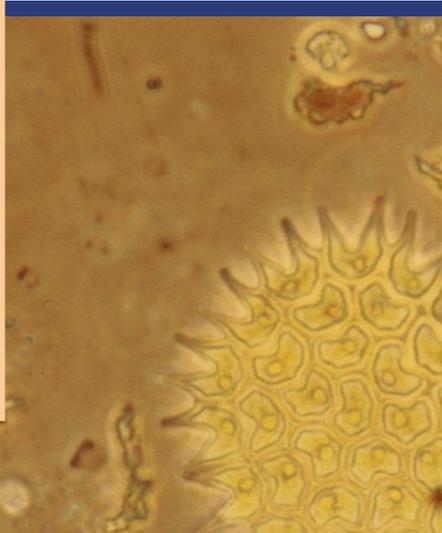
ENERGY PYRIMID



AQUATIC FOOD CHAIN



Algae



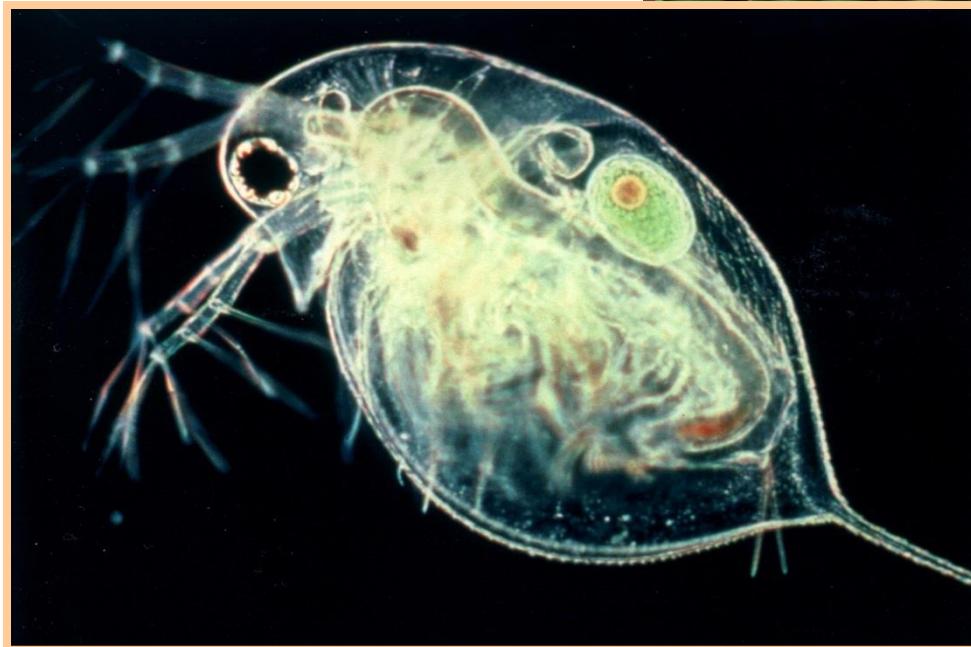


Aquatic Plants





Zooplankton & Aquatic Invertebrates

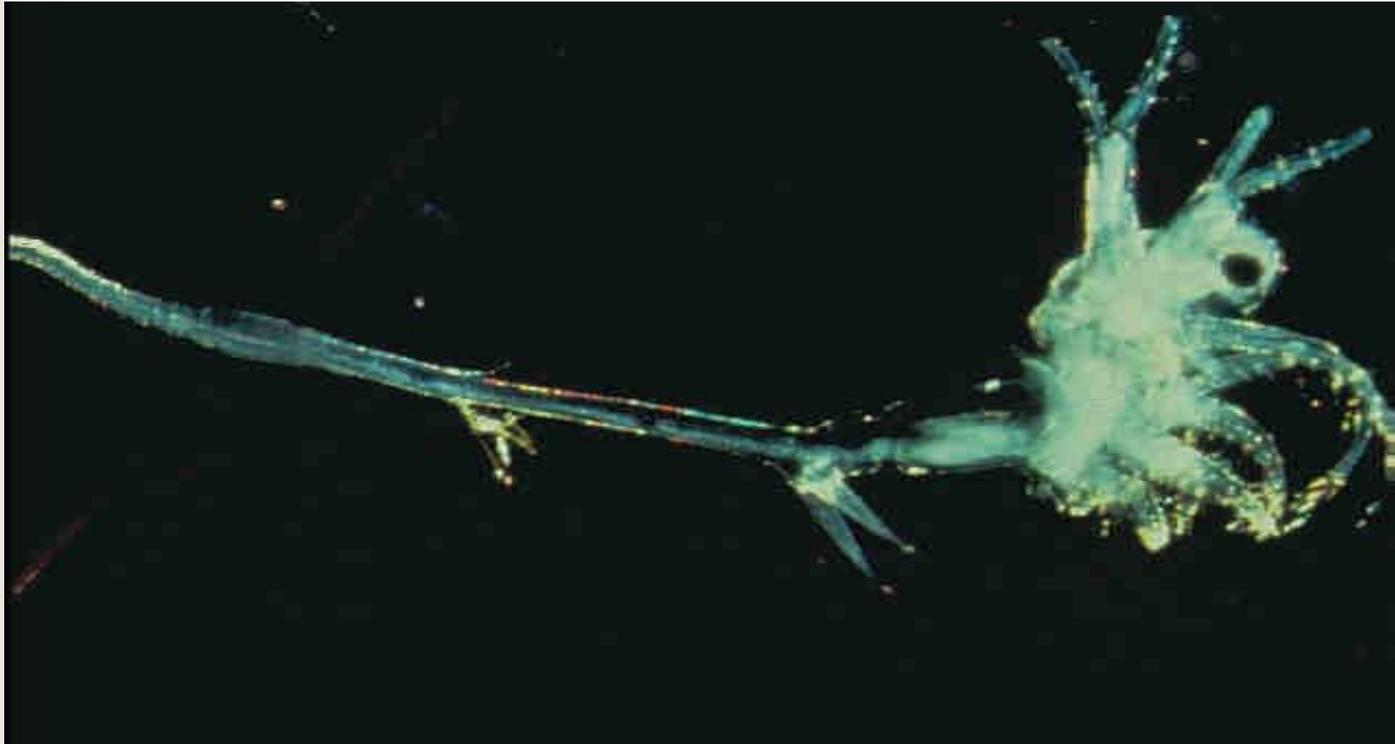




Zebra Mussel Larvae



Fishhook Water Flea



Fish



Brook Stickelback





Southern Redbelly Dace



Banded Darter

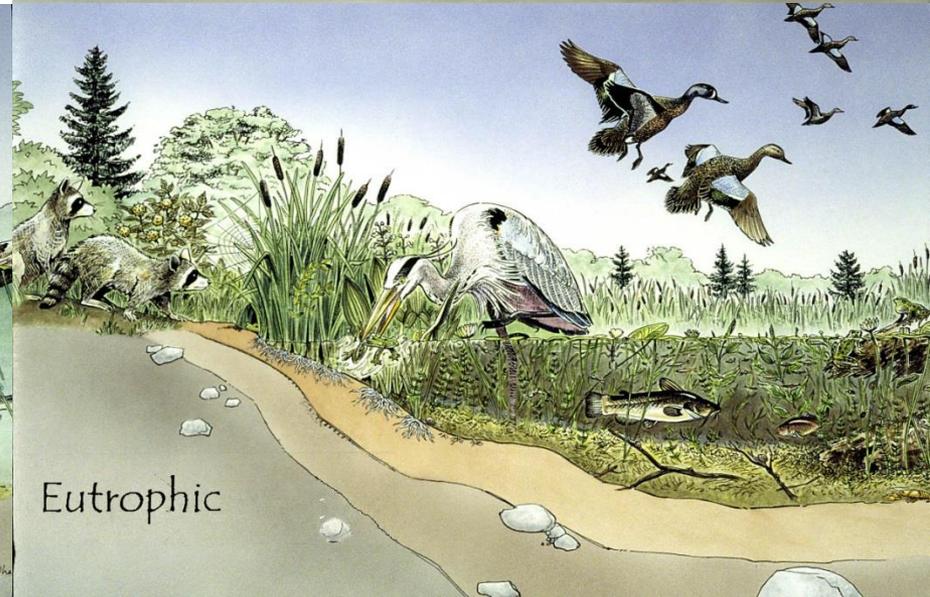
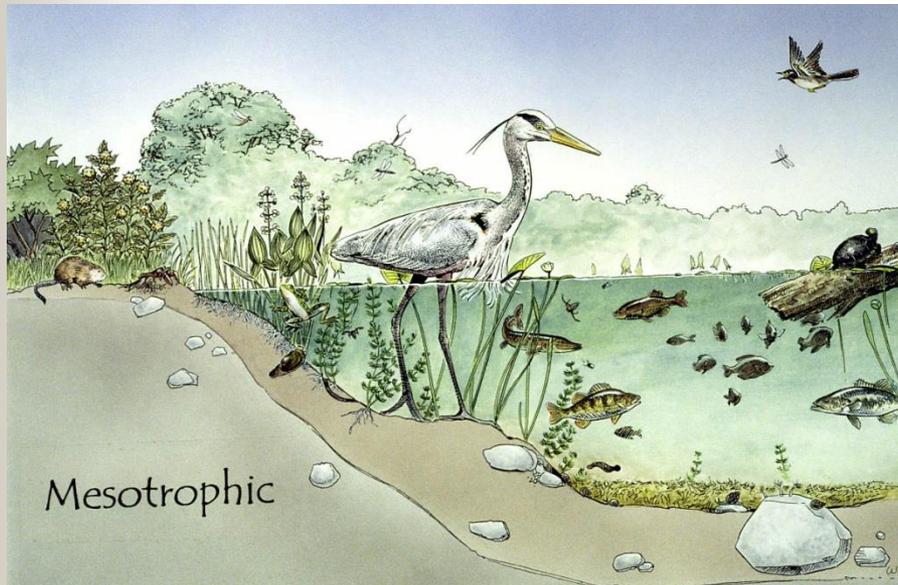
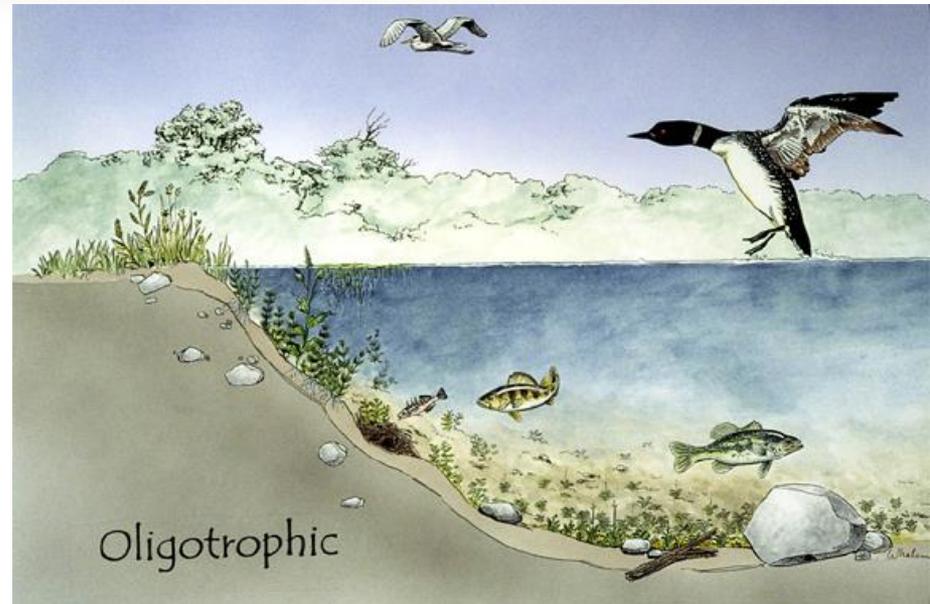


Mottled Sculpin

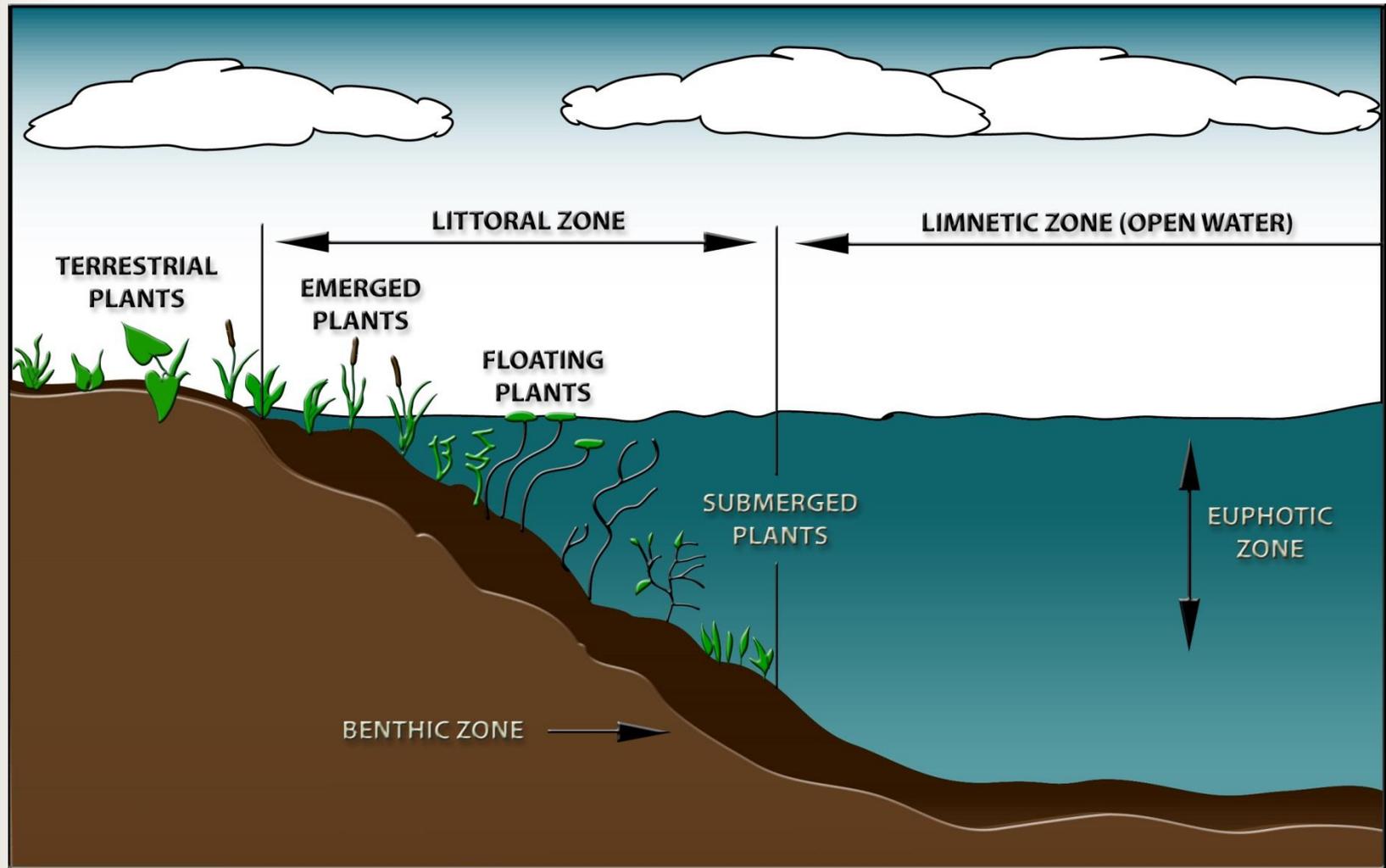


Trophic States

What differences do you see between the states?

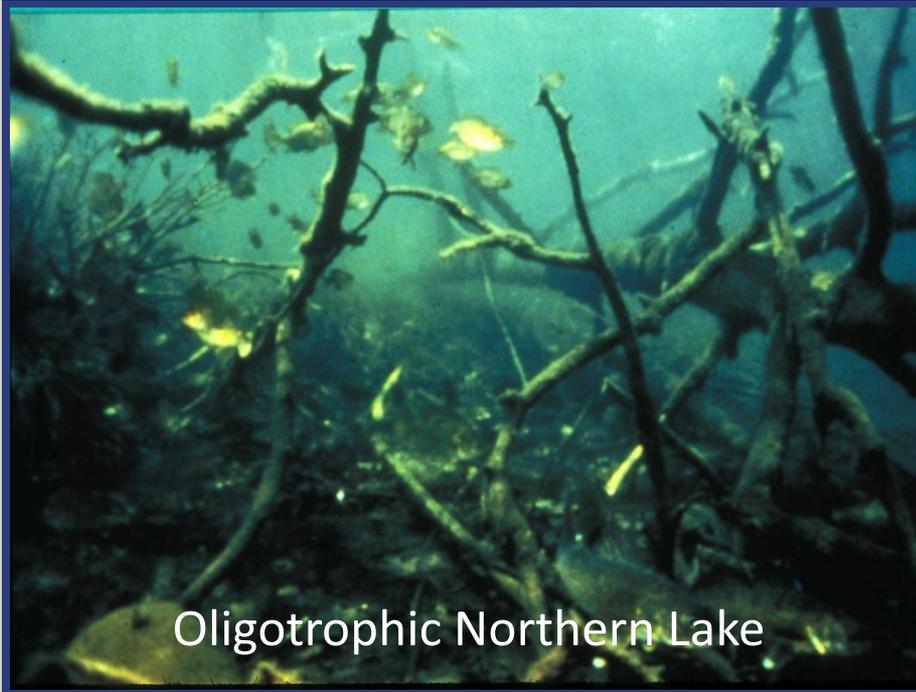


Lake Habitat Zones





Littoral Zone = Near-shore Habitat



Oligotrophic Northern Lake



Eutrophic Southern Lake

- 
- Why do lakes react differently to development?

Lakes react differently because of differences in their physical, chemical and biological characteristics.

- 
- Why is too much phosphorus bad for lakes?

Phosphorus is the key nutrient for most Wisconsin lakes. Too much phosphorus can trigger excessive aquatic plant and algae growth.



- Why should I worry about aquatic plants?

Aquatic plants are the foundation for healthy, balanced lakes. They provide food, shelter, and nurseries for fish, wildlife and insects.

- 
- Since lakes are so complex, what can I do to help protect my lake?

Since the littoral zone, or near-shore habitat, is the most critical area of a lake, work to protect or restore your lake's shoreland habitats.



Little Things Matter:

- Price of Boat: \$25,000
- Price of Truck: \$30,000
- Price of Hitch: \$50

- Having a Hitch that holds.....



Priceless!!!!