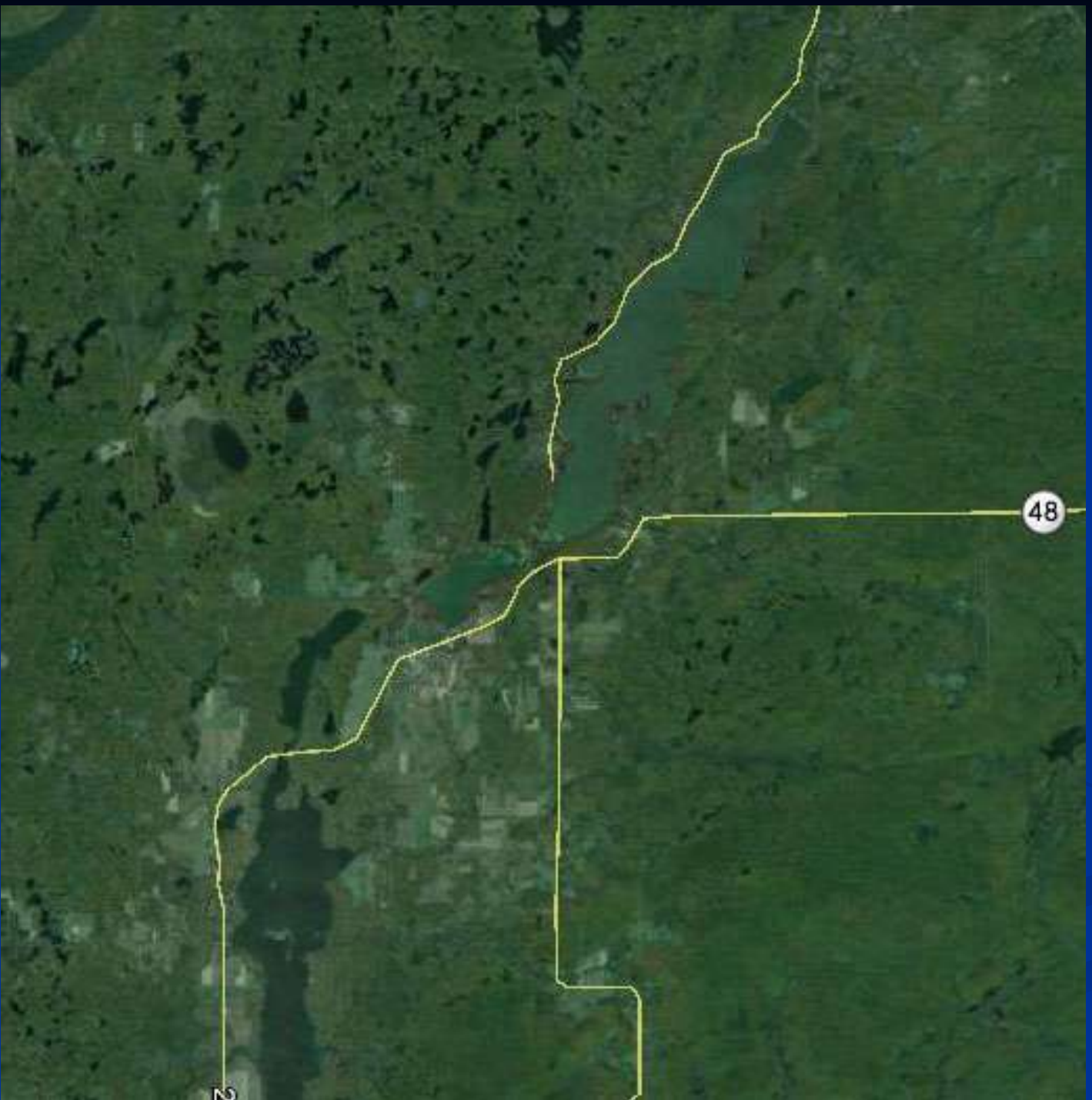
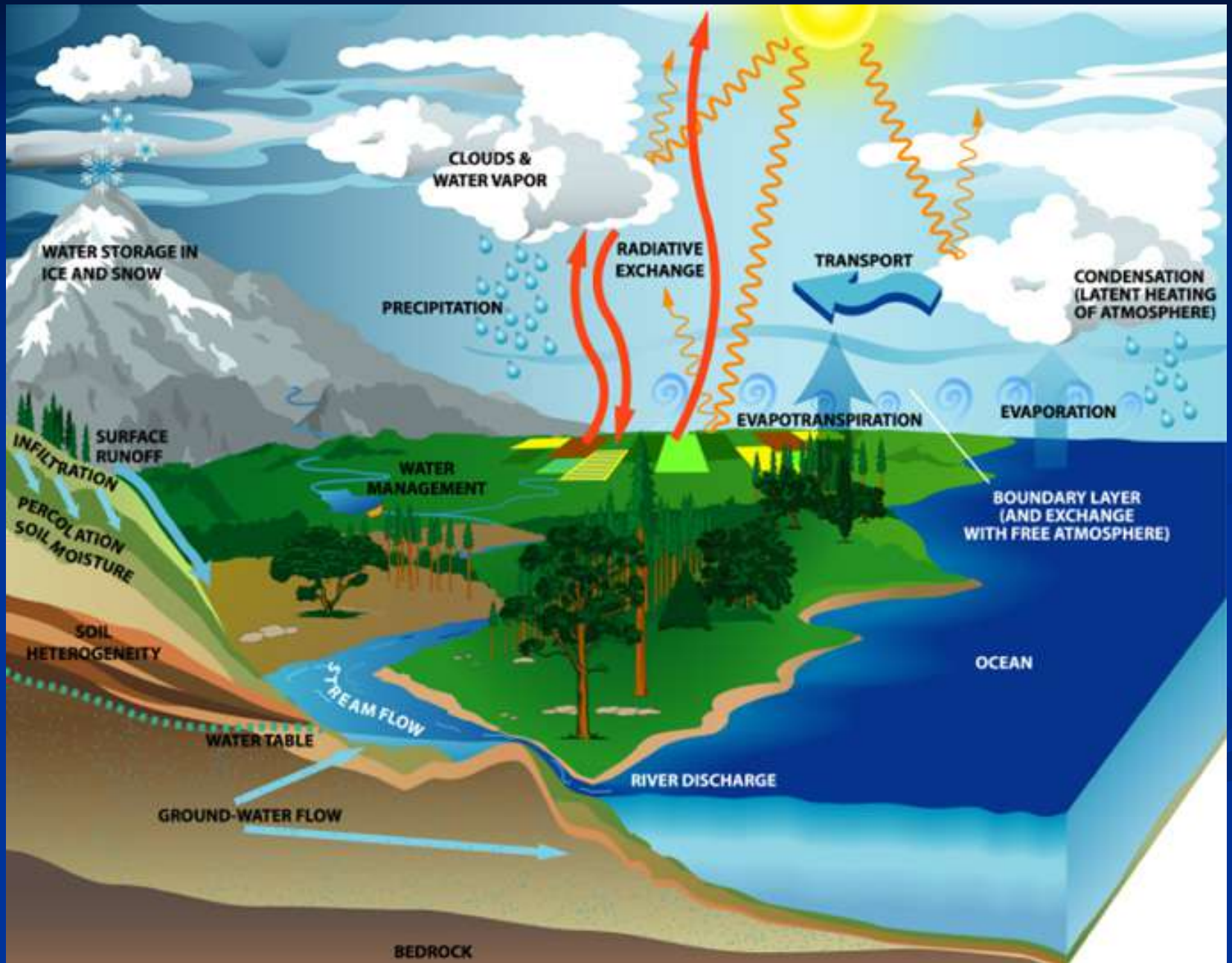


Big Chetac and the Red Cedar River Watershed

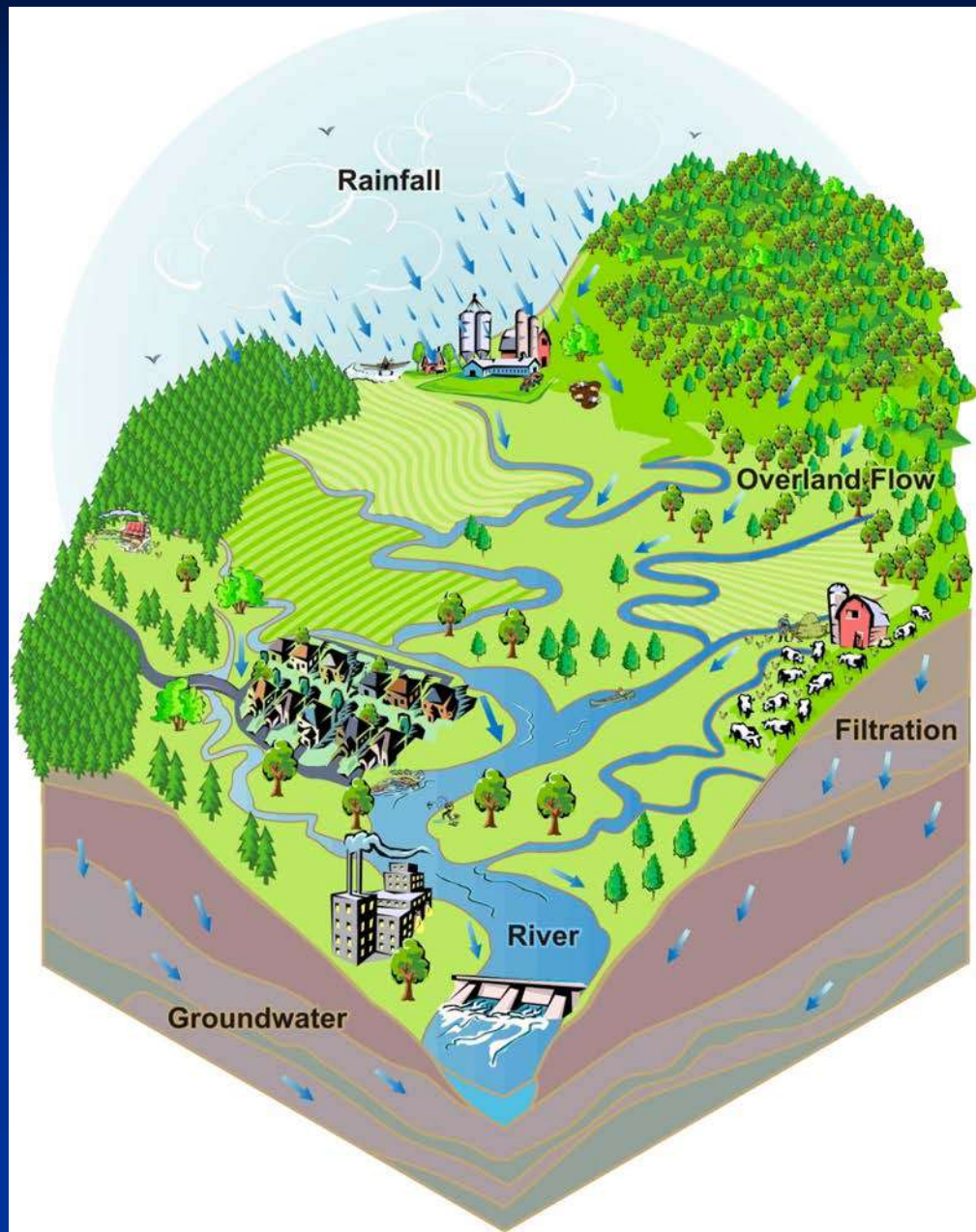
Dan Zerr
University of Wisconsin-Extension
Natural Resource Educator

The Water Cycle

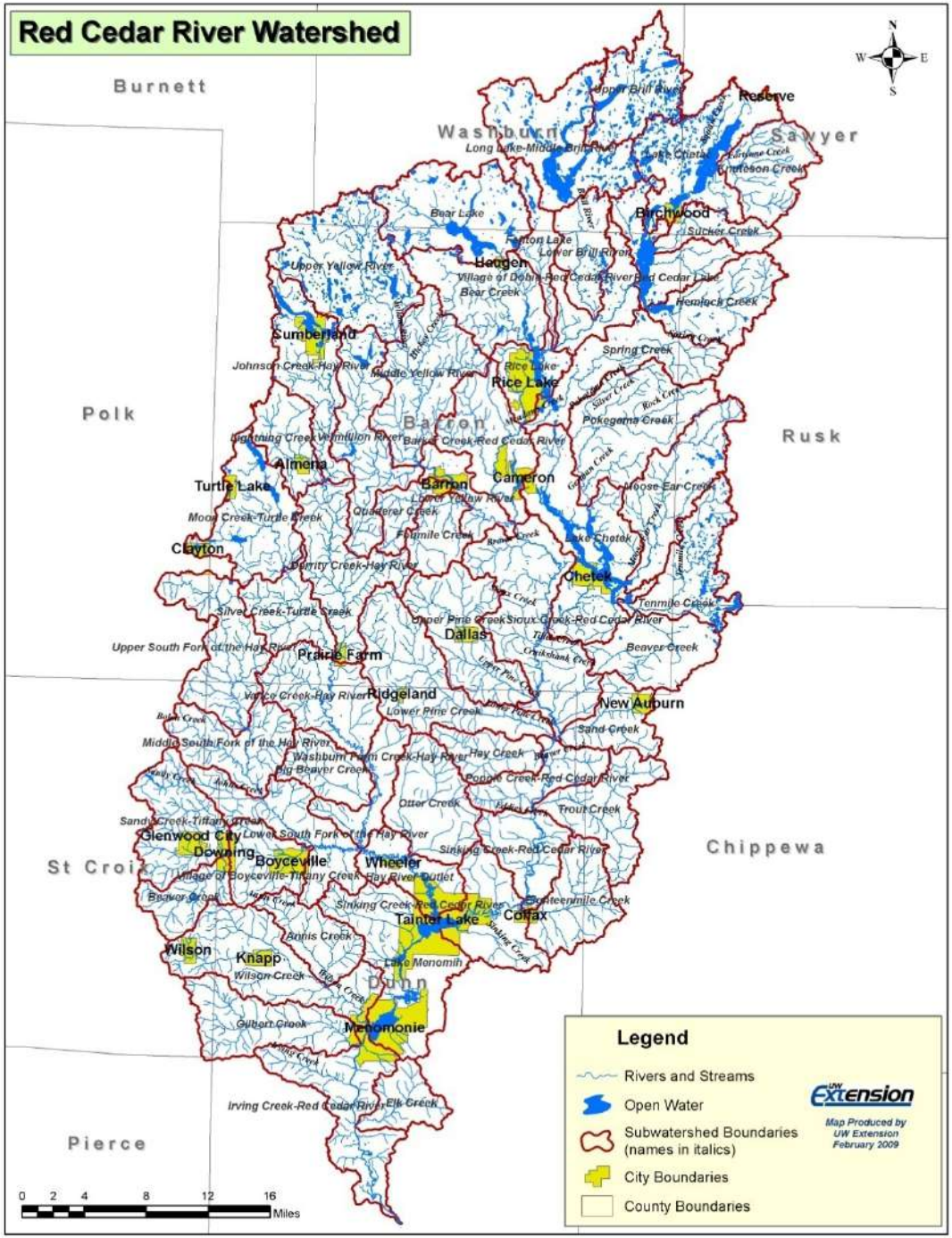


What Is A Watershed?

- An area that all drains to a particular stream, river, lake, or ocean.
- Includes all surface land area, smaller streams within that watershed, and groundwater flow.
- Watersheds are “nested” within each other. Small watersheds are usually part of larger watersheds.



- The Red Cedar River Watershed covers most of Barron and Dunn Counties, and parts of several others.
- Includes many smaller subwatersheds
- The Red Cedar River empties into the Chippewa River south of Menomonie

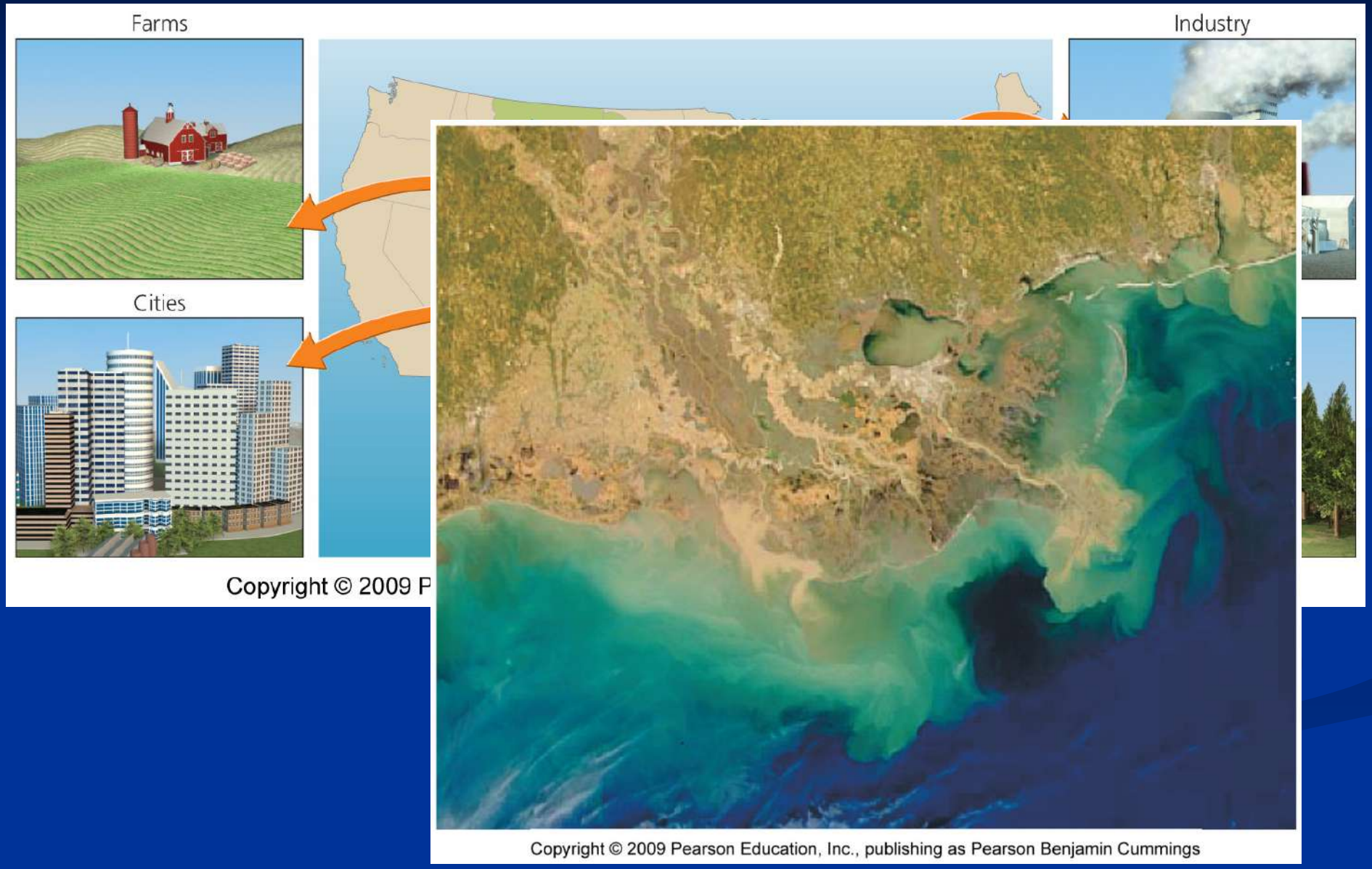


Red Cedar River Watershed Is Part of Other, Larger Watersheds

Part

Map Courtesy of US EPA

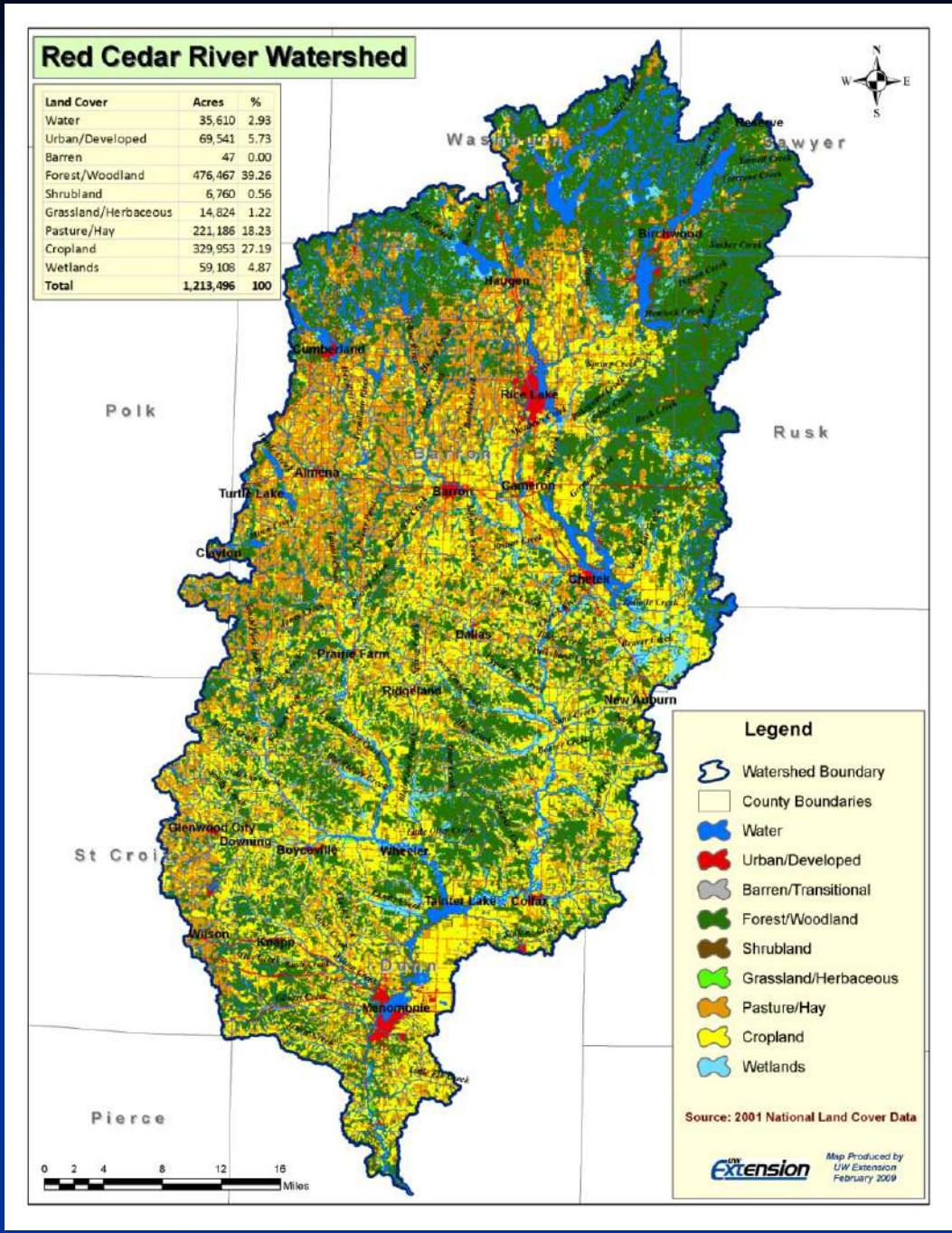
Mississippi River Watershed



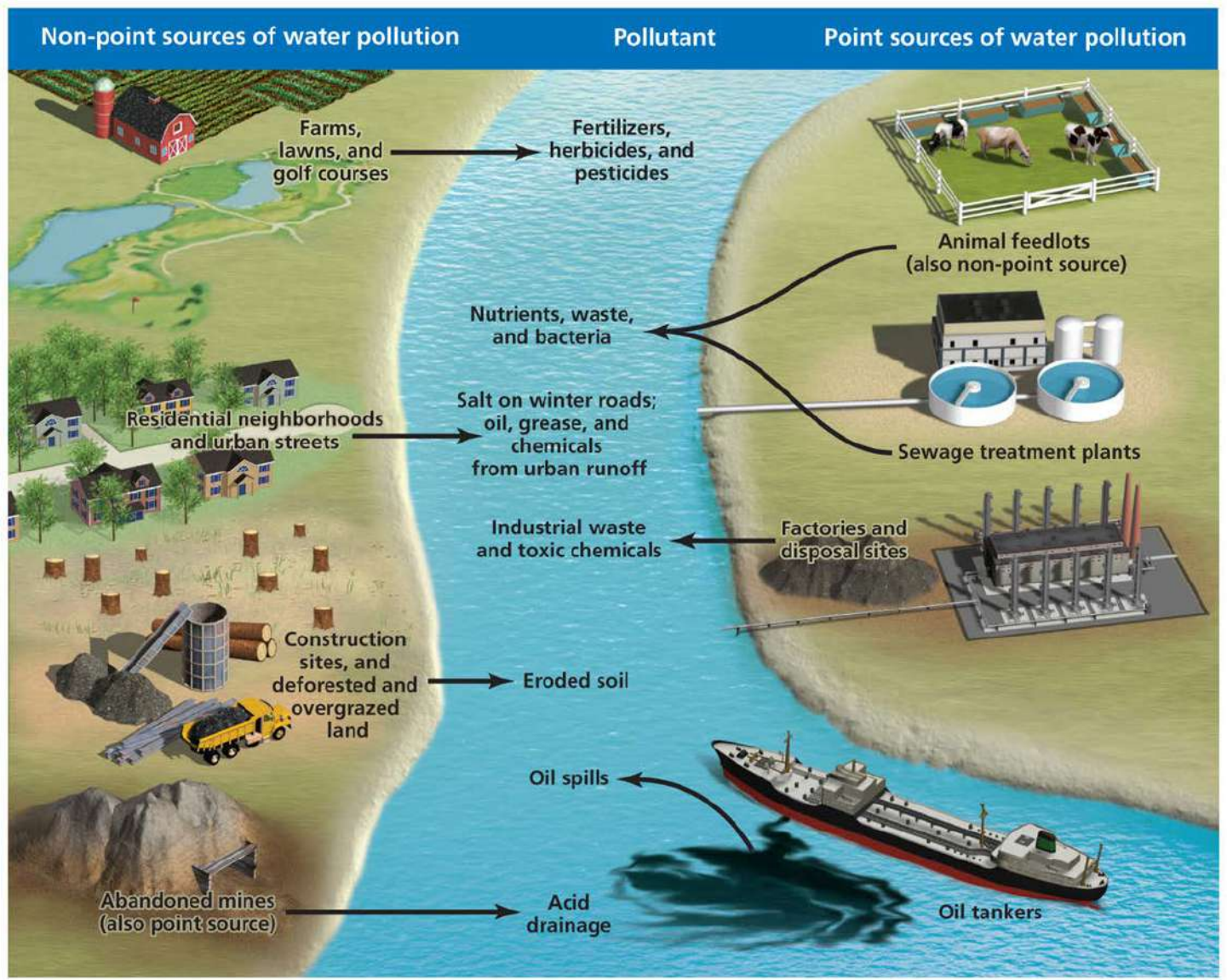
Human Impacts Within a Watershed

- Historic land cover in the basin was mostly forest with some prairie-oak savanna

- Since settlement, much of historic cover was lost, replaced by agriculture and grazing land, and reservoirs were created by placing dams on the river



Human Impacts Within a Watershed

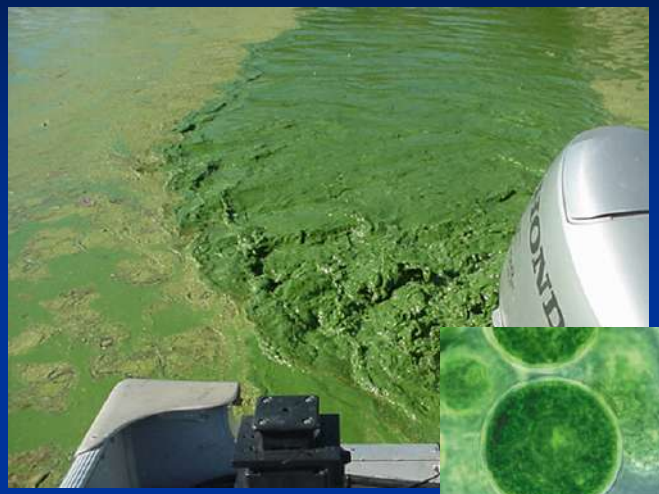


Water Quality Problems in The Red Cedar River Watershed

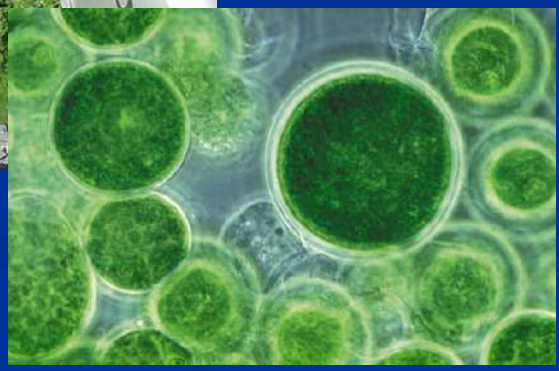
Photos Courtesy of WDNR

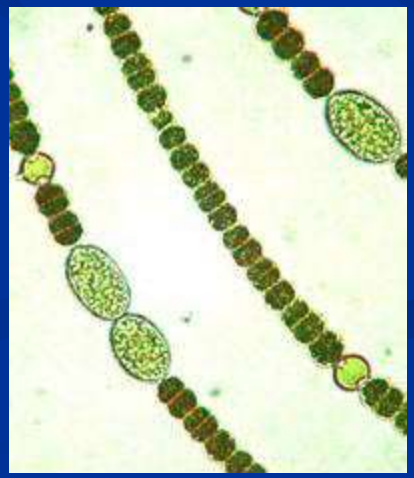
What's All That Green Stuff?

- Algae, cyanobacteria (blue-green algae)
- Photosynthetic organisms that, just like plants, need nitrogen and phosphorus to function
- Is naturally in our waters, but too much nitrogen and phosphorous cause algae to increase dramatically – known as an algal "bloom"



WDNR





www.lernz.co.nz

Why is Algae Bad For Water Quality?

- **Looks terrible! Who wants to swim in that?**

- **Cyanobacteria (blue-green algae) produce toxins that are harmful to animals, including humans**

- **Some people are more sensitive than others and may react with respiratory distress during a severe algal bloom**

Photos Courtesy of WDNR

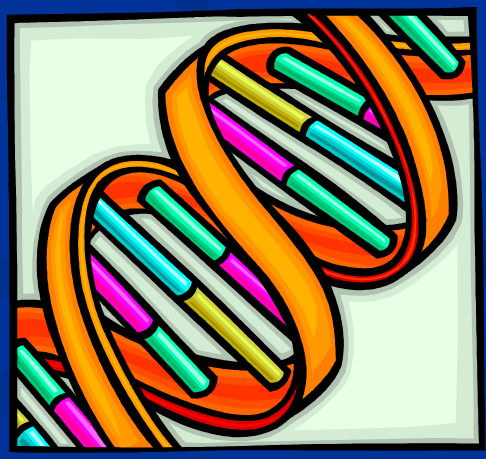
Why is Algae Bad For Water Quality?

- Decreases dissolved oxygen in the water, leading to fish kills
- Can raise pH, which some aquatic organisms can't tolerate
- Bad for economy (less fishing, less swimming, etc.)

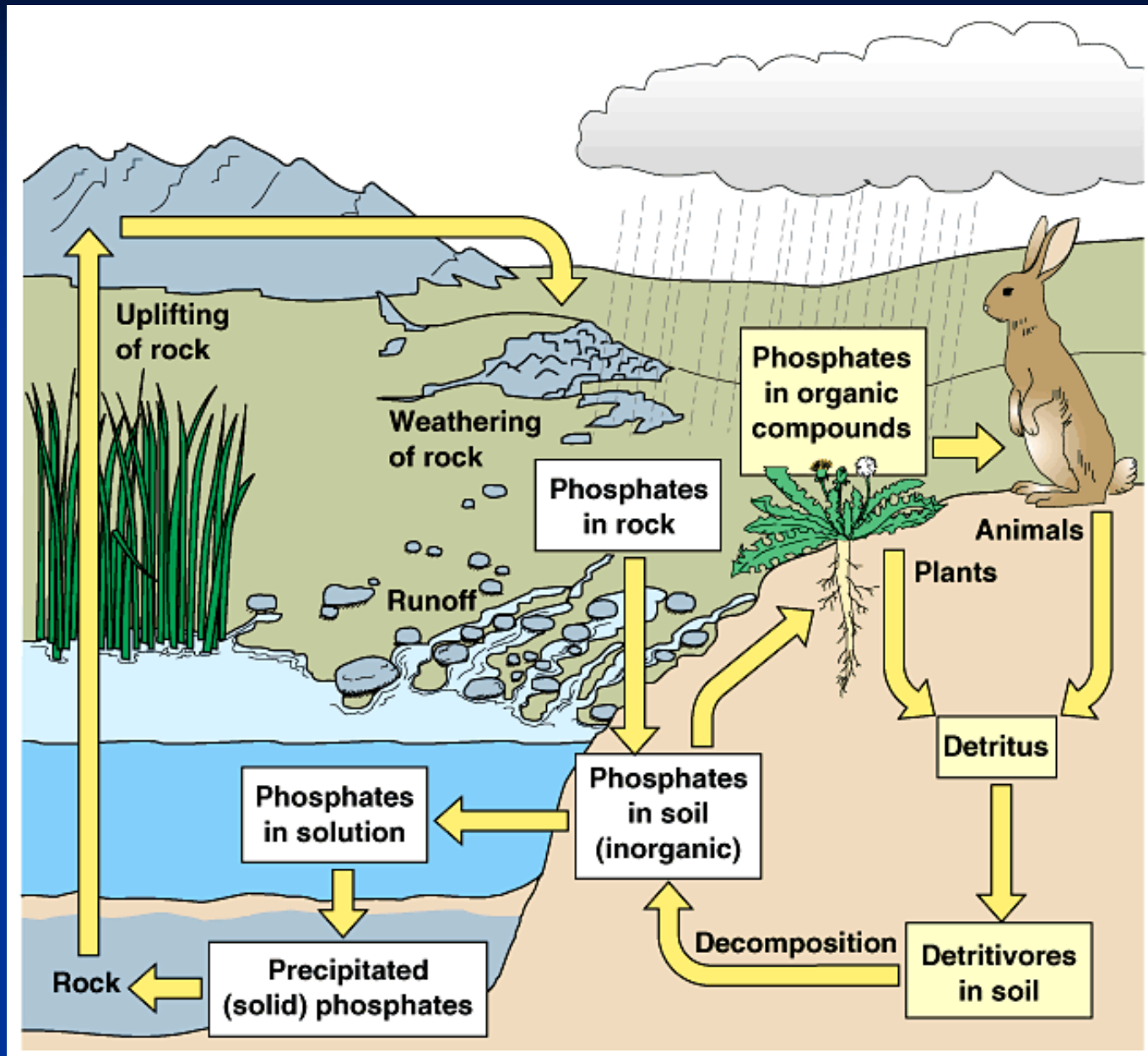
WDNR

What Is Phosphorus?

- A natural element present in rocks and soil
- Is also present in water, usually attached to soil particles suspended in the water
- Is a key component of living organisms, including plants and algae, and is found in DNA and in the membranes of cells
- Component of inorganic fertilizers, manure, and also human and pet waste



The Phosphorus Cycle

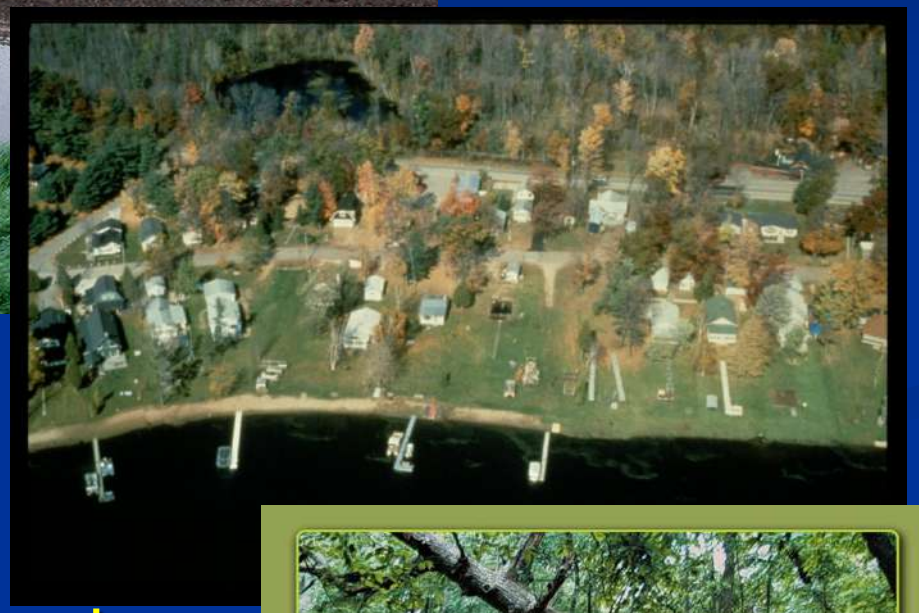


How is Phosphorus Getting In The Water?

- **Surface runoff**
  - Rainwater washes over land and runs into streams and lakes, carrying soil, excess fertilizer, manure, pet waste and other pollutants with it

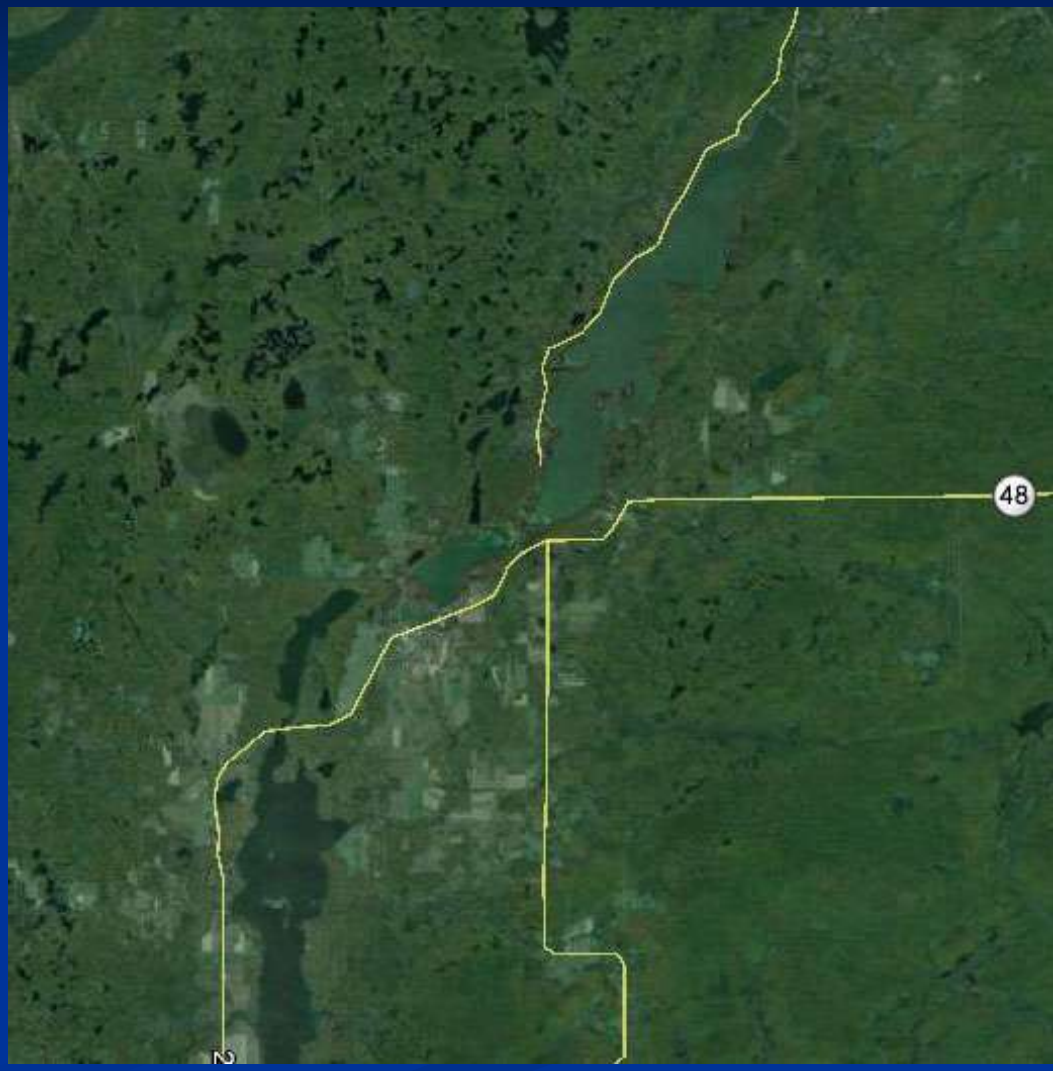
How is Phosphorus Getting In The Water?

- **Many Sources**
  - Farm fields
  - Lawns & Yards
  - City streets
  - Failing septic systems
  - Livestock operations
  - Eroding shorelines and banks
  - Waste water treatment plants
  - “Legacy” phosphorus



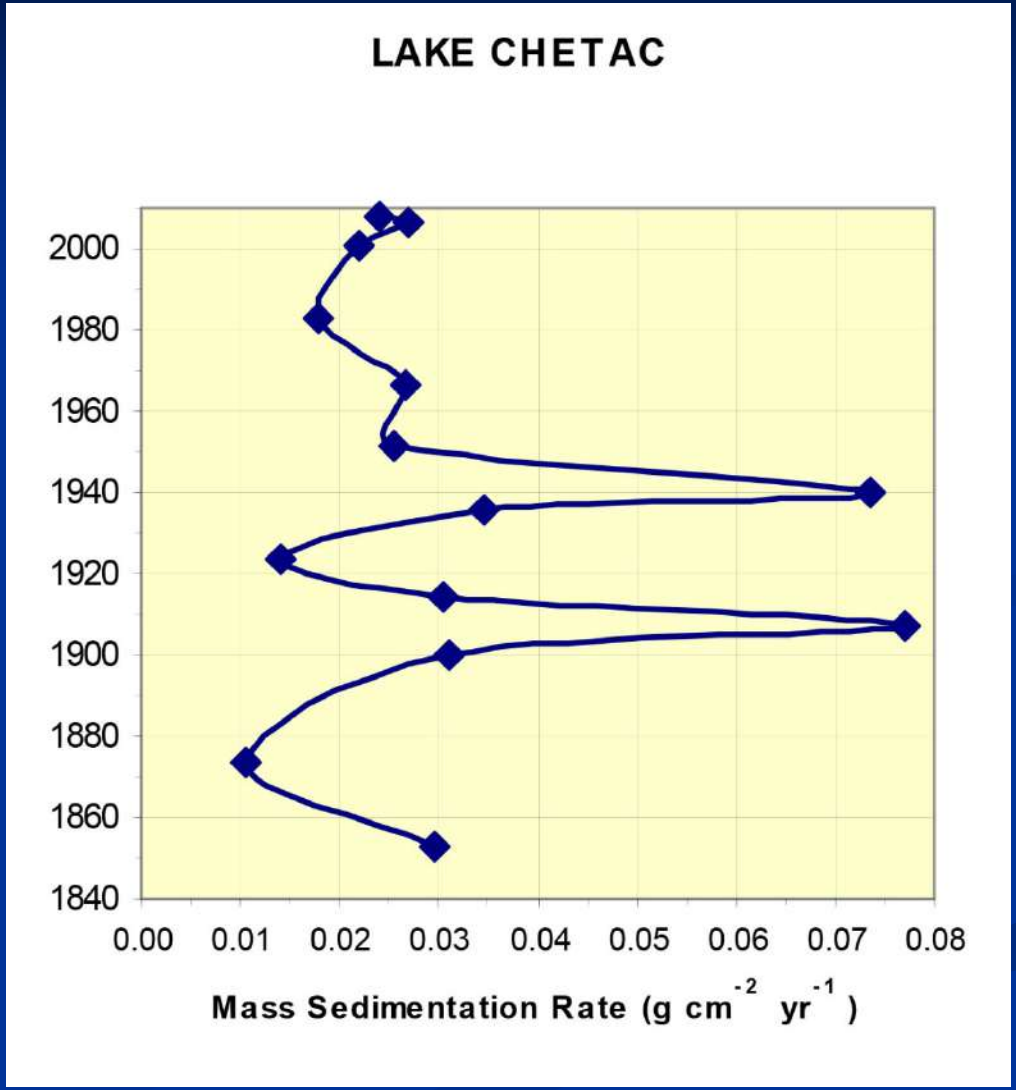
Big Chetac Lake

- 1,920 acre drainage lake
- Mean depth of 14 ft, maximum depth of 28 ft
- Watershed = 40 square miles, mostly forest
- Historically white pine, oak, aspen
- Various dams were built on the chain of lakes beginning in the 1880s.



Big Chetac Lake - Sedimentation

- The mean sedimentation rate for the lake has been about average for WI over the last 200 years.
- Spike in sedimentation in 1910 likely due to land flooding as a result of damming.
- Spike in 1940 more mysterious. May be from agricultural land and huge runoff event.
- Besides the spikes, sedimentation rate has been fairly constant for the last 150 years.



Data and graph from "PALEOECOLOGICAL STUDY OF LAKE CHETAC, SAWYER COUNTY" Paul J Garrison and Gina D. LaLiberte - 2010

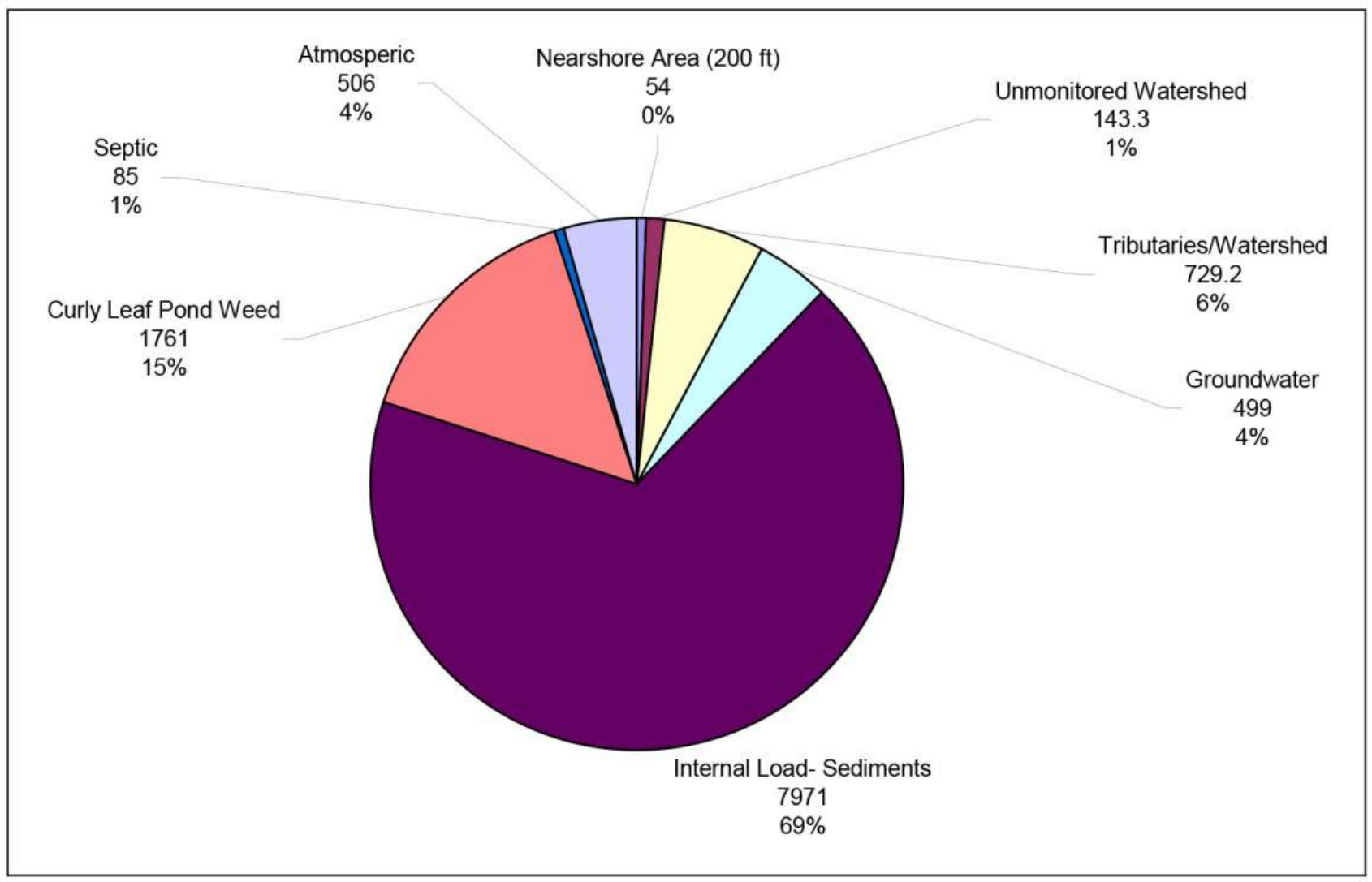
Big Chetac Lake – Curly-leaf Pondweed

- Recent infestations of curly-leaf pondweed, occurring in about 35% of the lake's surface
- Invasive species that outcompetes native species and can dominate the plant community
- Dies off in mid-summer, releasing nitrogen and phosphorus into the water column, which helps feed algae blooms
- Once established, can be very difficult to completely eliminate

Photo: Curly-leaf pondweed, Vic Ramey, University of Florida

Chetac CLP data from "Aquatic Macrophyte Survey for Chetac Lake
Sawyer County, Wisconsin", Endangered Resource Services, LLC - 2008

Big Chetac Lake - Phosphorus



Total Phosphorus loading to Big Chetac from various sources (lbs/year)

Data and graphics from “Comprehensive Lake Management Plan”, by SEH, 2010

What Can Be Done? – Sediments (69%)

- Phosphorus released from lake sediments when bottom of lake goes anoxic
- Mixing and aeration can alleviate some of this, but only on a limited scale
- Dredging and removal of sediments will remove P, but is very costly and very disruptive
- Alum treatment can lock P in the sediments, but is very expensive, and other sources of P should be minimized first

What Can Be Done? – CLP (15%)

- **CLP pulls phosphorus from the sediment and water column, and then releases it again when it dies in mid-summer, which is a critical time for algae blooms**
- **Can be treated with herbicides which can help control it, but requires the use of chemicals in the lake for several years (turions are hard to kill)**
- **Harvesting with aquatic plant harvesters can help, but is expensive, long-term, and can spread the plant by creating fragments**

Photo: CLP turions, courtesy of UW-La Crosse

Photo: SaveTheYaphankLakes.org

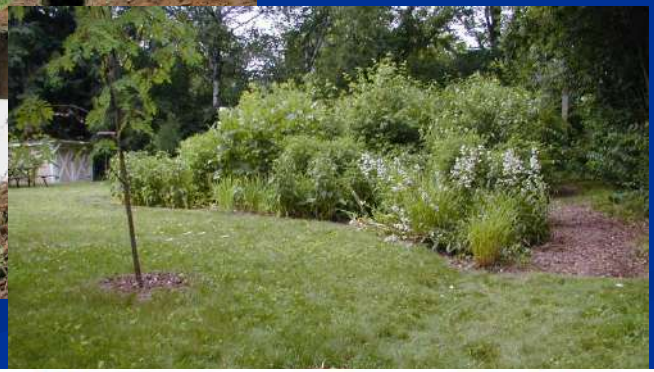
What Can Be Done? – Tributaries (6%)

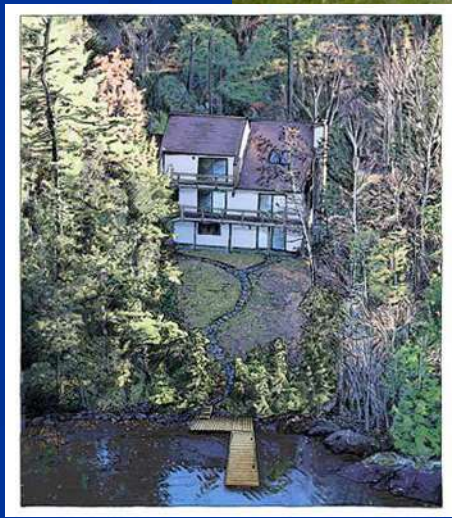
- Tributaries will always provide some P inputs
- Make sure all is being done on managed land to minimize runoff of soil, manure, fertilizers
- Agricultural practices should include buffers, conservation tillage, nutrient management
- Minimize intense logging near streams

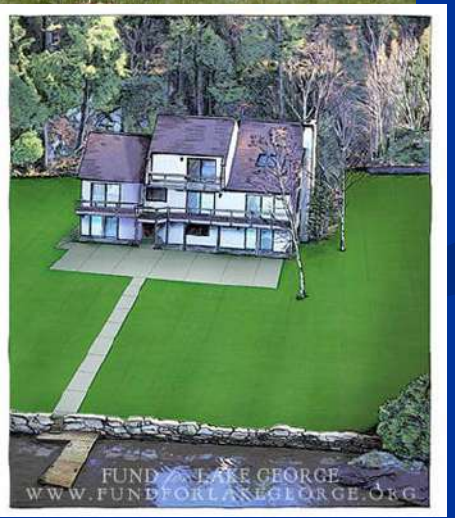
Photo courtesy of UW-La Crosse

What Can Be Done? – Lake Residents

- Maintain septic systems and repair if failing
- Plant rain gardens next to downspouts to infiltrate runoff from rooftops, and/or use rain barrels to collect rainwater
- Plant vegetated buffers near shorelines to minimize runoff into the lake and promote natural shorelines resistant to erosion







What Can Be Done?

- Use phosphorus-free products
  - fertilizers (or go without!)
  - dishwasher detergent
  - laundry detergent

Photo Courtesy of USGA

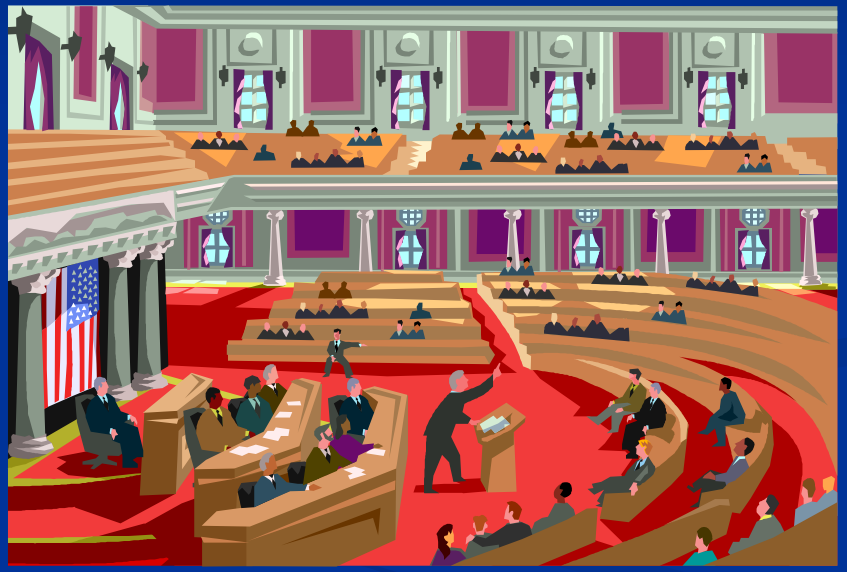
What Can Be Done?

- Keep leaves, grass clippings and other pollutants from the rivers and lakes, and from storm drains and ditches
- Pick up after your pets
- Use proper erosion control on construction sites

Photo Courtesy of Sandy, UT

What Can Be Done?

- Network and partner with other individuals or groups who may be working on water quality issues and events
- Talk to your local and state government officials about the need for proper resources to address the problems



What Can Be Done?

- Talk to your family and friends about what you learn and what you're doing to help
- Participate in clean-ups and other events designed to keep our environment, including our lakes and rivers, clean and sustainable

What Can Be Done?

- **Remember, water is life, and we need to keep it clean and available for everyone!**

Questions

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