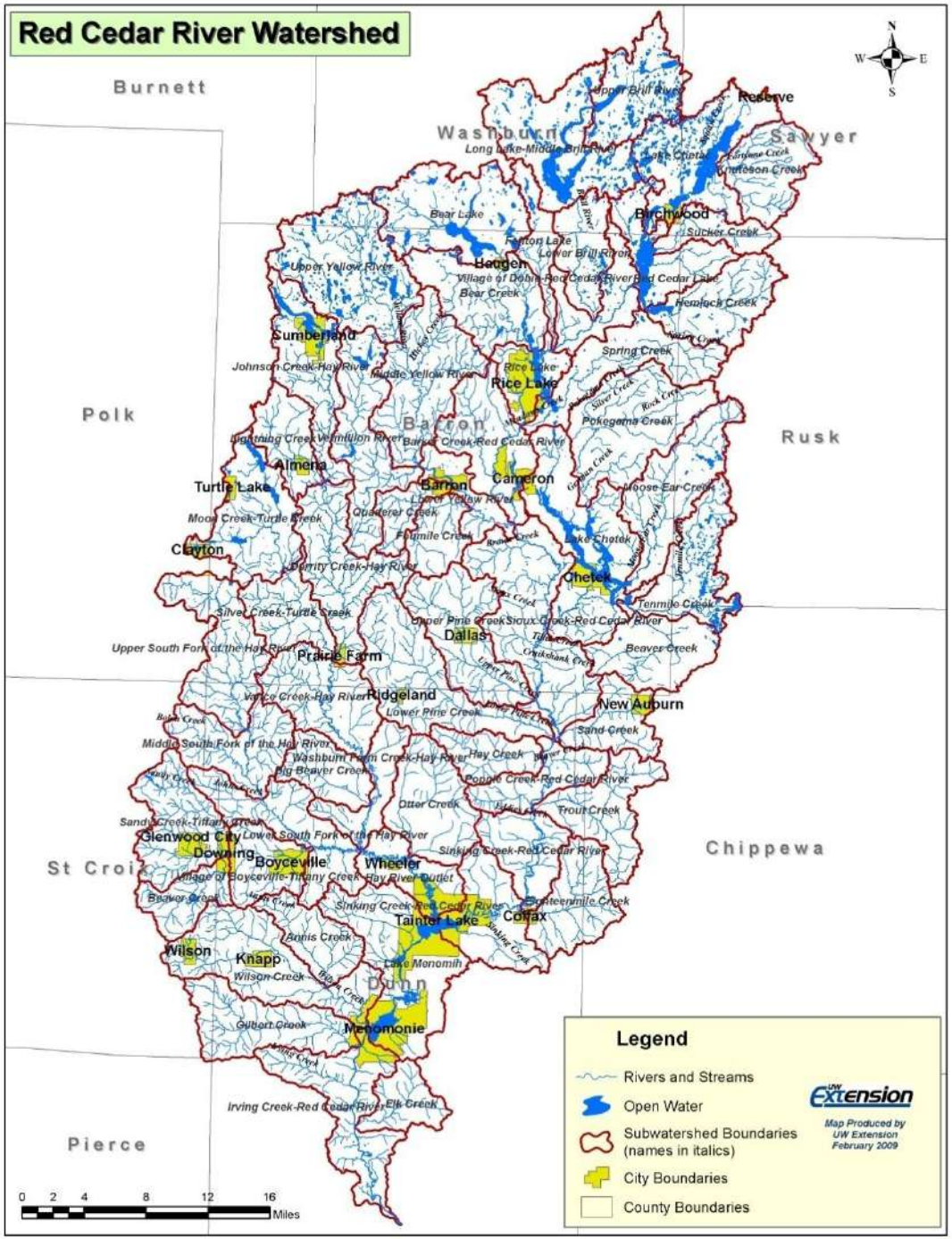
A Plan for Water Quality Improvement in the Red Cedar River Watershed

Dan Zerr
University of Wisconsin-Extension
Natural Resource Educator

- The Red Cedar River Watershed covers most of Barron and Dunn Counties, and parts of several others.
- 1,900 square miles
- Includes many smaller subwatersheds

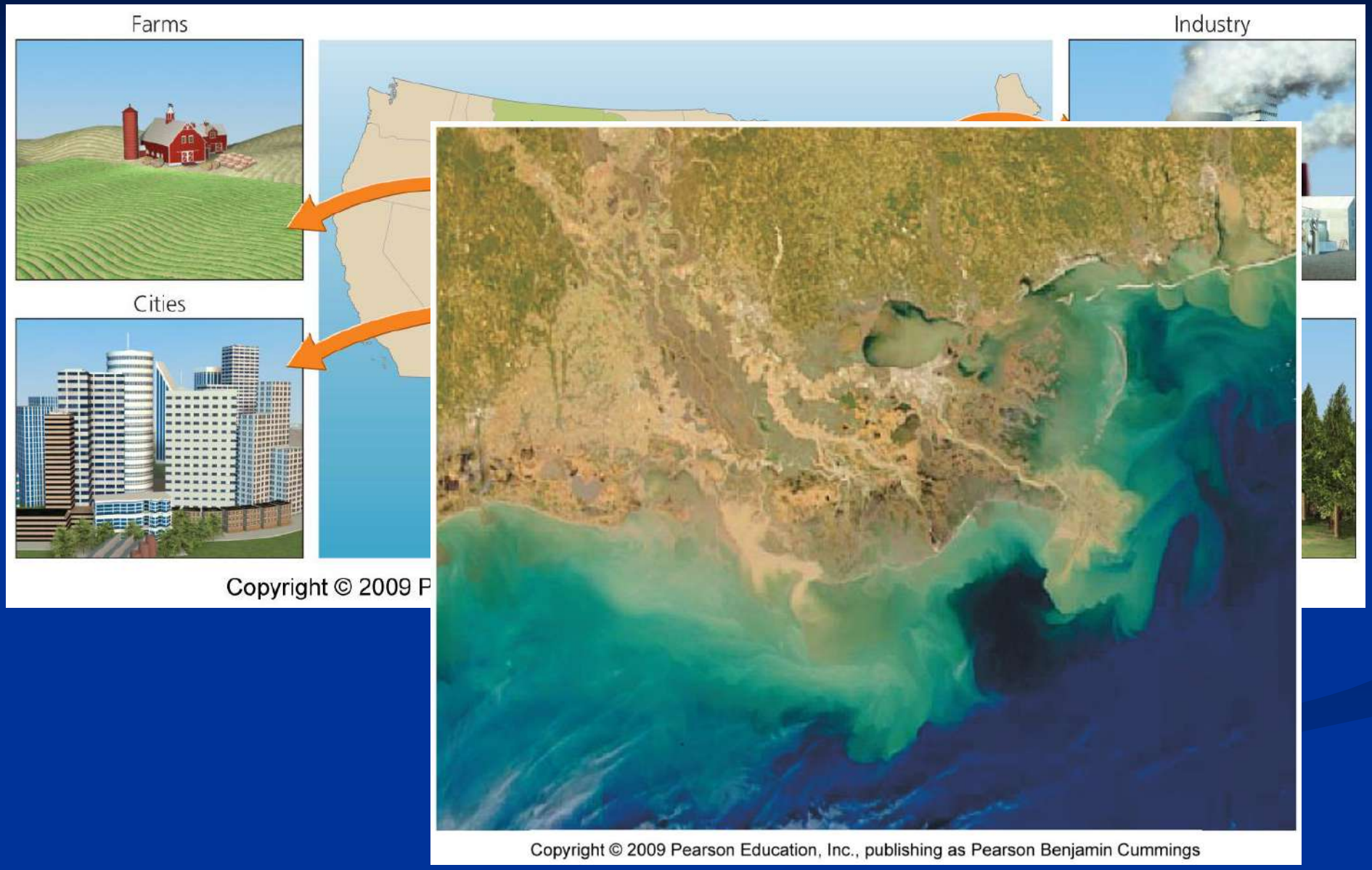


Red Cedar River Watershed Is Part of Other, Larger Watersheds

Part

Map Courtesy of US EPA

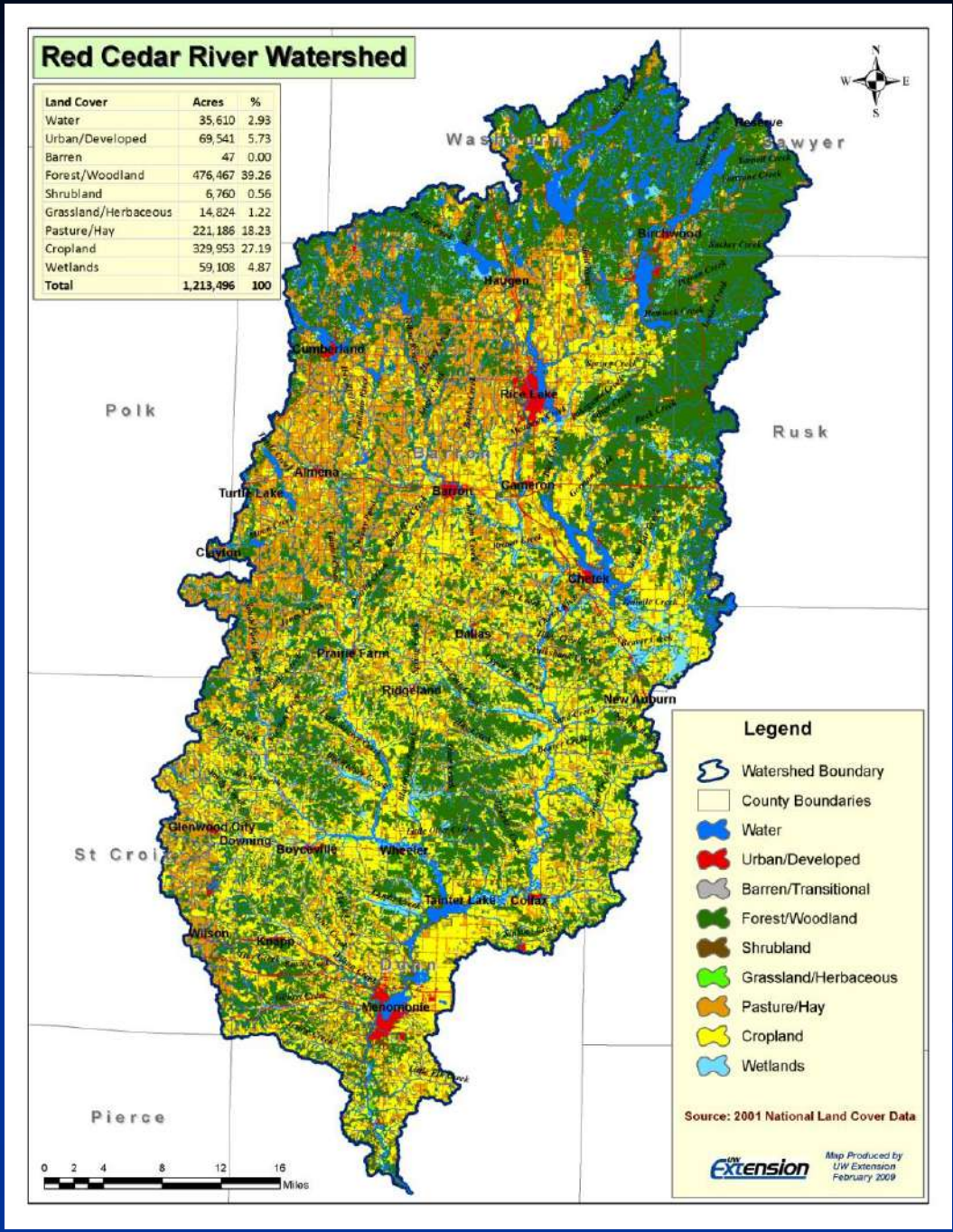
Mississippi River Watershed



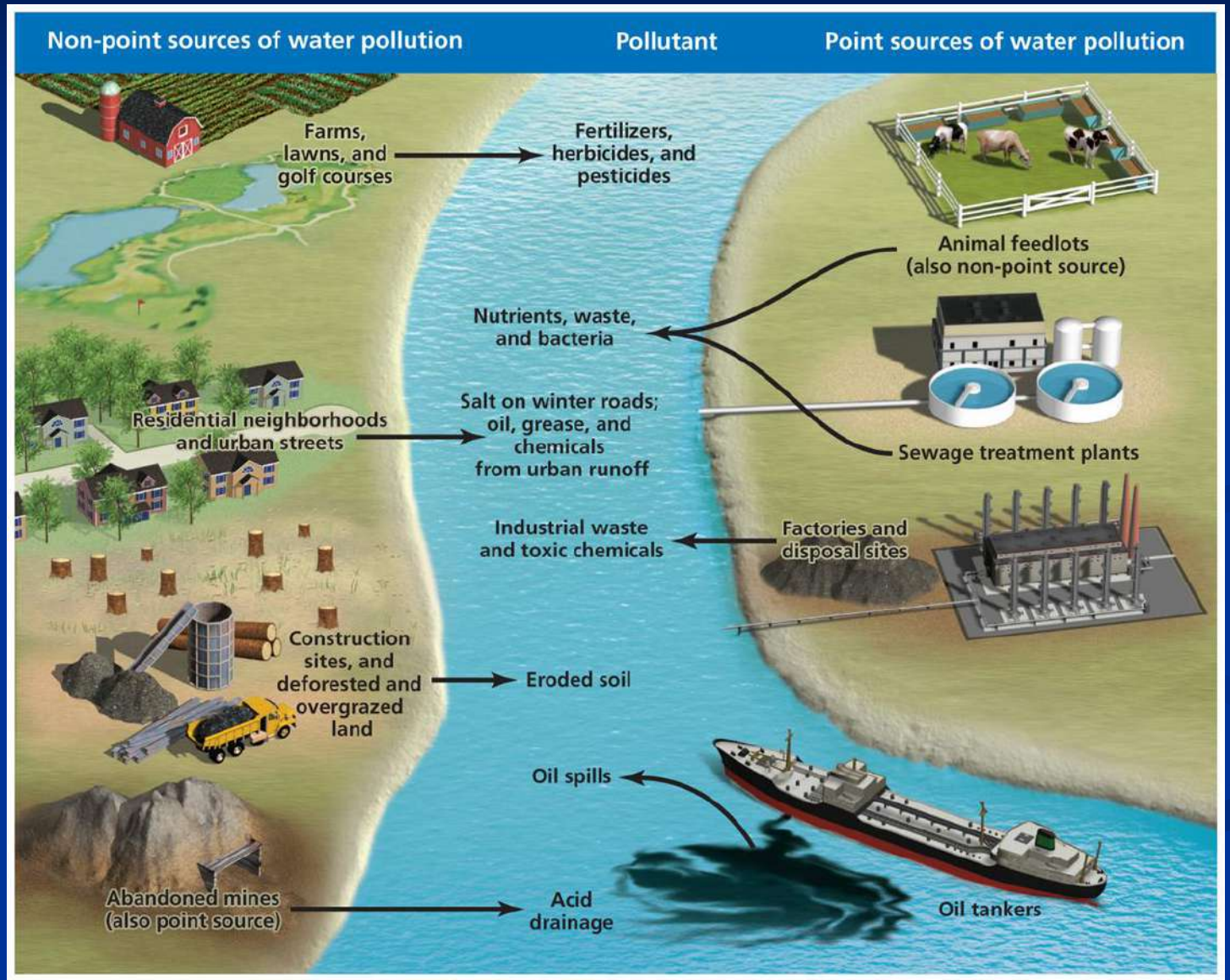
Human Impacts Within the Watershed

- 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



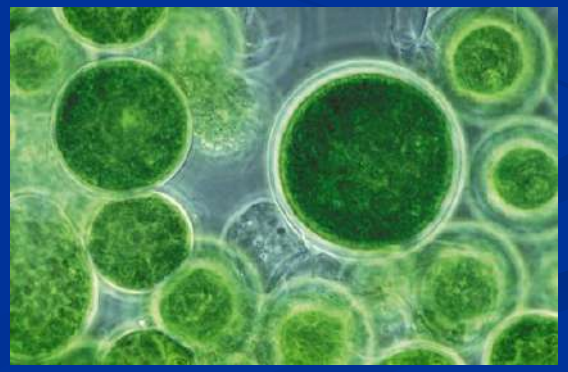
Water Quality Problems in The Red Cedar River Watershed

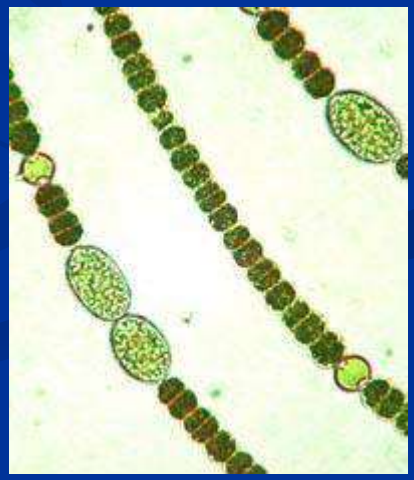
Photos Courtesy of WDNR

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

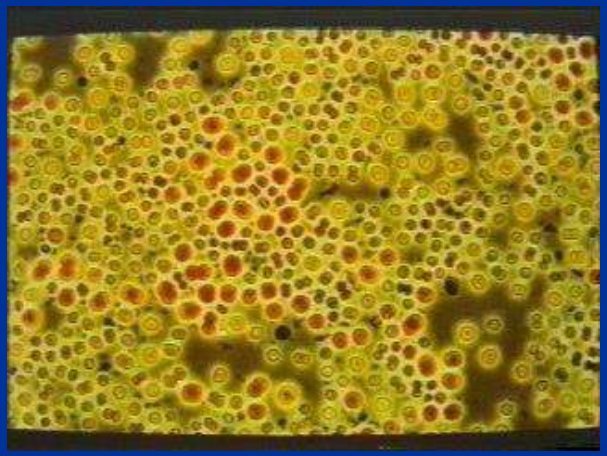
Why is Algae Bad For Water Quality?

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

WDNR

Why is Algae Bad For Water Quality?

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



http://www-cyanosite.bio.purdue.edu/images/images.html

Joshua Lott/Reuters

Why is Algae Bad For Water Quality?

- Some people are more sensitive than others and may have skin reactions
- Some also react with respiratory distress during a severe algal bloom

Photos Courtesy of WDNR

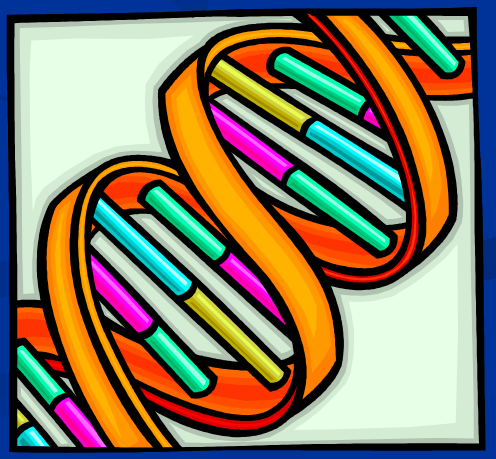
Why is Algae Bad For Water Quality?

- 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

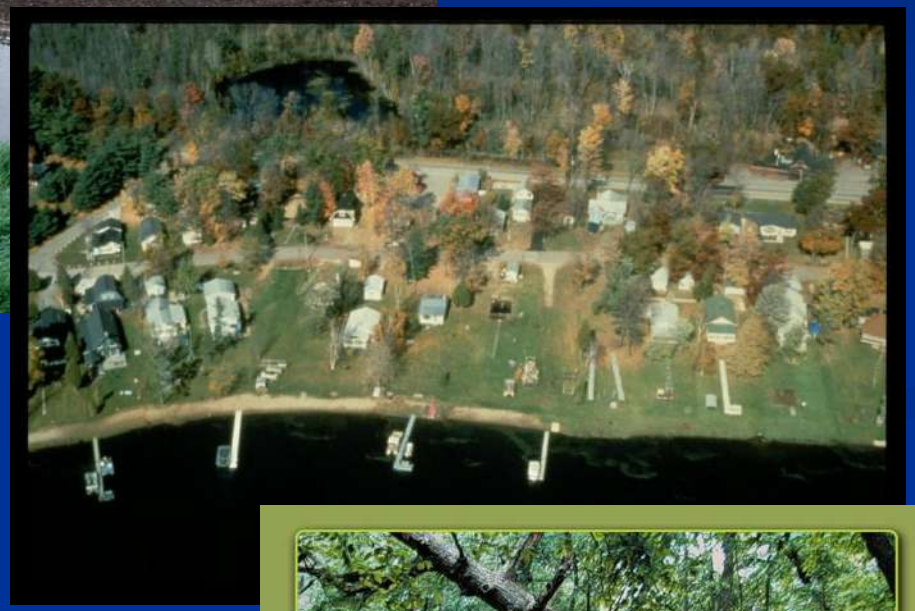


How is Phosphorus Getting In The Water?

- **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



Total Maximum Daily Load (TMDL)

- Amount of pollutant (phosphorus) that a water body can receive and still meet water quality standards
- Also is a research document that describes how this amount was derived, sources of pollutant, and possible solutions
- Lakes Tainter and Menomin and the Red Cedar River listed as "impaired" in 1996
- The TMDL was finally approved in 2012
- Recommends a 65% reduction in P inputs to the lakes

TMDL Recommendations

TMDL Phosphorus Load Allocation for Tainter Lake

Category	1990/93 Baseline Annual Phosphorus Load (pounds)	Annual Phosphorus Load Allocation (pounds)
Non-Point Sources	463,400	157,400
WPDES Permits	42,900	20,100
Totals	506,300	**177,000**

TMDL Recommendations

TMDL Phosphorus Load Allocation for Lake Menomin

Category	1990/93 Baseline Annual Phosphorus Load (pounds)	Annual Phosphorus Load Allocation (pounds)
Discharge from Tainter Lake at TMDL Goal	319,000	145,300
Non-point Sources (unsewered watershed)	3,500	2,200
Point Sources (Menomonie MS4)	3,500	2,200
General WPDES Permits		10
Totals	326,000	**149,710**

Red Cedar River Water Quality Partnership

- **Began meeting in late 2013**

- ***The Red Cedar River Water Quality Partnership is organized to share and learn information about the various efforts underway to improve the water quality of the streams, rivers and lakes of the Red Cedar River Watershed. The Partnership is the principal organization that will write a comprehensive watershed management plan focused on water quality in the Red Cedar River Watershed, and oversee implementation of that plan.***

Red Cedar River Water Quality Partnership

- Dunn Co Land Conservation
- Barron Co Land Conservation
- Dunn Co UW-Extension
- Barron Co UW-Extension
- WDNR
- NRCS
- City of Menomonie
- 3M Corporation
- West Wisconsin Land Trust
- UW – Stout
- Tainter/Menomin Lake Improvement Association
- Desair Lake Association
- Farmers Union
- UW-Extension

Red Cedar River Water Quality Implementation Plan

- Ten Year Plan
- Aims for an "interim" goal of 40% reduction of NPS phosphorus inputs (186,000 lbs) to Tainter Lake
- Meets federal and state guidelines for watershed planning (US EPA's "Nine Key Elements of a Watershed Plan")
- Will make the Red Cedar River watershed more attractive for certain funding grants

Practices and Predicted Load Reductions

BMP	Lbs P reduced
No-Till Farming Practices (60,000 – 86,0000 acres)	63,000
Manure Storage Structures (50)	34,000
Nutrient Management Plans/Practices (86,000 acres)	31,500
Cover Crops (107,000 acres)	18,000
Traditional Conservation Practices (10% of cropland)	11,000
Treatment of Milk House Waste (50)	6,600
Urban Storm Water Control (non-permitted)	5,700
Stream Buffers on Riparian Frontage (10%)	4,700
Barnyard Upgrades (68)	3,800
Replace Failing, Critically-Located Septic (440)	420
Storm Water Control on Rural Properties (2200 lots)	220
Wetland Restorations (200 acres)	210
Past Barnyard Reductions	27,000
Total	**206,150**

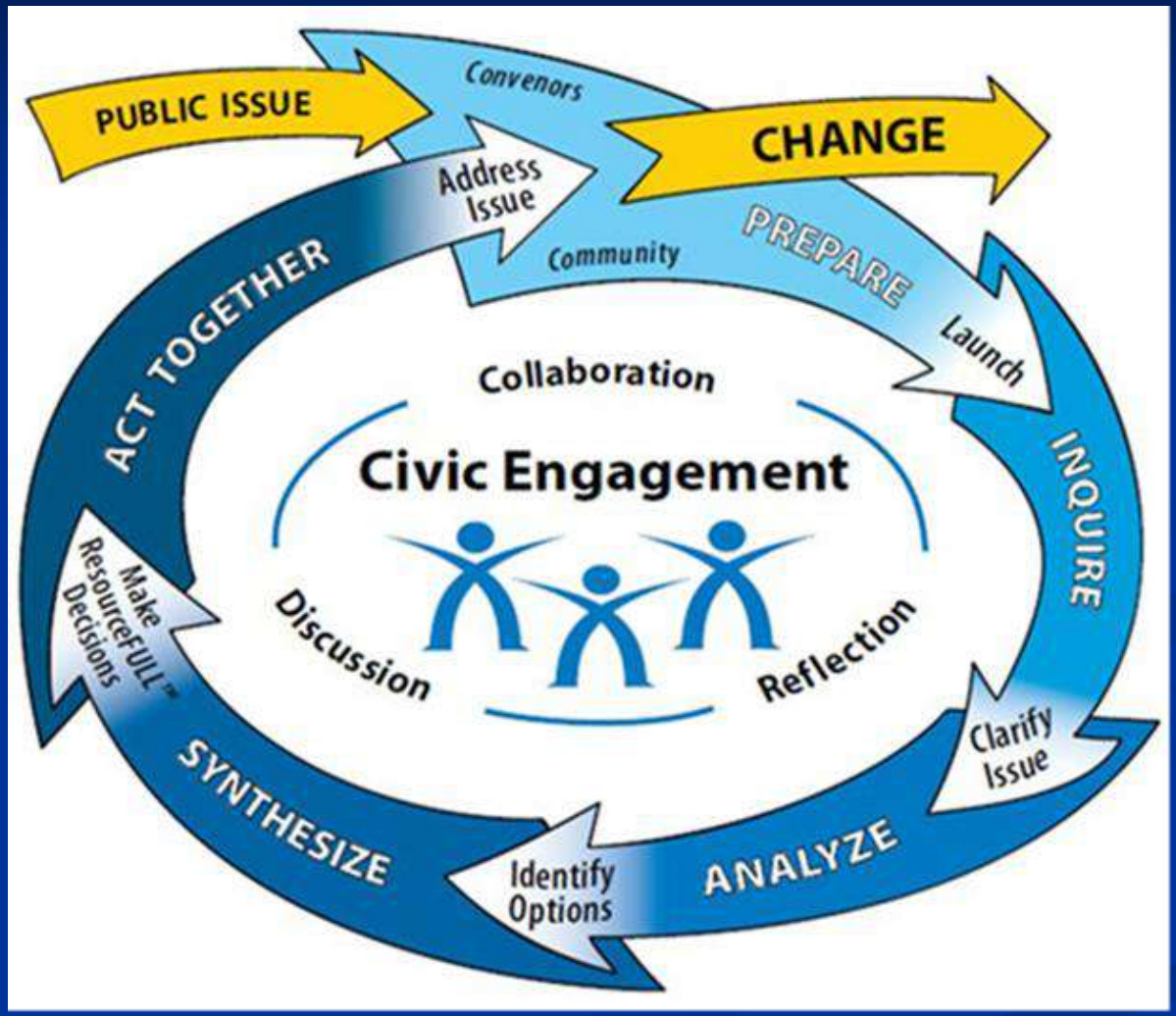
How?

Civic Engagement

and

Civic Governance

Civic Engagement



Authors: Radke, B., Hinz, L., Horntvedt, J., Chazdon, S., Hennen, M.A. and Allen, R.

Civic Governance

- **Creating the infrastructure to govern for the common good**
- **Incorporating feedback from stakeholders in measureable ways, reported in open forums**

Matt Zoschke

Civic Governance

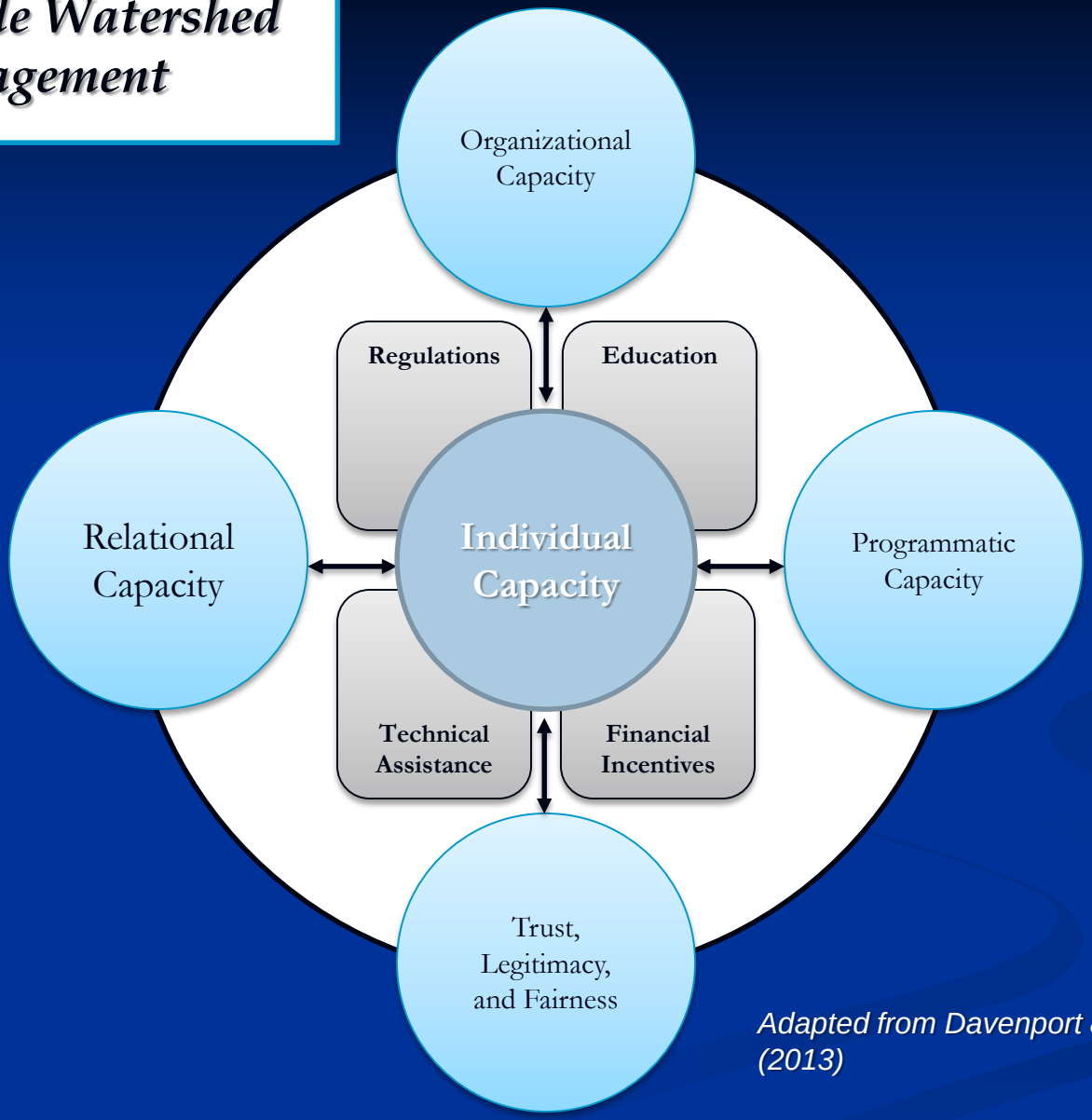
- Example: Town of Grant Phosphorus Reduction Project
- Social marketing information gathered about farmers in the Town
- Collaboration between Dunn Co LCD and River Country Resource Conservation and Development
- 2009-2011
- Focused on soil testing and no-till farming

Lance Klessig

Civic Governance

- Example: Farmer-Led Councils
- 4 Councils already established in NW Wisconsin
- FLC in Hay River watershed in northern Dunn Co
- Project collaboration between the County LCDs, UW-Extension, DNR and Farmers Union
- FLCs developing incentive payments (with money from a McKnight Foundation grant) that pay for certain practices the FLC decides are relevant

Sustainable Watershed Management



Adapted from Davenport & Seekamp (2013)

Outreach and Education

- Red Cedar River Conference!
- Presentations at various events
- Recognition of participants/partners
- Members of the Partnership take what they've learned and share it within the realms in which they interact (civic governance)

Measuring Progress

- **Social science measures – Assessments of current opinions and knowledge**
- **Participation measures – How many people are participating; how many acres; how many BMPs**
- **Water quality measures – Are levels of phosphorus in the river system and lakes changing?**

The Plan in Perpetuity

- Plan is in effect for ten years
- Plan will be reevaluated periodically during that time
- Changes made as necessary
- When ten years expires, it will be time to tackle the remainder of the problem with more sustainable watershed planning and management
- Cleaner rivers and lakes!

Questions

Daniel Zerr
Natural Resources Educator
UW-Extension
daniel.zerr@ces.uwex.edu
715-836-5513

UW Extension
University of Wisconsin-Extension