

Diamond Lake

▲ Water Quality

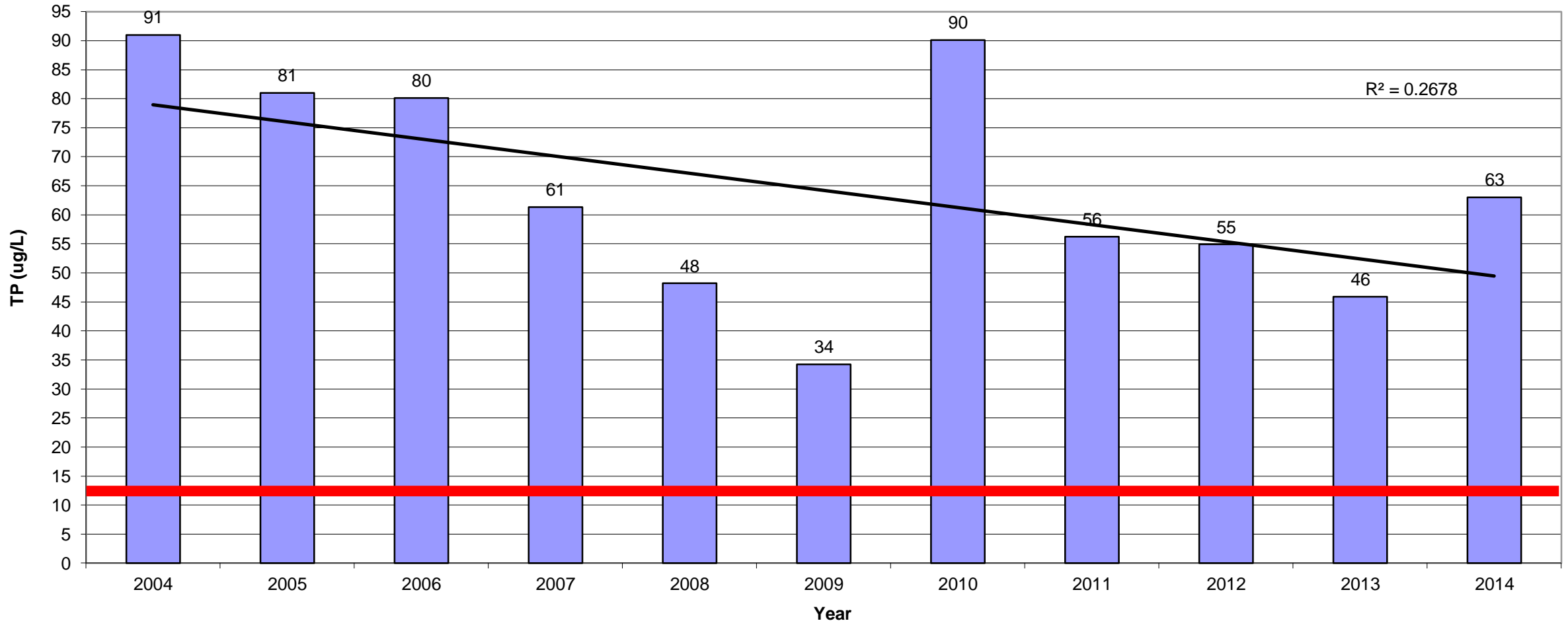
▲ TMDL Recommendations

▲ Curly-leaf Pondweed

▲ Schultz, Wheeler, Hubbard – Chain of Lakes
project

Water Quality

Diamond Lake Annual Ave TP Readings 2004-2014

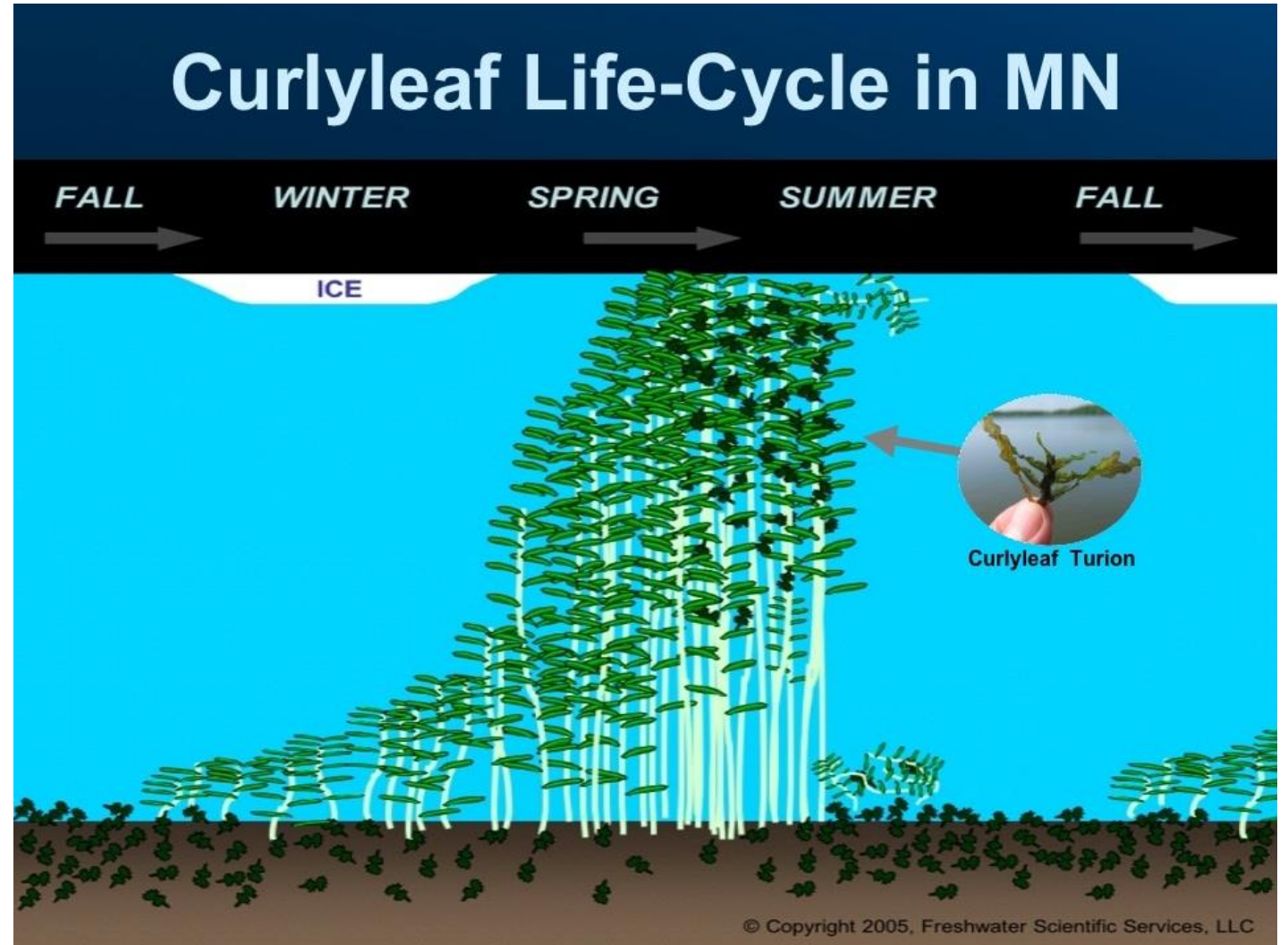


Diamond Lake: Accomplishments

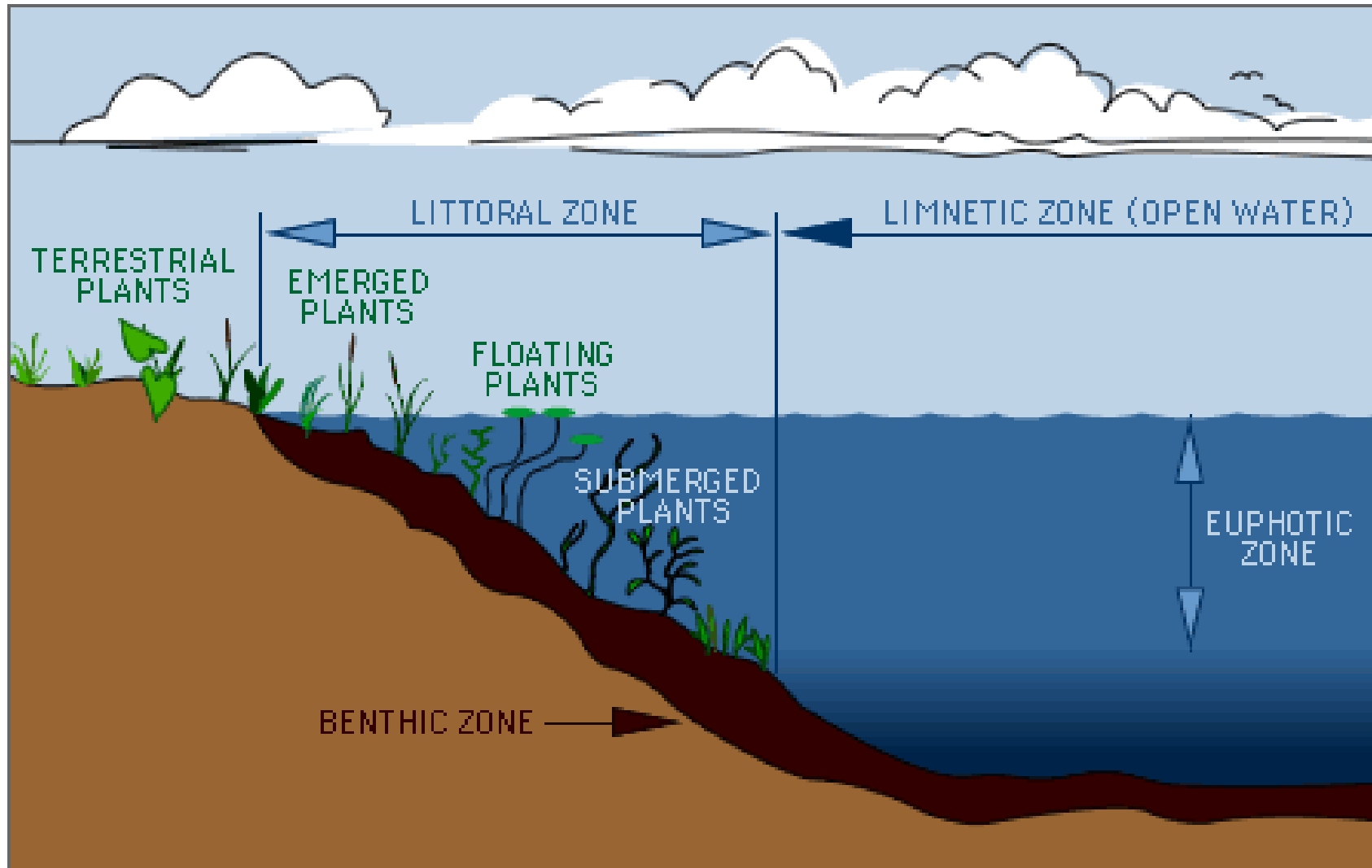
- **Total Maximum Daily Load**
 - The study allows for the identification of likely sources of nutrients
 - Develop implementation plan to address nutrient loading into Diamond Lake
- **Plan to address nutrient loading**
 - ✓ Connect to Green Lake Regional Wastewater Treatment System
 - ✓ Fish Barrier – control rough fish population in chain of lakes
 - Implement Lakeshore Best Management Practices (ongoing)
 - Implement Agriculture Conservation Practices (ongoing)
 - Educate Lakeshore Property Owners to Reduce Phosphorus (ongoing)
 - Control Curly Leaf Pondweed
 - Upstream Lake Management

Curly Leaf Pondweed

- ▲ Curly leaf pondweed actively grows during winter months
- ▲ Reaches maximum density in late spring
- ▲ Dies back in in mid-summer
- ▲ Turions (germinating portion of plant) are produced in late spring

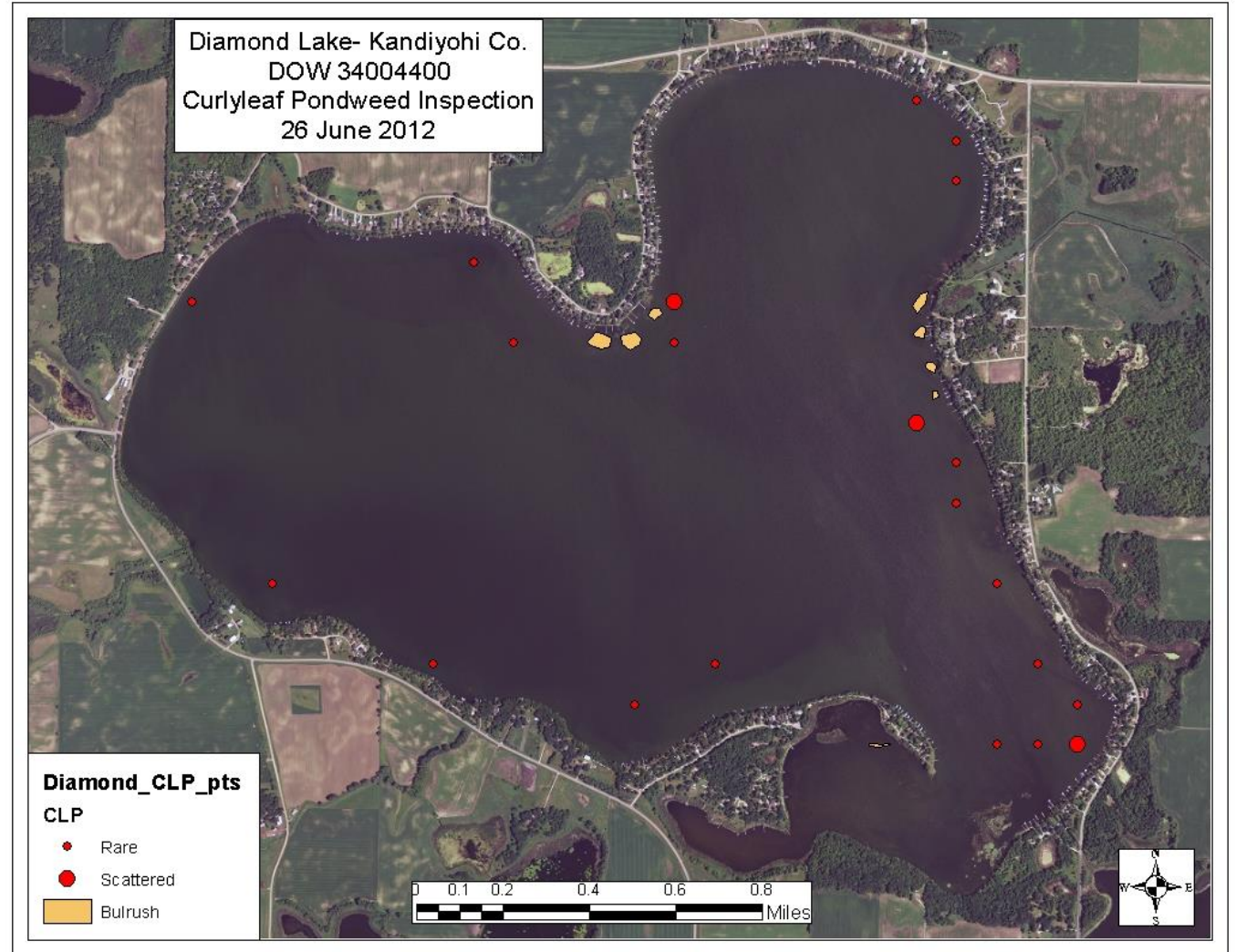


Lake Zones



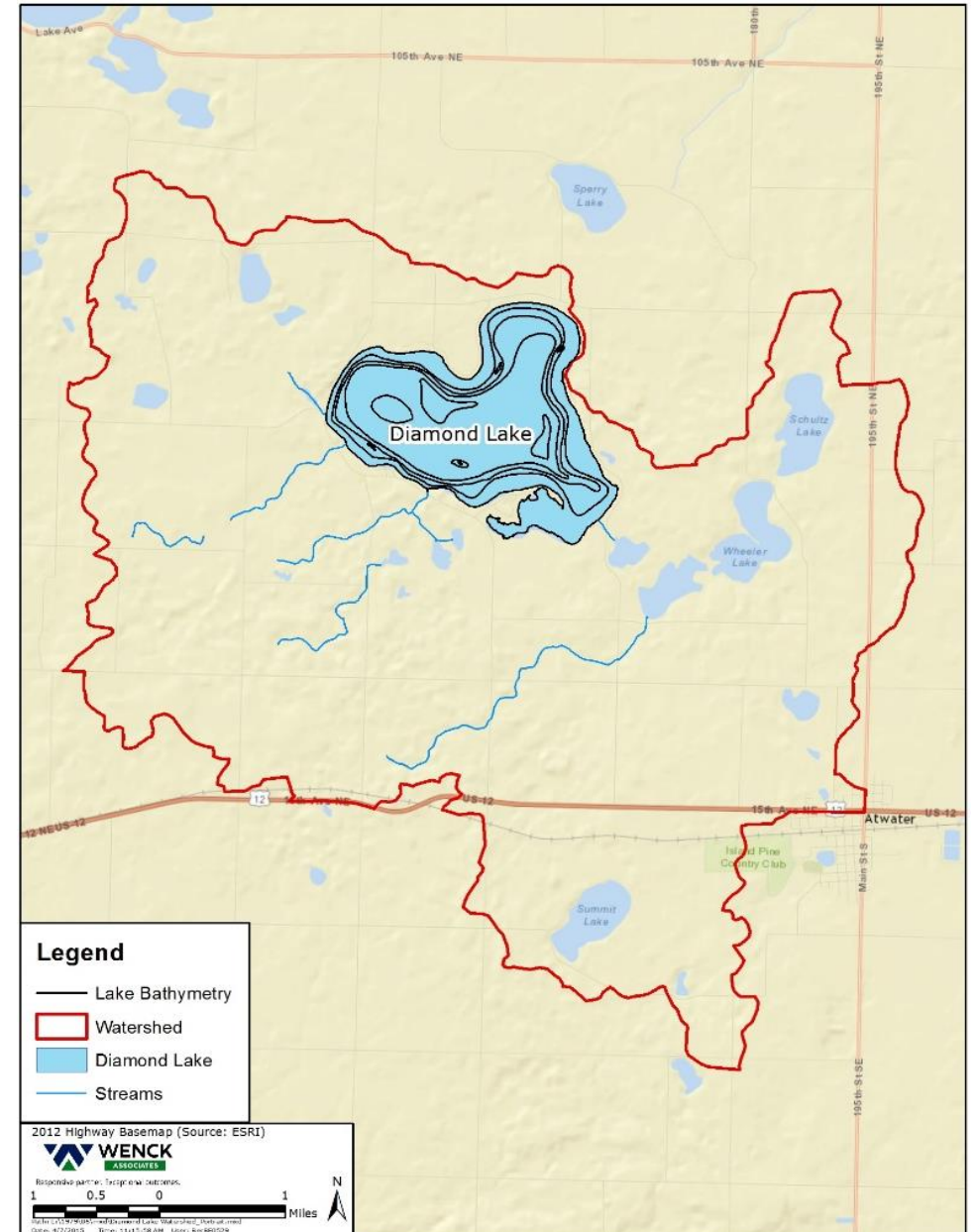
Diamond Lake Current Conditions

- ▲ Total Area:
 - 1,607 Acres
- ▲ Littoral Area
 - 648 Acres
- ▲ Curly Leaf Area
 - 150 acres
 - (~23% of littoral area)



Project Feasibility

- ▲ Determine feasible options
 - Past management by the Diamond Lake Area Recreational Association (DLARA)
 - Past management activities include chemical and mechanical treatments
- ▲ Expansion of management operations feasible
 - Cost constraints
 - Equitable distribution of costs



Alternative Analysis

- ▲ Curly-leaf pondweed typically grows between 3 and 10 feet
 - These areas will be targeted during the treatment process
- ▲ Target areas where Curly-leaf abundance is high
 - Small areas greater than 10 ft may be treated if Curly-leaf abundance is high
- ▲ 15 year project life cycle
- ▲ Present value calculations for cost estimate
- ▲ Based on costs quotes from herbicide applicators and harvesting operators

Herbicide and Harvesting Costs

Alternative	Description	Acres	Total Life Cycle Cost	Average Annual Cost ¹	Cost/Acre/Year
1	Invasive Contract Harvest	86 (48)*	\$968,410	\$64,561	\$482
2	Invasive Contract Herbicide	86 (48)*	\$515,074	\$34,338	\$256

¹Each annual cost adjusted to inflation and summed to obtain a total lifetime cost.

()* Area in parenthesis is the area designated for spot treatments.

Curly-leaf Management Timeline

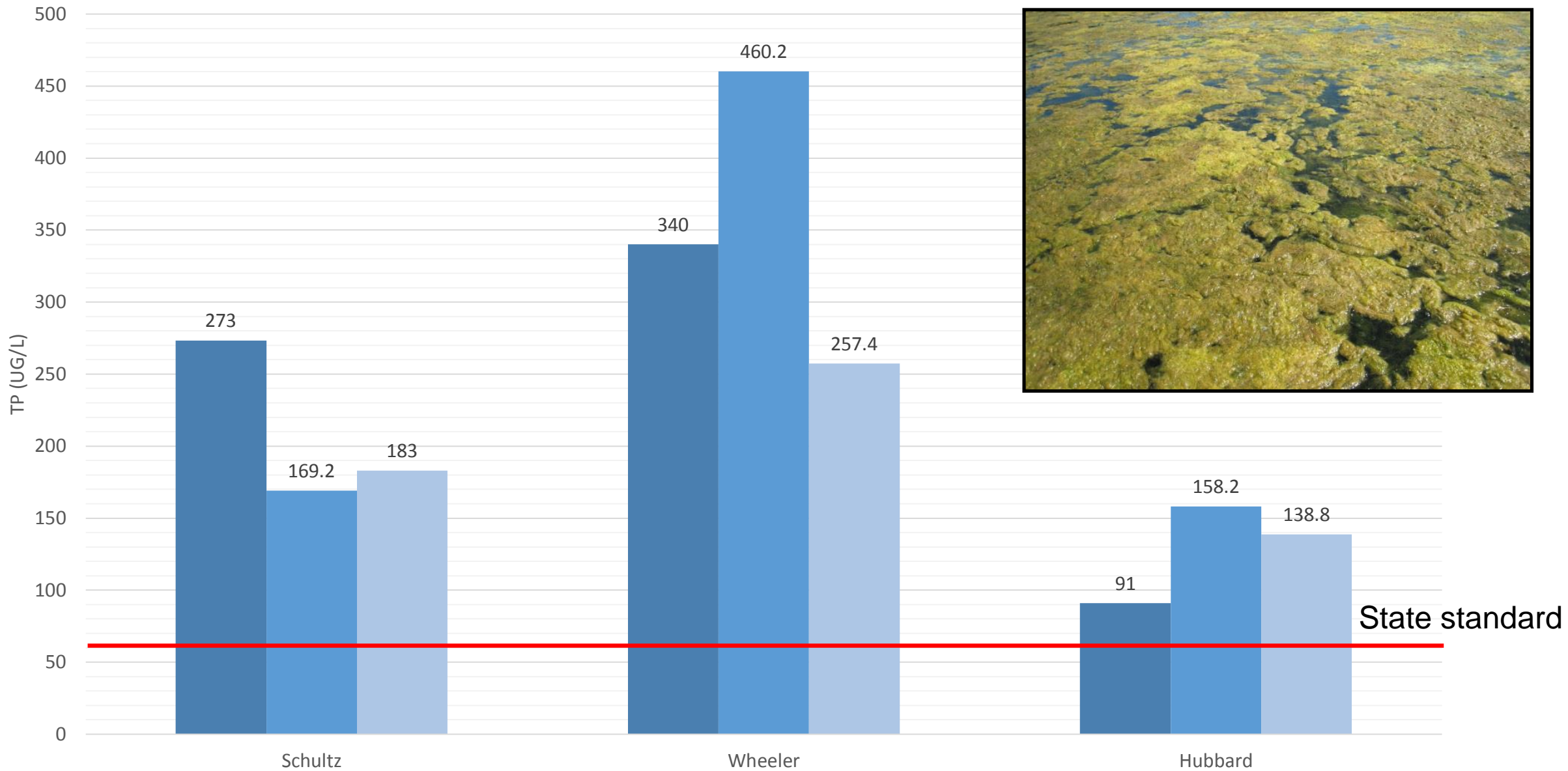
- ▲ Gather feedback from Diamond Lake Area Recreational Association
- ▲ Present final alternative decision to Lake Association
- ▲ Incorporate feedback into management alternatives
- ▲ Present recommendations to Middle Fork Crow River Watershed District Board
- ▲ Provide preferred approach to viewers for incorporation in benefits assignment
- ▲ Hold Public Hearing

Schultz,
Wheeler,
Hubbard



Chain of Lakes Total Phosphorus

■ 2008 ■ 2009 ■ 2014



Ducks Unlimited Drawdown Illustration



**LIVING
LAKES**

Diamond Lake Area Project - Kandiyohi County



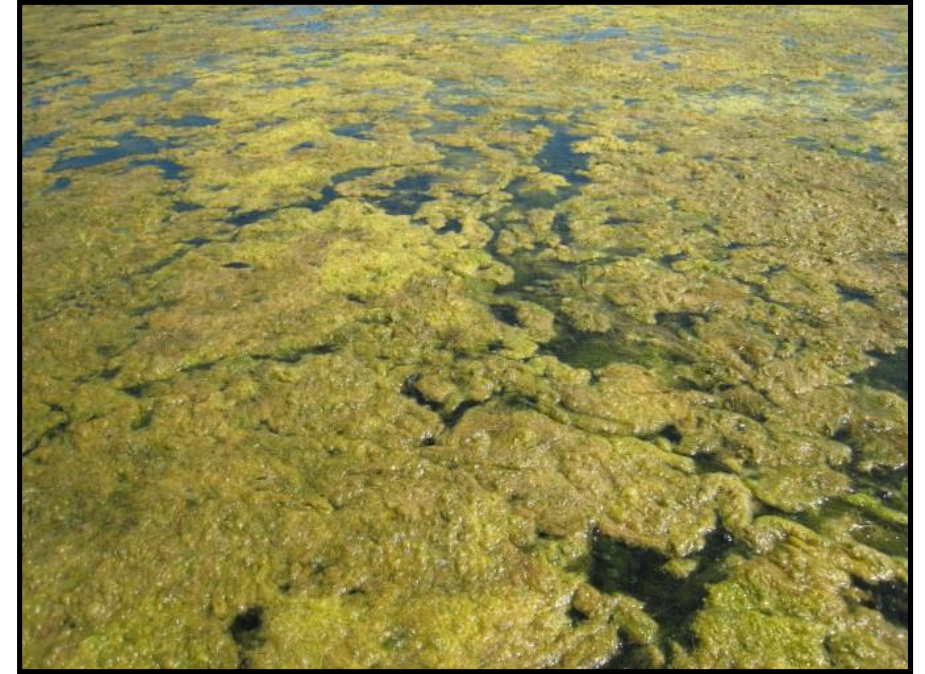
**Diamond Lake Area
Recreational Association**

★ - Proposed Management Structures

Phosphorus Reduction

- Reduce the average annual Total Phosphorus load to Diamond Lake by 335 kg/year (738 lbs).

*8.2 semi-trailers of algae!



Schultz, Wheeler, Hubbard: Timeline

- Meeting at Harrison Township Hall
- Public Hearing (District Office)
 - Capitol Project Establishment Hearing
- Present project Kandiyohi County Board of Commissioners MFCRWD
- Open House/Informational meeting: Riparian Landowners
- 103G Hearing (DNR Public Hearing)
 - Required for water level management
- Kandiyohi County Commissioners – Outlet Permit: Public Hearing