

PARTNERSHIPS IN ADAPTIVE MANAGEMENT & PHOSPHORUS TRADING

5th WISCONSIN RIVER
WATER QUALITY IMPROVEMENT
SYMPOSIUM – MARCH 19, 2015

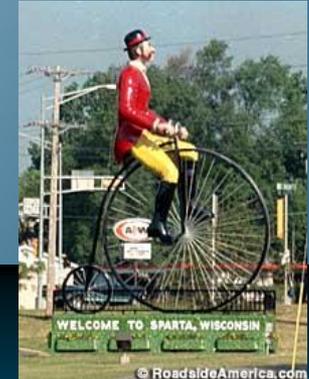
DAVE SAUER, P.E. – CEDAR CORPORATION
BOB MICHEEL, CONSERVATIONIST – MONROE
COUNTY

MIKE VOLLRATH – WISCONSIN DNR



Monroe County

- Size - 581,300 acres (908 mi²)
- Land use:
 - Fort McCoy -60,000 acres
 - Central Wisconsin Conservation Area (16,000 acres in Monroe Co.)
 - cranberries 3,654 acres
 - woodland 273,000 acres
 - cropland 185,800 acres
 - wetlands 56,000 acres
 - 5 Watershed Basins





Sparta Wisconsin

- One hunter recalled a nighttime visit to a swamp in Ohio in 1845, when he was sixteen; he mistook for haystacks what were in fact alder and willow trees, bowed to the ground under gigantic pyramids of birds many bodies deep. As late as 1871, a single nesting ground in Sparta, Wisconsin, covered eight hundred and fifty square miles, hosting more than a hundred million birds.
- But the profusion was misleading. Twenty-nine years later, a boy in Ohio shot a passenger pigeon out of a tree with a twelve-gauge shotgun, killing what was quickly identified as the last wild member of the species

10,000 Residents



Wisconsin's Phosphorus Rule



Effects of Excess Phosphorus

Lakes/ Reservoirs



- Excess algae growth
- Fluctuation in pH
- Low DO
- Undesirable films and deposits
- Reduced biodiversity

Rivers/ Streams



- Fluctuations in pH and DO
- Excess benthic chlorophyll growth
- Poor fish and aquatic life habitat
- Reduced biodiversity

Great Lakes



- Cladophora and other algae blooms
- Undesirable films and deposits
- Potential beach closures

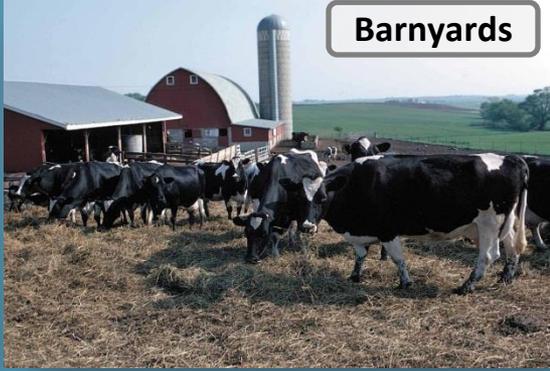
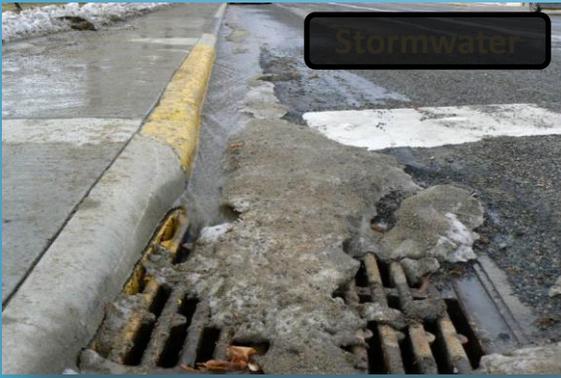
Human Health



- Increased risk of harmful algae bloom exposure:
 - Skin rashes
 - GI problems
- Reduced recreational value
- Reduced value of shoreline property

Potential sources of phosphorus

Nonpoint Sources



Point Sources



Types of P Limits

Technology-
Based P limits

Water Quality-
Based Effluent
Limits (WQBEL)

TMDL-Derived
WQBEL

Interim P limit

Types of P Limits:

TBLs

Technology-
Based P limits

Water Quality-
Based Effluent
Limits (WQBEL)

TMDL-Derived
WQBEL

Interim P limit

- Phosphorus TBLs have been in place since 1993
- No changes made during December 2010 rulemaking
 - NR 217 Subchapter II, Wis. Adm. Code
 - Typically, TBLs= 1mg/L

Types of P Limits:

Technology-
Based P limits

Water Quality-
Based Effluent
Limits (WQBEL)

WQBELs

TMDL-Derived
WQBEL

Interim P limit

- Created during December 2010 rulemaking
- Data Needed:
 - In-stream P concentration
 - Effluent P concentration
 - Effluent and stream flow
- Uses a mass balance equation to calculate a WQBEL (NR 217.13)

$$\text{Limit} = [WQC \cdot (Q_s + (1-f) Q_e) - (Q_s - f Q_e) \cdot C_s] / Q_e$$

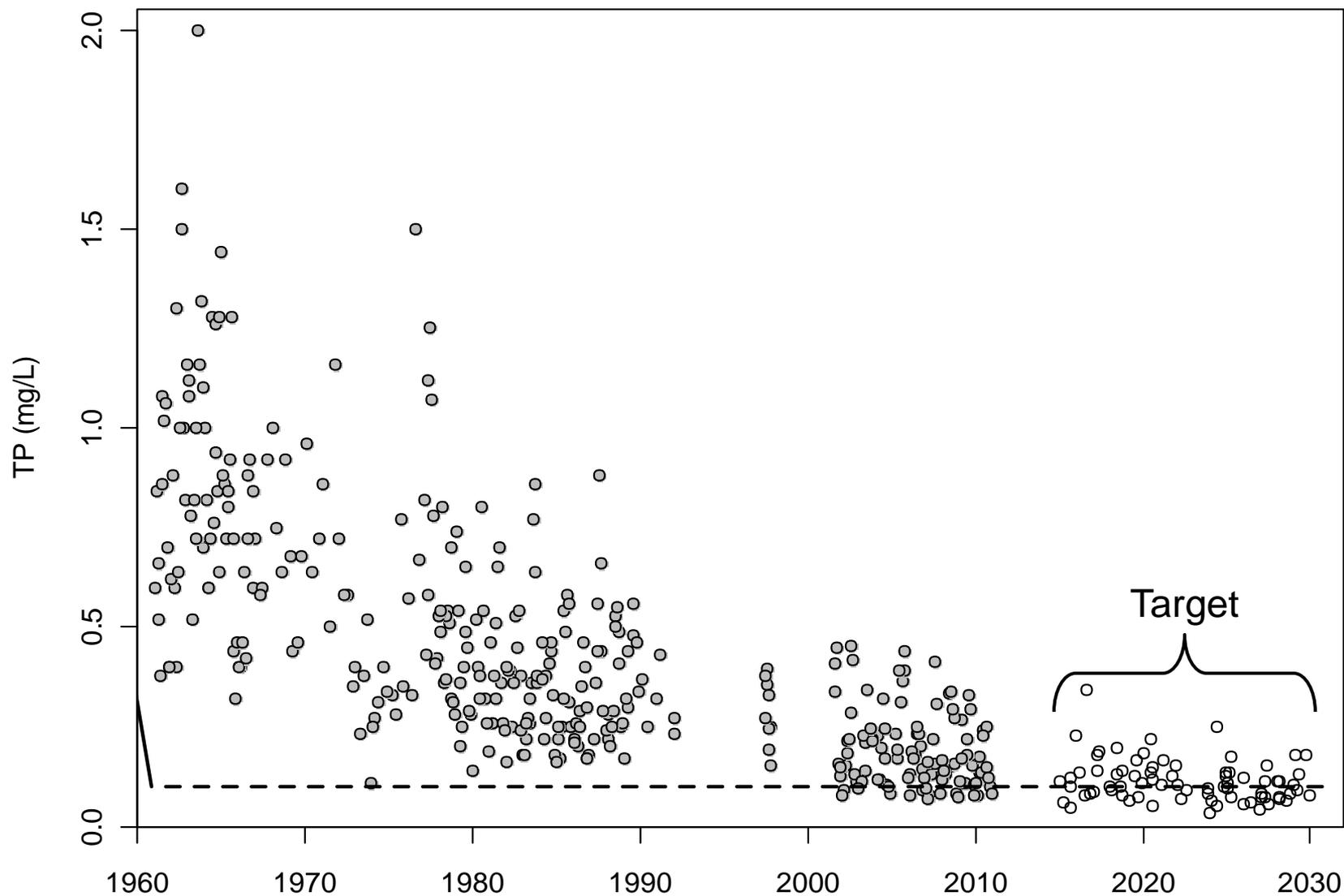
Protecting Wisconsin's Waters

- Phosphorus WQBELs can be included in permits to avoid exceeding the P criteria in the receiving water
 - Prevent adverse effects from excess phosphorus
- Time will be given for facilities to comply with these limits
- Several compliance options exist including trading and adaptive management

P Criteria <small>NR 102.06</small>			
Rivers: 100 ug/L	Streams : 75 ug/L	Reservoirs: 30-40 ug/L	Lakes: 15-40 ug/L



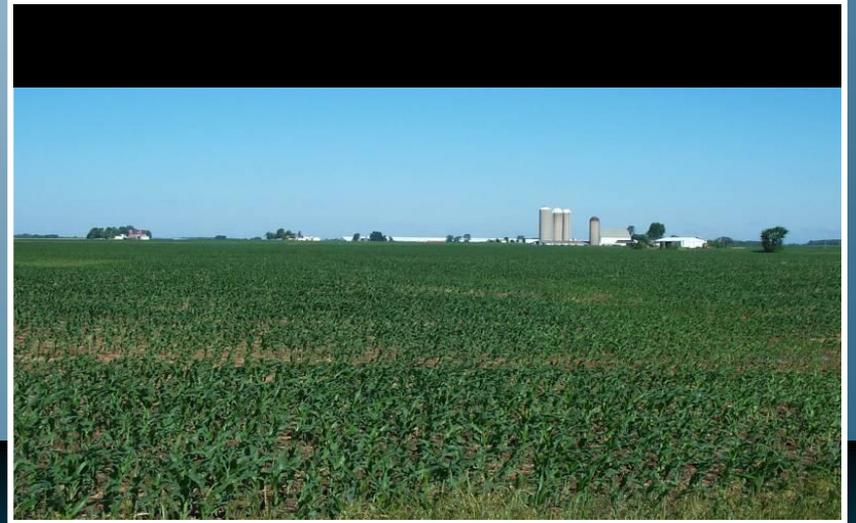
Rock River at Afton, WI



THE “NEW” COMPLIANCE OPTIONS

Adaptive Management (AM) & Water Quality Trading (WQT)





Adaptive Management Basics



What Adaptive Management is NOT

- NOT an option for all point sources
 - Specific eligibility requirements must be met
- NOT water quality trading
 - End of pipe compliance option

Eligibility Requirements

1. Receiving water exceeding the WQC
2. NPS contribute >50% of P load or NPS must be controlled
3. Filtration or equivalent technology required to meet WQBEL

NOTE: MS4s considered nonpoint under adaptive management

What is Adaptive Management?

- Compliance option focusing on water quality improvements, rather than a phosphorus offset
- Allows point sources to work with nonpoint sources to reduce overall phosphorus loads so that water quality criteria can be attained
- NR 217.18, Wis. Adm. Code

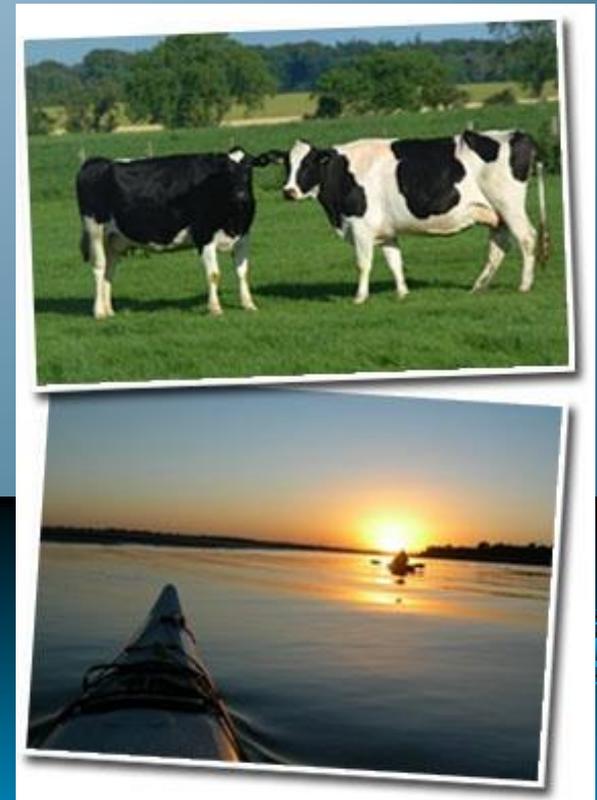


Keys to Trying Adaptive Management

- Adaptive Management must be cost effective to offset potential risk
 - Point source(s) should be willing to spend money throughout the watershed, not just in the municipal boundary
 - Partnerships to help develop/implement adaptive management
- 

What is Water Quality Trading?

- An Exchange of Credits (Pounds).
- Trading must result in an improvement in water quality and a net reduction of the pollutant being traded.
- Trading can provide ancillary environmental benefits such as flood retention, riparian improvement and habitat.



Who can I trade with?

- Point Sources
 - Municipal and Industrial
- MS4s
- Non-permitted Urban Sources
- Agricultural Sources



Quantifying Credits

- Credits Generated by a Nonpoint Source
 - SNAP-Plus and RUSLE2 for agricultural field practices
 - SLAMM and P-8 for urban practices
- Credits Generated by a Point Source
 - Effluent monitoring



Trade Ratio

- Uncertainty
 - Based on effectiveness and ease of verification of the management practices employed.
- Delivery (distance between generator and user)
 - TMDL – Same factors used in TMDL
 - Non-TMDL – USGS SPARROW model for P, N and sediment



Trades

- Upstream of Outfall - generally
- Details spelled out in permit
 - Terms are contractual
- Permittee must still meet monthly limits
- Practices must be in place and functioning ***prior*** to taking credit



Who facilitates trades?

- Direct
- Through 3rd party brokers
 - Likely route in regard to non-point
 - LCDs?
 - Private Consultants?



Likely Practices

- Nutrient management
- Conservation tillage
- Cover crops
- Buffers
- Barnyard controls
- Streambank restoration
- Wetland restoration
- Many others...





COMPARING ADAPTIVE MANAGEMENT & TRADING



Similarities between AM and WQT

- Voluntary compliance options for WPDES permit holders to comply with phosphorus requirements
- Options will be used when it is economically preferable to control nonpoint sources or other point sources of P
- Both require nonpoint and/or other point source reductions
 - Contractual agreements should be made
 - Need to look in same watershed (HUC 12)
- WDNR will not serve as broker for either program



Differences



	Adaptive Management	Trading
Pollutants Covered	TP (and possibly TSS)	All pollutants except BCCs
End Goals	Attaining the water quality criteria	Offsetting the limit
Implementation Area	Watershed-focused	Upstream-focused
Offsets	No trade ratios	Trade ratios apply
Timing	Implemented throughout the permit term	Generating credits before they can be used
In-Stream Monitoring	Required	Not required
Level of Documentation Needed	General watershed information	Field-by-field documentation

The Current Model

- Point source/their consultant works with WDNR to understand options
- Contacts the County LWCD to determine their level of interest
 - Potential opportunity for staff funding and cost share dollars
- Point source and County work to develop an AM/WQT agreement

MORE INFORMATION @

➤ dnr.wi.gov

search for

- water quality trading
- adaptive management



Welcome to Sparta, Wisconsin

Sparta is the county seat of Monroe County, nestled in the beautiful rolling hills of western Wisconsin. Once known for the healing powers of the local artesian springs, Sparta is now most recognized as the junction of the Elroy-Sparta and La Crosse River bike trails. Sparta's claim as the "Bicycling Capital of America" is based upon the first rail bed in Wisconsin to be converted to bike trails between Sparta and Elroy. Sparta is also recognized for our proximity to Fort McCoy, the largest Military base in Wisconsin. Hunting and fishing opportunities abound in the area as does award winning golf at River Run Sparta Golf Course. Sparta is home to many unique shops in our historic downtown district and world recognized manufacturers in our growing business parks. The quality of life in Sparta is second to none. Come for business, come for pleasure, stay for a lifetime.



Figure 2

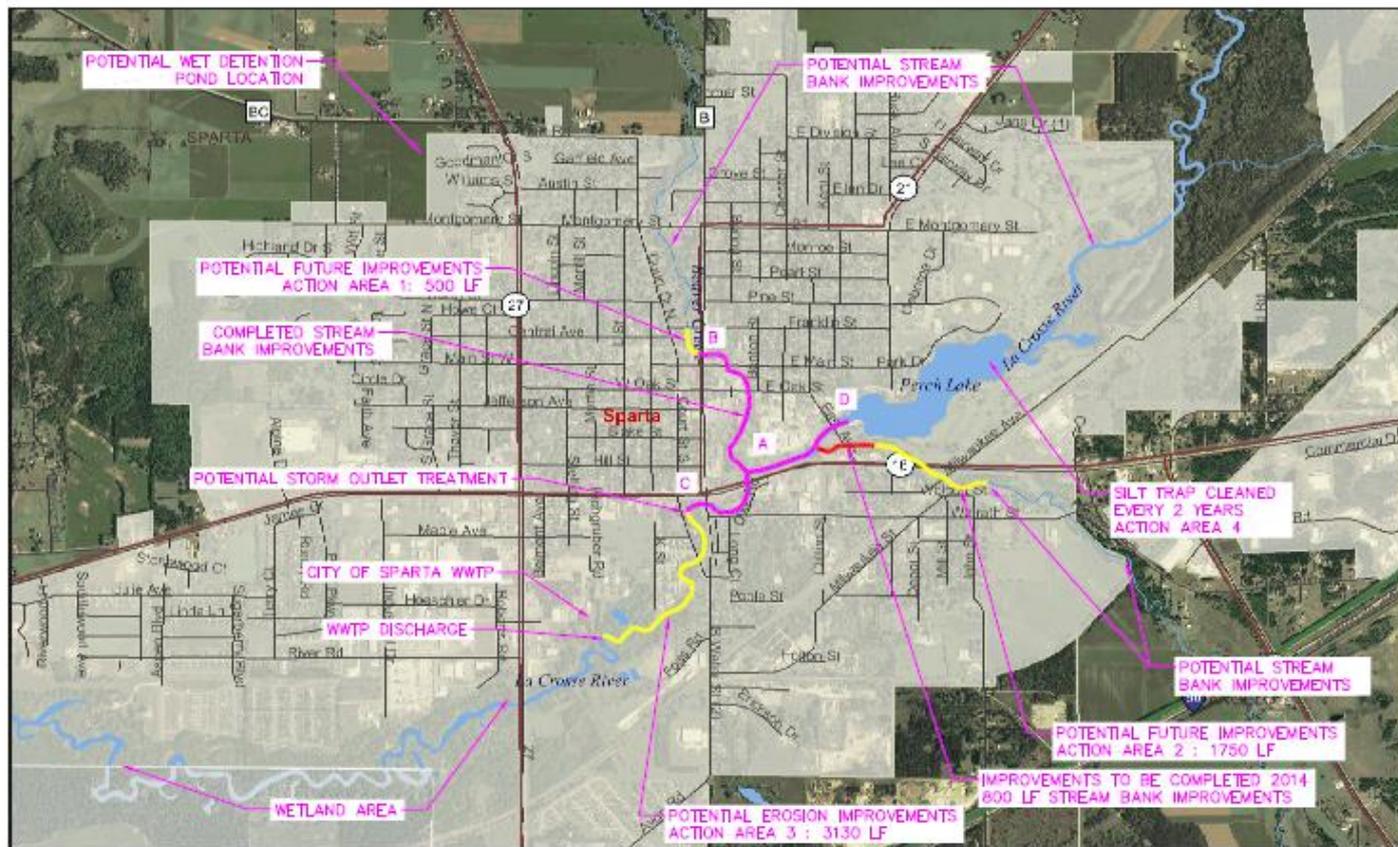
Figure 2: City of Sparta Stream Bank & Other Improvement Status



Legend

- Major Highways**
- Interstates
 - State Highways
 - US Highways
 - County Roads
 - Local Roads
 - Rail Tracks
 - Bus Lines
- Water**
- Lake Green Water
 - Lake Kopp and Reservoir
 - Reservoir
 - Ponds
 - Stream and Wetlands
 - Slough
 - All

DISTANCE SUMMARY
 FT A TO FT B = 2,210 LF
 FT C TO FT D = 3,040 LF



0 1750 3500 7000 FT.

If the map is to be used for purposes other than those for which it was prepared, the user assumes all liability for any errors or omissions. The user also assumes all liability for any damages, actual or consequential, resulting from the use of the map. © 2014 City of Sparta, WI. All rights reserved.

Scale: 1:17,000

La Crosse River & City Information

La Crosse River

Phosphorus – **0.098 mg/l**
Flow (average) – **102.5 MGD**

City of Sparta

Phosphorus – **0.7 mg/l**
Flow (average) – **1.0 MGD**

City Phosphorus Contribution – 3.6%

Required Phosphorus Reduction at WWTF

At Current Flow – 1,404 lb/yr

At Design Flow – 2,913 lb/yr

Required Phosphorus Non-Point Reduction at 2:1 Ratio

At Current Flow – 2,808 lb/yr

At Design Flow – 5,826 lb/yr

General Approach

A. Collected Additional Data

- **La Crosse River**
- **Contributing Upstream Creeks**
- **Groundwater**

B. WWTF

- **Phosphorus Data Review**
- **Industrial Contributors**
- **Operations Review**

C. Non-Point Phosphorus

- **Monroe County LCD**
- **Field Trips**
- **Alternatives Discussed**

Additional Data Collection

- **Confirmed Phosphorus Concentrations in La Crosse River**
- **Upstream Creek's Phosphorus Concentrations were Higher**
- **Groundwater Supply Phosphorus Concentrations Were Above 0.075 mg/l**

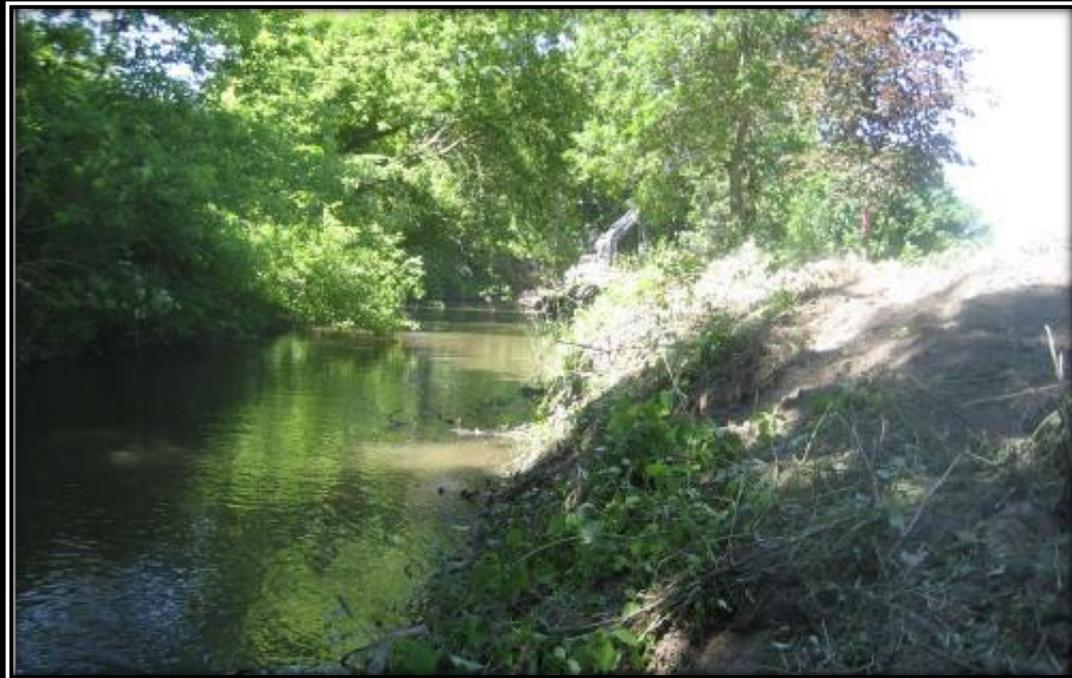
Non-Point Phosphorus

NOI Submitted for Trading to DNR

- **Stream Bank Stabilization**
- **Perch Lake Sediment Removal**
- **Storm Water Detention Pond**
- **Grade Stabilization Structures**
- **Grassed Waterways**

Non-Point Source Reduction

- **Expect up to 40% of Required P Reduction at Current Flow Rates**
- **Completed First Stream Bank Stabilization Project in 2014**
- **Received Approval of Phosphorus Trading Credit from Wisconsin Department of Natural Resources (February 2015)**
- **Continue Working with Monroe County LCD Staff to Implement 4-Year Plan**



Sparta, WI
Farmers Valley Creek
Existing North Stream Bank
6-13-14



Sparta, WI
Farmers Valley Creek
Existing North Stream
Bank
6-13-14

Sparta, WI
Existing North Stream Bank,
9' Height
6-13-14



Sparta, WI
Existing North Stream
Bank
6-13-14





Sparta, WI
Farmers Valley Creek
Lunker, Flat Limestone
Construction Practice
6-13-14

Sparta, WI
Farmers Valley Creek
Stabilized/Finished Section
(Looking Downstream, At Where
Creek Enters The La Crosse River)
6-13-14



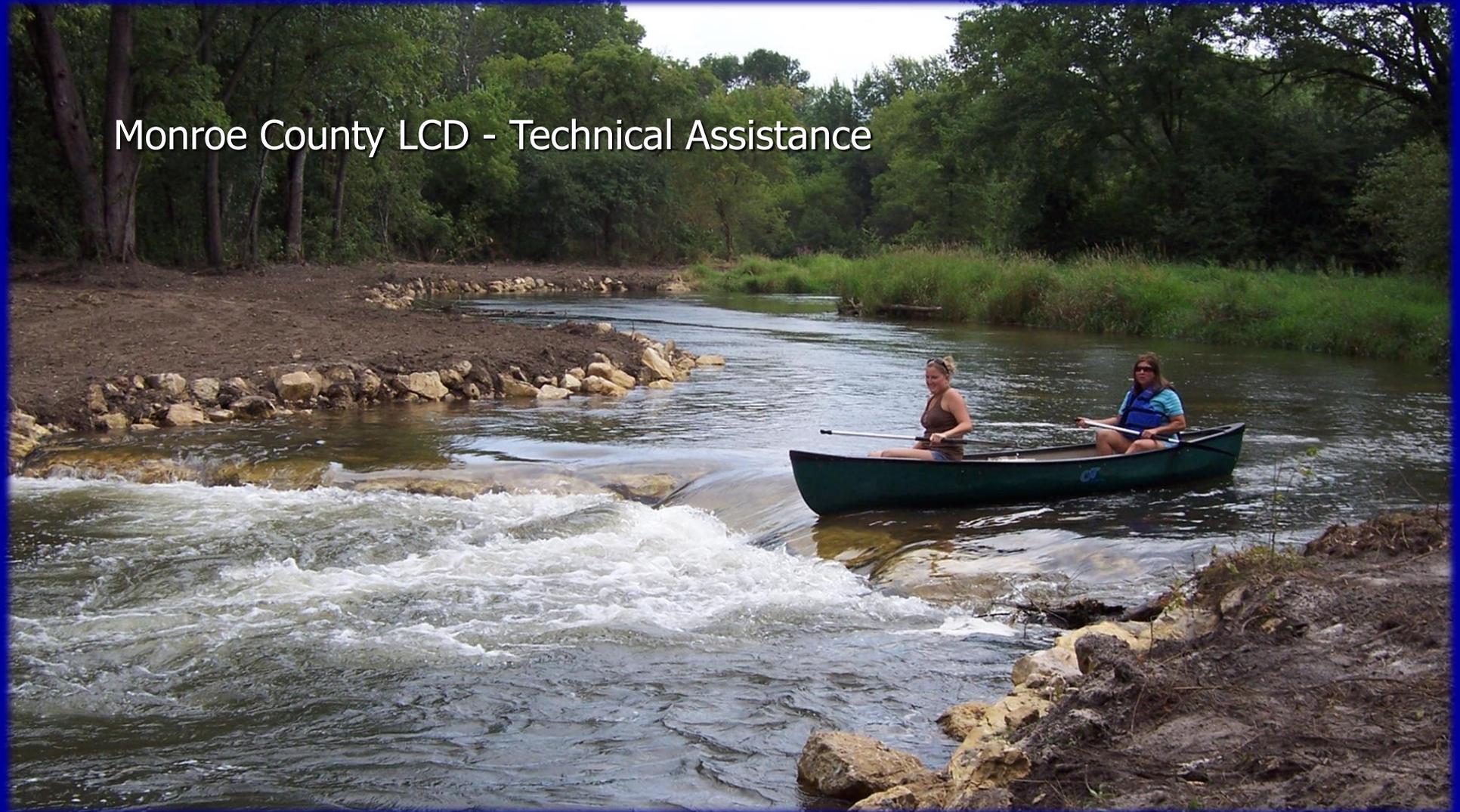


Looking South Or Cross
Section From Where Project
Work Started



Looking Downstream 50'
From Where Project Work
Started

Monroe County LCD - Technical Assistance



Topics:

- Background
- Working History/Relationship
- Stream Restoration
- Contractors

*Bob Micheel
Monroe County
Land Conservation - Director*



Conservation Programs - LCD

*Stop erosion

*Protect agricultural land

A man wearing a blue jacket and a dark hood is holding a large trout in his mouth. He has his eyes closed and a pained or determined expression. His hands are raised to his head. A blue banner with white text is overlaid on the image.

Trout Stream Restoration!!

LUNKERS!!



In-stream Cover

Utilize materials on site
more, more, more!!.





DNR Trade Credit

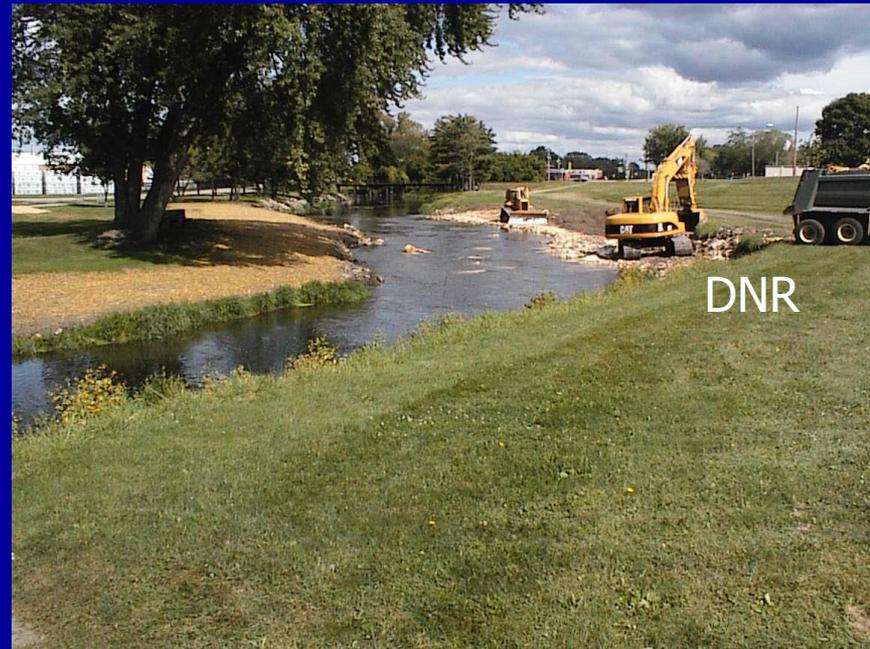


Sparta - 2003 Stream/River Restoration 1.5 miles



La Crosse River

Perch Lake



DNR



Project Success!

Landowner/City Relationships - Trust

- Opportunity
- Technical/Financial Assistance



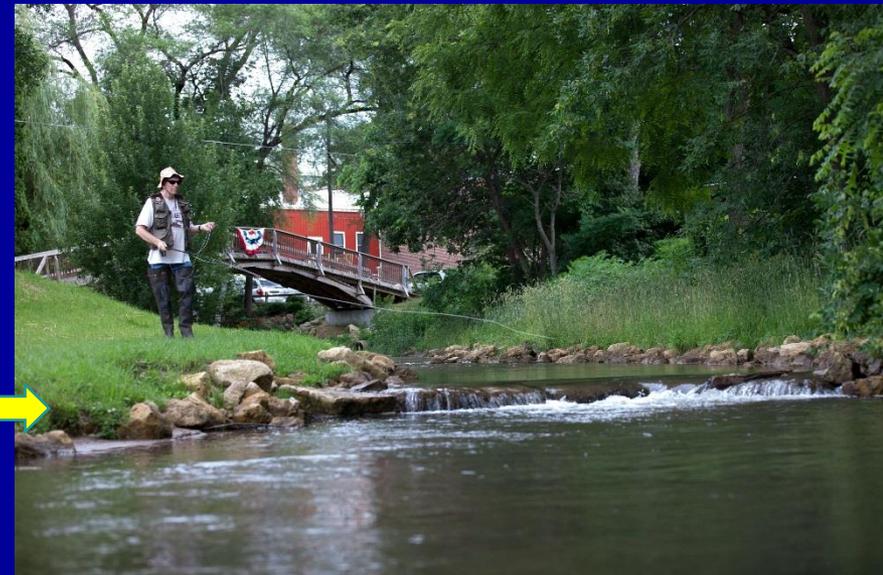
Vision



Planning/Installation
(Job Approval)



Goal



Land Conservation Dept.

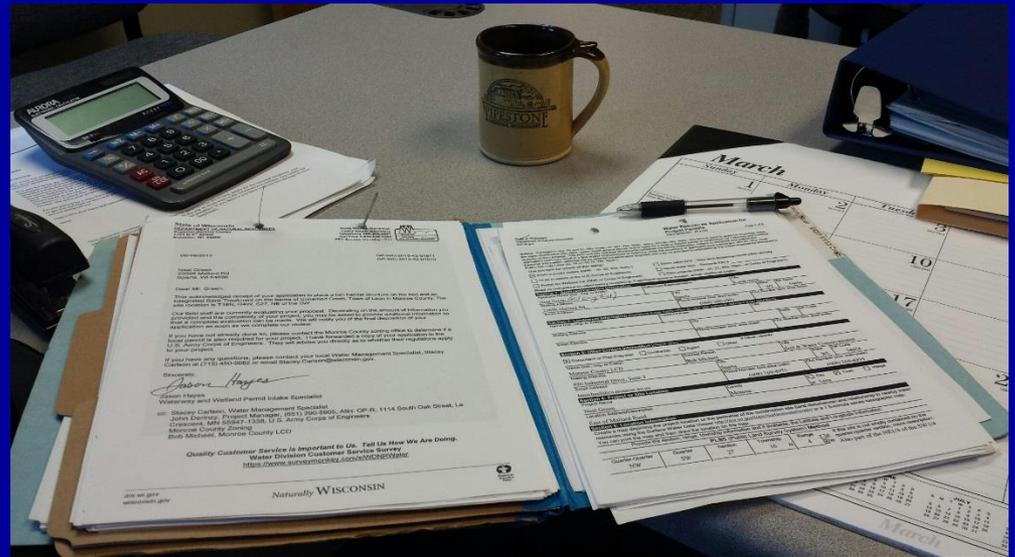
Responsibility: Design, cost containment, construction oversight (standards), obtaining fishing easements, permits, & securing financial partners.

31, Wis. Stats., ch. 281, Wis. Stats. and s. 283.33, Wis. Stats., this form is used to apply for coverage under water runoff general permit, and to apply for a state or federal permit or certification for waterway and wetland work and any required attachments constitute the permit application. Failure to complete and submit this form and any required attachments under the provisions of applicable laws including s. 283.91, Wis. Stats. may result in a fine and/or imprisonment or forfeiture under the provisions of applicable laws including s. 283.91, Wis. Stats. This form will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's



Quantities

Site	Length	Material	Quantity
1	35'	LUNKERS	1 ✓
2	100'	LUNKERS	1 ✓
3	150'	70' shaping	2L
4	30'	LUNKERS	1 ✓
5	180'	200' riprap	1 ✓
6	100'	shaping	1 ✓
7	100'	70' riprap	1 ✓
8	150'	LUNKERS	1 ✓
9	50'	LUNKERS	1 ✓
10	150'	shaping	1 ✓
11	50'	LUNKERS	1 ✓
12	120'	shaping	1 ✓
13	40'	LUNKERS	1 ✓

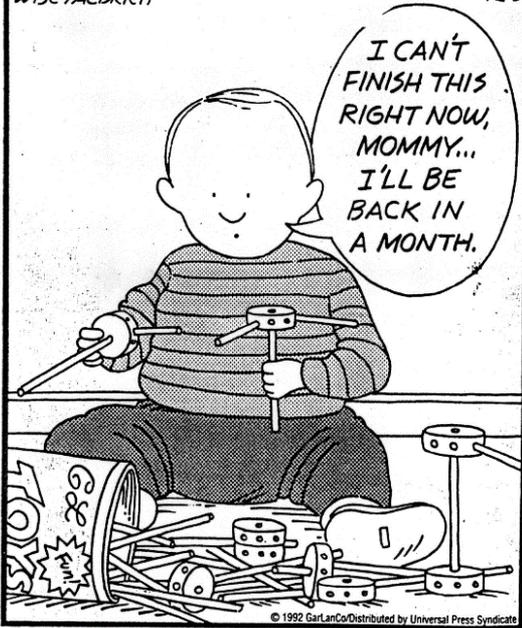


Design/Chapter 30 Permits

Real Life Adventures by Wise & Aldrich

WISE / ALDRICH

12-3



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Your contractor as a child.



Contractors

Bidding & Quantities



EXCAVATING

*Changing Yesterday's Environmental Ignorance
into Today's Environmental Solutions*



Value of a Trained Contractor

- Experience/Hands-on
- Cost
- Quality and Quantity of work
- Vision

This will
work!





Whoops!

Planned

LUNKERS



Trust!

Contractor Selection





Sparta - Water Quality Trading- 2014

- Phosphorous trading
- Point \$ for Non-point
- Trout Unlimited Chapters – Oak Brook, Coulee
- Sparta High School



Cost Share Programs/Partners (\$20-25/ft.)

State Programs:

Conservation Aids

DNR – Trout Stamp

DNR – Nonpoint

NR243/NOD

CREP

Organizations:

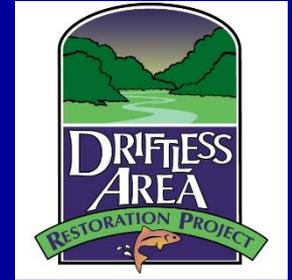
Trout Unlimited

Turkey Chapter

Pheasants Forever

Local Clubs & Chapters

Public, Schools, Community Service



County LCC Programs:

Land & Water

County

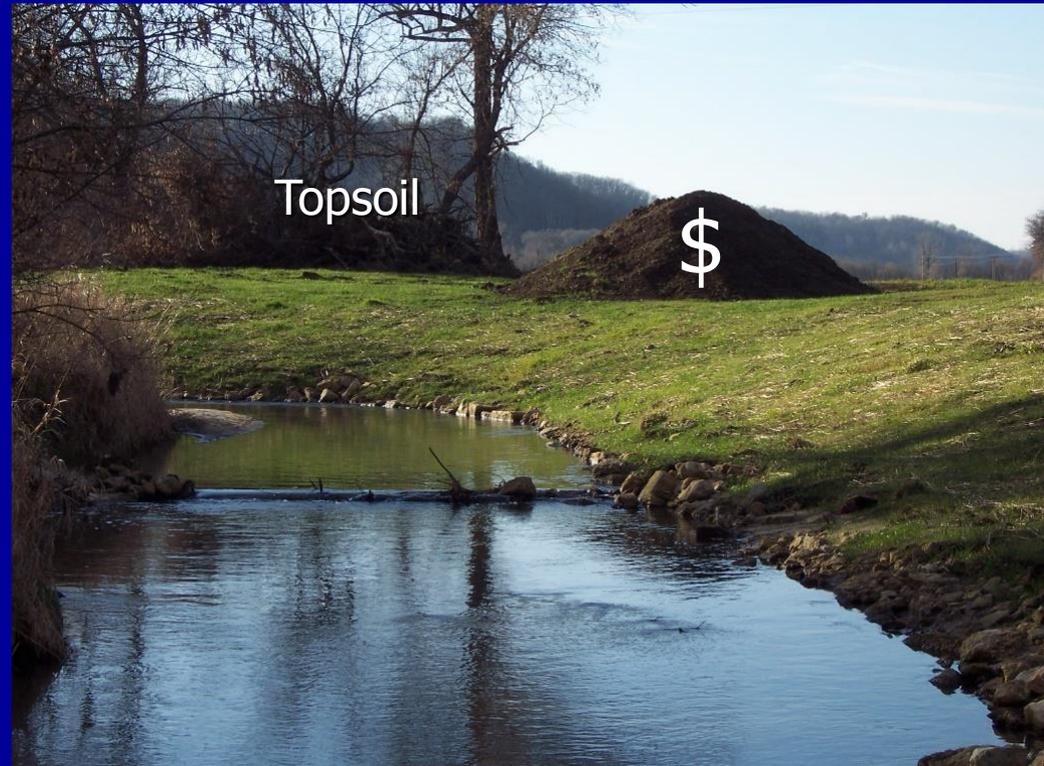
Federal Programs:

NRCS-EQIP

WHIP

CRP/CREP

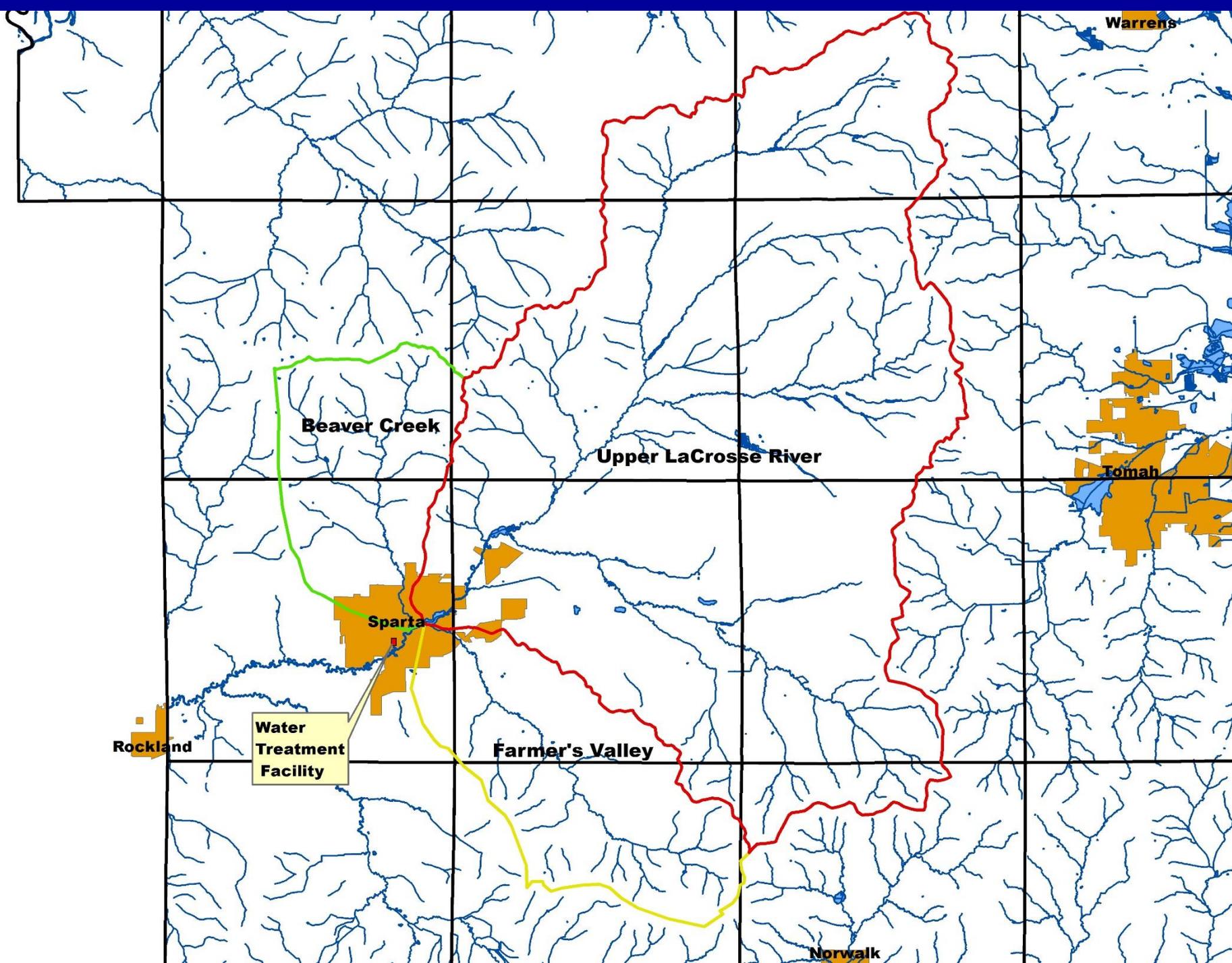
USFW



Sparta WQT Plan

- 1.4 miles of stream restoration & over
- 100 fish habitat structures
- Fishing easements & public access
- Waste TP – Save \$, meet standard
- Improved Green Space
- Flood Protection
- Tourism





Warrens

Beaver Creek

Upper LaCrosse River

Tomah

Sparta

Rockland

Water Treatment Facility

Farmer's Valley

Norwalk

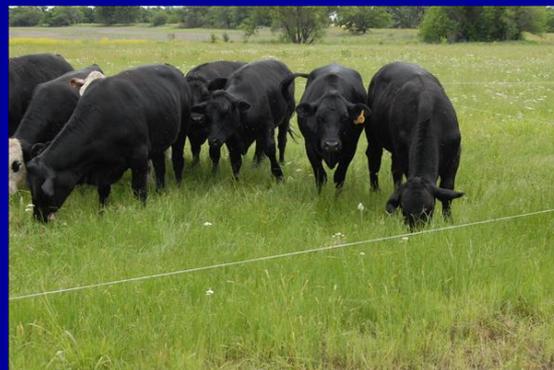


Stream Corridor Management

Prescribed burning



Mgt. Grazing



Mowing





Gully Erosion Control Practices



Phosphorus Credits

- **Follow WDNR Guidance Document**
- **Sample for Soil Phosphorus Content**
- **Calculate Soil Loss**
- **Calculate Phosphorus Credit**
- **Apply Trade Ratio**

Future Projects For Sparta

- **Continue Stream Bank Stabilization Work**
- **Perch Lake Sediment Removal**
- **Start Projects in 2015 Outside City Limits**
- **Need Perpetual Maintenance Agreements**