



Preparing for the Future

Developing and Implementing Water Protection Strategies for the Upper Pelican River, Becker County MN

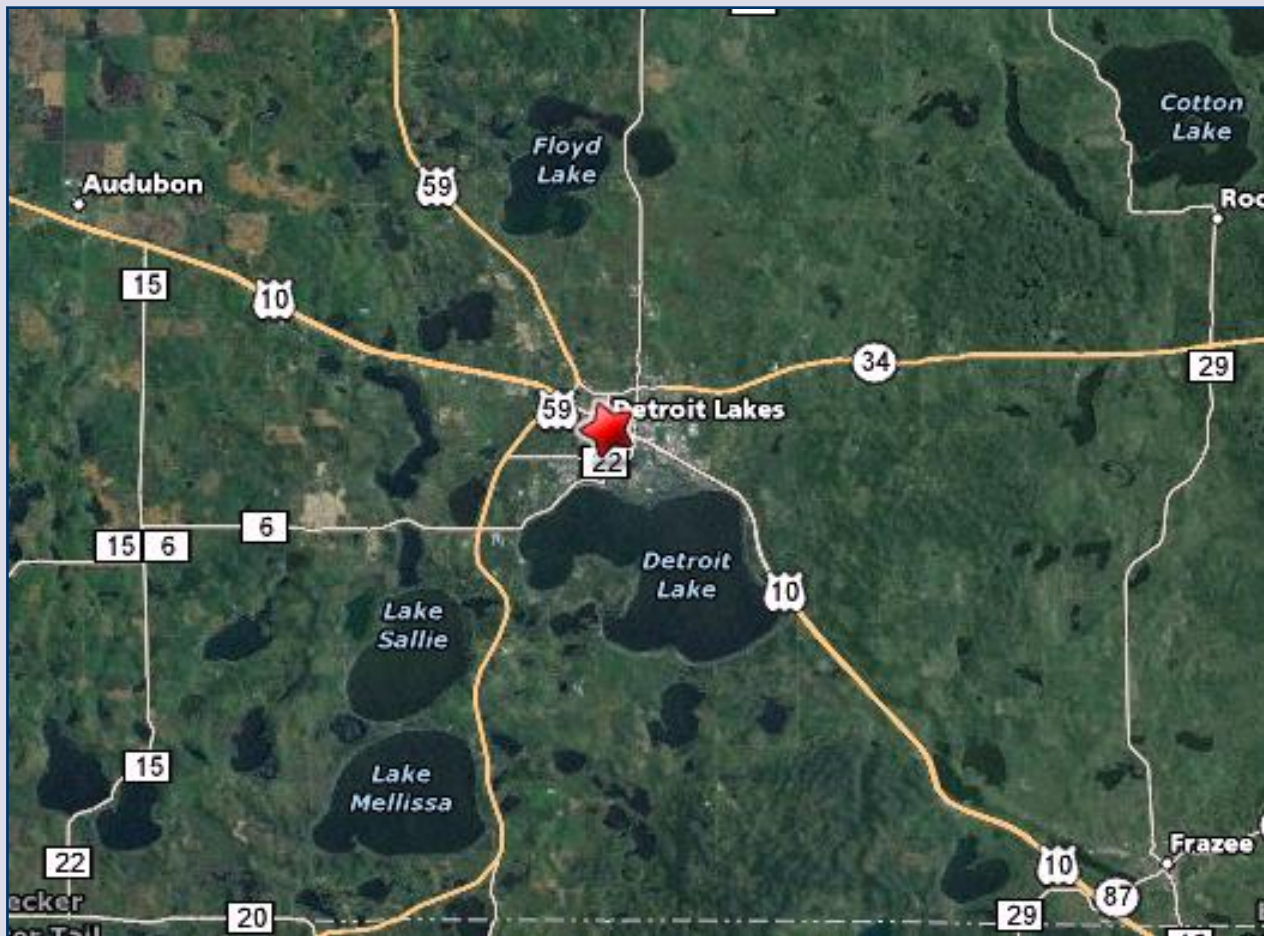
Tera Guetter
Administrator
Pelican River Watershed District
Detroit Lakes, MN

Detroit Lakes, MN



Project Location Fast Facts

- Upper Pelican River –Becker County, Ottertail Basin, Red River of North
- Detroit Lake Watershed – 46,110 acres; Chain of Lakes
- Detroit Lake – 3,089 acres; City of Detroit Lakes – 8,000 + population



Water Resource Significance

Detroit Lakes, Becker County

Regional Recreation Destination

- 637,000 visitors/yr
- Boating & Swimming
- Sport Fishery – Muskie
- Retirement Destination



Detroit Lake Mile-Long City Beach

Water Resource



Detroit Lake August 2014
“nuisance bloom”

A “lotta” Plans

Prioritize Target Measure

WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT



UPPER PELICAN RIVER WATERSHED

BECKER COUNTY, MINNESOTA
March 2007

United States Department of Agriculture
Natural Resources Conservation Service

Watershed Management Plan March 25, 2020 – March 25, 2030



PELICAN RIVER
watershed district
211 Holmes St. W. Suite 201 | Detroit Lakes MN 56501

Water Quality Assessment of the Upper Pelican River Watershed (North Floyd, Floyd, Little Floyd, Rice Wetland, Detroit Lake, Little Detroit Lake)

Becker County, Minnesota
CLEAN WATER PARTNERSHIP PROGRAM
WORKING PAPER, 2002



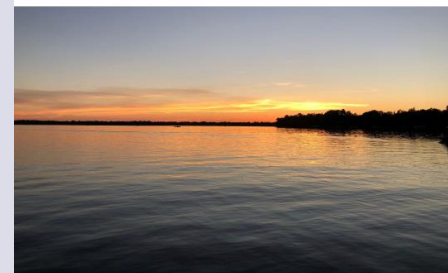
Draft 7/15/2002

Minnesota Pollution Control Agency
Policy and Planning and Regional Environmental Management Divisions
Bruce Wilson, Mark Everson and Tim James
Pelican River Watershed District
Richard Hovick
Tara Guetter

Otter Tail River Watershed

[March 2020]

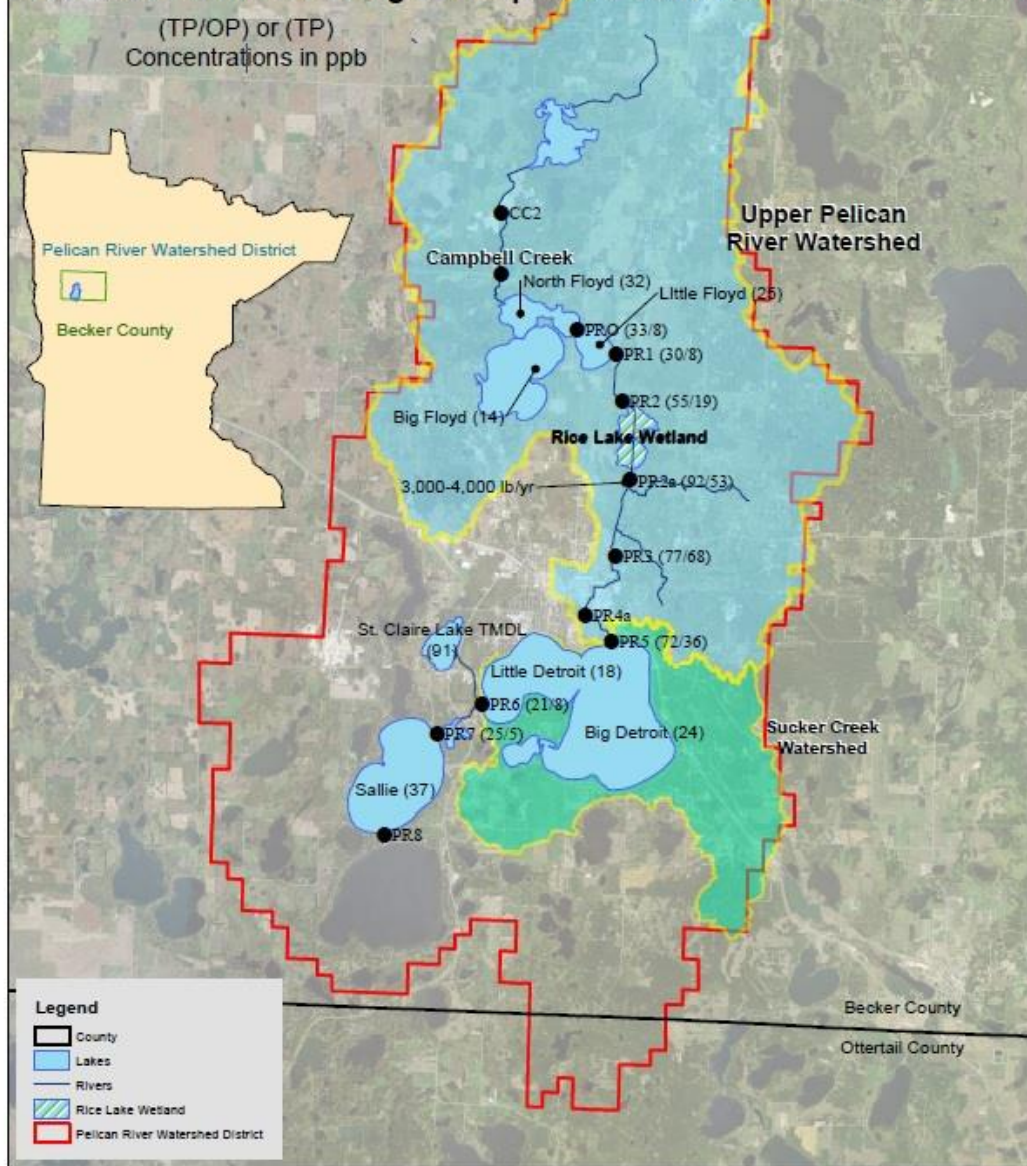
Draft Otter Tail River Watershed Restoration and Protection Strategy Report



m MINNESOTA POLLUTION
CONTROL AGENCY



Pelican River Watershed District Sequential Monitoring Network 1995-2015 Annual Average Phosphorus Concentrations and Loads



Detroit Lake Watershed Water Quality Management Goals

- **Non-Degradation of Floyd and Detroit system lakes**
- **Reduce P loads by 50% in Campbell Creek and Rice Lake Wetland**
- **Reduce Urban and Agricultural runoff loading**

Stream Goals:

Reduce TP to 50 ppb

Reduce OP to 30 ppb

Big Detroit Lake Goals:

In lake TP < 40 ppb n-degradation

In lake TP 20-30 ppb for long term management

Targeted areas:

Campbell Creek

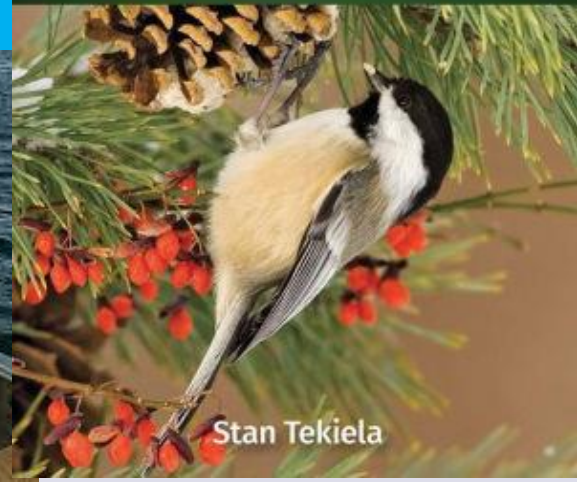
Rice Lake Wetland

Urban Section

Engage Landowners & Resource Users !



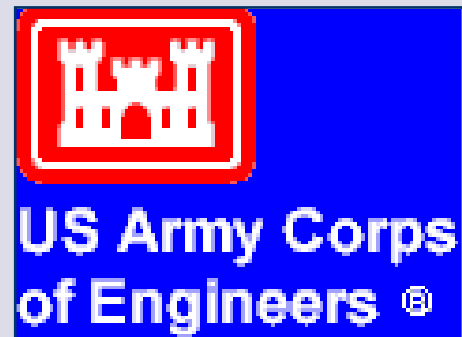
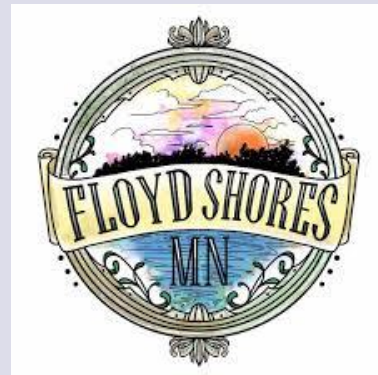
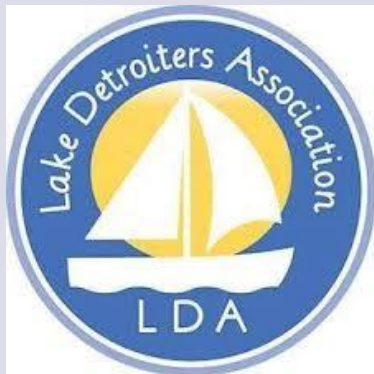
Water



Input and Listening Sessions!



Agencies and Local Groups



Clean Water Goals

Watershed Restoration and Protection Strategy

- ~Protection Strategies
- ~Implementation Plan

Water Quality Assessment of the
Upper Pelican River Watershed
(North Floyd, Floyd, Little Floyd, Rice Wetland,
Detroit Lake, Little Detroit Lake)

Becker County, Minnesota

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WORKING PAPER, 2002



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****Must reduce P exports from Rice
Lake Wetland
600 – 1,600 kg/year to achieve this goal**

Lakes – Non Degradation

- North Floyd < 40 ug P/L for Non degradation
- North Floyd 30 - 40 ug P/L long term management
- **Big Detroit < 30 ug P/L for Non degradation *****
- Big Detroit 20 - 30 ug P/L for long term management

Stream- Restoration

- Stream FWM TP < 50 ug P/L
- **Reduction of Campbell Creek and Rice Lake Wetlands P loads by 50%.**
- Reduce urban & agricultural runoff phosphorus & sediment loads at every chance



Three main areas

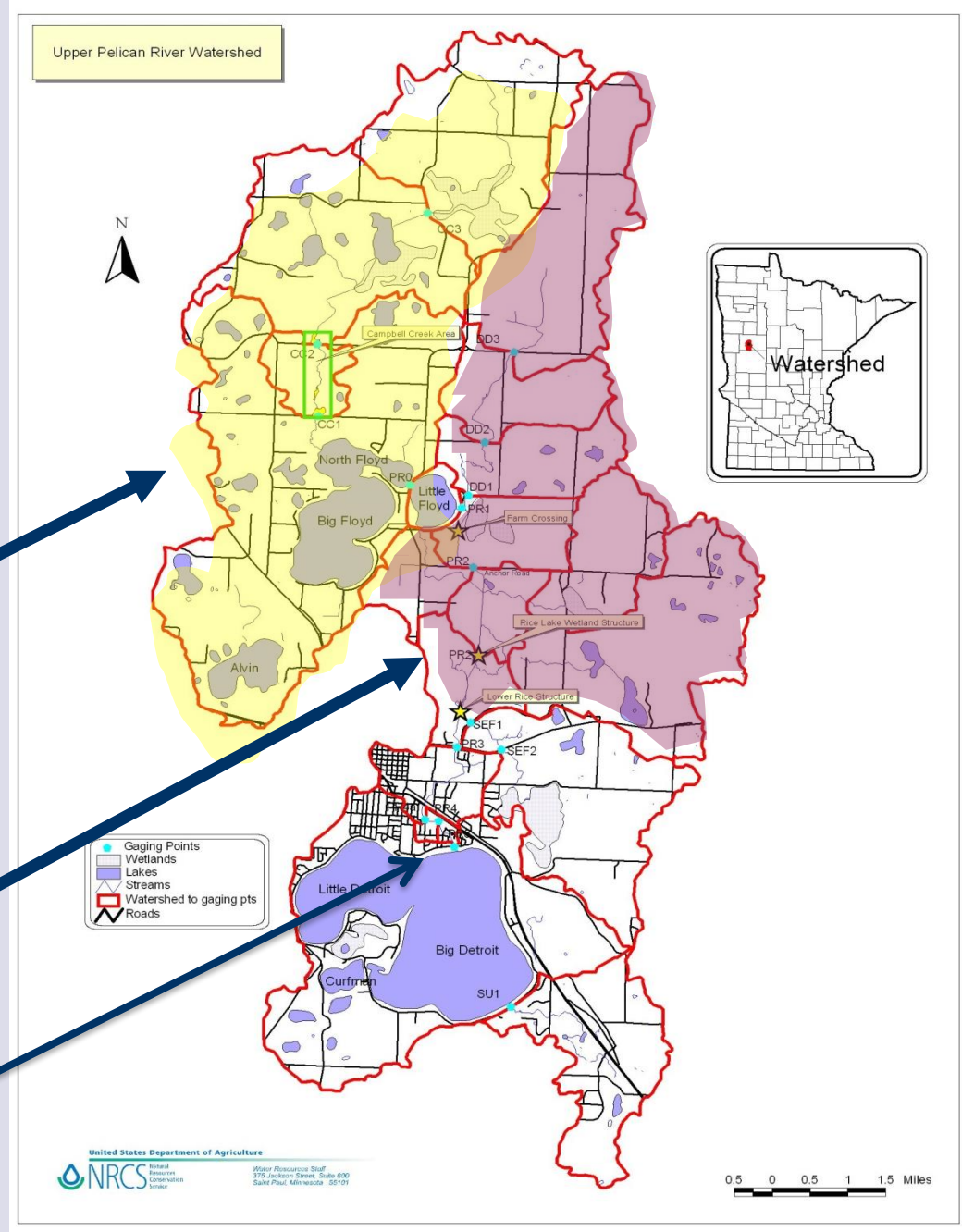
Campbell Creek

- Little Floyd and upstream (north).

Rice Lake Wetland

- Outlet of Little Floyd to North of Hwy 34.

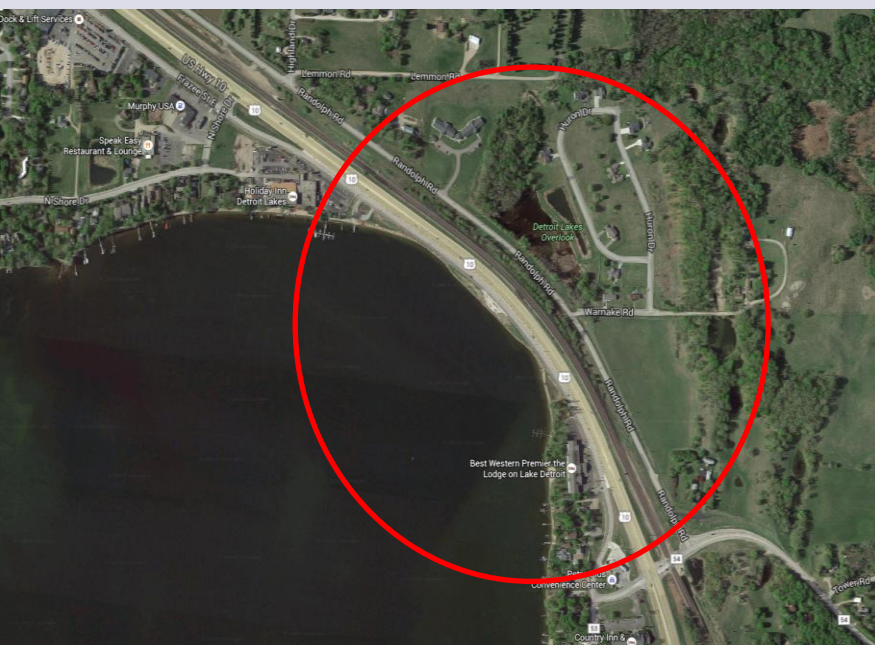
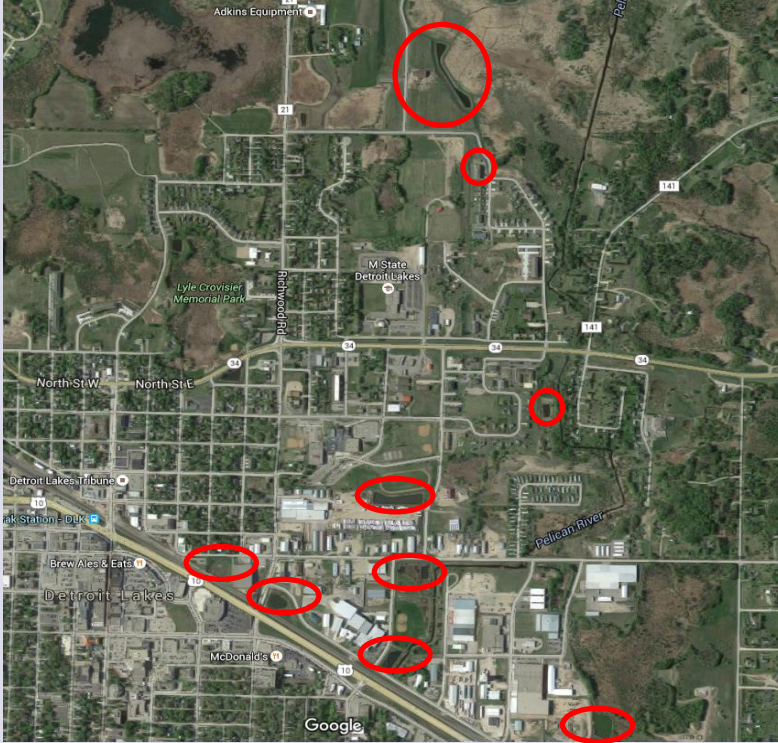
Urban Area



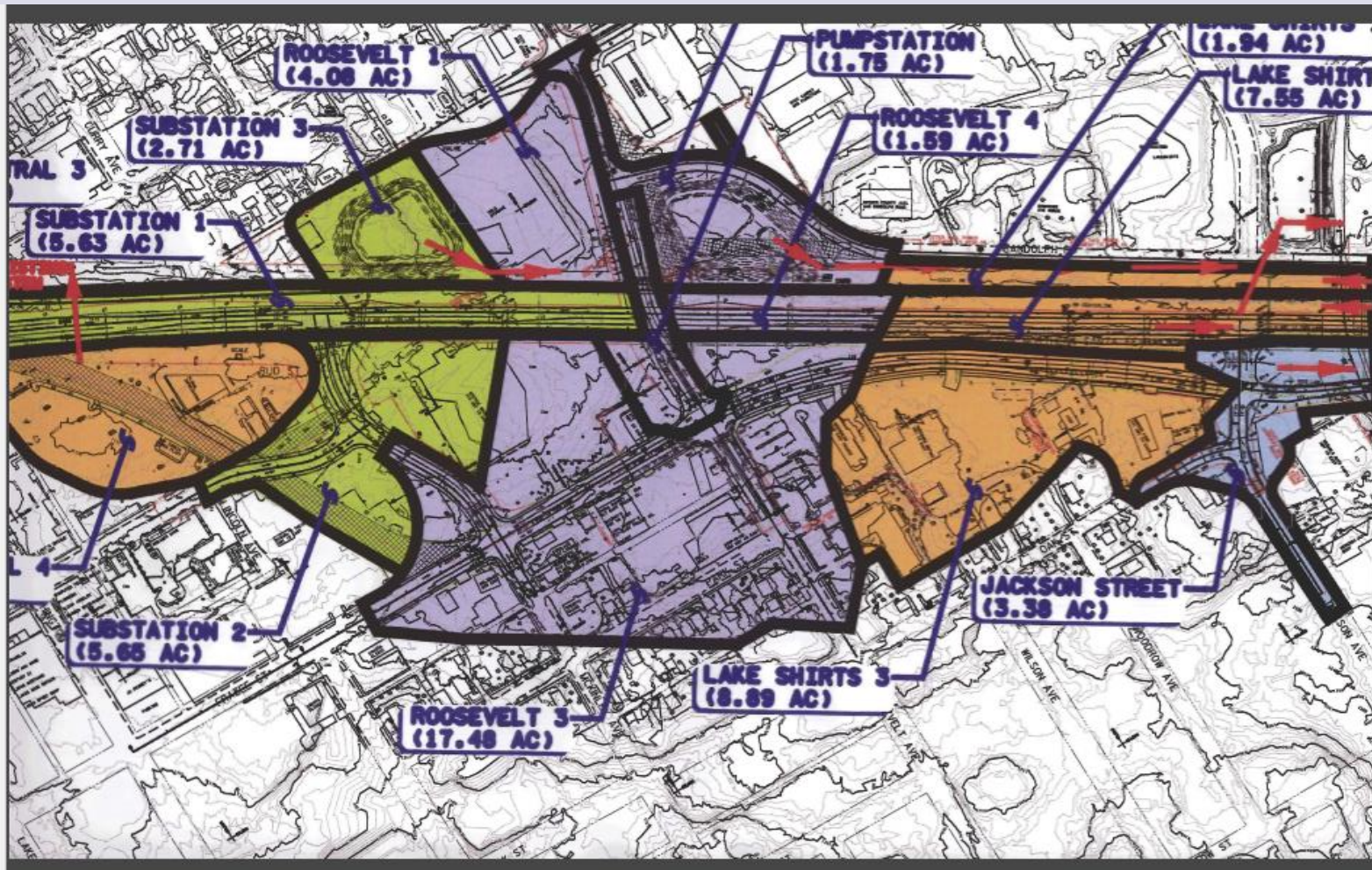
Urban

2000's – present

PRWD/City/MN DOT, MPCA, Mn DNR



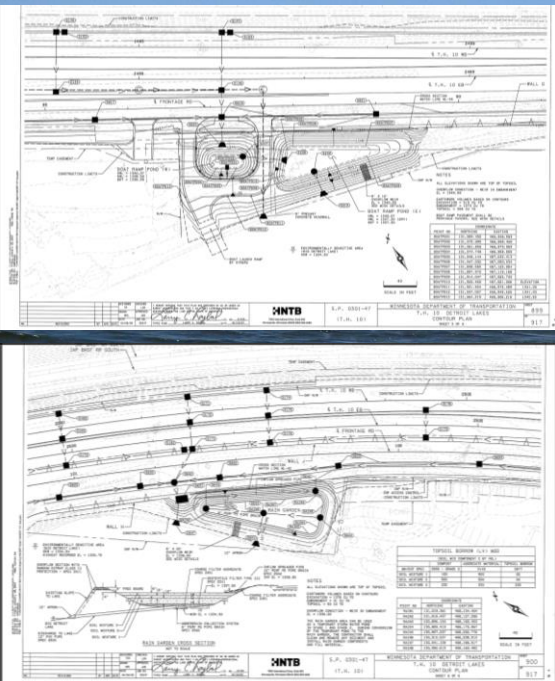
Urban – HWY 10



Storm water Treatment



WQ treatment & buffer



Detroit Lake – HWY 10



Detroit Lake Shoreline – HWY 10



Detroit Lake – HWY 10



Fish Passage to upstream spawning beds

Three main areas

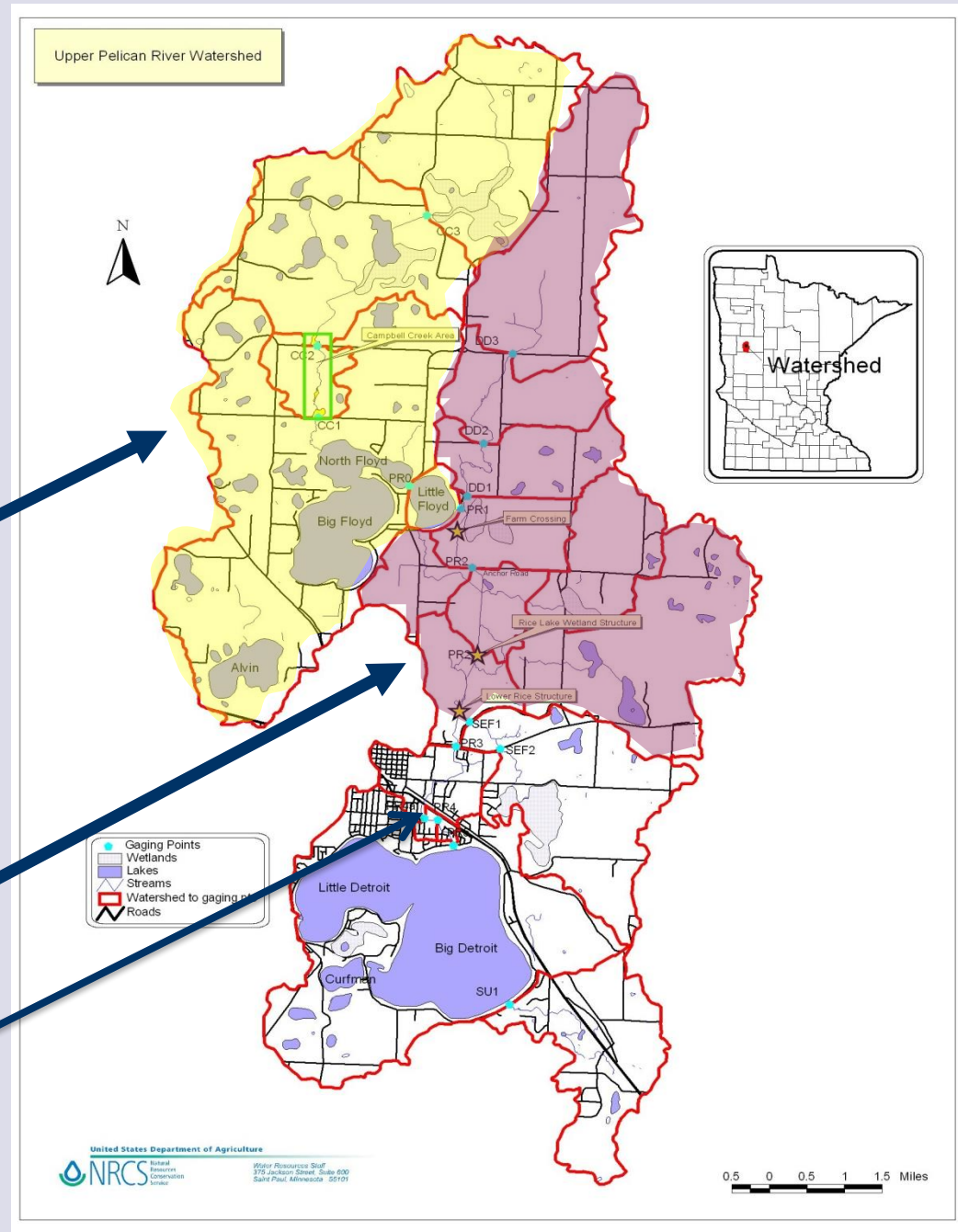
Campbell Creek

- Little Floyd and upstream (north).

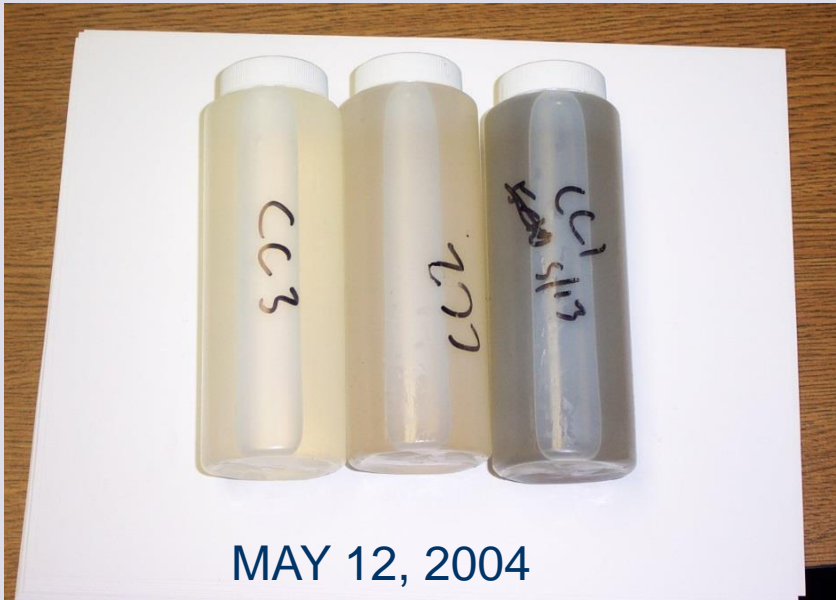
Rice Lake Wetland

- Outlet of Little Floyd to North of Hwy 34.

Urban Area



Floyd Lake - Campbell Creek



Campbell Creek Area

Campbell Lake to Floyd Lk - 3.8 Miles

Land Treatment

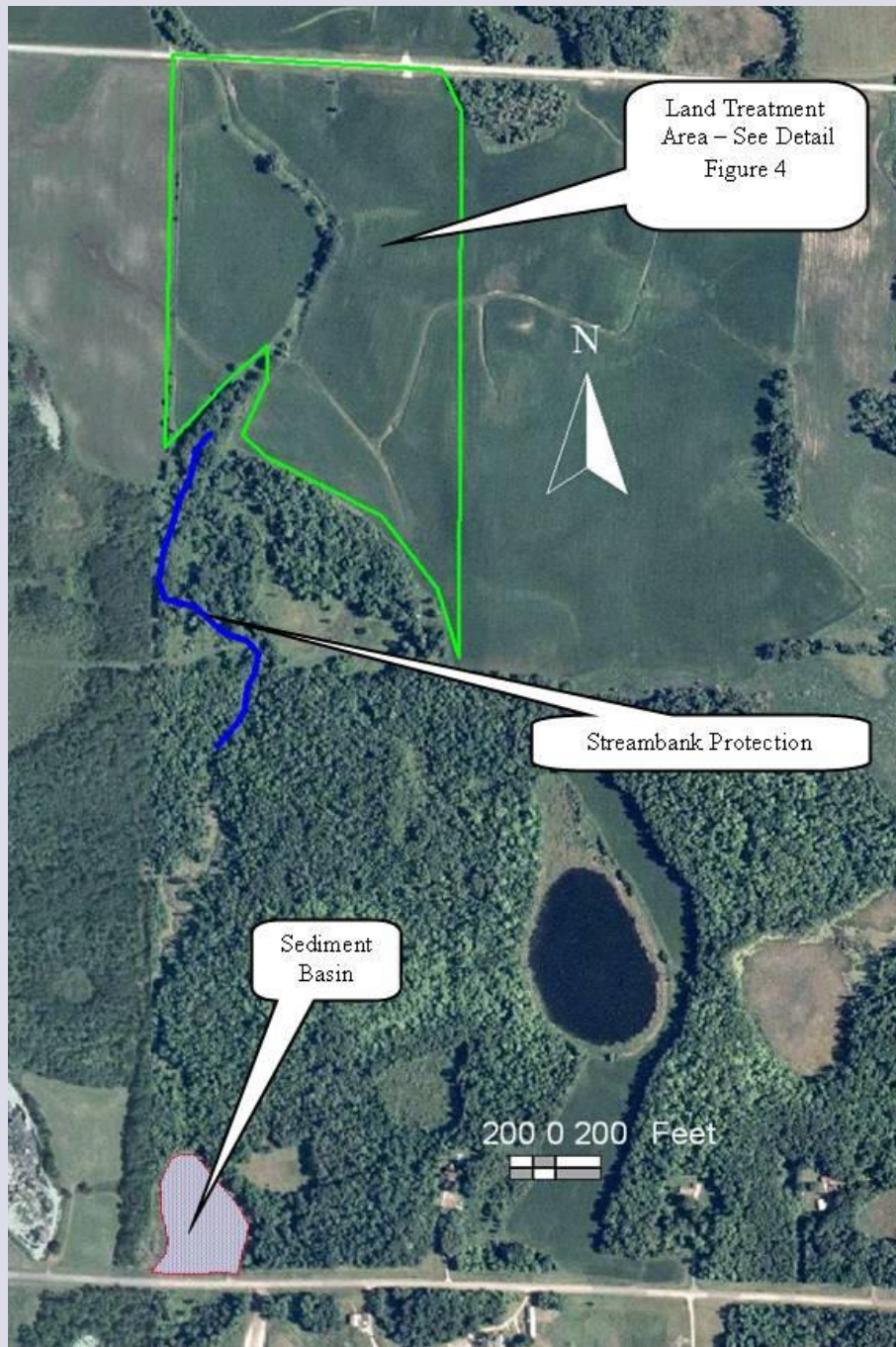
The number of water and sediment control basins and grassed waterways were based upon NRCS guidelines.

Livestock Exclusion and Watering System

Fencing would be installed along Campbell Creek to keep livestock out of the stream. A livestock watering station would also be installed

Stream Bank Stabilization

Stabilize the stream grade and banks along Campbell Creek in the reach through Section 33, Richwood Township. Rock and/or bio-engineering techniques would be used to protect the stream bank. The exact locations will be determined in the field.



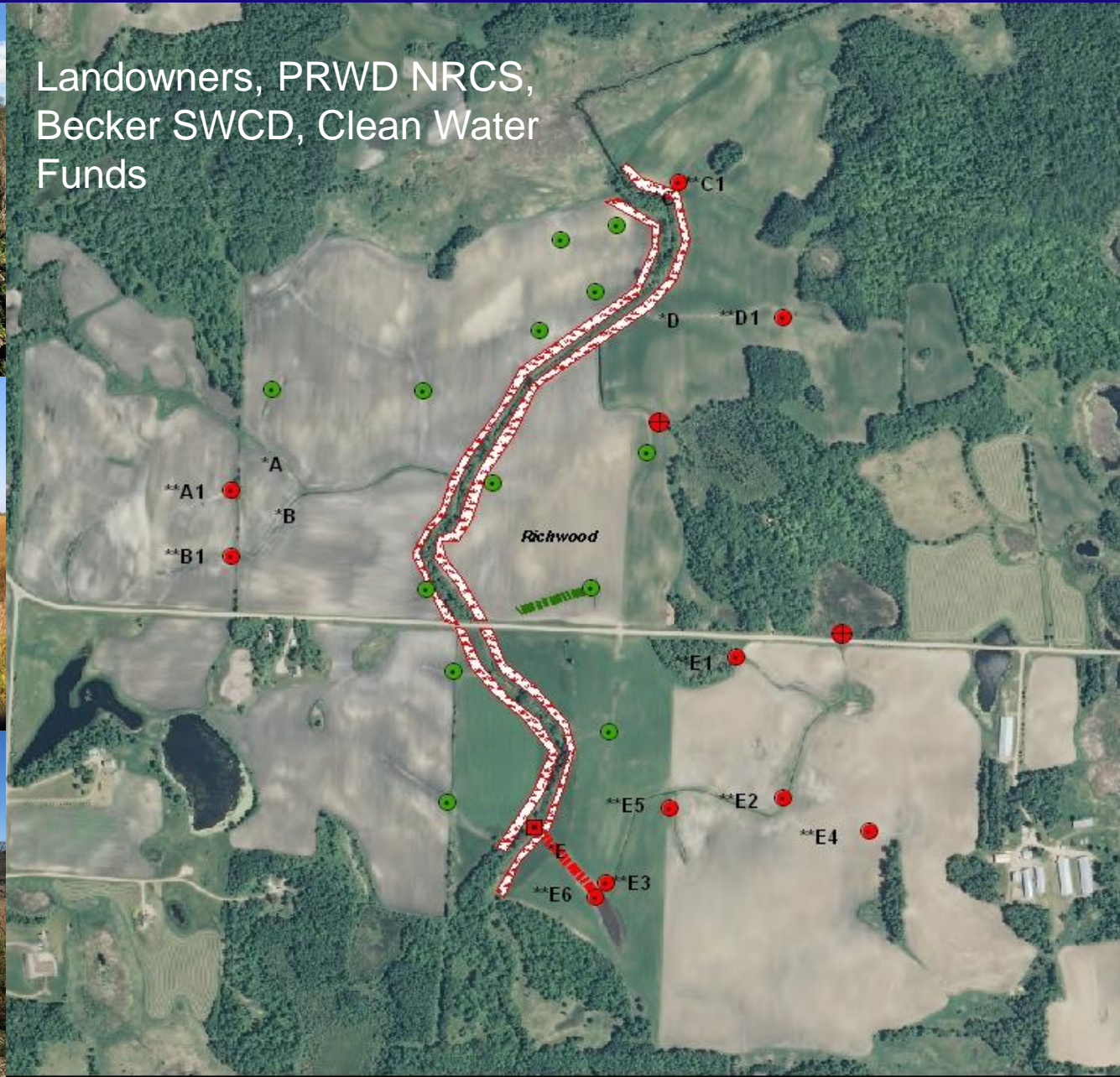
Land Treatments Considered



Campbell Creek: New Landowners=New Plan



Landowners, PRWD NRCS,
Becker SWCD, Clean Water
Funds



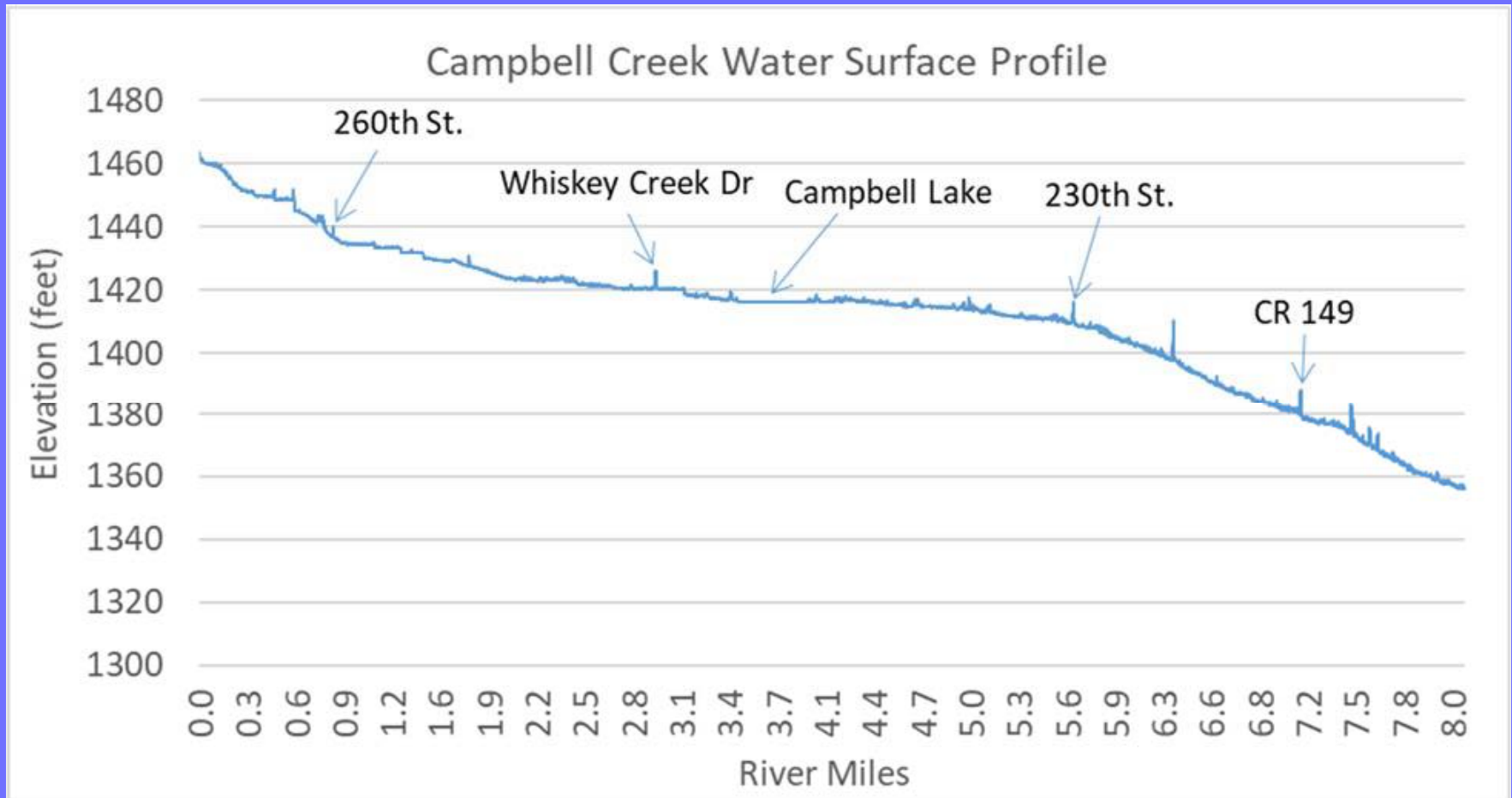
Campbell Creek – Natural Segment

Sediment Impairment

- **Ag Segment:** Identify and target additional upstream critical agricultural Erosion and Sediment transport areas and appropriate BMP's.
- Identify wetland restoration areas to reduce peak flows
- **Natural Segment:** Develop and implement streambank stabilization plan to reduce channel and bank erosion.



Bank Erosion- 2-mile segment



Three main areas

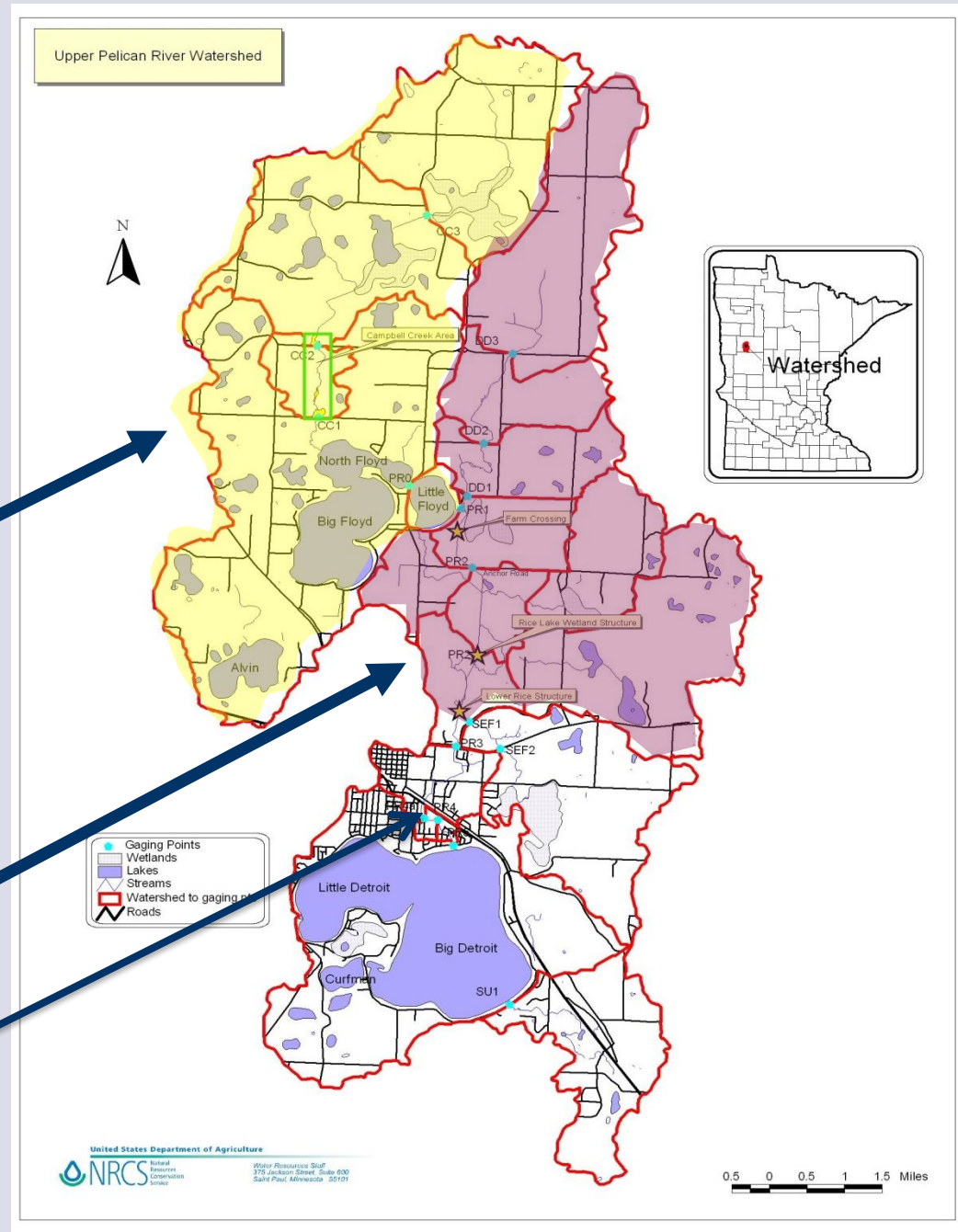
– Campbell Creek

- Little Floyd and upstream (north).

– Rice Lake Wetland

- Outlet of Little Floyd to North of Hwy 34.

– Urban Area

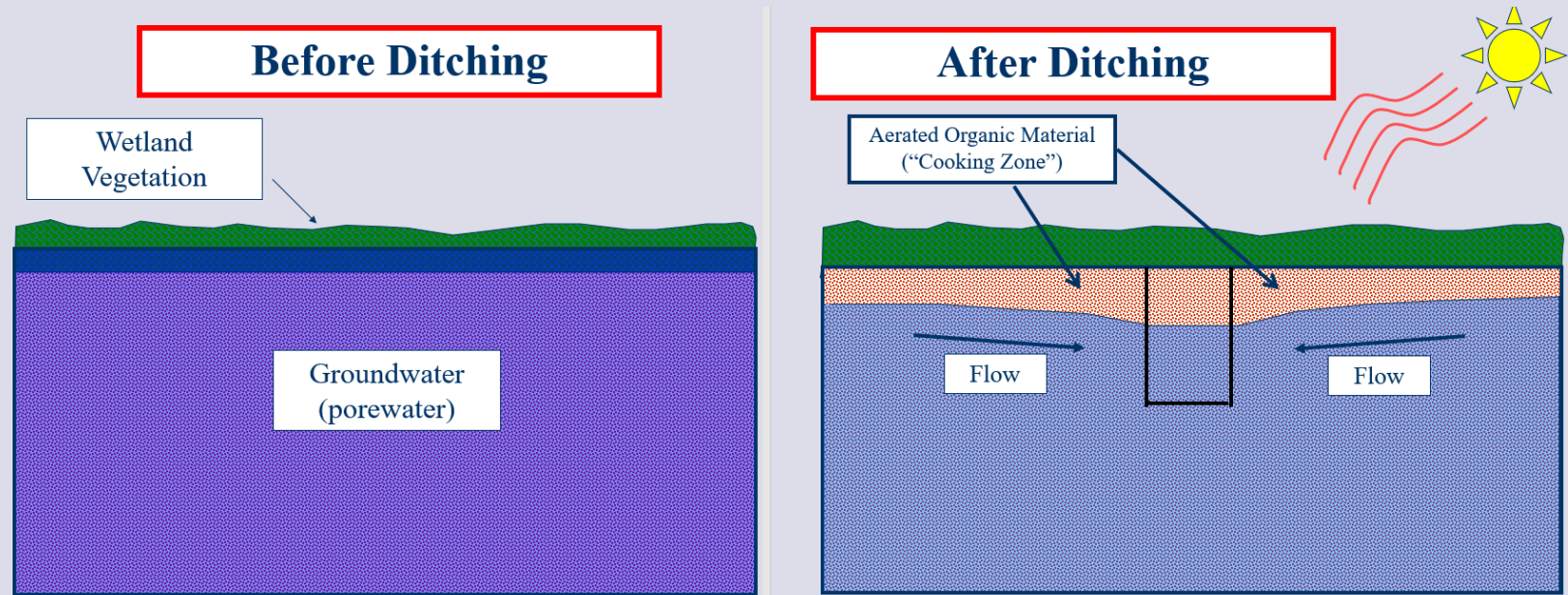


Rice Lake Wetland Restoration Project



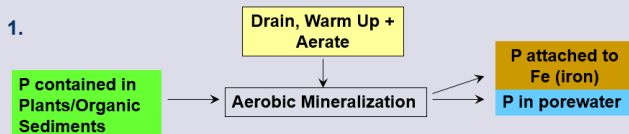
- Review of Phosphorus Loading
- Field Surveys
- Soil Borings Within Wetland
- Agricultural Research Service Field Work
- Impact of potential Rice Wetland Inundation

Increased P Loading Through Rice Wetland

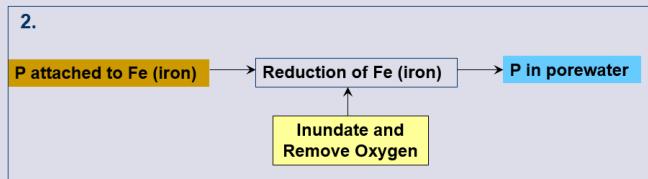


Wetland Phosphorus Chemistry

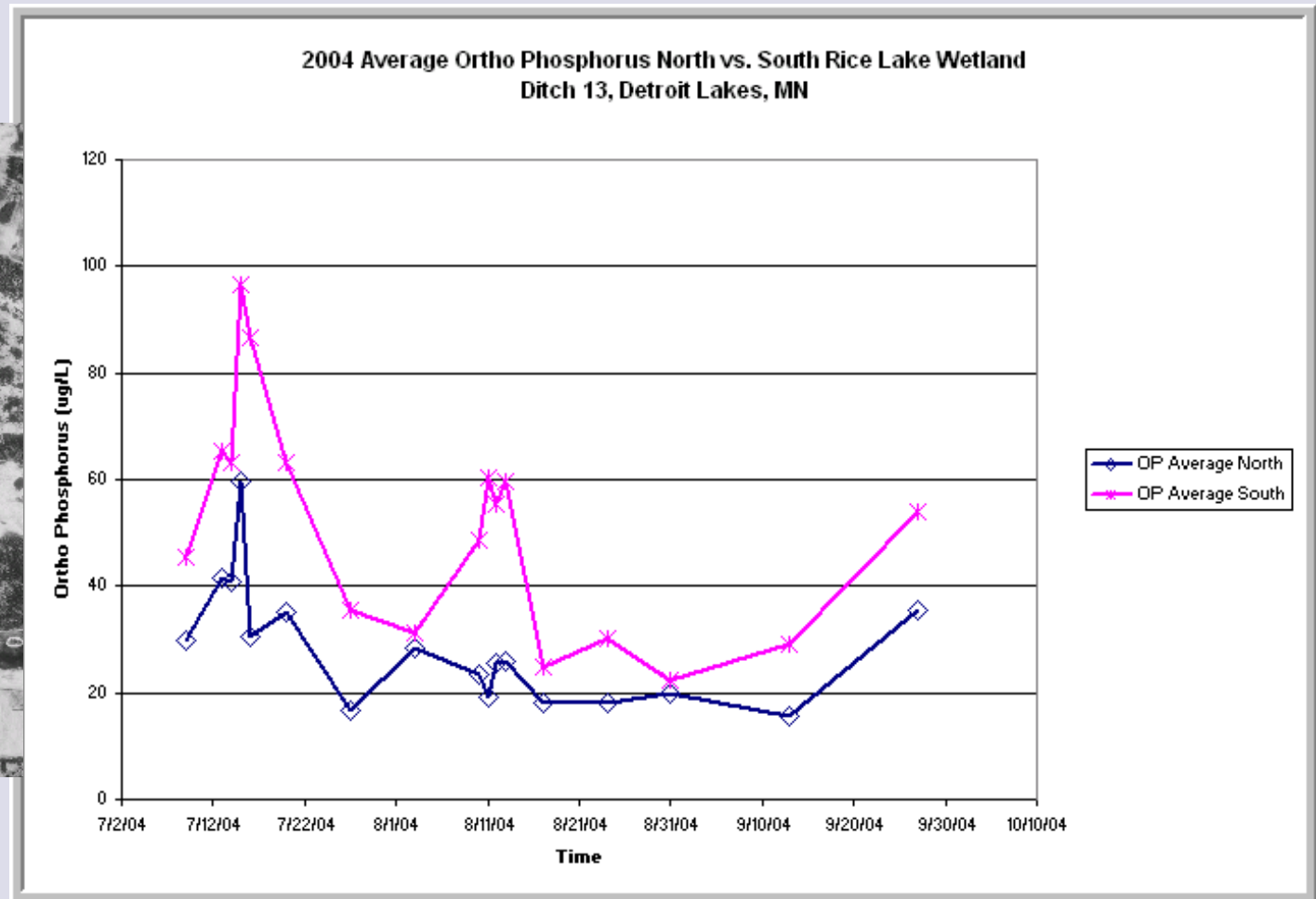
1.



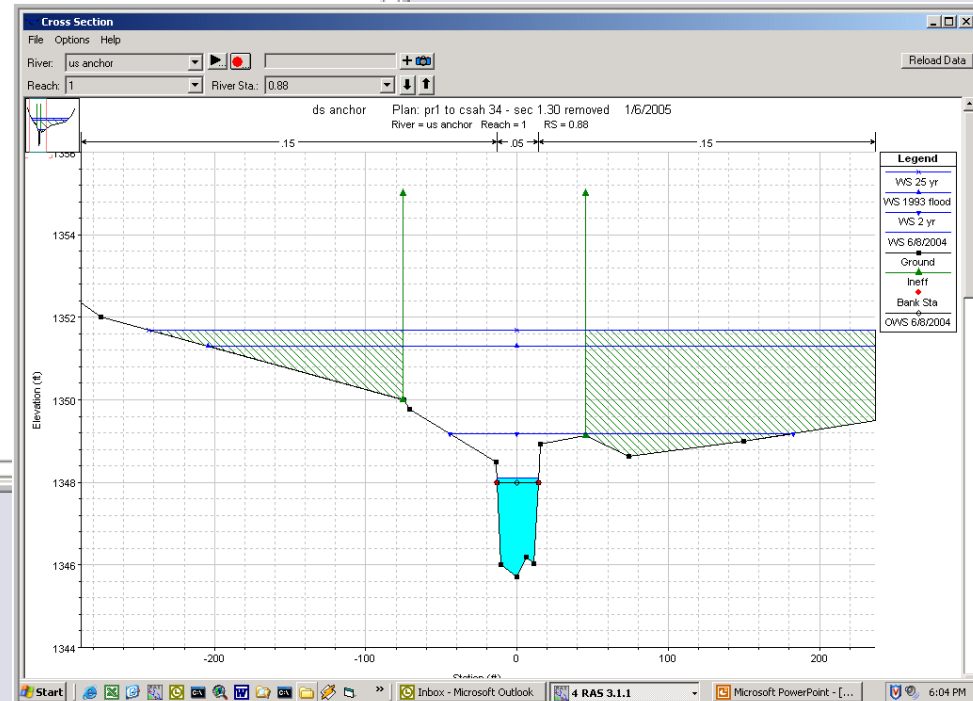
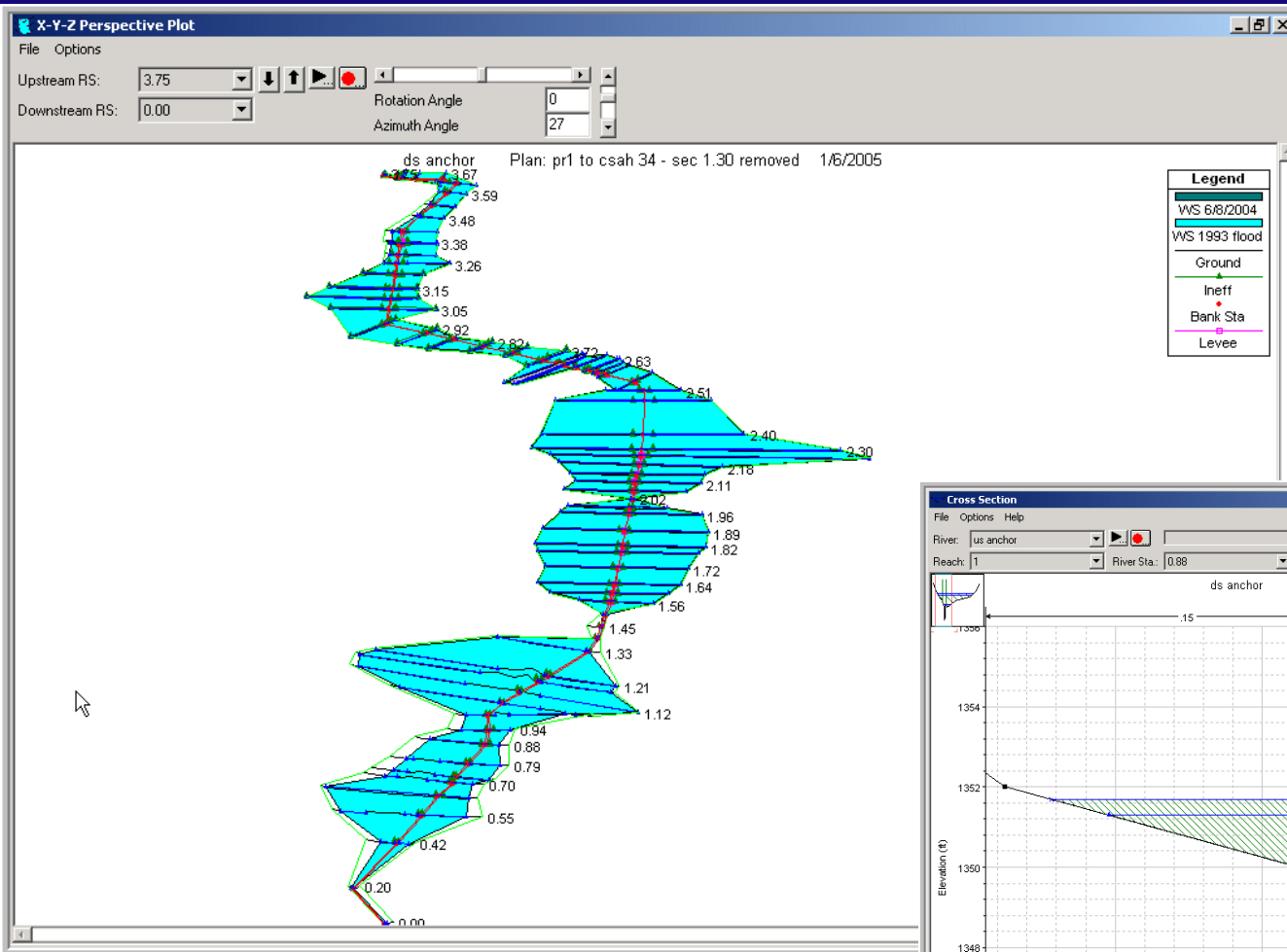
2.



Increased P Loading Through Rice Wetland

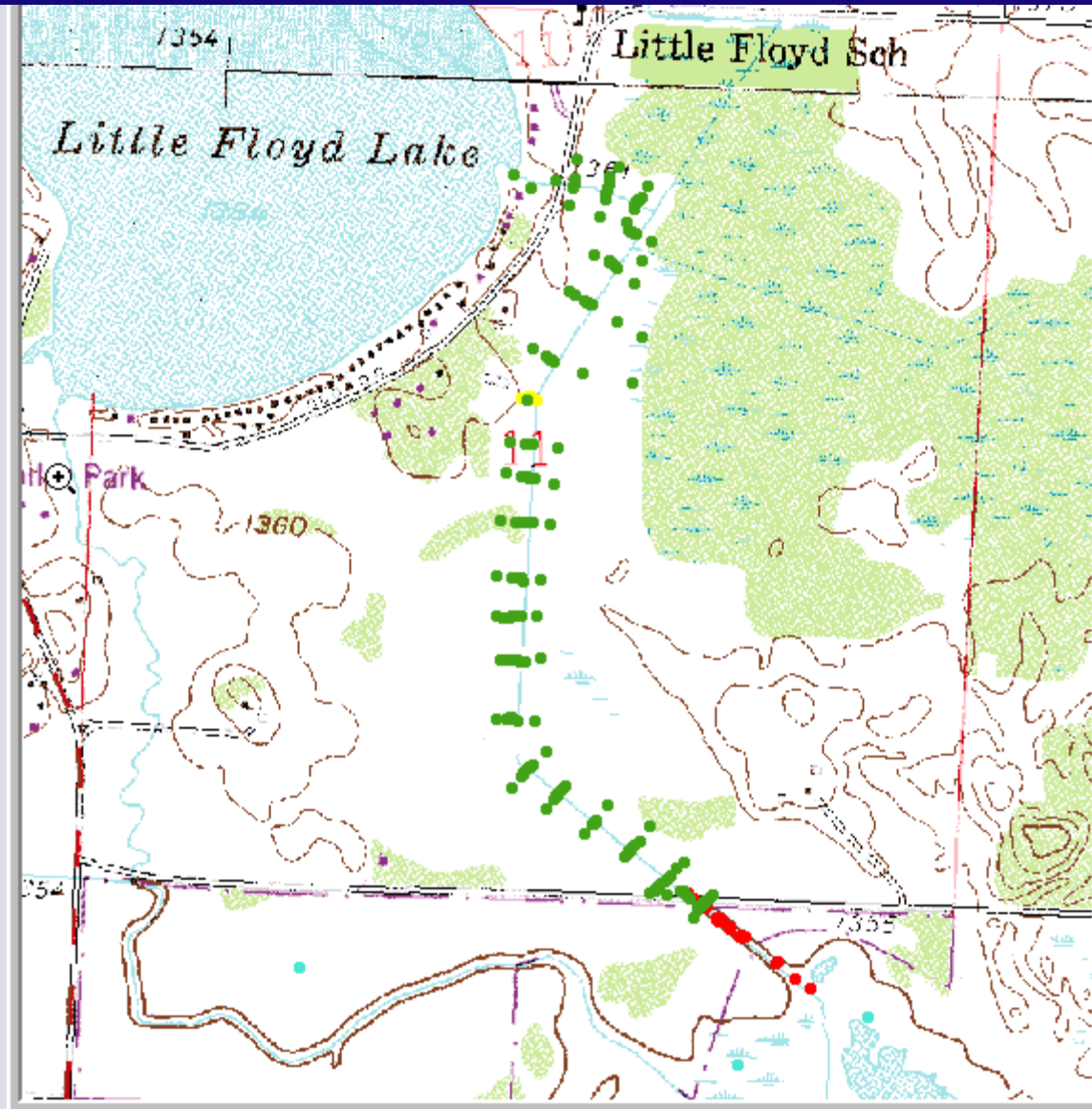


Hydraulics—How Deep/Fast Does Water Flow?



Channel Surveys

- Survey of Channel Dimensions
- Used in modeling depth/velocity of flow in Campbell Creek
- From Little Floyd Lake Outlet to Highway 34



Channel Survey Photos



Rice Wetland Elevation



Oct 2004 - Water Level = 1351.5'
(Approx 0.5' lower than proposed runout elevation)

ARS Involvement

Agricultural Research Service

Soil & Water Mgmt Unit, St. Paul, MN



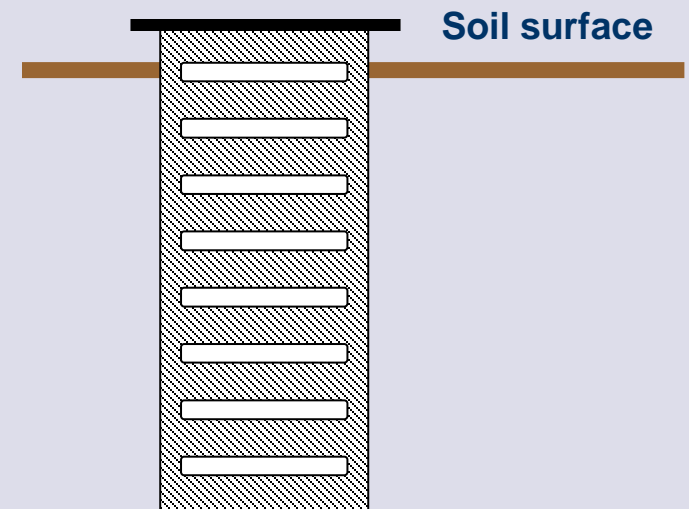
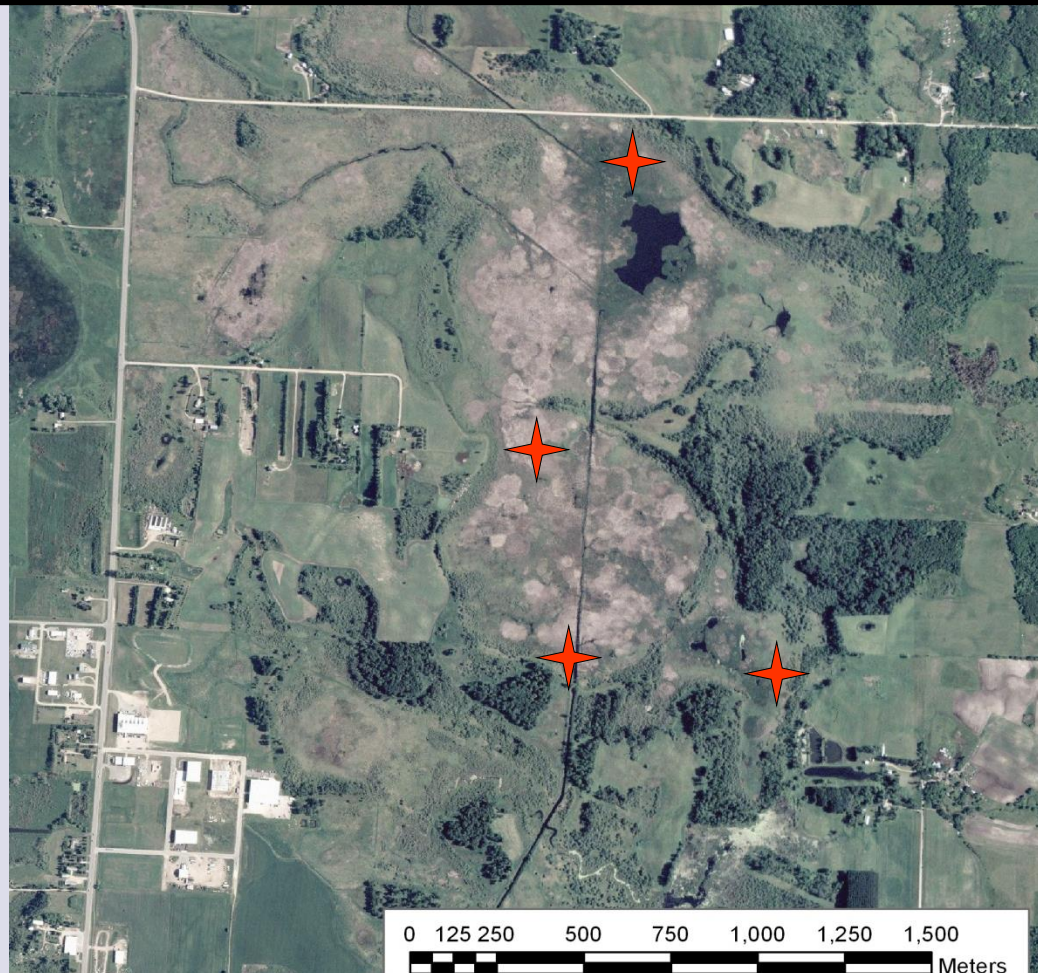
- John Baker – Research Leader for ARS Unit
- Pam Rice, Rod Venterea – ARS Scientists
- Jay Bell, Professor of Soil Science
- Brandy Elf, Erin Berryman – M.S. Students
(funded by PRWD/ARS,



ARS Research – 2004-2005

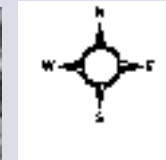
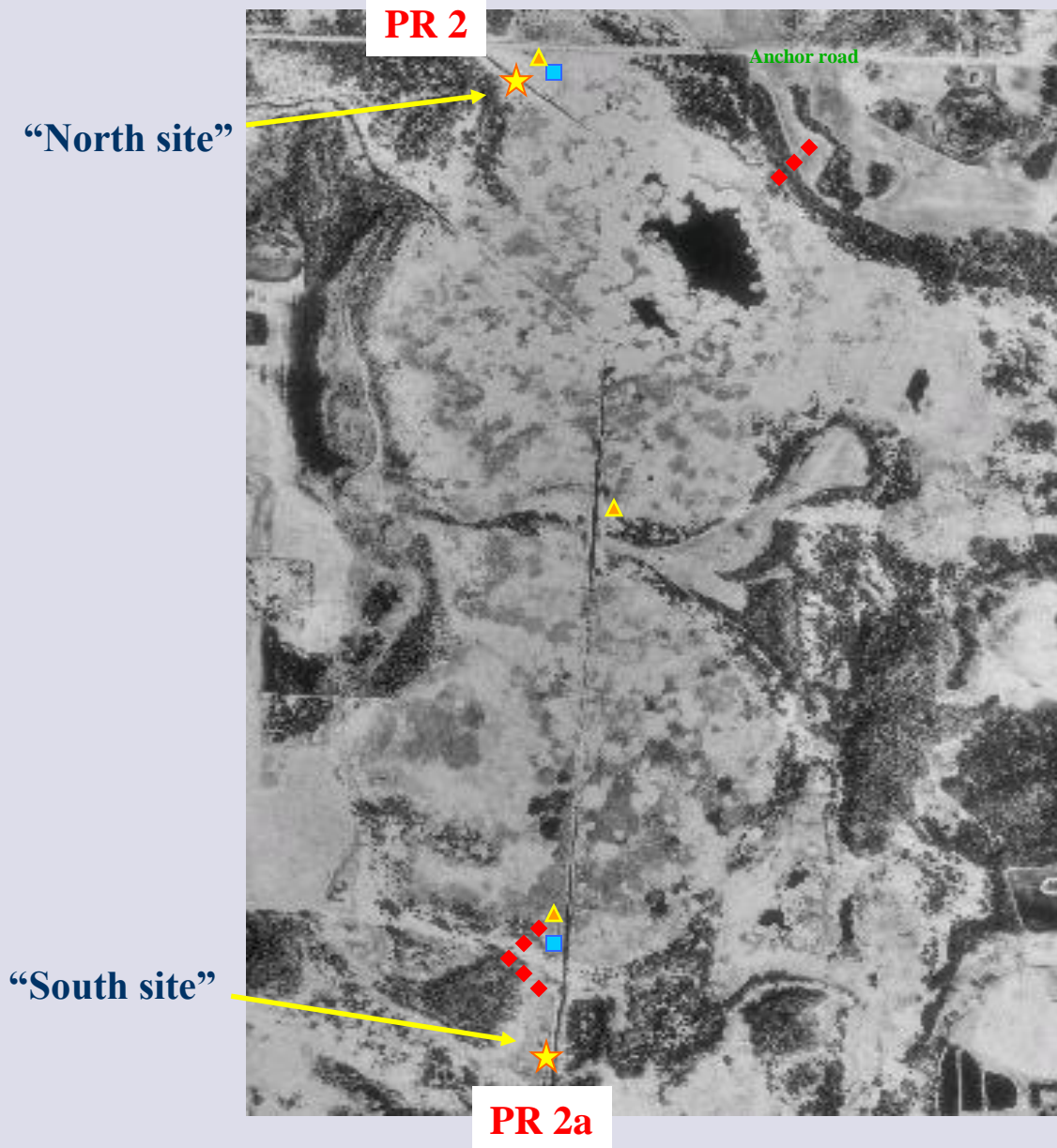
1. Field Measurements of Pore water Phosphorus
2. Soil Core Lab work measuring impact of water table levels on Phosphorus release
3. In stream flow/phosphorus concentrations measurement

Peeper Porewater Sampler Locations



Peeper Porewater
Sampler Locations

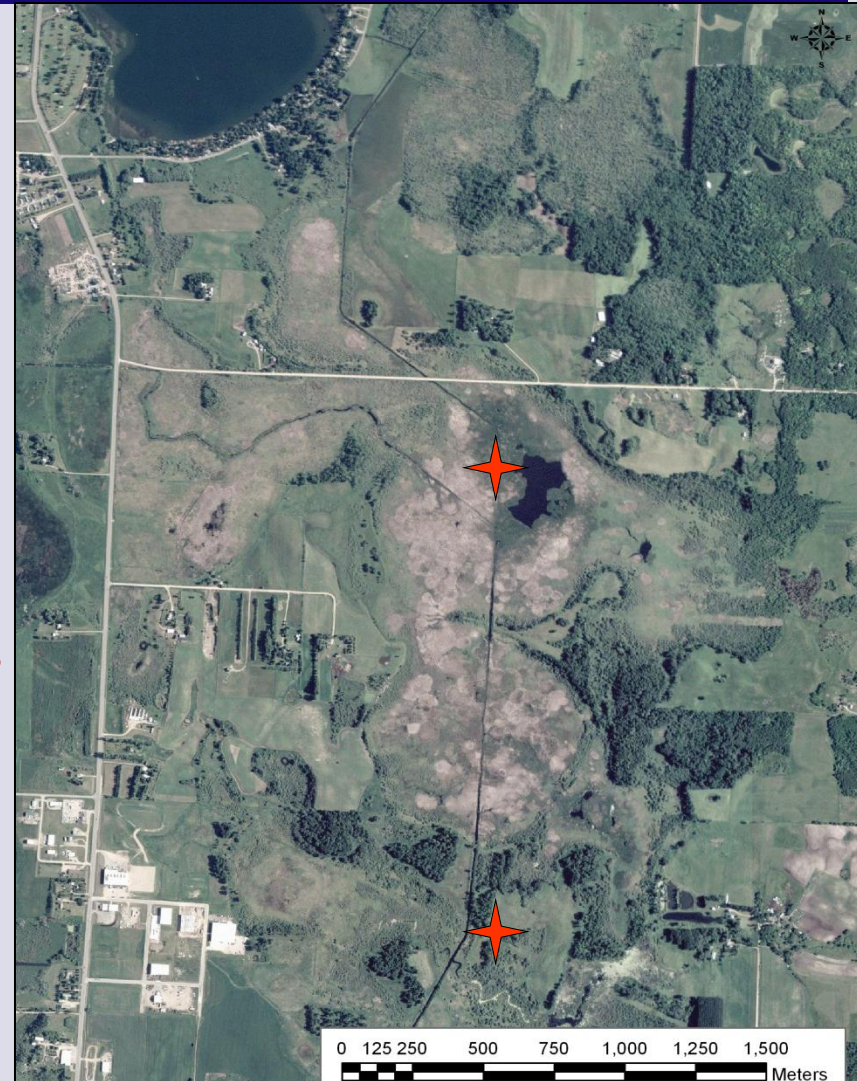
Approximate Locations of Monitoring Equipment and Sampling Rice Lake Wetland



- ★ ISCO sampler & Flow Monitor (activity 1)
- ◆ Piezometers & Wells (activity 2)
- ▲ Peepers and grab sampling (activity 3-4)
- Core Samples taken March 2004 (for activity 5)

Ditch Flow/P Concentration Monitoring

- Two Monitoring Periods
 - July thru Sept 2004
 - April thru Sept 2005
- Findings/Conclusions:
 - **P Concentrations Increase 1.5x's to 1.7x's** from N to S
 - **Flow Volumes Increase 2x's to 3x's** from N to S (strong groundwater inflows)



Rice Wetland Soil Sampling

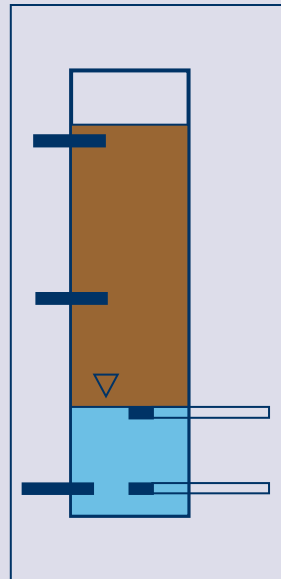
- Purpose: To determine depth of organic material and assess location of “floating” mat
- Field work performed June 7-10, 2004
- 11 test holes logged
- ARGO All-Terrain Vehicle to Access Wetland



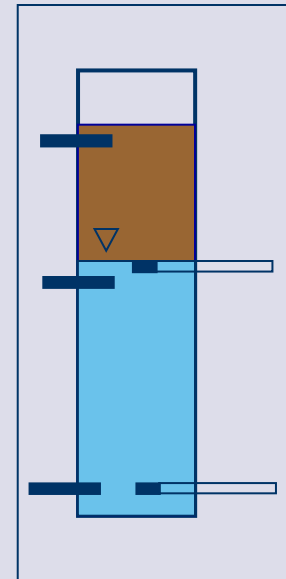


Soil Column Lab Experiment

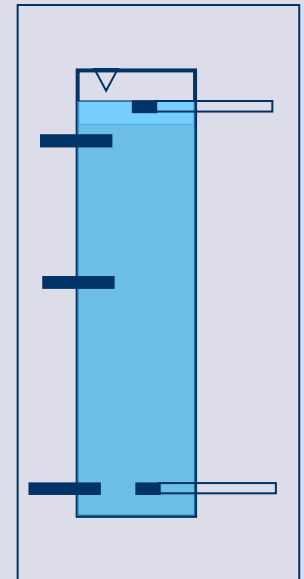
- Experiment to test the impact of water table on available orthophosphate (OP) in the porewater



**Low Water
Table**



**Mid Water
Table**



**High Water
Table**

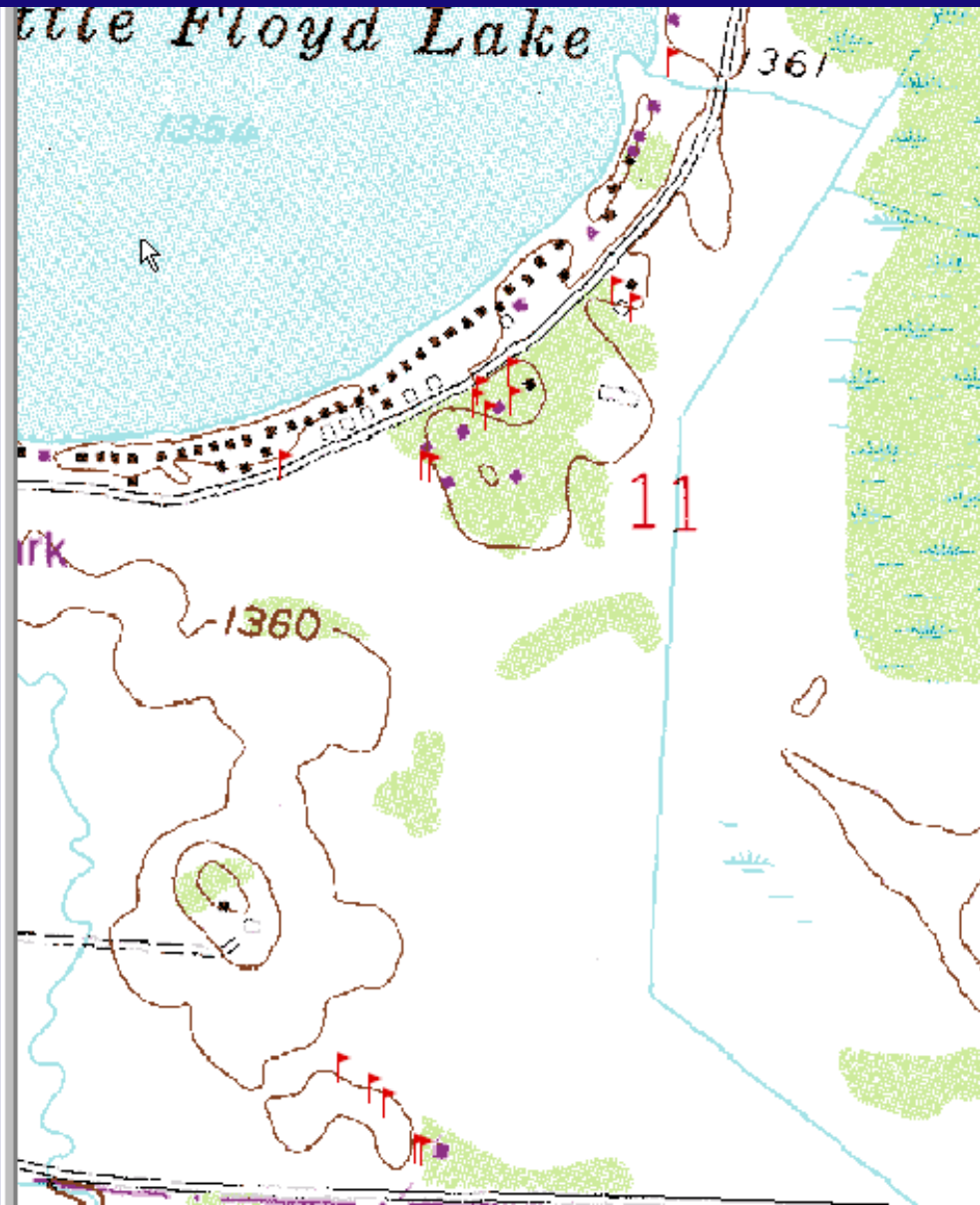
Cause Flooding?



Property Surveys

Assess any potential property impacts of raised water levels

- Survey conducted on 10/27/2004



Property Surveys

Elevations of First Floor, septic, wells, etc.

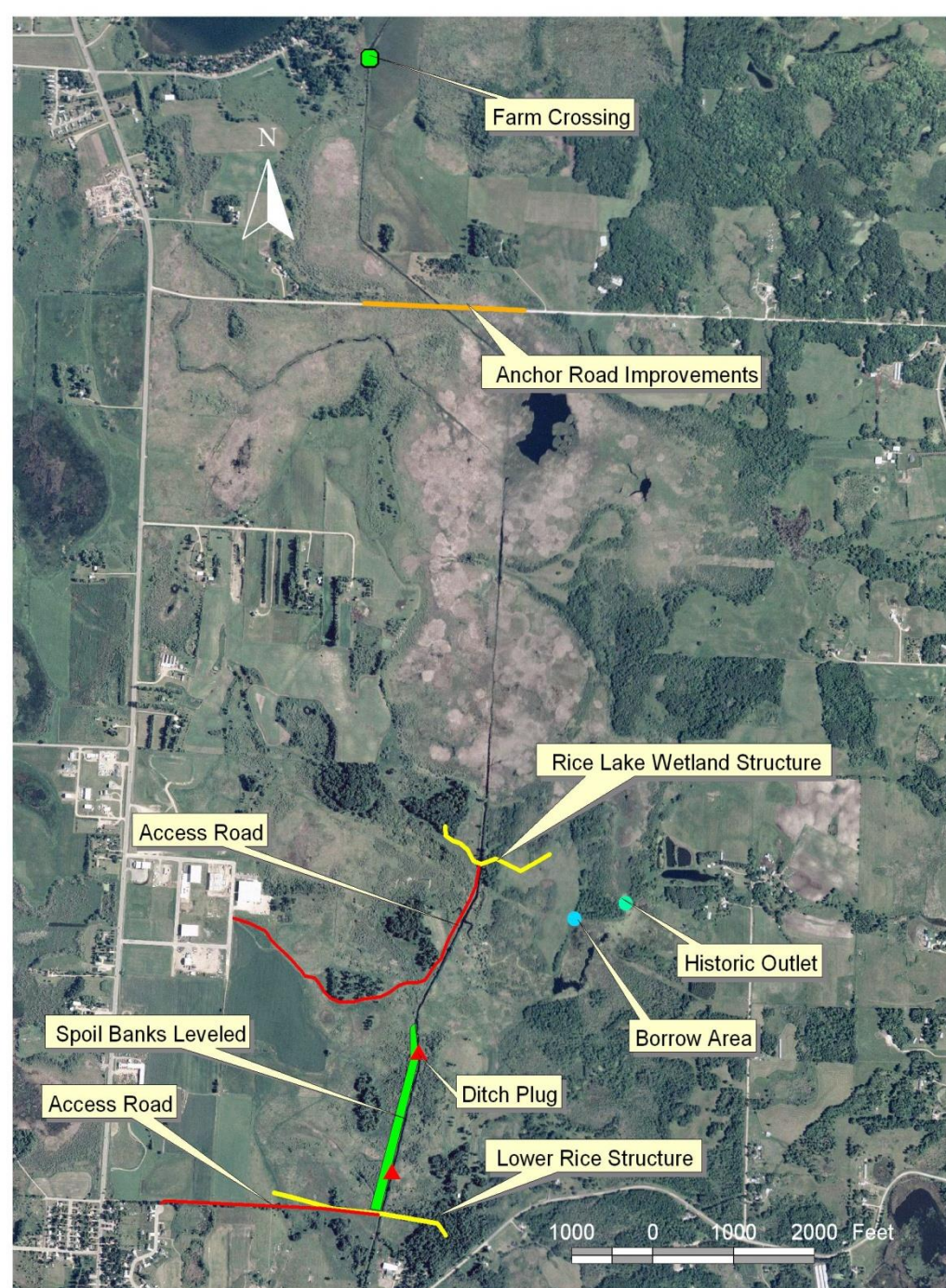


Other Activities

- NRCS Regional Technical Assessment of Project (April 26-28, 2004)
- Field Review of Project by Forrest Izuno and Greg Johnson (UM-SROC) for alternative methods of phosphorus capture
- Watershed Feedlot Inventory (June 2004)
- Technical Committee Meeting (October 2004)
- Field review of engineering site conditions for alternatives (November 2004)
- Development of potential alternatives

Rice Lake Wetland Complex

- Raise Anchor Road and install new culverts
- Construct structure at the outlet of Rice Lake Wetland
- Construct
- Installation of 2 ditch plugs between the Rice Lake Wetland Structure and Lower Rice Structure
- Installation of a structure on Pelican River, north of Sucker Creek (Lower Rice Structure)
- Replace historic outlet's culvert

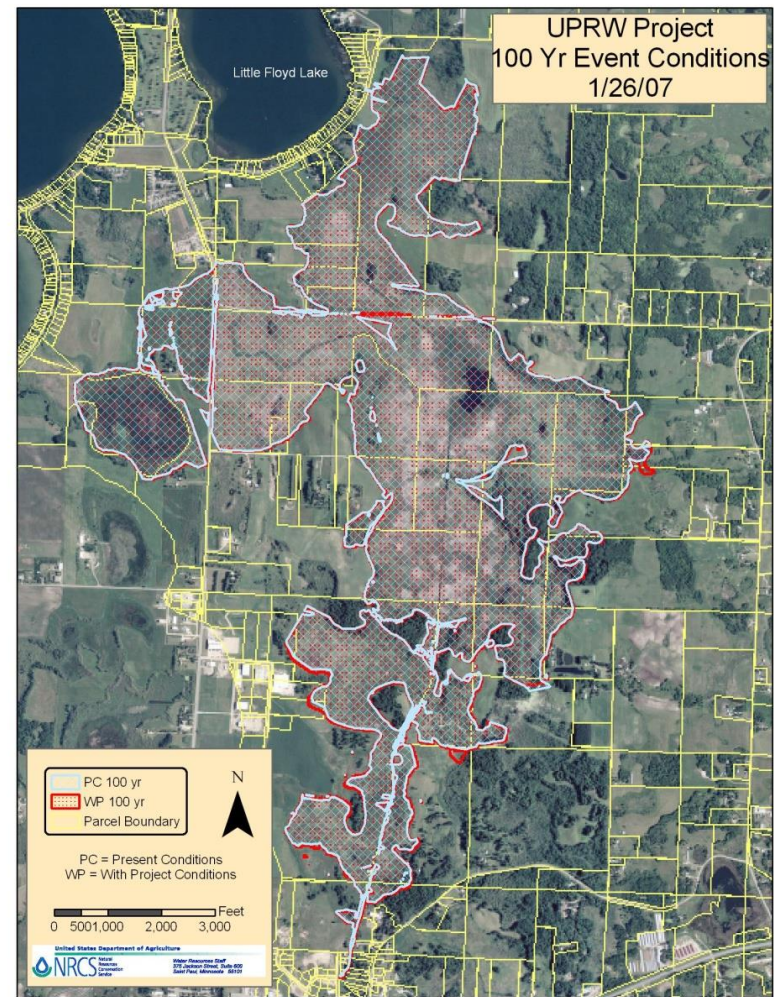
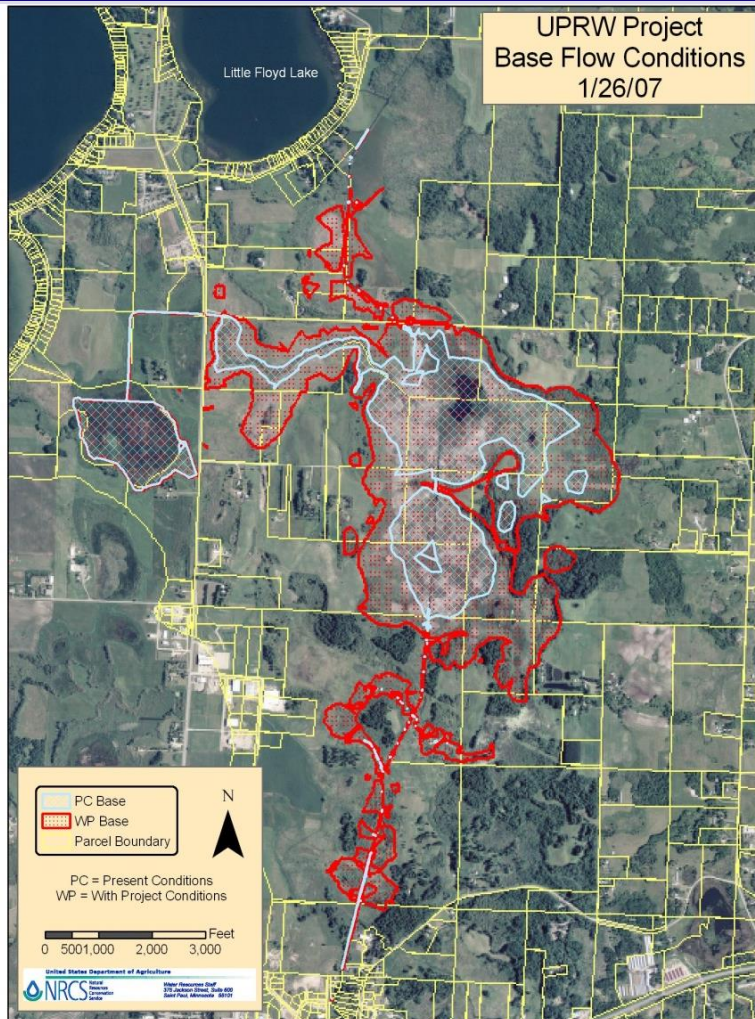


Preliminary Rice Wetland Outlet Structure Sizing

- Assumes 2 stage weir:
 - Low Stage – 15' Weir @ 1351.5
 - High Stage – 50' Weir @ 1353.0
- Creates a pool ~ 500 acres in size, 1.5 feet deep
- Simulated using year long hydrographs from 1994 (~2-yr), 1975 (~10-yr), and 1993 (~80-yr)
- Anchor Road raised to 1354.0 (~ 2 feet at current crossing), replace existing culverts with 3 – 4 ft x 6ft box culverts

Flowage Easements

1354.4 Elevation (100-yr event)



Permits

- **404.** Any work in water or wetlands would require authorization from the U.S. Corps of Engineers under Section 404 of the Clean Water Act.
- **401.** Certification required from MPCA if 404 permit is required.
- **Public Waters.** Any measures involving excavation or filling of earth located in public waters or protected wetlands require a permit from MN DNR Waters. The Rice Lake Wetland Structure is the only component of the recommended plan that this permit would be required for.
- **MN Wetland Conservation Act.** Any work impacting wetlands needs to be in accordance with the act. It is administered by the MN BWSR through local governments. Contact with Becker County SWCD has been made.
- **Construction Stormwater Permit.** Any job that disturbs more than an acre of ground may require this permit. Permit is issued by MPCA.
- **NPDES/SDS Permit.** Required for the installation of a chemical dosing station. Permit issued by MPCA.
- **Ditch Permit.** Any work within the legal drainage ditch system needs a permit. These permits are issued by Pelican River Watershed District.
- **State Environmental Review.** The project may trigger a mandatory Environmental Assessment Worksheet (EAW) pursuant to Minnesota Rules 4410.4300.
- Local, city, or county zoning permits may also be required for certain measures.

Project Partners, Timeline and Funding Sources for the Rice Lake Restoration Project

Item	Project Partners	Timeline	Status	Cost/Funding
Watershed Plan Environmental Assessment	NRCS- Small watershed group	2005-2007	Completed	\$500,000 - NRCS
Land Rights \$1,277/acre or buyout				
A. Private flowage easements PRWD acquired - 98 acres	MPCA - CWP	2008-May 2010	16 completed 3 in progress	\$50,000 CWP grant completed \$356,000 CWP loan
B. Private flowage easements WRP with PRWD match *No RIM fund match*	NRCS	Aug 2009 - present	14 Completed	\$345,000- NRCS \$172,000- PRWD/ CWP loan
C. City of Detroit Lakes land easements - 145 Acres	City of Detroit Lakes	Nov-09	Completed	Donated
D. State and Federal land easements - 510 Acres	MN DNR, USFWS	Upon completion of private land rights	In progress	Donated
Project Engineering – Construction designs	Clean Water Fund/BWSR	2010	Completed	\$250,000 Clean Water Fund/BWSR grant request
Construction*	BWSR	2016-2020	NOT HAPPEN	\$2 Million – BWSR/PRWD
Upper Structure and Access Road Construction	BWSR	2020	In progress	\$1.2 M
* Construction Includes: Rice Lake structure (access road, structure, embankments, dewatering); Ditch channel improvements (ditch plugs, removal of spoil banks); Lower Rice Lake structure (access road, concrete structure, embankments, dewatering); Anchor Road improvements and access parking				

Construction Challenges

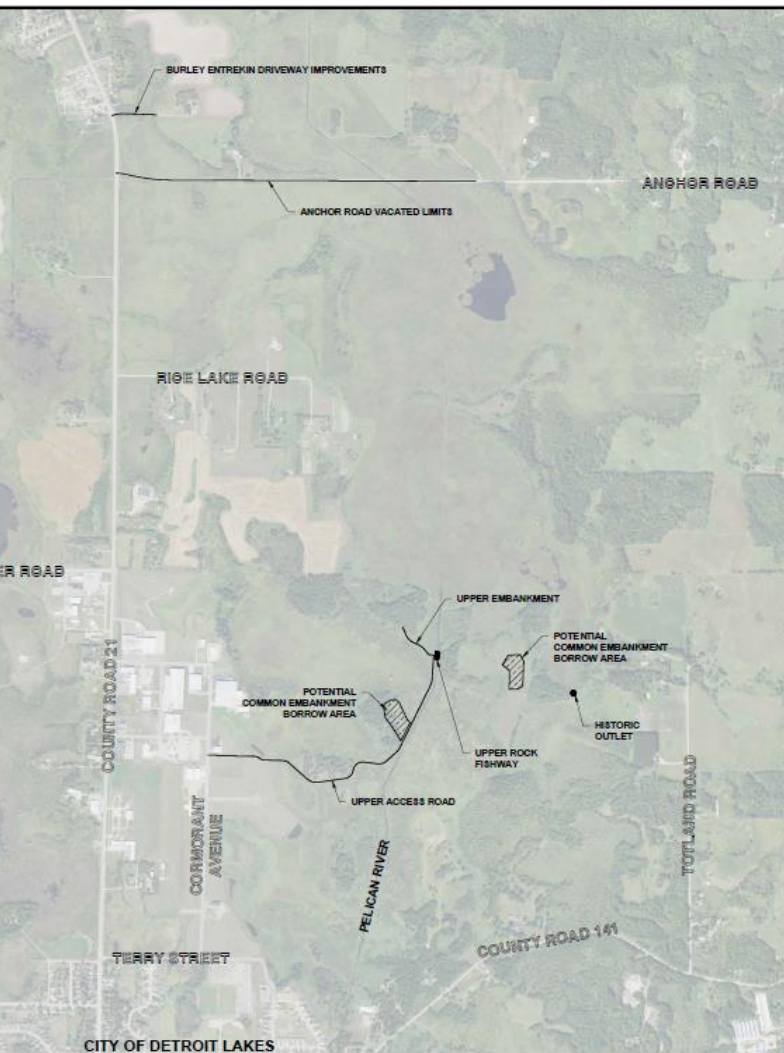
1. 2016-20 BWSR Grant Funding - \$1.5 M; PRWD Match
2. Finalized Construction Plans –Redesigned from concrete to sheet pile/rocks to lower construction costs.
3. Let bids – SURPRISE! - \$1.0 M **over** Engineer Estimate

Need to lower construction costs.....

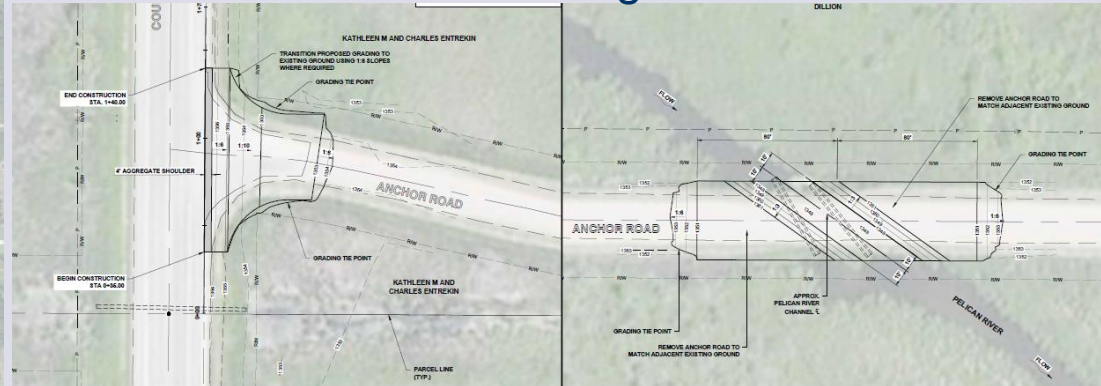
1. **Township Road Segment**– Township wants to abandon the impacted segment of Anchor Road. COMPLETED 2019.
2. **MN DNR wants fish passage** – Another redesign with rock fish passage. COMPLETED 2020.
3. **Build in 2-Phases** – Upper and Lower.



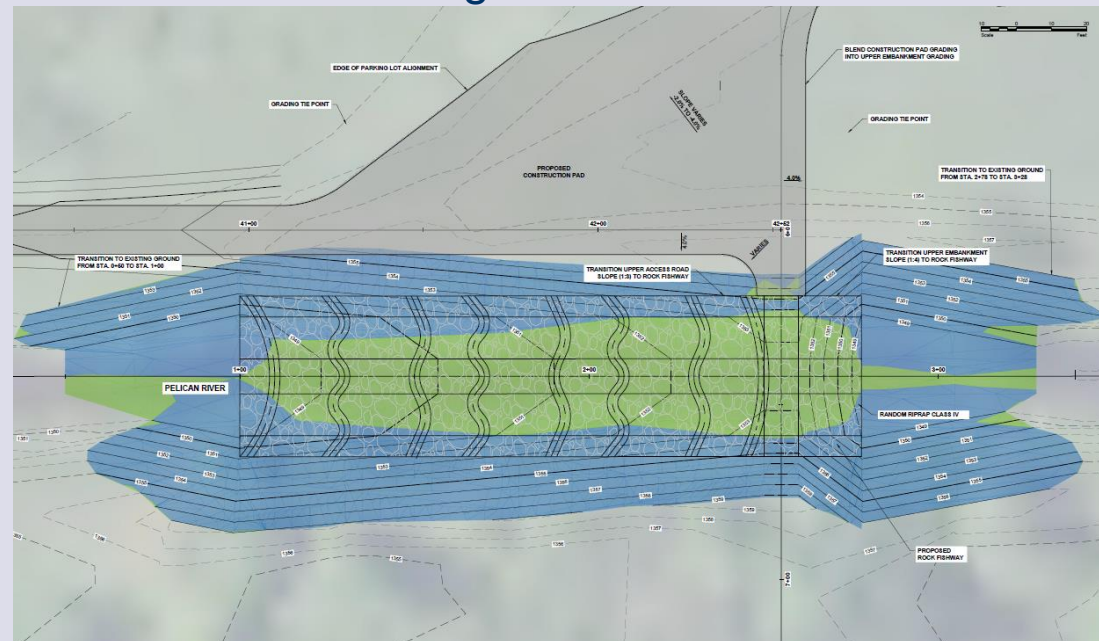
#3 Design



Anchor Road Vacated Segment



Rock Fish Passage Structure



Funding Challenges

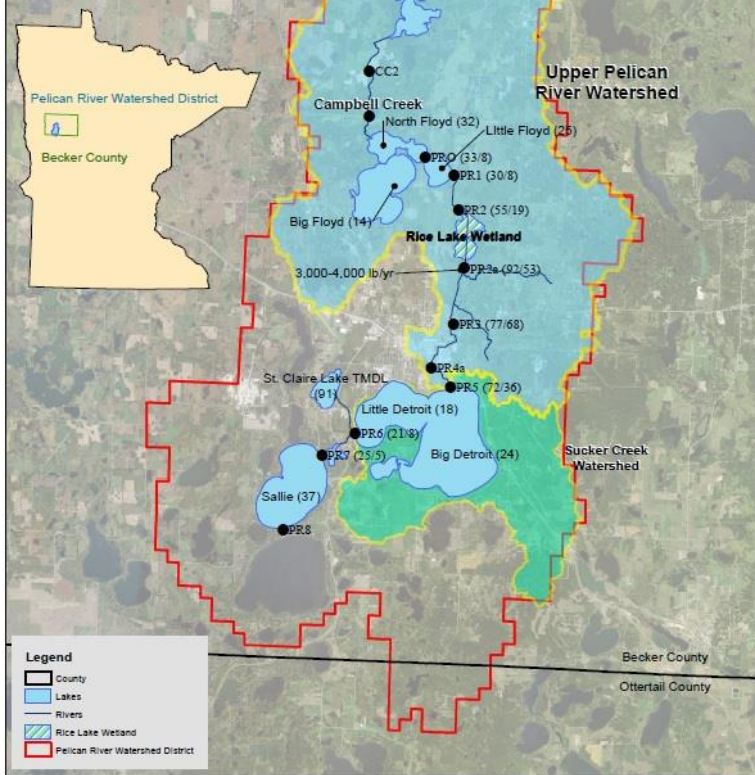
“a Moving Target”

- **2004 Funding Assumption**
 - Flowage Easements: WRP/RIM Program
 - Construction: WRP/RIM; MPCA CWP Loan; PRWD
- **2008 Funding Assumption –Farm Bill Impacts**
 - Flowage Easements: Straight WRP – Qualifying ; MPCA Loan/Grant – Non -Qualifying
 - Construction: WRP; PRWD Utility or Project
- **2009 Funding Assumption**
 - Flowage Easements: Qualifying ; MPCA Loan/Grant – Non –Qualifying & possible select properties
 - Construction Fund Options: MPCA CWP Loan; WRP/RIM; PRWD – Utility or Project; Clean Water Legacy/Lessard Heritage; Legislative Line Item
- **2016-20 Funding Assumption**
 - Flowage Easements: Completed
 - Complete Project Design and Construction – BWSR \$1.5 M; PRWD \$ 400K
 - COST too high; Ran out of time for construction within grant period.
- **2020 Funding Assumption**
 - **Two Phase project**
 - » Phase one – upper structure – Rock Fish Passage/Anchor Road Vacated Segment
 - » Project is permitted; Seeking funding for construction of Phase 1 – Shovel READY!

WHY ARE WE DOING THIS ?????

Pelican River Watershed District Sequential Monitoring Network 1995-2015 Annual Average Phosphorus Concentrations and Loads

(TP/OP) or (TP)
Concentrations in ppb



PELICAN RIVER
watershed district

Construct Project Implementation Plans
Continue water quality and effectiveness
program and analysis

Detroit Lake Watershed Water Quality Management Goals

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- **Reduce P loads by 50% in Campbell Creek and Rice Lake Wetland**
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