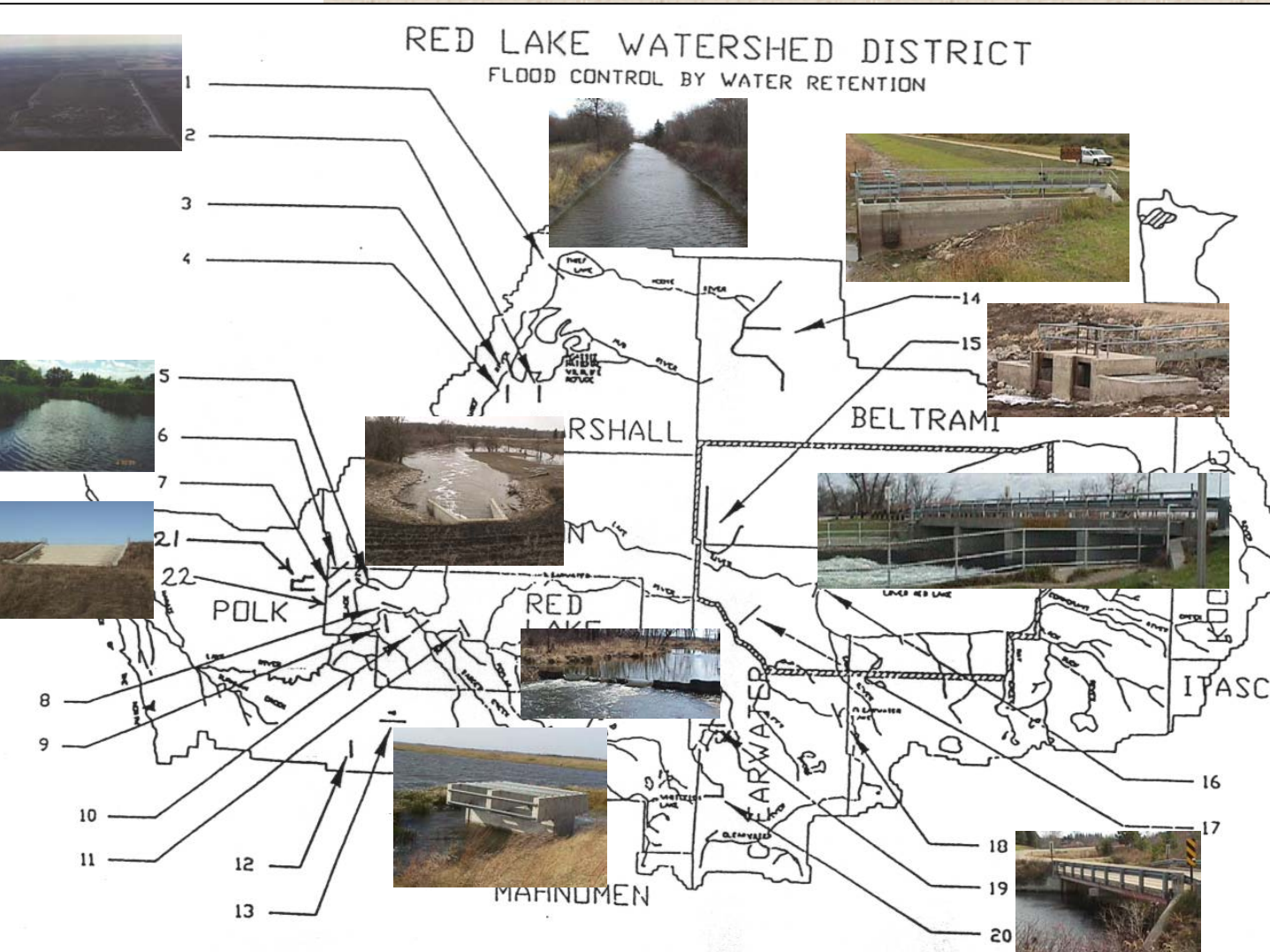




RLWD Projects

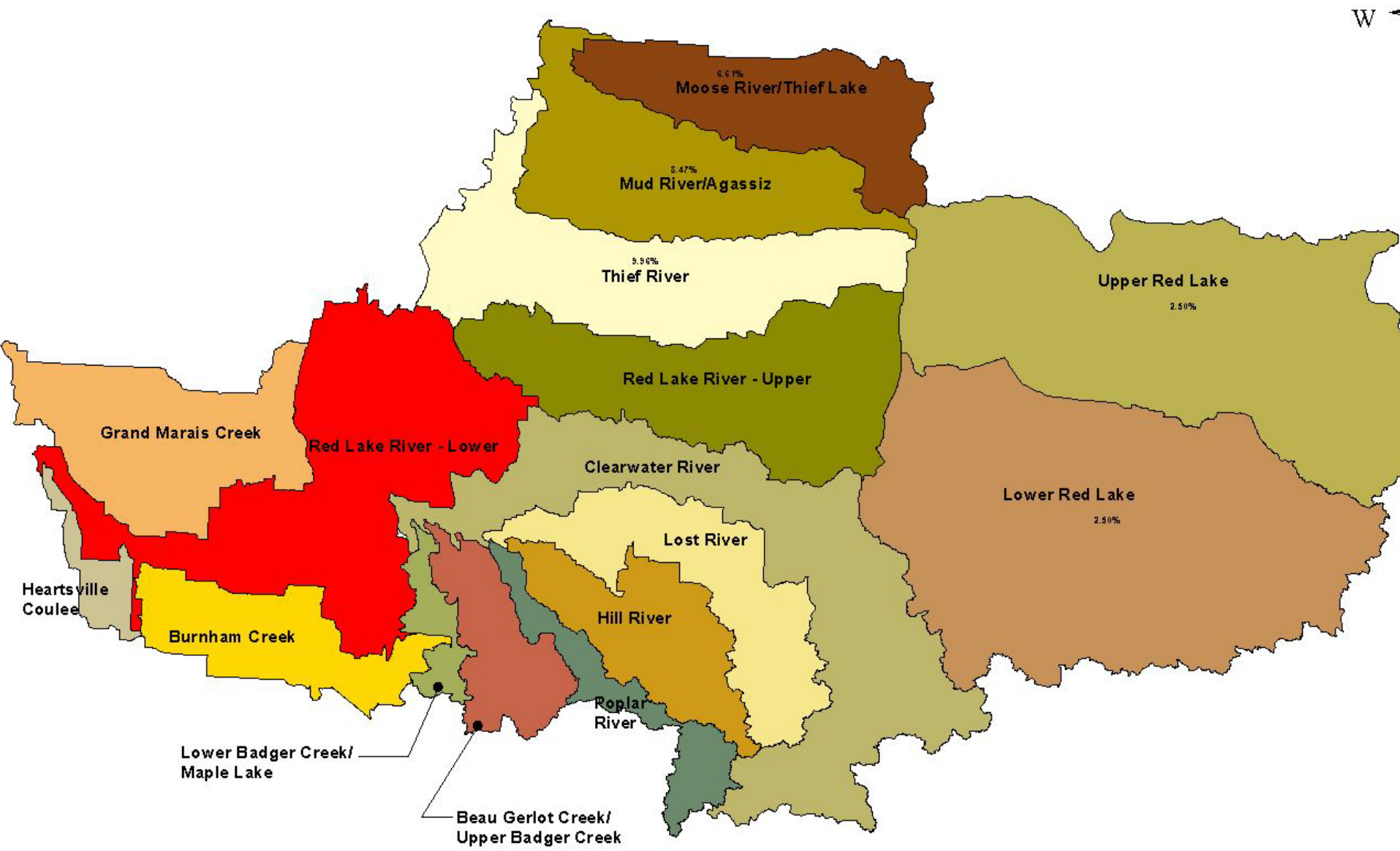


No.	Project	Drainage Area (mi.)	Storage (ac-ft.)
1	Thief Lake	222	45,000
2	Lost River Pool	54	4,500
3	Agassiz	387	45,000
4	Elm Lake	63	7,500
5	Black River	108	4,700
6	Goose Lake	16	3,500
7	Baird-Beyer	7	400
8	Thibert	1	6
9	Seeger	6	266
10	Knuston	3	42
11	Miller	4	123
12	Odney Flaat	7	36
13	BR-6	3	1,023
14	Moose River	125	36,250
15	Good Lake	72	10,100
16	Red Lakes	1,930	1,000,000
17	Kiwotay	36	12,000
18	Clearwater Lake	162	4,200
19	Pine Lake	45	6,080
20	Abraham	0.3	66
21	PARNELL	25	4,000
22	Low/PR	5.1	360

Counties in the RLWD



Major Watersheds of the RLWD



Engineering Projects



Parnell Impoundment

Polk County - Parnell Township - Sections 3 and 4



FSE Sites 1 and 2

Site 1



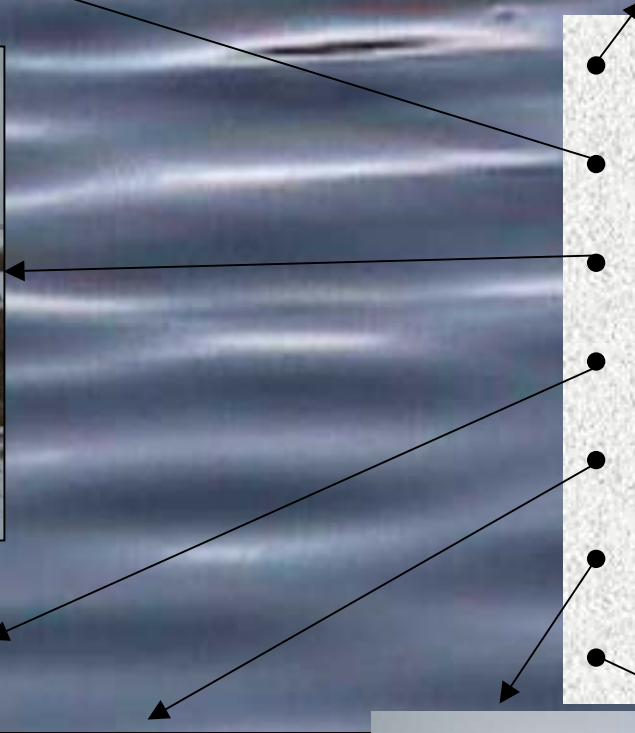
Site 2



Elm Lake



SCS Dams



- Seeger Dam
- Thibert
- Knutson
- Miller
- Latundresse
- BR6 Impoundment
- Baird-Beyer



Seeger Dam Slope Failure



Shirrick Dam



Lost River Pool



Snow Sampling



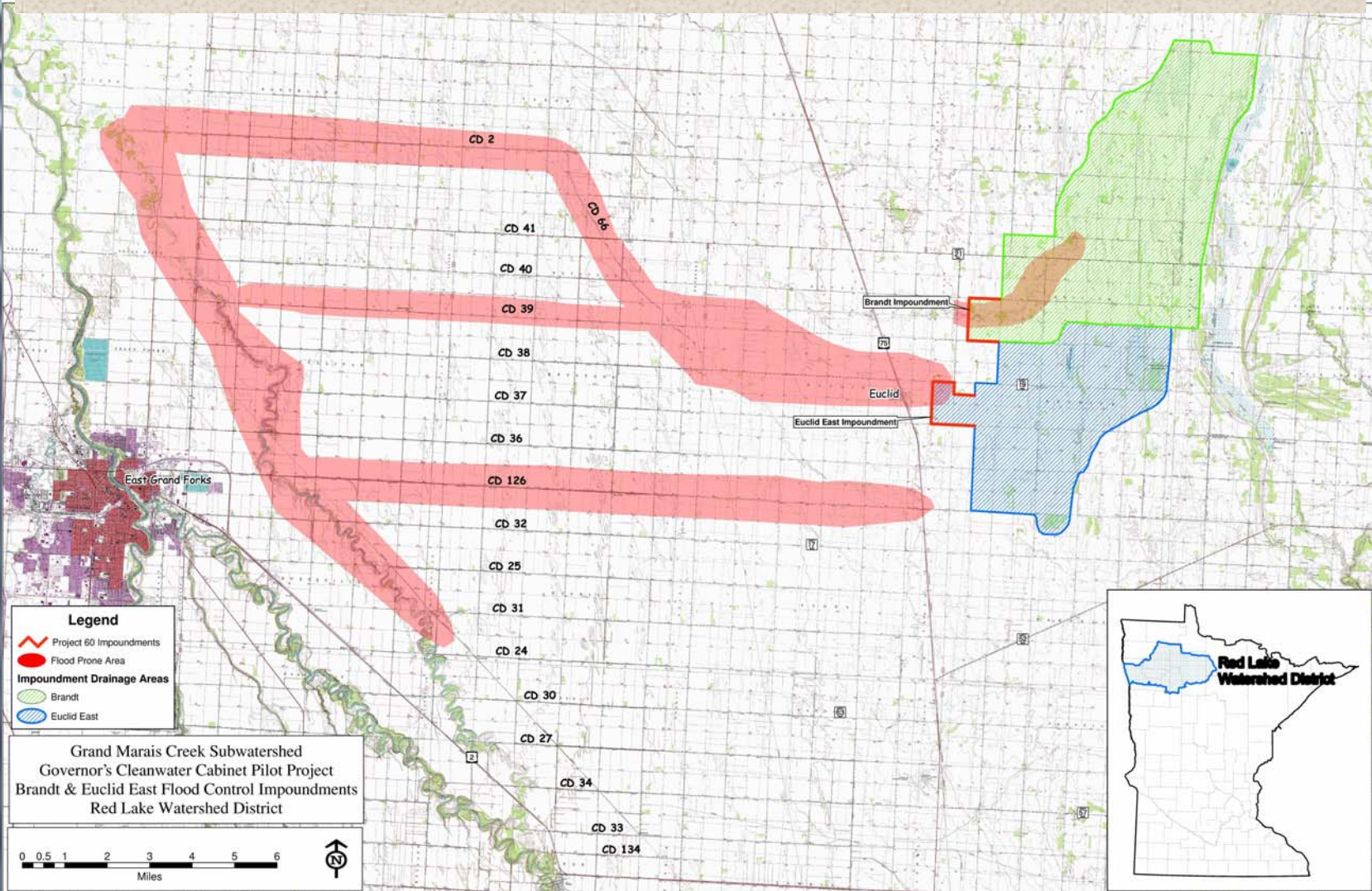
Pine Lake



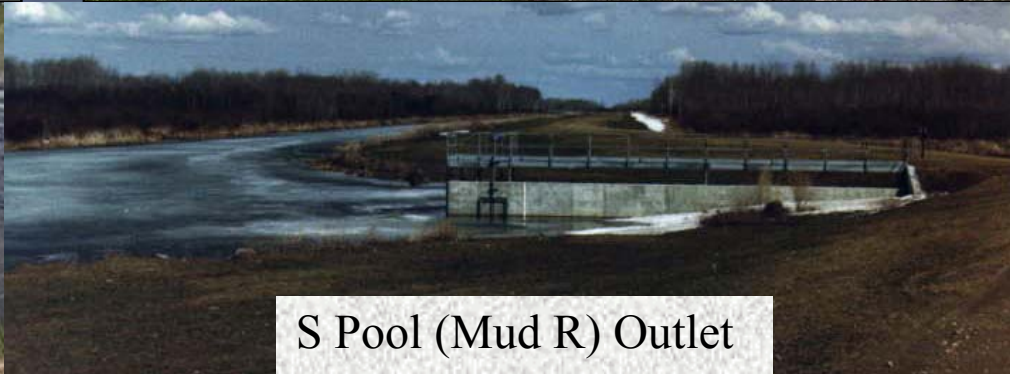
Louisville Parnell



Project 60



Moose River Impoundment



S Pool (Mud R) Outlet

Good Lake



Ring Dikes



Ditch Inspection



Ditch Cleaning

SD 83



Ditch #1 Before



Ditch #1 After

Permit Inspection



Clearing and Snagging – Clearwater River and SD 83



Stream Gauging

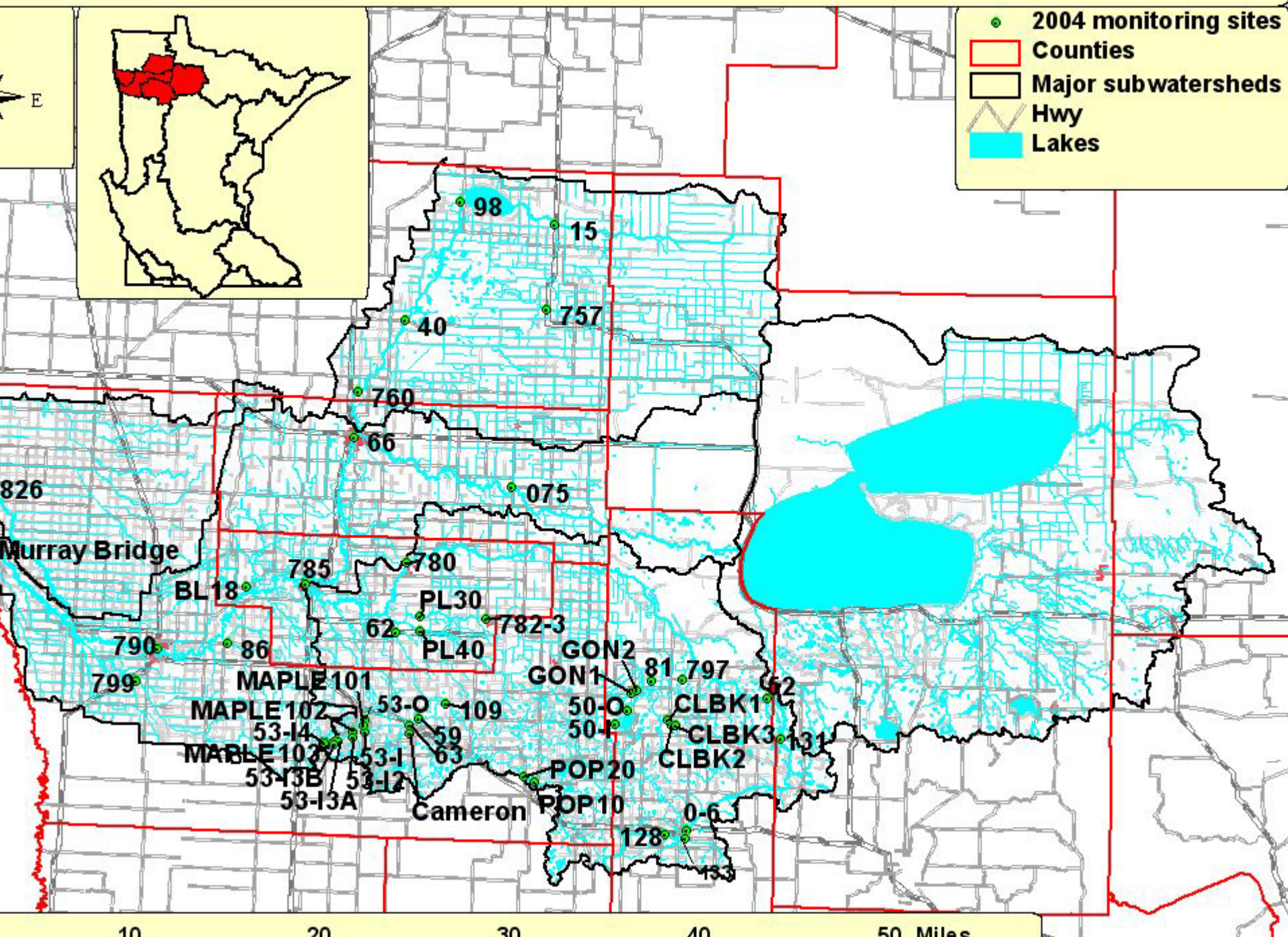
- The RLWD has collected flow and stage data at over 150 sites throughout the district



Water Quality Projects

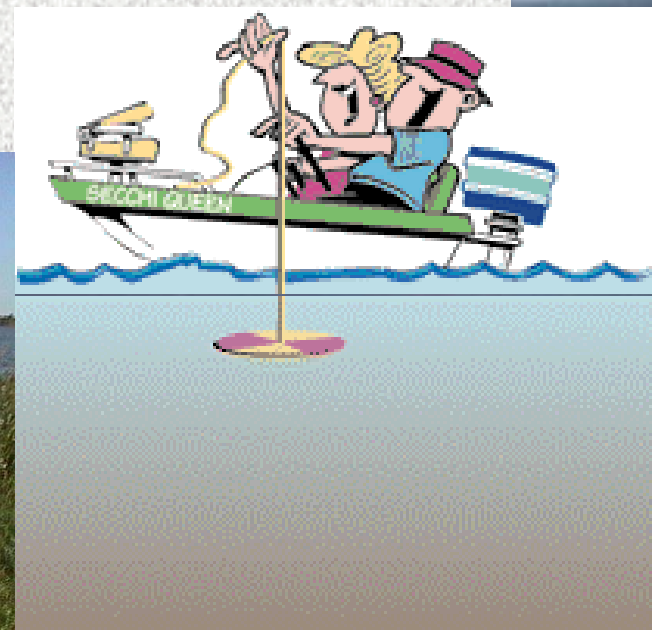
- Water Quality Monitoring
 - Over 30 sites
 - At least 4 samples per year
 - Lake and Stream Monitoring
- Special Studies
 - Clearwater Lake Water Quality Model, Habitat/bioassessment, Tile Drainage Study
- Water Quality Improvement Projects
 - Erosion Control
 - BMP Implementation

2004 MONITORING SITES



Lake Monitoring

- Clearwater Lake
 - Mesotrophic
- Maple Lake
 - Eutrophic
- Cameron Lake
 - Hypereutrophic



Field Measurements

- Dissolved Oxygen (mg/L)
- Water Temperature
- pH
- Conductivity
- Turbidity (NTUs)
- Transparency (cm)

Laboratory Analysis

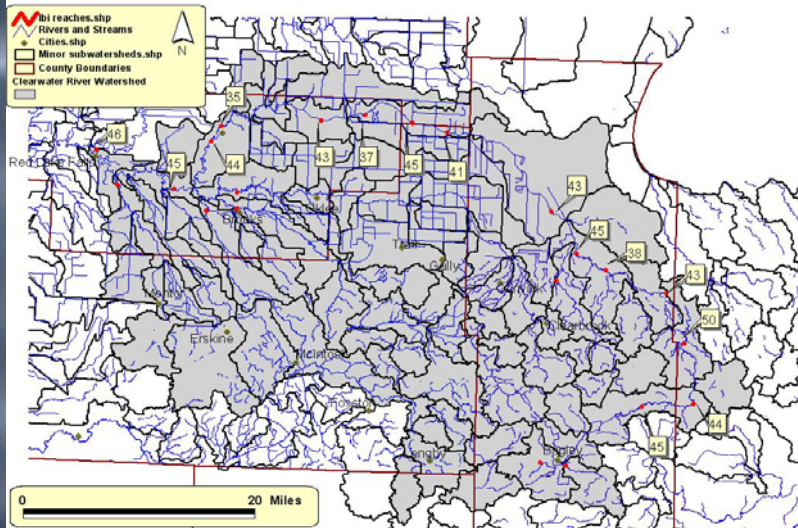
- **Total Suspended Solids**
- **Total Dissolved Solids**
- **Total Phosphorus**
- **Orthophosphorus**
- **Nitrates and Nitrites**
- **Ammonia Nitrogen**
- **Total Kjeldahl Nitrogen**
- **Fecal Coliform**
- **Chemical Oxygen Demand**



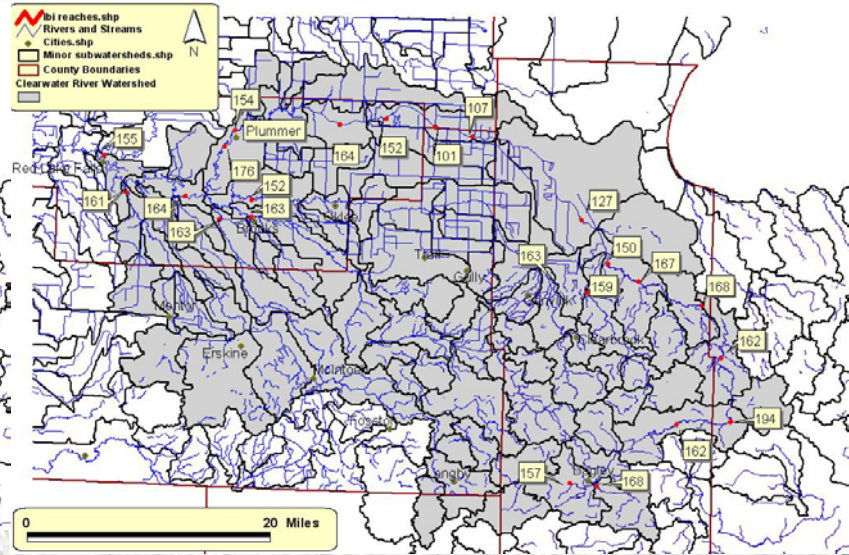
Clearwater River Habitat/Bioassessment

- Index of biotic integrity for sites along the Clearwater River and its tributaries

Clearwater River Habitat/Bioassessment
Fish IBI Scores



Clearwater River Habitat/Bioassessment
Habitat Scores



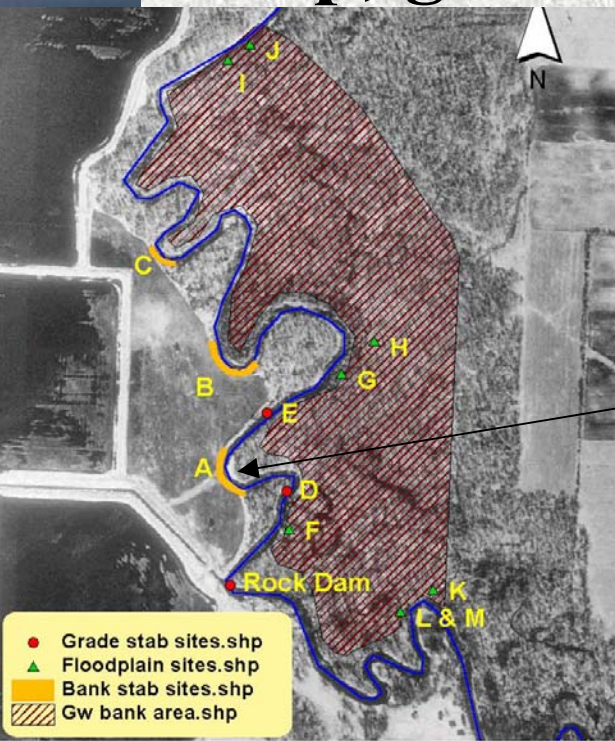
Clearwater River Bank Stabilization and Revitalization

- **Streambank erosion**
- **Gullies were being formed across river bends through the flood plain**
- **Headcutting from channelized reach**
- **Need for bank and grade stabilization**



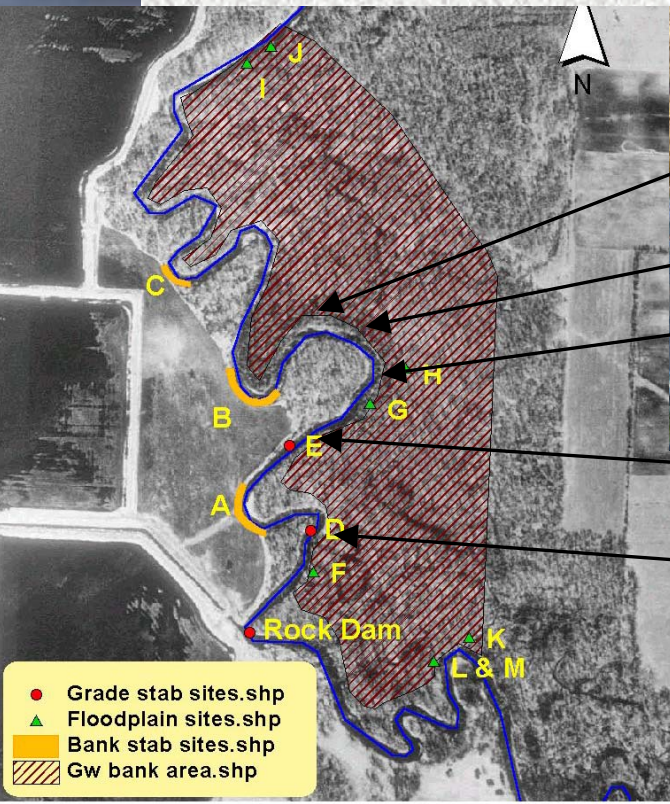
Clearwater River Bank Stabilization and Revitalization

- Banks were stabilized through re-shaping, willow bundles and stakes, rip-rap, geotextile fiber, and seeding



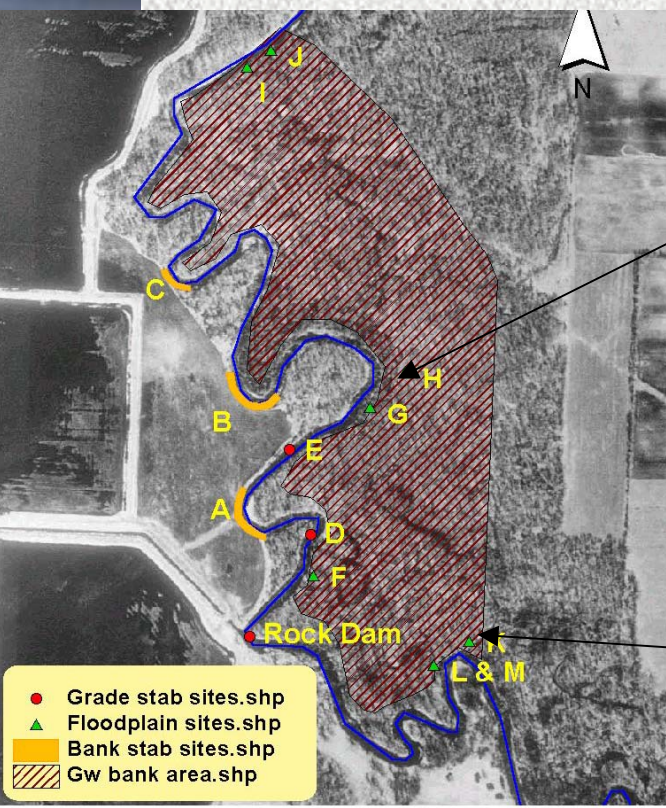
Clearwater River Bank Stabilization and Revitalization

- Cross-vane weirs were used to stabilize the grade of the channel



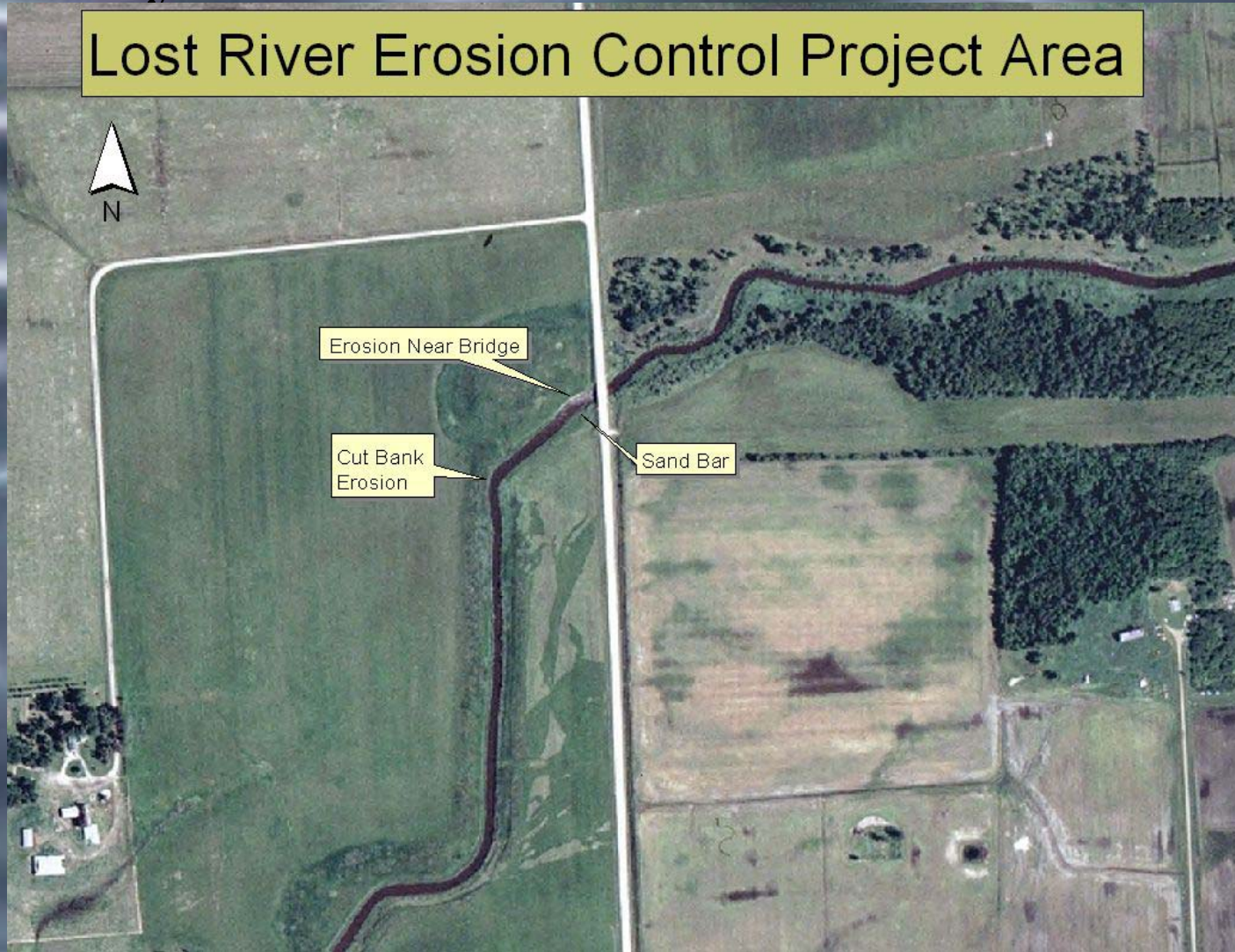
Clearwater River Bank Stabilization and Revitalization

- Rock dams were used to restore the flood plain



Clearwater River Bank Stabilization and Revitalization Project

- **Gully 6 – Lost River Erosion Control**



Clearwater River Bank Stabilization and Revitalization Project

- **Gully 6 – Lost River Erosion Control**

- **Before**



Clearwater River Bank Stabilization and Revitalization Project

- Gully 6 – Lost River Erosion Control -After



Cross Vane Weir



Stream Barbs



Clearwater Nonpoint Project Phase II – Bank Stabilization

- **Erosion Control at 4 Sites**
- **Example: Emardville Site**

1999



2004

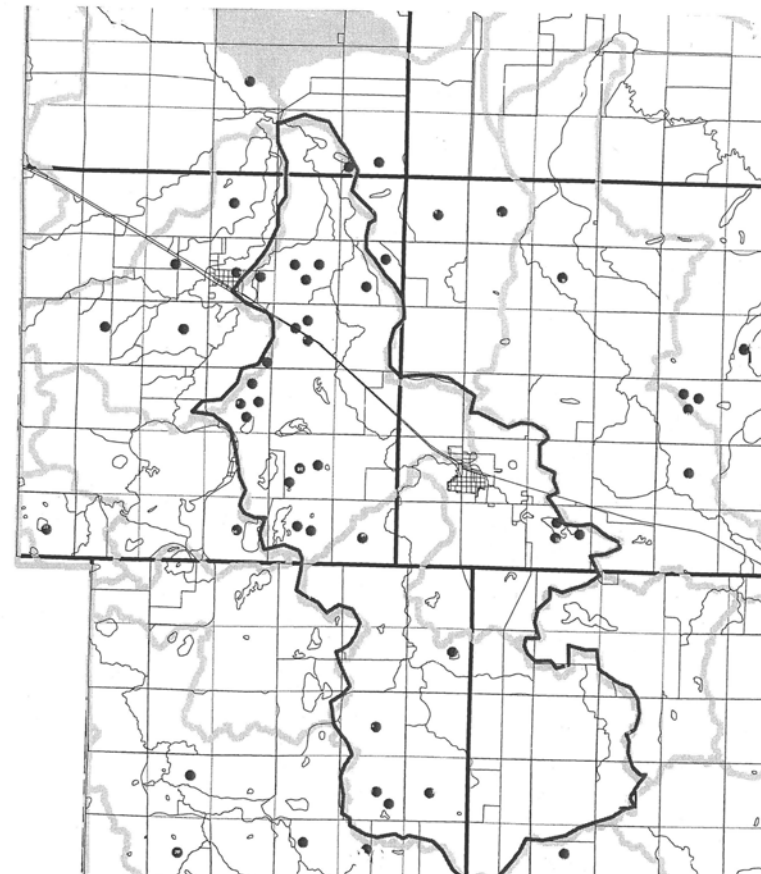
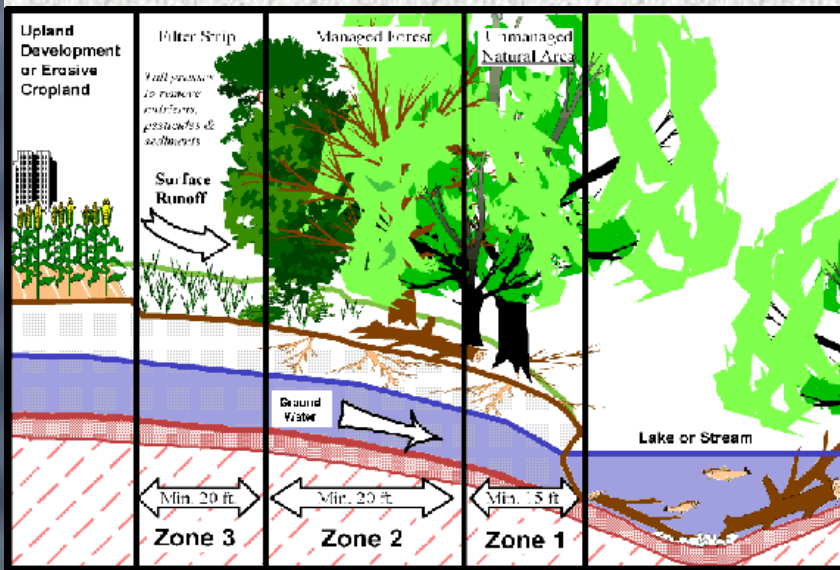


Buffer Initiative

- **Clearwater Nonpoint Project**
- **Silver Creek**
- **Red River Basin Commission 319 Grant**

Silver Creek Buffer Initiative Projects

In the Watershed - 29 Projects – 637 Acres



Bagley Urban Runoff Project

- 2001 - runoff impacting the Clearwater River



Bagley Urban Runoff Project

Construction



Site 1

Site 2



Site 3

Bagley Urban Runoff Project

Completed



Site 1



Site 3



Site 2

Public Education





River Watch

- Educational opportunity for the students
- Valuable source of Water Quality Data
- Fund River Watch Programs at 10 Schools within the RLWD
- Assist 5 of these schools in monitoring
 - East Grand Forks, Sacred Heart, Crookston, Fisher, Win-E-Mac, Red Lake County Central, Red Lake Falls, Clearbrook-Gonvick, Grygla, Fosston



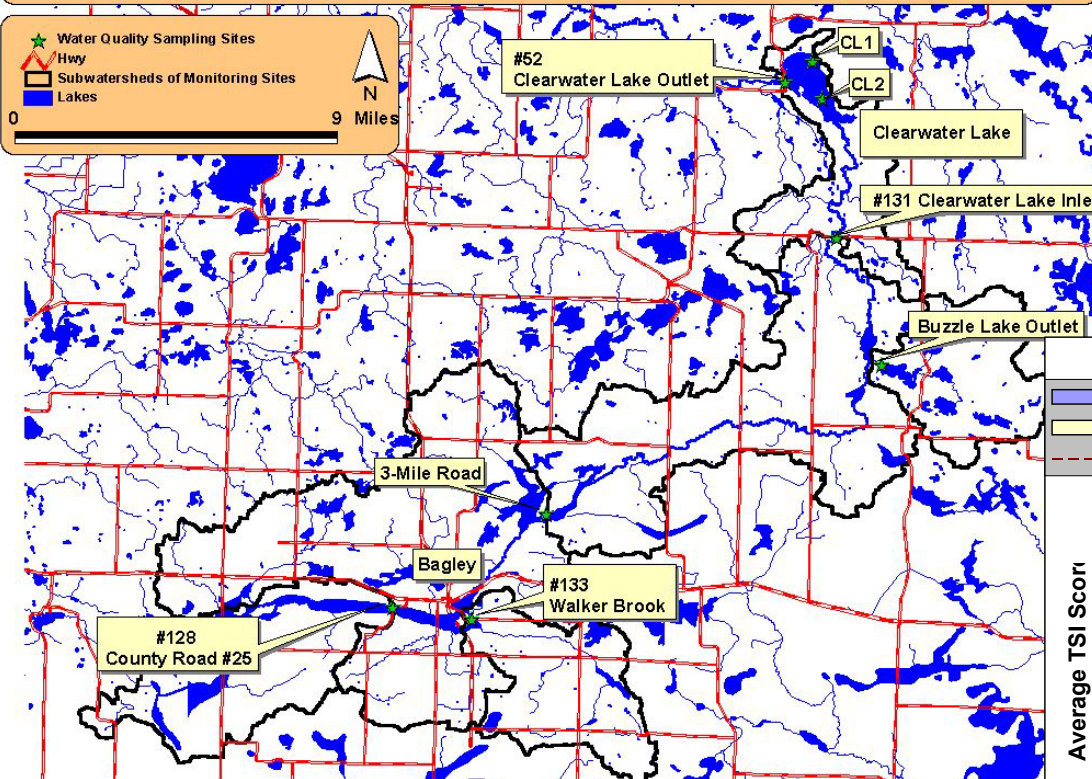
Clearwater Lake

AREA ASSOCIATION

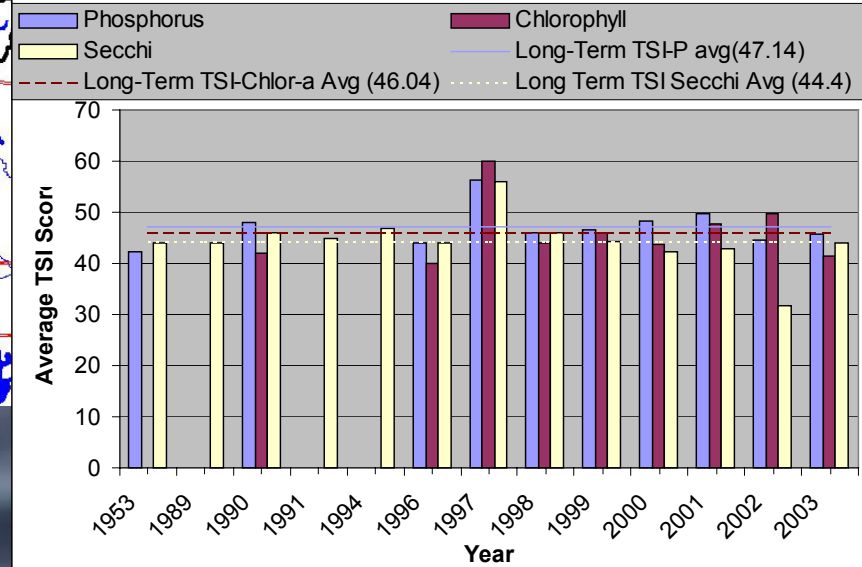
MANAGEMENT PLAN

Clearwater Lake Water Quality Model Study

Clearwater Lake Monitoring Sites



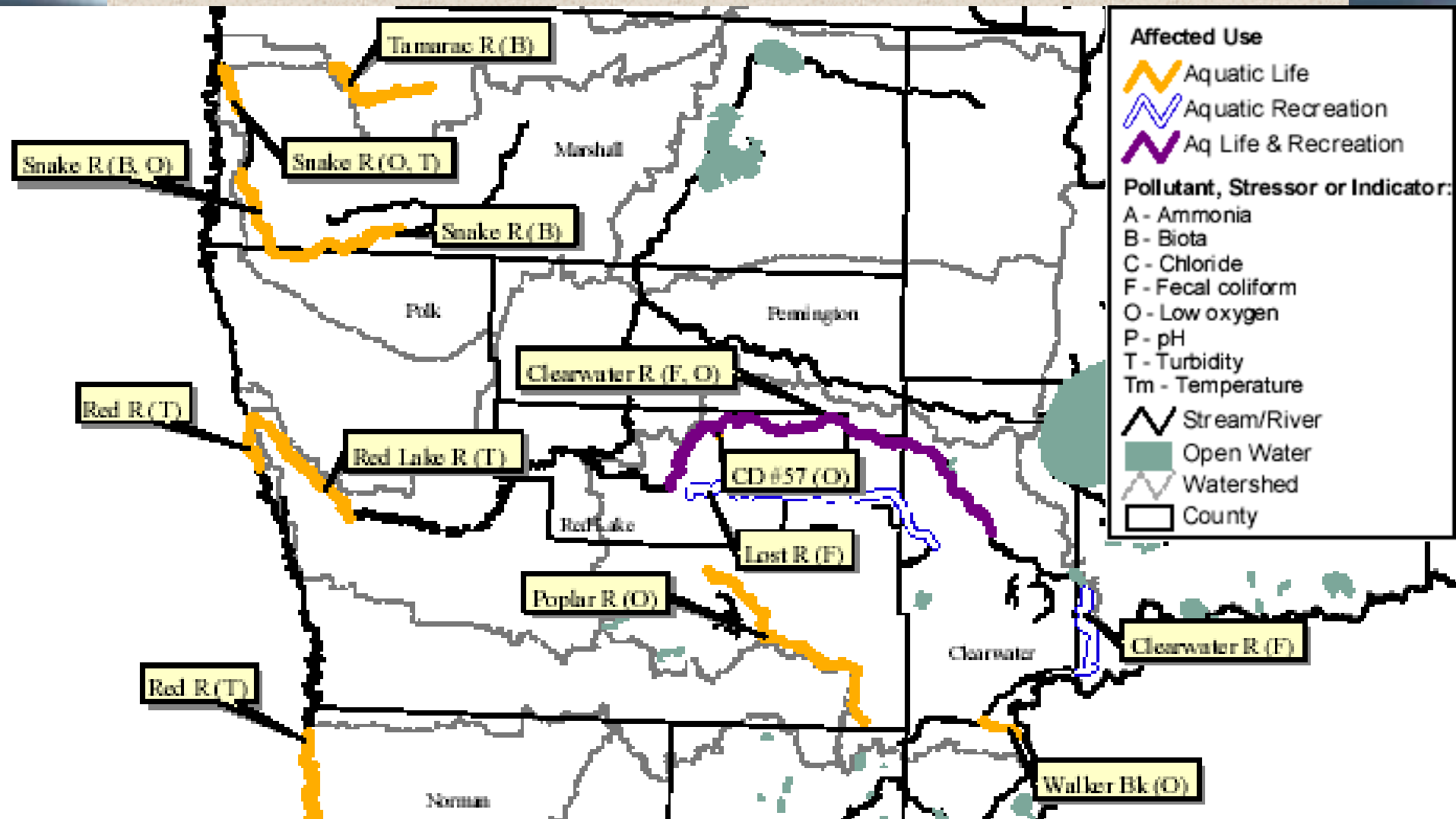
Clearwater Lake TSI Values



Red River Watershed Assessment Protocol

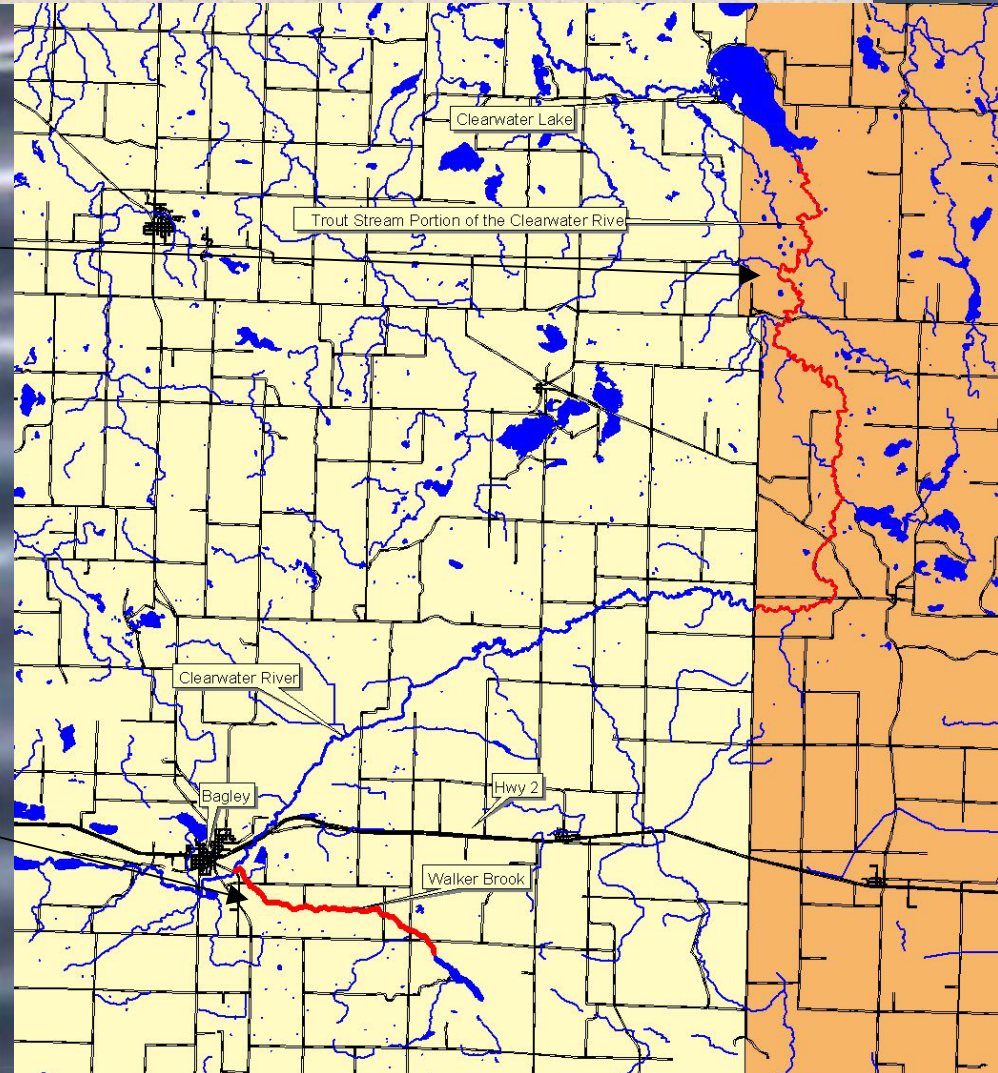
- Website: www.redlakewatershed.org
- Standard Operating Procedures for Water Quality Monitoring in the Red River Watershed
- Water quality database
- Statistical Methods Handbook
- Water quality data entered into STORET
- Water quality data analysis & modeling
- Comprehensive Water Quality Report (copies available upstairs)
- RLWD Quality Assurance Project Plan (QAPP)

TMDLs – Impaired Waters



TMDLs on the Clearwater River

- Trout Stream Reach of the Clearwater River – No longer impaired by fecal coliform
- Walker Brook – Low DO – Reclassified, impairment due to natural conditions





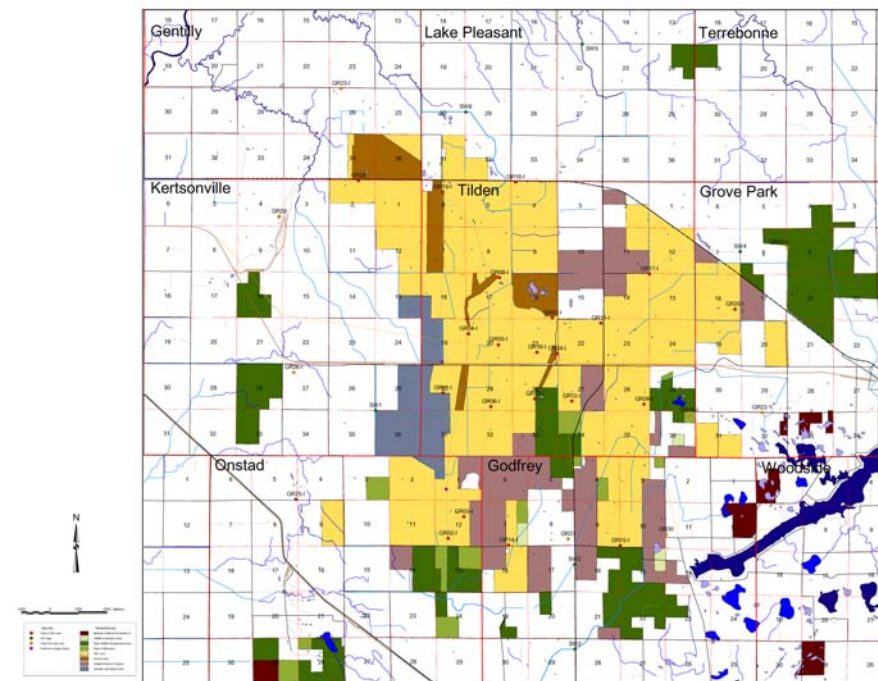
Tile Drainage Study



- **Grant from Northwest Minnesota Foundation, cost share with Red Lake SWCD, Marshall Beltrami SWCD, Red Lake Nation, and the Red River Watershed Management Board**
- **Compare tile drainage to surface drainage and natural background levels**
 - **Water Quality**
 - **Total suspended solids, total phosphorus, nitrates, total nitrogen**
 - **Flow**
 - **Total Volume**
 - **Peak Flows**
- **Compare different types of tile outlets**

Glacial Ridge

- **Partnership with the USGS and The Nature Conservancy**
- **Extensive Restoration of Wetlands**
- **Water Quality Study**



Red Lake River Corridor Enhancement

- Improve access to the Red Lake River
- Promote the recreational opportunities on the Red Lake River
- Collection Geographic Information System (GIS) data for the Red Lake River Corridor that may be viewed via the internet
- Erosion survey, erosion control projects, riparian buffer strip implementation

The End

