Rivers Council of Minnesota

1269 Second Street North, Suite 200, Sauk Rapids, MN 56379
PHONE 320-259-6800 • **FAX** 320-259-6678 • **E-MAIL** rivers@riversmn.org • **URL** www.riversmn.org

Barb Lang
Pelican Lake Association of St. Anna
37075 Pelican Lake Road
Avon, MN 56310

April 14, 2005

Dear Barb,

We have received your final report and attachments for the RCM/MLA Citizen Volunteer Monitoring Plan program, as funded through LCMR*.

Your document satisfies the reporting requirements and completes the monitoring plan training, implementation, and contract components for the program.

It has been a pleasure to work with you and your team. Please keep in touch with monitoring activities and updates on your program. Also let us know of future monitoring/training needs that may be of interest to you or your citizen volunteer monitoring group.

Sincerely,

Angie

Angie Becker Kudelka
River Watch Director
Rivers Council of Minnesota

* Funding for this project was recommended by the Legislative Commission on Minnesota Resources (LCMR) from the Minnesota Environment and Natural Resources Trust Fund.

Pelican Lake Association of St.Anna
37075 Pelican Lake Road
Avon, MN 56310
Phone 320-356-7700

February 28, 2005

To Angie Becker Kudelka
Rivers Watch Director
Rivers Council of Minnesota
1269 – 2nd St. N, Suite 200
Sauk Rapids, MN 56379

Re: Receipts for LCMR Grant money for water monitoring plan Pilot Program 2004

We have spent much more than this but we understand you need receipts for the $3,000.00 from LCMR

$4,280 in actual attached receipts

$5746.23 if you include minimal mileage and some in kind to the receipts on these pages.

We definitely had a fun and busy summer training volunteers on various equipment and doing everything we were suppose to this summer.
The plan is such a good tool to have to refer to almost every day for one thing or another and our monitoring indicated to us that we do need to give more attention to some of the areas in our watershed.

Our data also says we need to do more monitoring this year as planned and for many more years to come.

We plan on starting in April with training again this year and in May we will start monitoring again all summer.

We appreciate all you have done for us and all the training opportunities we have shared with you.

Keep up the fine job, you are doing more good than you can imagine.

Thanks for the opportunities & Education you have given us,

Sincerely,
Pelican Lake Association of St.Anna
37075 Pelican Lake Road
Avon, MN 56310

Pelican Lake Association of St. Anna
Final Report Narrative March 2005

1) The effectiveness of the purchases (the good, bad, etc.)

We thought the purchase of the pvc pipe with fittings and plugs was a very good investment and worked just fine. When we used it for monitoring the middle of the lake we straped a little puppy life jacket to it so we couldn't loose it and it was easier to hold it up while closing the stopper.

The transparency tubes served as an excellent tool in many ways, one of which we took and showed a group of people what clear water in the tube looks like and then we took the same pail of water and added just a ½ cup of dirt or sediment to it and stirred it around and put it back in the tube and let people see the difference in clarity which was remarkable and an excellent source of information etc. We saw changes immediately in some of those peoples yards.!!

2) Summary of what you are finding out about the data collected. Good spots, Not so good spots, and anything that has happened (did you use the data in anyway?)

We found certain areas were not as bad as we had expected and other areas were way worse!!

One area was always very high for fecal coliform and TSS turbidity was bad and we talked with SWCD and others including the land owner and explained what some of the possible solutions could be and a wetland restoration was put in place where corn would have been planted again this year and the water is running much more clear this year already!! This was all within 100 feet of the lake.

Another inlet was very high always for TP and TSS which got higher if we moved further away from the lake to test.So we talked with landowners to discuss options for them to not loose their good nutrients and soil by buffering along the tributaries and we were successful and now this year we are hoping to restore 3 wetlands and put in 2 buffer strips along this north tributary.!!

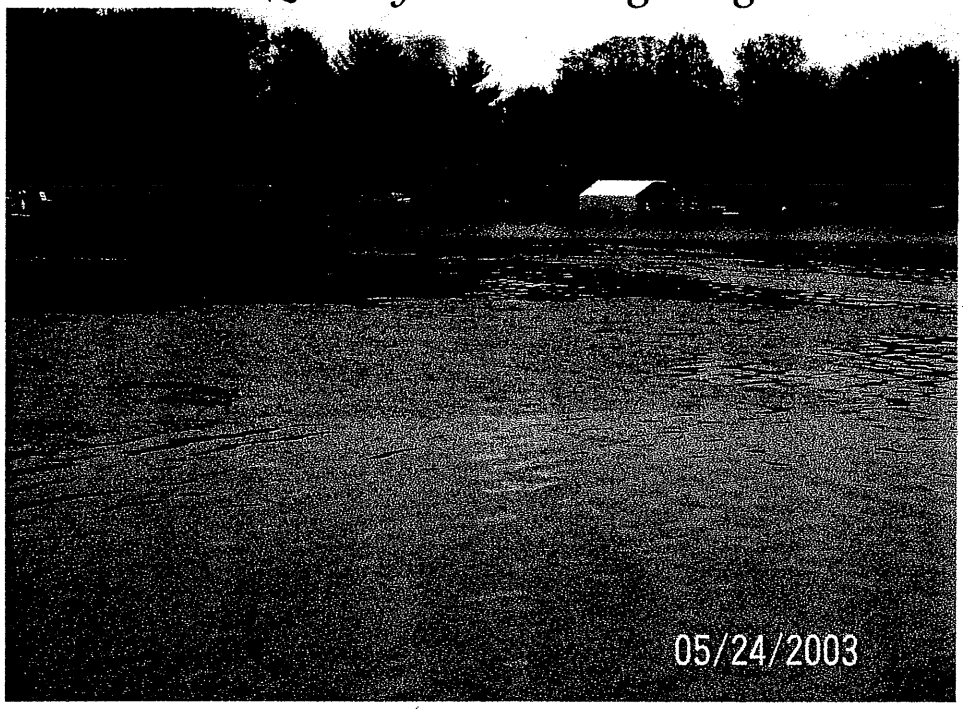
Yes we used the data to apply for grants or to do powerpoints presentations to the experts when asking their opinions of what the problems could be. We show pictures of the nasty looking water that is flowing and then pictures of the algae shortly thereafter on the lake and then we show our data and a few photos of the area and ask what the problem could be in their opinion.

Citizen Water Quality Monitoring Plan

By

Barb Lang
Pelican Lake Association of St Anna

Monitoring Plan for Citizen Volunteers Water Quality Monitoring Program



Sponsored By

MINNESOTA LAKES ASSOCIATION

Rivers Council of Minnesota

River Network

Table of Contents

Funding for this project was recommended by the Legislative Commission on Minnesota Resources (LCMR) from the Minnesota Environment and Natural Resources Trust Fund.

The goal of this grant is to enhance and expand the ability of citizen volunteers to collect water quality data that will be useful for lake and stream assessments and management. Minnesota Lakes Association and Rivers Council of Minnesota, with assistance from River Network, will work collaboratively to provide training, technical support, education and communications for individuals and organizations statewide interested in citizen volunteer lake and stream monitoring.

Introduction and Overview

Title Pages

Date Plan Completed:	March 2004
Organization Name:	Pelican Lake Association of St. Anna
Name of Program:	Monitoring Pilot Plan for Citizen Water Quality Monitoring Programs
Monitoring Plan Author:	Barb Lang, Linda Mock, Joe Lang
Primary Contact: Address:	Joe Lang 37075 Pelican Lake Road Avon, MN 56310
Contact Phone:	320-356-7700
Contact email:	jblspunk@albanytel.com

Title Pages

Pelican Lake Association of St. Anna Mission is to work with our watershed and landowners through awareness, education, and positive cooperation, to continually improve the water quality for our selves and for future generations.

The Lake Association was founded because the Lakes in our watershed are visually degrading and we as concerned citizens wanted to Volunteer and help with regard to water quality, waterfowl habitat, water quantity, fish habitat, healthy fish balance, aquatic plant concerns, nutrient and run-off issues, education & awareness. We also want to be an organization that helps bring community togetherness to this small rural area.

We plan events, hold educational meetings and we serve as a community informational system to help one another. We try to bring awareness to the problems we are faced with. Together, we feel it may be easier to help solve some of the problems within Pelican Watershed.

Our goals and objectives are to measurably improve water quality and water quantity in our watershed. We plan to do water monitoring on Pelican Lake and on Two River which flows on and through Albany and Holdingford and on to the Mississippi.
We hope to learn from test results so we can prioritize our needs for monitoring certain problem areas more often or additional areas if the budget allows.

We are located in central Mn in a very small rural community called St. Anna just 18 miles North Northwest of St. Cloud in Stearns County

Pelican Lake is part of South Two River Watershed District, it is at the top of STRWD, Pelican has 1 outlet which flows into Little Pine Lake, then to Pine Lake and on to Two River Lake and then Two River, River that flows through Holdingford and on to the Mississippi. Pelican Lake is surrounded by hills and ag land, Pelican Lake has 4 inlets that flow downhill from mostly tilled ag land.

Our organization was founded in Spring of 2003, We are a non-profit 501(c)(3) Tax Exempt Organization. We have 92 members our first year.

Introduction Narrative

We feel there is a need for education and awareness of what is harming our lakes, rivers and streams and that by building partnerships with volunteers we can access what the problems are and work toward solutions to correct the problem areas.

There is a visual degrading of our water bodies in recent years and we feel monitoring by state standards with an organized plan would provide us with a better vision of what might be causing the problem areas and what it may take to improve these areas.

Pelican Lake Association of St .Anna's Mission, is to work with our watershed and landowners through awareness, education, and positive cooperation, to continually improve the water quality for ourselves and for future generations
Together we vision a watershed with Clear water sandy bottom lakes with Less development, Lower Nutrient levels in the water, less run off, restoration of wetlands, Buffer strips, sediment ponds, native plantings, updated sewer systems, less black topping, more habitat area, good fishing, less algae, shoreline restorations, landowners concerned about using BMP's and most importantly, water with test results that are within state standards for safe use.

History:
Pelican Lake was known for being crystal clear water with a sandy bottom. It started changing about 3 years ago to a silt looking black bottom on the NNE side between the inlets and more algae and weeds were appearing.

In the last 2 years the Algae has increased. In 2003 algae was in bloom from Memorial Day week end until after Labor Day many could not use the water for what it was intended.

Water testing was done to see what nutrients were in the water flowing into Pelican Lake. At the inlets the counts were somewhat over normal range, so we starting checking across the road and upstream away from the lake and found there were even higher counts of TP, FC, & TSS across the road from the Lake.

Flow Charts

Annual Training for Volunteer Monitors

Care for Your Waters Stream Training and MLA Lake Training
(Spring of the year)

↓

Follow-up to Training

Organize Volunteers and Monitoring Sites – Barb Lang will take the lead base on this monitoring plan
(April and May of the year)

↓

Monitoring Season

Take Samples, lab analysis, record data
(May through October of the year)

↓

Data Management and Analysis

(Pelican Lake Association will record all data and look at trends. Technical help with data analysis will be sought as needed from SWCDs and the Watershed District
(October through December of the year)

↓

Planning and Action

Pelican Lake will share data and interpretation information with data users and make decisions about who else to contact, and actions to take.
(November through February of the year)

↓

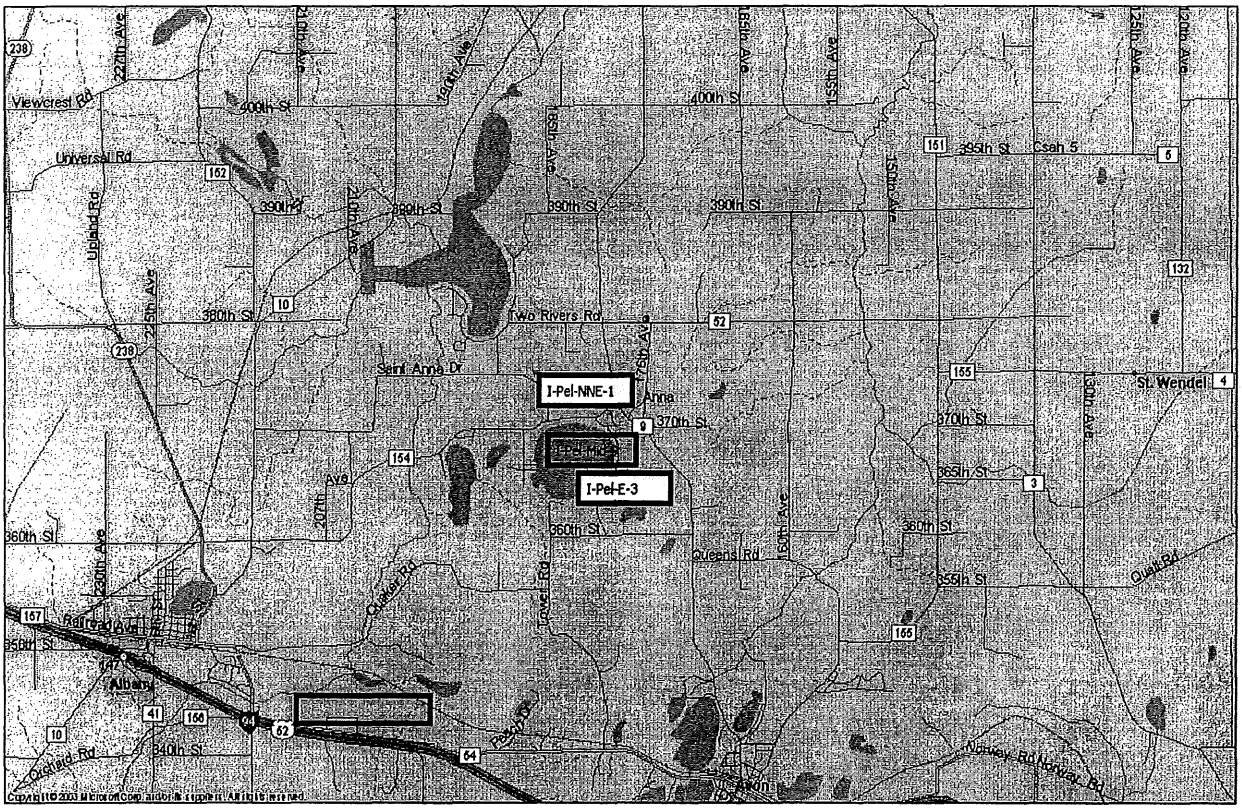
Evaluation

Pelican Lakes Association will evaluate program, decide on monitoring sites and plan for next year
(February and March of the year)

↖

Loop Back to beginning
for the next monitoring season

Monitoring Site Map for 2004



Monitoring Sites 2004

I-Pel-NNE-1

I-Pel-ESE-3

L-Pel-MID-9

S-TRR-Albany-18

Additional Maps (Are located in Appendix)

Pelican Lake

- Pelican Lake Watershed
- Superficial Geology
- Highly Erodible Soils
- Groundwater Sensitivity
- Feedlot Locations
- Bedrock Geology
- Pre-Settlement Vegetation
- Course Textured Soils
- Land Use
- Wetland Locations
- Soils
- Estimated Depth to Water Table
- DNR ToMo Map
- Pelican Lake Water Level Map
- DNR Lake Information Report

South Two River Watershed District

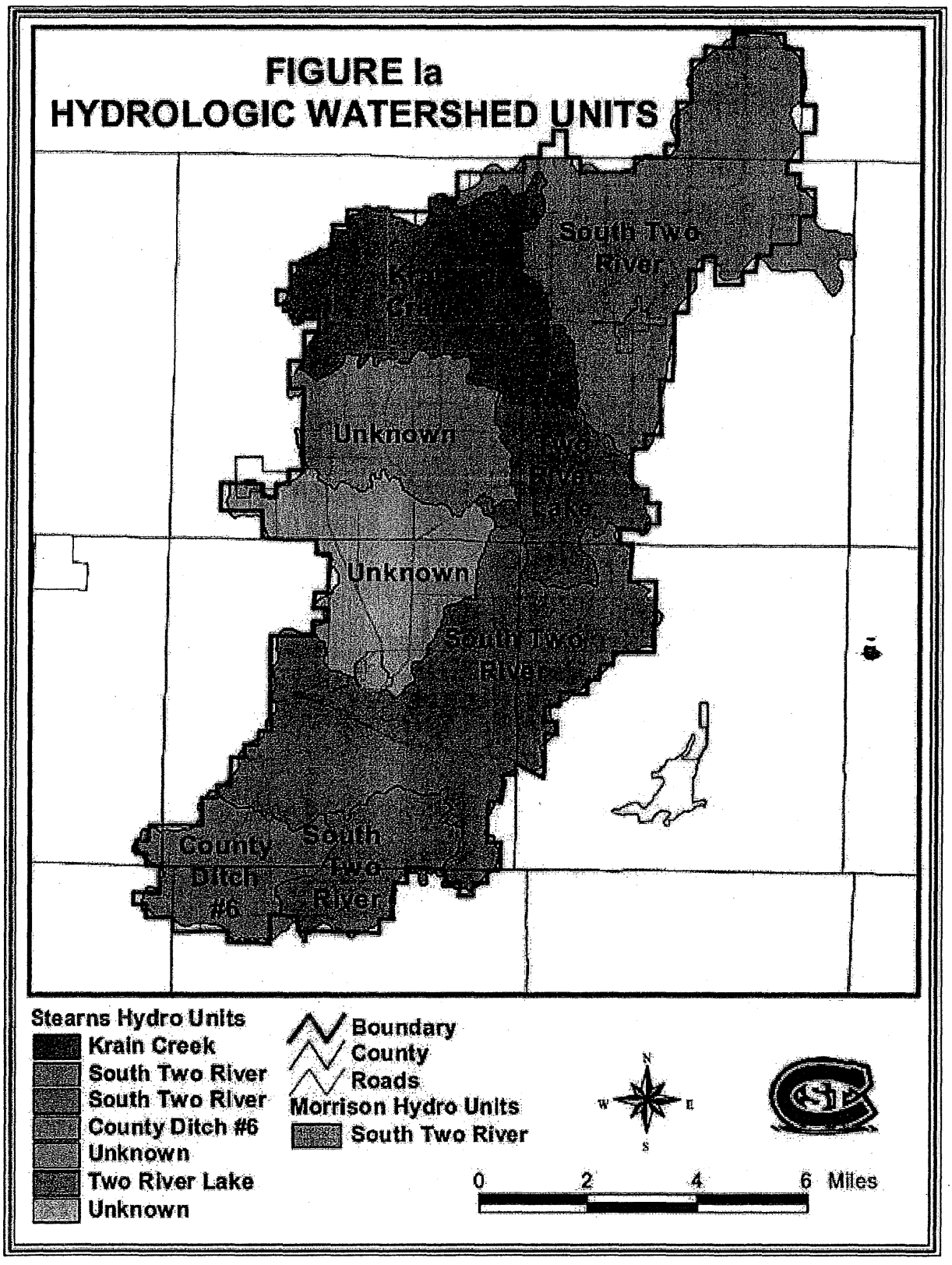
- Highest Point 1385
- Lowest Point
- 1938 to 1998 Photos of Wetland Analysis
- Sensitivity of Groundwater systems to Pollution
- Conservation
- Superficial Geology
- Protected Waters, Lakes, and Wetlands
- Depth to Bedrock
- Quaternary Stratigraphy
- Bedrock Topography
- Hydrogeology of the Quaternary Water-Table System
- Public Ditches
- Farms and Feed Lots

1989 Land Use/Cover Class Descriptions

- Urban or Built Up
- Agriculture Land
- Grasslands and Grassland-Shrub-Tree Complex
- Forest
- Water
- Miscellaneous
- Estimated depth to Water Table

Watershed Background and Information

A. South Two River Watershed District



B. Pelican Lake Surface Use Information

Specific Area of Interest: Pelican Lake 73-0118-00

INFORMATION TOPIC	ANSWER
Major Basin	Upper Mississippi River Basin
Watershed	South Two River Watershed District
Ecoregion	Central Hardwood Forest
Location	Stearns County
HUC Lake Id	HUC 07010201 (15) 73-0118-00
Zoning	Recreational
Known Soils	Sand
Littoral Area	135 Acres
Depth	Maximum 46 feet
Pelican 73-0118-00	337 Littoral Acres

General Information Topics

- Major Basin name
- Watershed name
- Ecoregion(s) name
- Location of water (counties)
- Classification Numbers (HUC, Zoning Classification number, Division of Waters Number)
- Watershed size (acres)
- Known/Dominant Soils
- Land Use Types and %s.
- Lake
  - depths(s) – maximum and mean in feet
  - surface area, littoral area
  - lake to watershed area
- River
  - length (miles) and gradient (feet per mile) of segment
  - stream order and largest water body it flows into (larger river or lake)
  - habitat types (riffles, runs, pools)
- Other

C. South Two Rivers Surface use Information

Specific Area of Interest: South Two River Watershed District

INFORMATION TOPIC	ANSWER
Major Basin	Mississippi
Watershed District	South two Rivers Watershed District
Ecoregion	Central Hardwood Forest
Zoning-except for Pelican Lake Classification HUC	Natural Environmental HUC 07010201 (15)
Watershed size	55,998 acres 91 sq miles
Location	Stearns County

General Information Topics

- Major Basin name
- Watershed name
- Ecoregion(s) name
- Location of water (counties)
- Classification Numbers (HUCs, Zoning Classification number, Division of Waters Number)
- Watershed size (acres)
- Known/Dominant Soils
- Land Use Types and %s.
- Lake
  - depths(s) – maximum and mean in feet
  - surface area, littoral area
  - lake to watershed area
- River
  - length (miles) and gradient (feet per mile) of segment
  - stream order and largest waterbody it flows into (larger river or lake)
  - habitat types (riffles, runs, pools)
- Other

Superficial Geology

Land use and types	Acres	Percent
Lake or Pond	1,390	2.5%
Alluvium	5,214	9.3
Eolian Sand	287	0.5
Lake Sand	1,240	2.2
Outwash	2,556	4.6
Ice contact, Deposit DesMoines	208	0.4
Mixed Till	22,354	39.9
Ice Contact Deposit Superior	284	0.5
Till Superior	11,385	20.3
Supra glacial Till	7,464	13.3
Till, Sand, Gravel	246	0.4
Marl	60	0.1
Till, Sand, Gravel, Superior	397	0.7
Till, Pitted, Superior	2,723	4.9
Till, Thrust Complex, Superior	180	0.3
Total	**55,998**	**100**

D. Information on Uses of Pelican Lake Surface Water

Specific Area of Interest: Pelican Lake

USES	ANSWER
Recreation	Swimming, Fishing, Boating
Public Access	Northwest side off CO RD 154 near The Landing restaurant. (Concrete)
Private Septic Systems	Mound Systems less than 10 years old
Predominately Cat Tail	On South West side of Lake
Fish Count has been done but no fish have been tested by MDH	7-8 times too many Northern 15-20 inches long. PLA Planted Walleye in 2003
Manure, Lime, & Fertilizer has been spread up to and into inlets especially on NNE end	Pelican Lake Association & SWCD is working with land owners to put in sediment ponds and wetland reserve projects.
Lake has clear water and sandy bottom but an over abundance of weeds and algae mats	Lake Association has gotten whole lake permits from DNR to deal with aquatic vegetation & Algae
Pelican Lake Association DNR SWCD	Water monitoring data 2003 Lake and Fish report 2001 Water Phosphorus 2000

Inventory of Uses

- Primary water uses (recreation, drinking)
- Public access spots (numbers and locations)
- Predominant wastewater systems?
- Point Source Discharges? (locations)
- Important native species?
- Significant exotic species?
- Have fish been tested?
- Any history of noteworthy events (environmental or cultural)?
- General public perceptions of the water
- Organizations that have or collect data about basin/watershed/ waterbody

E. Inventory on Uses of South Two River

Specific Area of Interest: South Two River

USES	ANSWER
Primary water uses	Recreation
Public access spots	On Pelican , Pine and Two River Lake
Predominant wastewater systems?	Private Septics (Mounds)
Any history of noteworthy event	Flooding on Two river
General public perceptions of the water	Lakes are in Poor condition
Organizations that have or collect data about basin/watershed/ water body	SWCD PLA

Inventory of Uses

- Primary water uses (recreation, drinking)
- Public access spots (numbers and locations)
- Predominant wastewater systems?
- Point Source Discharges? (locations)
- Important native species?
- Significant exotic species?
- Have fish been tested?
- Any history of noteworthy events (environmental or cultural)?
- General public perceptions of the water
- Organizations that have or collect data about basin/watershed/ water body

F. Photo Docaumentation

This was running into Pelican Lake from across the road when snow melted on March 8th 2004

What is in this water? Is it safe for the fish in the lake?
Will this cause more algae & weeds or will it harm humans, water life or habitat?
This shows the damage to the lake and people can not use the beach for what it is intended.

As you can see beaches were destroyed on this lake and it could not be used for swimming, fishing, boating or swimming.

Landowners had to rake this out every week and haul it away and pay out of their pocket to help deal with this mess that is running in to Inlets of Pelican Lake. Is this safe for children?

G. Current Status of Your Waters of Interest

1) **Water of Interest** (name, location, and/ or segment/ lake number)	2) **Use Classifications** WQS-7050	3) Lakes: **What is the Carlson Trophic Status?** 305(b)	4) **Assessed?**	5) **Are there Uses that are Fully Supported?** 305(b) (List)	6) **Are there Uses that are NOT Fully Supported?** 305(b) (List)	7) Streams: **Does Ecoregion Data Indicate any Threats?** 305(b) (List)	8) **If Impaired, what is the Affected Use?** 303(d)	9) **If Impaired, what is the Pollutant or Stressor?** 303(d)	10) **Suspected Sources** 305(b)
Pelican Lake 73011800	Recreation	Current statis Mesotrophic 46 Meso 8.9 secchi others are Phosphoru CloraphA	FS	M	NOT	CHF Central Hardwood Forest			
Two River Streams		Unknown				CHF Central Hardwood Forest			

* Will Revisit this again next year

H. Values

What are the things we value in our watershed?

1) **Water of Interest** (from column 1 in worksheet 1.4)	**Actual Uses and Values** (from own experience)
Pelican Lake	Habitat Waterfowl Clear Water (before algae blooms were present) Swimming Fishing Rolling Hills on South side of Lake
South Two River	Scenic Canoeing (would like to have this started) Habitat Fishing

I. Issues, Efforts to address Issues, & Evaluation

Issue (from worksheet 1.8)	Known Effort to Address the Issue (from worksheet 1.8)	Evaluating Known Efforts, Identifying Niches
Phosphorus Swimming & Boating & Fishing is restricted because of the floating algae and weeds	Wetland restorations Sediment Ponds Buffer Strips Lakeshore Native Plantings, PLA working with SWCD & DNR & STRWD Increased efforts were discussed with SWCD and more land owners were contacted about conservation projects	Started collecting samples but do not have enough data yet. PLA needs to monitor Pelican Lake and its Inlets to see what is going on in South Two River Lake. It takes a long time to sign people up for the programs, request funding, survey, engineer the project and finish to the landowners liking.
Erosions / Sedimentation (concerned about development impacts)	Various projects with PLA & SWCD & STRWD	Projects are going will T-Tube monitoring on South Two River to document any changes
Bacteria	Known efforts, PLA did some preliminary testing late season and found high counts	A good start but much more needs to be done to know what is going on with bacteria on all inlets to Pelican
Water Quantity	Flooding on Two River Lake	STRWD & SWCD & Engineers will figure out the flow into Pelican

MONITORING GOALS

A. Monitoring Goal

What is The Monitoring Goal?

SPECIFICALLY, WE WANT MONITORING TO ANSWER THIS:

1. We want to know whether bacteria levels are safe for swimming.
2. We want to know if our bacteria levels are increasing or decreasing for safety reasons.
3. Phosphorus Levels
4. Note Sediment on South Two River

SECONDARY QUESTIONS WE WOULD LIKE TO LEARN SOMEDAY:

1. We want to know if the lake supports healthy environment for fish habitat would like to get help from DNR.
2. We want to know if we have exotic or nuisance weeds.
3. We want to know if our algae is harmful to humans or animals.

PROCESS TO ANSWER QUESTIONS:

- Establish water management goals and priorities.
- Develop integrated strategies designed to address water management goals and priorities.

- Integrate and target point and non point source management strategies to specifically address the causes and source of specific water quality problems.

- Develop a water quality plan that addresses the goals and objectives of the residents and stakeholders and state and federal governments.

- Report to SWCD so they can use the information to meet funding requirements for conservation projects under RIM, 319, EQUIPP, Wetland Reserve Programs

- Report to US Fish and Wildlife when there may be land available to set aside for nature and habitat.

B. Data Users and Uses

We will gather data and provide it to other agencies in a format which they can use. This data could serve as a tool to base some of their decisions on.

Data Users & their Decisions

Stearns County Soil and Water Conservation District (SWCD) and Natural Resource Conservation Service (NRCS) has agreed use our data to help them make a decisions on whether a wetland restoration, holding pond, buffer strip or a different type of conservation project is needed to improve the water quality or quantity in an area. This data could also be included in documentation for a grant request for funding, for various conservation projects.

South Two River Watershed District (STRWD) will use our data when they are deciding whether a project is needed in an area, they could use the information when they are asked to make a decision regarding a permit application for an area. This data could be essential, i.e. to encourage them to make the developer install sediment ponds or rain gardens and proper storm sewers or help them deny a permit because more stress to a particularly stressed area could actually cause more damage to a water body especially if that water body is at or near TMDL already.

Pelican Lake Association of St Anna (PLA) does use this information to show decision makers where there is a problem and explain how important is to not allow further contamination to this area by allowing further development near an inlet to a lake, river or stream.
It could be used to convince riparian land owners to allow us to do native plantings of shrubs, trees, flowers, and grasses that could provide better or more habitat areas near the lakes, rivers, and streams.

For an example: If we have a problem on a certain inlet area of a lake and now a land owner wants to sell and develop his land on the second tier of this same water body, we could use our data to go to the planning commission and give them the facts, maybe ask that they consider the fact the water is already contaminated with nutrients and therefore would not be

a good place to be putting wells and sewers which could in fact make the situation worse.
We could ask the county commissioners to take into consideration whether the land they are making a decision about is near a water body or inlet and suggest they ask for any data that is available when it is near a lake, river, stream or inlet before they make a decision, especially when the water or ground Is already contaminated and there are no central facilities for sewer and water available. Especially if you have data that well water in the area is already testing for nitrate levels that are too high.
With facts we could point out that any further contamination to an inlet or lake, river or stream that is already at TMDL could destroy that lake and ruin habitat for many species.
We can also use this as a tool for education to show this data at the membership meetings to reiterate how important it is that we all use Best Management Practices. It will also let people know why we need more money and volunteers to help with the problems we are faced with. We could be a center for information which can be used by various agencies. Yet at the same time be a learning tool for our own organization and community.

Vince Schaefer a Stearns County Commissioner stated he would like to have copies of our data. This may help him when he makes decisions regarding 1st, 2nd and 3rd tier development or zoning decisions near water bodies or their Inlets within South Two River Watershed District.

**A wish I have is that in 2004 an ordinance or law would be passed that would require that any wetlands or other BMP's needed on property (acreage) be addressed and restored prior to any rezoning, plotting or development would be approved*

What, How, Where, When will you Monitor

A. Parameters

Water body Specific Parameters

Lake Parameters - 2004	If needed in 2005 - May add these parameters
Total Phosphorus	Depth profile of Oxygen & Temp
Secchi Disk	Fecal Coliform only if problems exist
Chlorophyll A	
Visual Observation	

Stream Parameters - 2004	2005 - May add these parameters
Total Phosphorus	
Total Suspended Solids	
Transparency Tube	
Fecal Coliform Bacteria	
Temperature	
Visual observations	

Inlets (ditches) - 2004	2005 - May add these parameters if needed
Total Phosphorus	Dissolved Oxygen
Total Suspended Solids	PH
Transparency Tube	Staff Gauge
Bacteria	
Visual Observations	

****Get evaluatiion instruction sheets for T- Tubes**

In 2004 the State currently uses Fecal but wants to switch to E-coli bacteria

B. Data Quality Objectives for Sampling

Sampling Method / Parameter	Completeness	Representativeness
Integrated Sampler Total Phosphorus (Lake)	1 / per month must complete all 5 per season	May – September Deepest part of Lake
Direct Sample/ Secchi Disc (Lake)	1 / week at least 1 / month	June – Sept
Integrated Sampler Cholorophyll A (Lake)	1 / Month must have 1 per month to be complete	May – Sept Deepest part of Lake
Total Phosphorus (streams/Inlets)	2 / month 10 per season	May – Sept
Total Suspended Solids (streams/Inlets)	1 - 2 / month + 3 storm events at least 5 per season	May – Sept
Transparency Tube (streams/Inlets)	1 / week + 3 storm events Ideal 2 / month + storm events	May - Sept
Fecal Coliform (streams/Inlets)	2 / month + storm events	May - Sept
Temperature (streams/Inlets)	2 / month + storm events	May – Sept or Oct. Will evaluate if we need to do October

Comparability:

All sites will be monitored using the same methods, and if historical data is collected in a different way, we will ask technical help to how to compare that data to our data.

C. Collection Methods for Samples

Sample Collection Methods:

(This means on one visit to the site)

Parameter	What will be sampled	What will be used to collect sample	Sample Containers/ Preservation	Quantity of sample to be collected	Number of samples to be collected per site	Sampling Methods Reference and Source
Total Phosphorus (lake)	Epiliniam on lake	Integrated Sampler	Follow lab instructions	1 Follow lab directions	just one per site.	CLMP + handbook & Lab methods
Secchi (lake)	Same spot on lake each time	Secchi	None	N/A	Mean of 2 readings	CLMP handbook
Chlorophyll A (lake)	Upper layer Epil.	Integrated Sampler	Keep Dark refrigerate 4 C./F	Follow lab instructions	1	CLMP + handbook & Lab methods
Total Phosphorus (stream / Inlet)	Middle	Grab Sample	Follow lab instructions	Follow lab instructions	1 each time	Lab methods & Care for your waters Grab sample
TSS (stream / Inlet)	Inlet water flow	Grab Sample	Follow lab instructions	Follow lab directions	1per site	Care for your waters Grab sample
T-Tube (stream/ Inlet)	Middle of stream	T Tube	N / A	60 C.	1 reading	Care for your waters T Tube
Fecal Coliform (stream/ Inlet)	Inlets	Grab Sample	Take to lab in cooler immediately	Follow lab directions	1 each time	Care for your waters
Temperature (stream/ Inlet)	Middle of stream	Thermometer	N / A	N / A	1 reading	Care for your waters
Staff Gauge	Level of water body on stream	Staff gauge	N/A	N/A	1 reading per site	DNR

D. The Quality of our Data for Analysis

Accuracy for Lab Parameters

TP (lake) Ch A (lake) TP (Streams) TSS (Streams) FC (Streams)	For the labs we will follow their accuracy precision & detection guidelines because they are doing the analysis
Secchi Disk	Take all volunteers out once a year and all do the same lake at the same time and see that we are all within + - 0.2 m. (or 6 inches if within feet)
T Tube	If you take 2 readings they should be no more than + or - 4 Centimeters in difference All volunteers plus each time you do a reading
Temperature	If you take 2 readings they should be no more than 3 degree apart

Visual Observations for all Sites:

1. Date
2. Time
3. Weather
4. Look at banks for erosion or anything unusual
5. Anything different in water column
6. Anything with habitat or wildlife

E. Analysis Methods

** *We will get directions from Lab in writing to add to this book to answer all of these questions*

Parameter	Where samples will be analyzed	How Sample Transported to Lab	Maximum holding time before Analysis	Analytical Method Reference and Source	Brief Description of Method	Reporting Units
TP (Lake)	Traut	Cooler Follow Lab Instructions			See care for your waters handbook	A S P
Secchi Disk (Lake)	Traut	N / A		Care for your waters	See care for your waters handbook	meters
Chlorophyll A (Lake)	Traut	Cooler Follow Lab Instructions			Get training for this one	UG/L
TP (Stream)	Traut	Cooler Follow Lab Instructions			See care for your waters handbook	UG/L
TSS (Stream)	Traut	Cooler Follow Lab Instructions			See care for your waters handbook	MG/L
T Tube (Stream)	In Field	N / A		Care for your waters	See care for your waters handbook	cm
FC (Stream)	Traut	Cooler Follow Lab Instructions			See care for your waters handbook	Number of colonies
Temp (Stream)	In Field	N / A		Care for your waters	See care for your waters handbook	F or C

F. Sampling Site List

PRIORITY SITES FOR 2004

Site #	Brief Description of Location (Code for Segment, if any)	How and Where the Site Will Be Sampled	Type of Site	Parameters	PRIORITY SITE 2004
I- Pel-NNE-1	North North East Inlet Gulley at County Rd. 154 & Pelican Lake Rd	Gtab Sample in flow Field Sample	Inlet gulley from ag land	TP TSS T Tube Bacteria Visual Observations	High Priority
I-Pel-ESE-3	East Inlet Between Pelican Lake Road and County Rd. 9	Grab Sample in flow	Inlet gulley from ag land and development area	TP TSS T Tube Bacteria Visual Observations	High Priority
L-Pel-Mid- 9	Middle of Pelican Lake Same spot each time	Secchi Disk Grab Sample	Lake	TP Secchi Disk Chlorophyll A Visual Observations	High Priority
S-TRR-Alb-18	Golfview Road	Grab Sample	Stream	TP TSS T Tube FCB Temperature Visual	High Priority

Key to Understanding Site #'s:

First Letter	Dash	Second Code	Dash	Label or sequence number
I = Inlet	-	PEL = Pelican Lake	-	The site may either be labeled by direction or
S = Stream	-	Pinl = Pine Lake	-	NNE – North north east
L = Lake	-	TRL = Two River Lake	-	or may be labeled by the town nearest river
		TRR = Two River River	-	Alb = Albany

G. OTHER SITES

Start these sites in 2004 or 2005:

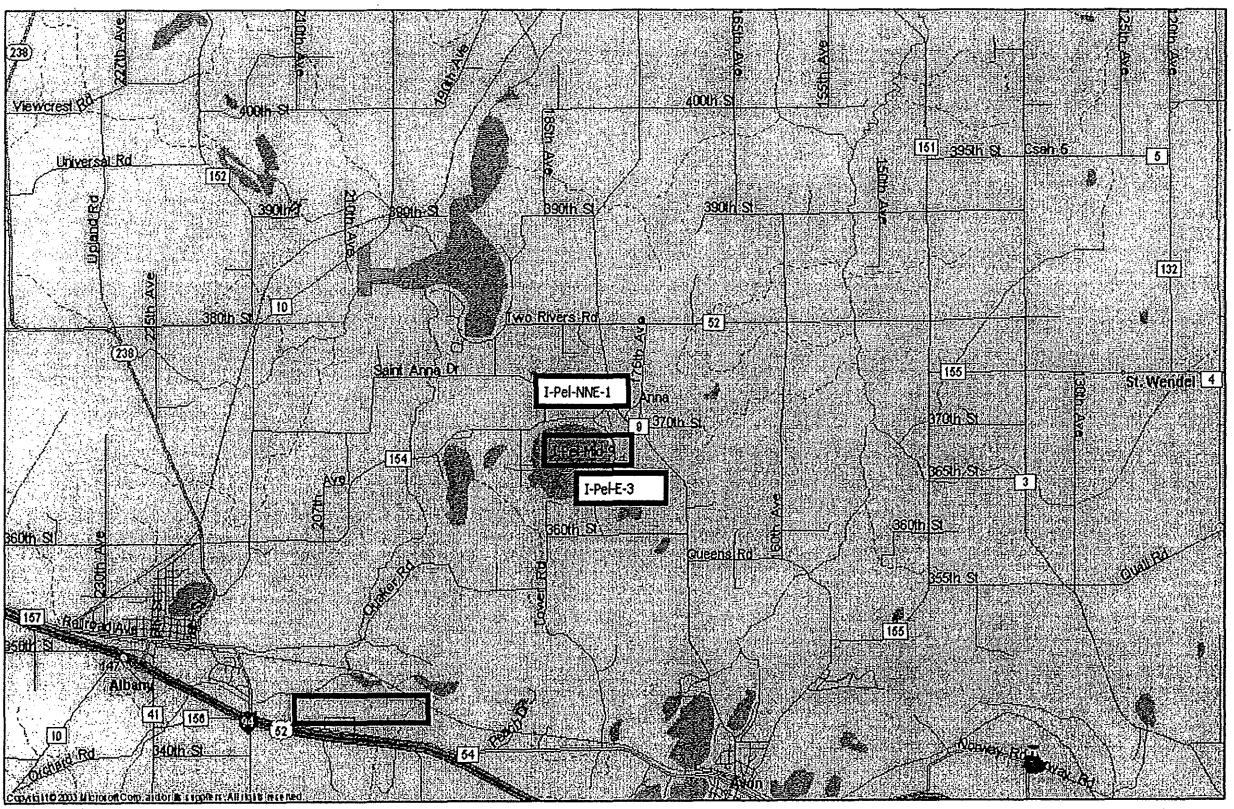
Site #	Brief Description of Location (Code for Segment, if any)	How and Where the Site Will Be Sampled	Type of Site	Parameters	PRIORITY SITE 2004
I-Pel-E- 5	East South East Tile under PLR from schwalbe lake and wetland	Grab Sample in flow	Inlet tile from ag land Under township road PLR	TP TSS T Tube Bacteria Visual Observations	Medium
I-Pel-S- 7	South Inlet from ag runoff in private ditch between Gondringer & Koopmeiners	Grab Sample	Private ditch from ag and then into Inlet flowage from tilled crop land	TP TSS T Tube Bacteria Visual Observations	High
S-STR-Alb-20	Upstream from ponds South of Albany Co.RD.20	Grab Sample	Two river River	TP TSS T Tube FCB Temperature Visual	High
S-Pel-W- 11	Between Angulski & Ehrlichman property north of Angulski beach (can do from boat)	Grab Sample	Outlet stream on west end of Pelcian lake	TP TSS T Tube FCB Temperature Visual	Low
S-TRR-Alb-22	South of Albany between sewage ponds and golf course	Grab Sample	Creek / River	TP TSS Visual T Tube FCB Temperature	High

Site #	Brief Description of Location (Code for Segment, if any)	How and Where the Site Will Be Sampled	Type of Site	Parameters	PRIORITY SITE 2004
S-TRR-Alb-24	North of Albany between co rd 154 and St.anna Drive	Grab Sample in flow towards upstream	River	TP TSS T Tube FCB Temperature Visual	Medium
L-Sch-26	Schwinghammer Lake East of Albany & Golf Course	Grab Sample in flow	Wetland & Lake	Phos TSS FC	Med
S-TRR-Alb-28	South of Albany across from sewage ponds An area that drains to Two River	Grab Sample in flow	Run off from watershed	Phos TSS FC	Low
L-TRL-30	A lake north of Albany With blue green algae problems	Integrated Sampler	This lake has 7 inlets and 1 outlet Prioritize	TP Secchi Disk Chlorophyll A Visual Observations	High

Key to Understanding Site #'s:

First Letter	Dash	Second Code	Dash	Label or sequence number
I = Inlet	-	PEL = Pelican Lake	-	
S = Stream	-	Pinl = Pine Lake	-	
L = Lake	-	TRL = Two River Lake	-	
		TRR = Two River River	-	

H. Monitoring Site Maps for 2004



Monitoring Sites 2004

I-Pel-NNE-1

I-Pel-ESE-3

L-Pel-MID-9

S-TRR-Albany-18

River Site Map

I. Site Specific Sampling

Parameters Monitored	Site #	Where In the Water Column?	Where Across Transect?
TP Lake	L-Pel-Mid-9	Epilinium	Deepest part of lake
Secchi Lake	L-Pel-Mid-9	Epilinium	Deepest part of Lake
Clora A Lake	L-Pel-Mid-9	Epilinium	Deepest part of Lake
TP Stream / Inlet	I-Pel-NNE-1 I-Pel-ESE-3 S-TRR-Alb-18	Middle of water column or 8" down	Greatest flow or middle of flow
TSS Stream / Inlet	I-Pel-NNE-1 I-Pel-ESE-3 S-TRR-Alb-18	Middle of water column or 8" down	Greatest flow or middle of flow
T Tube Stream / Inlet	I-Pel-NNE-1 I-Pel-ESE-3 S-TRR-Alb-18	Middle of water column or 8" down	Greatest flow or middle of flow
FC Stream / Inlet	I-Pel-NNE-1 I-Pel-ESE-3 S-TRR-Alb-18	Middle of water column or 8" down	Greatest flow or middle of flow
Temp Stream	I-Pel-NNE-1 I-Pel-ESE-3 S-TRR-Alb-18	Middle of water column or 8" down	Greatest flow or middle of flow

J. Sampling Schedule

Parameter(s)	Frequency	Time of Day	Time of Year	# of Years	Special Weather Conditions
TP Lake	1-month by weekly Ideal	10-3 pm	May-Sept	3 years then evaluate	Same time as secchi or clora A
Secchi Lake	1 / week	10-3 pm	June – Sept	Ongoing	On bright calm days
Clora A Lake	1 / month by weekly Ideal	10-3 pm	May-Sept	3 years	
TP Stream	2 / month 10 per season Ideal	10-3 pm	May-Sept	3 years	Same time as Temp
TSS Stream	1-2 / month +3 storm events 10 per season Idea	10-3 pm	May-Sept	3 years	May-Sept make sure to get 3 storm events
T Tube Stream	1 / weekly + 3 storm events	10-3 pm	May-Sept	3 years	May-Sept make sure to get 3 storm events
FC Stream	2 / month +storm events	10-3 pm	May-Sept	3 years	May-Sept make sure to get 3 storm events
Temperature	1 / weekly + 3 storm events	10-3 pm	May-Sept	3 years	Same time as T- Tube
Visual Observations	Every sampling Day / Event			Ongoing	Each time you go sampling

Quality Assurance and Quality Control

A. Quality Control Measures and How to Evaluate them

Quality Control Measures	Evaluation: Statistical Methods	Parameters and % Quality Control Samples				
		T Phos	Tss	Chl	Secchi & T-tube Temp	
Internal						
Field Blank (Distilled water not lake water)	**10%**	**10% Send to Lab**	**10%**	**10%**	**N / A**	
Field duplicate (2 separate bottle samples sent to lab or taken in the field)	**RPD**	**10%**	**10%**	**10%**	**100% of visits, take 2 readings to make sure your accuracy is acceptable**	

Response Action: If a response shows an inconsistency we will define

B. Instrument and Equipment Requirements

Take all this information from the manufacturers and labs and data users etc for the equipment we will use and incorporate into plan

Narrative Format:

I called Traut and they are putting a package together and I will go over it with them

We will be sending out samples in to a lab and all information with regard to that labs test equipment etc would be found at that Lab.

For secchi disk at the beginning of each season we will test the rope against an actual tape measure to see of the lines are still represent an accurate measurement.

We will also make sure the secchi disk is cleaned before we start the season, as needed during season and before we put them into storage at the end of the season.

For T- Tube: When you get to a new site rinse out T–Tube with water from that site before your test at that site.

C. Instructions Documentation, Records and Manuals

Instructions:

Identify and list the SOPs you'll need for your monitoring project. Also indicate who is responsible for them and where they will be housed.

Standard Operating Procedures for each piece of equipment will be stored in a 3 ring binder at the Pelican Lake Association Office labeled Standard Operating Procedures and will also be given to each monitor person along with their data sheets and any other necessary paperwork when they come to training and sign up to be a monitor person.

Documentation and Records:

Identify and list field and laboratory information and records needed for your monitoring project. Attach a copy of the types of records you will be keeping. Also include information on how long and where records will be maintained

Chain of Custody sheets
Sampling site map with site marked for that monitor person
Site address assigned for data recorder and user
Water sample bottles
Water sample labels
Field note book and pencil
Field lab data sheet
Care For Your Water training manuals and sheets
A sheet which lists date, time sample taken, location, type of sample, comments, weather, and time sample was dropped off at lab.
More of these sheets Will be stored in a 3 ring binder at the Pelican Lake Association and will also be given to each monitor person along with their data sheets and any other necessary paperwork when they come to training and sign up to be a monitor person.

Training Manuals used by volunteer monitors:

List all manuals used by volunteer monitors including equipment manuals containing calibration or any other pertinent information. If you are using an outside laboratory, list or attach the laboratory's QA/QC plan.

We will obtain this information from Traut Well prior to the training of the monitors we have let them know we need this information

When we all go to the training of care for your waters we will all be given new manuals and sheets upon completion of course

- Care for Your Waters
- Some Board members of PLA will be taking a course for Bacteria sampling in lakes

D.Training

Training Aspect	Description
What Training for	Sampling Techniques, and use of samples
Training Schedule	Care for Your Waters and once before season starts
Who will be Trained	All people wishing to monitor this season See Step 11 for list of Monitors
Training Materials	Care for Your Waters Handbook and others will be provided by our lab and manufacturers and others will be what we require for recording data
Training Provider	SRWD Care for Your Waters
Evaluation	We will include monitoring on the agenda each month for discussions and reporting on findings and progress etc. For technical questions we will call SWCD or Aaron Meyer
	For streams we may call Amy Trisko at SWCD, Angie At the Rivers Council
	For Lakes we will call Sandy Holm MLA

Data Storage and Management

A. What are you recording and where for Lakes

Data Management

For electronically generated information supplied by someone else, list name of database and whom it's from. These are your data sources.

Type of Sheet Field Sheet
Copies Attached (Y/N)

Type of Sheet _____
Copies Attached (Y/N)

Type of Sheet Field Book
Copies Attached (Y/N)

Type of Sheet _____
Copies Attached (Y/N)

Type of Sheet Chain of custody
Copies Attached (Y/N)

Type of Sheet _____
Copies Attached (Y/N)

Type of Sheet Field book
Copies Attached (Y/N) yes

Type of Sheet _____
Copies Attached (Y/N)

Type of Sheet _____
Copies Attached (Y/N)

Type of Sheet _____
Copies Attached (Y/N)

Type of Sheet _____
Copies Attached (Y/N)

Type of Sheet _____
Copies Attached (Y/N)

B. What are you recording and where for Streams

Data management

For electronically generated information supplied by someone else, list name of database and whom it's from. These are your data sources.

Type of Sheet Field Sheet

Copies Attached Y

Type of Sheet _____

Copies Attached (Y/N)

Type of Sheet Field Book

Copies Attached Yes

Type of Sheet _____

Copies Attached (Y/N)

Type of Sheet Chain of custody

Copies Attached Yes

Type of Sheet _____

Copies Attached (Y/N)

Type of Sheet Data Summary sheet

Copies Attached (Y/N)

Type of Sheet _____

Copies Attached (Y/N)

Type of Sheet _____

Copies Attached (Y/N)

Type of Sheet _____

Copies Attached (Y/N)

Type of Sheet _____

Copies Attached (Y/N)

Type of Sheet _____

Copies Attached (Y/N)

C. Meta Data

Data Management. Meta-data.

(Modified from PCA Volunteer Surface Water Monitoring Guide Appendix F) Place a check in the columns where the meta-data can be found. Leave the row blank if particular meta-data element is not used.

PROJECT INFORMATION *Check Where Found:*

Meta-data element	In the Plan	On Field Sheet	On Lab Sheet	In Com-puter Program	Other:
Project name	x				
Project Purpose	x				
Start Date	x				
Planned Duration					
Lead organization name	X	X	X	X	
Project manager (with contact info	X				
Other Contact (like MPCA rep, SWCD rep)	x				
Sampling personnel	x				
Sample collection methods	X	X		X	
Equipment Used	X	X	X	X	
Field measurement methods	x				
Comments about data transfer, submission	X	X	X	X	
Project Study Area	x				
Design & sampling frequency	x				
Cooperating Org.'	x				
QA plan summary/reference	x				

LABORATORY *Check Where Found*:

Meta-data element	In the Plan	On Field Sheet	On Lab Sheet	In Computer Program	Other:
Lab ID					
Laboratory name (w/ address and contact info					
Citation for lab (Manual or Handbook).					
Parameter					
Sample fraction					
Reporting units					
Comparable standard method					
Field preservation method					
Detection limit					
Lab certified for parameter?					
Length of Analysis					
Temperature basis					

STATION INFORMATION *Check Where Found*:

Meta-data element	In the Plan	On Field Sheet	On Lab Sheet	In Computer Program	Other:
Project station ID					
Related station					
Station name					
Station type					
Waterbody type (stream, lake, wetland)					
Station description					
Site ID					
Ecoregion name					
Travel directions					
Station latitude-longitude or UTM					
Geo-positioning method					
Datum					
Map scale					
Site lat-long					
State/county					
HUC code					
River Reach					
DNR Lake ID					
Habitat Type					

MONITORING RESULTS *Check Where Found:*

Meta-data element	In the Plan	On Field Sheet	On Lab Sheet	In Com-puter Program	Other:
Station and site ID					
Date					
Time					
Station ID					
Site ID					
Activity ID, type and category					
Medium					
Sample depth					
Sampling personnel					
Activity comments					
Sample collection method and equipment					
Sample preservation					
Lab ID					
Lab sample ID					
Lab certified?					
Results					
Field/lab ID					
Lab Sample Temperature					
Remark codes					

OTHER:

Meta-data element	In the Plan	On Field Sheet	On Lab Sheet	In Com-puter Program	Other:

* Note: We will refine this page after our first monitoring season.

D. Data Management

Entering and validating data

Parameter	Reporting Units Entered (e.g. mg/L, taxa, etc.)	Source of Data (for external data)	Computer Application (s) Used for Data Entry	Who Will Enter Data	Validation Steps and Who
TP Lake	ASP		Microsoft Excel	PLA / Linda	Barb check computer entries against field and lab sheets
Secchi Lake	Meter		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
Chlorophyll A Lake	UG / L		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
TP Stream	UG/L		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
TSS Stream	MG/L		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
T- Tube Stream	cm		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
FC Stream	Number of colonies		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
Temperature Stream	F or C		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
TP Inlet	UG/L		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
TSS Inlet	MG/L		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets
T-Tube Inlet	cm		Microsoft Excel	PLA	Barb check computer entries against field and lab sheets

E. Handling of Field, Lab and Electronic Data Transfer sheets

How will field and laboratory sheets be handled? Describe the pathway each field, tracking, and laboratory sheet will follow, and who is responsible for each.

Name of Sheet Or Database	From Field to Lab	From Lab to Data	Data Entry/Validation	Final Resting Place
Monitoring sheet	Will be signed by person that took sample and brought to lab	The lab will document who tested the sample and when and what date it was given to who for recording information	The data recorder will acknowledge receipt of data and indicate date data was recorded into computer	In computer, on a disk and in printed form at PLA for distribution
Chain of custody sheet Care for your waters				
Lab data sheet				

F. Miscellaneous and Problem Data

Miscellaneous problem data .*How will problem data, such as missing values, detection limit, nonsensical data, ranges, narrative, etc., be handled (e.g. not entered, special characters, etc.).*

Parameter	Data Entry Protocol for "Problem" Data
Fecal Coliform Bacteria	Challenging data: Got a result of 5 colonies per 100 ml Result will be entered as 0.9 because a 0 result can no9t be used in the calculation of geometric mean

When we come across problem data we will call the Sauk River Watershed District or the Stearns County Soil and Water Conservation District for assistance in how to handle the data.

Analysis, Interpretation, and Reporting

A. Summarizing and Comparing Your Data to Benchmarks

Parameter	Data User(s)	Statistical ummaries o Be Used	Types of Graphs	enchmark Used ote Use Class if WQS Used)	How Data Will Be Compared with Benchmark	How Comparison Will Be Interpreted
Total Phosphorus (Lake)	PLA SWCD STRWD	Range	Column Graph	Ecoregion (North Central Hardwood Forest)	TP, Clora A and secchi for lakes All Lakes data will be used together to run a TSI	We will look at how this compares to our eco-region to see if we fall in the "expected" ranges
Secchi Disk (Lake)	PLA DNR	Range	Column Grap	Ecoregion (North Central Hardwood Forest) standards	All Lakes data will need together to run a TSI	We will look at how this compares to our eco-region to see if we fall in the "expected" ranges
Chlorophyll A (Lake)	PLA SWCD	Seasonal average	Column Graph	Ecoregion standards	All Lakes data will need together to run a TSI	We will look at how this compares to our eco-region to see if we fall in the "expected" ranges
TP (Stream)	PLA SWCD STRWD	Average	Column Graph	Ecoregion standards	Wil look to trends over time and compare to weather data	We will look for impacts (based guidelines that SWCD ahs (both storm event related and otherwise)
Total Suspended Solids(Stream)	PLA SWCD STRWD	Range	Median	Water quality standards	Will look to treands over time and compare to rainfall and Transparency	SWCD will help interpret data Look at eco-region to see if we fall with in expected ranges.
T-Tube (Stream)	PLA SWCD	Median	Column Graph	N / A	Will look at trends over time and compare to rainfall and TSS	If transparency decreasesa with storm events we can confirm runoff / erosion issue
Temperature	PLA DNR		Bar graph	N / A	Will be used in conjunction with T-Tube	Will be used in conjunction with T-Tube
FC (Stream)	PLA SWCD	Quartiles	Column Graph	Water quality standards	Will consult with technical people SWCD	If bacteria exceeds the water quality standards more than10%of the time, we will consider it may

B. Data Interpretation and Analysis

Is there an overall pattern to the test results?

Does weather change test results? Better worse?

Does your visual observation point to a problem source?

Does weather change test results? Better worse?

Does your visual observation point to a problem source?

Did bacteria exceed water quality standards?

How does Phosphorus compare with our expectations?

Did we collect the required number of samples from the minimum number of sites (completeness)?

Did we collect samples frequently enough, at the right time of the year, at the right time of day to be representative of the conditions you are assessing?

How did our quality assurance results compare with expected results? Did they meet our data quality objectives?

C. Reporting, Presenting, and Planning for Change

1) Who will be preparing the reports and presentations?

Barb L

Doug A.

Joe L.

Linda M.

2) Who are the target audiences for reporting and presenting your information?

Pelican Lake Association of St. Anna
Community members
Lake Association Members

MPCA

DNR

STRWD

3) What formats will be used to present the story?

Access and Power Point Aids for visual and printed matter

Newsletter to PLA

Oral / Visual / Presentations

Videos

Displays

4) What tools will be used to tell your story?

Maps

Graphs and charts

Tables of standards vs actual

Photographs

Lap top

Projector Screen

Oral / Visual / Presentations

5) What kind of report information do your data users need?

Data User/ Target Audience	Report Information Needed
Lake Association	Actual test results, interpreted data, recommendations
DNR	Actual Secchi and Staff Gauge readings
MPCA	Actual readings on their forms if they request

6) When / Where will the message be delivered?

Each year in the spring before the monitoring starts there will be a day of training and discussions in March or April for all monitors and data users

If there is a demand for a second day one will be scheduled

7) What would you expect to happen as a result of your report or presentation?

If my data indicates there is an impairment I would expect to report this to the proper agency to try to get help in solving the problem

If my data is showing good test results we should document what this area looks like and make note of what good BMP's are being used and use as an example.

Also, test less frequent next year if numbers stay in a good or normal range.

I would expect to educate everyone on the impacts of linking land use to water quality

Feedback and Evaluation

A. Feedback and Evaluation

1) Follow-up:

Group/Audience	How Follow-up will happen:	When follow-up will occur (and times/year)
Citizen Volunteer Monitors	Send monitoring reports, training session, phone calls, post cards.	4 / year 1 training day Care for your waters April 1 meeting at start of season,1 fun motivation day and 1 day in Dec for all reports
Data Users	Send in monitoring Reports Phone calls, e-mails, letter	2 / year Reports in January and phone call in February more if needed

2) Evaluation

Evaluations Done Annually (Program and/or Outcome Based Components)	Tools used for evaluation
Did my monitoring answer the goals and questions I have?	Actual monitoring data and information
Equipment Inspection	Internal or External inspections / checks
Has my vision changed?	Actual monitoring data and information could help you evaluate
Were there any unexpected uses of my data?	Follow up surveys/evaluation program compromise

Evaluations Done Every 3 to 5 Years (Program and/or Outcome Based Components	Tools used for evaluation
Have my issues changed as a result of my data?	Actual monitoring data and informatio could help you evaluate
Did any restoration or protection happen as a result of the monitoring program?	Follow up surveys/evaluation program compromise
Did my decision –makers use my data?	Conversations with Data UsersFollow surveys/evaluation program compromi

Evaluation Form

This will be used to evaluate the program each year.

Monitoring Plan Component	*Data Covered by Evaluation*	*Challenge /Obstacles*	*Successors to Celebrate*	*Next Steps if any*

Volunteer Names, Tasks, and Timeline

A. Task Identification and Timeline

Dates covered by timeline:

Target Start Date	**Target End Date**	**Main Category** (Planning, Mgt,, Monitoring, Post-Monitoring)	**Task / Activity Description**	**Person(s) Responsible to Organize/ Evaluate**	**Other Resources** (human or financial) **to Carry-Out Task**	**Fill in Date** when done
Nov 18		Training for Plan	Do Homework sheets 1-4 for Plan	Barb	Joe, Scott, Doug, Linda	Feb 3
Feb 3		Training for Plan	Do homework sheets 5-12 and start plan	Barb	Joe,Scott, Doug, Linda	Mar 3
Mar 6	March 15	Review and finish plan	Meet with Angie to discuss Plan question etc.	Barb		March 15
April 17th	April 17th	Train Volunteers 9am – 2:30 pm	Care for Your Waters class at Melrose by SRWD	Barb	SRWD STRWD PLA	April 17th
May 3rd	May 3rd	Meet with Volunteers Give information & Data sheets etc.	Assign sites, hand out maps and equipment, etc	Joe, Doug, Barb	PLA	May 3rd
May 5th		Start Monitoring season	Make sure everyone knows how & where to start monitoring			

Target Start Date	**Target End Date**	**Main Category** (Planning, Mgt,, Monitoring, Post-Monitoring)	**Task / Activity Description**	**Person(s) Responsible to Organize/ Evaluate**	**Other Resources** (human or financial) **to Carry-Out Task**	**Fill in Date** when done
June						
July						
Aug						
Sept						
Oct						

C. Volunteer Monitors, Committees, Data Users

NAME	NOTES	Address	Phone	Email
Doug Anderson	Vice President of PLA	37059 Pelican Lake Road Avon, MN 56310	320-356-7555	
Kim Anderson	Will do whatever	37059 Pelican Lake Road Avon, MN 56310	356-7555	
Joe Lang	STRWD / President Treasurer PLA	37075 Pelican Lake Road Avon, MN 56310	320-356-7700	
Linda Mock	Monitor Pel	PLR	363-4310	
Bill Mock	Monitor Pel Mid		363-4310	
Lila Thomas	Monitor TRL	Two River Road	845-7267	
Dave Thomas	Monitor TRR		845-7267	
Shirley Graveen	Monitor TRR	231 River St.West Holdingford, MN	746-2505231	
Barb	President / PLA Data Recorder User	37075 Pelican Lake Road Avon, MN 56310	356-7700 or 248-9845 cell	
Scott Hanson	Board of Directors	Avon township	845-6217	
Doug Eli Board	Board of Directors	County rd 154 Avon, Mn 56310	845-2913	

Technical committee	Area of Expertise	Address	Phone	Email
Pelican Lake Association	Monitoring / Data	37075 Pelican Lake Road St.Anna, MN 56310	356-7700	
DNR	Secchi / Staff Gauge	Pelican Lake	320-255-7639	
Traut Labs	Technical Assistance	St.Cloud		
Amy Trisko SRWD	Education	524 4th St. South Sauk Centre,MN 56378		320-352-2231
MPCA	Volunteer Monitoring Program			

Data Users

Technical	Expected Data Use	Address	Phone	Email
Dan Lais / DNR	Secchi / Staff Gauge	940 Industrial Dr. S. Suite 103 Sauk Rapids MN 56379	320/255-2976	
Judy Crane / MPCA	Citizen Monitoring	520 Lafayette Rd. N. Saint Paul, MN 55155-4194	800-657-3864	
Barb / PLA	All data records	37075 Pelican Lake Road St.Anna, MN 56310	320-356-7700	
Joe Lang / STRWD	All monitoring done	Po box 743 741 Lake Ave Albany, MN	845-6050	
Aaron Meyer / SWCD	All monitoring done		251-7800 ext.3	
Vince / Schaefer	All data		253-1499	

Budget

A. Overall Budget

Revenues:

Item	Description	Budget
MLA / RCM	One time only	3,000.00
Watershed for district wide monitoring & Lab tests	One time only (part of which will be used in year 2)	3,000.00
Pelican Lake Association + volunteer in kind	Maybe per year	250.00
TOTAL REVENUE		**$6,250.00**

Expenses:

Type of Expense	(unit price)	(number of units)	Budget
Secchi Disk	15.00	3 disks	$45.00
Integrated Sampler	15.00	2 samplers	$30.00
T tubes	25.00	10 Tubes	$250.00
Thermometer	7.50	4 thermometers	$30.00
Supplies for Office/communications for monitors folders, ink cartridges, posters,	300.00	Paper, pencils, postcards, stamps, phone card, envelopes, floppy disk, tablet, ink cartridge etc.	$300.00
Lake Training	$65.00	Learn Chlorophyll A etc. (registration)	$65..00
Microsoft Office for data	265.00	W /Access, excel, power point, word, etc.	$265.00
Stream Training Day	130.00	Care for your waters seminar x 13 monitors	$130.00
Recruitment special day As part of STRWD visioning day	130.00	Cost to cover citizen monitoring portion of the day $10.00 x 13 for lunch and materials	$130.00
Printing of Monitoring Plan (10 copies)	235.00	10 copies (printing of plan, maps)($20 x 10 copies)+	$235.00
Supplies for monitors	5.00	13 clipboards, 13 field books and /or data sheets, ($5.00 x 13), 13 Care for you waters	$65.00
I-Pel-NNE-1 TP	$22.00	10 ideal x 22.00 = 220.00	$220.00
I-Pel-NNE-1 TSS	$16.00	13 ideal x 16.00 = 208	*$208.00*
I-Pel-NNE-1 Bacteria	$18.00	13 ideal x a8.00 = 234.00	*$234.00*
I-Pel-ESE-3 TP	*$22.00*	10 ideal x 22.00 = 220.00	$220.00
I-Pel-ESE-3 TSS	$16.00	13 ideal x 16.00 = 208	*$208.00*
I-Pel-ESE-3 Bacteria	$18.00	13 ideal x a8.00 = 234.00	*$234.00*
L-Pel-Mid-9 TP	$22.00	10 ideal x22.00 = $220.00	$220.00
L-Pel-Mid-9 Chlorophyll A	**$33.00**	**10 ideal x 33.00=$330.00**	**$330.00**
S-TRR-Alb-18 TP	$22.00	10 ideal x 22.00 = 220.00	$220.00
S-TRR-Alb-18 TSS	$16.00	13 ideal x 16.00 = 208	*$208.00*
S-TRR-Alb-18 FCB	$18.00	13 ideal x a8.00 = 234.00	*$234.00*
TOTAL EXPENSES 2004	**$1381.50**		**$3,256.00**

B. In-Kind Contributions

Summary of some of our In Kind

Item	Description	Value
Volunteer Hours (value of $16.00 Hour)	13 volunteers @ 20 hours each = 260.00 x 16.00 =	$4,160.00
Data Sheets, pencils, field note books, calling card, black print cartridge, colored for data maps, envelopes, floppy disks	Donated –To work on doing this plan, transportation, lunches, materials	$100.00
Mileage value @ 37.5 a mile	13 volunteers @ 30 miles each person per a season =390 miles	$146.25
Volunteering with 39 land owners about doing conservation projects on their land	2 people @ 50 hours a season =100 hours @ $16.00 =	$1,600.00 at minimum
Meetings and Seminars for projects Videos, lunches, tools, time, paperwork, mileage etc.	Many throughout the season for various projects such as buffer strips, basins, sediment ponds, wetland restoring, grassways, fencing cattle, set aside, restoring a lake!!	At least $1,000.00 out of pocket expenses donated
Working on Pilot training monitoring plan, monitoring and taking photos	1 person x 55 hr = 880.00 1 person x 24 hr = 384.00 1 person x 12 hr =192.00 2 people x 12 hr = 384.00	$1,840.00
Training, MAWD	Ditch & Drainage Law	125.00
Total In Kind	**Value**	**$8971.25**

C. Budget by Site

Site(s): I-Pel-NNE-1

Indicator or parameter and Other Costs	Initial Equipment Costs	Lab or Processing Costs per visit	Number of Labs Trips per monitoring season	Expected Costs First Year (if applicable)		*Expected Costs following Years*
TP		$22.00	10 ideal	$220.00		$220.00
TSS		$16.00	10 ideal	$160.00		$160.00
T Tube	$25.00			$25.00		
Bacteria		$18.00	13 ideal	$234.00		$234.00
TOTAL COSTS	$25.00	$56.00		$639.00		*$614.00*

Site(s): I-Pel-ESE-3

Indicator or parameter and Other Costs	Initial Equipment Costs	Lab or Processing Costs per visit	Number of Labs Trips per monitoring season	Expected Costs First Year (if applicable)		*Expected Costs following Years*
TP		$22.00	10 ideal	$220.00		$220.00
TSS		$16.00	10 ideal	$160.00		$160.00
T Tube	$25.00			$25.00		$25.00
Bacteria		$18.00	13 ideal	$234.00		$234.00
TOTAL COSTS	$25.00	$56.00		$639.00		*$639.00*

Site(s): L-Pel-Mid-9

Indicator or parameter and Other Costs	Initial Equipment Costs	Lab or Processing Costs per visit	Number of Labs Trips per monitoring season	Expected Costs First Year (if applicable)		*Expected Costs following Years*
TP Integrated Sampler	$15.00	$22.00	10 ideal	$220.00 + sampler		*$235.00*
Secchi Disk	$15.00			$30.00		
Chlorophyll A		$33.00	10 ideal	$330.00		*$115.00*
Training May 6		$65.00		$65.00		
TOTAL COSTS	$30.00	$120.00		$645.00		$350.00

Budget by Site

Site(s): S-TRR-Alb-18

Indicator or parameter and Other Costs	Initial Equipment Costs	Lab or Processing Costs per visit	Number of Labs Trips per monitoring season	Expected Costs First Year (if applicable)		*Expected Costs following Years*
TP			10 ideal	*$220.00*		*$220.00*
TSS		$16.00	13 ideal	$160.00		$160.00
T Tube	$25.00			$25.00		$25.00
FCB		$18.00	10+3storms	$234.00		$234.00
Temperature	$7.50					
TOTAL COSTS	$32.50	$34.00		$639.00		$639.00

Site(s):

Indicator or parameter and Other Costs	Initial Equipment Costs	Lab or Processing Costs per visit	Number of Labs Trips per monitoring season	Expected Costs First Year (if applicable)		*Expected Costs following Years*
TOTAL COSTS				$		

Site(s):

Indicator or parameter and Other Costs	Initial Equipment Costs	Lab or Processing Costs per visit	Number of Labs Trips per monitoring season	Expected Costs First Year (if applicable)		*Expected Costs following Years*
TOTAL COSTS				$		

Appendix

Additional Map

Appendix

Data Summary Sheets

Data Summary Sheet 1

Use this sheet to compile your data for each sample date

Notes:_____

Name:_____

Sample Date:_____

Time:_____

Precipitation over last 24 hours ____inches

Past Weather Conditions (Last three days):_____

_____

Sample from: ___ Bridge ___ Bank ___ Wading ___ Boat

Current Weather: (Check all that apply) ___Cloudy ___Calm ___Sunny ___Partly Sunny ___Rain/Snow ___Windy

Site #	Bottle # (if applicable)	Transparency Tube (cm) Clear, Milky, Foamy, Muddy, Green, Tea-Colored	Flow (ft/sec)	Rain Gauge	Fahrenheit				Monitor Initials of who took sample	Time sample taken		Confirm Initials for check-in	Monitor Initials to confirm results	
					Air Temp. (degree)	First Water Temp. Reading	Second Water Temp. Reading	Final Water Temp. Reading (Avg. 1 & 2)						

Data Summary Sheet 2
Use this sheet to compile your data for each sample date

Notes:_____

Name:_____
Sample Date:_____
Time:_____
Precipitation over last 24 hours ____inches
Past Weather Conditions (Last three days):_____
_____

Sample from: ___Bridge ___Bank ___Wading ___Boat
Current Weather: (Check all that apply) ___Cloudy ___Calm
___Sunny ___Partly Sunny ___Rain/Snow ___Windy

Site #	Bottle # (if applicable)	Transparency Tube (cm) Clear, Milky, Foamy, Muddy, Green, Tea-Colored	Monitor name	Rain Gauge	Fahrenheit				Monitor Confirm Initials for check-in	Time sample taken		Lab results back on this date	Compare data sheets before entering	initials
					Air Temp. (degree)	First Water Temp. Reading	Second Water Temp. Reading	Final Water Temp. Reading (Avg. 1 & 2)						

Monitoring Data Summary Sheet 3
Use this sheet to compile your data for each sample date

Notes:_____
_____
_____
_____
_____

Name:_____
Sample Date:_____
Time:_____
Precipitation over last 24 hours ____inches
Past Weather Conditions (Last three days):_____
_____

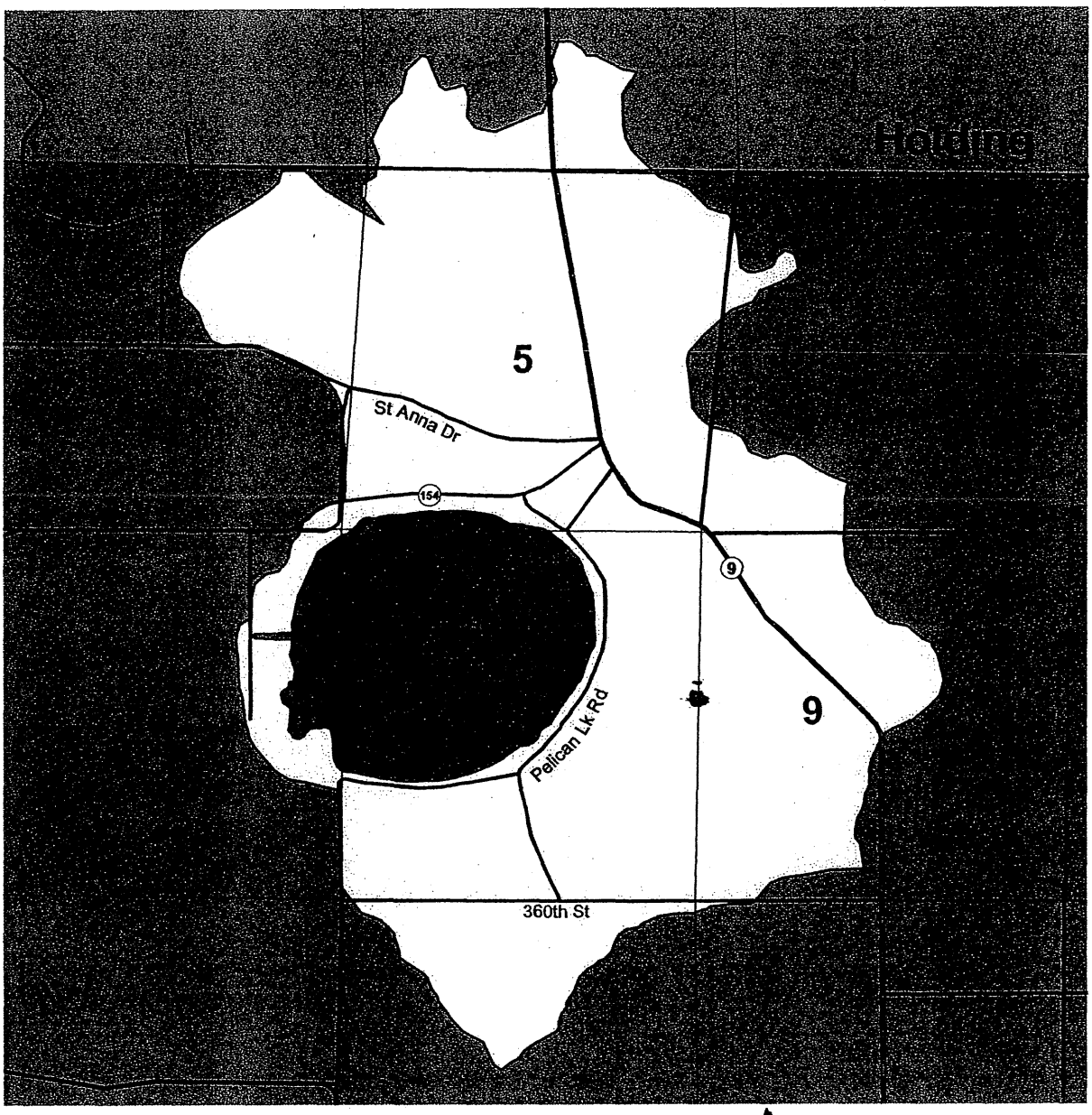
Sample from: ___Bridge ___Bank ___Wading ___Boat
Current Weather: (Check all that apply) ___Cloudy ___Calm
___Sunny ___Partly Sunny ___Rain/Snow ___Windy

Site #	Lab ID #	Transparency Tube (cm) Clear, Milky, Foamy, Muddy, Green, Tea-Colored	Monitor name	Rain Gauge	Fahrenheit				Monitor Initials for check-in	Time sample taken 10 am to 2 pm		Lab results back on this date	Compare data sheets before entering	initials
					Air Temp. (degree)	First Water Temp. Reading	Second Water Temp. Reading	Final Water Temp. Reading (Avg. 1 & 2)						

Pelican Lake

Watershed Location

Pelican Lake Watershed



0 0.5 1

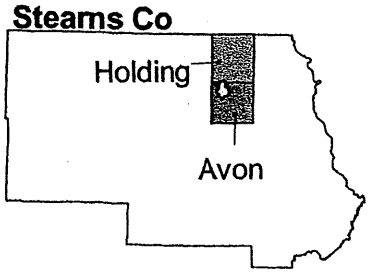
Miles

N

December 17, 2001

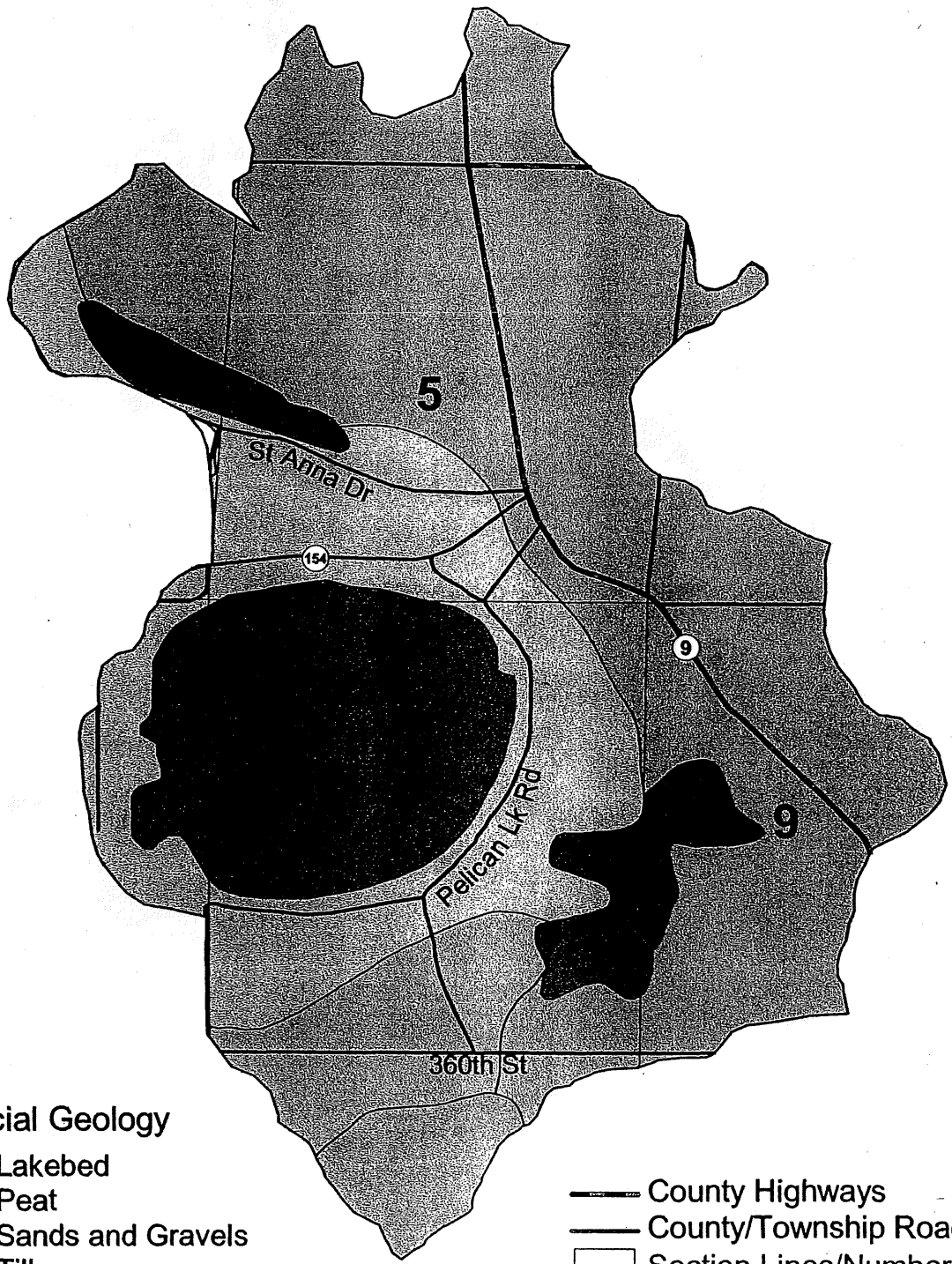
Pelican Lakeshed
County Highways
County/Township Roads
Section Lines/Numbers

Pelican Lake
Lakeshed
1,820 Acres
Lake
337 Acres



Surficial Geology

Pelican Lake Watershed



Surficial Geology

- Lakebed
- Peat
- Sands and Gravels
- Till
- Unsorted Sediments
- Thrusted Till

- County Highways
- County/Township Roads
- Section Lines/Numbers

0 0.5 1

Miles

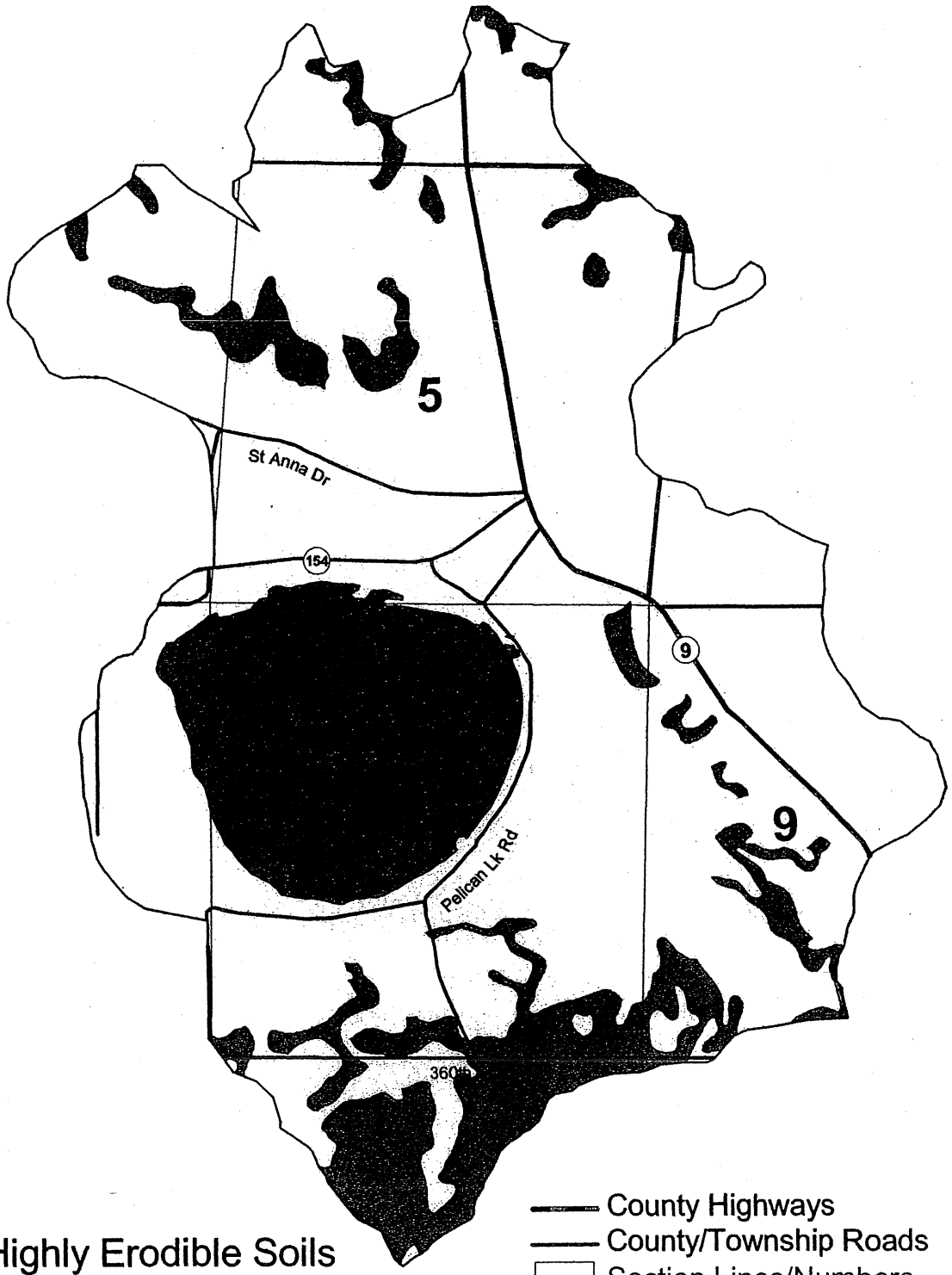
N

December 17, 2001

Source: Stearns County Geologic Atlas

Highly Erodible Soils

Pelican Lake Watershed



Highly Erodible Soils
Other Soils

County Highways
County/Township Roads
Section Lines/Numbers

0 0.5 1
Miles

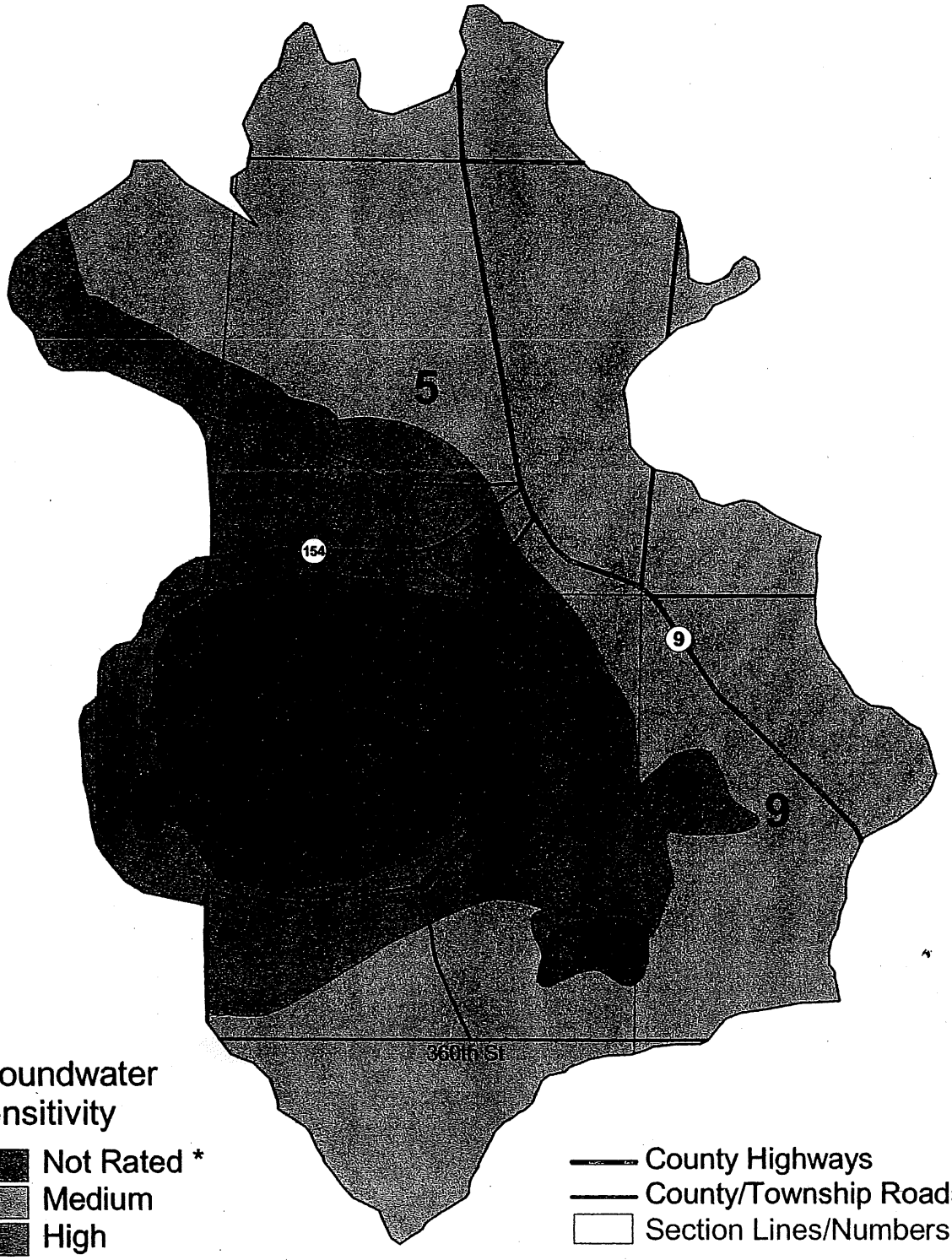
N

December 17, 2001

Source: Stearns County Soil Survey

Groundwater Sensitivity

Pelican Lake Watershed



Groundwater Sensitivity

- Not Rated *
- Medium
- High

* Open bodies of water are not rated for groundwater sensitivity

- County Highways
- County/Township Roads
- Section Lines/Numbers

0 0.5 1

Miles

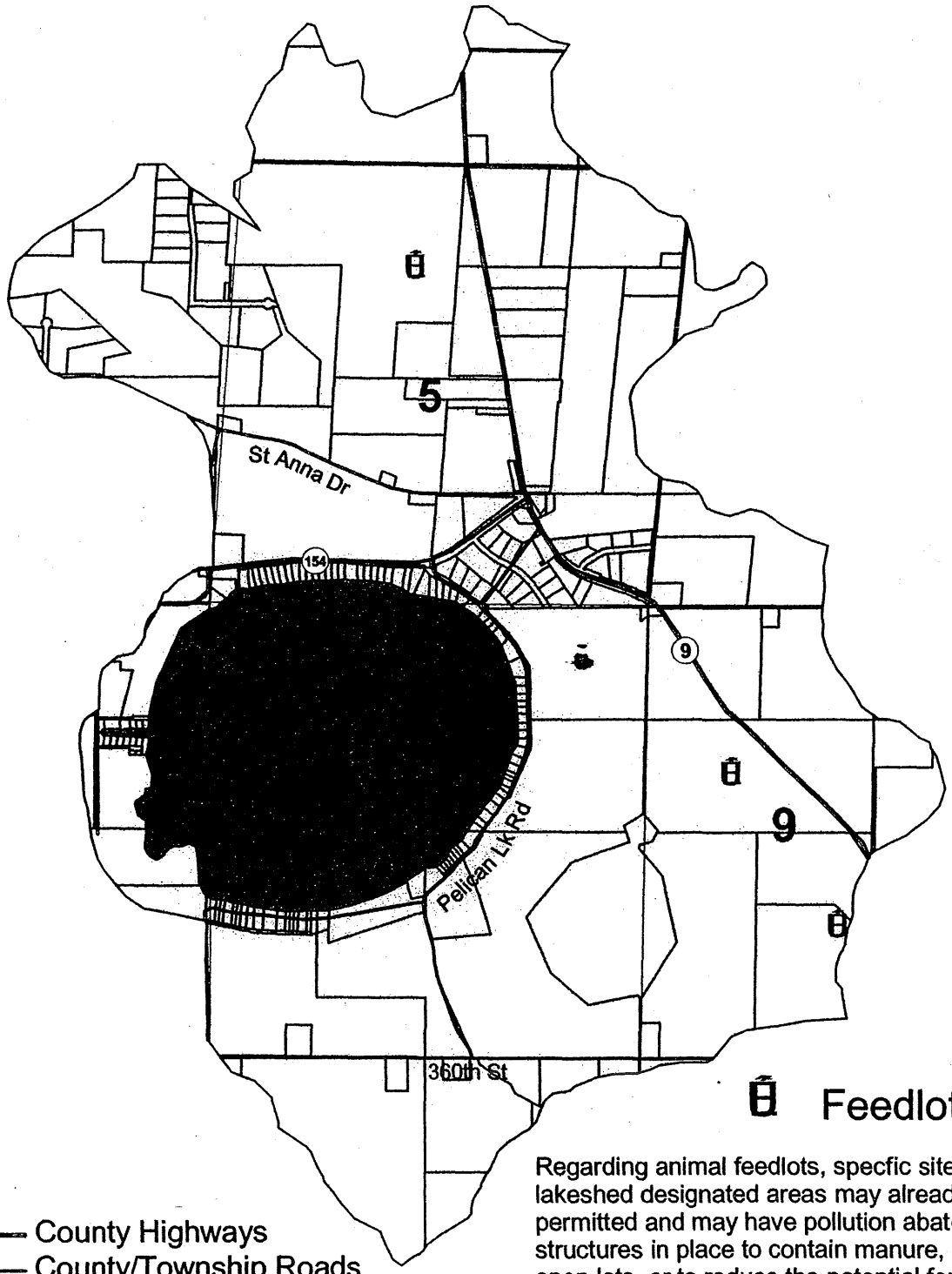
N

December 17, 2001

Source: Stearns County Geologic Atlas

Feedlot Locations

Pelican Lake Watershed



Feedlot

Regarding animal feedlots, specfic sites within lakeshed designated areas may already be permitted and may have pollution abatement structures in place to contain manure, runoff from open lots, or to reduce the potential for manure spills.

County Highways
County/Township Roads
Section Lines/Numbers
Parcel Boundaries

0 0.5 1
Miles

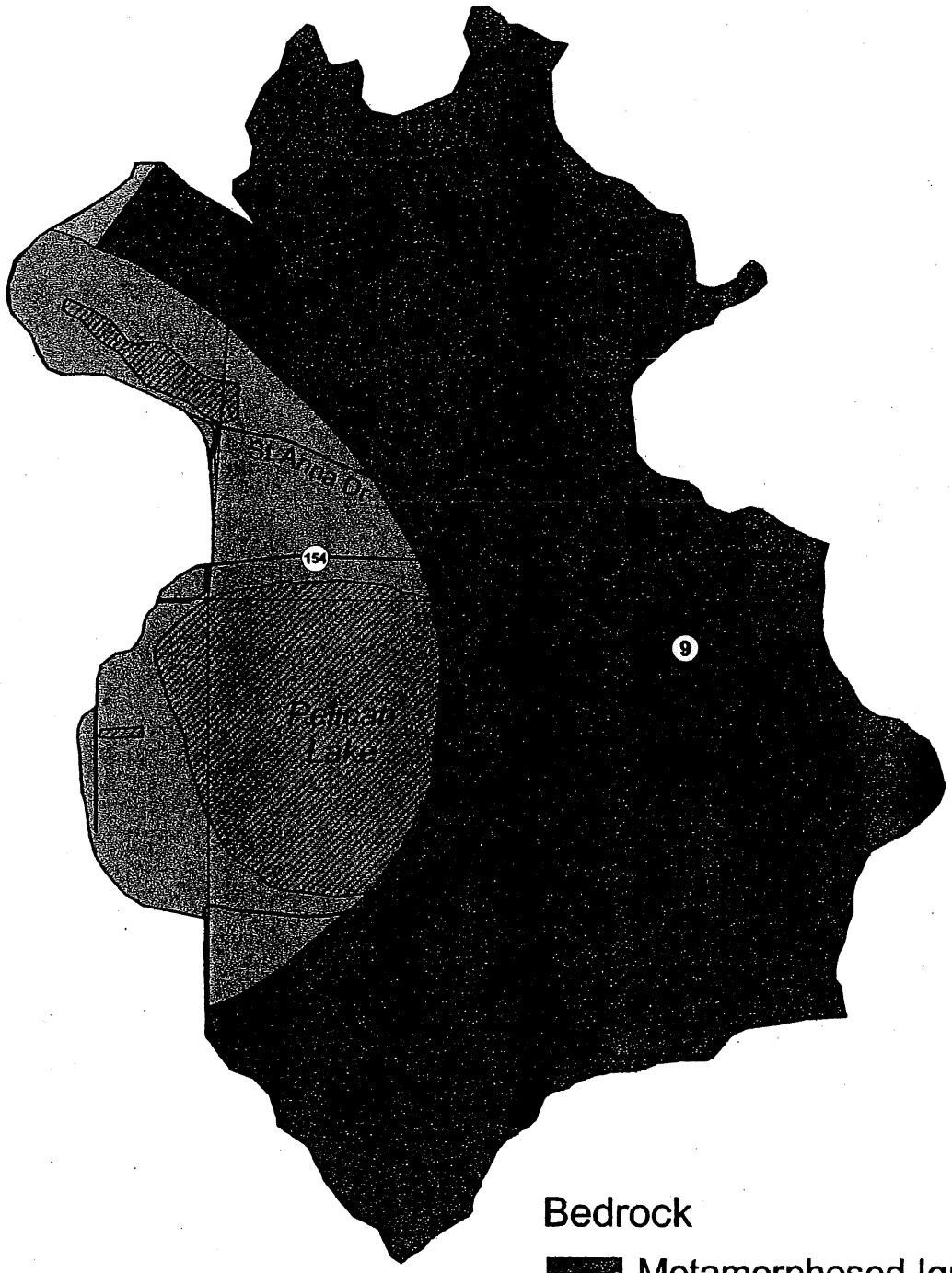
N

December 17, 2001

Source: Stearns County Environmental Services

Bedrock Geology

Pelican Lake Watershed



Bedrock

- Metamorphosed Igneous
- Schist
- Granite

- Open Water
- County Highways
- County/Township Roads
- Section Lines/Numbers

0 0.5 1

Miles

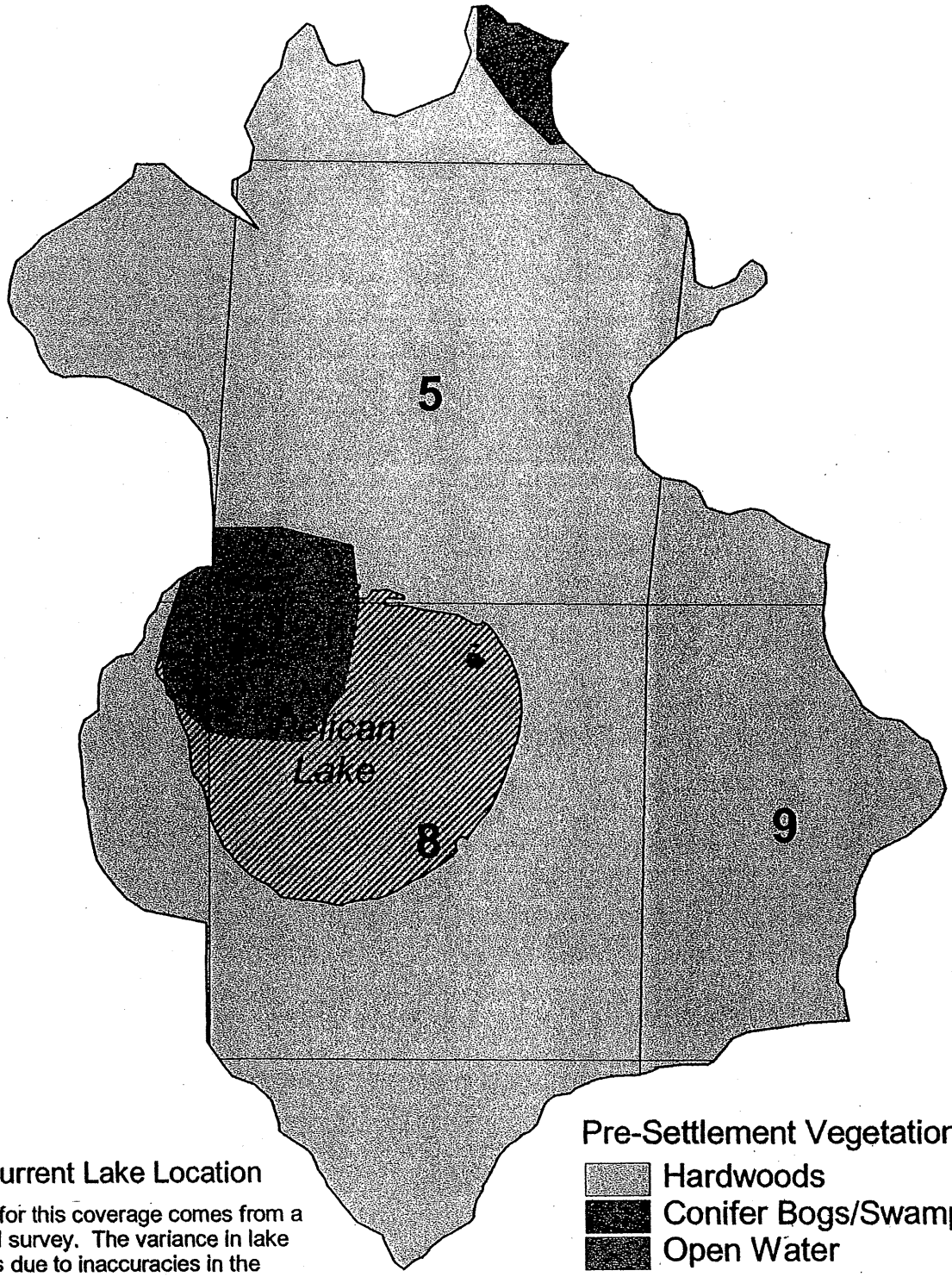
N

December 17, 2001

Source: National Wetlands Inventory

Pre-Settlement Vegetation

Pelican Lake Watershed



Pre-Settlement Vegetation

- Hardwoods
- Conifer Bogs/Swamps
- Open Water

Section Lines/Numbers

Current Lake Location

The data for this coverage comes from a 1895 land survey. The variance in lake location is due to inaccuracies in the 1895 survey. This map will still give you an idea of what type of vegetation was present prior to settlement.

0 0.5 1

Miles

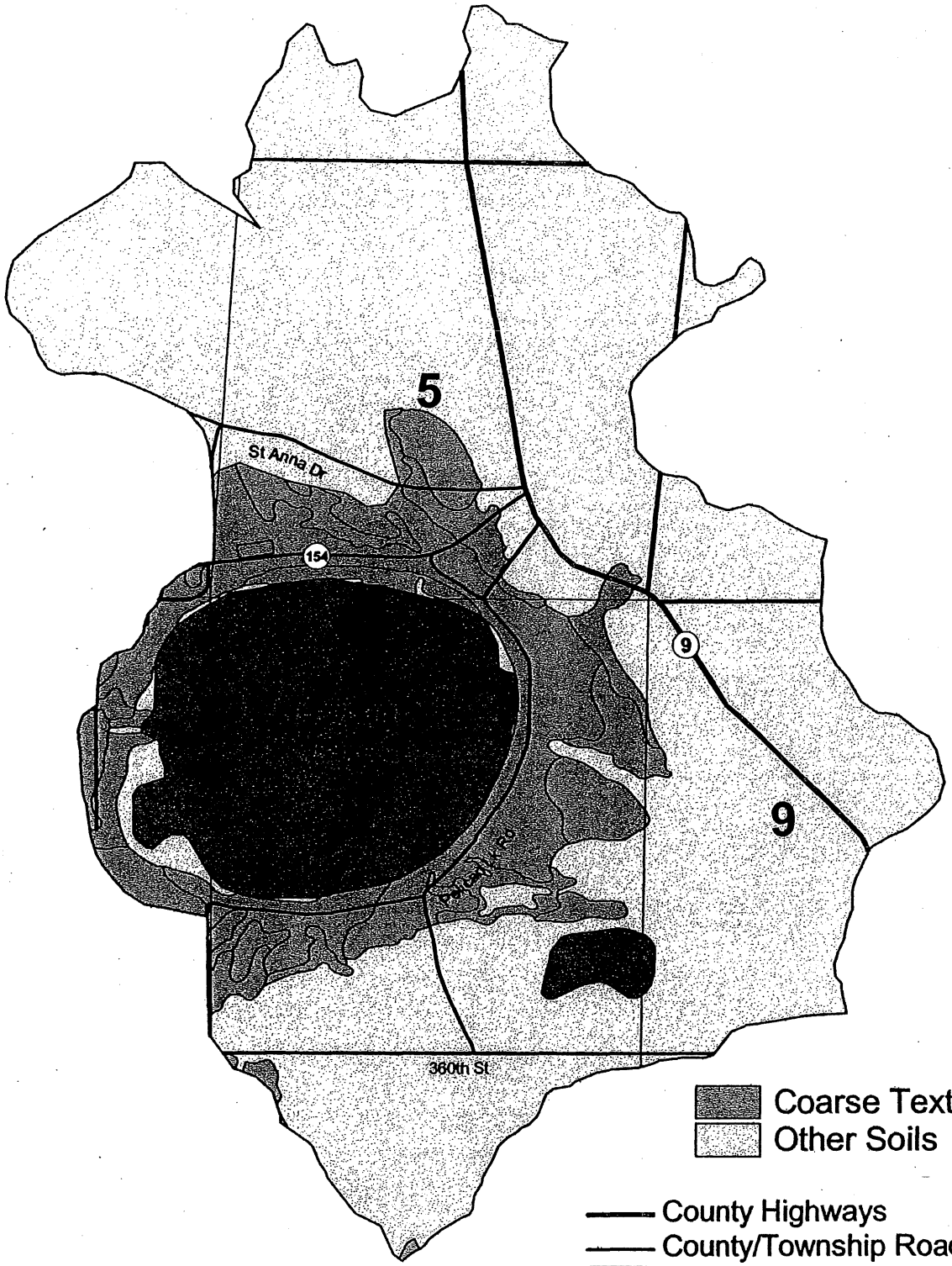
N

December 17, 2001

Source: National Wetlands Inventory

Coarse Textured Soils

Pelican Lake Watershed

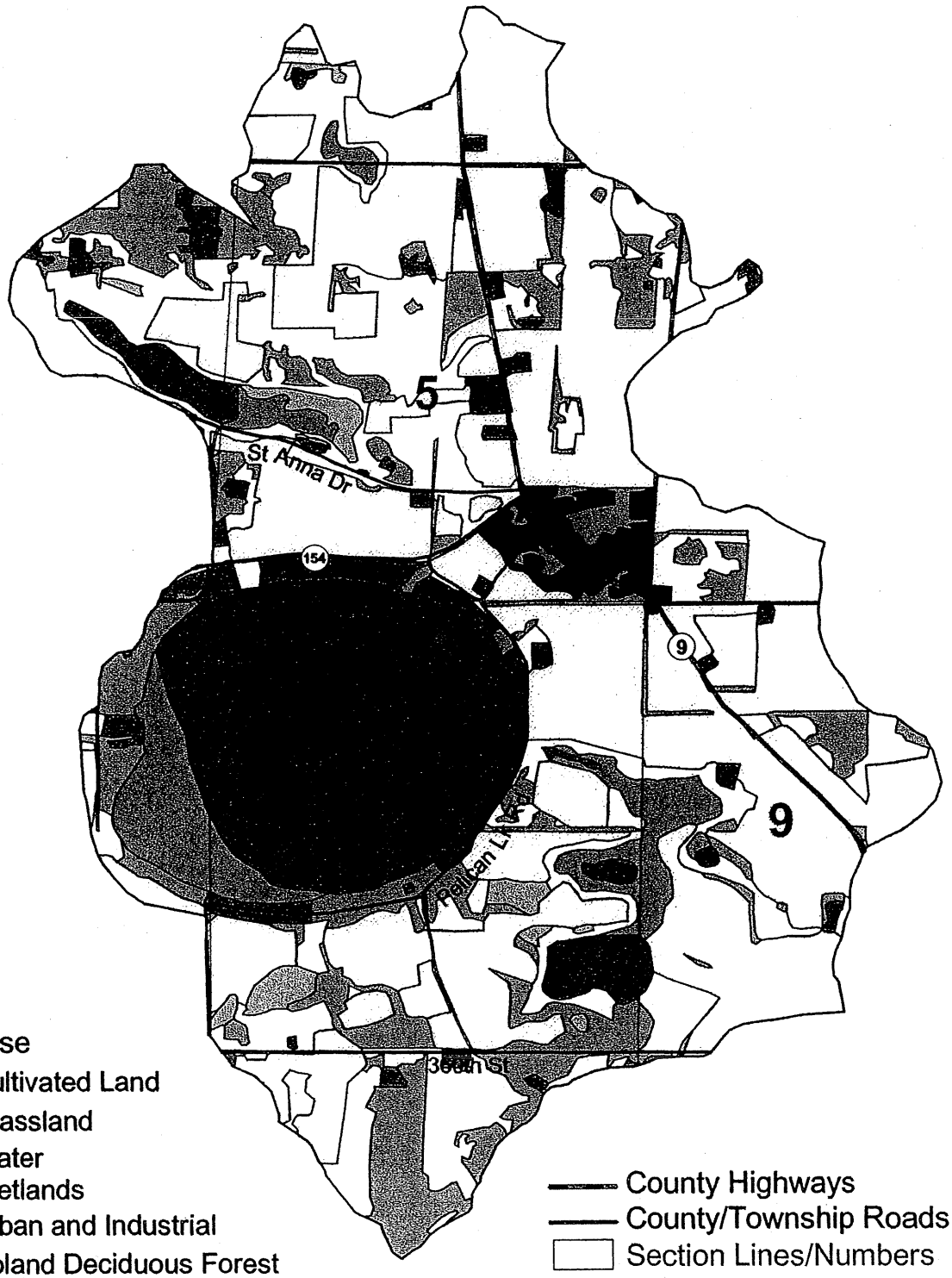


December 17, 2001

Source: Stearns County Soil Survey

Land Use

Pelican Lake Watershed



Land Use
- Cultivated Land
- Grassland
- Water
- Wetlands
- Urban and Industrial
- Upland Deciduous Forest
- Grassland Shrub Treed Complex
- Farmsteads and Rural Residences

- County Highways
- County/Township Roads
- Section Lines/Numbers

0 0.5 1
Miles

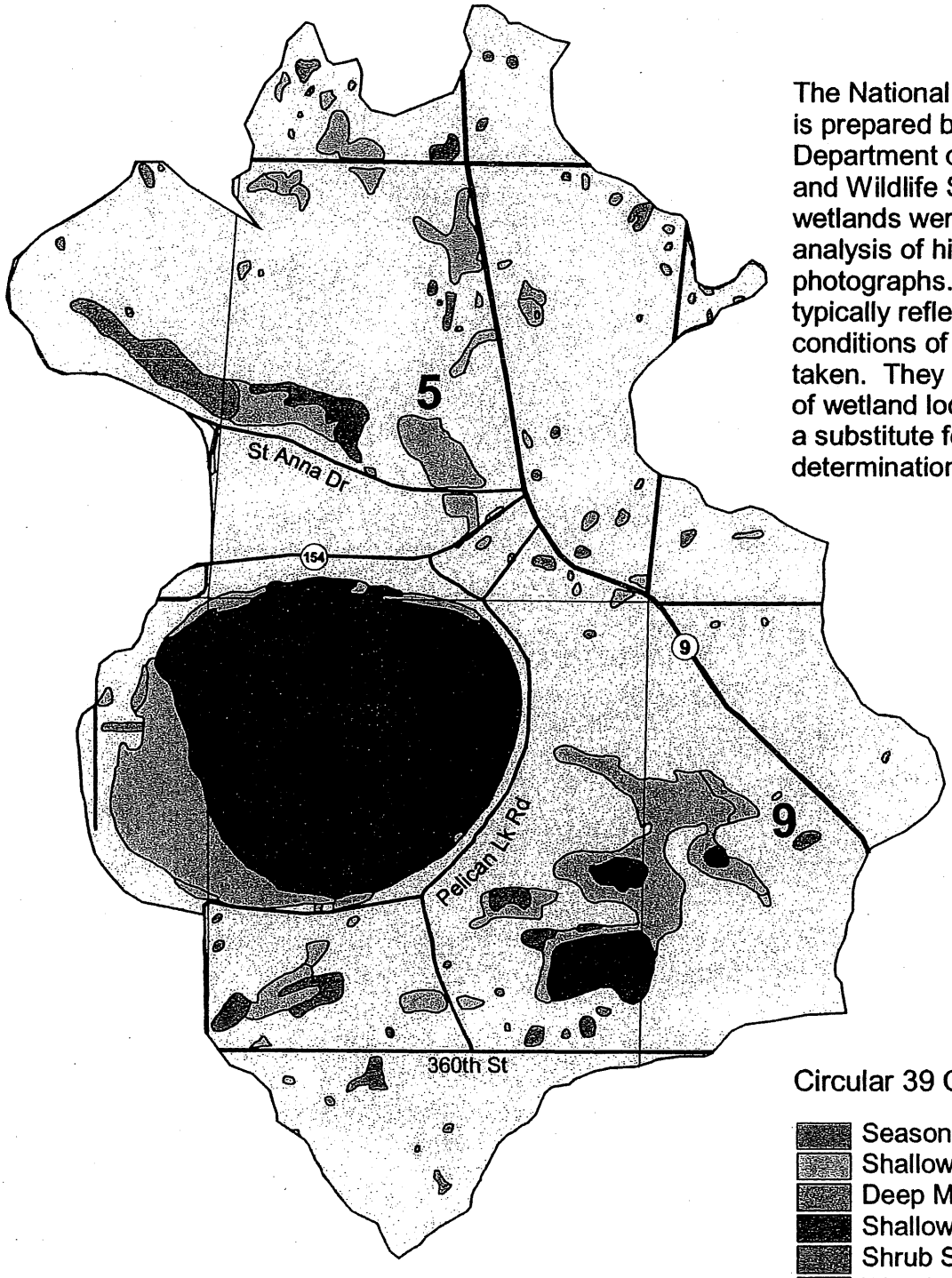
N

December 17, 2001

Source: 1989 Land Management Information Center data

Wetland Locations

Pelican Lake Watershed



The National Wetland Inventory is prepared by the U.S. Department of the Interior, Fish and Wildlife Service. The wetlands were identified by analysis of high-altitude aerial photographs. The photographs typically reflect the seasonal conditions of the year in which taken. They are an indication of wetland locations, but are not a substitute for on-site wetland determinations.

Circular 39 Classification

- Seasonally Flooded Basin
- Shallow Marsh
- Deep Marsh
- Shallow Open Water
- Shrub Swamp
- Wooded Swamps
- Uplands (Non-Wetland)

- County Highways
- County/Township Roads
- Section Lines/Numbers

0 0.5 1

Miles

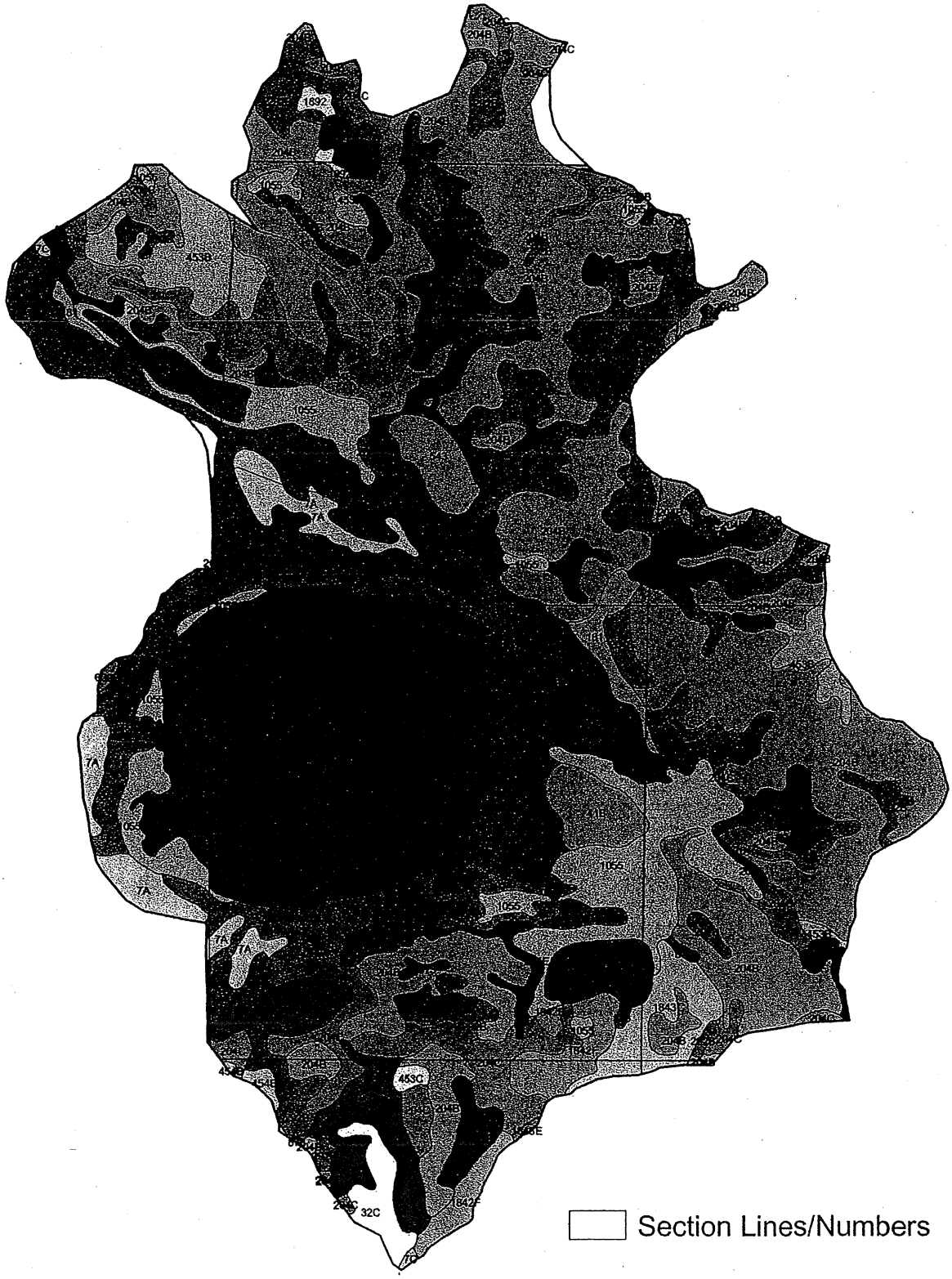
N

December 17, 2001

Source: National Wetlands Inventory

Soils

Pelican Lake Watershed

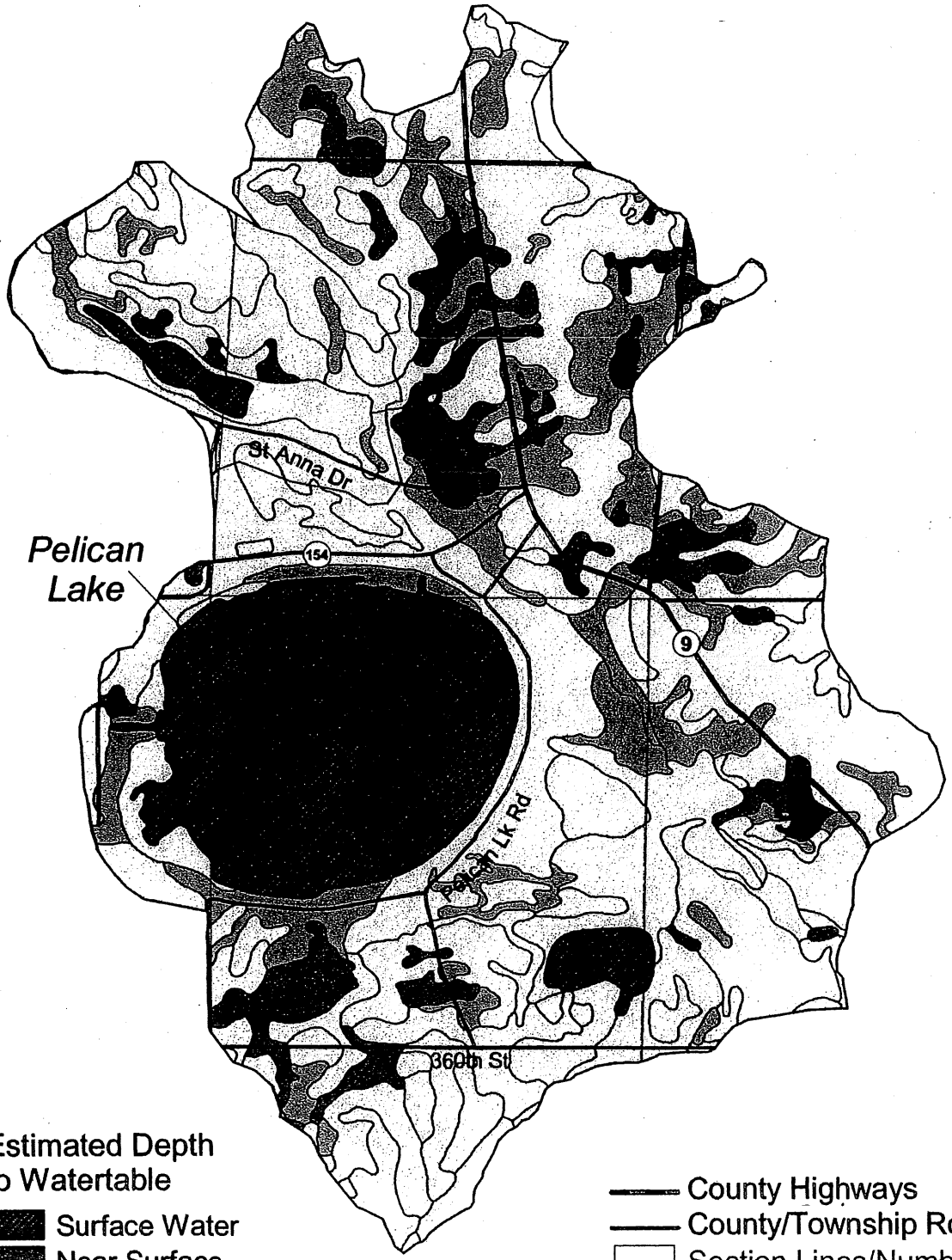


December 17, 2001

Source: Stearns County Soil Survey

Estimated Depth to Water Table

Pelican Lake Watershed



Estimated Depth to Watertable

- Surface Water
- Near Surface
- 1 to 3 Feet
- Greater than 6 Feet

- County Highways
- County/Township Roads
- Section Lines/Numbers

0 0.5 1

Miles

N

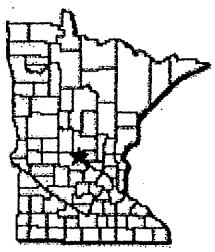
December 17, 2001

Source: Stearns County Soil Survey

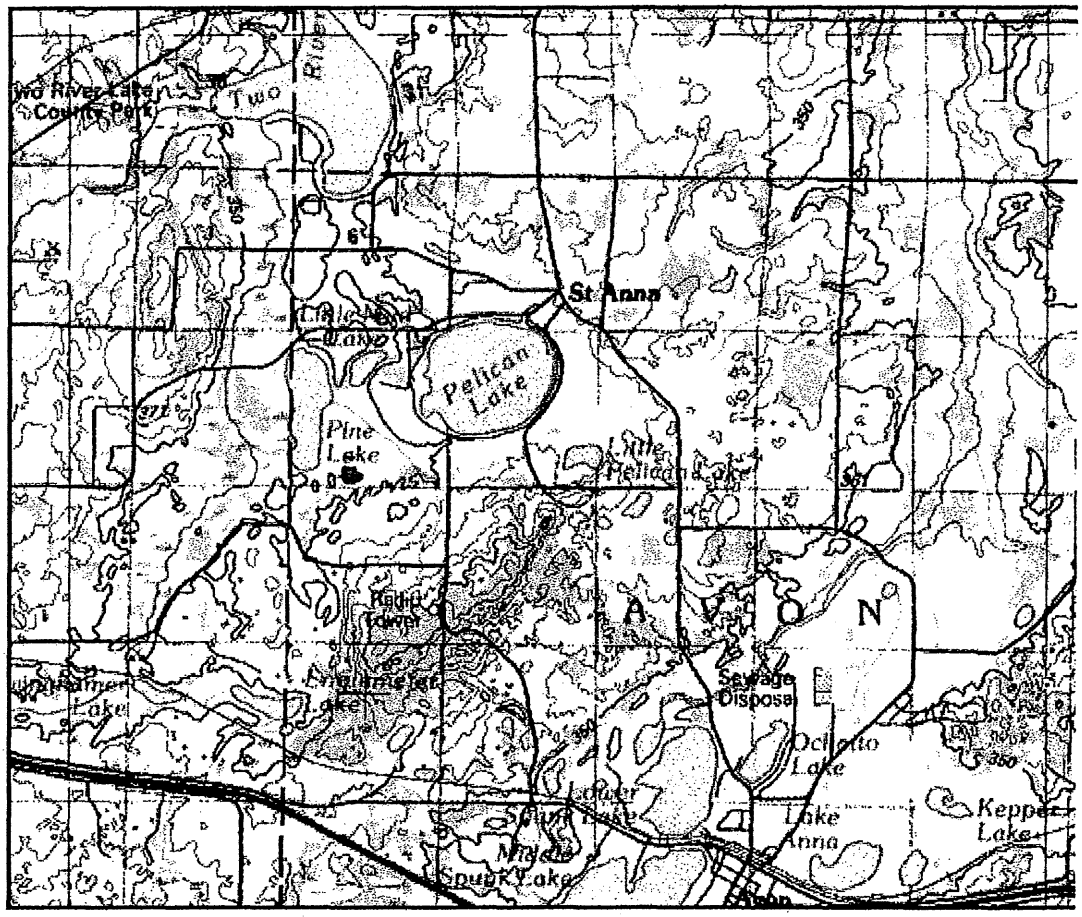
ToMO

1:24,000 1:100,000 1:250,000 **Find place:** go!

small
medium
large

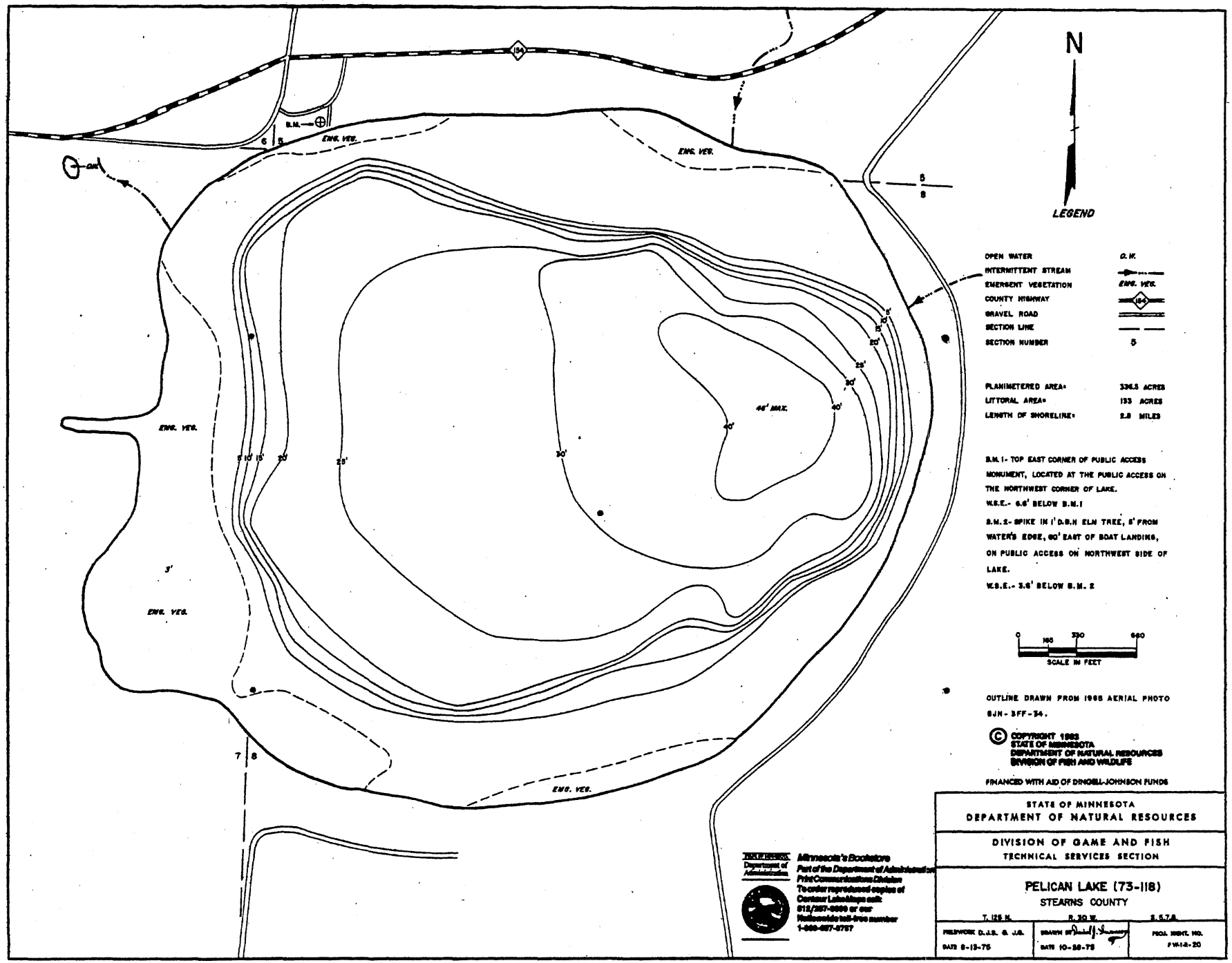


map key



Map(s) Displayed: St. Cloud

Main Categories: Outdoor Activities | Regulations, Licenses, Permits | Natural Resources | Education
About the DNR | Maps | Publications | Employment | Volunteering | Technical & Financial Assis
Public Input



LEGEND

OPEN WATER	O.W.
INTERMITTENT STREAM	
EMERGENT VEGETATION	EMG. VEG.
COUNTY HIGHWAY	154
GRAVEL ROAD	
SECTION LINE	
SECTION NUMBER	5

PLANIMETERED AREA=	336.5 ACRES
LITTORAL AREA=	193 ACRES
LENGTH OF SHORELINE=	2.8 MILES

B.M. 1- TOP EAST CORNER OF PUBLIC ACCESS MONUMENT, LOCATED AT THE PUBLIC ACCESS ON THE NORTHWEST CORNER OF LAKE.
W.S.E.- 6.6' BELOW B.M. 1

B.M. 2- SPIKE IN 1' D.B.H ELM TREE, 5' FROM WATER'S EDGE, 60' EAST OF BOAT LANDING, ON PUBLIC ACCESS ON NORTHWEST SIDE OF LAKE.
W.S.E.- 3.6' BELOW B.M. 2

0 165 330 660
SCALE IN FEET

OUTLINE DRAWN FROM 1968 AERIAL PHOTO
8JN-3FF-34.

FINANCED WITH AID OF DINGELL-JOHNSON FUNDS

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GAME AND FISH
TECHNICAL SERVICES SECTION

PELICAN LAKE (73-118)
STEARNS COUNTY

T. 125 N. R. 30 W. S. 5,7,8

FIELDWORK D.J.S. & J.S. DATE 8-13-75	DRAWN BY DATE 10-28-75	PROJ. MGMT. NO. FW-14-20

C-2484

Lake information report

PRINTABLE VERSION

Name: PELICAN

Nearest Town: ST. ANNA
Primary County: Stearns

Survey Date: 07/10/2000
Inventory Number: 73-0118-00

Public Access Information

Ownership	Type	Description
Minnesota DNR	Concrete	Public access on northwest side off CO RD 154 near The Landing restraunt.

Lake Characteristics

Lake Area (acres): 337.00
Littoral Area (acres): 135.00
Maximum Depth (ft): 46.00
Water Clarity (ft): 13.50

Dominant Bottom Substrate: sand, silt, muck
Abundance of Aquatic Plants: abundant
Maximum Depth of Plant Growth (ft): 21.00

Did you know? Ongoing habitat improvement and maintenance work is conducted on trout streams that have publicly owned land or easements.

Fish Sampled up to the 2000 Survey Year

Number of fish per net

Species	Gear Used	Caught	Normal Range	Average Fish Weight (lbs)	Normal Range (lbs)
Black Bullhead	Gill net	2.3	0.8 - 7.7	1.03	0.4 - 0.8
Bluegill	Gill net	2.3	N/A - N/A	0.11	N/A - N/A
	Trap net	29.8	6.1 - 46.6	0.13	0.1 - 0.3
Bowfin (Dogfish)	Trap net	0.3	0.4 - 1.3	2.80	2.9 - 4.9
Brown Bullhead	Gill net	0.3	0.5 - 2.5	0.20	0.6 - 1.0
	Trap net	0.1	0.4 - 2.1	0.58	0.6 - 1.1

Green Sunfish	Trap net	0.2	0.3 - 2.3	0.03	0.1 - 0.2
Hybrid Sunfish	Gill net	0.3	N/A - N/A	0.03	N/A - N/A
	Trap net	1.2	N/A - N/A	0.30	N/A - N/A
Largemouth Bass	Trap net	0.1	0.3 - 1.3	0.11	0.2 - 0.7
Northern Pike	Gill net	34.3	3.5 - 10.5	1.48	1.6 - 2.9
	Trap net	0.8	N/A - N/A	1.18	N/A - N/A
Pumpkinseed Sunfish	Gill net	0.3	N/A - N/A	0.04	N/A - N/A
	Trap net	0.6	2.0 - 8.5	0.20	0.1 - 0.2
Painted Turtle	Trap net	5.2	N/A - N/A	0.85	N/A - N/A
Snapping Turtle	Trap net	0.7	N/A - N/A	ND	N/A - N/A
Walleye	Gill net	1.5	1.3 - 5.0	3.60	1.3 - 2.5
White Sucker	Gill net	0.3	0.5 - 2.7	3.03	1.8 - 2.5
Yellow Bullhead	Gill net	5.0	1.0 - 10.5	0.81	0.4 - 0.8
	Trap net	2.6	1.3 - 9.8	0.81	0.5 - 0.8
Yellow Perch	Gill net	0.3	3.4 - 43.6	0.10	0.1 - 0.2
	Trap net	0.1	0.5 - 3.3	ND	0.1 - 0.2

Normal Ranges represent typical catches for lakes with similar physical and chemical characteristics.

Length of Selected Species Sampled for All Gear for the 2000 Survey Year

	Number of fish caught in each category (inches)								
Species	***0-5***	***6-8***	***9-11***	***12-14***	***15-19***	***20-24***	***25-29***	***>29***	***Total***
Black Bullhead	0	1	4	4	0	0	0	0	9
Bluegill	188	88	1	0	0	0	0	0	277
Brown Bullhead	0	1	1	0	0	0	0	0	2
Green Sunfish	2	0	0	0	0	0	0	0	2
Hybrid Sunfish	4	8	0	0	0	0	0	0	12
Largemouth Bass	1	0	0	0	0	0	0	0	1
Northern Pike	0	0	0	2	109	29	3	1	144
Pumpkinseed Sunfish	4	2	0	0	0	0	0	0	6
Walleye	0	0	0	0	0	6	0	0	6
Yellow Bullhead	0	3	31	9	0	0	0	0	43
Yellow Perch	0	1	0	0	0	0	0	0	1

*For the record, the largest **Northern Hogsucker** taken in Minnesota weighed 1 lb., 15 oz. and was caught by:*

Who: Brian Humble, Brooklyn Park, MN
Where: Sunrise River near Sunrise, Chisago County
When: 8/16/82.
Statistics: 14.25" length, 7.1" girth

Fish Stocked by Species for the Last Five Years

Year	Species	Age	Number
1997	*Walleye*	Fingerling	2,860
1999	*Walleye*	Fingerling	2,915
	Walleye	Yearling	4
	Walleye	Adult	1
2001	*Walleye*	Fingerling	3,525

Fish Consumption Advisory

No fish consumption information is available for this lake. For more information, see the "Fish Consumption Advice" pages at the Minnesota Department of Health.

Status of the Fishery (as of 07/10/2000)

Pelican Lake is located one half mile southwest of St. Anna in Stearns County. The lake has a surface area of 337 acres and a maximum depth of 46 feet. The north and west sides of the lake are shallow and have dense, submerged vegetation. The lakeshore is heavily developed, except for the west side (largely wetland), but the watershed is small and water quality is good. The lake is a popular for fishing and a public access is located on the northwest side of the lake.

Northern pike are abundant and dominated the summer lake survey in 2000. Catch rates of pike were very high, but the average size (18.8 inches) and weight (1.5 pounds) were low and growth rates were slow. Few pike longer than 24 inches were caught, although the largest fish was 32.8 inches. Although the catch rate of pike has increased since the last survey in 1993, catch rates for pike have always been relatively high. Few yellow perch were captured, probably due to the high numbers of northern pike. It seems likely that there are too many small pike and not enough prey fish to support good pike growth.

Walleye catch rate was low in 2000 and has declined since 1993, but the average size was high (3.6 pounds, 22 inches). Lakes with a high northern pike population and few yellow perch typically do not support high numbers of walleye. Walleye fingerlings are currently stocked every other year, but no walleye were caught from fish stocked in 1994 or 1997. All walleye captured in 2000 were 9-11 years old. Walleye stocked in 1999 may have been too small to be caught in gill nets in 2000. The high number of small pike probably limit the survival of fingerling walleye.

The largemouth bass catch rate declined from 1993 to 2000 during spring electrofishing, but was still normal for area lakes. The average size (13 inches, 1.4 pounds) was relatively large, despite slow growth rates. The largest bass caught was 20 inches long and estimated to be 14 years old. Good natural reproduction was evident from the wide variety of bass ages from electrofishing as well as numerous juveniles caught during shoreline seining in late summer.

The catch rate for bluegill declined from 1993 to 2000, but was within the expected range for

lakes similar to Pelican; trap net catch rates for bluegill are highly variable and typically fluctuate from survey to survey . The growth rate and average size of bluegill (5.3 inches) caught in summer trap nets were average. Some large individuals up to 9 inches were captured. No black crappie were captured in 2000 and historical crappie catch rates have been low. Other panfish caught included hybrid sunfish, pumpkinseed sunfish, and green sunfish.

Catch rates for both yellow bullhead and black bullhead were average for the lake type, but average size was high; yellow bullhead averaged 0.8 pounds each and black bullhead averaged 1 pound. Other species captured included brown bullhead, bowfin, white sucker and several minnow species.

Anglers can help improve the fishery by selectively harvesting smaller northern pike (less than 22 inches) and releasing larger fish. This may allow both better pike growth and better walleye survival. Wise stewardship by lakeshore owners and efforts to protect natural shoreline areas can also help preserve good water quality and habitat for fish.

For Additional Information

Area Fisheries Supervisor:

7372 State Highway 25 SW
MONTROSE, MN 55363
(763) 675-3301

Lake maps can be obtained from:

Minnesota Bookstore
117 University Ave
St. Paul, MN 55155
(651) 297-3000 or (800) 657-3757
To order, use C2484 for the map-id.

General DNR Information:

DNR Information Center
500 Lafayette Road
St. Paul, MN 55155-4040
(651) 296-6157 or (888) MINNDNR
TDD: (651) 296-5484 or (800) 657-3929
E-Mail: info@dnr.state.mn.us

Turn in Poachers (TIP):

Toll-free: (800) 652-9093

Main Categories: Outdoor Activities | Regulations, Licenses, Permits | Natural Resources | Education & Safety | About the DNR | Maps | Publications | Employment | Volunteering | Technical & Financial Assistance | Public Input

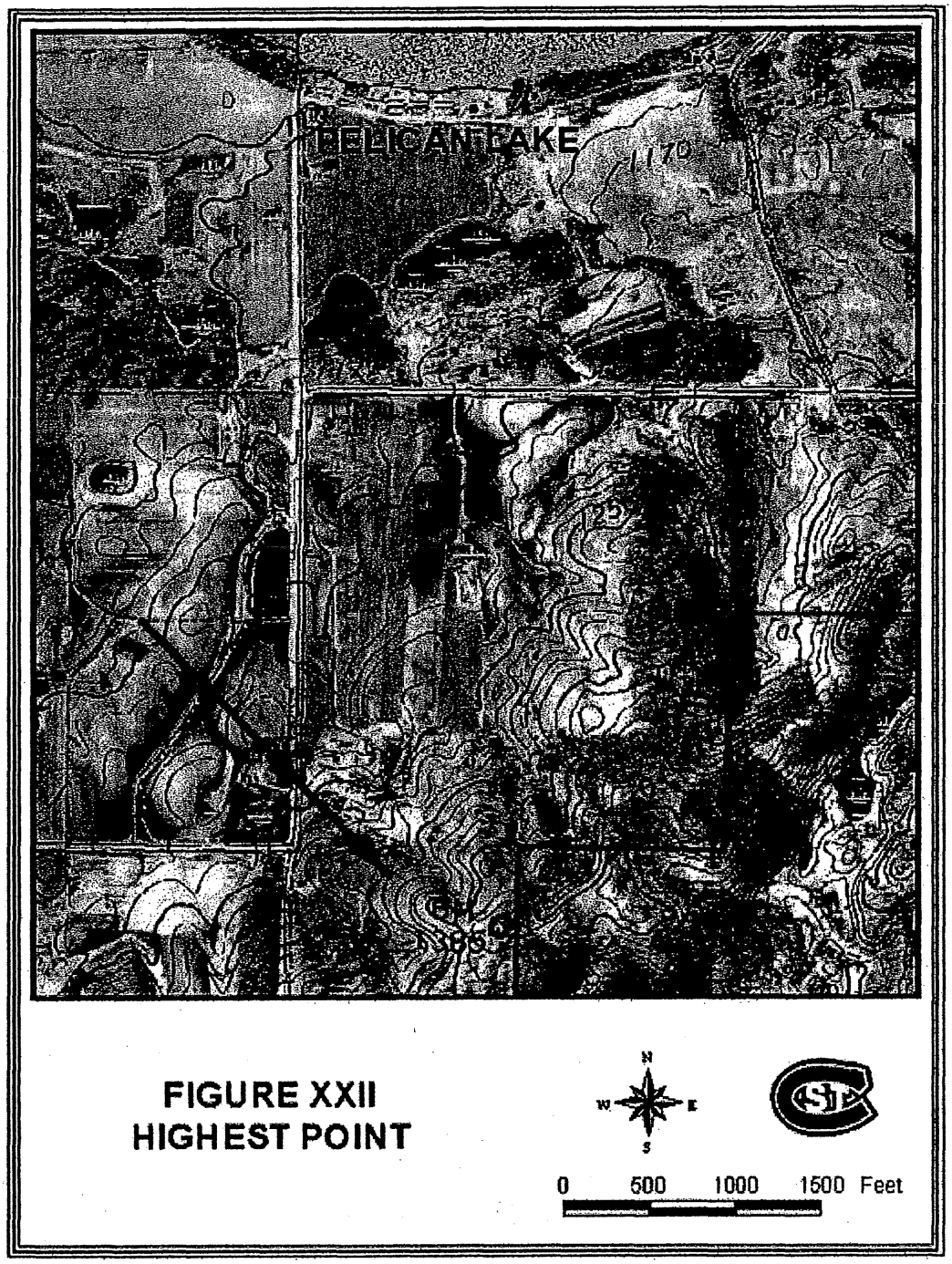


FIGURE XXII
HIGHEST POINT

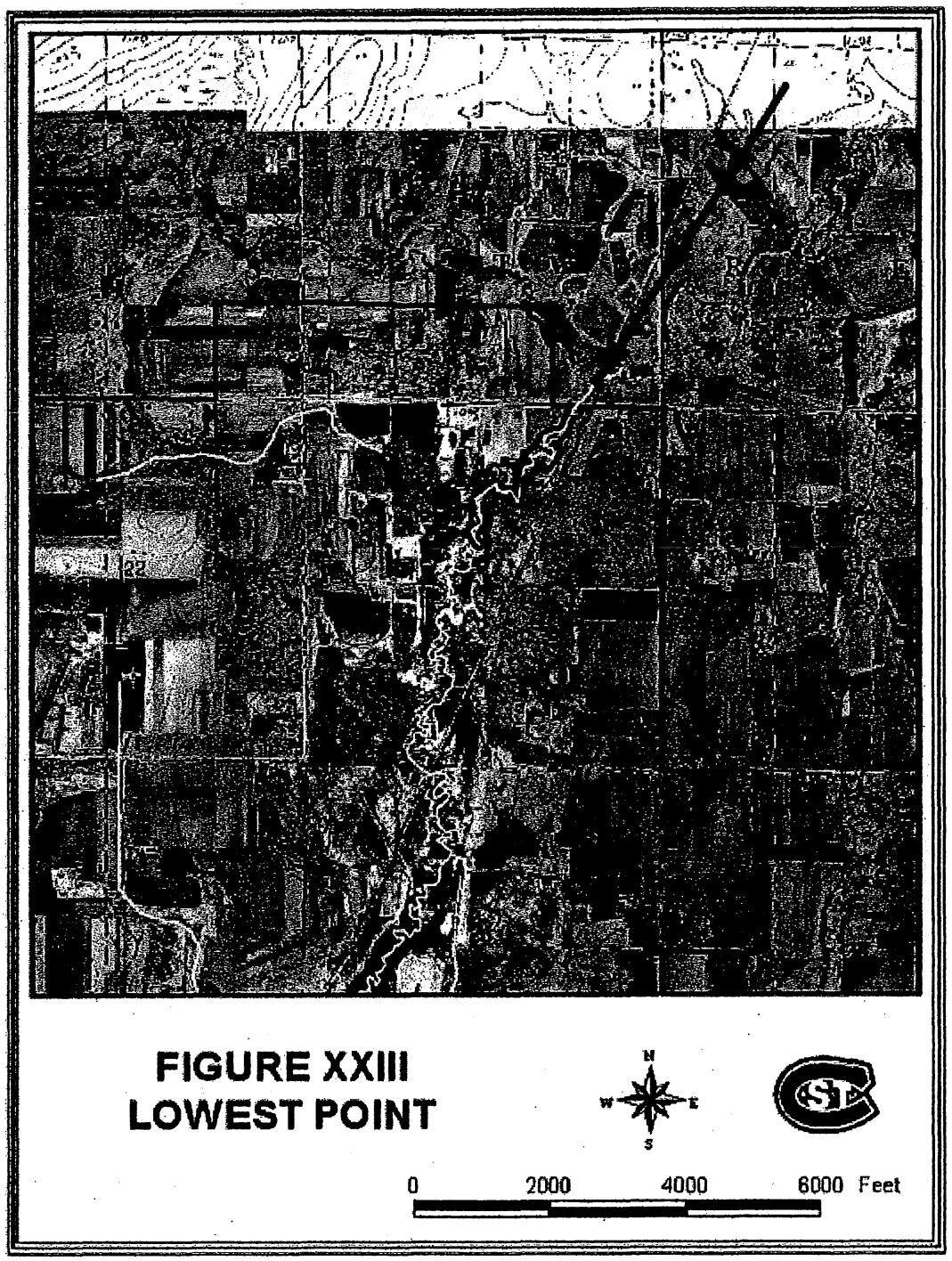


FIGURE XXIII
LOWEST POINT
N
W
E
S
0
2000
4000
6000 Feet

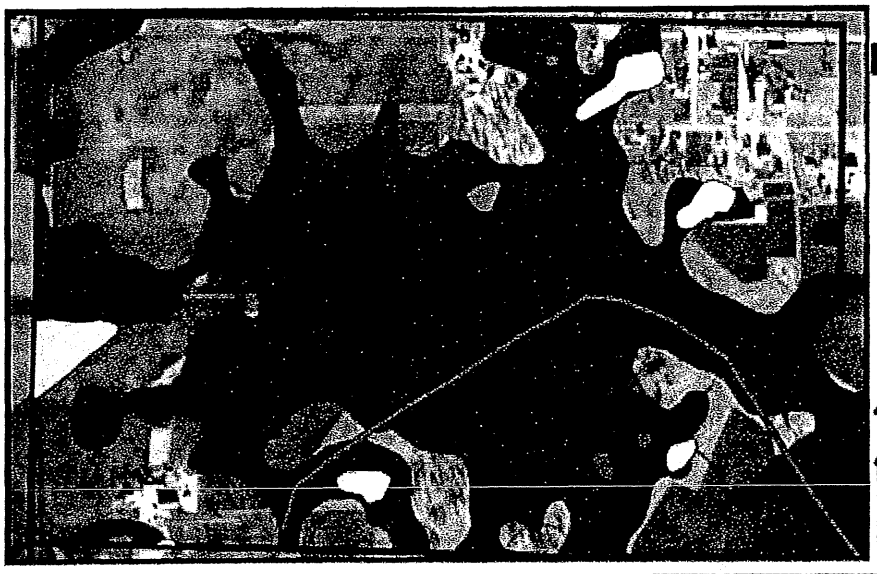
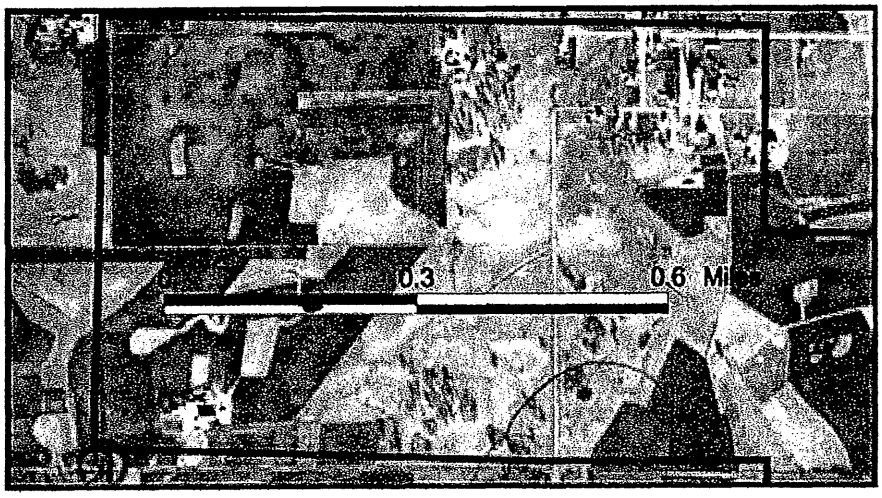


FIGURE XXVII WETLAND ANALYSIS

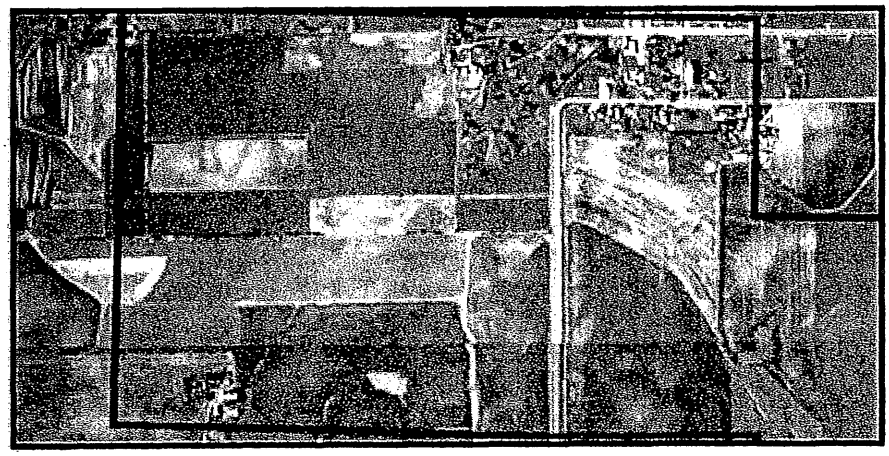
Wetlands
- 1926
- 1969
- 1977
- 1981

Boundary
Rivers
Legal Ditch
Wet Soils
VP Drained Soils
Poorly Drained Soils



1938 Photo

N
W E
S



1998 Photo

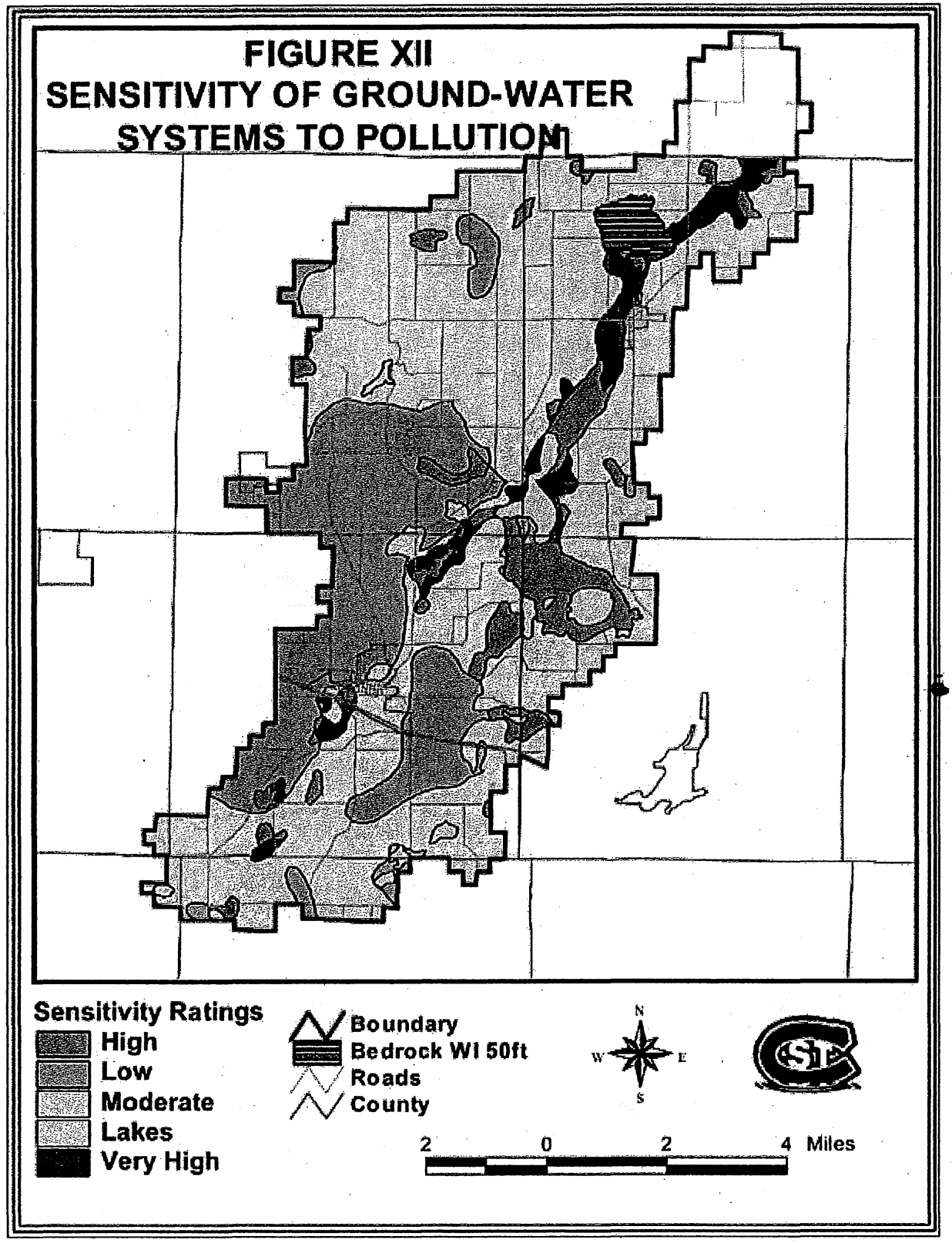


FIGURE XII
SENSITIVITY OF GROUND-WATER SYSTEMS TO POLLUTION
Sensitivity Ratings
High
Low
Moderate
Lakes
Very High
Boundary
Bedrock WI 50ft
Roads
County
N
W
E
S
2 0 2 4 Miles

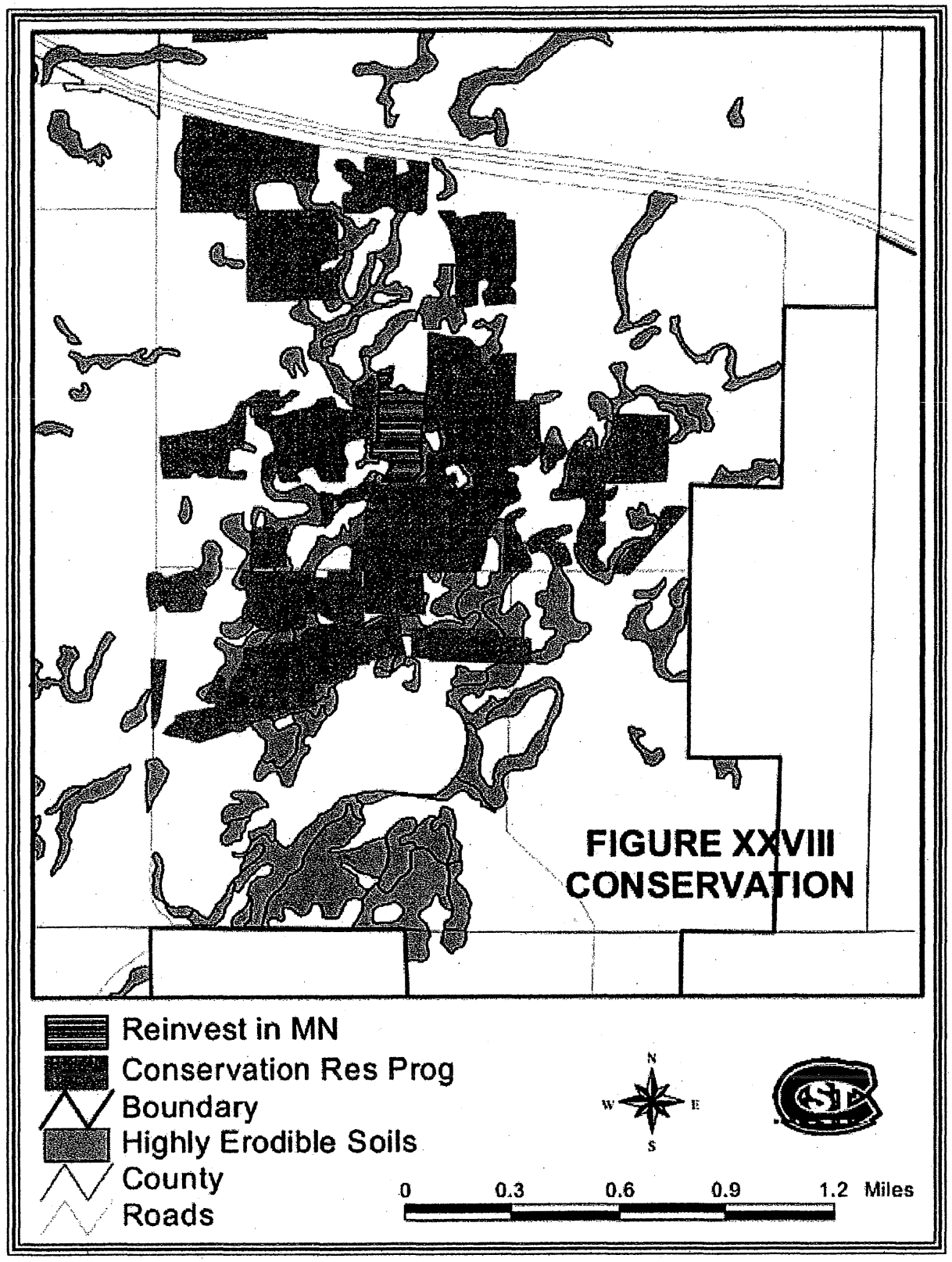


FIGURE XXVIII
CONSERVATION
Reinvest in MN
Conservation Res Prog
Boundary
Highly Erodible Soils
County
Roads
N
W
E
S
0
0.3
0.6
0.9
1.2 Miles

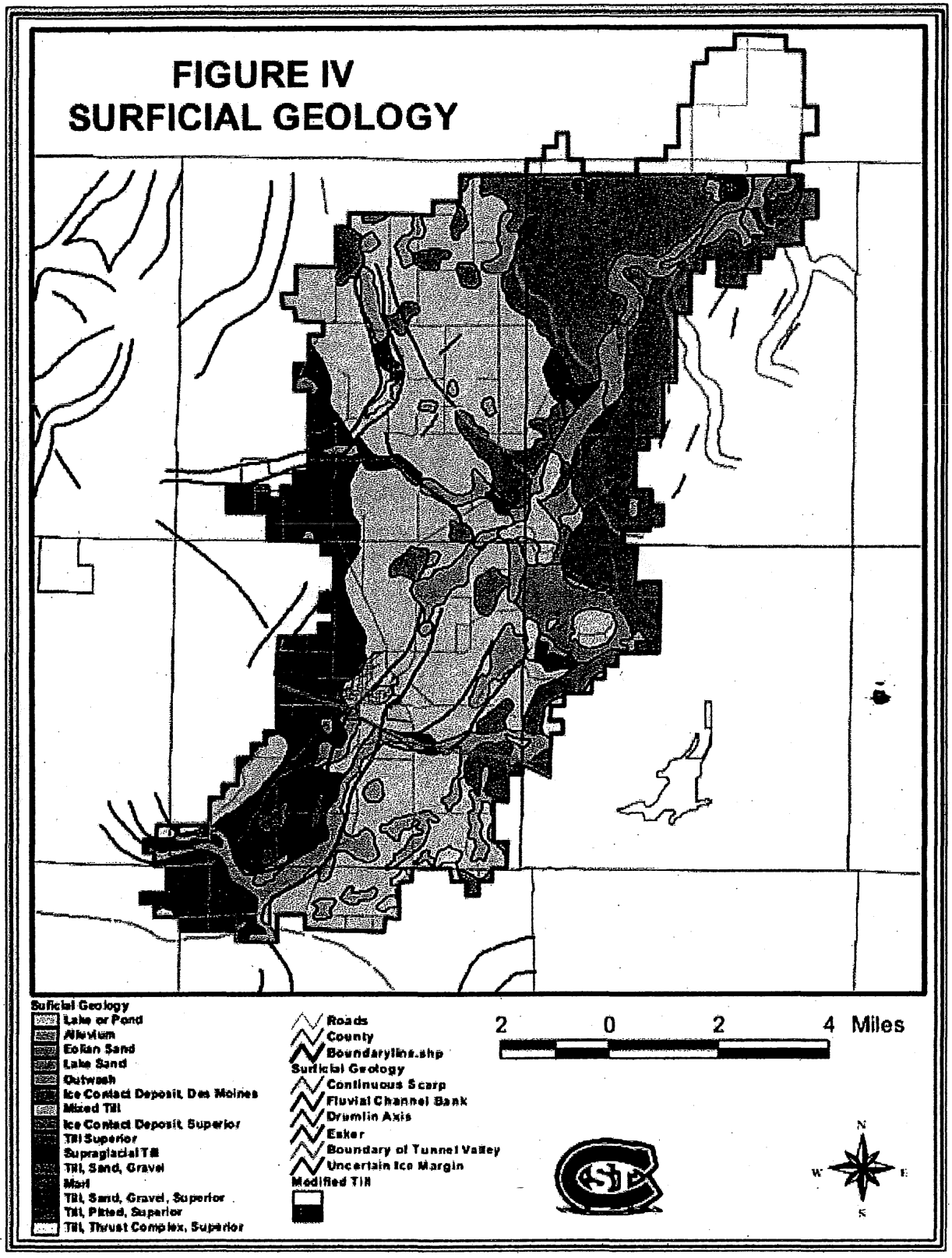
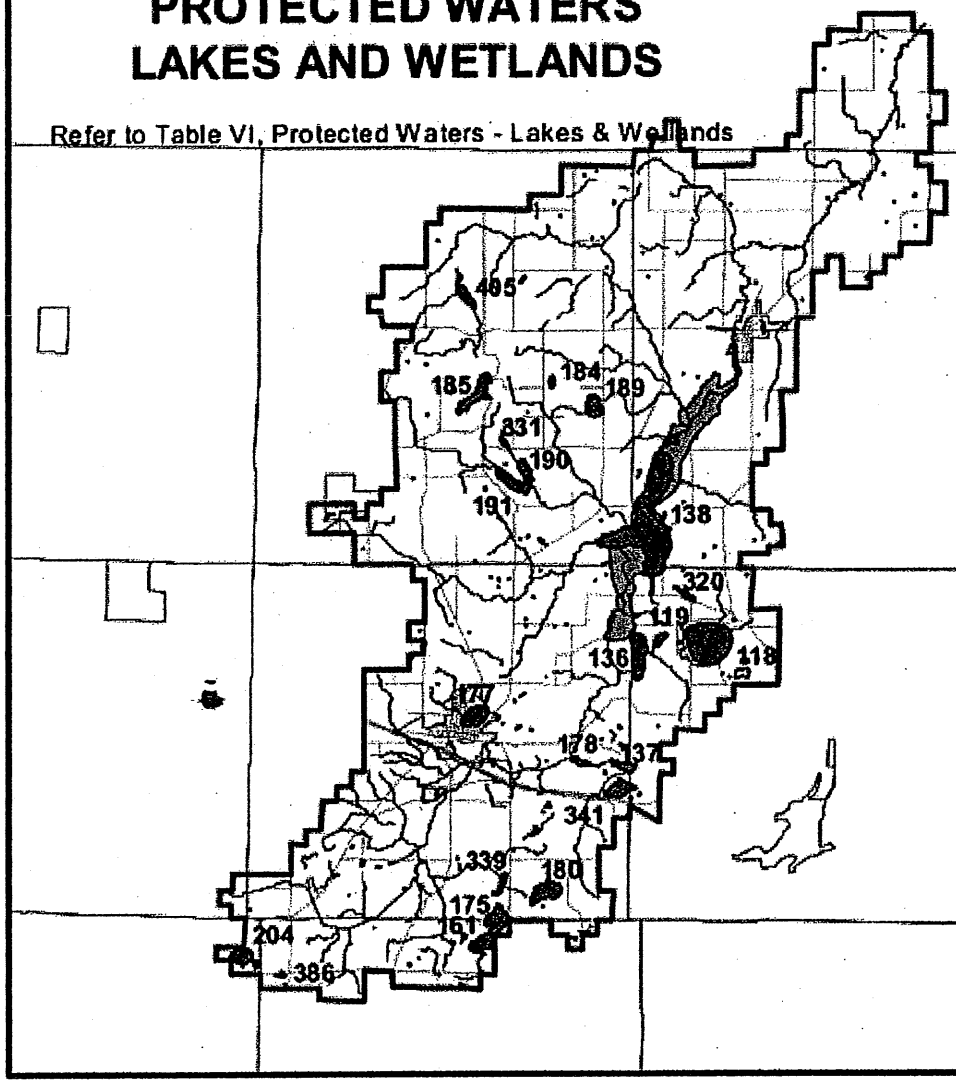


FIGURE IV
SURFICIAL GEOLOGY
Suficial Geology
Lake or Pond
Alluvium
Eolian Sand
Lake Sand
Outwash
Ice Contact Deposit, Des Moines
Mixed Till
Ice Contact Deposit, Superior
Till Superior
Supraglacial Till
Till, Sand, Gravel
Marl
Till, Sand, Gravel, Superior
Till, Pitted, Superior
Till, Thrust Complex, Superior
Roads
County
Boundarylins.shp
Surficial Geology
Continuous Scarp
Fluvial Channel Bank
Drumlin Axis
Esker
Boundary of Tunnel Valley
Uncertain Ice Margin
Modified Till
2 0 2 4 Miles
N
W
E
S

FIGURE XIV
PROTECTED WATERS
LAKES AND WETLANDS

Refer to Table VI, Protected Waters - Lakes & Wetlands



Boundary
Protected Waters
Other Waters
Streams
Flood Plain
100
County
Roads

N
W E
S

0 3 6 Miles

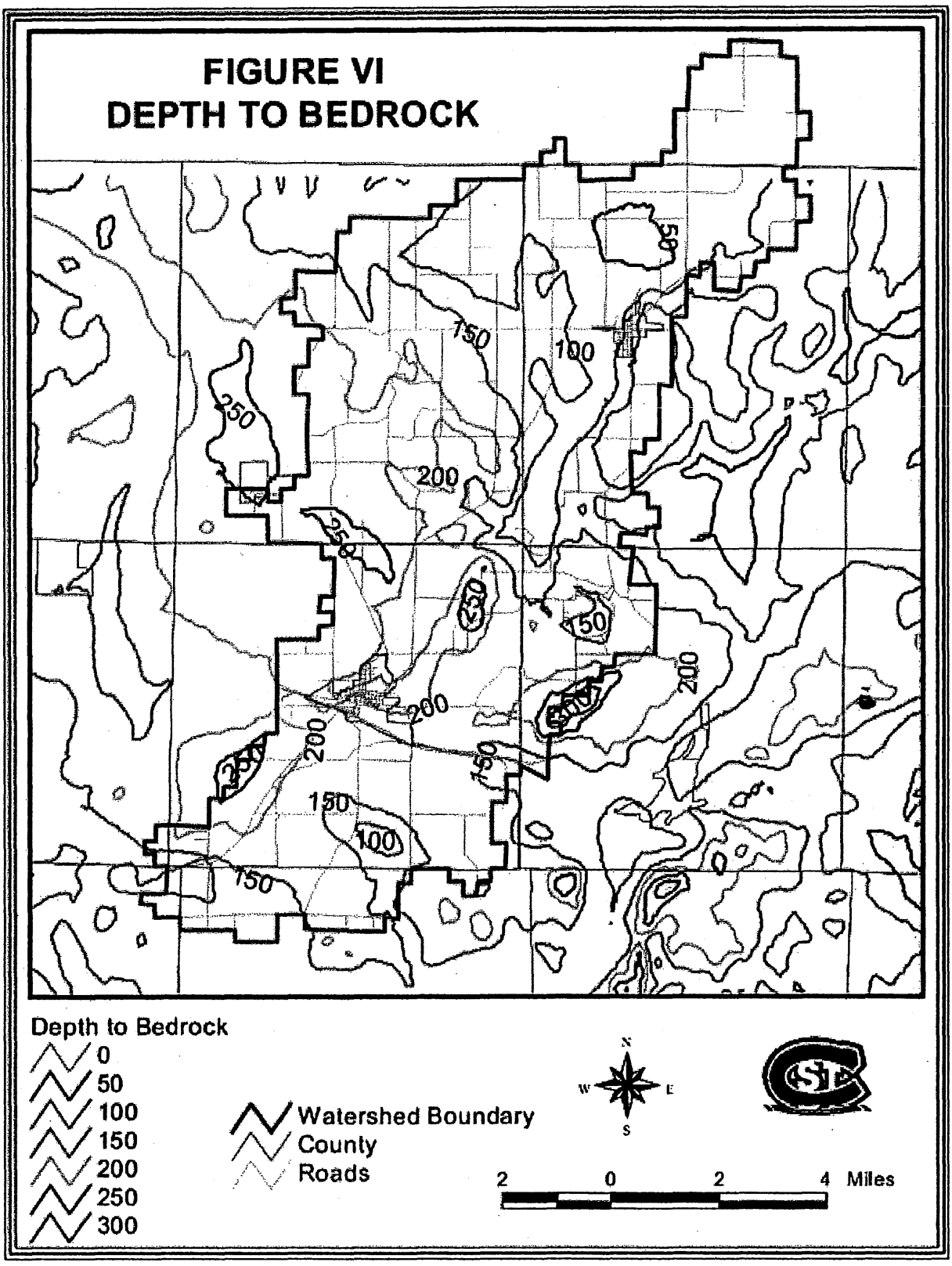


FIGURE VI
DEPTH TO BEDROCK
50
100
150
200
250
300
Depth to Bedrock
0
50
100
150
200
250
300
Watershed Boundary
County
Roads
N
W
E
S
2 0 2 4 Miles

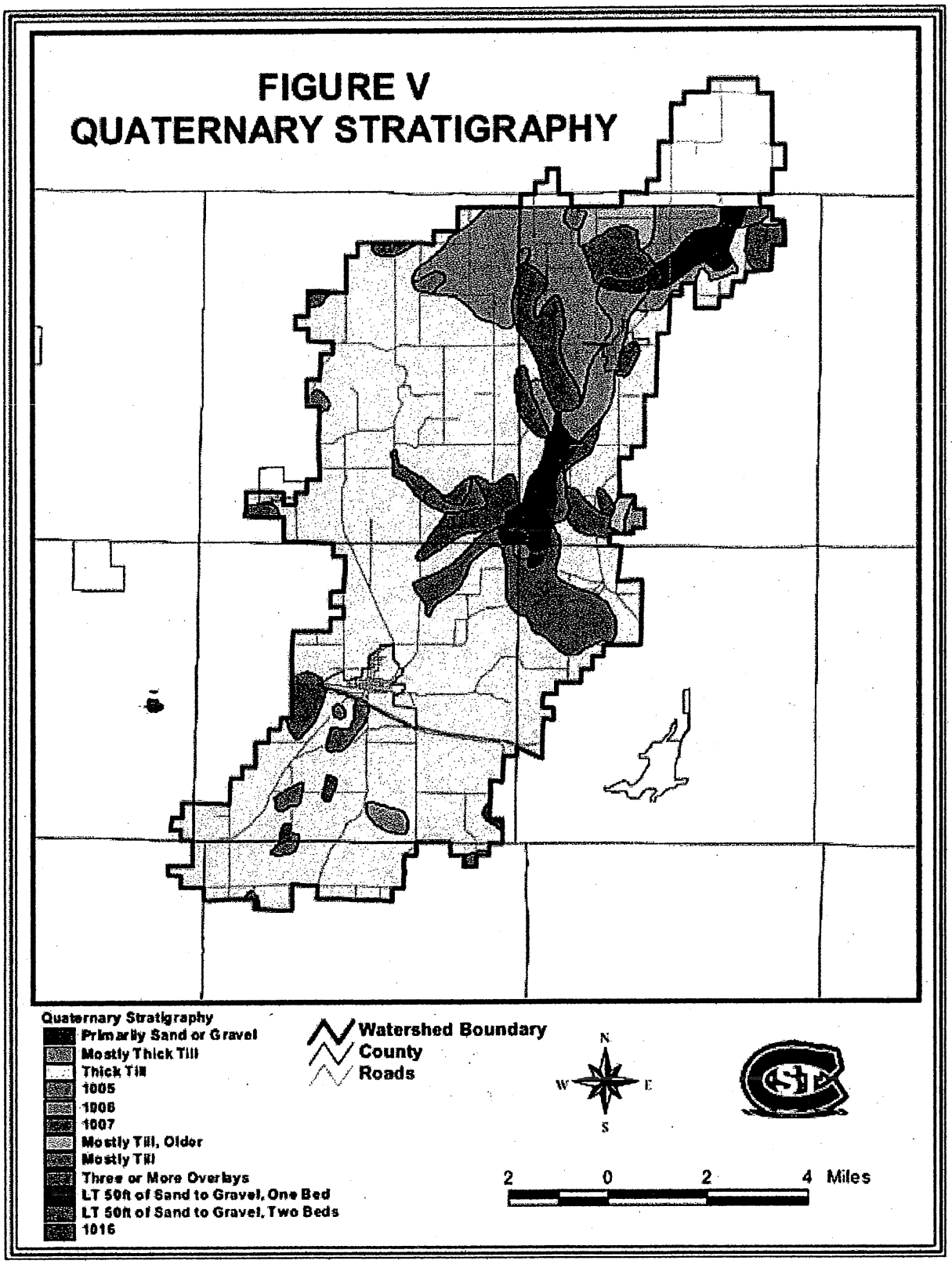


FIGURE V
QUATERNARY STRATIGRAPHY
Quaternary Stratigraphy
Primarily Sand or Gravel
Mostly Thick Till
Thick Till
1005
1006
1007
Mostly Till, Older
Mostly Till
Three or More Overlays
LT 50ft of Sand to Gravel, One Bed
LT 50ft of Sand to Gravel, Two Beds
1016
Watershed Boundary
County
Roads
N
W
E
S
2 0 2 4 Miles

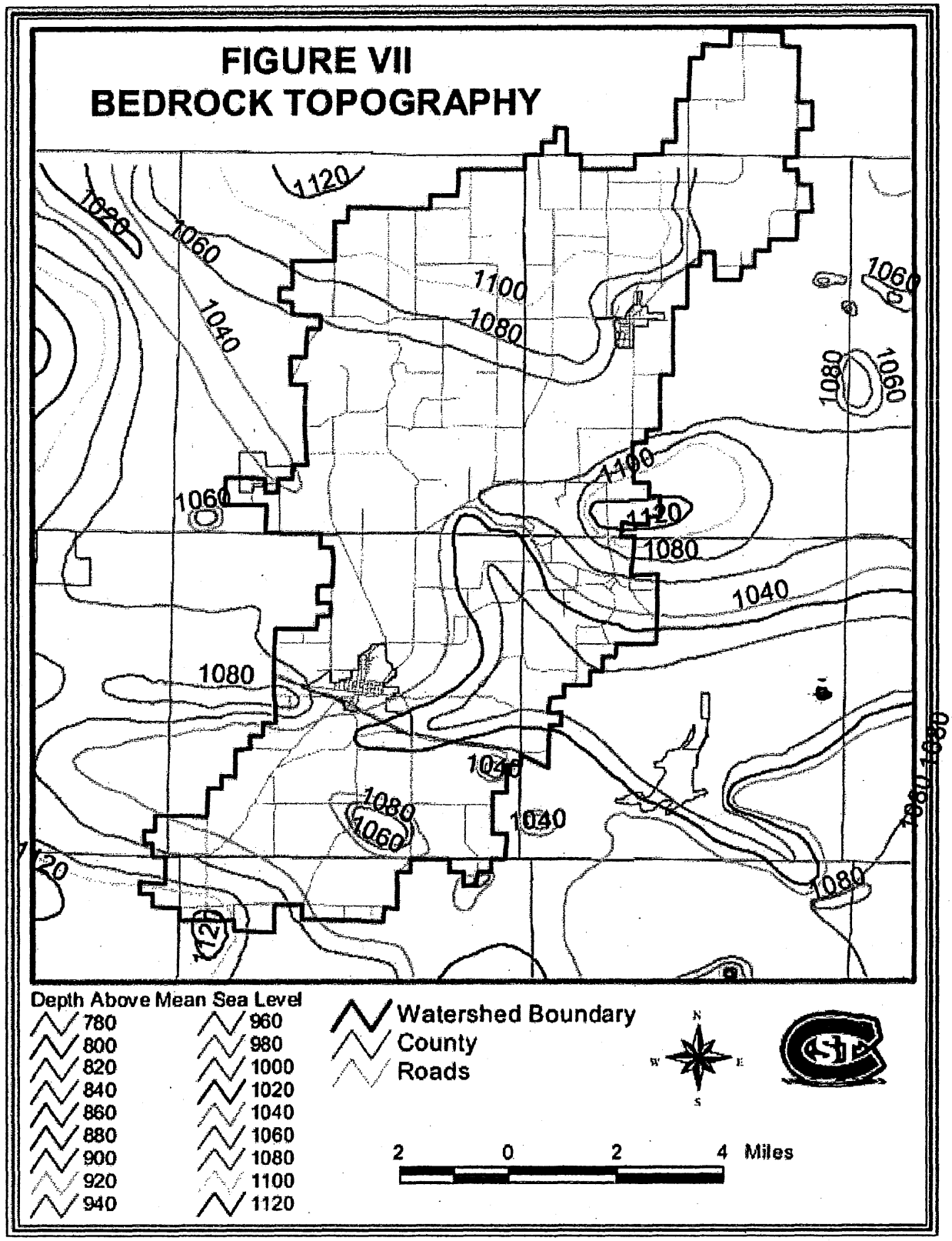


FIGURE VII
BEDROCK TOPOGRAPHY
1120
1060
1040
1100
1080
1060
1080
1060
1100
1120
1080
1040
1080
1040
1080
1060
1040
1080
1080
1120
Depth Above Mean Sea Level
780
800
820
840
860
880
900
920
940
960
980
1000
1020
1040
1060
1080
1100
1120
Watershed Boundary
County
Roads
N
W
E
S
2 0 2 4 Miles

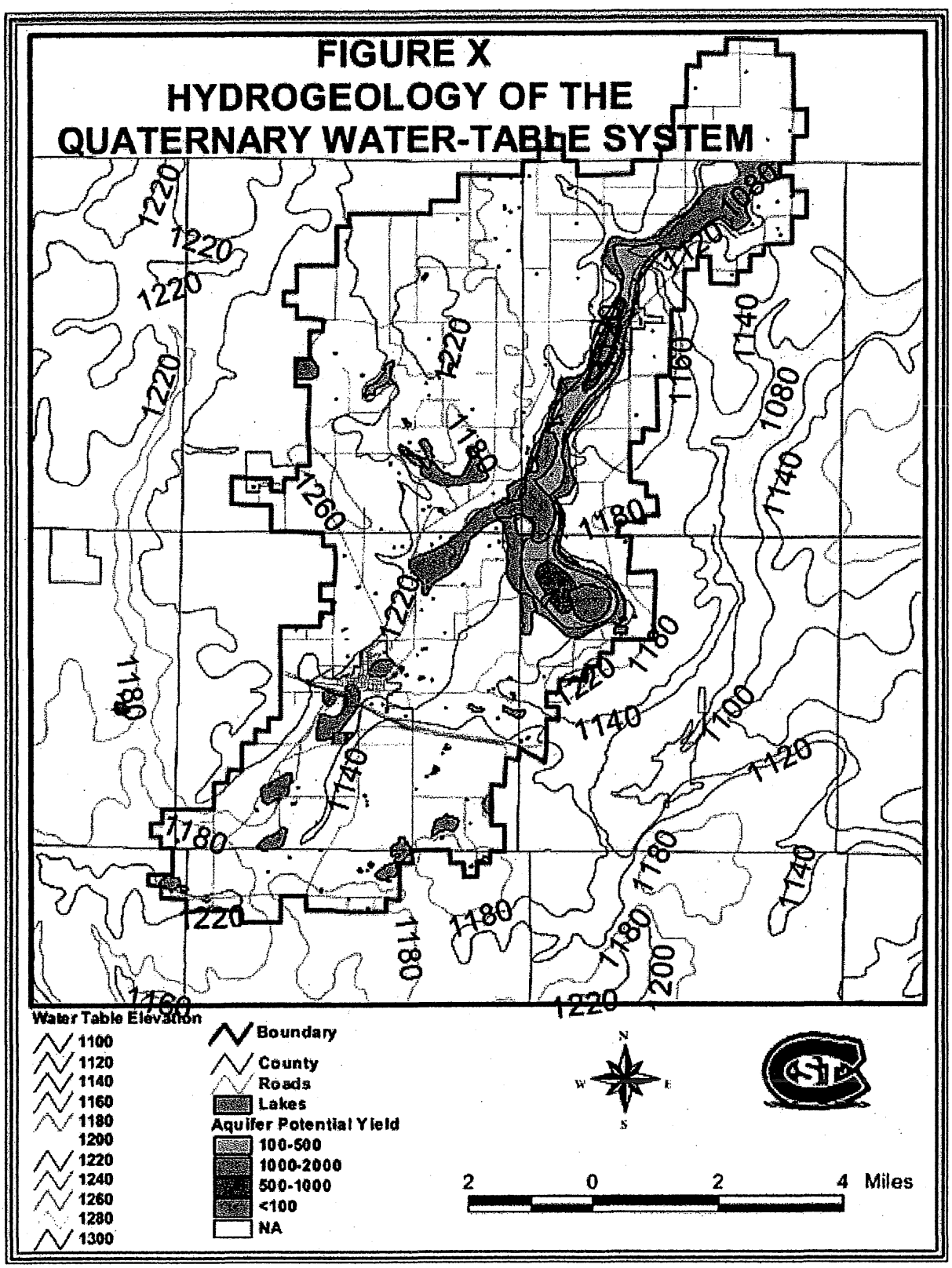


FIGURE X
HYDROGEOLOGY OF THE
QUATERNARY WATER-TABLE SYSTEM
Water Table Elevation
1100
1120
1140
1160
1180
1200
1220
1240
1260
1280
1300
Boundary
County
Roads
Lakes
Aquifer Potential Yield
100-500
1000-2000
500-1000
<100
NA
N
W
E
S
2 0 2 4 Miles

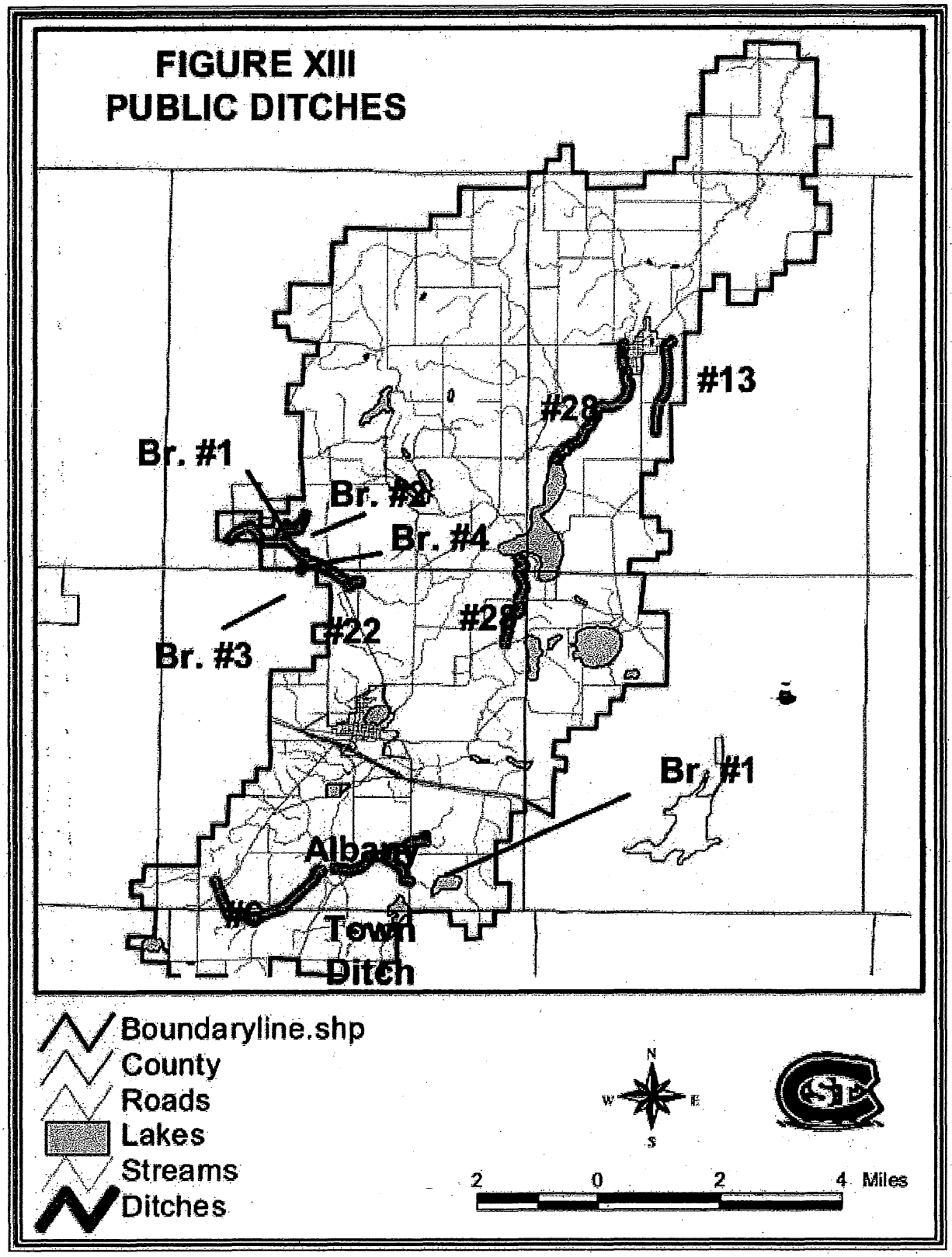


FIGURE XIII
PUBLIC DITCHES
#13
#28
Br. #1
Br. #2
Br. #4
#22
#29
Br. #3
Br. #1
Albany
Town
Ditch
Boundaryline.shp
County
Roads
Lakes
Streams
Ditches
N
W
E
S
2
0
2
4 Miles

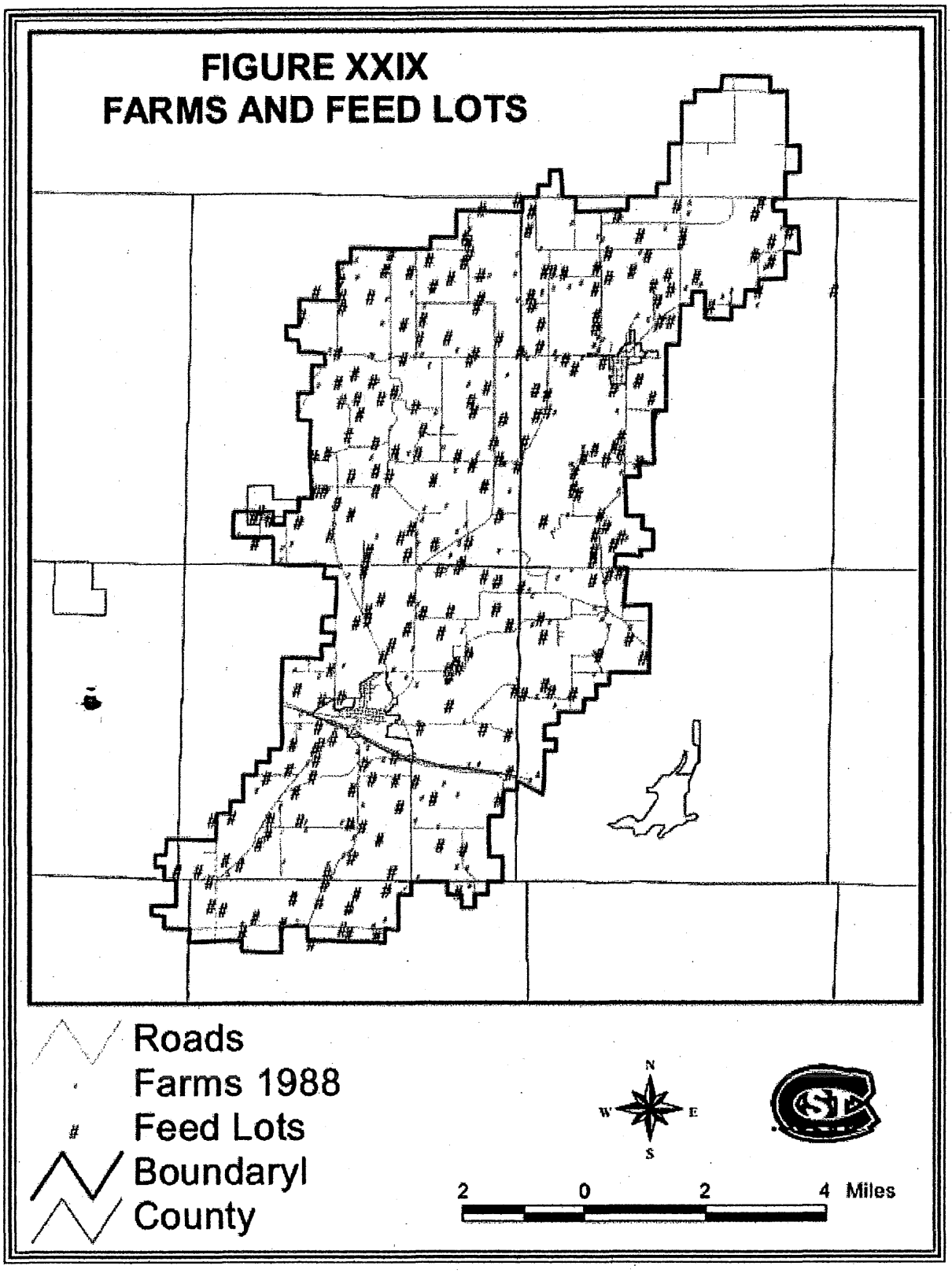


FIGURE XXIX
FARMS AND FEED LOTS
Roads
Farms 1988
Feed Lots
Boundaryl
County
N
W
E
S
2
0
2
4 Miles

1989 LAND USE/LAND COVER CLASS DESCRIPTIONS

URBAN OR BUILT-UP

Urban and Industrial

This category includes cities, towns, and villages with place names. Small residential areas without USGS topographic map place names are classified as rural residential developments (see 'Rural Residential Development Complexes' below). The urban and industrial category also includes commercial, industrial or urban developments that are included within, or are directly associated with, an urban area. Examples include: manufacturing and processing plants, power plants, urban airports, and waste treatment plants.

Farmsteads and Rural Residences

Farmsteads - Include the farmhouse and adjoining farmyard areas. Farmsteads also include buildings such as machinery storage areas, grain storage facilities, and corrals and livestock holding and feeding areas directly associated with the farmyard area.

Rural Residences - Are non-urban residences other than farmsteads. Rural residences include the residence, associated structures such as garages and sheds, and the associated landscaped area. This category includes from one to four residences in close proximity, with no distinguishable, intervening, non-residential features.

Rural Residential Development Complexes

This category includes rural residences, as defined above, in a complex that includes five or more residences in close enough proximity to be mapped as a single unit.

Other Rural Developments

This category includes commercial and industrial, cultural and recreational, and agricultural developments not directly associated with urban areas.

Commercial and Industrial - Developments include substations, communications facilities, power plants, small private airstrips, junkyards, landfills, storage maintenance yards, businesses, factories, lumber mills, commercial livestock and poultry operations, and grain operations.

Cultural and Recreational - Developments include built-up factories and service areas associated with parks and rest areas, camp grounds, and golf courses. It also includes churches, cemeteries, community halls, and rural schools.

Agriculture - Developments include those agricultural facilities not directly associated with farmsteads. It includes machine storage areas, grain storage areas, barns and corrals, and isolated buildings. It also includes isolated farmsteads that no longer have apparent road access.

AGRICULTURAL LAND

Cultivated Land

Cultivated land includes those areas under intensive cropping or rotation, including periods when a parcel may be fallow. It represents land planted to forage or cover crop. The units exhibit linear or other patterns associated with current or relatively recent tillage.

Transitional Agricultural Land

This category includes areas that show evidence of past tillage but do not now appear to be continuously cropped or in a crop rotation. Parcels in this unit include fields that are idle or abandoned and may or may not have been planted to a cover crop. In addition to displaying some evidence of past tillage, they usually are relatively uniform in vegetation.

GRASSLANDS AND GRASSLAND-SHRUB-TREE COMPLEX

Grassland

This unit includes grasslands and herbaceous plants. It may contain up to one-third shrubs and/or tree cover. Areas may be small to extensive, and range from regular to very irregular in shape. They are often found between agricultural land and more heavily wooded areas, and along right-of-ways and drainages. These areas may be mowed or grazed, and range in appearance from very smooth to quite mottled.

Grassland-Shrub-Tree Complex (Deciduous)

This classification includes a combination of grass, shrubs, and trees, in which the deciduous tree cover comprises from one-third to two-thirds of the area, and/or the shrub cover comprises more than one-third of the area. This complex is often found adjacent to grassland or forested areas, but may be found alone. These areas are often irregular in shape and vary greatly in extent.

Grassland-Shrub-Tree Complex (Coniferous)

This classification includes a combination of grass, shrubs, and trees, in which the coniferous tree cover comprises from one-third to two-thirds of the area, and/or the shrub cover comprises more than one-third of the area. This complex is often found adjacent to grassland or forested areas, but may be found alone. These areas are often irregular in shape and vary greatly in extent.

FOREST

Deciduous Forest

This classification includes areas with at least two-thirds of the total canopy cover composed of predominantly woody deciduous species. It may contain coniferous species but it is dominated by deciduous species. It includes woodlots, shelterbelts, and other planted areas.

Coniferous Forest

This classification includes areas with at least two-thirds of the total canopy cover composed of predominantly woody coniferous species. It may contain deciduous species but it is dominated by coniferous species. It includes woodlots, shelterbelts, and other planted areas.

WATER

Water

This category includes permanent water bodies, including lakes (U.S. Fish and Wildlife Service Lacustrine System 'L'), rivers, reservoirs, stock ponds, and permanent palustrine open water (U.S. Fish and Wildlife Service POWH). Intermittently exposed palustrine open water areas (U.S. Fish and Wildlife Service POWG, POWJ, POWZ) are included in this open water category when the photo evidence indicates that the area is covered by water the majority of the time.

Wetlands

This category includes wetlands visible on the photography with an area of at least 2 acres. Wetlands boundaries are delineated from U.S. Fish and Wildlife Service National Wetland Inventory data. In cases where these boundaries have changed (such as for drained wetlands), the boundaries are determined from the current photography.

U.S. Fish and Wildlife Service National Wetland Inventory types included in this category are semi-permanent palustrine emergent wetlands (PEMF and PEMY categories) and areas of semi-permanent palustrine open water (POWF) associated with PEMF through PEMY wetlands, as defined in the U.S. Fish and Wildlife Service National Wetland Inventory. These categories represent basins with deep-water emergents (primarily cattail, bulrush, and whitetop) and open water inclusions. Where U.S. Fish and Wildlife Service data are not available, wetland classification will be based on the distribution of visible deep-water emergents and open water inclusions.

Temporary, saturated, seasonal, and intermittently exposed palustrine wetlands will, in most cases, be mapped according to dominant cover type visible on the photography (e.g., open grassland, cultivated, grass-shrub-tree complex, etc.) rather than as wetlands.

MISCELLANEOUS

Gravel Pits and Open Mines

This category includes areas stripped of top soil with exposed substrate. Gravel pit areas that have been reclaimed either naturally or artificially are classified as the current cover type.

Bare Rock

This category includes areas of rock outcrops that lack appreciable soil development or vegetative cover.

Exposed Soil, Sandbars, and Sand Dunes

This category includes areas lacking appreciable plant cover that are not gravel pits or bare rock.

Unclassified

This category includes areas that could not be classified into any of the other categories.

Full MetaData Available Online Here: http://lucy.lmic.state.mn.us/metadata/luse89.html