

PL - 566 STUDY
FOR
BIG GREEN LAKE WATERSHED

Big Green Lake Watershed

PL-566 Study

prepared for:

Green Lake Association

Prepared by:

Green Lake County Department of Land Conservation

James A. Hebbe, County Conservationist
Brenda L. Sondalle, Clerk
Paul D. Gunderson, Soil Conservationist
Thomas J. Jonker, Land Conservation Technician

Under the supervision of:

Green Lake County Land Conservation Committee

Michael Stoddard, Chairman
Raymond Gregor, Vice-Chairman
Edward Wargula, Jr., Secretary
Kenyon Krueger
Joy Rowley
Roger Ladwig, ASCS

1. The first part of the report

is devoted to a general

description of the

method used in the

investigation.

The results of the investigation

are presented in the following

sections of the report.

The first section is devoted to

a description of the

apparatus used in the

investigation.

The results of the

investigation are

presented in the

following sections

TABLE OF CONTENTS

	Page
Introduction	1
Background	1
Big Green Lake Watershed Map	2
Trends	3 - 4
Looking At The Future	5
PL-566 Survey	6 - 7
PL-566 Survey Summary	8
Graphs and Charts:	
Water Quality	9
Program Leadership	9
Eminent Domain Power	10
Sechhi Disk Reading Averages	11
Phosphorus and Sediment Load and Yields	12
Letter of Recommendation	13 - 14
County Board Resolution	15
Summary	16
Recommendation	16

INTRODUCTION

In 1992, the Green Lake County Land Conservation Department was approached by the Green Lake Association to conduct a study to determine the feasibility of implementing a PL-566 project for the Big Green Lake Watershed.

BACKGROUND

Big Green Lake is the deepest lake in Wisconsin (237 ft) and considered to be one of the premier water bodies in southern Wisconsin. The Big Green Lake Watershed is located in Green Lake and Fond du Lac counties. Located within one hundred miles of the highly populated southeastern portion of Wisconsin, it offers numerous recreational opportunities.

A 1970 investigation by DNR found Big Green Lake to be relatively oligotrophic. The 1978 report by Donahue & Associates estimated an annual sediment load to Silver Creek at 450 tons/year and a total watershed yield of 2,025 tons/sediment/year. The 1988-93 average sediment loading reading from the USGS station at Silver Creek showed an average 1,568 tons/sediment/year compared to the 1978 model estimate of 450 tons/year. Interpolating that data in turn could state then that the total watershed sediment delivery is in the area of 7,047 tons/year.

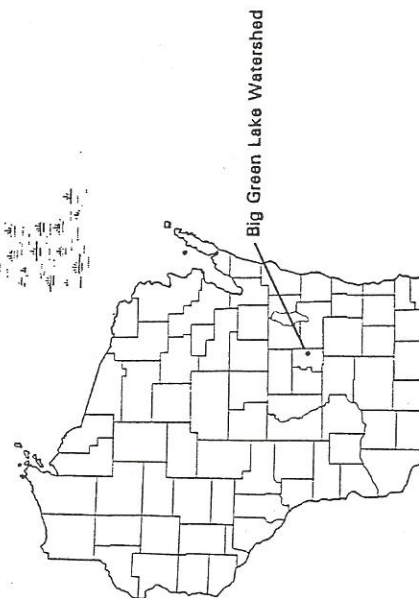
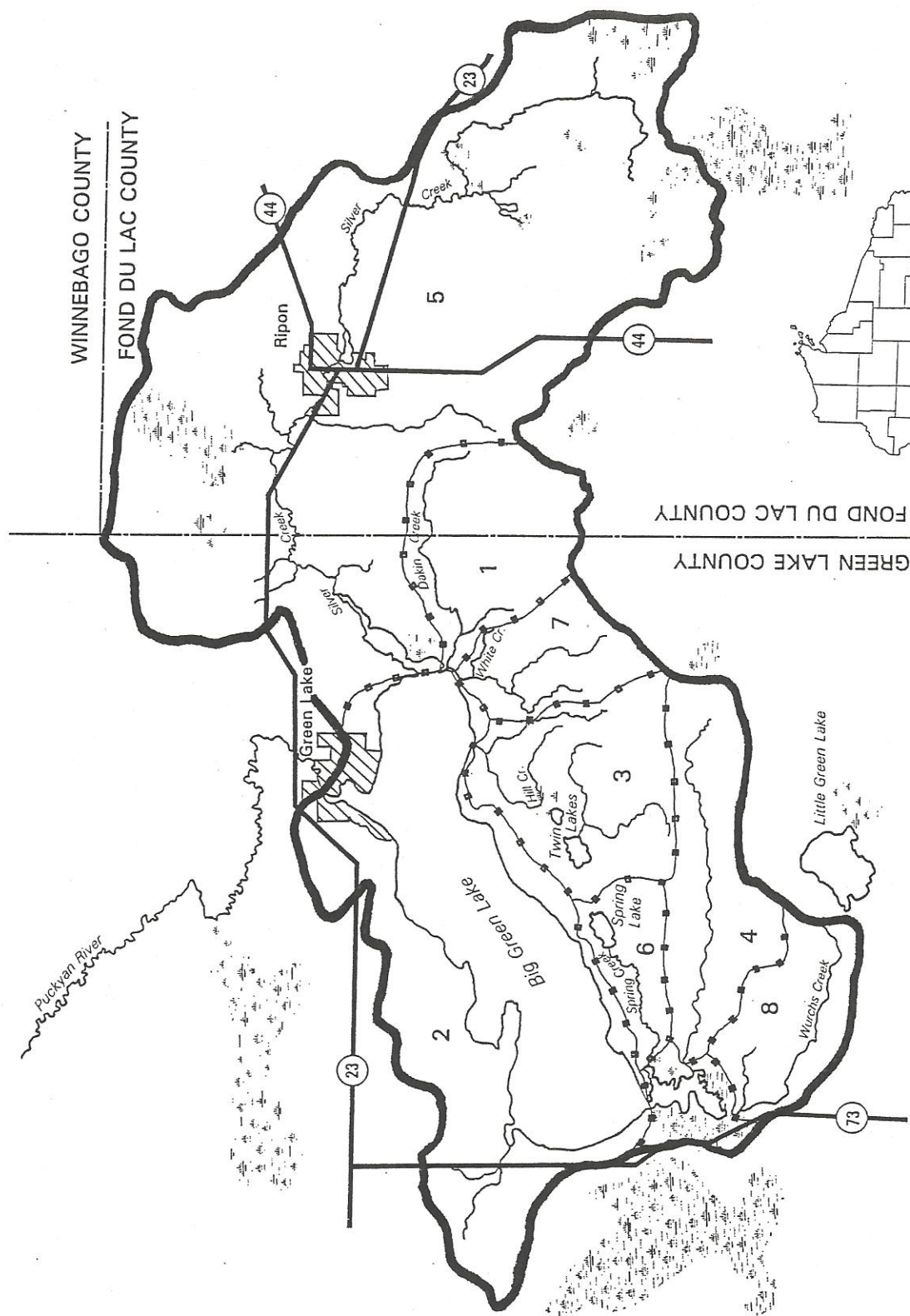
bad
modelling
or
wild
assumption

Using these figures indicates that a sediment loading of that amount is detrimental to the lake and must be reduced dramatically if water quality improvement is desired.

Big Green Lake Watershed

Subwatersheds:

- 1 DAKIN
- 2 DIRECT
- 3 HILL-TWIN LAKES
- 4 ROY
- 5 SILVER
- 6 SPRING
- 7 WHITE
- 8 WURCHS



TRENDS

The decreasing water quality trend for Big Green Lake appears to be leveling off. As recent as 1987 though, soil erosion and sediment delivery were considered out of control and the uncertainty of the continuing trend was of great concern to local officials. Several factors caused the worsening trend to level off.

- 1) The Federal Conservation Reserve Program (CRP) temporarily idled over 1,000 acres of Highly Erodible Land.
- 2) The Best Management Practices that were installed by cooperating landowners had a positive effect on reducing non-point pollution.
- 3) Conservation standards required by the Farmland Preservation Program (FPP) and Federal Commodity Programs caused many farmers to change towards more conservation oriented farming.
- 4) Overall environmental awareness by farmers and continued technological improvements are allowing farming to have better pollution control.

Although the trend was changed, soil erosion and livestock manure management are still causing great water quality degradation to Big Green lake. Some of the factors that contribute to water quality degradation are still in place such as:

- 1) Excessive soil preparation to plant a crop (excessive tillage). In particular, residue management cover levels are below for most landowners in contrast to what they could obtain.
- 2) Decrease in total ruminant livestock operations which results in less alfalfa or alfalfa grass rotations. Crops like alfalfa help reduce soil erosion.
- 3) Larger more concentrated livestock operations which in turn creates manure management problems such as lot runoff, inadequate amount of land available to handle the larger volume of animal waste.
- 4) Attractiveness by farmers to plant crops that can create

massive soil erosion. The crops (sweet corn, peas, snap beans) provide high economic returns (in comparison to traditional crops) to farmers who allow excessive sacrifice soil erosion for the economic return. It is not the crop causing the problem but rather the inability of many of the growers and industry to adopt modern day technology to control erosion by using conservation tillage practices.

- 5) Excessive tillage in the Fall months which in turn leaves the soil exposed to erosion for up to an additional six months of the year. Some farmers currently only have their soil protected for four months of the year or 33 percent of the time compared to many farmers who keep the ground covered for 9-12 months of the year. (The Soil Conservation Service (SCS) has recently changed the method of soil loss by crediting the erosion protection by additional time coverage of the soil - RUSLE.)

LOOKING AT THE FUTURE

Factors that will affect non-point pollution in the future.

- 1) Phase out of the Conservation Reserve Program will have a negative impact on water quality. Approximately 1,000 acres of land in the watershed are enrolled in this program. The soil erosion reduction on this amount of land results in a minimum reduction of 7,500 tons of soil loss annually. Sediment delivery reduction to the lake amounts to approximately 1,000 tons per year based on past county averages.
- 2) Possible crippling of the state Farmland Preservation Program. There is currently much discussion occurring with the property tax issue in Wisconsin. Farmers are presently being taxed unfairly with property taxes and the Farmland Preservation Program has never been revised to reflect the dramatic property tax increases of the 1980's and early 1990's. The Farmland Preservation Program was designed to help farmers maintain farmland areas along with a property tax credit to encourage participation.
- 3) Livestock Concentrations on Farms
While the number of livestock farmers continues to decline in Green Lake County and the watershed, the actual number of animals remains constant due to larger amounts on the livestock farms remaining. This concentration has a both positive and negative effect. The positive effect is that barnyard runoff problems are limited to fewer farms. Monitoring is easier due to the manageable numbers of farmers that the Land Conservation Department must deal with.
- 4) Residential Development in the watershed
This factor may be accelerated by the recent partial sewerage of Big Green Lake. Unchecked development along with poor planning results in construction site erosion along with negative watershed hydrology changes.

1. The first part of the document is a letter from the President of the United States to the Congress.

2. The second part is a report from the Secretary of the Treasury on the state of the Union.

3. The third part is a report from the Secretary of the Navy on the state of the Navy.

4. The fourth part is a report from the Secretary of the War on the state of the War.

5. The fifth part is a report from the Secretary of the Interior on the state of the Interior.

6. The sixth part is a report from the Secretary of the Agriculture on the state of the Agriculture.

7. The seventh part is a report from the Secretary of the Commerce on the state of the Commerce.

8. The eighth part is a report from the Secretary of the Education on the state of the Education.

9. The ninth part is a report from the Secretary of the Health on the state of the Health.

10. The tenth part is a report from the Secretary of the Labor on the state of the Labor.

11. The eleventh part is a report from the Secretary of the Finance on the state of the Finance.

12. The twelfth part is a report from the Secretary of the Justice on the state of the Justice.

13. The thirteenth part is a report from the Secretary of the State on the state of the State.

14. The fourteenth part is a report from the Secretary of the War on the state of the War.

15. The fifteenth part is a report from the Secretary of the Interior on the state of the Interior.

16. The sixteenth part is a report from the Secretary of the Agriculture on the state of the Agriculture.

17. The seventeenth part is a report from the Secretary of the Commerce on the state of the Commerce.

18. The eighteenth part is a report from the Secretary of the Education on the state of the Education.

19. The nineteenth part is a report from the Secretary of the Health on the state of the Health.

20. The twentieth part is a report from the Secretary of the Labor on the state of the Labor.

21. The twenty-first part is a report from the Secretary of the Finance on the state of the Finance.

22. The twenty-second part is a report from the Secretary of the Justice on the state of the Justice.

23. The twenty-third part is a report from the Secretary of the State on the state of the State.

24. The twenty-fourth part is a report from the Secretary of the War on the state of the War.

25. The twenty-fifth part is a report from the Secretary of the Interior on the state of the Interior.

26. The twenty-sixth part is a report from the Secretary of the Agriculture on the state of the Agriculture.

27. The twenty-seventh part is a report from the Secretary of the Commerce on the state of the Commerce.

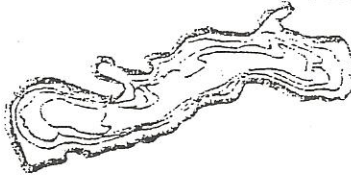
28. The twenty-eighth part is a report from the Secretary of the Education on the state of the Education.

29. The twenty-ninth part is a report from the Secretary of the Health on the state of the Health.

30. The thirtieth part is a report from the Secretary of the Labor on the state of the Labor.

**GREEN LAKE COUNTY
DEPARTMENT OF LAND CONSERVATION**

492 Hill Street-Courthouse
P.O. Box 3188



Green Lake, WI 54941-3188
414 / 294-4051

The Green Lake Association and the Green Lake County Land Conservation Committee have received a grant from the DNR to assess the feasibility of major structures to contain runoff in subwatershed area around Green Lake. In the past, efforts have been concentrated on dealing with problems on a voluntary farm by farm, field by field approach. Please fill out the following survey to give us your opinion as to the future direction in the control on non-point pollution to Green Lake.

1. Do you feel the water quality of Green Lake over the past few years is
☐ Improving
☐ Degrading
☐ Staying about the same

2. What do you feel are the major contributors of pollution to Green Lake? Number in order of largest impact (1) to least impact.
☐ Faulty septic systems
☐ Construction site runoff
☐ Runoff (cropland erosion, livestock manure runoff, gully erosion)
☐ Geese and other wildlife
☐ Boats (human impact - ie, gas & oil)
☐ Lawn fertilization
☐ Other _____

3. What amount of money do you think that local, State, Federal government, Sanitary District is spending on non-point pollution control for Green Lake?
☐ Less than \$25,000
☐ \$25,000 to \$75,000
☐ \$75,000 to \$150,000
☐ More than \$150,000

4. Who should take the lead on non-point pollution efforts around Green Lake in the future?
☐ Local (Citizen Action Committee)
☐ County
☐ Sanitary District
☐ Federal
☐ State
☐ Other _____

5. Is the amount now spent by local tax dollars for non-point pollution adequate?
☐ Yes
☐ No

6. What do you feel should be spent annually to help reduce non-point pollution?
- ☐ Less than \$25,000
 - ☐ \$25,000 to \$75,000
 - ☐ \$75,000 to \$150,000
 - ☐ More than \$150,000
7. Do you feel local government should use the powers of eminent domain if a landowner is unwilling to sell a piece of property that is required as part of a pollution control project?
- ☐ Yes
 - ☐ No
8. How would you feel about having this eminent domain decision if it affected your property?
- ☐ The same as Question 7
 - ☐ Different than Question 7. Explain _____
- _____
- _____

Comments _____

If you want a copy of the results, call LCC office at 294-4051 after February 5, 1993.

PL-566 SURVEY SUMMARY

IMPROVING

33% feel water quality is improving
75% feel pollution from runoff is the major contributor
60% feel that local government should take the lead
55% feel spending is adequate
40% agree with eminent domain

DEGRADING

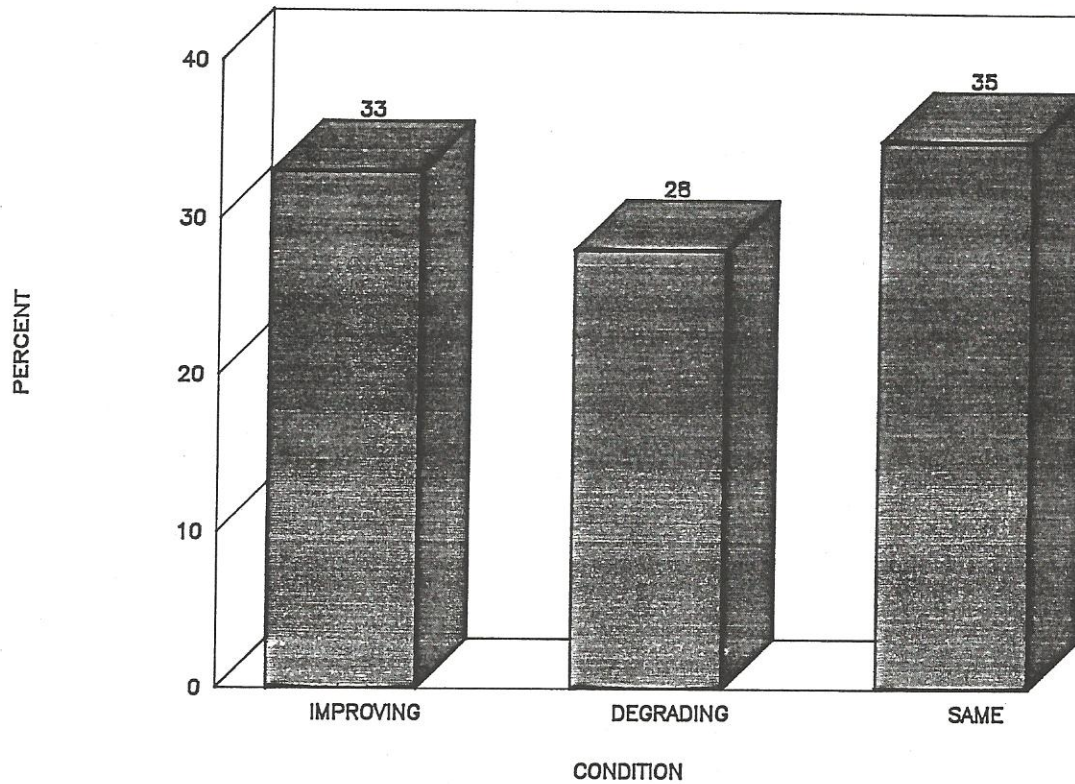
28% feel water quality is degrading
71% feel pollution from runoff is the major contributor
82% feel that local government should take the lead
47% feel spending is inadequate
24% feel spending is adequate
53% agree with eminent domain

STAYING THE SAME

35% feel that water quality is staying about the same
86% feel pollution from runoff is the major contributor
62% feel that local government should take the lead
43% feel spending is adequate
57% agree with eminent domain

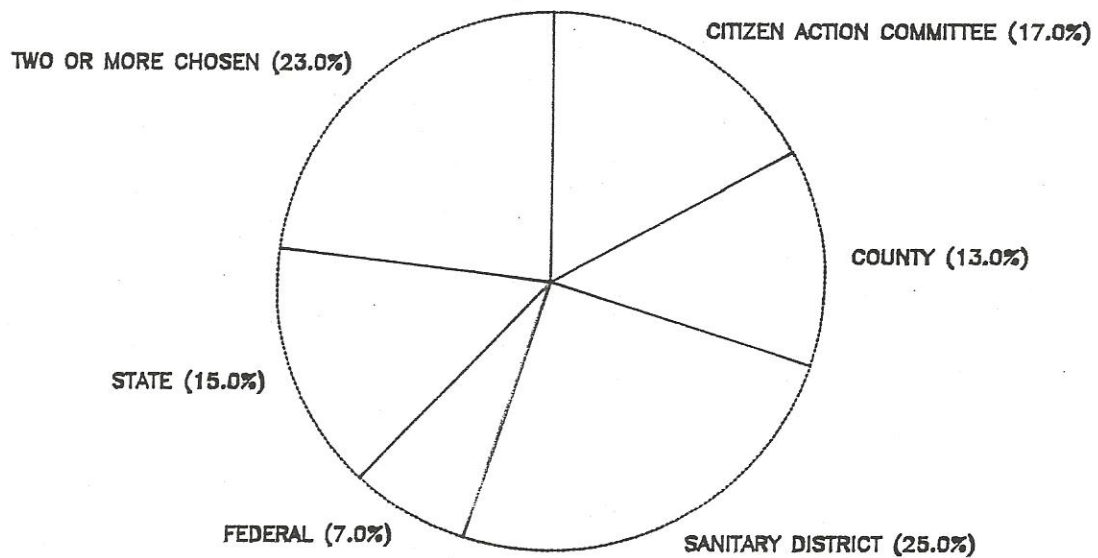
WATER QUALITY

BIG GREEN LAKE



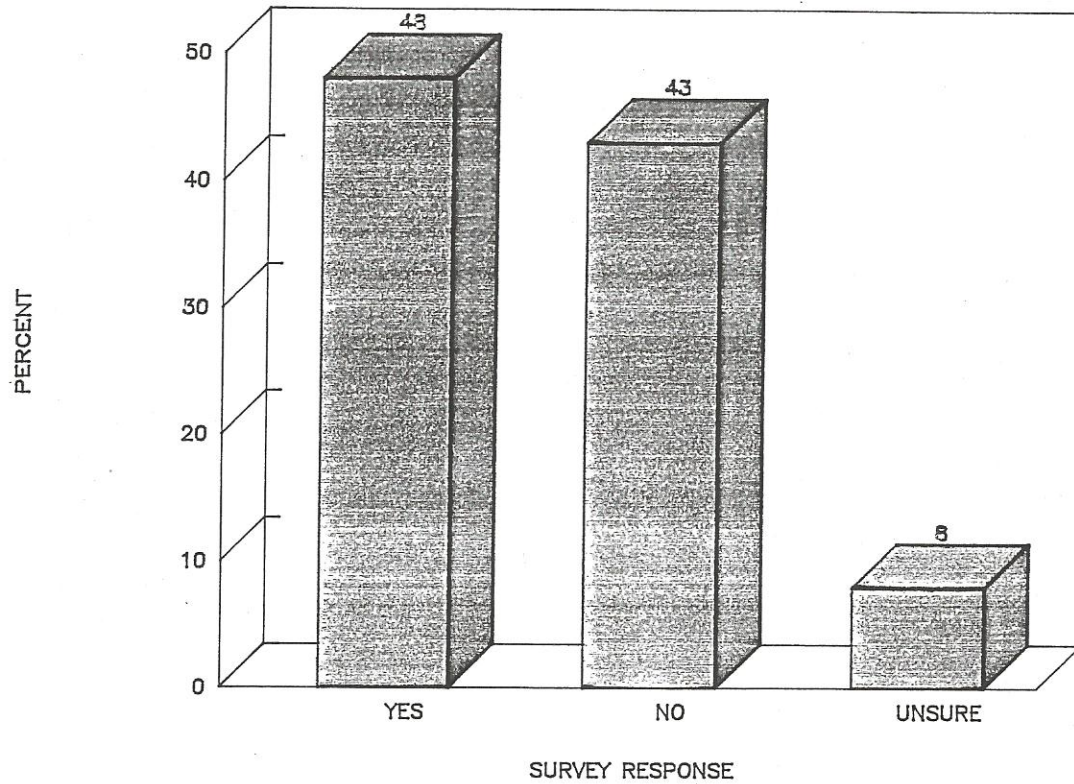
PROGRAM LEADERSHIP

UNIT OF GOVERNMENT



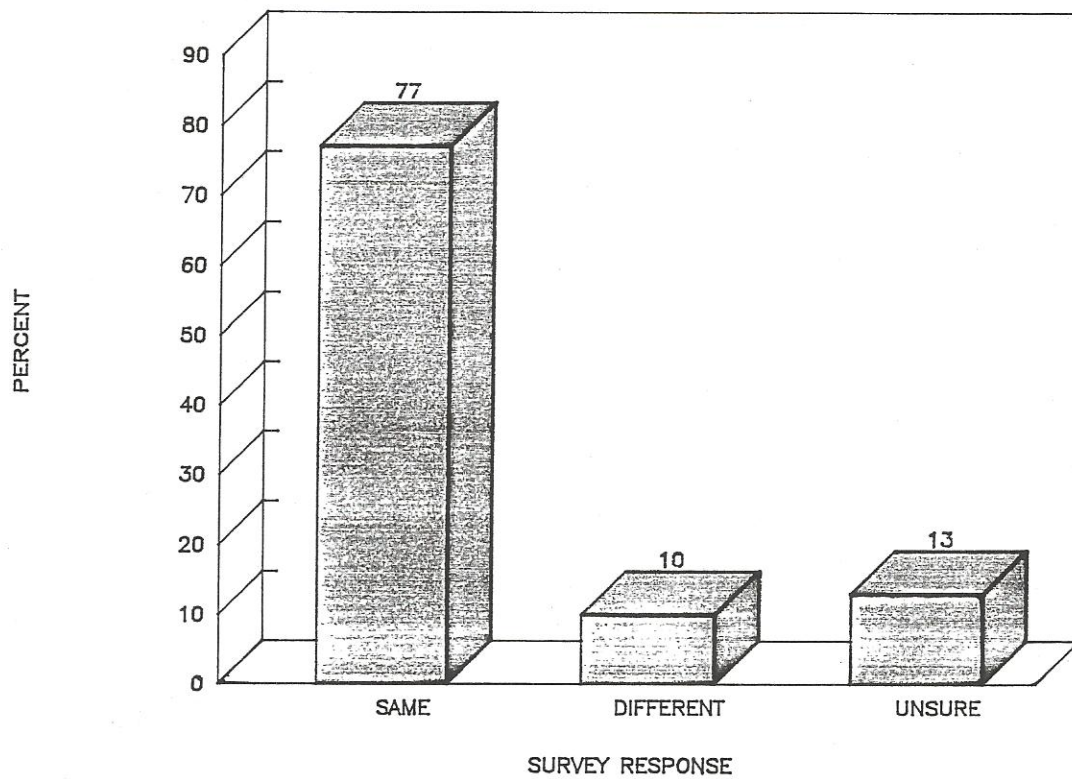
EMINENT DOMAIN POWER

SHOULD IT BE USED?



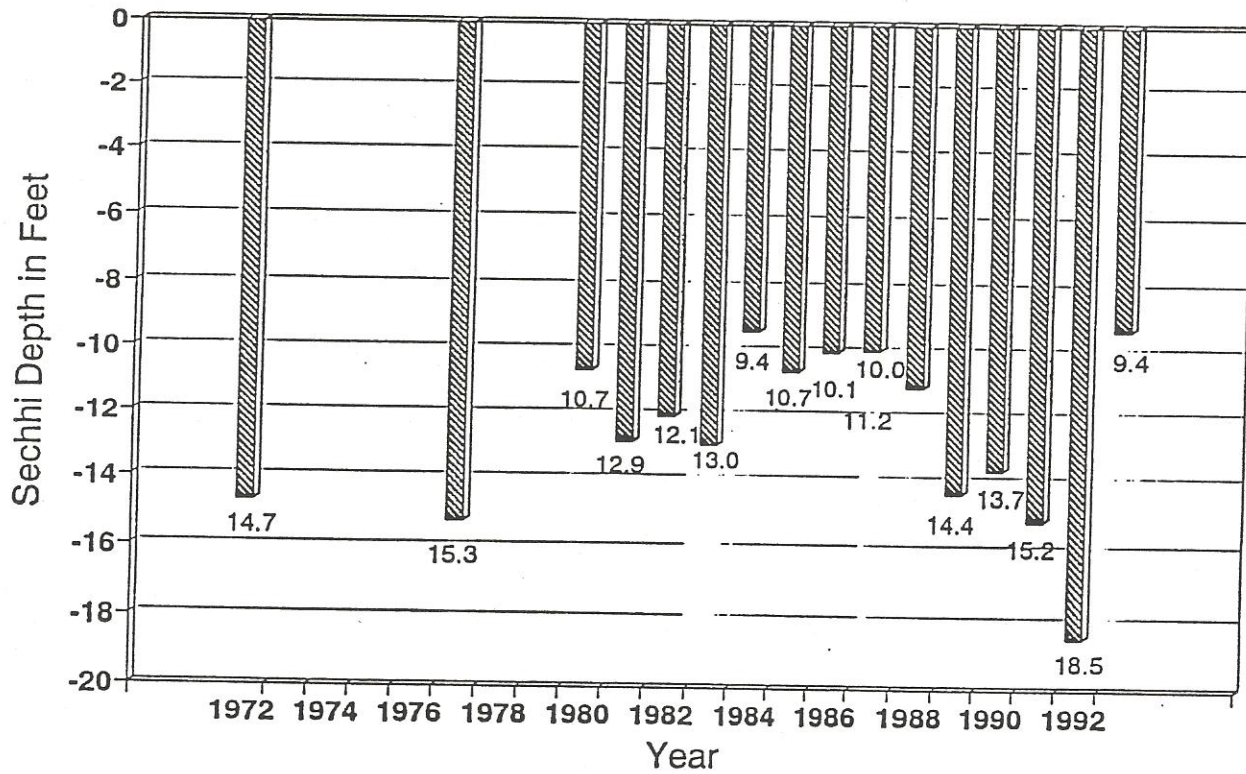
EMINENT DOMAIN POWER

WHAT IF IT'S YOUR PROPERTY?



GREEN LAKE - West & East Basins

Average of All Readings



Phosphorus Loads and Yields
At
Silver Creek and Green Lake Inlet

<u>Water Year</u>	<u>Silver Creek</u> (36.2 sq mi)		<u>Green Lake Inlet</u> (53.5 sq mi)	
	Load (lbs)	Yield (lbs/sq mi)	Load (lbs)	Yield (lbs/sq mi)
*1987	4,710	130	5,080	95
1988	6,370	176	6,010	112
1989	21,000	580	23,600	441
1990	16,800	464	17,300	323
1991	8,000	221	8,370	156
1992	16,800	464	17,250	322
1993	24,100	666	28,200	527
'88-'93 avg.	15,512	428	16,788	314

NOTE: Silver Creek receives about 3000 lbs/yr from Ripon sewage-treatment plant (personal communication, 1991, Ron Edwards, GLSD).

* Only Feb-Sept; all others Oct-Sept Data from USGS annual data reports 1987-1993

Suspended Sediment Loads and Yields
At
Silver Creek and Green Lake Inlet

<u>Water Year</u>	<u>Silver Creek</u> (36.2 sq mi)		<u>Green Lake Inlet</u> (53.5 sq mi)	
	Load (tons)	Yield (tons/sq mi)	Load (tons)	Yield (tons/sq mi)
*1987	269	7.4	501	9.4
1988	390	10.8	359	6.7
1989	1,690	46.7	2,010	37.6
1990	673	18.6	1,432	26.8
1991	639	17.7	604	11.3
1992	673	18.6	1,432	26.8
1993	1,730	47.8	3,570	66.7
'88-'93 avg.	966	26.7	1,568	29.3

* Only Feb-Sept; all others Oct-Sept

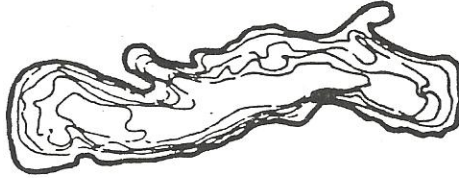
Data from USGS annual reports 1987-1993

GREEN LAKE SANITARY DISTRICT

P.O. Box 417

GREEN LAKE, WISCONSIN 54941

TEL. (414) 295-4488 FAX (414) 295-3111



July 29, 1994

Mr. Jim Hebbe
County Conservationist
Green Lake County
492 Hill St.
Green Lake, WI 54941

Re: PL-566 Study Recommendations

Dear Jim:

The Green Lake Sanitary District Commission reviewed the PL-566 study drafted by the Land Conservation Department. The Commission asked me to send a letter to the Land Conservation Committee in support of the study recommendation to apply for a PL-566 watershed project for the Big Green Lake Watershed.

We agree with the conclusions of the LCC study. As you know, the Sanitary District has monitored sediment and phosphorus loading into Silver Creek and White Creek since 1983. Over the years, our data has shown that both of these tributaries contribute significant loadings of sediment and phosphorus to Green Lake annually.

Your survey results show that of all people surveyed, greater than 75% of them believe that runoff is the major pollution source to Green Lake. It is also interesting to note that a majority of the people surveyed believe that local government should take the lead in responding to the problem. There appears to be broad public awareness and support for a PL-566 project in the watershed.

We firmly believe that any structure, including dams and retention basins, and best management practices that reduces the runoff to Green Lake provides direct water quality benefits. The community also benefits by maintaining a lake that is desirable for all types of recreational use.

You should also know that the Sanitary District Board of Commissioners recently created a Lake and Watershed Protection Fund that establishes a segregated, non-lapsing fund. This fund consists of:

Mr. Jim Hebbe
County Conservationist
July 29, 1994
Page 2

- All gifts, grants and bequests to the Fund;
- Any appropriations to the Fund approved by the Board of Commissioners;
- Any funds received from other units of government for the purposes of the Fund; and
- All investment income of the Fund.

Money in the Fund may be expended for costs associated with the acquisition of wetlands, highly erodible lands or other lands which contribute significantly to the protection or improvement of the water quality of Big Green Lake. The fund may also be used to cost-share the installation of nonpoint source water pollution best management practices on farms located in the watershed. The resolution establishing the fund, also allows the Sanitary District to seek and accept federal, state or private matching funds for the purposes described above.

Please keep us advised on the status of the LCC application for a USDA-Soil Conservation Service PL-566 watershed project. Also, if you need assistance in submitting an application please let us know. We are happy to assist you in any way that we can.

Thank you for your ongoing efforts to protect lakes and streams in Green Lake County.

Sincerely,

GREEN LAKE SANITARY DISTRICT

A handwritten signature in cursive script, appearing to read "Ron Edwards", with a long horizontal flourish extending to the right.

Ron Edwards
Administrator

RESOLUTION NUMBER 49-94

Relating to: Request to the Soil Conservation Service for a PL-566 Project

The County Board of Supervisors of Green Lake County, Green Lake, Wisconsin, duly assembled at its regular meeting begun on the 16th day of August, 1994, does resolve as follows:

WHEREAS, nonpoint pollution to Big Green Lake continues to be a major concern, and;

WHEREAS, the Land Conservation Committee has studied and approved a PL-566 report which was prepared by the Land Conservation Department, and;

WHEREAS, the Land Conservation Committee has received positive public support to request a project such as this, and;

WHEREAS, in order first to be selected as a PL-566 project the county must request the Soil Conservation Service to designate the Big Green Lake Watershed as a potential PL-566 candidate;

NOW THEREFORE, BE IT RESOLVED, that the Green Lake County Board of Supervisors authorizes the Green Lake County Land Conservation Committee to request the Soil Conservation Service to select Big Green Lake as a PL-566 project.

Roll Call on Resolution 49-94

Ayes 9, Nays 1, Absent 1, Abstain 0.

Passed and Adopted/Rejected this
16th day of August, 1994.

Dan Berlok
County Board Chairman

Margaret B. Bortlmann
ATTEST: County Clerk

Approved as to Form
Joe B. Lubing
Corporation Counsel

Submitted by Land Conservation Committee

Michael Stoddard
Michael Stoddard, Chairman

Raymond Gregor
Raymond Gregor, Vice-Chairman

Edward Wargula, Jr.
Edward Wargula, Jr., Secretary

Kenyon K. Krueger
Kenyon Krueger

Joy Rowley
Joy Rowley

Roger Ladwig
Roger Ladwig, ASCS

Room 110

SUMMARY

The Big Green Lake Priority Watershed Project which was funded mainly by the Wisconsin Department of Natural Resources along with local funding from the Green Lake Sanitary District as well as Green Lake County was considered a successful project. The trend of increasing pollution load to the lake was halted.

Much of the work done in the project focused on upland crop areas and barnyard runoff control. Very little work was done with stream bank stabilization or control of the channelized areas to the lake. A most urgent need remains to deal with these remaining problem areas.

A PL-566 project that would address these areas by constructing large scale dams would provide the ability to control the large storm surges. The dams would accomplish two important goals 1) protection of channel areas and 2) retention of sediment and solids which otherwise would reach the lake.

In areas where there has been non-cooperating or unconcerned landowners the structures would allow a reduction in pollutant load to the lake. Other positive benefits would include the possible development of enhanced wildlife areas.

RECOMMENDATION

It is the recommendation of the Green Lake County Land Conservation Committee that Green Lake County authorize the Land Conservation Committee to apply to the USDA-Soil Conservation Service for a PL-566 watershed project for Big Green Lake.

