

# Nonpoint Source Control Plan for the Rock Lake Priority Watershed Project



This plan was prepared under the provisions of the Wisconsin Nonpoint Source Pollution Abatement Program by the Wisconsin Department of Natural Resources, the Wisconsin Department of Agriculture, Trade and Consumer Protection, and the Jefferson County Land Conservation Department.

# Watershed Plan Organization Information

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# **Nonpoint Source Control Plan for the Rock Lake Priority Watershed Project**

**The Wisconsin Nonpoint Source Water Pollution Abatement Program**

**Plan approved December, 1997**

**Plan revised May, 2001**

**This plan was cooperatively prepared by:**

Wisconsin Department of Natural Resources,  
Wisconsin Department of Agriculture, Trade, and Consumer Protection,  
and the Jefferson County Land & Water Resources Department

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## LIST OF ACRONYMS

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<b>ACP</b>	Agricultural Conservation Program
<b>BARNY</b>	Barnyard nutrient analysis model
<b>BIM-GEO</b>	DNR Bureau of Information Management-Geographical Unit
<b>BMP</b>	Best Management Practice
<b>CAC</b>	Citizen Advisory Committee
<b>CFSA</b>	Consolidated Farm Services Agency (United States Department of Agriculture)
<b>COD</b>	Chemical Oxygen Demand
<b>CRP</b>	Federal Cropland Reserve Program
<b>CSA</b>	Cost share agreement
<b>DATCP</b>	Wisconsin Department of Agriculture, Trade, and Consumer Protection
<b>DILHR</b>	Department of Industry, Labor, and Human Resources
<b>DNR</b>	Wisconsin Department of Natural Resources
<b>FFA</b>	Future Farmers of America
<b>FOCS</b>	Field Offices Computing System
<b>FPP</b>	Wisconsin Farmland Protection Program
<b>FSA</b>	Food Security Act
<b>GW</b>	Groundwater
<b>I&amp;E</b>	Information and Education
<b>LCC</b>	Land Conservation Committee
<b>LWCB</b>	Land and Water Conservation Board
<b>NPM</b>	Nutrient and Pest Management
<b>NRCS</b>	Natural Resource Conservation Service
<b>SHS</b>	Wisconsin State Historical Society
<b>SIP</b>	Stewardship Incentive Program
<b>SOS</b>	Signs of Success Monitoring Program
<b>USEPA</b>	United States Environmental Protection Agency
<b>USDA</b>	United States Department of Agriculture
<b>USGS</b>	United States Geological Survey
<b>UWEX</b>	University of Wisconsin-Extension
<b>WGNHS</b>	Wisconsin Geological and Natural History Survey
<b>WPDES</b>	Wisconsin Pollutant Discharge Elimination System [permit system]
<b>WUWN</b>	Wisconsin Unique Well Number assigned to well sample sites



George E. Meyer  
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

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December 18, 1997

Mr. Lloyd A. Holterman, Chair  
Jefferson County Land Conservation Committee  
N7925 CTH X  
Watertown, WI 53094

Dear Mr. Holterman:

I am pleased to approve the Rock Lake Priority Lake Plan. This plan meets the intent and conditions of s. 281.65, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. This plan has been reviewed by the Department of Agriculture, Trade and Consumer Protection. This plan went before the Land and Water Conservation Board on December 2, 1997 and was approved at that time. My approval of the watershed plan completes the plan approval process as set forth in Wisconsin Statutes and allows the granting of funds through the Nonpoint Source Water Pollution Abatement Program. I am also approving the plan as an amendment to the Upper Rock River Basin Areawide Water Quality Management Plan.

I would like to express the Department's appreciation to the Jefferson County staff that participated in preparing the plan. We look forward to assisting Jefferson County and other units of government in the watershed in implementing the plan.

Sincerely,

George E. Meyer  
Secretary

cc: Mark Watkins - Jefferson County LCD  
Sue Porter - DATCP  
Ruth Johnson, DNR, Horicon  
Cindy Hoffland - CA/8  
Carolyn Betz - WT/2



RESOLUTION NO. 97-\_\_\_

WHEREAS, Resolution 95-33, adopted September 12, 1995, authorized the Land Conservation Committee to undertake the Rock Lake Priority Lake Project, and

WHEREAS, the Jefferson County Land Conservation Department, the Wisconsin Department of Natural Resources, and the Department of Agricultural Trade and Consumer Protection have prepared the Rock Lake Priority Lake Plan, which has been approved by the Jefferson County Land Conservation Committee, and

WHEREAS, approval of said plan by the Jefferson County Board will permit the Jefferson County Land Conservation Committee to be eligible for state grant funds for office operations and local cost sharing assistance to Jefferson County landowners,

NOW, THEREFORE, BE IT RESOLVED that the Jefferson County Board hereby approves the Rock Lake Priority Lake Project Plan.

BE IT FURTHER RESOLVED that the Land Conservation Committee is authorized to implement said plan.

AYES 30

NOES 0

ABSENT \_\_\_\_\_

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# Rock Lake Priority Lake Plan Summary

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## Introduction

The *Rock Lake Priority Watershed Project Plan* assesses the nonpoint sources of pollution in the Rock Lake watershed and guides the implementation of nonpoint source control measures. These control measures are needed to meet specific water resource objectives for Rock Lake and its tributaries. The primary objective of the project is to reduce nonpoint source pollution to Rock Lake, and to enhance and protect the water quality of Mud, Marsh, and Bean Lakes which are also located in the Rock Lake watershed.

Nonpoint sources of pollution that have been found in this watershed include: polluted runoff from barnyards and feedlots; sediment from cropland erosion; phosphorus and sediment from urban sources; ditchbank erosion; and to a limited extent, infiltration of pollutants to groundwater. The purpose of this project is to reduce the pollutant loadings originating from nonpoint sources that reach surface water and groundwater within the Rock Lake Priority Watershed Project area.

This plan was prepared by the Wisconsin Department of Natural Resources (DNR), the Department of Agriculture, Trade, and Consumer Protection (DATCP), and the Jefferson County Land Conservation Department (LCD). The DNR selected the Rock Lake watershed as a priority lake project through the Wisconsin Runoff Management Program in 1995. There are about 70 similar watershed projects statewide in which nonpoint source control measures are being planned and implemented. The Nonpoint Source Water Pollution Abatement Program was created in 1978 by the Wisconsin State Legislature. The program provides financial and technical assistance to landowners and local governments to reduce nonpoint source pollution.

The project is administered on the state level by the DNR and DATCP. Jefferson County will administer the project on the local level with assistance from the University of Wisconsin-Extension and the Natural Resources Conservation Service (U.S. Department of Agriculture).

## General Watershed Characteristics

The Rock Lake Watershed drains 12-square miles of land in northwestern Jefferson County, Wisconsin. The watershed is part of the Upper Rock River Basin. The watershed drains to Rock Creek which drains to the Crawfish River, a tributary of the Rock River. For this planning effort, the watershed was divided into 3 smaller drainage areas, called subwatersheds. They are Rock and Marsh Lakes, Bean Lake and Mud Lake.

Land use in the watershed, as shown in Table S-1, is mainly agricultural and is currently dominated by cash grain operations. The watershed population is approximately 4,600 people and has grown steadily over the past ten years. Most of the watershed population lives outside incorporated areas in small pockets of residential development or on farmsteads. A portion of the City of Lake Mills is in the watershed.

Land Use	Acres	Percent of Watershed
Agricultural	4377	57
pasture	(233)	(3)
cropland	(4144)	(54)
Woodland	373	5
Developed	980	13
Wetlands <sup>1</sup>	1950	25
Total	7,680	100%

<sup>1</sup> These are estimates of wetland acres based on NRCS data.

Source: Jefferson County LCD

## Water Quality

Rock Lake is a 1160-acre natural glacial lake that is 57-feet deep. It is considered one of the best quality lakes in southern Wisconsin, and is used extensively for recreational purposes. Rock Lake supports a diverse fisheries with 32 species identified. Primary gamefish include northern pike, largemouth bass, smallmouth bass and walleye. A ten-foot dam constructed in 1865 artificially altered the water level and created Marsh Lake (211 acres) south of Rock Lake. Marsh Lake supports excellent native aquatic plant beds and is a popular early season largemouth bass and panfish angling site.

Mud Lake is a small drainage lake located within the wetlands south of Rock Lake. It is 93 acres with a maximum depth of 22 feet. The Lake Mills Wildlife Area encompasses the lake and provides access for non-motorized watercraft. The lake is a popular angling site in the spring and shortly after ice cover.

Bean Lake is a 33-acre, landlocked shallow lake surrounded by over 280-acres of tamarack which is part of the Bean Lake Scientific Area. The lake supports native aquatic plants and stunted panfish. The combined wetlands and basins within the wildlife and scientific areas support rare herptiles, plants and habitats as well as abundant migrating waterfowl populations.

The lakes of the watershed are not reaching their highest water quality potential uses due to pollution from nonpoint sources. Sediment and phosphorus from eroding croplands, shorelines and ditchbanks, and improperly maintained construction sites are the major sources of nonpoint pollution in the watershed. Rock Lake is sensitive to runoff and shows the best water clarity during drought years when polluted runoff does not reach the lake. Mud, Marsh and Rock Lakes function as a chain with Mud and Marsh Lakes trapping the over 60% of the upland loadings before draining to Rock Lake.

An assessment of groundwater quality was completed by sampling 18 private wells for nitrate + nitrite and triazine. Results show that of the well samples collected, 11 percent had nitrate levels over the enforcement standard (health advisory level) of 10 milligrams per liter (mg/L), and 22 percent had nitrate levels between 2 mg/L and 10 mg/L. Nitrate + Nitrite levels greater than 2 mg/L (the preventative action limit) show that human activities are affecting groundwater quality.

## **Sources of Water Pollution**

The Jefferson County LCD collected data on all agricultural lands, barnyards, manure storage sites, ditchbanks, and urban areas in the watershed. These data were used to estimate the pollutant potentials of these nonpoint sources. The amount of phosphorus and sediment carried in runoff from each source was calculated. From that information, the project goals were established to result in improvement or maintenance of existing water quality.

In the Rock Lake watershed, approximately 31% of the total sediment pollution is contributed from upland agricultural erosion. About 26% of the sediment is derived from upland agricultural erosion. About 26% of the sediment is from construction sites, and 14% originates from ditchbank erosion. The remainder (3%) is from existing urban areas.

In the Rock Lake watershed, approximately 56% of the phosphorus load is coming from upland agricultural erosion. About 12% of the phosphorus is from shoreline erosion, and 13 percent from construction site erosion. The remainder is from ditches (8%), existing urban areas (6%), and lastly, barnyards (4%).

The results of the investigations of nonpoint sources are summarized below:

### ***Barnyard Runoff Inventory:***

23 barnyards were assessed.

These barnyards were found to contribute 146 pounds (4%) of phosphorus to surface waters annually.

### ***Ditchbank Erosion Inventory Results:***

9 miles of ditchbanks were inventoried; all showed signs of erosion, but none of it is severe.

210 tons of sediment delivered are delivered annually (14% of total sediment load).

298 pounds of phosphorus are delivered with eroding soils (9% of total phosphorus load).

***Shoreline Erosion Inventory:***

1.75 miles of the Rock Lake shoreline were found to have either severe or moderate eroding sites.

370 tons of sediment are delivered annually (26% of total sediment load).

423 pounds of phosphorus are delivered annually (12% of total phosphorus load).

***Upland Sediment Inventory (cropland and other agricultural sources):***

2,800 acres or 100% of agricultural land were inventoried.

446 tons of sediment are delivered to downstream waterbodies (31% percent of total sediment load).

2,011 pounds of phosphorus are delivered annually (50% of the total phosphorus load).

***Urban Inventory Results:***

628 acres of existing urban areas were inventoried.

50 tons of sediment are delivered annually from existing urban areas (3% of the total sediment load).

236 pounds of phosphorus are delivered annually from existing urban areas (6% of the total phosphorus load).

About 7 acres per year are being developed.

About 370 tons of sediment are delivered annually from construction sites (26% of the total sediment load).

About 472 pounds of phosphorus are delivered annually from construction sites (13% of the total phosphorus load).

***Wetland Inventory Results:***

1,950 acres are existing wetlands.

1,300 acres are owned by the Department of Natural Resources.

1,311 acres are farmed wetlands.

40% of the original wetlands have been converted

# Pollutant Reduction Goals

Pollutant load reductions are developed according to activities needed to achieve the water quality objectives. The following is a summary of reductions to be targeted for the entire watershed.

**Sediment Goal:** Reduce overall sediment delivered to receiving waterbodies by 43%. To meet this goal, the following is needed:

- 50% reduction (223 tons) in sediment delivered to all waterbodies from agricultural uplands in all subwatersheds.
- 50% reduction (186 tons) in shoreline sediment delivered to Rock Lake.
- 50% reduction (25 tons) in sediments coming from existing urban sources.
- 50% reduction (185 tons) in sediment from construction sites.

**Phosphorus Goal:** Reduce overall phosphorus load to receiving waterbodies by 42%. To meet this goal, the following is needed:

- 50% reduction (1,006 pounds) in phosphorus from agricultural uplands.
- 50% reduction (212 pounds) in phosphorus from eroding shorelines.
- 25% reduction (59 pounds) in phosphorus coming from urban sources.
- 50% reduction (236 pounds) in phosphorus coming from construction sites.

In addition, this plan calls for a restoration of approximately 100 acres of degraded or prior converted wetlands.

## Management Actions

Management actions are described in terms of best management practices (BMPs) that are needed to control nonpoint sources to the pollutant levels described above. Cost-share funds for installing pollutant control measures will be targeted at operations which contribute the greatest amounts of pollutants. Cost-share funds will be available through the Wisconsin Runoff Management Program for certain BMPs. As shown in Table S-2, cost-share rates range from 50 to 70 percent. The landowner bears the additional cost.

The Jefferson County LCD will contact all landowners who are eligible to receive cost-share funds during the project's implementation. All critical sites of nonpoint pollutants must be

controlled if a landowner wishes to participate in any aspect of the program. Critical sites represents the level of pollution control needed to achieve a significant portion of the water quality goals in the watershed. Eligible sites contribute less of the pollutant load than critical sites. They are included in cost sharing eligibility to further insure that water quality goals are met. Controlling sources with eligible sites is not mandatory for a landowner to accept funding to control other sources.

The Jefferson County LCD will assist landowners in applying BMPs. Practices range from alterations in farm management (such as changes in manure-spreading and crop rotations) to engineered structures (such as diversions, sediment basins, and manure storage facilities), and are tailored to specific landowner situations.

The following is a brief description of critical nonpoint pollutant sources, project eligibility criteria, and BMP design targets for the project.

- **Agricultural Lands**

All agricultural lands delivering sediment to streams or ditches at a rate greater than T and greater than 0.30 tons/acre/year will be classified as critical sites and must be brought down below T and delivering sediment at a rate of no more than 0.17 tons per acre per year. This involves an estimated 18 critical acres of cropland to control 7% of the upland sediment and 7% of the phosphorus in the watershed. Other agricultural lands that are eligible for participation are those delivering sediment to streams or ditches at a rate greater than 0.20 tons per acre per year. This would control 53% percent of the upland sediment and 37% of the phosphorus being delivered to downstream waterbodies in the watershed.

The BMPs identified by the Jefferson County LCD emphasize both improving farm management and controlling pollutants. Table S-2 shows the eligible practices and cost-share rates.

- **Animal Lots**

At this time in the Rock Lake watershed there are no critical or eligible barnyards. However, criteria have been established to prevent water quality degradation in the future. Any barnyard contributing 100 lbs or more will be considered a critical site. Critical site barnyards will be eligible for full barnyard systems. Any barnyard contributing 60-100 pounds of phosphorus will be eligible for clean water diversions.

- **Ditchbanks**

There are no critical or eligible ditchbanks in the Rock Lake Watershed. However, criteria have been established to prevent water quality degradation in the future. Ditchbanks with a lateral recession rate of greater than 0.5 feet per year will be considered a critical site. Those with lateral recession rates between 0.1 and 0.5 feet per year will be eligible for cost sharing. Lateral recession rates less than 0.1 foot/year will not be eligible for cost sharing.



Ditchbank erosion may be controlled within the watershed through other mechanisms. There is continuous sign-up for the Conservation Reserve Program (administered by Farm Service Agency) where farmers can be compensated for taking highly erodible or environmentally sensitive lands out of production.

Cost sharing by the Runoff Management Program will also not be available for ditchbanks in areas where there are active drainage districts. Ditches located in an active drainage district are required to be maintained through buffers and shaping and seeding to prevent erosion.

- **Shoreline**

Shoreline erosion on Rock Lake contributes 26% of the overall sediment delivered in the watershed. Critical sites for shoreline erosion those shorelines with a bank height of at least 3 feet, a lateral recession rate of greater than 0.5 feet per year, and banks with at least 50% exposed soil. About 450 feet in the watershed are considered critical sites.

Shorelines categorized as severely eroding are those with a lateral recession rate of at least 0.5 feet per year. These are eligible to receive cost-share dollars at a maximum rate of \$30.00 per linear foot. About 1,600 feet of shoreline (5%) meet this criterion. Other eligible sites are those with moderate erosion. Moderate sites are defined as having shorelines with a lateral recession rate of at least 0.1 feet per year but less than 0.5 feet per year. These sites are only eligible for establishing shoreline buffer areas. Around 7,600 feet of shoreline (23%) are categorized as moderately eroding.

Priorities will be set for shoreline erosion control: the first choice will be to install environmentally sound practices, such as a bioengineering approach. Second will be low cost alternatives. The final choice will be riprap.

- **Urban**

Sediment contributions from existing urban areas will be reduced by 50% through better management practices. Phosphorus will be reduced by 25% from existing urban areas. Sediment contributions from construction sites, which currently contribute 26% of the total load to receiving waterbodies, will be reduced by 50%. Phosphorus will be reduced by 50% from construction sites. This will be achieved by better enforcement of existing or amended construction site erosion control ordinances, and through training and educational opportunities with builders, contractors and developers.

**Table S-2. State Cost-Share Rates for Best Management Practices**

BEST MANAGEMENT PRACTICE	STATE COST SHARE RATE
Contour and field strip-cropping	50% <sup>1</sup>
High residue management systems	50%
Cropland protection cover (green manure	50%
Nutrient/Pest management (not to exceed 3 years)	50%
Livestock fencing	50%
Intensive grazing management	50% <sup>4</sup>
Manure storage facilities - for first \$20,000 costs	70% <sup>5</sup>
Manure storage facilities - for remaining costs	50% <sup>5</sup>
Pesticide spill control facilities	70%
Animal waste system storage abandonment	70%
Field Diversions	70%
Terraces	70%
Grassed waterways	70%
Critical area stabilization	70%
Grade stabilization structures	70%
Agricultural sediment basins	70%
Shoreline buffers	70%
Wetland restoration	70%
Barnyard runoff management	70%
Animal lot abandonment or relocation	70%
Roofs for barnyard runoff management and manure storage facilities	70%
Milking center waste control	70%
Cattle mounds	70%
Well abandonment	70%

<sup>1</sup>Wildlife habitat recreation has a state cost-share rate of 70%

<sup>2</sup>Spill control facilities have a state cost-share rate of 70%

<sup>3</sup>The maximum cost-share rate for land acquisition, storm sewer rerouting, and removal of structures necessary to install structural urban best management practices is 50%

<sup>4</sup>The maximum cost-share rate per watering system is \$2,000

<sup>5</sup>The maximum cost-share rate for manure storage facilities may not exceed \$35,000 total per facility. (See NR 120 for more details)

# Funds Needed for Cost Sharing, Staffing, and Educational Activities

Grants will be awarded to Jefferson County by the DNR for cost sharing, staff support and educational activities. Table S-3 includes estimates of the financial assistance needed to implement needed nonpoint source controls in the Rock Lake Watershed, assuming a 75 percent participation rate of eligible landowners.

Eligible Activity	Total Cost <sup>1</sup>	State Share <sup>1</sup>	Local Share <sup>1</sup>
Cost Sharing: Practices	\$319,291	\$217,223	\$102,068
Easements and Land Acquisition	84,376	79,688	4,688
Jefferson County Staffing	283,781	283,781	0
Educational Activities	10,000	10,000	0
Other Direct (travel, supplies, etc.)	65,025	65,025	0
Totals	\$762,473	\$655,717	\$106,756

<sup>1</sup> Estimates based on 75% participation.

## Project Implementation

Project implementation is scheduled to begin in 1998. It will run for six years, or until the end of 2004. The first five years of implementation is the period for participants to sign cost-share agreements. There is a six-year period for practice installation. While an eligible landowner or operator has five years to determine whether to participate in the program, the installation of BMPs can usually begin as soon as a landowner has signed a cost-share agreement with the Jefferson County LCD.

## Information and Education

An information and education program will be conducted throughout the project period with the Jefferson County LCD having overall responsibility for the program. University of Wisconsin-Extension staff will provide assistance. This program will be most intensive

during the first three years of the project as landowners and local governments sign up for state cost sharing for pollution control. The program includes:

- Intensive educational activities, such as meetings, workshops, tours, and demonstration projects for landowners and local government officials who must adopt new pollution control techniques.
- Water quality newsletters that will inform farmers, local government officials, community groups, and concerned citizens about watershed activities, implementation processes, and pollution control methods.
- Educational activities and service projects to inform youth about water resource issues and help them develop a conservation ethic.

## Project Evaluation and Monitoring

The evaluation strategy for the project involves the collection, analysis, and reporting of information so that progress may be tracked in three areas:

- **Administrative:** This category includes the progress in providing technical and financial assistance to eligible landowners, and carrying out education activities identified in the plan. The Jefferson County LCD will track the progress in this area and report to the DNR and DATCP quarterly.
- **Pollutant Reduction Levels:** The Jefferson County LCD will calculate the reductions in nonpoint source pollutant loadings resulting from changes in land use practices and report to the DNR and DATCP at an annual review meeting.
- **Water Resources:** The DNR will monitor changes in water quality, habitat, and water resource characteristics periodically during the project and at the end of the project period.

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# **CHAPTER ONE**

## **Purpose, Legal Status and General Description**

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### **Wisconsin Nonpoint Source Water Pollution Abatement Program**

The State Legislature created the Wisconsin Nonpoint Source Water Pollution Abatement Program in 1978. The goal of the Program is to improve and protect the water quality of streams, lakes, wetlands, and groundwater by reducing pollutants from urban and rural nonpoint sources. The 12-square-mile Rock Lake Watershed, located in Jefferson County, was designated a "Priority Lake Project" in 1996. The primary objective of this project is to reduce nonpoint source pollution loads and to enhance and protect the water quality of Rock Lake. The Rock Lake Watershed is part of the Upper Rock River Basin.

Nonpoint sources of pollution in the watershed include: eroding agricultural lands, eroding ditchbanks, runoff from livestock wastes, agricultural practices, erosion from developing areas, runoff from established urban areas and shoreline erosion. Pollutants from nonpoint sources are carried to the surface water or groundwater through rainfall runoff or seepage, and snowmelt.

The following is an overview of the Nonpoint Source (NPS) Priority Watershed program:

- The Department of Natural Resources (DNR) administers the program in cooperation with the Department of Agriculture, Trade and Consumer Protection (DATCP). Wisconsin is divided into 333 discrete hydrologic units called watersheds. These watersheds are assessed for water quality concerns as part of a comprehensive basin planning program. Watersheds with a high degree of water quality impairment from nonpoint sources of pollution became eligible for consideration as a priority watershed project between 1978 and 1996. A total of 24 watersheds (large and small-scale) are completed, and 64 are underway in the implementation phase. Priority watershed projects are no longer being selected through this process. Designation as a priority watershed project enabled special financial support to local governments and private landowners in the watershed to reduce nonpoint source pollution.
- A priority watershed project is guided by a plan such as this one that is prepared cooperatively by the DNR, DATCP and local units of government, with input from a local citizen's advisory committee. Project staff evaluate the conditions of surface water and groundwater, and inventory the types of land use and nonpoint sources of pollution throughout the watershed. The priority watershed plan

assesses nonpoint and other sources of water pollution and identifies best management practices (BMPs) needed to control pollutants to meet specific water resource objectives. The plan guides implementation of these practices in an effort to improve water quality.

- Upon approval by state and local authorities, local units of government implement the plan. Water quality improvement is achieved through mandatory and voluntary implementation of nonpoint source controls (BMPs) and the adoption of ordinances. Landowners, land renters, counties, cities, villages, towns, sanitary districts, lake districts, and regional planning commissions are eligible to participate.
- Technical assistance is provided to aid in the design of BMPs. State level cost-share assistance is available to help offset the cost of installing these practices. Eligible landowners and local units of government are contacted by the local staff to determine their interest in installing the BMPs identified in the plan. Signed cost-share agreements list the practices, costs, cost-share amounts and a schedule to install management practices. Municipal governments are also assisted in developing and installing BMPs to reduce urban pollutants.
- Informational and educational activities are developed to encourage participation.
- The DNR and DATCP review the progress of the counties and other implementing units of government, and provide assistance throughout the length of the project which is usually ten years. The DNR monitors improvements in water quality resulting from control of nonpoint sources in the watershed.

## **Legal Status of the Nonpoint Source Control Plan**

The Rock Lake Priority Watershed Plan was prepared under the authority of the Wisconsin Nonpoint Source Water Pollution Abatement Program described in Section 144.25 of the Wisconsin Statutes and Chapter NR 120 of the Wisconsin Administrative Code. It was prepared through the cooperative efforts of the DNR, DATCP, and the Jefferson County Land and Water Conservation Department.

This watershed plan is the basis for the DNR to enter into cost-share and local assistance grants with agencies responsible for project implementation and will be used as a guide to implement measures to achieve desired water quality conditions. If a discrepancy occurs between this plan and the statutes or the administrative rules, or if statutes or rules change during implementation, the statutes and rules will supersede the plan. This watershed plan does not in any way preclude the use by local, state or federal governments of normal regulatory procedures developed to protect the environment. All local, state and federal permit procedures must be followed. In addition, this plan does not preclude the DNR from using its authority under Chapters 147 and 144 of the State Statutes to regulate significant nonpoint pollution sources in the project area.

This priority watershed plan was approved by DNR following approvals by the Land and Water Conservation Board, and Jefferson County Board of Supervisors.

## **Amendments to the Plan**

This plan is subject to the amendment process under NR120.08(4) for substantive changes. The Department of Natural Resources will make the determination with the local sponsors if a proposed change will require a formal plan amendment.

## **Relationship of the Nonpoint Source Control Plan to the Stormwater Discharge Permit Program**

Wisconsin's Pollution Discharge Elimination System (WPDES) Storm Water Permit Program is administered by DNR's Bureau of Watershed Management under Chapter 147 of the Wisconsin Statutes. This program applies to certain classes of dischargers statewide as identified in NR 216. In some cases, implementation grants may only apply to activities identified in the watershed plan. Practices to control construction site erosion and storm water runoff from new development are not eligible for cost sharing. In industrial areas, cost sharing is available as specified in NR 120.10 (1)(g) — only in the non-industrial parts of facilities where a problem has also been identified in the priority watershed plan.

# **Priority Watershed Project Planning and Implementation Phases**

## **Planning Phase**

The planning phase of the Rock Lake Priority Lake Project began in 1996. The following information gathering and evaluation activities were completed during this stage:

- Determination of the conditions and uses of groundwater, ditchbanks, streams, and lakes.
- Inventory of the types of land uses and severity of nonpoint sources affecting groundwater, streams and lakes.
- Evaluation of the types and severity of other factors which may be affecting water quality. Examples include discharges from municipal wastewater treatment plants and natural or endemic stream conditions. (This has been completed through the ongoing integrated resource management planning efforts in the Upper Rock River Basin).
- Determination of nonpoint source controls and other measures necessary to improve and/or protect water quality.
- Preparation and gaining approval of a program for local implementation of the project so that plan recommendations would be carried out.

## **Implementation Phase**

The implementation phase of the Rock Lake Priority Watershed Project began in 1999 following review of the draft priority watershed plan, a public hearing, and approval by the DNR, LWCB, and the Board of Supervisors for Jefferson County. Public review during plan development occurred primarily through the efforts of the Rock Lake Priority Watershed Citizen Advisory Committee.

During the implementation phase:

- DNR enters into local assistance agreements with local units of government that have implementation responsibilities identified in the plan. These agreements provide funds necessary to maintain the resources and staff required for plan implementation.
- In the rural portions of the watershed, the Jefferson County Land and Water Conservation Department contact eligible landowners to determine their interest in installing best management practices identified in the plan.

In the urban portions of the watershed, the DNR or its designee contacts local units of government to discuss in detail the required actions for implementing the plan recommendations.

- In rural areas, the landowner signs a cost-share agreement with the county that outlines the practices, costs, cost-share amounts and a schedule for installation of management practices. Practices are scheduled for installation after an agreement is signed. Practices must be maintained for at least 10 years. Easements must be perpetual.

In urban areas, similar processes are used. In some cases, the local units of government and the DNR sign agreements for urban practices. In other cases the agreements will be between local units of government and their private landowners.

## **Location and Community Information**

The Rock Lake Priority Watershed is a 12-square-mile drainage basin located approximately 25 miles east of Madison, Wisconsin. The watershed is part of the Upper Rock River Basin. Rock Lake itself is in the northern portion of the watershed. The land use in the watershed includes residential land use in the City of Lake Mills, agriculture, including row crops, pasture, hayfields, and conservation preserve land, woodlands, and wetlands. The majority of the watershed is in agricultural uses. Wetlands comprise approximately a quarter of the watershed land cover and surround the main tributary entering Rock Lake. Mud, Marsh, and Bean Lakes are also located in the watershed. Map 1-1 is a map of Rock Lake and its watershed.



## **Civil Divisions**

The Rock Lake watershed lies within Jefferson County. Incorporated areas in the watershed include part of the City of Lake Mills. Public land within the watershed includes the Bean Lake Natural Area and other DNR public lands.

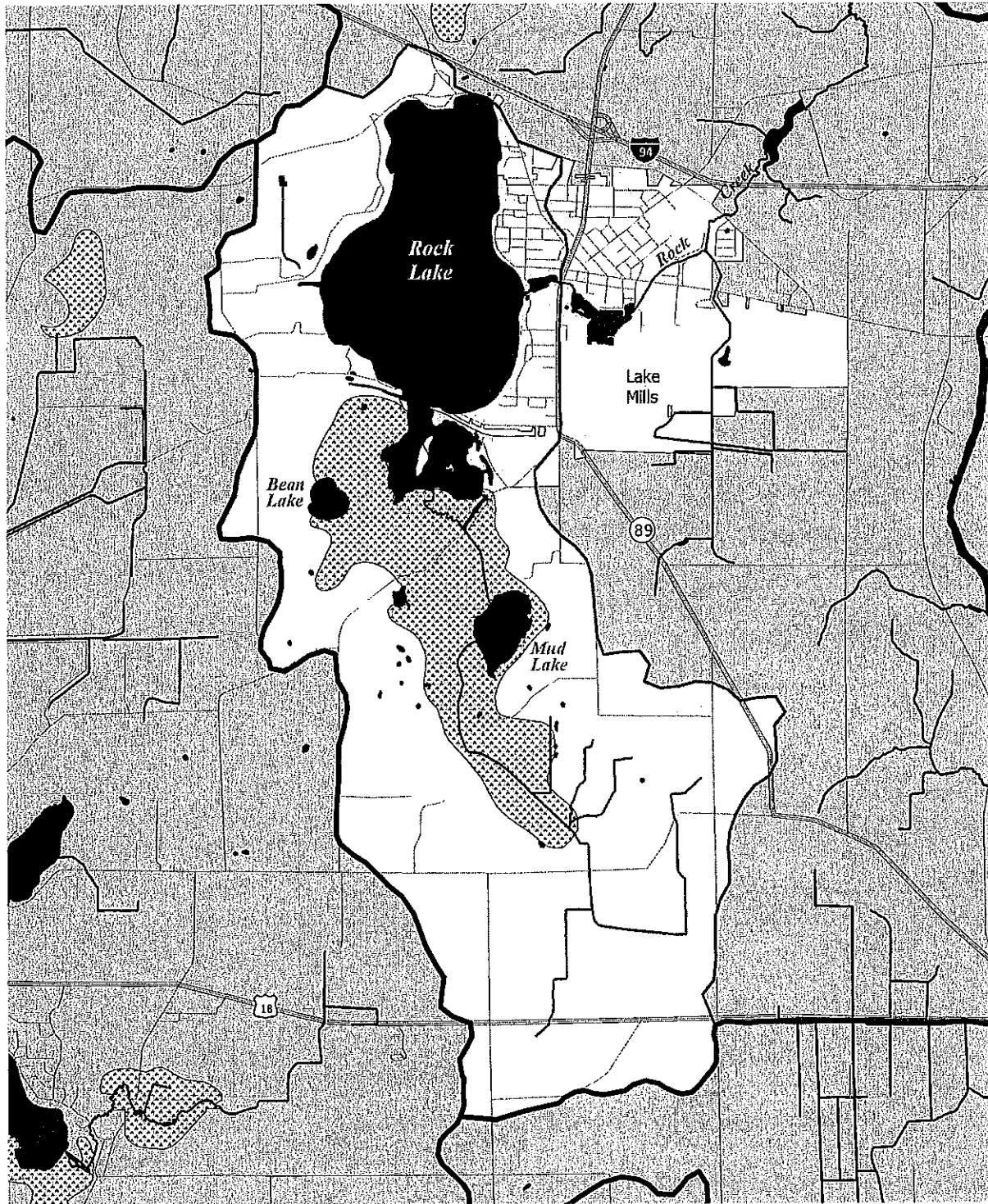
## **Population Size and Distribution**

The Rock Lake watershed population is estimated to be about 4,579 persons. Most of the watershed population lives in rural unincorporated areas. Population growth rates in the watershed are growing. The city and township of Lake Mills have grown over 44% over the past decade. Regional trends suggest that the watershed's population will continue to expand.

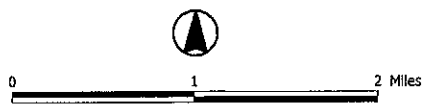
## **Land Uses**

Rural land uses predominate in the watershed (Table 1-1). Agriculture is the most important land use, comprising 57% of the land area. Cash crop operation is the primary enterprise; the average farm size is 173 acres. Jefferson County ranks fifth in the State in the production of soybeans, and twelfth in the production of corn for grain. (Wisconsin Agricultural Statistics, 1995). Wetlands are abundant and cover 25% of the land area and surround the main tributary into Rock Lake. Woodlands cover 5% of the land area. Developed land covers approximately 13% of the watershed. Table 1-2 shows the way in which the developed land is being used. As is true with other areas in this part of the state, more residential areas and roads will be built over the next 15 years in this watershed (Discovery Group LTD, 1996).

# Map 1-1. Rock Lake Priority Lake Project

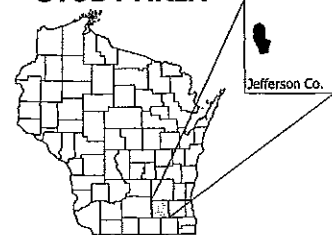


- |       |                    |   |              |
|-------|--------------------|---|--------------|
| —     | River/Stream       | ○ | Municipality |
| —     | Road               | ◐ | Marsh        |
| - - - | County Boundary    | ● | Open Water   |
| —     | Watershed Boundary |   |              |
| —     | Major Highway      |   |              |



Wisconsin Department of Natural Resources  
 Water Division  
 Bureau of Watershed Management  
 June 2001

## STUDY AREA



**Table 1-1. Summary of Land Uses in the Rock Lake Watershed**

Land Uses	Acres	Percent
Agriculture	4377	57
pasture	(233)	(3)
cropland	(4144)	(54)
Woodland	373	5
Developed	980	13
Wetland <sup>1</sup>	1950	25
<b>Total</b>	<b>7,680</b>	<b>100%</b>

<sup>1</sup> These are estimates of wetland acres based on NRCS data.

Source: DNR & Jefferson County LWCD

**Table 1-2. Extent of Urban Land Uses for the Rock Lake Watershed**

Municipality	Land Use in Acres							Total Acres
	Residential Density			Comm	Ind	Inst	Urban Open Space	
	Low	Med	High					
Town of Lake Mills	70	150	0	0	0	0	0	220
City of Lake Mills	55	196	6	9	3	26	30	325
<b>Totals</b>	<b>125</b>	<b>346</b>	<b>6</b>	<b>9</b>	<b>3</b>	<b>26</b>	<b>30</b>	<b>545</b>

Residential = Low, medium and high density  
 Inst = Institutional (e.g. schools, hospitals etc.)

Urban Open Space = Urban parks  
 Comm = Commercial  
 Ind = Industrial

Source: DNR and Jefferson County Land Information Dept.

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# CHAPTER TWO

## Watershed Conditions

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This chapter discusses the physical characteristics, existing conditions and water resource objectives for the water resources in the Rock Lake Priority Watershed. Information is presented for the watershed and by pollution source.

### Physical Setting

#### Climate and Precipitation

The frequency, duration and amount of precipitation influences surface and groundwater quality and quantity, soil moisture content, runoff characteristics, and the physical condition of waterways.

The Rock Lake watershed lies in the northwest corner of Jefferson County. Jefferson County is located 50 miles southeast of the "tension zone" boundary. Climate in this zone exhibits extremes in all of the climatic elements. Spring often comes late in the year and is a mixture of warm and cold periods, summers are warm and have several hot and humid periods, fall can arrive suddenly and often last into November, and winter can exhibit bitterly cold temperatures.

Mean annual precipitation for the region is about 33 inches of rain and melted snow; the majority falls in the form of thunderstorms during the growing season (May-September). Precipitation is normally adequate for farming, but some degree of soil moisture deficiency usually occurs in July and August. Most runoff occurs in February, March, and April when the land surface is frozen and soil moisture is highest.

#### Topography

Jefferson County is primarily drained by the Rock River. Rock Lake drains to the Crawfish River which is a major tributary to the Rock River. Drainage patterns throughout Jefferson County are largely controlled by glacial drift features. Large and small streams meander throughout the county, generally because ice has dammed and drift plugged natural water sources. Where melt water was unable to deepen channels sufficiently, marshes and shallow lakes have formed, as shown by the high percentage of wetlands in the county (Glocker, 1979).

The Rock Lake watershed is part of a large outwash plain that stretches from the south of Lake Ripley to just north of Lake Mills. This outwash plain displays all the features of a stream built, or meltwater terrace. Water apparently trapped by the kettle moraine to the east and the terminal moraine to the south and east formed large areas of shallow lakes that have since drained away, resulting in large areas that are low and nearly flat (Glocker, 1979).

## Geology

Evidence indicates that a glacial lobe advanced southward from Green Bay across the county in Woodfordian (Cary) time about 15,000 years ago. The lime naturally occurring in the subsoils of Jefferson County was derived by geologic agencies from dolomite formations. This bedrock is at the surface at a few places. The unconsolidated deposits include glacial till; outwash deposited by melt water; lake-laid clay, silt, and sand; and accumulations of peat and wind-blown silts. The mineral material was derived largely from local bedrock and Precambrian rocks of the Canadian shield. Local alluvial deposits lie in patches along streams and on the foot slopes of drumlins. Many kettles have somewhat deep silty deposits (Glocker, 1979).

## Soils

The soil deposits found in the Rock Lake watershed are characteristic of glacial features including: glacial lake basins, outwash plains, terraces, kames, and eskers. The most common soil types found in the Rock Lake watershed include: Houghton Muck (35%), Kidder Loam (20%), Fox Loam (10%), and Palms Muck (5%). The following are descriptions of major soils:

**Houghton** soils are found in depressions in old glacial lake basins. They are very poorly drained and nearly level. Typically the organic layer is black, very dark brown, and very dark grey muck. If adequately drained, these soils have fair to good potential for corn and specialty crops. The potential for wildlife habitat is good.

**Kidder** soils are on till plains and drumlins. They are well drained and are gently sloping to moderately steep. The surface layer is typically a dark grayish brown loam. If protected against erosion, these soils have good potential for cultivated crops and clover hay. Some areas that are not too steep have good potential for building sites.

**Fox** soils are found on outwash plains and terraces. They are somewhat well drained and are nearly level to sloping. Typically the surface layer is dark grayish brown silt loam 10 inches thick. Fox soils have fair to good potential for cultivation and fair to good potential for residential development or urban uses. As a result of very rapid permeability of the underlying sand and gravel, pollution of groundwater is a hazard if the sites are used for waste disposal.

**Palms** soils are found in old lake basins. They are very poorly drained and nearly level. Typically the surface layer is black muck. Most drained areas are cultivated most commonly with corn and soybeans. If not drained, these areas are limited by the seasonal high water table. Low fertility, poor tilth, and micronutrient deficiencies are important concerns in managing the soils. These soils have good potential for wetland and wildlife habitat.

Characteristics of the minor soils in the watershed can be found in the publication, Soil Survey of Jefferson County, Wisconsin.

# Water Resource Conditions and Goals

This section describes the general conditions of the surface and groundwater resources in the Rock Lake watershed. Descriptions and several tables provide summaries of the watershed's resources. Groundwater resources and quality are also discussed.

## Surface Water and Recreational Resources

The surface water recreational resources in the Rock Lake Watershed can be divided into two distinct areas: Rock Lake itself, and wetland wildlife area located in the southern portion of the watershed. The wetland area is the primary inlet for Rock Lake and includes three named smaller lakes. The inlet area serves as a natural filter for Rock Lake. The associated lakes and wetlands are shown in Map 1-1 in Chapter 1. Table 2-1 presents the general conditions of major surface water resources in the Rock Lake watershed.

### Lakes

**Rock Lake** is the predominant surface water feature in the watershed. It is the largest lake within the Crawfish River subbasin of the Upper Rock River Basin and is considered one of the best quality lakes in southern Wisconsin. Rock Lake is 1,160 acres, with a maximum depth of 56 feet and a mean depth of 16 feet. There are 6.2 miles of shoreline. It is a natural glacial lake formed as a large compound depression in the ground moraine.

Known for its clear water, the lake is intensively used for recreation including swimming, boating and angling. Angling is popular because the lake supports walleye, smallmouth bass, largemouth bass, northern pike and panfish populations. Reports that Rock Lake contains submerged Native American artifacts and structures is an additional attraction for divers and archeology enthusiasts who routinely survey the lake bed.

Although natural in origin, the water level in Rock Lake was altered by construction of a 10-foot dam in 1865, creating the Marsh Lake basin south of the Glacial Drumlin bike trail. The dam expanded recreational opportunities on the lake, but managing the water levels has been a source of conflict and challenge.

Rock Lake has five public boat ramps and two public beaches. It offers diverse year round recreational opportunities, including fishing, boating, ice boating, jet skiing, sailing, and swimming. The Glacial Drumlin State Bicycle Trail crosses an old train trestle located at the southern end of Rock Lake.

At various times throughout the year Rock Lake does not meet its full recreational potential. Occasionally there is a threat of swimmers itch causing swimming restrictions at the local beaches. There is a large resident goose population on Rock Lake during the summer and geese are known to harbor the parasite that causes swimmers itch. Algal blooms and nuisance weed growth can occur in quiet shallow areas around the lake. Some mooring canals are overgrown with nuisance weed growth making motoring through them difficult if not

impossible. Excess phosphorus in lakes has long been known to contribute to algal blooms and nuisance weed growth.

Other lakes in the watershed are Marsh Lake, Mud Lake, and Bean Lake. **Marsh Lake** is a shallow basin located at the south end of Rock Lake, created by the 1865 dam. Marsh Lake serves as the main inlet area to Rock Lake. This lake is approximately 210 acres and is mostly surrounded by wetlands. It supports excellent native aquatic plant beds and is a popular early season largemouth bass and panfish angling site.

**Mud Lake** is a 93-acre lake with a maximum depth of 22 feet. Mud Lake is a drainage lake and is part of the main tributary system that enters Rock Lake. The Lake Mills Wildlife Area encompasses the lake and access for non-motorized watercraft is provided. The lake is a popular angling sites in the spring and shortly after ice cover.

**Bean Lake** is a 33-acre seepage lake with a maximum depth of 6 feet. Bean Lake is surrounded by over 280 acres of tamarack and shrub swamp and is located in the Bean Lake Natural State Area, making it one of the best examples of a wilderness experience in southern Wisconsin. The lake supports native aquatic plants and stunted panfish. The combined wetlands and basins within the wildlife and scientific areas support rare herptiles, plants and habitats as well as abundant migrating waterfowl populations.

**Table 2-1. General Condition of the Lakes in the Rock Lake Watershed**

Lake	Biological Use		Problems Related to Nonpoint Source Pollution
	Current	Potential	
Rock	Good water quality	Excellent	Phosphorus loading and shoreline development
Mud	Poor water quality	Fair	Excessive phosphorus loading and wetlands reduction
Marsh	Excellent fish & wildlife habitat		
Bean	Excellent Fish & Wildlife Habitat		

All of the lakes have public access. Although there is a road leading to Bean Lake, access may be difficult. Low water levels and nuisance weed growth can at times limit motor accessibility and mobility. Sediments and excess nutrients from upland sources are concerns for these lakes, especially Mud and Marsh Lakes. A shoreline erosion inventory was done on Rock Lake to determine the amount of sediment being delivered from the shoreline.

## Lake Analysis

In 1986, the Department of Natural Resources selected Rock Lake as one of the 50 "Long Term Trends Lakes" statewide. Over the last ten years, the lake has generally displayed good water quality and is considered mesotrophic. The mesotrophic conditions are typical of marl lakes in southeast Wisconsin. In 1996, the worst water quality conditions in 10 years coincided with the record high precipitation and runoff in June. Water clarity dropped to less than one meter compared to the 10-year mean which is greater than three meters (range 1.5 - 5.6 meters) during the growing season.

While marl lakes are usually somewhat less susceptible to nonpoint source pollution compared to lakes with lower calcium levels, poor water quality in June of 1996 clearly indicates that external phosphorus sources are affecting the lake water quality. The lake's response to nonpoint source pollution and external phosphorus loading was further confirmed by lake sediment core data. Rock Lake had excellent water quality prior to European settlement but declined as the watershed became developed. Extensive wetlands and upstream basins have prevented a more serious water quality decline in the lake.

In the late 1800s water quality began to decline as a result of agricultural activities in the watershed. During this time period the lake's water clarity was at its worse. Diatom concentrations in the core sample infer that the phosphorus level in the surface water was high (16 ug/L) and the hypolimnion was anoxic. In the last few decades, sedimentation rates likely have remained higher than presettlement levels but the lake's water quality has improved, both in the extent of anoxia as well as phosphorus levels. There is some evidence that phosphorus levels in the lake have begun to increase again in the last few years but they are not as high as concentrations experienced earlier in the 20th century.

Even though Rock Lake's water quality is still considered "good," both conventional wisdom and lake water quality data indicate that phosphorus reduction is needed to protect the lake. Currently Mud Lake receives most of the nonpoint source pollution from the watershed and is trapping much of the phosphorus before it reaches Rock Lake. While Rock Lake is partially protected, the water quality in Mud Lake is being compromised. In 1996, very poor water quality was observed in Mud Lake. Continued phosphorus loading to Mud Lake will not only degrade water quality even further, but the phosphorus trapping function (which has protected Rock Lake over the years) will decline as well. If Mud Lake's water quality continues to decline, important fish and wildlife functions will be lost.

While watershed drainage characteristics and lake chemistry have reduced nonpoint source pollution impacts, Rock Lake's water quality and nearshore habitat functions have been seriously compromised in recent years. Cumulative effects of shoreline development and lake use have reduced valuable fish spawning and nursery habitat.

The numbers of piers in Rock Lake have increased from 96 in 1950, to 153 in 1963, and to 276 in 1996. Extensive piers, seawalls, and motorboat traffic have destroyed valuable emergent, floating leaf and submersed aquatic plant beds around the lake. Coinciding with increased piers was reduced fish diversity in the lake. Nearshore fish distribution surveys produced 17 species in 1974 and only 11 species in 1996. Loss of nearshore habitat has been



the most obvious change and most serious threat to fish production and biodiversity in Rock Lake.

Only a few partially developed or undeveloped shorelines still persist around the lake today. In an effort to protect the fish and wildlife habitat functions found in these relatively intact nearshore areas, the Rock Lake Improvement Association recommended that the DNR identify these as "Sensitive Areas" under Wisconsin Administrative Code NR 107. Protecting nearshore habitat functions is a fundamental aspect of lake protection.

Even though Rock Lake is the primary focus of the Priority Lake Project, the wetlands and small basins within the upper watershed are very important for fish and wildlife habitat, recreation, and buffering Rock Lake from pollution. Water quality modeling indicates that a 30% phosphorus reduction from lands draining directly into Rock, Mud and Bean Lakes will protect the water quality of these resources. Preventing further habitat loss is a concern for the entire watershed. Intensive shoreline development, and perhaps carp, threaten nearshore habitat and the "Sensitive Areas" in Rock Lake.

## **Streams**

There is a defined stream channel that flows into Mud Lake and then into Marsh Lake. Most of the main channel that is navigable has been cleared or ditched to increase accessibility. The primary recreational benefit of the stream and ditched channels is accessibility to the inner lakes and wildlife viewing.

## **Ditches**

Upstream of Mud Lake there is an extensive system of ditched channels. There is an estimated 16.75 miles of agricultural ditches in the watershed. The main purpose of the ditches is to increase drainage of upland agricultural areas. The ditches maintain at least a small continuous flow throughout most of the year. Sediment and nutrients from rural areas are transported to Rock Lake through this system. Unique problems associated with agricultural ditches in the watershed will be described in more detail later in this chapter.

## **Wetlands**

Wetlands are valuable natural resources that provide wildlife habitat, fish spawning and rearing areas, recreation, storage of runoff and flood flows and removal of pollutants. The majority of the wetlands in the watershed are found to the south of Rock Lake. The importance of wetlands to Rock Lake cannot be emphasized enough. This wetland complex is the main inlet into Rock Lake and serves as a valuable filtering system for the lake. The wetlands trap sediment and bound nutrients before entering Rock Lake. Much of the wetland complex is publicly owned. A 195-acre State Natural Area was designated around Bean Lake due to its high ecological value.

A wetland and wildlife habitat inventory was done to identify existing and modified or converted wetlands for the purpose of protection from degradation or potential restoration. The focus of the inventory was on wetlands that are presently, or have been in the past,

degraded through drainage, cropping, or other activities causing water storage loss, and build-up of sediments. Due to sedimentation from upstream agricultural practices, the filtering ability of the wetlands has been reduced. Data was gathered from Natural Resource Conservation Service maps, air photos, the DNR wetland inventory maps, and the Jefferson County Soil Survey. Guidelines for wetland protection and restoration, which will be a component of this project, are outlined at the end of this chapter. Table 2-2 presents a summary of the wetland inventory.

**Table 2-2. Wetland/Wildlife Area Inventory Summary: Rock Lake Watershed**

<b>Rock Lake Watershed</b>	<b>WDNR Wildlife Areas</b>	<b>Farmed Wetlands</b>	<b>Existing Wetlands</b>	<b>Hydric Soils</b>
Totals (acres)	1,300	1,311	1,950	3,325

In the past wetlands were thought of as wastelands and draining or filling of those areas was encouraged and at times even cost-shared. We have now recognized the value of wetlands and the benefits of preserving them. Wetlands are found in areas with wet soils termed "hydric" (Table 2-3).

**Table 2-3. Hydric Soils in the Rock Lake Watershed**

<b>Rock Lake Hydric Soils Inventory</b>	
<b>Soil Group</b>	<b>Total Acres</b>
Houghton (Ht)	978
Otter (Ot)	21
Keowns (Kb)	219
Elvers (Ev)	2
Palms (Pa)	1,182
Wacousta (Wa)	155
Sebewa (Sm)	495
Palms (Pb)	262
Gilford (Gd)	2
Adrian (Ad)	9
<b>TOTAL</b>	<b>3,325</b>

Source: Jefferson County Soil Survey (1979)

The sum of wetlands that has been lost to filling and draining was estimated by comparing the amount of hydric soils to the amount of existing wetlands. There is a total of 3,325 acres of land associated with hydric soils in the watershed. There are an estimated 1,950 acres of wetlands in the Rock Lake watershed. This equates to a loss of 1,375 acres (more than 40%) of wetlands. This wetland loss results in a reduction in wildlife habitat and the pollutant filtering capacity of land surrounding Rock Lake.

At the same time the wetlands filtering Rock Lake have been reduced, the quantity of pollutants entering Rock Lake has increased. This is visible in the degradation of water quality observed in Mud and Marsh Lakes. The filtering capacity of existing wetlands has also been reduced, as seen by the channelization of water through the wetlands. Water moving through healthy wetlands typically moves slowly as sheet flow. Sheet flow allows plenty of time for sediment and pollutants to settle out. As sediment builds up or channels are dug, water flows through wetlands quickly with little retention time. Mud and Marsh Lakes are now serving as sediment collection areas for Rock Lake. As their abilities to collect sediment and pollutants is reduced, more pollutants will eventually make their way to Rock Lake.

## Recreational Amenities

The watershed's streams, wetlands, and lakes offer diverse and high-quality recreational opportunities. The most popular activities are fishing, boating, and canoeing. Other popular activities are wildlife observation, hiking, hunting, scuba diving, and sailing. Biking is also popular. The former Chicago and Northwestern Railroad line runs east and west, crossing Rock Lake at the narrows which connect Rock and Marsh Lakes. This old railroad corridor has been converted to the Glacial Drumlin State Bike Trail.

Rock Lake is of local importance because it draws many people from large cities in central Wisconsin (Milwaukee, Madison, and Janesville) and northern Illinois. Rock Lake is a high quality lake and is large enough for most boating activities and deep enough to support a quality fishery. Recreational access around Rock Lake includes five public boat ramps, two swimming beaches, a campground, and many picnic areas.

## Groundwater Resources

### Regional Aquifers

Groundwater is the main source of drinking water in the Rock Lake watershed. Groundwater is stored underground in pore spaces and cracks within the soil and rock layers.

Unconsolidated material and rock layers which hold groundwater are called aquifers. A municipal water supply system services the City of Lake Mills residents and those outside of the city limits rely on private wells.

The regional aquifers within the Rock Lake watershed include a sand and gravel aquifer and a sandstone aquifer.

*Sand and Gravel Aquifer:* Water-bearing sand and gravel is located in approximately half of Jefferson County and is concentrated in low areas. The saturated thickness of sand and gravel aquifer deposits ranges from 0-100 feet. Groundwater in these deposits moves along sand and gravel grains. Two factors that may increase the potential for contamination include shallow depth to groundwater and the high permeability of the substrate.

*Sandstone Aquifer:* The sandstone aquifer is also another important source of water within the watershed. It consists of a complex of sedimentary bedrock of Cambrian Ordovician age. This aquifer may be completely saturated and thickness may reach 1,100 feet. Well yields in the Rock Lake watershed may reach as high as 1,000 gallons per minute from this source.

Since 1936, the State of Wisconsin has required well drillers to document well construction and rock and soil layers encountered during well installation.

## Direction of Groundwater Flow

Local groundwater flow in the Rock Lake watershed roughly mirrors the topography of the land surface and flows "downhill" or down gradient toward Rock Lake. Regional groundwater flow in the watershed is toward the Crawfish and Rock Rivers.

## Groundwater Quality

Nearly anything that can be spilled or spread on the ground has the potential to leach or seep through the ground and into groundwater. The physical setting of an area and the nature of the contaminant determine how easily the groundwater becomes polluted if inadequate waste management or improper land uses occur. The physical setting includes the soil type, characteristics of the subsurface unconsolidated material, depth to bedrock, depth to groundwater, topography, and hydrologic characteristics. Potential point sources of groundwater contamination may include spills, leaking underground storage tanks, pesticide contamination sites, old landfills, and improperly abandoned wells. Potential nonpoint sources include fertilizers and pesticides, sludge and septage spreading, livestock waste spreading, irrigation, and road salt.

Groundwater quality in the Rock Lake watershed is generally considered good. As part of the water quality appraisal of the watershed, samples from private wells were collected and analyzed for nitrate ( $\text{NO}_3$ ) plus nitrite ( $\text{NO}_2$ ). Sample analytical results are summarized in Table 2-4. Samples analyzed for nitrate ( $\text{NO}_3$ ) plus nitrite ( $\text{NO}_2$ ) showed concentrations ranging from no detection to 27 parts per million or milligrams per liter (mg/L). The groundwater enforcement standard (ES) for nitrate is 10 mg/L. Nitrate ( $\text{NO}_3$ ) plus nitrite ( $\text{NO}_2$ ) concentrations above 2 mg/L exceed the state's preventive action limit (PAL).

**Enforcement Standard (ES) Health Advisory Level:** The concentration of a substance at which a facility regulated by DILHR, DATCP, DOT or DNR must take action to reduce the concentration of the substance in groundwater.

**Preventative Action Limit (PAL):** A lower concentration of a contaminant than the Enforcement Standard. The PAL serves to inform DNR of potential groundwater contamination problems, establish the level at which efforts to control the contamination should begin, and provide a basis for design codes and management criteria.

A total of 18 well water samples were taken in the Rock Lake watershed. For nitrates, five samples were between 2.0 and 10.0 mg/L, and one sample was greater than the 10 mg/L enforcement standard for drinking water. High nitrate levels in groundwater in parts of Wisconsin have been linked to agricultural practices, septage spreading and faulty septic systems. High nitrate levels are a potential health concern for pregnant women and infants, and also may impact livestock health, fish populations, and other ecosystem components. Results do not indicate any pattern of groundwater contamination that can be linked to specific sources of nitrates. These results do not represent the overall groundwater quality of the watershed.

The 18 water samples were also tested for atrazine through a triazine scan. All 18 samples were under the PAL which is 0.3 parts per billion.

**Table 2-4. Nitrate Sampling Results in the Rock Lake Watershed**

Number of samples less than 2.0 mg/L	%	Number of samples between 2.0 and 10.0 mg/L	%	Number of samples greater than 10.0 mg/L	%	Total
12	67	5	28	1	5	18

### Water Supplies

Water supplies for domestic, agricultural, and industrial uses in the Rock Lake watershed are obtained from groundwater sources. Precambrian rocks, the oldest rocks in the basin, are overlain by layered sedimentary rocks of marine origin, mostly sandstone and dolomite. The sandstone aquifer, which overlays crystalline rock, is the most productive aquifer in Jefferson County. It underlies the entire county.

Both private wells and municipal systems provide the potable water supplies throughout the watershed. Individual well yields and depths vary widely. Properly constructed wells can yield 1,000 gallons of water or more per minute. Wells in the upper part of this aquifer typically yield 10 to 25 gallons per minute (USDA, 1979).

Municipal water supply systems within the watershed serve the city and part of the Town of Lake Mills. The Lake Mills municipal well is approximately 820 feet deep and taps into the sandstone aquifer.

### Water Resources Objectives

There are six water resources objectives that are hoped to be achieved through the Priority Lake Project. They are as follows:

- Reduce nonpoint source phosphorus loading from the Rock and Mud Lake subwatersheds by 30%;
- Protect the Bean Lake Natural Area by reducing nonpoint source phosphorus loading from the area draining to it by 30%;
- Protect the rural agricultural character of the watershed;

- Preserve important habitats needed to sustain biodiversity, rare nongame species and sportfish production. Important habitats include lake "sensitive areas" and riparian wetlands;
- Restore drained wetlands to improve water quality and fish and wildlife habitat;
- Assess nuisance carp population and potential for removal to protect valuable native aquatic plants and "Sensitive Areas."

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# **CHAPTER THREE**

## **Inventory Results, Nonpoint Source Pollutants, and Cost-Share Eligibility Criteria**

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This chapter describes the nonpoint source inventories, objectives and cost-share eligibility criteria for each pollutant source. These sources are barnyard runoff, agricultural nutrients, sediments from upland areas, gully erosion, and streambank and shoreline erosion, as well as urban pollutants from existing urban areas, construction sites and stormwater runoff.

### **Management Categories**

Cost-share funds for installing pollutant control measures will be targeted at sites that contribute the greatest amount of pollutants (urban runoff, barnyards, manure spreading, upland fields, streambank and shoreline erosion or streambank habitat degradation sites). Management categories define which nonpoint sources are eligible for financial and technical assistance. They are based on the amount of pollution generated by a source and the feasibility of controlling the source. Specific sites or areas within the watershed project are designated as either "critical," "eligible," or "ineligible." These categories are described below.

Criteria to determine management category eligibility are expressed in terms of tons of sediment delivered to surface waters from eroding uplands and streambanks; pounds of phosphorus delivered to surface waters; feet of streambank trampled by cattle; and pounds of heavy metals and organics from urban areas. Any newly created sources requiring controls after the signing of a cost-share agreement must be controlled at the landowner's expense.

The Jefferson County Land and Water Conservation Department (LWCD) will assist landowners in applying best management practices (BMPs). Practices range from alterations in farm management (such as changes in manure-spreading and crop rotations) to engineered structures (such as diversions, sediment basins, and manure storage facilities), and are tailored to specific landowner situations.

### **Critical Site Management Category**

Nonpoint source pollutant load reduction in the Rock Lake Watershed Project will be achieved mainly through voluntary participation. Designation as a critical site indicates that controlling that source of pollution is essential for meeting the water quality objectives of the project. Nonpoint sources included in the critical category contribute a significant amount of the pollutants to surface or groundwaters. State statutes require that the nonpoint source control plan designates the necessary activities to ensure the reasonable likelihood of achieving water quality goals and objectives. Landowners with sites that meet the established



critical site criteria are required by law to address those specific sites by reducing the nonpoint source pollutant load to an acceptable level. Pollutant load reduction can occur solely through the action of landowners with guidance from county staff, or through watershed participation. Each site will be field verified before receiving notification as a critical site, with the findings sent to the DNR Regional Office. Landowners interested in receiving cost-share assistance for the installation of BMPs will need to sign a cost-share agreement with the Jefferson County LWCD.

### **Eligible Management Category**

Nonpoint sources which are eligible but not critical contribute less of the pollutant load, but are included in cost sharing eligibility to further insure that water quality objectives are met. These sites are eligible for technical and cost-share assistance. Landowners with eligible sites need not control every eligible source to receive cost-share assistance.

### **Ineligible Management Category**

Other sites which do not contribute significant amounts of pollutants are not eligible for funding and/or technical assistance under the priority watershed project. Other DNR programs (e.g., wildlife and fisheries management) can, if warranted, assist county project staff to control these sources as implementation of the integrated resource management plan for this watershed. Other local, state, or federal programs may also be applicable to these lands.

### **Barnyard Runoff**

Manure runoff from barnyards contains several components that adversely affect the water quality and aquatic life. Manure entering streams, lakes, or ditches breaks down, depleting the oxygen in the water which fish require to survive. Also, manure contains nitrogen which can be detrimental to surface waters. In high concentrations, ammonia from nitrogen is toxic to fish and other aquatic life. The nutrients in manure (including nitrogen and phosphorus) also promote nuisance algae and weed growth. Finally, the bacteria found in livestock manure is harmful to livestock drinking the water and humans using the water for recreation. The major sources of manure in the Rock Lake watershed are runoff from barnyards and improperly spread manure.

Barnyard runoff to the Rock Lake watershed was evaluated using the BARNY model which calculates phosphorus nutrient loading to surface waters. All of the barnyard sites combined generate a total of 146 pounds of phosphorus annually in the Rock Lake watershed (Table 3.1). Criteria have been established for critical site barnyards: sites that have runoff contributions over 100 pounds of phosphorus annually. These sites are eligible for cost-sharing for full barnyard systems. At this time there are no eligible or critical sites in the watershed.

A central component of the critical site management category are the Animal Waste Advisory Committee (AWAC) recommendations. These recommendations include four prohibitions on basic activities associated with the raising of livestock:

- No overflow of manure storage structures
- No unconfined manure stacking (piling) within water quality management areas within 300 feet to streams and rivers, within 1,000 feet of lakes, and a county requirement of no more than 300 feet from a drainage ditch
- No direct runoff from feedlots or stored manure to waters of the state
- No unlimited livestock access to waters of the state where high concentrations of animals prevent adequate sod cover maintenance.

Barnyard sites that have runoff contributions between 60 and 100 pounds of phosphorus annually will be considered "eligible." Cost-sharing for this category will be for clean water diversion work first, including diverting clean upland water and roof runoff away from the animal lot to reduce loading to 40 pounds or less. Landowners with barnyards that still exceed a phosphorus loading of 40 pounds after installation of these low-cost controls are eligible for additional controls. Currently, there are no barnyards in the watershed that fit the criteria in this category.

The development and implementation of a nutrient management plan will be a requirement for landowners receiving cost-share dollars for the installation of a barnyard runoff management system. All nutrient pest management plans will be developed by a certified crop consultant. Those landowners installing low-cost clean water diversions and/or roof gutters will also be encouraged to develop a nutrient pest management plan, although it is not required.

**Table 3-1. Barnyard Inventory and Eligibility Criteria**

Barnyard Inventory Results		
Subwatershed	No. of Barnyards	Annual Phosphorus Load (Lbs./yr.)
Mud Lake	9	60
Rock Lake	14	86
Total	23	146

Certain components of waste management systems (as specified in NRCS Std. 312), specifically those involving collection, handling and storage, require the preparation of a nutrient management plan (NRCS Std. 590) for the acreage that the waste may be spread. Roof Runoff Management (NRCS Std. 588), Livestock Exclusion (NRCS Std. 472), and Clean Water Diversion (NRCS Std. 362) are practices that are exempt from this requirement.

Operations eligible for waste management systems are also eligible for cost-sharing of nutrient management practices, specifically the development of both nutrient management and pest management (NRCS Std. 595) plans, soil testing and crop scouting. See "Nutrient and Pest Management" later in this chapter for additional detail.

## **Cropland Spread Manure & Pesticide Runoff**

Mismanagement of both cropland spread manure, stored manure, and fertilizers will be targeted for control through the adoption of nutrient management plans (NRCS Std. 590). Development of nutrient management plans allow landowners an opportunity to balance the needs of water quality while maintaining a sustainable agricultural system that reduces excess nutrient applications and the costs associated with it. Reduced nutrient runoff is achieved by taking nutrient credits for legumes and landspread manure, in turn reducing applications of commercial nutrients. In addition, 590 plans will require landowners to reduce nutrient runoff by lowering their soil erosion rates to the tolerable soil loss (T) as a minimum to qualify for nutrient management planning.

## **Nutrient and Pest Management**

Nutrient and pest management must be one component of a conservation management plan. In order to reduce over application of nutrients and pesticides, livestock and cash grain operations will be eligible and encouraged to participate in this on-farm nutrient and pest management educational program. This program is intended to reduce over application through implementing a nutrient management plan, and in some cases an additional pest management plan, using NRCS Standards 590 and 595. There are up to 2,400 acres of cropland eligible for soil testing and nutrient and pest management plans developed by certified crop consultants. Landowners will be eligible to participate for up to three years and may receive 50% cost-sharing of the consultant's fee for plan development. These plans will be submitted to and approved by the Jefferson County LWCD.

Eligibility for manure storage cost sharing will be based on the nutrient management plan developed in accordance with NRCS Std. 590, demonstrating that manure cannot be practically managed during periods of snow cover, frozen ground or saturated conditions without the use of storage practices. The nutrient management plan must also demonstrate that proper utilization of manure can be achieved following adoption of the intended storage practice.

Cost sharing for manure storage facilities will also be based on the least cost system. These options may include manure stacks (in accordance with Std. 312) and short term storage (capacity for 30 to 100 days production in accordance with Std. 313 or 425). Least cost analysis will also include evaluation of alternatives to storage. Alternatives to manure storage for reducing the surface water quality impact from the over application of manure to cropland are to:

- Reduce on-farm animal numbers
- Rent or purchase additional land that is suitable for winter spreading
- Haul manure or broker manure to a neighboring farm.

Cost sharing will not be provided to a landowner for manure storage or manure spreading if a nutrient management plan demonstrates that sufficient land is available for winter spreading.

Landowners receiving cost sharing to install a manure storage structure or implement a spreading program will be required to develop a nutrient management plan with a certified crop consultant.

## **Rural Sediments**

### **Upland Sediment**

Intensive agricultural practices have caused eroded soil to reach wetlands and lakes in the Rock Lake watershed. Upland agricultural erosion is the leading source of sediment and phosphorus carried to the wetlands and surface waters in the Rock Lake watershed.

Upland sediment sources were evaluated using the WINHUSLE sediment erosion model. The model used 76% of the total upland area which had been inventoried and then extrapolated to the remaining watershed area, totaling 12 square miles. The results of this inventory are summarized in Table 3-2. Model results show that there is an estimated 446 tons of sediment and 2,011 pounds of phosphorus per year delivered to wetlands and surface waters in the Rock Lake watershed. About 252 tons of sediment flow into Rock Lake annually, and the remaining 194 tons of sediment is deposited within the ditches, wetlands, and in Bean, Marsh, and Mud Lakes. About 1,087 pounds of phosphorus enter Rock Lake each year from upland sources.

The goal is to reduce the sediment delivered from uplands to receiving waterbodies by 50%. Critical sites are all fields eroding above T and delivering sediment at a rate greater than 0.3 tons per acre per year. These fields must be brought down to T and have a sediment delivery rate of no more than 0.17 tons per acre per year. The current average delivery rate for all fields is now 0.17 tons per acre per year. Critical site management will also target cropland fields where nitrogen applications exceed twice the amount of University of Wisconsin soil test recommendations. Fields delivering greater than 0.20 tons/acre/year will also be eligible for cost sharing (see Table 3-2), but those delivering at a rate less than 0.2 are ineligible for cost-sharing.

**Table 3-2. Rural Uplands Targeted for Sediment Control**

Sub-watershed	Inventory Conditions			Critical sites >T or >0.3 sediment delivery			Eligible sites - >0.2 sediment Delivery		
	Total Acres	Total Sediment (tons)	Total P (lbs.)	Acres	Sediment controlled (tons)	Phosphorus controlled (lbs.)	Acres	Sediment controlled (tons)	Phosphorus controlled (lbs.)
Mud Lake	3249	173	834	18	29	132	1080	67	316
Marsh Lake	658	20	90	0	0	0	41	77	30
Rock Lake	505	253	1087	0	0	0	222	92	395
Total	4412	446	2011	0	29	132	1343	236	741

### Stream and Ditchbank Erosion

A survey was conducted on about 9 of the 14 miles of ditches in the watershed. The 9 miles that were inventoried represent 93,000 feet of bank when factoring in both sides of the ditch. Ditchbank length, height, and lateral recession rates were measured. Banks eroding with a lateral recession rate of greater than 0.5 feet per year are categorized as "severe erosion." Banks eroding at a rate of 0.1 but less than 0.5 feet per year are categorized as "moderate erosion." Severe and moderately eroding banks are eligible for cost-sharing. Severe sites will be cost-shared at a maximum rate of \$30.00 per linear foot while moderate sites will be cost-shared at a maximum rate of \$20.00 per linear foot. Banks eroding at a rate less than 0.1 feet per year show slight to stable erosion and are not eligible for cost-sharing. Eligibility criteria are shown in Table 3.3.

All of the ditches that were inventoried showed some signs of erosion, yielding 210 tons of sediment per year and 298 pounds of phosphorus per year. All of the inventoried ditches had an erosion rate of less than 0.1 foot per year, categorizing them as slight erosion, making them not eligible for cost-sharing. Further, any ditches within a drainage district are not eligible for cost-sharing. It is mandated that drainage districts maintain their banks.

Should any ditches be eligible for cost-sharing in the future, best management practices will be limited to low cost nonstructural controls such as shaping and seeding, fiber rolls and other bioengineering techniques. Less intrusive measures such as brush cutting to increase light penetration and vegetation establishment may also be effective. Foregoing control altogether may be necessary if the degree of site disturbance needed to install practices offsets the benefits to the bank.

### Shoreline Erosion

An inventory was conducted of the shoreline along Rock Lake to determine how much erosion was taking place and at what rate (Table 3.3). 32,450 feet of shoreline was surveyed and categorized using the same criteria described in the ditchbank erosion discussion above

(Table 3.4). Shorelines in the "severe" and "moderate" categories are eligible for cost-sharing, but those in the "slight/stable" category are not eligible. A total of 370 tons of sediment and 423 pounds of phosphorus are generated each year from shoreline erosion. The survey placed 2,050 feet of shoreline in the severe category and 7,600 feet in the moderate category, allowing cost-sharing to be available. A total of 22,800 feet experienced only slight to stable erosion. Critical sites are those sites that have greater than 0.5 feet of lateral recession per year, with a bank height of greater than 3 feet with more than 50% exposed soil. About 450 feet are considered critical, with 32 tons of sediment and 37 pounds of phosphorus delivered to the lake each year.

**Table 3-3. Shoreline Erosion Survey - Rock Lake**

Category	Length	Sediment (tons/yr.)	Phosphorus (lbs./yr.)
Severe	2,050	145	165
Moderate	7,600	175	200
Slight	12,975	51	58
Stable	9,825	0	0
Total	32,450	371	423

Shoreline erosion will be addressed with low cost alternatives such as establishing shoreline buffer zones and will only use the most environmentally sound alternative. Severe erosion will be cost-shared at a maximum rate of \$30.00 per linear foot for rock riprap. Moderate erosion sites will be eligible for cost-sharing using shoreline buffers only.

**Table 3-4. Ditchbank and Shoreline Erosion Eligibility Criteria and Results**

Category	Eligibility Criteria	Ditchbank Inventory Results	Shoreline Inventory Results
Critical	>0.5 ft. lateral recession rate per year, bank height > 3 ft., banks with >50% exposed soil	0	450 ft.
Severe Erosion - Not Critical	>0.5 ft. per year	0	1600 ft.
Moderate Erosion	>0.1 ft. per year but <0.5 ft./yr.	0	7,600 ft.
Ineligible	< 0.1 ft./yr.	93,000 ft.	22,800 ft.

### **Livestock Access**

Livestock access to surface waters in the Rock Lake watershed are of little concern at this time. Some grazing pastures extend slightly into wetlands or ditches. Cattle are seldom provided access to ditches. Ditches provide important drainage to cropped fields. The sediment that erodes into ditches reduces their drainage capabilities and must be cleaned out at a cost to the farmer. If cattle had access to these areas they would easily trample the ditch banks and decrease the amount of time in between maintenance.

### **Gully Erosion**

Because gully erosion has never been identified as a significant problem in this watershed, a field inventory of gully erosion was not done. Any significant gullies identified during implementation will be evaluated to determine if they are significant sediment sources and eligible for cost sharing. Gullies eroding with a lateral recession rate exceeding 0.3 tons per year will be classified as eligible for cost-sharing.

## **Pollutant Reduction Goals and Project Objectives for Rural Nonpoint Sources**

The main goals of the Rock Lake Priority Lake Project are to reduce nonpoint source pollution loads and to enhance and protect the water quality of Rock Lake. To achieve these goals, sediment and phosphorus must be reduced, wetlands must be restored, and groundwater resources must be protected and enhanced.

The following is a summary of reductions to be targeted for the entire watershed.

**Sediment Objectives:** Reduce overall sediment delivered by 50%. To meet this, the following is needed:

- 50% or 223 tons annual reduction of sediment reaching wetlands and all surface waters from agricultural uplands.
- 50% or 186 tons annual reduction in shoreline erosion.

**Phosphorus Objective:** Reduce overall phosphorus load by 50%. To meet this, the following is needed:

- 50% reduction (or around 1,000 pounds) in phosphorus from agricultural uplands.
- 50% reduction (or 212 pounds) in phosphorus from shoreline erosion.
- A reduction in phosphorus from landspread manure.
- Promote nutrient and pest management as an economically and environmentally sound practice within the watershed.

**Wetland Restoration Objective:** Restore approximately 100 acres of degraded or prior converted wetlands in the watershed.

**Groundwater Objective:** Protect and enhance groundwater resources in the Rock Lake watershed. To meet this objective, the following is needed:

- Properly abandon any earthen manure storage pits that pose a threat to groundwater.
- Use nutrient management plans to reduce the over-application of commercial fertilizer and manure and the application of winterspread manure on unsuitable cropland.
- Implement BMPs as appropriate to protect and enhance groundwater quality.
- Encourage proper abandonment of unused wells per NR 120 and NR 812, Wis. Adm. Code.
- Reduce over-application of pesticides.

Provide landowners with extensive informational and educational materials such as Farm\*A\*Syst to promote awareness of potential groundwater contamination sources.



# Urban Inventory Results, Nonpoint Source Pollutants, Pollution Reduction Goals, and Eligibility Criteria

An urban nonpoint source inventory and analysis was conducted to identify urban pollutant loading in the Rock Lake watershed. This section describes the urban nonpoint source pollutants as well as the management needs and reduction objectives for each pollutant in the Rock Lake watershed.

## Description of Urban Runoff

The principal water quality and quantity problems derived from urban runoff result from many factors including:

- Loading of sediment, nutrients, heavy metals and other toxic materials.
- Stream channel modifications, including straightening and lining with concrete.
- Hydrologic disturbances, including flashy high flows and loss of base flow.
- Streambank and shoreline erosion.

Urban runoff carries a variety of pollutants to surface water. Pollutants found in urban runoff include heavy metals (lead, copper, zinc, cadmium and chromium) and a large number of toxic organic chemicals (polycyclic aromatic hydrocarbons (PAH), pesticides and others). Other substances in urban runoff include sediment, nutrients, bacteria, and protozoans. The pollutants that are the focus of this watershed are sediment and phosphorus.

The delivery of pollutants to Rock Lake from existing urban areas depends on the types of urban land uses, the types of storm water conveyance systems, and urban pollution prevention practices, such as street sweeping, yard waste collection, and waste oil recycling programs. Roads and commercial and industrial areas have the highest unit/area/year pollutant loads, producing the most significant amounts of metals and other urban toxic pollutants. Medium density and multi-family residential areas also generate metals, sediment and phosphorus and include large impervious areas. Residential areas contain more lawn area than commercial areas, while commercial areas have more rooftop, street, and parking lot surfaces. Lawns also can contribute fertilizers and pesticides. Rooftop areas are important sources of zinc and atmospheric pollutants. Their connection to the storm drainage system may be direct or indirect, depending on the use of downspouts, grassed areas, drain tiles, or other practices.

Existing urban land uses and associated sediment and phosphorus pollutant loads are shown in Table 3-5. The urban land in the watershed is concentrated around the perimeter of Rock Lake. The greatest amount of urban development is in medium to low-density residential land uses (78% of all urban land). Runoff from new urban areas has the potential to further

degrade lake water quality unless stormwater management controls are reviewed during development.

**Table 3-5. Pollutant Generation Rates From Urban Land Uses**

Land Use	Unit Area Load		
	Acres	Sediment (tons/yr.)	Phosphorus (lbs./yr.)
Residential	492	36.3	192.0
Commercial	14	5.6	16.0
Industrial	7	3.5	10.5
Institutional	31	3.6	15.5
Open Space	84	0.1	2.5
Total	628	49.1	236.5

Residential includes high, med and low density, apartments and mobile homes.  
 Commerical includes strip commercial, shopping center and commercial downtown.  
 Industrial is manufacturing and non-manufacturing.  
 Institutional includes school and misc. industrial.  
 Open space includes parks, cemeteries and undeveloped urban land.

## Stormwater Conveyance

### Description

In the Rock Lake watershed, storm water is most commonly conveyed to Rock Lake through a combination of storm sewers, roadside ditches, and grassed swales: Storm sewers transport runoff rapidly with no pretreatment or filtering of the runoff before it enters streams or lakes. Properly designed grassed swales generally reduce runoff volume because of infiltration, and sod vegetation serves to remove some pollutants from runoff before it flows into streams, lakes and storm sewer systems.

The types and amounts of pollutants transported by runoff depend on the way that pollutant-bearing surfaces are connected to the storm drainage system. For example, commercial parking areas and arterial streets deliver the highest concentrations of lead, asbestos, cadmium, and street sediment because normally these areas are drained by storm sewers that discharge to a lake or stream.

Reducing pollutant transport to surface waters involves reducing the amount of urban storm water reaching streams and lakes, primarily from impervious surfaces. This is accomplished by increasing the infiltration of storm water into the soil and ground layers. Storm water infiltration on a suitable site can effectively reduce nonpoint pollution. In addition, infiltration can help stabilize the hydrology of small urban streams and lakes by replenishing

groundwater, much of which is ultimately discharged to surface water. Infiltration can reduce bank erosion and the need for expensive, highly engineered drainage structures such as concrete lined channels. Infiltration practices can be used with wet detention ponds to supplement pollutant removal effectiveness or reduce pond size.

Practices that increase on-site infiltration include porous pavements, redirecting roof downspouts to grassed areas, and directing runoff water to infiltration trenches. These practices are generally most applicable to small source areas such as rooftops and parking lots. Grassed swale drainage systems also can be used to reduce runoff and erosion. Finally, infiltration basins can be located at the end of drainage outlets serving larger drainage areas.

## **Objectives**

The long-term management goal is to reduce the urban sediment loading by 50%, and the phosphorus loading by 25%. Analysis of storm water management techniques shows that certain best management practices (BMPs), such as infiltration basins and storm water detention ponds, can significantly reduce sediment and other pollutant loadings to lakes and streams. Adoption of storm water management ordinances and use of storm water management practices will be a priority in the implementation of this plan.

Redeveloped urban areas should have storm water quality and flow control practices included as part of the development.

## **Construction Site Erosion**

### **Description**

Construction sites are those areas in any phase of construction that involves disturbing the soil through grading or excavation. Construction sites in the project area entail new development and renovation or redevelopment. The renovation and redevelopment activities include utility replacement, street replacement, bridge reconstruction, or rehabilitation of commercial, industrial, or residential areas.

Construction site erosion is a water quality concern in the Rock Lake watershed. Uncontrolled construction site erosion can devastate aquatic communities in lakes receiving sediment-laden runoff. The reduced capacity of stormwater conveyance systems resulting from sedimentation can cause localized flooding. Importantly, water quality improvements occurring through implementation of nonpoint source control practices for existing urban areas can be negated by construction site erosion pollution sources. Predicting rates of construction site erosion is difficult. However, erosion rates exceeding 75 tons/acre/year can occur. This rate of erosion is greater than occurs on the most severely eroding croplands and 65 times the sediment loading rate from existing commercial and industrial areas. Often the proximity of construction sites to storm sewers or other drainage ways serving urban areas results in nearly all of the sediment being delivered to streams and lakes.

Average annual sediment loading to waterbodies from construction site erosion was determined by using existing and projected development patterns and an average soil erosion

rate of 30 tons per acre per year. These estimates show that about 370 tons of sediment and 423 pounds of phosphorus are delivered to waterbodies each year.

## Future Development

Table 3.6 shows projected pollutant loads for a ten-year time period. Future construction within the Rock Lake Watershed will mostly be residential, as has been the trend over the last 5 years. The majority of development will occur less than 0.75 miles from Rock Lake. All remaining open land in the watershed is zoned as agriculture or residential development. A grass swale ditch drainage system will be used to convey stormwater away from developed areas to Rock Lake. Proper construction site erosion is necessary to protect Rock Lake from unnecessary soil erosion.

**Table 3-6. Projected Construction Site Erosion From Residential Development for a 10-year period, 1995-2005**

Location	Projected Acres Needed 1995-2005	Sediment Erosion (30 ton/acre)	Phosphorus Delivered (1.28 lbs/ton)
Town Lake Mills	74	2,220 Tons	2842lbs.
City Lake Mills	200	1,500 Tons	1920lbs.
<b>TOTALS</b>	205	3,720 Tons	4,762 lbs

Source:Jefferson County Agricultural Preservation and Land Use Plan, 1999

These projections suggest that construction site erosion, left unchecked, will deliver on average 372 tons of sediment and 476 pounds of phosphorus to the lake each year.

## Management Needs and Alternatives

Two levels of management were evaluated for construction sites:

1. Manage construction sites, assuming control practices which are 70 percent effective in controlling off-site sedimentation.
2. Manage construction sites, assuming control practices which are 50 percent effective in controlling off-site sedimentation.

Construction site erosion control throughout most of the watershed project area is critical to achieving sediment reduction goals. It is expected that the rate of construction activity will remain steady in the future. Without at least a 50 percent control of the sediment from these

sites, construction site erosion will remain a serious deterrent to desired water quality and aquatic life in the watershed project area.

Enforcing state and local ordinances can be an effective means to reduce construction site erosion and its adverse water quality impacts. In 1986, the DNR and the League of Wisconsin Municipalities cooperatively developed a model ordinance for the control of construction site erosion (DNR, 1987). It contains provisions for planning, designing, installing and maintaining erosion control practices. It also contains guidance for administering and enforcing the ordinance.

The Town and City of Lake Mills in the project area has ordinance requirements for controlling construction site erosion and sedimentation. In addition, developers are governed by state regulations (Ch. 144 Wis. Stats.) set forth by the Department of Industry, Labor and Human Relations (DILHR) for erosion control on sites with one and two family dwellings; and the DNR Wisconsin Pollutant Discharge Elimination System (WPDES) permit regulations for sites greater than five acres.

Despite these regulations, several potential impediments to effective erosion control exist. For example, developers sometimes perceive erosion control as an add-on cost and not a built-in cost of construction; enforcement is often done only in response to complaints; maintenance of erosion control is often poor; sedimentation basin designs consume large areas where vacant land is scarce; unnecessary grading and excavation is commonplace; soil is routinely tracked onto roads because preventative measures are not a high priority for builders; and there is often confusion about who is responsible for installing erosion control practices.

Local ordinances must meet the applicability and content requirements of NR 120.16 dealing with erosion control. The "Model Construction Site Erosion Control Ordinance," developed cooperatively by the DNR and the League of Wisconsin Municipalities (DNR, 1987), and suggested changes to the model ordinance (set forth by Mr. James H. Schneider, League Legal Counsel, in the March 1989 issue of "The Municipality") will be used as guides to determine adequacy of ordinances. Erosion control practice standards and applicability criteria should be consistent with those set forth in the Wisconsin Construction Site Best Management Practice Handbook (DNR, 1989).

The following is a list of specific recommendations that units of government and developers should address in developing an effective construction site erosion control program.

- Municipalities should review (and modify where needed) their existing ordinances to assure effective penalties for non-compliance and to adequately respond to concerns of citizens, inspection staff and developers.
- Municipalities should evaluate staffing and training needs for effective ordinance administration and enforcement.
- Municipalities should evaluate their permit fee schedule to investigate ways to raise revenue to support effective enforcement activities.

- Developers and contractors need to know what is expected of them, and they need better access to technical information through seminars and other educational activities and materials.
- Erosion control inspectors need specific guidelines for documenting ordinance violations in order to provide for more consistent and effective legal action.

An erosion control information and education strategy is described in Chapter Five.

## **Objectives**

High priority items to improve compliance include more consistent issuance of citations, hiring of additional inspection staff where needed, new fee structures to cover the cost of improved staffing, and more effective court action when ordinance violations occur.

Because of the gaps in state agency regulations, construction erosion control is best accomplished through a local erosion control ordinance, locally administered building codes, practice standards and application guidelines, an effective administrative program and effective enforcement. Training programs are needed for staff administering ordinances and developers who are responsible for installing and maintaining the erosion control practices.

## **Pollution Prevention Practices**

### **Description**

Pollution prevention practices are conducted to remove pollution at its source and prevent the need for treatment once they enter the resource. Practices include street sweeping, yard waste collection, recycling programs, and a variety of behavioral changes.

These factors affect the amount of pollutants from urban surfaces carried to lakes and streams by runoff. Street sweeping removes some of the particulate pollutants from street and parking lot surfaces before they can be transported to surface waters. Repeated street sweeping of commercial and industrial areas in the early spring, to remove winter accumulation of sand and street dirt, and in the fall, to remove leaves, provides the greatest benefit. The potential for lawn care chemicals to be carried by runoff to nearby streams and drainageways is also a concern. Fertilizer residues can enrich surface waters with nutrients and promote algae growth. Pesticides can add to toxic pollution.

Many benefits can be gained through changes in lifestyle by urban residents such as reducing the amount of automobile traffic and adopting erosion control practices. There are many actions individuals can take; the following is a partial list:

- Reduce or eliminate the use of galvanized roof materials and gutters, a primary source of zinc in urban runoff. Revise municipal building codes where possible.

- Remove pet wastes immediately from lawns, sidewalks, and streets to reduce bacterial contamination of urban runoff. Enforce local pet waste ordinances and familiarize pet owners with good pollution prevention practices.
- Control the timing and reduce the amount and type of fertilizer and pesticide applications in all areas. Market phosphorus-free fertilizer.
- Dispose of automobile waste fluids such as radiator water and engine oil appropriately, keeping them out of the storm sewer system. Set up municipal recycling programs for antifreeze and waste oil. Create partnerships with car dealerships and auto maintenance shops in the watershed project area.
- Remove street dirt, leaves and debris from catch basins, streets and parking lot surfaces through municipal street maintenance and leaf collection programs.
- Control development and redevelopment through zoning which, in part, considers on-site suitability for storm water management practices to meet water quality, habitat, and flood prevention objectives.
- Control construction site erosion.
- Minimize use of street de-icing compounds.
- Reduce the amount of motorized traffic.
- Reduce the areal extent of parking lots.

### **Objective**

Encourage the use of pollution prevention practices through local programs. This goal ties together closely with the information and education component of the project.

### **Pollutant Reduction for Urban Nonpoint Sources**

A summary of the reduction objectives from urban sources:

- For existing urban areas, reduce sediment loading by 50% and phosphorus loading by 25%
- From construction sites reduce sediment and phosphorus loading by 50%.
- Reduce sediment loading from shoreline erosion by 50%.

The adequacy of these objectives will be reviewed after five years (or sooner if future water quality data indicate a need for revision as determined by the watershed project Technical Advisory Committee).

## Rural and Urban Pollution Load Summary

Tables 3-7 and 3-8 summarize the sediment and phosphorus loading to Rock Lake and present the reduction goals for the watershed project. It is important to recognize that some activities that may take place have not been quantified and are therefore not listed in these tables. These include wetland restoration, and nutrient management. Use of these practices will also help improve the quality of Rock Lake.

**Table 3-7 . Rock Lake Watershed Sediment Reduction Objectives**

Source	Sediment Delivered (tons)	Percent of Total	Sediment Reduction Objective	Sediment Reduced (tons)
Cropland	446	31%	50%	223
Shoreline	370	26%	50%	185
Ditches	210	14%	0%	0
Urban	50	3%	50%	25
Construction	370	26%	50%	185
Total	1,446	100%	43%	618



**Table 3-8 . Rock Lake Watershed Phosphorus Objectives**

Source	Phosphorus Delivered (lbs.)	Percent of Total	Phosphorus Reduction Objective	Phosphorus Reduced (lbs.)
Barnyards	146	4%	0%	0
Cropland	2,011	56%	50%	1006
Ditches	298	8%	0%	0
Shoreline	423	12%	50%	212
Urban	236	6%	25%	59
Construction	472	13%	50%	236
Total	3,586	100%	42%	1,513

Additional phosphorus reductions are expected through the implementation of nutrient management plans which have not been quantified.

## **Eligibility for Wetland Restoration and Easements**

### **Wetland Restoration**

All of the existing and farmed wetlands (3,261 acres) are classified as eligible for restoration. There will be no critical sites for wetland restoration. The targeted goal is to restore about 100 acres of wetlands throughout the watershed. Wetland restoration is considered a best management practice for the purpose of controlling nonpoint sources of pollution. Wetland restoration includes: the plugging or breaking up of existing tile drainage systems, the plugging of open channel drainage systems, other methods of restoring the pre-development water levels of an altered wetland, and the fencing of wetlands to exclude livestock. Secondary benefits of wetland restoration may be enhancement of fish and wildlife habitat.

Wetland restoration is an available option to address any of the following:

1. Cultivated hydric soils with tile or open channel drainage systems discharging to a stream or tributary.

Wetland restoration will reduce the amount of nutrients and pesticides draining from the altered wetland to a water resource either by establishing permanent vegetation or altering the drainage system.

2. Pastured wetlands riparian to streams or tributaries.

Eliminating livestock grazing within wetlands will reduce the organic and sediment loading to the wetland and adjacent water resource, and reduce the direct damage to the

wetland from the livestock. Livestock exclusion by fencing will control the pollutants and restore the wetland.

3. Prior converted wetlands downslope or upslope from fields identified as eligible upland sediment sources through the WINHUSLE model.

Restoration of wetlands in these situations will do one of two things: 1) create a wetland filter which reduces the pollutants from an upslope field(s) to a water resource; or 2) reduce the volume and/or velocity of water flowing from an up-slope wetland to a down-slope critical field. Two eligibility conditions must be met to use wetland restoration in this situation:

- All upland fields draining to the wetland must be controlled to a soil loss rate that is less than or equal to the soils "T" value.
- Wetland restoration costs must be the **least-cost** practice to reach sediment reduction goals. Within the Rock Lake watershed wetland restorations of eligible prior converted wetlands will be considered over lower cost practices to control nonpoint source pollutants.

## Land Easements

Although easements are not considered a best management practice, they can help achieve desired levels of nonpoint source pollution control in specific conditions. Easements are used to support best management practices, enhance landowner cooperation, and more accurately compensate landowners for loss or altered usage of property. The benefits of using easements in conjunction with a management practice are: (1) riparian easements can provide fish and wildlife habitat along with the pollutant reduction function; (2) easements are generally perpetual, so the protection is longer term than a management practice by itself; and (3) an easement may allow for limited public access (depending on the situation). However, the primary justification of an easement must be for water quality improvement.

Nonpoint source program funds may be used to purchase land easements in order to support specified best management practices. These practices, all of which involve the establishment of permanent vegetative cover, include:

- **Shoreline Buffers:** vegetative areas which minimize nonpoint source impacts and other direct impacts to streams and lakes;
- **Critical Area Stabilization:** stabilization efforts needed on sites that either erode at an excessive rate, or have high sediment delivery rates to surface water;
- **Wetland Restoration:** areas where wetlands are intentionally restored or enhanced in order to improve their ecological values, such as natural filters of surface water.

Easements may also be considered for protecting municipal well heads if it can be established that vegetative cover will correct an existing groundwater quality threat.

Easements should be considered in the following situations:

1. To exclude livestock from grazed wetlands or along eroding streambanks or ditchbanks within the watershed. Easements are strongly recommended whenever:
  - there is any grazing of wetlands.
  - livestock density is so great that areas of unvegetated soil are within 60 feet of streams or intermittent streams.
  - where streambanks or ditchbanks are eroding.
  - channel erosion is exacerbated by livestock grazing such that unvegetated streambanks are two feet or more in height.
2. When elimination of row cropping and the establishment of permanent vegetative cover will stabilize a critical area. Easements are strongly recommended whenever:
  - Row cropping is occurring within 60 feet or less of streams or intermittent streams.
  - Row cropping is being practiced on slopes greater than 20 percent.
3. To support eligible wetland restorations. Easements are strongly recommended whenever:
  - The eligible wetland restoration is greater than 25 acres in size.
4. When a barnyard or animal feedlot is located within the flood plain and: (a) a permanent easement is the least-cost alternative to provide adequate pollution reduction or (b) a permanent easement provides a greater level of pollution reduction than on-site engineering options at a price that is cost-effective when compared to the level of pollution reduction and the price of the available engineering options. Easements are strongly recommended whenever:
  - Engineering options would require intensive management in order to continue to provide adequate pollution reduction.
  - Surrounding land use is largely agricultural and it is anticipated that it will remain so for two decades or more.

## **Ordinances**

### **Manure Storage Ordinance**

Surface water and groundwater resources are at risk when animal waste storage facilities are improperly located, designed, constructed, or abandoned. Manure overflows and storage facility failures are a serious threat to aquatic life. In order to prevent ground and surface water pollution from these failures, counties adopt animal waste storage ordinances that

follow DATCP guidelines and meet construction and management standards adopted by the NRCS.

The adoption of an animal waste storage ordinance in Jefferson County was required within 2 years of plan approval by the Jefferson County Land Conservation Committee. Certain costs for development and administration of the ordinance are eligible for reimbursement under the Priority Watershed Project. As required by State statutes, the County must repay to the State all Nonpoint Source Grant funds if the ordinance is not adopted.

On September 21, 1999, the Jefferson County Board of Supervisors passed the Jefferson County Animal Waste Storage and Nutrient Management Ordinance. The purpose of the ordinance is to prevent water pollution and thereby protect the health and safety of the citizens in the county. The ordinance regulates the (1) location, design, construction, and use of all new animal waste storage facilities; (2) modification or closure of all facilities; (3) transfer of wastes into storage facilities; and (4) use of wastes from storage facilities. An Animal Waste Storage Facility Permit is required before any construction or modification activity takes place. Each application for this permit shall include a complete set of detailed construction plans and a Nutrient Management Plan. An Animal Waste Storage Facility Closure Permit is required before the closure of an idle storage facility. Each application for this permit shall include a site-specific design for closure.

### **Construction Site Erosion and Stormwater Management Ordinances**

A number of local governments recognize that the cost of *preventing* damage from erosion and sedimentation is often less than the cost of *correcting* damage from erosion. Also, many believe that the cost of preventing erosion damage should be borne by those benefiting from the development rather than by taxpayers paying to remove sediment from ditches, culverts, streets, harbors, lakes, and streams. These local governments are developing or amending subdivision ordinances, zoning ordinances, and other local ordinances to include runoff and erosion control requirements for developing land areas.

Chapter 236 of the Wisconsin Statutes gives cities, villages, towns, and counties authority to control erosion from developing subdivisions and smaller land divisions. This chapter establishes the minimum standards and procedures for land division in Wisconsin. The chapter enables local governments that have an established planning agency to adopt subdivision ordinances that are more restrictive than the state standards. Several of these government units have included runoff and erosion control provisions in their ordinances. These ordinances typically require a developer to submit a detailed plan specifying control measures for minimizing erosion and runoff during and after development. Typically, before a final plat is filed, the person who reviewed the erosion and runoff control plan visits the development site and certifies that the measures have been installed in accordance with the plan.

Similar to erosion control, Wisconsin cities, villages, towns, and counties have authority to adopt a stormwater management zoning ordinance. A draft Model Stormwater Management Zoning Ordinance was developed by the DNR in 1995. This model ordinance is meant to be complimentary to the model construction site erosion control ordinance prepared in 1987 by the DNR, in conjunction with the Wisconsin League of Municipalities.

The DNR suggests that the Wisconsin Construction Site Erosion Best Management Handbook (DNR Publication WR-222-93) and the Wisconsin Stormwater Manual (DNR Publication WR-349-94) be used as a reference for any development that occurs in the Rock Lake watershed project.

## **Other Pollution Sources**

Many pollution sources contributing to surface water quality degradation in the watershed are typically not addressed by the priority watershed project. Control of these pollution sources occurs through other state and county regulatory programs, as described below.

### **Leaves as a Source of Phosphorus**

Leaves can be an additional source of phosphorus in the fall and spring of the year. The current collection method of leaves in the City of Lake Mills allows for leaves to be blown into Rock Lake. The city requires residents to push their leaves into the gutter where they can easily end up in the lake via the storm sewer system.

The Rock Lake Priority Watershed Project would like to work with the City of Lake Mills on establishing better scheduling of the leaf pickup so they would be picked up within the same leaves are set in the gutter. This would decrease the amount of leaves that enter the lake.

### **Municipal and Industrial Point Sources of Pollution**

Discharges of wastewater from permitted municipal and industrial sources are important considerations for improving and protecting surface water resources. Chapter 147, Wis. Stats., requires any person discharging pollutants into the waters of the state to obtain a Wisconsin Discharge Elimination System (WPDES) Permit issued by the DNR.

### **Municipal Waste Water Treatment Plants**

Sanitary sewer service is available throughout the majority of the Rock Lake watershed, serving 70% of the watershed's population. Wastewater generated by the remainder of the watershed residents is disposed of through private on-site systems.

The City of Lake Mills' Wastewater Treatment Plant discharges to Rock Creek which is a tributary to the Crawfish River. The discharge site is located outside of the Rock Lake watershed. The treatment system was built in 1991 and is operating well-within its design capacity. The system uses an activated sludge-extended aeration treatment system. The system currently services 5,000 people at 800,000 gallons per day and can service up to 1.16 million gallons per day.

## **Private Sewage Systems**

Septic systems consist of a septic tank and a soil absorption field. Septic systems fail due to soil type, location of system, or poor design or maintenance such as tanks which go unemptied. Pollutants from septic system discharges are nitrates, bacteria, viruses and hazardous materials from household products. Generally, in the Rock Lake watershed, the majority of soils are not suitable for conventional septic tank soil absorption systems. The poorly drained Houghton Muck soils in the watershed can be close to the water table and can possibly cause groundwater-related problems with conventional systems. Therefore, most rural residents would have to go to an alternative system such as a mound system. Landspreading of septic system waste during the winter months also can create surface water quality problems.

The Wisconsin Fund is a Private Sewage System Replacement Grant Program offering financial assistance designed to help eligible homeowners and small business operators offset the costs of replacing a failing septic system. Counties have been using the Wisconsin Fund since 1981. The program is administered by the Jefferson County Zoning Department. The grant program applies to principle residences and small businesses built prior to July 1, 1978, and is subject to income and size restrictions. Seasonal homes are not eligible for participation in this program. Interested individuals should contact their county zoning department for more information.

## **Land Application of Municipal and Industrial Wastes**

Sludge is an organic, non-sterile by-product of treated wastewater, composed mostly of water (up to 99 percent). The re-use of sludge through land application is considered a beneficial recycling of nutrients and a valuable soil conditioner. Use of sludge in this manner is also considered to be the most cost-effective means for treatment facilities to dispose of the material.

Land application of municipal and industrial sludge is regulated under NR 204 and NR 214 respectively which require a WPDES permit, site criteria, minimum distances from wells, and application rates to ensure that environmental and public health concerns such as proper soil types, depth to groundwater, distance from surface water, and the type of crop to be grown on sludge amended fields are taken into consideration when the DNR approves agricultural fields for sludge application.

There is one site in the Rock Lake Watershed that accepts and spreads municipal sludge on a total of 20 acres. There are sites in the watershed that accept and spread industrial sludge in the Rock Lake watershed. Industrial sludge is primarily chicken manure.

## **Solid Waste Disposal Sites**

There are no active landfill sites in the Rock Lake Priority Lake watershed.

## Other Contaminated Sites

The Wisconsin Environmental Fund was created with the enactment of 1983 Wisconsin Act 410 commonly called the Groundwater Law. The Environmental Fund provides the Department of Natural Resources with the means to investigate and correct environmental pollution which is not severe enough to warrant action under the Federal Superfund, but still threatens the public health, welfare or safety, and the environment. The Wisconsin Remedial Response Site Evaluation Report (WRRSER) (SW-504-95) outlines the inventory results and status of sites. The WRRSER is comprised of three lists: inventory of sites or facilities which may cause or threaten environmental pollution, high priority spill sites, and medium priority leaking underground storage tanks (LUSTs).

**Table 3-9. Jefferson County WRRSER Statistical Summary (1995)**

Facilities	Facilities Removed	Spills	Spills Removed	LUSTs	LUSTs Removed
1	0	3	1	66	16

NOTE: This report is a continuing process started in 1983. This report provides a point in time status and is being continually up-dated and as a result, may not reflect the total number of sites that have been added or removed from the list in Jefferson County.

## Geese Population Concerns

Migrating geese move back and forth between Hudson Bay and Mexico. Their flight path reaches from the East Coast through the Midwest. Studies indicate that 70,000 birds are nesting in urban areas with more and more migrating geese seeming to shun the entire migrant flight and taken up intermediate residence in open water areas. As resident geese populations continue to rise in the area, so does the concern for human health and nutrient loading to lakes and streams. Rock Lake is no exception.

Geese are a common site at many of the beaches around Rock Lake. High fecal coliform counts have closed beaches on Rock Lake due to an increased health concern. Also, swimmers itch is caused by a parasite found in waterfowl manure. The microscopic-parasites die shortly after penetrating the skin, but can cause an allergic reaction in some people.

Goose manure is another contributor of nutrients to Rock Lake. By using a simple equation, the effects of Canada geese on water quality were calculated. The equation takes into account the number of resident geese, number of days they reside in the area, amount of excrement per day, and percentage of nutrients in the excrement. The WNDR estimates that there are approximately 400 geese in the Rock Lake area 254 days of the year. Canada geese contribute an estimated 42 pounds of phosphorus a year.

There are ways that the community can help control the goose problem near Rock Lake. Currently, the town has no ordinance against feeding waterfowl. But the City of Lake Mills prohibits the feeding of waterfowl in or adjacent to Bartel's Beach, Tyrenena Park, and Sandy Beach. Reducing easy access to food may discourage geese from coming onto riparian areas. Secondly, it would be beneficial to establish buffer areas along the lake shore. Geese like

open areas where grass has been mowed down to the water's edge. Maintaining a 30-foot buffer area along the water's edge would discourage geese from accessing that property. This would also reduce the volume of manure reaching Rock Lake.



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# CHAPTER FOUR

## Implementation

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### Introduction

This chapter identifies the means for implementing the rural management actions for nonpoint source pollution control described in the previous chapter. The success of this priority watershed project depends on the aggressive implementation of these nonpoint source pollution control strategies. This chapter identifies:

- The best management practices (BMPs) needed to control nonpoint sources of pollution as described in Chapter Three;
- The cost containment policies;
- The cost-share agreement procedures;
- Schedules for implementing the project;
- The estimated project budget for cost-sharing, staffing, and for other support.

## Agricultural Best Management Practices (BMPs)

### BMPs Eligible For Cost-Sharing And Their Rates

Best management practices control nonpoint sources of pollution and are identified in NR 120. Design and installation of all BMPs must meet the conditions listed in NR 120. Generally these practices use standard specifications included in the NRCS Field Office Technical Guide. In some cases additional specifications may apply. The applicable specifications for each BMP can be found in NR 120.14. The Department also may approve other alternative best management practices and design criteria based on the provisions of NR 120.15.

If the installation of BMPs destroys significant wildlife habitat, NR 120 requires that habitat be recreated to replace the habitat lost. The DNR District Private Lands Wildlife Specialist or a designer will assist the LWCD in determining the significance of wildlife habitat and the methods used to recreate the habitat. Every effort shall be made during the planning, design, and installation of BMPs to prevent or minimize the loss of existing wildlife habitat. Wildlife habitat restoration components of the practice are cost-shared at 70 percent.

The practices eligible for cost-sharing and the cost share rates for each BMP are listed in Tables 4-1 and 4-2 below; the BMPs listed in Table 4-1 can either be cost-shared at 50% or at the flat rates listed.

**Table 4-1. BMP Flat Rates**

<b>BEST MANAGEMENT PRACTICE</b>	<b>FLAT RATE</b>
Contour Farming	\$ 9.00/ac <sup>1</sup>
Contour Stripcropping	\$ 13.50/ac <sup>1</sup>
Field Stripcropping	\$ 7.50/ac
High Residue Management	\$ 18.50/ac <sup>2</sup>
Cropland Protection Cover	\$ 25.00/ac <sup>2</sup>
Vegetative Riparian Buffers	\$100.00/ac <sup>3</sup>

<sup>1</sup> Wildlife habitat restoration components of this practice are cost-shared at 70%.

<sup>2</sup> This project will fund up to three years.

<sup>3</sup> This is currently an IBMP in the Branch River Watershed. It is anticipated that in late-2001, NR 120 will be revised and this BMP will be available to the Rock Lake Watershed Project.

The following is a brief description of some of the most commonly used BMPs. A more detailed description of these practices can be found in NR 120.14.

**Contour Farming.** The farming of sloped land so that all operations from seed bed preparation to harvest are done on the contour.

**Contour Stripcropping.** Growing crops in a systematic arrangement of strips or bands, on the contour, in alternate strips of close grown crops, such as grasses or legumes, and row-crops.

**Field Diversions.** The purpose of this practice is primarily to divert water from areas where water is in excess or is doing damage, to areas where it can be used or transported safely.

**Terraces.** A system of ridges and channels constructed on the contour with a nonerosive grade at a suitable spacing.

**Grassed Waterways.** A natural or constructed channel shaped, graded and established with suitable cover as needed to prevent erosion by runoff waters.

**High Residue Management.** A system which leaves at least 30 percent of the ground covered with crop residue after crops are planted.

**Nutrient Management.** The management and crediting of nutrients from all sources, including legumes, manure, and soil reserves for the application of manure and commercial fertilizers. Management includes the rate, method and timing of the application of all sources of nutrients to minimize the amount of nutrients entering surface or groundwater. This practice includes manure nutrient testing, routine soil testing, and residual nitrogen soil testing.

**Pesticide Management.** The management of the handling, disposal and application of pesticides including the rate, method and timing of application to minimize the amount of pesticides entering surface and groundwater. This practice includes integrated pest management scouting and planning.

**Cropland Protection Cover (Green Manure).** Cropland protection cover are close-growing grasses, legumes or small grain grown for seasonal soil erosion protection and soil improvement.

**Intensive Grazing Management (Rotational Grazing).** Intensive grazing management is the division of pastures into multiple cells that receive a short but intensive grazing period followed by a period of recovery of the vegetative cover. Rotational grazing systems can correct existing pasturing practices that result in degradation and should replace the practice of summer dry-lots when this practice results in water quality degradation.

**Critical Area Stabilization.** The planting of suitable vegetation on sites producing nonpoint source pollution and other treatment necessary to stabilize eroding lands.

**Grade Stabilization Structure.** A structure used to reduce the grade in a channel to protect the channel from erosion or to prevent the formation or advance of gullies.

**Agricultural Sediment Basins.** A structure designed to reduce the transport of sediment and other pollutants eroded from agricultural fields to surface waters and wetlands.

**Shoreline and Streambank Stabilization.** The stabilization and protection of stream and lake banks against erosion and the protection of fish habitat and water quality from livestock access.

**Table 4-2. State Cost-Share Rates for Best Management Practices**

BEST MANAGEMENT PRACTICE	STATE COST SHARE RATE
Contour and field strip-cropping	50% <sup>1</sup>
High residue management systems	50%
Cropland protection cover (green manure	50%
Nutrient/Pest management (not to exceed 3 years)	50%
Livestock fencing	50%
Intensive grazing management	50% <sup>4</sup>
Manure storage facilities - for first \$20,000 costs	70% <sup>5</sup>
Manure storage facilities - for remaining costs	50% <sup>5</sup>
Pesticide spill control facilities	70%
Animal waste system storage abandonment	70%
Field Diversions	70%
Terraces	70%
Grassed waterways	70%
Critical area stabilization	70%
Grade stabilization structures	70%
Agricultural sediment basins	70%
Shoreline buffers	70%
Wetland restoration	70%
Barnyard runoff management	70%
Animal lot abandonment or relocation	70%
Roofs for barnyard runoff management and manure storage facilities	70%
Milking center waste control	70%
Cattle mounds	70%
Well abandonment	70%

<sup>1</sup>Wildlife habitat recreation has a state cost-share rate of 70%

<sup>2</sup>Spill control facilities have a state cost-share rate of 70%

<sup>3</sup>The maximum cost-share rate for land acquisition, storm sewer rerouting, and removal of structures necessary to install structural urban best management practices is 50%

<sup>4</sup>The maximum cost-share rate per watering system is \$2,000

<sup>5</sup>The maximum cost-share rate for manure storage facilities may not exceed \$35,000 total per facility. (See NR 120 for more details)

**Shoreline Buffers.** A permanently vegetated area immediately adjacent to lakes, streams, channels and wetlands designed and constructed to manage critical nonpoint sources or to filter pollutants from nonpoint sources.

**Wetland Restoration.** The construction of berms or destruction of the function of tile lines or drainage ditches to create conditions suitable for wetland vegetation.

**Barnyard Runoff Management.** Structural measures to redirect surface runoff around the barnyard, and collect, convey or temporarily store runoff from the barnyard.

**Animal Lot Relocation.** Relocation of an animal lot from a critical site such as a floodway to a suitable site to minimize the amount of pollutants from the lot to surface or groundwater.

**Manure Storage Facility.** A structure for the storage of manure for a period of time that is needed to reduce the impact of manure as a nonpoint source of pollution. Livestock operations where this practice applies are those where manure is winter spread on fields that have a high potential for runoff to lakes, streams and groundwater. The facility is needed to store and properly spread manure according to a management plan.

**Animal Waste Storage System Abandonment.** Animal waste storage system abandonment is the proper abandonment of leaking and improperly sited manure storage systems, including a system with bottom at or below groundwater level; a system whose pit fills with groundwater; a system whose pit leads into the bedrock; a system which has documented reports of discharging manure into surface or groundwater due to structural failure; and a system where there is evidence of structural failure. The practice includes proper removal and disposal of accumulated wastes, liner materials, and saturated soil as well as the shaping, filling, and seeding of the area.

**Milking Center Waste Control Systems.** A milking center waste control system is a piece of equipment, practice or combination of practices installed in a milking center for purposes of reducing the quantity or pollution potential of the wastes.

**Roofs for Barnyard Runoff Management and Manure Storage Facilities.** Roofs for barnyard runoff management and manure storage facilities are a roof and supporting structure constructed specifically to prevent rain and snow from contacting manure.

**Livestock Exclusion from Woodlots.** The exclusion of livestock from woodlots by fencing or other means to protect the woodlots from grazing.

**Cattle Mounds.** Cattle mounds are earthen mounds used in conjunction with feeding and dry lot operations and are intended to provide a dry and stable surface area for cattle.

**Structural Urban Best Management Practices.** These practices are source area measures, transport systems and end-of-pipe measures designed to control storm water runoff rates, volumes and discharge quality. These practices will reduce the amount of pollutants carried in runoff and flows destructive to stream habitat. These measures include such practices as

infiltration trenches, porous pavement, oil water separators, sediment chambers, sand filtration units, grassed swales, infiltration basins and detention/retention basins.

**Easements.** Easements are legally binding restrictions on land titles. Easements are purchased to provide permanent vegetative cover.

### **Interim Best Management Practices**

Under some circumstances, practices may be recommended that are not included on the BMP list. Administrative Rule NR 120.15 provides for interim practices where necessary to meet the water resource objectives identified in the watershed plan. The Department may identify in the nonpoint source grant agreement the design criteria and standards and specifications where appropriate, cost share conditions, and cost share rates for each interim best management practice.

### **Practices Not Cost-Shared**

Practices not cost-shared, but which shall be included on the cost share agreement if necessary to control the nonpoint sources, are listed below (as listed in NR 120.17):

- That portion of a practice to be funded through other programs.
- Practices previously installed and necessary to support cost-shared practices.
- Changes in crop rotations.
- Changes in location of unconfined manure stacks involving no capital cost.
- Nonstationary manure spreading equipment.
- Practices needed for land use changes during the cost-share agreement period.
- Other practices determined necessary to achieve the objectives of the watershed project.
- Minimum levels of street sweeping and leaf collecting.

### **Activities and Sources of Pollution Not Eligible For Cost Share Assistance**

Priority watershed cost-share funds cannot be used to control sources of pollution and land management activities specifically listed in NR 120.10(2). The following is a partial list of those ineligible activities:

- Operation and maintenance of cost-shared BMPs,
- Actions which have drainage of land or clearing of land as the primary objective,

- Practices already installed, with the exception of repairs to the practices which were rendered ineffective due to circumstances beyond the control of the landowner,
- Activities covered under the Wisconsin Pollution Discharge Elimination System (WPDES) Program or covered in other ways by Chapter 147 of Wis. Stats. (including livestock operations with more than 1,000 animal units, or livestock operations issued a notice of discharge under ch. NR 243),
- Septic system controls or maintenance,
- Dredging activities,
- Silvicultural activities,
- Bulk storage of fertilizers and pesticides,
- Activities and structures intended primarily for flood control,
- Practices required to control sources which were adequately controlled at the time the cost-share agreement was signed, with the exception of those that occurred which were beyond the control of the landowner,
- Other practices or activities determined by DNR not to meet the objectives of the program.

## **Cost-Share Budget**

### **Costs of Installing BMPs**

The quantity and type of management practices that would be used to meet the water quality objectives of this project are listed in Table 4-3. This budget serves as an estimate only of the number and types of practices that can be used in the Rock Lake watershed project. The capital cost of installing the BMPs are listed for 100% and 75% percent landowner participation rates. Units of measurement and cost per unit for the various BMPs also are included.

The capital cost of installing the best management practices is approximately \$425,720, assuming 100% participation. More realistic is the 75% participation rate where the capital cost is \$319,291.

- State funds necessary to cost-share this level of control would be approximately \$217,223.
- The local share provided by landowners and other cost-share recipients would be approximately \$102,068.

## **Easement and Land Acquisition Costs**

Chapter Three identifies where nonpoint source program funds can be used to purchase easements. The estimated cost of purchasing easements on eligible lands is shown in Table 4-3. At 75% participation, the estimated purchase price of easements on eligible lands would be \$75,000. Easements are funded at 100%. Acquisition costs are estimated to be \$4,688 each for state and local shares.



**Table 4-3. Cost-Share Budget for Rural Management Practices in the Rock Lake Priority Lake Project**

Management Needs Best Management Practices	Number/ unit	Cost/ Unit	Total Cost (1)	75% Participation*	
				State Share	Local Share
<b>Upland NPS Control</b>					
Change in Crop Rotation	200 ac	0	0	0	0
Contour Cropping <sup>(1)(3)</sup>	220 ac	13.50	2,970	2,228	0
Reduced Tillage <sup>(1)(2)</sup>	1,500 ac	18.50	27,750	20,813	0
Cropland Protection Cover <sup>(1)(2)</sup>	300 ac	25.00	7,500	5,625	0
Intensive Grazing Management	0 ea	4,000.00	0	0	0
Critical Area Stabilization	1 ac	800.00	800	420	180
Grass Waterways	20 ac	3,000.00	60,000	31,500	13,500
Field Diversions & Terraces	500 ft	3.00	1,500	788	338
Grade Stabilization	0 ea	4,000.00	0	0	0
Agricultural Sediment Basin	0 ea	10,000.00	0	0	0
Nutrient Mgmt only <sup>(2)</sup>	7,200 ac	6.00	43,200	16,200	16,200
Nutrient and Pest Mgmt. <sup>(2)</sup>	3,600 ac	10.00	36,000	13,500	13,500
Wetland Restoration	100 ac	100.00	10,000	5,250	2,250
Spill Control Basins	0 ea	15,000.00	0	0	0

\* Participation level to meet the established pollution reduction goals.

(1) Local share consists of labor and equipment costs. Also see flat rates in table 4-1.

(2) Number of acres shown reflects 3 times the eligible acres--cost share allowed 3 times.

(3) This BMP includes in-field buffers of permanent vegetative cover with flat rate of \$13.50.

(4) Maximum cost-share is \$35,000. 70% of first \$20,000 & 50% of the remaining cost including waste transfer equipment

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**Table 4-3. (cont.) Cost-Share Budget for Rural Management Practices in the Rock Lake Priority Lake Project**

Management Needs Best Management Practices	Number/ unit	Cost/ Unit	Total Cost (1)	75% Participation*	
				State Share	Local Share
<b>Barnyard Runoff Control</b>					
Filter Strip/Walls	1 ea	30,000	30,000	15,750	6,750
Roof Gutters	1 ea	1,500	1,500	788	338
Clean Water Diversions	1 ea	2,500	2,500	1,313	563
Roofs	0	3,000	0	0	0
Cattle Mounds	0	3,000	0	0	0
Manure Storage Facility(4)	2 ea	40,000	80,000	39,000	21,000
Animal Waste Storage Abandonment	3 ea	10,000	30,000	15,750	6,750
Well Abandonment	4 ea	500	2,000	1,050	450
Animal Lot Abandonment	0	60000	0	0	0
Milking Center Waste Control	1 ea	7,000	7,000	3,675	1,575
<b>Streambank Erosion Control</b>					
Shape and Seed	3,000 ft.	10	30,000	15,750	6,750
Shoreline Buffers	15 ac.	200	3,000	1,575	675
Streambank Fencing	0 ft.	2	0	0	0
Rock Riprap	1,000 ft.	30,000	3,000	15,750	6,750
Bio Riprap	1,000 ft.	20,000	2,000	10,500	4,500
<b>Subtotal</b>			425,720	217,223	102,068
Easements	50 ac.	2000	100,000	75,000	0
Wetlands, Critical Areas, Streambank Land Acquisition	5 ac.	2500	12,500	4,688	4,688
<b>TOTALS</b>			\$538,220	\$296,910	\$106,755

\* Participation level to meet the established pollution reduction goals.

(1) Local share consists of labor and equipment costs. Also see flat rates in table 4-1.

(2) Number of acres shown reflects 3 times the eligible acres--cost share allowed 3 times.

(3) This BMP includes in-field buffers of permanent vegetative cover with flat rate of \$13.50.

(4) Maximum cost-share is \$35,000. 70% of first \$20,000 & 50% of the remaining cost including waste transfer equipment

# Cost Containment

## Cost Containment Procedures

Chapter NR 120 requires that cost containment procedures be identified in this plan to control the costs of installing BMPs. The cost containment procedure to be used by Jefferson County is described below. The bidding procedure, average cost and flat rate lists can be obtained from the county LWCD.

## Cost-Share Agreement and Contact Strategy

Money for cost-share agreements is distributed by the Jefferson County LWCD from a Nonpoint Source Grant provided by the DNR. The LWCD receives additional grant money to support administrative responsibilities. Cost share agreements are binding contracts between landowners and the LWCD. Landowners must meet eligibility requirements defined in Chapter Three.

The following procedure will be used to make landowner contacts.

- During the first three months of the implementation period, all landowners or operators with eligible nonpoint sources will receive a mailing from the county explaining the project and how they can become involved.
- During the first year of implementation, county staff will make personal contacts with all landowners that have been identified as having critical nonpoint sources of pollution.
- The county will continue to make contacts with eligible landowners and operators until they have made a definite decision regarding participation in the program.
- The county will contact all eligible landowners not signing cost-share agreements by personal letter six months prior to the end of the cost-share sign-up period.

## Budget and Staffing Needs

This section estimates the funding and staffing required to provide technical assistance for the rural portion of this project.

### Staff Needs and Costs

Table 4-4 lists the total estimated staff needed to implement the project assuming a 75 percent level of participation by eligible landowners. A total of approximately 13,725 staff hours are

required to implement this plan. This includes 3,500 staff hours to carry out the information and education program.

Currently, one position is being funded for the Rock Lake watershed project. The LWCD and agencies will determine the need for additional staff based on the annual workload analysis.

The estimated cost for staff at the 75% participation rate is approximately \$283,781. These costs will be paid by the state through the Local Assistance Grant Agreement.

**Table 4-4. Estimated County LWCD Staff Needs for Project Implementation**

Activity	Staff Hours at 75% Landowner Participation Rate
Project and Financial Mgmt.	900
Information and Education	3,500
Pre-Contract Inventory, Landowner Contact, and Progress Tracking	2,000
Conservation Planning and Cost-Share Agreement Development	3,000
Plan Revisions and Monitoring	1,200
Practice Design and Installation Upland Sediment Control Animal Waste Management Streambank Erosion Control Easement and Land Acquisition	1,450 300 625 330
Training	420
Total LWCD Workload	13,725
Estimated Staff Required for Years 1-6	1.2 per year
Hours	2,288 per year

Source: WI Dept. of Agriculture, Trade and Consumer Protection, DNR and Jefferson Co. LWCD

# **Implementation Schedule**

## **Grant Disbursement and Project Management Schedule**

Implementation of this priority watershed project shall begin upon both approval of this plan and receipt of the Nonpoint Source Grant. The plan must be approved by the Department of Natural Resources (DNR), the Jefferson County Board, and the Wisconsin Land and Water Conservation Board. Implementation cannot begin unless a nonpoint source grant has been awarded.

The project implementation period is six years. During the first five years of implementation, cost-share agreements with eligible landowners may be signed. This sign-up period may be extended for two years if an evaluation, conducted by the DNR, shows that an extension is warranted. Practices listed on any cost-sharing agreement must be installed before the end of the implementation phase. The implementation phase of this project is scheduled to conclude in 2004.

The initial Nonpoint Source Grant will cover the cost of practices over the entire six year implementation phase. The amount of the Nonpoint Source Grant is calculated as 75% participation by eligible landowners; see Table 4-4 for a detailed explanation. This grant may be amended due to changes needed for time of performance, funding levels, or scope of work.

Local Assistance Grants (LAG) will be disbursed annually to Jefferson County to cover the costs of personnel, operating expenses, and equipment. The eligible costs for LAG's are in NR 120.2. The DNR will evaluate a workload analysis and grant application submitted by Jefferson County.

## **Landowner Contact Schedule**

During the first 12 months of the implementation period, all landowners with sites defined as "eligible" or "critical" nonpoint sources will receive correspondence from the county LWCD explaining the project and how they can become involved.

County LWCD staff will continue to make contacts with eligible landowners until the landowners have made a definite decision regarding participation in the program. County staff will contact all eligible landowners not signing cost-share agreements by personal letter six months prior to the end of the cost-share sign-up period to encourage participation.

As part of the annual inventory work, LWCD staff expect to identify fields that meet the criteria for critical sites. The LWCD staff will verify all sites identified each year and note these in a report to DNR as explained in the critical site notification process below.

## **Critical Site Notification Process**

At the time of critical site verification, any uninventoried sites on the same farm must be inventoried. This would determine all critical sites on a farm so the landowner would receive only one critical site notice and avoid the possibility of a notification of a barnyard critical site notice one year and another for upland erosion years later.

- Project staff will begin to contact the highest-ranked critical sites for verification immediately after plan approval and complete the contacts within six-months. Highest-ranked is defined as the top 25 percent of the inventoried critical site load. The plan approval date may be the same as the date on which the project receives the Nonpoint Source Grant. The department may allow up to three 90-day extensions beyond the six-month period to allow the counties sufficient time to verify that all sites meet the critical site criteria. The county shall make a request to DNR, in writing, which includes the reasons to support the extension.

By the end of the six-month verification period, the project staff will send a report to DNR that states each site meets the critical sites criteria or has changed status according to sec. NR 120.09(6), Adm. Code. The reasons for these conclusions will be included. Documentation of site visits and additional information will be maintained at the appropriate LWCD offices and will be available for inspection upon request.

- Following receipt of the report, the DNR has 60 days to send critical site notification letters to the landowners.
- The county LWCD staff are intending to complete the verification of critical sites sometime between the year 2000 and no later than 2002. The notification schedule may be modified and revised at the annual watershed review meeting when progress on critical sites is discussed.

## **Critical Site Appeals Process**

The owner or operator of a site designated as a critical site may appeal the critical site designation to the Land Conservation Committee of the county in which the site is located. The site owner or operator, now called the appellant, must write to the LCC and ask for an informal hearing. The appeal request must be received by the LCC within 60 days of the day that the notification letter was received by the owner or operator.

The Land Conservation Committee shall:

- Provide the appellant with a hearing and give reasonable notice of the hearing to the appellant, the DNR and the DATCP.
- Conduct the hearing as an informal hearing. Chapter 68.11(2), Wis. stats., does not apply to this hearing. This language describes the conduct of the hearing.
- Hold the hearing in a place that is convenient for the appellant.

The appellant and project staff will present information about the site so that LCC members may make a decision. Representatives of DNR and DATCP may attend the hearing. DNR is required to submit a report and recommendation to the LCC within 60 days after the hearing. DATCP has the option to submit a report and recommendation within 60 days.

The LCC shall provide a decision, in writing, within 45 days of receiving:

- (1) the DNR and DATCP reports and recommendations,
- (2) the notification by the DNR and DATCP that no report or recommendations would be submitted, or
- (3) the conclusion of the 60-day period following the hearing.

The LCC may support or overturn the designation of the site as a critical site. To make its decision, the LCC shall consider whether or not the critical site designation is consistent with the critical site criteria established in the project's priority watershed plan. The LCC also shall consider whether governmental representatives erred in their verification of the site conditions or management. Loss of profit is not grounds for support of an appeal. Violations by, or appeals granted to, other appellants shall not justify support of an appeal.

The owner or operator of a site designated as a critical site may request a review of the LCC decision by filing a written request with the Land and Water Conservation Board within 60 days after receiving the decision of the county LCC.

The owner or operator of a site designated as a critical site may request a contested case hearing under Chapter 227 to review the decision of the Land and Water Conservation Board by filing a written request with the DNR within 60 days after receiving an adverse decision by the LWCB.

## **Project Cost**

The total state funding required to meet the rural nonpoint source pollution control needs at 75% landowner participation is presented Table 4-5. This figure includes the capital cost of practices, staff support, and easement costs presented above. The estimated cost to the state is \$655,717. The estimated cost to landowners and others is \$106,756 for a total project cost estimate of \$762,473.

This cost estimate is based on projections developed by agency planners and local staff. Historically, the actual expenditures for projects are less than the estimated costs. The factors affecting expenditures for this watershed project might include: the participation rate; the amount of cost sharing that is actually expended; the number of staff working on the project; and the amount of support costs.



**Table 4-5. Cost Estimates for the Rock Lake Priority Watershed Project Based on 75% participation**

Eligible Activity	Total Cost <sup>1</sup>	State Share <sup>1</sup>	Local Share <sup>1</sup>
Cost Sharing: Practices	\$319,291	\$217,223	\$102,068
Easements and Land Acquisition	84,376	79,688	4,688
Jefferson County Staffing	283,781	283,781	0
Educational Activities	10,000	10,000	0
Other Direct (travel, supplies, etc.)	65,025	65,025	0
Totals	\$762,473	\$655,717	\$1106,756

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# **CHAPTER FIVE**

## **Integrated Resource Management Program**

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### **Introduction**

The purpose of this chapter is to identify existing local, state, and federal resource management programs which provide benefits for water quality and/or fish and wildlife resources in the Rock Lake watershed. Watershed staff will work to coordinate the efforts of these programs to provide the best possible management of land and water resources in the watershed. This comprehensive approach will facilitate consideration of the various goals and objectives for all the programs in which the landowner participates. Each of these activities is described below.

### **Fisheries and Wildlife Management**

Watershed best management practices (BMPs), such as ditchbank or shoreline protection, shoreline buffer strips and easements, should be implemented in a manner that preserves and enhances the management goal of providing a quality fishery in the Rock Lake watershed. Specifically, all shoreline protection BMPs should be installed using large-diameter sized rock below the water line. Rock riprap should be installed and sized so that the placement and size of rock will positively benefit fish habitat. Vegetative shoreline erosion control using emergent aquatic vegetation for habitat enhancement should be used where applicable. Wildlife habitat components should also be incorporated into vegetative filter strips along streams or in upland areas.

Shoreline erosion control measures will be installed in a manner beneficial to fisheries and wildlife habitat. DNR fish managers and wildlife managers will be consulted for input in the design of shoreline protection BMPs to maximize benefits to the fish and wildlife communities. In cooperation with counties, DNR staff will also review placement of agricultural sediment basins, provide technical assistance when the installation of BMPs will require the removal of obstructions or other wildlife habitat by proposing measures to minimize impact on wildlife habitat, and assist in resolving questions concerning effects of agricultural nonpoint source BMPs on wetlands.

### **Wetland Restoration**

About 100 acres have been identified in the Rock Lake watershed as being targeted for restoration. Further, the general guidelines for wetland restoration, easement acquisition and shoreline buffers to protect existing wetlands should be followed. Wetlands that are important

wildlife habitats will be identified in consultation with DNR wildlife managers and watershed managers. Shoreline buffer easements may be acquired adjacent to these wetlands to offer better protection from sedimentation and other nonpoint source pollution.

## **Groundwater Management**

Wells provide a direct conduit for pollutants to reach groundwater resources. Preventing well contamination and sealing abandoned wells are important steps for protecting these resources. If not properly sealed, abandoned wells can directly channel contaminated surface water or shallow groundwater into deeper drinking water aquifers, bypassing the normal purifying action that takes place as surface water slowly percolates downward. Abandoned wells are a significant threat to groundwater quality.

Project staff will encourage all landowners to properly seal abandoned wells. Information on the proper abandonment procedures will be provided to landowners when abandoned wells are located.

### **Well Abandonment**

The Agricultural Conservation Program (ACP), which is administered by the Farm Service Agency (FSA), provides cost-share assistance to operators in the Rock Lake watershed to properly seal abandoned wells to protect groundwater resources. Well abandonment is also an eligible cost-share practice under NR 120.

### **Wisconsin Well Compensation Grants**

Wisconsin's Well Compensation grant program provides financial assistance to replace or treat private wells contaminated with heavy metals, pesticides, solvents or gasoline. Wells must exceed state or federal drinking water standards. Replacement of wells contaminated with bacteria or nitrate are not eligible for cost-sharing, with the exception of livestock wells contaminated with more than 40 ppm of nitrate. DNR district water supply personnel should be consulted for more information concerning income limits and other eligibility requirements.

## **Private Sewage System Maintenance and Rehabilitation**

Poorly sited or improperly functioning private sewage systems have the potential to contaminate groundwater and surface waters in the Rock Lake watershed. Pollutants from sewage system discharge includes bacteria, viruses, household chemicals, nitrates and phosphorus. Many sewage systems located in riparian areas are out-dated and installed in soils which do not adequately filter pollutants due to the poor filtering ability of the soil and/or a high water table. Failing sewage systems in riparian areas are a special concern since pollutants can enter the surface waters with minimal filtering. Sewage system failure is often due to poor maintenance, primarily a failure to pump septic tanks on a regular basis.

Jefferson County staff will prepare educational materials to promote the proper maintenance of private sewage systems. Sewage system maintenance and household tips to reduce groundwater contamination will also be stressed during field visits and "home environmental audits."

It is also recommended that Jefferson County adopt an "update at date of sale" policy to require the proper inspection, update and/or replacement of septic systems when homes are sold in Jefferson County.

### **Wisconsin Fund**

The Private Sewage System Replacement & Rehabilitation Grant Program (Wisconsin Fund) provides financial incentives to protect and improve groundwater quality in Wisconsin. The Wisconsin Fund provides funds to update private sewage systems installed before 1978. To be eligible the septic system must have been inspected by the Jefferson County Sanitarian and determined to be failing by discharging waste to the groundwater or surface water. Only permanent residences qualify, and there are income restrictions. Applications for Wisconsin Fund assistance are made through the Jefferson County Zoning and Solid Waste Department.

Jefferson County staff will inform watershed residents about the benefits of the Wisconsin Fund grant program and encourage eligible landowners to apply.

## **Riparian Zones**

Cattle access to streams or ditchbanks and lakes has not been identified as a serious problem in the watershed. Any sites impacted by cattle access that are identified during the implementation phase of the project should be protected with BMPs. Sensitive riparian areas can be acquired through easements so they receive lasting protection.

Jefferson County staff will promote the protection of riparian areas where possible.

## **Stewardship**

The Stewardship Program enables the purchase of land or easements to protect sensitive environmental areas. The streambank protection program under stewardship is an important additional means of protecting water quality. Under this program, the DNR could obtain an easement on both sides of streams in the watershed (generally 66 feet wide on each side). If needed, the DNR will financially support the fencing of the stream to protect it from livestock access.

The Jefferson County Land Trust is a non-profit, tax-exempt organization dedicated to preserving rural and natural areas in Jefferson County. The Trust can assist landowners in the preservation of natural and agricultural lands by providing economic benefits and possible

tax deductions without developing their property. The Jefferson County Land Trust, Inc. is located in Jefferson, Wisconsin.

## **Forestry Programs**

There are approximately 400 acres of forested land within the Rock Lake watershed; there are 166 acres in the Forest Tax Law Program. Private forest lands contribute to the quality of water resources and fish and wildlife resources in the watershed. Financial assistance is available for forest management and soil and water resource protection through the Stewardship Incentive Program (SIP), the Managed Forest Law Program (MFL) and other forest stewardship programs. Additional information can be found in DNR publication FR-093-95, Wisconsin Forestry Best Management Practices For Water Quality, developed by DNR Bureau of Forestry.

### **Stewardship Incentive Program**

The Stewardship Incentive Program (SIP) was developed to stimulate enhanced management of forest lands by cost-sharing approved management practices. SIP provides cost share funding of up to 75% for practices that provide soil and water protection. The SIP program applies to nonindustrial private forest land of 10 acres or more on forested or forest related (i.e., prairie, wetlands) lands. Practices that are cost-shared by SIP include: development of a landowner forest stewardship plan, site preparation and tree planting, timber stand improvement, windbreak and hedgerow establishment, soil and water protection and improvement, riparian and wetland protection and improvement, fisheries habitat enhancement, wildlife habitat enhancement, and forest recreation enhancement.

### **Managed Forest Law**

The goal of the Managed Forest Law (MFL) program is to encourage long-term sound forest management. MFL is a tax incentive program for industrial and nonindustrial private woodland owners who manage their woodlands for forest products while also managing for water quality protection, wildlife habitat, and public recreation. In return for following an approved management plan for 25-50 years, annual property taxes are set at a lower rate than normal. When the landowner receives an income from a timber harvest, some of the deferred tax is collected in the form of a yield tax. Management plans are based on the landowners' objectives and long-term, sound forest management practices. These plans may require harvesting, planting, thinning, release and/or soil erosion control practices on a mandatory basis, while other practices such as wildlife habitat and aesthetic enhancement activities are voluntary.

### **Other Stewardship Programs**

Some other forest stewardship programs available to watershed landowners include the Environmental Quality Incentive Program (EQIP) and the Wildlife Habitat Incentives Program (WHIP). Jefferson County Land and Water Conservation staff and DNR foresters will encourage eligible forest landowners in the Rock Lake watershed to participate in various

forestry stewardship programs to benefit water resources and forest habitat. Protection of soil and water resources should be addressed in all SIP and MFL plans where applicable.

## **Coordinating Regulations, Permits, and Zoning**

Best management practices that address shoreline erosion such as riprap or vegetative shoreline stabilization will require permits from the DNR. Any BMP which effects wetland form or function may require permits from the DNR, Jefferson County Zoning office and the U.S. Army Corps of Engineers.

Individual landowners are required to apply for necessary permits from the DNR Water Regulation and Zoning staff, the Jefferson County Zoning Department and/or the U.S. Army Corps of Engineers. These permits must be received prior to the installation of shoreline stabilization practices.

In an attempt to protect the use, enjoyment and water quality of our lakes and streams the state, federal and local government regulates some activities on riparian properties. Activities that disturb or remove the natural vegetation surrounding our lakes and streams reduces the buffering capacity of the area and often drastically increases erosion, sedimentation and nutrient runoff. Many lakefront property owners, particularly those who are purchasing waterfront property for the first time, are not aware of these regulations or the need for them.

DNR's Administrative Rule, Chapter N.R. 115, governs the regulations on lakeshore property. Briefly, the major aspects of N.R. 115 aim to:

- Control the density of development. Sewered lots must have a minimum average width of 65 feet and a minimum area of 10,000 square feet. Septic tank lots (i.e., lots not served by a public sanitary sewer) must have a minimum average width of 100 feet and a minimum area of 20,000 square feet.
- Create a protective buffer of vegetation along public waterways. Clear-cutting of trees and shrubs is not allowed in the strip of land from the ordinary high water mark to 35 feet inland. One exception exists for a 30 foot wide path, for every 100 feet of shoreline, down to the water.
- Minimize disturbances to water resources.
- Protect wetlands that are located near lakes and streams by prohibiting most filling or draining and by placing limits on what can be done in those special areas.
- All buildings and structures must be set back at least 75 feet from the ordinary high water mark. The exceptions are piers, boat-hoists, and boathouses are allowed along the shore. If an existing pattern of development exists, counties may allow new homes to be built closer than 75 feet from the ordinary high water mark at the same setback as the average setback of neighboring homes.

- Grandfathering of homes which allows for the continued use of those homes that were built before the county shoreland zoning ordinance was enacted, even if they are too close to the water. The county may limit or prohibit additions, structural alterations and repairs to "grandfathered" homes. For example, a county may prohibit additions, and structural alterations and repairs if the cost of these additions, alterations or repairs over the lifetime of the building exceeds one-half (50%) of the assessed value. The intent of this kind of restriction is to eventually require re-construction of these non-conforming homes at a setback of 75 feet or greater.

## **Coordination With State and Federal Conservation Compliance Programs**

The Rock Lake Watershed Project will be coordinated with the conservation compliance features of the Wisconsin Farmland Preservation Program (FPP) administered by DATCP, and the Federal Food Security Act (FSA) administered by the Natural Resource Conservation Service. DATCP will assist the LWCD and the NRCS offices to identify landowners within the watershed that are subject to the compliance provisions of FPP and FSA. Conservation Farm Plans were completed for all landowners in FSA by December 31, 1989. There are approximately 46 FPP and FSA plans within the watershed project.

Implementation and amendment of these conservation plans will be necessary during the implementation phase of the watershed project. Watershed project staff will inform FPP and NRCS staff of changes in plans resulting from management decisions and the installation of needed BMPs for nonpoint source pollution abatement.

The Rock Lake Priority Watershed Project will also be supporting and working jointly with other programs such as Environmental Quality Incentive Program (EQIP), Conservation Reserve Program (CRP), and Wetland Reserve Program (WRP) in the project area. By working in conjunction with these programs we can offer more cost-sharing dollars and bring more financial options to the landowner. The CRP may be especially helpful in establishing buffer areas around ditchbanks and wetlands because this program provides annual payments. The watershed staff will present these options to the landowner whenever possible.

## **Archaeological Sites: Coordination with State and Federal Historic Preservation Laws**

Projects using state and federal funding, assistance, licenses and permits are required by law to consider the effects of their actions on archaeological and historical sites and historical structures. The watershed project is a joint cooperative effort between federal, state, and county agencies as well as the private landowners who volunteer to participate in the program. As a result, the federal Historic Preservation Act of 1966, as amended, and the State Historic Preservation Statute, S. 44.40, Wis. Stats., have been blended to produce a

cultural resource management program which is both compatible to preserving cultural sites and implementing the watershed project.

There are 45 known archaeological sites within the Rock Lake Priority Watershed Project. The sites are concentrated on the southern end of Rock Lake, and continue in a southeastward direction past Mud Lake. Of the 45 sites, ten are mounds. These areas will need special consideration when structural best management practices are being considered. Settling basins, manure storage structures, and streambank or shoreline shaping and riprapping are likely practices that may impact archaeological sites. As discussed above, state and federal laws require preservation of archaeological resources within the framework of the NPS Program.

Before finalizing the cost-share agreement with the landowner, project staff should review the maps showing known archaeological and historic sites. If a known site occurs in the vicinity of a proposed BMP, this does not necessarily mean the BMP needs to be moved or altered. In some cases, the specific location of the BMP will not actually be near enough to the location of the known site to warrant further review. Project staff should visit the area and conduct a "pre-review" to ensure that the *specific* location of the proposed BMP will not disturb the known archaeological or historic site.

If it is too difficult to determine through a pre-review, or if it appears that the known site would indeed be disturbed, a formal Archaeological or Historic Site Review should be conducted of the area. Any costs incurred as part of a site review *will not be passed on to the landowner*. The DNR's Nonpoint Source Pollution Abatement Program will pick up the costs of professional historic and/or archaeological site reviews. In some cases, a representative from the U.S. Natural Resources Conservation Service (NRCS) may conduct the review.

#### *Practices of concern - Archaeological Sites*

- Field Diversions

- Terraces

- Grade Stabilization Structures

- Agricultural Sediment Basins

  - Streambank and Shoreline Stabilization

  - Sediment Retention, Erosion or Water Control Structures

  - Structural Urban Practices

  - Wetland Restoration

- Buildings

  - Barnyard Runoff Management Systems

  - Animal Lot Relocation

  - Manure Storage Facilities

  - Roofs for Barnyard/Manure Storage Facilities

#### *Practices - No Concern Needed for Cultural Sites*

- Contour Farming

- Contour Strip-cropping

- Field Strip-cropping

- Reduced Tillage



No-till Systems  
Permanent Vegetative Cover  
Cropland Protective Cover  
Critical Area Stabilization  
Nutrient Management  
Pesticide Management  
Shoreline Buffers  
Livestock Exclusion from Woodlots  
Grass Waterways

## Endangered and Threatened Resources

Information on threatened and endangered resources was obtained from the Bureau of Endangered Resources of the DNR. Endangered resources include rare species and natural communities. It should be noted that comprehensive endangered resource surveys have not been completed for the project area. As a result, our data files may be incomplete. The lack of additional known occurrences does not preclude the possibility that other endangered resources may be present.

### Rare Species

Rare species are tracked by Wisconsin's Natural Heritage Inventory in the Bureau of Endangered Resources. Species tracked by the inventory include those that are listed by the U.S. Fish and Wildlife Service or by the State of Wisconsin.

### Wisconsin Endangered Species

An endangered species is one whose continued existence as a viable component of this state's wild animals and wild plants is determined by the DNR to be in jeopardy on the basis of scientific evidence. Wisconsin endangered species within the watershed are: *Acris crepitans blanchardi* (Blanchard's cricket frog), and based on historical data only, *Platanthera leucophaea* (prairie white-fringed orchid).

### Wisconsin Threatened Species

A threatened species is one which, if not protected, has a strong probability of becoming endangered. Wisconsin threatened species within the watershed are: *Cypripedium candidum* (white lady's slipper) and based on historical data only, *Notropis anogenus* (pugnose shiner).

## Wisconsin Special Concern Species

A special concern species is one for which some problem of abundance or distribution is suspected in Wisconsin, but not yet proven. The purpose of this category is to focus attention on certain species **before** they become endangered or threatened. Wisconsin special concern species within the watershed are:

### Animal Species

*Erimyzon sucetta* (lake chubsucker)

*Rana catesbeiana* (bullfrog)

*Etheostoma microperca* (least darter)\*

### Plant Species

*Solidago ohioensis* (Ohio goldenrod)

*Gentianopsis procera* (small fringed gentian)

*Cypripedium parviflorum* (small yellow lady's slipper)\*

*Arethusa bulbosa* (dragon's mouth)\*

*Cypripedium reginae* (showy lady slipper)\*

\* Note, these species listed are from historical records (over 25 years old) of rare species known to occur within the watershed. The Bureau of Endangered Resources has no current survey information documenting the continued existence of these species in the area. These species may or may not still occur in the watershed area.

## Natural Areas

Natural areas are sites that contain high quality examples of natural communities. The following natural areas have been identified in the Rock Lake watershed. The natural communities found at each area are listed.

### Bean Lake State Natural Area

#### Communities and Feature Present:

Southern Dry-Mesic Forest - 17 acres

Northern Wet Forest - 45 acres

Shrub-Carr - 58 acres

Southern Sedge Meadow - 24 acres

Bean Lake - shallow, soft water, seepage lake- 33 acres

If specific locational or other information is needed about these species or natural communities, contact the Bureau of Endangered Resources, DNR. **Please note** that the specific location of endangered resources is sensitive information. Exact locations may not be released or reproduced in any publicly disseminated documents.

# Farm Practices Inventory

A survey was administered to farmers in the watershed in 1997 by the University of Wisconsin Extension. The overall objective of the Farm Practices Inventory (FPI) is to identify farmer needs which can help to guide information and assistance efforts in helping farmers adopt best management practices. The FPI also helps to evaluate these efforts. The management practices are essential to protecting farm profitability and water quality. The survey looked at three things: 1) general characteristics of farms in the watershed, 2) nutrient management, and 3) farmstead pollution. Results from the survey can be found in Appendix A, Farm Practices Inventory.

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# CHAPTER SIX

## Information and Education Strategy

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This chapter outlines an education strategy designed to assist watershed residents in adopting water quality best management practices (BMPs). This strategy is an adaptable guide and will be evaluated annually. The ability to accomplish the strategy is based on having an adequate number of staff that can devote time to the personal delivery of the strategy, particularly the one-on-one contact time with landowners, contractors, developers and elected and career government staff. The other variable that will dictate the ability to implement the strategy is adequate funding for educational activities.

### **Education Mission**

The educational mission of the Rock Lake Priority Watershed Project is to foster understanding of nonpoint source pollution problems and promote participation in resource protection.

### **Project Goals and the Rock Lake Educational Strategy**

The Rock Lake Priority Watershed Program's Education Work Group utilized two different aspects of the watershed planning process to develop the following education strategy for the watershed. The first consideration was the water quality goals developed for the Rock Lake Project. The second consideration in developing the strategy was the need to impact the general population regarding the project, the resource and the effect of run-off on Rock Lake. These two facets of the project guided the selection of target audiences and educational objectives. They were the foundation used to design appropriate activities to meet the objectives.

Therefore, the following goals are divided into two sections: 1) those involving specific water quality goals with targeted educational audiences and 2) general education goals involving all citizens in the watershed. The water quality goals are focused on pollution reduction, while the educational goals are focused on the watershed citizenry.

### **Watershed Project Goals Utilized in Developing Educational Strategy**

#### *Sediment and Phosphorus Reduction Goal 1: Cropland*

Reduce sediment contribution from cropland by 223 tons or 50%

Reduce phosphorus contribution from cropland by 1,006 pounds, or 50%

#### *Sediment and Phosphorus Reduction Goal 2: Shoreline*

Reduce sediment contribution from shoreline sources by 186 tons or 50%.

Reduce phosphorus loading from shoreline sources by 212 pounds, or 50%.

### *Sediment and Phosphorus Reduction Goal 3: Construction Site Erosion Control*

- Reduce soil erosion from construction sites by 185 tons or 50%.
- Reduce phosphorus loading from construction sites by 236 pounds, or 50%

### *Sediment and Phosphorus Reduction Goal 4: Established Urban Areas*

- Reduce the sediment loading from established urban areas by 25 tons, or 50%.
- Reduce phosphorus loading from established urban areas 59 tons, or 25%.

### *Groundwater Protection Goal 1: Improve Groundwater Quality*

- Reduce threats to groundwater by proper construction of manure storage systems, proper abandonment of abandoned wells, nutrient management planning, pesticide management, and farmstead pollution prevention.

## **Educational Goals for all Audiences**

### *General Audiences - Goal 1: Project Awareness*

- Local citizens will be aware and knowledgeable of the Rock Lake Priority Watershed Program.

### *General Audiences - Goal 2: Resource Appreciation*

- Local citizens will be aware of the importance of the soil and water resources in the Rock Lake watershed, the potential threats to the resource, and the BMPs necessary to reduce nonpoint source pollution.

### *General Audiences - Goal 3: Action*

- Local citizens will take personal action to reduce their contribution to nonpoint source pollution.

## **Needs Assessment**

Indirect methods were used for determining educational needs within the Rock Lake Watershed. Like all watershed projects, all information and education campaigns should begin with long-term awareness-building activities. These activities should deliver simple messages through many different channels, making the message ubiquitous. Using the term polluted runoff instead of nonpoint source pollution may help clarify the problems that we are trying to manage. We should also promote simple, inexpensive, and visibly effective activities that reduce non-point source pollution. Reducing runoff may require many people to adopt slightly different life styles. Most of the focus group participants learned about environmental issues from their children or grandchildren. Therefore, by taking our message into the schools, we are teaching future generations how to reduce runoff and are also teaching about water quality. The Rock Lake plan strives to move beyond awareness by focusing additional resources on specific target audiences and Best Management Practices.

Feedback and input on the educational strategy was solicited from the Rock Lake Citizen Advisory Committee, from individuals of local town, city and county government, and key audience groups such as developers and contractors. This input was then used in the fine tuning of the educational strategy.

## **Target Audiences**

Target audiences were classified into two distinctive categories: general and specific. Specific target audiences include both urban and rural components. Rural audiences include:

- 1) Those involved directly with farm management (land owner/operators)
- 2) Those involved in conservation courses/activities (high school, vo-tech and universities instructors, FFA and 4-H leaders, and youth)

Urban audiences include:

- 1) Those involved directly in planning and developing the site and implementing the construction erosion control plan (developers, engineers, contractors, builders, machine operators, inspectors)
- 2) Those that can support the development of erosion control and storm water plans (bankers, board of adjustment, municipal regulatory bodies, zoning officials)

General audience categories can best be described as

- 1) Those who must act (local elected and appointed officials, urban homeowners/residents, business and industry owners/operators)
- 2) Those that can support change (conservation, civic, service, church and environmental groups; fishing, boating and other water resource user groups; concerned citizens; and mass media)
- 3) Future actors and supporters (teachers, youth group leaders, and youth)

## **Implementation Team**

The education strategy was developed by the Jefferson County Land and Water Conservation Department (LWCD) staff and the University of Wisconsin-Extension (UWEX) Southern District Area Water Quality Education Specialist.

The Jefferson County LWCD will take lead responsibility for the implementation of the information and education strategy. In addition to the LWCD, the Jefferson County Extension staff (one agricultural agent and one community, natural resources and economic development agent) will implement specific aspects of the education strategy. The University of Wisconsin-Extension's Southern District Education Specialist along with UWEX's publication staff will provide assistance to the Rock Lake project. Other staff that will provide assistance to the Rock Lake project include staff from the Department of Natural Resources (DNR) and Department of Agriculture, Trade and Consumer Protection (DATCP).

The Jefferson County LWCD will work with and seek support from local units of government and organizations. The Rock Lake Citizen Advisory Committee will continue to meet throughout the life of the project. They will annually review the education strategy, make suggestions and assist with the implementation of this strategy.

## **Rock Lake Priority Watershed Educational Objectives and Activities**

Educational objectives as written in this plan are focussed on what we would expect a person to be able to know or do after participating in one or more educational activities.

The following summarizes the goals and the objectives and action items. The tables identify specific activities for each objective, including the responsible agency for implementation, a proposed timeline and a priority ranking for the activity.

## Cropland Goals, Objectives and Actions

**Cropland Goal: Reduce sediment and phosphorus loading by 50%.**

**Cropland Objective 1: The landowner/operator will be able to adopt residue management.**

Actions	Who	When	Priority
1. Newsletter articles on success stories and how to stories	LWCD and UWEX	2x/year	H
2. One-on-one contacts	LWCD and UWEX	ongoing	H

**Cropland Objective 2: Ag-business will be able to work with clients to promote residue management.**

Actions	Who	When	Priority
1. One-on-one contacts	LWCD and UWEX	ongoing	H
2. Invite them to assist in planning of events/workshops	LWCD and UWEX	ongoing	H

**Cropland Objective 3: Landowners/operators will know how to utilize the concept of "whole farm planning" on their land.**

Actions	Who	When	Priority
1. Utilize simplified farm checkoff list of potential concerns	LWCD and UWEX	1997	H
2. Develop list of primary contacts for information or contractors/suppliers for each item on checkoff list.	LWCD and UWEX	1997	H
3. Provide Farm*A*Syst materials to landowners/operators through meetings or one-on-one.	LWCD and UWEX	ongoing	L
4. Develop list of potential manure bartering participants	LWCD and UWEX	2000	L

**Cropland Objective 4: Landowners will be able to explain how wetland restoration can improve water quality and will know where wetland restoration would be appropriate on their land.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. One-on-one contacts with landowners of priority sites	LWCD	ongoing	H
2. Have available already produced items on wetlands restoration	LWCD	ongoing	H

### **Nutrient Management Goals, Objectives, and Actions**

**Nutrient Management Goal 1: Reduce the amount of phosphorus runoff and nitrate contamination.**

**Nutrient Management Objective 1: Landowners/operators will know the advantages of developing and maintaining clean water practices.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. One-on-one contacts	LWCD	ongoing	H
2. Newsletter articles	LWCD	ongoing	H
3. Provide rural practices fact sheet to eligible landowners	LWCD	ongoing	H

**Nutrient Management Objective 2: Landowners will be able to explain the impact of animal waste runoff on surface and groundwater and will know how they can reduce animal waste runoff from their operation.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. One-on-one contacts	LWCD	ongoing	H
2. Individual tours of existing systems	LWCD	1998 or 1999	H
3. Newsletter articles	LWCD and UWEX	ongoing	H
4. Make available Extension/DATCP fact sheets on Animal Waste Systems	LWCD and UWEX	ongoing	L



## Shoreline Goal, Objectives, and Actions

**Shoreline Goal: Reduce sediment and phosphorus loading from shorelines by 50%.**

**Shoreline Objective 1: Landowners will use appropriate shoreline erosion control.**

Actions	Who	When	Priority
1. One-on-one contacts	LWCD	ongoing	H
2. Fact sheets	LWCD	ongoing	H
3. Lake Fair	LWCD/Lake Association	occasionally	M
4. Individual or small group tours to Lake Ripley to view bioengineering installations.	LWCD	occasionally	M

**Shoreline Objective 2: Landowners will implement buffer strips along ditches.**

Actions	Who	When	Priority
1. One-on-one contacts	LWCD	ongoing	L
2. Fact sheets/handouts	LWCD	ongoing	L

## Construction Site Erosion Control Goal, Objectives, and Actions

**Construction Site Goal: Reduce sediment and phosphorus loading from construction sites by 50%.**

**Construction Site Objective 1: All audiences will be able to describe the environmental, social, and economic impacts of construction site erosion.**

Action	Who	When	Priority
1. Face-to-face with elected officials	LWCD	ongoing	H
2. Fact sheet on current and projected trends include environmental and economic benefits, written specifically with the target audience in mind.	LWCD	1997	M
3. Presentations to organizations: Slides with specific information from plan, each presentation to be tailored to the audience.	LWCD and UWEX	ongoing	M
4. Reports to town, village and county boards	LWCD	annually	M
5. Utilize existing videos on soil erosion impacts mostly for use in schools	UWEXT or DNR	as needed	L

**Construction Site Objective 2: All audiences will be able to explain how construction site, farm field and urban sediment differ from each other in terms of delivery rate to streams.**

Actions	Who	When	Priority
1. Presentations specific to each urban target audience	LWCD and UWEX	annually	H
2. Utilize existing fact sheets and the Resource Handbook to be developed by Dane County as well as the DNR Construction Site Erosion Handbook	LWCD	1998	H

**Construction Site Objective 3: Zoning officials (urban audience 2) will require the development of an effective storm water runoff control plan at the most efficient time.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. One-on-one discussions with developers	LWCD	ongoing	H

**Construction Site Objective 4: Contractors (urban audience 1) will be able to implement and maintain an effective construction site erosion plan.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. One-on-one contact	LWCD	ongoing	H
2. Resource handbook	LWCD	1997	H
3. Encourage attendance at state sponsored soil erosion control workshops	LWCD	ongoing	H

### **Existing Urban Areas Goal, Objectives, and Actions**

**Existing Urban Area Goals: Reduce sediment loading by 50% and phosphorus loading by 25%.**

**Existing Urban Areas Objective 1: Citizens will be able to describe the most important sources and the impacts of nonpoint source pollution on health, economics and the environment.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. Media releases	LWCD and UWEX	ongoing	H
2. Distribute already developed fact sheets	LWCD	1997	M
3. Display at public events/libraries etc.	LWCD and UWEX	ongoing	M

**Existing Urban Areas Objective 2: Home owners/renters, government officials and business owners will know how to decrease pollutants coming from their property.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. Work with the Lake Association for the purpose of recommending goals and strategies to maintain or improve water quality.	LWCD and UWEX	1997	H
2. Distribute already developed pamphlets and fact sheets to all target audiences	LWCD and UWEX	ongoing	M
3. Presentations to neighborhood associations and other groups	LWCD and UWEX	ongoing	M
4. Participate in appropriate Jefferson County special events	LWCD and UWEX	ongoing	M

### **Groundwater Protection Goal Objectives and Actions**

Groundwater Protection Goal: Protect and enhance groundwater in the Rock Lake watershed

**Groundwater Protection Objective: Landowners will understand how improper handling of manure, improperly abandoned wells, and farmstead pollution can threaten drinking water resources.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. One-on-one contacts	LWCD	ongoing	H
2. Fact sheets	LWCD	ongoing	H
3. Well Abandonment workshops	LWCD and UWEX	occasional	M

## General Audience Goals, Objectives, and Actions

**General Audience Goal 1: Local citizens will be aware and knowledgeable of the Rock Lake Priority Watershed Program.**

**General Audience Objective 1: All citizens will know that the Rock Lake Priority Watershed Project is a locally run program to control polluted runoff and they will know who to contact for assistance.**

Actions	Who	When	Priority
1. Newsletters	LWCD and UWEX	ongoing	H
2. Media releases	LWCD and UWEX	ongoing	H
3. Displays at events: lake fair, county fair	LWCD and UWEX	ongoing	M
4. Lake, boundary and boat launch signs	LWCD	1997	H
5. Distribute brochures and promotional items at appropriate educational programs	LWCD and UWEX	ongoing	M
6. Add a Rock Lake Priority Watershed page to the Jefferson County Homepage	LWCD	1998	M

**General Audience Objective 2: Local citizens will understand and will be able to express the concern that many small individual actions from both rural and urban areas caused today's situation and that many individual actions are necessary for water quality solutions.**

Actions	Who	When	Priority
1. Presentations to lake association, Chamber of Commerce and other groups	LWCD and UWEX	ongoing	M
2. Display focussing on the concept	LWCD and UWEX	ongoing	M
3. Lake tours for selected groups	LWCD	ongoing	L

**General Audience Goal 2: Resource Appreciation and Understanding**

Local citizens will be aware of the importance of the soil and water resources in the Rock Lake Watershed and the threats to these resources.

**General Audience Objective 1: All citizens will understand what a watershed is and be able to describe the water resources within the Rock Lake Watershed.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. Distribute already-produced materials into various outlets in county; libraries, schools, town halls,	LWCD and UWEX	ongoing	M
2. Placemats	UWEX	every two yrs	M
3. Displays at events	LWCD and UWEX	ongoing	M

**General Audience Objective 2: Citizens will be knowledgeable of the best management practices that reduce NPS pollution.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. Presentations to neighborhood associations and other groups	LWCD and UWEX	ongoing	M
2. Utilize existing PSA's, brochures, videos, etc, from other projects	CAC, LWCD and UWEX	ongoing	H
3. Places ads in community publications, church bulletins, sports bulletins, yearbooks, weeklies, billboards	LWCD	ongoing	M
4. Media coverage of events	LWCD	ongoing	M
5. Design periodic special events (lake fair)	UWEX, CAC, and LWCD	annually	M

**General Audience Objective 3: Teachers/youth group leaders will be knowledgeable about the watershed project, its goals and the principals of NPS and best management practices and will be able to teach about these subjects.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. Develop a listing of resource people: what they can help with, and how to contact	UWEX	ongoing	H
2. Develop a summary of the various resources and programs (Adopt-a-Lake, Project WET, Water Education Resource Center, Give Water a Hand, Water Action Volunteers, etc.), advertise workshops occurring in adjacent areas.	UWEX	1997	H
3. Adopt a Lake Workshop	UWEX and LWCD	ongoing	H
4. Participate in ongoing teacher/youth group leader training activities/in service programs	LWCD and UWEX	ongoing	H
5. Begin joint partnership activities with Lake Ripley	LWCD	ongoing	M

**General Audiences Goal 3: Local citizens will take personal action to reduce their contribution to nonpoint source pollution.**

**General Audience Objective 1: Citizens will be able to describe the most important sources and the impacts of nonpoint source pollution on health, economics and the environment.**

<b>Actions</b>	<b>Who</b>	<b>When</b>	<b>Priority</b>
1. Media releases	LWCD and UWEX	ongoing	H
2. Distribute already developed fact sheets	LWCD	1997	M
3. Display at public events/libraries etc.	LWCD and UWEX	ongoing	M

**General Audience Objective 2: Home owners/renters and business owners will know how to decrease pollutants coming from their property.**

Actions	Who	When	Priority
1. Fact sheets	LWCD and UWEX	ongoing	M
2. Presentations to neighborhood associations and other groups	LWCD and UWEX	ongoing	M
3. Display at lake fair and home shows	LWCD and UWEX	ongoing	M

**General Audience Objective 3: Youth will take responsible action concerning water quality in the Rock Lake Watershed.**

Actions	Who	When	Priority
1. Organize storm drain stenciling campaign	LWCD	1997	H
2. Publicize fact sheet, if available, on how to collect & share meaningful data on watersheds/lakes	UWEX	2001	H
3. Encourage local cable access channels to show water quality videos	LWCB/ Rock Lake Assoc.	ongoing	M

**General Audience Objective 4: Local service, civic, and church groups will support the need to control runoff pollution.**

Actions	Who	When	Priority
1. Distribute fact sheets	LWCD and UWEX	ongoing	M
2. Presentations to local service, civic, and church groups	LWCD and UWEX	ongoing	M
3. Meet with members/boards of key organizations	LWCD and UWEX	ongoing	M



## **Activity Definition**

The following is an alphabetical listing of most of the activities listed above. Several activities are occasionally discussed together to reduce repetition.

### **Brochures**

Brochures are normally three panel, folded sheets of paper. With the computer capacity that now exists, brochures on specific topics or activities can be developed and printed in small numbers as needed throughout the project life.

### **Citizens Advisory Committee**

The Citizens Advisory Committee will continue to meet throughout the project as necessary. LWCD staff will provide assistance to the CAC for minutes, meeting space scheduling and mailings. The CAC will develop its own agendas and actions. The CAC will help insure that local views, concerns and involvement are included in the implementation of the watershed plan. The CAC will consist of local government officials, representatives of conservation groups, farm organizations and interested citizens.

### **Displays**

The Rock Lake Priority Lake Project will use existing displays that can be tailored to the audience or event. In addition, smaller table top displays or poster displays will be developed as needed for programs at schools, banks, malls, sport shows etc. All displays will include photos, text, and graphics and wherever possible, a hands-on component.

### **Fact Sheets**

The University of Wisconsin-Extension has produced a series of information sheets on urban and rural non-point source pollution sources and solutions. The Rock Lake Priority Lake Project will make these easily available at convenient sites through out the watershed. They will develop on an as-needed basis other printed materials regarding the project for events, presentations or use during one-on-one sessions. Fact sheets are normally one to four pages in length and combine text with graphics to describe a concern or to explain a practice.

### **Media Releases**

The LCD and LWCD staff will develop media releases regarding pollution prevention activities or concerns at least twice each year. Releases also will go to newspapers, tv and radio prior to major events such as the kickoff, field days, community cleanups, workshops, lake fairs, etc.

### **Newsletters**

Newsletters are two or four pages in length focussing primarily on the agricultural area of the watershed. The newsletters will be sent out 2 or 3 times a year. The newsletters will be a vehicle for explaining the project, for increasing problem recognition and solution acceptance among landowners and operators and to help celebrate the positive accomplishments being made through the watershed project.

### **One-on-One and Face-to-Face Contacts**

LWCD staff will make one-on-one visits with every eligible landowner in the watershed. Project staff and UW-Extension agents will visit rural landowners and operators. The LCD and Extension staff will distribute appropriate written materials to landowners during these visits and promote Farm\*A\*Syst packets where drinking water concerns are expressed.

Staff will meet with developers and builders on a regular basis. Staff may occasionally meet with small groups of municipal or government staff, bankers, zoning officials in formal and informal face-to-face meetings. Valuable information can be shared in these meetings and questions answered. The dynamics of a small group allows for the free flow of questions and helps to be sure that everyone is hearing the same information completely and accurately.

### **Placemats**

The University of Wisconsin-Extension has developed one placemat focussed on non-point source pollution and intends to develop another one on lakes. The Rock Lake Priority Lake Project will use these placemats as appropriate during the year. The placemats help develop resource awareness, problem recognition and solution acceptance.

### **Presentations/Reports/Seminars**

These three items are similar techniques but vary in audience, length and technical information. Presentations are normally 30-45 minutes in length and are given by staff to groups, organizations or schools. They are normally enhanced with slides or other visuals. While we have one basic slide program already produced, each program, its visuals and handouts, will be adapted and tailored for the audience and requested subject matter.

Reports are short updates on the project normally made to government committees, the CAC or agencies. They are usually accompanied by handouts. Watershed staff will make reports to the LCC and town, city and village meetings on a regular basis.

Seminars are technical programs usually for professionals or for agency staff. They are normally composed of several presentations, a hands on section and a question and answer period. Seminars are normally 2-4 hours in length.

### **Promotional Items**

During the planning phase of the project, several different promotional items were developed. These items help provide recognition and awareness for the watershed project when used in combination with presentations, displays, youth activities and demonstrations.

### **PSA's/Radio programs**

Extension staff do a weekly radio program and will include information on nonpoint source pollution, drinking water protection and pollution prevention on a regular basis. Because the audience is greater than the project area, most of the radio materials and

PSA's will be focussed on problem recognition and solution acceptance rather than on project specific information.

PSA's (Public Service Announcements) will be produced to highlight specific positive behaviors such as recycling oil, fertilizing properly or keeping leaves out of the gutter. The primary audience for the PSA's are homeowners.

### **Tours/Demonstrations and Field Days**

Many tours, demonstrations and field days will be offered through out the life of the project. Many of these will be formal, advertised events; others will be informal tours for landowners, developers and agency staff. LWCD staff also gets frequent requests for tours for such diverse audiences at the state 4H Congress and the League of Municipalities. Field days will be focussed on agriculture practices, primarily nutrient and pest management practices.

### **Videos**

Many good videos are available through the UW-Extension. The videos are available to schools and groups through the public library system or through the County Extension offices.

### **Water Action Volunteers and Adopt-a-Lake**

These are two state sponsored programs that encourage people to learn and take action for state waters. Water Action Volunteers (WAV) focusses on streams and rivers and recommends such actions as collecting stream critters to determine water quality, storm drain stenciling, and river cleanups. Adopt-a-Lake is an intergenerational program teaming an adult sponsor with a youth group or class. Together they learn about a local lake and develop actions to help improve the lake. The Rock Lake project will host workshops for both of these projects.

### **Workshops/meetings**

A variety of workshops, tailored to specific audiences will be the primary vehicle used to teach specific skills and knowledge sets to people involved in land development and construction. Workshops are typically 3 - 6 hours in length, this provides the opportunity to present technical information regarding the program's timeline, funding and requirements as well as develop an awareness for area water quality problems, knowledge of the impacts on economics, environment and society and available solutions.

Other workshops will be offered for teachers, youth group leaders and community group members. These will consist of Project WET (Water Education for Teachers) and Project WILD. Project WET and Project WILD are national programs that provide more than 200 activities for teachers, youth group leaders and interested citizens on water and wildlife. Together these three programs provide a great foundation of activities and local information for educators.

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# CHAPTER SEVEN

## Project Evaluation

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This chapter briefly summarizes the plan for monitoring the progress and evaluating the effectiveness of the Rock Lake Priority Lake Project. The evaluation strategy includes these components:

- Administrative review
- Pollution reduction evaluation
- Watershed Resource Evaluation Monitoring

Information on the first two components will be collected by the Jefferson County LWCD and reported on a regular basis to the DNR and the DATCP. The project team will meet at the beginning in the year throughout the implementation phase to review and evaluate the accomplishments of the preceding year. Additional information on the numbers and types of practices on cost-share agreements, funds encumbered on cost-share agreements, and funds expended will be provided by the DNR's Bureau of Community Financial Assistance. The Watershed Resource Evaluation Monitoring follows guidance established by DNR's Bureau of Watershed Management to select specific sites in the watershed to monitor resource quality changes.

A final report will be prepared for the Rock Lake Priority Lake Project within 18 months of the end of the grant period. This report will include information on landowner participation, project management, grant management and technical assistance completed within the watershed among other topics. It is developed to evaluate progress, provide documentation on attainment of water quality and pollutant load reduction objectives, evaluate BMP effectiveness, and provide recommendations on which target areas need improvement in the NPS program. Jefferson County Land and Water Conservation Department staff will prepare the final report.

### Administrative Review

The first component, the administrative review, will focus on the progress of Jefferson County and other units of government in implementing the project. The project will be evaluated with respect to accomplishments, financial expenditures, and staff time spent on project activities.

## **Accomplishment Reporting**

The Jefferson County LWCD will provide the following data to the DNR and the DATCP annually:

- Planned and completed conservation acres
- Major information and education activities undertaken
- Status of critical sites

Accomplishment data are summarized in the annual accomplishment report prepared by DATCP and DNR, and also are discussed at watershed review meetings held annually for projects in implementation. Additional evaluation data provided by the Jefferson County LWCD for the annual watershed review include:

- Pollutant load reductions (described below)
- Status of grants and related financial activities
- Evaluation of landowner participation
- Status of nutrient management planning, and easement acquisition and development

The Field Offices Computing System (FOCS) is a computer data management system that has been developed by the U.S. Natural Resources Conservation Service (NRCS). The NRCS, the DNR and the DATCP use FOCS to meet the accomplishment reporting requirements of all three agencies. The Jefferson County LWCD will use FOCS to collect data for administrative accomplishments, and will provide the information to the DNR and the DATCP for program evaluation.

## **Financial Expenditures**

The Jefferson County LWCD and other participating units of government will provide the following financial data to the DNR on an annual basis:

- Number of landowner cost-share agreements signed
- Amount of money encumbered in cost-share agreements
- Number of landowner reimbursement payments made for the installation of best management practices (BMPs), and the amount of money paid
- Staff travel expenditures
- Information and education expenditures
- Expenditures for equipment, materials, and supplies
- Expenditures for professional services and staff support costs
- Total project expenditures for the Jefferson County staff

The Jefferson County LWCD and other participating units of government will also provide the DNR with the following financial data on an annual basis:

- Staff training expenditures
- Total budget and expenditures on the project.

## **Nonpoint Source Pollutant Load Reduction**

The purpose of the second evaluation component, pollutant load reduction, is to estimate reductions in nonpoint source pollutants as a result of installing BMPs. Key sources were identified for estimating changes in pollutant loads that reach surface waters in the Rock Lake Priority Lake Project. Data collected for evaluation include sediment load reduction from uplands, streambanks and shorelines, gullies, and streambank and shoreline habitat protection. Chapter Three of this plan describes target pollutant reductions for Rock Lake and its subwatersheds.

### **Cropland Sources**

Jefferson County LWCD will use the WINHUSLE (Wisconsin Nonpoint Source) computer model to estimate sediment reductions due to changes in cropping practices. A substitute program may be used if WINHUSLE is no longer supported. The sediment and phosphorus load reduction goal is 50%.

### **Shoreline Erosion Sources**

Jefferson County LWCD staff will estimate changes in streambank and shoreline sediment erosion. A tally will be kept of landowners contacted, the amount of streambank and shoreline sediment (in tons) being generated at the time of contact, and changes in erosion levels estimated after installing BMPs. The goal is to reduce sediment and phosphorus by 50% from shoreline erosion.

### **Barnyard Runoff**

At the present time, phosphorus loading from barnyards is not significant to the overall water quality of Rock Lake. If needed, the Jefferson County LWCD will use the BARNY model to estimate phosphorus reductions due to the installation of barnyard control practices. The LWCD will report the information to the DNR through FOCS. In the event that FOCS is replaced, the replacement system will be used for all project tracking.

## Rock Lake - Water Quality Monitoring

Rock Lake has been involved in the Self-Help Lake Monitoring since 1997. Volunteers measure the water clarity of the lake on a weekly basis to detect trends over time. On a monthly basis during the ice-free season, volunteers are involved in more in-depth monitoring. On site, they collect water profile data measuring the dissolved oxygen and temperature of the lake. Samples are also collected and analyzed at a lab for phosphorus and chlorophyll. Reports are generated by the DNR on an annual basis documenting the results.

Rock Lake will continue to be monitored by lake management specialists as part of the DNR's Long-Term Trends Monitoring Program (also called Ambient Monitoring). Data have been collected on Rock Lake since 1986 as part of a 50-lake set statewide. The lake has been and will continue to be monitored five times a year for physical, chemical, and biological parameters.

Monitoring of Rock Lake will continue as described in Table 7-1. Trophic State Index (TSI) calculations based on secchi disc, chlorophyll, and total phosphorus recordings will be used to evaluate changes in lake water quality. This table should only be used as a guide, however, since changes in budgets and regional priorities may vary this schedule to some extent.

**Table 7-1. Lake Monitoring Sampling Schedule for Rock Lake**

Parameter	Spring Turn-over	Mid June	Mid July	Mid August	February	Remarks
Complete Water Chemistry <sup>1</sup>	X					Two depths: 1 ft. below the water surface and 2 ft. above the lake bottom.
Total Phosphorus	X*	X**	X**	X**	X*	* = 2 depths: 1 ft. below water surface and 2 ft. above the lake bottom. ** = Third additional depth at top of hypolimnion.
Water Temperature, Dissolved oxygen, pH	X	X	X	X	X	Profile: 1 ft. below water surface and proceed to lake bottom using 3-6 ft. intervals, depending on existing conditions and/or total lake depth.
Chlorophyll a	X	X	X	X	X	Two depths: 1 ft. below water surface and at depth of observed metalimnion oxygen maxima.
Secchi disk depth	X	X	X	X		Minimum frequency; weekly by local volunteer if possible
Lake water level	X	X	X	X		Minimum frequency; weekly by local volunteer if possible
Fish survey						Comprehensive survey every 5 years--spring fyke netting for pike/walleyes; summer shoreline seining for young-of-year; fall boom shocking; Other monitoring every 3-5 years
Fish Contaminants						Occasional monitoring for PCBs and other contaminants
Macrophyte			X or	X		Survey every 3-6 years (specific sites are mapped)

<sup>1</sup> Water chemistry sampling includes TKN; Total P; Ca, pH, & color



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## References

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Glocker, C., 1979. Soil Survey of Jefferson County, Wisconsin. Soil Conservation Service. 169 pp.

Marshall, D., 1997. Rock Lake - Priority Lake Project Water Resources Appraisal. Wisconsin DNR, Jefferson Co. Land Conservation Department, Rock Lake Improvement Association. 40 pp.

Wisconsin Department of Natural Resources, 1989. Wisconsin Construction Site Best Management Practice Handbook. WR-222-89.



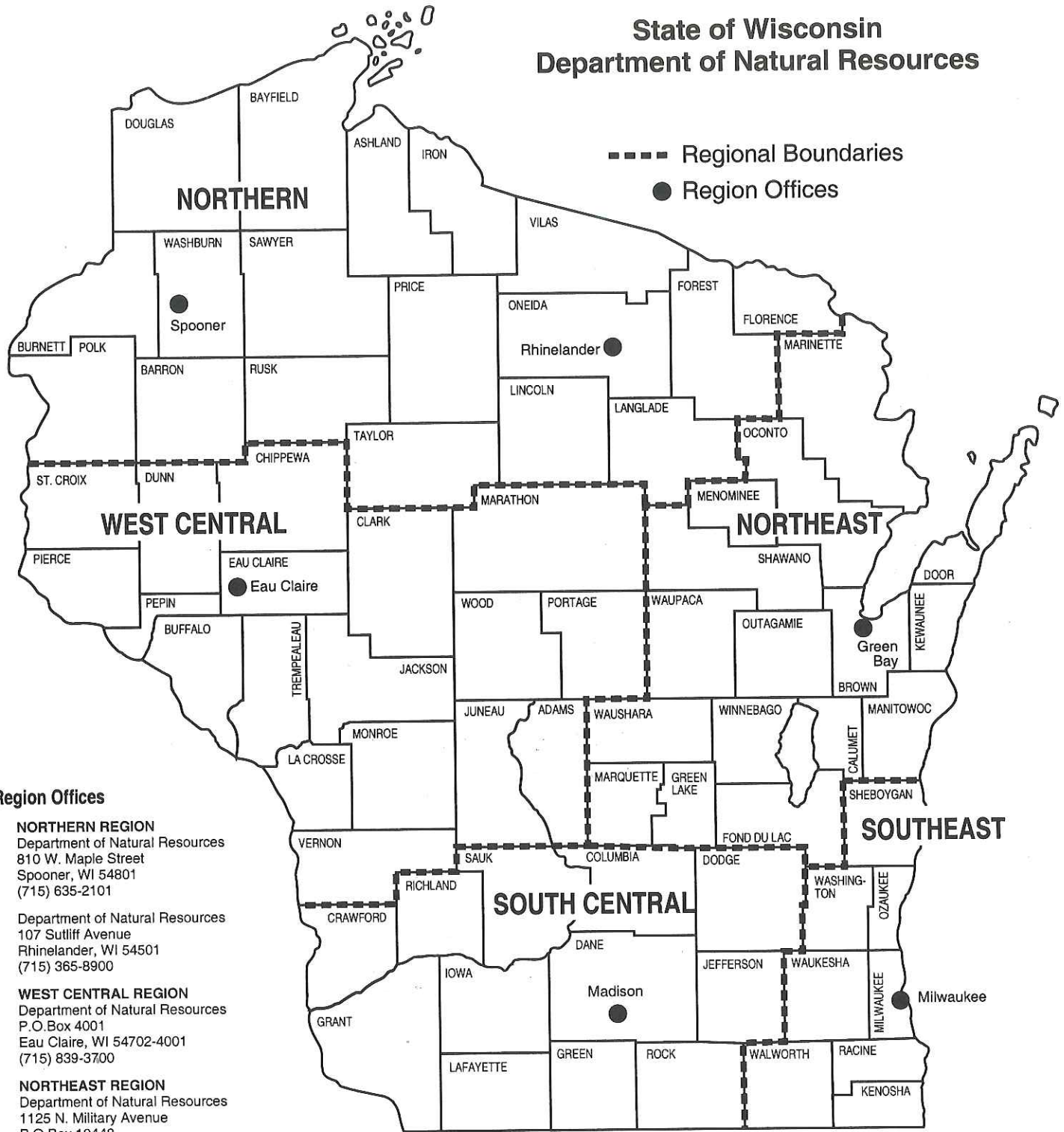
## Priority Watershed Projects in Wisconsin: 1999

<u>Year Selected-</u> <u>Map Number</u>	<u>Large-scale Priority Watershed Project</u>	<u>County(ies)</u>	<u>Year Selected-</u> <u>Map Number</u>	<u>Small-scale Priority Watershed Project</u>	<u>County(ies)</u>
79-1	Galena River †	Grant, Lafayette	90-6	Duncan Creek	Chippewa, Eau Claire
79-2	Elk Creek †	Trempealeau	91-1	Upper Trempealeau River	Jackson, Trempealeau
79-3	Hay River †	Barron, Dunn	91-2	Neenah Creek	Adams, Marquette, Columbia
79-4	Lower Manitowoc River †	Manitowoc, Brown	92-1	Balsam Branch	Polk
79-5	Root River †	Racine, Milwaukee, Waukesha	92-2	Red River - Little Sturgeon Bay	Door, Brown, Kewaunee
80-1	Onion River †	Sheboygan, Ozaukee	93-1	South Fork Hay River	Dunn, Polk, Barron, St. Croix
80-2	Sixmile-Pheasant Branch Creek ††	Dane	93-2	Branch River	Manitowoc, Brown
80-3	Big Green Lake †	Green Lake, Fond du Lac	93-3	Soft Maple/Hay Creek	Rusk
80-4	Upper Willow River †	Polk, St. Croix	93-4	Tomorrow/Waupaca River	Portage, Waupaca, Waushara
81-1	Upper West Branch Pecatonica River †	Iowa, Lafayette	94-1	Duck Creek	Outagamie, Brown
81-2	Lower Black River †	La Crosse, Trempealeau	94-2	Apple/Ashwaubenon Creeks	Outagamie, Brown
82-1	Kewaunee River †	Kewaunee, Brown	94-3	Dell Creek	Sauk, Juneau
82-2	Turtle Creek †	Walworth, Rock	94-4	Pensaukee River	Shawano, Oconto
83-1	Oconomowoc River †	Waukesha, Washington, Jefferson	94-5	Spring Brook	Langlade, Marathon
83-2	Little River †	Oconto, Marinette	94-6	Sugar/Honey Creeks	Walworth, Racine
83-3	Crossman Creek/Little Baraboo River †	Sauk, Juneau, Richland	95-1	Pigeon River	Manitowoc, Sheboygan
83-4	Lower Eau Claire River †	Eau Claire	95-2	Middle Peshtigo/Thunder Rivers	Marinette, Oconto
84-1	Beaver Creek †	Trempealeau, Jackson	95-3	Fond du Lac River	Fond du Lac, Winnebago
84-2	Upper Big Eau Pleine River †	Marathon, Taylor, Clark	95-4	Lower Rib River	Marathon
84-3	Sevenmile-Silver Creeks †	Manitowoc, Sheboygan	95-5	Kinnickinnic River (St. Croix Basin)	St. Croix, Pierce
84-4	Upper Door Peninsula †	Door	95-6	Lower Little Wolf	Waupaca
84-5	East & West Branch Milwaukee River	Fond du Lac, Washington, Sheboygan, Dodge, Ozaukee	95-7	Pine & Willow Rivers	Waushara, Winnebago
84-6	North Branch Milwaukee River	Sheboygan, Washington, Ozaukee, Fond du Lac			
84-7	Milwaukee River South	Ozaukee, Milwaukee	<u>Year Selected-</u> <u>Map Number</u>	<u>Small-scale Priority Watershed Project</u>	<u>County(ies)</u>
84-8	Cedar Creek	Washington, Ozaukee	SS-1	Bass Lake †	Marinette
84-9	Menomonee River	Milwaukee, Waukesha, Ozaukee, Washington	SS-90-1	Dunlap Creek	Dane
85-1	Black Earth Creek	Dane	SS-90-2	Lowes Creek	Eau Claire
85-2	Sheboygan River	Sheboygan, Fond du Lac, Manitowoc, Calumet	SS-90-3	Port Edwards - Groundwater Prototype †	Wood
85-3	Waumandee Creek	Buffalo	SS-91-1	Whittlesey Creek	Bayfield
86-1	East River	Brown, Calumet	SS-91-2	Spring Creek	Rock
86-2	Yahara River - Lake Monona	Dane	SS-94-1	Osceola Creek	Polk
86-3	Lower Grant River	Grant			
89-1	Yellow River	Barron	<u>Year Selected-</u> <u>Map Number</u>	<u>Priority Lake Project</u>	<u>County(ies)</u>
89-2	Lake Winnebago East	Calumet, Fond du Lac	PL-90-1	Minocqua Lake †	Oneida
89-3	Upper Fox River (Ill.)	Waukesha	PL-90-2	Lake Tomah	Monroe
89-4	Narrows Creek - Baraboo River	Sauk	PL-91-1	Little Muskego, Big Muskego, Wind Lakes	Waukesha, Racine, Milwaukee
89-5	Middle Trempealeau River	Trempealeau, Buffalo	PL-92-1	Lake Noquebay	Marinette
89-6	Middle Kickapoo River	Vernon, Monroe, Richland	PL-92-2	Lake Ripley	Jefferson
89-7	Lower East Branch Pecatonica River	Green, Lafayette	PL-93-1	Camp/Center Lakes	Kenosha
90-1	Arrowhead River & Daggets Creek	Winnebago, Outagamie, Waupaca	PL-93-2	Lake Mendota	Dane, Columbia
90-2	Kinnickinnic River (Milwaukee Basin)	Milwaukee	PL-93-3	Hillsboro	Vernon
90-3	Beaverdam River	Dodge, Columbia, Green Lake	PL-94-1	St. Croix County Lakes Cluster	St. Croix
90-4	Lower Big Eau Pleine River	Marathon	PL-94-2	Upper St. Croix/Eau Claire River	Douglas
90-5	Upper Yellow River	Wood, Marathon, Clark	PL-95-1	Big Wood Lake	Burnett, Polk
			PL-95-2	Rock Lake	Jefferson
			PL-95-3	Horse Creek	Polk, St. Croix

† Project completed

† Sixmile-Pheasant Branch is being redone as part of the Lake Mendota project (PL-93-2).

# State of Wisconsin Department of Natural Resources



----- Regional Boundaries  
● Region Offices

## Region Offices

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**SOUTHEAST REGION**  
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2300 N. Dr. Martin Luther King Jr. Dr.  
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**SOUTH CENTRAL REGION**  
Department of Natural Resources  
3911 Fish Hatchery Road  
Fitchburg, WI 53711  
(608) 275-3266

## Our Mission:

To protect and enhance our natural resources:  
our air, land and water;  
our wildlife, fish and forests  
and the ecosystems that surround them.

To provide a clean, sustainable environment  
and a full range of outdoor opportunities.

To insure the right of all Wisconsin citizens  
to use and enjoy these resources  
in their work and leisure.

To work with people  
so that we understand their views  
and can carry out their will.

And in this partnership with our citizens,  
consider the future  
and those who will follow us.



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