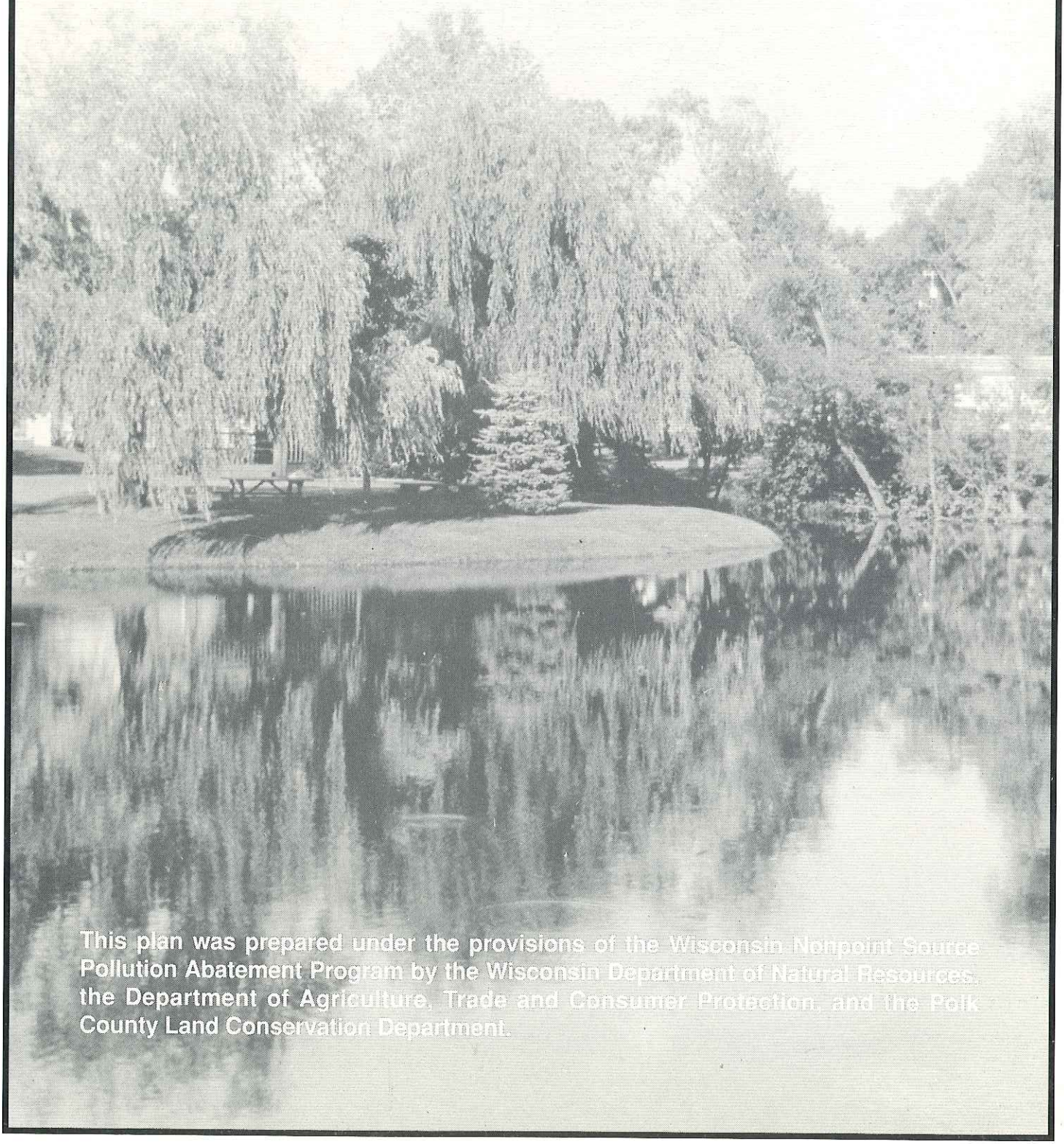
Nonpoint Source Control Plan for the Osceola Creek Priority Watershed Project



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

Watershed Plan Organization Information

Natural Resources Board

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Trygve A. Solberg, Vice Chairman
Neal W. Schneider, Secretary
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Gerald Handlos, County Board Chair
Wilfred Kuhl, FSA Representative

Wisconsin Department of Natural Resources

George E. Meyer, Secretary
Susan L. Sylvester, Administrator, Division for Environmental Quality
Paulette Harder, Director, Bureau of Watershed Management
Rebecca Wallace, Chief, Runoff Management Practices Section

Wisconsin Department of Agriculture, Trade and Consumer Protection

Alan Tracy, Secretary
Nicholas Neher, Administrator, Division of Agriculture Resource Management
Dave Jelinski, Director, Bureau of Land and Water Resources
Keith Foye, Chief, Soil and Water Resource Management Section

Nonpoint Source Control Plan for the Osceola Creek Priority Watershed Project

The Wisconsin Nonpoint Source Water Pollution Abatement Program

October 1996

This Plan Was Cooperatively Prepared By:

Polk County Land Conservation Department
The Wisconsin Department of Natural Resources
and
The Wisconsin Department of Agriculture, Trade, and Consumer Protection

Publication WR-465-96

For copies of this document please contact:

Department of Natural Resources
Bureau of Watershed Management
Runoff Management Practices Section
P.O. Box 7921
Madison, WI 53707

The Department of Natural Resources acknowledges the Environmental Protection Agency's Region V Office for their involvement in the partial funding of this activity through Section 319 of the Water Quality Act.

Watershed Plan Credits

Author

Cheryl Clemens Bursik, Polk County Land Conservation Department

Principal Contributors

Terence Kafka, DNR Bureau of Watershed Management
James Cahow, DNR Northern Region

Additional Contributors

Jane Malischke DNR Northern Region
Lynne Hess, DATCP Soil and Water Resources Section
Ron Struss, University of Wisconsin Extension
Roxann Radke, Polk County Land Conservation Department
Pat Schmidt, Polk County Land Conservation Department
Kay Fandel, Polk County Land Conservation Department
Jeff Timmons, Polk County Land Conservation Department
Harlan Owens, Village of Osceola
Dave Rasmussen, West Central Regional Planing Commission
Randy Ferrin, National Park Service
Mike Johnson, DNR, Balsam Lake Service Center
Kevin Morgan, DNR Barron Service Center
Rick Cornelius, DNR Barron Service Center
Tim Jergenson, University of Wisconsin Extension Polk County
Don Mayer, NRCS Balsam Lake
Keith Zygowicz, NRCS Balsam Lake
Mary Anne Lowndes, DNR Bureau of Watershed Management
Ken Baun, DNR Bureau of Watershed Management
Cindy Hoffland, DNR Bureau of Community Assistance
Laura Chern, DNR Bureau of Drinking Water and Groundwater
Mike Grinyer, DNR Balsam Lake Service Center

Editors

Terence Kafka, DNR Bureau of Watershed Management
Shelley Magsamen, DNR Bureau of Watershed Management

Graphics / Maps

DNR Bureau of Enterprise Information, Technology, and Applications (Maps)
Bob Queen, DNR Bureau of Communication and Education Strategy (Cover)

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WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Tommy G. Thompson, Governor
George E. Meyer, Secretary

Box 7921
101 South Webster Street
Madison, Wisconsin 53707-7921
TELEPHONE 608-266-2621
FAX 608-267-3579
TDD 608-267-6897

October 1, 1996

Mr. Gerald Handlos, Chair
Polk County Board
100 Polk County Plaza
Balsam Lake, WI 54810

Dear Mr. Handlos:

I am pleased to approve the Osceola Creek Priority Watershed Plan that was prepared through the Wisconsin Nonpoint Source Pollution Abatement Program. This plan meets the intent and conditions of S. 144.25, Wisconsin Statutes, and Chapter NR120, Wisconsin Administrative Code. This plan has been reviewed by the Department of Agriculture, Trade and Consumer Protection and was approved by the Land and Water Conservation Board on October 1, 1996. I am also approving this plan as an amendment to the St. Croix River Basin Area-wide Water Quality Management Plan.

I would like to express the Department's appreciation to the Polk County Land Conservation Department Staff that participated in preparing this plan. The implementation of the Osceola Creek Priority Watershed Project will greatly enhance the area's water quality and set a standard for future small-scale projects selected as part of the Department of Natural Resources Nonpoint Source Pollution Abatement Program.

We look forward to assisting Polk County, the Village of Osceola, and other units of government participating in the implementation of the Osceola Creek Priority Watershed Plan.

Sincerely,

George E. Meyer
Secretary

cc: Alan Tracy, DATCP
Jim Bradley, LWCB Chair
Pat Levenworth, NRCS
Jeff Timmons, Polk County LCD
Cheryl Bursik, Polk County LCD
Richard Coen, LCC Chair
Harlan Owens, Osceola
Ted Smith, NOR
Jane Malischke, NOR
Terence Kafka, WT/2
Lynne Hess, DATCP
Cynthia Hoffland, CF/8

RESOLUTION 67-96
ADOPTING THE OSCEOLA CREEK
NONPOINT SOURCE PRIORITY WATERSHED PLAN

WHEREAS, the Osceola Creek Watershed was designated by the Department of Natural Resources in 1994, under the Wisconsin Nonpoint Source Water Pollution Abatement Program, and

WHEREAS, the Polk County Land Conservation Department in cooperation with the Department of Natural Resources and the Department of Agriculture, Trade and Consumer Protection conducted a detailed inventory of the land use within the watershed in 1995 and

WHEREAS, this inventory resulted in the development of a detailed nonpoint source control plan for the watershed, and

WHEREAS, a public informational meeting and an official Public Hearing was conducted on July 23, 1996, and

WHEREAS, pertinent public comments have been incorporated into the plan, and

WHEREAS, the County wishing to receive cost sharing grants for landowners in the watershed must first adopt the Osceola Creek Watershed Plan.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Supervisors of the County of Polk, that the Osceola Creek Watershed Nonpoint Source Priority Watershed Plan be adoption and the implementation of the plan begin as soon as possible.

Dated this 20th Day of August, 1996

FISCAL IMPACT: Costs to the County for implementation of this watershed plan are reimbursed 100% by the State except for 30% of the cost of office equipment, materials and supplies.

Presented at the request of the Land Conservation Committee

Richard Coen | John Bonneprise | Violet Wright

Approved as to form: Robert Hachey, Corporation Counsel

OFFICE OF
Polk County Clerk
SHARON SCHIEBEL
Courthouse
Balsam Lake, Wisconsin 54810

STATE OF WISCONSIN)
) ss
COUNTY OF POLK)

I, Sharon Schiebel, County Clerk for Polk County do hereby certify that the attached is a true and correct copy of Resolution No. 67-96 which was adopted by the Polk County Board of Supervisors on August 20, 1996.

Sharon Schiebel
Sharon Schiebel
County Clerk

RESOLUTION # 13 - 96

VILLAGE OF OSCEOLA
POLK COUNTY, WISCONSIN

RESOLUTION

ADOPTING THE OSCEOLA CREEK
NONPOINT SOURCE PRIORITY WATERSHED PLAN

WHEREAS, the Osceola Watershed was designated by the Department of Natural Resources in 1994 under the Nonpoint Source Water Pollution Abatement Program; and

WHEREAS, the Polk County Land Conservation Department in cooperation with the Department of Natural Resources and the Department of Agriculture, Trade and Consumer Protection conducted a detailed inventory of land use within the watershed in 1995; and

WHEREAS, this inventory resulted in the development of a detailed nonpoint source control plan for the watershed; and

WHEREAS, a number of public informational meetings have been conducted throughout the watershed, and a properly noticed, official public hearing was conducted on July 23, 1996; and

WHEREAS, pertinent public comments have been incorporated into the plan.

NOW, THEREFORE, BE IT RESOLVED, that the Osceola Village Board adopts the Osceola Creek Nonpoint Source Priority Watershed Plan and encourages the implementation of the plan as soon as it is feasibly possible.

BE IT FURTHER RESOLVED, that the Osceola Village Board agrees to pursue completion of the "CORE ELEMENTS" of the urban nonpoint pollution control program for the Osceola Creek Watershed as outlined in the watershed plan.

Passed this 13th day of August, 1996.

Signed: Charles E. Jensen

Charles E. Jensen, President

Attest: H. O. Owens

Harlin O. Owens, Administrator

TOWN OF OSCEOLA
POLK COUNTY, WISCONSIN 54020

TELEPHONE: 715 - 755 - 3060 FACSIMILE: 715 - 755 - 2271

RESOLUTION #96-05

WHEREAS, the Osceola Creek Watershed was designated by the Department of Natural Resources in 1994 under Wisconsin Nonpoint Source Water Pollution Abatement Program, and

WHEREAS, the Polk County Land Conservation Department in cooperation with the Department of Natural Resources and the Department of Agriculture, Trade and Consumer Protection conducted a detailed inventory of the land use within the watershed in 1995, and

WHEREAS, this inventory resulted in the development of a detailed nonpoint source control plan for the watershed, and

WHEREAS, a number of public informational meetings have been conducted throughout the watershed, and an official public hearing was conducted on July 23, 1996, and

WHEREAS, pertinent public comments have been incorporated into the plan,

SO THEREFORE BE IT RESOLVED, by the Osceola Town Board of Supervisors, that the Osceola Creek Watershed Nonpoint Source Priority Watershed Plan be adopted.

BE IT FURTHER RESOLVED, that the Town of Osceola agrees to develop and implement a *Construction Site Erosion Control Ordinance* as soon as possible.

DATED THIS 12th OF AUGUST, 1996

Ronald D. Gamache, Chairman

Eugene R. Lindholm, Supervisors

Hilary Gustafson, Supervisor

ATTEST:

I hereby certify that the Resolution, of which the above is a copy, was duly passed by the Town Board of Supervisors of the Town of Osceola, Polk County, State of Wisconsin, on the 12th day of August, 1996, at a meeting duly called and held and at which a quorum was present and acted throughout.

Jo Ann Everson, Clerk/Treasurer

TOWN OF FARMINGTON

RESOLUTION 5-96

ADOPTING THE OSCEOLA CREEK NONPOINT SOURCE PRIORITY WATERSHED PLAN

WHEREAS, the Osceola Creek Watershed was designated by the Department of Natural Resources in 1994 under the the Wisconsin Nonpoint Source Water Pollution Abatement Program, and

WHEREAS, the Polk County Land Conservation Department in cooperation with the Department of Natural Resources and the Department of Agriculture, Trade and Consumer Protection conducted a detailed inventory of the land use within the watershed in 1995, and

WHEREAS, this inventory resulted in the development of a detailed nonpoint source control plan for the watershed, and

WHEREAS, a number of public informational meetings have been conducted throughout the watershed, and an official public hearing was conducted on July 23,1996, and

WHEREAS, pertinent public comments have been incorporated into the plan.

NOW, THEREFORE, BE IT RESOLVED, by the Town Board of the Town of Farmington that the Osceola Creek Watershed Nonpoint Source Priority Watershed Plan be adopted, and

BE IT FURTHER RESOLVED, that the Town Board is willing to participate in a joint effort with the Town of Osceola and the Village of Osceola to develop a Construction Site Erosion Control Standard.

DATED THIS 5th OF August 1996

Approved 3

Disapproved 0

Donald C. Getschel, Chairman

Deb Swanson, Clerk/Treasurer

CHAPTER ONE
Purpose, Legal Status, and General Description

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 Osceola Creek Watershed (located in Polk County) encompasses a nine-square-mile area that was designated as a small-scale "priority watershed" in 1994. The primary objectives of the project are to reduce nonpoint source pollution to Osceola Creek and to enhance and protect the water quality of the surface and groundwater within the Osceola Creek Watershed. The Osceola Creek Watershed is part of the St. Croix River Basin.

Nonpoint sources of pollution include: eroding agricultural lands, stream banks, roadsides, and construction sites; runoff from fields applied with manure, fertilizers, and pesticides; runoff from barnyards; and runoff from established urban areas. Pollutants from nonpoint sources are carried to surface water through rainfall or snowmelt runoff or to the groundwater through seepage. The following is an overview of the Nonpoint Source (NPS) Priority Watershed program:

- The DNR administers the program in cooperation with DATCP. Wisconsin is divided into 330 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 become eligible for consideration as a priority watershed project. Designation as a priority watershed project enables 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 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 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 ten-year project. 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 Osceola Creek 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, the Polk County Land Conservation Department, the village of Osceola, and the Osceola Creek Watershed Citizen's Advisory Committee.

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, the village of Osceola, the towns of Osceola and Farmington, and the Polk County Board of Supervisors.

Amendments to the Plan. This plan is subject to the amendment process under NR 120.08(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 is separate from the Nonpoint Source program and applies to certain classes of dischargers statewide as identified in NR 216. In cases where the programs do overlap, 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 except for the demonstration

project selected for the watershed. In industrial areas, cost sharing is available only in the non-industrial parts of facilities where a problem has also been identified in the priority watershed plan as specified in NR 120.10 (1)(g).

Priority Watershed Planning and Implementation Phases

Planning Phase

The planning phase of the Osceola Creek Watershed project began in 1995. The following information gathering and evaluation activities were completed during this stage:

- Determine the conditions and uses of Osceola Creek, wetlands, and ground water.
- Inventory types of land uses and severity of nonpoint sources affecting Osceola Creek, wetlands, and groundwater.
- Evaluate 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 St. Croix River Basin).
- Determine nonpoint source controls and other measures necessary to improve and/or protect water quality.
- Prepare and gain 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 Osceola Creek Priority Watershed Project began following review of the draft priority watershed plan, a public hearing, and approval by the DNR, LWCB, the Osceola Village Board, and the Polk County Board of Supervisors. Public input and review during plan development occurred primarily through the efforts of the Osceola Creek Citizen's 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 Polk County LCD staff contact eligible landowners to assess 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 are 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 private landowners within their boundaries.

Location and Community Information

The Osceola Creek Watershed is a nine-square-mile drainage basin located approximately 45 miles northeast of the Minneapolis-St. Paul Metropolitan Area in Northwestern Wisconsin (map 1-1). The watershed is predominantly rural with crop fields, but few dairy operations. The village of Osceola makes up about one quarter of the watershed. The Osceola Creek Watershed lies within the larger Trout Brook Watershed of the St. Croix River Basin.

Civil Divisions

The Osceola Creek Watershed lies entirely within Polk County in the townships of Osceola and Farmington. Most of the village of Osceola is within the watershed boundaries.

Population Size and Distribution

The Osceola watershed population is estimated to be about 2,200 persons.[1] The majority of the watershed residents live within the village of Osceola. In the period from 1980 until 1990 the village of Osceola population increased at a rate of 31 percent. The town of Osceola had a 25 percent growth rate, and the population within the town of Farmington increased by a rate of 6 percent. The overall growth rate in Polk County was 7.5 percent.[2] Regional trends, the high percentage of the population of child-bearing age, and in-migration (especially from the Twin Cities Metropolitan area) suggest that the watershed's population will continue to expand.

Land Uses

Rural land uses predominate in the watershed, although the village of Osceola makes up about one quarter of the watershed as illustrated in map 1-2. Open space including woodlands, wetlands, and grassland covers 47 percent of the land area. Agriculture is the next most prevalent land use, comprising 41 percent. Cash grain farming is the primary enterprise. The remainder of the watershed consists of residential, commercial, and industrial development, as indicated in figure 1-1 and table 1-1).

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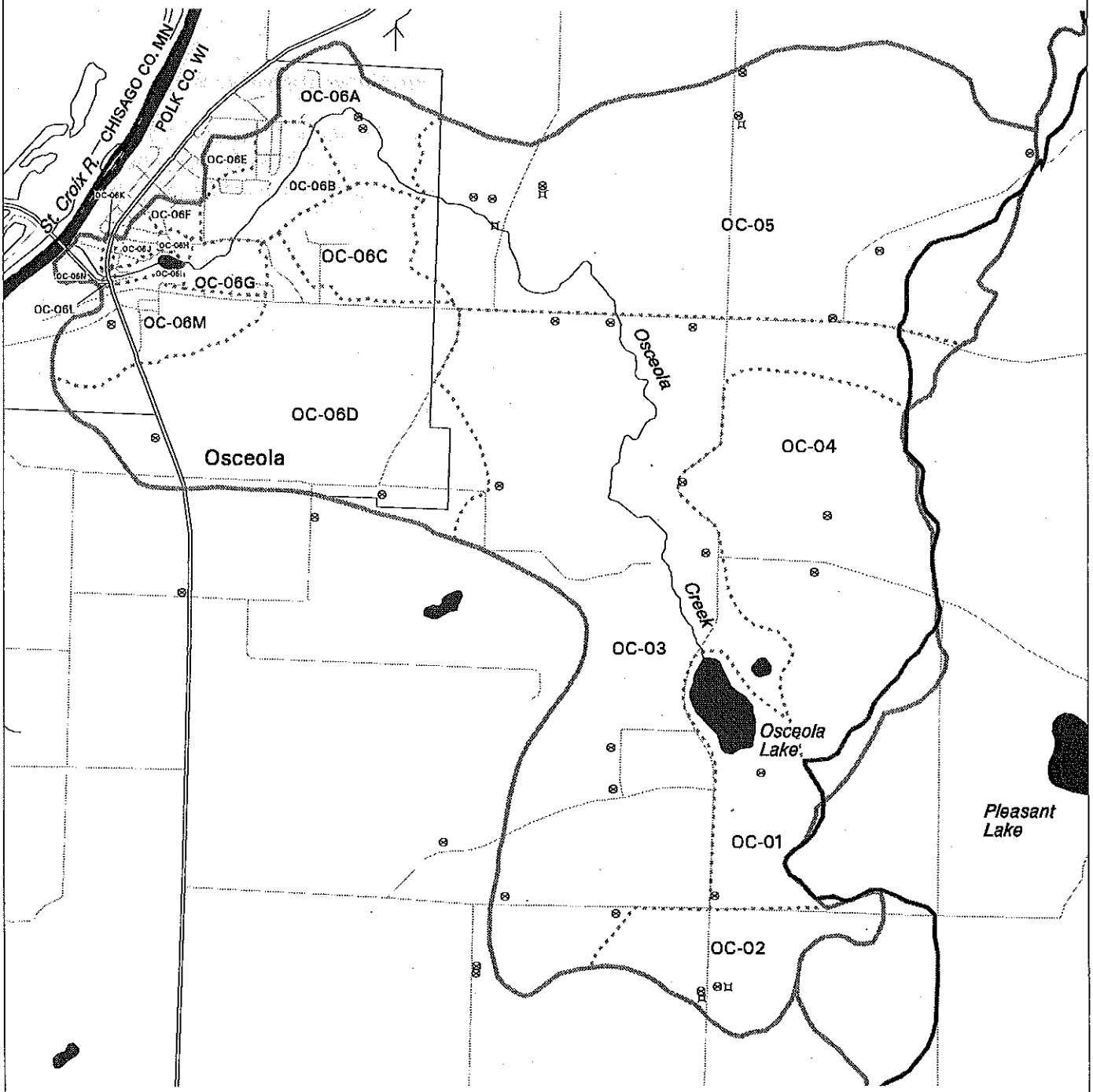
[1]Wisconsin Department of Administration Demographic Services Center. 1995.

[2]U.S. Census Bureau. 1990.

Map 1–1. Osceola Creek Watershed Project



LEGEND

- Barnyard Location
- Well Location
- Watershed Boundary
- Project Boundary
- Subproject Boundary
- Major Highway
- Local Roads
- Perennial Stream
- Intermittent Stream
- County Boundary
- Wetland
- Open Water
- Municipal Area

Study Area

Wisconsin Department
of Natural Resources
BIM - GEO Services Section
January 1997

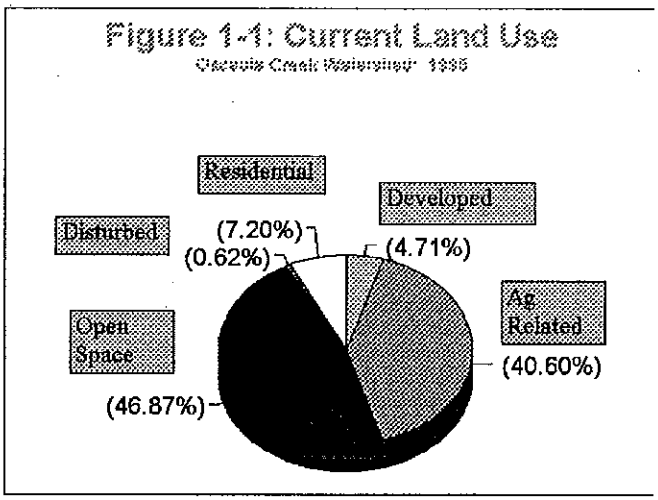
0 0.5 1 Miles

0 0.5 1 1.5 Kilometers

Scale 1:40,175

The urban area of the Osceola Creek Watershed includes most of the village of Osceola. The boundaries of the urban area were defined by direction of water flow rather than political boundaries. The urban area contains considerable cropland and open space. A detailed land use breakdown is given in table 1-2.

Over the next several years, homes will be constructed where crops are now grown. Figure 1-2 illustrates this change. In general agricultural land and open space will decline, and there will be increases in commercial and residential development. Open space increased slightly in the transitional period because a landfill classified as a disturbed area in 1995 was closed and planted to grass.



Ag related includes cropland, farmstead, and pasture.

Open space includes wetland, forest land, grassland, parks, and the golf course.

Disturbed includes construction sites, gravel pits, and the landfill.

Residential includes single and multi-family homes and mobile home courts.

Developed includes commercial, institutional, industrial land, and the airport.

Map 1-2. Land Uses in the Osceola Creek Watershed

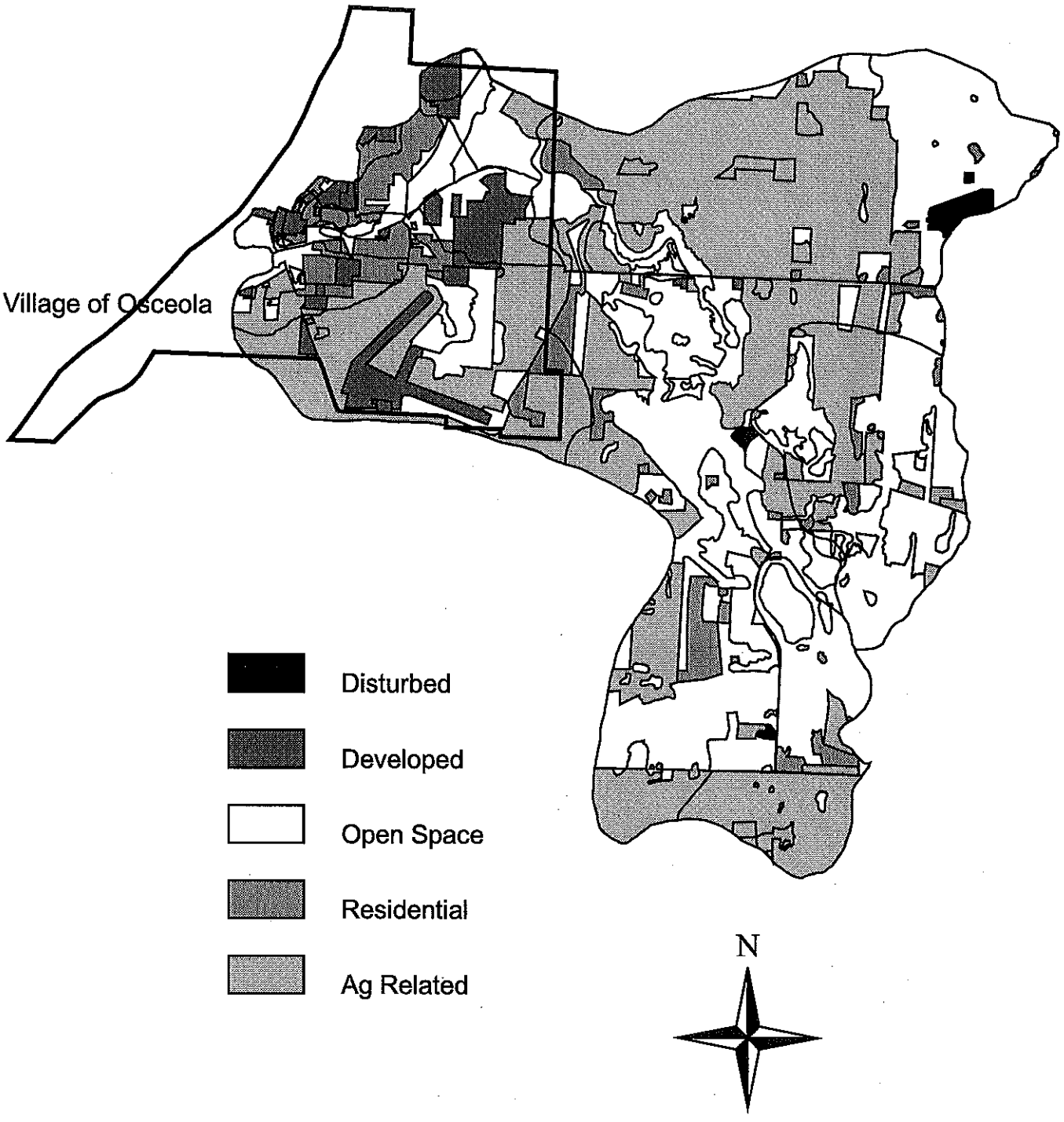


Table 1-1. Summary of Land Uses in the Osceola Creek Watershed: 1995[1]

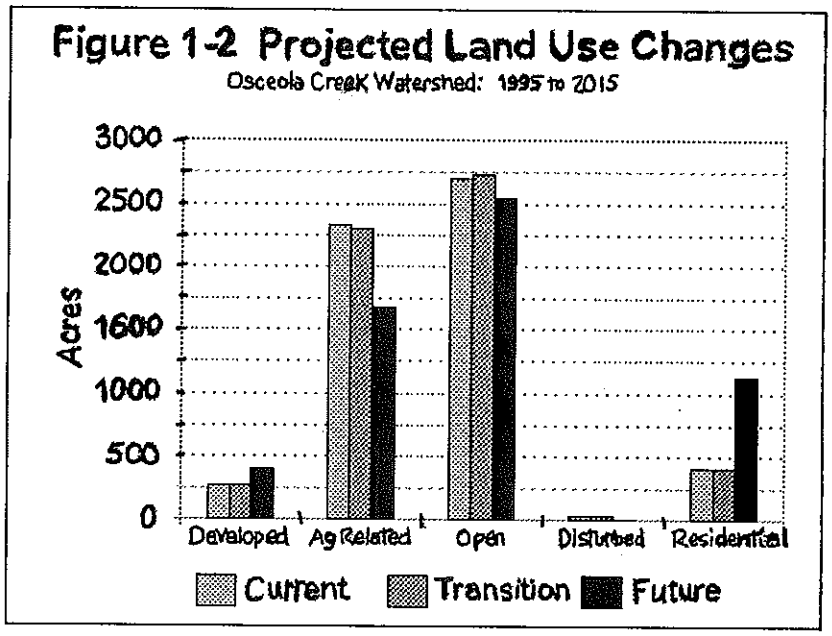
Land Use	Acres	Percent
Agricultural		
pasture	78	1%
cropland[2]	2,173	38%
farmstead	86	1%
Open Space		
grassland	657	11%
woodland	1,444	25%
wetland	598	10%
Developed	271	5%
Disturbed	36	1%
Residential	414	7%
Total	**5,757**	**100%**

[1]Sources: Farm Services Administration 1995 Aerial Photos, DNR Wisconsin Wetland Inventory.

[2]Cropland currently in the conservation reserve program is included as grassland because it more accurately reflects ground cover and sediment delivery.

Table 1-2. Urban Land uses within the Osceola Creek Watershed: 1995

Land Use	Acreage	Percent
Single-Family	203	14%
Mobile Home/ Multi-Family	27	2%
Commercial	118	8%
Airport	77	5%
Institutional	73	5%
Wetland	109	7%
Grassland/ Open Space	227	15%
Cropland	541	36%
Farmstead	10	1%
Woodland	106	7%
Total	**1491**	**100%**



CHAPTER TWO
Watershed Conditions, Objectives, and Eligibility Criteria

Introduction

This chapter discusses watershed physical characteristics, pollution sources, water resources objectives, and eligibility criteria for corrective measures.

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 Osceola Creek Watershed lies in the continental zone which is characterized by winters which are long and relatively cold and snowy, and summers which are mostly warm with periods of hot humid conditions. Mean annual precipitation for Polk County is about 28 inches of rain and melted snow; the majority falls in the form of thunderstorms during the growing season (May-September). Most runoff occurs in February, March, and April when the land surface is frozen and soil moisture is highest.

Topography

The watershed has a relief that is primarily the result of glacial activity. Land forms generally associated with this area include outwash plains, pitted and collapsed outwash plains, fans, terraces, and moraines. The topography ranges from nearly level throughout much of the watershed to very hilly at the easternmost edge and along the St. Croix River on the western edge of the watershed.

Geology

The watershed is, for the most part, underlain with sandstone, dolomite, and basalt less than thirty meters deep. The overlying deposits are primarily outwash, although till does occur in the southeast portion of the watershed. These deposits are the result of glacial activity from the Superior Lobe of the Laurentide Ice Sheet. The Superior Lobe flowed into the area prior to 25,000 years ago and influenced the area until about 9,500 years ago.

Soils

The soils of Polk County originate from three major sources: continental glaciation, bedrock weathering, and fluvial action. Watershed soils include the following three major soil associations:

Burkhardt-Dakota Association. The Burkhardt-Dakota Association occupies the northwestern half of the watershed. It consists of nearly level to sloping, somewhat excessively drained and well drained, loamy soils on outwash plains, fans, and terraces. The somewhat excessively drained Burkhardt soils formed in loamy deposits 12-24 inches thick over sandy and gravelly outwash. The well drained Dakota soils formed in loamy deposits 20-40 inches thick over sandy and gravelly outwash. In some areas dolomite occurs within 60 inches. Permeability is moderate or moderately rapid in the loamy mantle and is rapid or very rapid in the outwash. Surface runoff is slow to medium depending on slope. Mineral and organic wetland soils occur along streams and within some depressions.

Most areas are used for cultivated crops. Maintaining tilth and fertility and controlling erosion in sloping areas are the main concerns in managing the major soils for cultivated crops. Droughtiness is an additional limitation on Burkhardt soils. The potential for cultivated crops is good. The major soils are not naturally forested and generally are not managed as woodland. The potential for residential development is good, but the effluent from septic tank absorption fields can pollute groundwater because soils are highly permeable and provide a poor filter.

Rosholt-Cromwell-Menahga Association. The Rosholt-Cromwell-Menahga Association occupies the eastern and central portion of the watershed. It consists of nearly level to very hilly, well drained to excessively drained, loamy and sandy soils on pitted and collapsed outwash plains. The well drained Rosholt soils formed in loamy deposits 20-40 inches thick over sandy and gravelly outwash. The somewhat excessively drained Cromwell soils formed in loamy deposits 10-24 inches thick over sandy and gravelly outwash. The excessively drained Menahga soils formed in sandy outwash. Permeability in the Rosholt and Cromwell soils is moderate or moderately rapid in the loamy mantle and is rapid or very rapid in the outwash. Permeability in the Menahga soils is rapid. Surface runoff is slow to very rapid on Rosholt soils and slow to medium on Cromwell and Menahga soils depending on slope. Mineral and organic wetland soils occur along streams and within some depressions.

Much of the acreage is used for cultivated crops. Many areas, especially the more sloping areas, are pasture or woodland. Erosion and droughtiness are the main limitation in managing the major soils for cultivated crops. Soil blowing is an additional hazard on Menahga soils. The potential is good to poor for cultivated crops and fair or good for woodland. The potential for residential development is good, but effluent from septic tank absorption fields can pollute ground water because soils are highly permeable and provide a poor filter.

Amery-Santiago-Magnor Association. The Amery-Santiago-Magnor Association occupies the southeastern portion of the watershed. It consists of nearly level to very hilly, well drained and somewhat poorly drained, loamy and silty soils on moraines. The well drained Amery soils formed in loamy till. The well drained Santiago soils and the somewhat poorly drained Magnor soils formed in silty deposits 12-36 inches thick over dense loamy till. Permeability in these soils is moderate in the upper part and very slow in the lower. Surface runoff is slow to very rapid on Amery soils, medium to very rapid on Santiago soils, and very slow to medium on Magnor soils. Mineral and organic wetland soils occur along streams and within some depressions.

Much of the acreage is used for cultivated crops or pasture. Many areas are woodland. Erosion is the main limitation in cultivated areas. Excessive wetness and impoundment of water are additional problems for cultivation on Magnor soils. If adequately protected against erosion, the major soils have good potential for cultivated crops. They also have good potential for woodland. The potential for residential development is only fair because limitations for septic tank absorption fields are moderate or severe.

Water Resource Conditions and Goals

This section describes the general conditions of the surface and groundwater resources in the Osceola Creek Watershed. It describes the classifications used for Wisconsin's waters and the surface water and recreational resources in the watershed. Water quality goals and objectives are established.

Water Use Classifications

Surface water quality standards and criteria are expressions of the conditions considered necessary to support biological and recreational uses. Water quality standards for recreational and biological uses are contained in Chapters NR 102, NR 104, and NR 105 Wisconsin Administrative Code.

Biological Stream Use. Wisconsin surface waters are classified according to the biological uses each stream can potentially attain. These classifications are listed for each stream in the water quality management plans developed for each basin. For designating water quality criteria and regulating water quality standards, Wisconsin's surface waters are classified into one of the following fish and other aquatic life use classification categories:

COLD = Coldwater Communities include surface waters capable of supporting a community of coldwater fish and other aquatic life or serving as a spawning area for coldwater fish species.

WWSF = Warmwater Sport Fish Communities include surface waters capable of supporting a community of warmwater sport fish and/or serving as a spawning area for warmwater sport fish.

WWFF = Warmwater Forage Fish Communities include surface waters capable of supporting an abundant diverse community of forage fish and other aquatic life.

LFF = Limited Forage Fish Communities

LAF = Limited Aquatic Life Communities

Trout streams that are listed in Wisconsin Trout Streams, publication number 6-3600(80) and any additional trout streams listed as Outstanding/Exceptional Resource Waters in Wisconsin Administrative Code NR 102.20 and NR 102.11 are classified as Cold Water for water quality standards purposes. Trout streams are also classified for fisheries management purposes as follows:

Class I: Trout streams of high quality with populations sustained by natural reproduction.

Class II: Trout streams that have some natural reproduction, but may need stocking to maintain a desirable fishery.

Class III: Trout streams that have no natural reproduction and require annual stocking of legal-size fish to provide sport fishing.

Trout stream categories are used for evaluating surface water biological use potential and use attainment and developing watershed recommendations. Table 2-1 summarizes the water resource classification and conditions for the Osceola Creek Watershed.

Table 2-1. General Condition of Osceola Creek Stream Segments

Stream Segment	Biological Use		Problems Related to Nonpoint Source Pollution
	Current	Potential	
Segment 1 Upstream of 248th Street	CW Class III	CW Class II (only from Cty M to 248th)	✓Collapsing streambanks ✓Trampling/runoff from pasture ✓Upland erosion from cropland and construction
Segment 2 248th St. to 3rd Avenue	CW Class II	CW Class I	✓Collapsing streambanks ✓Trampling/runoff from barnyard ✓Upland erosion from cropland and construction
Segment 3 3rd Ave. to St. Croix	CW Class III	CW Class III	✓Runoff from impervious surfaces ✓Construction site erosion

Surface Water and Recreational Resources

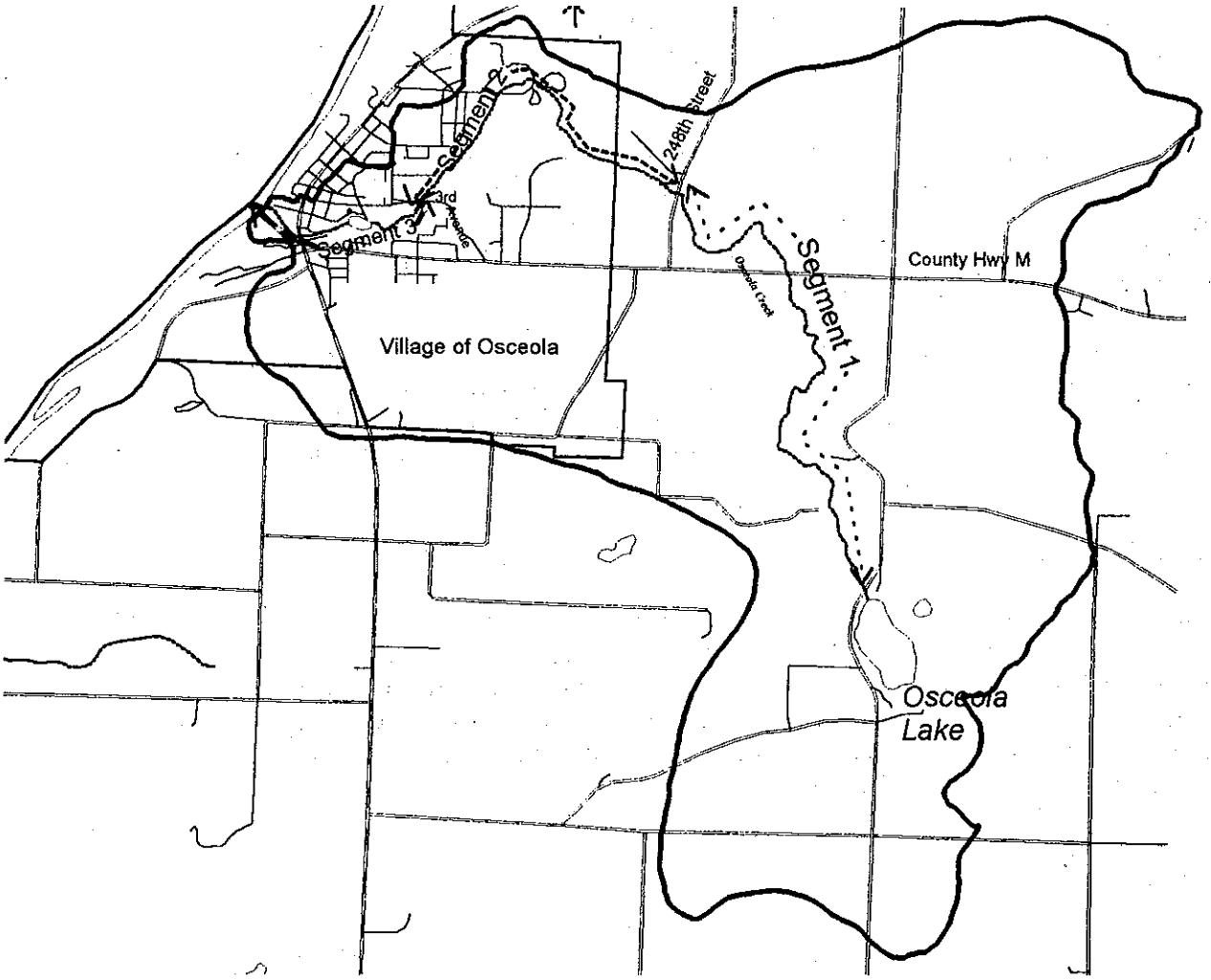
Osceola Creek

Osceola Creek is a cold water fishery with an approximated stream length of 5.2 miles. As illustrated in Map 2-1, Osceola Creek was divided into 3 distinct segments due to habitat and fishery variations that were found within the stream during the Water Resource Appraisal.[1]

The upper 2.7 miles of Osceola Creek (from Osceola Lake to 248th Street) supports a marginal cold water forage fishery with occasional trout. The next 2.0 miles downstream (from 248th Street to 3rd Avenue) supports a Class II brook trout (*Salvelinus fontinalis*) fishery. From 3rd Avenue downstream through the village of Osceola and to the confluence of the St. Croix River, the stream supports a

[1]Cahow, Jim. *Osceola Creek Priority Watershed Surface Water Resources Appraisal Report.* Department of Natural Resources. (Draft March 1996).

Map 2-1 Osceola Creek Stream Segments



LEGEND

- Watershed Boundary
- Road
- Secondary Road
- Street
- Osceola Creek
- Village of Osceola
- Segment 1
- Segment 2
- Segment 3

N

marginal coldwater forage fishery. The creek flows through three constructed impoundments in this segment - the upper, lower, and middle mill ponds. Trout are stocked in the lower mill pond. Osceola Creek is not reaching its highest potential use due to pollution from nonpoint sources. Eroding croplands, a single livestock operation along the creek, and runoff from city streets are the major sources of nonpoint pollution in the watershed.

Much of the stream is currently bordered by wetlands, historic pasturing in these wetland areas has resulted in badly hummocked, unstable streambanks. Tag alders partially stabilize the streambank in some areas. However, alders also cause bank instability as they reach maturity and fall into the stream. New construction will likely be the greatest threat to water quality within this watershed in the near future.

Stream segments from County Hwy. M to 248th Street and from 248th Street to 3rd Avenue show the best potential for trout fishery improvement. The overall objective from County Hwy. M to 248th Street is to upgrade from a COLD Class III to a COLD Class II stream. The objective from 248th Street to 3rd Ave. is to upgrade the stream from a COLD Class II stream to a COLD Class I stream.

Osceola Lake

Osceola Lake encompasses an area of approximately 38 acres in size, and receives surface water runoff from a 219 acre area that is relatively undeveloped. The Lake also receives significant groundwater inputs that provide naturally elevated background levels of phosphorus. Due to these factors, the lake is not expected to show a response to upland management efforts and therefore, is not a focus for this project. In addition, all land surrounding the Lake is owned by a single landowner, and there is no public access to the lake.

Mill Ponds

The mill ponds were created within the village of Osceola around 1870. The upper mill pond has filled in with sediment from the creek and is currently functioning as a wetland. The middle mill pond, which was formerly used for swimming, has also filled in considerably. The pond is now quite shallow with abundant aquatic plant and algae growth. The lower mill pond is the center of a small village park just above a falls that is created from the steep drop to the St. Croix River.[2]

Wetlands

Wetlands are valuable natural resources. They provide wildlife habitat, fish spawning and rearing areas, recreation, storage of runoff and flood flows, and removal of pollutants. Wetlands in the watershed are mainly in the Osceola Creek floodplain. Floodplain wetlands support furbearers and water fowl populations and may provide seasonal habitat for sport fish.

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[2]*Osceola Middle Pond Polk County Feasibility Study Results and Management Alternatives.* Bureau of Water Resources Management. DNR. 1985.

The second inventory examined data from the Polk County soil survey, Natural Resource Conservation Service maps, air photos, and DNR wetland inventory maps. The 21 altered or disturbed wetlands that were identified were drained through the construction of ditches or drainage tiles. Of the 21 altered sites identified, 14 are potential restoration sites. Guidelines for wetland restoration, which will be a component of this project, are outlined at the end of this chapter.

Recreation

Osceola Creek offers residents and visitors an opportunity to fish for trout. The watershed's wetlands offer bird watching and wildlife observation opportunities. The creek flows through a golf course and the village campground. The lower mill pond and Cascade Falls, which is located in the gorge to the St. Croix River, are local tourist attractions.

Groundwater Resources

Regional Aquifers

Groundwater is the main source of drinking water in the Osceola Creek Priority 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.

Since 1936, the State of Wisconsin has required well drillers to document well construction and rock and soil layers encountered during well installation. Information from geologic logs, driller construction reports, and Wisconsin Geological and Natural History Survey reports for Polk County is summarized below.

Principle aquifers within the watershed are the glacially deposited sand and gravel, the Prairie du Chien dolomite aquifer, the Cambrian sandstone aquifer, and the Precambrian basalt aquifer. Within the watershed, only one well draws water from a limestone member of the Cambrian sandstone aquifer. The rest tap either the sandstone or the glacial sand and gravel aquifer. One well reaches the basalt at a depth of 307 feet but draws water from the sandstone.

Private wells in the sand and gravel aquifer range in depth from 20 to 75 feet deep with the depth to water ranging from 12 to 38 feet below the ground surface. Private wells which draw water from the sandstone aquifer range in depth from 92 to 307 feet. The depth to water ranges from 30 to 85 feet below the ground surface. One well which draws from limestone is 214 feet deep with water drawn from a depth of 135 feet below the ground surface.

There is a basalt ridge called "trap rock" which runs west of the watershed. No wells within the watershed use the basalt as a source of groundwater.

Direction of Groundwater Flow

Local groundwater flow in the Osceola Creek Watershed roughly mirrors the topography of the land surface and flows "downhill" or down gradient toward the St. Croix River. Osceola Lake is "perched" meaning that groundwater flowing into the lake has a shallower more local source of recharge.

Groundwater Quality

Groundwater quality in the Osceola Creek watershed is generally considered good. As part of the local inventory, private well samples were collected and analyzed for nitrate (NO_3) + nitrite (NO_2). Sample analytical results are summarized in table 2-3.

Samples analyzed for nitrate (NO_3) + nitrite (NO_2) showed concentrations ranging from not detected to 14 parts per million or milligrams per liter (mg/L). The groundwater enforcement standard (ES) for nitrate is 10 mg/L. nitrate (NO_3) + nitrite (NO_2) concentrations above 2 mg/L exceed the states 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.

As in summarized in Table 2-2, two samples (7 percent) exceeded 10 mg/L and 16 (53 percent) of the samples exceeded 2 mg/L.

Results so far do not indicate a pattern of groundwater contamination that can be linked to specific sources of nitrate. These results do not represent the overall groundwater quality of the watershed.

Table 2-2. Well Sampling Results: Osceola Creek Watershed

NITRATE						
	Number of Nitrate Samples		Number of Nitrate Samples		Number of Nitrate Samples	
	less than 2.0 mg/l	%	between 2.0 and 10.0 mg/l	%	greater than 10.0 mg/l	%
Totals	12	40	16	53	2	7

In 1990 a study was conducted in Polk and surrounding counties to assess the natural occurrence of phosphorus in the geologic materials and groundwater in Northwestern Wisconsin and determine whether these background levels of phosphorus affect water quality.[3] Osceola Lake was a site for this study. On the basis of data from the Osceola Lake study site, the upland surface water features throughout the surrounding area are assumed to be perched which means they are separated from the underlying regional aquifer by an unsaturated zone. Osceola Lake has somewhat elevated phosphorus concentrations, the source of which is thought to be naturally elevated phosphorus in groundwater.

Water Supplies

Water supplies for domestic, agricultural, and industrial uses in the Osceola Creek Watershed are obtained from both private groundwater sources and municipal systems.

The water supply for the village of Osceola comes from three wells. Well number 1 is 328 feet deep, number 2 is 346 feet deep, and number 3 is 260 feet deep. They all draw water from the Tunnel City, Wonewoc, and Eau Claire formations which make up the Cambrian sandstone aquifer. This municipal water system supplies almost 90 percent of the watershed's population.

Potential Groundwater Quality Problems

Previously identified sites that pose potential groundwater quality problems in the Osceola Creek Priority Watershed are identified in Table 2-3.

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[3]Muldoon, M.A., F.W. Madison, and M.D. Johnson, 1990. Soils, Geologic and Hydrogeologic Influences on Lake Water Quality in Northwestern Wisconsin. Wisconsin Geologic and Natural History Survey.

Table 2-3. Sites that pose potential groundwater quality problems[4]

Site Name	DNR LIST	Address	Priority
Quickie Transport Company	E.R.R.P[5]	101 Depot Street Osceola	High
St. Croix River Valley Landfill	E.R.R.P L.U.S.T	Oak Drive Osceola	High Low
Circle C	L.U.S.T[6]	Highway 35 and County M	High
DOT	L.U.S.T	Highway 35 and County M	High
Cascade Street	L.U.S.T	Uncertain	High
Osceoal Bus Garage	L.U.S.T	Zindaus Street	Low
Osceola Liquor and Gas	L.U.S.T	Highway 35 and 243	High
Central Rivers Cooperative	E.R.R.P	Depot Road	High

[4]These sites were listed in DNR Publication SW-144, The Wisconsin Remedial Response Site Evaluation Report (1994) which lists superfund sites, solid and hazardous waste disposal sites, leaking underground storage tank sites and reported spill sites.

[5]E.R.R.P is an acronym for Environmental Response and Repair.

[6]L.U.S.T is an acronym for Leaking Underground Storage Tank.

Water Quality Goals and Project Objectives

DNR, Polk County, DATCP staff, and the Citizen's Advisory Committee (CAC) developed water quality goals and project objectives. Details can be found in the Osceola Creek Project Appraisal Report (Cahow, 1996), which is available through DNR's Northern Regional Office in Spooner.

Following are descriptions of general goals for water resources:

- **Protection**: Protection refers to maintaining the present biological and recreational uses supported by a stream. For example, if a stream supports a healthy cold water fishery and is used for full-body contact recreational activities, the goal seeks to maintain those uses.

- **Enhancement**: Enhancement refers to a change in the overall condition of a stream or lake within its given biological and recreational use category. For example, if a stream supports a warmwater fishery whose diversity could be enhanced, the goal focuses on changing those water quality conditions which keep it from achieving its full biological potential.

- **Restoration**: Restoration refers to upgrading the existing capability of the resource to support a higher category of biological use. An example would be a stream which historically supported healthy populations of warmwater game fish, but no longer does. This goal seeks to improve conditions allowing viable populations of forage and warmwater game fish species to become reestablished.

Based upon review of the water quality appraisal, the citizen's advisory committee supported the following as general objectives for the watershed project:

Protect groundwater quality in the watershed.

Reduce sediment and other pollutants carried in Osceola Creek to the St. Croix River.

Improve aquatic habitat in Osceola Creek to enhance the trout fishery.

Preserve the natural character and scenic beauty of Osceola Creek and its watershed.

Protect the watershed's wetlands from the impacts of sediment loading.

The conditions needed to support the objectives for Osceola Creek, the watershed's wetlands, and groundwater are the basis for determining the type and level of nonpoint source control to be implemented under the priority watershed project.

Project objectives and necessary controls are described for both rural and urban nonpoint sources of pollution in the following discussion. The water quality conditions and pollutant sources are listed for each segment of the creek to help target implementation of objectives.

Water Quality Objectives and Controls

The controls listed below will help to protect groundwater quality, improve aquatic habitat, enhance the trout fishery and the macroinvertebrate community, and prevent degradation of wetlands.

Reduce sediment delivery from rural uplands (primarily croplands).

Reduce sediment delivery from construction sites.

Reduce sediment and phosphorus coming from barnyard on the stream.

Stabilize stream banks and reduce sediment delivery from heavily pastured area immediately adjacent to the creek.

Improve runoff quality from impervious surfaces in developed areas.

Reduce nutrient loading and other pollutant loading to groundwater from crop fields, turf, and other sources.

The overall project objectives and controls were derived from an analysis of the three main segments of the creek and specific wetland areas, and from other concerns raised during the inventory.

The water quality appraisal describes general conditions of each creek segment, lists water quality conditions and nonpoint source pollutants impairing the segment, and establishes objectives for each.

Table 2-4 summarizes conditions and recommendations for each stream segment from the appraisal.

Table 2-4. Water resource conditions and objectives for Osceola Creek stream segments

Stream Segment	Length (Miles)	Use Class[1]	Water Resource Objectives	Pollutant Load Reduction Goals	Necessary Controls
Segment 1: Upstream of 248th Street	3.2-5.2	CW Class III	**Improve** aquatic habitat **Improve** and expand the trout fishery **Improve** the stability of streambanks **Improve** riparian vegetative cover and the width to depth ratio in pastured area **Improve** the macroinvertebrate community	**Reduce** sediments from the streambanks to a **high degree** through stabilization. **Reduce** the addition of sediment from pastured areas to a **high degree** **Reduce** the amount of sediment from upland soil erosion a **moderate** degree **Reduce** the amount of sediment from construction by a **moderate** degree	**Stabilize/reconstruct** streambanks in pastured area providing cover and a narrower stream channel. **Limit** runoff from pasture areas by providing adequate vegetative buffers. **Fence** cattle and provide cobble crossings and access points
Segment 2: 248th St to 3rd Avenue	1.2-3.2	CW Class II	**Improve** to a Class I trout fishery by providing cover for larger fish and reducing sedimentation	**Reduce** sediment and nutrients coming from the barnyard and pasture on 248th Street to a **high degree.** **Reduce** sediment and nutrients coming from upland soil erosion to **a moderate degree**	**Barnyard** modifications or complete removal. **Limit** cattle access in stream and riparian corridor areas **Cattle crossings** with coarse gravel/cobble.
Segment 3: 3rd Avenue to St. Croix River	0-1.2	CW Class III	**Improve** water quality to sustain a natural gradient in the macroinvertebrate community structure	**Reduce** runoff from impervious surfaces by a **moderate degree.** **Reduce** construction site erosion by a **moderate** degree	**Increase** infiltration surface area around impermeable areas **Reduce** the amount of impermeable surface areas draining through a single catchment system

[1] Coldwater streams are classified as Class I , II , or III. Class I streams are high quality streams where populations are sustained by natural reproduction. Class II streams have some natural reproduction but need stocking to maintain a desirable fishery. Class III streams sustain no natural reproduction and require annual stocking of legal-size fish for sport fishing.

Segment 1: Upstream of 248th St.

Description

Segment 1 runs from the outlet of Osceola Lake to 248th Street. This segment supports a marginal cold water forage fishery with occasional trout. The segment is bordered by extensive riparian wetlands.

Water Quality Conditions

The upper portion of this segment (above the Krooked Creek Golf Course) is largely influenced by the outflowing water from Osceola Lake and surrounding wetlands which result in summer temperatures above those which can support trout. The stretch through the golf course was pastured historically which resulted in unstable banks with irregular hummocks. Tag alder (*Alnus rugosa*) which grow on the stream bank in this area and further downstream tend to collapse the banks as they mature and fall into the stream. This creates back washing behind the root masses. There are extensive deposits of fine sediments which limit fish habitat through the golf course. The pastured stretch just above 248th Street is in very poor condition. Fine sediments cover the stream bottom and the banks are very unstable.

Nonpoint Source Pollutants

The most critical direct impact to stream habitat is a pastured area immediately upstream of 248th Street that results in runoff from the pasture and trampled banks.

The stream bank is degraded from collapsing tag alders.

Cropland is the major source of upland sediment delivery to this segment.

Like the rest of the watershed, this area is under threat of new residential development. Construction sites will be a continued source of pollutants.

Water Resource Objectives

Improve aquatic habitat, the stability of the streambank, and the macroinvertebrate community on the entire segment.

Improve coldwater fishery from a Class III to a Class II trout stream on the stretch between CTH M and 248th Street.

- reduce nutrient, sediment, and organic matter delivery to the creek, and
- stabilize streambanks at critical locations to reduce in-stream sedimentation.

Segment 2: 248th St. to 3rd Avenue

Description

This is the primary trout segment of Osceola Creek. It flows through an extensive wooded area in the Brookside Campground then through wetlands which border village lawns.

Water Quality Conditions

The upper end of this segment has poor habitat because of a barnyard and cattle crossing. Nutrients from the barnyard were identified as a concern with phosphorus levels 3-4 times those found in other areas of the creek. The rest of this segment has good trout and invertebrate habitat. The lack of pools and cover are the limiting factor within this segment.

Nonpoint Source Pollutants

The most critical direct impact to stream habitat is a barnyard and cattle crossing immediately downstream from 248th street.

The streambank is degraded from collapsing tag alders.

Sediment delivery from upstream also influences this segment, where cropland erosion is the major source.

Like the rest of the watershed, this area is under threat of new residential development. Construction sites will be a continued source of pollutants.

Water Resource Objectives

Improve aquatic habitat, the stability of the streambank, and the macroinvertebrate community on the entire segment.

Improve coldwater fishery from a Class II to a Class I trout stream.

- reduce nutrient, sediment, and organic matter delivery to the creek,
- stabilize streambanks at critical locations to reduce in-stream sedimentation, and
- provide cover for larger fish through in-stream improvements.

Segment 3: Below 3rd Avenue to the St. Croix River

Description

Three ponds referred to as the upper, middle, and lower mill ponds were constructed in the late 1800s on this stretch of the creek. The upper mill pond has filled in with sediment and reverted to a wetland with little open water. The middle pond has also filled in considerably so that it is very shallow with little capacity to capture additional sediment. The lower mill pond is also very shallow. Trout are stocked annually in the lower mill pond. Below the lower mill pond, the creek drops rapidly through a gorge to the St. Croix River.

Water Quality Conditions

A potential toxics concern was identified in the section below Highway 35. The macroinvertebrate community deteriorated quickly from a point below the falls to a point just above the confluence with the St. Croix River. Runoff from storm sewer outfalls was identified as a potential source of the problem.

Nutrients and sediments accumulated from the entire watershed enter the St. Croix River at the end of this segment.

Nonpoint Source Pollutants

The urban portion of the watershed drains to the creek in this stretch. Impervious surfaces with direct delivery to the creek via storm sewers or street flow are a concern here.

Cropland is a source of sediment within the village limits of Osceola in this portion of the watershed. As this land is developed, construction site erosion control will be critical for controlling sediment that is contained within stormwater runoff.

Water Resource Objectives

Improve water quality to improve macroinvertebrate community structure and resulting biotic index rating.

Reduce sediment and other pollutants carried in Osceola Creek to the St. Croix River.

Rural Nonpoint Source Pollutants, Objectives, and Cost Share Eligibility Criteria

This section describes the results of the rural nonpoint source inventories, further refines objectives, and lists cost share eligibility criteria for each pollutant source. These sources include barnyard runoff, sediments from upland areas, and streambank erosion.

Management Categories

Cost share funds for installing pollutant control measures will be targeted at sites which contribute the greatest amounts of pollutants. 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 types of sites areas within the watershed project are designated as either "critical," "eligible," or "ineligible." Designation as a critical site indicates that controlling that source of pollution is essential for meeting the pollutant reduction goals for the project. 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. Landowners with eligible sites need not control every eligible source to receive cost share assistance.

Management category eligibility criteria are expressed in terms of tons of sediment delivered to surface waters from eroding uplands and streambanks; pounds of phosphorus delivered to surface waters from barnyard manure; and feet of streambank trampled by livestock. The inventory that establishes management categories for a particular site may be revised up to the point that a landowner signs a cost share agreement. Any sources requiring controls that are created after the cost share agreement is signed must be controlled at the landowner's expense.

The Polk County Land Conservation Department 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 barnyards), and are tailored to specific landowner situations.

Critical Management Category: Nonpoint sources included in this category contribute a significant amount of the pollutants impacting surface waters. Critical sites are those sites where BMPs must be applied to have a reasonable likelihood of achieving water quality objectives. These sites are designated by both numeric and descriptive criteria. Nonpoint sources designated as *critical* are eligible for funding and technical assistance through the priority watershed project.

Eligible Management Category: Specific nonpoint sources of pollution in this category contribute less significantly to surface and groundwater impacts. These sites are eligible for technical and cost share assistance but individual sites are not as critical to reaching water quality objectives.

Ineligible Sites: 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 programs (e.g., wildlife and fisheries management) can, if warranted, assist county project staff to control these sources as suggested in the integrated resource management plan (Chapter 4) for this watershed.

Barnyard Runoff

Barnyards and other confined livestock areas are not a major source of pollutants in the Osceola Creek Watershed with one important exception. There are five barnyards in the watershed that contribute a total of 355 pounds of phosphorus annually. Three barnyards with the Osceola Creek Watershed contributed more than 4 pounds of phosphorus to the stream on an annual basis (Table 2.5).

Of the three barnyards with a annual phosphorus loading greater than 4 pounds, one is located directly adjacent to Osceola Creek. This yard contributes 60 pounds of phosphorus directly to the creek each year. If a complete system with a concrete settling basin and filter strip were installed, it is estimated that 98 percent of the phosphorus would be controlled. The landowner may chose to install low cost options to reduce phosphorus by 50%. If low cost options are installed, the impacts to the creek will be re-evaluated after five years. Additional controls may be required at that time. A second option would be to reduce loading by more than 90% by installing a complete barnyard runoff control system or by abandoning the barnyard entirely at this site. The second barnyard is a potential groundwater concern. The third is in an internally drained area and drains to a wetland.

Barnyards sites that directly contribute more than 50 pounds of phosphorus annually to the stream may be designated critical sites in the future. Barnyards that contribute less than 10 lbs. of P annually are not eligible for cost-sharing.

Table 2-5. Barnyard Eligibility

Eligibility Category[1]	Annual Phosphorus Load (pounds/year)	Number of BarnYards	Total Annual P Load (pounds/year)
Critical	>50 w/Direct Contribution to Stream	1	64
Eligible	>10	0	0
Ineligible	<10	2	6
Internally Drained (Eligible)	>10	2	285
Total		**5**	**355**

[1]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 where the waste may be spread. A conservation plan that controls erosion to the tolerable soil loss level will also be required on these acres. 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.

Internally Drained Barnyards

Internally drained barnyards drain to surface depressions or wetlands rather that directly to surface waters. Two internally drained yards were identified in the Osceola Creek Watershed. Eligibility for internally drained animal lots is based on a site by site analysis. Sites that drain to a wetland, sinkhole, creviced bedrock, wells, or gravel pits and have the potential to contaminate groundwater or impact wetlands will be eligible for cost sharing if annual phosphorus loading is greater than 10 pounds.

Agricultural Nutrients

Manure Spreading and Storage

Because of the limited number of livestock operations in and near the watershed, few acres are spread with manure. Nutrient management plans were prepared for 1244 acres of 2173 acres (57 percent) of the cropland in the watershed as part of a pilot nutrient management planning program available in 1995. Of the areas planned, only 218 acres received manure.

Eligibility for cost-sharing for manure storage practices will be based on an evaluation using NRCS Standard 590. There is no *critical* designation for manure storage.

An operation is *eligible* if the evaluation demonstrates that manure cannot be feasibly managed during periods of snow covered, frozen, and saturated conditions without the installation of storage practices. The evaluation must also demonstrate that proper utilization of the manure can be achieved following adoption of the intended storage practice.

The eligibility for storage facilities will be based on the least cost system. These options may include manure stacks (in accordance with Std. 312), short term storage (capacity for 30 to 100 days production in accordance with Std. 313), and long term storage (capacity for up to 210 days production in accordance with Std. 313 or 425). Cost-sharing will be based upon the cost of up to seven month facilities.

Landowners receiving cost-sharing funds for manure storage or barnyard practices are required to develop a nutrient management plan for those acres that will receive manure applications resulting from these practices. A conservation plan that controls erosion to the tolerable soil loss level will also be required on these acres.

Nutrient and Pest Management

Farmers can benefit from nutrient and pest management plans by taking nutrient credits for legumes and landspread manure and reducing applications of commercial nutrients and pesticides. Runoff from manure spreading and management of nutrients and pesticides are addressed through two Natural Resource Conservation Service standards: Nutrient Management Standard 590 and Pest Management Standard 595.

All farms are eligible to participate in an on-farm nutrient and pest management educational program to reduce over application of nutrients and pesticides. The golf course is also eligible for both practices.

Nutrient and pest management may be addressed with the development of nutrient management (NRCS Std. 590) and pest management (NRCS Std. 595) plans, soil tests, and crop scouting. The plans may be prepared by crop consultants and must be consistent with NRCS Standard 590 and 595. Landowners will be eligible to receive cost share payments for up to three years. These plans will be submitted to the Polk County LCD for review and approval as a condition of receiving cost share dollars. The LCD will keep records showing progress towards reducing the use of fertilizer and pesticides.

Other practices that are singularly eligible for cost-sharing are soil and manure testing, crop scouting, and spill control basins for pesticide handling. These practices may be used to assist the producer with the development of a nutrient management plan. The cost share rate for all nutrient and pesticide management practices is 50% with the exception of spill control basins which have a 70% cost share rate.

Rural Sediments

Upland Sediment

Intensive agricultural practices have caused considerable amounts of eroded soil to reach the stream, ponds, and wetlands in the Osceola Creek Watershed. Many farms are intensively worked cash grain operations with no hay in their rotations. Upland erosion is the major source of the sediments that are carried downstream beyond individual stream segments. A land cover analysis was used to identify and prioritize sources of sediment in the watershed.[7]

Sediment Contribution by Land Use

Figure 1-1 (chapter one) depicts current land use for the entire watershed including the urban area in 1996. Each of the figures on the following page group land use as described below.

Ag related includes: cropland, farmstead, and pasture.
Open space includes: wetland, forest land, grassland, parks, and the golf course.
Disturbed includes: construction sites, gravel pits, and the landfill.
Residential includes: single and multi-family homes and mobile home courts.
Developed includes: commercial, institutional, industrial land, and the airport.

Although the village of Osceola makes up almost one-fourth of the watershed, a large segment of the watershed is categorized as open space (47%), and agricultural land (41%); some of these land uses are within the village limits. Presently, agricultural land contributes the greatest quantity of sediment when compared to other land uses in the watershed. As illustrated in Figure 2-1, agricultural land use contributes 64 percent of the total sediment load, while developed land contributes approximately 18 percent. Disturbed areas are also significant, as they contribute 12 percent of the sediment, while they comprise less than 1 percent of the land area.

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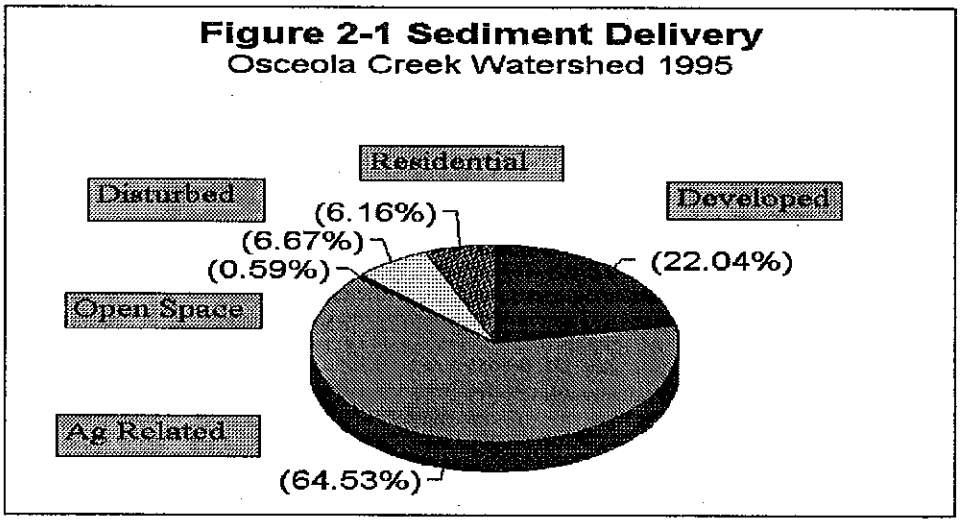
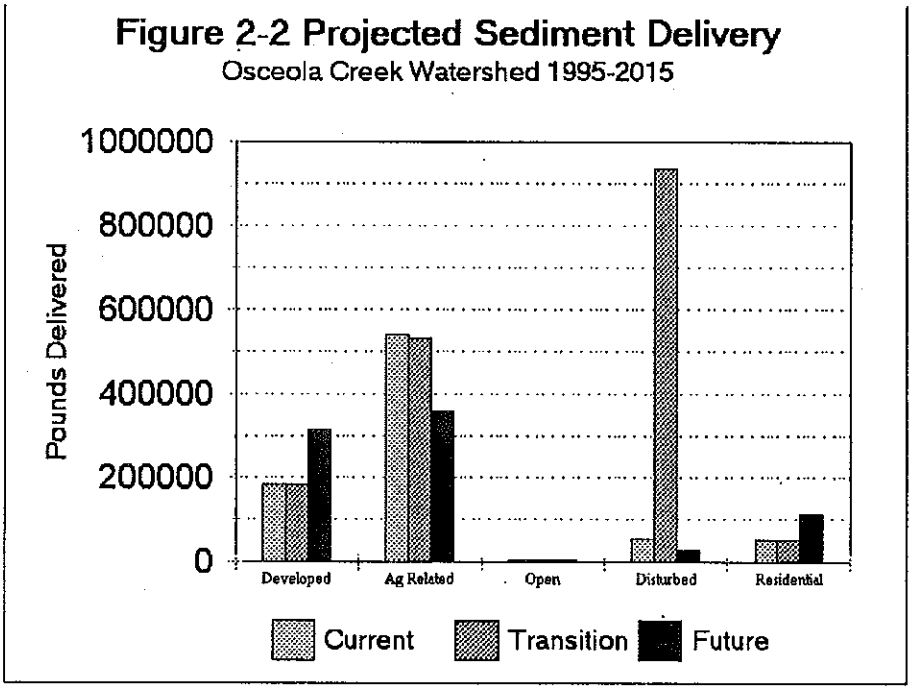
[7] Bursik, Cheryl. *Osceola Creek Priority Watershed Rural Nonpoint Source Inventory and Analysis.* April 1996. Polk County Land Conservation Department.





Impact of Land Use Changes

Figure 1-2 (Chapter One), depicts the projected land use changes within the Osceola Creek watershed project area. The transition period reflects the early years of development to full development with construction occurring over a twenty year period. Figure 2-2 shows the resulting sediment loads with these changes in land use. The transition year illustrated shows significant increases in sediment delivery because of exposed soil eroding from construction sites.

There will be an increase in sediment loading from residential lots in the future. This is expected to be more than offset by a decreased amount of sediment eroding from cropland. However, lot size will influence the change. If greater numbers of small lots are built (< ½ acre) in the rural portion of the watershed, instead of fewer larger lots (> 1 acre), significantly more sediment will be produced.

Cropland Erosion

Detailed information on field conditions and crop management were gathered for 152 fields within the Osceola Creek watershed (of a possible 172). Of those inventoried, 25 fields contribute 88 percent of the total cropland sediment load that is delivered to the stream and wetlands (or 62 percent of the total watershed sediment load).[8] If riparian buffers are added to increase the distance between cropland and the stream or wetlands along 12 of these fields, a 25% reduction of sediment delivery from cropland is expected (15% total watershed reduction). However, establishment of a riparian buffer would only be a temporary solution without further upland sediment control. Further upland control in conjunction with riparian buffer establishment would prolong the longevity and effectiveness of a vegetated buffer.

Cropland in the watershed is generally farmed below the tolerable soil loss level ("T"). Of the top twenty five fields, only 4 had soil loss above "T," and three of these were less than 0.5 tons over. Minimum tillage methods could be used to reduce sediment delivery on many fields in the watershed, even if they meet the tolerable soil loss level. If minimum tillage is initiated or enhanced on these fields, a 23% reduction from cropland is expected (14% total watershed reduction).

If buffers and minimum tillage methods were put in place where needed on the 25 fields examined, a 43% reduction of sediment from cropland is predicted (26% total watershed reduction). A 25 percent reduction in sediment from eroding fields (15% overall reduction) is targeted for agricultural lands.

To be classified as *Critical*, a landowner's fields must be contributing greater than 0.5 tons/acre/year of sediment *and* have less than 20 feet of buffer to Osceola Creek. There is currently one field identified in this category. This field already has relatively low soil loss because of minimum tillage methods in place. If other *critical* fields are found, a combination of methods may be used to reduce sediment delivery to the creek from these fields. Fields that were not inventoried are not expected to be designated as critical sites because none of these fields are immediately adjacent to Osceola Creek or other direct channelized flow to the stream.

Buffers are expected to yield significant decreases in sediment delivery because water generally flows in sheet flow from the gradually sloped fields that border Osceola Creek and associated wetlands. Sediment was considered "delivered" where runoff entered Osceola Creek, riparian wetlands, or any channelized flow (including storm sewers) to the stream or a wetland.

Landowner cost share *Eligibility* criteria for reduced tillage is identified in Table 2-6. Producers will be able to receive cost sharing to implemenmt a high residue management system on individual fields for up to two years. A conservation plan will be used to ensure use of high residue systems if cost sharing is

[8] Some fields were not inventoried because crop records were not reported to the Farm Services Agency. An attempt to gather information for these fields by phone and letter was unsuccessful.

provided for fields on the entire farm on a longer term basis. Fields will be eligible for cost sharing for high residue management for a total of five years. Payments for the establishment of vegetative buffers along wetlands will also be made available as described in the interim best management practice in Appendix A.

Priority fields will include the 25 identified above that deliver more than 1.5 tons per field. To protect wetlands in internally drained areas, fields that have high sediment delivery to a wetland (<20 foot buffer) will also be considered a priority. Owners of these fields will be contacted regarding participation first.

Cropland immediately adjacent to wetlands are eligible for wetland buffer protection as described in Appendix A. Windbreaks may also be used to reduce erosion from cropland (see windbreak interim BMP as described in Appendix A).

Table 2-6. Cropland Erosion Eligibility Criteria

Eligibility Category	Criteria	Number of Fields	Total Acres
Critical[1]	no streambank buffer, >0.5 per acre delivery	1	32
Eligible	all remaining fields	171	2,423

[1]Note that delivery for critical sites is sediment that is delivered directly to Osceola Creek, while delivery for other sites is to wetlands adjacent to the creek *or* sediment delivered from the creek itself.

Gully Erosion

Gully erosion has not been identified as a significant problem in this watershed, therefore, a field inventory of gully erosion was not conducted. Gullies identified during implementation will be evaluated to determine if they are significant sediment sources and eligible for cost sharing based on the criteria identified in Table 2-7.

Gullies which are actively eroding and accessible to machinery will be classified as *Eligible* for cost sharing. Gullies which are actively eroding, directly connected to Osceola Creek, and are greater than 2 feet deep are *Critical* sites. No eligible or critical gullies were identified in the inventory.

Table 2-7. Gully Erosion Eligibility Criteria

Management Category	Description	Target Reduction Level
Eligible	Actively Eroding Gullies	50% of the sediment load
Not Eligible	Inactive Gullies	N/A

Streambank Erosion

Streambank erosion contributes an insignificant percentage of the overall sediment to surface waters in the Osceola Creek Watershed. However, erosion and trampling at specific sites cause considerable habitat degradation. Approximately 4 miles of Osceola Creek were evaluated for bank erosion. The Streambank inventory results are shown in Table 2-9

Significant erosion has occurred and/or aquatic habitat and water quality were degraded along approximately 2,975 feet of either side of the streambank. An estimated 1.5 tons of sediment are eroding into the stream annually. Table 2-8 depicts landowner cost share eligibility criteria.

Critical sites are identified as those with severe erosion and a lateral recession rate of greater than 0.5 feet/year. No severe erosion sites were found during the streambank inventory. If severe sites are found during the implementation of the project, the *Critical* criteria will be used.

Eligible management streambanks are those with identified *moderate* lateral recession rates of between 0.1 and 0.5 feet per year. No moderate erosion sites were identified in the streambank inventory. Streambank sites with *slight* erosion have lateral recession rates between .05 and 0.1 feet per year. These sites are not eligible for cost sharing.

Table 2-8. Streambank Erosion Eligibility Criteria

Management Category	Lateral Recession Rate (feet/year)	Reduction Objective
Critical	> 0.5	Protect and stabilize bank, Establish vegetative cover, Limit livestock access
Eligible	> 0.1 to 0.5	Stabilize the Bank, Establish vegetative cover, Limit livestock access
Not Eligible	< 0.1	Maintain vegetative cover

Livestock Access. A streambank area may also be designated as a *Critical Site* if the bank is trampled by livestock to a point where a protective vegetative cover is no longer present. If a trampled site within the Osceola Creek watershed exceeds 100 feet in length per property, the site will be designated as Critical. One landowner on the creek falls into this category. These banks may be repaired by shaping and seeding or establishing a buffer and restricting cattle access. Banks must be managed so that adequate vegetative cover is maintained by restricting livestock access (although a cattle crossing may be allowed and cost shared), rotational grazing, or significantly reducing the number of cattle allowed access.

Eligible streambanks are all other sites where cattle have access. At the time of publishing, no additional landowners with property adjacent to the stream fall within this category.

Table 2-9. Streambank Inventory Results: Osceola Creek Watershed

Inventoried Streambank Length (feet)	Eroded Sites (feet)	Trampled Sites (feet)	Cattle Access (feet)	Total Sediment Loss Tons/Year	% Bank Degraded From E,T,S
67,650	1,315	1,660	1,660	1.6	4

Well Abandonment

Wells provide a direct conduit for pollutants to reach groundwater. The groundwater resource can be protected, and well contamination prevented if abandoned or unused wells are properly sealed. 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 through the soil profile. Abandoned wells are a significant threat to groundwater quality in the watershed.

The Polk County Land Conservation Department will encourage all landowners to properly seal all unused or abandoned wells with a clean clay slurry or a chip bentinite product. Information on the proper abandonment procedures will be provided to landowners when abandoned wells are located. All unused or abandoned wells in the watershed will be eligible for cost sharing to properly abandon the well.

Pollutant Reduction Goals and Project Objectives for Rural Nonpoint Sources

The following is a summary of reductions to be targeted for land uses in the rural portion of the watershed (including cropland located within the village of Osceola). Table 2-11 summarizes the sediment reduction goals for the entire watershed.

Sediment Objective: To reduce sediment delivered by 20 percent, the following is needed:

- 25 percent reduction in sediment reaching streams from agricultural uplands.
- Repair of streambank habitat along 1,660 feet of the stream (3 percent).
- Reduce erosion from disturbed sites by enacting construction site erosion control ordinances.

Phosphorus Objective: Phosphorus reduction is targeted to where nutrients impact the stream:

- 50 percent reduction in P from barnyard that drains to the creek.
- Reducing cropland soil erosion will reduce phosphorus significantly because phosphorus is carried on sediment particles.

Groundwater Objective: Identify and properly abandon unused wells in the watershed.
Develop nutrient and pesticide management plans for farms in the watershed.

Wetland Restoration Objective: Restore 10 percent of degraded or prior converted wetlands.

Urban Inventory Results and Pollution Reduction Goals

For the purposes of analyzing the water quality of runoff, the watershed was divided into an urban and rural area. The urban area includes much of the village of Osceola; however, the boundary drawn between the urban and rural sections was based on water drainage patterns rather than political boundaries. The urban area was further divided into hydrologic units based on water drainage for this analysis (map 2-2).

An urban nonpoint source inventory and analysis was conducted to identify and prioritize water resource concerns in the urban area of the Osceola Creek watershed.[9] Pollutant sources and management alternatives were identified in this inventory.

Description of Urban Runoff

The 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 or rip rap.
- Hydrologic disturbances, including flashy high flows and loss of base flow.
- Streambank 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 (polychlorinated biphenols, polycyclic aromatic hydrocarbons, pesticides, and many others). Other substances in urban runoff include sediment, nutrients, bacteria, and protozoans. Because of the limited amount of industrial and commercial development (8% of the urban watershed), sediment and phosphorus were the pollutants the Osceola Creek inventory focused on.

The delivery of pollutants to streams from urban areas depends on the types of urban land uses, the types of stormwater conveyance systems, and pollution prevention practices that are in place. These practices, sometime referred to as "good housekeeping practices," include street sweeping, yard waste collection, waste oil recycling programs, and educational programs for residents. The purpose of these programs is to keep land surfaces and therefore runoff clean. Freeways, commercial, and industrial areas produce the most significant amounts of metals and other urban toxic pollutants. Medium density and multi-family residential areas, which include large impervious surfaces, also generate metals, sediment, and phosphorus. Residential areas generate less pollution than commercial areas because they contain more lawn area than commercial areas, while commercial areas have more rooftop, street, and parking lot surfaces. Lawns can contribute fertilizers and pesticides. Rooftop areas are sources of zinc and atmospheric pollutants. Direct connections to the storm drainage systems through roof gutters that drain to drain tiles or paved surfaces deliver more pollutants than indirect connections where runoff travels across grassed areas.

Urban land uses and anticipated growth were summarized in table 1-2 and figure 1-2 in the previous chapter. Existing land uses within the Osceola Creek watershed and their respective amounts and types of pollutant loads are shown in table 2-10. These loading rates were used for the rural and urban inventory.

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[9] *Osceola Creek Urban Watershed Water Quality Analysis.* March 1996. Barr Engineering Company.

Table 2-10. Pollutant Generation Rates for Land Uses in the Osceola Creek Watershed

Land Use	Pollutant Export Coefficients (pounds/acre/year)		
	Total Suspended Solids	Total Phosphorus	Total Lead
Construction Sites (Rural)	5,000	7	0.01
Construction Sites (Urban)	60,000	80	0.07
Cropland	275	0.7	0.01
Forest	3	0.03	0.005
Open Space	3	0.03	0.005
Wetland	0	0.03	0.005
Golf Course	3	0.1	0.005
Pasture	250	0.65	0.005
Farmstead	334	0.8	0.2
Low-Density Residential	10	0.04	0.01
Medium-Density Residential	190	0.5	0.25
Mobile Homes/Multi-Family	420	1	0.25
Commercial	1,000	1.5	2.7
Landfill/Gravel Pit	1,100	1.55	0.25
Airport	400	0.7	0.25
Institutional	440	0.5	0.25

Sources: U.S. EPA (1983)
Pitt and McLean (1986) as compiled by Pitt Voorhees (1995)
Southeastern Wisconsin Regional Planning Commission, WDNR (1990)
Reckhow, et. al. (1980)
Bannerman, et.al. (1983)

Three hydrologic units—OC-06C, D, and M—provide 83 percent and 92 percent of the total suspended solids and total phosphorus annual mass loads, respectively. These three hydrologic units are also the largest, comprising about 71 percent of the urban watershed area. They include the industrial park and the urban area south of County Highway M. The small hydrologic units in downtown Osceola—OC-06J, K, L, H, and I—comprise only 3 percent of the urban watershed, yet provide 7 percent of the total suspended solids due to the high percentage of commercial land use in these areas.

For the entire urban watershed, the total suspended solids annual load increases from 344,600 pounds for existing conditions to 361,200 pounds for future development conditions, an increase of about 5 percent. Most of the total suspended solids load increase occurs in hydrologic unit OC-06C, which encompasses the Osceola Industrial Park. The park is expected to expand significantly in the next 20 years. Since industrial areas tend to produce high loads of total suspended solids in runoff, the annual mass load from the park will increase as development occurs. The total phosphorus mass load for the urban watershed decreases from 1,408 lbs for existing conditions to 933 lbs for future conditions, a decrease of about 34 percent. This decrease is due to the expected transition of cropland to single family residential areas.

Runoff from new urban areas has the potential to further degrade stream and groundwater water quality unless stormwater management and construction site erosion controls are incorporated during development. New developments will be constructed in the village limits, but an equivalent amount of development is expected in the currently rural portions of the watershed.

Stormwater Conveyance

Description

Stormwater is most commonly conveyed to streams through a combination of storm sewers, roadside ditches, grassed swales, and ponds. Storm sewers transport runoff rapidly with no pretreatment or filtering of the runoff before it enters streams. Properly designed grassed swales generally reduce runoff volume because of infiltration, and the sod vegetation in swales serves to remove some pollutants from runoff before it flows into streams 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 these areas are normally drained by storm sewers that discharge to a stream or lake.

One way to reduce pollutant transport to surface waters is to reduce the amount of urban stormwater reaching streams from impervious surfaces. This is accomplished by increasing the infiltration of stormwater into the soil and ground layers. Stormwater infiltration on a suitable site can effectively reduce nonpoint pollution. In addition, infiltration can help stabilize the hydrology of small urban streams by replenishing groundwater, much of which is ultimately discharged to surface water. Infiltration can also 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 down spouts 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 can also be used to reduce runoff and erosion. Finally, infiltration basins can be located at the end of drainage outlets serving larger drainage areas.

Wet detention and infiltration practices should be located where land availability and soil conditions are suitable for providing a high level of control as determined by detailed feasibility studies. Wet detention

ponds are one of the most effective methods for treating stormwater runoff. They hold runoff water allowing pollutants to settle. Some removal of dissolved nutrients occurs through biological activity. Natural wetlands should not be used for creating detention basins for treatment. Infiltration basins or trenches may be used in combination with wet detention ponds.

Recommendations[10]

Enactment of Stormwater Ordinances: Any stormwater ordinance legislated by the village should include requirements for control of construction site erosion (if these controls are not dealt with in a separate ordinance). Since significant development is expected during the next 20 years, the stormwater ordinance should also include water quality treatment requirements for new developments. For instance, an ordinance may require installation of BMPs to achieve 80 percent solids removal from a development's runoff, or allow no net increase of water flow from predevelopment conditions. Additional practices that could be addressed in a stormwater ordinance include a phosphorus fertilizer ban, pet feces cleanup requirements, maintenance of vegetated buffer strips, etc.

Storm Sewer Mapping: A storm sewer map is needed to accurately evaluate and design retrofitted storm sewer structural BMPs. The map should be updated regularly as future development occurs. Development and grading plans for all future development projects should be kept on file in the village office to aid future water quality and hydraulic evaluations.

The Mill Ponds

It may be possible to temporarily restore the mill ponds by dredging the bottom sediments. Increasing the pond depths would reduce aquatic plant growth and make the ponds more pleasant for swimming. Unfortunately, dredging of wet sediments can be quite expensive. To estimate the cost of dredging the ponds, existing water depths throughout the ponds must be determined, and desired depth of water after dredging must be decided. Financial assistance is not available for dredging through the priority watershed program.

Vegetative Buffers

The village of Osceola owns land adjacent to Osceola Creek about 40 feet from each side of the stream, approximately from the campground to the 3rd Avenue bridge. A few residents mow this strip closely so that is does not function to filter pollutants. The village should develop clear guidelines so residents are aware of what must be done to maintain a functioning vegetative buffer on this strip.

Vegetative buffers should be established in other areas along the creek and wetlands consistent with recommendations for each drainage area below. Easements and the interim wetland buffer BMP described in Appendix A may be used to encourage establishment and maintenance of these buffers.

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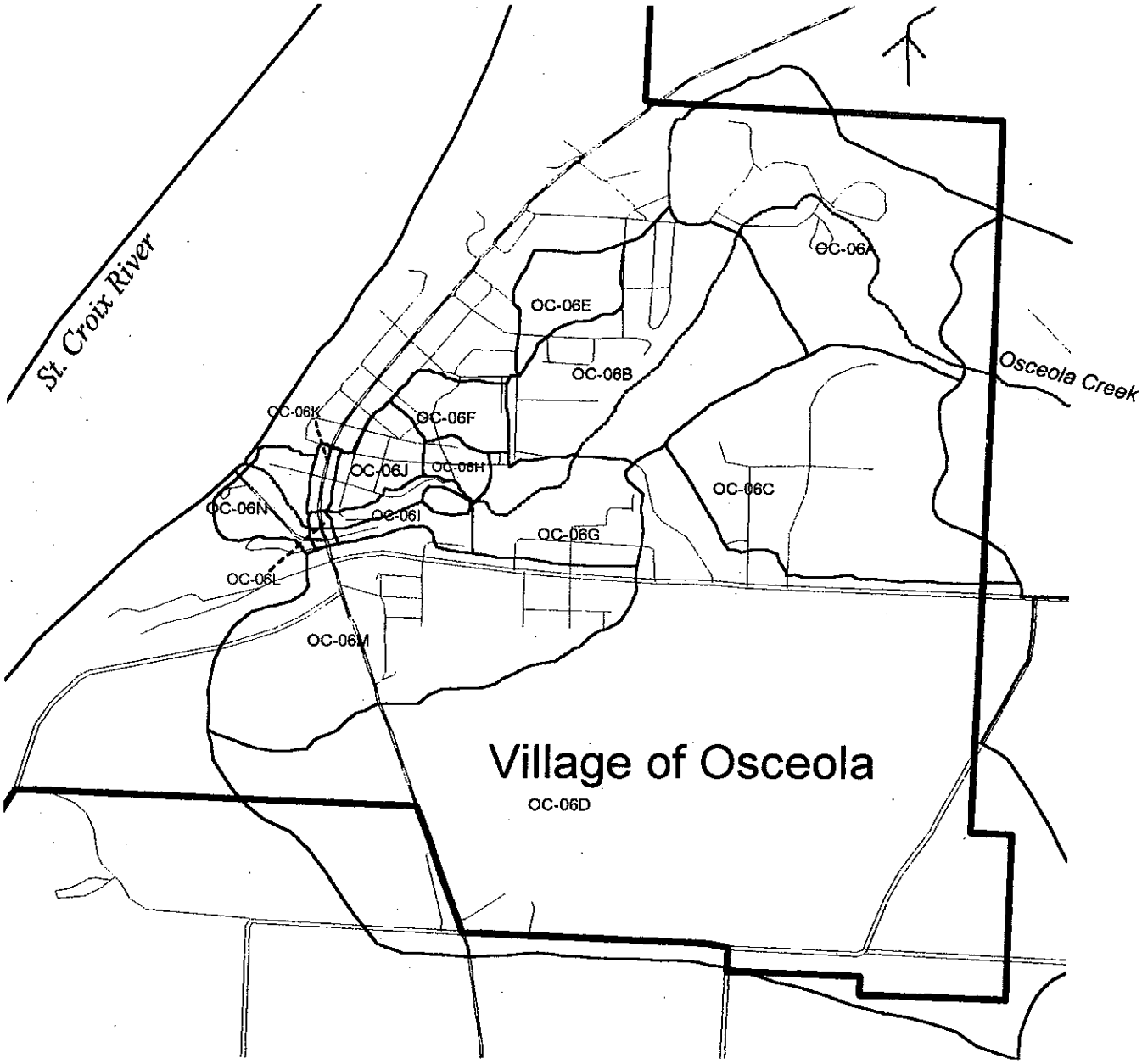
[10]See Barr Engineering report for more detail.

Map 2-2 Urban Hydrologic Areas



Site Specific Stormwater Recommendations

Recommendations for each hydrologic drainage area in the urban area are listed below. These areas are delineated in map 2-1.

OC-06A: Consider wet detention pond to capture runoff from the high school
Plant or maintain stream buffers

OC-06B: Inspect storm sewer outlets regularly
Install erosion control materials at outlets
Consider forebay construction or infiltration trenches at outlets
Plant or maintain stream buffers

OC-06C: Construct wet detention pond for runoff from industrial park.
Equip pond with oil and grease skimmer

OC-06D: Pursue stormwater demonstration south of Highway M
Construct wet detention pond
Preserve buffer along wetland
Maintain vegetated drainageways

OC-06E: No specific recommendations.

OC-06F: No specific recommendations.

OC-06G: Plant and maintain stream buffers

OC-06H: Consider installation of a forebay or infiltration trench where storm sewer drains to middle mill pond

OC-06I: Plant and maintain stream and pond buffers

OC-06J: Consider installation of an oil and grit separator just upstream of the lower mill pond.

OC-06K: Consider installation of an oil and grit separator along North Cascade Street
Clean debris from cliff slopes regularly

OC-06L: Clean debris from cliff slopes regularly

OC-06M: Consider installation of an oil and grit separator
Install oil and grease traps at gas stations

OC-06N: No specific recommendations

Feasibility studies will be needed to select site specific infiltration and wet detention practices for areas where they are recommended. The cost and complexity of studies will vary, depending on the availability of land and compatibility with storm sewer networks. Assistance available to communities under the

priority watershed project to develop nonpoint source controls in established urban areas is presented in chapter three.

Pollution Prevention Practices

Description
Pollution prevention practices are nonstructural practices that remove pollution at its source, preventing the need for treatment. Practices include street sweeping, yard waste collection, recycling programs, and a variety of behavioral changes that reduce the pollutants on urban surfaces.

Street Sweeping
Street sweeping is of particular importance in the Osceola Creek urban watershed, because space is generally severely limited for installation of structural stormwater practices. Many of the storm sewer outfalls discharge to the gorge where the creek falls to the St. Croix River. The water quality appraisal identified a decline in the macroinvertebrate community structure below these outfalls. With treatment options limited by the watershed's topography, improved street sweeping is especially important to meeting plan objectives.

Street sweeping removes particulate pollutants from street and parking lot surfaces before they can be transported to surface waters. Repeated 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. High efficiency sweepers that combine brush and vacuum action into a single unit can reach 50 - 60 percent removal effectiveness for total suspended solids and associated pollutants. Tandem sweeping which combines the use of a mechanical sweeper and a vacuum sweeper can also reach this level of effectiveness. These ranges of pollutant removal are expected with frequent (at least weekly) sweeping, with the machine(s) traveling at 5 miles per hour. Sweeping regularly before rainfall is important to remove the fine particulate matter that will wash into surface water.

Information and Education
An information and education program can be used to encourage the many actions individuals can take to improve water quality. The following is a partial list:

- Promote water quality awareness through storm drain stenciling.
- Increase effectiveness of street sweeping program by promoting alternate side parking.
- Promote good housekeeping practices for landscaping, gardening, and other outdoor activities.
- 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.

- Minimize use of street de-icing compounds.

- Reduce the amount of motorized traffic.

- Reduce the extent of parking lots.

Recommendations

Implement an accelerated street sweeping program in the village of Osceola as outlined in the interim BMP included in Appendix A. An accelerated street sweeping program would require the use of a high efficiency sweeper or a combination of sweepers to reach 50% removal of total suspended solids, nutrients, and heavy metals from high traffic areas. Arterials and commercial areas are to be swept at least weekly throughout the spring, summer, and fall. Residential streets should be swept repeatedly early in the spring to remove winter accumulations of grit and salt, and in the fall to remove fallen leaves. Debris collected in the sweeper must be disposed of through a DNR approved method; landfilling is recommended.

Encourage the use of pollution prevention practices, such as those listed above, through local programs. See chapter 5 for detailed information and educational strategy. According to the street sweeping interim best management practice, the following activities must be implemented in order to qualify for cost sharing for a street sweeper: development and implementation of a Department approved construction site erosion control ordinance, storm drain stenciling; sign placement or policy development to encourage alternate side parking; and awareness programs aimed at proper lawn and garden care, landscape practices, and other good housekeeping practices.

Construction Site Erosion

Description

Construction sites are areas where soil is disturbed by grading or excavation for new development or renovation. Renovation may involve utility replacement, street replacement, bridge reconstruction, or rehabilitation of commercial, industrial, or residential areas.

Construction site erosion is a major water quality concern in the watershed. Uncontrolled sediment-laden runoff from construction sites can devastate aquatic communities. The reduced capacity of stormwater

onveyance systems resulting from sedimentation can cause localized flooding. Water quality improvements that may be gained through implementation of other practices, could easily be negated by erosion from construction sites.

Predicting rates of construction site erosion is difficult. However, erosion rates exceeding 75 tons per acre each year can occur. This rate of erosion is greater than occurs on the most severely eroding croplands and greatly exceeds erosion from existing commercial and industrial areas. The proximity of construction sites to storm sewers or other drainage ways serving urban areas often results in nearly all of the sediment eroded being delivered to streams, lakes, or wetlands.

Management Needs and Alternatives

Because construction activity is expected to remain heavy in the near future, construction site erosion control throughout the watershed project area is critical to achieving sediment reduction goals. Although there is land available for development within the village limits, much of the development is expected to occur within the unincorporated areas. Without control of the sediment from throughout the project area, construction site erosion will remain a serious deterrent to desired water quality and aquatic life.

Average annual sediment loading to streams from construction site erosion for 1995 to 2015 conditions was determined by multiplying the amount of land planned for construction by an average of 30 tons per acre per year in urban areas and an average of 2.5 tons per acre per year in rural areas where storm sewers are not developed. It is estimated that in the years between 1995 and 2015, construction erosion will contribute about 465 tons per year of sediment (about 54 percent of total sediment load from nonpoint sources) to Osceola Creek and wetlands in the entire project area (including rural areas).

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. The model also contains guidance for administering and enforcing the ordinance.

None of the municipalities in the project area has ordinance requirements for controlling construction site erosion and sedimentation. In addition, state regulations (Ch. 144 Wis. Stats.) set forth by the Department of Commerce for erosion control on sites with one and two family dwellings are not enforced in the project area. The village of Osceola enforces only the structural requirements of the Uniform Dwelling Code, not the erosion control provisions. The DNR Wisconsin Pollutant Discharge Elimination System (WPDES) permit regulations for sites greater than five acres are in place.

Even with regulations in place, 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. 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 Handbook (DNR, 1989).

Highway and bridge construction projects are often next to streams and water conveyance structures where erosion control is critical. Wisconsin State Statute 89.19 requires the Department of Transportation in consultation with the Department of Natural Resources, to establish standards for the control of erosion related to highway and bridge construction, and establish a training program for persons who prepare plans for, review plans for, conduct inspections of, or engage in highway or bridge construction activities. Highway and bridge construction projects funded in whole or in part by state or federal funds are covered under this statute.

Recommendations

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.

- The village of Osceola should enforce the erosion control provisions of the Uniform Dwelling Code. The towns of Osceola and Farmington should consider adoption of the UDC. These provisions will apply to one and two family homes once a building permit is issued. The village and towns should also develop a means to regulate erosion from grading, clearing, and excavation that may occur before a building permit is issued.

- 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 should be informed of erosion control requirements and have access to technical information through seminars and other educational activities and materials.

- Erosion control inspectors should have specific guidelines for documenting ordinance violations in order to provide for more consistent and effective legal action.

Highway and bridge construction that is not state or federally funded is not covered under the provisions of State Statute 89.19.1. As part of the Osceola Creek Priority Watershed Plan, the DNR strongly recommends that areas of road and bridge construction not covered under State Statute 89.19 abide by the guidance standards for erosion control as specified by the Department of Transportation's Facilities Development Manual and the Department of Natural Resources Wisconsin Construction Site Best Management Practice Handbook. The Polk County Land Conservation Department will work with county and township road departments to inform them about these requirements and all future educational opportunities related to these standards. *An erosion control information and education strategy is described in chapter five.*

Land Use Planning

Poorly planned development can have a devastating impact on water quality. Land use management planning is a tool that can be used to protect Osceola Creek, wetlands, and groundwater. Implementation measures of land use plans may include stormwater management ordinances, subdivision ordinances, zoning ordinance revisions, and preservation of natural sites or corridors which protect water quality. The village and townships in the watershed have recently completed or are in some stage of development of a land use plan.

Urban Streambank Erosion

Refer to the streambank erosion discussion earlier in this chapter. A separate evaluation was not conducted for the urban area. No streambank erosion concerns were identified within the urban area of the watershed.

Urban Toxins

Description

Runoff in the urban area was not tested for toxins such as zinc and lead. However, there was one location on Osceola Creek where a potential toxics concern was identified. The macroinvertebrate community in Osceola Creek deteriorated rapidly from just below the falls to just above the confluence with the St. Croix River. A number of storm sewer outfalls are located along the canyon walls. Old gully erosion is evident at many of the falls. This is an area needing further investigation.

Because there is no room for structural practices along the canyon, urban pollution prevention practices, especially regular sweeping of the commercial area and arterials, are critical to make improvements here. Oil and grease separators installed at recommended locations may also improve the situation.

Recommendations

Implement accelerated street sweeping in the village of Osceola as described in the interim BMP in Appendix A.

Construct wet detention basins in the industrial park to capture runoff from both existing and new development.

Construct wet detention basins in one half of the new residential developments in the urban area, or install practices that will accomplish an equivalent level of reduction of runoff of toxins.

Monitor impacts of implementation of recommended BMPs on macroinvertebrate populations below the falls on Osceola Creek. Monitoring will begin following full implementation of BMPs for existing development.

Drinking Water

A wellhead protection program is recommended to protect the drinking water supply for village residents. These programs protect the wellhead areas of public water supply wells from contaminants which may have adverse effects on human health, and provide contingency plans if water is contaminated.

A wellhead protection plan will identify and locate potential contaminant sources within the wellhead protection areas and assess the adequacy of existing programs to protect the groundwater resources from identified contaminant sources. With assistance from the DNR, a workgroup consisting of local representatives then develops a strategy to protect the groundwater resource within the identified well protection areas.

Pollutant Reduction Goals and Project Objectives for Urban Nonpoint Sources

Objectives

Improve runoff quality from impervious surfaces in the urban area by achieving a 25 percent reduction of sediment. Installation of a wet detention basin to capture runoff from the industrial park is expected to reduce the overall urban watershed sediment load by 19%. Additional recommended best management practices are expected to reach the 25% reduction goal. Infiltration basins and wet detention ponds can significantly reduce sediment loading. Vegetative buffers have been shown to reduce sediments if runoff flow is not concentrated in a channel.

Reduce lead and other toxic pollutants by 25%. Regular street sweeping of commercial areas using high efficiency methods is expected to reduce lead loads by approximately 15 percent. Wet detention basins in the industrial park will contribute an additional 30 percent reduction in existing lead load. These reductions combined with installation of wet detention basins in new commercial developments and one half of new residential developments, will accomplish a 25 percent reduction in lead load even with the commercial and industrial expansion expected in the Osceola area in the near future.

Construction Sites: Develop ordinances to require construction site erosion plans be in place. Guide implementation of ordinances to ensure effective enforcement. (Village, Townships)

Developed and Developing (Urban) Areas: Construct detention ponds to settle water collected from the industrial park (OC6-C) and the residential/commercial development south of Hwy M(OC-6D) in the village.

Require ponding or infiltration of water within new developments. (Support provisions in county subdivision ordinance; encourage development of village ordinance.)

Develop stormwater management plan for the village of Osceola. Begin by mapping storm sewers in village. Consider sites for storm sewer forebays and grit chambers. Develop stormwater ordinance for the village of Osceola. Consider provisions of ordinance to support or require construction site erosion control, vegetative buffers, and ponding or infiltration of water in subdivisions.

Maintain or develop vegetative buffers along the creek and wetlands. Develop specifications for maintenance of village owned land along the creek.

Continue development of long range land use plans with water quality concerns in mind (village of Osceola, towns of Osceola and Farmington, and Polk County).

Improve street sweeping methods throughout the urban area of the watershed. Increase sweeping frequency in early spring and fall in residential areas, and from spring to fall in commercial areas and along arterials.

Encourage good housekeeping practices such as proper fertilizer and pesticide use, pet waste cleanup, vegetative buffer maintenance, and sidewalk and driveway cleanup to reduce pollutants at their source through an educational program.

Develop a wellhead protection program for village wells.

Urban Reduction Goals:

- Reduce overall pollutant loading to the Osceola Creek Watershed Project urban area by 25 percent.
- Reduce lead and other toxic pollutant loads by 25 percent by emphasizing implementation of BMPs in high traffic industrial and commercial areas.
- Achieve moderate levels of sediment reduction from construction site erosion control practices.

The adequacy of these goals will be reviewed after five years (or sooner if future water quality data indicate a need for revision).

Table 2-11. Watershed Sediment Reduction Goals

Source	Sediment Delivered (tons)	Sediment Reduction Goal (%)	Sediment Reduced (tons)	Percent of total
Cropland	254	25%	63	15%
Construction Sites*	500	75%	375	prevent future loadings
Urban nonpoint	172	25%	43	10%

*The major concern with construction sites is future development. In years when significant construction is occurring, loads could be as high as 500 tons per year in the watershed.

Eligibility for Wetland Restoration and Easements

Wetland Restoration

There will be no *Critical* areas for wetland restoration. All inventoried wetlands (21 sites) will be classified as *Eligible* for restoration. The targeted goal is to restore 10 percent (2 sites) of the wetlands sites inventoried.

Wetland restoration is considered a best management practice for the purpose of controlling nonpoint sources of pollution. Wetland restoration involves 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/or the fencing of wetlands to exclude livestock. Enhancement of fish and wildlife habitat is frequently a secondary benefit of wetland restoration.

Wetland restoration will be a priority where:

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

   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 are 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 are down slope or up slope from crop fields.

   Restoration of wetlands in these situations will do one of two things: 1) create a wetland filter which reduces the pollutants from an up slope 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 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.

Land Easements

Nonpoint source program funds may be used to purchase land easements in order to support specified best management practices. These practices include:

- Shoreline Buffers: vegetative areas which minimize nonpoint source impacts and other direct impacts to streams;

- Critical Area Stabilization: stabilization efforts needed on sites that either erode at an excessive rate, or have high sediment delivery rates to surface water; and

- 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 wellheads if it can be established that vegetative cover will correct an existing groundwater quality threat.

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.

Easements should be considered in the following situations:

1. To exclude livestock from grazed wetlands or along eroding stream banks 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.
   - more than 100 feet of streambank are severely trampled and eroding.
   - channel erosion is exacerbated by livestock grazing such that unvegetated stream banks 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 6 percent.

3. To support eligible wetland restorations. Easements are strongly recommended whenever:

   - The eligible wetland restoration is greater than one acre 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..

5. To protect the stream and riparian wetlands from urban runoff.

Ordinances

Manure Storage Ordinance

Surface water and groundwater resources are at risk when animal waste storage facilities are improperly located, designed, or constructed. Manure overflows and storage facility failures are a serious threat to aquatic life. Counties adopt animal waste storage ordinances to prevent ground and surface water pollution by assuring the proper design, construction, location, and management of permitted facilities. An ordinance must meet the guidelines adopted by DATCP and cite the applicable NRCS construction and management standards. Ordinances require permits for the installation, modification, and major repair of animal waste storage facilities.

Polk County enacted an animal waste storage ordinance in 1985. However, this ordinance applies only to earthen pits. A new ordinance under development will prohibit the construction of earthen pits. The revised ordinance has been presented to the Land Conservation Committee. A public hearing was held in August of 1996. The ordinance will be brought before the county board in December 1996.

Construction Site Erosion

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. A more detailed discussion on construction site erosion control ordinances is included earlier in this chapter.

Adoption of construction site erosion control ordinances is a condition of grant funding for the village of Osceola and the towns of Osceola and Farmington. Financial assistance will be made available through the priority watershed program for the development and early implementation of these ordinances. Polk County is also eligible for funds to develop a county-wide ordinance.

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.

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.

There is one general WPDES permit for periodic disposal of water from the swimming pool at Osceola High School. Water is discharged to the land and allowed to infiltrate into the ground. Industries located in the industrial park in Osceola discharge cooling water directly to the municipal water system.

Sewage Treatment Systems

Sanitary sewer service is available within the village of Osceola. Wastewater generated by the remainder of the watershed residents is disposed of through private on-site systems. The municipal waste water treatment plant is located south of the watershed boundary. It discharges to the St. Croix River.

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, poor design, or poor maintenance such as tanks which go unemptied. Pollutants from septic system discharges are nitrates, bacteria, viruses and hazardous materials from household products. In the Osceola Creek Watershed, the majority of soils are generally suitable for conventional septic tank soil absorption systems, however, high permeability and poor infiltration ability of some soils limits the effectiveness of effluent treatment. There are also soils within the watershed that are on slopes that are too steep or that are too wet for an effective absorption system. Landspreading of septic system waste during the winter months can also create surface water quality problems.

Counties have been using the Wisconsin Fund since 1981. 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. The program is administered by the Polk 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 the treatment facility 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, 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.

Municipal
There are three sites in the Osceola Creek Watershed that accept and spread municipal sludge on a total of thirty two acres. The village will eliminate landspreading of municipal sludge late in 1996 when it will begin sending sludge to the Regional Biosolids Facility currently being constructed near Ellsworth, Wisconsin.

Industrial
There are no sites in the watershed that accept and spread industrial sludge.

Solid Waste Disposal Sites

Landfill

The St. Croix River Valley Landfill is located in Osceola Township, T33N-R18W, Section 30. A demolition landfill on the site was permanently closed and seeded in 1995. The municipal solid waste landfill will be capped and closed in 1996. Sediment basins have been constructed around the landfill, and an erosion control plan is in place. The landfill operated for 15-20 years. Groundwater contamination problems exist at the site; volatile organic compounds and heavy metals have been detected.

Private wells located northwest of the site in the direction of groundwater flow will be sampled quarterly. So far, these tests do not reveal any contamination.

There are no active landfill sites in the watershed. A transfer station owned and operated by Waste Management, Inc. is on a nearby parcel.[11]

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[11]Personal communication. Bob Germer. DNR Solid Waste Specialist. Northwest District Office. February 22, 1996.

Petroleum Storage: Leaking Underground Storage Tank (LUST) Sites

The Wisconsin Remedial Response Site Evaluation Report (DNR publication number SW-144-91) lists the sites identified through the LUST program. There are five sites listed within the watershed. These sites sites are listed in table 2-4 with locations and project priority.

Other Contaminated Sites

The Wisconsin Remedial Response Site Evaluation Report also has the Inventory of Sites or Facilities Which May Cause or Threaten to Cause Environmental Pollution and the Spills Program List which includes sites or facilities identified under the Hazardous Substance Spill Law. See table 2-4 for list of these sites.

CHAPTER THREE
Osceola Creek Watershed's Implementation Program

Introduction

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

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

Agricultural and Urban Best Management Practices (BMPs)

BMPs Eligible For Cost Sharing And Their Rates

Best management practices that control nonpoint sources of pollution are identified in Chapter NR 120 of the Wisconsin Administrative Code. 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.

If the installation of a BMP will destroy significant wildlife habitat, NR 120 requires that habitat be recreated to replace the habitat lost. The DNR District Private Lands Wildlife Specialist or a designee will assist the LCD 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 3-1 and 3-2 below; the BMPs listed in table 3-1 can either be cost-shared at 50% or at the flat rates listed.

Table 3-1. BMP Flat Rates

BEST MANAGEMENT PRACTICE	FLAT RATE
Contour Farming	$ 9.00/ac[1]
Contour Stripcropping	$ 13.50/ac[1]
Field Stripcropping	$ 7.50/ac[1]
High Residue Management	$ 18.50/ac[2]
Wetland Buffer Strip (Interim BMP)	$ 125.00/ac[2]
Cropland Protection Cover	$25.00/ac[3]

[1] Wildlife habitat restoration components of this practice are cost-shared at 70%.
[2] Up to five years.
[3] Up to three years.

Following is a brief description of the most commonly used BMPs. More detailed descriptions 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 alternating strips of row crops and grasses or legumes on contour.

Field Diversions. A channel constructed across the slope with a supporting ridge on the lower side, to divert excess water to a safe outlet in another area.

Terraces. A system of ridges and channels with suitable spacing, constructed on the contour with a suitable grade to prevent erosion in the channel.

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 and 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 is close-growing grasses, legumes, or small grain grown for seasonal soil erosion protection and soil improvement.

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

Table 3-2. State Cost Share Rates for Best Management Practices

BEST MANAGEMENT PRACTICE	STATE COST SHARE RATE
Nutrient and Pesticide Management	50% [1]
Pesticide Handling Spill Control Basins	70%
Livestock Exclusion from Woodlots	50%
Intensive Grazing Management	50% [2]
Manure Storage Facilities	70% and 50% [3]
Manure Storage Facility Abandonment	70%
Field Diversions and Terraces	70%
Grassed Waterways	70%
Critical Area Stabilization	70% [4]
Grade Stabilization Structures	70%
Agricultural Sediment Basins	70%
Shoreline and Streambank Stabilization	70% [4]
Shoreline Buffers	70% [4]
Wetland Restoration	70% [4]
Barnyard Runoff Management	70%
Barnyard Abandonment and Relocation	70%
Roofs for Barnyard Runoff Management and Manure Storage Facilities	70%
Structural Urban BMPs	70%[5]
Milking Center Waste Control	70%
Cattle Mounds	70%
Well Abandonment	70%
Street Sweeping (Interim BMP)	70%
Windbreaks (Interim BMP)	70%

1 Spill control basins have a state cost share rate of 70%

2 To a maximum of $2,000 per watering system

3 Manure storage is cost shared at 70% for the first $20,000 of eligible costs, and at 50% for remaining eligible costs, not to exceed $35,000

4 Easements may be entered into with landowners in conjunction with these BMPs. See chapter two for an explanation of where easements may apply.

5 The maximum cost share rate for land acquisition, storm sewer rerouting, and removal of structures necessary to install structural urban BMPs is 50%

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 nonpoint source sites 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 Basin. A structure designed to reduce the transport of sediment or 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.

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

Lake Sediment Treatment. A chemical, physical, or biological treatment of polluted lake sediments. Sources of pollution to the lake must be controlled prior to treatment of lake sediments. Treatment does not include dredging.

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

Barnyard Abandonment or 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; or abandonment of the lot without relocation.

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.

Manure Storage Facility Abandonment. Proper abandonment of leaking and improperly sited manure storage systems, including a system where the bottom is 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 wastes, liner materials, and saturated soil as well as 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 and supporting structures constructed specifically to prevent rain and snow from contacting manure.

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

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 stormwater 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 alternative practices where necessary to meet the water resource objectives identified in the watershed plan. The Department may identify the design criteria and standards and specifications where appropriate, cost share conditions, and cost share rates for each interim best management practice in the nonpoint source grant agreement. These practices are described in more detail in Appendix A.

Wetland Buffers. Buffers are established vegetated areas immediately adjacent to natural wetland areas. Vegetated buffers are designed and constructed to function as a filter to delay, absorb, or purify contaminated runoff before it enters a natural wetland area.

Windbreaks. A strip or belt of trees and/or shrubs established in or adjacent to a field. Windbreaks are designed to reduce soil blowing and the suspension of sediments that frequently carry herbicides, fertilizers, and other contaminants to surrounding surface waters.

Street Sweeping. Involves the removal of grit, debris, and trash from urban impervious areas such as streets, parking lots, and sidewalks. Implementation of an accelerated street sweeping program will reduce water quality problems that urban stormwater flows and the associated pollutant loads cause.

Practices, Sources, and Activities Not Eligible for Cost Sharing

Ch. NR 120 prohibits cost sharing for certain practices, sources, or activities that are deemed as inappropriate. The following is a summary of those practices not eligible for cost sharing within the Osceola Creek Priority Watershed project area (refer to NR 120.17 for specific language):

- Best Management practice installation, operation, or maintenance started prior to the signing of the cost share agreement.
- Activities covered by the WPDES permit program including those identified in chs. NR 200 to 299 (except as provided in sub. (1) (g)).
- Livestock operations which have applied and are eligible for a WPDES permit, have been issued a WPDES permit, have greater than 1,000 animal units, or have greater than 1,000 animal units and have been issued a notice of discharge under ch. NR 243.

- Activities required as part of, or as a condition of, a license for a solid waste management plan.
- Activities funded through state or federal grants for wastewater treatment plants.
- Active mining operations.
- Pollutant control measures needed during building and utility construction, and storm water management practices for new development.
- Pollutant control measures needed during construction of highways and bridges.
- The planting, growing, and harvesting of trees associated with silviculture, except as necessary for site stabilization.
- Small scale on-site human domestic waste facility construction.
- Dredging of harbors, lakes, rivers, and ditches.
- Dams, pipes, conveyance systems, and detention basins intended soley for flood control.
- Operation and maintenance of cost shared practices.
- Practices normally and routinely used in growing crops.
- Practices whose purpose is to accelerate or increase the drainage of land, except where drainage is required as a component of a best management practice.
- Practices to control spills from commercial bulk storage of pesticides, fertilizers, petroleum and similar materials required by chs. ATCP 32 and 33 or other administrative rules.
- Practices needed to control sources, which were adequately managed for the specific land use at the time of cost share agreement signing.
- Practices to be fully funded through other programs.
- Practices previously installed and necessary to support cost shared practices.
- Changes in crop rotation.
- Minimum levels of street sweeping and leaf collection.
- 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 which the department determines are not necessary to achieve the objectives of the watershed project.

Rural Implementation Program

The rural and urban portions of the watershed will be administered separately. Polk County will be primarily responsible for the implementation of the rural area of the watershed, and the village of Osceola for the urban area. Separate budget estimates have been prepared for the urban and rural components.

Rural Area Roles and Responsibilities

Landowners and Land Operators. Owners and operators of public and private land are important participants in the program. They will adopt BMPs to reduce nonpoint sources of water pollution and protect and enhance fish, wildlife, and other resources.

Polk County. Polk County is the primary unit of government responsible for implementing this plan within the rural component of the Osceola Creek Priority Watershed. The Polk County Land Conservation Committee (LCC) will act for the County Board and will be responsible contractually and financially for management of the project in rural areas.

The Land Conservation Department will carry out implementation of the program including contacting landowners, developing farm plans and practice designs, administering cost share agreements, and conducting the information and education program. The LCD will track project progress and participate in project review meetings.

Department of Natural Resources. The DNR is responsible for overall administration of the Nonpoint Source Program in the state. Their responsibilities include monitoring project progress, providing financial support and guidance, and providing technical assistance.

Other Agencies. Other state and federal agencies including the Department of Agriculture, Trade, and Consumer Protection; the University of Wisconsin Extension; the Natural Resources Conservation Service; and the Farm Services Agency will provide assistance in administering the watershed program.

Rural Cost Share Budget

Costs of Installing BMPs. The quantity and type of management practices that are required to meet the water quality objectives of this project are listed in table 3-3. Units of measurement and cost per unit for the various BMPs are also included.

The cost of installing Best Management Practices is approximately $604,000 assuming 100 percent participation. At 75 percent participation, the capital cost for rural BMP installation would be approximately $453,000.

- State funds necessary to cost-share a 75 percent landowner participation level would be approximately $358,000.
- The local share provided by landowners and other cost-share recipients would be approximately $95,000 at the 75 percent participation level.

Easement Costs. Chapter two 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 3-3.

At a landowner participation level of 75 percent, the estimated purchase price of easements on eligible lands would be $50,000. Easements are funded at 100 percent and will be purchased by DNR or Polk County.

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 Polk County is described below. The bidding procedure and average cost and flat rate lists can be obtained from the county LCD.

Bids: Competitive bids will be used for structural BMPs with estimated total costs above $5000. The bidding process requires a minimum of two bids from qualified contractors in itemized bid format. In cases where one bid was received, the county will determine if the bid constitutes an appropriate cost for the project. If no bids are received or if the lone bid is not deemed appropriate, the county will limit cost sharing based on average costs.

Where average costs and range of costs are well established, the Land Conservation Department may authorize use of average costs on project estimated to cost more than $5000.

Average Costs: Average costs will be used for structural BMPs with an estimated cost of less than $5000 and for non-structural BMPs not using a flat rate, unless the cost share recipient decides, and the county agrees, to bid the installation of the BMPs. If the cost share recipient or county decides to bid a structural BMP under $5000, the above bid procedure will apply. Individual projects below $5000 may be pooled by the county and bid together.

Flat Rates: BMPs using flat rates are shown in table 3-1. The rates shown are the state's share of the practice installation costs.

The Wisconsin Conservation Corps may be used to install BMPs for cost share recipients.

Payments for "in kind" contributions will be based on the county's guidelines. Cost share payments will be based on actual installation costs. If actual installation costs exceed the amount estimated on the cost share agreement, the amount paid the grantee may be increased. Approval from the Polk County Land Conservation Committee is required where cost estimates are exceeded by the lesser of 20% or $3000. Appropriate documentation regarding the need for the changes will be submitted to DNR.

Table 3-3. Cost-Share Budget Needs for Rural Management Practices in Polk County

BMP	Number	Maximum Cost/unit ($)	Total Cost	75% Participation	
				State Share	Local Share (1)
Upland Control					
Change in Crop Rotation	500 ac	0	0	0	0
High Residue Management (1)(2)	2,455 ac	92.5	227,088	170,316	0
Cropland Protection Cover (1)(3) (Green Manure)	166 ac	75	12,450	9,338	0
Intensive Grazing Management (Rotational Grazing)	1 ea	4,000	4,000	1,500	1,500
Critical Area Stabilization	10 ac	500	5,000	2,625	1,125
Grass Waterways	5 ac	3,500	17,500	9,188	3,938
Field Diversions and Terraces	200 ft	15	3,000	1,575	675
Grade Stabilization	3 ea	8,000	24,000	12,600	5,400
Agricultural Sediment Basin	3 ea	12,500	37,500	19,688	8,438
Shoreline Buffers	40 ac	200	8,000	4,200	1,800
Nutrient Management (4)	1,228 ac	18	22,104	8,289	8,289
Nutrient and Pest Management (5)	1,227 ac	30	36,810	13,804	13,804
Spill Control Basin	1 ea	15,000	15,000	7,875	3,375
Wetland Restoration	2 ea	500	1,000	525	225
Livestock Exclusion, Woods	3,000 ft	1	3,000	1,125	1,125
Wetland Buffer (Interim BMP) (1)(6)	13 ac	625	8,125	6,094	0
Windbreaks (Interim BMP)	3,000 ft	1	3,000	1,575	675

(1) Local share includes labor and equipment costs. Also see flat rates in Table 3-1.

(2) High Residue Management is cost shared at a maximum rate of $18.50/acre/year for five years.

(3) Cropland Protection Cover is cost shared at a maximum rate of $25/acre/year for any three years.

(4) Nutrient Management is cost shared at a maximum rate of $6/acre/year for three years.

(5) Nutrient and Pest Management, is cost shared at a maximum rate of $10/acre/year for three years.

(6) Wetland Buffers are cost shared at a maximum of $125/acre/year for five years.

BMP	Number	Maximum Cost/unit ($)	Total Cost	75% Participation	
				State Share	Local Share (1)
Animal Waste Control					
Complete Barnyard System or Barnyard Abandonment or Relocation	2 ea	25,000	50,000	26,250	11,250
Roof Gutters	1 ea	1,500	1,500	788	338
Clean Water Diversion	1 ea	2,500	2,500	1,313	563
Manure Storage Facility (5)	1 ea	62,000	62,000	27,250	19,250
Manure Storage Facility Abandonment	2 ea	10,000	20,000	10,500	4,500
Cattle Mounds	1 ea	3,000	3,000	1,575	675
Milking Center Waste Control	2 ea	7,000	14,000	7,350	3,150
Streambank Erosion Control					
Shape and Seeding	100 ft	10	1,000	525	225
Fencing	3,000 ft	1	3,000	1,575	675
Crossing	1 ea	2,500	2,500	1,313	563
Remote Watering Systems	1 ea	2,000	2,000	1,050	450
Miscellaneous					
Well Abandonment	20 ea	750	15,000	7,875	3,375
Subtotal	**0**		**604,077**	**357,681**	**95,383**
Easements (1)	20 ac	2500	50,000	50,000	0
		Total	**654,077**	**407,681**	**95,383**

(1) Local share includes labor and equipment costs. Also see flat rates in Table 3-1.

(5) Manure storage is cost-shared at 70% for the first $20,000 of eligible costs, and at 50% for the remaining eligible costs, not to exceed $35,000.

Source: Wisconsin DNR, DATCP, and Polk County

Cost Share Agreement and Contact Strategy

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

The following procedure will be used to make landowner contacts.

- During the first year 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.

Rural 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 3-4 lists the total estimated staff needed to implement the project assuming a 75 percent level of participation by eligible landowners. Approximately 9,950 staff hours are required to implement this plan. This includes 3,000 staff hours to carry out the information and education program.

Currently, 0.70 positions are being funded by the Osceola Creek Priority Watershed Project. This current level includes the development of the plan and an information and education program. The Land Conservation Department also assists with implementation of the urban plan recommendations including demonstrations.

The estimated cost for staff to implement the nonpoint source pollution abatement plan at the 75 percent participation rate is $174,125. These costs will be paid by the state through a Local Assistance Grant Agreement.

Urban Budget and Staffing Needs: Funding is provided for local implementation of many of the core and segmented activities through a Local Assistance Grant from the Department. Activities eligible for funding include development and implementation of a construction site erosion control ordinance, development of a stormwater ordinance, and design of stormwater management practices.

It is estimated that $378,000 in state funds and $130,000 in local funds will be needed to implement the urban plan recommendations. See table 3-6 for a description of how these costs were estimated.

Table 3-4. Estimated Polk County Staff Needs for Eight Years of Project Implementation at 75 Percent Landowner Participation

Activity	Polk County Staff Hours
Project and Financial Management	4,000
Information and Education Program	3,000
Pre-Contact Office Inventory; Landowner Contracts and Progress Tracking	625
Conservation Planning and Cost-Share Agreement Development	360
Plan Revisions and Monitoring	210
Practice Design and Installation	
Upland Sediment Control	885
Animal Waste Management	415
Streambank Erosion Control	75
Easements	80
Training	300
Total:	**9,950**
Estimated Staff Required per year	**0.60**
Hours per year	**1,244**

Source: DNR, DATCP, and the Polk County LCD

Urban Implementation Program

The following discussion provides guidance on how the urban nonpoint source control program will be implemented. It presents the "core" activities that provide a base for the urban program. In addition, more complex, "segmented" activities are presented. Eligibility for financial assistance is also described in this section.

Core Elements of the Urban Management Program

The "core" elements of the urban program are basic measures that can be implemented without further study. Adoption of these measures by a participating municipality is the first step in the implementation process. This show of commitment is required in order to receive financial assistance through the watershed program. It is required only where the municipality receives funds for its own use, such as where the municipality installs, owns, and operates a management practice. It does not apply to those instances where the municipality acts as a grantor, passing cost-share funds through to private landowners. Individual landowners within the municipality may receive funds before the municipality has agreed to conduct the core program.

Core program elements for the village of Osceola:

> Develop, adopt, and enforce a construction erosion control ordinance as outlined in the recommendations in chapter 2. The ordinance should cover clearing, grading, and excavation conducted prior to the issuance of a building permit. The village must also commit to enforcing the erosion control provision of the Uniform Dwelling Code.
>
> Carry out a regular street sweeping program sweeping village streets at least twice each year in the spring and fall, including fall leaf collection.
>
> Assist the Polk County Land Conservation Department with the implementation of an information and education program for urban pollution prevention practices by handing out educational materials and assisting in the coordination of local events.
>
> Establish and enforce maintenance requirements for village-owned vegetated riparian buffers.

Segmented Elements of the Urban Management Program

The "segmented" elements of the urban nonpoint source program include those requiring further study prior to implementation. Recommendations from chapter 2 that are not included in the core element description are considered segmented elements. Examples include construction of a wet detention pond to capture runoff from the Industrial Park, erosion control or infiltration devices at storm sewer outlets, and the development of a stormwater plan and ordinance. Detailed engineering studies will be required for some of these practices.

The village of Osceola may implement the segmented activities any time after expressing commitment to implement all of the core activities listed above. Cost sharing will be available throughout the eight year implementation period of the project.

Segmented program activities recommended for the village of Osceola include:

Conduct detailed engineering studies to determine the best means to implement recommended structural practices.

Design and install structural urban best management practices.

Develop a stormwater management plan. Map the storm sewer system in preparation for this plan.

Develop a stormwater management ordinance. Adopt and enforce the ordinance.

Develop a wellhead protection program.

Implement accelerated street sweeping as described in Appendix A.

Establish and maintain vegetative buffers on privately owned land along the stream and riparian wetlands.

Continue development of long range land use plans with water quality concerns in mind.

The townships of Osceola and Farmington are also eligible for cost share funds to implement the urban recommendations. The development of construction site erosion control provisions as outlined within the recommendations section of this plan will be considered a core activity for the towns. With commitment to develop an erosion control ordinance, the townships of Osceola and Farmington are also eligible for funding for stormwater management ordinance development. This commitment must occur within three years of plan approval in order to be eligible for funds.

Urban Roles and Responsibilities

Local Units of Government

Each municipality wishing to participate in the Osceola Creek Priority Watershed Project will need to:

Commit to the implementation of the core activities.

Develop a schedule for implementation of activities within six months following commitment to participate in the program. This schedule will outline implementation of core and segmented activities for each municipality. The schedule may be revised during the implementation period.

Prepare and submit annual work plans, annual reports, and attend annual review meetings.

Enter into cost share agreements for eligible best management practices. Cost share agreements between landowners and the village are expected to be minimal. For practices installed and maintained by private individuals, the cost share agreement is between the landowner and the local unit of government.

Department of Natural Resources

The DNR is assigned the overall administrative responsibility for the priority watershed program by statute. This includes providing financial support for local staff and installation of management practices, assisting local units of government to integrate wildlife and fish management concerns into selection and design of BMPs, and conducting project evaluation activities. The Department will also provide assistance in development of ordinances and other project implementation activities, review designs for urban BMPs, and approve stormwater management plans.

Polk County Land Conservation Department

The LCD will be responsible for the following activities in the urban area:

Assist municipalities in the development of construction site erosion control and stormwater management ordinances.

Develop and implement the recommended information and educational program outlined in chapter five of this plan.

Provide assistance in the development of grant applications, cost share agreements, project schedules, and progress tracking.

Landowners and Land Operators

In some situations, private landowners will install BMPs on their property. As such, they can be important participants in the urban implementation strategy. Eligible landowners can participate in the project by signing cost-share agreements with local units of government.

BMPs Eligible for Cost Sharing

As described earlier in this chapter, eligible best management practices (BMPs) and specifications for their design are identified in NR 120. Eligible practices and state cost share likely to be used in the urban area of the Osceola Creek watershed are identified below in table 3-5.

Table 3-5. State Cost Share Rates for Urban Management Practices

Best Management Practice	State Cost Share Rate
Structural Urban Practices	70%
Street Sweeping (Interim BMP)	70%
Land Acquisition for Practices	50%

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 excluded in NR 120.17. Many of these were practices and activities were mentioned earlier in this chapter.

Some items not eligible for funding may be required in order to implement the plan recommendations. An example is the renovation of storm sewers, which may be required to install a wet detention basin. Limits on funding eligibility are meant to apply only to the priority watershed program as administered under existing administrative code. These limits are not meant to preclude separate budgetary or contractual financial assistance agreements. Such agreements might be developed under new state or federal programs, or with other units of government. The plan endorses the use of funds procured through such agreements to implement plan recommendations.

Nonpoint Source Grant Agreement and Administration

The Nonpoint Source Grant Agreement is the means for transferring funds from the DNR to local units of government to provide cost sharing for the installation of urban best management practices. In some cases the municipality will act only as a grantee. In these cases, the municipality will use grant funds for practices it will install, own, and operate.

Occasionally, the municipality will act as the grantor. In these situations, the municipality will pass the cost share funds it has received from the DNR to private landowners who install, operate, and maintain the practices. When this occurs, the municipality will enter into a separate cost share agreement with the private landowner receiving the state funds. The procedures for administering urban grant agreements parallel those contained in the rural implementation strategy described earlier.

Cost Share Agreement and Administration

Consistent with s. 144.25 and NR 120, cost share funding is available to landowners and local units of government for a percent of the costs of installing BMPs to meet project objectives. Cost share agreements must be initiated within seven years after formal approval of the watershed plan and are filed as part of the property deed. Agreements may be amended throughout the 8 year project period.

Practices included on cost share agreements must be installed within the schedule agreed to on the cost share agreement. Practices must be maintained for a minimum of ten years from the date of installing the final practice listed within the cost share agreement.

Local, state, or federal permits may be needed prior to installation of some BMPs. Areas in which a permit is generally required include zoned wetlands and the shoreline areas of lakes and streams. These permits are needed whether the activity is a part of the watershed project or not. The cost share recipient is responsible for acquiring the needed permits prior to installation of practices.

Local units of government are responsible for enforcing compliance of cost share agreements to which they are a party. Where DNR serves as party to an agreement with a unit of government, the DNR will take responsibility for monitoring compliance. The responsible party will insure that BMPs installed through the program are maintained in accordance with the operation and maintenance plan for the practice for the appropriate length of time.

Table 3-6. Cost Share Budget Needs for Urban Management Practices

Item	Village of Osceola		Town of Osceola		Town of Farmington		TOTAL
	State Share	Local Share	State Share	Local Share	State Share	Local Share	
Practices within Established Urban Areas	140,000	60,000	0	0	0	0	200,000
Street Sweeping	113,400	48,600	0				162,000
Easements	20,000	1,000	0	0	0	0	21,000
Subtotal NPS[3]	**$273,400**	**$109,600**					
Construction Site Erosion Control Ordinance (CSECO) Development	5,000		5,000		5,000		15,000
CSECO Implementation[4]	10,000	10,000	5,000	5,000	5,000	5,000	40,000
Storm Water Planning	15,000		5,000		5,000		25,000
Engineering Design and Feasibility Studies	40,000						40,000
Wellhead Protection	5,000						5,000
Subtotal LAG[5]	**$75,000**	**$10,000**	**$15,000**	**$5,000**	**$15,000**	**$5,000**	
TOTAL	**$348,400**	**$119,600**	**$15,000**	**$5,000**	**$15,000**	**$5,000**	**$508,000**

1 The local share of the cost of practices on established urban areas and stormwater planning may be paid by private landowners or other state agencies instead of local governments where applicable.

2 BMPs for established urban areas include wet detention basins, oil-grit separators, and storm sewer outfall forebays or infiltration practices. Local governments or private landowners bear the additional cost of operation and maintenance (not included in the table).

3 Nonpoint Source Grant.

4 Funding for implementation limited to three years following adoption of an ordinance at 50% state share. Fees are expected to support implementation after this period.

5 Local Assistance Grant. Information and education activities to promote pollution prevention practices will be coordinated by the Polk County Land Conservation Department and funded through their LAG.

Sources: DNR, village of Osceola, Polk LCD, towns of Osceola and Farmington

Urban Budget and Staffing Needs

Funding is provided for local implementation of many of the core and segmented activities through a Local Assistance Grant from the Department. Activities eligible for funding include development and implementation of a construction site erosion control ordinance, development of a stormwater ordinance, and design of stormwater management practices.

It is estimated that $378,000 in state funds and $130,000 in local funds will be needed to implement the urban plan recommendations. See table 3-6 for a description of how these costs were estimated.

Implementation Schedule

Project Cost

The state funding required to meet the rural nonpoint source pollution control needs at 75 percent level of landowner participation is presented in table 3-7. The estimated cost to the state is $614,000. The estimated cost to landowners and others is $100,000. This figure includes the capital cost of practices, staff support, and easement costs as presented above.

The state funding required to meet the urban nonpoint source pollution needs is also presented in table 3-5. The estimated state cost is $378,000. Local costs are estimated at $130,000.

The total state cost of plan implementation is expected to be $992,000. Local costs from landowners, municipalities, and Polk County totals $230,000.

These cost estimates are 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.

Grant Disbursement and Project Management Schedule

Implementation of this priority watershed project shall begin following approval of this plan and receipt of the Nonpoint Source Grant. The plan has been approved by the DNR, the Polk County Board, and the Wisconsin Land and Water Conservation Board. The village of Osceola and the towns of Osceola and Farmington have also approved the plan.

The project implementation period is eight years. During the first seven years of implementation, cost share agreements with eligible landowners may be signed. Practices listed on any cost share 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 rural Nonpoint Source Grant will cover the cost of practices over the entire eight year implementation phase. The amount of the rural Nonpoint Source Grant is calculated at 75 percent

participation by eligible landowners; see table 3-3 for a detailed explanation. Urban grants will be applied for and disbursed annually. Grants may be amended due to changes needed for time of performance, funding levels, or scope of work.

Local Assistance Grants will be disbursed annually to Polk County, the village of Osceola, and other participating municipalities to cover the costs of personnel, operating expenses, and equipment. The DNR will evaluate each annual workload analysis and grant application.

Table 3-7. Cost Estimates for the Osceola Creek Watershed Project

	Rural Costs		Urban Costs	
Item	State Share	Local Share	State Share	Local Share
Cost Share Funds: Practices	357,681	95,383	253,400	108,600
Cost Share Funds: Easements	50,000	1,000	20,000	1,000
Local Assistance Staff Funding	174,125	0	10,000	10,000
Information and Education Direct	7,500	0	0	0
Other Direct (travel, supplies, etc.)	19,360	3,500	0	0
Engineering Assistance	5,000	0	40,000	0
Professional Services	0	0	55,000	10,000
Total	**$613,666**	**$99,883**	**$378,400**	**$129,600**
Total State Share				**$992,066**

Source: DNR, DATCP, and the Polk County Land Conservation Department

CHAPTER FOUR
Integrated Resource Management Program

Introduction

The purpose of this chapter is to identify existing state, federal, and local resource management programs which provide benefits for water quality and/or fish and wildlife resources within the Osceola Creek 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 various goals and objectives for the programs in which a landowner participates.

Fisheries and Wildlife Management

Watershed best management practices (BMPs), such as streambank protection, shoreline and wetland buffer strips, and easements should be implemented in a manner that preserves and enhances the quality of the fishery within Osceola Creek. When rock riprap is installed, it should be sized so that the placement and size of rock will positively benefit fish habitat. Emergent aquatic vegetation that enhances wildlife habitat should be used for shoreline erosion control whenever feasible. Wildlife habitat components should be incorporated into vegetative filter strips along Osceola Creek or wetlands within the project area.

DNR Fish Management and Wildlife Management personnel will be consulted for input in the design of streambank and 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, propose measures to minimize impact on wildlife habitat when BMPs are installed, and assist in resolving questions concerning effects of agricultural nonpoint source BMPs on wetlands.

Wetland Restoration

Restorable wetlands have been identified within the Osceola Creek Watershed. The general guidelines for wetland restoration, easement acquisition, and shoreline buffers is to protect existing wetlands should be followed (chapter tw).

The Watershed lies within what has been identified as the Wisconsin Northwest Focus Area of the North American Waterfowl Management Plan. This area is a small part of a much larger area being targeted under this plan. Work associated with this plan will include fee title and easement acquisition, restoration and enhancement of wetlands and associated uplands to increase the populations of waterfowl and nongame birds, and to provide the benefits of an extensive wetland-upland complex.

Wetlands that provide important wildlife habitat will be identified in consultation with DNR Wildlife Management and Water Management personnel. Shoreline buffer easements may be acquired adjacent to these wetlands to offer better protection from sedimentation and other nonpoint source pollution.

Funding is available to support wetland restoration in the watershed under this program or similar initiatives.

Groundwater Management

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.

Eligible landowners will be encouraged to apply for well replacement funds through the Wisconsin Well Compensation Grant Program.

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 watershed. Pollutants from sewage system discharge include bacteria, viruses, household chemicals, nitrates, and phosphorus. Many sewage systems located in riparian areas are out-dated and were 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 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.

Polk County staff will distribute educational materials to promote the proper maintenance of private sewage systems. Sewage system maintenance and household tips to reduce groundwater contamination will be stressed during visits with landowners. It is also recommended that Polk 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.

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 a Polk County Sanitary Inspector 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 Polk County Zoning Department.

Polk 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 and lakes has been identified as a problem in limited areas along the creek. 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.

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

Forestry Programs

Private forest lands account for 1,444 acres, or 25 perecent of the total watershed area. These forest lands contribute to the quality of water resources and fish and wildlife habitat 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 for which there is a DNR approved management plan. The SIP program applies to nonindustrial private forest land and 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, property taxes are set at a lower rate than normal. At a later time 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 landowner's objectives. These plans may address harvesting, planting, thinning, release, and soil erosion on a mandatory basis while addressing other practices such as wildlife and aesthetic activities on a voluntary basis. Grazing is not allowed under this program. Contracts are generally in place for 25 or 50 years.

Other Stewardship Programs. Some other forest stewardship programs available to watershed landowners include the Forest Incentive Program (FIP) and the Agricultural Conservation Program (ACP). These programs provide funding for the establishment of timber stands. ACP funds are currently not available.

Polk County staff and DNR foresters will encourage eligible forest landowners in the watershed to participate in forest stewardship programs to benefit water resources and forest habitat. Protection of soil and water resources shall 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 affects wetland form or function may require permits from the DNR, Polk County Zoning office, and the US Army Corps of Engineers.

The Polk County Land Conservation Department will work closely with the DNR Water Regulation and Zoning staff, the Polk County Zoning Department, and the US Army Corps of Engineers to assure that necessary permits are 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 governments regulate some activities on riparian properties. Activities that disturb or remove the natural vegetation surrounding lakes and streams reduce the buffering capacity of the area and often drastically increase 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.

The LCD will work in cooperation with the Property Listing Department, Zoning Department, and the DNR to provide information packets to new waterfront property owners in the watershed.

Coordination With State and Federal Conservation Compliance Programs

The Osceola Creek 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 LCD 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 3 FPP participants within the watershed project area. 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.

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 with preserving cultural sites and implementing the watershed project.

There are two burial sites and four known archaeological sites within the Osceola Creek watershed. Three of the archaeological sites are along the banks of Osceola Creek. These areas will need special consideration when structural best management practices are being planned. 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.

The Osceola Creek Priority Watershed Project addresses these concerns with the following procedures:

1. Archeological sites have been plotted on project maps with assistance from the Wisconsin State Historical Society. Counties will obtain a supply of landowner questionnaires from the historical society which will be used to identify additional non-inventoried sites.

2. Landowners' questionnaires will be sent to the State Historical Society for determination of archaeological significance. In addition, landowners will have their lands evaluated by county staff for the need to conduct an archaeological survey (essentially compare property with known archaeological site locations). The historical society will determine the need for additional, extensive surveys. The county and the DNR District NPS Program Coordinator will also be involved in this determination.

3. If the inventory or questionnaire does reveal an archaeological site and the proposed best management practice may impact the site, an archaeological survey conducted by a qualified archaeologist will need to be completed. The survey will assess the potential of the practice to significantly impact the site. Alternative BMPs may need to be considered both before and after the results of the survey.

4. A cost share agreement is signed before the survey is conducted. In certain instances a survey may reveal a significant archaeological site which precludes the installation of a particular BMP at that specific site. Cost share agreements will contain language which nullifies or partially nullifies the agreement based on the final results of the archaeological survey.

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 entire Osceola Creek Priority Watershed. The lack of additional occurrence records does not preclude the possibility that other endangered resources are present in the watershed. In addition, the bureau's endangered resource files are continuously updated from ongoing field work. There may be other records of rare species and natural communities which are in the process of being added to the database and so are not listed in this document.

Rare Species

Rare species are tracked by Wisconsin's Natural Heritage Inventory of 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 or wild plants is determined by the DNR to be in jeopardy on the basis of scientific evidence. Wisconsin endangered species within the watershed follow:

Crystallaria asprella, crystal darter (Endangered Fish Species)

Epioblasma triquetra, snuffbox (Endangered Mussel Species)

Ellipsaria lineolata, butterfly (Endangered Mussel Species)

Lanius ludovicianus, Loggerhead Shrike (Endangered Bird Species)

Wisconsin Threatened Species. A threatened species is one which, if not protected, has a strong probability or becoming endangered. Wisconsin threatened species within the watershed follow:

Poa paludigena, bog bluegrass (Threatened plant Species)

Opuntia fragilis, brittle prickly-pear (Threatened plant Species)

Besseya bullii, kitten tails (Threatened Plant Species)

Tritogonia verrucosa, buckhorn (Threatened Mussel Species)

Quadrula metanevra, monkeyface (Threatened Mussel Species)

Buteo lineatus, Red-shouldered Hawk (Threatened Bird Species)

Dendroica cerulea, Cerulean Warbler (Threatened Bird Species)

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 follow:

Talinum rugospermum, prairie fame-flower (Special Concern Plant Species)

Cardamine pratensis, cuckoo flower (Special Concern Plant Species)

Senecio congenstus, marsh ragwort (Special Concern Plant Species)

Lithospermum latifolium, American gromwell (Special Concern Plant Species)

Protonotaria citrea, Prothonotary Warbler (Special Concern Bird Species)[1]

Seiurus motacilla, Louisiana Waterthrush (Special Concern Bird Species)[1]

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[1]This Special Concern Species is fully protected by federal and state laws under the Migratory Bird Act.

Communities

Examples of the following natural communities have been identified in the Osceola Creek Priority Watershed.

Bedrock glade

Emergent aquatic

Springs and spring runs, hard

Dry prairie

Stream--fast,hard, cold

Southern mesic forest

Floodplain forest

If specific locational or other information is needed about these species or natural communities, contact the Bureau of Endangered Resources, DNR. The specific location of endangered resources is sensitive information.

CHAPTER FIVE
Information and Education Activities

Goal

Residents of the watershed will make decisions and take actions that protect surface and groundwater quality in the Osceola Creek Watershed.

Objectives

1) ***Agricultural producers will understand the importance of controlling soil erosion and will have the tools and knowledge required to plan and implement erosion control practices.***

2) ***The village of Osceola, the town of Osceola, the town of Farmington, and Polk County will adopt ordinances and policies that protect water resources in the watershed.***

3) ***Individuals involved in construction will understand the importance of controlling construction site erosion and will have the tools needed to plan, implement, and maintain erosion control practices.***

4) ***Watershed residents will understand the importance of protecting water quality and will follow good housekeeping practices to reduce water pollution.***

5) ***Watershed residents will understand the importance of and the steps needed to protect groundwater quality.***

For each objective identified above, the following are identified:

Audience: Groups or individuals that should be targeted.

Message: Key information to communicate to the target audience.

Activities: Suggested activities to get messages to the target audience and encourage actions.

Activities will be selected and presented in an annual information and education plan. New activities may be included as needed to respond to changing needs of the program and the evaluation of past activities.

Implementation Team

The education strategy was developed by Polk County Land Conservation Department staff with assistance from the watershed Citizen's Advisory Committee, UW Extension, DNR, and the Land Conservation Committee.
The Land Conservation Department will take lead responsibility for the implementation of the information and education strategy. The University of Wisconsin Cooperative Extension (UW-Ex), the Department of Natural Resources, (DNR), and the Department of Agriculture (DATCP) will provide supporting assistance. The LCD will work with and seek support from local units of government and community groups and businesses.

Strategy

1) ***Agricultural producers will understand the importance of controlling soil erosion and will have the tools and knowledge required to plan and implement erosion control practices.***

Audience:

Landowners with critical sites

Landowners with eligible sites

Message:

There are water quality problems on your property.

Efforts are also being made to correct urban problems.

The watershed program offers assistance to help make improvements.

Nutrient management plans can help improve yields while protecting water quality.

Buffers of vegetation decrease sediment delivery to the stream and wetlands.

Minimum tillage methods can work with your operation.

It is important to protect wetlands in the watershed.

Activity:

✓One-on-one visits with LCD conservation planner and design technician

✓Demonstrations of yield improvements following nutrient management recommendations

✓Zone tillage/minimum tillage demonstrations

2) ***The village of Osceola, the town of Osceola, the town of Farmington, and Polk County will adopt ordinances and policies that protect water resources in the watershed.***

Audience:

Osceola Village Board

Village Planning Commission

Town of Osceola Board

Town of Farmington Board

Polk County Board of Supervisors

Message

Construction site erosion control plans are crucial to protect the creek and wetlands as the area develops.

A stormwater management plan and ordinance will provide helpful, more detailed recommendations for protecting the creek as the village develops.

Ponding or infiltration of water should be required so water flow from new developments does not increase from predevelopment condition.

Long range land use plans with water quality concerns in mind should be developed.

Vegetative buffers along the creek and associated wetlands are important.

It is important to protect wetlands because of their many functions and values.

Streets should be swept regularly and good housekeeping practices should be encouraged.

Detention ponds are recommended to collect water from the industrial park and from the proposed residential development south of Highway M.

Activity

✓Present information at board meetings (advisory committee members and staff)

✓Publicize project goals and activities to strengthen public support for policy changes.

✓Newspaper articles

✓Public meetings

✓Workshops and tours

3) ***Individuals involved in construction will understand the importance of controlling construction site erosion and will have the tools needed to plan, implement, and maintain erosion control practices.***

Audience

Builders, developers, contractors, and architects

Home buyers

Town, village, and county elected officials and staff

General public

Message

Sediment from construction site erosion flows to Osceola Creek and wetlands.

It is critical to control construction site erosion as res./comm. development occurs.

Practices are available to control erosion.

Communities can adopt ordinances to require erosion control plans.

Activities

✓Demonstrate erosion control practices at a home building site

✓Meet with village and town officials; explain ordinance development in detail

✓Provide new home buyers with information packet and follow-up phone call

✓Increase public awareness through the media, fair displays, etc.

4) ***Watershed residents will understand the importance of protecting water quality and will follow good housekeeping practices to reduce water pollution.***

Audience

Students, youth groups

General public

Message

Storm sewers drain to Osceola Creek and the St. Croix River.

Sweep to keep sidewalks and driveways clean.

Recycle leaves and grass clippings - keep them off of streets and gutters.

Vegetative growth along the creek and wetlands is critical as a buffer.

Clean up pet waste.

Minimize use of fertilizer, pesticides, and other chemicals. Use chemicals and petroleum products with care. Prevent and clean up spills.

Landscape practices can help protect water quality.

We all contribute pollutants; we all need to do our part.

It is possible to improve the trout fishery in Osceola Creek.

Osceola Creek drains to the St. Croix River, a national and regional treasure.

It is important to protect wetlands for their many functions and values.

Activity

✓Storm drain stenciling and promotion

✓Newspaper articles (regular series of articles)

✓Osceola Community Fair Display

5) ***Watershed residents will understand the importance of and the steps needed to protect groundwater quality.***

Audience

Rural and urban landowners

Village and town officials

Agricultural producers

General public

Message

Groundwater is the area's sole source of drinking water.

Our individual and community health is based on having a safe drinking water supply.

Activities on the ground can pollute water under the ground.

Abandoned (unused) wells need to be properly closed to prevent groundwater contamination.

Activities

✓Water testing programs

✓Well closing demonstrations

✓Farmstead assessments for sources of groundwater contamination

✓Articles in local media

Evaluation

An evaluation report of information and education activities will be prepared annually. Evaluation will be built into program activities where feasible. Activities may be evaluated through recording the number of attendees at a function, the number of target audience members reached, event surveys, or other methods.

CHAPTER SIX
Project Evaluation and Monitoring

Introduction

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

(1) Administrative review

(2) Nonpoint source pollutant load reduction evaluation

(3) Watershed resource evaluation monitoring

(4) Evaluation of innovative approaches

(5) Final project report

Evaluation Overview

Information on the first two components will be collected by the Polk County LCD and reported on a regular basis to the DNR and the DATCP. 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 and monitor resource quality changes at specific sites within the watershed.

The third component, water resource evaluation monitoring, will be conducted by DNR Water Quality Biologists. Monitoring will be conducted to demonstrate changes in water quality and/or habitat conditions resulting from the installation of BMP's. Signs of Success (SOS) monitoring at specific sites will follow guidelines established by DNR's Bureau of Watershed Management.

The fourth component involves evaluating special approvals that have been granted for innovative approaches that are created to meet the specific and individual needs identified during the planning process of a watershed project. The DNR Nonpoint Source Pollution Abatement Program is continually striving to improve the methods upon which nonpoint problems are addressed and commonly grants special approval for new and innovative approaches that will economically and effectively reduce nonpoint source pollutants within the watershed.

A final project report will be prepared once the implementation period of the project has ended. Many practices will still be in their required operation and maintenance period at this time. The report will summarize evaluations of all aspects of the project.

Administrative Review

Project administration will be reviewed annually as county project managers will report a variety of information to the DNR and the DATCP. The administrative review will focus on the progress of Polk County, the City of Osceola, 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 as well as landowner participation, and progress toward achieving the water quality, aquatic habitat, and pollutant load reduction objectives of the watershed project.

The information listed above is described in more detail in the following sections and will be analyzed and discussed at an annual review meeting. During the annual review meeting, reduction goals, landowner contact strategy modifications, progress with critical sites, and work planning needs will be jointly developed for each subsequent year. Each year the county project managers, DNR, and DATCP staff will compare actual performance to the annual goals. Local assistance grant recommendations and awards will, in part, be determined by annual pollution reduction objectives.

Accomplishment Reporting

Polk County will use their data system to collect data for administrative accomplishments and will provide the information to the DNR and the DATCP for program evaluation. Polk County will keep the Department apprised of the changing status of critical site landowners.

The following data will be included within the annual accomplishment report:

- Number of acres within the project with conservation and nutrient management plans
- Number and type of conservation practices/BMP's installed by project
- Progress toward contacting landowners
- Information and education activities completed

Details of the reporting requirements are contained within the jointly published evaluation plan for the Soil and Water Resource Management Program and the Nonpoint Source Water Pollution Abatement Program (DNR Publication WR-223-94). The publication is reviewed every two years by the DATCP and the DNR and revised as necessary.

Likewise, participating local units of government implementing the urban nonpoint source management program will meet periodically with DNR staff to review progress. The DNR and local units of government will jointly evaluate the urban implementation program. Annual reports of governmental units will include:

- Information and education activities completed
- Construction site erosion control ordinance amendments adopted
- Number of CSEC permits monitored for ordinance compliance
- Implementation of urban "housekeeping" program activities
- Acres of existing (1995) urban lands covered by engineering feasibility studies
- Acres of new (post-1995) urban development, by land use, covered by stormwater

management plans for controlling water quality
- Stormwater management ordinance provisions adopted
- Structural best management practices installed
- Street sweeping frequency and coverage

Financial Expenditures

The Polk County LCD and other participating units of government will provide the following financial data to the DNR and the DATCP on an annual basis unless otherwise directed:

- 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 money encumbered in cost share agreements
- Staff travel expenditures
- Information and education expenditures
- Expenditures for equipment, materials, and supplies
- Expenditures for professional services
- Total project expenditures for staff
- Interest money earned and expended
- Staff training expenditures
- Total budget and expenditures on the project

Time Spent On Project Activities

The Polk County LCD and other participating governmental units with local assistance grants will provide time summaries to both departments for the following activities on an annual basis:

- Project and fiscal management
- Clerical assistance
- Pre-design and conservation planning activities
- Technical assistance: practice design, installation, cost share agreement status review and monitoring
- Educational activities
- Training activities
- Leave time

Nonpoint Source Pollutant Load Reduction Evaluation

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 Osceola Creek Watershed. Data to be collected for evaluation include sediment load reduction from uplands, gullies, reduced winter spreading of manure, and streambank (habitat) protection. Chapter two of this plan describes target pollutant reductions for the urban and rural areas of the watershed.

Cropland Sources

The Polk County LCD will use a spreadsheet that estimates sediment reductions due to changes in cropping practices to track pollutant reductions from cropland. Notification to landowners with critical sites will begin within six months following department plan approval, as stated within administrative code NR 120.09. The department may grant up to three ninety-day extensions in addition to the initial six month period to allow the Polk County LCD time for site verification. The Polk County LCD will need to submit a written request to the Department within four months after plan approval for extension consideration.

Streambank Sources

The total length of trampled streambank that has been repaired will be tracked by the Polk County LCD and reported to the DNR on an annual basis. No moderately or severely eroding sites that would be eligible for cost sharing were identified during the streambank inventory. Streambank critical site landowners will be contacted by the Polk County LCD within six months following department plan approval; critical site verification will occur at that time.

Barnyard Runoff

The LCD will use the BARNY model to estimate phosphorus reductions due to the installation of barnyard control practices. The LCD will report the information to the DNR during the annual watershed review meeting. Barnyard critical site landowners will be contacted by the Polk County LCD within six months following department plan approval; critical site verification will occur at that time.

Wetland Restorations

The number of wetland areas restored and the acreage of wetlands created will be tracked. A method to track reductions in sediment delivery from restored wetlands will be developed.

Urban Areas

The Osceola Creek Priority Watershed is predominantly a rural project with an estimated population of 2,200 residents; the village of Osceola, with a population of 2,000 residents is the only incorporated area within the watershed. The West Central Wisconsin Regional Planning Commission (Overall Economic Development Program Annual Report, 1995) reported a population increase of 31 percent between 1980 and 1990. Regional trends suggest that the population will continue to expand.

The Polk County LCD will continue to work with the village of Osceola, the town of Farmington, and the town of Osceola to promote water quality. Local units of government will report annually to the DNR on any activities that may result in changes in urban pollutant loadings. Such activities include acres of existing (1995) and new (post-1995) urban land, by land use, served by new storm water BMPs; new urban lands, by land use, not served by storm water BMPs; and other information requested by the DNR concerning BMP characteristics.

Construction Site Erosion Control

While the DNR tries to remain as flexible as possible when dealing with urban communities interested in participating in the Nonpoint Source Pollution Abatement Program, the Department also realizes the need for ordinance development when the situation warrants such an action. Because the village of Osceola and surrounding townships are currently, or projected to see rapid urban development, the village of Osceola and all townships within the Osceola Creek Watershed will be required to adopt a Department approved CSECO as a grant condition.

The village of Osceola and other local units of government participating in the urban implementation component of the Nonpoint Source Pollution Abatement Program will report annually to the DNR on the number of construction sites served by adequate erosion control practices, number of construction sites receiving appropriate permits, and any amendments to construction site erosion control ordinances that affect sediment loads associated with these sources.

Watershed Resource Evaluation Monitoring

Limited funds and the intensive staffing needed to properly evaluate water quality changes prohibits monitoring each watershed individually. Instead, two types of evaluation monitoring are being conducted on a state-wide basis: Master Monitoring Sites and Signs of Success.
The goal of the evaluation monitoring activities is to determine the progress the Nonpoint Source Program is making towards improving the quality of Wisconsin's water resources.
Evaluation monitoring activates were developed to answer five questions about the water resource objectives and the pollution reduction goals:

1) Do the levels and types of best management practices recommended in the watershed plans achieve the water resource objectives?

2) Do the types and levels of best management practices recommended in the watershed plans achieve the pollutant reduction goals?

3) Does any level of practice installation below 100 percent achieve the water resource objectives or the pollutant reduction goals?

4) Do we need to adjust the pollutant load reduction goals to achieve the water resource objectives?

5) Can we use simple environmental indicators in many of the watershed projects to provide some early evidence that the practices might achieve the water resource objectives and pollutant reduction goals?

A team of experts from state and federal agencies and the University of Wisconsin was formed to develop and direct the evaluation monitoring activities at the Master Monitoring and Signs of Success sites.

Master Monitoring Sites

Criteria were developed to select and monitor twelve streams around the state. The stream sites represent the five major types of fishery found in agricultural and urban parts of priority watersheds, and they also represent three of the five ecoregions in the state. The five fishery types are: high gradient cold water sport fishery, high gradient warm water sport fishery, high gradient warm water forage fishery, low gradient warm water forage fishery, and low gradient cold water sport fishery. A storm sewer outfall is also being monitored. The three ecoregion types represented are the Southeastern Wisconsin till plains, the Driftless area, and the North Central Hardwood Forest.

All but one of the stream sites drain a small area (about ten square miles or less). The schedule involves two years of monitoring before any best management practices are installed, five years of monitoring during the practice installation phase, 2 years of monitoring during the response period, and two years of monitoring during the post-practice installation phase, for a total of eleven years of monitoring.

State-of-the-art chemical and physical monitoring is being done at all the stream sites. State-of-the-art biological monitoring will be done at eight of the twelve streams. Results of the monitoring will be used to determine how well the best management practices achieve the pollution reduction goals and objectives. The success of the evaluation monitoring activities depends on the installation of all the best management practices at the Master Monitoring Sites.

Signs of Success Sites

Signs of success (SOS) is short-term monitoring designed to provide some early evidence that better land management does make a difference. One sight is being sought for each watershed project. Signs of Success will focus on one practice such as barnyard runoff controls, manure storage, or streambank fencing that is expected to have an early effect on the adjacent stream.

Monitoring will take place over a two-year period--the year before and the year after a practice is installed. Expected positive improvements will be on those sites where degraded habitat has occurred. Habitat sampling and photographs will be used to indicate the benefit of the practice. Limited chemical monitoring and fish sampling will be done at some sites.

The results of the signs of success monitoring will be featured in educational materials such as local newsletters and newspapers and the statewide newsletter "Fields and Streets."

SOS sites for the Osceola Creek Watershed are still being identified and will be established shortly after the implementation stage begins.

Evaluation of Innovative Approaches

Evaluation of innovative approaches will be conducted by Polk County staff at least every three years and for the final report. Interim BMP's were created to meet the specific and individual needs identified during the planning process of the Osceola Creek Priority Watershed Project and will be used on a trial basis.

These interim BMP's (Appendix A) will be evaluated by the Polk County LCD and the DNR for their effectiveness in reducing nonpoint source pollution before consideration as a standard BMP. These cost shared practices are: Vegetated Buffers for Riparian and Wetland Protection, Field Windbreaks and Windbreak Renovation, and Accelerated Street Sweeping.

Evaluation will include an analysis of practice utility based on landowner acceptance, state and landowner cost, and if possible the amount of pollution controlled. The report will also include a discussion of results, problems encountered, likelihood of transferability to other watershed projects, and recommendations based on local experience with the BMP's.

Final Report

A final report will be prepared for the Osceola Creek Priority Watershed Project within 18 months of the end of the grant period. This report will include information on landowner participation, project management, grant management, technical assistance, and any "Signs Of Success" sites 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 which target key areas needing improvement in the NPS program. The Polk County LCD will prepare the final report in cooperation with DNR and DATCP.

APPENDIX A
Interim Best Management Practices

Wetland Buffer

A. Name of Interim Best Management Practice:

Osceola Creek Vegetated Buffer for Riparian and Isolated Wetland Protection.

B. Definition

Buffers are established vegetated areas immediately adjacent to natural wetland areas. Vegetated buffers are designed and constructed to function as a filter to delay, absorb, or purify contaminated runoff before it enters a natural wetland area.

C. Purpose

Established vegetated buffers will provide significant protection to the water resource in Osceola Creek by protecting natural and restored wetland areas. This will enhance the water quality and related wetland functions of the buffered wetlands by decreasing turbidity and decreasing the likelihood of undesirable changes in the plant community such as domination by reed canary grass, phragmites, and other species which invade overly fertile wetlands. This will enhance the ability of riparian wetlands to further trap sediments and remove nutrients from associated streams.

Vegetated buffers for wetlands can also improve habitat for wildlife such as grassland birds, waterfowl, amphibians, reptiles, and small mammals, which utilize both wetlands and surrounding upland areas.

Landowners within the Osceola Creek Priority Watershed will be encouraged to participate in the conservation easement program when the establishment of a buffer is needed to meet nonpoint source program objectives. Landowners that are not interested in the conservation easement program will be eligible for riparian buffer establishment.

D. Eligibility Parameters for Buffer Establishment

1) To be eligible for an annual payment, the establishment of a thirty-five foot-wide buffer strip will be required as a minimum, although a sixty-six foot wide buffer is preferred.

a) All NRCS and DNR delineated natural wetlands will be eligible for buffer establishment.

b) The minimum measurable width of a buffer shall adhere to the matrix parameters indicated in Table A-1.

C) Vegetated buffer widths may be extended to cover floodplain areas to meet nonpoint source program objectives. Approval from the DNR District Coordinator will be required for proposed buffer areas that exceed 66 feet in width.

2) Buffers must be maintained in an NRCS, DOT, or DNR approved perennial seed mixture appropriate to the site for a period of 10 years from the installation date of the final practice listed on the cost share agreement. Reed canary grass shall not be included in any seed mix. Refer to NRCS Technical Guide Specification Number 342 for seeding recommendations.

a) Landowners shall be encouraged to plant a prairie grass seed mixture in areas deemed appropriate by the local wildlife and wetland specialists. An operation and maintenance schedule for the mowing or cutting of prairie grasses shall be followed by the landowner as recommended by the local wildlife specialist.

3) Mowing and removal of grasses that were established to provide a vegetated buffer will be allowed only to reduce competition from weeds and woody vegetation. To encourage and protect nesting wildlife, mowing will be allowed only between July 15 and September 1. Mowing in the second year and every five years thereafter is recommended.

a) Soil disturbance within the established buffer area during reseeding shall be held to a minimum. When soil disturbance becomes necessary due to streambank or gully repair, the appropriate action(s) shall be taken to limit the disturbance and protect all exposed areas.

4) Ecological considerations, such as maximizing benefits to wetland wildlife and maximizing opportunities to establish or enhance native plant communities shall be taken into account when designing this practice.

5) A cost share agreement must be signed by the landowner.

6) Cost share eligibility for the establishment of vegetated buffers is dependent upon the cost effectiveness and the absence of rills or gullies throughout the width of the buffer.

7) Before a landowner is to receive an annual payment, the sediment delivery rate of fields immediately adjacent to the proposed vegetated buffer shall be planned down to the tolerable soil loss ("T").

8) Installation of the vegetated buffer must be verified by county staff before the initial payment to the landowner is made.

9) Buffer strip boundaries shall be marked in an identifiable manner. Acceptable methods would be fencing or sign placement every 100 feet, or other DNR approved methods.

10) A status review of established buffers shall be conducted by the county agent every 3 years. While conducting a status review of a riparian wetland buffer, the county agent shall inspect for the following conditions:

a. encroachment within the delineated boundary.

b. the presence of rills or gullies.

c. sparse vegetative cover and the presence of invasive species.

d. buffer degradation due to cattle or machinery access.

11) Outstanding flat-rate payments for the vegetated buffer practice will be taken into account during the easement appraisal process for those landowners interested in selling a NPS corridor easement.

E. Cost sharing is authorized:

1. At a rate of 70% for permanent fencing or buffer boundary delineation.

2. At a rate of 70% for the establishment of an NRCS, DOT, or DNR approved perennial grass mixture that does not contain reed canary grass.

3. At a flat-rate payment of $125/acre/year for five years. This rate is based on an economic evaluation analysis.

F. Cost-sharing is not authorized for:

1. Areas with pre-established vegetated buffers that meet the aforementioned conditions.

2. The establishment of vegetated buffers in areas in which the landowner or operator will allow livestock access.

3. Sites were there is no direct benefit to protecting the surface water resource, as determined by the best professional judgement of a local LCD, DNR, or NRCS wetland expert.

G. Determining Sediment and Phosphorus Removal Rates:

1. Establishment of a vegetative buffer within the Osceola Creek Priority Watershed that complies with the aforementioned criteria can be credited at a 50 percent sediment and phosphorus removal rate.

2. Cropland within 300 feet of a vegetated buffer that has a slope greater than ten percent, is not eligible for a sediment and phosphorus removal credit.

3. Sediment and phosphorus removal credits for vegetated buffer strips of 20 to 66 feet wide is limited to drainage areas of 1,320 feet or less, measured perpendicular to the buffer.

Table A-1. Buffer Strip Matrix for the Osceola Creek Priority Watershed.

Minimum Buffer Width/ Side of Channel	Point Range	General Slope of Land Within 300 Feet of Stream	Point Range	Land Use Beyond Riparian Zone (300 feet)	Point Range	Sloped Riparian Zone Within 66 Feet of Water Body	Point Range	Drainage Area Above Segment (This Should = 2 for Lakes, Ponds and Wetlands)	Point Range	Soil Type of the Drainage Area	Point Range
20	14 - 24	0-2%	4	undisturbed forested,wetlands, idle grasslands, CRP, permanent hay	4	0 - 2%	2	0 - 25 acres	2	A	2
35	25 - 42	3-4%	8	conservation plan with high level of implementation conservation tillage, waterway's, rotation grazing	8	3 - 4%	4	26 - 50 acres	4	B	4
40	43 - 52	5-6%	12	standard rotation farm plan under "T"	18	5 - 6%	6	51 - 75 acres	6	C	6
50	53 - 64	7-8 %	16	standard rotation farm plan over "T"	22	7 - 8%	8	76 - 150 acres	8	D	9
60	65 - 78	9-10%	20	intensive agriculture (mainly row crops over "T")	26	9 - 10%	10	151 - 640 acres	10		
66	79 - 88	11-12%	24	land greater than "2T"	34	11 - 12%	12	>640 acres	12		
>66	89 -103	13-20 %	30	----------	-----	13 - 20%	18	----------	-----		

Field Windbreaks

A. Name of Interim Best Management Practice:

Osceola Creek Field Windbreaks and Windbreak Renovation.

B. Definition

A strip or belt of trees and/or shrubs established in or adjacent to a field.

C. Purpose

To reduce soil blowing and the suspension of sediments that frequently carry herbicides, fertilizers, and other contaminants to surrounding surface water areas. Proper placement of field windbreaks will reduce the volume of sediments entering adjacent surface water bodies, conserve soil moisture, and protect crops from wind damage.

D. Eligibility Parameters for Buffer Establishment

1) Field windbreaks can be installed to protect cropland that is currently exceeding the tolerable soil loss level "T", as calculated by the WEQ (Wind Erosion Equation) or at levels needed to reduce crop damage and the saltation and suspension of sediments by wind, that are contaminating surface water bodies. These levels, if less than "T", must be documented in the local Field Office Technical Guide.

a) The renovation of an existing windbreak is an eligible practice provided that one of the following conditions exist:

* Renovation is needed to provide adequate soil loss protection ("T") or level determined by the FOTG.

* The renovation will assure that nonpoint source pollution levels will meet the nonpoint source water quality goals and objectives.

2) Wildlife and environmental consideration shall be given when designing this practice.

3) A cost share agreement shall be signed by the landowner.

4) This system shall be maintained for a minimum of ten years from the installation date of the final practice listed on the cost share agreement.

5) Windbreaks shall be strategically located to minimize soil deposition to surface water. If it is necessary to place a windbreak near surface water, the windbreak shall be established at least 20 feet from the waters edge to reduce the chance of soil deposition to the stream.

6) Windbreak establishment, renovation, and planning considerations shall follow NRCS Technical Guide Specification Numbers:

382 - Fencing
392 - Field Windbreaks
650 - Windbreak Renovation

E. Maintenance

An operation and maintenance plan for field windbreaks will include documentation that meets the following criteria:

1) Dead trees or shrubs will be replaced whenever their absence will have a negative affect on windbreak performance.

2) Windbreaks should be thinned whenever crowding is contributing to reduced growth rates, limb loss, or insect and disease problems.

3) Whenever feasible and economically practical, windbreaks should be protected from insect and disease damage. Care should be taken in the selection of species that are not subject to known local insect and disease problems.

4) Windbreak plantings should be planned so that protection from physical damage is assured. Posting, flagging, and fencing can be used to exclude vehicles from the plantings.

F. Cost sharing is authorized:

1) At a rate of 70% for planting trees or shrubs as needed for restoring or establishing field windbreaks. Eligible components will include site preparation, plant materials, installation, weed control, fencing, and protective tree shelters.

2) Eligible components for windbreak renovation will be provided at a rate of 70% and includes thinning, pruning, girdling, and tree removal.

G. Cost sharing is not authorized for:

1) Fencing for property boundary delineation.

2) Planting orchard trees or plantings for ornamental purposes.

3) The establishment of field windbreaks in areas in which the landowner or operator will allow livestock access.

4) Sites where there is no direct benefit to protecting the surface water resource.

Street Sweeping

A. Name of Interim Best Management Practice:

Accelerated Street Sweeping Management Program for the village of Osceola.

B. Definition

Street sweeping involves the removal of grit, debris, and trash from urban impervious areas such as streets, parking lots, and sidewalks.

C. Purpose

The implementation of an accelerated street sweeping management program will be an integral part of attaining the desired urban water quality objectives identified in the Osceola Creek Priority Watershed Nonpoint Source Control Plan.

A water quality appraisal of Osceola Creek was conducted in 1995; this appraisal documents a dramatic decrease in macroinvertebrate numbers downstream of the stormwater discharge area, including reduced instream oxygen levels. Because the village of Osceola is situated along the escarpment of the St. Croix River, limited pollutant treatment options exist within the stormwater discharge area. The Osceola Creek Urban Water Quality Analysis, prepared by Barr Engineering, recommends street sweeping as the only feasible pollutant reduction practice in the commercial area.

The specific pollutants generally reduced by street sweeping include sediment, nutrients, and oxygen-demanding substances. The Osceola Creek Water Quality Appraisal Workgroup has established a sediment, phosphorus, lead, and other toxin reduction objective of 25 percent for the urban area of the watershed; implementation of an accelerated street sweeping management program identified within the watershed plan will be an important component to attaining this objective (Street sweeping can achieve a 16% reduction of the urban lead load for Osceola, with the use of an effective sweeper and an accelerated frequency of sweeping).

D. Eligibility Parameters

1) The village of Osceola shall adopt an accelerated urban street sweeping program that incorporates the following activities:

a) Leaf and litter pick-up and proper disposal that is consistent with the water quality objectives of the program.

b) An alternate side parking policy to allow the street sweeper complete access to the full length of the curb, as with snow removal.

c) Pickup in the spring before spring rains wash the finer particles off the streets.

d) An accelerated street sweeping program in the commercial area shall be in effect from the period of spring thaw through fall leaf pickup, on a weekly schedule.

2) The Village adopted accelerated street sweeping program shall meet the following management objectives:

a) Significantly reduce the pollutant load in the existing storm sewer area with curb and gutter, through the use of a high-efficiency combination sweeper.

b) The accelerated street sweeping program shall occur from spring thaw through fall leaf pickup, on a weekly schedule.

c) That the Village maintain the accelerated level of sweeping for a minimum period of ten years.

3) The Village of Osceola and/or the Polk County Land Conservation Department shall develop an Urban Information and Education Program that includes but is not limited to:

a) Storm drain stenciling to promote water quality awareness.

b) Sign placement or policy development to promote alternate side parking to accommodate an accelerated street sweeping program.

c) Educating local urban residents on proper lawn and garden care that includes nutrient and pesticide applications and lawn watering recommendations.

d) Beneficial landscape practices to improve water quality.

e) Good housekeeping practices such as composting of lawn, garden, and household biodegradable materials.

E. Cost sharing is authorized:

1) At a rate of 70% for a five-year professional services contract that meets the street sweeping management objectives.

2) At a rate of 70% for the purchase of a DNR (Department) approved street sweeper.

3) For activities which promote an aggressive information and education program that targets local residents and businesses, and increases awareness of the water quality aspects of the program.

4) At a rate consistent with Administrative Code NR120, for the training of a sweeper operator to optimize the efficiency of the street sweeping effort.

5) For the development of a policy to control parking on village streets to be swept if the existing program is determined to be inadequate.

F. Cost sharing is not authorized for:

1) Adopting a minimal street sweeping program that provides no additional water quality benefits.

2) Operation and maintenance of a street sweeper purchased with Nonpoint Source Program funding.

3) Disposal of the material collected by the street sweeper, although it shall be disposed of in a manner approved by the Department of Natural Resources.

G. Sediment and Phosphorus Crediting Parameters:

1) Sediment and nutrient reduction crediting will be determined by the Department; the pollutant reduction percentage will be dependent upon the street sweeping management program being implemented, which may include other incorporated core elements.

APPENDIX B
Glossary

ACUTE TOXICITY:

Any poisonous effect produced by a single short-term exposure to a chemical that results in a rapid onset of severe symptoms.

ADVANCED WASTEWATER TREATMENT:

The highest level of wastewater treatment for municipal treatment systems. It requires removal of all but 10 parts per million of suspended solids and biological oxygen and/or 50 percent of the total nitrogen. Advanced wastewater treatment is also known as "tertiary treatment."

AGRICULTURAL CONSERVATION PROGRAM (ACP):

A federal cost-sharing program to help landowners install measures to conserve soil and water resources. ACP is administered by the USDA ASCS through county ACP committees.

ALGAE:

A group of microscopic, photosynthetic water plants. Algae give off oxygen during the day as a product of photosynthesis and consume oxygen during the night as a result of respiration. Therefore, algae effect the oxygen content of water. Nutrient-enriched water increases algae growth.

AMMONIA:

A form of nitrogen (NH_3) found in human and manures. Ammonia can be toxic to aquatic life.

ANAEROBIC:

Without oxygen.

ANOXIC:

Absence of oxygen

AREA OF CONCERN:

Areas of the Great Lakes identified by the International Joint Commission (IJC) as having serious water pollution problems.

AREAWIDE WATER QUALITY MANAGEMENT PLANS (208 PLANS):

A plan to document water quality conditions in a drainage basin and make recommendations to protect and improve basin water quality. Each basin in Wisconsin must have a plan prepared for it, according to section 208 of the Clean Water Act.

ANTIDEGRADATION:

A policy stating that water quality will not be lowered below background levels unless justified by economic and social development considerations. Wisconsin's antidegradation policy is currently being revised to make it more specific and meet EPA guidelines.

AVAILABILITY:

The degree to which toxic substances or other pollutants are present in sediments or elsewhere in the ecosystem and are available to affect or be taken up by organisms. Some pollutants may be "bound up" or unavailable because they are attached to clay particles or are buried by sediment. Oxygen content, pH, temperature and other conditions in the water can affect availability.

BACTERIA:

Single-cell, microscopic organisms. Some can cause disease, but others are important in organic waste stabilization.

BARNY:

The Wisconsin Barnyard runoff model, a computer model used to assess the water quality impacts of barnyards or feedlots. It was developed by DNR with assistance from NRCS and DATCP.

BASIN PLAN:

See "Areawide Water Quality Management Plan".

BENTHIC ORGANISMS (BENTHOS):

Organisms living in or on the bottom of a lake or stream.

BEST MANAGEMENT PRACTICE (BMP):

The most effective, practical measures to control nonpoint sources of pollutants that runoff from land surfaces.

BIOACCUMULATION:

The uptake and retention of substances by an organism from its surrounding medium and food. As chemicals move through the food chain, they tend to increase in concentration in organisms at the upper end of the food chain such as predator fish, or in people or birds that eat these fish.

BIOASSAY STUDY:

A test for pollutant toxicity. Tanks of fish or other organisms are exposed to varying doses of treatment plant effluent. Lethal doses of pollutants in the effluent are then determined.

BIOCHEMICAL OXYGEN DEMAND (BOD):

A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. BOD_5 is the biochemical oxygen demand measured in a five day test. The greater the degree of pollution, the higher the BOD_5.

BIODEGRADABLE:

Waste that can be broken down by bacteria into basic elements. Most organic wastes such as food remains and paper are biodegradable.

BIOTA:

All living organisms that exist in an area.

BUFFER STRIPS:

Strips of grass or other erosion-resisting vegetation between disturbed areas and a stream or lake.

BULKHEAD LINES:

Legally established lines that indicate how far into a stream or lake an adjacent property owner has the right to fill. Many of these lines were established many years ago and allow substantial filling of the bed of the river and bay. Other environmental laws may limit filling to some degree.

CARCINOGENIC:

A chemical capable of causing cancer.

CATEGORICAL LIMITS:

All point source discharges are required to provide a basic level of treatment. For municipal wastewater treatment plants this is secondary treatment (30 mg/1 effluent limits for SS and BOD). For industry the level depends on the type of industry and the level of production. More stringent effluent limits are required, if necessary, to meet water quality standards.

CHLORINATION:

The application of chlorine to wastewater to disinfect it and kill bacteria and other organisms.

CHLORORGANIC COMPOUNDS (CHLORORGANICS):

A class of chemicals that contain chlorine, carbon and hydrocarbon. This generally refers to pesticides and herbicides that can be toxic. Examples include PCB's and pesticides such as DDT and dieldrin.

CHRONIC TOXICITY:

The effects of long-term exposure of organisms to concentrations of a toxic chemical that are not lethal, but is injurious or debilitating in one or more ways. An example of the effect of chronic toxicity is reduced reproductive success.

CLEAN WATER ACT:

See "Public Law 92-500."

COMBINED SEWERS:

A wastewater collection system that carries both sanitary sewage and stormwater runoff. During dry weather, combined sewers carry only wastewater to the treatment plant. During heavy rainfall, the sewer becomes swollen with stormwater. Because the treatment plant cannot process the excess flow, untreated sewage is discharged to the plant's receiving waters, i.e., combined sewer outflow.

CONFINED DISPOSAL FACILITY (CDF):

A structure built to contain and dispose of dredged material.

CONGENERS:

Chemical compounds that have the same molecular composition, but have different molecular structures and formula. For example, the congeners of PCB have chlorine located at different spots on the molecule. These differences can cause differences in the properties and toxicity of the congeners.

CONSERVATION TILLAGE:

Planting row crops while only slightly disturbing the soil. In this way a protective layer of plant residue stays on the surface. Erosion rates decrease.

CONSUMPTION ADVISORY:

A health warning issued by DNR and WDHSS that recommends people limit the fish they eat from some rivers and lakes based on the levels of toxic contaminants found in the fish.

CONTAMINANT:

Some material that has been added to water that is not normally present. This is different from a pollutant, which suggests there is too much of the material present.

CONVENTIONAL POLLUTANT:

Refers to suspended solids, fecal coliforms, biochemical oxygen demand, and pH, as opposed to toxic pollutants

COST-EFFECTIVE:

A level of treatment or management with the greatest incremental benefit for the money spent.

CRITERIA:

See water quality standard criteria.

DIEL:

Referring to a 24-hour period, usually involving a day and a night.

DIOXIN (2,3,7,8-tetrachlorodibenso-p-dioxin):

A chlorinated organic chemical which is highly toxic.

DISINFECTION:

A chemical or physical process that kills organism that cause disease. Chlorine is often used to disinfect wastewater.

DISSOLVED OXYGEN (DO):

Oxygen dissolved in water. Low levels of dissolved oxygen cause bad smelling water and threaten fish survival. Low levels of dissolved oxygen often result from inadequate wastewater treatment. The DNR considers 5 ppm DO necessary for fish and aquatic life.

DISTRICTS:

DNR field offices. There are six DNR administrative districts in the state (see inside back cover for map).

DREDGING:

Removal of sediment from the bottom of water bodies.

ECOSYSTEM:

The interacting system of biological community and its nonliving surrounding.

EFFLUENT:

Solid, liquid or gas wastes (byproducts) that are disposed on land, in water or in air. As used in the RAP, effluent generally means wastewater discharges.

EFFLUENT LIMITS:

The DNR issues WPDES permits establishing the maximum amount of pollutant to be discharged to a receiving stream. Limits depend on the pollutant and the water quality standards that apply for the receiving waters.

EMISSION:

A direct (smokestack particles) or indirect (busy shopping center parking lot) release of any contaminant into the air.

ENVIRONMENTAL PROTECTION AGENCY (USEPA):

The federal agency responsible for enforcing federal environmental regulations. The Environmental Protection Agency delegates some of its responsibilities for water, air and solid waste pollution control to state agencies.

ENVIRONMENTAL REPAIR FUND:

A fund established by the Wisconsin Legislature to deal with abandoned landfills.

EPIDEMIOLOGY:

The study of diseases as they affect populations rather than individuals, including the distribution and incidence of a disease mortality and morbidity rated, and the relationship of climate, age, sex, race and other factors. EPA uses such data to establish national air quality standards.

EROSION:

The wearing away of the land surface by wind or water.

EUTROPHIC:

Refers to a nutrient-rich lake. Large amounts of algae and weeds characterize a eutrophic lake (see also "Oligotrophic" and "Mesotrophic").

EUTROPHICATION:

The process of nutrient enrichment of a lake loading to increased production of aquatic organisms. Eutrophication can be accelerated by human activity such as agriculture and improper waste disposal.

FACILITY PLAN:

A preliminary planning and engineering document that identifies alternative solutions to a community's wastewater treatment problems.

FECAL COLIFORM:

A group of bacteria used to indicate the presence of other bacteria that cause disease. The number of coliform is particularly important when water is used for drinking and swimming.

FILAMENTOUS ALGAE:

Algae that forms filaments or mats attached to sediment, weeds, rocks, etc.

FISHABLE AND SWIMMABLE:

Refers to the water quality goal set for the nation's surface waters by Congress in the Clean Water Act. All waters were to meet this goal by 1984.

FOOD CHAIN:

A sequence of organisms where each uses the next as a food source.

GREEN STRIPS:

See buffer strip.

GROUNDWATER:

Undergroundwater-bearing areas generally within the boundaries of a watershed, which fill internal passageways of porous geologic formations (aquifers) with water that flows in response to gravity and pressure. Often used as the source of water for communities and industries.

HABITAT:

The place or type of site where a plant or animal naturally lives and grows.

HEAVY METALS:

Metals present in municipal and industrial wastes that pose long-tern environmental hazards if not properly disposed. Heavy metals can contaminate ground and surface waters, fish and other food stuffs. The metals of most concern are: arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium and zinc (see also separate listings of these metals for their health effects).

HERBICIDE:

A type of pesticide that is specifically designed to kill plants and can also be toxic to other organisms.

INFLUENT:

Influent for an industry would be the river water that the plant intakes for use in its processing. Influent to a municipal treatment plant is untreated wastewater.

IN-PLACE POLLUTION:

As used in the RAP, refers to pollution from contaminated sediments. These sediments are polluted from post discharges from municipal and industrial sources.

ISOROPYLBIPHENYL:

A chemical compound used as a substitute for PCB.

LANDFILL:

A conventional sanitary landfill is "a land disposal site employing an engineered method of disposing of solid wastes on land in a manner that minimizes environmental hazards by spreading solid wastes in thin layers, materials at the end of each operating day". Hazardous wastes frequently require various types of pretreatment before they are disposed of, i.e., neutralization chemical fixation encapsulation. Neutralizing and disposing of wastes should be

considered a last resort. Repurifying and reusing waste materials or recycling them for another use may be less costly.

LEACHATE:

The contaminated liquid which seeps from a pile or cell of solid materials and which contains water, dissolved and decomposing solids. Leachate may enter the groundwater and contaminate drinking water supplies.

LOAD:

The total amount of materials or pollutants reaching a given local.

MACROPHYTE:

A rooted aquatic plant.

MASS:

The amount of material a substance contains causing it to have weight in a gravitational field.

MASS BALANCE:

A study that examines all parts of the ecosystem to determine the amount of toxic or other pollutant present, its sources, and the processes by which the chemical moves through the ecosystem.

MESOTROPHIC:

Refers to a moderately fertile nutrient level of a lake between the oligotrophic and eutrophic levels. (See also "Eutrophic" and "Oligotrohpic.")

MILLIGRAMS PER LITER (mg/1):

A measure of the concentration of substance in water. For most pollution measurement this is the equivalent of "parts per million".

MITIGATION:

The effort to lessen the damages caused, by modifying a project, providing alternatives, compensating for losses or replacing lost values.

MIXING ZONE:

The portion of a stream or lake where effluent is allowed to mix with the receiving water. The size of the area depends on the volume and flow of the discharge and receiving water. For streams the mixing zone it is one-third of the lowest flow that occurs once every 10 years for a seven day period.

NONPOINT SOURCE POLLUTION (NSP):

Pollution whose sources cannot be traced to a single point such as a municipal or industrial wastewater treatment plant discharge pipe. Nonpoint sources include eroding farmland and construction sites, urban streets, and barnyards. Pollutants from these sources reach water bodies in runoff, which can best be controlled by proper land management.

OLIGOTROPHIC:

Refers to an unproductive and nutrient-poor lake. Such lakes typically have very clear water. (See also "Eutrophic" and "Mesotrophic.")

OUTFALL:

The mouth of a sewer, drain, or pipe where effluent from a wastewater treatment plant is discharged.

PATHOGEN:

Any infective agent capable of producing disease. It may be a virus, bacterium, protozoan, etc.

PELAGIC:

Referring to open water portion of a lake.

PERIPHYTON:

Microscopic plants growing on rocks and other substrate.

PESTICIDE:

Any chemical agent used to control specific organisms, such as insecticides, herbicides, fungicides, etc.

PH:

A measure of acidity or alkalinity, measured on a scale of 0 to 14 with 7 being neutral and 0 being most acid, and 14 being most alkaline.

PHENOLS:

Organic compounds that are byproducts of petroleum refining, textile, dye, and resin manufacture. High concentrations can cause taste and odor problems in fish. Higher concentration can be toxic to fish and aquatic life.

PHOSPHORUS:

A nutrient that, when reaching lakes in excess amounts, can lead to overfertile conditions and algae blooms.

PLANKTON:

Tiny plants and animals that live in water.

POINT SOURCES:

Sources of pollution that have discrete discharges, usually from a pipe or outfall.

POLLUTION:

The presence of materials or energy whose nature, location, or quantity produces undesired environmental effects.

POLYCHLORINATED BIPHENYLS (PCBs):

A group of 209 compounds, PCBs have been manufactured since 1929 for such common uses as electrical insulation and heating/cooling equipment, because they resist wear and chemical breakdown. Although banned in 1979 because of their toxicity, they have been detected on air, land and water. Recent surveys found PCBs in every section of the country, even those remote from PCB manufacturers.

POLYCHLORINATED ORGANIC COMPOUNDS:

A group of toxic chemicals which contain several chlorine atoms.

PRETREATMENT:

A partial wastewater treatment required from some industries. Pretreatment removes some types of industrial pollutants before the wastewater is discharged to a municipal wastewater treatment plant.

PRIORITY POLLUTANT:

A list of toxic chemicals identified by the federal government because of their potential impact in the environment and human health. Major dischargers are required to monitor all or some of these chemicals when their WPDES permits are reissued.

PRIORITY WATERSHED:

A drainage area about 100,000 acres in size selected to receive Wisconsin Fund money to help pay the cost of controlling nonpoint source pollution. Because money is limited, only watersheds where problems are critical, control is practical, and cooperation is likely are selected for funding.

PRODUCTIVITY:

A measure of the amount of living matter which is supported by an environment over a specific period of time. Often described in terms of algae production for a lake.

PUBLIC LAW 92-500 (CLEAN WATER ACT):

The federal law that sets national policy for improving and protecting the quality of the nation's waters. The law set a timetable for the cleanup of the nation's waters and stated that they are to be fishable and swimmable. This also required all dischargers of pollutants to obtain a permit and meet the conditions of the permit. To accomplish this pollution cleanup, billions of dollars have been made available to help communities pay the cost of building sewage treatment facilities. Amendments in the Clean Water Act were made in 1977 by passage of Public Law 95-217, and in 1987.

PUBLIC PARTICIPATION:

The active involvement of interested and affected citizens in governmental decision-making.

PUBLICLY OWNED TREATMENT WORKS (POTW):

A wastewater treatment plat owned by a city, village or other unit of government.

RECYCLING:

The process that transforms waste materials into new products.

REMEDIAL ACTION PLAN:

A plan designed to restore beneficial uses to a Great Lakes Area of Concern.

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RF/FS):

An investigation of problems and assessment of management options conducted as part of a superfund project.

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 (RCRA):

This federal law amends the Solid Waste Disposal Act of 1965 and expands on the Resource Recovery Act of 1970 to provide a program that regulates hazardous wastes, to eliminate open dumping and to promote solid waste management programs.

RETRO-FIT:
The placement of an urban structural practice in an existing urban area, which may involve rerouting existing storm sewers and/or relocating existing buildings or other structures.

RIPARIAN:
Belonging or relating to the bank of a lake, river or stream.

RIPRAP:
Broken rock, cobbles, or boulders placed on the bank of a stream to protect it against erosion.

RULE:
Refers to Wisconsin administrative rules. See Wisconsin Administrative Code.

RUNOFF:
Water from rain, snowmelt, or irrigation that flows over the ground surface and returns to streams. Runoff can collect pollutants from air or land and carry them to receiving waters.

SECONDARY IMPACTS:
The indirect effects that an action can have on the health of the ecosystem or the economy.

SECONDARY TREATMENT:
Two-stage wastewater treatment that allows the coarse particles to settle out, as in primary treatment, followed by biological breakdowns of the remaining impurities. Secondary treatment commonly removes 90% of the impurities. Sometimes "secondary treatment" refers simply to the biological part of the treatment process.

SEDIMENT:
Soil particles suspended in and carried by water as a result of erosion.

SEICHES:
Changes in water levels due to the tipping of water in an elongated lake basin whereby water is raised in one end of the basin and lowered in the other.

SEPTIC SYSTEM:
Sewage treatment and disposal for homes not connected to sewer lines. Usually the system includes a tank and drain field. Solids settle to the bottom of the tank. Liquid percolates through the drain field.

SLUDGE:
A byproduct of wastewater treatment; waste solids suspended in water.

SOLID WASTE:
Unwanted or discharged material with insufficient liquid to be free flowing.

STANDARDS:
See water quality standards.

STORM SEWERS:
A system of sewers that collect and transport rain and snow runoff. In areas that have separated sewers, such stormwater is not mixed with sanitary sewage.

SUPERFUND:

A federal program that provides for cleanup of major hazardous landfills and land disposal areas.

SUSPENDED SOLIDS (SS):

Small particles of solid pollutants suspended in water.

SYNERGISM:

The total effect is greater than the sum of the individual effects. For example, the characteristic property of a mixture of toxicants that exhibits a greater-than-additive cumulative toxic effect.

TERTIARY TREATMENT:

See advanced wastewater treatment.

TOP-DOWN MANAGEMENT:

A management theory that uses biomanipulation, specifically the stocking of predator species of fish to improve water quality.

TOTAL MAXIMUM DAILY LOADS:

The maximum amount of a pollutant that can be discharged into a stream without causing a violation of water quality standards.

TOXIC:

An adjective that describes a substance which is poisonous, or can kill or injure a person or plants and animals upon direct contact or long-term exposure. (Also, see toxic substance.)

TOXIC SUBSTANCE:

A chemical or mixture of chemicals which, through sufficient exposure, or ingestion, inhalation of assimilation by an organism, either directly from the environment or indirectly by ingestion through the food chain, will, on the basis of available information cause death, disease, behavioral or immunologic abnormalities, cancer, genetic mutations, or development of physiological malfunctions, including malfunctions in reproduction or physical deformations, in organisms or their offspring.

TOXICANT:

See toxic substance.

TOXICITY:

The degree of danger posed by a toxic substance to animal or plant life. Also see acute toxicity, chronic toxicity and additivity.

TOXICITY REDUCTION EVALUATION:

A requirement for a discharger that the causes of toxicity in an effluent be determined and measures taken to eliminate the toxicity. The measures may be treatment, product substitution, chemical use reduction or other actions that will achieve the desired result.

TREATMENT PLANT:

See wastewater treatment plant.

TROPHIC STATUS:

The level of growth or productivity of a lake as measured by phosphorus content, algae abundance, and depth of light penetration.

TURBIDITY:

Lack of water clarity. Turbidity is usually closely related to the amount of suspended solids in water.

UNIFORM DWELLING CODE:

A statewide building code for communities larger than 2500 residents specifying requirements for electrical, heating, ventilation, fire, structural, plumbing, construction site erosion, and other construction related practices.

UNIVERSITY OF WISCONSIN-EXTENSION (UWEX):

A special outreach, education branch of the state university system.

VARIANCE:

Government permission for a delay or exception in the application of a given law, ordinance or regulation. Also, see water quality standard variance.

VOLATILE:

Any substance that evaporates at a low temperature.

WASTELOAD ALLOCATION:

Division of the amount of waste a stream can assimilate among the various dischargers to the stream. This limits the amount (in pounds) of chemical or biological constituent discharged from a wastewater treatment plant to a water body.

WASTEWATER:

Water that has become contaminated as a byproduct of some human activity. Wastewater includes sewage, washwater and the water-borne wastes of industrial processes.

WASTE:

Unwanted materials left over from manufacturing processes, refuse from places of human habitation or animal habitation.

WASTEWATER TREATMENT PLANT:

A facility for purifying wastewater. Modern wastewater treatment plants are capable of removing 95% of organic pollutants.

WATER QUALITY AGREEMENT:

The Great Lakes Water Quality agreement was initially signed by Canada and the United States in 1972 and was subsequently revised in 1978 and 1987. It proves guidance for the management of water quality, specifically phosphorus and toxics, in the Great Lakes.

WATER QUALITY LIMITED SEGMENT:

A section of river where water quality standards will not be met if only categorical effluent standards are met.

WATER QUALITY CRITERIA:

A measure of the physical, chemical or biological characteristics of a water body necessary to protect and maintain different water uses (fish and aquatic life, swimming, etc.).

WATER QUALITY STANDARDS:

The legal basis and determination of the use of a water body and the water quality criteria, physical, chemical, or biological characteristics of a water body, that must be met to make it suitable for the specified use.

WATER QUALITY STANDARD VARIANCE:

When natural conditions of a water body preclude meeting all conditions necessary to maintain full fish and aquatic life and swimming, a variance may be granted.

WATERSHED:

The land area that drains into a lake or river.

WETLANDS:

Areas that are inundates or saturated by surface or groundwater at a frequency and duration sufficient to support a variety of vegetative or aquatic life. Wetland vegetation requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs and similar areas.

WINHUSLE:

A computer model for evaluating sediment delivery to suface waters from agricultural lands. It was developed by DNR with assistance from NRCS.

WISCONSIN ADMINISTRATIVE CODE:

The set of rules written and used by state agencies to implement state statutes. Administrative codes are subject to public hearing and have the force of law.

WISCONSIN FUND:

A state program that helps pay the cost of reducing water pollution. Funding for the program comes from general revenues and bonds and is based on a percentage of the state's taxable property value. The Wisconsin Fund includes these programs:
Point Source Water Pollution Abatement Grant Program - Provides grants for 60% of the cost of constructing wastewater treatment facilities. Most of this program's money goes for treatment plant construction, but three percent of this fund is available for repair or replacement of private, on-site sewer systems.

Nonpoint Source Water Pollution Abatement Grant Program - Funds to share the cost of reducing water pollution. Nonspecified sources are available in selected priority watersheds.

Solid Waste Grant Program - Communities planning for solid waste disposal sites are eligible for grant money. $500,000 will be available each year to help with planning costs.

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT GRANT PROGRAM:

A state cost-share program established by the State Legislature in 1978 to help pay the costs of controlling nonpoint source pollution. Also known as the nonpoint source element of the Wisconsin Fund or the Priority Watershed Program.

WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES):

A permit system to monitor and control the point source dischargers of wastewater in Wisconsin. Dischargers are required to have a discharge permit and meet the conditions it specifies.

APPENDIX C
List of Acronyms

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

APPENDIX D
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Priority Watershed Projects in Wisconsin: 1996 - 1997

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

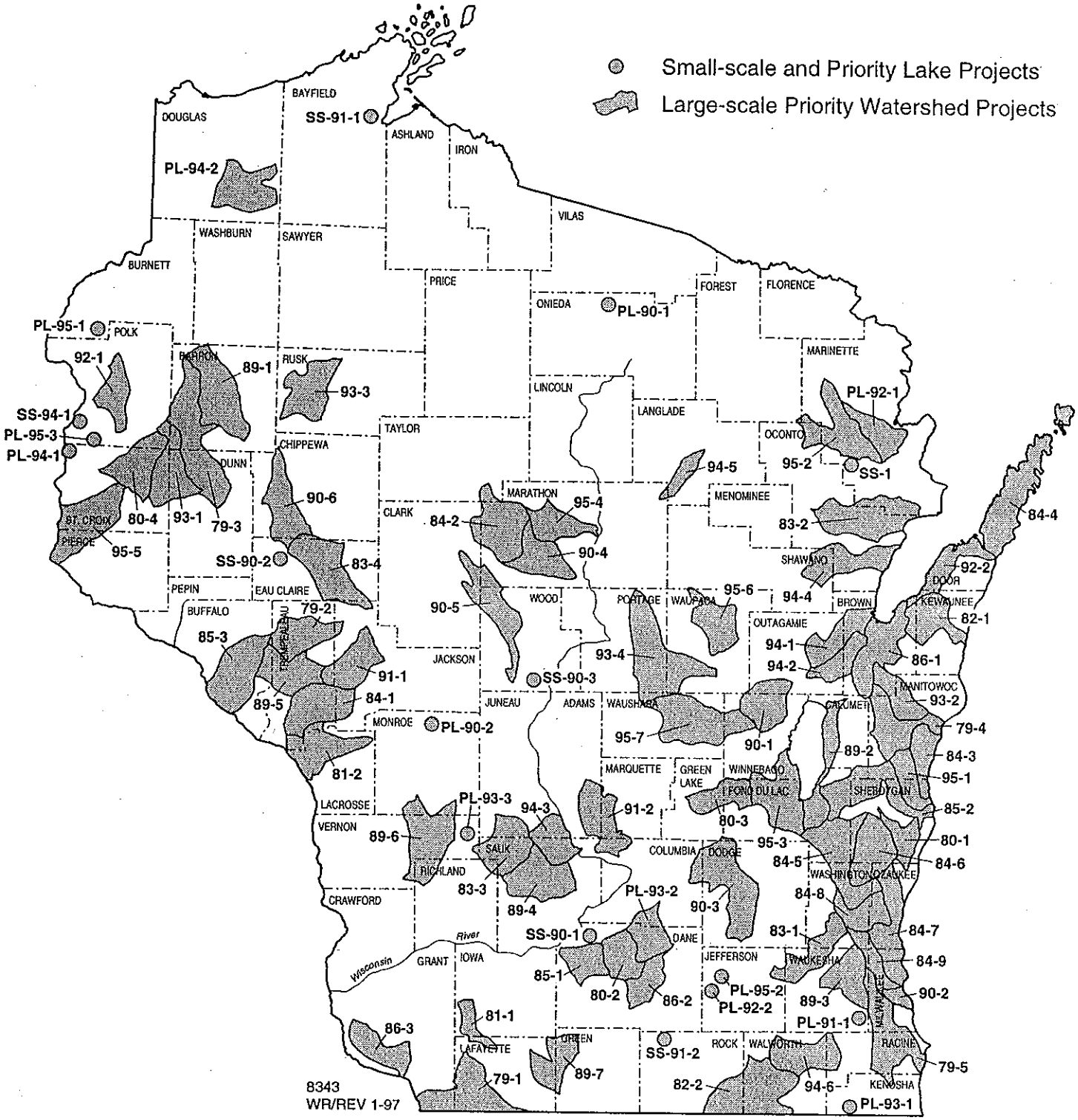
Year Selected-Map Number	Small-scale Priority Watershed Project	County(ies)
SS-1	Bass Lake ♦	Marinette
SS-90-1	Dunlap Creek	Dane
SS-90-2	Lowes Creek	Eau Claire
SS-90-3	Port Edwards - Groundwater Prototype	Wood
SS-91-1	Whittlesey Creek	Bayfield
SS-91-2	Spring Creek	Rock
SS-94-1	Osceola Creek	Polk

Year Selected-Map Number	Priority Lake Project	County(ies)
PL-90-1	Minocqua Lake	Oneida
PL-90-2	Lake Tomah	Monroe
PL-91-1	Little Muskego, Big Muskego, Wind Lakes	Waukesha, Racine, Milwaukee
PL-92-1	Lake Noquebay	Marinette
PL-92-2	Lake Ripley	Jefferson
PL-93-1	Camp/Center Lakes	Kenosha
PL-93-2	Lake Mendota	Dane, Columbia
PL-93-3	Hillsboro	Vernon
PL-94-1	St. Croix County Lakes Cluster	St. Croix
PL-94-2	Upper St. Croix/Eau Claire River	Douglas
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).*

Priority Watershed Projects in Wisconsin
1996-1997



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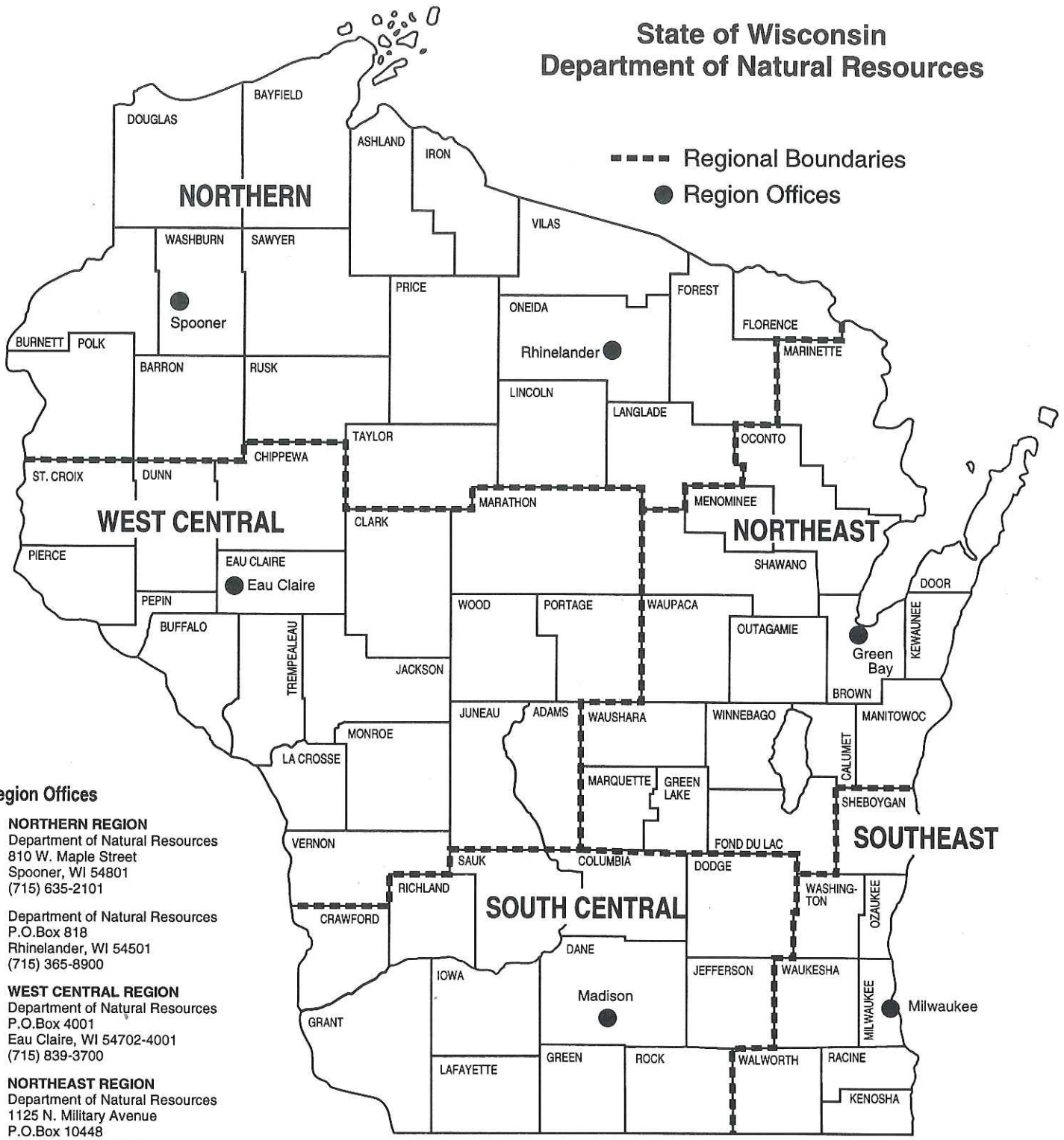

Region Offices

NORTHERN REGION
Department of Natural Resources
810 W. Maple Street
Spooner, WI 54801
(715) 635-2101

Department of Natural Resources
P.O.Box 818
Rhinelander, WI 54501
(715) 365-8900

WEST CENTRAL REGION
Department of Natural Resources
P.O.Box 4001
Eau Claire, WI 54702-4001
(715) 839-3700

NORTHEAST REGION
Department of Natural Resources
1125 N. Military Avenue
P.O.Box 10448
Green Bay, WI 54307
(414) 492-5800

SOUTHEAST REGION
Department of Natural Resources
2300 N. Dr. Martin Luther King Jr. Dr.
P.O.Box 12436
Milwaukee, WI 53212
(414) 263-8500

SOUTH CENTRAL REGION
Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711
(608) 275-3266

REV 1-97

Our Mission:

To protect and enhance our Natural Resources—
our air, land and water;
our wildlife, fish and forests.

To provide a clean 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.

And in cooperation with all our citizens
to consider the future
and those who will follow us.

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