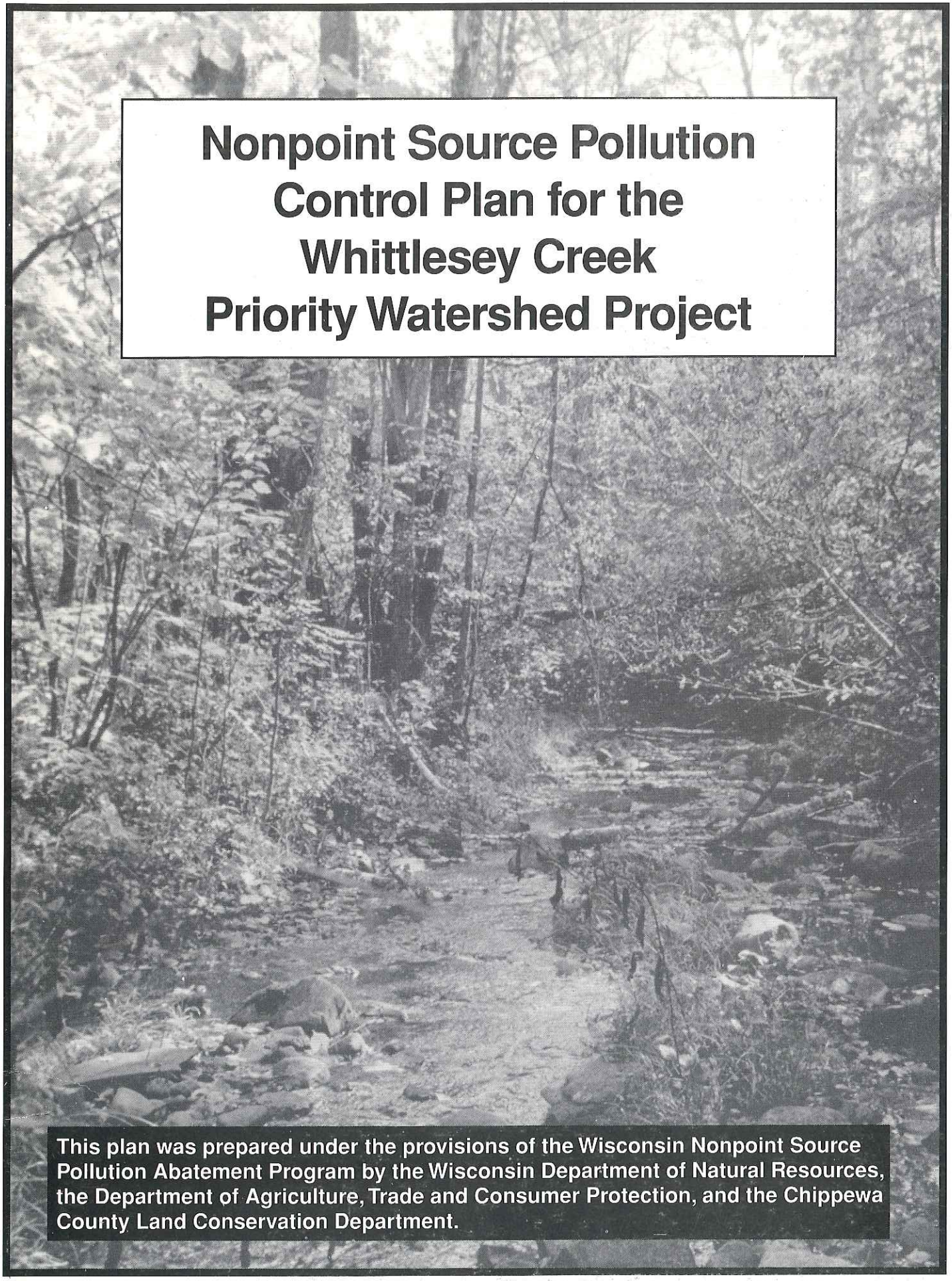


Nonpoint Source Pollution Control Plan for the Whittlesey Creek Priority Watershed Project

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 Chippewa County Land Conservation Department.

Watershed Plan Organization Information

Natural Resources Board
1996

Herbert F. Behnke, Chairman
Trygve A. Solberg, Vice Chairman
Neal W. Schneider, Secretary
James E. Tiefenthaler, Jr.
Stephen D. Willett
Betty Jo Nelsen
Mary Jane Nelson

Chippewa County Land Conservation Committee

Duane Bowe
Emery Sedlacek
Marilyn Holte
Jim Dahl
Vernon Kellen
Evelyn Maloney
Ronald Steinmetz

Department of Natural Resources

George E. Meyer, Secretary
Susan L. Sylvester, Administrator, Division for Environmental Quality
Bruce Baker, Director, Bureau of Water Resources Management
Rebecca Wallace, Chief, Nonpoint Source & Land Management Section

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 Section

A NONPOINT SOURCE CONTROL PLAN FOR THE WHITTLESEY CREEK PRIORITY WATERSHED PROJECT

The Wisconsin Nonpoint Source Water Pollution Abatement Program

Plan Published: December 1996

This Plan Was Cooperatively Prepared By:

The Department of Natural Resources
The Department of Agriculture, Trade and Consumer Protection
The Bayfield County Land Conservation Department
The Whittlesey Creek Steering Committee

Publication WR-474-96

For copies of this document please contact:

Department of Natural Resources
Bureau of Water Resources Management
Nonpoint Source and Land Management Section
P.O. Box 7291
Madison, WI 53707

The DNR 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 ACKNOWLEDGEMENTS

Thanks is extended to the many people who helped with this project.

Project Steering Committee

Ron Hellstrom, Chairman - Land Conservation Department
Bruce Swanson - DNR Fisheries Management
Tom Syverud - UW Agricultural Research Station
Rose Hillebrand - DNR Forest Management
Sandy Schultz - ABDI Land Conservation Department
Tom Cogger, Natural Resource Conservation Service
Ulf Gafvert, Natural Resource Conservation Service
John Markus - UWEX Agricultural Agent
Ray Kiewit - Chequamegon National Forest
John Wroblewski - Barksdale Town Chairman
George F. Koval - Land Conservation Department
Rudy Janes - Land Conservation Department
Verne Gillis - Land Conservation Department
Bill Heart - Land Conservation Department
Lillian Santikko - Land Conservation Department

Project Supporting Staff

Frank Koshere - DNR
Lynne Hess - DATCP
Phil Belfiori - DNR

Principal Authors

Mike Gardner - Whittlesey Creek Project Manager
Jane Malischke - DNR Nonpoint Source Coordinator

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

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

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

June 11, 1996

IN REPLY REFER TO: 3200

Mr. Fred Janz, Chairman
Route 3
Ashland, WI 54806

Dear Fred Janz:

I am pleased to approve the Whittlesey Creek Priority Watershed Management Plan prepared through the Wisconsin Nonpoint Source Pollution Abatement Program. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. The plan went before the Land and Water Conservation Board on February 19, 1996 and was unanimously approved at that time. I am also approving this plan as an amendment tot he Lake Superior Areawide Water Quality Management Plan.

I would like to express the Department's appreciation to the Land Conservation Department staff that participated in preparing this plan. We look forward to assisting the county and other units of government in the watershed int he implementation of the Whittlesey Creek Priority Watershed Management Plan.

Sincerely,

George E. Meyer
Secretary

cc: Alan Tracy - DATCP
Jim Bradley - LWCD
Sandy Schultz - ABDI County LCD
Mike Gardner - Bayfield County LCD
George Koval - Bayfield County LCC Chairman
Ted Smith - NWD
Jane Malischke - NWD
Lynne Hess - DATCP
Cindy Hoffland - CA/8

06-19-96 A08:34 IN

WISCONSIN
DEPT. OF NATURAL RESOURCES
George E. Meyer
Secretary

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

101 South Webster Street
P.O. Box 7921
Madison, Wisconsin 53707
TELEPHONE 608-266-2621
TELEFAX 608-267-3579
TDD 608-267-6897

June 15, 1995

IN REPLY REFER TO: 3200

Fred Janz, Chairman
Rt. 3
Ashland, WI 54806

Dear Mr. Janz:

I am pleased to approve the Whittlesey Creek Priority Watershed Management Plan 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. The plan went before the Land and Water Conservation Board on February 19, 1996 and was unanimously approved at that time. I am also approving this plan as an amendment to the Lake Superior Areawide Water Quality Management Plan.

I would like to express the Department's appreciation to the Land Conservation Department staff that participated in preparing this plan. We look forward to assisting the county and other units of government in the watershed in the implementation of the Whittlesey Creek Priority Watershed Management Plan.

Sincerely,

George E. Meyer
Secretary

cc: Alan Tracy, DATCP
Jim Bradley, LWCB
Sandy Schultz, ABDI County LCD
Mike Gardner, Bayfield County LCD
George Koval, Bayfield County LCC Chairman
Ted Smith, NWD
Jane Malischke, NWD
Lynne Hess, DATCP
Cindy Hoffland, CA/8

Whittlesey Creek Watershed Plan

Whereas, the Bayfield County Board of Supervisors at their September 27, 1994 meeting approved the Nonpoint Source Pollution Management Plan for Whittlesey Creek; and

Whereas, under the direction of the Department of Natural Resources the plan has been amended; and

Whereas, the Bayfield County Land Conservation Committee has held public meetings, and a public hearing was conducted to allow the public to comment on the amended plan; and

Whereas, the Bayfield County Land Conservation Committee has reviewed and approved the amended watershed plan; and

Whereas, the Bayfield County Land Conservation Committee is now submitting the amended watershed plan to the County Board of Supervisors for review and approval.

Now, Therefore, Be It Resolved that the Bayfield County Board of Supervisors approves the amended Nonpoint Source Pollution Management Plan for Whittlesey Creek.

November 14, 1995

Lillian Santikko

Verne Gilles

George Koval

STATE OF WISCONSIN }
COUNTY OF BAYFIELD }

I, THOMAS J. GORDON, Bayfield County Clerk, DO HEREBY CERTIFY that the foregoing is a true and correct copy of Resolution #7.a. adopted by the County Board of Supervisors at their meeting held 11/14/95

THOMAS J. GORDON Bayfield County Clerk

Table of Contents

List of Figures

Page

List of Tables

EXECUTIVE SUMMARY

Introduction

Whittlesey Creek was designated as a priority watershed in 1991. The purpose of the Whittlesey Creek Watershed project is to protect and improve water quality in the watershed. The Nonpoint Source Management Plan is a guide to implement measures that protect watershed functions that are healthy while directing restoration treatments toward underlying processes causing deterioration.

General Watershed Characteristics

The Whittlesey Creek watershed is located in the township of Barksdale in Bayfield County. It is located in the Lake Superior drainage basin and is a direct tributary to the Lake at Chequamegon Bay. The watershed covers approximately 12,000 acres, 50% is located in the Chequamegon National Forest. The remaining land uses are 14% agriculture and 36% small rural plots, wetland and woodlots.

Water Quality

Streams in the watershed are regionally important for fish spawning and rearing habitats. The mouth of Whittlesey is part of a large coastal wetland that comprises a significant part of the aquatic and wildlife resources of Chequamegon Bay.

Physical habitat and not other water quality problems are limiting the streams in the Whittlesey watershed from reaching full potential. Nonpoint sources of pollution in the form of sediment (sand) from unstable streambanks and surface runoff are causing degradation. Deposition of excessive fine sediment on the stream bottom eliminates habitat for aquatic insects, reduces the permeability of spawning gravels and blocks the interchange of subsurface and surface waters.

Goals and Objectives

The primary water resource goal for the project is to protect and improve fish habitat for both anadromous and resident trout and salmon in each of the watershed streams. Working toward the following objectives will bring us toward the goal.

- Protect stream water quality from nutrient and organic oxygen consuming wastes.
- Protect stream from cropland runoff.
- Reduce hydraulic peaks and improve baseflow to the stream.
- Reduce bank erosion.
- Reduce stream sediment bedload.
- Improve instream habitat.

The management strategies developed to achieve the water resource goals and objectives are based on voluntary participation in the program by landowners controlling all nonpoint sources on their property. Landowners will be encouraged to develop a management plan that will meet their own objectives for the land and provide for hydrologic and water quality benefits.

Management Actions

To meet the water quality goals and objectives the following practices and programs will be available to project participants:

Cost-Share Agreements: An agreement between Bayfield County and individual landowners listing the best management practices and establishing the conditions and considerations under which the cost-share recipient agrees to install the practices consistent with the watershed plan.

Best Management Practices:

- Grassed Waterway
- Streambank Stabilization
- Wetland Restoration
- Shoreline Buffers
- Critical Area Stabilization
- Livestock Exclusions
- Diversions
- Critical Area Stabilization
- Green Manure Crop
- Barnyard Runoff Management
- Manure Storage Facility
- Grade Stabilization Structure
- Nutrient Management
- Sediment Basins

Conservation Easements: Purchase of an easement means purchasing a limited set of rights associated with the ownership of a particular tract of land. The whole point of an easement is to purchase only specific rights to accomplish a specific purpose. The rights purchased in any particular transaction will vary depending on the water quality objective and the character of the tract relative to the purpose.

Land Use Planning: Land use activities in the watershed involve complex interactions, where an activity in one area impacts the activities in other areas. Most watershed management activities have impacts on a number of different people as well. Because of this interaction, it is critical that land use be coordinated through a practical integrative planning process. Land use planning will be a cost-shared best management practice for the watershed project.

Interim Forestry Best Management Practices: To promote and support multi-resource management on private forest lands cost-sharing will be provided for forest erosion best management practices. As determined in each landowners management plan practices for tree planting, road and skid trail stabilization will be eligible consistent with the Wisconsin Program Provisions for the Stewardship Incentive Program.

Project Implementation

Owners of public and private land within the Whittlesey watershed will be eligible to participate

in the project. They will enter into agreements with Bayfield County to install best management practices on their property to reduce nonpoint sources of pollution. Participating landowners will have water quality conservation plans developed for all their property and will work with the components of their cost-share agreement.

Table S1: Total Project Cost and Grant Disbursement Schedule 75% Landowner Participation

	Project Year				
Item	**1**	**2**	**3**	**4 - 8**	**Total**
Cost Share Funds: Practices	$88,581	$177,162	$177,162	$708,648	$1,151,553
Cost Share Funds: Easements	$10,000	$10,000	$10,000	$40,000	$70,000
Staff Support	$36,400	$36,400	$36,400	$145,600	$254,800
Information/Education	$2,000	$2,000	$2,000	$8,000	$14,000
Other Direct	$4,160	$4,160	$4,160	$16,640	$29,120
Total	$141,141	$229,722	$229,722	$918,888	$1,519,473

Information and Education Program

To achieve its objective to protect and improve water quality the project will maintain a program designed to increase awareness, understanding and appreciation of water resources in the watershed. School programs, field days and teacher education featuring the principles of watershed dynamics, ecosystem function and nonpoint sources of pollution will be pursued. Project residents need to be aware of the projects existence and that technical, educational and financial assistance is available for the application of best management practices.

Project Evaluation and Monitoring

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

Administrative: This category includes the tracking of progress in providing technical and financial assistance to eligible landowners and carrying out educational activities. The Bayfield County Land Conservation Department will track progress and report to the DNR and DATCP quarterly.

Pollutant Reduction Evaluation: The Bayfield County LCD will determine the reductions in nonpoint source pollutant loadings for upland sediment sources, gullies and streambanks and report to the DNR at an annual review meeting.

Water Resources: The DNR will monitor the stream for changes. Water temperature, habitat diversity and fish populations will be used as indicators.

CHAPTER 1: INTRODUCTION, PURPOSE, AND LEGAL STATUS

Nonpoint Source Water Pollution Abatement Program

The Wisconsin Nonpoint Source Water Pollution Abatement Program was created in 1978 by the state legislature. The goal of the program is to improve the water quality of streams, lakes, wetlands, and groundwater by reducing pollutants from urban and rural nonpoint sources. The 18 square-mile Whittlesey Creek watershed, located in Bayfield County, was designated a "priority watershed" in October 1991.

Nonpoint sources of pollution include: erosion from agricultural lands, timber harvesting, streambanks, roadsides and developing recreational areas. Pollutants from nonpoint sources are carried to the surface water or groundwater through the action of rainfall, runoff, snow melt, and seepage.

The following is an overview of the program:

The program is administered by the Department of Natural Resources (DNR).
The program focuses on critical hydrologic units called priority watersheds and is implemented through priority watershed projects.

A priority watershed project is guided by a plan prepared cooperatively by the DNR and local units of government, with input from a local citizens steering 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. A priority watershed plan is developed which contains an assessment of nonpoint and other sources of water pollution in the watershed and identifies Best Management Practices needed to control pollutants to meet specific water quality and water resource objectives. The plan is used to guide implementation of practices in an effort to improve water quality.

Upon approval by state and local authorities, the plan is implemented by local units of government. Water quality improvement is achieved through voluntary implementation of nonpoint source controls (Best Management Practices) and the adoption of local ordinances. Landowners, land renters, counties, cities, villages, towns, metropolitan sewerage districts, lake districts, and regional planning commissions are eligible to participate.

Technical assistance is provided to aid in the design of Best Management Practices. State level cost share assistance is available to help offset the cost of installing these practices. Eligible landowners and local units of government are contacted by the County Land Conservation Departments to determine their interest in voluntarily installing the Best Management Practices identified in the plan. Cost share agreements are signed listing the practices, costs, cost share amounts and a schedule for installation of management practices.

Informational and educational activities are conducted to encourage participation.

The DNR reviews the progress of the counties and other implementing units of government, and provides assistance throughout the eight year project.

Legal Status of the Nonpoint Source Control Plan

The Whittlesey Creek Watershed Plan has been 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. The plan has been prepared under the cooperative efforts of DNR, Bayfield County Land Conservation Department, Natural Resource Conservation Service, US - Forest Service, local units of government, and the Whittlesey Creek Watershed Steering Committee.

This plan is the basis for the DNR to enter into cost share and local assistance grants and is used as a guide to implement measures to achieve desired water quality conditions. In the event that a discrepancy occurs between this plan and the statutes or the administrative rules, or if the statutes or rules change during implementation, the statutes and rules will supersede the plan.

Plan Organization

Chapter 2. "General Watershed Characteristics," is an overview of the cultural and natural resource features pertinent to planning and implementation efforts for the priority watershed project.

Chapter 3. "Water Quality Conditions, Objectives, and Nonpoint Pollution Sources," contains a presentation of field inventory results and an identification of the water quality or water resource problems, and the improvements that can be obtained through implementation of a nonpoint source control project.

Chapter 4. "Recommended Management Actions," includes an identification of the level of rural nonpoint source pollution control needed to meet the water quality objectives. Eligibility criteria for funding to control nonpoint sources under the priority watershed project are also presented.

Chapter 5. "Local Government's Implementation Program," describes the means by which the local units of government administer the project, estimates a local assistance and management practice cost share budget, and identifies an information and education program.

Chapter 6. "Integrated Resource Management," presents the strategy for involving DNR resource management programs (fisheries management, forestry, wildlife, etc.) in the nonpoint pollution abatement efforts in the Whittlesey Creek Watershed. Also presented in this chapter are ideas for integrating the watershed project with other national programs involving coastal zone management and Great Lakes or Lake Superior programs.

Chapter 7. "Progress Assessments," discusses the means for assessing the amount of nonpoint source control gained through installation of best management practices in the watershed.

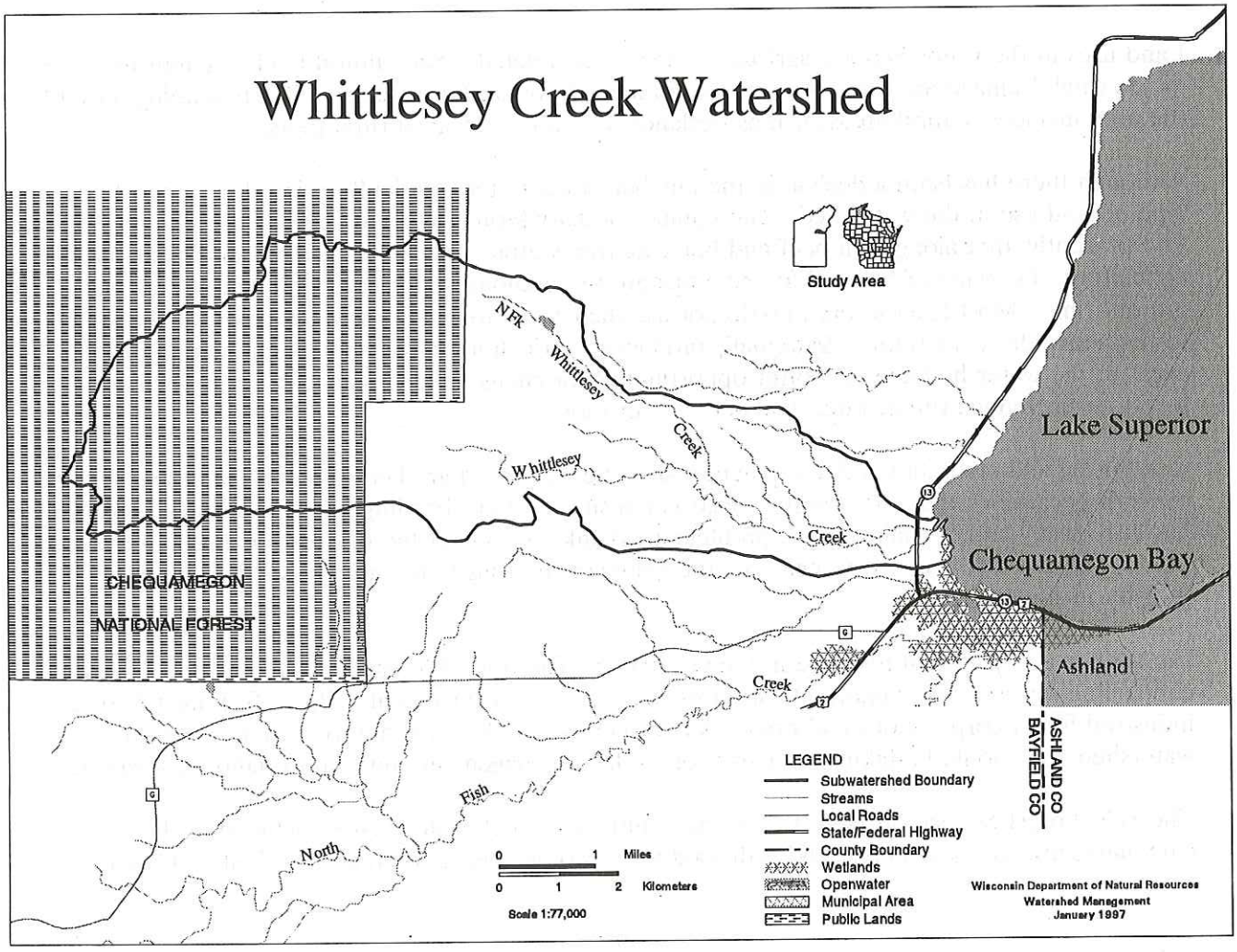
Chapter 8. "Evaluation Monitoring," presents a statewide nonpoint source monitoring strategy for determining the water quality impacts of implementing nonpoint source controls in the priority watershed projects.

CHAPTER 2. GENERAL WATERSHED CHARACTERISTICS

Location

The Whittlesey Creek watershed is located in the town of Barksdale in Bayfield County, in northwest Wisconsin. The watershed is located in the Lake Superior drainage basin and is a direct tributary to the Lake in the Chequamegon Bay. The headwaters of Whittlesey Creek form as two spring fed streamlets in the W 1/2 of section 30, T48N-R5W and flow southeast to its entry into Lake Superior.

Figure 1. Whittlesey Creek Priority Watershed location map



Cultural Features

Governmental Units

The Whittlesey Creek watershed covers 18 square miles within the town of Barksdale in Bayfield County. The area is dotted with farms and rural dwellings, however there are no major housing centers over 1,000 population within the watershed and the only minor concentration of housing is the community of Ondossagon. Public lands within the watershed include approximately 7,600 acres of the Chequamegon National Forest.

Population

A 1991 population estimate for the Whittlesey Creek watershed is not available however the 1991 population estimate for the town of Barksdale is 760 people. The watershed is located in the eastern portion of the Barksdale township and probably has a majority of the township population. Much of the western portion of the township is within the National Forest boundaries and is not heavily populated.

Land Use

Land uses in the watershed are agriculture and forest related. Agricultural lands account for 14% of the total drainage area, and 50% of the total are National Forest lands. The remaining 36% of the area includes natural areas such as wetlands, woodlots and small rural plots.

Although there has been a decline in the number of operations, agriculture is still an important type of land use in the watershed. The number of dairy farms has gone from 25 in the late 1950's to 4 presently, that along with beef and horse activities utilize the 1,600 acres of land available for agriculture. Growing of hay and forage crops are the predominant agricultural land use at the present time. Most landowners who do not use their fields for their own livestock rent the land to the active dairy operators. Marginally productive agricultural lands and abandoned cropland exists in the watershed and may offer opportunities for changing land management to increase forest cover, reduce runoff rates, and decrease erosion.

Residential and recreational development within the watershed are becoming an increasing concern because of the potential for construction site erosion. Eroding banks adjacent to roads has historically been a maintenance problem and bank scouring at the bridges remains a perpetual issue. There is also a concern regarding the ability of the soils in the area to safely support private on-site sewerage.

Forests are a key natural resource in the watershed. The role of forests in reducing runoff and controlling erosion is an important aspect of water quality management. The U.S. Forest Service, industrial forest corporations and private landowners are all forest property owners within the watershed and should be taking an active role in land management and water quality protection.

The U.S. Forest Service property within the Whittlesey Creek watershed is included in the Chequamegon National Forest and is divided in to two management areas, the Sunken Camp

Management Area and the Pipeline Management Area. The landscape is broken into many patches with a high degree of heterogeneity among community types. Forest Plan guidelines are followed and vegetation is randomly arranged within the stand due to use of natural regeneration techniques.

Forest management on lands within the project boundary but outside the National Forest involves private landowners. Forest managers are working with many landowners to encourage proper forest management for their property based on their objectives and providing them with information to make sound decisions.

Private Water Usage

The residents of the Whittlesey Creek watershed use private wells for their water supplies and private septic systems to treat their wastewater. Because of unsuitable septic system drainage conditions, it is thought that some residents may be using conventional septic systems that are not in conformance with state specifications and may have above ground discharges. Other residents store their wastewater in holding tanks and have the tanks pumped out several times a year.

Physical Setting

Climate and Precipitation

The influence of Lake Superior and Chequamegon Bay have a moderating effect on the climate of the Whittlesey Creek watershed. The result of this thermal tempering is a potential for longer growing seasons, cooler summers and slightly more precipitation.

Data collected at the University of Wisconsin Agricultural Research Station at Ashland indicates mean yearly precipitation totals of in excess of 30 inches. Snowfall totals average 59 inches yearly with as much as 41 inches occurring in one month. The mean annual temperature is 40 degrees Fahrenheit.

Topography

The quantity of water and the rate at which it reaches the channel and passes through the stream system during a particular hydrologic event is influenced by storm and watershed size, vegetation cover and topographic conditions. The Whittlesey watershed has a steep gradient, dropping 417 feet in the four miles between Range Road to the bridge at Town Hall Road.

The topographic conditions are important for understanding the hydrology of the watershed and the potential effects of high runoff and peak flows on channel conditions and fish habitat. The watershed is a variable source area that expands and contracts according to rainfall, other water input characteristics, and the capacity of the soil to store and transmit water. The cumulative effects of natural hydrologic functions and land use activities must be factored into all project activities.

Soils and Geology

The Whittlesey Creek watershed is underlain by Precambrian age Keweenawan formations composed of sandstone with interbedded shales. These bedrock formations are covered by glacial and lake laid sediments. The glacial deposits are from at least four major episodes of glaciation that covered the area. These Pleistocene glacial deposits are derived from recurring southward advances of ice out of the Lake Superior basin. The last glaciation, called the Wisconsin age, melted back about 10,000 years ago.

The loose rock and soil, called glacial drift, remaining after the ice melted back, blankets the area to a depth of about 100 to 300 feet or more. This material ranges from clayey or loamy glacial till, (material deposited directly from ice melt-out), sand and gravel outwash, (from glacial meltwaters), and clayey and silty slack-water deposits.

The glaciers helped to carve out the deep basin that is now Lake Superior. The retarding glaciers filled the basin with meltwater; this initial stage is known as Lake Duluth. The weight of ice had depressed the Earth's crust, and with no outlets open to drain the water, Lake Duluth was deeper and more extensive than the current Superior. Evidence can be seen in old remnant beaches, deltas, and some of the silty and clayey deposits, at the elevation of 900 to 1,100 feet. The current Superior is at an elevation of about 600 feet. Subsequent drainage of the lake (and isostatic rebound of the land) brought the lake to its current point, and streams like those of the Whittlesey drainage cut deep "V" shaped channels into the old lake plain and glacial sediments.

The red, clayey glacial till, (derived from old lake sediments) was smeared onto the land by advancing ice, covering most of the lower portion of the Whittlesey watershed, from the lake level at 600 feet elevation, to about 1,000 to 1,050 feet, approximately 6,300 acres. The upper watershed, above 1,050 feet, consists of predominately sandy outwash deposits. This covers about 5,300 acres.

The character of the deposits, of sand in the upper reaches and clays downstream, has a large influence on the hydrology of this stream. Few surface streams can be seen in the upper portion as the sand can be 200 to 300 feet thick, and water percolates down to underlying bedrock or clay, where it travels laterally, "downslope," coming to the surface as innumerable seeps and springs. These are found where the sand deposits thin out on top of the clay, with subsurface water moving through the soil profile throughout the year. These properties have much to do with the stable flow and constant temperature characteristic of Whittlesey Creek.

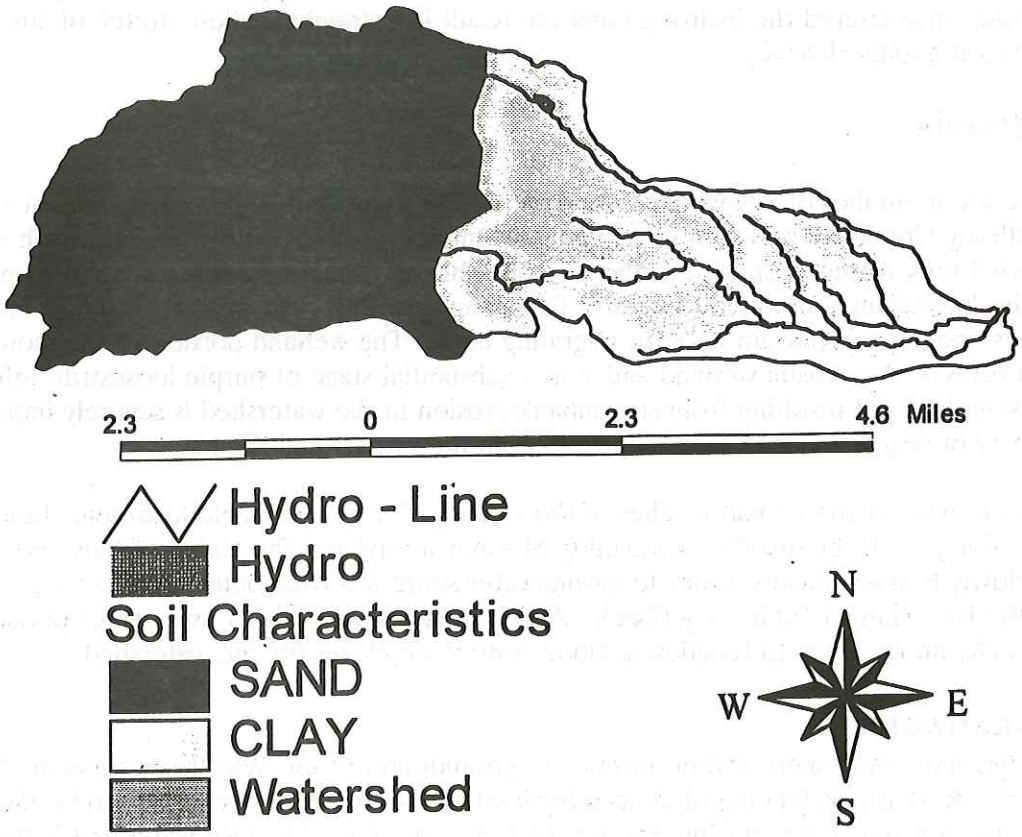
Water Resources

Streams

Streams in this watershed include Whittlesey Creek, the North Fork of Whittlesey Creek and Little Whittlesey Creek. Whittlesey Creek currently has a good water quality and is classified as an outstanding resource water. The stream is a class I trout water supporting both salmonid and non-salmonid fish species. It is also a regionally important spawning for anadromous trout and salmon from Lake Superior. There has been a seven fold increase in fishing pressure for

Soil Characteristics of the Whittlesey Creek Watershed

Figure 2. Soil Characteristics of the Whittlesey Creek Watershed



anadromous fish on Lake Superior since the early 1980's and fish biologists are concerned about maintaining, and if possible, increasing anadromous fish production to meet angler demands. Whittlesey Creek is an important component of the Lake Superior fishery, producing thirty-five percent of all Wisconsin coho salmon in Lake Superior, the second most sought after salmonid species in the state. Maintaining stream conditions favorable to self sustaining populations of salmonids will guarantee a positive sustaining effect on the regional economy as well.

Habitat in Whittlesey Creek is threatened due to sedimentation. At times the stream carries a heavy load of sand and silt. Typically the silt is carried out to the lake but the sand deposits in the stream which has a negative impact on instream habitat. There is also concern about the sand deposition within the lower mile of the stream resulting in a base-leveling action. In the past these concerns took the form of actions which had a large impact on the natural stream functions of Whittlesey Creek. In 1949, the Army Corps of Engineers dredged 4,500 feet of the stream channel in an effort to stabilize the floodplain. Meanders were removed and a straight channel was constructed from Highway 13 to Lake Superior. In 1958, the channel was redirected towards its natural mouth because of the amounts of sand had filled the previous dredging. Both of these activities have altered the hydrology and the result is a straight shallow stretch of stream lacking significant habitat diversity.

Wetlands

There are a number of key wetland areas within the watershed. The coastal area at the mouth of Whittlesey Creek is a part of a large wetland complex which extends from just north of the mouth of Fish Creek to the west edge of the City of Ashland. This wetland is a significant part of the wildlife habitat and aquatic resources of Chequamegon Bay. The area is used by many wildlife species and is an important area for migrating birds. The wetland portion of the mouth constitutes a rare coastal wetland and is in a substantial stage of purple loosestrife infestation. The sand bedload resulting from streambank erosion in the watershed is severely impacting the diversity of vegetation and water depths in both the estuary and the bay.

Wetland areas in the upland reaches of the watershed have a valuable hydrologic function in determining both the quality and quantity of water available. The ability of these areas to store and slowly transfer surface water to groundwater sources is what determines both the temperature and the base flow of Whittlesey Creek. Additionally the capacity to carry water periodically and seasonally allows them to function as flood control structures for the watershed.

Groundwater

The dynamics, movement and occurrence of groundwater in the Whittlesey watershed plays a critical role in the well-being of all its inhabitants. Groundwater, considered to be the water in the zone of saturation seeps into the stream in the absence of surface water and is the source of well water. Water enters the zone of saturation by percolation through the soil from the ground surface and by seepage from the stream during times of high streamflow.

Aquifer characteristics resulting from the existing geology and soils creates a confined condition indicated by the existence of artisan wells along Lake Superior. The lower elevation, red clay areas of the watershed contain quantities of groundwater that is made available to the stream through substrate and adjacent springs. These active groundwater areas are found within the alluvial floodplains, and are biologically and hydrologically connected to the surface water of the system. They are significant to all stream organisms especially invertebrates, during periods of disturbance to the system. Habitat assessments have identified these zones as intimately associated with fish spawning and rearing areas and are an important source of energy and nutrient transport. The 5,300 acre area of outwash material in the higher elevations is a valuable source area to recharge these lower zones confined by the clay plain, although many localized sources exist in the form of depressions and wetlands.

Endangered and Threatened Resources

Information on endangered resources was obtained from the Bureau of Endangered Resources of the Department of Natural Resources. Endangered resources include rare species and natural communities.

It should be noted that comprehensive endangered resource surveys have not been completed for the entire Whittlesey 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 in the following lists. Updates or revisions of this watershed plan should be reviewed by the Bureau of Endangered Resources to include new records.

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 United States Biological Survey or by the State of Wisconsin.

Wisconsin Endangered Species

Any species whose continued existence as a viable component of this state's wild animals and wild plants is determined by the Department of Natural Resources to be in jeopardy on the basis of scientific evidence.

Wisconsin Threatened Species

Any species which appears likely, within the foreseeable future, on the basis of scientific evidence to become endangered.

Wisconsin Special Concern Species

Any species about 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.

The following species may be found within the Whittlesey Creek Priority Watershed:

Endangered Flora -

Beautiful sedge
Lenticular sedge
Auricled Twayblade
Michaux's sedge
Smith Melic Grass
Rams - head Lady Slipper
Small Shinleaf
English Sundew

Lake cress
Moonwort
Sweet Coltsfoot
Broadleafed Twayblade
Linear Leaved Sundew
Alpine Milk Vetch
Algal - Leaved Pondgrass
Marsh Grass of Parnassus

Endangered Mammals -
Timber Wolf
Canada Lynx
Pine Marten

Threatened Reptiles & Amphibians - Wood Turtle

Endangered Insects -
Knobel's Riffle Beetle
Northern Blue Butterfly
Pygmy Snaketail Dragonfly

Cultural Resources

The Whittlesey Creek watershed is rich in Native American archeological and cultural resources and the location of much post European settlement cultural activity. The State Historical Society of Wisconsin has been charged with ensuring the preservation of these resources. Chapter 5 outlines a procedure for use within this project to minimize the disturbance of these resources while allowing for implementation of the watershed plan.

CHAPTER 3: WATER QUALITY CONDITIONS, OBJECTIVES, AND NONPOINT SOURCES

Introduction

The first part of this chapter contains a general description of how nonpoint source pollutants impact water quality. The remainder of the chapter contains a discussion of: 1) the water resource conditions present in the watershed, 2) the results of the nonpoint source inventories, 3) other potential sources, 4) the improvements that may be achieved in the stream if nonpoint sources of pollution are controlled, and 5) the amount of pollutant control necessary to achieve the desired water resource conditions.

The amount of pollutants generated from degraded streambanks and shoreline were inventoried and analyzed. The results are summarized in Table 1.

Water Quality Basics

Nonpoint sources of pollution are responsible for degraded conditions of the streams in the watershed. In this watershed the most serious pollutant is sediment. Problems caused by sediment are discussed below.

Sediment: Sediment occurs in streams naturally and is a normal component to fish habitat. Sediment can adversely impact water and habitat resources in a number of ways. Major disruption of the system occurs when sediment delivery substantially exceeds the natural level and the amounts of sediment and the turbidity becomes excessive. Deposition of excessive fine sediment on the stream bottom eliminates habitat for aquatic insects; reduces density, number and diversity of aquatic insects; reduces the permeability of spawning gravels and blocks the interchange of subsurface and surface waters. The increase in fine sediments settle preferentially in pools, impacting a healthy pool to riffle ratio necessary to fish populations. The depth of these pools provides thermal refuge for fish during summer low flows, the riffles provide spawning habitat.

There are two main types of sediment typically found in the streams of the south shore of Lake Superior; sediment consisting of the red clay fines and sediment consisting of sand. The main problem from a fisheries concern is the sand sediment, which settles out in the stream and the lake degrading existing habitat, creating unstable conditions. The red clay fines typically remain in suspension and are carried out into the lake. They are not felt to be a priority concern to this project. It should be noted however, if the sand sediment is reduced we can also expect to see some reduction in the clay sediment. The major source of sediment in Whittlesey Creek is streambank erosion.

Sediment has also had an adverse impact on the coastal wetland at the mouth of Whittlesey Creek. Sand bedloading of the stream channel and the estuary is occurring at an accelerated rate and occurs over a wide range of flow conditions. The resulting loss of vegetation has affected fish

and wildlife habitat by removing cover and reducing available food.

Water Quality Conditions and Uses

Whittlesey Creek is 5.2 miles in length. It originates as two spring fed streamlets, which during normal flow conditions are internally drained and do not provide a continuous flow downstream. The main tributary to Whittlesey Creek is the North Fork of Whittlesey Creek. The North Fork of Whittlesey Creek is 2.8 miles in length and is trout water. The lower 1.8 miles is Class I and the upper mile is Class II. The base flow, temperature, and quality of the water entering Whittlesey is the result of numerous springs and seeps adjacent to the channel. These conditions result in a perennial flow for the lower reaches of the stream to Lake Superior. Whittlesey Creek is an Outstanding Resource Water and a Class I trout stream.

Two small unnamed feeders join Whittlesey Creek. These unnamed tributaries also support spawning anadromous trout and salmon. A small stream just to the north of Whittlesey Creek is known by either of the names Mary Annes Creek or Little Whittlesey Creek. Historically this stream joined Whittlesey Creek near the mouth, but was dredged at one time to be a separate stream discharging into Chequamegon Bay. The two stream channels now pass within 30 feet of each other in the wetland on the Bay.

Streams in the Whittlesey watershed are regionally important spawning and rearing habitats for anadromous salmonids. The watershed produces approximately 35% of the coho salmon in Wisconsin waters of Lake Superior. These populations represent the stocks for the increasing sport fishing industry that is valuable to a sustainable local economy.

The mouth of Whittlesey Creek enters Chequamegon Bay in a large wetland complex that extends from just north of the two Whittlesey Creeks, south to the west edge of the City of Ashland, beyond the mouth of Fish Creek. This wetland is a significant part of the aquatic resources of Chequamegon Bay. The vegetation in the wetland is being invaded by purple loosestrife, an aggressive exotic plant species that reduces wetland ecosystem values, particularly to wildlife. This wetland and part of the Bay is also the home of the Wisconsin rare species, Elliptio complanata, Atlantic elliptio.

Physical habitat, and not other water quality problems are limiting the streams potential to fully provide the uses described above. The dominant problems limiting habitat within the streams are excess sand and streambank instability. The sand is a commonly dispersed material within the red clay. The clay is easily suspended and transported downstream to the Bay. The sand is deposited in the lower reach where the gradient does not provide sufficient energy to move the material cleanly from the stream bed, resulting in a wide shallow stream buried in unstable shifting sand. Streambank instability is a result of high runoff rates which exaggerate peak flows and result in bank undercutting and destabilization. Continual sluffing of the streambank results in slowly widening of the stream and decreased stream flow velocities.

Water Resource Goals and Objectives

The primary water resource goal for this project is to protect and improve fish habitat for both

anadromous and resident trout and salmon in each of the watershed streams.

Working toward the following objectives will bring us toward the goal:

- Protect stream water quality from nutrient and organic oxygen consuming wastes.
- Protect stream from cropland runoff.
- Reduce hydraulic peaks and improve baseflow to the stream.
- Reduce bank erosion.
- Reduce stream sediment bedload.
- Improve instream habitat.

The Whittlesey Creek watershed represents a unique combination of complex and diverse systems that results in outstanding water and habitat potentials. In order to accomplish goals and objectives that are responsive to the needs of the Whittlesey watershed it is necessary to incorporate strategies that consider all the processes occurring within the project boundaries.

The condition of water resources in the Whittlesey watershed indicate factors that both enhance and limit the system from reaching its full potential. The water resource goals and objectives will integrate both factors into project strategies. The overall implementation strategy of the project is to protect those watershed functions that are healthy while directing restoration treatments toward the underlying processes causing deterioration. The means to reach these objectives is through active participation by watershed residents and local communities.

Protection

The healthy headwater, floodplain, wetland, and groundwater recharge/discharge areas in the Whittlesey watershed can only continue to function as needed if they are protected through integrated management programs. This will insure the future biological integrity of the system while operating as the fundamental building block for subsequent restoration efforts.

Specific strategies to implement these efforts are detailed in Chapter 6 and are the target of enhanced integrated resource management. The ecological significance of these healthy areas cannot be minimized because they are often the most vulnerable to disturbance and sensitive to change. To maintain existing levels of diversity and quality of the Whittlesey water resources our implementation approach must be anchored in protection.

Restoration

To work toward the goal of restoration of critically impacted areas the following objectives have been established:

- Reduce upland runoff rates.
- Stabilize / restore 25% of eroding streambanks.
- Enhance instream habitat.
- Manage groundwater recharge/discharge areas to maintain stream baseflow.

Many of the project objectives are inter-related. Practices used in meeting one objective will also

help attain other objectives. Reducing peak flows by reducing or slowing upland runoff should also help increase groundwater infiltration. This may be done by reducing water flow, changing vegetative cover or constructing water holding structures. Conditions in the stream are largely determined by processes occurring in the watershed and should be not be considered separately

Enhancing instream habitat diversity is particularly important in the lower reaches of the stream. An Instream Habitat Improvement Plan has been developed for portions of Whittlesey Creek by the DNR Northwest District Field Operations staff. In some cases stream habitat can be enhanced by bank stabilization with tree and other vegetative plantings. In other sections practices such as the use of rock retards to provide fish cover and cause the accumulating sediment to scour out exposing gravel rubble spawning areas or creating deep pools may be used. Other instream practices proposed include the use of brush bundles, lunker covers, log revetments, and rock wing deflectors. Stabilizing streambank erosion will also serve to protect and improve habitat conditions necessary for anadromous and nonanadromous salmonids.

Some of the project protection and restoration objectives do not lend themselves to be very quantifiable. Protecting high value areas and reducing upland runoff rates cannot be measured in a traditional sense. Practices aimed at managing land resources for facilitating infiltration and controlling erosion and sediment will be pursued.

Participation

The management strategies developed to achieve the water resource objectives are based on voluntary participation in the program by landowners controlling all nonpoint sources on their property. Further clarification of the voluntary nature of the program and the requirements of participants may be found in Chapter 4.

Landowners will be encouraged to develop a management plan that will meet their objectives for the land and provide for hydrologic and water quality benefits. Cost-share agreements and the Forest Stewardship Incentive Program can be utilized to encourage implementation of sound conservation practices.

Results of Nonpoint Source Assessment

Agriculture

Historically, the cutting of timber and land clearing for agriculture uses had been an erosion problem and source of sediment. More of a problem developed with the grazing of cattle in the woodlands, on stream banks and along ravines. Many fields created by early settlers in the watershed have been ditched to enhance runoff and drainage. This has increased runoff rates and contributes to stream flashiness and results in unstable streambanks, erosion and loss of habitat. The work beginning in 1957 of the Red Clay Interagency Committee on erosion and sedimentation control through controlled grazing, surface drainage systems and conservation planning had a positive impact on the role of agriculture in the watershed. These systems need to be reviewed to address the present agriculture uses.

Currently, approximately 1,600 acres of cropland are available and are used for hay or forage production. There are four dairy operations, one beef, and various other livestock operations presently in existence. These family farms vary in size, scope and impact potential. Less dairy animals on pasture and increased emphasis on quality forage have shifted potentials from livestock trampling of banks to management of plants and nutrients. Many landowners rent their cropland to those operations or utilize it for horse pasture. It was determined the impact of nonpoint sources of pollution to Whittlesey Creek from agriculture did not warrant a complete inventory despite the existence of some problems. Runoff, grazing livestock, manure storage and nutrient management represent the areas of concern. Land management systems designed to retard flow rates and nutrient runoff from fields such as sediment basins, diversions, grassed waterways and wetland restoration will be pursued.

Forestry

Forest cover type and age influence both upland runoff and groundwater infiltration. These in turn affect peak streamflow and sedimentation of the stream. The Chequamegon National Forest has approximately 7,600 acres within the project area which contribute to groundwater recharge and resulting stream baseflow. The majority of the remaining 2,500 forested acres are nonindustrial private holdings that comprise much of the riparian and upland drainage. A better picture of the present types and ages of the private forests in the watershed will be determined as more landowners get involved in management programs and their land is inventoried. Some alteration of cover type or age may be suggested from this information to meet the goals in Chapter 4.

Forest cover adjacent to the stream and drainages to the stream is especially critical. These riparian areas not only influence runoff and infiltration but also provide shade and organic debris to the streams and act as a buffer zone. Shading influences stream temperatures and the organic debris provides nutrients and structure for instream habitat. Identified critical areas need to be maintained or where forest cover is lacking it needs to be reestablished. Much of the present riparian areas are in aspen cover. Converting to a conifer cover is recommended to provide long term benefits to the stream.

Forestry practices such as harvesting and planting can also impact stream conditions. Activities including road building, skidding, burning or scarification can alter flow (good and bad) or lead to increased sedimentation. Best management practices should be used in any future activities to minimize any negative impacts of the activities to the stream. Correcting problem areas from past practices may also be warranted.

Transportation

The development of transportation systems in the watershed has cumulatively impacted the water balance. Historically the efforts to move logs by rail to local mills impacted the surface drainage in ways that are visible and functional today. The development and maintenance of roads throughout the drainage has determined the water movement both in the uplands and the floodplain.

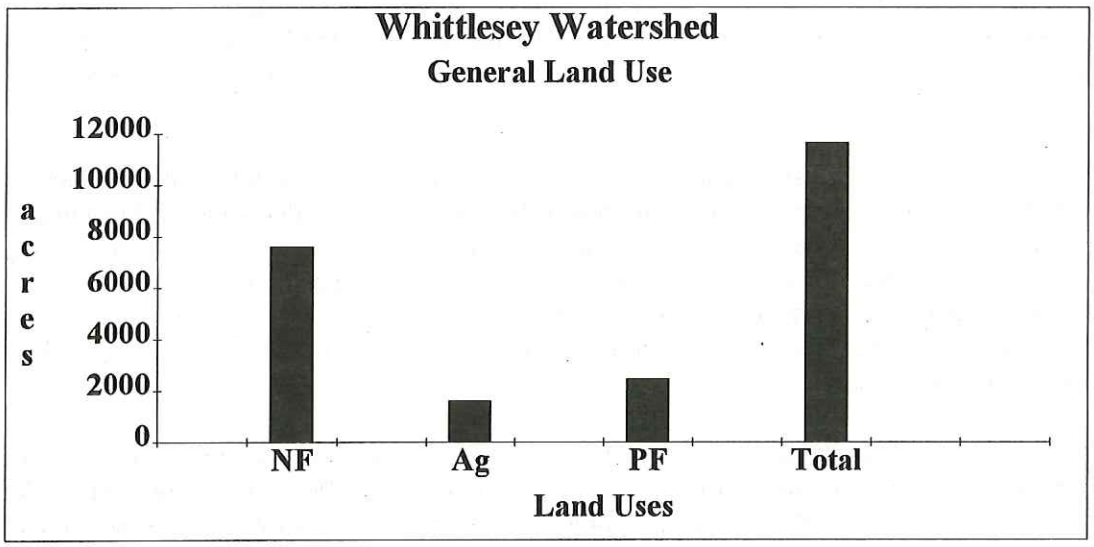
The stabilization of the roadside ditches and earth embankments had historically been one of the

most serious erosion problems in the watershed. Prior efforts to stabilize through shaping and mulching have been successful, but road ditches still channel significant volumes of runoff into the stream and contribute to erosive conditions.

Streambank erosion

Streambank erosion is a natural process that occurs when the force of the water exceeds the combined resistance of the soil materials and vegetation. Factors effecting erosion rates along Whittlesey Creek are watershed size, gradient, amount and type of vegetation, and the cohesiveness of the streambank soils. The Whittlesey watershed has experienced changes that have increased the magnitude and frequency of flooding. The initial cut over followed by agriculture and rural housing development have been major causes of streambank erosion. Channelization of the stream in the floodplain and alterations of bank vegetation have changed flow velocities and resistance. These variables and natural disturbances have created an accelerated condition along the stream.

Figure 3. Whittlesey Watershed General Land Use



NF=National Forest; AG=Agriculture: PF=Private Forest / Wetland

In 1993, an inventory of eroding streambanks along the entire main branch of Whittlesey Creek was conducted. The survey began in the upper portions of the drainage where the stream is deeply entrenched and runoff comes from several directions. Sites with active erosion and significant height or length were identified. Locations were evenly distributed throughout the channel with bank heights ranging from 4 to 200 feet, and lengths from 15 to 300 feet. The resulting estimates of sediment varied from 5 tons to 900 tons annually per site.

Gully erosion

The Whittlesey watershed is characterized by extreme relief with a pattern of narrow deep gullies that intermittently contribute runoff and sediment to the system. Surface erosion and mass wasting has historically been occurring faster than it can be naturally rebuilt. The elimination of pasturing in these areas and the stabilization of adjoining road ditches has helped curtail sediment sources but the accelerated runoff that has resulted remains a problem. Best management practices applied to all activities in these areas and adjoining uplands will control erosion and improve the quality of water resources.

Other Potential Sources of Water Pollution

This section describes activities in the Whittlesey Creek watershed which have the potential to affect surface or ground water resources, and are outside of the scope or ability of the priority watershed project in terms of providing corrective assistance. Many of these potential pollutant sources are regulated by the State of Wisconsin through various Departments. Unlike nonpoint sources of pollutants, there are required conditions that must be met and which are defined in a permit, statute, or administrative rule. These regulations are established so that the water quality impacts from each operation are minimized. If the conditions are being met, it is likely that there are no significant water quality impacts occurring at the site.

Municipal Wastewater Treatment Facilities

Ondossagon School Wastewater Treatment Facility - this wastewater treatment facility has been abandoned. Historically, the facility consisted of a septic system followed by sand filters which discharged to a holding pond. The facility discharged from the pond into Whittlesey Creek. Since the school has been closed the wastewater treatment plant has been abandoned and a holding tank has been put in place to service the current building use.

Septage and Holding Tank Waste Disposal

The disposal of septage (septic tank semi / solid liquid material) and holding tank wastes are regulated under Chapter NR 113 Wis. Adm. Code. The preferred alternative for both materials is treatment at a nearby wastewater treatment facility. If land application of septage is chosen as the disposal method, a site approval must be obtained from the Department, and disposal must be carried out in accordance with Chapter NR 113 Wis. Adm. Code procedures.

Failing Septic Systems

The Wisconsin Fund Private Sewage Replacement Grant Program is a financial assistance program designed to help homeowners and small business operators offset the cost of replacing a failing septic system. The program is now administered by the Department of Industry, Labor, and Human Relations. Bayfield County is currently participating in the program.

The grant program applies to principal 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 either their county zoning department or the DILHR for further information.

Other Contaminated Sites

The document entitled Wisconsin Remedial Response Site Evaluation Report (PUBL-SW-144-91) is a compilation of the following:

- The Inventory of Sites or Facilities Which May Cause or Threaten to Cause Environmental Pollution, (s.144.442(4)(a), Stats);

- The Spills Program List which includes sites or facilities identified under the Hazardous Substance Spill Law, (s. 144.76, Stats.); and

- The LUST Program List which includes sites identified through the Leaking Underground Storage Tank. The Bureau of Solid Waste Management within the Department of Natural Resources may be contacted for more information concerning sites which maybe listed in this document.

None of the sites listed in the above referenced document are within the Whittlesey Creek project area. The Bureau of Solid Waste Management within the Department of Natural Resources may be contacted for more information regarding the document.

CHAPTER 4: RECOMMENDED MANAGEMENT ACTIONS

Introduction

This chapter describes the management actions developed to meet the project goals.

Criteria for Eligibility of Nonpoint Pollutant Sources

As stated in Chapter 3, the project objectives for the Whittlesey Creek Priority Watershed Project are to stabilize eroding stream banks, reduce upland runoff rates, enhance instream habitat and manage groundwater recharge/discharge areas to protect stream baseflow.

Streambank Erosion

Eroding streambanks have been identified throughout the watershed. Variables such as soils, upland runoff, and land use factor into site variables. All bare and/or eroding streambank reaches in the watershed will be eligible for installation of streambank stabilization best management practices. Priority will be given to the most actively eroding sites with an emphasis on those determined to be contributing the most sand into the stream system. Sites will be evaluated for cost effectiveness and practicality of implementation.

The overall objective for streambank stabilization is to maintain and restore balanced, integrated, adaptive communities of riparian and aquatic organisms. It is essential that they be comparable to the natural systems of the region and incorporate both stability and a capacity for self repair.

Gully Erosion Control

Gully erosion control measures are eligible for cost share funding throughout the watershed if it is determined that treatment can cost effectively and practically abate sediment transfer to surface waters. The intent of the gully control requirement is to stabilize the banks of ravines and gullies because of their potential to contribute even larger sediment loads in the future if allowed to continue forming.

Forest Management

Forest management goals for the project are:

- Establish Riparian Management Zones (RMZs) along the streambanks and intermittent drainage into the creek. These areas provide a myriad of benefits such as decreasing the velocity of runoff, providing shade, stabilizing banks and providing organic debris. The RMZ's should extend at least to the top of the streambank slopes and be maintained in woody cover, preferably conifers. Natural seeding of balsam fir or underplanting of white

pine or white spruce should be encouraged. Logging activities would be limited within these zones as described in the BMP guidelines.

- Work toward maintenance of a good balance between the three major vegetation types within the watershed to reduce peak flow from snowmelt. The vegetation types include grassland or open field, hardwood forest and conifer forest. Due to different light infiltration and temperature within these types, snowmelt is spread out reducing the peak flow. Young stands, especially hardwood, would be considered as open areas for snowmelt purposes.

- Work toward preventing more than 50% of the cover type to be in the 0-15 year class in areas where upland runoff is a concern. This is generally the clay soils. The sandy soils generally do not get saturated and groundwater infiltration may be a more critical concern in these areas (see next goal). Summer peak flows generally increase if large areas of the watershed are in young vegetation. The young vegetation does not transpire as much water as the older trees resulting in soils that are more saturated. This results in increased runoff when there are heavy summer rains. Try to manage these areas for older species that are deep rooted and transpire a lot. Conifers are preferred over hardwoods as they intercept more rainfall allowing it to evaporate or slowing it reaching the soil. Open fields should be vegetated. Heavy cover reduces the impact of the rainfall and slows runoff.

- Work toward maintaining young stands in the area of the watershed where groundwater discharge is important to the stream. This is generally sandy or unsaturated soils where runoff is not a concern. Young stands evapotranspire less than mature stands using less of the available groundwater. Also manage for shallow rooted species over deep rooted species and hardwood species are preferred over conifers as they intercept less rainfall allowing more to reach the soil.

- Work toward implementation of Forestry Best Management Practices in all project activities to ensure that erosion and runoff is minimized and infiltration is increased. Areas of concern to Whittlesey include riparian management zones, forest roads, timber harvesting, use of chemicals and wetland protection.

- Develop a Memorandum of Understanding between Bayfield County and the Chequamegon National Forest pertaining to Whittlesey Creek. Consideration of the broad context of all land, air, and water within the Forest and the entire Whittlesey watershed when making management decisions will be pursued. This will involve using principles of landscape ecology and looking beyond Forest boundaries in an attempt to assess the National Forest contribution to water quality, biological diversity, sensitive areas and species, and other components of ecosystem management in environmental and cumulative effects analyses.

Due to the number of private landowners in the watershed it may be unrealistic to expect large changes in the overall cover type. It may be more realistic to concentrate on protecting or establishing riparian zones and preventing the negative impacts of any forestry activities. To accomplish these goals landowners will be encouraged to participate in the Forest Stewardship Incentive Program and get a forest management plan for their property. These plans address landowners objectives, incorporate watershed concerns and include Forestry Best Management Practices for Water Quality.

Conservation Field Trial

In an effort to restore streambanks that reflect native communities and have a balanced living capacity for self repair the Project will participate in a Conservation Field Trial proposed by the Natural Resource Conservation Service. The purpose of the field trial is to add to and strengthen the development of soil bioengineering technology as it relates to streambank stabilization.

Soil bioengineering is an applied science that uses living plant parts as its main structural component. Considering both mechanical/hydraulic and ecological/environmental parameters with site specific information, appropriate systems and plant species are chosen. Used alone or in combination with conventional systems, bioengineering will be pursued where applicable, to reduce costs and increase effectiveness, performance and aesthetic appeal.

Land Use Planning

To protect water quality, provide a rational basis for future growth and manage for change a comprehensive land use plan for the Town of Barksdale is recommended for the implementation of the Nonpoint Source Management Plan for Whittlesey Creek. Funding for the development of this overall land management plan to the extent it emphasizes water quality considerations, is identified in Chapter NR 120.21 Wis. Adm. Code and may be cost shared at the 100% level. The results of this planning effort will be to identify the tools to maintain and enhance the surface and groundwater quality of the watershed.

Land Easements

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

- Stream Corridor, Shoreline Buffers,
- Critical Area Stabilization,
- Wetland Protection, Restoration, and Creation.

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 allow establishment of a vegetative buffer strip to filter pollutants and can provide fish and wildlife habitat; 2) easements are 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). The primary justification of an easement will be for water quality protection and improvement.

Easements to Support Critical Area Stabilization and Riparian Buffers: The following guidelines and criteria are for the purchase of easements used to support critical area stabilization, stream corridors, and shoreline buffers, exclusive of wetland restoration. Guidelines for using easements to support wetland restoration are presented later in this chapter.

Riparian lands along "high priority" water resources: These are the highest priority areas for obtaining easements to support critical area stabilization, stream corridor and shoreline buffer and include all channels and tributaries to Whittlesey Creek. These water resources will experience added benefits of riparian management, enhancements to aquatic habitat, and if agreed to by the landowner, improved public access to surface waters.

In this watershed "high priority" are all ravines, channels and tributaries of Whittlesey and North Fork of Whittlesey Creek. Easement acquisition in these areas would aid greatly in achieving water resource objectives. Easements to allow the establishment of riparian management zones will be preferred.

Easements to Support Wetlands: Easements may be used to support eligible wetland protection and restoration projects. If wetland restoration does not involve the purchase of an easement, then the LCD may sign a cost share agreement for the required costs and proceed to implement the practice.

Administration of Easements: Easements shall be perpetual. The easement will be developed as an agreement separate from the cost sharing agreement for the best management practice. Easements may be contracts between the land owner and the Department of Natural Resources, or between the land owner and Bayfield County. Bayfield County will retain responsibility for identifying how the easement will help in attainment of project goals. Final approval of the easement rests with the DNR's Bureau of Water Resources Management.

To initiate the process, Bayfield County shall forward the easement proposal to the DNR District Nonpoint Source Coordinator. The Nonpoint Source Coordinator will be responsible for obtaining review comments from the local DNR staff including from Wildlife Management, Fish Management, and Water Regulations and Zoning. The Nonpoint Source Coordinator will then forward the proposal to DNR bureau offices for Water Management, Property Management and other disciplines as appropriate.

Estimated Need for Easements: No estimate of the number of easements needed exists for the watershed.

Wetlands

Criteria for Eligibility of Wetland Restoration and Protection

All wetlands are eligible for restoration using best management practices for the purpose of reestablishing altered drainage patterns to reduce upland runoff rates. Secondary benefits of wetland restoration may be enhancement of fish and wildlife habitat.

Wetland restoration includes: the plugging or breaking up of existing tile drainage, the plugging of open channel drainage systems, other methods of restoring the pre-development water levels of an altered wetland, and the fencing of livestock out of a wetland.

To support eligible wetland restorations easements may be used if the restored wetland is greater than one acre. Easements may also be used to protect existing wetlands if the wetland is determined to have significant impact on the groundwater recharge/discharge pattern of the stream.

Best Management Practices Eligible for Cost Sharing

Design and installation of all BMPs must meet the conditions listed in Chapter NR 120 Wis. Adm. Code. Generally these practices use specific standard specifications included in the NRCS Field Office Technical Guide. In some cases additional or other specifications will apply. The applicable specifications for each BMP can be found in Chapter NR 120.14 Wis. Adm. Code.

The following is a brief description of some of the most commonly used cost-shared BMPs. A more detailed description of these practices can be found in Chapter NR 120.14 Wis. Adm. Code.

Upland Sediment Runoff Control

Critical Area Stabilization - planting suitable vegetation on critical nonpoint sites.

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

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.

Green Manure Crop - A crop of close-growing grasses, legumes, or small grain grown for seasonal protection and soil improvement.

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

Diversions - This practice is primarily diverts water from areas where it is in excess or is doing damage, to where it can be transported safely.

Sediment Basins - A structure designed to reduce the transport of pollutants to surface waters and wetlands of sediment eroded from critical fields.

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

Intensive Grazing Management (Rotational Grazing) - The division of pastures into multiple cells that receive a short but intensive grazing period with high animal density followed by a period suitable to allow for the recovery of the vegetative cover.

Streamband Erosion Control

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 and erosion. This practice includes shaping, seeding, fencing, structural and vegetative stabilization techniques.

Stream Crossings - The design and installation of culverts or low water crossings for equipment or livestock. Temporary bridges or crossings may be used if determined feasible and cost effective.

Wetland Restoration - Constructing berms or destroying tile lines or drainage ditches to create conditions suitable for wetland vegetation.

Fisheries Habitat Improvement

The primary purpose for fisheries habitat improvement is to improve cover, increase stream areas suitable for fish habitat, and increase spawning habitat. Instream devices eligible for cost sharing include combinations of wing deflectors, bank covers, boulder retards, and log covers and shelters in conjunction with streambank protection methods. The installation of instream structures and modification of conditions within or along the stream will protect and restore habitat potentials.

Agriculture Best Management Practices

Manure storage facilities, barnyard runoff management, and nutrient management best management practices may be eligible for cost sharing. Eligibility will be determined on a case-by-case evaluation to be completed by the LCD and the DNR Northwest District Nonpoint Source coordinator. The eligibility evaluation shall include, but not limited to, pollutant load reduction to be achieved with each BMP, practice cost, and the potential impact of the nonpoint source on the water resources of the project.

Forestry Best Management Practices

Under a pilot program, the following forest practices will be eligible for cost-sharing as determined in each landowners land management plan.

- Planting - Open field or riparian areas.
  - Site Preparation
  - Tree Costs
  - Planting Costs
  - Release
  - Tree Shelters

- Road Stabilization - For new roads or the rehabilitation of existing roads.
  - Road layout and planning
  - Road leveling and seedbed preparation
  - Water diversion structures
  - Seed including companion crops
  - Seeding operation
  - Mulching
  - Sedimentation traps

Cost-share rates and practice standards and specifications will the same as the Wisconsin Program Provisions of the Stewardship Incentive Program.

BMPs Not Eligible for Cost-Sharing

Priority watershed cost-share funds cannot be used to control nonpoint sources and land management activities specifically listed in Chapter NR 120.10(2) Wis. Adm. Code. The following is a partial list of these activities.

- Activities that are normally and routinely used in growing crops. This will include soil tillage, seedbed preparation, and the sowing of seed.
- Actions that drain or clear land as the primary objective.
- Activities with installation costs that can reasonably be passed to potential consumers.
- Practices already installed, or placed on lands prior to this project.
- Activities covered under the Wisconsin Pollutant Discharge Elimination System (WPDES) Program or covered in other ways by Chapter 147 of Wis. Stats. (including livestock operations with more than 1,000 animal units, or livestock operations issued a notice of discharge under Chapter NR 243 Wis. Adm. Code).
- Septic system controls or maintenance.

  Dredging activities.
- Bulk storage of fertilizers and pesticides.

Alternative Best Management Practices

The Whittlesey Creek Watershed Project may, where necessary to meet the water quality objectives, use a BMP other than those listed in Chapter NR 120.14 Wis. Adm. Code, or may use a modification of the BMPs listed in Chapter NR 120.14 Wis. Adm. Code.

County Ordinances

Ordinances can be an effective program tool to protect water quality.

- Bayfield County has a Shoreland-Wetland Zoning Ordinance to further the maintenance of safe and healthful conditions and prevent and control water pollution, flooding, and erosion.
- The Bayfield County Floodplain Zoning Ordinance controls the development and use of floodplains, rivers or streams and provides a uniform basis for the preparation implementation and administration of sound floodplain regulations.
- Bayfield County does not have a construction site erosion control ordinance. Erosion control plan development and proper implementation is currently handled by a reciprocal agreement between the Zoning Department and the Land Conservation Department.

- Bayfield County does not have a county-wide manure storage ordinance. Currently persons seeking technical assistance for manure storage are encouraged to follow NRCS standards and specifications.

Land Use Planning

Land use regulations and requirements as allowed by Chapter 59.97, Wisconsin State Statutes and adopted by Bayfield County detail the present land use options for any given zoning district. Land use activities on watersheds involve complex interactions, where an activity in one area impacts the activities in other areas. Most watershed activities have impacts on a number of different people as well. Because of these interactions, it is critical that land use management activities on the watershed be coordinated through a practical integrative planning process. A comprehensive land use plan may be a 100% funded management practice to provide for water quality and a rational basis for future growth.

Comprehensive land use planning is a continuing process to create a common vision for the entire community's future. Planning provides an agreed on course of action to create and sustain a livable community. Water quality is a foundation and this plan details its protection and restoration through management of nonpoint sources of pollution. Every attempt has been made to be realistic, compatible and integrated with the perceived needs of the overall community surrounding Whittlesey Creek. It will be a tool available with a land use plan, regulations and zoning to guide local officials and citizens in land use problem solving and decision making.

CHAPTER 5: LOCAL GOVERNMENTS PROGRAM FOR IMPLEMENTATION

Introduction

This chapter describes how the Whittlesey Creek Priority Watershed Project will implement resource management and Best Management Practices (BMPS) to meet the water resource objectives that have been determined.

Project Participants: Roles and Responsibilities

Landowners

Owners and operators of private land and owners of public land will be the most important participants in the Whittlesey Creek Watershed Project. They will enter into agreements with the county to install BMPs on their property to reduce nonpoint pollution of the waters in the Whittlesey Creek watershed. The landowners will also have water quality conservation plans developed for all their property, and will work with the components of their cost share agreements. Landowners who already have conservation plans for their property will have the plans updated to address water quality.

Owners of private land who chose to participate in the Federal Stewardship Incentive Program (SIP) are eligible for cost sharing if they have an approved stewardship plan and agree to implement approved practices within ten years.

The different types of landowners who may be eligible to participate in the Whittlesey Creek Watershed Project are:

- Private landowners
- Bayfield County
- State of Wisconsin
- Barksdale Township
- Chequamegon National Forest
- Corporations

The Land Conservation Committee

The Bayfield County Land Conservation Committee will review and approve the watershed plan, will periodically review the progress of the watershed project, will continue to provide staff to operate the watershed project, and will report annually to the County Board of Supervisors as to the progress of the project. The Land Conservation Committee will also determine the cost share rates for some best management practices as necessary.

The Land Conservation Department

The Land Conservation Department (LCD) is the agency with which the key responsibility in implementing all phases of the Whittlesey Creek Watershed Project. The LCD is responsible for completing parts of the watershed plan, contacting eligible landowners, developing cost-share agreements, developing conservation plans, designing and installing BMPs, reimbursing landowners after BMPs are installed, and monitoring the BMPs once they are installed. The LCD is also responsible for working with the county and township to minimize roadside and other construction site erosion. The LCD will also work with UW Extension and other agencies to implement the information and education program of the Whittlesey Creek Watershed Project.

The LCD reports periodically to the Land Conservation Committee on the progress of the watershed project. The LCD is responsible for filling out necessary reports and reimbursement forms due quarterly and annually to the DNR and DATCP.

The Department of Natural Resources

The DNR has been statutorily assigned the overall administrative responsibility for the Wisconsin Nonpoint Pollution Abatement Program. The Department's role is summarized below.

Project Administration
Project Administration includes working with Bayfield County to ensure that work commitments required during the 8-year implementation phase can be met. The DNR participates in the annual work planning process and will conduct annual project review meetings with the county. The Department reviews cost-share agreements signed by the County and participating landowners for installing BMPs. The DNR also provides guidance when questions arise concerning the conformance of proposed activities with the statutes, administrative rules, and the watershed plan.

Financial
Financial support for implementation of the priority watershed project is provided in two ways. A local assistance grant agreement supports the staff and watershed operations, and a nonpoint source grant agreement to supply cost-share money.

The DNR may also enter into cost-share agreements directly with local or state units of government to control pollution sources on land the government owns and operates. Contracts between a landowner and the Department in the form of easements are an alternative that may be pursued.

Project Evaluation
The DNR has responsibility for priority watershed project monitoring and evaluation activities. These efforts determine if changes in water quality occur as best management practices and other pollution controls are installed and implemented. The DNR documents the results of monitoring and evaluation activities in a final priority watershed project report.

Technical Assistance
The DNR, Bureau of Forestry will approve all stewardship plans as required by the Federal

Forest Stewardship Program and supply technical assistance for planning and implementation of forestry practices. The DNR Area Fisheries and Field Operations staff will supply technical assistance for the planning and installation of instream habitat improvement techniques and practices.

Natural Resource Conservation Service (NRCS)

This agency works through the county LCC to provide technical assistance for planning and installing conservation practices. The Field Office NRCS personnel will work with the county LCD staff to provide assistance with technical work. Personnel from the Area NRCS office will provide staff training and engineering assistance for BMPs, especially where there is a lack of engineering job approval for particular practices. The assistance from the Area NRCS office is available through an agreement between the NRCS State Office and the DNR. The NRCS Soil Survey Team will assist with updating watershed soils information and on-site soils interpretations.

University of Wisconsin Extension (UWEX)

County and Area Extension agents will provide expertise and time in implementing the information and education program.

Chequamegon National Forest

The County will be pursuing the development of a Memorandum of Understanding with the USDA - Forest Service to include at a minimum, Wisconsin Forestry Best Management Practices for Water Quality and County Shoreland Zoning.

Project Implementation Schedule

The project implementation schedule for the Whittlesey Creek Watershed includes a three-year period where cost-share agreements will be developed with landowners. After signing a cost-share agreement, the landowner has five years to install the BMPs included in the agreement.

BMPs can be installed during this three-year period also. BMP installation will continue through the scheduled five-year installation period.

Under extenuating circumstances the DNR can extend the three-year period for entering into cost-share agreements, providing there is evidence that the extension will result in improved water quality.

The five years allowed for BMP installation on any given cost-share agreement can be extended under the following circumstances:

- There must be ample time between the end of the five-year installation period and the end of the watershed project to install the BMPs.
- The reasons for needing the extension of the cost-share agreement must be in accordance with Chapter NR 120.13(6)(a) Wis. Adm. Code.

Landowner Contact Strategy Procedure to Develop Cost-Share Agreements

A checklist including all the BMPs available through the Whittlesey Creek Watershed Project will be printed. Each eligible landowner will receive a checklist showing the BMPs they are eligible for.

Eligible landowners whose property contributes a significant amount of nonpoint pollution to the waters in the Whittlesey Creek watershed will be contacted.

Eligible landowners who show interest in participating in the watershed project will be visited several times during the process of developing a cost-share agreement.

Landowners who are not eligible for any BMPs through the watershed project will be visited briefly to explain the project and to encourage them to practice good conservation and water quality management on their own.

Landowner contacts through newsletters and the general media is detailed in the Information and Education Program.

Cost-Share Agreement Administration

Purpose and Responsibilities

Consistent with s. 144.25, Stats. and Chapter NR 120, Wis. Adm. Code, cost-share funding is available to landowners for a percent of the costs of installing BMPs to meet the project objectives. Landowners have three years after formal approval of the watershed plan to enter into cost-share agreements. There is an option for an additional two year sign up period if determined necessary by the project Steering Committee and the Nonpoint Source Coordinator. Practices included on cost-share agreements must be installed within the schedule agreed to on the cost-share agreement.

The cost-share agreement is a legal contract between the landowner and Bayfield County. The agreement includes the name and other information about the landowner and grant recipient, conditions of the agreement, the practices involved and their location, and number of years the practice must be maintained. The agreements also identify and provide information on practices not cost-shared through the nonpoint program, but are essential to control pollution sources. Once the cost-share agreement is signed by both parties, the landowner is legally bound to carry out the provisions in the agreement.

If landownership changes, the cost-share agreement remains with the deed and the new owner is legally bound to carry out the provisions. Chapter NR 120.13(9) and (10) has more information on changes of landownership and the recording of cost-share agreements.

The cost-share agreement binds the county to provide the technical assistance needed for the planning, design, and verification of the practices on the agreement, and to provide the cost-share

portion of the practice costs.

Bayfield County is responsible for enforcing compliance for cost-share agreements to which they are a party. Where the DNR serves as a party to an agreement with a unit of government, the DNR will take responsibility for monitoring compliance.

Procedure for Developing A Cost-Share Agreement

The landowner will be informed of the practices that will be included on the cost-share agreement, and the priority of installation. If the landowner is interested in participating in the Whittlesey Creek Watershed Project, development of the cost-share agreement will begin. The procedure for developing a cost-share agreement is as follows:

- Eligibility and cost estimates of all practices the landowner wants to install will be made by the Land Conservation Department.

- A draft cost-share agreement will be drawn up by the LCD for the landowner to review. The landowner will decide on an installation schedule and after review and negotiations are completed between the county LCD and the landowner, a final draft of the cost-share agreement will be drawn up.

- The landowner will review the final draft of the cost-share agreement. If the cost-share agreement is acceptable to the landowner, a date for cost-share agreement signing will be set. Signing of the cost-share agreement will take place in the LCD office. The Land Conservation Committee chairman will sign the cost-share agreement.

- After the cost-share agreement is signed, the landowner is instructed to report to the Register of Deeds Office to file the contract with their deed.

- At the same time the cost-share agreement is being developed, development of a water quality conservation plan and designs for the BMPs will also be started.

- After BMP installation and verification by the county LCD, the landowner will request reimbursement from the LCD, at which time the LCD will process the cost-sharing and have the County Clerk's office process payment.

Fiscal Management of Cost-Share Agreements

This section identifies the responsibilities and procedures for handling state funds used to cost-share nonpoint source control practices. The actual disbursement of the grants (Local Assistance and Nonpoint Source) will be based on annual workload analysis and the grant application process. Fiscal management requirements for local units of government are specified in Chapter NR 120, Wisconsin Administrative Code, and are summarized below.

Funding Agreements

The Nonpoint Source Grant Agreement is the means for transmitting funds from the DNR to the management agency for use in supporting cost-share agreements with landowners. Cost-share agreements are used to transmit funds from the local management agency to the individual landowner. Restrictions on he use of Nonpoint Source Control Program funds are as follows:

- Nonpoint Source Control Program funds may only be used to support cost-share agreements signed within the eligible period specified on the Nonpoint Source Grant Agreement.
- Practices installed prior to the signing of a cost-share agreement are not eligible for support by the priority watershed project.
- Only those practices specified in the Nonpoint Source Grant Agreement will be eligible for support by the priority watershed project.

Responsibilities and Procedures

Bayfield County will have a Nonpoint Source Grant Agreement with the DNR, and will handle cost-share agreements with the landowners. The county is fiscally responsible for preparing and maintaining their own fiscal management files, as specified in Chapter NR 120, Wisconsin Administrative Code.

Fiscal management procedures used to administer cost-share funds are:

- The LCD in Bayfield County will develop cost-share agreements with eligible landowners, and when necessary obtain the DNR's review and approval. A copy of the cost-share agreement with tracking sheet will be sent to the District NPS Coordinator.
- LCD staff will design the BMPs.
- LCD staff will oversee practice installation.
- LCD staff will verify that the practice meets applicable standards and that cost containment requirements have been met.
- The landowner will request reimbursement from the LCD, and will provide proof of payment that 100% of the expenses incurred during BMP installations were paid.
- The Land Conservation Committee will approve cost-share payments to landowners. The LCD is responsible for obtaining proof that the local share of the practice cost is paid.
- Checks are issued by the LCD to the respective landowners installing the practices and project ledgers are updated. Whenever possible payments will be made using a two-party check that lists as payees, the grant recipient and the contractor. No payments will be made until necessary seeding and mulching is completed to finish the installation of a BMP.
- The list of average costs will be reviewed annually and updated as needed.

Cost Containment Provisions

The Land Conservation Committee will use a combination of quotes and average cost techniques to contain the cost of BMPs. The following summarizes other cost containment provisions:

- For nonpoint source control practices having a total estimated cost of $5,000.00 or more, the landowner must receive two or more quotes from qualified contractors according to county procedure.
- For nonpoint source control practices having a total estimated cost of less than $5,000.00, the landowner or grant recipient may receive quotes at their own discretion.
- If quotes or requests for proposals are not used, the cost share payment will be based on the average cost method. The county will develop an average cost per unit for materials and

labor to determine the average cost for practice and practice components.

- The lists of average costs will be reviewed annually and/or updated as needed.
- Payments for "in kind" contributions will be based on the county's guidelines. Cost share recipients who wish to install a BMP using their own labor, material and equipment must submit a quote plus one quote from a qualified contractor for the practice installation.
- The Wisconsin Conservation Corps may be used to install BMPs for the cost share recipients.
- Cost share payments will be based on actual installation costs. If actual installation costs exceed the amount of cost sharing determined by cost estimates, then the amount paid the grantee may be increased with the approval of the Land Conservation Committee. Appropriate documentation regarding the need for changes will be submitted to the DNR.

Staff Needs for Installing Best Management Practices

It is estimated that the installation of BMPS and administration of the watershed project will require one full time staff person throughout the life of the project. See Table 1.

Schedules

Grant Disbursement and Project Management Schedule

Implementation may begin upon approval of this plan by the Bayfield County Board; Wisconsin Department of Agriculture, Trade and Consumer Protection; and the Wisconsin Department of Natural Resources. The priority watershed project implementation period lasts eight years. It includes an initial three year period for contacting eligible landowners and signing cost-share agreements. Practices on any cost-share agreement must be installed within five years of signing the CSA.

Table 1: Estimated County LCD Staff Needs for Project Implementation

Activity	Staff Hours
Project and Financial Management	2,400
Information and Education Program	5,000
Pre-Contact Office Inventory; Landowner Contracts and Progress Tracking	1,000
Conservation Planning and Cost-Share Agreement	600
Development	
Plan Revisions and Monitoring	600
Practice Design and Installation Upland Sediment Control Streambank Erosion Control Easements	 600 4,000 1,000
Training	1,000
TOTAL LCD Workload	16,200
Estimated Staff Required	1 per year
Hours	2,015 per year

Table 2: Total Project Cost and Grant Disbursement Schedule 75% Landowner Participation

	Project Year				
Item	1	2	3	4 - 8	Total
Cost Share Funds: Practices	$88,581	$177,162	$177,162	$708,648	$1,151,553
Cost Share Funds: Easements	$10,000	$10,000	$10,000	$40,000	$70,000
Staff Support	$36,400	$36,400	$36,400	$145,600	$254,800
Information/Education	$2,000	$2,000	$2,000	$8,000	$14,000
Other Direct	$4,160	$4,160	$4,160	$16,640	$29,120
Total	$141,141	$229,722	$229,722	$918,888	$1,519,473

Table 3. Cost-Share Budget Needs for Best Management Practices

Best Management Practices	Number/unit	Cost/Unit	Total Cost (1)	100% Participation		75% Participation	
				State Share	Local Share	State Share	Local Share
Upland NPS Control							
Change in Crop Rotation	NA ac	NA (2)	0	0	0	0	0
Contour Cropping	NA ac	6	0	0	0	0	0
Contour Strip Cropping	NA ac	12	0	0	(3)	0	(3)
Reduced Tillage (4)	NA ac	45	0	0	0	0	0
Reduced Tillage (5)	NA ac	15	0	0	0	0	0
Critical Area Stabilization	200 ac	800	160,000	112,000	48,000	84,000	36,000
Grass Waterways	40 ac	3,000	120,000	84,000	36,000	63,000	27,000
Field Diversions & Terraces	2,000 ft	3	6,000	4,200	1,800	3,150	1,350
Grade Stabilization	12 ea	10,000	120,000	84,000	36,000	63,000	27,000
Agricultural Sediment Basin	TBD ea	0	0	0	0	0	0
Nutrient Management (7)	TBD ac	6	0	0	0	0	0
Nutrient and Pest Mgmt. (7)	NA ac	10	0	0	0	0	0
Shoreline Buffers	20 ac	200	4,000	2,800	1,200	2,100	900
Wetland Restoration	12 ea	2,000	25,000	16,800	7,200	12,600	5,400
Livestock Exclusion, Woods	320 rods	16	5,120	5,120	(3)	3,840	(3)
Spill Control Basins	NA ea	0	0	0	0	0	0
Animal Waste Management							
Barnyard Runoff Control	TBD						

Best Management Practices	Number/unit	Cost/Unit	Total Cost (1)	100% Participation		75% Participation	
				State Share	Local Share	State Share	Local Share
Complete System	TBD ea	0	0	0	0	0	0
Roof Gutters	TBD ea	0	0	0	0	0	0
Clean Water Diversion	TBD ea	0	0	0	0	0	0
Manure Storage Facility (6)	TBD ea	0	0	0	0	0	0
Streambank Erosion Control							
Shape and Seeding	5,000 ft	10	50,000	35,000	15,000	26,250	11,250
Fencing	320 rods	16	5,120	5,120	(3)	3,840	(3)
Rip-Rap & Bioengineering	10,000 ft	30	300,000	210,000	90,000	157,500	67,500
Livestock/Machinery/Crossing Watering Ramp	15 ea	3,000	45,000	31,500	13,500	23,625	10,125
Remote Watering Systems	NA ea	0	0	0	0	0	0
Subtotal:			$0	$0	$0	$0	$0
Easements	70 ac	1,000	70,000	70,000	0	52,500	0
TOTALS			**$909,240**	**$660,540**	**$248,700**	**$495,405**	**$186,525**

(1) Total cost to control identified critical pollution sources
(2) NA means that cost-share funds are not available for this practice
(3) Local share consists of labor and any additional equipment costs, also see flat rates
(4) Reduced tillage on greater than three years continuous row crops
(5) Reduced tillage, including no-till, on rotations including hay
(6) Maximum cost-share is $20,000
(7) Nutrient and Pest Management is cost-shared per acre over a three-year period.
(8) TBD means cost-share availability will be determined by the District NPS Coordinator

Source: WI Department of Natural Resources; WI Department of Agriculture, Trade and consumer Protection; and the Land conservation Department of Bayfield County

Under extenuating circumstances, the initial period for entering into cost-share agreements can be extended by the DNR for a limited period of time if it will result in a significant increase in nonpoint source control. Limited extensions for the installation period for practices on individual cost-share agreements must also be approved by DNR and DATCP.

The disbursement of the grants (Local Assistance and Nonpoint Source) to Bayfield County will be based on an annual workload analysis and grant application process. The estimated grant disbursement schedule based on 75% participation by eligible landowners can be found in Table 2.

Total Project Cost: The total funding required to meet the rural nonpoint source pollution control needs at a 75% level of landowner participation is presented in Table 3. This figure includes the capital cost of practices, staff support, and easements costs presented above. The estimated cost to the state is $495,405 and the estimated cost to landowners and others is $186,525.

This cost estimate is based on projections developed by the agency planners and Land Conservation staff. Historically, the actual expenditures for projects are less than the estimated costs. The factors affecting expenditures for this project include: the time it takes to plan the project; the length of time the project is under implementation; the amount of cost sharing that is actually expended; the number of staff working on the project; the amount of support costs; and the time local assistance is necessary.

Involvement of Other Programs

In an attempt to facilitate the integrated resource management strategies detailed in Chapter 6 the Whittlesey Creek Watershed Project will cooperate with agencies whose programs will assist project goals and objectives. The following programs may be utilized:

- Federal Forest Stewardship Incentive Program
- Wisconsin Managed Forest Law
- NRCS Conservation Field Trials and Plant Materials Program
- Wisconsin River Watch Program
- National Wildlife Federation - Lake Superior Biodiversity Program
- Wisconsin Coastal Management Program
- USFWS Partners for Wildlife
- Wisconsin Conservation Corps
- The Nature Conservancy

Information and Education Program

Introduction

The Information and Education (I&E) Plan describes the methods and procedures that will be implemented to inform and educate the public about Whittlesey Creek and the Whittlesey Creek Priority Watershed Project. It will also serve as a guide during implementation and evaluation of the plan. The proposed activities are based on availability of funds and review of annual work plans. The activities may be revised through the annual work plan procedure.

The objective of the I&E program is to assist the Whittlesey Creek Watershed Project in reaching its goals of protecting and improving water quality through participation by watershed residents. It will accomplish this through information and education activities directed at those who are either watershed residents or active citizens of Bayfield County.

Goals

To achieve its objective of protecting and improving water quality, the I&E program has been structured around the following goals:

- Increased awareness, understanding and appreciation of the water resources in the Whittlesey Creek watershed.

- Increased understanding of the principles of watershed dynamics, ecosystem function and especially nonpoint sources of water pollution as experienced in the Whittlesey Creek watershed

- Increased awareness and understanding that Best Management Practices are available that, if put in use, can lead to the protection and improvement of Whittlesey Creek.

- Increased awareness and understanding that the Whittlesey Creek Watershed Project is in existence, and can provide technical, educational, and financial assistance to project residents for the application of Best Management Practices that will protect and improve water quality.

Audience

Target audiences for the I&E Program can be divided into two principle groups:

- Those who should make management changes in their land, business, and their everyday activities to reduce nonpoint source pollution.

- Those who are in a position to be supportive of such actions.

Information and Education Activities

Newsletters

Newsletters will be a major component of the I&E strategy. Newsletters will be distributed twice per year and emphasize the operation and maintenance of BMP's, the water quality improvements realized through BMP installation and overall watershed progress.

News Releases

News releases will be sent to local newspapers. Topics of the news releases will in include:

- Description of the water resources and impact of nonpoint source pollution on the watershed.
- Current status of the watershed projects progress.
- Success stories of improved water quality.
- Invitations to project tours.
- Pollution awareness and benefits of BMP installation.

Project Display

A project display board will be developed for exhibit at county fairs, conferences, meetings and other public locations. Different topics will be developed for use with various audiences.

Youth Programming

Involving youth in the watershed and water quality education activities can have long term benefits to the community. Interest in education activities and programs will be solicited through teachers and administrators from the various schools and youth organizations. Water quality and watershed educational materials will be developed and used with existing materials. Educational programs and activities will be offered and implemented as school and youth organizations become aware and interested in the project.

Public Informational Meetings

Public meetings during the sign-up period will be held by the project. This will provide an opportunity to answer any questions and encourage landowner participation. Topics that may be covered.

- An explanation of nonpoint sources of pollution and detailed overview of BMPs needed to reduce pollution problems.

- Program overview, including project sign-up, practice design, installation, and payment procedure.
- Goals and objectives of the watershed plan.
- Administration rules for the watershed project, including eligibility and cost-sharing.

Demonstration Tours

Sites will be selected for demonstration of streambank stabilization, riparian management, habitat and wetland restoration. Tours will allow landowners to observe BMPs first hand and encourage participation.

Slide Presentation

A slide presentation on nonpoint source pollution as it relates to Whittlesey Creek will be created. The presentation will be used at meetings and presentations to school groups and service organizations

CHAPTER 6: INTEGRATED RESOURCE MANAGEMENT

Introduction

The integration of resource management activities in the Whittlesey Creek Priority Watershed will coordinate existing federal, state, and local programs. The ability to integrate programs will help achieve the best possible management of land and water resources in the project area. There are a number of specific program activities which will need coordination in the project and will involve several different agencies.

Agricultural Programs

The Whittlesey Creek Priority Watershed Project will be coordinated with the conservation compliance features of the Wisconsin Farmland Preservation Program (FPP) administered by the ABDI Land Conservation Department, and the Federal Food Security Act (FSA) administered by the Natural Resource Conservation Service. Conservation Farm Plans developed for all landowners in the FSA and FPP programs will need to be amended to include management decisions and the installation of needed BMP's for nonpoint source pollution abatement. This comprehensive approach to farm planning will facilitate consideration of the goals and objectives for all programs in which the landowner participates.

DNR Resource Management Programs

The Wisconsin DNR fisheries and forestry objectives for the Whittlesey Creek watershed project have been identified and implementation activities developed. Some of these activities have a very direct relationship to water quality while others are more indirect as a result of improved resource management. General information and education activities described in Chapter 5 will be used to help implement resource management objectives. These activities are listed at the end of this chapter.

Wildlife Management

The Whittlesey Creek watershed provides habitat for a variety of upland and lowland dependant species. Three major elements of wildlife habitat are food, water and cover. The size of individual territories or home ranges for wildlife is determined to some extent by the abundance and interspersion of these three elements. Any such development that decreases the supply or restricts the distribution of these elements will tend to reduce the ability to sustain wildlife populations. The long term consequences of incremental or cumulative landscape change , habitat change and habitat fragmentation should be anticipated and avoided in the watershed.

No known critical habitat occurs in the watershed for any threatened or endangered species of wildlife. Endangered species that may occasionally use the area are grey wolf and bald eagle.

The main channel of Whittlesey, its tributaries and associated riparian vegetation are important travelways for a variety of wildlife and function as habitat connectors.

Important big and small game species utilizing the area include white-tail deer, black bear, and ruffed grouse. These species require an interspersion of various habitat types managed to provide food and cover. The Forest Stewardship Incentive Program, Conservation Reserve Program, and Wetland Reserve Program can offer management options to accommodate a variety of needs on private lands.

Fisheries Management

Principles for managing salmonid habitat are complex and numerous, particularly in the case of anadromous salmonids that move from tributary streams through various habitats to lake feeding grounds and back to streams of origin. Water quality and habitat improvements will directly impact the fisheries in both Whittlesey Creek and Western Lake Superior; therefore management objectives have been developed that can be incorporated into all project activities.

Fundamental to habitat management is identification and mitigation of factors that limit production. On going survey and monitoring of changes in trout and salmon biomass and aquatic habitats is a primary goal. Rehabilitation techniques to enhance the natural recovery process of the watershed will be pursued.

Instream habitat improvements will incorporate techniques to improve spawning opportunities and increase the amount of cover for young fish. The quality and quantity of seasonal habitats and rearing areas will determine the streams ability to support desired populations.

Stream improvement techniques will evolve for Lake Superior tributaries only if individual applications are thoroughly evaluated and if those evaluations are made available to a diverse group for review. Evaluation will be an integral part of habitat improvement projects and will be included in the initial planning and budget processes.

Forest Management

Approximately 10,000 acres of the watershed are forested. The effects of timber harvesting and silvicultural treatments on stream ecosystems are complex. A major question for resource managers is regarding the effects specific cover types have on soil stability and surface runoff. The challenge is both to understand the watershed processes that are important for a given decision and to have enough site specific information to apply that knowledge.

The Whittlesey Creek Priority Watershed Project will cost-share forestry best management practices for water quality and foster the cooperation and communication of all forest professionals working within its boundaries. The DNR Bureau of Forestry will provide assistance on the nonindustrial private forests through the following programs:

<u>Forest Stewardship Incentive Program (SIP)</u>
SIP provides cost share assistance to landowners to meet the requirements of the Forest Stewardship Program. The owner must agree to a forest stewardship plan prepared by a

professional resource manager or DNR forester and approved by the DNR Bureau of Forestry. DNR foresters can write these plans. They are based on the landowners objectives and can include soil and water protection, timber production, recreation, aesthetics and fisheries or wildlife concerns.

Managed Forest Law (MFL)
The purpose of the MFL is to encourage the growth of future commercial crops through sound forestry practices while recognizing individual property owners' objectives and society's needs for compatible recreational activities, forest aesthetics, wildlife habitat, erosion control, and protection of endangered species. There are annual property tax incentives but the landowner has specific obligations detailed by the program and management plan.

The Forest Stewardship Program and the Managed Forest Law are compatible programs. All MFL plans will meet Forest Stewardship requirements. Both programs require consideration of the total forest resource in management planning. The major difference between MFL and SIP is the consideration of the importance of timber production. For SIP, timber production may be a minor objective, while in MFL plans, timber production is the major objective.

Chequamegon National Forest

That portion of the Whittlesey Creek watershed that lies within the National Forest System ownership is broken into two distinct management areas. Forest Service ownership in Sections 9-16, 23-24, and parts of Section 22, T.48N - R6W lies in the Sunken Camp Management Area, whereas Section 21, 26-35, and parts of section 22, T.48 - R6W and Sections 2-4, T.47 - R6W lies in the Pipeline Management Area.

The following are prescriptions as described in the Chequamegon National Forest Management Plan (1987):

Sunken Camp Management Area

The management prescription for the Sunken Camp Management Area emphasizes aspen pulpwood through even-aged management and habitat management for wildlife species associated with pioneer vegetation such as white-tailed deer, ruffed grouse, and sherp-shinned hawk, while providing opportunities for a wide variety of motorized and nonmotorized recreation within a roaded natural setting.

Pipeline Management Area

The management prescription for the Pipeline Management Area emphasizes the production of softwood sawtimber and pulpwood products through even-aged management, maintaining or increasing vegetative diversity for wildlife species, primarily nongame, and providing cover for white-tailed deer, while providing opportunities for a wide variety of motorized and nonmotorized recreation within a roaded natural setting.

The Whittlesey Creek Priority Watershed Project will support and cooperate with the Chequamegon National Forest in its commitment to principles of ecosystem management. All activities will incorporate an ecological approach to achieve multiple-use management and blend

the needs of the people and environmental values to represent healthy, productive, and sustainable ecosystems.

Information and Education Activities

Information and education activities which will be used to help implement integrated resource management objectives include:

- Information sharing through direct landowner contacts made by project staff,
- facilitate sharing of information between project area landowners,
- radio, television, and /or local press coverage when feasible,
- featuring practices on project tours and field days whenever practical,
- featuring practices on project's display exhibit,
- articles in the project newsletter and other newsletters serving project area, and
- distributing existing printed materials where feasible.

CHAPTER 7: PROGRESS ASSESSMENTS

Introduction

This chapter describes how progress will be monitored in the Whittlesey Creek Priority Watershed Project. The strategy includes two components:

(1) administrative review, and
(2) pollution reduction evaluation.

Information on these components will be collected by the county Land Conservation Department (LCD) and reported to DNR and 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 DNR's Bureau of Community Assistance.

Administrative Review

The administrative review component will focus on the progress of Bayfield County in implementing the project. The project will be evaluated with respect to 1) amount and types of BMP's on Cost-share Agreements and installed (accomplishment reporting), 2) financial expenditures, and 3) staff time spent on project activities.

Accomplishment Reporting: The Computer Assisted Management and Planning System, (CAMPS) is a computer data management system that has been developed by the USDA Natural Resource Conservation Service (NRCS). It is used by NRCS, DNR, and DATCP to meet the accomplishment reporting requirements of all three agencies. Data on administrative accomplishments will be collected by each county LCD using CAMPS, and will be provided to DNR and DATCP for program evaluation. In the future, CAMPS will be replaced by another data management system known as Wisconsin FOCS. When Bayfield County converts from CAMPS to WI FOCS accomplishment reporting will be provided on the new system.

The County LCD's will provide the following data to DNR and DATCP on a quarterly basis:

1) number of personal contacts made with landowners,
2) completed I&E activities,
3) number of farm conservation plans prepared for the project,
4) number of cost-share agreements signed,
5) pollutant load reductions associated with planned practices,
6) number of landowners participating in the Stewardship Incentive Program.

In addition to quarterly reports, County LCD representatives will meet with DNR and DATCP staff annually to review progress and plan for the next year.

Financial Expenditures: The LCD will provide the following financial data to DNR and DATCP on a quarterly basis:

1) number of landowner cost-share agreements signed,
2) amount of money committed on cost-share agreements,
3) number of landowner reimbursement payments made, and amount paid for installation,
4) expenditures for staff travel,
5) expenditures for information and education program,
6) expenditures for equipment, materials, and supplies,
7) expenditures for professional services and staff support costs, and
8) total project expenditures for LCD staff,
9) staff training expenditures,
10) interest money earned and expended, and
11) total county LCD budget and expenditures on the project.

Time Spent On Project Activities: The LCD will provide time summaries to both departments for the following activities on a quarterly basis:

1) project and fiscal management,
2) clerical assistance,
3) pre-design and conservation planning activities,
4) technical assistance: practice design, installation, cost-share agreement, status review and monitoring,
5) educational activities,
6) training activities, and
7) leave time.

Pollutant Reduction Evaluation

Purpose: The purpose of this evaluation component is to calculate reductions in the amount of key pollutants as a result of planning and installing Best Management Practices. The primary means for tracking planned and installed pollutant reductions is through the use of the Operating Unit's Wisconsin Data Listing report in CAMPS. Running this report for each landowner at the time of cost-share agreement preparation will provide the initial planned reductions, and also will ensure the base of information necessary to run future summary reports is entered in CAMPS. Five key sources have been identified for estimating changes in pollutant loads in the Whittlesey Creek Watershed: a) upland sediment b) gully erosion, and c) streambank erosion. Tracking procedure for each source is described below.

Procedure:

Upland Sediment Sources

County LCD staff will be responsible for determining the estimated sediment control achieved through planned and installed Best Management Practices. The county will report the information to DNR through CAMPS.

Gully Erosion

The county will record for each landowner the number of gullies and the sediment being generated by the gullies at the time of contact, the number of gullies to be controlled through Best Management Practices identified on the Cost-share Agreement, and the tons of sediment reduced through control of the gullies.

Streambanks and Shorelines

The county LCD will calculate changes in streambank and shoreline sediment in terms of tons of sediment and length of eroding sites. A tally will be kept of landowners contacted, the amount of sediment being generated at the time of contact, changes in erosion levels estimated after installing Best Management Practices, and the number of fish habitat structures installed, if any. Much of this information will be provided through CAMPS.

Forestry Best Management Practices

Local watershed staff in cooperation with the local DNR forester and the Nonpoint Source Coordinator, will be responsible for monitoring the progress and evaluating the effectiveness of the interim forestry BMPs. The number of landowner cooperators, types of BMP used and the effectiveness of pollution protection will be reviewed at the annual watershed progress evaluation meeting. A final evaluation will be conducted at the end of the BMP installation period, described in the Interim Best Management Practice proposal.

BIBLIOGRAPHY

Burnham, Guy M., 1930, The Lake Superior Country in History and in Story

Cahow, Adam C., 1971, Abandoned Shorelines and Related Geomorphic Features, Bayfield County, Wisconsin, Masters Thesis: Michigan State University

Clayton, L., 1984, Pleistocene Geology of the Superior Region, Wisconsin: Wisconsin Geological Survey

Dickas, Albert B., 1993, Wisconsin's Lake Superior Basin Water Quality Study - Technical Report One: University of Wisconsin-Superior

Gebert, W.A., 1979, Low Flow Characteristics of Streams in the Lake Superior Basin, Wisconsin - Water Resources Investigations Open-File Report 79-38: U.S. Department of Interior Geological Survey

Johannes, S.I., Sather, L.M., Theinen, C.W., 1970, Surface Water Resources of Bayfield County: Wisconsin Department of Natural Resources

Koshere, Frank, 1993, Water Resources Appraisal for Whittlesey Creek Priority Watershed: Wisconsin Department of Natural Resources

Krug, Wm. R., Conger, Duane H., Gebert, Warren A., 1992, Flood Frequency Characteristics of Wisconsin Streams - Water Resources Investigations Report 91-4128: U.S. Geological Survey

Olson, Avis R., Interview - Researcher: Bayfield & Ashland Counties, 713 9th Avenue West, Ashland, WI 54806

Smith, Jane S., Goc, Michael J., Looking Backward Moving Forward, Ashland: The Garland City of the Inland Seas

The Red Clay Interagency Committee, 1967, Erosion and Sedimentation Control Report

The St. Louis River System Remedial Action Plan - Stage One, 1992

United States Department of Agriculture Soil Conservation Service, 1961, Bayfield County Soil Survey

United States Environmental Pollution Control Agency, 1980, Impact of Nonpoint Pollution Control on Western Lake Superior, Red Clay Project

Verry, E.S., 1986, Forest Harvesting and Water - The Lakes States Experience: Water Resources Bulletin, 22(6)1039-1047

BIBLIOGRAPHY cont.

Verry, E.S., Lewis, J.R., Brooks, K.N., 1983, Aspen Clearcutting Increases Snowmelt and Storm Flow Peaks in North Central Minnesota: Water Resources Bulletin, 19(1):59-67

Wisconsin Department of Natural Resources, 1991, Lake Superior Basin Water Quality Management Plan

Wisconsin Department of Natural Resources, 1994, Field Surveys on Whittlesey Creek

Wisconsin Department of Natural Resources, Wisconsin's Forestry Best Management Practices for Water Quality - Field Manual for Loggers, Landowners and Land Managers

GLOSSARY

Anadromous: Moving from the lake to tributary streams for reproduction.

Alluvial: Deposited by running water.

Aquifer: A saturated permeable material (often sand, gravel, sandstone, or limestone) that contains or carries groundwater.

Base flow: Portion of stream discharge derived from such natural storage sources as groundwater, lakes, and wetlands situated outside the area of net rainfall that creates local surface runoff; the sustained discharge that does not result from direct runoff or from stream regulation, water diversion, or other human activities.

Biomass: Summed mass or weight of individuals in one or more species, usually related to a defined area or volume.

Ecosystem: The physical and the climatic features and all the living and dead organisms in an area that are interrelated in the transfer of energy and material.

Evapotranspiration: Loss of water by evaporation from the soil and transpiration from plants.

Flood plain: Level lowland bordering a stream onto which the stream spreads at flood stage.

Glacial till: Heterogeneous veneer of clay, silt, sand, gravel, and boulders left on the ground by melting glaciers.

Recharge: The resupply of water to an aquifer. Natural recharge is supplied by precipitation infiltrating through the soil and into an aquifer.

Riparian area: Area with distinctive soils and vegetation between a stream or other body of water and the adjacent upland. It includes wetlands and those portions of the floodplains and valley bottoms that support riparian vegetation.

Salmonids: Fish of the family Salmonidae, most often referring to salmon, trout, and chars.

Zone of saturation: The area of soil or rock in which all open spaces are filled with water.

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

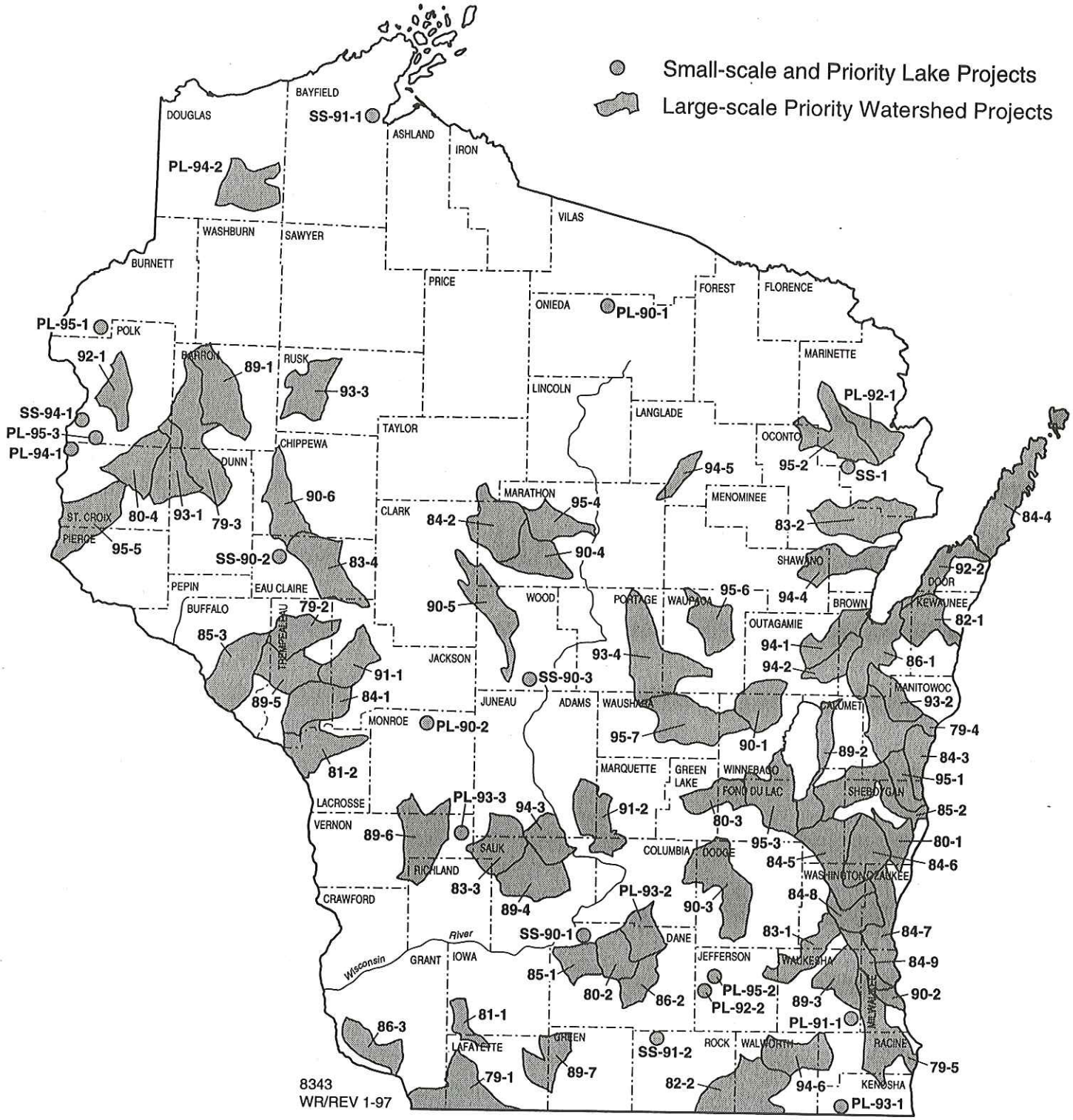
Year Selected-Map Number	Small-scale Priority Watershed Project	County(ies)
SS-1	Bass Lake ♦	Marinette
SS-90-1	Dunlap Creek	Dane
SS-90-2	Lowes Creek	Eau Claire
SS-90-3	Port Edwards - Groundwater Prototype	Wood
SS-91-1	Whittlesey Creek	Bayfield
SS-91-2	Spring Creek	Rock
SS-94-1	Osceola Creek	Polk

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

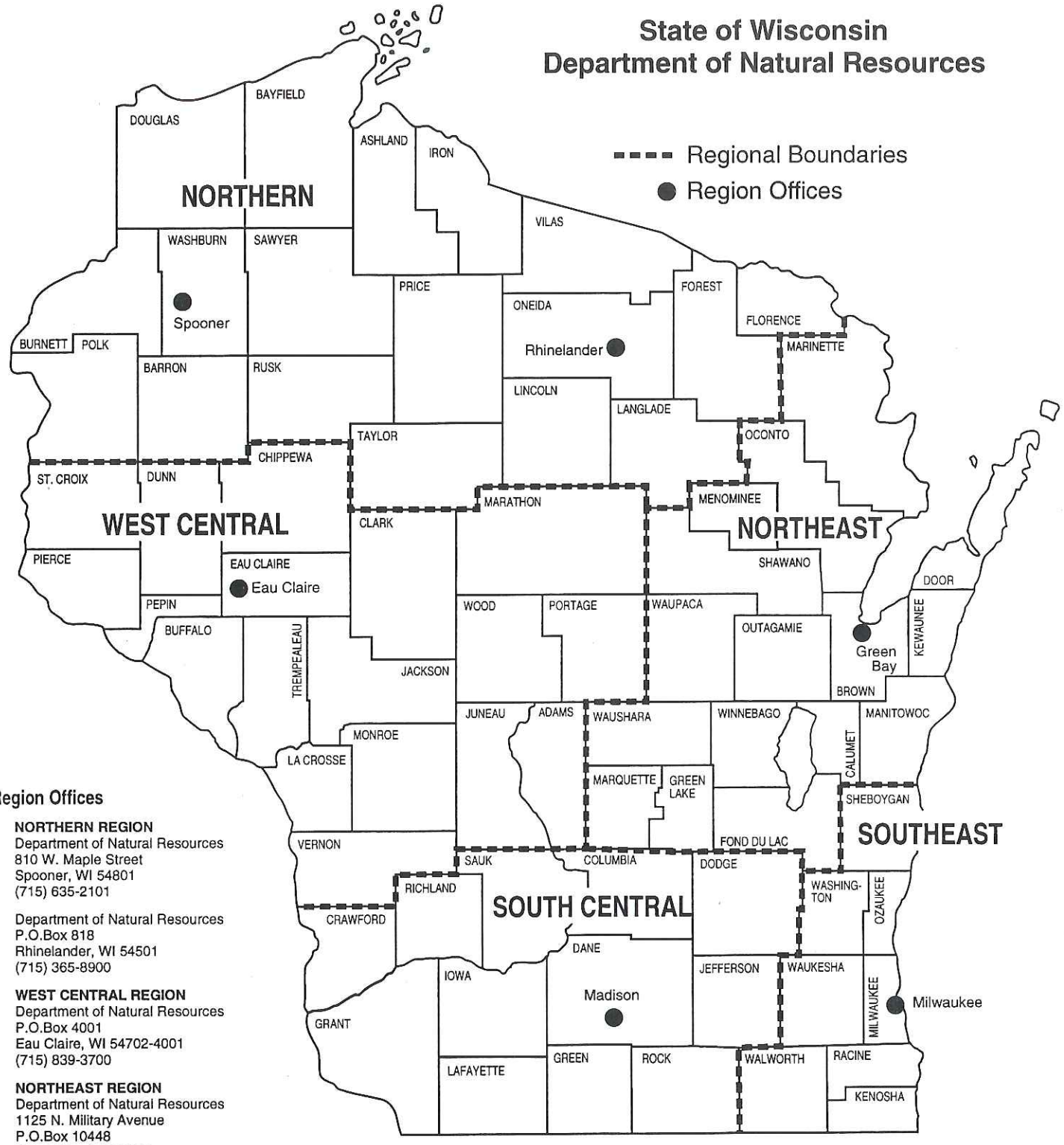
♦ *Project completed*

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

Priority Watershed Projects in Wisconsin
1996-1997



State of Wisconsin
Department of Natural Resources



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.

WISCONSIN
DEPT. OF NATURAL RESOURCES

PRINTED ON
RECYCLED
PAPER