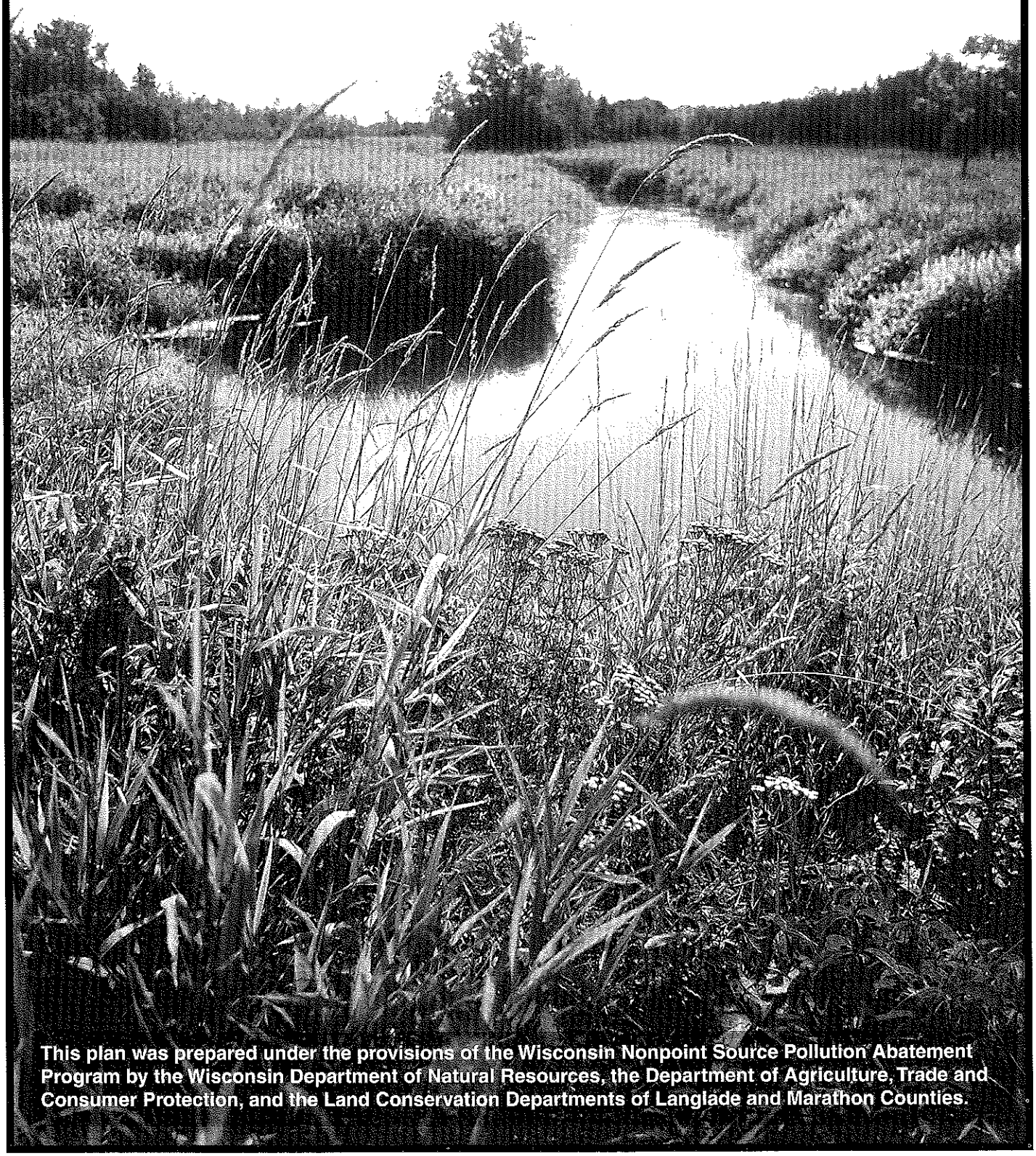
Nonpoint Source Control Plan for the

Spring Brook

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 Land Conservation Departments of Langlade and Marathon Counties.

Watershed Plan Organization Information

Spring Brook Citizens Advisory Committee

Ken Husnick
Ray Jankowski
Gene Matuszewski
Leonard Pagel
Rick Parilek
Robert Pregler
Norbert Schroepher
David Simon
Keith Wilson

Natural Resources Board

Herbert F. Behnke, Chair
Trygve A. Solberg, Vice Chair
Neal W. Schneider, Secretary
Betty Jo Nelsen
Howard D. Poulson
James E. Tiefenthaler, Jr.
Stephen D. Willett

Langlade County Board

Eugene Kamps, Chair

Land Conservation Committee

James Jansen, Chair
Eugene Kamps
Anthony Koss
Bernard Urban
John Wolter
Paul Schuman

Marathon County Board

Aaron C. Baumgardt, Chair
Mort McBain, County Administrator

Land Conservation Committee

Richard Scheuer, Chair
Wallace R. Emmerich
Leo Martin
Robert VanLanen
Frank Zebro

State of Wisconsin

Tommy G. Thompson, Governor

Wisconsin Department of Natural Resources

George E. Meyer, Secretary
Susan L. Sylvester, Administrator, Division of Water Quality
Paulette Harder, Director, Bureau of Watershed Management
Gordon Stevenson, Acting Chief, Runoff Management Section

Land and Water Conservation Board

Robert Uphoff, Chair
Ken Van Dyke, Vice Chair
Wilbur Petroskey, Secretary
Mary E. Bierman
James Bradley
Russel Brock
Marigen Carpenter
George Nettum
George Meyer, DNR Secretary
David Schmiedicke, Department of Administration, Secretary Designee
Alan T. Tracy, Department of Agriculture, Trade, and Consumer Protection, Secretary

Wisconsin Department of Agriculture, Trade and Consumer Protection

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

Nonpoint Source Control Plan for the Spring Brook Priority Watershed Project

The Wisconsin Nonpoint Source Water Pollution Abatement Program

June 1997

This Plan Was Cooperatively Prepared By:

The Wisconsin Department of Natural Resources
Wisconsin Department of Agriculture, Trade and Consumer Protection
and
Langlade County and Marathon County Land Conservation Departments

Publication WT-480-97

For copies of this document please contact:

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

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

Watershed Plan Credits

Author

Paul Tollard, Project Manager, Langlade County Land Conservation Department

Principal Contributors

Tom Blake, Implementation Coordinator, Northern Region, WDNR
Lynne Hess, DATCP, Soil and Water Resource Management Section
Jim Klosiewski, Water Resource Specialist, Northern Region, WDNR
Dana Schoening, CONRAD Specialist, UWEX
Jan Whitcomb, Watershed Planner, NRCS

Additional Contributors

Ken Baun, WDNR Nonpoint Source & Land Management Section
Becky Frisch, Administrator, Langlade County Land Records and Regulations Department
Kathryn Gorichan, District Conservationist, NRCS
Marie Graupner, County Conservationist, Langlade County Land Conservation Department
Cindy Hoffland, WDNR Bureau of Community Assistance
Carolyn Johnson, UWEX
Dean Kaatz, County Conservationist, Marathon County Land Conservation Department
Ken Lassa, Marathon County Land Conservation Department
Pat Vander Lease, City Engineer, Antigo
Steve Zimmerman, UW-Extension
Nik Zymonas, WDNR Groundwater Management Section

Editor

Jan Whitcomb, Watershed Planner, NRCS

Graphics/Maps

Bureau of Information Management Services Section, WDNR
Robert Queen, WDNR (Cover Photograph)

WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

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

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

June 3, 1997

IN REPLY REFER TO: 3200

Eugene Kamps, Chairman
N1102 Fairview Road
Antigo, WI 54409

Dear Gene Mr. Kamps

I am pleased to approve the Spring Brook Priority Watershed Plan prepared through the Wisconsin Nonpoint Source Pollution Abatement Program. This plan meets the intent and conditions of S. 281.65, Wisconsin Statutes, and Chapter NR120, Wisconsin Administrative Code. This plan has been reviewed by the Department of Agriculture, Trade, and Consumer Protection. The plan went before the Land and Water Conservation Board on June 3, 1997, and was approved at that time. I am also approving this plan as an amendment to the Upper Wisconsin River Central Subbasin Areawide Water Quality Management Plan.

I would like to express the Department's appreciation to the Langlade County LCD staff that participated in preparing this plan. We look forward to assisting Langlade County LCD and other units of government in the watershed in the implementation of the Spring Brook Priority Watershed Plan.

Sincerely,

George

Good luck on your project.

George E. Meyer
Secretary

cc: Alan Tracey, DATCP
Robert Uphoff, LWCB
Marie Graupner, Langlade County LCD
James Jansen, Langlade County LCC Chairman
Tom Blake, NO-Rhinelander
Arlyn E. Loomis, NO-Rhinelander
Thomas E. Bashaw, NO-Rhinelander
Keith Foye, DATCP
Cindy Hoffland, CA/8
Jan Whitcomb, WT/2

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

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

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

June 3, 1997

IN REPLY REFER TO: 3200

Aaron C. Baumgardt, Chairman
401 Rosecrans St.
Wausau, WI 54401

Dear Mr. Baumgardt

I am pleased to approve the Spring Brook Priority Watershed Plan prepared through the Wisconsin Nonpoint Source Pollution Abatement Program. This plan meets the intent and conditions of S. 281.65, Wisconsin Statutes, and Chapter NR120, Wisconsin Administrative Code. This plan has been reviewed by the Department of Agriculture, Trade, and Consumer Protection. The plan went before the Land and Water Conservation Board on June 3, 1997, and was approved at that time. I am also approving this plan as an amendment to the Upper Wisconsin River Central Subbasin Areawide Water Quality Management Plan.

I would like to express the Department's appreciation to the Marathon County LCD staff that participated in preparing this plan. We look forward to assisting Marathon County LCD and other units of government in the watershed in the implementation of the Spring Brook Priority Watershed Plan.

Sincerely,

George

Good luck on your project.

George E. Meyer
Secretary

cc: Alan Tracey, DATCP
Robert Uphoff, LWCB
Dean Kaatz, Marathon County LCD
Richard Scheuer, Marathon County LCC Chairman
Tom Blake, NO-Rhinelander
Arlyn E. Loomis, NO-Rhinelander
Thomas E. Bashaw, NO-Rhinelander
Keith Foye, DATCP
Cindy Hoffland, CA/8
Jan Whitcomb, WT/2

LANGLADE COUNTY

RESOLUTION #52-97

INTRODUCED BY: LAND CONSERVATION COMMITTEE

INTENT: ADOPTING THE SPRING BROOK NONPOINT SOURCE PRIORITY WATERSHED PLAN

WHEREAS, the Spring Brook Watershed was designated by the Department of Natural Resources in 1995 under the Wisconsin Nonpoint Source Water Pollution Abatement Program; and

WHEREAS, the County Land Conservation Department in cooperation with the Wisconsin Department of Natural Resources and the Wisconsin Department of Agriculture, Trade and Consumer Protection conducted a detailed inventory of the land use within the watershed in 1995 and 1996; and

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

WHEREAS, a number of public informational meetings have been conducted throughout the watershed and an official public informational hearing was conducted on May 13, 1997; and

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

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

NOW THEREFORE, BE IT RESOLVED, by the Board of Supervisors of the County of Langlade, that the Spring Brook Watershed Nonpoint Source Priority Watershed Plan be adopted and the implementation of the plan begin as soon as possible.

Fiscal Impact: Costs to the County for implementation of this watershed plan are reimbursed 100% by the State.

LAND CONSERVATION COMMITTEE

James Jansen, Chairman

Anthony Koss

Paul Schuman

John F. Wolter

Eugene Kamps

ADOPTED BY THE COUNTY BOARD OF LANGLADE COUNTY THIS 20th DAY OF MAY, 1997

Kathryn Jacob, County Clerk

RJ2
JM

RESOLUTION #R- 39-97

ADOPTING THE SPRING BROOK NONPOINT SOURCE PRIORITY WATERSHED PLAN

WHEREAS, the Spring Brook Watershed was designated by the Department of Natural Resources under the Wisconsin Nonpoint Source Water Pollution Abatement Programs; and

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

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

WHEREAS, an official public hearing was conducted on May 13, 1997; and

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

WHEREAS, the County wishing to receive cost-sharing grants for landowners in the watershed must first adopt the Spring Brook Plan.

NOW, THEREFORE, BE IT RESOLVED by the Supervisors of the County of Marathon that the Spring Brook Watershed Plan be adopted.

DATED: This 20th day of May 1997.

FISCAL IMPACT: Less than 10% of this watershed is in Marathon County. Cost to the County for implementation of this plan are reimbursed 100% by the State.

LAND CONSERVATION COMMITTEE

TABLE OF CONTENTS

Page

CHAPTER THREE

Implementation

Page

List of Tables

Page

List of Maps

List of Acronyms

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

CHAPTER ONE
Purpose, Legal Status and General Description

Wisconsin Nonpoint Source Water Pollution Abatement Program

The State Legislature created the Wisconsin Nonpoint Source Water Pollution Abatement Program in 1978. The goal of the Program is to improve and protect the water quality of streams, lakes, wetlands, and groundwater by reducing pollutants from urban and rural nonpoint sources. The 67 square mile Spring Brook Watershed, located in Langlade and Marathon Counties, was designated a "priority watershed" in 1994. The primary objective of this project is to reduce nonpoint source pollution and to enhance and protect the water quality of the streams and groundwater in the Spring Brook Watershed. The Spring Brook is part of the Upper Wisconsin River Central Sub-Basin.

Nonpoint sources of pollution in the watershed include: nitrate contamination of groundwater from agricultural fertilizers, eroding agricultural lands, runoff from livestock wastes, construction erosion, eroding streambanks and roadsides, and stormwater from urban areas. Pollutants from nonpoint sources are carried to the surface water or groundwater through rainfall runoff or seepage, and snowmelt.

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

- The Department of Natural Resources (DNR) administers the program in cooperation with the Department of Agriculture, Trade, and Consumer Protection (DATCP). Wisconsin is divided into 333 discrete hydrologic units called watersheds. These watersheds are assessed for water quality concerns as part of a comprehensive basin planning program. Watersheds with a high degree of water quality impairment from nonpoint sources of pollution become eligible for consideration as a priority watershed project. Approximately 20 projects are completed and 70 are underway. As directed by the state legislature, all of these high ranking watersheds, about 150, must be planned by 2015. Designation as a priority watershed project enables special financial support to local governments and private landowners in the watershed to reduce nonpoint source pollution.

- A priority watershed project is guided by a plan such as this one, prepared cooperatively by the DNR, DATCP, and local units of government, with input from a local citizen's advisory committee. Project staff evaluate the conditions of surface water and groundwater, and inventory the types of land use and nonpoint sources of pollution throughout the watershed. The priority watershed plan assesses nonpoint and other sources of water pollution and identifies best management practices (BMPs) needed to

control pollutants to meet specific water resource objectives. The plan guides implementation of these practices in an effort to improve water quality.

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

- Technical assistance is provided to aid in the design of BMPs. State level cost-share assistance is available to help offset the cost of installing these practices. Eligible landowners and local units of government are contacted by the local staff to determine their interest in installing the BMPs identified in the plan. Signed cost-share agreements list the practices, costs, cost-share amounts and a schedule to install management practices. Municipal governments are also assisted in developing and installing BMPs to reduce urban pollutants.

- Informational and educational activities are developed to encourage participation.

- The DNR and DATCP review the progress of the counties and other implementing units of government, and provide assistance throughout the ten-year project. The DNR monitors improvements in water quality resulting from control of nonpoint sources in the watershed.

Legal Status of the Nonpoint Source Control Plan

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

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

This priority watershed plan was approved by DNR following approvals by the Land and Water Conservation Board, Langlade County, and Marathon County.

Amendments to the Plan

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

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

Wisconsin's Pollution Discharge Elimination System (WPDES) Storm Water Permit Program is administered by DNR's Bureau of Wastewater Management under Chapter 147 of the Wisconsin Statutes. This program is separate from the Nonpoint Source program and applies to certain classes of dischargers statewide as identified in NR 216. In cases where the programs do overlap, implementation grants may only apply to activities identified in the watershed plan. Practices to control construction site erosion and storm water runoff from new development are not eligible for cost sharing. In industrial areas, cost sharing is available as specified in NR 120.17 only in the non-industrial parts of facilities where a problem has also been identified in the priority watershed plan.

Priority Watershed Project Planning and Implementation Phases

Planning Phase

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

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

Implementation Phase

The implementation phase of the Spring Brook Priority Watershed Project will begin following review of the draft priority watershed plan, a public hearing, and approval by the DNR, LWCB, the Board of Supervisors for Langlade County, and the Board of Supervisors for Marathon County. Public review during plan development occurred primarily through the efforts of the Spring Brook Citizen Advisory Committee.

During the implementation phase:

- DNR enters into local assistance agreements with local units of government that have implementation responsibilities identified in the plan. These agreements provide funds necessary to maintain the resources and staff required for plan implementation.

- Langlade County will protect water quality in the watershed through the adoption of an animal waste storage ordinance.

- Nonpoint source pollutant load reduction in the Spring Brook Priority Watershed will be achieved mainly through voluntary participation. However, state statutes require that the nonpoint source control plan contain the necessary language to ensure the reasonable likelihood of achieving water quality goals and objectives. Landowners with sites that meet the established critical site criteria are required by law to address those specific sites by reducing the nonpoint source pollutant load to an acceptable level. Pollutant reduction can occur solely through the action of the landowner with guidance from county staff or through watershed participation. Each identified site will be field verified before receiving notification as a critical site. All critical sites in the Spring Brook Priority Watershed are upland crop fields. There are no identified critical sites related to animal waste.

- In the rural portions of the watershed, the Langlade County LCD and Marathon County LCD staff will contact eligible landowners to determine their interest in installing best management practices identified in the plan.

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

- In rural areas, the landowner signs a cost-share agreement with the county that outlines the practices, costs, cost-share amounts, and a schedule for installation of management practices. Practices are scheduled for installation after an agreement is signed. Practices must be maintained for at least 10 years (except where required as a component of another practice, high residue management systems, nutrient management, pesticide management, and cropland protection cover are exempt from the minimum 10 year operation and maintenance period, and only need to be maintained during the period for which cost sharing is received). Any easements which may be acquired will be perpetual.

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

Location and Community Information

The Spring Brook Watershed is a 67 square mile drainage basin located in northeast Wisconsin. Over 90 percent of the watershed, or 63.2 square miles, lies within Langlade County, with the balance of 3.8 square miles in Marathon County. The Spring Brook Watershed drains to the Eau Claire River and ultimately to the Wisconsin River at Schofield.

Civil Divisions

The Spring Brook Watershed lies within Langlade and Marathon Counties. Incorporated areas in the watershed include the City of Antigo. The watershed covers all or part of the following Towns:

Langlade County			Marathon County
Antigo	Ackley	Neva	Harrison
Polar	Price	Rolling	

Population Size and Distribution

The Spring Brook Watershed population is estimated to be about 10,200 persons. Most of the watershed population lives in the City of Antigo. Population in the watershed is increasing, based on the 1994 estimates compared to the 1990 census. The population in the watershed decreased between 1950 and 1990. The population of Antigo was 9,902 in 1950, 8,284 in 1990, and is estimated at 8,540 during 1994. Only the Town of Rolling showed an increase during the period 1950 to 1990. The watershed population is estimated to have decreased by about 13 percent since 1950. Regional trends suggest that the watershed's population will probably increase somewhat.

Land Uses

Rural land uses predominate in the watershed. Agriculture is the most important land use, comprising 85 percent. Dairy farming is one of the two main agricultural enterprises in the watershed. The watershed is also important for the production of certified seed potatoes. Langlade County ranks third in the state for total potato production. Marathon County ranks first statewide in milk production, hay, corn, second in corn silage and barley, third in oats, and tenth in potatoes (Wisconsin Agricultural Statistics, 1996). Woodlands tend to be located on the upland areas along the watershed boundaries, and cover 15 percent of the land area. Developed land uses occupy 6 percent of the watershed (Table 1-1).

Table 1-1. Summary of Land Uses in the Spring Brook Creek Watershed

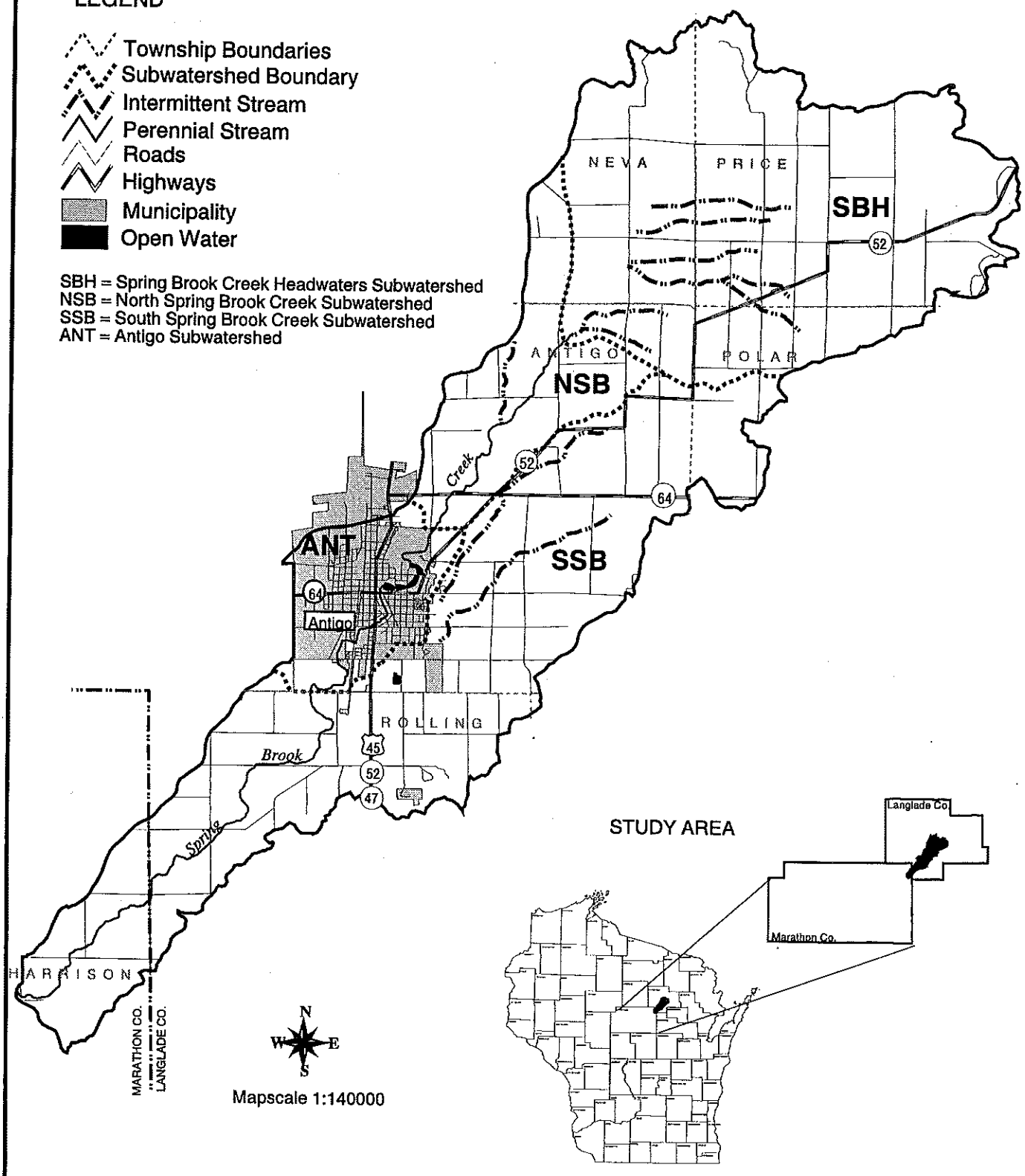
Land Uses	Acres	Percent
Cropland and Pasture	30,200	70
Woodland	6,300	15
Other[1]	3,800	9
City of Antigo	2,700	6
Wetland[2]	700	2
Total	43,000	100

1 Farmsteads, farm lanes, rural roads and highways, etc.

2 These are estimates of wetland acres based on DNR Wetland Inventory data for Langlade County. The estimates are of actual wetland acres, not cropped wet fields. See wetland section in this chapter for a more comprehensive estimate of wetland acreage. This acreage is also included in other land use categories.

Source: DNR and Langlade and Marathon LCDs.

Map 1: Spring Brook Creek Watershed



Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

CHAPTER TWO
Watershed Conditions and Nonpoint Sources of Pollution

This chapter discusses the physical characteristics, existing conditions, nonpoint sources, objectives, and management categories for the water resources in the Spring Brook priority watershed. Information is presented for each subwatershed and by pollution source.

Physical Setting

Climate and Precipitation

The frequency, duration, and amount of precipitation influences surface and groundwater quality and quantity, soil moisture content, runoff characteristics, and the physical condition of waterways. The Spring Brook Watershed lies in the continental zone which is characterized by winters which are long and relatively cold and snowy, and summers which are mostly warm with periods of hot humid conditions. Mean annual precipitation for the region is about 33 inches of rain and melted snow; the majority falls in the form of thunderstorms during the growing season (May-September). Most runoff occurs in February, March, and April when the land surface is frozen and soil moisture is highest.

Topography

The relief in the region is largely controlled by glacial features. The Spring Brook Watershed is located on a plain called the Antigo Flats. Slopes in this area are long, smooth, and nearly level. This area encompasses the smoothest land in Langlade County, and constitutes the county's major agricultural district. The Antigo Flats are bounded to the north and south by steeper, hilly, marginal moraines. The surface of the area slopes to the south west, dropping about 10 feet per mile. The north east watershed boundary is about 1650 feet above mean sea level and drops to about 1430 feet in the south west, giving a relief of 220 feet within the watershed.

Geology

The Spring Brook Watershed lies primarily on an outwash plain that is adjacent to the older drift area. In the most recent glacial advance, the Langlade lobe on the continental glacier covered the northern and eastern half of the county, which contains most of the natural lakes. The balance of the county is covered by older drift from previous glaciers consisting of ground moraine and unpitted outwash. Most of the watershed was not

covered by the most recent glacial advance and as a result there are none of the natural lakes typical of glaciated areas.

Soils

The soils of Langlade County originate from one major source: continental glaciation. The majority of the Spring Brook Watershed is of the Antigo-Langlade association. The Antigo-Langlade soils consists of well drained, nearly level and gently sloping, silty soils on outwash plains. Areas are broad and rather flat, except for a few knolls, swells, swales, and foot slopes bordering terminal moraines, drainage ways, and valleys. Slopes range from 0 to 15 percent. The Kennan-Keweenaw soil is also found in the watershed. Kennan-Keweenaw soils are well drained, undulating to very steep, stony, loamy and silty soils on moraines and drumlins.

Water Resource Conditions and Goals

This section describes the general conditions of the surface and groundwater resources in the Spring Brook watershed. It describes the classifications used for Wisconsin's waters, then describes the surface water and recreational resources in the watershed. Descriptions of subwatersheds are also included and several tables provide summaries of the watershed's resources. Table 2-1 in the next section also serves as a useful summary of the surface water resources in each subwatershed. Groundwater resources and quality are also discussed.

Water Use Classifications

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

In addition to these standards, other criteria were used to assess the suitability of surface waters for recreational and biological uses. Data characterizing stream size and accessibility were used to help determine the suitability and types of recreation a stream is capable of supporting. Information on current recreational use of surface waters (provided by users at public access points and discussions with local officials) is also used to assess suitability of surface waters for recreation. Use classifications and supporting water quality standards used in evaluating water resource conditions are discussed below.

Biological Stream Use

Wisconsin streams are classified according to the biological uses desired for each stream. These classifications are listed for each stream in the water quality management plans developed for each basin in the subwatershed discussions. Stream classification determines allowable pollutant loads to the system. Resources are classified as one of the following:

COLD = Coldwater Communities include surface waters capable of supporting a community of coldwater fish and other aquatic life or serving as a spawning area for coldwater fish species.
WWSF = Warmwater Sport Fish Communities include surface waters capable of supporting a community of warmwater sport fish and/or serving as a spawning area for warmwater sport fish.
WWFF = Warmwater Forage Fish Communities include surface waters capable of supporting an abundant diverse community of forage fish and other aquatic life.
LFF = Limited Forage Fish Communities

Trout streams carry a separate designation found in "Wisconsin Trout Streams" (DNR Publication number. 6-3600(80)) and Outstanding/Exceptional Resource Waters, Wisconsin Administrative Code NR 102.20 and NR 102.11. Trout classes are:

Class I trout streams are high quality, and populations are sustained by natural reproduction.
Class II trout streams have some natural reproduction but may need stocking to maintain a desirable fishery.
Class III trout streams have no natural reproduction and require annual stocking of legal-size fish to provide sport fishing.

Table 2-1 summarizes the water resource classification and conditions for the Spring Brook Watershed.

Recreational Stream Use

Recreational stream use classifications are described by a level of human body contact determined to be safe and reasonable. The system applies to all surface waters including those categorized as intermediate or marginal under the above referenced biological use classification system. Three designations are used under the recreational stream classification system. These designations are full body contact, partial body contact, and non-contact.

Full Body Contact. These waters are used for human recreation where immersion of the head is expected and occurs often. Recreation activities classified as full body contact include swimming, waterskiing, sailboarding and other similar activities.

Partial Body Contact. These waters are used for human recreation where immersion of the head is not frequent and contact is most often incidental or accidental. Recreational activities classified as partial body contact include boating, canoeing, fishing, and wading.

Non-contact. These waters should not be used for human recreation. This category is used infrequently when extenuating circumstances such as high concentrations of in-place pollutants, an uncontrollable pollution source, or other conditions dictate that contact with the water would be an unnecessary health risk.

Surface Water and Recreational Resources

For the purposes of this project, the Spring Brook Watershed is subdivided into 4 individual subwatersheds. Each subwatershed conveys surface water to the Spring Brook Creek. Spring Brook Creek, Antigo Lake,

major tributaries, wetlands, and subwatershed divides are shown in Map 1-1. See Table 2-1 for the general conditions of major water resources in the Spring Brook Watershed.

Subwatersheds in the Spring Brook Watershed

Spring Brook Headwaters	SBH
North Spring Brook	NSB
Antigo	AN
South Spring Brook	SSB

Streams

Originating approximately three miles northeast of the City of Antigo, (T.31N, R.11E, S.29) Langlade County, Spring Brook is 19 miles long and flows southwesterly through Antigo before joining the Eau Claire River in northeast Marathon County. The stream is intermittent in the headwaters and spring-fed in the Antigo Flats area. There are no perennial feeder streams associated with Spring Brook.

Spring Brook is classified as a Class I trout stream for 17 of its 19 miles. Trout waters are located between CTH V and one-half mile below North Avenue, and from CTH X to the confluence with the Eau Claire River. These stretches of the stream are also listed in NR 102 as Exceptional Resource Waters. The segment of stream flowing through the City of Antigo, from one-half mile below North Avenue to CTH X lacks quality habitat, experiences warmer water temperatures, and exhibits poor dissolved oxygen conditions. This stretch of stream is currently classified as a warmwater sport and forage fishery with forage minnows being the dominant fish. Spring Brook is not reaching its highest potential use due to pollution from nonpoint sources. Eroding croplands and improperly managed livestock operations are the major sources of nonpoint pollution in the watershed.

In stream, the overall objective is to upgrade the stream classifications in all subwatersheds.

The stream will be described in more detail in the subwatershed descriptions later in this chapter.

Antigo Lake

Antigo Lake, the only lake in the watershed is 32 acres in size and is comprised of a series of four interconnected basins. Maximum depth is 16 feet, and the average depth is 7 feet. The drainage area of Antigo Lake is approximately 34.3 square miles. Spot checks of dissolved oxygen conditions in the lake during algal blooms show super saturated levels above 20 mg/L at the water's surface and under 3mg/L only a few feet below the surface. These dissolved oxygen levels reveal that the summer algal blooms are having adverse chemical effects on the lake, which in turn effects the lake's fish population.

Antigo Lake offers a diverse recreational resource, but has a history of water quality problems including algae blooms, and excess levels of sediment, nutrients and organic matter which limit its use.

Table 2-1. General Condition of Major Water Resources in the Spring Brook Watershed

Subwatershed	Water Body	Biological Use		Problems Related to Nonpoint Source Pollution
		Current	Potential	
Headwaters Subwatershed	Spring Brook	N.A.	N.A.	Sediment
Spring Brook North	Spring Brook	Cold Class I	Enhanced trout reproduction	Sediment & Nutrients
Antigo	Spring Brook	Cold Class I	Enhanced trout reproduction	Sediment & Nutrients
	Antigo Lake	Warm Water Sport Fish	Same	Sediments & Nutrients
South Spring Brook	Spring Brook	Cold Class I	Enhanced trout reproduction	Sediment & Nutrients

Table 2-2. Wetland Summary: Spring Brook Watershed (Acres)

Wetland Type	Spring Brook Headwaters	North Spring Brook	Antigo	South Spring Brook
Aquatic Bed/Open Water			12.7	
Emergent Wet Meadow	34.4	4.5	44.5	36.1
Scrub/Shrub	34.4	45.3	66.7	163.3
Forested	68.7	104.1	38.1	72.6
Total	137.5	153.9	162.0	272.0

Wetlands

Wetlands are valuable natural resources. They provide wildlife habitat, fish spawning and rearing areas, recreation, storage of runoff and flood flows, and removal of pollutants. Wetlands were once more common in the watershed. Most wetlands have subsequently been drained and are now in agriculture or other uses. Remaining wetlands occur primarily in riparian areas.

Recreation

The watershed's streams, lakes, and wetlands offer diverse and high-quality recreational opportunities. The most popular activities are fishing and swimming. Other popular activities are wildlife observation, hunting, and trapping. The Spring Brook is used for a wide range of recreational activities. It is of local importance because it draws many people for its trout fishing. Recreational facilities on the Spring Brook include a park on Antigo Lake with fishing docks, picnic areas, and playground equipment.

Groundwater Resources

Regional Aquifers

Groundwater is the primary source of drinking water in the Spring Brook Priority Watershed. Groundwater is stored underground in pore spaces and cracks within the soil and rock layers. Unconsolidated material and rock layers which will yield groundwater in usable quantities are called aquifers. Aquifers receive and store water and also discharge groundwater to lakes, streams, wetlands, and wells.

Since 1936, Wisconsin law has required well drillers to document well construction and rock and soil layers encountered during well installation. Information from geologic logs, driller construction reports, the United States Geological Survey (USGS) and Wisconsin Geological and Natural History Survey (WGNHS) reports is included below. The principal aquifer within the watershed is the sand-and-gravel aquifer. A few wells reach the deeper Precambrian basement complex, but generally only where the sand-and-gravel aquifer is very thin or absent, or otherwise, for use as sumps. The water table within the watershed lies, for the most part, within surficial deposits. Most drinking water wells tap groundwater aquifers at depths ranging from 50 to 150 feet.

The sand-and-gravel aquifer consists of unconsolidated sand and gravel deposits in glacial drift and alluvium. In the Spring Brook Watershed, saturated sand and gravel occurs in discontinuous lenses primarily within outwash and till deposits. Antigo Unit outwash ranges in thickness from less than 50 feet to nearly 300 feet, with saturated thickness varying from zero to greater than 200 feet. Wells may provide yields exceeding 800 gallons per minute. Depth to groundwater ranges from 0 feet to over 100 feet. The sand-and-gravel aquifer in the Mapleview Till of the Outer Moraine is less continuous and less productive than in the Antigo Unit. Still, wells in the till commonly yield 10-20 or more gallons per minute. In general, the extent of the sand-and-gravel aquifer diminishes in the lower watershed to the west/southwest of Antigo.

A few wells tap the Precambrian bedrock aquifer in areas where the sand-and-gravel aquifer is thin or absent. This crystalline bedrock holds water in pore spaces in the broken-down top layer of rock as well as in deeper

fractures. Wells in this aquifer typically yield less than 5 gallons of groundwater per minute, sufficient for some domestic purposes.

Direction of Groundwater Flow

Groundwater in the watershed flows in shallow, local systems, as well as a deeper, regional system. Shallow groundwater flow roughly mirrors the topography of the land surface and flows "downhill" or down-gradient towards stream valleys. In Langlade County, groundwater supplies an estimated 70% of the annual streamflow. On a regional scale, deeper groundwater flows to the south. A major component of the regional groundwater system is the displacement of the groundwater divide separating water in the Mississippi River Basin from water in the Lake Michigan Basin. This groundwater divide is displaced to the north and west, such that surface water in the Spring Brook Watershed flows toward the Wisconsin River, while the underlying deep groundwater flows toward Lake Michigan. Regional and shallow groundwater flows also may be influenced by localized cones of depression produced by high-capacity water supply wells in the area.

Groundwater Quality

Groundwater quality in the Spring Brook Watershed is generally considered good. It naturally ranges from moderately hard to very hard due to the concentrations of calcium and magnesium. The quality of groundwater resources, however, may be adversely affected by human activities.

Nearly anything that can be spilled or spread on the ground has the potential to leach or seep through the ground into groundwater. The physical setting of an area and the nature of the contaminant determine how easily groundwater becomes polluted, if inadequate waste management or improper land uses occur. Physical setting includes a location's soil type, characteristics of the subsurface unconsolidated material, depth to bedrock, depth to groundwater, topography, and hydrologic characteristics. Proximity to the land surface and relatively high permeability of subsurface materials increase the susceptibility to the sand-and-gravel aquifer in this watershed. Potential point sources of groundwater contamination may include spills, leaking underground storage tanks, pesticide contamination sites, old landfills, and unabandoned or improperly abandoned wells. Potential nonpoint sources include fertilizers and pesticides, sludge and septage spreading, livestock waste spreading, irrigation, and road salt. In the ranking of watersheds in the Upper Wisconsin River Central Sub-basin (WDNR PUBL-WR-287-91-REV), the Spring Brook Watershed earned the highest possible score (10) for groundwater protection priority due to groundwater quality impacts from nonpoint sources.

High nitrate levels in groundwater in parts of Wisconsin have been linked to agricultural practices, septage spreading, and faulty septic systems. Agricultural activity within the Spring Brook Watershed is a potential concern for nitrate contamination. During the rural inventory, 36 private well samples were collected and analyzed for nitrate (NO_3) + nitrite (NO_2). Sample analytical results are summarized in Table 2-3. Samples analyzed for nitrate (NO_3) + nitrite (NO_2) showed concentrations ranging from not detectable to 17.7 parts per million or milligrams per liter (mg/L). The groundwater enforcement standard (ES) for nitrate is 10 mg/L. The state preventive action limit (PAL) is 2 mg/L.

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

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

Three samples (12%) exceeded 10 mg/L and twenty-one (88%) of the samples exceeded 2 mg/L. Results so far do not indicate a pattern of groundwater contamination that can be linked to specific sources of nitrate. These results do not necessarily represent the overall groundwater quality of the watershed. However, the high percentage of PAL exceedences (88%) suggests consideration of nitrate reduction measures. Best Management Practices that may reduce nitrate inputs to groundwater include nutrient management, manure storage facilities, barnyard runoff management, animal lot relocation, animal waste storage abandonment, roofs for barnyard runoff management, manure storage facilities, and wetland restoration.

Pesticides have contaminated groundwater in parts of Wisconsin, and the WDNR Groundwater Retrieval Network lists a small number of pesticide detections in past samples from the Spring Brook Watershed. Pesticide testing, however, was not a component of the Water Quality Appraisal. No atrazine prohibition areas currently exist within the watershed. Due to the extent of agricultural land use in this watershed and the coarseness of subsurface deposits, pesticide levels in groundwater should be carefully monitored.

No samples were collected through the Water Quality Appraisal for coliform bacteria or hazardous substances, such as volatile organic compounds (VOCs). The WDNR Groundwater Retrieval Network lists detections of coliform bacteria and also of VOCs in samples taken from the watershed in the past. Coliform bacteria can be a drinking water problem where septic systems, land spreading of manure, or barnyards are located upgradient (generally uphill) from a private well. Bacteria may enter the drinking water supply along the well casing of improperly constructed wells, through a cracked casing, through improperly capped wells, or through fracture flow in bedrock. Generally, wells with bacteria can be rehabilitated.

Volatile organic compounds, common examples include gasoline products, such as benzene, may enter a well from nearby leaking underground gasoline or other fuel storage tanks, spills, and landfills. Once these compounds are in the groundwater, they are difficult to clean up. In general, the contaminated wells have to be abandoned and a new well drilled.

Table 2-3. Well Sampling Results: Spring Brook Watershed

NITRATE								
	Number of Water Samples		Number of Water Samples		Number of Water Samples		Number of Water Samples	
Subwatershed	Less Than 2.0 mg/L NO_3	%	Between 2.0 and 6.0 mg/L NO_3	%	Between 6.0 and 10.0 mg/L NO_3	%	Greater Than 10.0 mg/L NO_3	%
Antigo	0	0	0	0	0	0	0	0
Headwaters	0	0	7	54	5	38	1	8
North Spring Brook	0	0	0	0	2	100	0	0
South Spring Brook	0	0	3	33	4	45	2	22
Totals	0	0	10	42	11	46	3	12

Water Supplies

Water supplies for domestic, agricultural, and industrial uses in the Spring Brook Watershed are obtained from both private and public groundwater systems. The primary source of water supplies is the sand-and-gravel aquifer. In the Antigo Flats area, the sand-and-gravel aquifer furnishes yields sufficient for all purposes. Downward percolation within the watershed and groundwater inflow from the north recharge the watershed's aquifers. Agriculture within the watershed incorporates a substantial amount of groundwater-dependent irrigation. However, studies have determined that this produces little noticeable effect on groundwater levels in the Antigo Flats. One municipal water supply system, Antigo Waterworks, serves the watershed's residents. The system's six wells tap the sand-and-gravel aquifer at depths ranging from 55-62 feet.

In addition to private and municipal community water supply systems, watershed residents may also rely upon other-than-municipal community systems and transient or non-transient non-community systems. Other-than-municipal community systems serve year-round residents and have at least 15 service connections, or serve at least 25 people for 60 or more days per year and are not owned by a municipality. Non-community systems do not serve year round residents. A non-community system that serves the same 25 people for 6 or more months per year is considered non-transient, otherwise the system is classified as a transient system. WDNR Bureau of Drinking Water and Groundwater data from August 1996 lists two other-than-municipal systems and two non-transient non-community systems within the watershed.

Potential Groundwater Quality Problems

Previously identified potential groundwater quality problems in the Spring Brook Watershed are provided below. These sites are not currently causing groundwater pollution, but are the types of problems which have caused groundwater contamination elsewhere. This information is periodically updated and subject to change. Potential pollution associated with nonpoint sources is described in various sections throughout the remainder of this chapter. The WDNR Publication SW-504-95(REV), The Wisconsin Remedial Response Site Evaluation Report (October 1995), lists superfund sites, sites which may cause or threaten to cause environmental pollution, leaking underground storage tank (LUST) sites, and reported hazardous substance spill sites. This publication lists the following sites in the watershed or within 2 miles of the watershed boundary:

Table 2-4a Sites or facilities which may cause or threaten to cause environmental pollution (Wisconsin Hazard Ranking System) :

Tn./City	TWP	RN	SN	QQ	Q
Antigo City Landfill (old)	T31N	R11E	S19	NW	NE

Table 2-4b High priority spill sites:

Tn./City	TWP	RN	SN	QQ	Q
Aniwa	30N	10E	35	SE	SW
Antigo	30N	11E	18	NE	NE
Antigo	31N	11E	20	NE	NE
Antigo	31N	11E	29	NW	SE
Antigo	31N	11E	29	SW	SW
Harrison	30N	10E	25	NE	SE

Table 2-4c High and medium priority LUST sites:

Tn./City	TWP	RN	SN	QQ	Q
Antigo	31N	11E	17	SW	NE
Antigo	31N	11E	17	NW	SW
Antigo	31N	11E	17	NW	SW
Antigo	31N	11E	17	SW	SW
Antigo	31N	11E	29	SW	SE
Antigo	31N	11E	29	SE	SW

Antigo	31N	11E	29	SE	SW
Antigo	31N	11E	30	---	NW
Antigo	31N	11E	31	SE	NE
Polar	31N	12E	16	SW	NE

The WDNR publication SW-108-93, Registry of Waste Disposal Sites in Wisconsin lists the following waste disposal sites in the watershed or within 2 miles of the watershed boundary:

Tn./City	TWP	RN	SN	QQ	Q
Antigo	31N	11E	19	SW	NE
Antigo	31N	11E	22	--	W
Bryant	32N	12E	26	SE	NE
Neva	32N	11E	11	SE	SE
Neva	32N	11E	11	SE	SE
Polar	31N	12E	21	SE	NE
Polar	31N	12E	04	SE	SE
Rolling	30N	11E	11	SW	NW

This watershed contains no Superfund sites.

Water Quality Goals and Project Objectives

The DNR staff, with assistance from the Langlade County LCD staff and DATCP developed water quality goals and project objectives. Objectives for each subwatershed are included in the next section. Details can be found in the Spring Brook Priority Watershed Project Appraisal Report (Klosiewski, 1995) available through the DNR's Northern Region Office.

Following are the overall goals for water resources:

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

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

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

The water quality conditions needed to support the goals for streams and lakes are the basis for determining the type and level of nonpoint source control to be implemented under the priority watershed project.

Project objectives are identified and listed for each subwatershed and for rural and urban nonpoint sources of pollution throughout this chapter.

Subwatershed Discussions

This section describes the physical and water quality conditions for each subwatershed in the Spring Brook Priority Project. Discussions for each subwatershed are broken into four parts: a general description, water quality conditions, the nonpoint source pollutants impairing the subwatershed, and objectives for the subwatershed. A more detailed description of each watershed can be found in the water quality appraisal report written by the Department of Natural Resources and available through DNR's North Central District Office. Table 2-4 summarizes the subwatershed conditions.

Spring Brook Headwaters Subwatershed (SBH)

Description

The Headwaters Subwatershed begins north of CTY. O in section 7, T32N, R12E and ends just north east of CTY. V at Skinner Dam. The Spring Brook Headwaters Subwatershed drains an area of 17,181 acres, or 40 percent of the total watershed area. (See Map 2-1.)

Water Quality Conditions

Habitat surveys and biotic indices were not conducted in this area because there are no perennial streams located within the subwatershed. The surface water resources are made up of a network of intermittent drainage ditches. It appears that the advent of agriculture has had a great impact on the groundwater levels in

the whole watershed, especially the headwaters subwatershed. The lower groundwater levels have left this area dry, no longer recharging Spring Brook, except during spring runoff.

Even though perennial surface water resources in this area are nonexistent, sediment and fertilizer laden floodwaters which drain to Spring Brook have detrimental impacts on the resource. Skinner dam, located in T31N, R11E, Sec.02, was built in the 1930's in order to reduce impacts of flooding in the City of Antigo. Severe flooding was never known until after the transformation of forest lands to agriculture. Even though the topography in this area is very flat to gently rolling, and there are no perennial streams, spring snow melt and, or rain is efficiently drained from agricultural fields by a network of intermittent drainage ditches, and is held back by the dam. This creates what is described as a large brown lake. Flooding of roads, causing extensive damage, is common in this area. Sediment laden, nutrient rich runoff is unable to penetrate the frozen ground of early spring, is delivered through the dam to Spring Brook. Large runoff events during warm months are less of a problem as the silty soil is not frozen at the time.

The effects of runoff from the Headwaters subwatershed may be the biggest problem facing all of the Spring Brook. Below Skinner Dam, stream conditions of Spring Brook have been severely degraded in many areas. These problems are discussed in the North Spring Brook Subwatershed. Even though the headwaters of Spring Brook cannot be brought back to a perennial system without the unrealistic cessation of farming in the area, managing sediment and nutrient delivery to the downstream resource has to be aggressively addressed in order to show improvements in Spring Brook.

Nonpoint Source Pollutants

- The Headwaters Subwatershed contains 13 inventoried animal lots of which 4 contribute 69 pounds of phosphorus annually. This represents an estimated 35 percent of the barnyard phosphorus for the entire watershed.

- The upland sediment delivery in the Headwaters Subwatershed is 2700 tons, annually, or 41 percent of the entire watershed load. Cropland is the only source in this subwatershed, contributing 100 percent of the load.

Water Resource Objectives

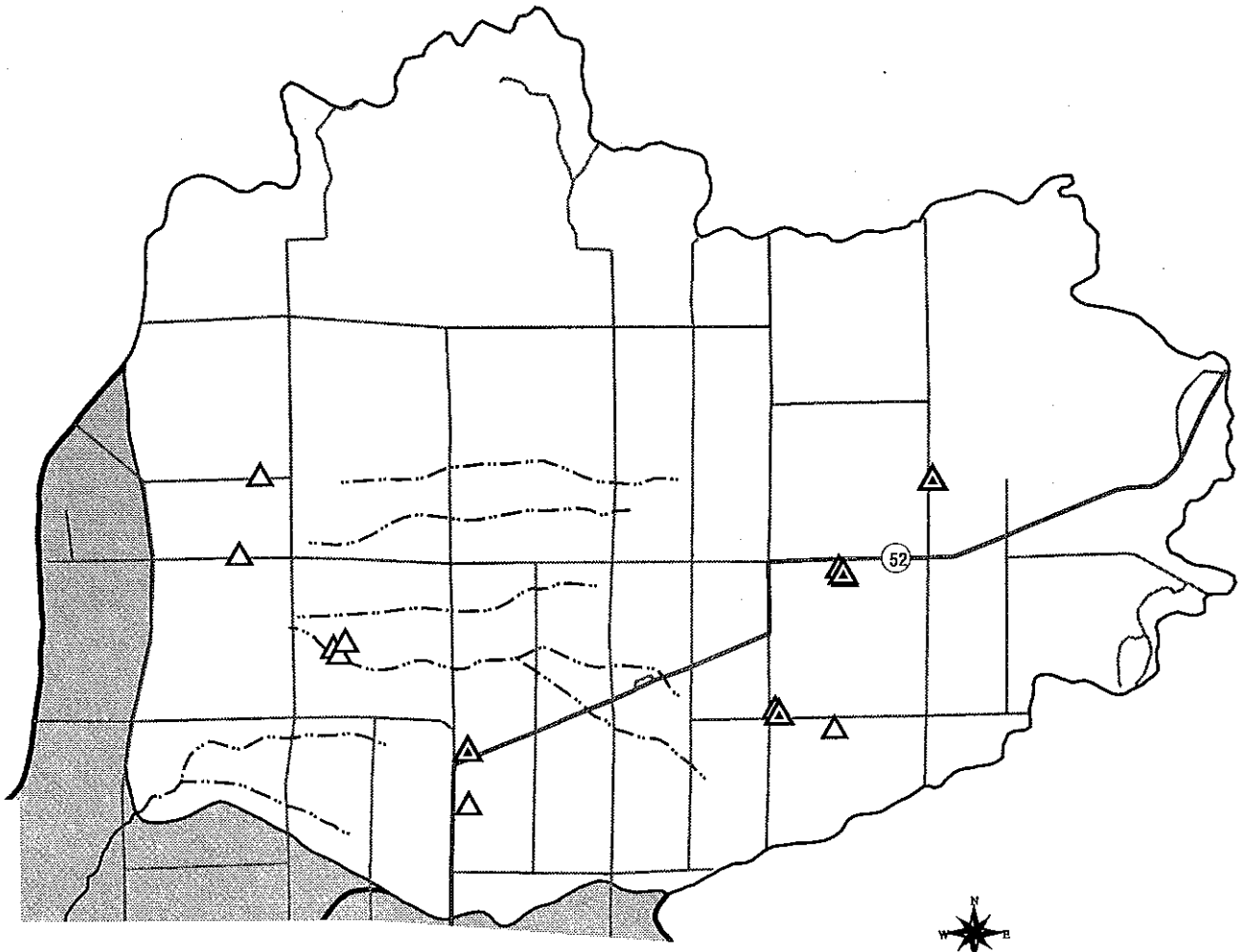
Spring Brook Headwaters

Improve water quality:

- reduce sediment, nutrient and pesticide delivery to Spring Brook by:
  - controlling runoff to reduce the transport of sediment, nutrients, and pesticides.

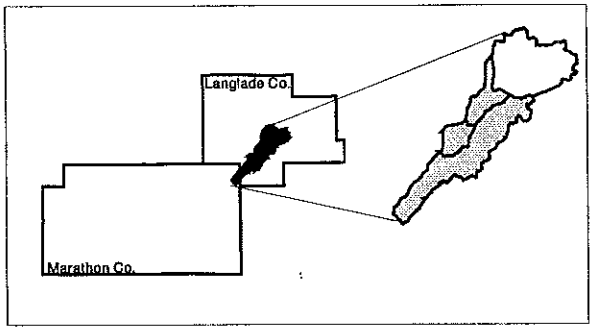
As a secondary benefit, implimentation of best management practices should also reduce the severity of overland runoff and fluctuating water levels.

Map 2: Spring Brook Creek Headwaters Subwatershed Barnyard Phosphorous Loads



Mapscale 1:75000

Study Area

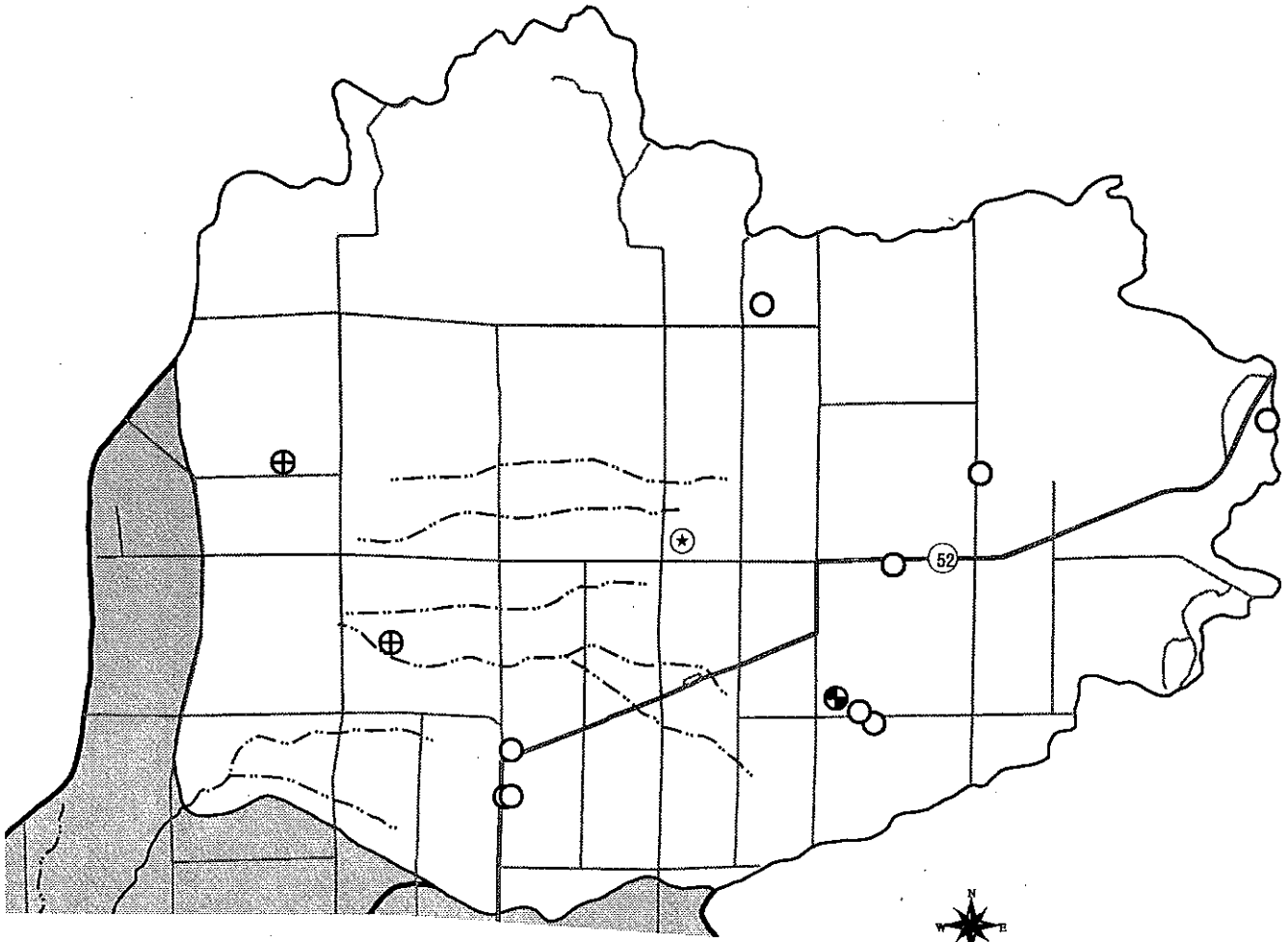


LEGEND

- Phosphorous >= 10 lbs.
- Phosphorous < 10 lbs.
- Local Roads
- Highways
- Intermittent Stream
- Perennial Stream

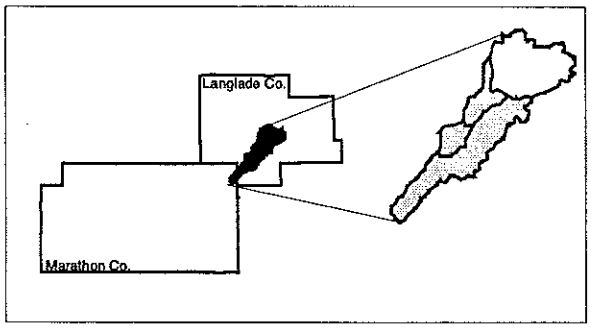
Wisconsin Department of Natural Resources
Division of Water
Bureau of Watershed Management
April 1997

Map 3: Spring Brook Creek Headwaters Subwatershed Well Nitrate Summary



Mapscale 1:75000

Study Area



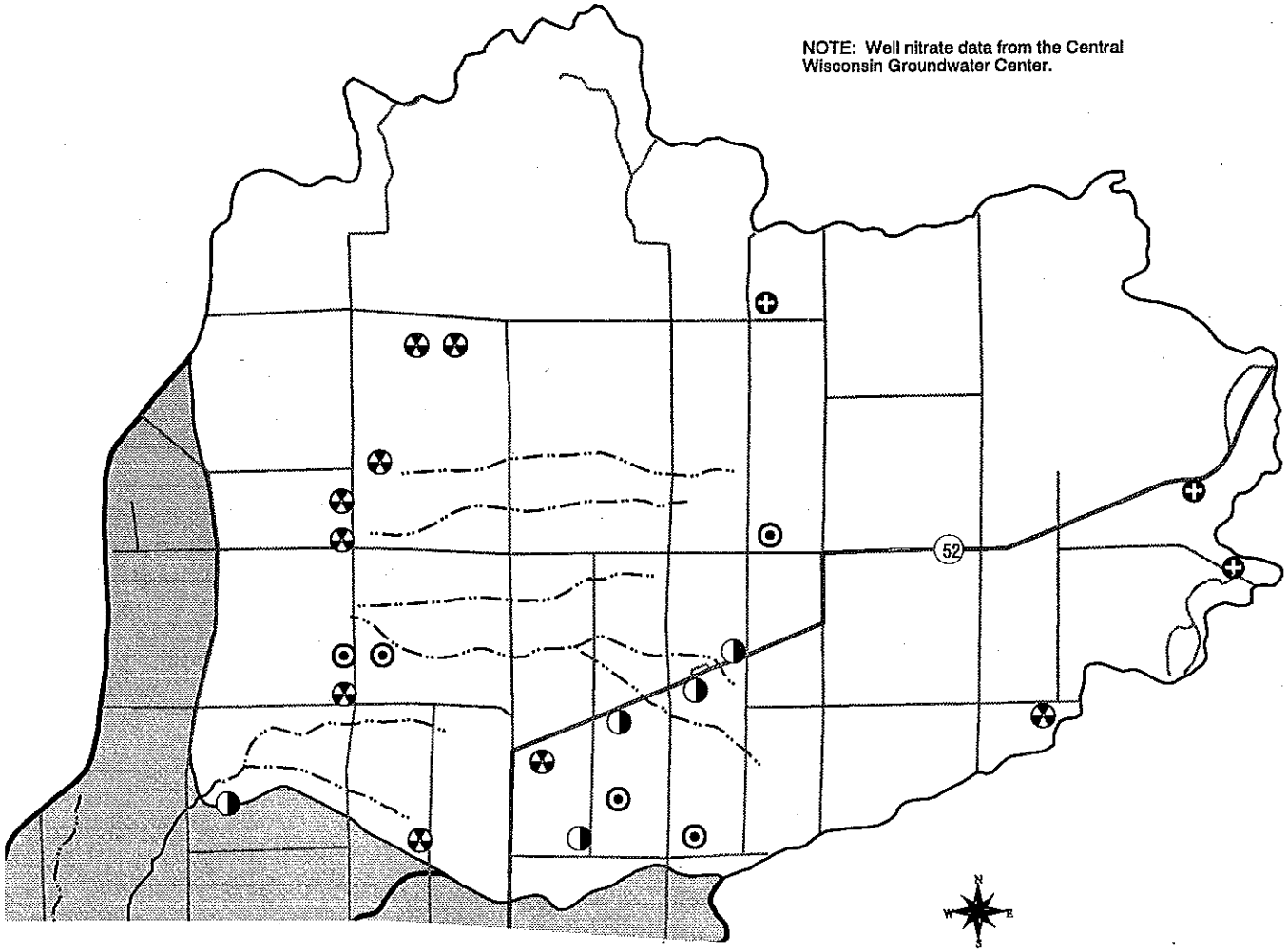
LEGEND

- Nitrate >= 10 mg/l
- Nitrate >6 mg/l and <10 mg/l
- Nitrate >2 mg/l and <=6 mg/l
- Nitrate <=2 mg/l
- Roads
- Highways
- Intermittent Stream
- Perennial Stream

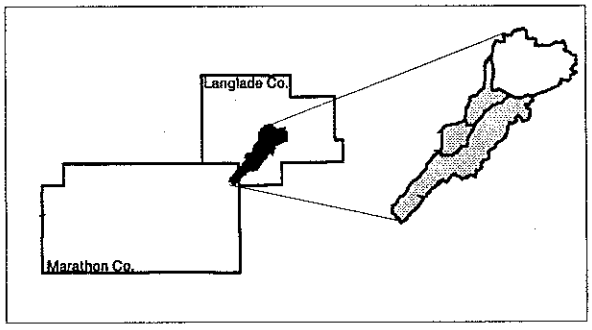
NOTE: Well nitrate data from the WDNR Groundwater Retrieval Network.

Wisconsin Department of Natural Resources
Division of Water
Bureau of Watershed Management
April 1997

Map 4: Spring Brook Creek Headwaters Subwatershed Well Nitrate Summary



Study Area



LEGEND

- Nitrate >= 10 mg/l
- Nitrate >6 mg/l and <10 mg/l
- Nitrate >2 mg/l and <=6 mg/l
- Nitrate <=2 mg/l
- Roads
- Highways
- Intermittent Stream
- Perennial Stream

Wisconsin Department of Natural Resources
Division of Water
Bureau of Watershed Management
April 1997

North Spring Brook Subwatershed (NSB)

Description and Resource Conditions

The North Spring Brook Subwatershed is approximately 4528 acres in size. Spring Brook begins below Skinner Dam in Sec. 2, T31N, R11E. The 5.5 miles of stream is supplied with an abundant groundwater discharge. All 5.5 miles are managed as a Class I brook trout fishery and designated an Exceptional Resource Water.

Fish surveys in this area have not been conducted recently due to the unaccessible nature of the stream channel. The area fish manager confirms that in stream habitat throughout the subwatershed is severely impacted in areas. Due to a combination of heavy runoff deposits of sand and beaver activity, Spring Brook has been altered to the point that it no longer flows in its original channel in areas between Cherry Rd. and STH 64. Though beavers have been kept under control, sediments including coarse sand, have over time mounded behind old dams redirecting the stream out of its original channel. Sediment delivery from the Headwaters Subwatershed is a huge contributor to the sedimentation problems found in this subwatershed.

Macroinvertibrate samples collected in 1984 and 1995 indicate very good to excellent organic water quality with slight organic pollution. Though biotic indexes don't show severe problems in this stretch of stream, in stream habitat surveys conducted at reachable locations indicate only fair habitat.

Other common surface water pollution problems found in this stretch of stream include, poor dissolved oxygen conditions from Cherry Rd. (north due to sediment and phosphorous loading), sedimentation of pool and riffle areas, and heavy growths of algae and duckweed, in calmer areas.

Nonpoint Source Pollutants

- The North Spring Brook Subwatershed contains 7 animal lots of which 2 contribute 7 pounds of phosphorus, annually. This represents an estimated 4 percent of the barnyard phosphorus for the entire watershed.

- The upland sediment delivery in the North Spring Brook Subwatershed is 700 tons annually, or 11 percent of the entire watershed load. Cropland is the only source of sediment in this subwatershed, contributing 100 percent of the load.

Water Resource Objectives

North Spring Brook Subwatershed

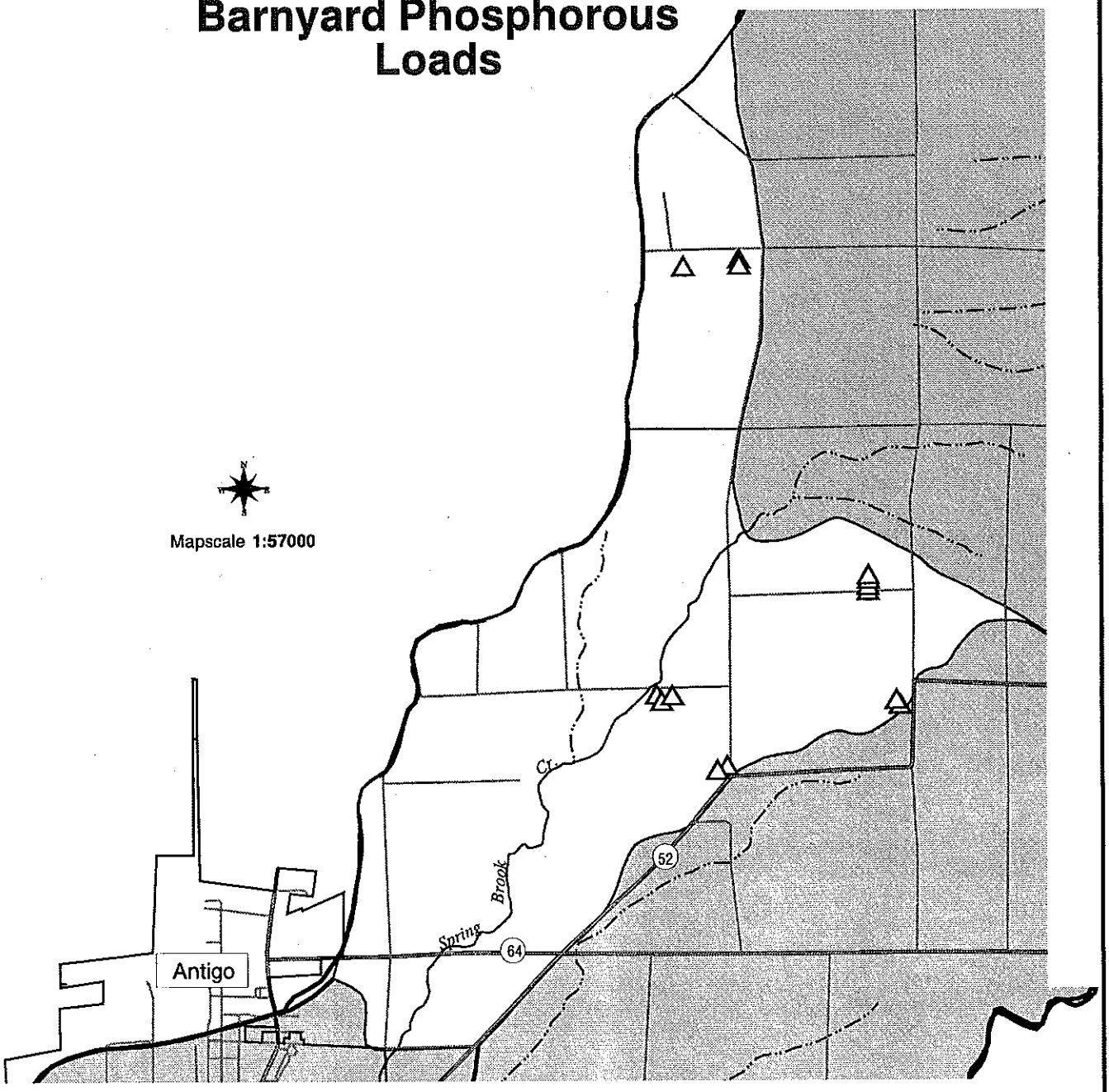
Improve water quality:

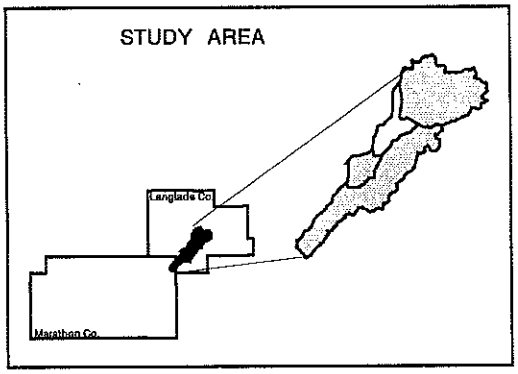
- reduce sediment, nutrient, and pesticide delivery to Spring Brook by:
    - controlling runoff to reduce the transport of sediment, nutrients, and pesticides.

- Enhance trout fishery, aquatic habitat and water quality by:
  - reducing sediment delivery to the stream
  - obtaining Conservation Easements in order to reestablish the stream channel
  - installing in stream habitat improvement devices
  - controlling beaver populations

- Maintain and improve wildlife habitat by:
  - obtaining Conservation Easements in order to protect stream corridor

Map 5: North Spring Brook Subwatershed Barnyard Phosphorous Loads





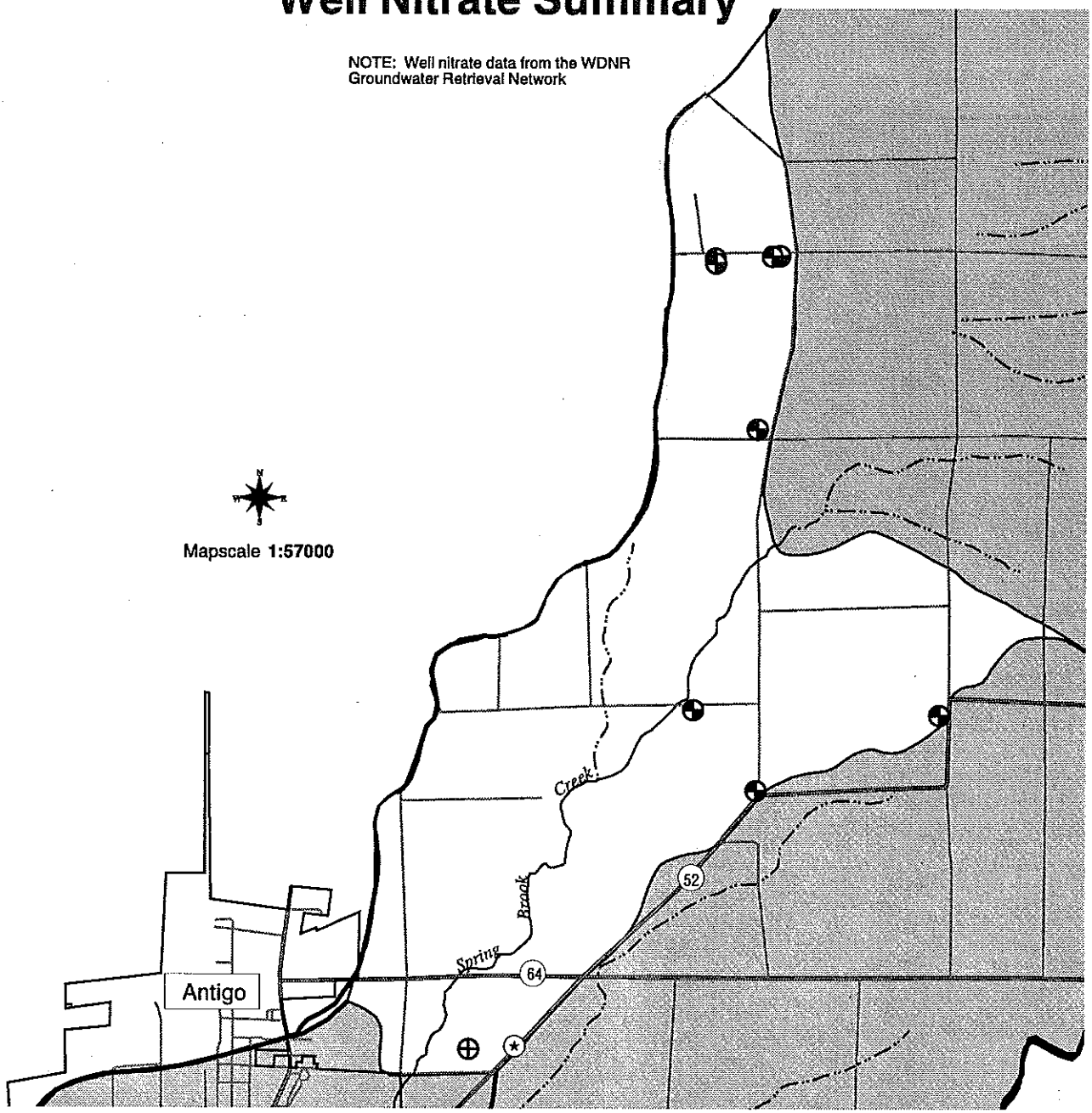
LEGEND

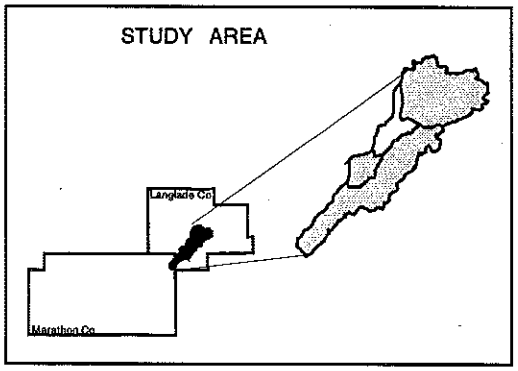
- Phosphorous < 10 lbs.
- Roads
- Highways
- Intermittent Stream
- Perennial Stream
- Open Water
- City of Antigo

Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

Map 6: North Spring Brook Subwatershed Well Nitrate Summary

NOTE: Well nitrate data from the WDNR Groundwater Retrieval Network





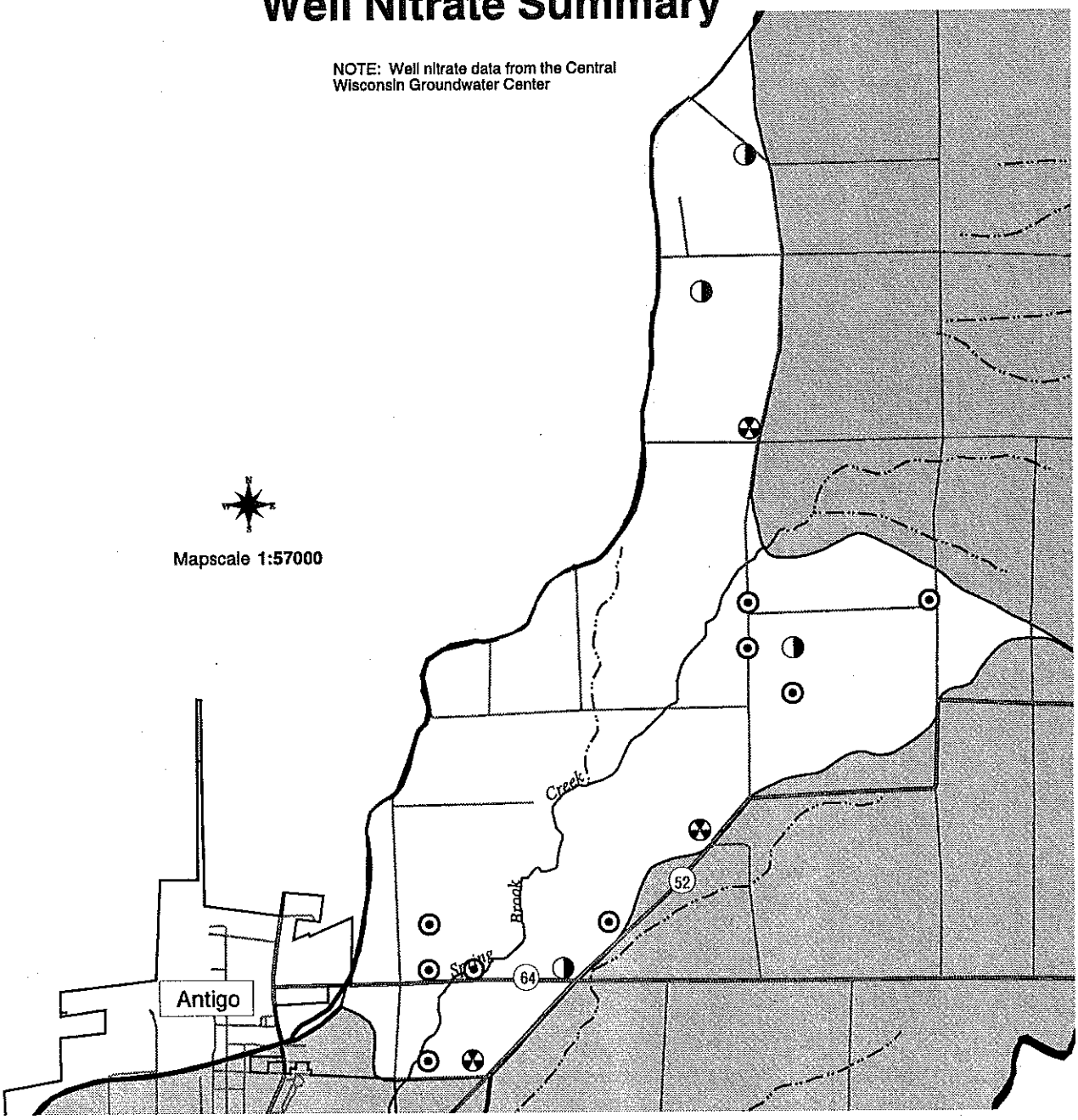
LEGEND

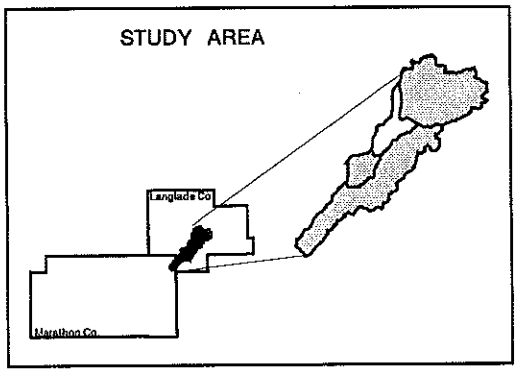
- Nitrate >=10 mg/l
- Nitrate >6 mg/l and <10 mg/l
- Nitrate >2 mg/l and <=6 mg/l
- Nitrate <=2 mg/l
- Roads
- Highways
- Intermittent Streams
- Perennial Streams
- City of Antigo

Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

Map 7: North Spring Brook Subwatershed
Well Nitrate Summary

NOTE: Well nitrate data from the Central Wisconsin Groundwater Center





LEGEND
- Nitrate >=10 mg/l
- Nitrate >6 mg/l and <10 mg/l
- Nitrate >2 mg/l and <=6 mg/l
- Nitrate <=2 mg/l
- Roads
- Highways
- Intermittent Streams
- Perennial Streams
- City of Antigo

Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

Antigo Subwatershed (AN)

Description and Resource Conditions

The Antigo Subwatershed is 3178 acres is size, and the majority of these acres are comprised of the City of Antigo. This subwatershed has two types of surface water resources, Antigo Lake and Spring Brook. Water quality problems in this subwatershed come from both urban and rural land uses. The water resources and their water quality problems are described in detail below.

Antigo Lake

Antigo Lake, the only lake within the watershed, is 32 acres in size and is comprised of a series of four interconnected impoundments. The maximum depth is 16 feet, and the mean depth is 7 feet. The lake supports a limited fishery, with yellow perch dominating, although largemouth bass, northern pike, and brook trout are present. Trout are stocked in the lake yearly by the local chapter of Trout Unlimited as a recreational opportunity for kids and senior citizens. The trout survival rate is low, however there is no natural reproduction. Trout are able to escape the poor water quality conditions found in the impoundment by swimming upstream.

Spot checks of dissolved oxygen conditions in the lake during summer algal blooms, reveal super saturated levels (above 20 mg/L of Dissolved Oxygen) at the waters surface, to levels below 3 mg/L only a few feet below the surface.

In the past, dense growths of nuisance aquatic vegetation developed annually. Through the late 1950's, 60's, and 70's, the City of Antigo applied for and carried out chemical aquatic nuisance control almost annually. Lack of water depth, compounded by nuisance growth of macrophytes caused the greatest loss in recreational value of the lake. These problems combined with increasing sediment accumulation, periodic flooding, and unstable fish population were excessive. This resulted in an Inland Lake Protection and Rehabilitation District being formed for Antigo Lake in 1974. A study completed that year by the U.S.D.A. Natural Resource Conservation Service estimated a total of 82,000 cubic yards of soft sediment in the southern three basins of Antigo Lake. In the late fall of 1990, a lake dredging project took place. This project removed approximately 130,000 cubic yards of soft sediment and hard substrate from the lake bottom, increasing water depth to a maximum of 16 feet. Antigo Lake acts as a sediment settling basin for agricultural and urban runoff.

Spring Brook

The upper one-half mile segment of Spring Brook, which lies within this subwatershed, is classified as a Class I trout stream and designated as an Exceptional Resource Water. The remaining one and one-half mile stretch which is contained within the city is classified as a warm water sport fishery.

Macroinvertabrate sampling conducted at two locations, reveals excellent organic water quality above and very good water quality below Antigo Lake. Although aquatic insect samples don't reveal severe problems

below Antigo Lake, depressed dissolved oxygen levels, higher stream temperatures, and loss of habitat are evident. It is believed that large amounts of groundwater feeding Spring Brook in the above subwatershed are overriding more severe negative effects that may otherwise be exhibited. Suitable aquatic insect sampling locations were not apparent in the lower half of the subwatershed.

Stream habitat is lacking; ratings at seven locations show fair to poor conditions. In many locations, gravel areas are filled by sediment from agricultural and urban runoff. A section of stream located behind the city snow dump area is clogged by pieces of concrete and an old culvert, impounding water upstream. The stream has been channelized throughout the city in order to reduce flooding. This has widened and slowed the stream, destroying the in stream habitat.

Problems associated with agricultural practices affecting Antigo Lake, and run off from storm sewers in the City of Antigo are having severe negative impacts on the Spring Brook. Dissolved oxygen and temperature measurements clearly show effects of these impacts.

Nonpoint Source Pollutants

- The cropland sediment delivery in the Antigo Subwatershed is 100 tons, annually, or 0.2 percent of the entire subwatershed load, however the Antigo subwatershed receives 100 tons of sediment from subwatersheds upstream.

- The City of Antigo contributes 2200 tons of sediment annually from urban nonpoint source pollution.

Water Resource Objectives

Antigo Subwatershed

Improve water quality:

- reduce sediment, nutrient, and pesticide loading by:
  - controlling agricultural and urban runoff.

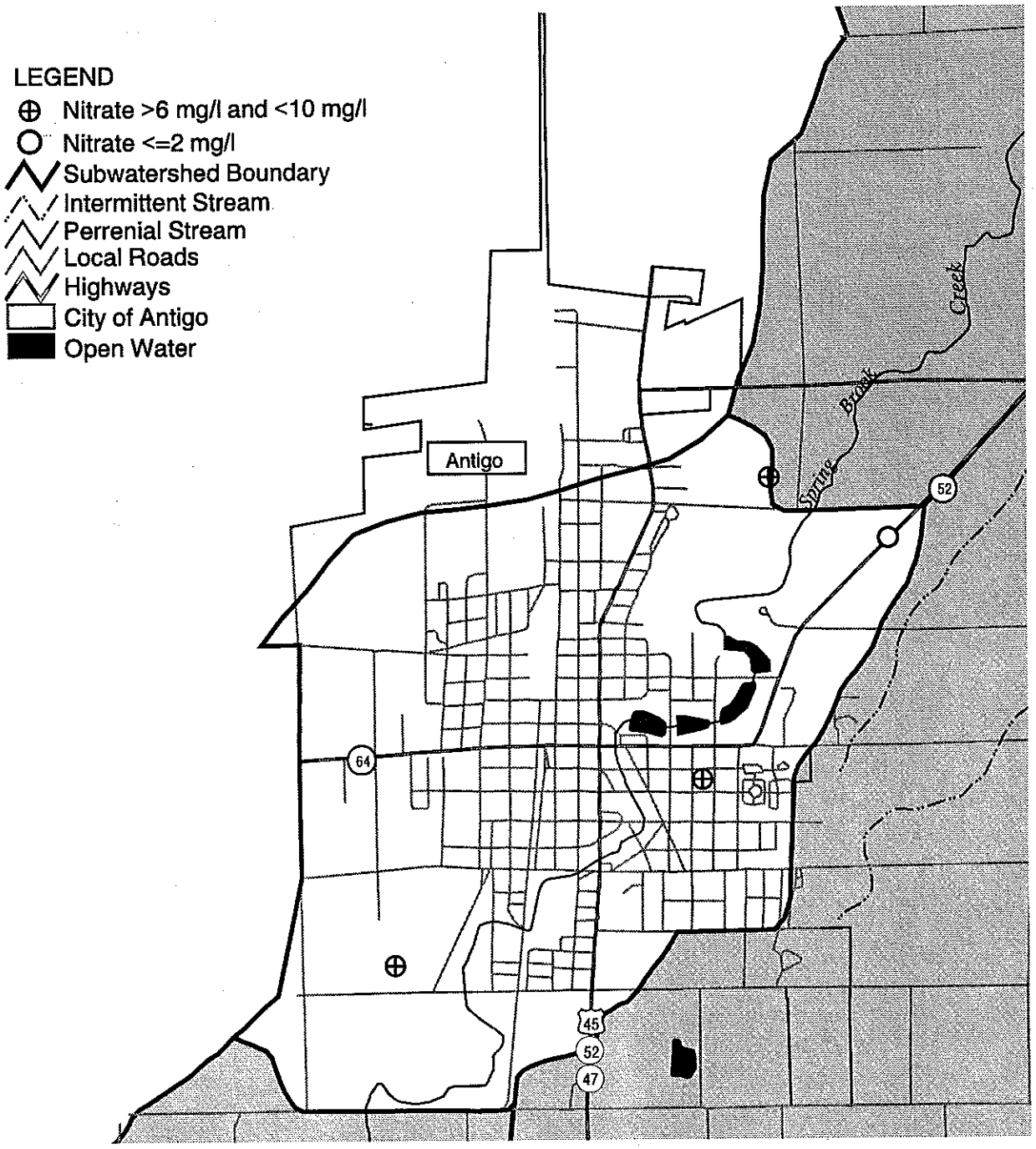
- Enhance aquatic habitat and water quality by:
  - controlling agricultural and urban runoff
  - removing broken concrete from stream segment adjacent to Antigo's snow dump area
  - obtaining Conservation Easements in order to reestablish the stream channel by dredging from CTH Y to CTH X
  - controlling beaver population

- Improve Dissolved Oxygen levels between CTH Y and CTH X by:
  - obtaining Conservation Easements in order to reestablish stream channel by dredging from CTH Y to CTH X or,

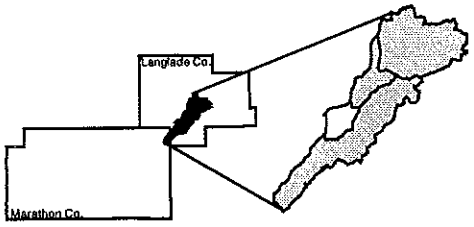
- Maintain and improve wildlife habitat by:
  - obtaining Conservation Easements

Map 8: Antigo Subwatershed Well Nitrate Summary

NOTE: Well nitrate data from the WDNR Groundwater Retrieval Network



Study Area

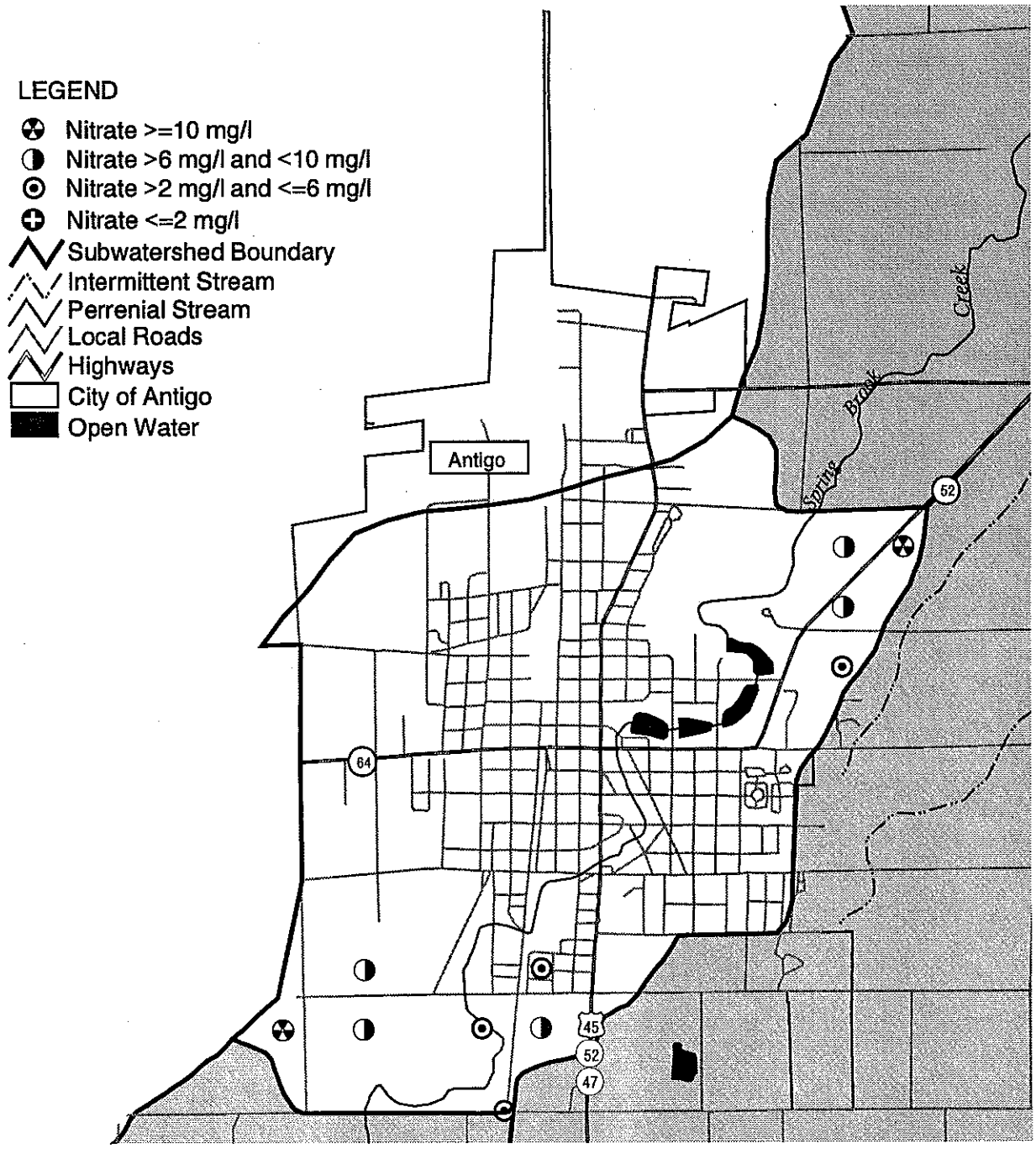


Mapscale 1:43000

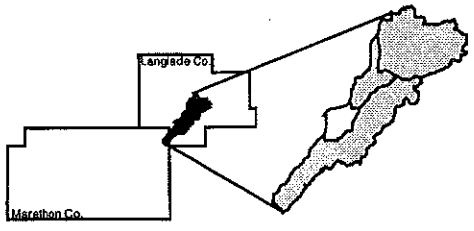
Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

Map 9: Antigo Subwatershed Well Nitrate Summary

NOTE: Well nitrate data from the Central Wisconsin Groundwater Center



Study Area



Mapscale 1:43000

Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

South Spring Brook Subwatershed (SSB)

Description and Resource Conditions

South Spring Brook is 18,141 acres in size, and contains 11 miles of stream. This watershed is different from Spring Brook North in that the agriculture is not dominated by potatoes. Instead, there is an emphasis on dairy and row crop farming. Therefore, different impacts such as streambank erosion from livestock grazing are noted.

Problems found in the Spring Brook in this subwatershed include poor dissolved oxygen, sedimentation of substrate, and heavy macrophyte and filamentous algae growth.

Spring Brook is very wide and shallow in areas in this subwatershed due to historic and present day practice of allowing livestock free access to the stream. Streambanks have been, and are presently being eroded by this practice, thus widening the stream and reducing stream habitat. Canopy and overhanging bank cover is also limited in these areas. Sedimentation, consisting mainly of shifting sand has, in areas of lower gradient, filled in riffle areas, thereby reducing habitat and optimal trout spawning sites.

Nonpoint Source Pollutants

- The South Spring Brook Subwatershed contains 32 animal lots of which 18 contribute 123.0 pounds of organic phosphorus annually. This represents an estimated 62 percent of the barnyard phosphorus for the entire watershed.

- The upland sediment delivery in the South Spring Brook Subwatershed is 3000 tons, annually, or 47 percent of the entire watershed load. Cropland is the only source of sediment in this subwatershed, contributing 100 percent of the load.

Water Resource Objectives

South Spring Brook Subwatershed

Improve water quality by:

- reduce sediment, nutrient, and pesticide loading by:
  - controlling agricultural runoff.

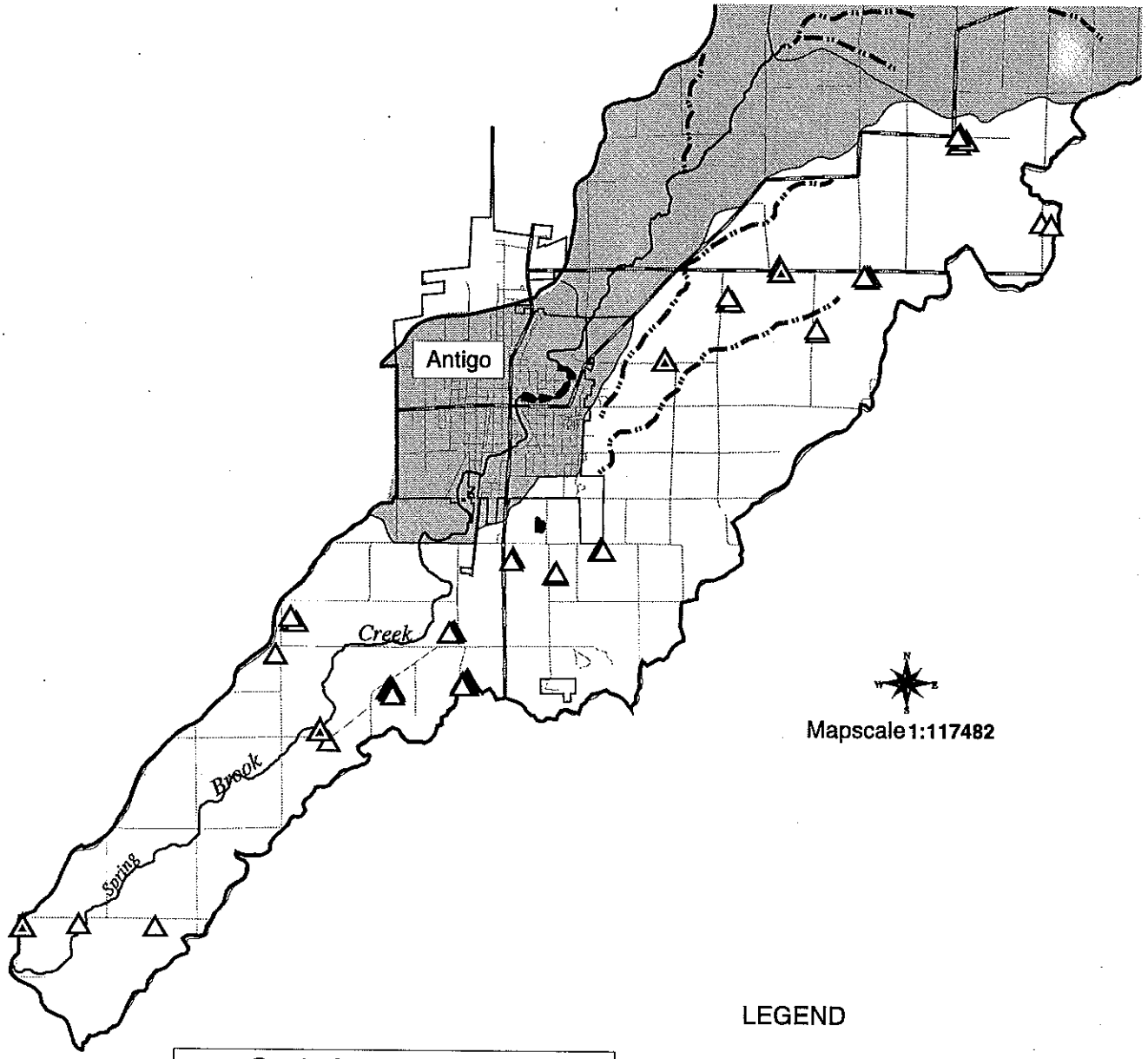
- Improve aquatic habitat and water quality by:
  - controlling agricultural runoff
  - installing in stream improvement devices where appropriate
  - obtaining Conservation Easements
  - controlling beavers

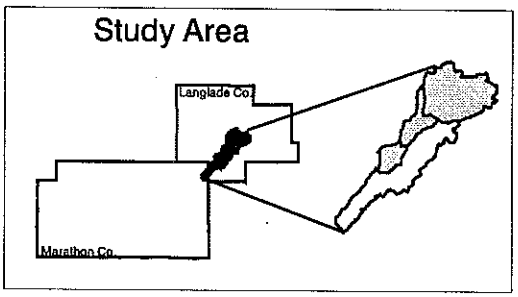
- Improve Dissolved Oxygen levels between CTH Y and CTH X by:

- obtaining Conservation Easements in order to reestablish stream channel by dredging from CTH Y to CTH X or,
- installing and maintaining an aeration system at CTH X, if necessary

- Maintain and improve wildlife habitat by:
  - obtaining Conservation Easements

Map 10: South Spring Brook Subwatershed Barnyard Phosphorous Loads





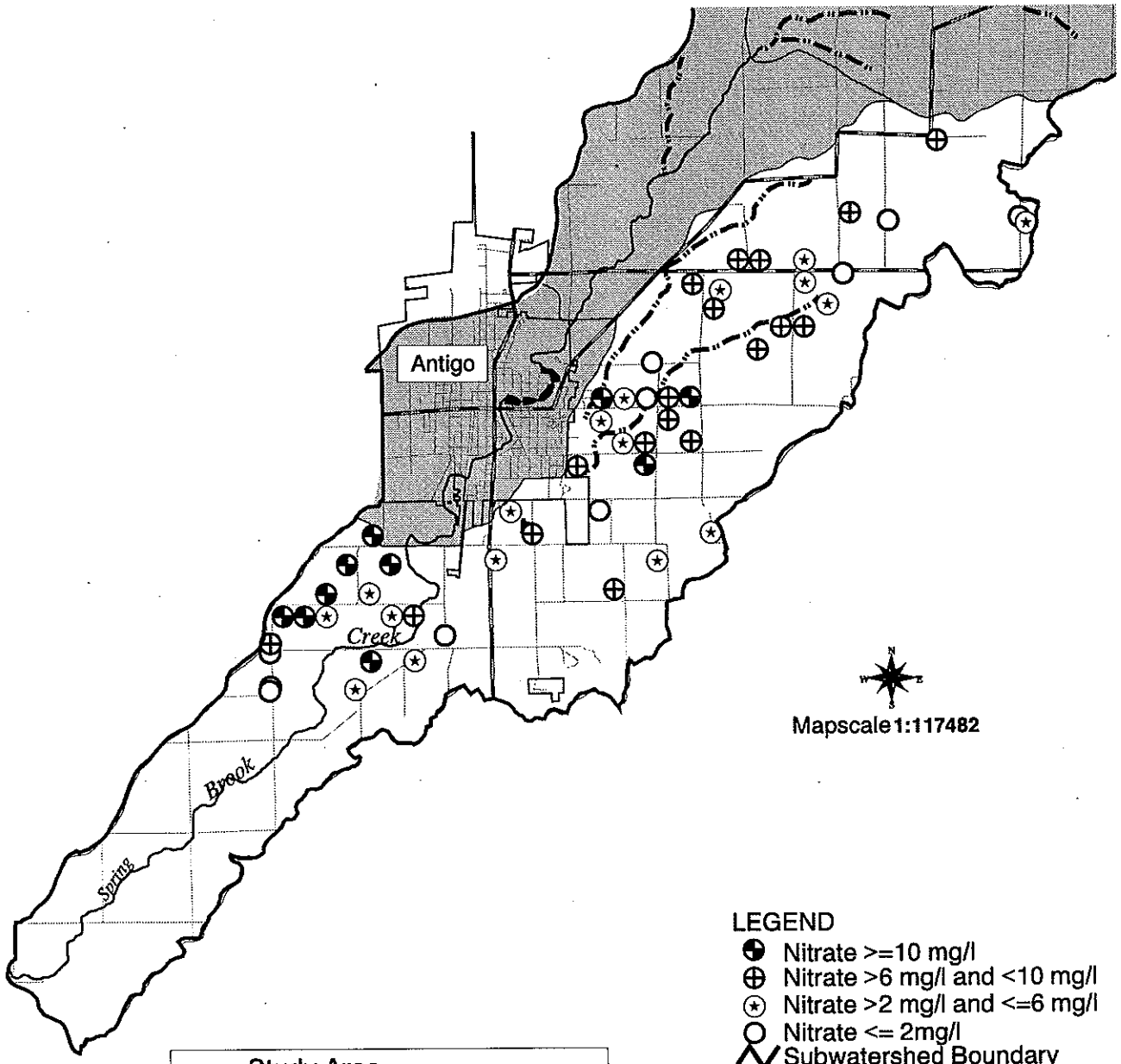
LEGEND

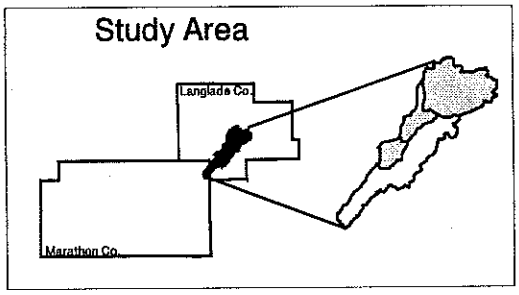
- Phosphorous >=10 lbs
- Phosphorous < 10 lbs
- Subwatershed Boundary
- Intermittent Stream
- Perennial Stream
- Roads
- Highways
- Open Water

Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

Map 11: South Spring Brook Subwatershed Well Nitrate Summary

NOTE: Well nitrate data from the WDNR Groundwater Retrieval Network





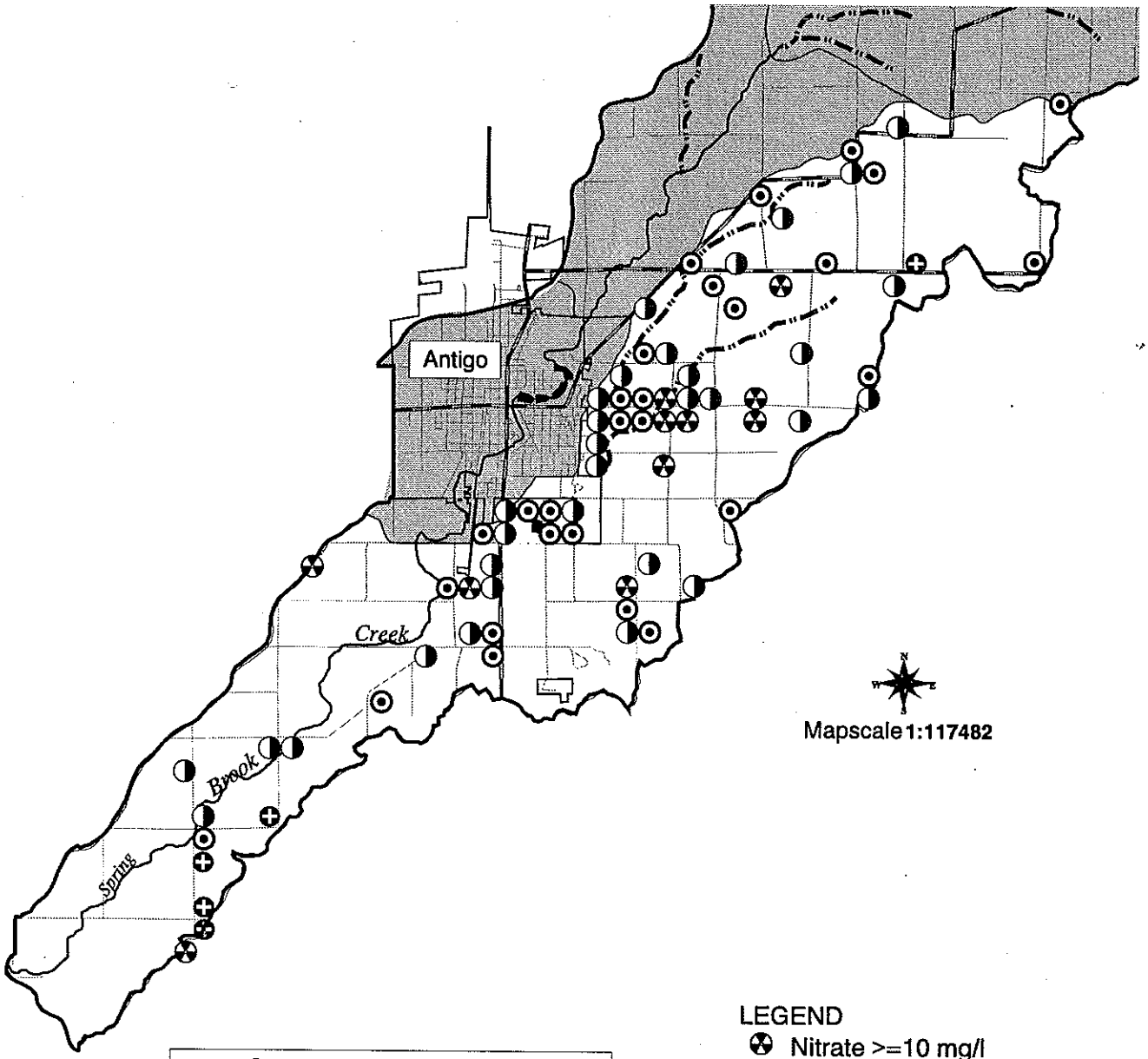
LEGEND

- Nitrate >=10 mg/l
- Nitrate >6 mg/l and <10 mg/l
- Nitrate >2 mg/l and <=6 mg/l
- Nitrate <= 2mg/l
- Subwatershed Boundary
- Intermittent Stream
- Perennial Stream
- Roads
- Highways
- Open Water

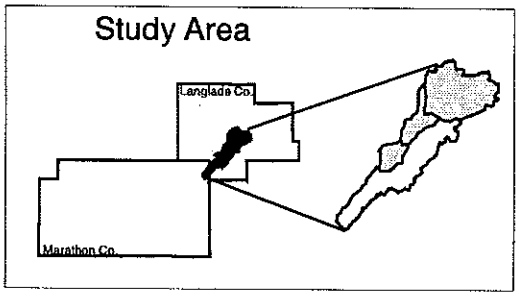
Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

Map 12: South Spring Brook Subwatershed Well Nitrate Summary

NOTE: Well nitrate data from the Central Wisconsin Groundwater Center



Mapscale 1:117482



LEGEND

- Nitrate >=10 mg/l
- Nitrate >6 mg/l and <10 mg/l
- Nitrate >2 mg/l and <=6 mg/l
- Nitrate <= 2mg/l
- Subwatershed Boundary
- Intermittent Stream
- Perennial Stream
- Roads
- Highways
- Open Water

Wisconsin Department of Natural Resources
Water Division
Bureau of Watershed Management
April 1997

Table 2-5 Water Resource Conditions and Objectives for the Spring Brook Watershed

Subwatershed	Stream Name	Length (Miles)	Biological Use[1] Current Use/Miles	Potential Use/Miles	Supporting Potential Use Fully-Part-Not (Miles)	Limiting Factors[2]	Observed or Potential Sources	Water Resource Goals	Surface Water Resource Objectives
Headwaters	Intermittent. Ditches	N.A.	N.A.	N.A.	N.A.	(Lack of Water) HAB,SED	Low Groundwater table Loss of forest cover Agriculture	Reduce sediment, phosphorous, and nutrient loading to down stream waters	Control Runoff
North Spring Brook	Spring Brook	5.5	Cold / 5.5 Class 1	Enhanced Trout Protection 5.5		HAB,SED, NUT	NPS, CL, BV	-Reduce sediment, and nutrient loading - Enhance trout fishery, aquatic habitat and surface water quality - Maintain and improve wildlife habitat.	-Controlling runoff -Obtaining Conservation Easements in order to reestablish stream channel -Installing in stream improvement devices -Controlling beavers -Protecting wetland and woodland stream corridor
Antigo	Spring Brook	0.5 2	cold / 0.5 Class 1 WWSF / 2	Enhanced trout reproduction Same / 2		SED, HAB, NUT, TMP	NPS, CL, BV, SS, IMPD	-Reduce sediment, and nutrient loading - Enhance aquatic habitat and water quality -Maintain and improve wildlife -Improve oxygen levels between CTH Y and CTH X	-Controlling runoff -Obtaining Conservation Easements - Dredging between CTH Y and CTH X, or by installing an aeration system at CTH X -Removing concrete debris from stream on city property next to snow dump.

Subwatershed	Stream Name	Length (Miles)	Biological Use[1] Current Use/Miles	Potential Use/Miles	Supporting Potential Use Fully-Part-Not (Miles)	Limiting Factors[2]	Observed or Potential Sources	Water Resource Goals	Surface Water Resource Objectives
Spring Brook South	Spring Brook	11	Cold / 11 Class 1	Enhanced trout reproduction (11)		SED, HAB, NUT	NPS, CL, BY, PSB, BV	-Reduce Sediment, and nutrient loading - Enhance trout fishery, aquatic habitat and water quality - Maintain and improve wildlife habitat -Improve dissolved oxygen levels between CTH Y and Stoney Road	-Controlling runoff -Obtaining Conservation Easements -Limiting livestock access to the stream -Reestablishing the stream channel between CTH Y and CTH X -Dredging between CTH Y and CTH X, or by installing an aeration system -Installing in stream habitat improvement structures -Controlling beavers -Preserving wetland and woodland stream corridor

LEGEND:

[a] The current use classification listed in NR 104.
[b] Trout stream identified in the "blue" Trout Stream Book (DNR,1980).
[c] A formal classification or classification review has been completed and approved. (These are classifications that have been completed but for one reason or another will not appear in NR 104).
[d] A formal classification or classification review has been completed. Based on this analysis the current NR 104 is incorrect and should be changed the next time NR 104 is revised.
[e] Recent studies or the professional judgement of a fish manager or aquatic biologist familiar with the water indicates this is the biological use the stream is currently meeting or has the potential to meet.
[f] Other information used

[1] Biological Use, Existing - this column indicates the existing biological use supported by the stream as defined in NR 102 (04)(3) under fish and aquatic life uses.
COLD - coldwater communities
WWFF - warmwater forage fish communities
WWSF - warmwater sport fish communities
LFF - limited forage fishery (intermediate surface waters)

Biological Use, Potential: This column indicates the biological use a stream or stream segment could meet if it was well managed and pollution sources controlled. In many cases the potential use is the same as the existing use. In other streams potential use may be higher than the existing use. Abbreviations are the same as those used in the existing use columns. The sources of information are indicated by footnotes on each table. The classifications for trout streams came from "Wisconsin Trout Streams" (DNR Publ. 6-3600[*80]).
Supporting Potential Use: This column indicates whether a stream is fully, partially, or not meeting its potential biological use. An entry in any of the columns indicates the relationship between actual stream use and potential use. For example, if the entire length of a stream is listed under the "Fully" column, the stream has no problems which can be controlled. When a portion or all of a stream length is listed under another heading the stream is affected by some manageable factor, and the biological use of the stream can probably be improved.

[2] Limiting Factors
HAB - Habitat (lack of cover, sedimentation scouring etc.)
SED - Sedimentation (filling in of pools)
TMP - Temperature (extreme high for trout)
DO - Dissolved Oxygen (to low)
FLOW - Flooding or fluctuating water levels
ALG - Algae (abundant)
NUT - Nutrient enrichment
TURB - Turbidity
BAC - Bacteria (MMFCC/100 ml)

Nonpoint Source Pollutant Reduction Goals

This section describes the nonpoint source inventories, objectives, and cost-share eligibility criteria for each pollutant source. These sources include barnyard runoff and sediment from upland, gully, streambank, and construction site erosion and urban runoff. Cost-share funds for installing pollution control measures, known as best management practices (BMPs), will be targeted at sites which contribute the greatest amounts of pollutants. This section is organized in the following manner.

Pollutant Reduction Goals and Project Objectives for Nonpoint Sources

Management Categories

Rural Nonpoint Pollution Sources and Management Strategy

Urban Nonpoint Pollution Sources and Management Strategy

Pollutant Reduction Goals and Project Objectives for Nonpoint Sources

Goals for water quality in the Spring Brook watershed were identified earlier in this chapter as protection, enhancement, and restoration of water resources. These goals will be achieved through project objectives for sediment and phosphorus reduction.

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

Sediment Objective: Reduce overall sediment delivered by 25 percent. To meet this objective, the following is needed:

- 25 percent reduction in sediment reaching Spring Brook from agricultural uplands.
- 25 percent reduction in sediment reaching Spring Brook from all urban sources, including construction site erosion.

Phosphorus Objective: Reduce phosphorus load by 20 percent. To meet this objective, the following is needed:

- 20 percent reduction in P from barnyards.
- A reduction in P from land-spread manure.
- 25 percent reduction in P from cropland sources.
- 20 percent reduction in P from urban sources.

In addition, this plan calls for restoration of degraded or prior converted wetlands wherever possible.

Tables 2-6 and 2-7 summarize the sediment and phosphorus reduction goals for the Spring Brook Priority Watershed Project.

Table 2-6. Sediment Reduction Objective

Source	Inventoried Sediment Load (tons)	Percent of Total	Planned Percent Reduction	Sediment Load Reduction (tons)
Cropland	6,500	75	25	1,600
Urban nonpoint	2,200	25	25	500
Total	8,700	100	25	2,100

Table 2-7. Phosphorus Reduction Objectives

Nonpoint Source	Inventoried Phosphorus Load (lbs)	Percent of Total	Planned Percent Reduction	Planned Phosphorus Load Reduction (lbs)
Barnyards	200	0	20	40
Upland(1)	38,900	65	25	9,700
Urban (3)	8,700	17	20	1,700
Antigo Treatment Plant (2)	10,500	17	66	6,900
Total	58,300	100	31	18,300

1. 6500 tons of sediment x 6lbs. phos /ton of sediment
2. On October 1, 1997, the Antigo Treatment Plant will have to comply with a state water quality standard effluent limit of 1mg/l daily average.
3. Includes 1800 tons of sediment from construction site erosion x 4lbs.phos /ton of sediment

Management Categories

Management categories define which nonpoint sources are eligible for financial and technical assistance. They are based on the amount of pollution generated by a source. Specific sites or areas within the watershed project are designated as either critical, eligible, or ineligible.

Management category eligibility criteria are expressed in terms of tons of sediment delivered to surface waters from eroding uplands and streambanks and pounds of phosphorus delivered to surface water from barnyards.

The LCDs will assist landowners in applying BMPs. Practices range from alterations in farm management (such as changes in manure-spreading and crop rotations) to engineered structures (such as diversions, sediment basins, and manure storage facilities), and are tailored to specific landowner situations. See Chapter 3 for a complete list of BMPs.

Critical Site Management Category

Nonpoint source pollutant load reduction in the Spring Brook Watershed project will be achieved mainly through voluntary participation. Nonpoint sources included in the critical category contribute a significant amount of the pollutants impacting surface waters. State statutes require that the nonpoint source control plan designates the necessary activities to ensure the reasonable likelihood of achieving water quality goals and objectives. Landowners with sites that meet the established critical sites criteria are required by law to address those specific sites by reducing the nonpoint source pollutant to an acceptable level. A reduction in pollutant load can occur solely through the action of the land owner with guidance from county staff, or through watershed participation. Each site will be field verified before receiving notification as a critical site, with findings sent to the DNR District Office. Landowners interested in receiving cost-share assistance for the installation of Best Management Practices will need to sign a cost-share agreement with their respective county Land Conservation Department.

Eligible Management Category

Nonpoint sources of pollution in this category contribute less significantly, per site, to water quality degradation. These sites are eligible for technical and cost-share assistance, but are not as critical to reaching water quality objectives.

Ineligible Management Category

Sites which do not contribute significant amounts of pollutants are not eligible for funding or technical assistance through the priority watershed project. Other DNR programs, such as wildlife and fisheries management, may assist county project staff to control these sources as part of the implementation of the integrated resource management plan for this watershed. Other local, state, or federal programs may also be applicable to these lands.

Rural Nonpoint Pollution Sources and Management Strategy

Barnyard Runoff

Barnyards Draining to Spring Brook

Runoff carrying a variety of pollutants from barnyards and other confined livestock areas is a source of pollutants to Spring Brook. The 52 barnyards in the watershed are a source of 200 pounds of phosphorus per year. The relative amounts of phosphorus measured using the BARNY model are an indicator of the amounts of organic matter entering the stream. Organic matter in manure is a pollutant because it depletes oxygen from the water and contributes bacteria and nutrients.

The objective for barnyard runoff control is to reduce phosphorus loading to the stream by 20 percent. Barnyard sites contributing a phosphorus load greater than 10 pounds annually will be eligible for cost sharing for clean water diversion practices. Nine sites are eligible. Installation of these low-cost practices alone will provide significant pollutant load reductions in the watershed.

There are no critical barnyard sites identified in the watershed. Any barnyards that meet NR 243 criteria for a notice of discharge following an investigation of a complaint or discovery by staff will be designated critical sites.

Table 2-8. Barnyard Inventory and Reduction Objectives by Subwatershed

Subwatershed	Number of Barnyards Inventoried	Number of Barnyards Eligible	Pounds of Phosphorus Inventoried	Pounds of Phosphorus Reduced	Percent Reduction
(HW) Head Waters	13	4	69	36	52
(NS) North Spring	7	0	7	0	0
(AN) Antigo	0	0	0	0	0
(SS) South Spring	32	5	123	31	25
Totals	52	9	200	67	33

Internally Drained Barnyards

Internally drained barnyards drain to surface depressions rather than directly to surface water. Fourteen internally drained yards were identified in the Spring Brook watershed. Eligibility for internally drained barnyards is based on a site by site analysis conducted by LCD staff to determine likelihood of groundwater

contamination.

Nutrient and Pest Management

All cropland in the Spring Brook Watershed will be eligible for cost sharing for development of a nutrient and pest management plan. Approximately 200 farms (31,700 acres) are eligible.

Manure spreading runoff and management of nutrients are addressed through Natural Resource Conservation Service (NRCS) Nutrient Management Standard 590. Pest management is addressed through NRCS Pest Management Standard 595. Nutrient and pest management plans will be developed by private consultants. Landowners will be eligible to participate for up to three years and will be responsible for paying 50 percent of the consulting fees. LCD staff will prepare soil conservation plans and materials for the nutrient and pest management plan. LCD staff will also review the nutrient and pest management plans.

Nutrient and pest management activities will result in pollutant load reductions. For this reason, fertilizer application rates must be tracked and reported. Professional services contracts developed for nutrient and pest management consulting must include a provision for reporting the required information to the LCD.

The Spring Brook watershed participated in the pilot Nutrient Management Assessment Program during 1995. Approximately 16,900 acres were enrolled in the pilot program in the watershed. The pilot program allowed the counties to work through private sector consultants to provide nutrient management assistance to landowners.

Manure Storage

Eligibility for a grant for manure storage practices will be based on the Nutrient Management Plan, developed in accordance with NRCS standard 590. An operation is required to address the water quality impact if the nutrient management plan demonstrates that manure cannot be feasibly managed during periods of snow-covered, frozen, and saturated conditions without the installation of storage practices. The nutrient management plan must also demonstrate that proper utilization of the manure can be achieved following adoption of the intended storage practice.

The eligibility for storage facilities will be based on the least cost system. These options may include, but are not limited to: properly located manure stacks (in accordance with Std. 312), the construction of a short term storage facility (capacity for 30 to 100 days manure production in accordance with Std. 313), the construction of a long term storage facility (capacity for up to 210 days production in accordance with Std. 313 or 425), a reduction in the number of animals, the rental of additional lands, or haul or broker manure to a neighboring farm.

Landowners receiving cost-sharing funds for manure storage or barnyard practices are required to develop a nutrient management plan for those acres that will receive manure applications resulting from these practices.

Upland Sediment

Intensive agricultural practices have caused considerable amounts of eroded soil to reach streams, ponds, and wetlands in the Spring Brook Watershed (while some timber harvest may occur in the watershed, this is not a significant source of sediment in the Spring Brook). Upland erosion is the major source of the sediments that are carried downstream, beyond individual subwatershed boundaries.

Upland sediment sources were evaluated through subarea sampling and extrapolation for the entire watershed

(67 square miles). Soil erosion was calculated using the Universal Soil Loss Equation (USLE). Sediment delivery was calculated using USLE and hydrology information using the FOCS WINHUSLE computer model.

The results of this inventory are summarized in Table 2-9. An estimated 6500 tons of soil annually are delivered to wetlands or streams in the watershed from croplands. The average sediment delivery rate for all subwatersheds is 0.2 tons/acre/year. Uplands are the source of 70 percent of the sediment delivered to surface waters.

A 25 percent reduction in sediment from eroding fields is targeted in each subwatershed. This means bringing lands that are contributing sediment to streams at a rate greater than 0.2 tons/acre/year down to 0.2 tons/acre/year.

Critical sites are those fields delivering greater than 0.4 tons/acre/year of sediment in the Spring Brook Headwaters and the North Spring Brook subwatershed. In the South Spring Brook subwatershed critical sites are those fields delivering greater than 2.0 tons/acre/year. This category will control an estimated 2100 acres of cropland, and 8 percent of the watersheds upland sediment load (500 tons).

Table 2-9. Summary of Cropland Sediment Loading in Spring Brook Watershed

Subwatershed		Upland
Headwaters	Acres	17,200
	Sediment	2,700
North Spring Brook	Acres	4,500
	Sediment	700
Antigo	Acres	300
	Sediment	100
South Spring Brook	Acres	18,100
	Sediment	3,000
Totals	Acres	40,100
	Sediment	6,500

Notes: Sediment is reported in tons/year.

Table 2-10. Upland Sediments

Subwatershed	Inventory Results				Goal- 25 % Reduction in Sediment Delivered						
	Cropland (Acres)	Tons per Year - Sediment Delivered	% Contributed by Subwatershed	Objective Reduction (%)	Critical Category: >T Soil Loss or > 0.4 Sediment Delivered			Eligible Category: < = T and > 0.2 Sediment Delivery			Ineligible Category < T Soil Loss and < 0.2 Sediment Delivery (Acres)
					# Acres	Target - Tons Reduced	% Reduced	# Acres	Target - Tons Reduced	% Reduced	
Headwaters	11,500	2,700	42%	25%	1,100	200	8%	2,300	400	16%	8,100
North Spring Brook	4,100	700	11%	25%	200	100	5%	1,400	200	20%	2,500
Antigo	400	100	.2%	25%	0	0	0	200	0	25%	200
South Spring Brook [1]	14,200	3,000	47%	25%	800	200	8%	4,100	900	30%	9,300
Total	30,200	6,500	100		2,100	500		8,000	1,500		20,100

[1] In the South Spring Brook Subwatershed the Critcal Catagory is >2.0 tons sediment yield.

An additional 17 percent of the sediment load delivered to the stream will be controlled through Eligible sites, which includes an estimated 8,000 acres, controlling 1,100 tons. Eligible classification includes those fields delivering sediment at a rate between .4 and .2 tons/acre/year for the Headwaters, Antigo, and North Spring Brook subwatersheds, and between .2 and 2 tons/acre/year in South Spring Brook subwatershed (Table 2-10).

Gully Erosion

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 farming.

Streambank Erosion

Streambank erosion contributes little or no sediment to the total sediment loading of the surface waters in the Spring Brook Watershed. Approximately 17 miles of stream was inventoried. An estimated 1.5 tons of sediment are eroding into streams annually. There are no critical streambanks in the Spring Brook Watershed. Any streambanks that contribute significant amounts of sediment as determined jointly by the LCD and the DNR Nonpoint Coordinator will be eligible for cost-sharing streambank BMP's to stabilize and protect the streambank.

Eligibility for Wetland Restoration, Easements, and Land Acquisition

Wetland Restoration

Prior to European settlement, Wisconsin had an estimated 10 million acres of wetlands. Today, slightly more than 5.3 million acres remain. Many thousands of pre-development wetlands have been converted to cropland. Thousands more have been filled for highways and urban development.

Wetlands are an important part of our ecosystem. When water enters a wetland, the wetland acts as a purifier, cleaning the water before it exits. Wetlands do this by removing, retaining, and transforming nutrients, processing wastes, and trapping sediment. Because wetlands are a principal conduit for rain water flowing to lakes and streams, their importance to water quality, water supply, flood control, erosion control, flora and fauna, and the food chain is significant. Wetlands act as a sponge to store runoff and slowly release water to the stream system. This reduces runoff peaks, and in turn reduces the potential for damaging floods. Restoration of wetlands may increase base flow throughout the stream. Infiltration will also be increased through the use of other BMPs such as conservation tillage, riparian buffers, and sediment control basins.

Wetlands vary from areas with seasonally saturated soil conditions to areas with standing water year-round. Some of the diverse types of vegetation that can be found in wetlands include pond lilies, cattails, rush, black ash, and willow. Wetland restoration may include the plugging or breaking up of existing tile drainage systems, the plugging of open channel drainage systems, other methods of restoring the pre-development water levels of an altered wetland, and the fencing of wetlands to exclude livestock. Restoration must be in accordance with NRCS standard 657 - Wetland Restoration and a wetland specialists recommendations.

Native seed and plants will be used wherever possible and no reed canary grass will be planted.

Restoration of wetlands provides primary and secondary benefits to water quality:

Primary - The use of wetland restoration as a best management practice for the purpose of controlling nonpoint sources of pollution. To control runoff pollution, the wetland must act as a sediment and nutrient filter, flood and storm water attenuation and storage area, and provide infiltration.

Secondary - Enhancement of fish and wildlife habitat. Wetlands provide essential habitat for fish, waterfowl, animals, and plants, including endangered species.

The following two eligibility conditions must be met in order for wetland restoration to be cost-shared:

- All upland fields draining to the wetland must be controlled to a soil loss rate that is less than or equal to the soils "T" value.
- Wetland restoration costs must be the least-cost practice to reach sediment reduction goals. In the subwatersheds, wetland restorations will be considered over lower cost practices to control nonpoint source pollutants because the cold-water streams of these subwatersheds are high priority water resources.

Cost-share eligibility for wetland restoration is divided into 3 categories:

1) Priority Restorations - Priority wetland restorations provide at least one of the water quality benefits as described in a. through d. below *and* provide essential habitat for fish, waterfowl, animals, and plants, including endangered species.

   a. Cultivated hydric soils with tile or open channel drainage systems discharging to surface waters. Wetland restoration will reduce the amount of nutrients and pesticides draining from the altered wetland to a water resource by establishing permanent vegetation and altering the drainage system.

   b. Pastured wetlands riparian to surface waters. Eliminating livestock grazing within wetlands will reduce the organic and sediment loading to the wetland and adjacent water resource, and reduce the direct damage from the livestock. Livestock exclusion by fencing will control pollutants and restore the wetland.

   c. Wetlands down-slope or up-slope from fields identified as significant upland sediment sources. Restoration of wetlands in these situations may do two things: 1) create a wetland filter which reduces the pollutants from an up-slope field(s) to a water resource; or 2) reduces the volume and velocity of water flowing from an up-slope wetland to a down-slope critical field.

   d. Wetlands providing water quality improvements through infiltration. Water stored in wetlands is filtered as it infiltrates to groundwater and increased base flow in streams.

Additionally, priority will be given to prior converted and farmed wetlands. Prior converted wetlands are those that have been drained, dredged, filled, leveled, or otherwise manipulated (including removal of woody vegetation) before December 23, 1985, for the purpose of making the production of an agricultural commodity possible. Farmed wetlands include potholes and seasonally flooded or ponded wetlands that were not fully converted prior to December 1985 and are cropped in dry years.

2) Eligible Restorations - Sites that do not meet the definition of a priority site yet offer significant water quality benefits such as providing storage of storm event runoff and flood flows that significantly improve the watershed hydrology or perform the function of a filter to delay, absorb, or purify contaminated runoff before it enters watershed streams or lakes.

3) Ineligible Restorations - Sites where existing physical characteristics or conditions are such that the potential for restoration would not be environmentally viable or economically feasible.

Wetland Restoration Permitting - County LCD staff, DNR, US Fish and Wildlife, and wetland restoration experts will assist landowners in plan development including assistance in obtaining permits. Permits may be needed from three sources.

Federal (Army Corps of Engineers) Clean Water Act §404
State (DNR) Clean Water Act §401 Water Quality Certification, Chapter 30 and 31, Stats.
Local (County or Municipal Zoning Office)

Land Easements

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

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

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

- Wetland Restoration: areas where wetlands are intentionally restored or enhanced in order to improve their ecological values, such as natural filters of surface water.

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

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

Easements should be considered in the following situations:

1. To exclude livestock from grazed wetlands or along eroding streambanks within the watershed. Easements are strongly recommended whenever:

- there is any grazing of wetlands.
- livestock density is so great that areas of unvegetated soil are within 60 feet of streams or intermittent streams.
- channel erosion is exacerbated by livestock grazing such that unvegetated streambanks are two feet or more in height.

2. When elimination of row cropping and the establishment of permanent vegetative cover will stabilize a critical area. Easements are strongly recommended whenever:

   - Row cropping is occurring within 60 feet or less of streams or intermittent streams.

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

   - The eligible wetland restoration is greater than 25 acres in size.

4. When a barnyard or animal feedlot is located within the flood plain and: a) a permanent easement is the least-cost alternative to provide adequate pollution reduction or b) a permanent easement provides a greater level of pollution reduction than on-site engineering options at a price that is cost-effective when compared to the level of pollution reduction and the price of the available engineering options. Easements are strongly recommended whenever:

   - Engineering options would require intensive management in order to continue to provide adequate pollution reduction.
   - Surrounding land use is largely agricultural and it is anticipated that it will remain so for two decades or more.

Land Acquisition

Units of Government, including Lake Protection and Rehabilitation Districts, within the Spring Brook Priority Watershed Project area are eligible for nonpoint source grants to supplement the purchase of land, the interest in land that is contributing, or will contribute nonpoint source pollution.

Eligibility Criteria - Eligibility for land acquisition, lands must meet one of the following items.

lands located along riparian areas of the watershed project area will be eligible for land acquisition grants or;

Any cropland proposed for acquisition must have sediment delivery levels above the criteria for eligible as specified in the sediment delivery section of the plan or;

Any acquisition proposal must meet the applicable goals of the watershed project.

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

An urban nonpoint source inventory and analysis was conducted to identify and prioritize major and minor constraints to achieving water quality goals in the Spring Brook watershed. This section describes the urban nonpoint source pollutants as well as the management needs and reduction objectives for each pollutant in the Spring Brook watershed. It includes assessments for stormwater conveyance, sediment from construction site erosion and streambank erosion, pollution prevention practices, and urban toxic pollutants carried in runoff. The section ends with a summary of the pollutant reduction and project objectives for urban nonpoint sources.

Description of Urban Runoff

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

Loadings of sediment, nutrients, heavy metals, and other toxic materials.

Stream channel modifications, including straightening and lining with concrete.

Hydrologic disturbances, including flashy high flows and loss of base flow.

Urban runoff carries a variety of pollutants to surface water. Pollutants found in urban runoff include heavy metals (lead, copper, zinc, cadmium, and chromium) and a large number of toxic organic chemicals (polychlorinated biphenyls, polycyclic aromatic hydrocarbons, pesticides, and many others). Other substances in urban runoff include sediment, nutrients, bacteria, and protozoans.

The delivery of pollutants to streams from existing urban areas depends on the types of urban land uses, the types of storm water conveyance systems, and urban pollution prevention practices, such as street sweeping, yard waste collection, and waste oil recycling programs. Highways, commercial, and industrial areas have the highest unit/area/year pollutant loads, producing the most significant amounts of metals and other urban toxic pollutants. Medium density and multi-family residential areas also generate metals, sediment, and phosphorus, and include large impervious areas. Residential areas contain more lawn area than commercial areas, while commercial areas have more rooftop, street, and parking lot surfaces. Lawns can also contribute phosphorous from grass clippings, leaves, pet waste, and debris that get washed into storm sewers or roadside ditches; and from fertilizer and pesticide over applications and spills. Rooftop areas are important sources of zinc and atmospheric pollutants. Their connection to the storm drainage system may be direct or indirect, depending on the use of downspouts, grassed areas, drain tiles, etcetera.

Urban land uses and anticipated growth are summarized in Table 2-11. Typical pollutant generation rates from urban land uses is shown in Table 2-12. Existing urban land uses in the Spring Brook watershed and their respective amounts and types of pollutant loads are shown in Table 2-13. The greatest amount of urban land in the watershed is concentrated around the City of Antigo. Runoff from new urban areas has the potential to further degrade lake and stream water quality unless stormwater management controls are incorporated during development. Because different land use development patterns can have significantly different impacts on water quality in lakes and streams, funding may be available to study the water quality impacts associated with various types or patterns of land use development. Funding may also be available to help develop new or revise existing subdivision ordinances, zoning ordinances, or land use plans as they relate to the goals in the plan.

Table 2-11. Increases in Urban Land Use Within the City of Antigo, 1995 to 2020

Land Use Category	1995		Planned Increment		Year 2020	
	Acres	% of Total	Acres	% Change	Acres	% of Total
Residential	1,340	36.7	1,050	78.3	2,390	38.4
Commercial	250	6.9	460	180	710	11.4
Industrial	310	8.6	670	216	980	15.9
Governmental, Institutional	190	5.3	100	49.5	290	4.6
Recreational	1,560	42.5	290	18.6	1,850	29.7
Totals	3,650	100	2,570	70.3	6,220	100

Source: City of Antigo

Table 2-12. Typical Pollutant Generation Rates From Urban Land Uses

Land Use	Unit Area Load (pounds/acre/year)				
	Sediment	Phosphorus	Lead	Zinc	Other Concerns
Industrial	1,000	1.5	2.4	2.1	Volatile organics
Commercial	1,000	1.5	2.7	2.1	Volatile organics
Shopping Centers	440	0.5	1.1	0.6	Volatile organics
Medium Density Residential	190	0.5	0.2	0.2	Pesticides
Low Density Residential	10	0.04	0.01	0.04	Pesticides
Parks	3	0.03	0.005	-	Pesticides

Source: DNR. Note: In each subwatershed these figures were adjusted for specific watershed conditions.

Table 2-13. Pollutant Loads from Urban Areas

Subwatershed	Urban Land Use		Sediment		Phosphorus		Lead[1]	
	Acres	%	Tons/Yr	%	Pounds/Yr	%	Pounds/Yr	%
Antigo[2]	3,650[2]	99.6	2,200	99.6	1,530	100	1,650	100

[1] Lead is used as an indication of metal loadings contributed from urban land uses.
[2] Includes 2,880 acres within the City of Antigo subwatershed and 770 developing acres in adjacent areas.
Source: DNR

Table 2-14. Grass Swale Drainage, Street Sweeping and Wet Ponds By Land Use For Municipalities in the Spring Brook Watershed

Municipality	Land Use	Acres	Percent Drained by Grass Swales	% Drained Catch Basins	Estimated Infiltration Rate (in/hr)	Street Sweeping (sweeping s/yr)
Antigo	Residential	1,340	0	100	0	5-6
	Commercial	200	0	100	0	5-6
	Industrial	310	0	100	0	5-6
	Open Space	1,250	30	70	.6	5-6
	Institutional	50	0	100	0	5-6

Source: DNR

Stormwater Conveyance

Description

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

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

Reducing pollutant transport to surface waters involves reducing the amount of urban storm water reaching streams, primarily from impervious surfaces. This is accomplished by increasing the infiltration of storm water into the soil and ground layers. Storm water infiltration on a suitable site can effectively reduce nonpoint pollution. In addition, infiltration can help stabilize the hydrology of small urban streams by replenishing groundwater, much of which is ultimately discharged to surface water. Infiltration can reduce bank erosion and the need for expensive, highly engineered streambank stabilization structures. Infiltration practices can be used with wet detention ponds to supplement pollutant removal effectiveness or reduce pond size.

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

Management Needs and Alternatives

Hydrologic analyses have not been conducted to investigate the effect of management alternatives on reducing and preventing streambank erosion and bed scour, or on maintaining stream base flows. These studies will need to be conducted as part of future stormwater management feasibility studies for nonpoint source control in established urban areas. Table 2-14 shows the percent of grass swale drainage, street sweeping frequency, and number of stormwater ponds for the City of Antigo.

Four management alternatives were considered for Antigo. These management alternatives present a range of practices and control effectiveness which include:

1. Do nothing.

2. Increase catch basin cleaning to at least two times each year on [1]targeted urban land uses.

3. Increase street sweeping to at least two times per month on targeted urban land uses.

---

[1] Targeted urban landuses include commercial, industrial, and medium density residential.

4. Install and maintain construction site erosion control measures to control 50 percent of the sediment generated.

The analysis of management alternatives assumes that sediment ponds will trap all sediment particles of 20 microns or larger. This will result in about a 50 percent control of suspended sediment and about 30 percent control of phosphorus and heavy metals in urban runoff.

The analysis assumes an infiltration rate of 0.5 inches per hour for infiltration basins and grassed swales. This is a moderate rate of infiltration that will provide less control of pollutants than stormwater ponds. The actual infiltration rate in the Spring Brook watershed is a range of 0.6-2.0 inches per hour. Higher infiltration rates of about 2.5 inches per hour would provide excellent control of pollutants. Existing levels of street sweeping and grassed swale drainage are accounted for in evaluating these alternatives.

Stormwater ponds and infiltration practices should only be installed when specifically called for in detailed feasibility studies. These practices should be located where land availability and soil conditions are suitable for providing a high level of control as determined by detailed feasibility studies. Infiltration basins or trenches would provide groundwater recharge and base flow enhancement.

Feasibility studies will be needed to select the site specific stormwater detention and infiltration practices consistent with this watershed plan. The cost and complexity of studies will vary, depending on land use and the compatibility of the existing storm sewer networks with locating structures.

Catch basin cleaning is used to remove leaf litter, accumulated dirt, and debris to improve water quality of downstream surface waters. Catch basins can be cleaned either manually with a shovel, or by machine using a clamshell bucket, or specially designed equipment including bucket loaders, and vacuum attachments to street sweepers. Cost sharing is authorized for partial support of supplementary catch basin cleaning for existing target land uses. Supplementary catch basin cleaning is defined as levels greater than one cleaning for each catch basin per year in target land use areas.

Objectives

The management objective for the City of Antigo is to achieve a 20 percent reduction of pollutants. The management of pollutants from existing developed areas can be accomplished through activities such as street sweeping, catch basin cleaning, and construction site erosion control.

The long-term management goal for future development in all subwatersheds is to achieve a 75 percent reduction of pollutants. The management of pollutants from future development require wet detention (or a corresponding level of infiltration based on an equivalent amount of pollutant removal) for all target land use areas. Those activities recommended for existing developed areas should also be conducted in future developed areas. Grassed swales should be considered in new developments rather than curb and gutter. Stormwater management ordinances for future development can specify criteria for these controls.

Analysis of storm water management techniques shows that certain activities such as streetsweeping, catch basin cleaning and construction site erosion control; and certain best management practices (BMPs), such as infiltration basins and storm water detention ponds, can significantly reduce sediment and other pollutant loadings to lakes and streams. Adoption of storm water management ordinances

and use of storm water management practices will be a priority in the implementation of this plan.

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

Construction Site Erosion

Description

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

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

Management Needs and Alternatives

Construction site erosion control throughout most of the watershed project area is critical to achieving sediment reduction goals. Without at least a 70 percent control of the sediment from these sites, construction site erosion will remain a serious deterrent to desired water quality and aquatic life in the watershed project area.

Average annual sediment loading to streams from construction erosion for 1995 to 2020 conditions was determined by multiplying the amount of land planned for construction by an average of 15 tons per acre per year. This rate of erosion and sediment control is based on observed land development patterns and generalized climatic conditions. It is estimated that in the years between 1995 and 2020, construction erosion will contribute about 1,800 tons per year of sediment to streams in the project area, if construction erosion prevention and control methods and measures are not used.

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

Langlade County does not have erosion control and stormwater management ordinances for development in unincorporated areas. In addition, developers are governed by state regulations (Ch. 281 Wis. Stats. Note: This was formerly numbered Ch. 144) set forth by the Department of Commerce (DOC) for erosion control on sites with one and two family dwellings; and the DNR

Wisconsin Pollutant Discharge Elimination System (WPDES) permit regulations for sites greater than five acres.

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

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

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

- The City of Antigo and counties should review (and modify where needed) their existing ordinances to assure effective penalties for non-compliance and responses to concerns of citizens, inspection staff, and developers.

- The City of Antigo and counties should evaluate staffing and training needs for effective ordinance administration and enforcement.

- The City of Antigo and counties should evaluate their permit fee schedule to investigate ways to raise revenue to support effective enforcement activities.

- Developers and contractors need to know what is expected of them, and they need better access to technical information through seminars and other educational activities and materials.

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

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

Objectives

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

Because of the gaps in state agency regulations, construction erosion control is best accomplished through a local erosion control ordinance, locally administered building codes, practice standards and

application guidelines, an effective administrative program and effective enforcement. Training programs are needed for staff administering ordinances and developers who are responsible for installing and maintaining the erosion control practices.

Pollution Prevention Practices

Description

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

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

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

- Control construction site erosion.
- Remove street dirt, leaves and debris from catch basins, streets and parking lot surfaces through municipal street maintenance and leaf collection programs.
- Reduce or eliminate the use of galvanized roof materials and gutters, a primary source of zinc in urban runoff. Revise municipal building codes where possible.
- Remove pet wastes immediately from lawns, sidewalks, and streets to reduce bacterial contamination of urban runoff. Enforce local pet waste ordinances and familiarize pet owners with good pollution prevention practices.
- Control the timing and reduce the amount and type of fertilizer and pesticide applications in all areas.
- Dispose of automobile waste fluids such as radiator water and engine oil appropriately, keeping them out of the storm sewer system. Set up municipal recycling programs for antifreeze and waste oil. Create partnerships with car dealerships and auto maintenance shops in the watershed project area. Discourage dumping waste oil on the ground or in storm sewers.

- Control development and redevelopment through zoning which, in part, considers on-site suitability for storm water management practices to meet water quality, habitat, and flood prevention objectives.
- Minimize use of street de-icing compounds.
- Reduce the amount of motorized traffic through car pooling or other transportation.
- Reduce the areal extent of parking lots.
- Restrict development in environmental corridors.
- Promote the use of cluster developments.

Objective

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

Urban Toxic Pollutants

Description

An important means for improving water quality in the Spring Brook watershed is to prevent high concentrations of toxic materials in urban runoff. Four pollutants (sediment, phosphorus, zinc, lead) were chosen to characterize the type and severity of urban nonpoint pollution.

The management alternatives analysis indicates that pollution prevention activities for nonpoint source control in established areas are needed in the to achieve the previously described pollutant reduction objectives. In addition, the City of Antigo will be expected to conduct the "core" activities of the plan, with a primary emphasis on urban pollution prevention and educational activities.

Objective

Prevent loadings of heavy metals and other toxic materials that would exceed acute and chronic toxicity standards as identified in Wis. Adm. Code NR 105.

Pollutant Reduction Goals and Project Objectives for Urban Nonpoint Sources

A summary of the reduction goals and objectives:

- Reduce overall pollutant loading (1995 baseline) within the City of Antigo by 20 percent by the year 2010.

- Reduce future pollutant loadings in all subwatersheds by 20%.
- Achieve high levels of sediment reduction from construction site erosion control practices.
- Improve municipal pollution and citizen prevention practices including street sweeping and catch basin cleaning.

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

Other Pollution Sources

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

Industrial Point Sources of Pollution

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

Sewage Treatment Systems

Sanitary sewer service availability is 100% throughout the Antigo Subwatershed. Approximately 8,600 persons, 60 percent of the watershed population, receive service. Wastewater generated by the remainder of the watershed residents is disposed of through private on-site systems.

Private Sewage Systems

Septic systems consist of a septic tank and a soil absorption field. Septic systems fail due to soil type, location of system, poor design or maintenance such as tanks which go unemptied. Pollutants from septic system discharges are nitrates, bacteria, viruses and hazardous materials from household products. Generally, in the Spring Brook Watershed, the majority of soils are suitable for conventional septic tank soil absorption systems. Landspreading of septic system waste during the winter months can also create surface water quality problems.

Counties have been using the Wisconsin Fund since 1981. The Wisconsin Fund is a Private Sewage System Replacement Grant Program offering financial assistance designed to help eligible homeowners and small business operators offset the costs of replacing a failing septic system. The program is administered by the Langlade and Marathon County Land Records and Regulations Department. 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 their county zoning department for more information.

Land Application of Municipal and Industrial Wastes

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

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

Municipal
There are 11 sites in the Spring Brook Watershed that are approved for spreading municipal sludge on a total of 355 acres.

Industrial
There are 50 sites in the Spring Brook Watershed that are approved for spreading industrial sludge on a total of 2005 acres. Industrial sludge is primarily cheese and meat packing factory waste.

Solid Waste Disposal Sites

City of Antigo Landfills

There are two landfill sites located within the Spring Brook Watershed.

The old City of Antigo Landfill is located in the Antigo township, T.31N.-R.11E., SEC 19-20. The landfill opened in the 1940's and closed in 1971. It was designated as a superfund site and has gone through a clean-up process.

The current City of Antigo Landfill is located in the Rolling township, T.31N.-R.10E., SEC 10-11. The landfill opened in the 1979.

Mining

Gravel pits are the only kind of mining taking place in the Spring Brook Watershed. There are approximately 16 gravel pits in the watershed.

Ordinances

Manure Storage Ordinance

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

To assure protection of surface and ground water from animal waste storage facilities throughout the watershed, the adoption of a animal waste storage ordinance in Langlade County is necessary during the course of the Spring Brook Priority Watershed Project. Certain costs for the development and administration of the ordinance are eligible for reimbursement under the Priority Watershed Project. As required by State statutes, the County must repay to the State all Spring Brook Nonpoint Source Grant agreement funds if the ordinance is not adopted. This will be a condition of the Langlade County Nonpoint Source Grant Agreement. Marathon County enacted a animal waste storage ordinance in 1984 and udated it in 1996.

All counties required to adopt manure storage ordinances as part of their project must adopt ordinances to control manure or repay all of the NPS grant at the end of the project.

Construction Site Erosion and Stormwater Management

Cost for the development and administration of land use ordinances which are related to water quality are eligible for reimbursement under the priority watershed project.

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

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

Similar to erosion control, Wisconsin cities, villages, towns, and counties have authority to adopt a

stormwater management zoning ordinance. A draft Model Stormwater Management Zoning Ordinance has been developed by the DNR in 1995. This model ordinance is meant to be complimentary to the model construction site erosion control ordinance prepared in 1987 by the DNR, in conjunction with the Wisconsin League of Municipalities.

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

The City of Antigo and Langlade County are encouraged to adopt construction site erosion control and stormwater management zoning ordinances.

CHAPTER THREE
Implementation

Introduction

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

- The best management practices (BMPs) recommended to control nonpoint sources of pollution as described in Chapter Two;
- The cost containment policies for practice installation;
- The cost-share agreement procedures;
- Schedules for implementing the project, including the critical sites notification schedule;
- The critical site designation appeal process;
- The estimated project budget for cost-sharing, staffing, and other support.

Best Management Practices

BMPs Eligible For Cost-Sharing And Their Rates

Best management practices control nonpoint sources of pollution and are identified in NR 120. Design and installation of all BMPs must meet the conditions listed in NR 120. Generally these practices use standard specifications included in the Natural Resources Conservation Service *Field Office Technical Guide*. In some cases additional specifications may apply. The applicable specifications for each BMP can be found in NR 120.14.

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

The practices eligible for cost-sharing and the cost share rates for each BMP are listed in Tables 3-1 and 3-2; the BMPs listed in Table 3-1 can either be cost-shared at 50% or up to the flat rates listed.

Table 3-1. Practices with Flat Rates for State Cost-Share Funding

BEST MANAGEMENT PRACTICE	MAXIMUM FLAT RATE
Contour Farming	$ 9.00/ac[1]
Contour Stripcropping	$ 13.50/ac[1]
Field Stripcropping	$ 7.50/ac[1]
High Residue Management	$ 18.50/ac[2]
Riparian Buffer Strip	$125.00/ac[3]
Cropland Protection Cover	$25.00/ac[4]
Street Sweeping and Leaf Collection	

[1] Wildlife habitat restoration components of this practice are cost-shared at 70 percent.
[2] Cost-shared up to six years.
[3] Cost-shared up to five years.
[4] Cost-shared up to three years.

Following is a brief description of the most commonly used BMPs. More detailed descriptions can be found in NR 120.14.

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

Contour Stripcropping. Growing alternating strips of row crops and grasses or legumes on the contour.

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

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

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

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

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

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

Table 3-2. State Cost-Share Rates for BMPs

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

[1] To a maximum of $2,000 per watering system

[2] Manure storage is cost-shared at 70% for the first $20,000 of cost and at 50% for the remaining cost, not to exceed $35,000.

[3] Easements may be entered into with landowners identified in the watershed plan in conjunction with these BMPs. See Chapter Two for an explanation of where easements may apply.

[4] The maximum cost-share rate for storm sewer rerouting and removal of structures necessary to install structural urban BMPs is 50%.

[5] Cost-sharing is available to acquire land for the construction of an urban structural practice or to acquire land which is contributing or will contribute nonpoint source pollution.

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

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

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

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

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

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

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

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

Barnyard Runoff Management. The use of structural measures such as gutters, down-spouts, and diversions to intercept and redirect surface runoff around the barnyard, and collect, convey and temporarily store runoff from the barnyard.

Barnyard Abandonment or Relocation. Relocation of an animal lot from an inappropriate site such as a floodway to a suitable site to minimize the amount of pollutants from the lot to surface or groundwater.

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

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

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

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

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

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

Structural Urban Best Management Practices. These practices are source area measures, transport systems and end-of-pipe measures designed to control storm water runoff rates, volumes and discharge quality. These practices will reduce the amount of pollutants carried in runoff and flows destructive to stream habitat. These measures include such practices as infiltration trenches, porous pavement, oil water separators, sediment chambers, sand filtration units, grassed swales, infiltration basins and detention/retention basins.

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

Land Acquisition. The purchase of land or the interest in land which is contributing or will contribute nonpoint source pollution or for the construction of an urban structural practice.

Interim Best Management Practices

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

Practices Not Cost-Shared

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

- That portion of a practice to be funded through other programs.
- Practices previously installed and necessary to support cost-shared practices.
- Changes in crop rotations.
- Changes in location of unconfined manure stacks involving no capital cost.
- Non-stationary manure spreading equipment.

- Practices needed for land use changes during the cost-share agreement period.
- Other practices necessary to achieve the objectives of the watershed project.
- Minimum levels of street sweeping and leaf collecting.
- Operation and maintenance of cost-shared BMPs.
- Practices already installed,with the exception of repairs to the practices which were rendered ineffective due to circumstances beyond the control of the landowner.
- Practices required to control sources which were adequately controlled at the time the cost-share agreement was signed, but which are producing an increased amount of pollutant loading to the surface or groundwater, counter to the water resource objectives of the watershed plan, due to the landowner's change in land management.
- Practices whose purpose is to accelerate or increase drainage of land or wetlands, except where drainage is required as a component of a BMP.
- Practices normally and routinely used in growing crops and required for growing crops or feeding livestock.
- Activities covered under the Wisconsin Pollution Discharge Elimination System (WPDES) Program or covered in other ways by Chapter 147 of Wis. Statutes, except urban nonpoint sources that must be controlled to obtain a WPDES permit if control of the sources is identified in the priority watershed plan and the sources are not required to obtain coverage under a WPDES stormwater permit for discharges associated with an industrial activity, as defined under ch. NR 216.
- Livestock operations which: have applied for and are eligible for WPDES permits, have been issued WPDES permits, have greater than 1,000 animal units, or are greater than 1,000 animal units and have been issued a notice of discharge.
- Septic system controls or maintenance.
- Dredging activities.
- Silviculture activities except as necessary for site stabilization.
- Practices to control spills from commercial bulk storage of pesticides, fertilizers, petroleum and similar materials.
- Activities and structures intended solely for flood control.
- Activities required as part of a license for a solid waste management site.
- Activities funded through state or federal grants for waste-water treatment plants.
- Active mining activities.

- Pollution control measures needed during building and utility construction and stormwater management practices for new developments.
- Pollution control measures needed during construction of highways and bridges.
- Other practices or activities determined by DNR not to meet the objectives of the program.

Cost-Share Agreement Administration

Cost-share funding is available to landowners and local units of government for a percent of the costs of installing BMPs to meet project objectives. This funding is distributed to landowners by the LCD from a Nonpoint Source grant provided by the DNR. The LCD receives additional grant money from the DNR to support its staff and other administrative responsibilities. Cost-share agreements are binding contracts between landowners and the LCD. To qualify for cost-sharing funds, pollution sources must meet eligibility criteria defined in the previous chapter.

Cost share agreements must be initiated within 5 years after formal approval of the watershed plan and are filed as part of the property deed. Agreements may be amended throughout the 10 year project period. Cost-share agreement sign-up for critical sites may exceed the voluntary cost-share sign-up period of five years because the critical site notification schedule extends to the end of the five year period of voluntary cost-share sign-up. At the time of notification, critical site landowners have 3 years to sign a cost-share agreement at the percent noted in Table 3-2.

Practices included on cost share agreements must be installed within the schedule agreed to on the cost share agreement. Practices must be maintained by the owner for a minimum of ten years from the date of installing the final practice listed within the cost share agreement. County LCD staff are responsible for enforcing compliance of cost share agreements. The LCD staff will monitor practices installed through the watershed project in conjunction with other state and federal conservation compliance programs. Practices should be monitored every 4 years or more frequently as necessary. Monitoring will insure that BMPs installed through the program are maintained in accordance with the operation and maintenance plan for the practice. Proper operation and maintenance of practices provides cost effective management of pollution sources.

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

Cost Containment Procedures

Chapter NR 120 requires that cost containment procedures be identified in this plan to control the costs of installing BMPs. Conservation practices estimated to cost in excess of $5,000 are to be bid according to the counties' bidding procedure. Conservation practices estimated to cost less than $5,000 are subject to average cost. The bidding procedure and average cost and flat rate lists can be obtained from the Langlade and Marathon County LCDs.

Implementation Schedule

Landowner Contact Schedule

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

- County LCD staff will continue to make contacts with eligible landowners until the landowners have made a definite decision regarding participation in the program. County staff will visit all eligible landowners in person unless the landowner has shown no interest in program participation.

- County staff will contact all eligible landowners not signing cost-share agreements by personal letter six months prior to the end of the five year cost-share sign-up period to encourage participation.

Sediment Delivery Inventory Completion Schedule

- Approximately 40 percent of the watershed's upland fields remain to be inventoried as of plan approval. Each year, the LCD staff will complete the inventory on 50 percent of the remaining uplands. At this rate, the inventory will be completed within 2 years of plan approval.

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

Critical Site Notification Process

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

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

- Following receipt of the report, the DNR has 60 days to send critical site notification letters to the landowners.

- The county LCD staff will complete the verification of critical sites at the rate of 25 percent per year according to the following schedule for 1998, 1999, 2000, and 2001.

  - April-November: Conduct site visits and verification work.
  - December-January: Prepare report.
  - February 1: Send report to DNR implementation coordinator.
  - April 1: DNR sends notification to the critical site landowners.

- Cost-share agreement sign-up for critical sites may exceed the voluntary cost-share sign-up period of five years because the critical site notification schedule extends to the end of the five year period of voluntary cost-share sign-up. At the time of notification, critical site landowners have 3 years to sign a cost-share agreement.

- The notification schedule may be modified and revised at the annual watershed review meeting when progress on critical sites is discussed.

Critical Site Appeals Process

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

The Land Conservation Committee shall:
- provide the appellant with a hearing and give reasonable notice of the hearing to the appellant, the DNR and the DATCP.
- conduct the hearing as an informal hearing. Chapter 68.11(2), Wis. stats., does not apply to this hearing. This language describes the conduct of the hearing.
- hold the hearing in a place that is convenient for the appellant.

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

The LCC shall:
- provide a decision, in writing, within 45 days of receiving:
  (1) the DNR and DATCP reports and recommendations,
  (2) the notification by the DNR and DATCP that no report or recommendations would be submitted, or
  (3) the conclusion of the 60-day period following the hearing.

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

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

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

Urban Implementation

Core Activities of the Management Program

The core activities of the nonpoint source control program applicable to local units of government include basic measures that can be implemented without further study. Adopting a community specific core program is the first step in the implementation process. Communities will need to commit to implementing the core program within the first three years of the date the Department approves the plan, with the exception of a construction site erosion control ordinance which is two years. This is a prerequisite to receive technical and financial assistance through the priority watershed project. This requirement applies only to the receipt of funds used directly by the municipality as a grantee, such as where the municipality installs, owns and operates a BMP. It does not apply to those instances where the municipality acts as a grantor, passing cost-share funds through to private landowners. This means that individual landowners could receive cost-share funds from the DNR for the installation of BMPs prior to a municipality's agreement to conduct core activities of the urban program.

The basic activities of the core program are:

- Adopt a construction site erosion control ordinance based on the state model ordinance and state building codes. Langlade County should adopt an ordinance and the city of Antigo must adopt an ordinance as a core program activity.

- Effectively enforce the construction erosion control provisions in local ordinances.

- Develop and implement a community specific program of urban pollution prevention practices which reduce nonpoint source pollution. This would include efforts such as adoption of ordinances regulating pet wastes, changes in the timing and scheduling of leaf collection, catch basin cleaning, street cleaning, use of phosphorus-free fertilizers, and pollution prevention at public works yards.

- Implement an information and education program consistent with the intent and purpose of Chapter 5 of this watershed plan.

Segmented Activities of the Management Program

The segmented activities of the nonpoint source management program include those requiring site specific investigations prior to installation (example: storm-water detention ponds needing an engineering siting feasibility study).

The higher costs of implementing this portion of the urban management program require communities to budget expenditures over the course of several years. Best management practices implemented under this portion of the program include detention ponds, infiltration devices, stream bank erosion controls, and other structural means for reducing urban nonpoint source pollution. These components also include changes in schedules and equipment used for catch basin cleaning.

Furthermore, detailed studies are needed for these practices, including engineering feasibility and other site specific investigations for existing and new development. Study results will determine the best means for reducing urban nonpoint sources in a specific community by more site specific application of the plan recommendations.

Communities can implement any mix of the segmented activities of the urban management strategy any time following development and initial implementation of the core program. However, cost sharing will be limited to segmented program activities completed within the ten year implementation period.

The basic activities of the segmented program are:

- Conduct detailed engineering studies to determine the best means to implement nonpoint source control measures for established urban areas. These studies should set forth the allocation of local costs between municipalities where more than one municipality contributes runoff to a BMP. The allocation should result in an equitable distribution of costs based on the contribution of each municipality to the total pollutant load or storm water runoff volume being controlled.

- Develop, as needed, storm water management plans for existing and planned urban development. These plans will identify the type and locations of BMPs.

- Adopt and enforce a storm water management ordinance consistent with the state's model storm water ordinance (in preparation)

- Following the completion and adoption of the DNR Storm Water Management Guidebook and Model Ordinance (in preparation), storm water management ordinances should be incorporated in the core program.

Program Participants -- Roles and Responsibilities

The specific roles and responsibilities for program participants are summarized below. The primary participants include local units of government (examples: cities, villages, county, local public works departments), the DNR, other state agencies, landowners, and land operators. Where applicable roles and responsibilities are discussed with respect to the previously described core and segmented activities. As noted in Chapter 1, "Plan Purpose and Legal Status," implementation begins following approval of this priority watershed by Langlade County, Marathon County, LWCB, and the DNR with input from representatives of the Watershed Project Citizen Advisory Committee.

Local Units of Government Core Program Roles and Responsibilities

The following is a schedule for implementing the core activities of the nonpoint source control strategy for this priority watershed project. Each participating unit of government should:

1. Identify in writing an authorized representative for the local unit of government within 30 days of the start of implementation.

2. Identify the roles and responsibilities of the county, the City of Antigo, developers, contractors, and landowners for controlling construction erosion in all areas of the watershed project area within 6 months of the start of implementation. Develop administrative procedures, and determine staff needs to enforce construction erosion control ordinances and building codes in the City of Antigo within 12 months of the start of implementation.

3. Develop and implement a community specific program of urban pollution prevention practices. This may include but is not limited to a combination of information and education efforts, adoption of ordinances regulating pet wastes, catch basin cleaning, street sweeping and public work yard pollution prevention plans, and changes to the timing and scheduling of leaf and yard waste collection. Activities and a schedule for implementation will be negotiated by the local unit of government and the DNR within 12 months of the start of implementation.

4. Implement the information and education strategy as described in Chapter 5.

5. Prepare and submit annual work plans for staff and activities necessary to implement the project.

6. Prepare and submit to DNR an annual report for the purpose of monitoring project implementation.

7. Participate in the annual watershed project review meeting.

Local Units of Government Segmented Program Roles and Responsibilities

The following is a schedule for the segmented activities of the nonpoint source control strategy for this priority watershed project. The City of Antigo can select those activities it wishes to pursue.

1. Within 12 month of the start of implementation, identify the high priority sub-basins the community wishes to address for nonpoint source management. This list can be amended throughout the 8 year project period.

2. Adopt, administer, and enforce a storm water management ordinance within 5 years of watershed plan approval by the Department. The state's model storm water management ordinance is in preparation and may be used as a guide.

3. Develop alternative financing and implementation plans which describe the methods for raising revenue to administer local pollution control programs in the City of Antigo. These studies will be conducted concurrently with the other high priority activities of the segmented program.

4. Develop information needed for the annual project evaluation to DNR.

DNR

The DNR has been assigned the overall administrative responsibility for the Wisconsin Nonpoint Source Water Pollution Abatement Program in s. 144.24 Stats, and s. NR 120, Wis. Adm. Code. (NR 120). This includes providing financial support for local staff and installation of management practices, assisting local units of government to integrate wildlife and fish management concerns into selection and design of BMPs and conducting project evaluation activities. The DNR's role in assisting local units of government in carrying out the core and segmented activities are as follows:

DNR Core Program Roles and Responsibilities

1. Assist local governments to enforce construction erosion control provisions developed in accordance with the DNR - Department of Commerce (DOC) Memorandum of Understanding.

2. Review community specific program of urban pollution prevention practices for nonpoint source control.

3. Review and approve annual work plans for staff and activities necessary to implement the project.

4. Review and approval annual project implementation reports.

5. Participate in the annual watershed project review meeting.

6. Track changes in urban pollutant loads using information supplied by local units of government.

DNR Segmented Program Roles and Responsibilities

1. Develop a model stormwater management ordinance. Assist communities with adoption and enforcement of stormwater management ordinances.

2. Assist communities to develop priorities, schedules, and requirements for segmented activities.

Cost-Share Budget

Costs of Installing BMPs

The quantity and type of management practices that are required to meet the water quality objectives of this project are listed in Table 3-3. Approximately 75 percent participation is needed to meet the pollution reduction goals. Units of measurement and cost per unit for the various BMPs are also included.

The estimated cost of installing the Best Management Practices is approximately $ 1.4 million.

- State funds necessary to cost-share this level of control would be approximately $ 975,500.
- The local share provided by landowners and other cost-share recipients would be approximately $ 461,000.

Easement Costs

Chapter Two identifies where nonpoint source program funds can be used to purchase easements. The estimated cost of purchasing easements is shown in Table 3-3. At 75 percent participation, the estimated purchase price of easements on eligible lands would be $ 25,500. Easements are funded at 100 percent and will be purchased by Langlade County.

Table 3-3 Estimated BMP Cost-Share Budget Needed to Meet Water Quality Objectives

BMP	Number of Units Eligible		Cost/ Unit ($)	Total Cost	Landowner Participation Needed to Meet Water Quality Objectives (Approximately 75 %)	
					State Share	Landowner Share
Upland Control						
Change in Crop Rotation	6,000	ac	NA	0	0	(1)
Contour Cropping	100	ac	9	900	700	(1)
Contour Strip Cropping	100	ac	13.50	1,400	1,000	(1)
High Residue Management (2)	1,500	ac	18.50	166,500	124,900	(1)
Cropland Protection Cover (3) (Green Manure)	2,000	ac	25	150,000	112,500	(1)
Intensive Grazing Management (Rotational Grazing)	5	ea	4,000	20,000	7,500	7,500
Critical Area Stabilization	10	ac	800	8,000	4,200	1,800
Grass Waterways	10	ac	3,000	30,000	15,800	6,800
Field Diversions and Terraces	9000	ft	3	27,000	14,200	6,100
Grade Stabilization	10	ea	4,000	40,000	21,000	9,000
Agricultural Sediment Basin	150	ea	3500	525,000	275,600	118,100
Shoreline Buffers	10	ac	400	4,000	2,100	900
Nutrient Management (3)	13,000	ac	6	234,000	87,800	87,800
Nutrient and Pest Management (3)	13,000	ac	10	390,000	146,300	146,300
Pesticide Spill Control Facility (6)	0	ea	10,000	0	0	0
Wetland Restoration	5	ea	2,000	10,000	5,300	2,300
Riparian Buffer Strips (4)	5	ac	125	3,100	2,300	(1)
Livestock Exclusion, Woods	1000	ft	1	1,000	400	400
Upland subtotal				**1,610,900**	**821,600**	**387,000**
Barnyard Runoff Control and Manure Storage						
Filter Walls and Strips (6)	0	ea	25,000	0	0	0
Roof Gutters	9	ea	1,500	13,500	7,100	3,000
Clean Water Diversion	9	ea	2,500	22,500	11,800	5,100

BMP	Number of Units Eligible		Cost/ Unit	Total Cost	State Share	Landowner Share
Manure Storage Facilities (5)	2	ea	40,000	80,000	42,000	18,000
Manure Storage Facility Abandonment	2	ea	10,000	20,000	10,500	4,500
Roofs (6)	0	ea	25,000	0	0	0
Cattle Mounds	3	ea	1,500	4,500	2,400	1,000
Milking Center Waste Control	5	ea	7,000	35,000	18,400	7,900
Barnyard subtotal				**175,500**	**92,200**	**39,500**
Streambank Erosion Control						
Shape and Seeding	500	ft	10	5,000	2,600	1,100
Fencing	6600	ft	1	6,600	3,500	1,500
Rock Riprap	0	ft	30	0	0	0
Bio-Bank Stabilization	2600	ft	25	65,000	34,100	14,600
Crossing	1	ea	2,000	2,000	1,100	500
Remote Watering Systems	1	ea	2,000	2,000	1,100	500
Streambank subtotal				**80,600**	**42,400**	**18,200**
Miscellaneous						
Land Acquisition	20	ac	2,000	40,000	14,000	14,000
Well Abandonment	20	ea	500	10,000	5,300	2,300
Subtotal				**1,917,000**	**975,500**	**461,000**
Easements	34	ac	1,000	34,000	25,500	0
Total				**1,951,000**	**1,001,000**	**461,000**

(1) Landowner share consists of labor and equipment costs. Also see flat rates in table 3-1.
(2) High Residue Management is cost-shared per acre over a six year period. Total cost shown represents six times the cost for one year.
(3) Cropland Protection Cover and Nutrient and Pest Management are cost-shared per acre over a three year period. Total cost shown is three times the cost per year.
(4) Riparian Buffer Strips are cost-shared per acre over a five year period. Total cost shown is five times the cost per year. This practice is currently an Interim BMP in the Branch River Watershed Project. When approved for statewide use, this BMP will be cost -shared in this project.
(5) Manure storage is cost-shared at 70% for the first $20,000 of cost and at 50% for the remaining cost, not to exceed $35,000.
(6) At this time, there were no sites identified needing these BMPs. They were included on this table in case the need arises.

Source: Wisconsin DNR, DATCP, Marathon, and Langlade County

Table 3-4. Cost-Share Budget Needs for Urban Management Practices in the Spring Brook Watershed

Item	State Share	Landowner Share	City of Antigo	Total
Local Assistance Staff Support	0	0	0	0
Information and Education Direct	5,000	0	0	5,000
Other Direct (travel, supplies, etc.)	5,000	0	0	5,000
Cost-Share Funds: Practices on Established Urban Areas[1,2]		0	200,000	200,000
Construction Site Erosion Control Practices ($250/acre)	0	250,000	0	250,000
Ordinance Enforcement: Construction Site Erosion Control and Storm Water Management[3]	55,000	40,000	55,000	150,000
Storm Water Management Plan Development	70,000	0	0	70,000
Storm Water Planning ($100/acre)[1]	20,000	0	0	20,000
TOTAL	155,000	290,000	255,000	700,000

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

[2] BMPs for established urban areas estimated at $20 per catch basin cleaning.

[3] Costs of starting up ordinance enforcement are cost shared at 50%. As fees start coming to support the program in the City of Antigo, the cost shared portion decreases over three years, and the landowner/developer share increases.

Source: DNR

The costs presented in Table 3-4 assume $20 per catch basin cleaning. The plan calls for two catch basin cleanings per year.

The cost of preparing construction site erosion control plans has not been estimated. It will be borne primarily by the private sector to meet requirements of local ordinances, state building codes and storm water permits.

It is assumed that construction site practices will average $250 per acre. All of this cost will be borne locally by the private developers, contractors and landowners to meet requirements of local ordinances, state building codes, and state storm water permits.

Funding is available on a limited basis to initially support the cost of contracted or additional staff for reviewing and amending construction erosion control ordinances. Within five years, it is expected that

the city and county government will charge building permit fees adequate to support enforcement and periodic updating of erosion control ordinances.

Likewise, the cost of additional staff or a consultant for developing the water quality components of storm water management ordinances will be funded 50 percent by the DNR for the first five years. Permit fees should be structured so that continued funding is available for enforcement of ordinances.

Budget and Staffing Needs

Rural Staff Needs and Costs

Table 3-5 lists the total estimated staff needed to implement the project assuming a 75 percent level of participation by eligible landowners. Approximately 22,400 staff hours are required to implement this plan. This includes 2130 staff hours to carry out the information and education program.

Currently, 1 position is being funded on the Spring Brook Watershed project. The LCD and agencies will determine the need for additional staff based on an annual workload analysis.

The estimated cost for staff is $ 300,000. These costs will be paid by the state through the Local Assistance Grant Agreement.

Project Cost

The total state funding required to meet the rural nonpoint source pollution control needs at 75 percent level of landowner participation is presented Table 3-6. The estimated cost to the state is $1,360,600. The estimated cost to landowners and others is $461,000 for a total project cost of $1,821,600. This figure includes the capital cost of practices, staff support, and easement costs as presented above.

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

Urban Budget and Staffing Needs

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

It is estimated that $155,000 in state funds and $255,000 in local funds will be needed to implement the urban plan recommendations. See Table 3-4 for a description of how these costs were estimated.

Table 3-5 Estimated Staff Hours Needed to Meet the Water Quality Goals in Spring Brook for 10 Years of Project Implementation

Activity	Langlade County Staff Hours	Marathon County Staff Hours
Project and Financial Management	5420	0
Information and Education Program	2130	0
Inventory and Planning*	3615	0
Practice Design and Installation		
Upland Sediment Control	5660	60
Animal Waste Management	260	20
Streambank Erosion Control	1340	140
Easements	350	0
Monitoring BMP Operation and Maintenance	1800	60
Training	1800	0
Total hours:	22,375	280
Hours per year	2,506	31.4
Estimated Staff Required per year	1.2	0.0

Source: DNR, DATCP, and Langlade and Marathon County LCD

* Inventory and Planning includes: Inventory, Landowner Contacts, Conservation Planning and Plan Revisions, Cost-Share Agreement Development and Amendment, and Progress Tracking.

Table 3-6. Cost Estimates for the Spring Brook Priority Watershed Project at 10 years of Implementation

	Rural Costs	
Item	State Share	Local Share
Cost Share Funds: Practices	$975,500	$461,000
Easements	25,500	0
Staff Funding	300,000	0
Information and Education Direct	18,200	0
Other Direct (travel, supplies, etc.)	36,400	0
Engineering Assistance	5,000	0
Total	**$1,360,000**	**$461,000**

Source: DNR, DATCP, City of Antigo, Marathon and Langlade County LCD

Grant Disbursement and Project Management Schedule

Implementation of this Priority Watershed project shall begin upon both approval of this plan and receipt of the Nonpoint Source grant. The plan must be approved by the DNR, the Langlade and Marathon County Boards, and the Wisconsin Land and Water Conservation Board.

The project implementation period is scheduled for ten years. During the first five years of implementation, cost-share agreements with eligible landowners may be signed. Practices listed on any cost-share agreement must be installed before the end of the implementation period. Implementation of this project is scheduled to conclude in 2007.

The initial Nonpoint Source grant will cover the cost of practices over the entire ten year implementation period. The amount of the Nonpoint Source grant is calculated at 75 percent participation by eligible landowners; see Table 3-3 for a detailed explanation. This grant may be amended due to changes needed for time of performance, funding levels, or scope of work.

Local Assistance grants will be disbursed annually to Langlade County to cover the costs of personnel, operating expenses, and equipment. The DNR will evaluate an annual workload analysis and grant application submitted by Langlade County. **Continued funding may be subject to project evaluation in accordance with performance standards developed by DNR.** See Chapter 6, Project Evaluation for details.

CHAPTER FOUR
Integrated Resource Management Program

Introduction

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

Fisheries and Wildlife Management

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

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

Wetland Restoration

Significant amounts of restorable wetlands have not been identified in the Spring Brook watershed. The general guidelines for wetland restoration, easement acquisition and shoreline buffers to protect

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

Groundwater Management

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

Langlade LCD and Marathon LCD will encourage all landowners to properly seal abandoned wells. Information on the proper abandonment procedures will be provided to landowners when abandoned wells are located.

Well Abandonment

Well abandonment is the proper filling and sealing of a well to prevent it from acting as a channel for contaminants to reach the groundwater or as a channel for the vertical movement of surface water to groundwater. Cost sharing is available for eligible components of well abandonment.

Wisconsin Well Compensation Grants

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

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

Private Sewage System Maintenance and Rehabilitation

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

Langlade County staff will distribute educational materials to promote the proper maintenance of private sewage systems. Sewage system maintenance and household tips to reduce groundwater contamination will also be stressed during field visits.

It is also recommended that Langlade County consider requiring the evaluation of private sewage systems in the Spring Brook watershed to determine which systems are failing and to order their replacement. The Land Records and Regulations Department has cooperated with several of the lake protection and rehabilitation districts in the county to order the replacement of failing private sewage systems. This program could possibly be extended to include the Spring Brook watershed. The Land Conservation Department could refer to the Land Records and Regulations Department any failing private sewage system that they observe in the course of performing their duties.

Wisconsin Fund

The Private Sewage System Replacement & Rehabilitation Grant Program (Wisconsin Fund) provides financial incentives to protect and improve groundwater quality in Wisconsin. The Wisconsin Fund provides funds to update private sewage systems for houses built and occupied prior to July 1, 1978. To be eligible the septic system must have been inspected by the County Code Administrator or County Sanitarian and determined to be failing by discharging waste to the groundwater or surface water. Only permanent residences qualify, and there are income restrictions. Applications for Wisconsin Fund assistance are made through the Langlade County Land Records and Regulations Department.

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

Riparian Zones

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

The Stewardship Program enables the purchase of land or easements to protect sensitive environmental areas. The streambank protection program under the Stewardship Program is an important additional means of protecting water quality. Under this program, the DNR, units of government, and qualified non-profit conservation organizations (NCOs) can purchase or obtain an streambank easements. If needed, the DNR will financially support the fencing of the stream to protect it from livestock access.

Langlade and Marathon County staff will promote the protection of riparian areas where possible.

Forestry Programs

Private forest lands, which account for over 6,300 acres within the Spring Brook watershed, are producers of forest products in Langlade and Marathon Counties. Private forest lands also contribute

to the quality of water resources and fish and wildlife resources in the watershed. Financial assistance is available for forest management and soil and water resource protection through the Stewardship Incentive Program (SIP), the Managed Forest Law Program (MFL) and other forest stewardship programs. Information can be found in DNR publication FR-093-95, Wisconsin Forestry Best Management Practices For Water Quality. Landowners may contact DNR foresters for assistance in developing a forestry management plan.

Stewardship Incentive Program

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

Managed Forest Law

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

Other Stewardship Programs

Some other forest stewardship programs available to watershed landowners include the Forest Improvement Program (FIP) . This program provides funding for the establishment of timber stands.

Langlade LCD and Marathon LCD staff and DNR Foresters will encourage eligible forest landowners in the Spring Brook Creek watershed to participate in Forest Stewardship Programs to benefit water resources and forest habitat. Protection of soil and water resources should be addressed in all SIP and MFL plans where applicable.

Coordinating Regulations, Permits, and Zoning

Best management practices that address shoreline erosion such as riprap or vegetative shoreline stabilization will require permits from the DNR and/or county. Any BMP which effects wetland form or function may require permits form the DNR, Langlade County Land Records and Regulations office or Marathon County Zoning office, as appropriate, and the US Army Corps of Engineers.

The Langlade LCD and Marathon LCD will work closely with the DNR Water Regulation and Zoning staff, the Langlade County Land Records and Regulations Department, Marathon County Zoning

Department, and the US Army Corps of Engineers to assure that necessary permits are received prior to the installation of shoreline stabilization practices.

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

Floodplain, Shoreland, and Shoreland-Wetland Zoning

County shoreland zoning ordinances protect riparian areas along navigable waterways by limiting development. The goals of the program are to protect water quality, protect natural scenic beauty, and prevent the destruction of near shore habitat. These ordinances use minimum structural setbacks, minimum lot sizes, land division review, and limiting uses of wetlands as tools to reach these goals. Other tools that are used include protection of vegetative buffers, restrictions on grading and filling in riparian areas, and enforcement of sanitary and well codes.

City and village shoreland-wetland zoning ordinances protect wetlands within shoreland zones by restricting structural development and limiting filling and grading of wetlands.

The main purpose for adopting county, city, and village floodplain zoning ordinances is to protect life and property. However, proper floodplain management can have secondary benefits to water quality by recognizing the natural functions and values of floodplain areas and protecting these resources. Limiting development in floodplain areas reduces the amount of nonporous areas thereby reducing the amount of runoff to surface water.

Local governments must work with the DNR to ensure proper administration of these ordinances and the protection of riparian and floodplain areas. Local governments are encouraged to adopt more restrictive regulations, if resource protection warrants it. For more information concerning floodplain, shoreland, or shoreland-wetland zoning restrictions, contact your local zoning administrator or building inspector. Local officials who are in need of assistance on evaluating ordinance language can contact your DNR Regional Headquarters.

Coordination With State and Federal Conservation Compliance Programs

The Spring Brook Watershed Project will be coordinated with the conservation compliance features of the Wisconsin Farmland Preservation Program (FPP) administered by DATCP, and the Federal Food Security Act (FSA) administered by the Natural Resource Conservation Service. DATCP will assist the LCD and the NRCS offices to identify landowners within the watershed that are subject to the compliance provisions of FPP and FSA. Conservation Farm Plans were completed for all landowners in FSA by December 31, 1989. FPP plans and FSA plans cover about 70 percent of the agricultural lands within the watershed project.

Implementation and amendment of these conservation plans will be necessary during the implementation phase of the watershed project. Watershed project staff will inform FPP and NRCS

staff of changes in plans resulting from management decisions and the installation of needed BMPs for nonpoint source pollution abatement.

Following is a brief summary of programs administered by the Natural Resources Conservation Service and Farm Services Agency:

Environmental Quality Incentives Program-The Environmental Quality Incentives Program (EQIP) consolidates the functions of four existing conservation programs into one and focuses assistance to locally identified conservation priority areas or areas where agricultural improvements will help meet water quality goals. The program will be funded at $200 million annually, nationwide. Funds will be used to pay for technical assistance and cost sharing on conservation practices. Fifty percent of the funds are dedicated to conservation associated with livestock operations.

Wetland Reserve Program-The Wetland Reserve Program (WRP) has been extended through the year 2002. WRP is a voluntary program to restore and protect wetlands on private property. The program provides financial incentives to enhance wetlands in exchange for retiring marginal agricultural land. Landowners who choose to participate in WRP may sell a conservation easement or enter into a cost share restoration agreement. Other agencies and private conservation organizations may provide additional assistance for easement payment and wetland restoration costs as a way to reduce the landowners share of the costs. Such special partnership efforts are encouraged. Recent changes in the program provide landowners more options for protecting wetlands. Landowners are now able to choose between permanent easements, 30 year easements, or restoration only cost share agreements.

Conservation Reserve Program-The Conservation Reserve Program (CRP) has also been extended through the year 2002, and is administered by the Farm Services Agency (FSA) CRP assists owners and operators conserve and improve soil, water, and wildlife resources by converting highly erodible and other environmentally sensitive acreage used to produce agricultural commodities to a long term vegetative cover. CRP participants enroll contracts for 10 to 15 years in exchange for annual rental payments and cost share assistance for installing certain conservation practices. Applicants submit bids to enroll their acreage. The maximum rental payments paid to successful applicants reflect site based soil productivity, prevailing local cash equivalent rental rates, and maintenance costs. The rental payment portion of the financial assistance provided through the CRP program may be piggy backed with other nonfederal programs. Cost sharing for practice installation may also be combined with other nonfederal programs, provided that the total cost share assistance does not exceed the cost of the practice.

Farmland Protection Program-The program provides assistance to states with existing farmland protection programs to purchase conservation easements.

Wildlife Habitat Incentive Program-Provides incentives to improve wildlife habitat on private lands.

Archaeological Sites: Coordination with State and Federal Historic Preservation Laws

Projects using state and federal funding, assistance, licenses and permits are required by law to consider the effects of their actions on archaeological and historical sites and historical structures. The watershed project is a joint cooperative effort between federal, state, and county agencies as well

as the private landowners who volunteer to participate in the program. As a result, the federal Historic Preservation Act of 1966, as amended, and the state historic preservation statute, s. 44.40, Wis. Stats., have been blended to produce a cultural resource management program which is both compatible to preserving cultural sites and implementing the watershed project.

There are no known archaeological sites within the Spring Brook Watershed. There are two historic structures and three known burial sites. These areas will need special consideration when structural best management practices are being considered. Settling basins, manure storage structures, and streambank or shoreline shaping and riprapping are likely practices that may impact archaeological sites. As discussed above, state and federal laws require preservation of archaeological resources within the framework of the NPS Program.

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

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

Practices of concern

- Archaeological Sites
  - Field Diversions
  - Terraces
  - Grade Stabilization Structures
  - Agricultural Sediment Basins
  - Streambank and Shoreline Stabilization
  - Sediment Retention, Erosion or Water Control Structures
  - Structural Urban Practices
  - Wetland Restoration
- Buildings
  - Barnyard Runoff Management Systems
  - Animal Lot Relocation
  - Manure Storage Facilities
  - Roofs for Barnyard/Manure Storage Facilities

Practices - No Concern Needed for Cultural Sites

- Contour Farming
- Contour Strip-cropping
- Field Strip-cropping
- Reduced Tillage

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

Endangered and Threatened Resources

Information on threatened and endangered resources was obtained from the Bureau of Endangered Resources of the DNR. Endangered resources include rare species and natural communities. It should be noted that comprehensive endangered resource surveys have not been completed for the entire Spring Brook Priority Watershed. The lack of additional occurrence records does not preclude the possibility that other endangered resources are present in the watershed. In addition, the Bureau's endangered resource files are continuously updated from ongoing field work. There may be other records of rare species and natural communities which are in the process of being added to the database and so are not listed in this document.

Rare Species

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

Wisconsin Endangered Species

An endangered species is one whose continued existence as a viable component of this state's wild animals or wild plants is determined by the DNR to be in jeopardy on the basis of scientific evidence. Wisconsin endangered species found in the general area and which may exist within the watershed are: *Ophiogomphus Howei*, the pygmy snaketail (dragonfly).

Wisconsin Threatened Species

A threatened species is one which, if not protected, has a strong probability or becoming endangered. Wisconsin threatened species found near or within the watershed are:

Haliaeetus leucocephalus, bald eagle[1]
Buteo Lineatus, Red Shouldered Hawk.

[1]This species is also on the Federal Endangered Species list as Endangered. A federally Endangered species is any species or subspecies which is in danger of extinction throughout all or a significant portion of its range.

Wisconsin Special Concern Species

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

Pleurobema Sintoxia, Round Pigtoe (Mussel);
Alasmidonta Marginata, Elktoe (Mussel);
Medeola Virginiana, Indian Cucumber Root (Plant);
Platanthera Dilatata, Leafy White Orchis (Plant);
Erebia Discoidalis, Red Dished Alpine (Butterfly);
Gomphus Quadricolor, Rapids Club Tail (Dragonfly);
Gomphus Viridifrons, Green Faced Clubtail (Dragonfly).

CHAPTER FIVE
Information and Education Activities

Goals

The general nature of the Information and Education (I & E) activities in the Spring Brook Priority Watershed Project is to move residents of the watershed to make decisions and take actions that protect surface and ground water quality.

This section provides the I & E strategy for the Spring Brook Project. It sets goals, identifies target audiences, and recommends specific actions to reach these target audiences.

Spring Brook Priority Watershed Project Goals

1) Build strong support for the watershed plan by increasing public awareness of the watershed project, public appreciation of water resources, and public understanding of the need to improve water quality resources in the watershed.

2) Agricultural producers will minimize nutrient, sediment, and other polluting inputs from farming activities by adopting best management practices.

3) Rural non-farm residents will learn best land management techniques to minimize phosphorus, sediment, and other polluting inputs into water resources.

4) Reduce sediment, nutrient, and potentially toxic pollutants in runoff from existing urban areas by providing information about stormwater management and pollution prevention to local government officials, businesses, and residents.

6) Local government officials will make decisions that protect water quality.

Targeted Audiences

Given the unique characteristics of the Spring Brook Watershed Project, a number of audiences have been identified and should be targeted with I & E activities to enhance implementation of the project. The target audiences are listed below.

1. Local governments and community leaders.
2. Rural landowners and farmers.
3. Farm organizations.
4. Urban and lake district residents.
5. Business and industry.

Goals are listed below with targeted audiences and recommended activities to deliver to the audiences to enhance Spring Brook Priority Watershed Project implementation.

Activities will be selected and presented in an annual information and education plan. New activities may be included as needed to respond to changing needs of the program and the evaluation of past activities. Recognition programs for cost share participants and residents using BMPs are a part of the strategy.

Implementation Team

The education strategy was developed by Spring Brook Watershed I & E staff with assistance from the watershed Citizens Advisory Committee, UW Extension, DNR, and the Land Conservation Committee.

The I & E will take lead responsibility for the implementation of the information and education strategy. The University of Wisconsin Cooperative Extension (UW-Ex), the Department of Natural Resources, (DNR), and the Department of Agriculture (DATCP) will provide supporting assistance. The I & E staff will work with and seek support from local units of government and organizations such as farm organizations, lake districts, City of Antigo, and other community groups and businesses.

Information and Education Strategy

This section presents the goals, audiences reached, and activities planned in the Spring Brook Priority Watershed Project.

Goal 1: Public Awareness

Build strong support for the watershed plan by increasing public awareness of the watershed project, public appreciation of water resources, and public understanding of the need to improve water quality resources in the watershed.

Audience and Activities:

News Releases

Distribute periodic news releases about activities in the watershed, focusing on community projects coordinated to clean up stretches along the Spring Brook Watershed.

Hold editorial meetings with the local newspaper editors and reporters.

Appear on the local radio breakfast club to inform about water quality activities and to promote the watershed project.

Youth, youth group leaders, and teachers

Expand participation in the Spring Brook Watershed to local school districts.

Promote water quality programs and volunteer activities (i.e., storm drain stenciling, water action volunteers, project wet, etc.)

Community groups and Antigo Lake District

Notify community groups of speakers available through the county Land Conservation Department.

General Public

Prepare resource material packets and exhibits for use at public facilities and County Fair.

Goal 2: Cropland Erosion

Agricultural producers will minimize nutrient, sediment, and other polluting inputs from farming activities by adopting best management practices.

Audience and Activities:

Cropland Owners and Operators:

Promote tillage practices which reduce runoff from fields and encourage better water infiltration.

Informational meetings and presentations to build understanding of advantages to particular cover crop alternatives.

One-on-one contacts to build understanding of best management practices to reduce runoff in the watershed.

Goal 3: Rural Resident Land Management

Audience and Activities:

Rural non-farm residents will learn best land management techniques to minimize phosphorus, sediment, and other polluting inputs into water resources.

Rural Non-farm Landowners:

Information meetings, presentations, and workshops to build understanding of best management practices to enhance surface and groundwater drinking resources (i.e., Home Assist program).

UWEX Community Resource Development Agent will conduct Drinking Water Testing Program to communities in the watershed.

Goal 4: Urban Resident Land Management

Audience and Activities:

Reduce sediment, nutrient, and potentially toxic pollutants in runoff from existing urban areas by providing information about stormwater management and pollution prevention to local government officials, businesses, and residents.

Home Owners/Renters

Informational meetings, presentations, and workshops to build understanding of best urban land management practices to enhance surface water quality (i.e., Home Assist program).

Distribute Yard Care and other fact sheets through exhibits and direct mailings.

Provide information about oil and antifreeze recycling and hazardous waste collection to all urban residents.

Stencil storm drains with a "Dump No Waste" message.

Developers, Contractors, Builders

Promote UW-Extension erosion control workshops.

Distribute "Erosion Control for Home Builders" fact sheets.

Distribution of information about changes in regulations and any other updates regarding construction site erosion.

Goal 5: Local Government

Local government officials will make decisions to improve water quality.

Audience and Activities:

Local Elected Officials

Meetings/presentations with elected officials and staff to promote the need for enhancing water quality in the watershed.

Public Works Employees

Informational meetings and workshops to bring awareness and understanding of alternative best management practices to minimize adverse impacts on water quality.

Evaluation

An evaluation report of information and education activities will be prepared annually. Evaluation will be built into program activities where feasible. Activities may be evaluated through recording the number of attendees at a function, the number of target audience members reached, event surveys, or other methods. A survey will be used every two years to assess how watershed residents are getting information about the program and how effective the activities are in delivering messages, and where behavioral changes have occurred.

Table 5-1. Information and Education Budget and Staff Needs

Activity	Total Number	Total Direct Costs	Required Staff Hours	
			Years 1-3	Years 4-8
Newsletters	21	$10,000	225	375
News Releases	8	0	30	25
Public Meetings	3	300	100	0
Workshops/Seminars	8	3,500	200	100
Demonstration Tours	4	600	225	0
Demonstration Farm Video	2	200	75	0
Fact Sheets	12	250	200	300
Project Display Booth	1	3,000	50	25
Slide Presentation	2	400	125	75
Totals		$18,150	1,230	900

CHAPTER SIX
Project Evaluation

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

- Administrative review
- NPS Pollutant load reduction
- Watershed resource evaluation monitoring

Information on the first two components will be collected by the Langlade and Marathon County LCDs and reported on a regular basis to the DNR and the DATCP. The project staff will meet early in the year throughout the implementation phase to review and evaluate the accomplishments of the preceding year and develop goals for the following year. Additional information on the numbers and types of practices on cost-share agreements, funds encumbered on cost-share agreements, and funds expended will be provided by the DNR's Bureau of Community Financial Assistance. The Watershed resource evaluation monitoring follows guidance established by DNR's Bureau of Watershed Management to monitor water quality.

Administrative Review

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

Accomplishment Reporting

The Langlade LCD and Marathon LCD will provide the following accomplishment data to the DNR and the DATCP annually:

- Planned and completed BMPs
- Planned and completed conservation systems
- Major information and education activities undertaken

Accomplishment data is summarized in the Annual Accomplishment Report and is discussed at watershed review meetings held annually for projects in implementation. Additional evaluation data provided by Langlade and Marathon LCDs for the annual watershed review include:

- Pollutant load reductions (described below)

- Status of grants and related financial activities
- Evaluation of landowner participation
- Status of project administration including data management, staff training, and BMP monitoring
- Status of nutrient management planning, easement and property acquisition and development
- Effectiveness of county directed construction site erosion control activities
- Status of adopting an Animal Waste Storage Ordinance
- Status of storm water management activities for new development

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

- Information and education activities
- Construction site erosion control ordinance amendments adopted and enforcement
- Number of permits monitored for ordinance compliance
- Implementation of urban "housekeeping" program activities
- Acres of existing (1996) urban development, by land use, covered by storm water management plans for controlling water quality
- Acres of new (post-1996) urban development, by land use, covered by storm water management plans for controlling water quality
- Storm water management ordinance provisions adopted and enforcement

Details of the reporting requirements are contained in DNR Publication WR-223-94, which is reviewed every two years by DATCP and DNR and revised as necessary.

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

Financial Expenditures

Langlade County LCD, Marathon County LCD, and other participating units of government will provide the following financial data to the DNR and the DATCP on an annual basis:

- Number of cost-share agreements signed
- Amount of money encumbered in cost-share agreements
- Number of reimbursement payments made for the installation of BMPs, and the amount of money paid
- Staff travel expenditures
- Information and education expenditures
- Expenditures for equipment, materials, and supplies
- Expenditures for professional services and staff support costs
- Total project expenditures for the Langlade and Marathon LCD staff

The Langlade LCD, Marathon LCD, and other participating units of government will also provide the DNR with the following financial data on an annual basis:

- Staff training expenditures
- Interest money earned and expended
- Total budget and expenditures on the project

Time Spent On Project Activities

The Langlade County LCD, Marathon County LCD, and other participating governmental units with local assistance grants will provide time summaries to the DNR and DATCP on an annual basis.

Nonpoint Source Pollutant Load Reduction

The purpose of the second evaluation component, pollutant load reduction, is to estimate reductions in nonpoint source pollutants as a result of signing cost share agreements with landowners and installing BMPs. Key sources were identified for estimating changes in pollutant loads that reach surface waters in the Spring Brook Watershed. Data collected for evaluation include sediment load reduction from uplands and streambanks, acres with nutrient management plans, barnyards and phosphorus, reduced winter spreading of manure, and streambank habitat protection. Chapter Two describes target pollutant reductions for each of the subwatersheds.

Cropland Sediment

Langlade and Marathon LCDs will use the WIN-HUSLE (Wisconsin Nonpoint Source) model to estimate sediment reductions due to changes in cropping practices. The Langlade and Marathon LCDs will use FOCS to provide data for the WIN HUSLE model on an annual basis, as described above.

Streambank Sediment

The Langlade County LCD and the Marathon County LCD staff will estimate reductions in streambank erosion. A tally will be kept of landowners contacted, the amount of streambank sediment (in tons) being generated at the time of contact, and changes in erosion levels estimated after contracting for and installing BMPs.

Barnyard Runoff

County LCDs will use the BARNY model to estimate phosphorus reductions due to the installation of barnyard control practices. The LCDs will report the information to the DNR through FOCS. In the event that FOCS is replaced, the replacement system will be used for all project tracking.

Construction Sites

Local units of government participating in the urban implementation grant program will report annually to the DNR on the number of construction sites served by adequate erosion control practices, number of construction sites receiving appropriate permits, any amendments to construction site erosion control ordinances that affect sediment loads associated with these sources, enforcement actions, and an estimate of the tons of sediment controlled.

Urban Areas

Participating local units of government will report annually to the DNR on any activities that may result in changes in urban pollutant loadings. Such activities include acres of existing (1996) and new (post-1996) urban land, by land use, served by new storm water BMPs; new urban lands, by land use, not served by storm water BMPs; and other information requested by the DNR concerning BMP characteristics.

Water Resource Evaluation Monitoring

Limited funds and the intensive staffing needed to properly evaluate water quality changes prohibits monitoring each watershed individually. Instead, two types of evaluation monitoring are being conducted on a state-wide basis: Whole Stream Monitoring and Signs of Success.

The goal of the evaluation monitoring activities is to determine the progress the Nonpoint Source Program is making towards improving the quality of Wisconsin's water resources.

Evaluation monitoring activities were developed to answer five questions about the water resource objectives and the pollution reduction goals:

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

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

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

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

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

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

Whole Stream Monitoring Sites

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

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

State-of-the-art chemical and physical monitoring is being done at all the stream sites. State-of-the-art biological monitoring will be done at eight of the twelve streams. Results of the monitoring will be used to determine how well the best management practices achieve the pollution reduction goals and objectives. Improving the fish community is the most important water resource objective for all the streams.

A total of about $8,360,000 would be needed for the stream monitoring, if the work is carried out over a period of eleven years. The success of the evaluation monitoring activities depends on the installation of all the best management practices at the Whole Stream Monitoring Sites.

Signs of Success

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

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

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

SOS sites within the Spring Brook Watershed project area may be identified. Sites will be identified by the county staff and a final site approved by DNR Water Quality Staff. SOS evaluation will start

shortly after the implementation stage begins, and may continue throughout the project, if sites are identified.

Single Source Monitoring

In addition to Signs of Success, the project may also consider possible single source monitoring sites for evaluating project water quality impacts. Single source monitoring is a more in depth look at the effects of BMPs on water quality, and covers a longer time period. Whether or not single source monitoring is pursued will depend on the availability of suitable sites for this type of monitoring, finding landowners willing to cooperate, the level of interest of the LCDs, and the availability of funding.

Evaluation of Special Approvals for Innovative Approaches

Evaluation of special approvals for innovative approaches will be conducted by the Langlade and Marathon county staff at least every three years and for the final report.

Interim Best Management Practices

Interim BMPs may be created to meet the specific and individual needs identified during the planning process of watershed projects and are used on a trial basis. Interim BMPs are evaluated by the County LCDs and the DNR for their effectiveness in reducing nonpoint source pollution before consideration as a standard BMP. At the time of plan writing there are no proposed interim BMPs for the Spring Brook Watershed.

If Interim BMPs are developed for the Spring Brook, evaluation will include an analysis of practice utility based on landowner acceptance, state and landowner cost, and if possible, the amount of pollution controlled. The report will also include a discussion of results, problems encountered, likelihood of transferability to other watershed projects, and recommendations based on local experience with the BMPs.

Final Report

A Final Report will be jointly prepared for the Spring Brook Priority Watershed Project by the Langlade and Marathon County LCDs within 18 months of the end of the grant period. This report will include information on pollution load reduction achieved, effectiveness at addressing nonpoint threats to groundwater, landowner participation, project management, grant management, and technical assistance provided to landowners. It will also serve as the final evaluation of special approvals and innovative approaches. The report will summarize findings from any Signs of Success Monitoring and conclusions drawn from comparisons made with the Master Monitoring Site.

The Final Report is developed to evaluate progress made toward attaining water quality and pollution reduction objectives, evaluate BMP effectiveness, and provide recommendations for improvement in the NPS program. It will be jointly prepared by the Langlade County LCD, Marathon County LCD, DNR, and DATCP.

BIBLIOGRAPHY

Ball. J. 1982. "Stream Classification Guidelines for Wisconsin." Unpublished Draft Technical Bulletin, Department of Natural Resources. 13 pages.

Hilsenhoff, W. 1982. "Using a Biotic Index to Evaluate Water Quality in Streams." Wisc. Department of Natural Resources. Technical Bulletin 132.

Midwest Plan Service. 1985. Livestock Waste Facilities Handbook. 109 pages.

USDA, Natural Resources Conservation Service. 1986. Soil Survey of Langlade County. 167 pages.

Batten, W. G. 1987 "Water Resources of Langlade County, Wisconsin". Wisconsin Geological and Natural History Survey, Information Circular 58.

Devaul, R. W. and Green, J. H. 1971. "Water Resources of Wisconsin, Central Wisconsin River Basin". U.S. Geological Survey Hydrologic Investigations Atlas HA-367.

Harder, A. H. and Drescher, W. H. 1954. "Ground-Water Conditions in Southwestern Langlade County, Wisconsin". U.S. Geological Survey Water Supply Paper 1294.

Mickelson, D. M. 1987. "Pleistocene Geology of Langlade County". Wisconsin Geological and Natural History Survey, Information Circular 52. Groundwater Resources.

USDA, Natural Resources Conservation Service. 1969. Work Plan for Watershed Protection and Flood Prevention, Spring Brook Watershed.

APPENDIX A
Glossary

ACUTE TOXICITY:

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

ADVANCED WASTEWATER TREATMENT:

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

AGRICULTURAL CONSERVATION PROGRAM (ACP):

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

ALGAE:

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

AMMONIA:

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

ANAEROBIC:

Without oxygen.

AREA OF CONCERN:

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

AREAWIDE WATER QUALITY MANAGEMENT PLANS (208 PLANS):

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

ANTIDEGRADATION:

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

AVAILABILITY:

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

BACTERIA:

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

BARNY:

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

BASIN PLAN:

See "Areawide Water Quality Management Plan".

BENTHIC ORGANISMS (BENTHOS):

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

BEST MANAGEMENT PRACTICE (BMP):

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

BIOACCUMULATION:

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

BIOASSAY STUDY:

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

BIOCHEMICAL OXYGEN DEMAND (BOD):

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

BIODEGRADABLE:

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

BIOTA:

All living organisms that exist in an area.

BUFFER STRIPS:

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

BULKHEAD LINES:

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

CARCINOGENIC:

A chemical capable of causing cancer.

CATEGORICAL LIMITS:

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

CHLORINATION:

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

CHLORORGANIC COMPOUNDS (CHLORORGANICS):

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

CHRONIC TOXIcity:

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

CLEAN WATER ACT:

See "Public Law 92-500."

COMBINED SEWERS:

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

CONFINED DISPOSAL FACILITY (CDF):

A structure built to contain and dispose of dredged material.

CONGENERS:

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

CONSERVATION TILLAGE:

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

CONSUMPTION ADVISORY:

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

CONTAMINANT:

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

CONVENTIONAL POLLUTANT:

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

COST-EFFECTIVE:

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

CRITERIA:

See water quality standard criteria.

DIEL:

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

A chlorinated organic chemical which is highly toxic.

DISINFECTION:

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

DISSOLVED OXYGEN (DO):

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

DISTRICTS:

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

DREDGING:

Removal of sediment from the bottom of water bodies.

ECOSYSTEM:
The interacting system of biological community and its nonliving surrounding.

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

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

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

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

ENVIRONMENTAL REPAIR FUND:
A fund established by the Wisconsin Legislature to deal with abandoned landfills.

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

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

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

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

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

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

FILAMENTOUS ALGAE:

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

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

GREEN STRIPS:
See buffer strip.

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

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

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

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

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

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

ISOROPYLBIPHENYL:
A chemical compound used as a substitute for PCB.

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

neutralization chemical fixation encapsulation. Neutralizing and disposing of wastes should be considered a last resort. Repurifying and reusing waste materials or recycling them for another use may be less costly.

LEACHATE:

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

LOAD:

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

MACROPHYTE:

A rooted aquatic plant.

MASS:

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

MASS BALANCE:

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

MESOTROPHIC:

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

MILLIGRAMS PER LITER (mg/1):

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

MITIGATION:

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

MIXING ZONE:

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

NONPOINT SOURCE POLLUTION (NSP):

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

OLIGOTROPHIC:

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

OUTFALL:

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

PATHOGEN:

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

PELAGIC:

Referring to open water portion of a lake.

PERIPHYTON:

PESTICIDE:

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

PH:

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

PHENOLS:

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

PHOSPHORUS:

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

PHOTOSYNTHESIS:

PLANKTON:

Tiny plants and animals that live in water.

POINT SOURCES:

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

POLLUTION:

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

POLYCHLORINATED BIPHENYLS(PCBs):

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

POLYCHLORINATED ORGANIC COMPOUNDS:

A group of toxic chemicals which contain several chlorine atoms.

PRETREATMENT:

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

PRIORITY POLLUTANT:

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

PRIORITY WATERSHED:

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

PRODUCTIVITY:

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

PUBLIC LAW 92-500 (CLEAN WATER ACT):

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

PUBLIC PARTICIPATION:

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

PUBLICLY OWNED TREATMENT WORKS (POTW):

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

RECYCLING:

The process that transforms waste materials into new products.

REMEDIAL ACTION PLAN:

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

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RF/FS):
An investigation of problems and assessment of management options conducted as part of a superfund project.

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 (RCRA):
This federal law amends the Solid Waste Disposal Act of 1965 and expands on the Resource Recovery Act of 1970 to provide a program that regulates hazardous wastes, to eliminate open dumping and to promote solid waste management programs.

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

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

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

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

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

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

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

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

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

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

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

SOLID WASTE:

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

STANDARDS:

See water quality standards.

STORM SEWERS:

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

SUPERFUND:

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

SUSPENDED SOLIDS (SS):

Small particles of solid pollutants suspended in water.

SYNERGISM:

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

TERTIARY TREATMENT:

See advanced wastewater treatment.

TOP-DOWN MANAGEMENT:

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

TOTAL MAXIMUM DAILY LOADS:

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

TOXIC:

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

TOXIC SUBSTANCE:

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

TOXICANT:

See toxic substance.

TOXICITY:

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

TOXICITY REDUCTION EVALUATION:

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

TREATMENT PLANT:

See wastewater treatment plant.

TROPHIC STATUS:

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

TURBIDITY:

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

UNIFORM DWELLING CODE:

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

UNIVERSITY OF WISCONSIN-EXTENSION (UWEX):

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

VARIANCE:

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

VOLATILE:

Any substance that evaporates at a low temperature.

WASTELOAD ALLOCATION:

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

WASTEWATER:

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

WASTE:

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

WASTEWATER TREATMENT PLANT:

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

WATER QUALITY AGREEMENT:

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

WATER QUALITY LIMITED SEGMENT:

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

WATER QUALITY CRITERIA:

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

WATER QUALITY STANDARDS:

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

WATER QUALITY STANDARD VARIANCE:

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

WATERSHED:

The land area that drains into a lake or river.

WETLANDS:

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

WINHUSLE:

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

WISCONSIN ADMINISTRATIVE CODE:

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

WISCONSIN FUND:

A state program that helps pay the cost of reducing water pollution. Funding for the program comes from general revenues and bonds and is based on a percentage of the state's taxable property value. The Wisconsin Fund includes these programs:

Point Source Water Pollution Abatement Grant Program - Provides grants for 60% of the cost of constructing wastewater treatment facilities. Most of this program's money goes for treatment plant construction, but three percent of this fund is available for repair or replacement of private, on-site sewer systems.

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

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

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT GRANT PROGRAM:
A state cost-share program established by the State Legislature in 1978 to help pay the costs of controlling nonpoint source pollution. Also known as the nonpoint source element of the Wisconsin Fund or the Priority Watershed Program.

WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES):
A permit system to monitor and control the point source dischargers of wastewater in Wisconsin. Dischargers are required to have a discharge permit and meet the conditions it specifies.

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

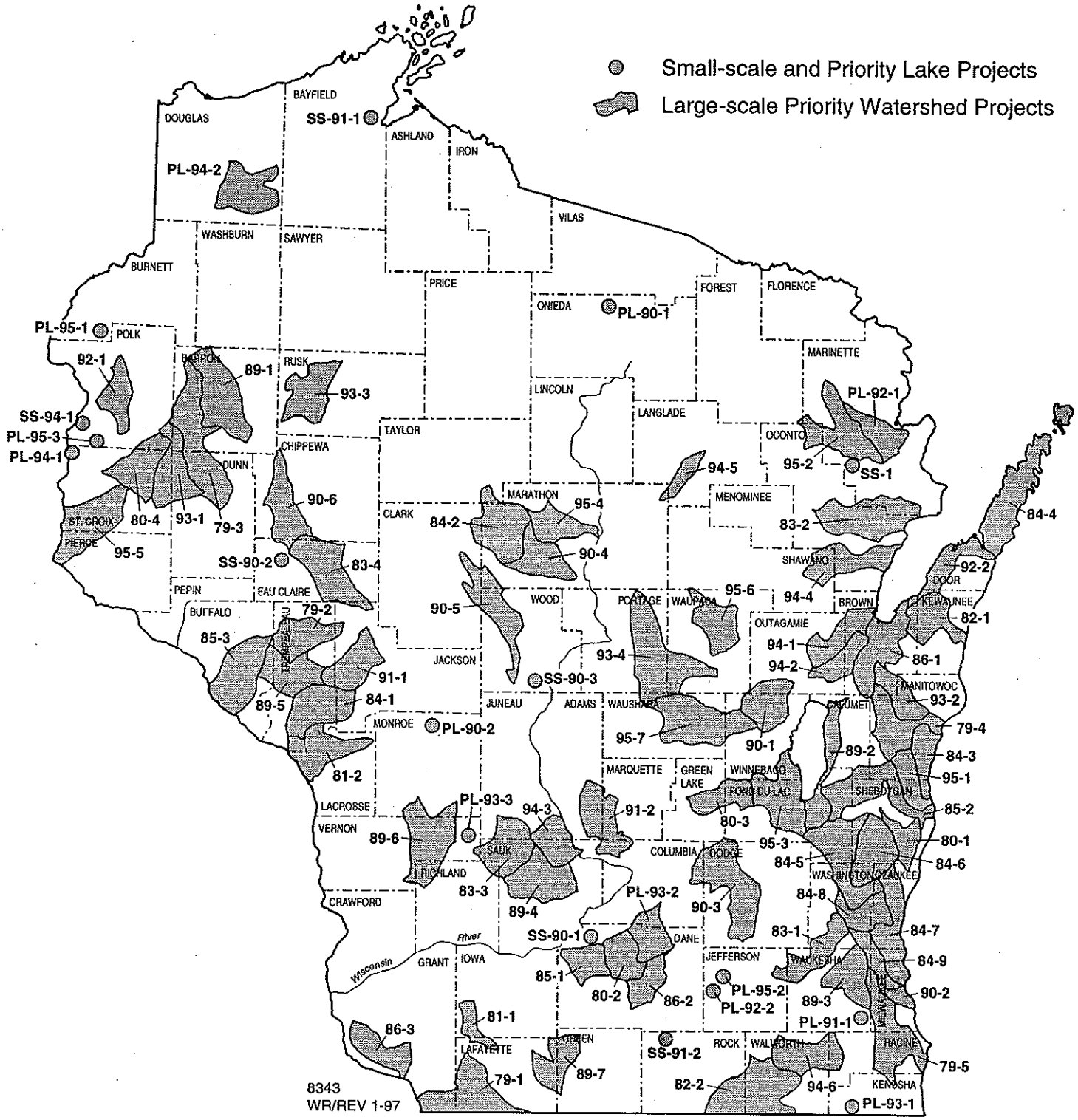
Year Selected-Map Number	Small-scale Priority Watershed Project	County(ies)
SS-1	Bass Lake ♦	Marinette
SS-90-1	Dunlap Creek	Dane
SS-90-2	Lowes Creek	Eau Claire
SS-90-3	Port Edwards - Groundwater Prototype	Wood
SS-91-1	Whittlesey Creek	Bayfield
SS-91-2	Spring Creek	Rock
SS-94-1	Osceola Creek	Polk

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

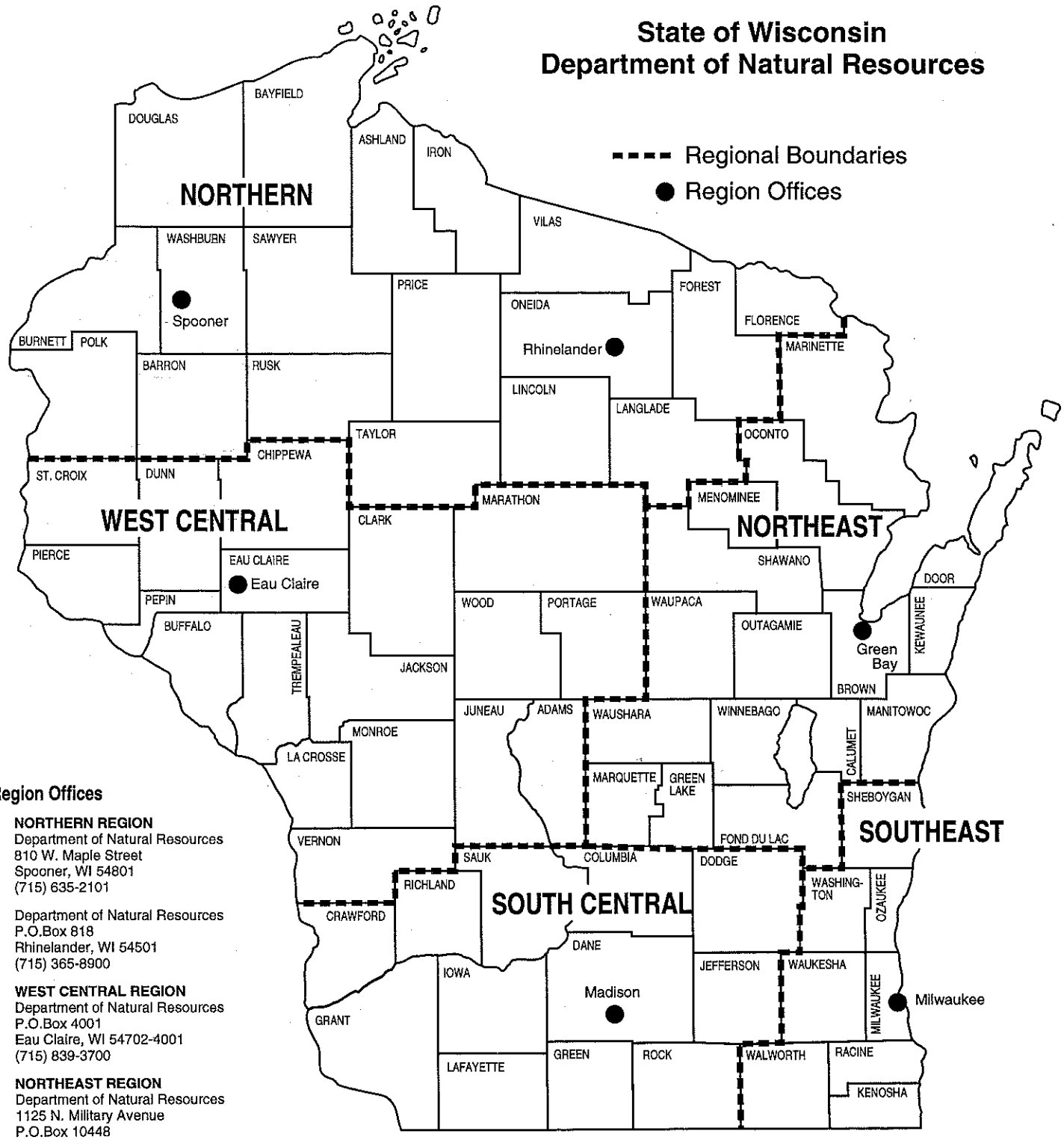
♦ *Project completed*

† *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
(920) 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