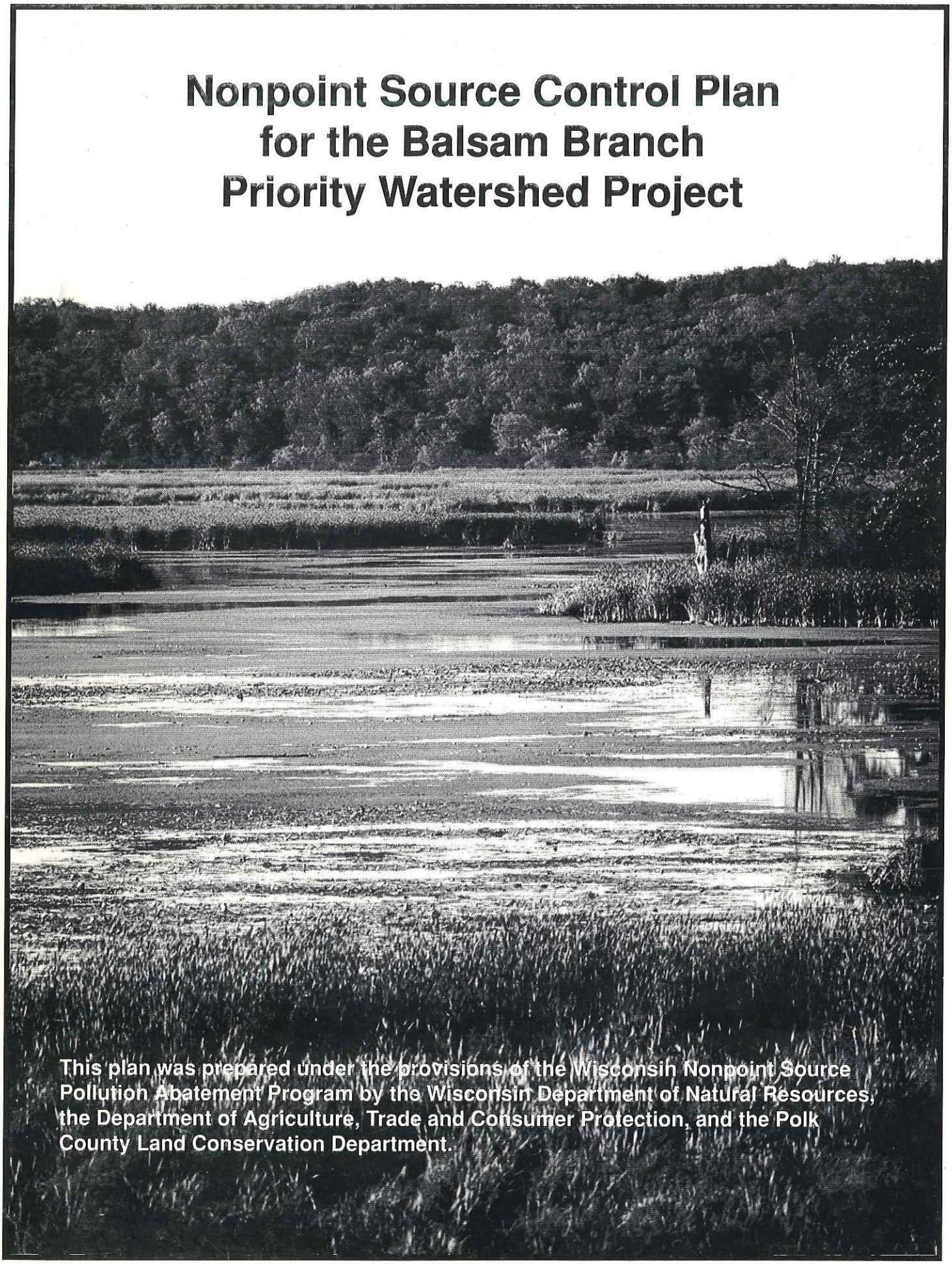
Nonpoint Source Control Plan for the Balsam Branch Priority Watershed Project



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

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1995

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Nonpoint Source Control Plan for the Balsam Branch Priority Watershed Project

The Wisconsin Nonpoint Source Water Pollution Abatement Program

Plan Approved
April, 1995

This Plan Was Cooperatively Prepared By:

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

Publication WR-430-95

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July 14, 1995

IN REPLY REFER TO: 3200

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

Gerald

Dear ~~Mr.~~ Handlos:

I am pleased to approve the Balsam Branch Priority Watershed Management Plan prepared through the Wisconsin Nonpoint Source Pollution Abatement Program. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and chapter NR120 Wisconsin Administrative Code. The plan went before the Land and Water Conservation Board on June 6, 1995, and was unanimously approved at that time. I am also approving this plan as an amendment to the St. Croix River Areawide Water Quality Management Plan.

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

Sincerely,

George

George E. Meyer
Secretary

w:\corespdc\handlos.ltr

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

STATE OF WISCONSIN)
) ss
COUNTY OF POLK)

I, Sharon Schiebel, County Clerk for Polk County do hereby certify that the attached is a true and correct copy of Resolution No. 56-95 which was adopted by the Polk County Board of Supervisors on May 16, 19 95.

Sharon Schiebel
Sharon Schiebel
County Clerk

56-95

RESOLUTION APPROVING THE BALSAM BRANCH

PRIORITY WATERSHED PROJECT PLAN

WHEREAS, the Polk County Land Conservation Department is required to developed a watershed project plan,

WHEREAS, the watershed plan has been completed and approved by the Land Conservation Committee,

NOW THEREFORE, BE IT RESOLVED that the Polk County Board of Supervisors approve the Balsam Branch Priority Watershed Project Plan.

Submitted at the request of the Polk County
Land Conservation Committee.

Walter V Lee

Violet M. Wright

Carter B. Duholm

APPROVED AS TO FORM: Robert L Hachey

Robert Hachey, Corp Counsel

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SUMMARY

Introduction

The Balsam Branch Priority Watershed Project plan examines the sources of nonpoint pollution in the watershed and guides the implementation of pollution control measures. The goal of the plan is to protect, maintain, and enhance the aquatic ecosystem of the watershed. The control measures are designed to meet this goal.

Sources of nonpoint pollution found in this watershed include: cropland, streambanks, gullies, construction sites, livestock manure, lakeshore property, urban land, and septic systems. These sources contribute sediment, nutrients, toxins, and organic matter to the water. The purpose of this project is to reduce the amount of pollutants originating from these sources, thereby reducing the amount of pollution reaching surface water and groundwater in the project area.

The major land use in the watershed is agriculture. Therefore, agricultural runoff is a significant concern. However, most of the lake shoreline is developed, and as seasonal homes are converted to permanent homes, pollutants from residential sources will increase. Village residents also contribute their share of pollution through stormwater runoff that drains to a stream or lake. Some residents of the watershed have already adopted best management practices (BMPs), such as conservation tillage and lakeshore buffer strips, that protect water quality. However, for the watershed project to be successful, many more residents and visitors to the watershed will need to mindful of such practices.

This plan was prepared by the Polk County Land Conservation Department (LCD), the Wisconsin Department of Natural Resources (DNR), and the Department of Agriculture, Trade, and Consumer Protection (DATCP). The DNR selected the Balsam Branch Watershed as a priority watershed project through the Wisconsin Nonpoint Source Water Pollution Abatement Program in 1992. It joined approximately 60 similar watershed projects statewide in which nonpoint source control measures are being planned and implemented. The Nonpoint Source Water Pollution Abatement Program was created in 1978 by the Wisconsin State Legislature. The program provides financial and technical assistance to landowners and local governments to reduce nonpoint source pollution.

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

General Watershed Characteristics

The Balsam Branch Watershed drains approximately 110 square miles of land in Polk County in Northwestern Wisconsin. The watershed is part of the St. Croix River Basin. The watershed drains to the St. Croix River by way of the Apple River. The Balsam Branch Watershed is divided into 9 smaller drainage areas, called subwatersheds, for this planning effort.

Subwatersheds in the Balsam Branch Watershed
Antler Lake
Balsam Lake
Deer Lake
Half Moon Lake
Long Lake
Loveless Lake
Rice Lake
Wapogasset Branch
Wapogasset Lake

Land use in the watershed, as shown in Table S-1, is mainly agricultural and is used primarily for growing crops. The watershed population of approximately 5,400 permanent residents is growing at a moderate rate. The watershed population nearly triples during the summer months when seasonal homes along the major lakes are occupied.

Water Quality

The Balsam Branch Watershed contains several high value recreational lakes that are developed with lakeshore homes, parks, and resorts. The watershed's proximity to the Twin Cities (Minneapolis - St. Paul, Minnesota) makes it a target for continued development and urbanization pressure. Lake fertility ranges from mesotrophic to highly eutrophic. Mesotrophic lakes have moderate nutrient levels and productivity, while eutrophic lakes have higher nutrient levels and are very productive with high concentrations of aquatic plants and algae. As plants and algae die back, the deeper waters of highly eutrophic lakes become depleted of oxygen and cold-water fish may die. The streams of the watershed are mostly tributary to one of the lakes. Streams in this watershed are low gradient and have large areas of associated wetlands. There do not appear to be many widespread nonpoint source related problems on these streams, however, there are site specific problems which can be addressed through this project. Runoff from eroding croplands and livestock operations is the major source of nonpoint pollution in the watershed.

Map S –1. Balsam Branch Watershed

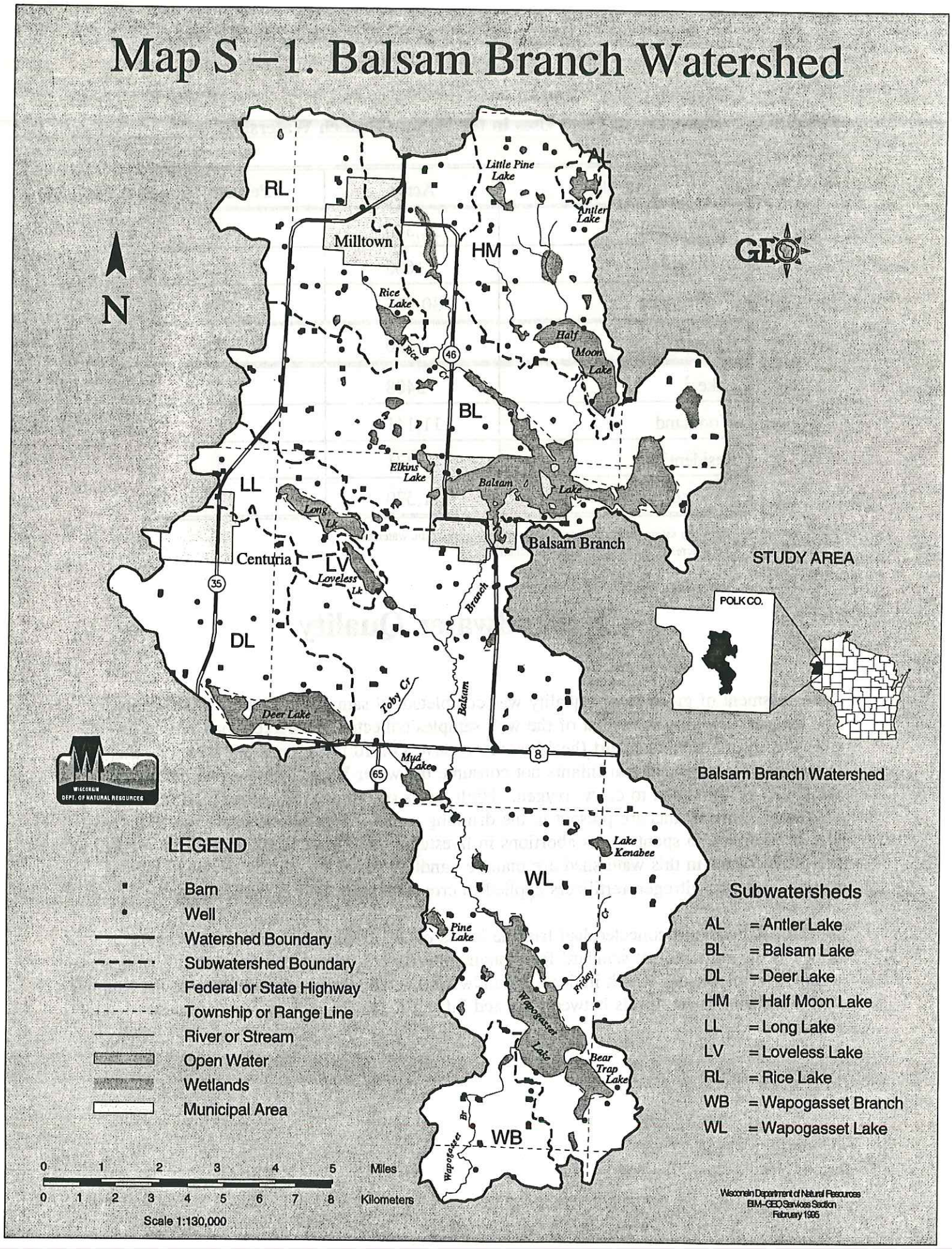


Table S-1. Summary of Land Uses in the Balsam Branch Watershed[1]

Land Uses	Acres	Percent
Agricultural	32,340	48
pasture	1605	(2)
cropland	30,735	(46)
Farmstead	1350	2
Lakes[2]	5408	8
Woodland	11,141	17
Residential	5371	8
Wetland	11,570	17

[1] Land use estimates are based on a partial inventory of the watershed.
[2] Total acres of the seven largest watershed lakes.

Groundwater Quality

An assessment of groundwater quality was completed by sampling private wells for nitrate and triazine. Results show that of the well samples collected, 11 percent had nitrate levels over the enforcement standard (health advisory level) of 10 milligrams per liter. At this level it is recommended that infants not consume the water because the nitrate interferes with the ability of the blood to carry oxygen. High levels of nitrates may also be an indication that other contaminants are present in the drinking water. High nitrate concentrations have also been linked to spontaneous abortions in livestock. The most likely sources of nitrates in the groundwater in this watershed are manure handling practices, poorly designed manure storage systems, nitrogen fertilizers applied to croplands, and failing septic systems.

None of the samples collected had triazine levels over 3.0 micrograms per liter (μg/L), which is the enforcement standard for atrazine plus its breakdown components. Triazines are a family of herbicides which indicate groundwater contamination. Six percent of the samples collected had triazine levels between 0.3 and 3.0 μg/L.

Sources of Water Pollution

The Polk County LCD collected data on agricultural lands, residential lands, barnyards, manure storage sites, construction sites, and streambanks in the watershed to estimate the pollutant potentials of these nonpoint sources.

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

Barnyard Runoff Inventory Results

- 98 barnyards were assessed.
- These barnyards were found to contribute 3787 pounds of phosphorus to surface waters annually.

Streambank Erosion Inventory Results

- 88 stream miles were inventoried.
- 138 tons of sediment reach streams from eroding sites.
- 18 percent of the streambanks were degraded from trampling or erosion.

Shoreline Erosion Inventory Results

- 63 miles of lake shoreline were inventoried.
- 15 percent of lake shoreline was found to have either severe, moderate, or mild erosion or trampled banks.
- 50 tons of sediment are delivered to lakes annually from their banks.

Upland Sediment Inventory Results

Approximately 30 percent of the watershed was inventoried for land use and cropland erosion. A computer model will be used to estimate decreases in sediment and phosphorus delivery from the implementation of management practices.

Wetland Inventory Results

The DNR located 150-200 altered wetlands in the watershed that are potential restoration sites. These wetlands have been altered by drainage, grazing, or cropping.

Lakeshore Soil Sampling

Soil samples were analyzed from 25 randomly selected lakeshore homes. More than half of the lawns showed excessive amounts of phosphorus in the soil.

Construction Sites

There are approximately 35 new homes constructed in the watershed each year.

Pollutant Reduction Goals

The Balsam Branch Priority Watershed Project plan examines the sources of nonpoint pollution in the watershed and guides the implementation of pollution control measures. The goal of the plan is to protect, maintain, and enhance the aquatic ecosystem of the watershed. The control measures are designed to meet this goal.

The general objectives for the watershed are:

Nutrient Reduction
Sedimentation and Erosion Reduction
Runoff Rate Reduction
Restoration and Protection of Aquatic Habitat Including Wetlands
In-lake Nutrient Management
Groundwater Protection

Strategies to Achieve Objectives

An educational program will be implemented (see page 16) to encourage watershed residents and visitors to follow practices that protect water quality. Some of the practices (primarily agricultural practices) will be cost shared with state funds.

Phosphorus Reduction Strategy

The Balsam Branch Priority Watershed Water Resource Appraisal Report (Koshere, 1994) indicates that the control of phosphorus from agricultural runoff is critical to the success of this project. Runoff from barnyards and fields spread with manure and/or commercial fertilizer carries phosphorus, and phosphorus attaches to soil particles eroded from fields. Other key contributors of phosphorus in the watershed include lakeshore residences, Rice Lake (a degraded lake that is a net source of phosphorus), and stormwater runoff from villages. While reduction of sediment from all sources is desired, phosphorus reduction is the primary objective of the project.

Cost share practices are available to control phosphorus from the following sources:

Cropland Erosion and Nutrient Runoff
Barnyards and Manure Storage
Milk House Waste
Gullies

Wetland restoration and easements for wetland protection and restoration are also available. In-lake sediment treatment may be used to tie up phosphorus.

Structures will be considered to treat stormwater run off from the village of Milltown.

Construction site erosion control may be implemented county-wide or just in the shoreland area, to limit sediment and therefore phosphorus entering surface water.

Groundwater Protection Strategy

The following cost share practices will be promoted to protect groundwater in the watershed:

Barnyards on Internally Drained Animal Lots
Manure Pit Abandonment
Nutrient and Pest Management (includes internally drained areas).

Aquatic Habitat Improvement (Includes Wetlands)

The following cost share practices will be promoted to protect and improve aquatic habitat in the watershed:

Wetland Restoration
Streambank and Shoreline Erosion Control
Riparian Fencing where Trampling Occurs
Livestock Exclusion from Wetlands
Upland Sediment Control.

Easements will be available for protection of existing wetlands and for wetland restoration.

Management Actions

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

The Polk County Land Conservation Department will contact all landowners who are eligible to receive cost-share funds during the project's implementation. All Category I sources of nonpoint pollutants must be controlled if a landowner wishes to participate in any aspect of the program. Category I represents the level of pollution control needed to achieve water quality goals in the watershed. Nonpoint sources in Category II contribute less of the pollutant load than those in Category I. They are included in cost sharing eligibility to

further insure that water quality goals are met. Controlling sources in this category is not mandatory for a landowner to be funded for controlling other sources.

The Polk County Land Conservation Department 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. Participation in the program is voluntary.

The following is a brief list of critical nonpoint pollutant sources, project eligibility criteria, BMP cost share rates, and participation requirements for the project.

Croplands

Category 1: All agricultural lands with a soil loss greater than "T" the tolerable soil loss (3-5 tons per acre annually in Polk County depending on soil type) will be classified as Category 1 for cost sharing and must be brought down below "T" on a farm by farm basis. This involves an estimated 3000 acres of cropland. If 75% of the landowners in this category participate in the program, a 17% reduction of sediment and phosphorus from cropland is projected.

Category 2: Fields delivering greater than .3 tons of sediment per acre per year to surface water, but have soil erosion less than T will be category 2. A combination of management practices to reduce soil erosion *and* structures to capture sediment will be used on these fields. Approximately 1000 ac would receive treatment to reduce sediment and phosphorus delivery by 11% for a total of 28% reduction.

The BMPs for croplands include conservation tillage, no-till, changes in crop rotations, and agricultural sediment basins. They emphasize both improving soil management and controlling pollutants. Table S-2 and S-3 show the eligible practices and cost-share rates.

Gullies

Category I: Gullies are Category I if the following conditions are met:

1) are at least 3 feet deep,
2) have bare soils and active erosion,
3) have direct connection with surface water via channelized flow,
4) allow reasonable access for machinery.

Category II: Gullies are Category II if conditions 1, 2, and 4 are met.

Table S-2. State Cost-Share Rates for Best Management Practices[1]

BEST MANAGEMENT PRACTICE	STATE COST SHARE RATE
Field Diversions and Terraces	70%
Grassed Waterways	70%
Critical Area Stabilization	70% [2]
Shoreline Buffers	70% [2]
Wetland Restoration	70% [2]
Shoreline and Streambank Stabilization	70% [2]
Grade Stabilization Structures	70% [2]
Agricultural Sediment Basins	70% [2]
Barnyard Runoff Management	70%
Animal Lot Relocation	70%
Manure Storage Facilities	70%/50% [3]
Livestock Exclusion from Woodlots	50%
Nutrient and Pesticide Management	50% [4]
Animal Waste Storage System Abandonment	70%
Intensive Grazing Management	50%
Milking Center Waste Control	70%
Cattle Mounds	70%
Lake Sediment Treatment	70%
Urban Related Activities	50-70%

[1] Table S-3 shows BMPs cost shared at a flat rate.
[2] Easements may be entered into with landowners in conjunction with these BMPs. See Chapter 4 for an explanation of where easements may apply.
[3] Maximum cost share amount is $35,000 for manure storage. The cost share rate is 70% for the first $20,000 costs, and 50% for the remaining costs.
[4] Spill control basins have a state cost share rate of 70%.

Table S-3. Practices Using a Flat Rate for State Cost-Share Funding

BEST MANAGEMENT PRACTICE	FLAT RATE
Contour Farming	$6.00/ac [1]
Contour Stripcropping	$12.00/ac [1]
Reduced Tillage	$45.00/ac [2]
Reduced Tillage	$15.00/ac [3]
Cover and Green Manure Crop	$25.00 per acre [4]

[1] Wildlife habitat restoration components of this practice are cost-shared at 70%.
[2] $45 per acre over 3 years for reduced tillage on continuous row croplands.
[3] $15 per acre for one year only for reduced tillage on crop rotations involving hay.
[4] Cost sharing is available for up to three years if fields otherwise would contribute to degraded water quality.

Animal Lots

Category I: Barnyards that contribute over 60 pounds of phosphorus to surface waters per year. Twenty eight of the 98 barnyards inventoried are considered Category I barnyards. Most of the Category I barnyards are in the Balsam Lake and Wapogasset Lake subwatersheds.

Category II: Barnyards that contribute between 30 and 60 pounds of phosphorus to surface waters per year. Seventeen of the 98 barnyards inventoried are in this category.

Manure collected from a barnyard cost shared under this program must be spread according to a nutrient management plan.

Nutrient Management Planning/Manure Spreading

All landowners in the watershed will be eligible for nutrient management planning. A nutrient management plan may identify the need for winter storage of manure because of limitations of winter spreading on steep slopes and spreading on fields near water.

Manure Storage

A nutrient management evaluation will be used to determine eligibility for manure storage. An operation is eligible for animal waste storage if the evaluation demonstrates that manure cannot be feasibly managed during periods of snow covered, frozen, and saturated conditions without the installation of storage. It is estimated that 60 operators in the watershed will be eligible for this cost share practice.

Manure collected in a manure storage facility cost shared under this program must be spread according to a nutrient management plan and must not be winter spread.

Manure Storage Facility Abandonment

Malfunctioning animal waste storage facilities as defined in Polk County Manure Storage Ordinance (in draft form as of April 1995) will be eligible for cost sharing.

A farm is eligible for a new manure pit under the criteria described above for manure storage. A farm may also be eligible for cost sharing for a new manure pit if the farm is designed to collect and handle liquid manure but standard eligibility requirements are not met. This group is included to encourage proper abandonment of malfunctioning manure pits.

Milk Center Waste

Milk centers will be eligible for cost sharing for systems to treat waste when surface water contamination from a milking center is likely. Potential for surface water contamination from a milking center would normally be examined during design work for a barnyard or manure storage facility or as a result of a complaint to the Land Conservation Department or DNR.

Streambanks and Lake Shoreline

Table S-4. Streambank and Shoreline Eligibility Criteria

Management Category	Criteria
	Erosion Rates
I	SEVERE EROSION: >0.5 feet per year
II	MODERATE EROSION: 0.1 to 0.5 feet per year
III	MILD EROSION: 0.05 to 0.1 feet per year
	Severity of Trampling
I	Adequate sod cover not maintained
II	Evidence of trampling

Sources: Polk County LCD, DNR and DATCP

Most of the streambank eligible for cost sharing for stabilization is trampled. There are only a few sites in the watershed where erosion of streambank or lakeshore is classified as moderate or severe. Table S-4 shows the eligibility criteria for streambank and shoreline.

Wetland Restoration

All landowners in the watershed will be eligible for restoration of drained or altered wetlands.

Wetland Protection

The watershed will support easements for wetland protection. The project will also examine existing regulations that protect wetlands, and provide technical review and support. Controlling sources of upland erosion will also protect wetlands.

Land Easements

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

Shoreline Buffers
Critical Area Stabilization
Wetland Restoration, Creation, or Protection
Agricultural Sediment Basins

Urban Structural Practices

Urban structural practices are an eligible cost share item. Options for urban structural practices for the village of Milltown, the village of Balsam Lake, and other developed areas will be evaluated by the DNR district Nonpoint Source Coordinator.

In-Lake Nonpoint Source Control

Nutrient inactivation is an eligible treatment to reduce internal cycling of phosphorus from bottom sediments, thereby improving water quality conditions in lakes in the watershed.

Land Use and Stormwater Management Planning

Local governments are eligible for funding for the development of a land management plan to protect surface water quality, groundwater, and wetlands in the watershed.

Funds Needed for Cost Sharing, Staffing, and Educational Activities

Grants will be awarded to Polk County by the DNR for cost sharing, staff support, and educational activities. Table S-5 includes estimates of the financial assistance needed to implement needed nonpoint source controls in the Balsam Branch Watershed, assuming a 75 percent participation rate of eligible landowners.

Project Implementation

Project implementation is scheduled to begin in 1995. Participants can sign cost share agreements during the first five years of implementation. There is a five-year period for practice installation. The installation of BMPs can usually begin as soon as a landowner has signed a cost-share agreement with the Polk County Land Conservation Department.

Table S-5. Total Project Cost and Grant Disbursement Schedule at 75 percent Landowner Participation

Item	Project Year			
	1	2-5	6-10	total
Cost-Share Funds: Practices	$100,000	$1,534,323	$1,917,904	$3,552,227
Cost-Share Funds: Easements	$13,500	$54,000	$67,500	135,000
Local Assistance Staff Support[1]	$138,320	$553,280	$673,400	1,365,000
Information/Education: Direct	$4,500	$18,000	$15,000	37,500
Other Direct: (travel, supplies, etc.)	$15,808	$63,232	$76,960	156,000
Engineering Assistance[1]	$5000	$20,000	$25,000	50,000
Totals	$277,128	$2,242,835	$2,775,764	$5,295,727

[1]Local Assistance Staff Support includes staff time to perform engineering services. Some of this work may be contracted, decreasing the funds required for staff support and increasing the funds needed for engineering assistance.

Additional staff may be requested if an erosion control ordinance is implemented. Support for in-lake controls and land use planning is not included in this estimate.

Source: Wisconsin Department of Natural Resources, Wisconsin Department of Agriculture, Trade and Consumer Protection, and the Polk County Land Conservation Department

Information and Education

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

during the first five years of the project to encourage landowners to sign up for state cost sharing for pollution control.

The objectives for the information and education program are as follows:

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

2) *Lakeshore residents will minimize phosphorus, sediment, and other polluting inputs from lakeshore property and septic systems.*

3) *Village residents will minimize phosphorus, sediment, and other polluting inputs to stormwater systems.*

4) *Landowners will protect and restore wetlands in the watershed.*

5) *Watershed residents will understand the value of surface and ground water resources and how to preserve them.*

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

Activities will be targeted to accomplish specific objectives. Some of the activities planned include:

- Personal one-on-one contacts with landowners.

- Presentations, discussions, workshops, tours, and demonstration projects for farmers, lakeshore property owners, other watershed residents, and local government officials who must adopt new pollution control techniques.

- Water quality newsletters or articles in existing newsletters or newspapers that will inform farmers, lakeshore property owners, village residents, local government officials, community groups, and concerned citizens about watershed activities, implementation processes, and pollution control methods.

- Distribution of information through displays, brochures, and fact sheets

- Educational activities and service projects to inform youth about water resource issues and help them develop a conservation ethic.

Project Evaluation and Monitoring

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

1. **Administrative**: This category includes the progress in providing technical and financial assistance to eligible landowners, and carrying out education activities identified in the plan. The Polk County LCD will track progress in this area and report to the DNR and DATCP quarterly.

2. **Pollutant Reduction Levels**: The Polk County LCD will calculate the reductions in nonpoint source pollutant loadings resulting from changes in land use practices and report to the DNR and DATCP at an annual review meeting.

3. **Water Resources**: The DNR will monitor changes in water quality, habitat, and water resource characteristics periodically during the project and at the end of the project period. Selected sites may be chosen to monitor the effectiveness of BMPs in the watershed.

CHAPTER ONE
Introduction, Purpose and Legal Status

Wisconsin Nonpoint Source Water Pollution Abatement Program

The Wisconsin State Legislature created the Wisconsin Nonpoint Source Water Pollution Abatement Program (NPS) in 1978. The goal of the NPS 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 110 square-mile Balsam Branch Watershed, located in Polk County, was designated a "priority watershed" in 1992. The primary objectives of this project are to reduce nonpoint source pollution loads to many of the major water bodies in the watershed such as Balsam Lake, Lake Wapogasset, and Deer Lake and to enhance and protect the water quality of the streams in the Balsam Branch Watershed.

Nonpoint sources of pollution include eroding agricultural lands, streambanks, roadsides, and construction sites; runoff from field application of manure, fertilizers and pesticides; runoff from barnyards; and stormwater runoff from villages. Pollutants from nonpoint sources are carried to the surface water or groundwater through the action of rainfall runoff, snow melt, and infiltration.

The following is an overview of the NPS Program:

- The DNR and DATCP administer the program which focuses on critical hydrologic units called priority watersheds. The program is implemented through priority watershed projects for which a plan is prepared.

- Local units of government implement the watershed project. Water quality improvement is achieved through implementation of nonpoint source controls (best management practices or BMPs) and adoption of ordinances. Landowners, land renters, counties, cities, villages, towns, metropolitan sewage districts, 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.

- Informational and educational activities are employed to encourage participation and implementation of BMPs that are not cost shared.

- 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 of pollution in the watershed.

Priority Watershed Project Planning and Implementation Phases

Planning Phase

The planning phase of the project began in 1992 and included the following information-gathering and evaluation steps:

1. Determine the conditions and uses of groundwater, streams, and lakes.

2. Inventory types of land uses and severity of nonpoint sources impacting streams and lakes.

3. 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 step was accomplished through the integrated resource management planning efforts in the St. Croix River Basin.

4. Determine levels of nonpoint source pollution control and measures necessary to improve and/or protect water quality.

5. Prepare and gain approval for a priority watershed plan documenting the above evaluations, implementation procedures, and costs.

Implementation Phase

The implementation phase begins following review of the priority watershed plan by the Balsam Branch Priority Watershed Citizens Advisory Committee and Project Team, a public hearing and approval by the DNR, the DATCP, and the Board of Supervisors for Polk County. This phase is characterized below:

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

2. In the rural portions of the watershed, the Polk County LCD will contact eligible landowners to determine their interest in voluntarily installing BMPs identified in the plan.

3. In the incorporated portions of the watershed, the DNR or its designee will contact local units of government to discuss actions to implement plan recommendations.

4. For rural practices, the landowner and the county sign cost-share agreements outlining the practices, costs, cost-share amounts, and a schedule for installation of BMPs. All practices are scheduled for installation up to five years from the date the agreement is signed. The DNR and local units of government sign similar agreements for urban practices.

Legal Status of the Nonpoint Source Control Plan

The Balsam Branch 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 under the cooperative efforts of the DNR, DATCP, the Polk County LCD, local units of government, and the Balsam Branch Priority Watershed Citizens Advisory Committee.

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

Plan Organization

The remainder of this plan is divided into eight chapters. The contents of each chapter are described below:

The Watershed Assessment

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

Chapter Three. "Water Resource Conditions, Nonpoint Sources and Water Resource Objectives" characterizes the existing and potential biological and recreational uses of surface waters. The results of the nonpoint source inventories and evaluations and water resource objectives are discussed.

Chapter Four. "Nonpoint Source Pollution Control Strategy" identifies the level of urban and rural nonpoint source control needed to meet the water resource objectives and identifies the decision criteria and the nonpoint sources eligible for funding under the priority watershed project.

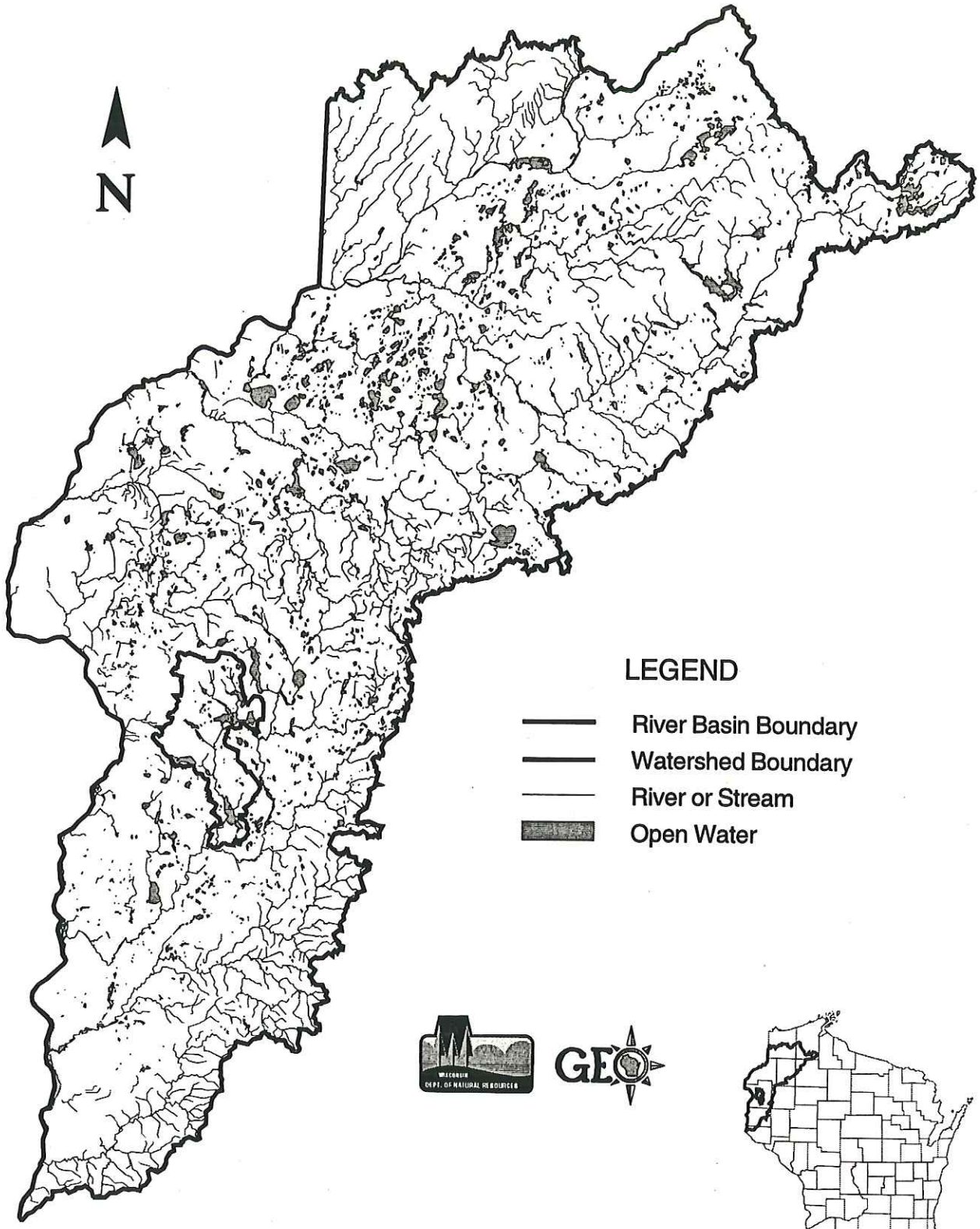
Chapter Five. "Detailed Program for Implementation" describes the means in which the local units of government administer the project, and estimates a local assistance and management practice cost-share budget.

Chapter Six. "Information and Education Program" describes techniques and activities for increasing awareness and understanding of water resources in the watershed, principles of nonpoint source pollution, best management practices, and the priority watershed project in general.

Chapter Seven. "Integrated Resource Management Program" presents the strategy for involving DNR resource management programs (fisheries management, wildlife, etc.) in the nonpoint source pollution abatement efforts in the Balsam Branch Watershed.

Chapter Eight. "Project Evaluation" discusses the means for assessing the amount of nonpoint source control gained through installation of best management practices.

Map 1 –1. Location of the Balsam Branch Watershed in the St. Croix River Basin



St Croix River Basin

0 5 10 15 20 25 Miles

0 5 10 15 20 25 30 35 40 Kilometers

Scale 1:900,000

Wisconsin Department of Natural Resources
BIM –GEO Services Section
May 1996

CHAPTER TWO
General Watershed Characteristics

Location

The Balsam Branch Watershed is a 110 square-mile drainage basin located approximately 85 miles northwest of Eau Claire in Polk County (See Map 2-1). The watershed is located in the center of Polk County and drains to the St. Croix River by way of the Apple River.

The Balsam Branch Watershed has diverse topography. The western portion of the watershed around the villages of Centuria and Milltown is relatively flat with large plats of land generally used for agriculture. The eastern and central portion of the watershed is more wooded with gently rolling terrain. The watershed contains many lakes in a variety of sizes. Many of the lakes in the watershed are under increasing pressures from lakeshore development and recreational use. The Balsam Branch Creek flows from Balsam Lake and ends its flow at Lake Wapogasset. Wapogasset Branch flows from Lake Wapogasset into the Apple River.

The following is a brief overview of the watershed's cultural and natural resource features.

Cultural Features

Civil Divisions

The Balsam Branch Watershed lies within Polk County. The villages of Balsam Lake, Milltown, and Centuria are included in the watershed. The townships of Balsam Lake, Garfield, Lincoln, Milltown, and St. Croix Falls make up the majority of the watershed. Small portions of Alden, Apple River, Black Brook, Georgetown, Eureka, and Luck Townships are also included in the watershed. The Balsam Lake and Half Moon Lake Protection and Rehabilitation Districts and Long Lake Sanitary District are also units of government in the watershed.

Population Size and Distribution

The Balsam Branch Watershed year round population is estimated to be about 5,400 persons. The watershed population nearly triples during the summer months when the numbers of

vacationers and lake residents are at peak levels. Most of the permanent and seasonal homes in the watershed are in rural unincorporated areas. The percentage of lakeshore homes that are permanent residences range from 6 percent on Loveless Lake to 39 percent on Lake Wapogasset (see Table 2-1).

Table 2-1. Permanent Lakeshore Residences in the Balsam Branch Watershed

Lake	Total Residences	Permanent Residences	% Residences Permanent
Antler Lake [1]	36	6	16
Balsam Lake [2]	540	149	28
Deer Lake [2]	296	89	30
Half Moon Lake [1]	235	40	17
Long Lake [1]	228	82	36
Loveless Lake [3]	78	5	6
Rice Lake	0	0	0
Wapogasset Lake [2]	510	200	39

[1] Information taken from Polk County tax rolls.
[2] Information from lake association or district 1993-1994 directory.
[3] Personal communication, Tim Vaugh, Organizer, Loveless Lake Association. January 1995.

Population is increasing in the watershed at a moderate rate. The townships that make up most of the watershed had an approximate 10 percent increase in population from 1980 to 1990 and are projected to increase an additional 6 percent through the year 2000. The highest growth rate (18%) was in St. Croix Falls township in the western portion of the watershed. The villages of Balsam Lake, Centuria, and Milltown had a combined growth rate of approximately 8 percent over the same period, but little growth is expected in the villages through the turn of the century.

Population forecasts suggest a slight slowing of population growth in the watershed. However, because of the proximity to the Twin Cities metropolitan area, continued growth of lakeshore development and demand on recreational resources in the watershed is expected. Because much of the lake shoreline in Polk County is already developed for residential use, this growth may come from small seasonal cottages being demolished or remodeled into permanent or larger homes. A recent population trend is an increase of people who work outside of Polk County, yet live and recreate within the county.

Land Uses

Most of the land in the watershed is agricultural, and there are over 100 active farms. The trend in Polk County is toward fewer, larger farms. In the period from 1960 to 1990 the number of farms decreased by 35 percent while the average size of a farm increased from 160 to 210 acres in the county. Farms in the watershed are generally from 40-160 acres, but many farmers rent and manage additional parcels of land.

Most of the agricultural land is used to grow crops. Antler Lake is the only subwatershed where forest land is more prevalent than agricultural land. Land uses are summarized in Table 2-2.

While agricultural land makes up the greatest percentage of land in the watershed, residential land has the highest total assessed valuation. In the period from 1980 to 1993, the assessed valuation of agricultural property decreased 63 percent while the value of residential land increased 48 percent in townships that make up most of the watershed. The total assessed valuation of property in the watershed is approximately $300 million.

Residential land use is prevalent along the shores of Antler, Balsam, Half Moon, Deer, Long, Loveless, and Wapogasset Lakes. Lakeshore development has expanded rapidly in recent years in the watershed. Residential land, including the villages of Balsam Lake, Centuria, and Milltown, makes up about 8 percent of the watershed.

Forest lands occupy 17 percent of the total acres in the watershed. Forest lands in Polk County have high environmental and recreational potential. The harvesting of timber for saw logs or pulp is common, and local timber markets have been improving in recent years.

Table 2-2. Summary of Land Uses in the Balsam Branch Watershed[1]

Land Uses	Acres	Percent
Agricultural	32,340	48
pasture	1,605	(2)
cropland	30,735	(46)
Farmstead	1,350	2
Lakes [2]	5,408	8
Woodland	11,141	17
Residential	5,371	8
Wetland	11,570	17

[1] Land use estimates are based on a partial inventory of the watershed.
[2] Total acres of the seven largest watershed lakes.

The outdoor recreation industry has become the major economic force in the county. Fishing, canoeing, golfing, and camping are the main recreational activities in the summer, and skiing and snowmobiling are popular in the winter.

Some of the major recreation centers in the watershed include:

*Balsam Lake Village Park Campground and Picnic Area

*Milltown Village Park

*Sandy Beach Picnic Area

*Balsam Lake/ Five Flags Golf Courses

*Balsam Lake/ Centuria Gun Club

*Kennedy Environmental Area

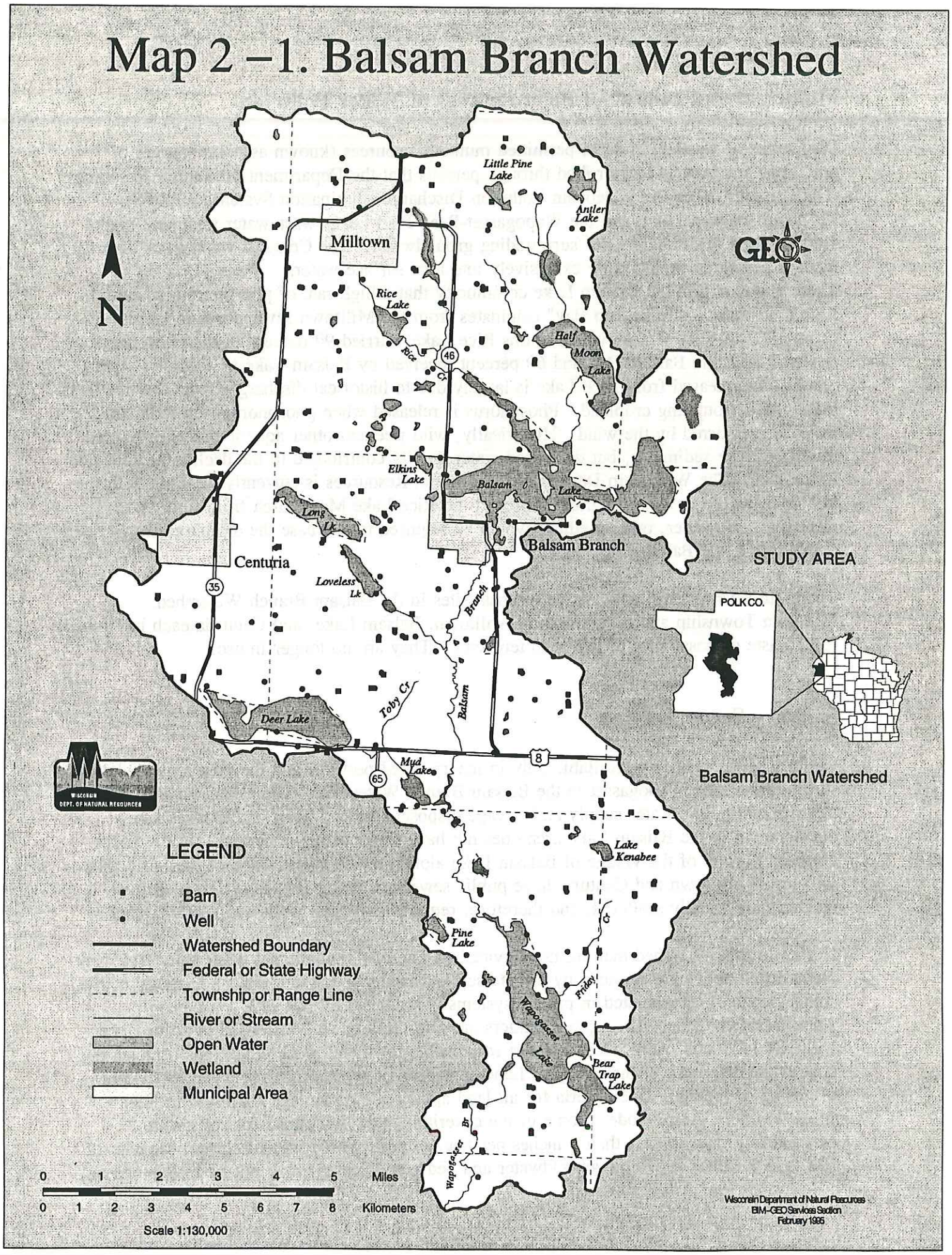
*Ice Age Trail

*Balsam Branch County Park

*Balsam Branch Beach

*Half Moon Beach

Map 2 –1. Balsam Branch Watershed



Municipal and Industrial Point Sources of Water Pollution

Discharges of wastewater from permitted municipal sources (known as point sources of pollution) are generally controlled through permits that the Department of Natural Resources (DNR) issues under the Wisconsin Pollution Discharge Elimination System (WPDES). Milltown, Balsam Lake, and the Wapogasset-Bear Trap Lakes wastewater treatment plants are permitted to discharge into surrounding groundwater. The Centuria wastewater treatment plant is permitted to discharge exclusively into area surface waters.
There is concern in the Balsam Lake community that a high rate of phosphorous loading to Rice Lake and "Little Balsam Bay" originates from the Milltown sewage treatment plant. From 1987-89 Rice Creek, which drains Rice Lake, carried 90 percent of the phosphorus received by Little Balsam Bay and 60 percent received by Balsam Lake as a whole. The phosphorus released from Rice Lake is largely due to historical discharges from the treatment plant and surrounding cropland. Phosphorus is released when phosphorus-rich sediments in the lake are stirred by the wind. Historically, wild rice and other aquatic plants prevented mixing of lake sediments, but decreased water quality contributed to the decline of wild rice in the lake. The Wisconsin Department of Natural Resources is currently working with the village of Milltown on a program to protect the Rice Lake Marsh area from future sewage discharge. However, other methods would be required to decrease the discharge from Rice Creek into Little Balsam Bay.

There are several small solid waste disposal sites in the Balsam Branch Watershed. Milltown Township and the villages of Milltown, Balsam Lake, and Centuria each have small solid waste disposal sites of less than ten acres. They are no longer in use.

Sanitary Sewer Service

Sanitary sewer service is available only in incorporated portions and the area immediately surrounding Lake Wapogasset in the Balsam Branch Watershed. The village of Balsam Lake has a partial public water supply and sewage disposal system. Most of the lakeshore development in the Balsam Lake area does not have water or sewer service, including the northern portion of the village of Balsam Lake along the southwest shore of the lake. The villages of Milltown and Centuria have public sewer and water supply systems. Rural residents are usually scattered, and therefore, require individual wells and septic tanks.

Homes in this watershed that are not serviced by one of the municipal wastewater treatment plants listed above are serviced by private septic systems or holding tanks. Disposal of the solids (septage) accumulated in private systems is regulated by NR 113, Wisconsin Administrative Code. The septage haulers are also required to be licensed in accordance with NR 113, Wis. Adm. Code and are responsible for meeting the conditions listed in the code when disposing of the septage. Land spreading of septage is a regulated method of disposing of septage. Site criteria for all land application of septage are listed in NR 113.08(3) Wis. Adm. Code. Some of the criteria include limitations for soils with permeability rates greater than 6 inches per hour or soils with a water holding capacity of less than 5 inches above the groundwater and bedrock. Septage may not be landspread or

discharged into or on any wetlands or in areas subject to ponding, including any ditch, dry run, pond, lake, or stream. Site restrictions regarding minimum depth from surface to bedrock and groundwater, maximum slope, minimum distance to a community well and noncommunity well, minimum distance to a residence or business, and many other restrictions are covered in the site restrictions of this code. For additional details on the regulations that apply to the disposal of septage, contact the wastewater management program in Cumberland DNR Office (715-822-3592).

Water Supply Service

Water supplies used in the Balsam Branch Watershed are obtained primarily from groundwater sources. Most groundwater in Polk County and the Balsam Branch Watershed is obtained from sand and gravel aquifers or sandstone aquifers. The sand and gravel deposits are mainly located in the outwash plains area of the watershed. The parts of western and north-central Polk County where glacial drift is shallow over traprock have poor potential for supplying adequate well water. The groundwater in these areas must be extracted through cracks in the rock formations. Groundwater in Polk County is generally of very good quality and is suitable for most purposes. Water obtained from these aquifers is readily available in quantities adequate to meet the needs for domestic, agricultural, municipal, and industrial uses.

Natural Resource Features

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 Balsam Branch Watershed lies in the continental zone which is characterized by winters which are long, relatively cold, and snowy, and summers which are mostly warm with periods of hot humid conditions. Polk County's mean annual precipitation is about 28 inches, 65 percent of which generally falls from May through September. The average date of the last killing frost in the spring is May 15, and that of the first killing frost in the fall is September 19. The growing season in the county averages 127 days. 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 thick glacial deposits. Much of the Balsam Branch Watershed is located within the North Central Hardwood Forest region. The watershed has a diverse landscape ranging from broad, nearly level glacial outwash to rough, broken glacial moraines and areas of pitted outwash. This landscape constitutes Polk

County's major agricultural district. The watershed landscape varies from nearly level plains in the western part of the watershed to wooded areas broken with a variety of lakes in the eastern half.

Geology

The Balsam Branch Watershed was affected by the last major glacial advance. Rock formations were deposited to form some of the surface formations in the watershed. The most recent glacial advances were responsible for forming a drainage pattern of broken moraines and areas of depressions and pothole lakes.

Soils

The soils of Polk County originate from three major sources: continental glaciation, bedrock weathering, and fluvial action. The majority of the Balsam Branch Watershed is underlain with three major soil types: Amery-Santiago-Magnor, Antigo-Rosholt, and Rosholt-Cromwell-Menahga. The Amery-Santiago-Magnor soils consist of nearly level to very hilly, well drained and somewhat poorly drained, loamy and silty soils on till plains. The Antigo-Rosholt soils consist of nearly level to sloping, well drained, silty and loamy soils on outwash plains. The Rosholt-Cromwell-Menahga soils are nearly level to very hilly, well drained and somewhat excessively drained, loamy and sandy soils on pitted outwash plains.

A large portion of the eastern and northern parts of the watershed consist of Amery-Santiago-Magnor soils. Many of these soils are being used for cultivated crops and pasture. Erosion is the main limitation in these cultivated areas. If adequately protected against erosion, the soil has good potential for cultivated crops and woodland. The potential of residential development is only fair because limitations for septic tank absorption fields are moderate or severe.

Portions of central and southern Balsam Branch Watershed are of the Rosholt-Cromwell-Menahga soil type. Erosion and drought are the main limitations in managing the major soils for cultivated crops. The potential for residential development is good.

Antigo-Rosholt soils are prevalent in a large portion of the western side of the watershed. Most of these soils are used for cultivated crops, but have good potential for woodland and residential land uses.

Because agriculture is the most common land use in the watershed, soil erosion on crop lands is a major contributor to nonpoint source pollution. In 1985, there were 25,148 total acres cropped within the Balsam Branch Watershed with about 54 percent or 13,654 acres having greater than the tolerable soil loss value set as a standard by the Soil Conservation Service (now the Natural Resources Conservation Service). The average soil loss was 4.5 tons per acre for the entire watershed.

Surface Water Resources

In order to better understand water quality impacts of land use, land drainage patterns in the Balsam Branch Watershed are delineated as nine individual subwatersheds. All except Wapogasset Branch and Lake, convey surface water through tributaries or directly to the Balsam Branch Creek. Major tributaries, associated streams, wetlands, and subwatershed divides are shown in Map 2-1.

Subwatersheds in the Balsam Branch Watershed

Antler Lake (AL)
Balsam Lake (BL)
Deer Lake(DL)
Half Moon Lake (HM)
Long Lake (LL)
Loveless Lake (LV)
Rice Lake (RL)
Wapogasset Branch (WB)
Wapogasset Lake (WL)

Streams

There are about 40 miles of combined stream length within the Balsam Branch Watershed. Most of these streams maintain at least a small continuous flow throughout most of the year. The Balsam Branch (11 miles) is the longest perennial stream in the watershed. Other primary streams in the watershed are Harder Creek, Wapogasset Branch, Rice Creek, Toby Creek, Otter Creek, Peabody Creek and Friday Creek.

The Balsam Branch Watershed supports three warmwater trout streams. The Balsam Branch has 3.0 miles of class II trout stream, in which brown trout are occasionally stocked to provide a viable population. Toby and Friday Creeks contain approximately 3.2 miles of coldwater classified brook trout streams. Sedimentation and nutrient runoff from agriculture, shoreline development, and road construction and maintenance are the major sources of nonpoint pollution to streams in the watershed. The Balsam Branch, Harder Creek, and Rice Creek are not reaching their highest potential use due to pollution from nonpoint sources.

Lakes

The Balsam Branch Watershed contains 45 lakes, many of which are heavily developed with permanent and summer homes. The eight largest lakes in the watershed total 5,408 acres. In addition, there are 4 lakes of 40 acres or more, 10 lakes between 20 and 39 acres, and 23 lakes of less than 20 acres in the watershed. The largest body of water in the watershed is

Balsam Lake which offers many recreational opportunities including picnicking, boating, and year-round walleye, bass, and panfish fishing.

There are very active organizations representing property owners around the lakes. Lake associations and districts in the watershed include: Antler Lake Association, Balsam Lake Protection and Rehabilitation (P&R) District, Balsam Lake Homeowners Association, Deer Lake Association, Half Moon Lake P&R District, Long Lake Sanitary District, and Lake Wapogasset/Bear Trap Association.

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. There are three concentrated areas of forested wetlands located in the watershed; the northeastern portion of Milltown Township, the central portion of Georgetown Township, and an area south of the village of Balsam Lake in the eastern half of Balsam Lake Township. There are also extensive forested wetlands along the Balsam Branch Creek riparian corridor.

Chapter Three of this plan contains a description of wetland quality and quantity within the Balsam Branch Watershed.

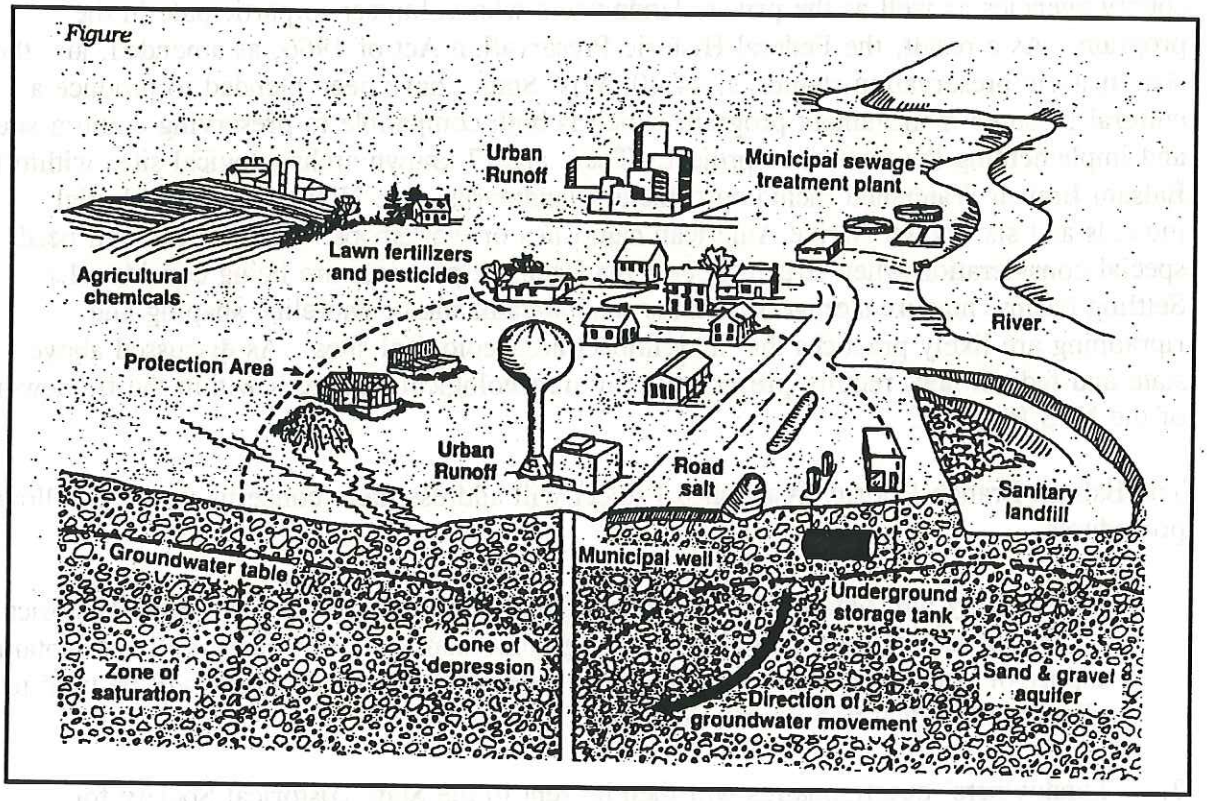
Groundwater Resources

In general, large supplies of good quality water are obtained from the groundwater reservoirs in this watershed. Most of the groundwater is obtained from a sand and gravel aquifer or a sandstone aquifer.

The sand and gravel aquifer includes glacial drift containing isolated deposits of buried sand and gravel, mostly undelineated. These deposits are highly permeable and yield large quantities of water to wells.

The sandstone aquifer consists of the saturated parts of the Ordovician formations and Cambrian sandstones. Throughout its area the sandstone aquifer provides reliable supplies of water for multiple uses.

Figure 2-1. Groundwater Schematic



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 27 known archaeological sites within the Balsam Branch Watershed including cemetery landmarks, five Native American burial mounds and six known Native American campsites or workshops. 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.

The Balsam Branch Priority Watershed Project will address these concerns with the following procedures:

1. Polk County will obtain inventory maps from the regional Wisconsin State Historical Society office and will plot sites on topographic maps. Polk County will also obtain a supply of landowner questionnaires from the historical society which will be used to identify additional non-inventoried sites.

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

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

4. A cost-share agreement is signed <u>before</u> the survey is conducted. In certain instances a survey may reveal a significant archaeological site which precludes the installation of a particular BMP at that specific site. Cost-share agreements will contain language

which nullifies or partially nullifies the cost-share agreement based on the final results of the archaeological survey.

Endangered and Threatened Resources

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

It should be noted that comprehensive endangered resource surveys have not been completed for the entire Balsam Branch 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 are therefore, not in the lists below.

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. In Wisconsin, species may be listed as "endangered," "threatened," or "special concern species."

Wisconsin Endangered Species:

Any species whose continued existence as a viable component of this state's wild animals or wild plants is determined by the Department of Natural Resources to be in jeopardy on the basis of scientific evidence. DNR files do not contain records of any Wisconsin Endangered species in this watershed.

Wisconsin Threatened Species:

Any species which appears likely, within the foreseeable future, on the basis of scientific evidence, to become endangered. Wisconsin threatened species within the watershed are:

Buteo lineatus, red-shouldered hawk

Haliaeetus leucocephalus, bald eagle.

Wisconsin Special Concern Species:

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

Psoralea argophylla, silvery scurfy pea.

Natural Areas

Natural areas are sites that contain high quality examples of natural communities. State Natural Areas (SNA's) have been officially designated by the DNR Natural Areas Program as deserving protection. They are owned by the DNR, other state and local agencies, or conservation organizations, and are managed to protect the natural resources. There are no State Natural Areas in the Balsam Branch Priority Watershed.

CHAPTER THREE
Water Quality Conditions, Objectives, and Nonpoint Sources

Introduction

Topics covered in this chapter include:

- major nonpoint source pollutants
- water quality conditions, uses, and objectives
- subwatershed discussions
- results of nonpoint source inventories
- pollutant reduction goals
- other potential pollutant sources

Major Nonpoint Source Pollutants

A combination of many types of nonpoint sources of pollution are responsible for the water resource conditions found in the Balsam Branch watershed. Some of the sources are very visible and easy to identify while others are less obvious and may mistakenly be assumed to be insignificant. The nonpoint source inventory conducted by the Balsam Branch watershed staff evaluated what are typically identified as nonpoint sources of pollution including barnyards, cropland, manure handling, and fertilizer application practices. Watershed staff also evaluated the not so typical pollution sources including the roadways, lakeshore development, and residential lakeshore management practices.

Watershed wide, the single most significant source of nonpoint source pollution is agriculture. This is to be expected since roughly 50 percent of the land (32,340 acres) in the watershed is involved in some form of agricultural use. Of the total watershed acreage, 18 percent of the land is wooded, 19 percent is wetland, and 9 percent of the land (5,371 acres) is in residential development.

Nutrient loading to the lakes within the watershed is a major concern for this project. Major sources of nutrients to the lakes are soil erosion from croplands, manure handling practices, and barnyard runoff. Lesser, but yet significant sources of nutrients to the lakes include:

runoff from existing lakeshore development, erosion from lake home construction sites, septic systems, and urban runoff.

Water Quality Conditions, Uses, and Objectives

Lakes

The Balsam Branch watershed contains several high value lakes in terms of recreational use by year-round and seasonal lake residents, fishers, and boaters (Table 3-1.). There are eight major lakes in the watershed including Antler, Balsam, Deer, Half Moon, Long, Loveless, Rice, and Wapogasset/Bear Trap. With the exception of Rice Lake, each of the lakes are intensively developed with lakeshore homes, parks, and resorts. The region is less than a two-hour drive from the major metropolitan area of Minneapolis/St. Paul, Minnesota. The watershed's proximity to the Twin Cities makes it a target for continued development and urbanization pressures. Lake fertility ranges from mesotrophic (moderate fertility) to highly eutrophic.

Streams

Individual streams in the watershed include the Balsam Branch, Rice Creek, Otter Creek, Wapogasset Branch, Harder Creek, Friday Creek, Peabody Creek, Toby Creek, an unnamed inlet stream to Half Moon Lake, and the unnamed outlet stream from Loveless Lake (Table 3-2.). Most of the streams are tributary to one of the lakes. Three of the streams are trout streams (Balsam Branch, Toby, and Friday Creeks). Streams in this watershed are low gradient and have large areas of adjacent wetlands associated with them. There do not appear to be many widespread nonpoint source related problems on these streams; however, there are site specific problems which can be addressed through this project.

Wetlands

Many wetlands in the Balsam Branch watershed are in poor condition. The degraded wetlands have been altered by pasturing, dredging, draining, and plowing, or are experiencing accelerated sedimentation rates from erosion of surrounding uplands. Due to these conditions, the wetlands have lost their ability to effectively filter nutrients and organic wastes and trap sediments from surface runoff. Other wetland benefits that have been lost as a result of the alterations include the loss of nest cover, brood rearing and feeding areas for birds, mammals, amphibians and reptiles; loss of spawning and feeding areas for fish; and the loss of important ecological communities that maintain plant and animal species diversity necessary for education, research, aesthetic, cultural and natural area value. Between 150 and 200 altered wetlands have been identified in this watershed. The locations of these wetlands are shown in Map 3-1.

Groundwater

Groundwater samples were collected by county staff and analyzed for nitrate concentration and triazine. Results showed an average of 11 percent of the wells sampled have nitrate concentrations that exceed the Wisconsin safe drinking water standard of 10 mg/l. At this level it is recommended that infants not consume the water because the nitrate interferes with the ability of the blood to carry oxygen. High levels of nitrates may also be an indication that other contaminants are present in the drinking water. High nitrate concentrations in the drinking water have also been linked to spontaneous abortions in livestock.

The most likely sources of nitrates in the groundwater in this watershed are manure handling practices, poorly designed manure storage systems, nitrogen fertilizers applied to croplands, and failing septic systems.

Results from the triazine scan showed all samples to be less than the 3.0 μg/L health standard. Six percent of the samples did have triazine detected in the water. Results do not indicate a pattern of groundwater contamination that can be linked to a specific source or location.

Goals and Objectives

This priority watershed project is lake oriented in its goals. Lake water quality, once degraded, is difficult if not impossible to fully restore. Long range water quality goals have been developed that are specific for each of the major lakes in the watershed. The lake water quality goals are listed as summer phosphorus concentration in ug/l in table 3-1. It is not within the scope of this project to reach long term goals, but rather to meet specific objectives to slow or halt the rate of decline in lake quality in the face of intensifying development. Specific upland nutrient loading objectives have been established for each subwatershed which reflect an aggressive strategy for changing land use practices in this watershed to minimize nutrient loading to surface waters while trying to maintain a healthy agricultural and recreational environment.

This project is intended to consider water quality in a broad ecosystem view by considering fish, wildlife, aesthetics, and critical aquatic habitat needs. In this respect, "improving/maintaining water quality" may be defined as protecting, maintaining, and enhancing the aquatic ecosystem of the watershed. Under this broad goal, there are several categories of actions and specific activities that can do more than just protect chemical water quality.

Following are the general objectives for the water resources in the Balsam Branch watershed:

- **Nutrient reduction**: sources of nutrients that are targets for reduction include agriculture, urban runoff, and lakeshore residential development.

- **Reduce erosion/sedimentation**: targeted sources for sediment and erosion reduction include agriculture, urban and residential development, and lakeshore and streambank erosion.
- **Reduce hydraulic runoff rates**: target areas for work toward this objective include upland agricultural land management, urban development, residential landscaping, and wetland restoration and protection.
- **Protect and restore aquatic habitat**: target areas include restoration and protection of wetlands and protection of aquatic plant sensitive areas.
- **Manage in-lake nutrients**: in some of the lakes within the watershed, recycling of nutrients already in the lake is a significant source of nutrient loading. Evaluation of the lake nutrient cycling within the lake, evaluation of in-lake techniques and implementation are target areas for work with this objective.
- **Groundwater protection**: protect the quality of groundwater in the watershed through promotion of sound nutrient and pesticide management techniques in agricultural, rural, and urban landuse.

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

Map 3 –1. Balsam Branch Watershed

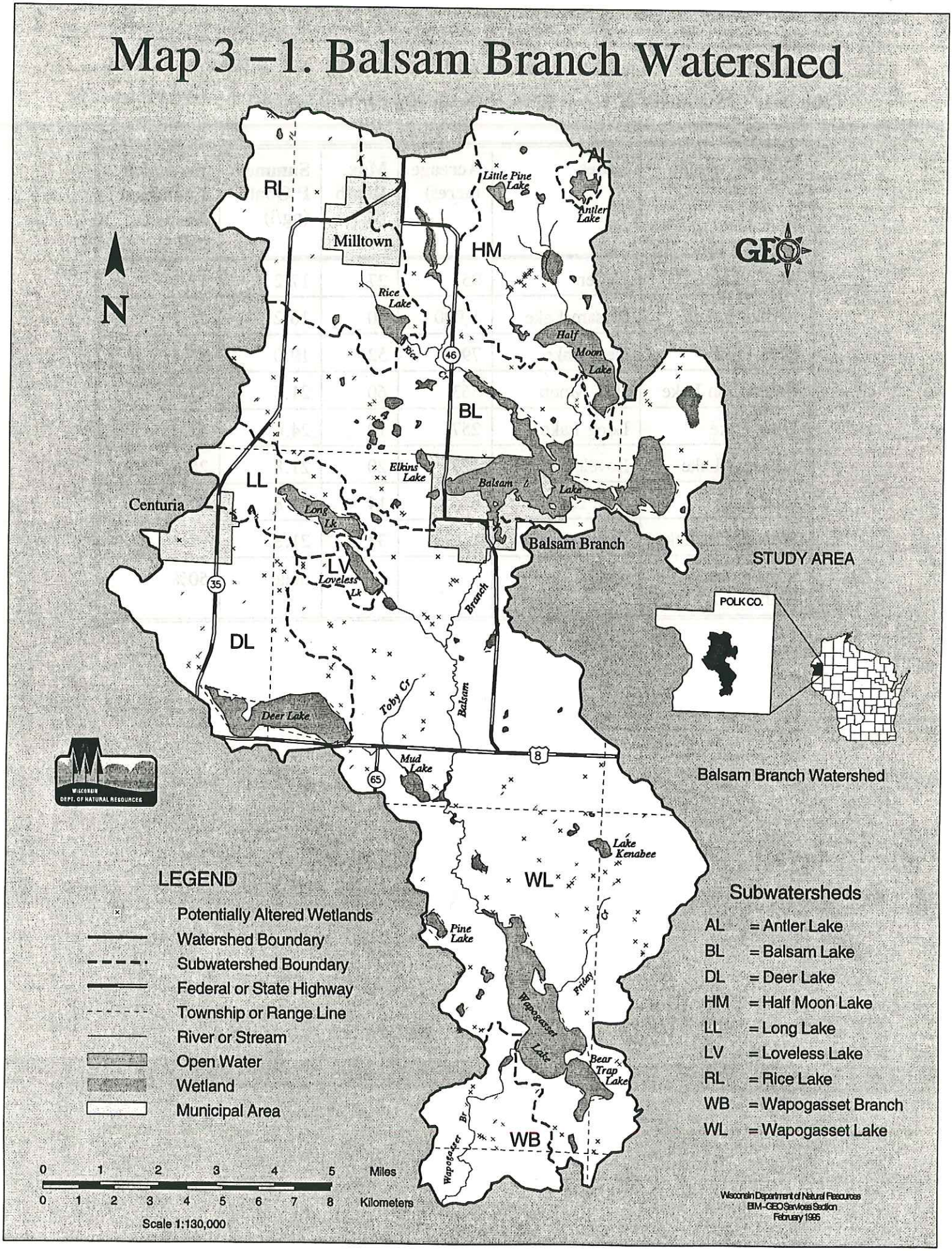


Table 3-1. Summary of Lakes in the Balsam Branch Watershed

Subwatershed	Lakes	Acreage (acres)	Max. Depth (ft.)	Summer P Goal (ug/l)	Percent P Reduction Needed (%)
Antler Lake	Antler	95	27	17.2	17.2
Balsam Lake	Balsam Lake	1,900	40	16.2	26.7
Deer Lake	Deer Lake	790	52	19.0	35.7
Half Moon Lake	Half Moon	563	60	21.8	17.8
Long Lake	Long Lake	257	10	24.6	41.3
Loveless Lake	Loveless Lake	123	20	21.8	28.6
Rice Lake	Rice Lake	87	14	33.8	69.0
Wapogasset Lake	Wapogasset	1,198	33	21.8	27.4
Wapogasset Branch	none			none	50%

Table 3-2. Summary of Streams in the Balsam Branch Watershed

Stream Name	Length (Miles)	Use Classification
Balsam Branch	11	COLD/3,DEF
Deer Creek	1	DEF
Friday Creek	3	COLD
Harder Creek	6	DEF
Otter Creek	3	DEF
Rice Creek	4	DEF
Rock Creek	<1	DEF
Toby Creek	3	COLD
Wapogasset Creek	5	DEF

DEF: Not formally classified. By the federal Clean Water Act, these streams are assumed to support a balanced warm water fishery and aquatic community.

COLD: Cold water community; includes surface waters capable of supporting a community of cold water fish and other aquatic life or serving as a spawning area for cold water fish species.

Table 3-3a. Lake Shoreline Inventory Results: Balsam Branch Watershed Shoreline Erosion and Habitat Degraded

Lake	Inventoried Shoreline Length (feet)	Eroded Sites (feet)	Trampled Sites (feet)	Slumped Sites (feet)	Cattle Access (feet)	Total Sediment Loss Tons/Yr	% Bank Degraded From E,T,S
Antler Lake	13,774	1,650	0	0	0	.61	12
Balsam Lake	121,875	5,205	0	75	1,200	7.22	6
Deer Lake	39,329	3,650	0	0	0	1.30	9
Half Moon Lake	35,561	2,020	0	0	0	1.28	6
Long Lake	22,737	9,250	1,000	0	1,000	4.13	45
Loveless Lake	13,174	590	0	0	0	.24	4
Rice Lake	13,939	0	0	0	0	0	0
Wapogasset/ Bear Trap Lakes	75,386	17,320	0	0	0	34.28	22
Totals	335,755	40,685	1,000	75	2,200	49.06	15

Source: Polk County Land Conservation Department Shoreline Inventory

Table 3-3b. Streambank Inventory Results: Balsam Branch Watershed Streambank Erosion and Habitat Degraded

Subwatershed	Inventoried Streambank Length (feet)	Eroded Sites (feet)	Trampled Sites (feet)	Slumped Sites (feet)	Cattle Access (feet)	Total Sediment Loss Tons/Yr	% Bank Degraded From E,T,S
Balsam Lake	67,266	0	6,815	0	6,015	16.54	18
Deer Lake	39,428	7,725	0	0	3,080	35.48	14
Half Moon Lake	54,298	0	5,450	0	5,450	.28	10
Rice Lake	15,259	0	0	0	0	0	0
Wapogasset Branch	50,900	2,270	5,450	0	5,450	5.41	15
Wapogasset Lake	240,083	6,900	15,260	0	15,355	79.99	12
Totals	467,234	16,895	32,975	0	35,350	137.7	18%

Source: Polk County Land Conservation Department Streambank Inventory

Table 3-4. Barnyard Inventory Results: Balsam Branch Watershed Barnyards Draining to Surface Water

Subwatershed	Number of Barnyards	Total Phosphorus[1] (lbs)
Balsam Lake	29	1,121
Half Moon Lake	9	167
Rice Lake	4	226
Long Lake	6	84
Wapogasset Lake	36	1,824
Deer Lake	8	159
Wapogasset Branch	6	206
Loveless Lake	0	0
Antler Lake	0	0
Totals	98	3,787

[1] Annual Phosphorus Loads
Source: Barnyard Survey (Polk County Land Conservation Department, DNR and DATCP)

Results of Nonpoint Source Inventories

Upland Sediment

Intensive agricultural tillage practices cause considerable amounts of soil to erode and reach the surface waters of the Balsam Branch watershed. Erosion is the major source of phosphorus to the surface waters within this watershed.

Upland sediment sources were evaluated for the entire watershed based on the extrapolation of data gathered from representative subareas of each subwatershed (32 percent of the total watershed area). Gully erosion was surveyed in the Loveless Lake, Long Lake and Wapogasset Branch subwatersheds. Gullies in other subwatersheds were not inventoried, but findings similar to the other inventoried subwatersheds are expected.

In general, the inventory found many farmers in the watershed are already controlling upland erosion on their fields to some degree. However, many of these same fields are still delivering a substantial amount of the sediment that is eroded to the surface waters even though the overall erosion rate may be relatively low with regard to "T", or tolerable soil loss. Despite the lack of steep topography and high erosion rates, cropland erosion still represents a significant sediment source.

Water quality objectives require sediment and phosphorus from upland sources to be reduced by 28 percent throughout the watershed. Sediment reduction objectives from upland sources range from 0 in the Antler Lake subwatershed where no cropland was inventoried to 53 percent in the Rice Lake subwatershed. This objective will be met for upland sediment sources if the following is achieved:

1. Reduce soil loss from fields identified as Category I to the tolerable soil loss rate which is 4 or 5 tons per acre per year for soils in Polk County. Reducing soil loss to "T" will result in a 17 percent reduction in sediment delivery to surface waters (see chapter 4).

2. Reduce soil loss from fields with relatively high sediment delivery. In general, more sediment is delivered if soil loss is occurring close to water. If fields with soil loss below "T" but with relatively high sediment delivery are targeted, an additional 11 percent reduction of sediment delivery is projected.

Streambank and Shoreline Erosion

Streambank and shoreline erosion are not significant contributors of sediment in this watershed; however, these erosion sites contribute all of their sediment directly to the surface water and have an immediate impact on habitat quality. Table 3.3a and 3.3b summarize the streambank and shoreline inventory results.

Water quality and habitat improvement objectives will be met with regard to degraded streambank and shoreline sites if the following is achieved:

1. Restrict livestock access through fencing or grazing management as specified in chapter 4.

2. Repair sites with moderate or severe erosion.

Animal Lot and Winter Spread Manure Runoff

Runoff carrying a variety of pollutants from barnyards and other livestock feeding, loafing, and pasturing areas, and also from spread manure, is a significant source of pollutants in the Balsam Branch watershed. Inventory results show that 98 animal lots contribute 3,786 pounds of phosphorus on an annual basis. Also, it is estimated that an equivalent amount is attributable to improper storage and spreading of manure during the winter months. Most of the oxygen demanding pollutants and nutrients associated with these operations drain via concentrated flow to the tributaries and ditches in the watershed. The most significant water quality problems associated with the land spreading of livestock manure occur when wastes are spread on "high hazard areas" such as steeply sloped frozen ground, floodplains, or areas close to surface water depending on factors such as drainage area and surface condition. Table 3.4 summarizes the animal lot inventory results.

Water quality objectives will be met if the following is achieved:

1. Reduce phosphorus contributed to surface waters from livestock wastes by 60 percent.
2. Landowners participating in the project and installing barnyard systems will use NRCS Standard 590 in determining suitable acres for winter spreading of manure.
3. Landowners will be identified as Category I for winter spread manure management and potential storage eligibility based on NRCS Standard 590 (see chapter four).

Residential and Urban Nonpoint Sources

Residential Nonpoint Sources. The Balsam Branch watershed is predominantly rural, but includes the village of Balsam Lake, Milltown, and Centuria. Residential and developed areas account for only 8 percent of the total land use, however the loadings from the developed areas can contribute significant nutrients to the lakes. The potential for lawn care chemicals to be carried by runoff from shoreline areas and nearby drainage ways to the lakes is a concern. Most lawns are groomed to the edge of the water. Fertilizers and herbicides appear to be used regularly in these areas which have direct drainage to the lakes. Staff for the Balsam Branch watershed project conducted a home lawn sampling study by collecting soil samples from 25 randomly selected lake homes on Balsam, Deer, and Wapogasset Lakes. More than half of the lawns showed excessive amounts of phosphorus in the soil. Applying more phosphorus through lawn fertilizers under these conditions will cost homeowners needlessly and may also contribute nutrients to fuel unwanted plant and algae growth in the lakes.

Control of residential pollution will be achieved primarily through information and education activities.

Urban Nonpoint Sources. Urban runoff carries a variety of pollutants to surface water. Some pollutants are specific to urban runoff while others are also found in runoff from agricultural areas. Pollutants found primarily in urban runoff include heavy metals (lead, zinc, cadmium, and chromium) and a large number of toxic organic chemicals (PCB's, aromatic hydrocarbons, esters, and many others). Other substances in urban runoff that are also found in runoff from rural areas include sediment, nutrients, bacteria, and other pathogens, and pesticides.

The sources of polluted urban runoff can be divided into basic land use groups which are typically referred to a "source areas." Highways, commercial areas, and high density residential areas (more than one home per 1/4 acre) are the greatest collectors of sediment, lead, and zinc on a per acre basis. Medium density (roughly one home per 1/4 acre lot) residential areas are less important sources of sediment and lead, but are significant sources of pesticides, bacteria, and household or automotive maintenance products dumped into ditches and storm sewers. Low density (less than one home per 1/4 acre lot) residential areas, particularly in the lakeshore areas, are important where the improper use and disposal of pesticides, fertilizers, and automotive maintenance products may occur.

Stormwater Conveyance. Stormwater is most commonly conveyed to streams and lakes through a combination of storm sewers, roadside ditches, grassed swales, and/ or detention ponds. Storm sewers transport runoff rapidly with no "pretreatment" or filtering of the runoff before it enters streams. Properly designed grassed swales generally transport lesser amounts of runoff because of infiltration, and the vegetation serves to remove some pollutants from the runoff before it flows into lakes, streams, or storm sewers systems.

The village of Milltown has a storm sewer which routes water to the wetland contiguous with Rice Lake. The increased hydraulic loading and resulting flushing of water through this wetland may be accelerating the nutrient release to Rice Lake. The village of Balsam Lake has storm sewer discharges both to Balsam Lake near the dam and to Balsam Branch Creek. The village of Centuria does not have storm sewers.

Construction Site Erosion. Predicting rates of construction site erosion is difficult. However, erosion rates exceeding 75 tons/acres/year can occur. This rate of erosion is greater than what occurs on the most severely eroding croplands. The significance of nonpoint source pollution from construction site erosion in the Balsam Branch Watershed was estimated by using septic permits to determine where new building has occurred. Over the past 14 years, about 28 new permits for new septic systems were issued each year. New septic permits are equivalent to new construction except where sewers are in place. Approximately 45 percent of these sites were in sections that contain waterfront property. In the villages and other areas which are sewered, approximately 12 homes are built each year. The population of townships with land included in the watershed has grown approximately 10 percent in the past decade, and villages have grown at a total of 7 percent.

Subwatershed Discussions

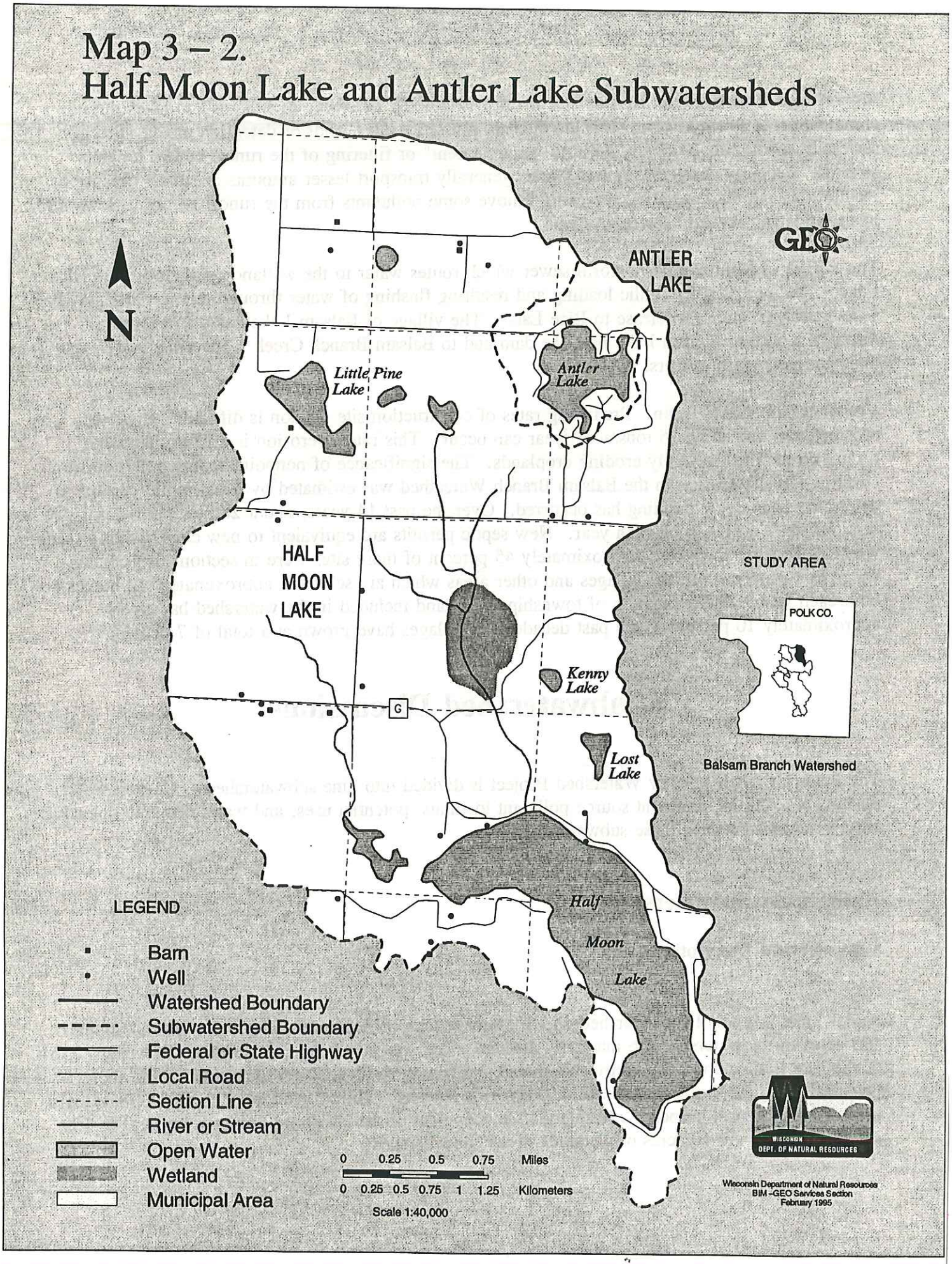
The Balsam Branch Priority Watershed Project is divided into nine subwatersheds. Current water resource conditions, nonpoint source pollutant loadings, potential uses, and water resource objectives vary somewhat between these subwatersheds.

Antler Lake Subwatershed

Subwatershed Description

Antler Lake is a small subwatershed with a drainage area of 232 acres (Map 3-2). An additional 109 acres in the watershed are internally drained. The lake is a small, 95 acre body of water. Most of the lake is surrounded by hardwood upland and has 36 residential developments on the shore. Over half the land in this watershed (210 acres) is forested. Only 3 percent of the land (11 acres) is used for agricultural purposes. Residential development of the lakeshore property amounts to 109 acres, and there are 10 acres of wetlands in the subwatershed.

Map 3 – 2.
Half Moon Lake and Antler Lake Subwatersheds



Water Resources Conditions

The lake is landlocked and is referred to as a seepage lake. The fishery consists of large mouth bass, northern pike, walleyes, and panfish. The watershed is small and has little agricultural land uses. The three largest phosphorus sources for Antler Lake have been identified as residential lakeshore runoff (37%), atmospheric deposition (33%), and lakeshore septic systems (13%). An aquatic plant sensitive area assessment has been conducted for this lake. Three areas have been designated as aquatic plant sensitive areas and have specific restrictions for the control of the aquatic vegetation. The Antler Lake association has purchased and installed an aerator which is operated and monitored throughout the winter. There has been a history of winter fish kills in the past, but since the installation of the aerator, no fish kills have occurred.

Water Resource Goals and Objectives

The following water resource management goals have been established for Antler Lake:

* Achieve and in lake water quality goal of 17 ug/l summer phosphorus concentration
* Enhance fish and wildlife habitat

The following water resource management objectives are recommended for the Antler Lake subwatershed:

1. Reduce the nutrient loading to Antler Lake from lakeshore development. This lake should be used for demonstrating practices to reduce the shoreline development impacts from residential and seasonal development. The percent nutrient reduction is not quantifiable for practices that should be installed. Examples of management actions to be implemented include using porous paving materials for roads and drives, planting vegetative buffer strips, upgrading and maintaining private waste disposal systems, using low phosphate fertilizers, etc.

2. Information and education activities focusing on "water quality friendly" yard maintenance for homeowners should be a strong focus in this watershed.

3. Protect and enhance wildlife habitat by improving wetland and grassland habitat through reduction of sediment and phosphorus loadings.

Balsam Lake Subwatershed

Subwatershed Description

Balsam Lake is the largest lake in Polk County (Map 3-3). The watershed is roughly 15,000 acres in size with land use split into approximately 8,710 acres (59%) of agricultural land, 1,264 acres (8%) of forested land, 2,810 acres (19%) of wetlands and 1,366 acres (9%) in residential development. The Balsam Lake Homeowners Association and the Balsam Lake Protection and Rehabilitation District are groups that have a long history of active lake management. These organizations have demonstrated an aggressive interest in pursuing measures to protect Balsam Lake. The district recently purchased a piece of property in the Balsam Lake Subwatershed in order to

take measures that will improve the water quality flowing from Rice Creek into Balsam Lake. Opportunities for potential measures will be investigated and potentially funded through the watershed program.

Water Resource Conditions

Balsam Lake is mesotrophic with moderate fertility. The lake has three basins, many bays, and adjoining wetlands. The lake has two main tributary streams, Harder and Rice Creeks. The largest outflow from Balsam Lake is the Balsam Branch Creek.

Approximately 60 percent of the phosphorus coming into Balsam Lake enters via the Rice Creek watershed (USGS, 1991). Lake water quality can be highly variable, depending where you are in this complex lake. Generally it is good although the water is fertile and algal blooms are periodic. Heavy macrophyte growth is present in some areas, and herbicide use and harvesting have been routinely used to control macrophytes and algal blooms.

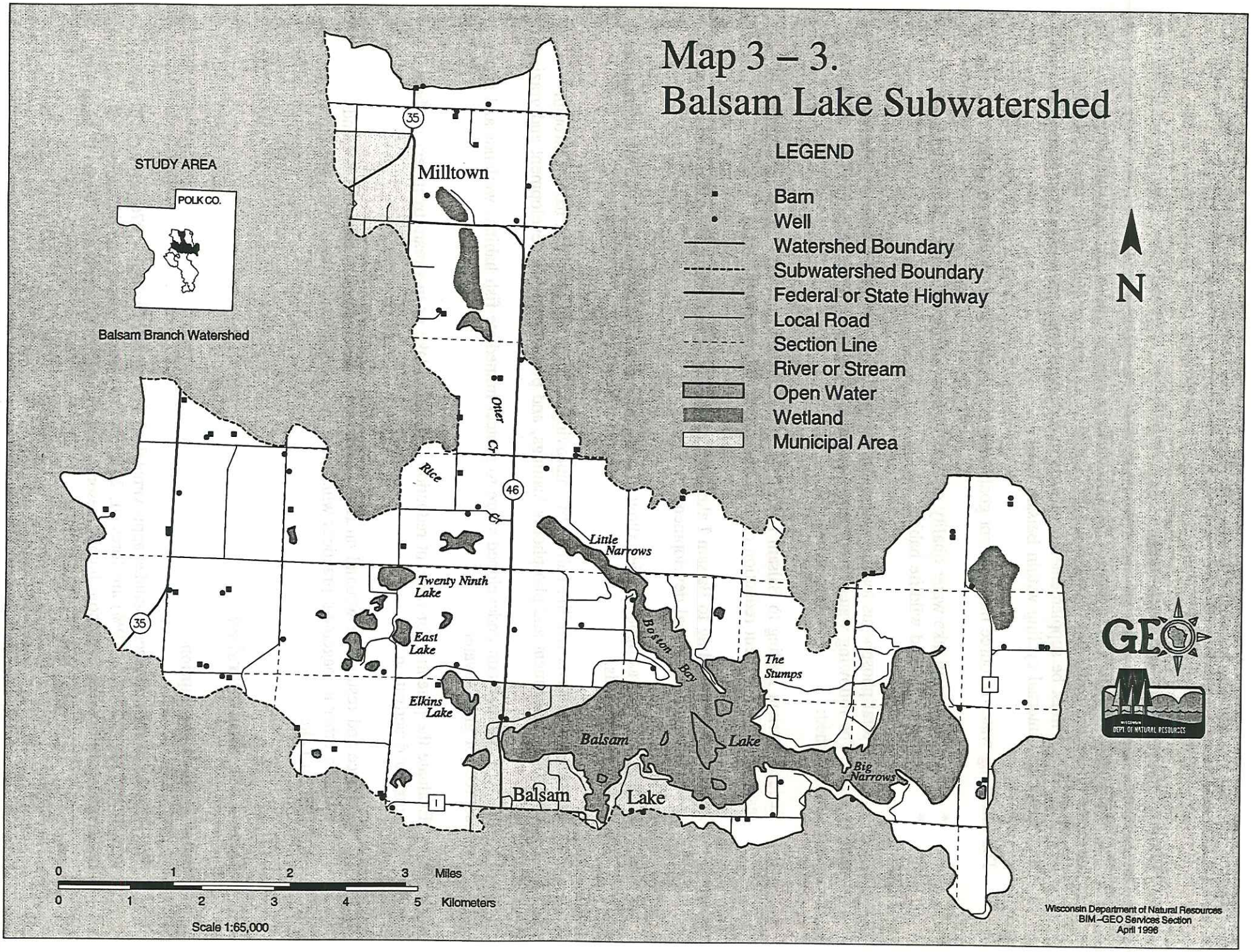
The village of Balsam Lake is located on the southwest shore near the outlet. Nearly all of the remainder of the lakeshore is developed with private homes, resorts, and marinas. Intense shoreline development is threatening the quality of the lake plant community, and increasing the risk of non-native weedy species becoming established.

Historically, the lake has supported a naturally reproducing walleye population, but since 1986 stocking has been necessary to maintain the population. This fishery receives intense fishing pressure. In 1992, 35% of the walleye were taken, the maximum harvest allowable. In addition to walleye, there are largemouth bass, northern pike, yellow perch, bluegills, pumpkinseeds, rock bass, green sunfish, crappies, white suckers, three species of bullheads, two shiner species, and brook silversides.

There is a potential for significant improvement in water clarity in Balsam Lake, particularly for Little Balsam, if nutrient deactivation techniques were to be used. In-lake remediation methods should be used only in combination with a successful nutrient reduction program in the Rice Lake subwatershed.

Streams in this subwatershed include Rice Creek, Otter Creek and Half Moon Creek. The creeks are typical of the streams throughout the watershed in that they are low gradient streams with large areas of adjacent wetlands associated with them. The primary factor affecting the use and values of these streams is beaver activity. Severe habitat changes exist on these streams due to beaver impoundments; there is ponded water rather than a flowing stream. Water quality changes from ponding include increased temperatures, potentially low dissolved oxygen concentrations, and changes in aquatic plant growth.

Map 3 – 3.
Balsam Lake Subwatershed



Water Resource Goals and Objectives

The water resource goals and objectives for Balsam Lake call for improving recreational and aesthetic values and enhancing fish and wildlife habitat. To achieve these goals, nonpoint source pollution control must be supplemented by efforts to reduce phosphorus inputs from Rice Lake via Rice Creek and internal cycling within Balsam Lake.

The following water resource management goals have been established for Balsam Lake:

* Achieve an in lake water quality goal of 16 ug/l summer phosphorus concentration
* Enhance fish and wildlife habitat

A 26.7 percent total phosphorus loading reduction will have to achieved to meet the lake water quality goal. The following water resource management objectives are recommended for the Balsam Lake subwatershed:

1. Reduce nutrient loading to Balsam Lake from subwatershed runoff by 25 percent, (this will result in a 13.7 percent reduction of total phosphorus loading to the lake).

2. Reduce nutrient loading to Balsam Lake from urban sources including the village of Balsam Lake and other residential developments.

3. Restore wetlands as opportunities allow to meet the overall watershed goal of 50% restoration of altered wetlands.

4. Protect and enhance wildlife habitat by improving wetland and grassland habitat through reduction of sediment and phosphorus loadings, and protection from development and grazing.

5. Restore and maintain undeveloped shore to protect immediate fish habitat, wetlands and spring sources of groundwater.

6. Evaluate the potential for nutrient reduction through in-lake or in-stream treatment methods for nutrient deactivation.

7. Enhance and restore the wetland on Rice Creek which is tributary to Balsam Lake and evaluate other management practices which may reduce nutrient loading from this stream to Balsam Lake.

Deer Lake Subwatershed

Subwatershed Description

The Deer Lake subwatershed includes approximately 5,909 acres of which 4,976 acres (84%) are in agricultural use, 515 acres (9%) are forested, 23 acres (1%) are wetland, and 419 acres (7%) are in residential development (lakeshore homes, resorts, and the village of Centuria). Refer to Map 3-4.

Residential development on the lakeshore is increasing not only on the immediate lake frontage, but also on backlots creating a secondary ring of homes around some portions of the lake.

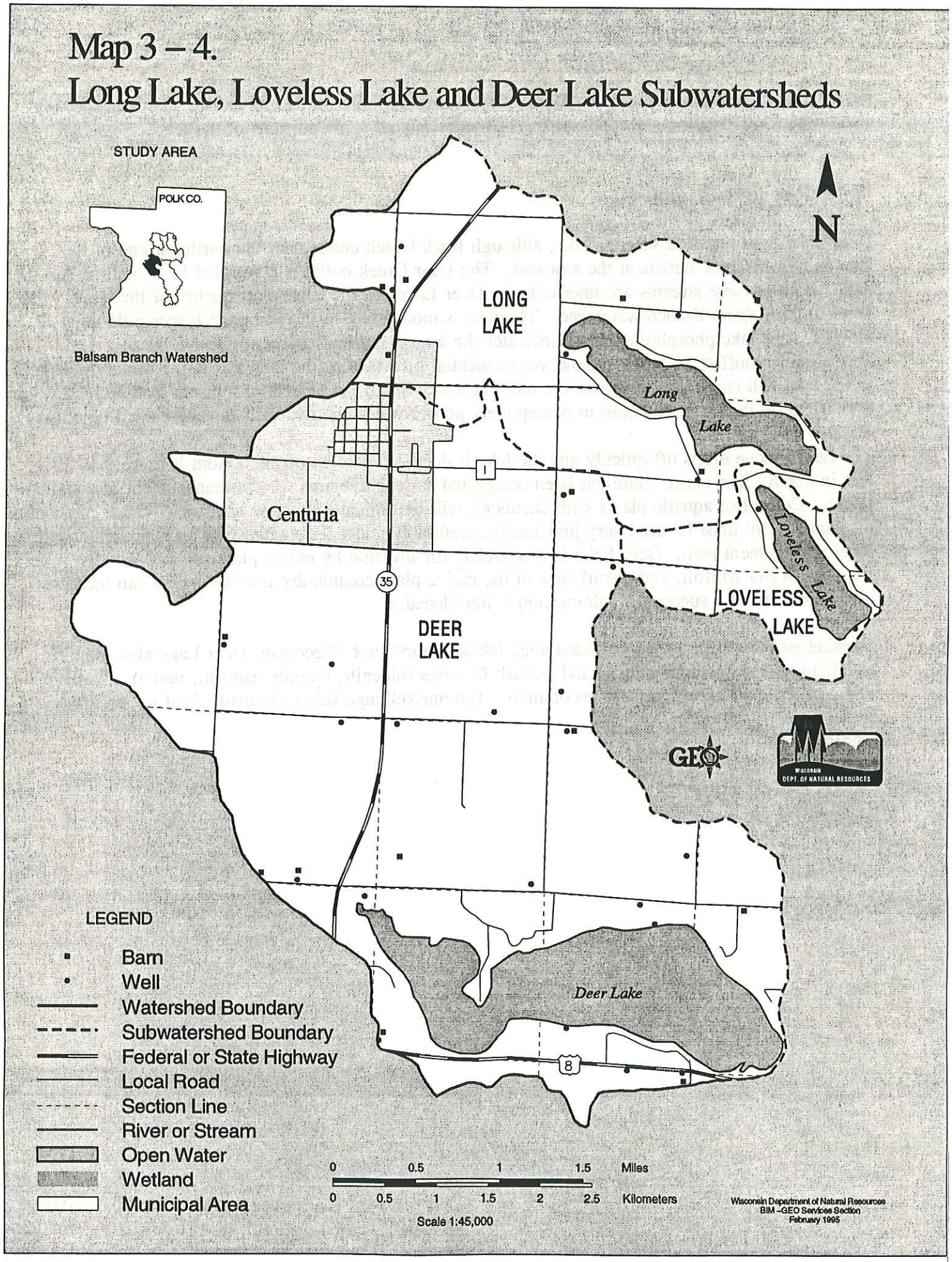
Water Resources Conditions

Deer Lake is primarily a seepage lake, although Rock Creek enters near the northeast end of the lake and Deer Creek outlets at the east end. The Deer Creek outlet is controlled by a small roller dam. Both of these streams are intermittent. Deer Lake has the best water quality of the large lakes in the Balsam Branch watershed. The lake is moderately fertile and experiences mild algal blooms. The lake phosphorus model indicates the largest nutrient source to Deer Lake is agricultural runoff at 71 percent, however residential growth near the lake and in the direct drainage to the lake will continue to increase the nutrient load. Small increments of nutrient load increases may trigger a threshold response to perceptively poorer water quality, such as severe algal blooms.

The littoral zone drops off quickly and the lake is deep; 70 percent of the bottom is more than 20 feet in depth. The entire shore has been designated as sensitive area for the management of aquatic plants. Control of aquatic plants with chemicals will be limited to narrow use lanes. Other methods of plant control must be used very judiciously, preferably under the guidance of an approved aquatic plant management plan. Deer Lake is a candidate for invasion by exotic plant species, namely Eurasian Water Milfoil, and disturbance of the native plant community is a factor that can increase the probability of a successful colonization if introduced.

Considered one of the premier muskellunge lakes in northwest Wisconsin, Deer Lake also supports excellent bass (largemouth, rock) and panfish fisheries (bluegill, crappie, sunfish, perch). Walleye and northern pike, however, are uncommon. The muskellunge fishery is maintained by stocking.

Map 3 – 4.
Long Lake, Loveless Lake and Deer Lake Subwatersheds



Water Resource Goals and Objectives

The following water resource management goals have been established for Deer Lake:

* Achieve an inlake water quality goal of 19 ug/l summer phosphorus concentration
* Protect and enhance fish and wildlife habitat

A 35.7 percent total phosphorus loading reduction will have to achieved to meet the lake water quality goal. The following resource management objectives are recommended for the Deer Lake subwatershed:

1. Reduce nutrient loading to Deer Lake from subwatershed runoff by 22 percent, (this will result in a 16.7 percent reduction of total phosphorus loading to the lake).

2. Reduce nutrient loading to Deer Lake from existing and future lakeshore development. The percent nutrient reduction is not quantifiable for the practices that should be installed. Activities to be implemented include using porous paving materials for roads and drives, planting vegetative buffer strips, upgrading and maintaining private waste disposal systems, using low phosphate fertilizers, etc.

3. Protect and enhance wildlife habitat by improving wetland and grassland habitat through reduction of sediment and phosphorus loadings.

4. Restore wetlands as opportunities allow to meet the overall watershed goal of 50 percent restoration of altered wetlands. Protect existing wetlands important maintaining water quality from development.

5. Develop an aquatic plant management plan to guide plant management in the lake for the protection of the existing aquatic plant community and protect against invasion of exotic plant species.

Half Moon Lake Subwatershed

Subwatershed Description

The Half Moon Lake subwatershed is approximately 5,624 acres in size (Map 3-2). Land use in the subwatershed includes approximately 1,856 acres (33%) of agricultural land, 1,538 acres (27%) of forested land, 1,591 acres (28%) of wetland, and 638 acres (11%) in residential development. The lake has one intermittent and one permanent inlet stream and one outlet stream. The outlet stream is Harder Creek which is a tributary to Balsam Lake.

Water Resource Conditions

An extensive tamarack marsh is associated with the intermittent inlet to the northwest. The lake has good water quality, however, there has been a noticeable decline in water quality over the past 10 to 15 years, and algal blooms have become more frequent.

Walleye are the dominant game fish. Perch are abundant, and the lake also supports good largemouth bass and panfish populations (predominantly bluegill and crappie).

Northern pike are uncommon. The fishery has undergone change over the last 10 to 15 years. In the past, natural reproduction maintained the walleye fishery; now walleye must be stocked. In addition, the lake's growing largemouth bass population may be indicative of advancing eutrophication.

An aquatic plant sensitive area determination has been completed for Half Moon Lake. Five specific areas have been identified for protection in addition to the entire lakeshore line outside of the five distinct aquatic plant community sites. Most of the lake is steep sided and the lake has a narrow littoral zone, which limits the extent of the aquatic plant growth.

Water Resource Goals and Objectives

The following water resource management goals have been established for Half Moon Lake:

* Achieve an in lake water quality goal of 22 ug/l summer phosphorus concentration
* Enhance fish and wildlife habitat

A 17.8 percent total phosphorus loading reduction will have to achieved to meet the lake water quality goal. The following resource management objectives are recommended for the Half Moon Lake subwatershed:

1. Reduce nutrient loading to Half Moon Lake from subwatershed runoff by 33 percent, (achieving this level of phosphorus reduction will exceed the level of reduction needed to achieve the water quality goal).

2. Reduce nutrient loading to Half Moon Lake from existing and future lakeshore development. The percent nutrient reduction is not quantifiable for the practices that should be installed. Activities to be implemented include using porous paving materials for roads and drives, planting vegetative buffer strips, upgrading and maintaining private waste disposal systems, using low phosphate fertilizers, etc.

3. Protect and enhance water quality and wildlife habitat by improving wetland and grassland habitat through reduction of sediment and phosphorus loadings.

4. Consider in-lake restoration measures as a means to further improve water quality.

5. Restore wetlands as opportunities allow to meet the overall watershed goal of 50 percent restoration of altered wetlands. Protect existing wetlands important to maintaining water quality from development.

Long Lake Subwatershed

Subwatershed Description

The Long Lake subwatershed is approximately 2,612 acres in size (Map 3-4). Land use in the watershed consists of 1,625 acres (62%) in agricultural use, 468 acres (18%) of forested land, 74 acres (3%) of wetland, and 445 acres (17%) in residential development (lakeshore development).

Water Resource Conditions

Long Lake is a 257 acre seepage lake (no surface water outlet). The fishery is mixed largemouth bass, northern pike, and panfish. The northern pike fishery has been periodically excellent for large trophy sized fish. Fluctuations in the lake water level affect lakeshore properties and cause concern among lakeshore residents. This lake is intensively developed and has a history as one of the most chemically treated lakes in the state for aquatic plant management.

Agricultural runoff and groundwater have been identified as the two major contributors to phosphorus in the lake. Agricultural sources account for 52 percent of the phosphorus contribution while groundwater has been determined to contribute 24 percent. At present, no known practical means of groundwater nutrient deactivation are known, however, there are a number of theoretical approaches that may be useful in reducing the groundwater phosphorus contribution. These techniques are all experimental in character and will require close evaluation to determine their feasibility.

Two aquatic plant sensitive areas have been identified on the lake.

Water Resource Goals and Objectives

The following water resource management goals have been established for Long Lake:

* Achieve an in lake water quality goal of 25 ug/l summer phosphorus concentration
* Enhance fish and wildlife habitat

A 41.3 percent total phosphorus loading reduction will have to achieved to meet the lake water quality goal. The following water resource management objectives are recommended for the Long Lake subwatershed:

1. Reduce nutrient loading to Long Lake from subwatershed runoff by 27 percent, (this will result in a 16.7 percent reduction of total phosphorus loading to the lake).

2. Protect and enhance wildlife habitat by improving wetland and grassland habitat through reduction of sediment and phosphorus loadings.

3. Evaluate techniques that may be effective in improving water quality through reducing the phosphorus groundwater contribution.

4. Restore wetlands as opportunities allow to meet the overall watershed goal of 50% restoration of altered wetlands. Protect existing wetlands important to maintaining water quality from development.

Loveless Lake Subwatershed

Subwatershed Description

The Loveless Lake subwatershed is approximately 510 acres in size (Map 3-4). Land use in the watershed consists of 123 acres (20%) in agricultural use, 131 acres (26%) of forested land, 4 acres (1%) of wetland, and 252 acres (49%) in residential development (lakeshore development).

Water Resource Conditions

Loveless Lake is 123 acres in size and is the headwaters for a small, unnamed outlet stream which is a tributary to the Balsam Branch Creek. The lake fishery is primarily bass and panfish. The lake is intensively developed and has steep sided shoreline, with high slopes to the water and a narrow littoral zone. Because of the narrow littoral zone, the entire shoreline is under a sensitive area designation for aquatic plant management.

Most of the phosphorus input to the lake is from agricultural sources (38%). Groundwater is the second largest source of phosphorus with an estimated contribution of 32 percent of the total load.

The outlet stream is unnamed and originates at a small roller dam on the lake. The stream flows about one-quarter mile into Little Bass Lake and from there flows another mile to the Balsam Branch. The habitat rating and Biotic Index rating for this stream both indicate fairly significant organic pollution.

Water Resource Goals and Objectives

The following water resource management goals have been established for Loveless Lake:

* Achieve an in lake water quality goal of 22 ug/l summer phosphorus concentration
* Enhance fish and wildlife habitat

A 28.6 percent total phosphorus loading reduction will have to achieved to meet the lake water quality goal. The following water resource management objectives are recommended for the Loveless Lake subwatershed:

1. Reduce nutrient loading to Loveless Lake from subwatershed runoff by 11 percent, (this will result in a 5.4 percent reduction of total phosphorus loading to the lake).
2. Protect and enhance wildlife habitat by improving wetland and grassland habitat through reduction of sediment and phosphorus loadings.
3. Restrict cattle access to the unnamed outlet stream from Loveless Lake to restore instream habitat and water quality.
4. Evaluate techniques that may be effective in improving water quality through reducing the phosphorus groundwater contribution.
5. Restore wetlands as opportunities allow to meet the overall watershed goal of 50 percent restoration of altered wetlands. Protect existing wetlands important to maintaining water quality from development.

Rice Lake Subwatershed

Subwatershed Description

Rice Lake is a shallow (maximum depth 6 feet), 128 acre lake located 0.6 miles southeast of the village of Milltown (Map 3-5). There is a large wetland complex on the west side of the lake which is contiguous with the lake. This subwatershed is also a significant source of nutrients to Balsam Lake via Rice Creek which flows from Rice Lake to Balsam Lake. The watershed is approximately 5,349 acres in size with 3,518 acres (66%) in agricultural land use, 612 acres (11%) of forest, 459 acres (9%) of wetlands and 658 acres (12%) in residential development (including the village of Milltown). Cash cropping is common in this subwatershed. Crops commonly raised include snap beans, corn, and alfalfa. The village of Milltown has a population of 786 (1990 Census). Stormwater from the village drains to Rice Lake via an unnamed creek.

Water Resource Conditions

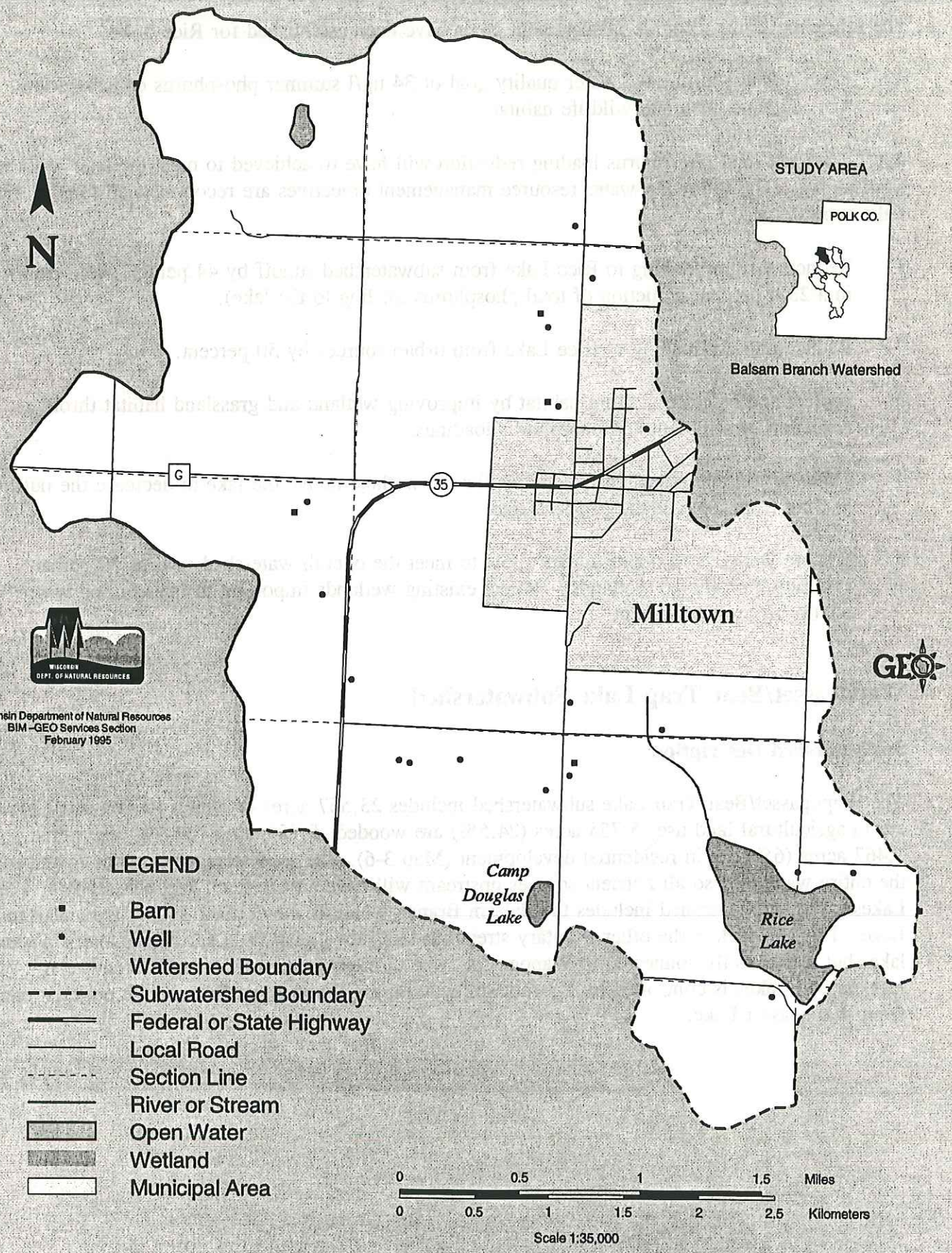
Rice Lake is basically undeveloped for recreational use and is highly eutrophic. The three largest phosphorus sources for Rice Lake are 40 percent agricultural, 36 percent wastewater related, and 12 percent urban runoff from the village of Milltown. A reduction in the nutrient loading to Rice Lake will also result in a reduction of one of the primary phosphorus loadings to Balsam Lake, (see Balsam Lake Subwatershed write-up). A primary problem on Rice Lake is an overall lack of rooted vegetation in the lake which allows wind mixing and suspension of phosphorus rich sediments. Currently the lake is dominated by planktonic algae which reduce light penetration and suppress rooted plant growth. Rooted plants would serve to stabilize sediments, uptake nutrients and prevent their transport downstream during the growing season, and improve wildlife habitat. In-lake and instream restoration projects should be pursued. These projects include the continuation of the macrophyte restoration project in Rice Lake, and evaluation for a wetland enhancement/restoration project for the tributary stream.

The wetland on the west side of the lake was the previous site of the Milltown wastewater treatment plant discharge. Poor quality wastewater was discharged to the wetland for 40 years. The wetland is no longer a point of direct discharge for the Milltown wastewater system, however, the build up of nutrients in the organic matter is a continual source of nutrient loading to Rice Lake.

Agricultural practices in the subwatershed focus mainly on cash cropping although there are 4 barnyards in the subwatershed, 3 of which are considered to be significant contributors of phosphorus to the system.

Rice Lake is also subject to urban runoff via drainage into the Rice Lake tributary stream flowing south from the village area. Urban practices should be implemented to reduce the nutrient contribution to Rice Lake.

Map 3 – 5. Rice Lake Subwatershed



Water Resources Goals and Objectives

The following water resource management goals have been established for Rice Lake:

* Achieve an in lake water quality goal of 34 ug/l summer phosphorus concentration
* Enhance fish and wildlife habitat

A 69.0 percent total phosphorus loading reduction will have to achieved to meet the lake water quality goal. The following water resource management objectives are recommended for the Rice Lake subwatershed:

1. Reduce nutrient loading to Rice Lake from subwatershed runoff by 44 percent, (this will result in a 23.4 percent reduction of total phosphorus loading to the lake).

2. Reduce nutrient loading to Rice Lake from urban sources by 50 percent.

3. Protect and enhance wildlife habitat by improving wetland and grassland habitat through reduction of sediment and phosphorus loadings.

4. Evaluate wetland management options for the wetland above the lake to decrease the nutrient loading from the wetland to Rice Lake.

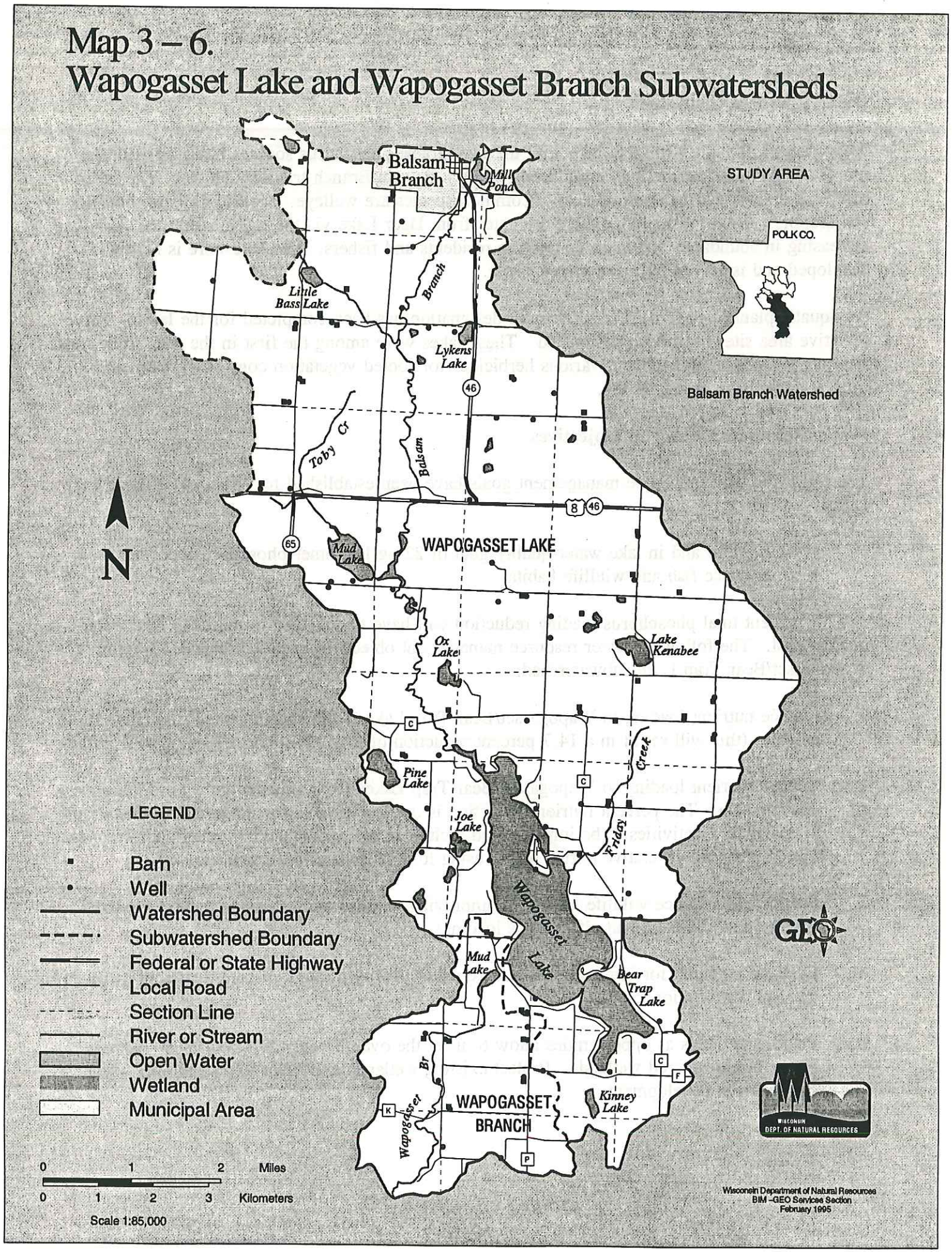
5. Restore wetlands as opportunities allow to meet the overall watershed goal of 50 percent restoration of altered wetlands. Protect existing wetlands important to maintaining water quality from development.

Wapogasset/Bear Trap Lake Subwatershed

Subwatershed Description

The Wapogasset/Bear Trap Lake subwatershed includes 23,567 acres of which 10,589 acres (45%) are in agricultural land use, 5,755 acres (24.5%) are wooded, 5,755 acres (24.5%) are wetland, and 1,467 acres (6%) are in residential development (Map 3-6). The subwatershed is at the lower end of the entire watershed so all nutrient sources upstream will have an effect on Wapogasset/Bear Trap Lakes. This subwatershed includes the Balsam Branch which is the outflow stream from Balsam Lake. Friday Creek is the other tributary stream in this subwatershed. Bear Trap Lake is a seepage lake, but it is directly connected to Wapogasset Lake through a narrows at its northwest end. Water level in both lakes is controlled by a 3-foot spillway on the Wapogasset Branch, the outlet stream from Wapogasset Lake.

Map 3 – 6.
Wapogasset Lake and Wapogasset Branch Subwatersheds



Water Resource Conditions

Wapogasset Lake is a eutrophic lake with the two largest phosphorus sources being agricultural runoff (41%) and contributions introduced from the Balsam Branch tributary (17%). The lakes contain a diverse and balanced fishery. Common species are walleye, largemouth bass, bluegill, and crappie. What muskellunge there are enter from Deer Lake via the Balsam Branch. Carp are increasing in abundance and are a concern to residents and fishers. The lakeshore is highly developed and is served by a sewerage system.

An aquatic plant management sensitive area designation has been completed for the lakes. Three sensitive area sites have been designated. These lakes were among the first in the state to be treated with copper sulfate algicide and various herbicides for rooted vegetation control. Treatment histories date back to the 1930's.

Water Resources Goals and Objectives

The following water resource management goals have been established for Wapogasset/Bear Trap Lake:

* Achieve and in lake water quality goal of 22 ug/l summer phosphorus concentration
* Enhance fish and wildlife habitat

A 27.4 percent total phosphorus loading reduction will have to achieved to meet the lake water quality goal. The following water resource management objectives are recommended for the Wapogasset/Bear Trap Lake subwatershed:

1. Reduce nutrient loading to Wapogasset/Bear Trap Lakes from subwatershed runoff by 26 percent, (this will result in a 14.7 percent reduction of total phosphorus loading to the lake).

2. Reduce nutrient loading to Wapogasset/Bear Trap Lakes from existing and future lakeshore development. The percent nutrient reduction is not quantifiable for the practices that should be installed. Activities to be implemented include using porous paving materials for roads and drives, planting vegetative buffer strips, using low phosphate fertilizers, etc.

3. Protect and enhance wildlife habitat by improving wetland and grassland habitat through reduction of sediment and phosphorus loadings.

4. Evaluate potential for improvement in lake water quality through in-lake treatment methods for nutrient deactivation.

5. Restore wetlands as opportunities allow to meet the overall watershed goal of 50 percent restoration of altered wetlands. Protect existing wetlands important to maintaining water quality from development.

Wapogasset Branch Subwatershed

Subwatershed Description

The Wapogasset Branch is the outlet stream from Wapogasset/Bear Trap Lakes and is a tributary to the Apple River (Map 3-6). Land use in this subwatershed includes 1,349 acres (45%) of agricultural practices, 627 acres (22%) forested, 854 acres (30%) wetlands, and 17 acres (1%) in rural residential use. Total acreage of this subwatershed is 2,848 of which 1,739 acres are internally drained and do not drain directly to Wapogasset Branch Creek.

Water Resource Conditions

The Wapogasset Branch is the primary drainage of the watershed and reflects fertile conditions resulting from cumulative nutrient sources moderated by the nutrient retention in the lakes.

Water Resource Objectives

The following water resource management objectives are recommended for the Wapogasset Branch subwatershed:

1. Reduce phosphorus contributions to the Wapogasset Branch from subwatershed runoff by 37 percent.
2. Restore wetlands as opportunities allow to meet the overall watershed goal of 50 percent restoration of altered wetlands.

Other Potential Sources of Water Pollution

This section describes several activities in the Balsam Branch watershed which have the potential to affect surface or ground water resources, and are outside of the scope or ability of the priority watershed project in terms of providing corrective assistance. Many of these potential pollutant sources are regulated by the State of Wisconsin through the Department of Natural Resources. Unlike nonpoint sources of pollutants, there are required conditions that must be met and which are defined in a permit, statute, or administrative rule. These regulations are established so that the water quality impacts from each operation are minimized. If the conditions are being met, it is likely that there are no significant water quality impacts occurring at the site. Permits, reports, and other information regarding the following potential sources of water pollution are on file with the Department of Natural Resources.

Municipal Wastewater Treatment Facilities

Balsam Lake Municipal Wastewater Treatment Facility - the village of Balsam Lake operates a two-cell aerated lagoon wastewater treatment facility which discharges treated water to seepage ponds. The treated water percolates through the soil and eventually reaches the groundwater.

Centuria Municipal Wastewater Treatment Facility - the village of Centuria operates a two-cell aerated lagoon wastewater treatment facility which disposes of treated water by discharging it to seepage cells. The treated water percolates through the soil and eventually reaches the groundwater.

Milltown Village Wastewater Treatment Facility - the village of Milltown operates a two-cell aerated lagoon wastewater treatment facility which is being modified to use spray irrigation to dispose of treated water. Currently the facility disposes of treated water by discharging to a seepage pond. The treated water percolates through the soil and eventually reaches the groundwater.

Wapogasset/Bear Trap Lake Sanitary District Wastewater Treatment Facility - the sanitary district operates a two cell aerated lagoon wastewater treatment facility which disposes of treated water by discharging it to seepage ponds. The treated water percolates through the soil and eventually reaches the groundwater.

Septage and Holding Tank Waste Disposal

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

Failing Septic Systems

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

The grant program applies to principal residences and small businesses built prior to July 1, 1978, and is subject to income and size restrictions. Seasonal homes are not eligible for participation in this program. Interested individuals should contact either their county zoning department or the DILHR for further information.

Land Disposal Facilities

The landfills located in the Balsam Branch watershed are primarily small landfills most commonly known as "town dumps." Several smaller private dumps and demolition landfills are also present in the watershed and are listed in the Registry of Waste Disposal Sites in Wisconsin (PUBL-SW-108-89). All landfills in the project area are now closed. Prior to covering and closure, the wastes in these town dumps were burned. The closure process included a consideration of the potential for groundwater contamination. Although there is no certainty about eventual contamination, the

landfills are not expected to present a problem. No groundwater monitoring is being conducted at any of the landfill sites.

Other Contaminated Sites

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

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

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

* The LUST Program List which includes sites identified through the Leaking Underground Storage Tank (LUST) program, (s.144.76, Stats.).

The Bureau of Solid Waste Management within the Department of Natural Resources may be contacted for more information concerning sites listed in this document.

CHAPTER FOUR
Recommended Management Actions: Control Needs and Eligibility for Cost-share Funding

Introduction

The management strategies designed to meet pollution reduction objectives are described in this chapter. (See chapter 3 for a summary of pollutant reduction goals and objectives). The major objectives for the watershed project are to reduce phosphorus inputs to lakes, protect aquatic habitat, and protect groundwater resources.

Cost sharing is provided for many of the management practices that will help achieve these watershed goals. The criteria that determine eligibility for cost-share funding through the nonpoint source program are described in this chapter.

Phosphorus Reduction

Cost share practices are available to control phosphorus (P) from the following sources:

Cropland Erosion and Nutrient Runoff
Gullies
Barnyards
Milk House Waste
Lake Sediments
Stormwater

Cost sharing for nutrient management will be available through the program to reduce over application of fertilizer and manure to reduce runoff of nutrients from fields.

Easements will be available to protect existing wetlands and restored wetlands. Cost share funds will be available for wetland restoration.

In-lake sediment treatment may be used to reduce phosphorus from lake sediments.

Structures will be considered to treat stormwater run off from the village of Milltown.

Construction site erosion control may be implemented county-wide or just in the shoreland area, to limit sediment and therefore phosphorus entering surface water.

Groundwater Protection Strategy

The following cost share practices will be promoted to protect groundwater in the watershed:

Barnyards on Internally Drained Animal Lots
Manure Pit Abandonment
Nutrient and Pest Management (includes internally drained areas).
Wetland Protection and Restoration

Aquatic Habitat Improvement

The following cost share practices will be promoted to protect and improve aquatic habitat in the watershed:

Wetland Restoration
Streambank/Shoreline Erosion Control
Riparian Fencing where Trampling Occurs
Livestock Exclusion from Wetlands
Upland Sediment Control
Easements for Wetland Protection and Restoration

Aquatic plant sensitive areas where aquatic plant management activities are limited have been designated by DNR on each of the major lakes in the watershed.

Management Categories for Cost Share Practices

Eligibility criteria have been developed for each major source of nonpoint pollution. Management categories are used for most sources to describe which sites are eligible for financial and technical assistance under the priority watershed project. Categories are based on the amount of pollution generated by a source and the feasibility of controlling the source. A definition of each management category is given below. Following this, the criteria used to define the management categories for each pollutant source are described.

The selection of a management category for a particular site must be confirmed at the time county staff visit the site. Management categories may be changed based on the conditions found at the time of the site visit. A management category may be revised up to the point that a landowner signs a cost-share agreement. If additional Category I sources are created by a landowner after the signing of a cost-share agreement, they must be controlled at the landowner's expense for a period of ten years.

Management Category I:

Nonpoint sources included in this category contribute a significant amount of the pollutants impacting surface waters and/or groundwater in the watershed. It is essential to correct these sites in order to achieve the water quality objectives for the watershed project.

Nonpoint sources in Category I are eligible for funding and/or technical assistance under the priority watershed project. As a condition of funding, all sources in Management Category I must be controlled if a landowner wishes to participate in any aspect of the watershed project.

Management Category II:

Nonpoint sources in this category collectively contribute less of the pollutant load than those in Management Category I. These nonpoint sources are eligible for cost-sharing to further insure that water quality objectives are met.

Nonpoint sources in this category are eligible for funding and/or technical assistance under the priority watershed project. Controlling sources in this category is not mandatory for a landowner to be funded for controlling other sources.

Management Category III:

Nonpoint sources of pollution in this category do not contribute a significant amount of the pollutants impacting surface waters or groundwater and are not eligible for funding and/or technical assistance under the priority watershed project. Other DNR programs (e.g., wildlife and fisheries management) can, if warranted, assist county project staff to control these sources as a part of implementation of the integrated resource management plan for this watershed. Federal programs may also be applicable to these lands.

Criteria for Eligibility and Management Category Designation

Croplands And Other Upland Sediment Sources

Sediment from eroding fields and other upland sources carries phosphorus and degrades aquatic habitat where it is deposited. An overall reduction of twenty-eight percent is targeted for agriculture and other sources of sediment.

The possibility of meeting water resource objectives through changes in cropping practices is generally examined first for controlling upland erosion in agricultural areas. Depending on the subwatershed, predicted reductions in sediment and phosphorus delivery range from 0 percent to 25 percent if fields are farmed to "T," the standard for conservation planning. Soils in Polk County generally have a tolerable soil loss of 3 to 5 tons per acre per year. "T" is met through crop rotations and tillage practices that limit soil erosion. The DNR WINHUSLE model was used by the

Polk County LCD to predict reductions in sediment and phosphorus delivery. This estimate is based on 75 percent participation. The predicted sediment and phosphorus reduction throughout the watershed if all farms are farmed to "T" is 17 percent.

Structural practices such as sediment basins will also be used to reach sediment delivery reduction goals and minimize local deposition problems in lakes in the watershed. Sediment basins are designed to temporarily pond runoff from fields to allow settling of sediments (and associated phosphorus). Periodic maintenance (dredging) of sediment basins would be required for them to function properly. Sediment basins would be constructed to avoid negative impacts to fish and wildlife. They would not be constructed in a perennial stream, nor would they be constructed where slowing water and increased temperature would negatively affect a fishery.

Easements can be used to encourage installation, allow access, and assign responsibility for maintenance of structures. The county will consider purchasing easements and taking responsibility for maintaining basins in priority areas such as the Rice Lake subwatershed and the Rice Creek area of the Balsam Lake subwatershed. Site by site determinations for consistency with watershed objectives will be used to identify easement opportunities.

Upland Erosion Standards

Category I

To assist in meeting phosphorus reduction goals, cropland must be farmed to "T," the tolerable soil loss level, on a farm by farm basis to participate in any cost share practice. Changes in crop rotations and tillage practices through conservation planning will be used to achieve "T" on a farm by farm basis without any concomitant increases in soil loss on fields already below "T". Reductions are determined on a whole farm basis. Approximately 3,000 acres are farmed above T in the watershed. If 75 percent of the cropland farmed above T is brought to T, phosphorus inputs from runoff will be reduced 17 percent.

Category II

Fields with high levels of sediment delivery but soil loss below T will be targeted for practices to reduce sediment delivery. In general, more sediment is delivered if soil loss occurs close to water. Practices to reduce sediment delivery include changes in cropping practices or structural practices. Shoreline areas within 300 feet of streams and 1,000 feet of lakes, the Rice Lake subwatershed, and the Rice Creek area of the Balsam Lake subwatershed will be priority areas to offer practices to reduce sediment delivery although any lands delivering greater than 0.3 tons/acre are eligible. Easements will be offered where necessary to allow maintenance of structures. If 30 percent of the fields that are above .3 tons per acre per acre per year sediment delivery are brought to .3, an 11 percent additional reduction of phosphorus is projected.

Table 4-1. Upland Sediment Erosion Eligibility Criteria

Management Category	Limits	Phosphorus Reduction
I	>T	17% [1]
II	>.3 [2] and <T	11% [3]
III	<.3 [2]	0

[1] Assumes 75 percent participation for Category I landowners.
[2] Sediment yield as estimated by WIN HUSLE in tons per acre per year.
[3] Assumes 30 percent participation for Category II landowners, except for Rice Lake subwatershed for which 75 percent participation is assumed.

Gully Erosion

Gully erosion causes local sediment deposition in lakes and streams in the watershed. Gullies were surveyed in the inventory process. Some large gullies, several feet deep and upwards of 200 feet long, were found in the watershed, but they do not appear to be significant throughout the watershed. Gullies were located in the Deer Lake, Long Lake, Loveless Lake and Wapogasset Lake subwatersheds. Sixteen gullies greater than three feet in depth were found.

Gullies are Category I if they meet the following criteria:

1) are at least 3 feet deep
2) have bare soils and active erosion
3) have direct connection with surface water via channelized flow
4) allow reasonable access for machinery

Gullies are Category II if conditions 1, 2, and 4 are met.

Animal Lot Runoff

To achieve the water quality objectives in the Balsam Branch Watershed Project, the phosphorus and other pollutants contained in animal lot runoff must be controlled at a high level. A 60 percent reduction of animal lot runoff is necessary to meet stated objectives in all subwatersheds but Rice Lake where an 80 percent goal is set.

A total of 114 livestock operations were inventoried. These operations contribute an estimated 3,387 pounds of phosphorus to surface water annually. Operations that contribute over 60 pounds of phosphorus to surface waters per year are classified as Category 1. Twenty eight barnyard segments fall into this category. Reducing the phosphorus contribution from each barnyard in Category 1 to 10 pounds of phosphorus would yield a 61 percent reduction. All barnyards must be designed to 10 pounds of phosphorus to be eligible for cost sharing.

Operations that contribute between 30 and 60 pounds phosphorus are classified as Category 2. Seventeen barnyard segments fall into this category. Reducing the phosphorus contribution in Category 2 will yield an 18 percent reduction. Barnyards will be designed to 10 pounds of phosphorus unless a determination is made that low cost options are more cost effective and consistent with the plan objectives. See Table 4-3 for barnyards targeted for runoff control by subwatershed.

Landowners receiving cost sharing for animal lot runoff (Waste Management System, NRCS Standard 312) are required to spread manure collected from the barnyard according to a nutrient management plan (NRCS Standard 590) for their operation. They are eligible for cost sharing to prepare the nutrient management plan. Eligible nutrient and pest management practices include the development of both nutrient (NRCS Std. 590) and pest management (NRCS Std. 595) plans, soil testing, and crop scouting.

If the waste management system does not include waste collection, handling, or storage, it is exempt from the nutrient management plan requirement. Such systems could consist of: Roof Runoff Management (588), Livestock Exclusion (472), and Clean Water Diversion (362).

Table 4-2. Animal Lot Runoff Eligibility Criteria - Balsam Branch Watershed

Management Category	Phosphorus Load per Barnyard	Number of Barnyard segments	Pounds Reduced	Percent P Reduction
I	greater than 60 lbs	28	2,327	61
II	between 30 and 60 lbs	17	695	18
III	less than 30 lbs	53	0	0

3787 total pounds of phosphorus inventoried to surface water

Concrete paving of all or portions of the yard will be allowed where the underlying soil has poor potential to attenuate pollutants to groundwater whether or not the lot is located in a designated internally drained area. Soils with poor attenuation potential include sandy and organic soils with groundwater close to the surface.

Table 4-3. Barnyards that Drain to Surface Water Targeted for Runoff Control by Subwatershed

Subwatershed	Total Phos. (lbs)	Management Category I			Management Category II			Management Category III (yards)
		Yards (#)	Control (lbs)	Control (%)	Yards (#)	Control (lbs)	Control (%)	
Balsam Lake	1,121	9	814	73	2	99	9	18
Deer Lake	159	0	0	0	2	85	53	6
Half Moon	167	0	0	0	1	42	25	8
Long Lake	84	0	0	0	1	40	48	5
Rice Lake	226	3	201	89	0	0	0	1
Wapogasset Branch	206	1	62	30	3	85	41	2
Wapogasset Lake	1,824	15	1,250	69	8	344	19	13
Antler Lake	0	0	0	0	0	0	0	0
Loveless Lake	0	0	0	0	0	0	0	0
Totals	3,387	28	2,327	61	17	694	18	53

Internally Drained Animal Lots

Fourteen internally drained lots were identified in the Balsam Branch watershed. Initial determination of eligibility for internally drained animal lots will be based on the same loading criteria as those for lots that drain to surface water. Based on these criteria, it is estimated that 1 lot is Category 1 and 2 lots are Category 2. These sites have the potential for nitrate contamination of groundwater or phosphorus inputs to groundwater flowing to surface water where groundwater is in close association with surface water.

Actual need for BMPs will be determined by county watershed staff based on pollution threat to groundwater or surface water due to depth to water table, soil texture, depth to and type of bedrock, groundwater flow, and other site conditions. Where the potential for impact to groundwater caused by an internally drained lot is uncertain, field investigations may be conducted jointly by the county project staff, water resource management investigators from the DNR's Northwest District Office, and staff from the DATCP.

Nutrient and Pest Management

Prevention of ground and surface water pollution through nutrient and pest management is more effective than treating degraded waters after damage has occurred. Farmers can benefit from nutrient and pest management plans by taking nutrient credits for legumes and landspread manure and reducing applications of commercial nutrients. Runoff from fields spread with manure and management of nutrients and pesticides are addressed through two Natural Resource Conservation Service (NRCS) standards: Nutrient Management Standard 590 and Pest Management Standard 595. Polk County is planning to develop a nutrient and pesticide management policy to supplement and clarify the water quality provisions of NRCS standards.

Any landowner in the watershed is eligible for cost sharing and will be encouraged to participate in an on-farm nutrient and pest management program to reduce over application of nutrients and pesticides. The program will consist of preparation of a nutrient management plan (or nutrient and pest management plan) and follow-up consultation. All landowners that receive cost-sharing for animal lot runoff or manure storage are required to do a nutrient management plan. However, a landowner receiving financial assistance from the Nutrient and Pest Management Program is not obligated to correct Category I pollution sources unless they sign a cost-share agreement for another practice.

Because nutrient and pest management planning has significant educational benefits, all of the farms in the watershed are eligible for this program. There are 31,000 acres of cropland on approximately 150 farms in the watershed. It is estimated that 75 percent of the farms will participate in the nutrient management program (23,250 acres) and that half of those participating (11,625 acres) will be evaluated for nutrient management and pest management. The remaining half will be nutrient management plans only.

Nutrient and pest management plans will be developed by a certified crop consultant after a landowner signs a cost share agreement with the Polk County Land Conservation Department. Emphasis will be placed on phosphorus.

Significance will be placed on developing plans which will meet the considerations of Wisconsin Technical Note- Conservation Planning-WI-1, Sec. II.D. (This requirement extends beyond the minimum criteria as defined in NRCS Standard 590 and implements the suggested criteria in section II.D of WI. Technical Note -Conservation Planning-WI-1.)

Crop consultants will notify the Polk County LCD when a soil test result has a concentration in excess of 75 ppm. The LCD will work with landowners to reduce erosion or implement other practices as may be necessary to control phosphorus loss. Landowners will be eligible to participate for up to three years and will be responsible for paying 50 percent of the consulting fees. Land Conservation staff will review the plans and provide follow-up consulting for implementation of plans.

Nutrient management activities will result in pollutant load reductions that will be tracked and reported. The amount of nutrients reduced through nutrient management will be reported at the annual watershed review meeting between DNR, the LCD, and DATCP. Professional services

contracts developed for nutrient and pest management consulting will include a provision for reporting the required information to the LCD.

Manure Storage

A nutrient management evaluation based on NRCS Standard 590 and will be used to determine eligibility for cost sharing for manure storage. An operation is eligible if the nutrient management evaluation demonstrates that manure cannot be feasibly managed without the installation of storage practices. The nutrient management evaluation must also demonstrate that proper utilization of the manure can be achieved following adoption of the intended storage practice. Manure collected from a manure storage facility cost shared under this program must be applied according to a nutrient management plan developed under NRCS Standard 590.

The eligibility for storage facilities will be based on the least cost system that will satisfy the Standard 590 specifications. These options may include manure stacks (in accordance with Std. 312), short term storage (capacity for 30 to 100 days production in accordance with Std. 313), and long term storage (capacity for up to 210 days production in accordance with Std. 313 or 425).

Landowners receiving cost-sharing funds for storage practices are required to adopt a nutrient management plan (Std. 590). Additionally, manure removed from cost-shared storage facilities designed to hold greater than 6 months, shall not be spread on frozen, snow covered, or saturated ground, as stated in NR 120. It is estimated that 60 landowners (approximately half of the number of barnyards surveyed) in the watershed will have limited lands available for spreading of manure. Much of the cropland in the Balsam Branch watershed will be limited for spreading of manure because of the prevalence of surface water.

Table 4-4. Manure Storage

Management Category	Eligibility Criteria
I	Cannot Meet 590 Standard
III	Does Not Exceed 590 standard

Animal Waste Storage Facility Abandonment

Malfunctioning animal waste storage facilities as defined in Polk County Manure Storage Ordinance (in draft form as of April 1995) will be eligible for cost sharing. Manure pits will be abandoned according to NR 120 Wis. Adm. Code requirements, to protect groundwater and surface water. Landowners with storage facilities abandoned under this cost share program will be eligible for cost sharing for new storage facilities using the following criteria:

1) Manure storage eligibility as described in the previous section, or

2) A farm is designed to collect and handle liquid manure. (This group is included to encourage proper abandonment of malfunctioning manure pits.)

Milk Center Waste

Waste from milk centers contains water, milk, and detergents. Milk has a high oxygen demand as it degrades in water, and both milk and detergents contain nutrients. Milk centers were not inventoried in the Balsam Branch watershed. They will be eligible for cost sharing when surface water contamination from a milking center is likely. Potential for surface water contamination from a milking center would normally be examined during design work for a barnyard or manure storage facility or as a result of a complaint to the Land Conservation Department or DNR. Milk center waste control systems may include a filter strip system, repair or modification of existing measures, and installation of equipment needed to transport waste. Also, the use of low phosphorus content cleaning products will be encouraged.

Streambank and Lake Shoreline Erosion

Streambanks and shorelines were inventoried in the Fall of 1993. Appendix A outlines the inventory methods that were used. Shoreline erosion in the Balsam Branch watershed contributes approximately 50 tons per year of sediment delivered to lakes. Streambanks contribute an estimated 138 tons per year of sediment to streams in the watershed. The eligibility criteria for streambanks and shorelines depend on severity of erosion at the site. The criteria are summarized in Table 4-5.

Category I sites are those with severe/moderate erosion. Severe/moderate sites are defined as having banks averaging six feet in height with a lateral recession rate of greater than 0.5 feet per year. Two sites with severe erosion were found during the streambank inventory.

Category II sites are those with moderate/mild erosion. Moderate/mild sites are defined as having banks averaging three feet in height, with a lateral recession rate of 0.1 - 0.5 feet per year.

Category III sites are those with mild erosion. Mild erosion sites are defined as having an average bank height of 1.5 feet, with lateral recession rates of 0.05 - 0.1 feet per year.

Livestock Access

Several sites were located in the watershed where livestock have trampled extensive stretches of streambank or shoreline. Trampled banks can lead to severe erosion and sedimentation of aquatic habitat. Where trampling is evident, banks are eligible for repair. Bioengineering will be the preferred method for bank stabilization. Where banks are repaired, they must be managed so that adequate sod cover will be maintained through restricting livestock access (except for a specially designed crossing), rotational grazing, or significantly reducing the number of cattle allowed access.

Where a crossing is allowed, it is an eligible cost share practice. Remote watering is also a cost-sharable practice where livestock access will be restricted.

Category I streambanks and shorelines include trampled sites where high concentrations of livestock prevent adequate sod cover maintenance. Category II streambanks and shorelines include sites where trampling is evident.

Additional sites on intermittent streams which meet the criteria above may be identified. These sites will have the same eligibility and participation criteria.

See Tables 4-6 and 4-7 for a summary of the number of landowners and the length of streambank and shoreline eligible for stabilization under the criteria described above.

Table 4-5. Streambank/Shoreline Eligibility Criteria for the Balsam Branch Watershed

Management Category	Criteria
Recession Rates	
I	>0.5 feet per year
II	0.1 to 0.5 feet per year
III	0.05 to 0.1 feet per year
Extent of Trampling	
I	Adequate sod cover not maintained
II	Trampling evident

Sources: Polk County LCD, DNR and DATCP

Table 4-6. Streambank Erosion Inventory for the Balsam Branch Watershed

Subwatershed	Slight Erosion		Moderate Erosion		Severe Erosion		Trampled Streambank	
	# Land owners	Feet	# Land owners	Feet	# Land owners	Feet	# Land owners	Feet
Balsam Lake	0	0	0	0	0	0	4	6,815
Deer Lake	UK[1]	7,725	0	0	0	0	0	0
Half Moon Lake	0	0	1	250	0	0	2	5,450
Rice Lake	0	0	0	0	0	0	0	0
Wapogasset Branch	UK	2,270	0	0	0	0	UK	5450
Wapogasset Lake	3+	6,900	0	0	2	95	7	15,260
Totals	3+	16,895	1	250	2	95	13+	32,975

[1] UK Unknown

Table 4-7. Lakeshore Erosion Inventory for the Balsam Branch Watershed

Subwatershed	Slight Erosion		Moderate		Severe		Trampled	
	# Land owner	Feet	# Land owners	Feet	# Land owners	Feet	# Land owners	Feet
Antler Lake	UK	1,650	0	0	0	0	0	0
Balsam Lake	UK	5,190	0	0	UK	15	?	?
Deer Lake	UK	3,650	0	0	0	0	0	0
Half Moon Lake	UK	2,000	1	20	0	0	0	0
Long Lake	UK	9,550	0	0	0	0	1	1,000
Loveless Lake	UK	590	0	0	0	0	0	0
Wapogasset Lake	UK	14,320	UK	3,000	0	0	0	0
Totals	UK	36,950	UK	3,020	UK	15	1	1,000

Urban Structural Practices

Urban structural practices are an eligible cost share item. Run off from the village of Milltown is a significant source of phosphorus in the Rice Lake subwatershed. Options for urban structural practices for the village of Milltown, Balsam Lake, or other developed areas will be evaluated by the DNR Northwest District Nonpoint Source Coordinator.

Wetland Restoration/Creation

Wetland restoration is an eligible best management practice for the purpose of controlling nonpoint sources of pollution. Wetlands act to filter nutrients, settle sediments, and trap organic wastes from surface runoff. A secondary benefit of wetland restoration for this program is the enhancement of fish and wildlife habitat.

Methods used to restore the pre-developed water level of an altered wetland include plugging or breaking up of existing drain tile systems, plugging drainage ditches, and scraping to remove accumulated silt. Wetlands may also be enhanced by fencing to exclude livestock.

There will be no Category I for wetland restoration. All inventoried wetlands (150-200 sites) will be Category II (eligible) for restoration. The targeted goal is to restore 50 percent (75-100 sites) of the wetland sites inventoried. A landowner receiving cost-sharing for wetland restoration is not obligated to correct other Category I sources unless they sign a cost share agreement for another practice. The altered wetlands identified in the watershed are shown in Chapter Three, Map 3-1. Any drained or altered wetland in the watershed is eligible for restoration. Priority will be given to restore sites in any of the following conditions:

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

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

2. Pastured wetlands riparian to lakes, streams, or tributaries.

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

3. Restoration of prior converted wetlands or creation of wetlands down-slope from, up-slope from, or in fields identified as Management Category I upland sediment sources.

   Restoration of wetlands in these situations will do one of two things: 1) create a wetland filter which reduces the pollutants from an up-slope field to a water resource, 2) reduce the

volume and/or velocity of water flowing from an up-slope wetland to a down-slope critical field, or 3) recreate a wetland in wet, marginal cropland to reduce pollutants from that field. Two eligibility conditions must be met to use wetland restoration in this situation:

- All upland fields draining to the wetland must be collectively controlled to a soil loss rate that is less than or equal to the soil's "T" value.

- Wetland restoration or creation will be used in conjunction with cropping practices and structures to meet sediment reduction goals.

Easements will be used to encourage wetland restoration in the watershed.

Creation of wetlands on non-hydric soils where wetlands did not previously exist is also an eligible alternative best management practice. Prior department approval is required before installation.

Prevention of Wetland Degradation

All landowners within the Balsam Branch Watershed will also be eligible (Category II) for cost share practices to protect exiting wetlands from degradation from upland erosion and sediment delivery and livestock access.

Easements will also be used for protection of existing valuable wetlands where wetlands are threatened by development, and regulatory programs do not appear to offer adequate protection. Funding sources outside of the priority watershed program will be investigated before watershed funds are committed.

Regulatory programs that provide protection against degradation of wetlands include county shoreland zoning, DNR Chapter 30 and 31 protection of navigable waters, Section 404 permits required by the Army Corps of Engineers, and administrative requirements under federal farm bills. Possible involvement of watershed staff and citizens in these processes will be investigated.

Land Easements

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

- Shoreline Buffers

- Critical Area Stabilization

- Wetland Protection, Restoration, or Creation

- Agricultural Sediment Basins

Although easements are not considered a best management practice, they can help achieve desired levels of nonpoint source pollution control in specific conditions. Easements are used to support best management practices, enhance landowner cooperation, and more accurately compensate landowners for loss or altered usage of property. The benefits of using easements in conjunction with a management practice are: 1) riparian easements allow establishment of a vegetative buffer strip to filter pollutants and can provide fish and wildlife habitat; 2) easements are 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). The primary justification of an easement must be for water quality improvement.

Within the Priority Watershed project, easements will be considered in the following situations:

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

   - there is any grazing of wetlands.
   - livestock density is so great that areas of unvegetated soil are within 60 feet of streams or intermittent streams.
   - more than 1,000 feet of stream bank are severely trampled and eroding.
   - channel erosion is exacerbated by livestock grazing such that unvegetated stream banks are two feet or more in height.

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

   - Row cropping is occurring within 60 feet or less of streams, intermittent streams, or wetlands.
   - Row cropping is being practiced on slopes greater than 6 percent.

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

   - The restored wetland will be greater than one acre.
   - A wetland is restored in the Rice Lake subwatershed or in the Rice Creek area of the Balsam Lake subwatershed.

4. Easements will also be used for protection of existing wetlands critical to maintaining water quality where wetlands are threatened by development, and regulatory programs do not appear to offer adequate protection.

5. 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.

NOTE: In addition to the criteria described above, participating landowners must control all "Management Category I" sources (through a cost-share agreement) to be eligible for an easement through the watershed project.

In-Lake Nonpoint Source Control

Nutrient inactivation is an eligible treatment to reduce internal cycling of phosphorus from bottom sediments, thereby improving water quality conditions in a lake. Alum treatments are one treatment method that may be used to meet water quality goals particularly in Balsam Lake, Long Lake, Loveless Lake, and Wapogasset/Bear Trap Lakes. Other methods for reducing internal cycling of phosphorus in Rice Lake will be investigated. However, nutrient inactivation practices should be conducted only after significant reductions in rural and urban nonpoint sources are achieved. Eligibility and adequacy of progress in controlling other nonpoint sources will be evaluated by the DNR Northwest District Nonpoint Source Coordinator and Lakes Management Coordinator.

Ordinances

Animal Waste Storage Ordinance

An animal waste storage ordinance is primarily intended 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. An animal waste storage facility ordinance requires permits for the installation, modification and major repair of animal waste storage facilities.

Poorly located, designed, constructed, or managed storage facilities can contaminate groundwater. Elevated nitrate-nitrogen concentrations are particularly common in groundwater near leaking storage facilities.

Surface water resources are also at risk when animal waste storage facilities, are improperly located, designed, or constructed. Manure overflows or blowouts from storage facilities are a serious threat to aquatic life. When above-ground facilities are improperly installed, the potential for system malfunctions increases. Drainage from these facilities can degrade surface water quality unless properly treated.

Animal waste storage facility ordinances are an essential tool in the prevention of water quality degradation. Thirty-two of Wisconsin's 72 counties have already adopted ordinances for animal waste storage.

Polk County enacted an animal waste storage ordinance in 1985. However, this ordinance applies only to earthen pits. The ordinance is in the process of being revised to encompass all pits, earthen and concrete. Also under consideration is to require nutrient management plans be prepared and implemented according to NRCS standard 590 where spreading of animal waste is causing significant pollution to enter surface or groundwater. The revised ordinance is scheduled to be presented to the Land Conservation Committee early in 1995. The new ordinance could go into effect in time for the 1995 construction season.

Construction Site Erosion Control Ordinance

Over the past several years, about 35 new homes have been constructed in the watershed each year. Many of these homes are built on the lakeshore. In light of this information, the DNR strongly suggests that Polk County pass an ordinance for preventative reasons. However, review of existing data reveals that construction sites do not represent a significant enough pollutant source in the project area at this time to warrant requiring an ordinance for grant eligibility.

The DNR will require the county to submit an annual review of building permits and population trends. If these data indicate water quality impacts have the potential to interfere with the goals of this plan, a construction site erosion control ordinance will be required at that time. The cost of implementation of an erosion control ordinance not covered by local fees may be covered by a grant from the DNR. State assistance is generally limited to 50 percent of the total costs for a period of 5 years.

The DNR suggests that the Wisconsin Construction Site Erosion Best Management Handbook (DNR Publication WR-222-89) be used as a reference for any development that occurs in the Balsam Branch Watershed.

Options for Erosion Control Regulation

The Uniform Dwelling Code in Wisconsin includes erosion control provisions for construction of 1 and 2 family dwellings. However, because the municipalities (villages and townships) within the watershed are each less than 2,500 in population, they are not required to enforce the UDC. St. Croix Falls is the only township in the watershed that has adopted the UDC. Polk County does have the option of enforcing only the erosion control provisions of the UDC where municipalities decide not to enforce the code. This would require a builder to submit an erosion control plan to the county for review, and the county to review the plan and perform follow up inspections.

Official seals must be purchased from the state at a cost of $25 for each erosion control permit. The state would also provide forms for application and inspections. The county can issue stop work

orders after a 72-hour waiting period following a notice of noncompliance and can levy fines for violations.

The Subdivision Ordinance as currently drafted requires submission of erosion control data and plans with the preliminary plat application. The plans are to be based on the publication "Wisconsin Construction Site Handbook, DNR, Publication WR-222-93." Erosion control plans for public and private roads shall follow the standards of Section 107.2 of the publication "Wisconsin Department of Transportation Standard Specifications for Road and Bridge Construction." The registered engineer or surveyor under whose seal the plans are submitted shall certify that the storm water and erosion control conditions "as built" conform to the approved plans. DNR issues stormwater permits for sites greater than 5 acres.

Enforcing existing provisions of the Polk County Shoreland Zoning Ordinance would assist in controlling construction site erosion. The ordinance (Article 9.1A) requires that filling, grading, lagooning, ditching, or excavating is done in a manner designed to minimize erosion, but does not require a permit unless the following conditions are met within 300 feet of the ordinary highwater mark:

(1) Any filling or grading on slopes >20 percent,

(2) Filling or grading of more than 1,000 square feet on slopes of 12 percent to 20 percent,

(3) Filling or grading of more than 2,000 square feet on slopes of 12 percent or less.

A permit may attach erosion control requirements. In addition, where no permit is required, there is a provision for zoning office approval of an "excavation plan" prior to construction. (Article 9.3B). This excavation plan could include an erosion control plan written according to state standards.

Currently, a permit for filling and grading in the shoreland zone is required only where slopes are greater than 20 percent. Permits should be required for the three conditions listed above. An excavation plan is generally not reviewed by the zoning office when a permit is not required.

The shoreline ordinance also regulates cutting of shrubs and trees along the shoreline to protect scenic beauty, control erosion, and reduce effluent and nutrient flow from the shoreland. Generally, no more than 30 percent or 30 feet of shrubs and trees in a 35 foot wide stretch along the shore are allowed to be cut. This provision is generally not enforced in Polk County, but must be enforced to protect the resource. The Land Conservation Department will work with the zoning office to increase enforcement efforts under this provision.

Road and Bridge Construction Erosion Control

Highway and bridge construction projects are often next to streams and water conveyance structures where erosion control is critical. Wisconsin State Statute 89.19 requires the Department of Transportation in consultation with the Department of Natural Resources, to establish standards for

the control of erosion related to highway and bridge construction, and establish a training program for persons who prepare plans for, review plans for, conduct inspections of, or engage in highway or bridge construction activities. Highway and bridge construction projects funded in whole or in part by state or federal funds are covered under this statute.

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

Land Use and Stormwater Management Planning

Land use management planning is another tool that can be used to protect surface water quality, groundwater, and wetlands in the watershed. Stormwater management planning is an important component of this planning effort. Poorly planned development can have a devastating impact on water quality. Implementation measures of land use management plans can help to alleviate these impacts. These implementation measures may include storm water management ordinances, subdivision ordinances, zoning ordinance revisions and preservation of natural sites or corridors which affect water quality.

Land use management plans may be prepared by municipalities including villages, townships, or counties. A coordinated effort among all units of government included in the watershed would provide the greatest benefit. Polk County, the villages of Balsam Lake, Centuria, and Milltown and the surrounding townships could enter into an agreement under Wisconsin Statute 66.30 to develop a growth/land use management plan. Such an effort is recommended as part of the implementation of the Balsam Branch Watershed Plan. Development and implementation (to some degree) of a land management plan and stormwater ordinances, to the extent they emphasize water quality considerations are eligible under NR 120.21 for state funding. Funding would also be available for individual municipality efforts for improving or protecting water quality if it is determined that such an approach would help meet the water quality goals of this plan.

CHAPTER FIVE
Local Government's Implementation Program

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. The emphasis of local implementation of cost share practices is in the rural areas of the watershed. Local involvement with the urban portion of the watershed is primarily in implementation of the education and information strategy outlined in chapter 6. The Department of Natural Resources may provide technical assistance and financial support directly to the villages or lake districts in the watershed, and the Land Conservation Department will assist with these efforts.

More specifically this chapter identifies:

- The agencies and units of government responsible for carrying out the identified tasks;
- The best management practices (BMPs) necessary to control pollutants on the sites identified in chapter 4;
- The cost-share budget;
- The cost containment policies;
- The cost-share agreement reimbursement procedures including administrative procedures for carrying out the project;
- Staffing needs including total hours per year and number of staff to be hired;
- Schedules for implementing the project;
- The involvement of other programs;
- The project budget including the expense for cost-sharing; and staffing for technical assistance, administration, and the information and education program.

Project Participants: Roles and Responsibilities

Landowners and Land Operators:

Owners and operators of public and private lands are important participants in the priority watershed program. They will adopt BMPs which reduce nonpoint sources of water pollution and protect and enhance fish, wildlife, and other resources. Land owners and land operators in the Balsam Branch watershed eligible for cost-share assistance through the priority watershed program include: 1) individuals; 2) Polk County; 3) other governmental units described in NR 120.02(19); 4) corporations; and 5) the State of Wisconsin.

Polk County

Polk County is the primary unit of government responsible for implementing this plan in rural areas.

The Polk County Land Conservation Committee (LCC) will act for the County Board and will be responsible contractually and financially to the State of Wisconsin for management of the project in areas with rural land uses. The County LCC will coordinate the activities of all other agencies involved with the rural portion of the project.

The specific responsibilities for the county are defined in the Wisconsin Administrative Rules, s. NR 120.04, and are summarized below:

1. Identify in writing a person to represent the county during implementation of the project.

2. Contact all owners or operators of lands identified as significant nonpoint sources (Category I) within one year of signing the nonpoint source grant agreement. The county's strategy for contacting landowners is included in this chapter.

3. Develop farm conservation plans consistent with the needs of the project.

4. Enter into nonpoint source cost-share agreements with eligible landowners and enforce the terms and conditions of cost-share agreements as defined in s. NR 120.13, Wisconsin Administrative Code.

5. For lands the county owns or operates, to enter into cost-share agreements with DNR to correct identified nonpoint sources and fulfill their obligations as a cost-share recipient.

6. Design best management practices and verify proper practice installation.

7. Reimburse cost share recipients for the eligible costs of installing BMPs at the rates consistent with administrative rules and established in this plan.

8. Prepare and submit annual work plans for activities necessary to implement the project. The Polk County Land Conservation Department (LCD) shall submit a workload

analysis and grant application to the Department of Agriculture, Trade and Consumer Protection (DATCP) as required in s. Ag. 166.50.

9. Prepare and submit to the Department of Natural Resources (DNR) and the Department of Agriculture, Trade and Consumer Protection (DATCP) the annual resource management report required under s. NR 120.21(7) to monitor project implementation by tracking changes in the nonpoint source inventory, and quantifying pollutant load reductions which result from installing BMPs.

10. Participate in the annual watershed project review meeting.

11. Conduct the information and education activities identified in this plan for which they are responsible.

Department of Natural Resources:

The role of the Department of Natural Resources (DNR) is identified in s. 144.24, Stats. and s. NR 120, Wis. Adm. Code. (NR 120). The Department has been statutorily assigned the overall administrative responsibility for the Wisconsin Nonpoint Source Pollution Abatement Program. The Department's role is summarized below.

Project Administration: Project administration includes working with the counties to ensure that work commitments required during the 10-year project implementation phase can be met. The DNR will participate in the annual work planning process with the county.

The Department reviews cost-share agreements signed by the county and the participating landowners for installing BMPs. The DNR provides guidance when questions arise concerning the conformance of proposed activities with the statutes, administrative rules, and the watershed plan.

Financial Support: Financial support for implementation of the priority watershed project is provided to each county in two ways: a local assistance grant agreement, and a nonpoint source grant agreement. These agreements are described later in this chapter.

The DNR may also enter into cost-share agreements directly with local or state units of government for the control of pollution sources on land the governments own or operate.

Project Evaluation: The DNR has responsibility for priority watershed project monitoring and evaluation activities. These efforts determine if changes in water quality occur as best management practices and other pollution controls are installed or implemented. The water quality evaluation and monitoring strategy for the Balsam Branch Watershed is included in Chapter 8. The DNR documents the results of monitoring and evaluation activities in interim and final priority watershed project reports.

Technical Assistance: The DNR provides technical assistance to the county and municipalities on the design and application of best management practices. This assistance is primarily for urban areas.

Other Responsibilities: These include:

1. The Northwest District Nonpoint Source Coordinator will arrange for DNR staff to assist county staff with site reviews to determine the impacts of nonpoint sources on wetlands and/or groundwater quality.

2. Assisting county staff to integrate wildlife and fish management concerns into selection and design of BMPs.

Department of Agriculture, Trade and Consumer Protection:

The role of the Department of Agriculture, Trade and Consumer Protection (DATCP) is identified in s. 144.25, stats., ch. 92 stats., and NR 120. In summary, the DATCP will:

1. Manage a training program for the staff involved with project implementation.

2. Cooperate with the University of Wisconsin - Extension to act as a clearinghouse for information related to agricultural best management practices, sustainable agriculture, and nutrient and pest management.

3. Assist the counties to carry out the information and education activities or tasks described in this plan.

4. Assist county staff to identify watershed participants subject to federal or state conservation compliance programs.

5. Assist counties, if requested, to develop a manure storage ordinance.

6. Assist county staff to complete annual workload analyses and grant applications for work conducted under the priority watershed project.

7. Participate in the annual project review meetings.

8. If the need arises, assist in developing technical standards for agricultural BMPs, and provide technical assistance to county staff concerning application of these practices.

9. Assist county staff to evaluate the site specific practicality of implementing rural best management practices.

10. Provide technical and engineering assistance to counties for agricultural BMPs.

Other Agencies:

The Balsam Branch Watershed Project will receive assistance from the agencies listed below.

Natural Resource Conservation Service (NRCS): This agency works through the local LCC to provide technical assistance for planning and installing conservation practices. The local NRCS personnel will work with the county staff to provide assistance with technical work when requested by the Land Conservation Committee and if NRCS staff time is available. Personnel from the Area NRCS office will provide staff training and engineering assistance for best management practices. Efforts will be made by DATCP to assist NRCS to coordinate the Balsam Branch Priority Watershed Project with the conservation compliance and other conservation provisions of the 1985 and subsequent Federal Farm Bills.

University of Wisconsin Extension (UWEX): County and Area Extension agents will provide support in developing and conducting a public information and education program aimed at increasing voluntary participation in the project. This will include assistance to carry out the information and education activities identified in this plan.

Farm Service Agency (FSA): FSA administers most of the federal programs aimed at the stabilization of the prices paid producers for agricultural products and administers federal funds for rural soil and water and other resource conservation activities. The Agricultural Conservation Program (ACP) which is administered by FSA will, to the extent possible, be coordinated with the Balsam Branch Priority Watershed Project. In addition other conservation incentives such as the Conservation Reserve Program (CRP) will be used whenever possible to control critical nonpoint sources of pollution.

Agricultural Best Management Practices (BMPs)

BMPs Eligible For Cost-Sharing And Their Rates:

Best management practices are those practices identified in NR 120 which are determined in this watershed plan to be the most effective controls of the nonpoint sources of pollution. The practices eligible for cost-sharing and the cost share rates for each BMP are listed in Tables 5-1 and 5-2 below.

Design and installation of all BMPs must meet the conditions listed in NR 120. Generally these practices use specific standard specifications included in the NRCS Field Office Technical Guide. In some cases additional specifications may apply. The applicable specifications for each BMP can be found in NR 120.14. The Department may approve alternative best management practices and design criteria based on the provisions of NR 120.15 where necessary to meet the water resource objectives. Approval for alternative agricultural BMPs, is developed in consultation with DATCP.

If the installation of BMPs destroys significant wildlife habitat, NR 120 requires that habitat will be recreated to replace the habitat lost. The DNR District Private Lands Wildlife Specialist or a designee will assist the LCD in determining the significance of wildlife habitat and the methods used to recreate the habitat. Every effort shall be made during the planning, design, and installation of BMPs to prevent or minimize the loss of existing wildlife habitat.

Table 5-1. State Cost-Share Rates for Best Management Practices[1]

BEST MANAGEMENT PRACTICE	STATE COST SHARE RATE
Field Diversions and Terraces	70%
Grassed Waterways	70%
Critical Area Stabilization	70%[2]
Shoreline Buffers	70%[2]
Wetland Restoration	70%[2]
Shoreline and Streambank Stabilization	70%[2]
Grade Stabilization Structures	70%[2]
Agricultural Sediment Basins	70%[2]
Barnyard Runoff Management	70%
Animal Lot Relocation	70%
Manure Storage Facilities	70%/50%[3]
Livestock Exclusion from Woodlots	50%
Nutrient and Pesticide Management	50%[4]
Animal Waste Storage System Abandonment	70%
Intensive Grazing Management	50%
Milking Center Waste Control	70%
Cattle Mounds	70%
Lake Sediment Treatment	70%
Urban Related Activities	50-70%

[1] Table 5-2 shows BMPs cost shared at a flat rate.
[2] Easements may be entered into with landowners identified in the watershed plan in conjunction with these BMPs. See chapter 4 for an explanation of where easements may apply.
[3] Maximum cost share amount is $35,000 for manure storage. The cost share rate is 70% for the first $20,000 costs, and 50% for the remaining costs.
[4] Spill control basins have a state cost share rate of 70%.

Table 5-2. Practices Using a Flat Rate for State Cost-Share Funding

BEST MANAGEMENT PRACTICE	FLAT RATE
Contour Farming	$ 6.00/ac (1)
Contour Stripcropping	$ 12.00/ac (1)
Reduced Tillage	$ 45.00/ac (2)
Reduced Tillage	$15.00/ac (3)
Cover and Green Manure Crop	$25.00 per acre (4)

[1] Wildlife habitat restoration components of this practice are cost-shared at 70%.
[2] $45 per acre over 3 years for reduced tillage on continuous row croplands.
[3] $15 per acre for one year only for reduced tillage on crop rotations involving hay.
[4] Cost sharing is available for up to three years if fields otherwise would contribute to degraded water quality.

Following is a brief description of some of the most commonly used BMPs included in Table 5-1 and 5-2. A more detailed description of these practices can be found in NR 120.14.

Contour Farming

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

Contour Stripcropping

Growing crops in a systematic arrangement of strips or bands, on the contour, in alternate strips of close grown crops, such as grasses or legumes, and row crops. All operations from seed bed preparation to harvest are done on the contour.

Reduced Tillage

A system which leaves substantial amounts of crop residue on the soil surface after crops are planted. The minimum amount of ground cover after planting shall be 30 percent. It is utilized in two situations; one for continuous (at least 3 consecutive years) row crops, the other for short crop rotations (no more than 2 years corn and small grains and hay) or for the establishment of forages and small grains.

Critical Area Stabilization

The planting of suitable vegetation on critical nonpoint source sites and other treatment necessary to stabilize a specific location.

Grassed Waterways

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

Grade Stabilization Structure

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

Livestock Exclusion from Woodlots

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

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. This practice includes streambank rip-rap, streambank shaping and seeding, stream crossings, livestock watering, fencing and fish habitat structures. This practice may also include plans and practices to manage or exclude livestock.

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.

Field Diversions

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

Barnyard Runoff Management

Structural measures such as filter systems and/or diversions and rain gutters to redirect surface runoff around the barnyard, and collect, convey or temporarily store runoff from the barnyard.

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.

Agricultural Sediment Basins

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

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.

Animal Lot Relocation

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

Wetland Restoration

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

Nutrient Management

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

Pesticide Management and Spill Control Basin

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 and spill control basins with liquid-tight floors for pesticide handling areas.

Easements

Although not considered to be Best Management Practices, easements are useful legal tools and their applicability is defined in Chapter 4, Management Actions. Details for such arrangements will be worked out between DNR and the counties during implementation phase.

Animal Waste Storage System Abandonment

70 percent cost sharing will be provided for the proper abandonment of leaking or improperly sited manure storage systems including abandonment of a nearby well. The practice includes proper

removal and disposal of wastes, liner materials, and saturated soil as well as shaping, filling, and seeding of the area.

Intensive Grazing Management

A grazing management scheme that divides the pasture into multiple cells (usually 5 to 30) that receive a short but intensive grazing period followed by a recovery period of approximately 28 days. Rotational grazing increases pasture production while enhancing a dense, stable vegetative cover. Rotational grazing can be installed on croplands that currently contribute nutrients, sediments or pesticides to a water resource with a maximum of 50 percent cost share. Maximum cost-share rate per watering system is $2,000.

Milking Center Waste Control

Up to 70 percent cost sharing may be provided for milk center waste control systems including: a filter strip system, repair, or modification of existing measures and installation of equipment needed to transport waste.

Cover and Green Manure Crop

Cost sharing of $25 per acre for up to three years may be allowed for cover and green manure crops if the fields otherwise would contribute to degraded water quality through soil erosion.

Cattle Mounds

70 percent cost share may be provided for cattle mounds when used with barnyard runoff control systems to replace dry lots or loafing areas that are identified as pollution sources.

Lake Sediment Treatment

70 percent cost share rate. Lake sediment treatment is a chemical, physical or biological treatment of polluted lake sediment. Dredging of sediment is not considered a cost sharable practice.

Urban Related Activities

Municipalities are required to identify and develop a schedule for implementation of: Core and Segmented Urban Programs.

Alternative Best Management Practices

- Wetland creation on sties where wetlands did not previously exist is proposed as an alternative BMP.

- The development of lake shore buffers is also proposed as an alternative BMP. The buffers shall extend a minimum of 15 feet from the shoreline inland. Eligibility will be based on site inspections done by the county and DNR staff.

BMPs Not Cost-Shared

BMPs not cost-shared, but which shall be included on the cost share agreement if necessary to control the nonpoint sources, are listed in NR 120.17. Several examples are included below.

- 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 and other activities normally and routinely used in growing crops or which have installation costs that can be passed on to potential consumers.
- Changes in location of unconfined manure stacks involving no capital cost.
- Other activities the DNR and the County determine are necessary to achieve the objectives of the watershed project.

Activities and Sources of Pollution Not Eligible For Cost Share Assistance

Priority watershed cost-share funds cannot be used to control sources of pollution and land management activities specifically listed in NR 120.10(2). The following is a partial list of ineligible activities most often inquired about for cost-sharing in rural areas.

- Operation and maintenance of cost-shared BMPs,
- Actions which have drainage of land or clearing of land as the primary objective,
- Practices already installed, with the exception of repairs to the practices which were rendered ineffective due to circumstances beyond the control of the landowner,
- Activities covered under the Wisconsin Pollution Discharge Elimination System (WPDES) Program or covered in other ways by Chapter 147 of Wis. Stats. (including livestock operations with more than 1,000 animal units, or livestock operations issued a notice of discharge under ch. NR 243),
- Septic system controls or maintenance,
- Dredging activities,
- Silvicultural activities,
- Bulk storage of fertilizers and pesticides,

- Activities and structures intended primarily for flood control,

- Practices required to control sources which were adequately controlled at the time the cost-share agreement was signed, with the exception of those that occur beyond the control of the landowner,

- Other practices or activities determined by DNR not to meet the objectives of the program.

Cost-Share Budget

Costs of Installing BMPs

The quantity and type of management practices that are required to meet the water quality objectives of this project are listed in Table 5-3. The capital cost of installing the BMPs are listed in this table assuming landowner participation rates of 100 percent and 75 percent. Also included are the units of measurement and cost per unit for the various BMPs.

The capital cost of installing the Best Management Practices is approximately $7.5 million, assuming 100 percent participation.

State funds necessary to cost-share this level of control would be about $4.7 million.

The local share provided by landowners and other cost-share recipients would be about $2.8 million.

At a 75 percent level of participation, the state funds needed to cover capital installation would be about $3.6 million.

Easement Costs

Chapter 4 identifies where nonpoint source program funds can be used to purchase easements. The estimated cost of purchasing easements on eligible lands in Polk County is shown in Table 5-3. At 100 percent participation, the estimated purchase price of easements on eligible lands would be $180,000. At 75 percent participation, the cost would be $135,000. The easement costs would be paid for entirely by the state. However, it is very difficult to determine landowner response to easements as a management tool. Easements are a relatively new tool in the Priority Watershed Program. Therefore, it is very difficult to estimate cost.

Table 5-3. Cost-share Budget Needs for Best Management Practices

Best Management Practices	Number	Cost/Unit $	Total Cost[1]	100% Participation		75% Participation	
				State Share	Local Share	State Share	Local Share
Upland NPS Control							
Change in Crop Rotation	2,000	NA[2]	0	0	0	0	0
Reduced Tillage[4]	1,500	45/ac	67,500	67,500	0	50,625	0
Reduced Tillage[5]	1,500	15/ac	22,500	22,500	0	16,875	0
Critical Area Stabilization	20	500/ac	10,000	7,000	3,000	5,250	2,250
Grass Waterways	20	3,500/ac	70,000	49,000	21,000	36,750	15,750
Field Diversions & Terraces	6,000	15/ft	90,000	63,000	27,000	47,250	20,250
Grade Stabilization	31	8,000/ea	248,000	173,600	74,400	130,200	55,800
Agricultural Sediment Basin	13	12,500/ea	162,500	113,750	48,750	85,313	36,563
Nutrient Management[7]	46,500	6/ac	279,000	139,500	139,500	104,625	104,625
Nutrient and Pest Mgmt[7]	46,500	10/ac	465,000	232,500	232,500	174,375	174,375
Shoreline Buffers	600	120/ac	72,000	50,400	21,600	37,800	16,200
Wetland Restoration	100	500/ea	50,000	35,000	15,000	26,250	11,250
Livestock Exclusion. Woods	13,000	14/rods	175,500	175,500	[3]	131,625	[3]
Animal Waste Management							
Barnyard Runoff Control							
Complete System	45	25,000/ea	1,125,000	787,500	337,500	590,625	253,125
Roof Gutters	42	800/ea	25,200	17,640	7,560	13,230	5,670
Clean Water Diversion	41	2,500/ea	102,500	71,750	30,750	53,813	23,063
Manure Storage Facility[6]	60	62,000/ea	3,720,000	2,100,000	1,620,000	1,575,000	1,215,000
Manure Storage Abandonment	10	5,000/ea	50,000	35,000	15,000	26,250	11,250
Streambank Erosion Control							
Shape and Seeding	37,355	12/ft	448,260	313,782	134,478	235,337	100,859
Fencing	2,060	14/rods	27,810	27,810	[3]	20,858	[3]
Rip-Rap	3,380	20/ft	67,600	47,320	20,280	35,490	15,210
Livestock/Machinery							
Crossing/Watering Ramp	15	3,000/ea	45,000	31,600	13,500	23,625	10,125
Remote Watering Systems	15	1,500/ea	22,500	15,750	6,750	11,812	5,063
Well Abandonement	40	1,000/ea	40,000	28,000	12,000	21,000	9,000
Subtotal							
Easements	530	300/ac	159,000	159,000	0	119,250	0
Totals			$7,504,870	$4,736,302	$2,768,568	$3,552,227	$2,076,426

1 Total cost to control identified critical pollution sources
2 NA means that cost share funds are not available for this practice
3 Local share consists of labor and any additional equipment costs, also see flat rates
4 Reduced tillage on greater than three years continuous row crops
5 Reduced tillage, including no-till, on rotations including hay
6 Maximum cost-share is $35,000
7 Nutrient and Pest Management is cost shared per ac over a three year period. Therefore, number of acres shown represents three times the eligible acres.

Source: DNR; DATCP; and the Polk County LCD

Cost Containment

Cost Containment Procedures

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

Bids: Competitive bids will be required for all structural BMPs with estimated total costs, as determined by the project technician, exceeding $5,000. The bidding process requires a minimum of two bids from qualified contractors in itemized bid format. In cases where bids were requested from a minimum of three qualified contractors, but only one bid was received, the county will determine if the bid constitutes an appropriate cost for the project. If no bids are received or if the lone bid is not deemed appropriate, counties will limit cost sharing based on average costs.

Average Costs: Average costs will be used for all structural BMPs with an estimated cost of less than $5,000 and for all non-structural BMPs not using a flat rate, unless the cost share recipient decides, and the county agrees, to bid the installation of the BMPs. If the cost share recipient or any county decides to bid a structural BMP under $5,000, the aforementioned bid procedure will pertain.

Flat Rates: BMPs using flat rates are shown in Table 5-2. The rates shown are the state's share of the practice installation costs.

Payments for "in kind" contributions will be based on the county's guidelines. Cost share recipients who wish to install a BMP using their own labor, material, and equipment must submit a quote plus one quote from a qualified contractor for the practice installation.

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

Cost-share payments will be based on actual installation costs. If actual installation costs exceed the amount of cost-sharing determined by cost estimates, then the amount paid the grantee may be increased with the approval of the Polk County Land Conservation Committee. Appropriate documentation regarding the need for changes will be submitted to the DNR.

Cost-Share Agreement Reimbursement Procedures

Nonpoint Source Grant Agreement and Administration

General Information

The Nonpoint Source Grant Agreement is the means for transmitting funds from the DNR (through the Nonpoint Source Program) to Polk County for use in funding the state's share of cost share agreements. Cost share agreements are the means to transmit funds from the county to the landowners.

A portion of the nonpoint source grant is forwarded to Polk County to allow the county to set up an "up front" account. Funds from this account are used by the county to pay landowners after practices are installed through the project. A second payment of the remainder of the grant will be made during the year. The county will submit an annual report of expenditures. The Nonpoint Source (NPS) Grant Agreement will be amended annually to provide funding needed for cost sharing for the year. The funds obligated under cost share agreements must never exceed the total funds in the NPS Grant Agreement.

Fiscal Management Procedures, and Reporting Requirements

Counties are required by NR 120 to maintain a financial management system that accurately tracks the disbursement of all funds used for the Balsam Branch Watershed Project. The records of all watershed transactions must be retained for 3 years after the date of final project settlement. A more detailed description of the fiscal management procedures can be found in NR 120.25 and NR 120.26.

Cost Share Agreement and Administration

Purpose and Responsibilities

Consistent with s. 144.25, Stats. and NR 120, Wis. Adm. Code, cost-share funding is available to landowners for a percent of the costs of installing BMPs to meet the project objectives. Landowners have five years after formal approval of the watershed plan to enter into cost-share agreements (CSA). Practices included on cost-share agreements must be installed within the schedule agreed to on the cost-share agreement. Unless otherwise approved, the schedule of installing BMPs will be within 5 years of signing of the cost-share agreement. Practices must be maintained for a minimum of ten years from the date of installing the final practice included in the cost-share agreement.

The cost-share agreement is a legal contract between the landowner and the county. The agreement includes the name and other information about the landowner and grant recipient, conditions of the agreement, the practices involved and their location, the quantities and units of measurement involved, the estimated total cost, the cost share rate and amount, the timetable for installation, and number of years the practice must be maintained. The agreements also identify and provide

information on practices not cost-shared through the nonpoint program but that are essential to controlling pollution sources (such as crop rotations). These items will be completely listed in the conservation plan and the conservation plan is tied to the CSA via addendum 2 of the CSA. Once it is signed by both parties, they are legally bound to carry out the provisions in it.

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

Local, state, or federal permits may be needed prior to installation of some BMPs. The areas most likely to need permits are 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. Landowners should consult with the Polk County Planning and Zoning Department or the Land Conservation Department offices to determine if any permits are required. The landowner is responsible for acquiring the needed permits prior to installation of practices.

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

Counties are responsible for enforcing compliance of cost-share agreements to which they are a party. Where DNR serves as a party to an agreement with a unit of government, the DNR will take responsibility for monitoring compliance. The responsible party will insure that BMPs installed through the program are maintained in accordance with the operation and maintenance plan for the practice for the appropriate length of time. Polk County will check for compliance with practice maintenance provisions once every three years after the last practice has been installed. The county must check maintenance at its own expense after the Nonpoint Source Agreement has lapsed, unless state funding for this activity becomes available at any time during the implementation or monitoring phase of this project.

Landowner Contact Strategy

The following procedure will be used to make landowner contacts.

- During the first three months of the implementation period, all landowners or operators with eligible nonpoint sources will receive a mailing explaining the project and how they can become involved from the county.

- After the initial landowner mailings, county staff will make personal contacts with all landowners that have been identified as having nonpoint sources of pollution in Management Category I. These contacts will occur within the cost-share sign-up period.

- The county will continue to make contacts with eligible (Management Category I and II) landowners and operators until they have made a definite decision regarding participation in the program. Landowners will be eligible to sign contracts for five years. If necessary, time extensions for signing contracts may be authorized by the department. The DNR's Northwest District Nonpoint Source Coordinator and the county project staff will evaluate

the cost-share sign-up rate and progress being made toward achieving the water quality goals. Performance standards will be jointly agreed to if an extension is to be authorized.

- The county will contact all eligible landowners not signing cost-share agreements by personal letter six months prior to the end of the cost-share sign-up period.

Procedure for Developing a Cost Share Agreement

Eligibility for cost-sharing is verified following a site visit, using the criteria described in chapter 4.

The development of farm conservation plans will be the primary method used to develop cost-share agreements. These plans are specific to a particular landowner and are a comprehensive approach to the abatement of the nonpoint sources of pollution, and the conservation of soil and other resources. The farm plan takes into consideration the sustainability of the agricultural resources and the management decisions of the owner or operator.

The cost share agreement specifies the items listed in the farm conservation plan that are necessary to reduce the nonpoint sources of pollution. The conservation plan and cost share agreement will document existing management which must be maintained to protect water quality.

The following procedure will be used by the county for developing and administering agreements. Below are the steps from the initial landowner contact through the completion of BMP maintenance.

1. Landowner and county staff meet to discuss the watershed project, NPS control practice needs, and coordination with conservation compliance provisions if applicable.

2. Landowner agrees to participate with the watershed project.

3. A farm conservation plan is prepared by the county.

4. The landowner agrees with the plan, a Cost Share Agreement is prepared and both documents are signed by the landowner and the county. A copy of the Cost Share Agreement (CSA) is sent to the DNR NW District Nonpoint Source Coordinator and a copy given to the landowner. The CSA will be recorded by the county with the Polk County Register of Deeds.

5. Practices are designed by the county, or their designee, and a copy of the design is provided to the landowner.

6. Landowner obtains the necessary bids or other information required in the cost containment policy.

7. Amendments to the CSA are made if necessary.

8. The county staff oversee practice installation.

9. The county verifies the installation.

10. The landowner submits paid bills and proof of payment (canceled checks or receipts marked paid) to the county.

11. Land Conservation Committees or their designated representative and if required, county boards, approve cost-share payments to landowners.

12. Checks are issued by the county to the respective landowners and project ledgers are updated.

13. The county records the check amount, number, and date.

14. DNR reimburses the county for expended cost-share funds.

Identifying Wildlife and Fishery Needs

The Polk County staff will consult with DNR's NW District wildlife management and fisheries management staff to optimize the wildlife and fish management benefits of nonpoint source control BMPs. Specifically, the county staff will contact DNR staff if in the county's opinion: fence rows, rock piles, wetlands, or other wildlife habitat components will be adversely affected by installation of agricultural BMPs.

The DNR staff will assist county staff at the county's request by:

- Identifying streambank protection practices that benefit fish and wildlife.
- Identifying wildlife habitat components that could be incorporated into vegetative filter strips along streams or in upland areas.
- Reviewing placement of agricultural sediment basins to assure that negative impacts on stream fish and aquatic life do not occur and recommending wildlife habitat components.
- Providing 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.
- Assisting to resolve questions concerning effects of agricultural nonpoint source BMPs on wetlands.

Submittal to the Department of Natural Resources

Cost-share agreements do not need prior approval from DNR, except in the following instances:

- where cost-share funds are to be used for practices on land owned or controlled by the county.
- for agreements or amendments where the cost-share amount for any practice for a landowner exceeds $50,000 in state funds, or when the total cost-share agreement amount and its amendments exceed $100,000.

- for grade stabilization structures and agricultural sediment basins with embankment heights between 15 and 25 feet and impoundment capacities of 15 to 50 acre feet.

- for streambanks to be controlled using riprap or other materials with banks over 6 feet high, according to NR 120.14. If applications are similar to each other in content, they will be reviewed to determine if future applications need be subject to this approval procedure.

- for animal lot relocation.

- for roofs over barnyards or manure storage facilities.

Local Assistance Grant Agreement Administration

General Information

The Local Assistance Grant Agreement (LAGA) is a grant from the DNR to Polk County for staff and support costs. Consistent with NR 120, the counties will use funds from the LAGA for staff to implement the project and conduct information and education activities. Other items such as travel, training, and certain office supplies are also supported by the LAGA. Further clarification of eligible costs supported by this grant is given in NR 120.14(4) and (6).

Grant Agreement Application Procedures

An annual review of the Local Assistance Grant Agreement is conducted through the development of an annual workload analysis by the county. This workload analysis estimates the work needed to be accomplished each year. The workload analysis is provided to DATCP and DNR for review and clarification. Along with the workload analysis, a grant application form is sent. Funds needed to complete the agreed upon annual workload are amended to the local assistance grant agreement.

Fiscal Management Procedures, Reporting Requirements

Polk County is required by NR 120 to maintain a financial management system that accurately tracks the disbursement of all funds used for the Balsam Branch Watershed Project. The records of all watershed transactions must be retained for 3 years after the date of final project settlement. A more detailed description of the fiscal management procedures can be found in NR 120.25 and NR 120.26. NR 120 requires quarterly reports to DATCP from the county in accordance with s. Ag. 166.40(4) accounting for staff time, expenditures, and accomplishments regarding activities funded through the watershed project. Reimbursement requests may be included with the submittal of the quarterly project reports.

Budget and Staffing Needs

This section estimates the funding and staffing required to provide technical assistance for the rural portion of this project and education and information activities for the entire watershed.

Staff Needs

Table 5-4 lists the total estimated staff needed to implement the project. Figures are provided for both the 50% and 75% levels of participation. A total of about 67,800 staff hours are required to implement this plan at a 75% landowner participation rate. This includes 10,000 staff hours to carry out the information and education program.

Currently, 2.6 positions are being funded for the Balsam Branch Watershed Project. The county and agencies will determine the need for additional staff based on the annual workload analysis. The county will assess the number and type of staff required for the final five years of the project based on the actual landowner participation following the five year cost-share sign-up period.

Staffing Costs

The estimated cost for staff at the 75% participation rate (see Table 5-5) is approximately $1.4 million. These costs will be paid by the state through the Local Assistance Grant Agreement.

Table 5-4. Estimated County LCD Staff Needs for Project Implementation

Activity	Project Years When Work Will Be Done	POLK COUNTY	
		75% Landowner Participation (Staff Hours)	50% Landowner Participation (Staff Hours)
Project and Financial Management Clerical	1-10	6,800 12,000	6,000 10,000
Information & Education Program	1-10	10,000	10,000
Pre-Contact Office Inventory; Landowner Contacts & Progress Tracking	1-5 (75 6-10 (25%	2,415	1,610
Easements	1-10	4,500	3,000
Conservation Planning & Cost Share Agreement Development	1-5 (75 6-10 (25%	1,725	1,150
Plan Revisions and Monitoring	1-5 (25 6-10 (75%	1,200	800
Practice Design & Installation Upland Sediment Control Animal Waste Management Streambank Erosion Control	1-10	 12,441 12,225 3,325	 8,294 8,150 2,216
Training	1-10	1,200	1,200
Total LCD Workload:		67,831	52,420
Estimated Staff Required for Years 1-5:		3.8 per yr	2.9 per yr
Hours		6,941 per yr	5,328 per yr
Estimated Staff Required for Years 6-10:		3.7 per yr	2.8 per yr
Hours		6,741 per yr	5,132 per yr

Source: WI Department of Natural Resources; WI Department of Agriculture, Trade and Consumer Protection and Land Conservation Department of Polk County.

Table 5-5. Polk County Total Project Cost and Grant Disbursement Schedule at 75 percent Landowner Participation

Item	Project Year 1	2-5	6-10	Total
Cost-Share Funds: Practices	$100,000	$1,534,323	$1,917,904	$3,552,227
Cost-Share Funds: Easements	$13,500	$54,000	$67,500	$135,000
Local Assistance Staff Support[1]	$138,320	$553,280	$673,400	$1,365,000
Information/Education: Direct	$4,500	$18,000	$15,000	$37,500
Other Direct: (travel, supplies, etc.)	$15,808	$63,232	$76,960	$156,000
Engineering Assistance[1]	$5,000	$20,000	$25,000	$50,000
Totals	$277,128	$2,242,835	$2,775,764	$5,295,727

[1] Local Assistance Staff Support includes staff time to perform engineering services. Some of this work may be contracted, decreasing the funds required for staff support and increasing the funds needed for engineering assistance.
Additional staff may be requested if an erosion control ordinance is implemented.
Source: Wisconsin Department of Natural Resources; Wisconsin Department of Agriculture, Trade and Consumer Protection; and the Polk County Land Conservation Department

Implementation Schedule

Grant Disbursement and Project Management Schedule

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

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

The disbursement of the grants (Local Assistance and Nonpoint Source) to Polk County will be based on an annual workload analysis and grant application process. The estimated grant disbursement schedule based on 75% participation by eligible landowners can be found in Table 5-5.

Total Project Cost

The total state funding required to meet the rural nonpoint source pollution control needs at a 75% level of landowner participation is presented Table 5-5. This figure includes the capital cost of practices, staff support, and easement costs presented above. The estimated cost to the state is $5.3 million, and the estimated cost to landowners and others is $2.1 million.

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

Involvement of Other Programs

Coordination With State and Federal Conservation Compliance Programs

The Balsam Branch 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 Soil 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 programs by December 31, 1989. There are 7 FPP plans and approximately 165 FSA plans within the watershed project.

Implementation and amendment of these conservation plans will be necessary during the implementation phase of the watershed project. Watershed project staff will inform FPP and NRCS staff of changes in plans resulting from management decisions and the installation of needed BMPs for nonpoint source pollution abatement. This comprehensive approach to farm planning will facilitate consideration of the various goals and objectives for all the programs in which the landowner participates.

Some eroding uplands in management categories 1 and 2 may need control in addition to that required for meeting sediment delivery targets, in order to meet soil erosion program goals established through other state and federal programs. Where this occurs, technical and financial assistance from the Nonpoint Source Program can be used to support practice design and installation on these critical lands. This assistance applies only where the additional control needed to meet soil erosion goals can be achieved using low cost practices.

CHAPTER SIX
Information and Education Strategy

OVERALL GOAL: *Residents of the watershed will make decisions and take actions that protect surface and ground water quality in the Balsam Branch Watershed.*

OBJECTIVES:

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

2) *Lakeshore residents will minimize phosphorus, sediment, and other polluting inputs from lakeshore property and septic systems.*

3) *Village residents will minimize phosphorus, sediment, and other polluting inputs to stormwater systems.*

4) *Landowners will protect and restore wetlands in the watershed.*

5) *Watershed residents will understand the value of surface and ground water resources and how to preserve them.*

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

For each objective identified above, the following are identified: audience, message, and suggested activities.

Audience: Groups or individuals that should be targeted. Subwatersheds of focus are indicated.

Message: Key information to communicate to the target audience.

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

Activities will be selected and presented in an annual information and education plan. The 1995 plan is included in Appendix B. Activities included in the 1995 plan are indicated with a "*" in this chapter. A strong educational program is important to the success of this plan. The 1995 plan requires 1,182 hours and $3,000 to implement. A similar number of hours and budget will be required throughout plan implementation. 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 will begin in 1996.

Implementation Team

The education strategy was developed by Polk County Land Conservation Department (LCD) staff with assistance from the watershed Citizens Advisory Committee, UW Extension, DNR, and the Land Conservation Committee.

The Polk County LCD will take lead responsibility for the implementation of the information and education strategy. The University of Wisconsin Cooperative Extension (UW-Ex), the Department of Natural Resources, (DNR), and the Department of Agriculture (DATCP) will provide supporting assistance. The LCD will work with and seek support from local units of government and organizations such as lake rehabilitation districts, villages, lake associations, and other community groups and businesses.

Strategy

Objective 1

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

Audience

Who must take action?	Who supports?
Individual farmers (operators)	Ag consultants (agronomists)
Farm and land owners	Cooperatives
	Implement dealers
	Bankers
	Seed salespersons
	FFA, VoAg (youth education)
	Cooperating agencies
	(ASCS, NRCS, DNR, UW-Ex, DATCP)
	Farm Bureau, Farmers Union

Messages

Good water quality is important to everyone.
Good neighbors protect water quality.
Nutrient management planning can help you manage your farm efficiently.
BMPs can help keep soil and nutrients on your farm.
BMPs help preserve ground and surface water quality.
Cost sharing is available to implement BMPs (emphasis year 1-5).
List and describe BMPs and cost share eligibility
e.g., manure pits and barnyard run-off systems
BMPs require regular maintenance.
Ground water quality problems are difficult to correct.
Abandoned wells are a potential source of groundwater contamination.
Preserving stream corridors and wetlands is important

Activities

* One-on-one contacts (e.g., follow-up to Nutrient Management plans)
  Informational meetings
* Demonstration tours
* Demonstration documentation (slides, fact sheets)
* Presentations at meetings of farmers groups
  Watershed newsletter
* Articles for other newsletters (CFSA, UW-Ex, Rural Electric, lake organizations, cooperatives)
* News releases
  Recognition for farms that install best management practices
* Displays (e.g., Polk County Fair, UW-Ex Dairy Day, Crop Day, Farm City Day)
* Nutrient Management Field Days

Objective 2

Lakeshore residents will minimize phosphorus, sediment, and other polluting inputs from lakeshore property and septic systems.

Audience

Who must take action?

Lakeshore residents
Rehabilitation districts
Lakeshore homeowner associations

Who supports?

Builders and developers
Landscapers
Zoning Board of Adjustment

Emphasis on Balsam Lake and Antler Lake

Messages

Good water quality is important to everyone.
Maintain water quality for fish/water sports
Yard waste/pet waste should be managed properly.
Lawn fertilizer requirements are limited - don't over-fertilize.
Buffer strips of vegetation preserve water quality.
Septic systems require regular maintenance.
Excessive amounts of run off cause problems.
Infiltration areas minimize run off.
Erosion from construction sites should be controlled.

Activities

  Watershed newsletter
* Articles in association, school newsletters
* News releases
* Workshops on lawn care and landscaping

* Demonstration sites: landscaping, erosion control

* Survey current management practices/knowledge
  Coupons for low-P fertilizer
  Posters in restaurants, bait shops, gas stations
* Presentations at meetings
  Certification/recognition for following practices
* Information at marinas when boats are launched
  Door to door information distribution
  Exchange lake organization newsletters
  Competition between lake organizations (clean-up)
  Mandatory septic system inspections at property sale
  Parade of residents (buffers on lakes, proper lawn care, aquatic vegetation management)
* Lake fairs
* Distribute informational handouts
  Construction site erosion control workshops

Objective 3
Village residents will minimize phosphorus, sediment, and other polluting inputs from stormwater systems.

Audience
Residents of Milltown and Balsam Lake
Public officials

Messages
Stormwater drains run directly into Rice Creek and Balsam Lake.
Fertilizer, detergents, leaves, and grass in storm drains cause water quality problems.

Activities
* Fact sheet - direct mail
* News releases
* School/volunteer group activity- storm drain stenciling
  Tour of homes
  Resident certificate/recognition program
  Watershed newsletter
  On-grass car wash fund-raiser

Objective 4
Landowners will protect and restore wetlands in the watershed.
Audience
Landowners throughout the watershed
Landowners at inventoried sites/CRP and pasture
Emphasis on Rice Lake subwatershed

Messages
Many wetlands in the watershed and across the country have been drained.
Farming wetlands generally isn't cost effective
Wetlands protect water quality by trapping nutrients from run off.
Wetlands provide wildlife habitat.
Buffer area around wetlands are beneficial to both wildlife and water quality.
Money is available to cover the cost of restoring wetlands on your property (emphasis in years 1-5).

Activities/delivery
* Personal contacts with landowners at inventoried sites
* Newsletter articles
* News releases
* Demonstration site tours
* Demonstration documentation (fact sheets, slides)
  Wetland visits/bird watching
  "User manual" for wetlands
  Informational meetings by subwatershed
* Displays (Lakefair)
* School group activities (teacher training to support)
  Presentations

Objective 5
Watershed residents and visitors will understand the value of water resources and the importance of preserving them.

Audience
Absentee land owners
Residents
Visitors
Elected officials
School groups
Science teachers
Youth groups
Resort/motel owners

Messages
Water resources are community assets.
We all have a role in keeping the water clean and protecting habitat.
Acknowledge contributions of cost share participants toward improved water quality.
Clean water (especially groundwater) is important to health.
Quality groundwater is key to the success of the local economy.
Point out economic impact of water resource, and the importance of preserving it.
Maintain water quality for fish/water sports.
Unused wells are a conduit for pollutants to groundwater. They must be capped.

Activities/delivery

* Lake fairs
* Watershed newsletter
* News releases
  Presentations
* Youth education (teacher training)
  Adopt-a-lake
  Billboards at public access (w/telephone # for emergency, brochures attached)
  Distribution of informational materials (e.g., telephone book covers, placemats, shopping bags, etc.)
  Well abandonment workshops.

Objective 6
Government officials will make changes to improve water quality.

Audience
Elected officials
County staff
Public works employees

Message
Standards are in place for highway/road construction, and training may be available.
Cost sharing/other funding sources available for structural BMPs and stormwater planning.
Clean streets mean clean water.
Settling basins may be needed to clean stormwater.
A construction site erosion control ordinance will help to maintain water quality in the area.
Land use impacts water quality. Growth and development needs to consider water quality.

Activities
* Meetings/presentations with elected officials and staff

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 at delivering messages, and where behavioral changes have occurred.

CHAPTER SEVEN
Integrated Resource Management

Introduction

The purpose of this chapter is to define the principles and guidelines for assuring that the watershed project is integrated with other resource management programs, organizations, and activities. Each of these activities is described below.

Fisheries

BMPs, such as streambank protection, shoreline buffer strips, easements, and in-lake treatments should be implemented in such a way that will enhance fishery habitat management. The DNR fishery manager should be consulted during the design phase of BMPs that may affect fishery habitat.

Wetland Restoration

Many restorable wetland areas exist in the watershed. General guidelines for wetland restoration, easement acquisition, and shoreline buffers to protect existing wetlands should be followed (see chapter four). Restorable wetlands were identified in the wetlands inventory conducted by DNR staff as part of a Federal 319 Grant awarded to the state.

The Balsam Branch watershed lies within what has been identified as the Wisconsin Northwest Focus Area under the North American Wetlands Conservation Act. This area is a small part of a much larger area being targeted under this act. Work associated with this act will include the restoration and enhancement of wetlands and associated uplands to increase the populations of waterfowl, nongame birds, and provide the benefits of an extensive wetland-upland complex. Some of the benefits include improved water quality, controlling flooding and erosion, and providing for public recreation. The wetlands inventory conducted for the Balsam Branch watershed shall be used to support the goals of the Wisconsin Northwest Pothole Habitat Initiative as part of the North American Wetlands Conservation Act.

Stewardship Program

Under this program, the DNR can obtain an easement on both sides of the stream (generally 66 feet wide on each side). If needed, the DNR will financially support the fencing of the stream to protect it from livestock access. Streams in the watershed should be nominated for eligibility when the DNR nomination period is opened if this program is to be used.

Endangered and Threatened Species Sites

Endangered, threatened, and special concern species and natural areas are listed in chapter two of this plan. To the extent possible, every effort should be made to protect these species. If site-specific information is needed, contact the DNR Bureau of Endangered Resources.

Cultural Resources

Procedures for coordination with state and federal historic preservation laws can be obtained from the DNR Nonpoint Source Coordinator. Since archaeological sites are found within the Balsam Branch watershed, special consideration must be given to their protection when BMP installations are being considered. Detention basins, manure storage structures, and streambank or shoreline shaping and riprapping are the most common practices that may disturb archaeological sites.

Coordination with State and Federal Conservation Compliance Programs

The Balsam Branch Priority 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 Soil Conservation Service.

Coordination with Lake Management Districts

Lake management districts are local units of government established for the purpose of protecting and rehabilitating lakes. Balsam Branch Watershed Project staff members will continue to cooperate with the three lake districts on watershed projects, attending board meetings, and public meetings

upon request. Fact sheets and other educational materials targeting riparian landowners will be distributed to lake district representatives. As local units of government, lake management districts may apply for local assistance grants (see chapter five). Balsam Lake, Long Lake, and Half Moon Lake each have an established inland lake protection and rehabilitation district under Ch. 33 Wis. Stats.

Coordination with Lake Associations

Lake associations are voluntary organizations. They raise money for special projects, cosponsor lake fairs and other events that educate and inform the public about lake issues, and participate in local actions to protect and improve lakes. Lake associations are eligible for nonpoint source program local assistance grant funds if they meet the following criteria:

* They must be incorporated under Chapter 181 Wisconsin Statutes.
* They must specify in the articles of incorporation or by-laws that they support the protection or improvement of inland lakes for the benefit of the general public and demonstrate this by their past actions.
* They must allow membership in the association to any individual living on or within one mile of the lake for at least one month each year or individuals who own real estate on or within one mile on that lake.
* They do not limit or deny the right of any member or class of members to vote as provided under Chapter 181.16(1), Wisconsin Statutes.
* They have been in existence for at least one year, have at least 25 members, and requires annual membership fees of not less that $10 nor more that $25.

State Lake Planning and Lake Protection Grant Programs

Local units of government and qualified lake associations in the watershed are eligible to receive Lake Planning Grants and/or Lake Protection Grants to do the following:

* Gather lake and watershed information and prepare lake management plans.
* Develop environmental ordinances to improve and protect lake water quality and lake ecosystems.

* Purchase property such as wetlands or shoreline buffers which will significantly contribute to lake water quality or lake ecosystems. (Note: dam property purchase or alteration is ineligible.)
* Restore wetlands.

Lake Planning Grant funds are available at a 75% cost share rate for up to $10,000 per two-year period and $30,000 for the life of the program. Lake Protection Grant funds are limited to $100,000 for property purchased, wetland restorations, and regulation development, and program funds must be matched with an equal share by the local government.

Aquatic Plant Management Program

The Department's Aquatic Plant Management (APM) program, operated under NR 107 Wis. Adm. Code, provides for the designation of "sensitive areas" of aquatic vegetation that "offer critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offer water quality or erosion control benefits to the body of water." The lakes in the Balsam Branch watershed with sensitive area designations are Antler, Half Moon, Long, Balsam, Deer, Wapogasset, and Bear Trap. The recommendations associated with each of sensitive areas are used to evaluate permit applications for chemical treatment of lake vegetation.

Coordination with Other Organizations and Activities

In addition to those activities and organizations listed above, others such as the St. Croix Watershed Alliance, Lake Management Plan activities, and Conservation Corps activities should be integrated with the watershed project to more effectively achieve water resources objectives of this plan.

CHAPTER EIGHT
Project Evaluation

Introduction

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

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

Information on these components will be collected by the Polk County Land Conservation Department (LCD) and reported on a regular basis to DNR and DATCP. Additional information on the numbers and types of practices on cost share agreements, funds encumbered on cost share agreements, and funds expended will be provided by DNR's Bureau of Community Assistance.

Administrative Review

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

1. **Accomplishment Reporting**

The Field Office Computing System (FOCS) is a computer data management system that has been developed by the US Natural Resources Conservation Service (NRCS). It is used by NRCS, DNR and DATCP to meet the accomplishment reporting requirements of all three agencies. Data on administrative accomplishments will be collected by the county LCD or using FOCS where appropriate, and will be provided to DNR and DATCP for program evaluation.

The County LCD will provide the following data to DNR and DATCP on an annual basis:

- number of personal contacts made with landowners,
- completed I&E activities,
- number of farm conservation plans prepared for the project,

- number of cost share agreements signed,
- pollutant load reductions associated with planned practices,
- number of farm conservation plan and cost share agreement status reviews completed, and
- number of farms and acres of cropland checked for proper maintenance of Best Management Practices,

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

2. **Financial Expenditures**

Local Assistant Grants are disbursed on the basis of the approved annual budget. The grant recipient receives 45% of this budget in January and 55% in late July or August. The grant recipient does not have to request either disbursement. By April 15 of the following year, the grant recipient must file a report of the total, actual expenses for the year with the Bureau of Community Assistance. If, as is usually the case, the grant recipient has spent less than the annual budget, the next July's disbursement will be adjusted downward by that amount. The following schedule illustrates the system. Assume that the LAG recipient has a $100,000 annual budget in Year 1 and in Year 2 and that there are $95,000 in actual expenses in Year 1.

Year 1		
	January	$45,000
	July/August	$55,000
Year 2		
	January	$45,000
	April 15	Report of Year 1 expenses ($95,000)
	July/August	$50,000

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

- number of landowner cost share agreements signed,
- amount of money encumbered in cost share agreements,
- number of landowner reimbursement payments made and amount paid for BMP installation
- expenditures for staff travel,
- expenditures for information and education program,
- expenditures for equipment, materials, and supplies,
- expenditures for professional services and staff support costs,
- total project expenditures for LCD staff,
- staff training expenditures,
- interest money earned and expended, and
- total county LCD budget and expenditures on the project.

3. **Time Spent On Project Activities**

The LCD will provide time summaries to both departments for the following activities on a quarterly basis:

- project and fiscal management,
- clerical assistance,
- pre-design and conservation planning activities,
- technical assistance: practice design, installation, cost share agreement status review and monitoring,
- educational activities,
- training activities, and
- leave time.

Pollutant Reduction Evaluation

Purpose

The purpose of the second evaluation component, pollutant load reduction, is to estimate reductions in nonpoint source pollutants as a result of installing BMPs. The primary means for tracking planned and installed pollutant reductions is through the use of the Operating Unit's Wisconsin Data Listing report in FOCS or its substitute. Running this report for each landowner at the time of cost share agreement preparation will provide the initial planned reductions, and also will ensure the base of information necessary to run future summary reports is entered in FOCS. Five key sources have been identified for estimating changes in pollutant loads in the Balsam Branch Watershed: a) upland sediment b) runoff from barnyards, c) number of acres managed under a nutrient management plan, d) gully erosion, and e) streambank erosion. Tracking procedure for each source is described below.

Cropland Sediment Sources

County LCD staff will use the WIN HUSLE (Wisconsin Nonpoint Source) model to estimate the percent sediment reductions due to changes in cropping practices. The county will report the information to DNR through FOCS a quarterly basis, as described above.

Animal Lot Nutrient Runoff

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

Nutrient Management Planning

The county staff shall record the number of NRCS 590 nutrient management plans developed, the number of acres managed by the plans, and the average pounds per acre of nitrogen and phosphorus credited from manure and other sources.

Gully Erosion

The county will record for each landowner, the number of gullies and the sediment being generated by the gullies at the time of contact, the number of gullies to be controlled through best management practices identified on the Cost Share Agreement, and the tons of sediment reduced through control of the gullies.

Streambanks and Shorelines

The county LCD will calculate changes in streambank and shoreline sediment in terms of tons of sediment and length of eroding sites. A tally will be kept of landowners contacted, the amount of sediment being generated at the time of contact, and changes in erosion levels estimated after installing best management practices.

Construction Sites

An annual tally of excavation plans with erosion control practices will be reported to the Department. This information will be used to further evaluate the need for a construction site erosion control ordinance.

Evaluation Monitoring

Evaluation monitoring activities in priority watersheds are planned and conducted according to monitoring program guidance in the Bureau of Water Resources, Surface Water Monitoring Strategy. However, evaluation monitoring is not conducted in every priority watershed, Currently, many of the lakes in this watershed project are monitored regularly through the DNR Self Help Monitoring Program. Water quality information is collected and submitted to the Department by lakeshore residents. These monitoring activities should continue and possibly be expanded where there is local interest. Any additional monitoring to be conducted by the DNR Northwest District water resources staff will be identified in the annual Surface Water Monitoring Strategy.

Sites will be evaluated for use in the Signs Of Success (SOS) program. This program is coordinated by the Department and is used to evaluate the effectiveness of best management practices being

installed. It is also hoped that information from the SOS program will be effective in promoting landowner participation in the project.

APPENDIX A
Watershed Planning Methods

This chapter describes the steps and procedures used to prepare this plan. These are:

- Evaluating water quality and aquatic habitat.
- Assessing pollution sources.
- Establishing water resource objectives.
- Establishing pollution reduction goals.
- Developing a nonpoint source control strategy.
- Involving the public and local units of government.

Evaluating Water Quality and Aquatic Habitat

The Department of Natural Resources (DNR) is responsible for: designating the biological and recreational uses that surface waters can support under proper management; prescribing the water quality required to sustain these designated uses; and indicating the methods to implement, achieve and maintain those conditions.

The DNR's Northwest District Water Resources Management staff conducted investigations of the existing quality and natural resource conditions for lakes and streams during 1993. Their purpose was to evaluate water quality problems and establish a basis for setting water resources management objectives. Detailed assessment results are documented in water resource appraisal reports.

Data Collection

The following is a summary of the five elements comprising the water quality and aquatic habitat investigation.

Subwatershed Delineation and Stream Segmentation

Prior to collecting field data, the watershed was divided into nine hydrologic subwatersheds. This was accomplished using 1988 1"=400' scale aerial photographs and 1"=2,000' (7.5 minute) U.S. Geological Survey quadrangle maps. These maps were also used to divide the perennial and intermittent stream network into segments. Stream segments were used to separate portions of waterways where either natural conditions or human-induced changes resulted in pronounced differences in stream character and/or water quality.

Water Quality Assessment

Surface water quality was assessed through review of historical water chemistry data and an evaluation of bottom dwelling animals (macroinvertebrates) using the Hilsenhoff Biotic Index (Hilsenhoff, 1982). Extensive bacteria (fecal coliform) surveys were conducted to assess the suitability of surface waters for recreational use. Private well samples were collected and analyzed for nitrate + nitrite and triazine herbicides. Analytical data were used to assess the quality of groundwater in the watershed.

Navigability and Recreational Use Determinations

The extent and degree to which streams are navigable was determined based on evidence of canoeing or boating, field data including evidence of stream alteration or use, and information that landowners or other local experts provided. Recreational uses were determined through field observations, file data, and information from local users.

Lake Appraisal

Lakes were evaluated for nutrient responses with various phosphorus reduction levels using a computer driven model named TROPIC. Spring phosphorus data was collected from the lakes in addition to monthly summer water quality samples.

Lake Sensitive Area Designations

An evaluation of lakeshore habitat provided by the aquatic plant community on each of the major lakes in the watershed was conducted. The evaluations were conducted by a team of resource managers including a fish manager, wildlife manager, water regulation and zoning manager and a water quality manager. Each sensitive area has identified restrictions on it to limit the plant management activities that maybe permitted.

Assessing Pollution Sources

The purpose of the pollution source assessment is to identify the rural and urban sources and quantities of pollutants impacting surface waters. Rural and urban pollutant sources assessed for this watershed are discussed below.

Rural Nonpoint Sources

Excessive quantities of sediment, nutrients, oxygen demanding substances, pesticides and bacteria are pollutants carried in runoff draining agricultural areas. These pollutants degrade surface water quality thereby restricting recreational and biological uses. The principal rural nonpoint sources evaluated in preparing this plan include:

- Barnyards and livestock area runoff.
- Eroding uplands delivering sediment to surface waters.
- Eroding, slumping, or trampled streambanks.
- Gullies.

The Polk County Land Conservation District (LCD) staff conducted inventories during 1993. Inventory procedures are documented at the LCD office. The LCD in cooperation with DNR and the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) completed the data analyses. Inventory and evaluation procedures are summarized below.

Barnyard and Livestock Area Runoff

The LCD staff mapped the locations of 98 barnyards in the watershed on 1988 1"=400' scale aerial photographs. A field survey of each barnyard was conducted to collect information needed to determine its pollution potential.

The barnyard data was used in the "BARNY" Model (Baun, 1992), a modification of the animal lot runoff model, which the U.S. Department of Agriculture, Agricultural Research Service developed (Young, 1982). Information about the mass loading of total phosphorus annually was generated to evaluate the relative pollution potential of each barnyard. The livestock operations were ranked according to their potential to impact surface and/or groundwater quality.

Upland Erosion and Sediment Delivery

The LCD staff conducted the inventory on about 19 square miles, or 32 percent of the watershed that is not internally drained, using existing data and field investigations. Cropland, pastures, grasslands, woodlands, residential land, and other open (non-urban) land uses were investigated. Existing data sources included site specific farm conservation plans, 1988 1"=400' scale aerial photographs, and U.S. Geological Survey 1"=2,000' scale quadrangle maps. The information obtained for each parcel included size, soil type and erodibility, slope percent and length, land cover, crop rotation, present management, overland flow distance and destination, channel type, and receiving water.

Upland erosion and sediment delivery was estimated using the Wisconsin Nonpoint Source (WIN HUSLE) Model (Baun & Snowden, 1992). The WIN HUSLE model calculates the average annual quantity of eroded soil reaching surface waters from each farm field. The determination is made based on a "typical" year of precipitation. Estimated sediment delivery was used to assess the relative pollution potential of each farm field in the watershed.

The WIN HUSLE model appears to over-predict the sediment and phosphorus delivery for the pitted topography of this watershed. When estimates of phosphorus calculated from WIN HUSLE were used to predict in-lake phosphorus concentration for lakes in the waters, the values were 4-10 times higher than actual measurements. For this reason, WIN HUSLE was not used to estimate absolute values for sediment and phosphorus delivery. Instead, the percentage change in predicted sediment and phosphorus delivery after implementation of management methods will be used to estimate the effectiveness of the changes.

Streambank/Shoreline Erosion

The LCD staff conducted field surveys on about 44 miles of perennial and intermittent streams and 64 miles of lake shoreline. The method used is a modification of the streambank erosion analysis included in Phase II of the Land Inventory Monitoring process used by the U.S. Department of Agriculture, Soil Conservation Service. At locations where erosion was occurring, the following information was recorded:

- Length of trampled or eroding bank.
- Vertical height.
- Estimated annual rate of recession.
- Adjacent land uses.
- Potential management measures.

The amount of sediment lost annually was calculated for each erosion site. In addition, areas adjacent to streams impacted by livestock, but which were not necessarily eroding at a high rate, were also noted.

Other Pollution Sources

Additional sources of surface water pollution beyond those discussed in this plan are degrading water quality in the watershed. These pollution sources have the potential of overshadowing improvements in water quality that might otherwise occur as a result of the priority watershed program.

The DNR conducted an inventory and evaluation of these other pollution sources. Inventory results and recommendations for alleviating the water quality impacts of these other pollution sources are documented in Chapter Four of this plan.

Establishing Water Resource Objectives

Recreational and biological water resource objectives were established for each of the streams and lakes in the watershed. These objectives identify how the project is anticipated to change the quality of the aquatic environment for recreational and biological uses. Factors considered in establishing water resource objectives include: existing water quality and aquatic habitat; factors or pollutants that may be preventing the surface water from reaching its full potential of supporting biological and recreational uses; and the practicality of reducing pollutants.

Establishing Pollution Reduction Goals

Nonpoint pollution reduction goals are estimates of the level of nonpoint source control needed to meet the water quality and recreational use objectives identified in this plan. Pollution reduction goals and water resource objectives are established together since they are integrally related.

Developing a Nonpoint Source Management Strategy

The final step in the planning process is the development of a strategy for achieving the nonpoint source pollution reduction goals identified in the plan. Several items are addressed in developing the management strategy including:

- Critical nonpoint pollution sources.
- Effective management practices and guidelines for use of state cost-share funds for practice installation.

- Responsibilities, estimated workloads, and work schedules for local implementing agencies, and guidelines for use of state funds to support local implementation activities.
- Estimated cost of installing practices and supporting staff at the local level.
- Information and education needs.
- Project evaluation needs.

Identification of critical nonpoint sources eligible for cost share and technical assistance under the Nonpoint Source Water Pollution Abatement (NPS) Program were determined by:

- Evaluating pollutant loading for major nonpoint sources in each subwatershed.
- Developing criteria to determine which sources need to be controlled.
- Applying the criteria to determine eligibility for participation in the priority watershed project.

This evaluation was carried out on a subwatershed and watershed basis for the nonpoint sources. The result is a site specific ranking of nonpoint sources and a determination of financial and technical assistance to be made available through the nonpoint source program for the control of NPS pollution.

Involving the Public and Local Units of Government

A citizen's advisory committee and two technical work groups were convened to assist in preparing this watershed plan. The advisory committee contained representatives from towns in the watershed, lake associations and districts, agricultural producers, and an environmental organization. This committee primarily provided policy guidance during the planning process and reviewed the draft plan.

APPENDIX B
1995 Education Plan

PLANNED INFORMATION AND EDUCATION ACTIVITIES
Balsam Branch Watershed Project

April 10, 1995 - December 31, 1995

MULTIPLE OBJECTIVES

Activity	Schedule	Number	LCD Hours	UW-Ex Hours	Cost
Preimplementation	1/95-5/95		48		$150
Develop 1996 plan	10/95	1	20	C8 A8	0
1995 Evaluation	10/95(d) 12/95(f)	1	20	C4 A4	0
OBJ1 SUBTOTAL			328		$1,185
OBJ2 SUBTOTAL			612		$650
OBJ3 SUBTOTAL			32		$205
OBJ4 SUBTOTAL			74		$410
OBJ5 SUBTOTAL			48		$400
TOTAL			1,182.00		$3,000.00

C = County Extension Agent
A = Area Water Quality Specialist

OBJECTIVE 1: Agricultural producers will minimize nutrient, sediment, and other polluting inputs from farming activities by adopting best management practices.

Activity	Schedule	Number	LCD Hours	UW-Ex Hours	Cost
One-on-One visits	7/95-12/95	20	80		$0
News releases/articles	6/95, 8/95 10/95	3	12	C8	$0
Barnyard demo tour	8/95	1	40	C8	$100
BY demo fact sheet	7/95	1	15	C2	$35
Presentations	on demand	4	32		$100
Newsletter articles	7/95 10/95	2	8	C4	$0
Develop displays (NPM/cost share)	4/95, 5/95	2	50		$400
Present displays (dairy days, County Fair)	4/95, 8/95	2	75		$400
Nutrient mgmt. field day	8/95	1	16	C16, NPM60	$100
Subtotal			328.00		1,235.00

OBJECTIVE 2: Lakeshore residents will minimize phosphorus, sediment, and other polluting inputs from lakeshore property and septic systems.

Activity	Schedule	Number	LCD Hours	UW-Ex Hours	Cost
News releases/articles	5/95, 6/95, 7/95, 8/95, 9/95	5	20	C16	$50
Demo sites, lakefront BMPs	6/95	4	40	C20	$300
Lakefront BMP workshop	7/95	3	20	C20	$100
Newsletter articles	5/95, 7/95, 9/95	3	12		$0
Presentations	as needed	10	40		$0
Lakeshore resident survey/ Info distribution at marinas	6/95, 8/95		400		$200
Lake fair (Amery)	7/95		80		paid through another grant
SUBTOTAL			612.00		$650.00

OBJECTIVE 3: Village residents will minimize phosphorus, sediment, and other polluting inputs from stormwater systems.

Activity	Schedule	Number	LCD Hours	UW-Ex Hours	Cost
Fact sheet - distributions	7/95, 9/95	2	16	A4	$155
News releases/articles	6/95, 9/95	2	8		$0
Storm drain stenciling	?		8		$50
SUBTOTAL			32.00		$205.00

OBJECTIVE 4: Landowners will protect and restore wetlands in the watershed.

Activity	Schedule	Number	DNR Hours	LCD Hours	UW-Ex Hours	Cost
One-on-one contacts	ongoing	20	60	30		$0
Newsletter articles	6/94, 9/94,	2	2	8		$0
News releases	6/94, 9/94	2	2	8		$0
Demo site tour	7/95	1	16	16		$100
Demo fact sheet/pictures	6/95	1	2	4		$40
Lakefair display	7/95	1	2	8		$20
Support wetland teacher training	?	5 teachers	2	2		$250
SUBTOTAL			86.00	76.00		410.00

OBJECTIVE 5: Watershed residents and visitors will understand the value of water resources and the importance of preserving them.

Activity	Schedule	Number	LCD Hours	UW-Ex Hours	Cost
Lakefair (see obj 2)					
News releases	6/95, 9/95	2	8		$0
Teacher training	9/95	1	40	40 (YA)	$200
Supplies for student activities	as requested				$200
SUBTOTAL			48.00		400.00

YA = Youth Agent

PREIMPLEMENTATION ACTIVITIES

Activity	Schedule	Number	LCD Hours	UW-Ex Hours	Cost
Farmer Meetings	2/95	3	24		$125
CAC Meetings	2/95, 3/95, 4/95	3	24		$25
SUBTOTAL			48.00		$150.00

APPENDIX C
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 animal wastes. 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.

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.

DDT:

A chlorinated hydrocarbon insecticide that was banned because of its persistence in the environment.

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.

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.

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.

FLOURANTHENE:

A polyaromatic hydrocarbon (PHA) with toxic properties.

FLY ASH:

Particulates emitted from coal burning and other combustion, such as wood burning, and vented into the air from stacks, or more likely, collected by electrostatic precipitators.

FOOD CHAIN:

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

FURANS (2,3,7,8-tetra-chloro-dibenzpfurans):

A chlorinated organic compound which is highly toxic.

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.

HYDROCARBONS:

Any chemical of a large family of chemicals containing carbon and hydrogen in various combinations.

INCINERATOR:

A furnace designed to burn wastes.

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.

INTERNATIONAL JOINT COMMISSION (IJC):

An agency formed by the United States and Canada to guide management of the Great Lakes and resolve border issues.

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.

LC-1:

The concentration that results in 1% mortality of the test animal populations exposed to the contaminant.

LC_{50}:

Lethal concentration for 50% of the test population exposed to a toxicant substance.

LD_{50}:

Lethal dose for 50 percent of the test population exposed to a toxicant substance.

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.

NPS:

See nonpoint source pollution.

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.

PESTICIDE:

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

PH:

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

PHENOLS:

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

PHOSPHORUS:

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

PLANKTON:

Tiny plants and animals that live in water.

POINT SOURCES:

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

POLLUTION:

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

POLYCHLORINATED BIPHENYLS(PCBs):

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

POLYCHLORINATED ORGANIC COMPOUNDS:

A group of toxic chemicals which contain several chlorine atoms.

PRETREATMENT:

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

PRIORITY POLLUTANT:

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

PRIORITY WATERSHED:

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

PRODUCTIVITY:

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

PUBLIC LAW 92-500 (CLEAN WATER ACT):

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

PUBLIC PARTICIPATION:

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

PUBLICLY OWNED TREATMENT WORKS (POTW):

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

RAP:

See Remedial Action Plan.

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.

TACs:

Technical advisory committees that assisted in the development of the Remedial Action Plan.

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.

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.

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 — Selected as of 1994

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. Croix
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
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	Springbrook Creek	Langlade, Marathon
94-6	Sugar/Honey Creeks	Walworth, Racine

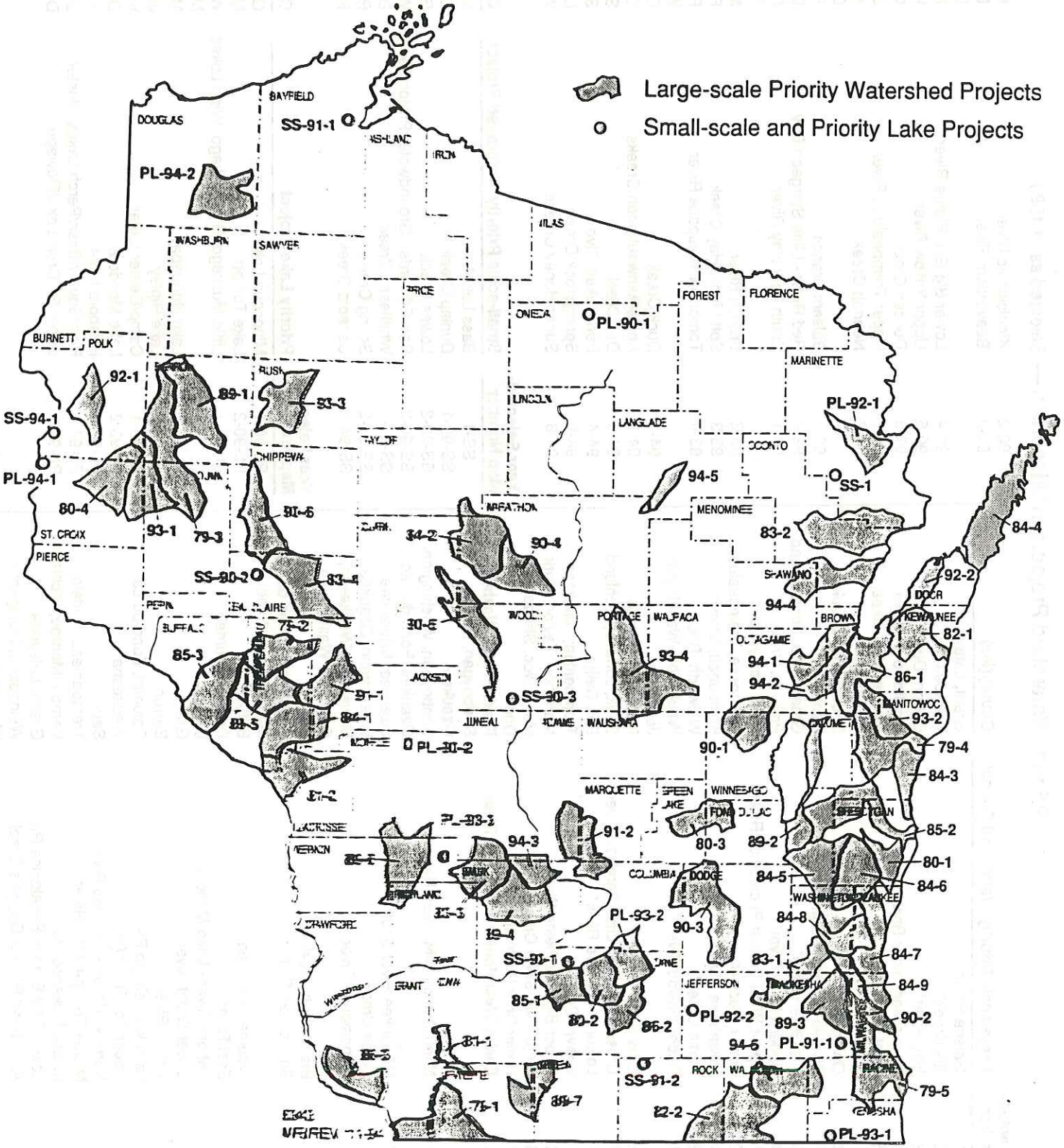
Year Selected-Map Number	Small-scale Priority Watershed Project	County(ies)
SS-1	Bass Lake*	Marinette
SS-90-1	Dunlap Creek	Dane
SS-90-2	Lowes Creek	Eau Claire
SS-90-3	Port Edwards - Groundwater Prototype	Wood
SS-91-1	Whittlesey Creek	Bayfield
SS-91-2	Spring Creek	Rock
SS-94-1	Osceola Creek	Polk

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 Lake	Vernon
PL-94-1	Pine/Squaw/Bass/Perch Lakes Cluster	St. Croix
PL-94-2	Upper St. Croix Lake/Flowage	Douglas

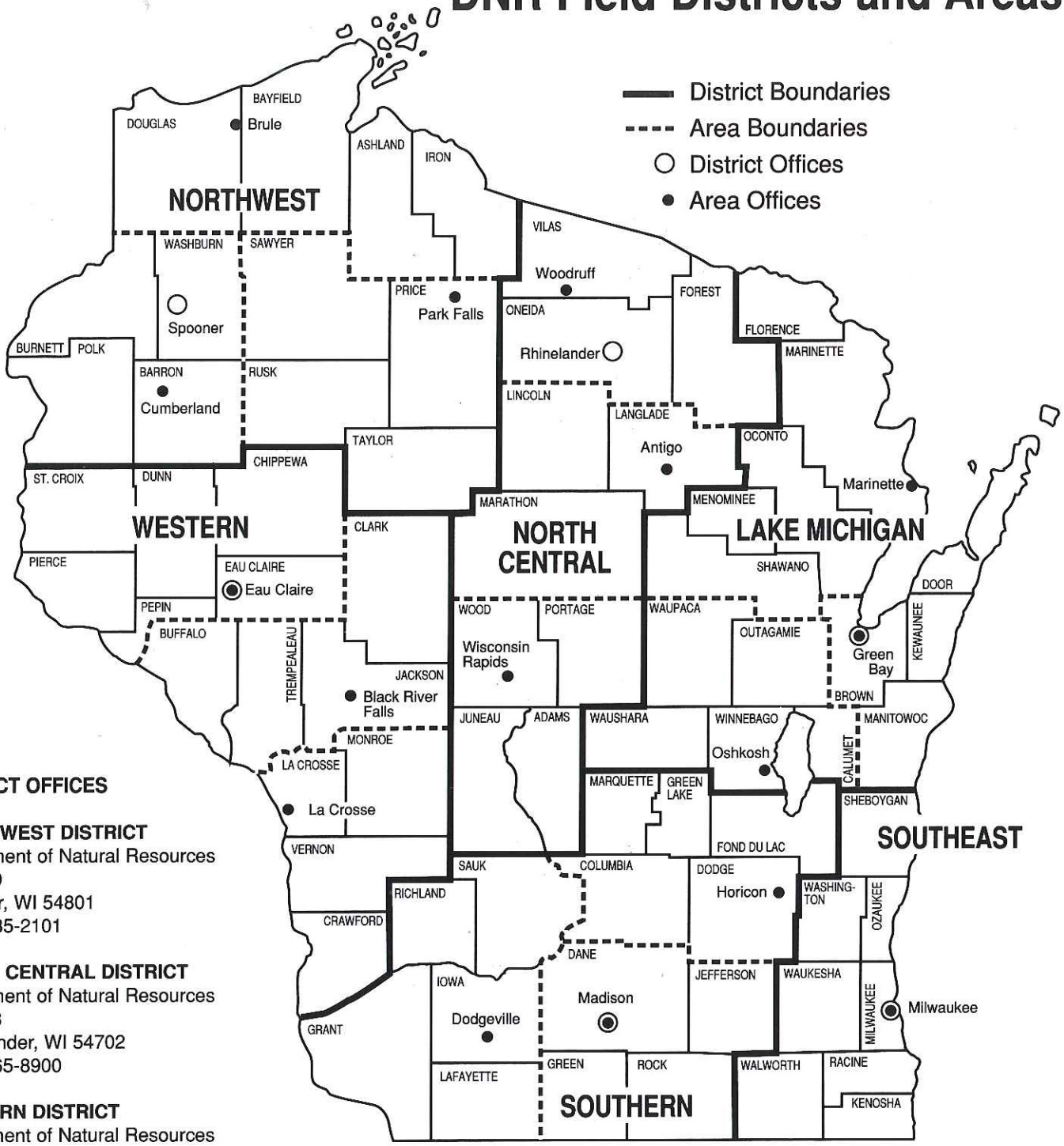
** Project completed*

Priority Watershed Projects in Wisconsin

Selected as of 1994



DNR Field Districts and Areas



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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

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