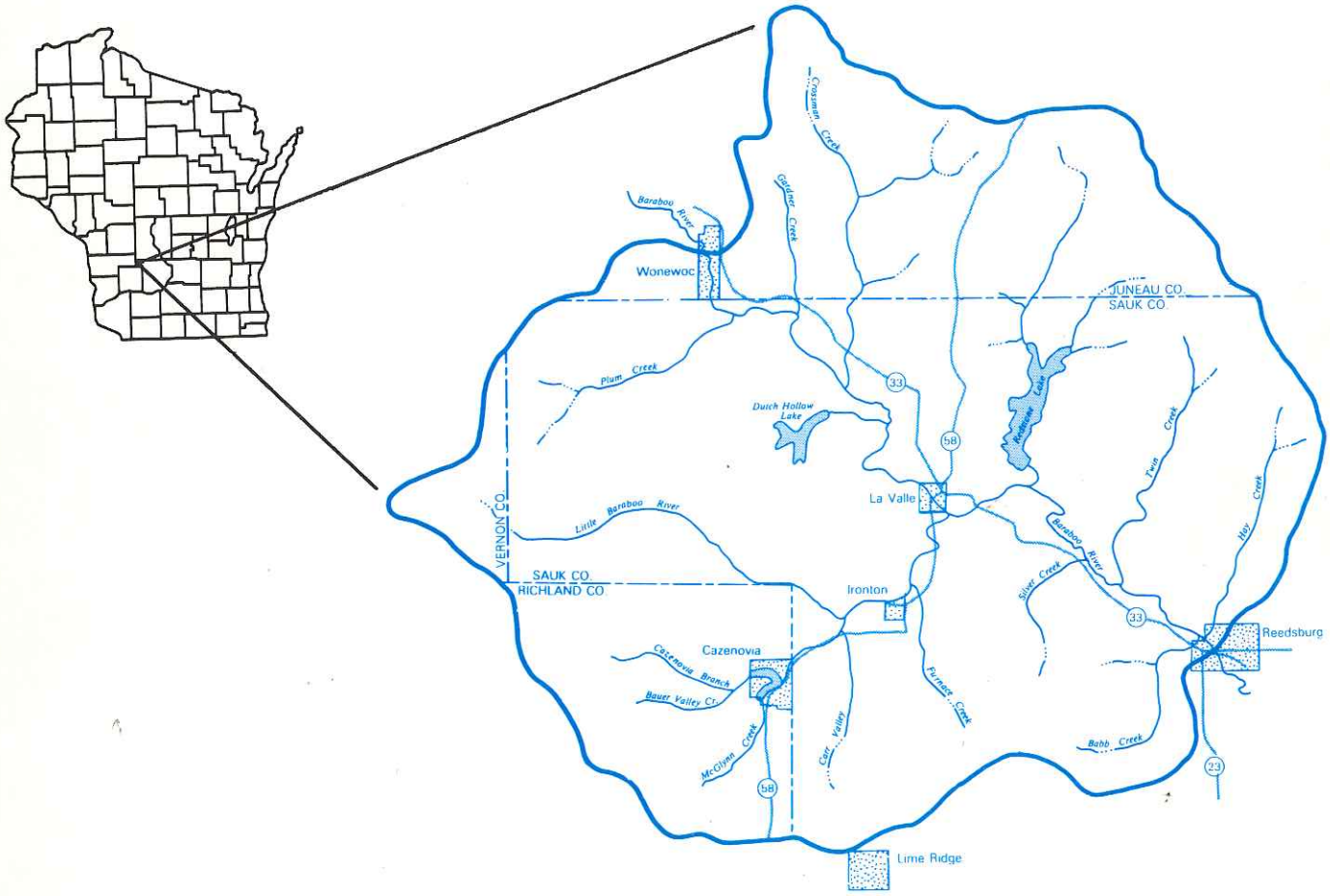
A NONPOINT SOURCE CONTROL PLAN FOR THE CROSSMAN CREEK – LITTLE BARABOO RIVER PRIORITY WATERSHED



PREPARED IN COOPERATION WITH:

The Land Conservation Depts. of: Sauk County
Juneau County
Richland County
Vernon County

The UW–Extension

The USDA Soil Conservation Service

The Wisconsin Department of Natural Resources

Sauk County
Land Conservation Committee

Melvin Rose; Chr.
Robert Geffert
Michael Weiss
Oscar Laper
LeRoy "Pete" Litscher
Herb Brandt

Juneau County
Land Conservation Committee

Michael Coughlin; Chr.
Charles Livingston
Oscar Schaller
Irvin Wehman
Robert Walsh

Richland County
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Arland McKittrick
Ann Greenheck
James Lewis
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Vernon County
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George Nettum
Keith Fiske
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Wisconsin Department of Natural Resources Board

John Lawton; Chr.
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Richard Lange; Sec.
Richard Hemp
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Wisconsin Department of Natural Resources

C. D. Besadny; Secretary

Lyman Wible; Administrator, Div. of Environmental Standards
Bruce Baker; Director, Bureau of Water Resources Mgmt.
John Konrad; Chief, Nonpoint Source & Land Mgmt. Section
Douglas Morrissette; Director, Southern District
Floyd Stautz; Assistant Director Southern District
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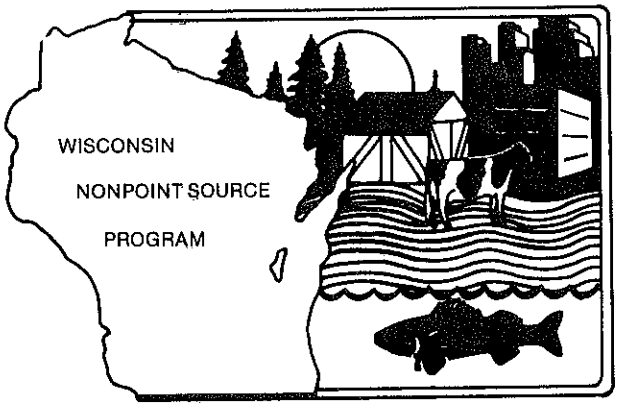
A NONPOINT SOURCE CONTROL PLAN FOR THE CROSSMAN CREEK - LITTLE BARABOO RIVER PRIORITY WATERSHED

October, 1985



This document was prepared under the provisions of the Wisconsin Nonpoint Source Water Pollution Abatement Program.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Carroll D. Besadny
Secretary

BOX 7921
MADISON, WISCONSIN 53707

October 18, 1985

IN REPLY REFER TO: 2600

Melvin Rose, Chair
County Board of Supervisors
Sauk County Courthouse
P.O. Box 30
Baraboo, WI 53913

Merlyn Merry, Chair
County Board of Supervisors
Richland County Courthouse
Richland Center, WI 53581

C. F. Saylor, Chair
County Board of Supervisors
Juneau County Courthouse
State St.
Mauston, WI 53948

Jack Robinson, Chair
County Board of Supervisors
Vernon County Courthouse
Courthouse Annex
Viroqua, WI 54665

I am pleased to be able to approve the Nonpoint Source Control Plan for the Crossman Creek-Little Baraboo River Priority Watershed. As you know, the watershed encompasses portions of Sauk, Juneau, Richland, and Vernon Counties. Your county is to be congratulated for its efforts in assisting in development of the Plan and preparing for its implementation. I am especially impressed by the high degree of cooperation among the counties to reach the common goal of protecting and improving the water resources of the area.

The Plan estimated total needs in the watershed to be $7,574,679 for installation of nonpoint source management practices and 33 person years of effort to provide administration and technical assistance. Over the 9 year project, actual cost and personnel needs will, of course, depend on participation rates during the 4 year sign-up period. The Department's Nonpoint Source Program has made funds available for additional County staff and for cost sharing of installation of management practices.

Judging by the response to the public hearing and the subsequent town meetings on the Plan, there is a great opportunity to achieve the water quality goals laid out in the Plan. Enhancement and protection of Redstone, Dutch Hollow, and Lee Lakes, 19 miles of trout streams, 60 miles of forage fishery streams, and the Baraboo River are very worthwhile goals.

The Plan for Control of Nonpoint Source Pollution in the Crossman Creek-Little Baraboo River Watershed has been reviewed by Department staff and meets the intent and conditions of s. 144.25, Statutes, and NR 120, Wisconsin Administrative Code. It is consistent with, and will serve to implement, the areawide water quality plan (Section 208, PL92-500) for the Lower Wisconsin River Basin and is therefore approved as an element part of that plan.

Sincerely,

C. D. Besadny
Secretary

CDB:JB:jd:5281V

RESOLUTION # 127-85

APPROVING THE CROSSMAN CREEK-LITTLE BARABOO RIVER

PRIORITY WATERSHED PLAN

WHEREAS, the Sauk County Board of Supervisors through Resolutions # 15-83 and 49-83 has expressed its support of the designation of the Crossman Creek-Little Baraboo River Watershed as a priority watershed project; and

WHEREAS, the inventory and planning phases of the project have been completed under the direction of the Sauk County Land Conservation Committee in cooperation with the Wisconsin Department of Natural Resources; and

WHEREAS, a priority watershed plan has been prepared which assesses the existing water quality and watershed conditions, identifies the management practices and actions necessary to improve or protect the water quality of the watershed, outlines the tasks required and the agency responsible for each, and establishes the time frame and cost estimates for the project; and

WHEREAS, a draft of the plan has been available for review and comments were accepted at a public hearing held September 17, 1985; and

WHEREAS, the implementation of this plan will provide both technical assistance and cost share monies to eligible landowners within the priority watershed for the installation of conservation practices designed to reduce the sources of non point pollution and protect or improve the quality of Sauk County's water resources;

NOW, THEREFORE, be it resolved, by the Sauk County Board of Supervisors met in regular session, that the "Plan for the Control of Non Point Source Pollution in the Crossman Creek-Little Baraboo River Priority Watershed" be approved; and that the Land Conservation Committee be given the authority and responsibility to act in behalf of Sauk County to administer this Priority Watershed Project as outlined in the plan.

For consideration by the Sauk County Board of Supervisors on October 15, 1985.

Respectfully submitted,

LAND CONSERVATION COMMITTEE:

Melvin Rose, Chairman

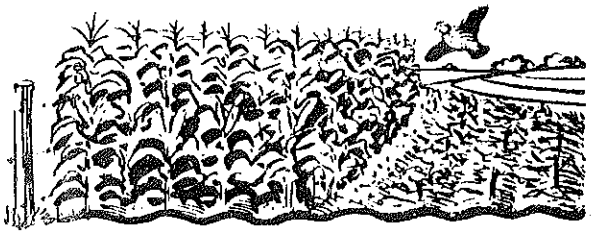
Robert Geffert, Vice Chairman

Michael Weiss, Secretary

Oscar Laper, Member

LeRoy Litscher, Member

Herbert Brandt, Member



JUNEAU COUNTY LAND CONSERVATION COMMITTEE
COURTHOUSE ANNEX
MAUSTON, WISCONSIN 53948 Ph. (608)847-6607

November 4, 1985

Carroll D. Besadny, Secretary
Dept. of Natural Resources
Box 7921
Madison, WI 53711

Dear Mr. Besadny:

The Juneau County Land Conservation Committee has applied for and has been approved for funding the Crossman Creek/Little Baraboo River Priority Watershed Project under the Non-Point Portion of the Wisconsin Fund.

The Committee staff, with cooperation from the Sauk, Vernon and Richland Center Land Conservation Departments and the Department of Natural Resources, has inventoried the Crossman Creek/Little Baraboo Watershed and have set up a procedure for cost-sharing with landowners on various practices to improve water quality within the watershed. The plan has been reviewed by the public during a public hearing which was held on September 17, 1985.

The Supervisors of the Juneau County Land Conservation Committee have also reviewed the plan and have approved the plan via a motion which was made and passed October 28, 1985.

Sincerely,

Michael Coughlin

Michael Coughlin, Chairman
Juneau County LCC

MC/cc

CC: Jim Bachhuber

RICHLAND COUNTY
LAND CONSERVATION DEPARTMENT

Man and Nature Working Together for Better Living

JAN 9 1986

Telephone 608-647-2100
Courthouse, P.O. Box 543
RICHLAND CENTER, WISCONSIN 5358

January 3, 1986

Mr. John Konrad, Chief
Nonpoint Source Section
Bureau of Water Resources Mgm't
Dept. of Natural Resources
Box 7921
Madison, WI 53707

Dear Mr. Konrad:

We have reviewed the Crossman Creek-Little Baraboo River Priority Watershed Plan. The plan meets our approval and the Richland County Land Conservation Committee will cooperate fully on the implementation of the plan.

Sincerely,

Ken Barry

Ken Barry, Chairman
Richland County Land Conservation Committee

KB:bs

RESOLUTION

WHEREAS, the Crossman Creek/Little Baraboo River Watershed was selected in June of 1983 as a Priority Watershed under the Wisconsin Nonpoint Source Water Pollution Abatement Program, and

WHEREAS, the priority watershed involves about 30 farmers in Greenwood Township, Vernon County, and

WHEREAS, the implimentation of this plan does not involve additional funds to be appropriated by the county, and

WHEREAS, it is estimated that this priority watershed will bring an additional $71,000 into the County in cost-share funds, and

WHEREAS, the draft plan has been reviewed through public hearings and informational meetings to the public for comment, now therefore, be it,

RESOLVED: that the Vernon County Board of Supervisors adopt this plan.

Signed George Williams
George Williams, Chairman

Signed Keith Fiske
Keith Fiske, Vice-Chairman

Signed George Nettum
George Nettum, Secretary

Signed Kenneth Keach
Kenneth Keach, Member

Signed _____
Edwin Swenson, Member

Signed Ernest Ekum
Ernest Ekum, ASCS Member

VERNON COUNTY LAND CONSERVATION DEPARTMENT

A Summary of the

Crossman Creek - Little Baraboo River

Priority Watershed Plan

Introduction

The Crossman Creek - Little Baraboo River Priority Watershed Plan addresses the needs for the control of nonpoint source pollution to the Baraboo River and to the tributaries entering the Baraboo River between Wonewoc and Reedsburg. Nonpoint source pollution is the pollution carried to the surface water or groundwater through the action of rainfall runoff or snowmelt. In this watershed the sources of this type of pollution includes upland erosion, streambank erosion, gully erosion, construction site erosion, barnyard runoff, manure stacking runoff, and field spread manure runoff.

The plan sets out objectives for each stream or lake and the level of nonpoint source control needed to reach the objectives. The report also describes the administrative procedure and agency responsibilities for carrying out the plan. The plan was developed jointly by the Sauk, Juneau, Richland, and Vernon County Departments of Conservation and the Department of Natural Resources.

Funding for this plan and its implementation is from the Wisconsin Nonpoint Source Water Pollution Abatement Program.

Besides the 17 streams in this watershed there are three lakes (Redstone, Dutch Hollow, and Lee) which are affected by nonpoint source pollution to varying degrees. The watershed area is 214 square miles in size and it includes portions of Sauk, Juneau, Richland, and Vernon Counties.

Assessing the Water Resources and Nonpoint Source Control Needs

The water quality of the streams and lakes within the watershed were assessed with several methods. The basic goal of these assessments was to determine the use each water resource was supporting currently, and the use the resource could support if nonpoint source pollution was controlled. Examples of water resource uses are sport fishing and the contact recreational uses.

The severity of the nonpoint sources of pollution were also assessed. With the help of state funding, the counties hired staff to conduct an inventory of the various sources. This information was collected on a "subwatershed" basis. Each stream or lake in the project was identified with its own subwatershed. Because of limited time and money, only the four most important sources were inventoried in detail. These inventories included all or portions of the properties 1,415 landowners. The procedure for these inventories is briefly described below.

Upland Erosion: The soil loss on 133,000 acres of cropland, woodland, pasture, and vacant lands was determined using the Universal Soil Loss Equation. The soil loss (in tons/acre/year) was summed for each landowner within each subwatershed.

Streambank Erosion: Fourteen streams were assessed for this source. The entire length of each stream was walked and information gathered at each eroded site on its location, landowner, length, height, recession rate (in feet/year), and cattle access. The total tons of sediment loss was calculated for each site and summed for each landowner along the stream.

Barnyard Runoff: For each barnyard in the watershed a calculation was made estimating the amount of pollution (phosphorus) runoff from the barnyard in spring conditions during a certain size rain storm. This assessment was done for 563 yards in the watershed. Within each subwatershed the yards were ranked as to their severity.

Manure Spreading Runoff: The potential for winter field spread manure runoff was estimated for each landowner. This was done by comparing the amount of manure produced by each herd and the slope and flooding potential of the land on which it was likely to be spread. The amount of land receiving manure during the winter which could cause water quality problems was estimated for each landowner.

A nonpoint source pollution control strategy was developed using information from the water resource assessment and the inventories. Based on the inventory 252 of these landowners had at least one nonpoint source that was determined to be very important in terms of impacts on water quality. There were 384 landowners who had nonpoint sources of medium importance and 779 landowners had minor or no nonpoint sources. Objectives were set for each water resource and the pollution control level needed to reach the objective was determined.

Inventory Results and Water Resource Objectives

The table below summarizes: 1) the objectives for each lake and stream in the watershed, 2) the nonpoint source pollution reduction goals for each water resource, and 3) the inventory results for each subwatershed.

CROSSMAN CREEK - LITTLE BARABOO RIVER PLAN: Water Resource Objectives, Inventory Results and Pollutant Reduction Goals

			INVENTORY SUMMARY						
	Water Resource	Pollutant Load	Upland Erosion		Barnyard Runoff		Manure Mgmt.	Streambank Erosion	
Water Resource	Objectives	Reduction	Acres	Soil Loss (tons/yr)	# of Yards	Phos. (lbs/yr)	Critical Ac. Spread	Eroded Sites (ft)	Soil Loss (t/yr)
Baraboo River * (Wonewoc - Reedsburg)	1	50%	19,218	112,649	66	2,257	719	No Inventory	
Bauer Valley Creek	2	70%	3,588	11,017	21	149	271	125	16
Carr Valley Creek	4	70%	6,144	23,141	28	619	224	12,006	1,329
Cazenovia Creek	2,4	70%	7,506	21,969	42	189	515	980	153
Crossman Creek	4	50%	13,265	142,261	72	5,371	846	19,838	1,199
Dutch Hollow Lake	5	70%	3,098	4,256	5	41	48	No Inventory	
Furnace Creek	4	50%	4,070	13,156	20	207	168	1,050	150
Gardner Creek	4	50%	2,904	42,554	23	1,289	352	14,970	1,026
Hay Creek	2	70%	5,718	15,631	19	164	170	125	8
Lee Lake (Cazenovia Millpond)	1	70%	13,860	42,873	68	398	911	1,050	81
Little Baraboo River	2,3,4	70%	20,310	77,883	79	776	900	19,614	2,488
McGlynn Creek	2	70%	4,110	12,963	14	119	161	785	81
Plum Creek	4	50%	9,613	42,491	54	368	599	11,010	1,858
Redstone Lake	6	70%	18,338	179,718	58	2,128	643	4,390	145
Silver & Babbs Crs.	4	50%	10,505	53,366	36	418	378	No Inventory	
Twin Creek	4	50%	7,981	32,397	29	808	302	620	123

Objectives:
1. Improve the warmwater fishery
2. Protect the current trout fishery
3. Improve the water quality and the habitat to support a trout fishery
4. Support a valuable forage fish population
5. Protect the current water quality of the lake
6. Decrease the duration & intensity of the algae blooms in the lake

Administering the Project

The county Land Conservation Departments (LCD) will have the major responsibility for administering this project at the watershed level. The LCD's will: contact the landowners, sign the cost share agreements, design practices, certify proper installation of the practices, make the cost share payments to the landowners, keep all records, and conduct an education/ information program. The LCD's will receive assistance for these responsibilities from the Soil Conservation Service (SCS), UW-Extension, and the Agricultural Stabilization and Conservation Service (ASCS). The counties will receive funding for the extra staff needed to carry out the project and for the cost share monies from the state of Wisconsin through the Department of Natural Resources.

General Procedures for Implementing the Project

The project will begin in the fall of 1985. There will be a four year period during which the counties will contact landowners, and the landowners will be able to enter into "cost share agreements" with the counties for the installation of the necessary management practices. Among other things, the

cost share agreement will list the practices, the cost share amount, and the schedule for the installation of the practice. A landowner can schedule a practice to be installed up to five years from the signing of the cost share agreement. Entering into the agreement is voluntary but no new agreements will be signed after the four year period. A list of the eligible practices and their cost share rates is shown on Table 17, page 65 of the plan.

After the agreement is signed by the landowner and the county, the county will provide designs for the practices. The landowner will be responsible for arranging for the installation of the practice and the county must certify that the practice was installed in accordance with the design specifications. The landowner then presents the paid bills for the practice to the county for reimbursement of the cost share portion. Upon approval by the county, a check is issued to the landowner for the cost share amount.

Project Costs and County Staff Needs

Based on the inventory data, estimates were made on the costs of all the needed practices in the watershed. If there were 100% participation by the landowners and all the needed practices were installed, the total costs (landowner and state share) would be $7,078,100. Of this amount $4,541 400 would be the state cost share portion. A more reasonable estimate of the cost share funds needed for this project is $3,406,000 which is derived from using a 75% level participation rate.

The additional staff needed by the counties to administer the project was also estimated. On the average there will be a need for three additional staff each year for the 9 year project.

Information and Education Program

An information/education program will be conducted throughout the project period. This program will be most intense during the first four years of the project and the activities will taper off during the rest of the project. The activities will include: management practice demonstrations, tours, newsletters, public meetings, and a display board. Some of this work was begun during the time this plan was being drafted.

Evaluating the Project

The Department of Natural Resources will be responsible for evaluating the progress of the project. The evaluation will include two approaches. First, the changes in land use and calculated pollution levels as a result of the practices installed will be investigated. Second, the actual changes in water quality and water use (such as the fish populations) that resulted from the project will be measured. The changes in the water quality will depend upon the participation and cooperation of the landowners within the project area.

PREFACE

Purpose and Approach of the Nonpoint Source Water Pollution Abatement Program

The Crossman Creek/Little Baraboo River Watershed was selected in June of 1983 as a Priority Watershed under the Wisconsin Nonpoint Source Water Pollution Abatement Program. This program was created by the State Legislature in 1978 as a means to reduce surface and groundwater pollution caused by nonpoint pollution sources. These sources include: eroding agricultural lands, eroding streambanks and roadsides, poorly managed livestock wastes, erosion from established and developing urban areas, and stormwater runoff from urban areas.

The Wisconsin Nonpoint Source Program approach to water quality management has four major characteristics:

1) The purpose of the program is to improve or protect water resources. Although the installation of land management practices is at the core of the program, their application under this program is restricted to sources that contribute significantly to water quality problems.

2) The program is implemented on a watershed basis so that all of the major nonpoint sources in an area draining to a water resource can be addressed at the same time. A substantial commitment of money and staff time is needed to control enough of the critical nonpoint pollutant sources to affect water quality,and limiting the program to selected watersheds helps assure that the comprehensive effort needed can be made. To date, there are 21 active priority watersheds in addition to the Crossman Creek/Little Baraboo River watershed in various stages of planning or implementation.

3) Involvement in the program by landowners, land renters, or municipalities that have critical nonpoint pollutant sources is voluntary. Participation is encouraged by state level cost-share assistance (to help offset the cost of installing the recommended management practices), and an information and education program (to raise landowner awareness of the Nonpoint Source Program and foster its acceptance).

4) The Nonpoint Source Program is conducted locally by the counties in the watershed. Using this watershed plan as a guide, the counties in the watershed provide technical assistance necessary to design and install the needed management practices, provide administrative and financial management, and carry out the information/education program. This effort is usually carried out by the staff of the counties' Land Conservation Department, the Soil Conservation Service, and the U.W. Extension under the authority of the County Board and/or County Land Conservation Committee.

How and Why the Crossman Creek/Little Baraboo River Watershed was Selected

Priority watersheds, including the Crossman Creek/Little Baraboo River Watershed, are selected because of: 1) the severity of water quality problems in the watershed, 2) the importance of controlling nonpoint sources of pollution in order to attain water quality improvement or protection, and

3) the capability and willingness of the local government agencies to carry out the planning and implementation of the project. The watersheds are selected through a three step process. First, all the watersheds in the state are ranked based upon water quality and landuse factors. Second, regional advisory groups recommend watersheds from their area of the state. Third, the State Nonpoint Source Coordinating Committee recommends to the Department of Natural Resources watersheds for selection. When a watershed is selected an offer of a project is sent to the County Boards of those counties in the watershed boundaries.

Structure of this Report and How it was Developed

A priority watershed project is carried out in two steps: planning, and implementation.

Once the offer of a priority watershed by the Department is accepted by the County Boards, the local agencies along with the Department of Natural Resources, prepare a watershed plan. This document is that plan. The rest of this report contains two parts. Part one assesses existing water quality and watershed conditions, and identifies the management practices and actions necessary to improve and/or protect the water quality of the watershed. Part two identifies the tasks necessary to carry out the the plan; the agencies responsible for the various tasks; and the time frame for completing the identified tasks. This portion also includes estimates of the funds required to install the recommended practices and administer the project.

The implementation phase of the project begins with the approval of this plan by both the Department of Natural Resources and the involved County Boards. During this phase, the state will provide funds to the counties to carry out the recommendations made in the plan. This "implementation phase" may last up to nine years. During an initial four year period, certain landowners in the watershed will be contacted and will be eligible to receive cost sharing for practices recommended in the plan. The cost share agreement signed by the landowner and the county outlines the practices, costs, cost share amounts, and schedule of installation. The practices can be scheduled for installation up to five years from the date of signing the cost share agreement.

This watershed plan was written with the best information available at the time of its preparation. Situations and conditions may change during the implementation of this plan, requiring changes in this document. Any revisions to this document must be approved by both the County and the Department of Natural Resources.

Once this document is approved by the Department of Natural Resources and certified by the Govenor, it becomes part of the Lower Wisconsin River Basin Water Quality Management Plan.

This watershed project's name will be abbreviated occassionally in this report. The name "Crossman Creek/Little Baraboo River Watershed" will be referred to as CC/LBR.

CROSSMAN CREEK - LITTLE BARABOO RIVER WATERSHED PLAN
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THE MANAGEMENT PLAN

I. GENERAL WATERSHED DESCRIPTION

A. General Location and Water Resources

The Crossman Creek/Little Baraboo River Watershed is located in the region where the counties of Sauk, Juneau, Richland, and Vernon meet. It is the area that drains to the Baraboo River between Wonewoc and Reedsburg and covers 214 square miles. Figure 1 is a map of the watershed. The project was named for the two largest tributaries to the Baraboo River between Wonewoc and Reedsburg - Crossman Creek, and Little Baraboo River. There are 14 other tributaries to the Baraboo River along this stretch and they are listed in Table 1. In addition to these streams, there are four impoundments in the watershed; Lake Redstone, Dutch Hollow Lake, Lee Lake (Cazenovia Millpond), and LaValle Millpond. These are briefly described on Table 2.

Table 1: Physical Characteristics of the Streams in the Crossman Creek-Little Baraboo River Watershed

Stream Name	Length (miles)	Average Flow (cu.ft./sec.)	Gradient (ft/mi)	Watershed Area (sq. mi.)
Baraboo River	21.4*	240	1.6	214.0*
Babb Creek	6.1	7.0	38.0	11.5
Bauer Valley Cr.	2.4	3.5	46.0	5.6
Big Creek-East	2.5	2.0	32.0	3.7
Big Creek-West	4.8	8.0	22.9	13.1
Carr Valley Cr.	4.8	6.0	36.0	9.6
Cazenovia Branch	5.8	15.0	19.0	23.7
Crossman Creek	8.0	13.0	1.3	20.7
Furnace Creek	3.6	4.0	35.0	6.3
Gardner Creek	2.8	3.0	20.0	4.5
Hay Creek	6.0	6.0	23.0	9.4
Little Baraboo R.	13.2	44.0	17.0	71.8
McGlynn Creek	3.1	4.0	41.0	6.4
Plum Creek	5.9	9.0	27.0	15.0
Silver Creek	3.2	3.0	37.0	4.9
Twin Creek	6.4	7.5	24.0	12.5

* length and area between Wonewoc and Reedsburg

Figure 1: Map of the Crossman Creek -- Little Baraboo River Priority Watershed Project

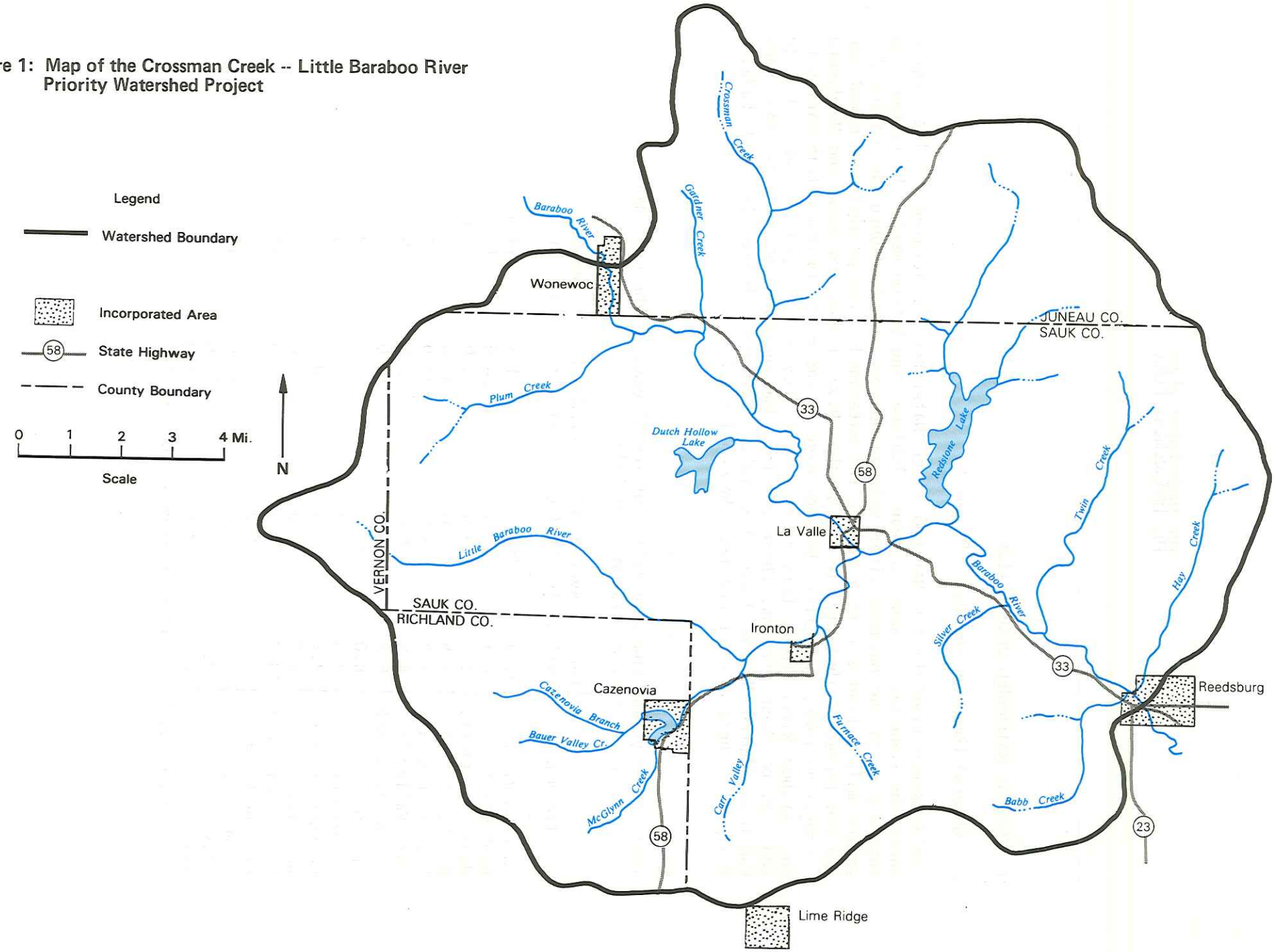


Table 2: Physical Characteristics of the Lakes in the Crossman Creek-Little Baraboo River Watershed

Lake Name	Surface Area (acres)	Average Depth (feet)	Public Acess Type
Lake Redstone	612	36	Co. Park Ramp
Dutch Hollow L.	210	40	Tn. Boat Ramp
Lee Lake (Cazenovia Millpond)	46	4	Vil. Pk. Ramp
LaValle Millpond	21	6	None

B. Land Use

The watershed is mostly rural in nature and agriculture accounts for most of the rural land use. The type of agriculture in the area is almost exclusively dairy with few other types of livestock operations and very little cash grain. In this watershed there are 563 barnyards. Figures 2 and 3 on the next page indicate the percentages of the different land uses and their respective soil losses in the watershed. This information is broken down in more detail by subwatershed on Table 9.

Incorporated areas of the watershed include portions of the Village of Wonewoc and City of Reedsburg, along with the Villages of LaValle, Ironton, and Cazenovia. These are all small muncipalities and runoff from their developed areas do not contribute significantly to the water quality conditions relative to the runoff from the rural areas.

C. Soils and Topography

This watershed is located in the unglaciated (or "driftless") area of Wisconsin, and because of this, the topography is characterized by very steep hill and valley terrain. The hillside slopes are commonly 12-20 percent with less steep slopes on the ridge tops. The Baraboo River itself creates a relatively wide (average width 1/2-1 mile), flat floodplain area. The soils along the river are typical floodplain soils: poorly drained, medium texture, organic, and flat to gently sloping. The soils in the upland portions of the watershed are steep, well drained, medium textured mineral soils ranging in depth from 20 to 60 inches to the dolomite bedrock. These steep slopes, along with the agricultural land uses, combine to cause a high potential for the runoff from cropland and livestock wastes to impact water quality. These potential sources of water quality impacts are discussed in detail in the other portions of this document.

Figure 2: Landuse in the Watershed

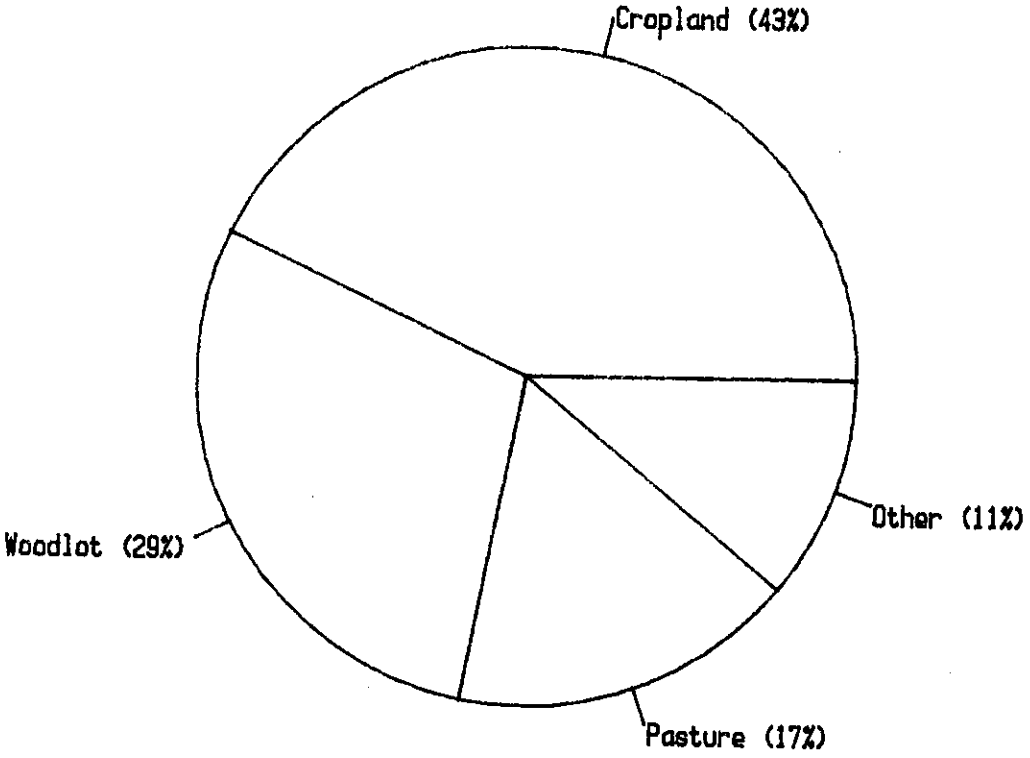
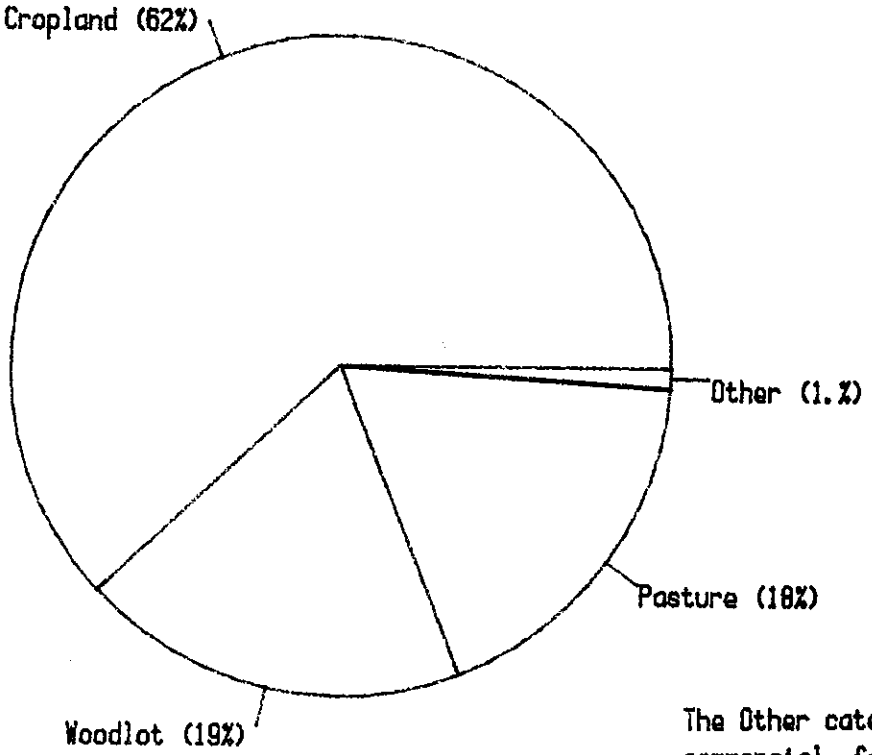


Figure 3: Soil Loss by Landuse



The Other category includes: residentia commercial, farmsteads, wetlands, and vacant lands.

II. METHODS OF ASSESSING THE WATER QUALITY, THE WATERSHED'S NONPOINT SOURCE CONDITIONS, AND THE NONPOINT SOURCE CONTROL NEEDS

A. Water Resource Assessment Methods

1. Introduction

As part of the watershed planning process, considerable time and effort was given to the determination of the current water quality and water use conditions of the streams and lakes in the project area. Then, an assessment was made of the potential changes in water quality and use that might be expected as a result of the control of nonpoint source pollution. This assessment was made based on many sources of information including: chemical and biological water quality data from DNR files, the "Surface Water Resources of _____ County" publications; along with input from county LCD and SCS staff, DNR fish managers, and DNR water quality specialists. Three of the tools used in this assessment are discussed in more detail below.

2. Biotic Index

The type of insects found living on rocks and other habitat in a streambed reflects the water conditions of that stream. Certain species of insects will only tolerate unpolluted waters while others are able to survive various degrees of water pollution. The term pollution in this discussion means organic material in the water. Two ways organic pollution affects water quality are: 1) the organic material adds nutrients to the water which may result in nuisance growth of algae or weeds, and 2) the breakdown of the organic material by bacteria can deplete the water of its dissolved oxygen (which is required for fish survival).

A system, developed in Wisconsin, indicates the degree of organic pollution in a stream by the types of insects living in the stream. The procedure used in Wisconsin is called the Hilsenhoff Biotic Index (HBI). Organic pollution tolerance values are assigned to various species of insects. The scale of these values is 0-5 with 0 being the least tolerant (insects least tolerant to organic pollution in the stream). The number and types of insects found at a stream site are used to calculate a HBI value between 0 and 5 for the stream. Qualitative descriptions of water quality for the index values are given on table 3 below.

Table 3: Qualitative Descriptions for the Biotic Index

HBI Range	Water Quality	Degree of Organic Pollution
0.00 - 1.75	Excellent	No organic pollution
1.76 - 2.25	Very Good	Possible slight organic pollution
2.26 - 2.75	Good	Some organic pollution
2.76 - 3.50	Fair	Significant organic pollution
3.51 - 4.25	Poor	Very significant organic pollution
4.26 - 5.00	Very Poor	Severe organic pollution

Source: DNR Technical Bulletin No. 132 (1982)

This procedure was conducted on 12 streams at 16 sites in the watershed in 1979 and in 1984. In order for a biotic index to be calculated at least 80 individual insects must be found in the sample. For various reasons, not all samples contain this required number of insects. In these cases, although an index value cannot be calculated, the sample still indicates a qualitative condition of the stream. Table 13 contains the results of this sampling.

3. Stream Fishery Habitat Assessment

In order to determine the present and potential future fishery uses of the streams a procedure developed by Joe Ball of the DNR described in the publication: "Stream Classification Guidelines for Wisconsin" (1982) was used. The system uses an inventory of the stream's physical fish habitat (stream flow, bed type, amount of riffles and pools, streambank conditions, etc) along with water quality, water temperature, pH, and current stream biotic conditions to classify the present fishery use of the stream. Then this information is modified to simulate the conditions that may be present as a result of a successful nonpoint source control project in the watershed. This second step results in an indication of the fishery which may be expected after a successful nonpoint source control project.

Below is a table indicating the general conditions that need to be present in order for a stream to support a certain type of fishery.

Table 4: Physical and Chemical Criteria Guidelines for Aquatic Life Use Classes.

Parameter	Use Class and Criteria A	B	C	D	E
Flow (cfs) (1)	>.5	>3	>.2	>.1	>0
Water Quality Dissolved Oxygen (mg/l) (2)(3)	>4	>3	>3	>1	<1
Temperature (Deg.F)(3)	<75	<86	<86	<90	>90
pH (3)	5-9.5	5-10.5	5-10.5	4-11	4-11
Toxics (4)	<acute	<acute	<acute	acute	>acute
Habitat Rating (1)	<144	<144	<144	>144	>200

(1) Wis DNR
(2) U.S. EPA (1977)
(3) Alabaster and Lloyd (1980)
(4) U.S. EPA (1980)

"<" means "less than"
">" means "greater than"

A: Cold Water Sport Fishery
B: Warm Water Sport Fishery
C: Valuable Tolerant Forage Fishery
D: Rough Fish
E: No Fishery

Source: DNR Technical Bulletin DRAFT (Ball, 1982)

Department of Natural Resources (Bureau of Water Resources Management) staff conducted this habitat classification procedure for nine streams (at eleven sites) in the fall of 1984. The results of these field investigations are shown on Table 14.

4. Lake Trophic Status

An assessment of the lakes in the watershed was also conducted. The water quality conditions of lakes is often referred to as the lake's "trophic status". In general, this refers to the nutrient level in the lake's waters. A lake with high levels of nutrients will support nuisance algae and weed growth and is termed "eutrophic". A lake low in nutrients that has clear water during the summer is called "oligotrophic". A level between these two classes is called "mesotrophic."

There are three indicators commonly used to establish the "trophic status" of a lake. The first is the in-lake phosphorus concentration. In Wisconsin lakes, phosphorus is usually the most significant nutrient limiting the growth of algae and weeds. The higher the concentration of phosphorus in the water, the greater the potential for nuisance growth of algae and weeds. The level of a substance called Chlorophyll a is a second indicator of the trophic status of a lake. Chlorophyll a is a substance found in algae. The concentration of Chlorophyll a in the water can be correllated with the amount of algae in the water. The third indicator is a measurement of the secchi disc depth. A secchi disc is an 8 inch diameter weighted plate with black and white markings on it. The depth to which the disc can be lowered and be seen in the lake's water is called the secchi depth. This depth can vary depending on the roughness of the water, the angle of the sun, and the technique of the observer. However, it does measure the depth of sunlight penetration, and the turbity of the water which could be due to algae or other suspended material.

Using these three indicators, plus some other information on a lake's physical characteristics, several models have been developed which can determine the trophic status of a lake and predict the trophic status given a change in the amount of nutrients entering into the lake on a yearly basis. Thus, if we know the mount of nutrient control that can be achieved with the installation of practices in a lake's watershed, a model can predict the changes in the lake's trophic status. Table 5 indicates some the values that could be expected for the parameters discussed above in various lake water quality situations. It must be emphasized that the values given on table 5 are only very general guidelines.

The lake trophic model actually used to analyze Lake Redstone was developed by P.J. Dillon and F.H. Rigler (1975). Most of the data required to conduct this analysis was obtained from the DNR's Bureau of Research. For Lake Redstone, additional information was obtained from a University of Wisconsin Water Resources Management Workshop (IES Report 115).

Table 5: Water Quality Index for Wisconsin Lakes Based on Total Phosphorus, Chlorophyll a Concentrations, and Water Clarity.

Water Quality	Approximate Total Phosphorus (mg/l)	Approximate Water Clarity (ft)	Approximate Chlorophyll a (ug/l)	Approximate Trophic Status Index *
Excellent	< .001	> 20	< 1	< 34
V. Good	.001 -.01	10 - 20	1 - 5	34 - 44
Good	.01 -.03	6 - 10	5 - 10	44 - 50
Fair	.03 -.05	5 - 6	10 - 15	50 - 54
Poor	.05 -.15	3 - 5	15 - 30	54 - 60
V. Poor	> .15	< 3	> 30	> 60

* After Carlson (1977)
Source: DNR Technical Bulletin 138 (1983)

"<" means "less than"
">" means "greater than"

5. Summary

The biotic index, stream habitat assessment, and lake model are important tools for helping to set water quality and water use objectives in the project. Although no water quality assessment tool can predict with 100% accuracy the changes in water quality and water use, these tools can be useful in appraising the current and potential future conditions of the water resources in the watershed project area.

B. Pollutant Source Assessment Methods

1. Introduction

Another part of the watershed planning process was the collection of information on the various nonpoint sources of pollution in the watershed. These were conducted under the supervision of the County Land Conservation Departments (LCD's) with funding support from the DNR. People were hired by the LCD's to gather the actual field data. The quality of these data were reviewed and approved by the LCD's. Then the data was sent to the DNR for analysis. The inventory methods used for each nonpoint pollutant source are described below.

Before the inventories were conducted, the watershed was divided into 17 sub-watersheds. The divisions were based upon individual water resources which could be protected or improved as a result of the control of nonpoint sources of pollution. The data from each of the inventories was organized by the sub-watersheds. With this information, objectives could be set for each water body and the corresponding reduction in pollutants needed to meet the objectives could be determined.

2. Upland Erosion

Upland erosion is of concern because it can be the main contributor of sediment to the streams and lakes of a watershed. Sediment in streams and lakes, in turn adversely impacts the water resources in many ways. The suspended sediment can make it difficult for fish to feed, and it can abrade fish gills making the fish more susceptable to disease. The suspended sediment also causes the water to be warmer in the summer, and warm water cannot hold as much oxygen as cold water. Sediment that settles out to the stream or lake bottom can fill up pools in streams (destroying the fish habitat) and can fill up the bays in lakes (promoting excess aquatic weed growth.). Soil from cropland entering the water can also contain nutrients and pesticides which can both increase the algae and weed growth in lakes and harm the aquatic life of a water body.

Upland Erosion (for this project) is defined as the sheet and rill erosion from land areas and is commonly measured by soil loss in tons per acre per year. This class of erosion includes only the type that results from the overland flow of water on fields. It does not include the gully and streambank types of erosion. The most common method of measuring upland erosion is with the Universal Soil Loss Equation (USLE). This method calculates the soil loss from a field in tons of soil lost from the field during an average year. The factors used to make this determination on a field are: rainfall runoff, soil erosivity, land cover, present management practices, slope, and slope length. This calculated soil loss is not necessarily the amount of soil that enters the channel system of a watershed. Some of the soil will become trapped in depressions on the land before it reaches a channel. This "trapped" soil may move into the channel system with subsequent rainfalls. (Once in the channel system, the sediment can become temporarily trapped in the pools of a stream before moving downstream.) Because of the steep topography and dense channel network in the CC-LBR Watershed the USLE method was used to determine which parcels potentially contribute the most sediment to the channel system, and what per cent of change in sediment pollution could be expected from the installation of soil erosion control practices.

The entire watershed was inventoried for upland erosion potential. On a parcel by parcel basis, USLE factors plus the location, landowner identification code, and present practice information was collected. A parcel was defined as a field with homogenous individual USLE factors and was bounded by landowner property lines and watershed or sub-watershed lines. The parcels generally ranged in size of 2 to 50 acres, and data was collected on about 10,000 parcels in the entire watershed.

The upland erosion inventory was conducted by two groups. The subwatersheds of Crossman Creek, Gardner Creek, Redstone Lake, and Baraboo River (Wonewoc to LaValle) were inventoried by one group (Group I) and the rest of the watershed was inventoried by another group (Group II). Because many of the factors used in the USLE require a field judgement, there is an unavoidable tendency for individual biases to show up in the data. One individual may consistently estimate a lower slope per cent, slope length, or other factor than another individual. There is strong evidence for these differences in the results of the upland erosion inventory. The soil losses calculated for the areas

inventoried Group I were consistently higher than thosed calculated for Group II. Overall erosion rates in Group I's subwatersheds were three to four times higher than the rates found in similar subwatersheds inventoried by Group II. Some of this may be due to physical differences in the areas inventoried but this explanation does not account for all the differences. For this reason it is best to compare the upland erosion results within the inventory group, and not compare Group I's results with Group II's results. Table 9, page 33, shows the results from this inventory, and the table is divided by the two inventory groups.

3. Streambank Erosion Survey

Streambank erosion is the obvious bank failure along channels caused by the cutting action of water on the banks. This erosion is important because of its direct impact on fish habitat in terms of bank shade and cover in addition to the impact of the sediment filling up the stream's pools. Streambank erosion can be caused by cultural activities (such as grazing cattle), or it can be a natural condition.

The inventory method used was a modification of the Phase II of the Land Inventory Monitoring process (SCS). The main channels of 14 streams totalling 68.7 stream miles were assessed with this method. For each erosion site, the method estimates the volume, and tons of sediment lost on a yearly average. This was done through measuring the length, height, and recessional rate of each erosion site. Recession rates were determined based upon the physical characteristics of the eroded site. The volume of sediment was then multiplied by the density of the sediment to obtain the tons of soil loss from the site. Along with this data, information on the location, landowner identification, and cattle access was collected for each site. This information was collected by field personnel walking the streams. Each erosion site was located on the ASCS 8 inch to the mile air photos. Results of this inventory are summarized on Table 12.

4. Barnyard Runoff

Dairy operations are the major type of agriculture in the Crossman Creek - Little Baraboo River Watershed. All of the barnyards were inventoried for their potential to impact water quality from their runoff. Runoff from these yards can carry manure to the streams and lakes of the watershed. The manure contains several components that can adversely affect the water quality and aquatic life. Manure contains nitrogen which can breakdown to ammonia in the streams and lakes. In high enough concentrations the ammonia can be toxic to fish and other aquatic life. When the manure enters a water system the breakdown of the organic matter results in a depletion of the oxygen in the water which fish require to survive. Also, the nutrients in manure (including nitrogen and phosphorus) will promote nuisance algae and weed growth in the streams and lakes. Finally, the bacteria found in livestock manure can be harmful to other livestock drinking the water, and humans using the water for recreation.

The United States Department of Agriculture - Agriculture Research Service developed a computer model to estimate the amount of pollutants coming from a barnyard as a result of a rainstorm. This model was modified by the Wisconsin

DNR - Nonpoint Source Section and has been used to indicate which barnyards within a watershed have the greatest potential to impact water quality from a rainfall washing through a barnyard. The model does not assess any needs for manure storage or the impact from manure runoff from spread fields - it only assesses the barnyard runoff pollutant quantities.

Information to run this model was collected on all of the barnyards in the CC-LBR Watershed (563 yards). The data required by this model includes the types and numbers of livestock; the size of the yard; the physical characteristics of the area which contributes surface runoff waters to the yard; and the physical characteristics of the area through which the runoff waters leaving the barnyard flow before becoming channelized. A rainfall amount is assigned to the model. The 10 year, 24 hour rain event (4.0 inches) was selected. With this information the model calculates the pounds of phosphorus and pounds of Chemical Oxygen Demand (COD) for each barnyard as a result of the selected rainfall event. (Chemical Oxygen Demand is a measure of the amount of organic material in the barnyard runoff).

The same two groups conducted the barnyard runoff survey as the upland erosion inventory. A similar discrepency (although not to the same degree) occurred with the collection of the barnyard runoff data. Field judgements may have unavoidably biased the results. For this reason the data is summarized on Table 10 by the inventory groups.

5. Manure Spreading Runoff

The disposal of livestock wastes on land can be a concern for water quality when it is done on frozen land with steep slopes or in a floodplain. Under these conditions, the spread manure can runoff with melting snow or winter rain and enter the streams and lakes of the watershed. The impacts from this runoff are the same as those mentioned in the barnyard runoff discussion.

The information collected for the upland erosion and the barnyard runoff inventory was combined and used to estimate the amount of unsuitable land used for manure spreading during the winter. Lands unsuitable for winter spreading of manure were defined as parcels with slopes greater than 6% or having soil types indicative of being prone to flooding.

The first step in this evaluation was to estimate how much land was required by each livestock operation to dispose of the manure generated over a 180 day period (the frozen ground period). The amount of manure generated by each operation was determined based on the animal type and number of animals. Using a rate of 25 tons per acre per year, the number of acres required for manure disposal was calculated for each operation. This number was compared to the acres of land suitable for winter spreading for each landowner according to the upland erosion inventory information. Lands unsuitable for winter spreading were those field with greater than 6% slope or those fields in the floodway. In this manner it was estimated, on an average annual basis, how many acres of unsuitable land was used for manure disposal during the winter. This procedure assumed every field had an equal chance for manure disposal from the landowner. The procedure could not account for the fact that

livestock operators do not evenly spread their manure across all of their property. In general, the most accessable land is used for disposal of the manure.

A summary of this analysis is shown on Table 11, page 37.

6. Point Sources of Pollution

Unlike the activities mentioned above, the point sources of pollution in Wisconsin are regulated by the state. For each municipal or industrial wastewater discharge, a permit is issued by the DNR which defines the quantity and the quality of the wastewater allowed from each site. The point sources have been the most significant, and the most obvious sources of water quality impairment in the past. With the large scale effort, and funding directed at cleaning up point source pollution in the past 20 years, the water quality impacts from these sources in the CC-LBR Watershed have been minimized.

Each municipal or industrial discharger has a permit file with the DNR. These files were reviewed to determine how well the treatment plant is meeting its permit requirements. If a facility is not in compliance with its permit, there are regulatory measures which can be employed to insure that clean up of the nonpoint sources of pollution will not be compromised by the wastewater treatment facilities.

C. The Pollutant Control Strategy

1. Introduction

For the Crossman Creek - Little Baraboo River Watershed, the inventory of nonpoint source pollution conditions along with the appraisal of water resources and their improvement potential, set the foundation for a pollution control strategy. This strategy includes three main components:

a) water resource objectives for each water body
b) pollutant load reductions needed to meet the specific objectives
c) identification of properties where nonpoint source controls are needed in order to meet the pollutant load reductions.

Two types of information are used to develop strategies for controlling nonpoint pollution sources in the watershed. First, the relative importance of the major source categories (upland erosion, barnyard runoff, manure spreading, or streambank erosion) contributing a common pollutant is estimated. Second, the relative importance of each site within the source category is determined. Then, this information is used to determine the percent pollutant load reduction that can be achieved by controlling different proportions of the load from each source. This can be called a ranking approach since, within each source category, the landowners are ranked from highest to lowest in terms of their potential nonpoint source pollution contribution.

2. The Relative Importance of Different Pollutant Sources

Each pollutant affecting a water resource may have several different sources. Phosphorus is one of the principal pollutants of concern which has many

sources. Rural sources of phosphorus include runoff from barnyards, manure stacks, winterspread manure, and upland erosion. Techniques to determine the relative phosphorus contribution from different agricultural sources are not sufficiently developed for the project area. This means that a comparison of the amount of phosphorus entering a stream system from upland erosion can not be compared to the amount from barnyard runoff. Because of this, it is assumed that each phosphorus source category was equally important in terms of their potential contribution of phosphorus to the streams and lakes.

It should also be kept in mind that the same "source category" can contribute different types of pollutants. The various pollutants coming from the different sources are described in Chapter II B: "Pollutant Source Assessment Methods". Each source (upland erosion, barnyard runoff, manure spread fields, and streambank erosion) is controlled for a different reason or combination of reasons. For example; barnyard runoff may need to be controlled in the Redstone Lake subwatershed for the reason of phosphorous and bacteria reduction; and barnyard runoff may need to be controlled in the McGlynn Creek Subwatershed for the reason of organic load reduction.

3. The Relative Importance of Sites Within Each Source Category

This was accomplished by preparing lists of properties for each subwatershed, and then determining the portion of the pollutant load contributed by each property for each source category. The properties for each source category were ranked based on relative pollutant contribution so that those contributing the greatest amount of pollutant appeared first on the list and the least amount appeared last. Rankings were done on a subwatershed basis for all source categories except manure spreading. For the manure spreading source category, one ranking was made for the entire watershed, because the disposal of manure is not confined to the subwatershed boundaries. Landowner rankings in each source category were based on the following criteria:

-Barnyard Runoff: pounds of phosphorus produced, as determined by the ARS Model,
-Upland Erosion Runoff: the portion of the soil loss occurring at a rate exceeding 4 tons/acre/year. This portion was summed for each farm and expressed as "tons of controllable soil loss" for each farm.
-Runoff of Winter Spread Manure: the number of critical acres estimated to be spread per year.
-Streambank Erosion: the tons of streambank erosion/year/property according to the inventory

4. Nonpoint Source Pollution Management Categories

In the Nonpoint Source Program, each landowner must agree to control all of the significant nonpoint pollution sources on his farm, or cost sharing assistance will be denied. This is known as the "total package approach" and it helps to insure that the water resource goals will be met.

Within each pollution source category, such as barnyard runoff or upland erosion, some sites are relatively more important than others. Not all landowners will want all of their sources controlled, since each practice represents an initial capital outlay by the landowner and a long-term

maintenance agreement. Where the unwanted practice is necessary to control a significant pollutant source, the cost share agreement should not be entered into with the landowner if that control of that source is not included. Where the unwanted practice controls a less significant source the agreement should be signed (even without this practice) as long as the critical sources on the land are controlled through the agreement. For this reason, "management categories" have been developed for sites within each source category to guide project staff in making decisions concerning what pollution sites on a property must be controlled by practices included on the cost share agreement.

Management Category I is reserved for sources that comprise a significant portion of the pollutant load to the waters within a subwatershed. Sources in this management category are eligible for cost sharing, and in fact must be controlled as part of any cost share agreement.

Management Category II is reserved for eligible, but less significant sources. These sources are eligible for cost sharing, but the inclusion of practices on the cost share agreement is optional. The project staff should strongly encourage the inclusion of practices in this category on cost share agreements.

For upland erosion this management category is divided into "IIa" and "IIb". Review of the ranking lists for upland erosion showed that the landowners at the bottom half of this category (management category II) only accounted for about 10% of the "controllable soil loss". These landowners are not very critical in terms of upland erosion pollution. This group of landowners comprises Management Category IIb. Practices to control their soil loss are eligible for cost sharing but they will not be contacted by county staff, if this is their only nonpoint pollution source. Management Category IIa includes landowners between Catagory I and IIb (see Tables 6a and 6b below).

Sources in Management Category III are not eligible for cost sharing. Sources in this category are not significant from a water quality perspective. It is not a cost effective use of time and funds to design and install practices in these areas.

Management categories assigned to the four sources are listed on Table 6a and 6b. These were the sources inventoried in the CC-LBR Watershed. Project staff will assign a management category to any new source (such as gullies) for each landowner identified during the implementation phase of the project. In addition, management categories assigned to specific sites in this plan may be amended by project staff if the original inventory was in error or conditions have changed for a landowner which has altered the pollution potential from the property.

The determination of the management categories for each pollutant source was based on the water resource affected by the source. Tables 6a and 6b indicate, for each pollutant source category, what percent of the total pollutant load reduction is included in each of the management categories. For example: under upland erosion, based on the landowners ranking from highest to lowest in terms of soil loss above 4 t/a/yr; the "60%" in table 6a means that landowners who make up the top 60% of the soil loss are in management category I for upland erosion.

Table 6a: Management Categories for Lakes or Trout Streams

Source	Landowner Ranking Criteria	Management Categories I	IIa	IIb	III
Upland Erosion	"controllable" soil loss	60%	61-90%	91-100%	0
Barnyard Runoff	phosphorus load	60%	61-80%	---	81-85%
Manure Spreading	critical acres spread	10%	11-87%	---	87-100%
Streambank Erosion	tons of soil	60%	61-100%	---	0%

Table 6b: Management Categories for Warmwater or Forage Fish Streams

Source	Landowner Ranking Criteria	Management Categories I	IIa	IIb	III
Upland Erosion	"controllable" soil loss	50%	51-90%	91-100%	0%
Barnyard Runoff	phosphorus load	50%	51-70%	---	71-85%
Manure Spreading	critical acres spread	10%	11-87%	---	87-100%
Streambank Erosion	tons of soil	50%	51-100%	---	0%

There are higher cutoff levels for management category I in the subwatersheds with lakes or trout streams (60%) verses those subwatershed with warmwater or forage fish streams (50%). This is because these types of water resources are more sensitive to nonpoint source pollutants than the warmwater or forage fish streams. For upland erosion the only landowners not eligible (management category III) are those with no soil loss above 4 tons/acre/year. The same is true for streambank erosion - all eroded streambanks are eligible for some assistance but only certain landowners have sites that must be controlled in order for any other practices to be cost shared on their land.

III. DESCRIPTION OF THE WATER RESOURCES: CONDITIONS, POLLUTANT SOURCES, & OBJECTIVES

A. Introduction

This section addresses each water body as to its current water quality, water use, and watershed conditions. Then, based on this information, and the assessment tools described in Part II, objectives are set for each stream or lake. Finally, recommendations are made for each water body on how to achieve those objectives. These recommendations are in the form of a table which shows the number of sites in each management category for the subwatershed. The achievement of the objectives will depend on the amount of nonpoint source control attained during the implementation of this plan.

Data gathered from the water resource assessment and the pollution source inventory for each subwatershed are summarized in a series of tables beginning on page 33. These tables are referred to often in the discussion and are listed below.

As mentioned previously,the pollution source inventory and and the analysis of this information was done on a subwatershed basis. A map of the subwatersheds is on the next page.

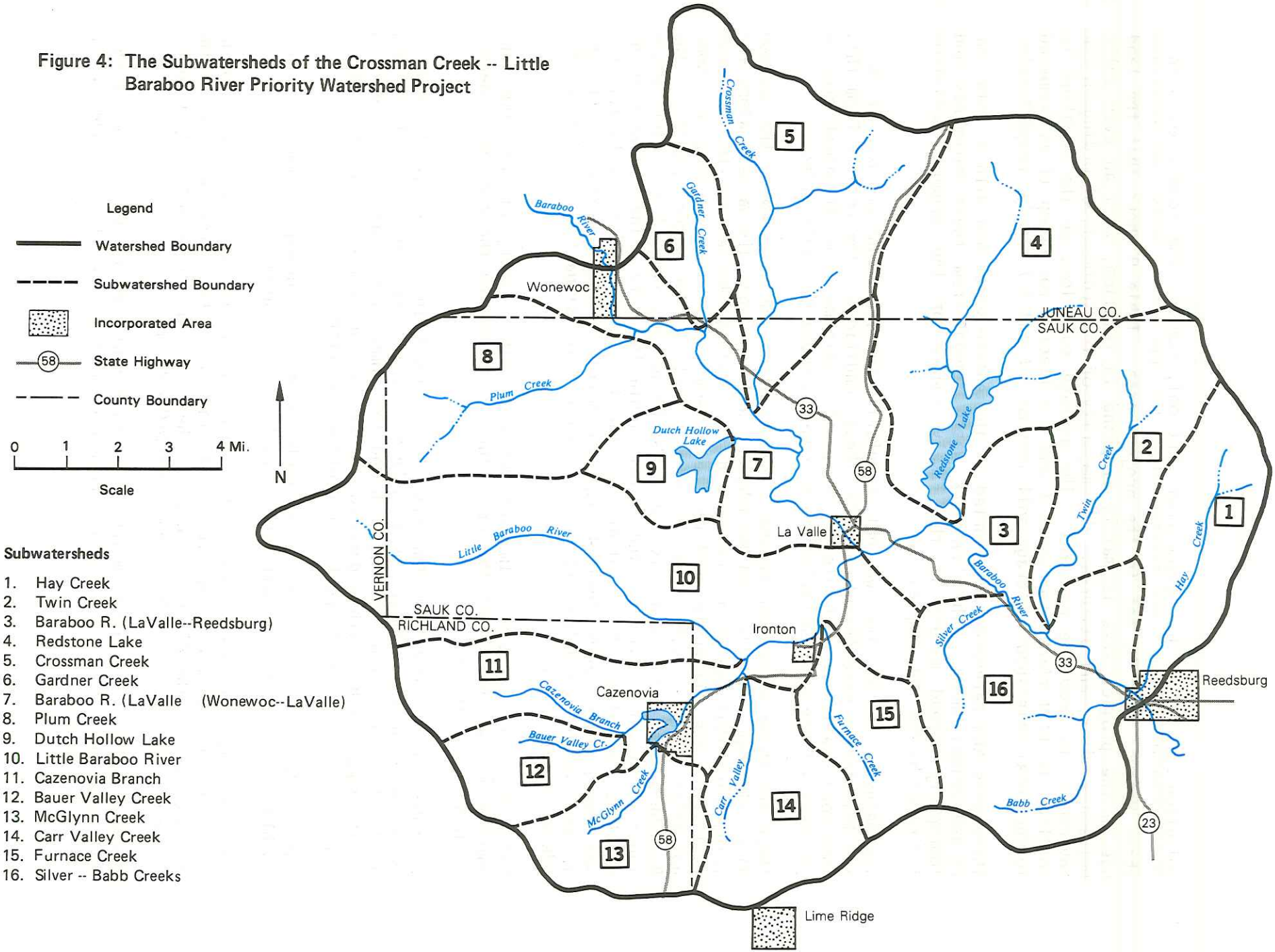
B. Surface Water Resource Descriptions

1. Baraboo River (mainstem - Wonewoc to Reedsburg)

General Description: The portion of the Baraboo River in the project is approximately 21 miles long. It has an average annual flow of about 172 cubic feet per second at Wonewoc and 240 cfs at Reedsburg. The river has a low gradient in this area and the adjacent land cover is mostly wetlands. There is one dam along this stretch at the Village of LaValle. The millpond created by the dam is virtually filled in with sediment. There was a dam on the river at Reedsburg but this has been removed.

Water Quality and Use: A warmwater fishery of smallmouth bass, northern pike, channel catfish, walleye, and panfish are present in the river. Besides fishing, the river is also used for waterfowl hunting and it is a popular canoeing route. In the past, the major pollution sources were the wastewater treatment facilities at Wonewoc and Reedsburg. Since these plants have been upgraded, their impact on the water quality has been minimized. The current major water quality concern is the high sediment load carried by the river. The HBI sampling results also indicate a concern for the organic pollution in the river.

Figure 4: The Subwatersheds of the Crossman Creek -- Little Baraboo River Priority Watershed Project



Subwatersheds

1. Hay Creek
2. Twin Creek
3. Baraboo R. (LaValle--Reedsburg)
4. Redstone Lake
5. Crossman Creek
6. Gardner Creek
7. Baraboo R. (LaValle (Wonewoc--LaValle)
8. Plum Creek
9. Dutch Hollow Lake
10. Little Baraboo River
11. Cazenovia Branch
12. Bauer Valley Creek
13. McGlynn Creek
14. Carr Valley Creek
15. Furnace Creek
16. Silver -- Babb Creeks

Pollution Sources: This discussion will only concern the conditions within the CC-LBR Watershed. The Baraboo River has 175 square miles of watershed above Wonewoc that is not in the project area. Table 9 shows that the land use in the project area is mainly cropland in rotation, with an even split between woodlots and pastures. The majority of the sediment, according to the inventory, is from the cropland. The average soil loss on the cropland in rotation is 12.9 t/ac/y for Group I and 6.3 t/ac/yr for Group II as compared to the total watershed's average soil loss of 9.6 and 3.7 t/ac/y. respectively.

There were 563 barnyards inventoried in the entire watershed with a total of 26,489 animal units. The livestock waste runoff from these barnyards and improperly spread manure is the likely source of the organic pollution indicated by the HBI samples.

The mainstem of the river was not inventoried for streambank erosion. Each of the tributaries were inventoried for these conditions. The results from this inventory (table 11) indicates that specific streams have streambank erosion concerns but the problem varies in seriousness among the tributaries.

There are three wastewater treatment plants along the mainstem of the Baraboo River (Wonewoc, LaValle, and Reedsburg); and two other dischargers along the tributaries (Village of Cazenovia and Carr Valley Cheese). Although these facilities are currently meeting their permit requirements there are some potential concerns with some of them affecting the water quality. The Reedsburg wastewater plant is currently being investigated for toxic waste input to the plant from the industries within the city. There have been no problems identified at the plant yet. The treatment facility at LaValle has had some problems with elevated suspended solids in their discharge. Changes in the plant's operation will likely correct this situation according to the DNR wastewater engineer.

Water Resource Objectives: Improve the warm water fishery in the river and improve the aesthetics of the river through decreasing the average suspended sediment concentration.

According to the DNR Fish Managers, the sediment in the Baraboo River is a major cause of the limited sport fishery in the river. The suspended sediment is impairing the sight feeding fish and this impairs the growth and survival of the sport fish. With a decrease in the average suspended sediment levels, stronger populations of sport fish could be expected.

The Baraboo River is also extensively used for canoeing. The the high turbidity of the river impairs the aesthetics of the area.

Nonpoint Source Control Needs: The control needs for the level of nonpoint source control will only be directed at the lands that directly drain to the Baraboo River. The direct drainage to the Baraboo River is broken up into two subwatersheds: Wonewoc/LaValle and LaValle/Reedsburg.

Recommendations for lands which drain to tributaries of the Baraboo within this watershed will be addressed under each tributary or lake writeup in the following pages.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	Number of Landowners---- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	50	18	59	79	77
Barnyard Runoff	50	8	9	0	51
Manure Spreading	50	2	19	0	19
Streambank Erosion	50	No Inventory Conducted			

2. Hay Creek

General Description: The creek enters the Baraboo River from the north just west of Reedsburg. It is a spring and seepage fed stream and is about 6 miles long. It is designated as a class II trout stream. The lower one mile of the creek is affected by the backwater from the Baraboo River and the water has a sluggish flow with a silty bottom. The rest of the creek has a good gradient and the bottom is almost totally silt-sand. There is a lack of deep pools and gravel bottom for trout spawning.

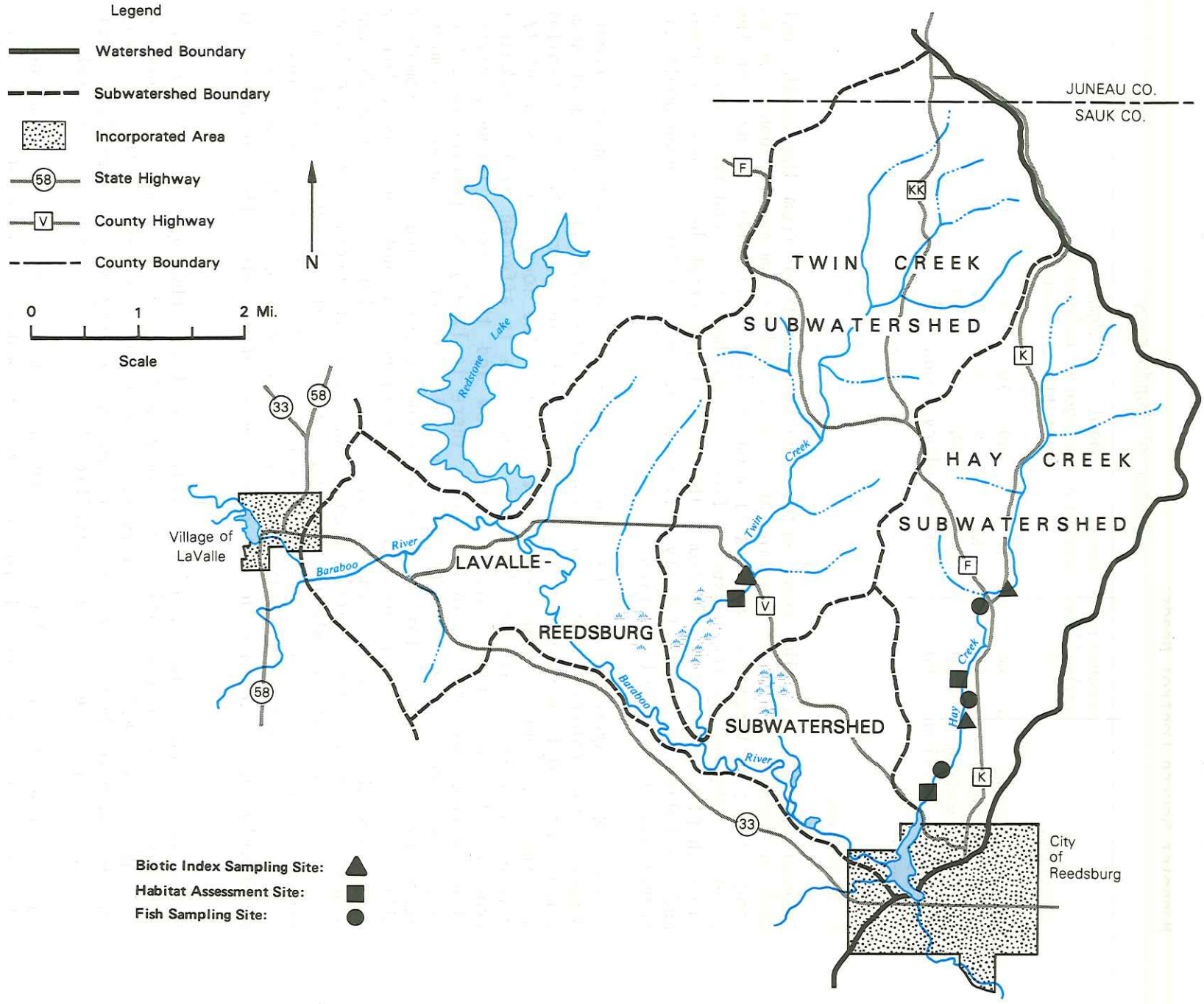
Current Water Quality and Use: Hay Creek is stocked with brown trout. However, the habitat assessment conducted in the fall of 1984 found some conditions which may limit the trout growth and survival. The habitat assessment was done at two sites on the creek. The lower site was about 1/4 mile north of the County Hwy. V bridge. This area is affected by the backwater from the Baraboo River. The flow is slow and the bottom is very silty. Although trout may survive in this area, there is likely no spawning occurring here. The second site assessed was above Middlesteadt Road (about 1.5 miles above the first site). This area has a steeper gradient and almost a complete silt-sand bottom. Also the pools in the creek are not deep (less than 2 feet), and they are filled in with the silt-sand material. These conditions probably restrict the trout's spawning and survival success. A biotic index sample was obtained at Middlesteadt Road in the fall of 1984, however, not enough insects were found to derive a biotic index. Of the aquatic insects that were found half were in the tolerance range of 1 or 2. This indicates a relatively clean stream with some minor degree of organic pollution present in the creek.

Pollution Sources: The soil loss rates in this subwatershed are not high compared to the rest of the CC-LBR watershed. Soil loss from croplands in rotation average 4.7 t/ac/yr. This land use accounts for 84% of the soil loss in the subwatershed even though it makes up only 46% of the land area. Woodlots and pastures are not a significant source of sediment to the creek.

The Hay Creek subwatershed has 19 barnyards with a total of 898 animal units. Six of these yards account for half of the modeled phosphorous load. The average pounds of phosphorus from barnyard runoff per square mile of subwatershed is low compared to the rest of the watershed.

There is very little streambank erosion occurring along Hay Creek (only 125 linear feet).

Figure 5: Hay Creek, Twin Creek, and
Baraboo River (LaValle -- Reedsburg) Subwatersheds



There are no point source dischargers to Hay Creek.

Water Resource Objectives: Protect the present cold water fishery and improve the trout's survival rate from year to year.

The factor limiting trout production and growth appears to be the silt-sand stream substrate. The stream currently supports stocked trout with very little year to year carry over. Given the relatively good watershed conditions it is doubtful that this creek could be improved to support a naturally reproducing trout population.

Nonpoint Source Control Needs:

		-----Number of Landowners----			
Sources	Reduction Objective %	Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	70	8	14	11	30
Barnyard Runoff	70	7	7	0	5
Manure Spreading	70	0	7	0	5
Streambank Erosion	70	1	1	0	? *

*It is not known how many landowners did not have any streambank erosion along the creeks.

3. Twin Creek

General Description: Twin Creek is a seepage and spring fed creek entering the Baraboo River from the north about two miles west of Reedsburg. The lower mile and half runs through the Baraboo River's floodplain. In this wetland area the channel is wide and the flow is sluggish. Above this area are about six miles of stream originating near the Sauk-Juneau County border. The upper portion the creek has a deep channel with good vegetative cover on the banks.

Water Quality and Use: Biotic index samples were taken at the County Highway V bridge crossing in the spring and fall of 1979, and in the fall of 1984. The 1979 samples showed that the stream had a significant amount of organic pollution. There were not enough insects in the 1984 sample to calculate a biotic index. The insects found in the 1984 sample showed an even mix of tolerant and intolerant insects and no conclusion can be drawn from this sample. Based on the 1979 samples it is likely that low dissolved oxygen conditions occur at times.

In the fall of 1984 a portion of the stream near the County Highway V bridge was evaluated for its fishery habitat. The channel is very deep and narrow along here but there are not an abundance of deep pools. Although the stream bottom is silted over, the silt is not deep (usually less than 6 inches). A field inspection in January of 1985 found that the creek was completely frozen over in the area of County Highway V. The groundwater flow was not adequate to keep the creek open during that winter. This information indicates that the

stream likely would not support a high quality trout population. The creek currently supports a good population of forage fish and provides a good habitat for fish production, but it has poor spawning habitat.

Pollution Sources: The major land uses in this subwatershed are evenly divided between cropland in rotation and woodlots (37% and 42% respectively; see table 9). Pasture is the only other land cover of significance (14%). Although the cropland in rotation makes up only 37% of the acreage; it accounts for 68% of the gross soil loss occurring in the subwatershed The average soil loss over the area is 4.1 t/a/yr. This may not seem high, however the average soil loss on the cropland is 7.6 t/a/yr.

There are 29 inventoried barnyards in the Twin Creek subwatershed (see table 10). According to the ARS model, the design event produces a total phosphorus loading of 808 pounds to the channel system of Twin Creek. Half of this phosphorus load is contributed by only two of the barnyards. The average pounds per barnyard is 27.8. This is the most likely source of the organic material affecting the Biotic Index values discussed above.

According to the inventory, there is very little active streambank erosion along Twin Creek (table 6). Only three erosion sites were found totalling 620 feet.

There are no point source dischargers in this subwatershed.

Water Resource Objectives: Improve the water quality to allow for a stronger forage fish population.

Currently Twin Creek supports a forage fishery and provides spawning habitat for sport fish from the Baraboo River. It is possible that the suspected low dissolved oxygen conditions and turbidity are two factors preventing the creek from supporting a better forage fish population or a smallmouth bass fishery. Improvement in the stream's dissolved oxygen and sediment levels should result in a more valuable forage fishery in Twin Creek with a slight chance of a minor sport fishery. Also, with a decrease in the sediment on the streambed, the spawning conditions would improve.

Nonpoint Source Control Needs:

		-----Number of Landowners----			
Sources	Reduction Objective %	Mgmt. Catagory I	Mgmt. Catagory IIa	Mgmt. Catagory IIb	Mgmt. Catagory III
Upland Erosion	50	7	18	25	30
Barnyard Runoff	50	2	3	0	24
Manure Spreading	50	0	12	0	9
Streambank Erosion	50	0	2	0	?*

*It is not known how many landowners did not have any streambank erosion along this creek.

4. Big Creeks - East and West Branches

General Description: These two creeks originate in Juneau County and flow about 3 miles before entering Redstone Lake near the Sauk-Juneau County border. The significance of these creeks is that their water quality has a major impact on the water quality of Redstone Lake. The streams themselves do not support a sport fishery and their flow is too low for much potential of a sport fishery. For these reasons the watershed conditions will be discussed below in the section concerning Redstone Lake.

5. Redstone Lake

General Description: Lake Redstone is an artificial lake created in 1965 through the impoundment of Big Creek in Sauk County. The dam is located two miles east of the Village of LaValle. The lake is 612 acres in size and has an average depth of 36 feet. The lake was created for recreational and residential development purposes. There are 1,600 lots platted around the lake and 377 of those lots are developed. The public access to the lake is through a county park and a boat ramp.

A lake management district was formed by the residents around the lake in 1976 in order to help address the water quality concerns of the lake. Several studies have been conducted on the lake's water quality. In 1978 the lake district contracted with a consultant to collect water quality data for the purpose of deciding on lake management strategies. This was done in cooperation with DNR's Office of Inland Lake Renewal. The DNR's Bureau of Research has also conducted water quality sampling investigations from 1967 through 1980. In 1980 the lake district funded a graduate program at the University of Wisconsin-Madison (the Water Resources Program - WRM) to: "analyze the lake data, identify water pollution sources, and define viable management alternatives". All of these sources of information were used in the analysis which follows.

Water Quality and Use: Water quality problems began almost as soon as the impoundment was filled. Nuisance algae blooms were common in the summer and the bays of the lake began to fill with sediment. Fish kills have occurred during some winters and summers since the late 1960's. These are likely a result of the low oxygen levels in the lake. Each of these water quality problems along with some other water quality indicators are discussed below in more detail. Appendix A contains the raw data from the DNR files on Lake Redstone. Table 8 is a summary of this data along with some results of predicting the future water quality conditions.

Phosphorus

Phosphorus levels in the lake is one of the major controlling factors in the growth of algae and aquatic weeds. According to the WRM report 55% of the phosphorus entering Lake Redstone comes from surface runoff. Groundwater inflow accounts for another 32% and atmospheric deposition accounts for the rest of the phosphorus entering the lake (see Table 7) . As mentioned previously, the concentration of phosphorus in the lake is one factor in determining a lake's trophic status. Although the level of this nutrient can vary with season and depth, the phosphorus concentration during the early spring period can indicate a lake's tendency to support summer algae blooms.

Table 7: Percent Phosphorus Loading to Lake Redstone by Source

Source	Percentage of Total
Surface Runoff	55 %
Groundwater	32 %
background	(28 %)
domestic (septic systems)	(4 %)
Atmospheric	13%
Total	101%

Source: WRM Workshop; IES Report 115

Concentrations greater than 0.020 mg/l are generally considered excessive and indicate a eutrophic condition (Vollenweider, 1968). DNR data shows that the average spring phosphorus concentration from 1971 - 1980 was 0.067 mg/l.

Algae and Chlorophyll a

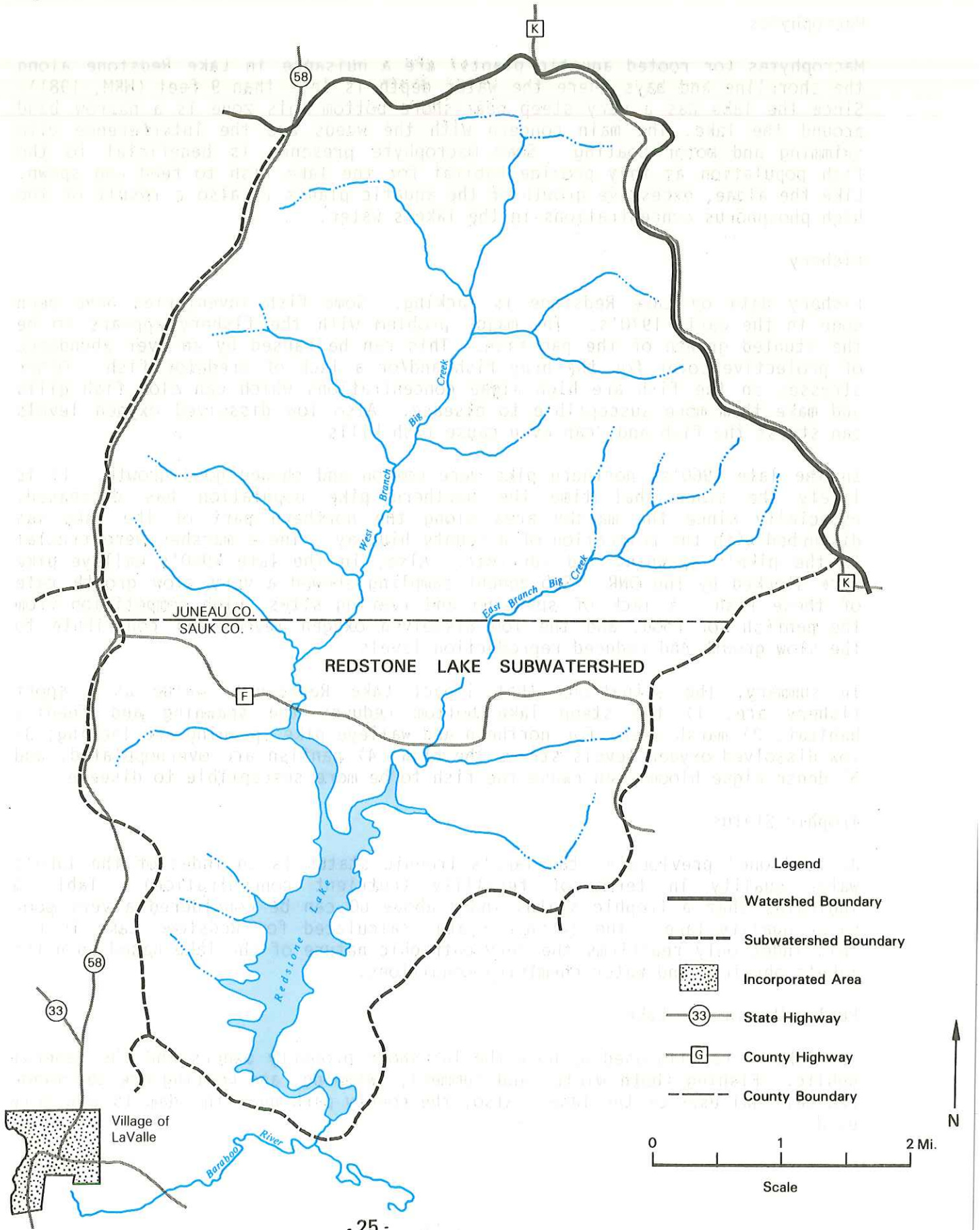
One result of these high phosphorus concentrations is excessive algae growth. Algae becomes a nuisance not only from an aesthetic point of view, but also some types of algae can produce toxic chemicals harmful to humans, and decomposing algae can result in low oxygen levels in the water. The lake has had annual spraying for the control of algae. Except for 1985, annual mechanical harvesting of the aquatic weeds has also occurred on the lake. During the summer of 1985 the weed density was not sufficient to warrant the harvesting.

A measure of the algae quantity is called the chlorophyll a concentration. Chlorophyll a is a compound found in almost all algae. In Lake Redstone, the average summer chlorophyll a concentration is 23 ug/l. These levels are generally highest in August and lowest in the winter. This level of chlorophyll a is another indicator of a highly fertile, eutrophic condition. (Wetzel, 1975).

Secchi Disc

The secchi disc transparency is a third indicator of a lake's trophic condition. The water clarity measured with this methods indicates how deep light can penetrate (which indicates where algae could survive). This measurement can be highly variable depending upon the observer, the weather, and the time of day. Summer secchi readings from 1967-1978 ranged from 2.5 to 8.0 feet with an average of 4.1 feet. There does not appear to be a trend in this measurement over the years of sampling. These readings do indicate a shallow depth of light penetration typical of fertile lakes. One likely cause of this are the algae blooms which interfere with the water clarity.

Figure 6: Redstone Lake Subwatershed



Macrophytes

Macrophytes (or rooted aquatic plants) are a nuisance in Lake Redstone along the shoreline and bays where the water depth is less than 9 feet (WRM, 1981). Since the lake has a very steep near-shore bottom this zone is a narrow band around the lake. The main concern with the weeds are the interference with swimming and motor boating. Some macrophyte presence is beneficial to the fish population as they provide habitat for the lake fish to feed and spawn. Like the algae, excessive growth of the aquatic plants is also a result of the high phosphorus concentrations in the lake's water.

Fishery

Fishery data on Lake Redstone is lacking. Some fish inventories have been done in the early 1970's. The major problem with the fishery appears to be the stunted growth of the pan fish. This can be caused by an over abundance of protective cover for the prey fish and/or a lack of predator fish. Other stresses on the fish are high algae concentrations which can clog fish gills and make them more susceptible to disease. Also low dissolved oxygen levels can stress the fish and, can even cause fish kills

In the late 1960's, northern pike were common and showed good growth. It is likely the since that time the northern pike population has decreased, especially since the marshy area along the northern part of the lake was disturbed with the relocation of a county highway. These marshes were crucial to the pike's spawning and survival. Also, in the late 1960's walleye pike were stocked by the DNR. Subsequent sampling showed a very slow growth rate of these fish. A lack of spawning and rearing sites, high competition from the panfish for food, and the low dissolved oxygen levels all contribute to the slow growth and reduced reproduction levels.

In summary, the situations that impact Lake Redstone's value as a sport fishery are: 1) the steep lake bottom reduces the spawning and feeding habitat; 2) marsh areas for northern and walleye pike spawning are lacking; 3) low dissolved oxygen levels stress the fish; 4) panfish are overpopulated; and 5) dense algae blooms can cause the fish to be more susceptible to disease.

Trophic Status

As mentioned previously, the lake's trophic status is an index of the lake's water quality in terms of fertility (nutrient concentration). Table 5 indicates that a trophic status index above 60 can be considered a very poor water quality lake. The trophic status calculated for Redstone Lake is 65. This index only reaffirms the very eutrophic nature of the lake based upon the lake's physical and water chemistry conditions.

Public Use of the Lake

The lake is heavily used by both the lakeshore property owners and the general public. Fishing (both winter and summer), swimming, and boating are the major recreational uses of the lake. Also, the county park near the dam is a highly used.

Table 8: Measured and Predicted Water Quality Conditions in Redstone Lake

Management Alternative	Total Phosphorus Loading to Lake ** (lbs/yr)	Spring In-Lake Phosphorus (mg/l)	Summer Secchi Depth (feet)	Summer Chlorophyll "a" (ug/l)	Trophic Status Index +	Qualitative Trophic Conditions
CURRENT CONDITIONS						
Average Measured Values (DNR-Bu. Research 1971-1980)	Not Avail.	0.067	4.9	25.3		
Calculated Values * (Based on measured phos.)	4,398	--	3.3	32.1	65	Eutrophic
PREDICTED CONDITIONS *						
Reduce P from runoff by 50%	3,188	0.048	4.2	20.2	60	Eutrophic
Reduce P from runoff by 70%	2,705	0.041	4.7	15.9	58	Eutrophic
Reduce P from runoff by 80%	2,462	0.037	5.0	13.9	56	Eutrophic

* All calculated and predicted values are based on a DNR model called DNR*ILR.TROPHIC which uses the Dillon and Rigler, 1974B equations to predict a phosphorus loading to phosphorus concentration relationship.

** This column is calculated based on the measured in-lake phosphorus using Dillon and Rigler 1974B

+ After Carlson (1977)

Pollution Sources: The land use in this subwatershed is evenly split between cropland in rotation and woodlots (32% and 35% respectively). Although the cropland in rotation is one third of the land area it accounts for half of the soil erosion in the subwatershed. Pasture is the next highest soil loss land cover. Nearly one third of the soil loss is occurring on pastures and this land cover makes up only 14% of the area. Residential lands (mainly the lakeshore development) makes up 9% of the subwatershed. Within the "Group I" inventory this subwatershed's average erosion rate is lower than Crossman Creek and Gardner Creek. This rate is still very high (9.8 t/ac/yr) and the average cropland erosion rate is even higher - 15.5 t/ac/yr.

There were 58 barnyards inventoried in the Redstone Lake subwatershed and 10 of these yards account for half of the phosphorus coming from barnyard runoff. The average phosphorous load in pounds per square mile is the lowest of the Group I inventory subwatersheds and the fifth highest compared to the entire watershed.

Streambank erosion along West Branch of Big Creek does not appear to be critical. Nine percent of the bank was eroding according to the inventory. The total soil loss from streambank erosion ranked eighth among the 12 stream systems inventoried.

There are no point sources of pollution in this subwatershed. The entire lakeshore development is unsewered and all of the residences are on septic systems or holding tanks. Based on the WRM Workshop Report it appears that at this time these septic systems are not a major factor in the overall nutrient loading to the lake. However, most of these systems were built before upgraded septic systems codes were in place. Also the region has thin soils over the bedrock which many not allow for proper wastewater purification from the septic system drain fields. There may be cases where individual systems are failing and causing localized bacteria and nutrient water quality impacts on the lake. This could only be determined on a site by site basis with an extensive survey of the domestic waste systems.

A potential serious source of sediment to the lake is from construction. As previously mentioned, only about one fourth of the lots surrounding the lake are developed. The construction period creates a condition which allows for maximum sediment loss from the site. This sediment may be small in volume compared to the total contribution from the upland erosion, but it can have significant local impacts on the lake.

Water Resource Objectives: 1) halt the degradation of Lake Redstone's water quality; 2) reduce the intensity and duration of the summer algae blooms; 3) create water quality conditions that would support a more stable and valuable population of sport fish.

The eutrophic nature of Lake Redstone will likely never be completely reversed. The background fertility levels of the water in the lake and in the feeding streams; along with the steep topography and land use will continue to support some algae growth even with the complete control of the nonpoint sources of pollution. The severity of the eutrophic conditions probably can be reduced through the reduction of nonpoint source pollution. Table 8 shows some predicted changes in water quality that could occur according the lake

model. These "Predicted Conditions" are at best rough indications of future conditions and they should not be interpreted as exact values. The model shows that even with an 80% control of the surface runoff phosphorus the lake would remain in a eutrophic condition. The spring phosphorus concentration would not drop to the .02 mg/l level generally considered as a threshold for nuisance algae growth. Given this condition it was determined that a 70% control level is probably the best that could be reasonably expected which will still result in some improvements in the water quality of the lake.

Changes in the lake's fish population are very difficult to measure. Fish populations have natural cycles and to know if the high or low populations are due to changes in water quality requires much more study than is available through the Department. For this reason the changes in the lake's water quality will be measured but, changes in the fishery will not.

Nonpoint Source Control Needs:

		----Number of Landowners------			
Source	Reduction Objective %	Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	70	35	52	65	17
Barnyard Runoff	70	15	20	0	22
Manure Spreading	70	2	19	0	19
Streambank Erosion	70	3	11	0	? *

* It is not known how many landowners do not have any streambank erosion.

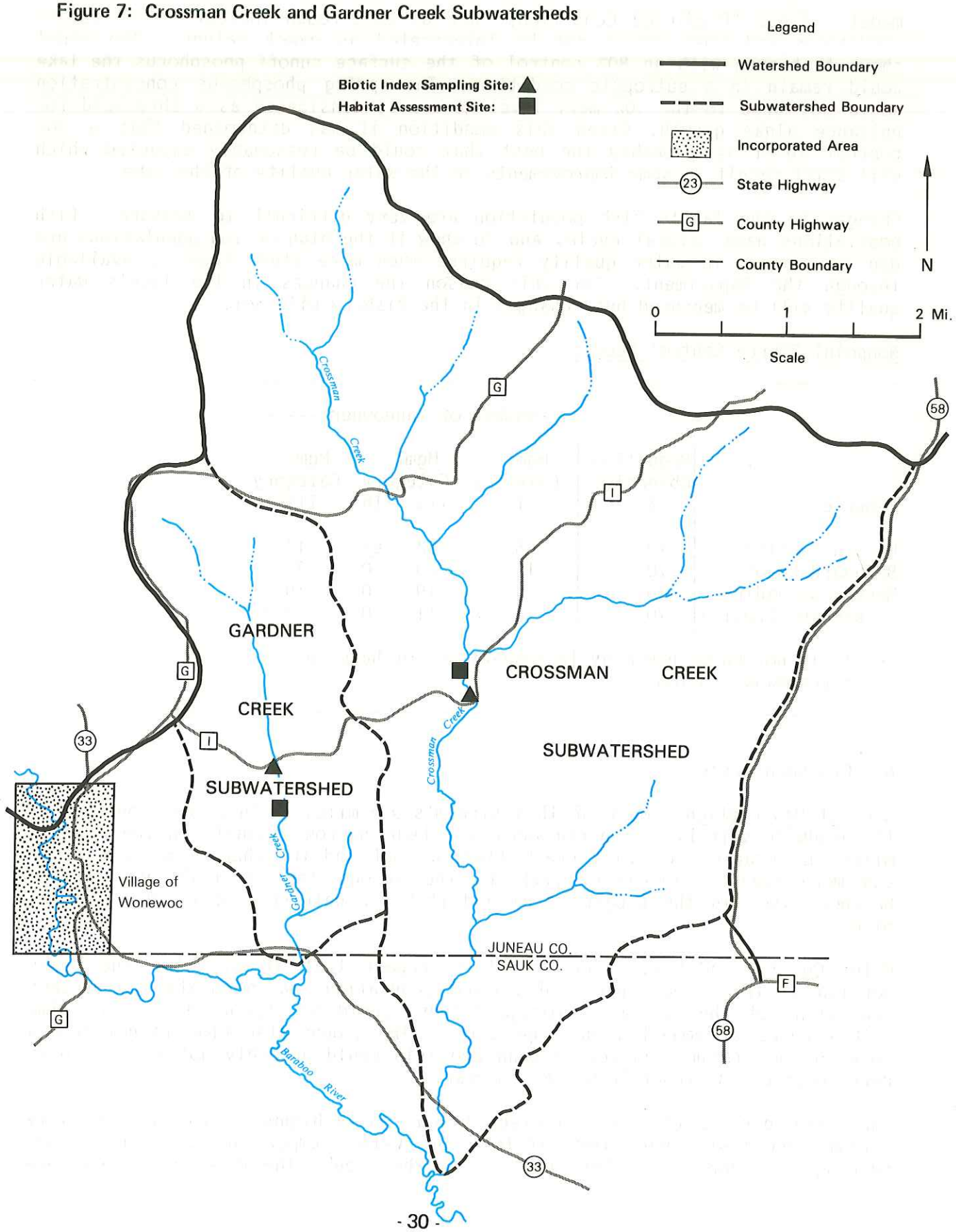
6. Crossman Creek

General Description: Most of this stream's 9.5 miles is in Juneau County. In the headwaters it is spring fed and has a deep, narrow channel. In the lower 3 miles the gradient of this creek flattens out and the channel becomes wider and more shallow. Crossman Creek is the second largest tributary to the Baraboo River in the project area and it has a watershed of about 21 square miles.

Water Quality and Use: Local residents report that at one time the upper portion of this creek supported a trout population. Based on the the present conditions of the stream, a forage fishery could be supported at this time with perhaps a remnant trout population. The groundwater flow is not enough to keep the stream open year around and this would probably not allow a high carry-over of the trout from year to year.

The lower portion of Crossman Creek below county highway I has a very silty stream bottom with very few riffles. The water temperature also is warmer (during the summer) in this portion of the creek. The creek was much more

Figure 7: Crossman Creek and Gardner Creek Subwatersheds



turbid in this area compared to the upstream reaches during a field inspection in the fall of 1984. This lower area likely does not support either cold water or warmwater sport fisheries. At this time it probably supports a forage fish population. A Biotic Index sample was taken at the county highway I bridge crossing in the fall of 1984. It was not a good sample site and the sample showed a mixture of stream insects tolerant and intolerant to organic pollution. This sample indicates some organic pollution affecting the stream aquatic life.

Pollution Sources: Crossman Creek has some of the highest soil loss of any subwatershed in the project area. Across the subwatershed the soil loss averages almost 11 t/ac/yr. Most of this soil loss is occurring on croplands in rotation, however a substantial amount is also coming from overgrazed pastures and grazed woodlots.

This subwatershed also has a high number of animal units (3,043). There were 72 barnyards inventoried in this area and the total phosphorus load according to the ARS model was 5,370 pounds. This was the highest total phosphorus load, and the highest phosphorus load on a per unit area basis of any subwatershed.

The streambank erosion survey indicated that nearly 25% (19,838 feet) of the streambank was eroded to some degree. This source is likely a major contributor to the silt bottom of the creek.

Water Resource Objectives: Improve the forage fish population in the portion of the creek above County Highway I. Improve the water quality in the portion below County Highway I in order to support a smallmouth bass population.

Although trout may have been present in the upper portions of this creek in the past; they probably did not have a high survival rate over the winter and thus would need restocking. Below this stretch, the creek could support a warmwater sport fishery (such as smallmouth bass) if the turbidity, streambed sediment, and low oxygen levels were removed. This region could also serve as a spawning area for sport fish from the Baraboo River if the proper habitat were made available.

Nonpoint Source Control Needs:

		-----Number of Landowners----			
Sources	Reduction Objective %	Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	50	21	45	44	17
Barnyard Runoff	50	14	14	0	25
Manure Spreading	50	1	30	0	17
Streambank Erosion	50	4	21	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

7. Gardner Creek

General Description: This is a high gradient, spring fed stream that enters the Baraboo River from the north, just downstream from the Village of Wonewoc. The watershed is mostly in Juneau County. It is a small stream and has a low flow.

Water Quality and Use: Gardner Creek currently supports a forage fishery. A habitat assessment was conducted on a mile of this creek south of county highway I in the fall of 1984. The stream bottom was heavily silted in and the pools were very shallow (less than two feet deep in most cases). A winter trip to this site in January of 1985 found the creek completely frozen over. This indicates that the groundwater flow is not sufficient to keep the creek open in the winter and thus, the creek would not be able to support a trout population. The fall, 1984 biotic index sample indicates fairly low organic pollution (a BI of 2.23)

Pollution Sources: In terms of total tons of soil loss, croplands in rotation contribute the largest amount of soil loss in this subwatershed. However, the highest erosion rates (in tons per acre per year) occur on the grazed woodlots. This land use category makes up 15% of the land and is accountable for 30% of the total soil loss in this subwatershed.

There are 23 barnyards in the Gardner Creek subwatershed. Of these barnyards, 4 contribute half of the calculated phosphorus. The calculated pounds of phosphorus on a per square mile basis is the highest of all the subwatersheds in the project area. The biotic index value for the creek does not reflect this high phosphorus load.

Gardner Creek also has serious streambank erosion conditions. It has the highest percent of bank erosion of all the subwatersheds. Most of this erosion occurs above the county highway I bridge.

No point sources of pollution discharge to Gardner Creek.

Water Resource Objectives: To improve the forage fishery in the creek.

Although Gardner Creek has serious nonpoint source pollution conditions, the major factor preventing this creek from supporting a sport fishery is the low flow. With the control of the nonpoint source pollution, the creek will likely support a valuable forage fish population. This use is important to support the sport fishery of the Baraboo River. The other reason for the control of nonpoint sources of pollution in this subwatershed is to reduce the pollutant load and its impact on the Baraboo River itself.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	-----Number of Landowners---- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	50	2	14	9	5
Barnyard Runoff	50	3	7	0	13
Manure Spreading	50	1	9	0	6
Streambank Erosion	50	1	8	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

Table 9: Land Use and Upland Erosion Inventory Results in the Crossman Creek-Little Baraboo River Watershed

Land Use	GROUP I INVENTORY: Baraboo River Wonewoc-LaValle Subwatershed			Crossman Creek Subwatershed			Gardner Creek Subwatershed			Redstone Lake Subwatershed			GROUP II INVENTORY: Baraboo River LaValle-Reedsburg Subwatershed			Bauer Valley Creek Subwatershed		
	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)
Cropland (in rotation)	4,008	11.0	44,234	5,300	11.7	61,837	1,620	12.8	20,682	5,799	15.5	89,806	2,455	8.8	21,659	2,066	4.0	8,213
	33%		51%	40%		44%	56%		49%	32%		50%	35%		83%	57%		75%
Cropland (cont. row)	551	8.1	4,437	201	17.7	3,555	23	43.3	997	102	46.1	4,701	246	4.2	1,028	24	2.9	69
	4%		5%	2%		3%	1%		2%	1%		3%	4%		4%	1%		1%
Woodlot	3,112	4.9	15,346	3,504	8.2	28,751	426	30.0	12,768	6,367	4.6	29,217	2,732	0.9	2,510	839	3.0	2,506
	25%		18%	26%		20%	15%		30%	35%		16%	39%		9%	23%		22%
Pasture	2,650	8.4	22,302	3,399	14.1	47,919	685	11.8	8,083	2,540	21.6	54,839	600	1.5	916	584	0.4	221
	22%		26%	26%		33%	23%		19%	14%		31%	8%		3%	16%		2%
Grassland (Vacant Land)	120	0.9	111	265	0.8	199	37	0.6	24	1,040	1.1	1,155	443	0.2	106	24	0.3	8
	1%		0%	2%		0%	1%		0%	6%		1%	6%		1%	1%		0%
Wetland *	630		0	146		0	0		0	815		0	129		0	2		0
	5%		0%	1%		0%	0%		0%	4%		0%	2%		0%	0%		0%
Farmstead & Residential *	1,141		0	398		0	113		0	1,654		0	292		0	49		0
	9%		0%	3%		0%	4%		0%	9%		0%	4%		0%	1%		0%
Commercial *	38		0	52		0	0		0	21		0	71		0	0		0
	0%		0%	0%		0%	0%		0%	0%		0%	1%		0%	0%		0%
All Land Uses Combined	12,250	7.1	86,430	13,265	10.7	142,261	2,904	14.7	42,554	18,338	9.8	179,718	6,968	3.8	26,219	3,588	3.1	11,017
	100%		100%	100%		100%	100%		100%	100%		100%	100%		100%	100%		100%

* The USLE was not calculated on these land uses. Gross soil loss was not considered significant from these areas.

Table 9 (con't): Land ULand Use and Upland Erosion Inventory Results in the Crossman Creek-Little Baraboo River Watershed

Land Use	Carr Valley Creek Subwatershed			Cazenovia Branch Subwatershed			Dutch Hollow Lake Subwatershed			Furnace Creek Subwatershed			Hay Creek Subwatershed			Little Baraboo River Subwatershed		
	GROUP II INVENTORY																	
	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)
Cropland (in rotation)	2,789	6.3	17,647	3,323	4.4	14,534	417	4.7	1,954	1,634	5.7	9,328	2,754	4.7	13,075	9,277	6.0	55,357
	45%		76%	44%		66%	13%		45%	40%		71%	46%		84%	46%		71%
Cropland (cont. row)	81	2.8	227	143	3.3	472	0	0.0	0	163	5.6	910	38	3.7	142	735	5.0	3,680
	1%		1%	2%		2%	0%		0%	4%		7%	1%		1%	4%		5%
Woodlot	1,891	2.4	4,444	1,937	3.0	5,844	767	2.0	1,572	1,334	1.7	2,269	1,860	1.0	1,933	5,022	3.2	16,048
	31%		19%	26%		27%	25%		37%	33%		17%	31%		12%	25%		20%
Pasture	1,147	0.5	523	1,468	0.7	988	180	0.6	116	627	0.6	377	905	0.5	464	3,867	0.1	2,053
	19%		2%	20%		4%	6%		3%	15%		3%	15%		3%	19%		3%
Grassland (Vacant Land)	119	2.5	300	306	0.4	131	978	0.6	614	126	2.2	272	124	0.1	17	824	0.9	745
	2%		1%	4%		1%	32%		15%	3%		2%	2%		0%	4%		1%
Wetland *	3		0	71		0	115		0	9		0	0		0	72		0
	0%		0%	1%		0%	4%		0%	0%		0%	0%		0%	0%		0%
Farmstead & Residential *	107		0	253		0	641		0	122		0	21		0	503		0
	2%		0%	3%		0%	21%		0%	3%		0%	5%		0%	2%		0%
Commercial *	7		0	5		0	0		0	55		0	16		0	10		0
	0%		0%	0%		0%	0%		0%	1%		0%	0%		0%	0%		0%
All Land Uses Combined	6,144	3.8	23,141	7,506	2.9	21,969	3,098	1.4	4,256	4,070	3.2	13,156	5,718	2.7	15,631	20,310	3.8	77,883
	100%		100%	100%		100%	100%		100%	100%		100%	100%		100%	100%		100%

* The USLE was not calculated on these land uses. Gross soil loss was not considered significant from these areas.

Table 9 (con't): Land Use and Upland Erosion Inventory Results in the Crossman Creek-Little Baraboo River Watershed

Land Use	GROUP II INVENTORY: McGlynn Creek Subwatershed Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Plum Creek Subwatershed Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Silver-Babb Creeks Subwatershed Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	Twin Creek Subwatershed Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	GROUP I SUMMARY Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)	GROUP II SUMMARY Acres	Aver. Soil Loss (t/a/y)	Total Soil Loss (t/yr)
Cropland (in rotation)	2,105	4.3	8,987	4,375	6.7	29,407	5,442	8.4	45,852	2,914	7.6	22,229	16,727	12.9	216,559	39,551	6.3	248,242
	51%		69%	46%		69%	52%		86%	37%		69%	36%		59%	44%		74%
Cropland (cont. row)	63	2.7	167	187	4.4	818	157	5.3	830	2	4.0	8	877	15.6	13,690	1,839	4.5	8,351
	2%		1%	2%		2%	1%		2%	0%		0%	2%		3%	2%		2%
Woodlot	1,227	2.7	3,329	2,733	3.0	8,206	2,828	2.0	5,564	3,331	2.1	6,948	13,409	6.4	86,082	26,501	2.3	61,173
	30%		26%	28%		19%	27%		10%	42%		21%	27%		19%	30%		18%
Pasture	557	0.6	317	1,842	2.0	3,763	1,205	0.5	648	1,133	2.3	2,569	9,274	14.4	133,143	14,115	0.9	12,955
	14%		2%	19%		9%	11%		1%	14%		8%	20%		18%	16%		5%
Grassland (Vacant Land)	120	1.4	163	237	1.3	297	413	1.1	472	452	1.4	643	1,462	1.0	1,489	4,166	0.9	3,768
	3%		1%	2%		1%	4%		1%	6%		2%	3%		1%	5%		1%
Wetland *	1		0	28		0	4		0	0		0	1,591		0	434		0
	0%		0%	0%		0%	0%		0%	0%		0%	3%		0%	0%		
Farmstead & Residential *	34		0	190		0	382		0	146		0	3,306		0	2,740		0
	1%		0%	2%		0%	4%		0%	2%		0%	7%		0%	3%		
Commercial *	3		0	21		0	74		0	3		0	111		0	265		0
	0%		0%	0%		0%	1%		0%	0%		0%	0%		0%	0%		
All Land Uses Combined	4,110	3.2	12,963	9,613	4.4	42,491	10,505	5.1	53,366	7,981	4.1	32,397	46,757	9.6	450,963	89,611	3.7	334,489
	100%		100%	100%		100%	100%		100%	100%		100%	100%		100%	100%		100%

* The USLE was not calculated on these land uses. Gross soil loss was not considered significant from these areas.

Table 10: Summary of the Barnyard Inventory Results
- Based on the ARS Model for a 10 yr-24 hr. rainfall (4.0")

Subwatershed	Number of Barnyards	Animal* Units	Total Phos. (lbs)	Animal Unit Density (au/sq.mi)	Average Phos. (lbs/sq.mi)	# of Barnyards in top 50% of Phos. Load
INVENTORY GROUP I						
Crossman Creek	72	3,043	5,371	146	258	14
Gardner Creek	23	1,330	1,289	293	284	4
Redstone Lake	58	2,489	2,128	87	74	10
Baraboo River (Wonewoc-LaValle)	54	2,145	2,165	112	113	4
GROUP I SUMMARY	207	9,007	10,953	123	150	32
INVENTORY GROUP II						
Bauer Valley Creek	21	1,112	149	198	27	4
Baraboo River (LaValle-Reedsburg)	12	598	92	55	8	4
Carr Valley Creek	28	1,554	619	162	64	2
Cazenovia Creek	42	2,114	189	180	16	8
Dutch Hollow Lake	5	237	41	49	9	2
Furnace Creek	20	1,062	207	167	33	4
Hay Creek	19	898	164	101	18	6
Little Baraboo	79	4,084	776	129	24	12
McGlynn Creek	14	797	119	124	19	2
Plum Creek	54	2,421	368	161	24	7
Silver/Babb Crs	36	1,971	418	120	25	6
Twin Creek	29	1,311	808	106	66	2
GROUP II SUMMARY	359	18,158	3,949	130	28	59

* An animal unit is equal to a 1000 pound beef cow

Table 11: Summary of Manure Management Analysis

Subwatersheds	# of Land-owners	# of Barn-yards	Acres Needed	Critical Acres Spread
GROUP I				
Crossman Creek	50	72	934	846
Gardner Creek	18	23	379	352
Redstone Lake	49	58	728	643
Baraboo River (Wonewoc-LaValle)	40	54	755	598
GROUP II				
Bauer Valley Creek	16	21	314	271
Baraboo River (LaValle-Reedsburg)	11	12	158	121
Cazenovia Branch	33	42	628	515
Carr Valley Creek	20	28	408	224
Dutch Hollow Lake	3	5	52	48
Furnace Creek	12	20	245	168
Hay Creek	9	19	198	170
Little Baraboo R.	59	79	1,189	900
McGlynn Creek	11	14	190	161
Plum Creek	38	54	751	599
Silver-Babb Crs	25	36	551	378
Twin Creek	22	29	402	302

* The "Acres Needed" Column is the amount of land needed to needed to dispose of a 6 month accummulation of manure at a disposal rate of 25 tons/acre.

* The "Critical Acres" Column is the annual average amount of land that is spread with manure and is not suitable for spreading when the ground is frozen.

Table 12: Summary of the Streambank Erosion Inventory

Subwatershed	Inventoried* Stream Length (feet)	Eroded Sites Total Length (feet)	Per Cent Of Banks Eroding (%)	Total Soil Loss (tons/yr)
Bauer Valley Creek	25,000	125	1%	16
Carr Valley Creek	50,800	11,841	23%	1,308
Trib. to Carr	9,800	165	2%	21
Cazenovia Creek	61,200	980	2%	153
Crossman Creek	85,000	19,838	23%	1,199
Furnace Creek	37,600	1,050	3%	150
Gardner Creek	29,600	14,970	51%	1,026
Hay Creek	63,400	125	0%	8
Little Baraboo R.	139,200	19,614	14%	2,488
McGlynn Creek	33,200	350	1%	41
Trib. to McGlynn	9,600	435	5%	40
Plum Creek	62,600	11,010	18%	1,858
Twin Creek	67,600	620	1%	123
West Br. Big Creek	51,000	4,390	9%	145
TOTAL WATERSHED	674,600	81,123	12%	8,428

* This column includes both banks of the stream which were inventoried

Table 13: Biotic Index (HBI) Sampling Results

BIOTIC INDEX VALUES

Site #	Stream	Sampling Location	Sampling Date 1979 Spring	1979 Fall	1984 Fall	Water Quality Condition
1	Hay Creek	Middlestadt Rd. (T13N-R4E S34)	-	-	*	Good
2	Twin Creek	Co. Hwy V (T13N-R4E S29)	2.82	3.38	*	Fair-Good
3	Crossman Creek	Co. Hwy. I (T14N-R3E S29)	-	-	2.44	Good
4	Gardner Creek	Co. Hwy. I (T14N-R2E S25)	-	-	2.23	V. Good
5	Baraboo R.	Co. Hwy G (T14N-R2E S35)	3.34	3.47	-	Fair
6	Baraboo R.	Dutch Hollow Rd. (T13N-R3E S20)	3.55	3.53	-	Fair
7	Plum Creek	Co. Hwy. G (T13N-R2E S2)	-	-	*	Fair
8	Little Baraboo R.	Henderson Rd. (T13N-R2E S31)	-	-	2.06	V. Good
9	Little Baraboo R.	Co. Hwy. G (T12N-R3E S5)	-	-	*	V. Good
10	Little Baraboo R.	State Hwy 58 (T13N-R3E S34)	3.24	3.57	-	Fair
11	Cazenovia Br.	Co. Hwy II (T12N-R2E S4)	-	-	2.52	Good
12	Cazenovia Br.	State Hwy 58 (T12N-R2E S5)	3.18	*	-	Fair
13	Bauer Valley Cr.	Dix Rd. (T12N-R2E S15)	-	-	2.22	Good
14	McGlynn Cr.	State Hwy 58 (T12N-R2E S13)	-	-	2.20	Good
15	Carr Valley Cr.	Marshall Rd. (T12N-R3E S8)	-	-	3.52	Poor
16	Furnace Cr.	State Hwy 58 (T12N-R3E S4)	-	-	*	Fair

* These sites did not have enough aquatic insects in the sample to calculate an index; a qualitative assessment of the streams water quality could be made from the insects that were found in the sample.

Table 14: Stream Habitat Rating Results and Use Class Predicted Changes in the Crossman Creek - Little Baraboo River Watershed

Stream	Warm Water Fishery		Cold Water Fishery		Use Class**	
	"before"	"after"	"before"	"after"	"before"	"after"
Babb Cr.	206	153	--	--	D	C
Carr Valley	--	--	152	113	D	A
Crossman Cr. (dwn strm)	175	117	--	--	D	B
Crossman Cr. (up strm)	141	113	--	--	D	C
Furnace Cr.	194	127	--	--	D	C
Gardner Cr.	221	102	--	--	D	C
Hay Cr. (dwn strm)	--	--	147	111	A	A
Hay Cr. (up strm)	--	--	143	103	A	A
Plum Cr.	185	138	--	--	D	C
Silver Cr.	--	--	--	--	E	C-D
Twin Cr.	122	105	--	--	C	C

* <70 = Excellent; 71-129 = Good; 130-200 = Fair; >200 = Poor

** Use Class Codes:
A - Capable of supporting a cold water sport fishery
B - Capable of supporing a warm water sport fishery
C - Capable of supporting a valuable intolerant forage fishery
D - Capable of supporting only rough fish (tolerant fish)
E - Capable of supporting very tolerant macroinvertebrates or no aquatic life

See the "Objective" section of each stream's writeup to find the use class predicted to be attained.

8. Plum Creek

General Description: Plum Creek originates in Vernon County, flows in a northeasterly direction, and enters the Baraboo River from the south, just downstream from the Village of Wonewoc. It is spring and seepage fed. Many of the tributaries to Plum Creek have been straightened.

Water Quality and Use: A biotic index sample was obtained from this creek near the County Highway G bridge in the fall of 1984. The streambed at the sample site was silty and not a good substrate for the sampling technique. Most of the insects found in the sample were tolerant to organic pollution and the biotic index value calculated was indicative of significant organic pollution. The habitat assessment conducted upstream from the County Highway G bridge showed poor fish habitat and pools that were silted in (less than 2.5 feet of depth). A water temperature measurement was obtained in January of 1985. Although the temperature was 0°C. The stream was open and flowing. There likely was not a substantial amount of groundwater flow at that time. The stream does not currently support a sport fishery.

Pollution Sources: Croplands in rotation had the highest average soil loss in tons/acre/year. This land use makes up 46% of the subwatershed but accounts for 69% of the soil loss occurring. In general, woodlots and pastures are not a significant source of sediment in this subwatershed.

Of the 54 barnyards in this subwatershed seven of them contribute half of the calculated phosphorus runoff. Compared to the other subwatersheds, Plum Creek ranks in the middle for pounds of barnyard runoff phosphorus per square mile of subwatershed.

Streambank erosion along Plum Creek is severe. According to the inventory 18% of its streambank is eroding to some degree. The total tons of soil lost from streambank erosion is the second highest of all the streams inventoried although the stream has only the fifth longest total length of eroded sites. This means that where erosion does occur, it has a high recession rate.

There are no known point source dischargers to Plum Creek.

Water Resource Objectives: Improve the forage fish population.

It is very difficult to estimate the potential fishery of Plum Creek. There is much evidence of nonpoint source impacts on the creek (relatively high BI value and high amount of silt in the stream). The flows and water temperatures indicate that this stream is a border line trout, or forage fishery. If the groundwater flow is strong enough to keep the water cool in the summer and open in the winter, the stream might be able to support a stocked trout population. The objective given above may be revised upon further investigation.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	Number of Landowners---- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	50	14	31	38	17
Barnyard Runoff	50	6	14	0	29
Manure Spreading	50	0	28	0	8
Streambank Erosion	50	1	10	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

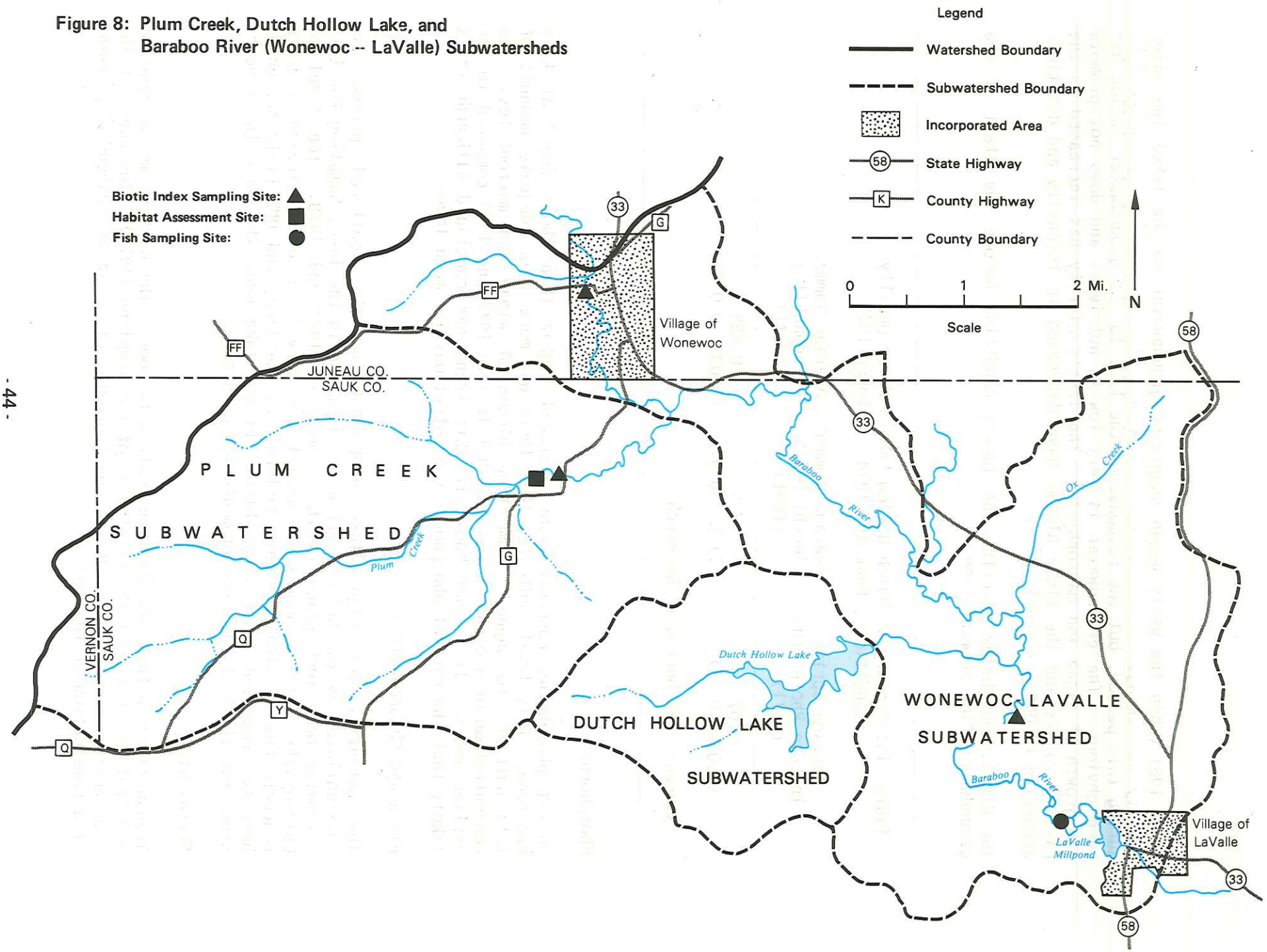
9. Dutch Hollow Lake

General Description: This is an artificial lake created when a dam was built in 1970 on Dutch Hollow Creek. The dam has a head of 45 feet and is located about 2.5 miles northwest of the Village of LaValle. It is 190 acres in size and has an average depth of 40 feet. The lake was created for the purpose of residential development for first and second homes. There are currently about 70 homes around the lake with 1100 lots yet to be developed.

There was much controversy during the first several years of creation of the lake and the management of the lake properties. The natural surface runoff was not enough to the fill the lake and water was being lost through the porous bedrock in the lake's bottom. Several options were studied to increase the level of the lake. Finally, in 1981 two high capacity wells began pumping groundwater into the lake to increase the inflow to the lake and raise its level. For the first few years these wells were pumping continuously during the summer to maintain the lake level. The rate of outflow through the lake's bottom has decreased for the last couple of years so that the wells are only used intermittently now. The dam has a bottom draw valve which has never been opened, except for testing. Dutch Hollow Creek continues to flow as a result of the groundwater outflow from the lake. It is predicted that in the next 5 years the lake's bottom will seal to the point that the bottom draw valve will need to be opened to maintain a minimum flow in the creek.

Water Quality and Use: The water quality of the lake has been quite variable since its creation. Like many artificial lakes in agricultural watersheds, Dutch Hollow showed signs of being very fertile and having eutrophic conditions when the lake was fed from surface runoff. Water quality sampling has been done by DNR between 1974 and 1978. Table 15 shows the average measurements for the three parameters that indicate the trophic status of the lake during that period. The raw data from which this table was obtained is in Appendix A.

Figure 8: Plum Creek, Dutch Hollow Lake, and Baraboo River (Wonewoc -- LaValle) Subwatersheds



Since 1981 (when the wells began supplying groundwater to the lake) the water quality has changed dramatically. There has been no monitoring on the lake during this period, but the response of the lake to the groundwater inflow has been obvious. The groundwater is very low in nutrients and does not promote the growth of algae and macrophytes. The lake's clarity has increased in the past few years and the algae blooms have decreased in intensity and duration. according to DNR personnel.

The discussions below describe the lake's condition before the start of the groundwater flow augmentation.

Table: 15: Summary of Dutch Hollow Lake's Water Quality Conditions, February 1974 - October 1978

Average Spring In-Lake Phosphorus (mg/l)	Average Summer Secchi Depth (feet)	Average Summer Chlorophyll a (mg/l)
0.07 (0.03 - 0.25)	3.0 (1.5 - 6.9)	0.058 (0.034 -0.0 82)

Source: DNR Bureau of Research

Phosphorus

Spring phosphorus concentrations averaged higher than those found at Lake Redstone. This level indicates that there was more than adequate amounts of this nutrient to support summertime blooms of algae and macrophytes. The concentration of phosphorus was somewhat less in 1977 and 1978 compared to the earlier years. It is not known if this trend has continued although it is likely that the current phosphorus concentrations are much lower.

Algae and Chlorophyll a

The potential for high algae growth during the monitored period was substantiated by the Chlorophyll a levels found in the lake. Sampling for this parameter only took place in the summers of 1977 and 1978. The level of Chlorophyll a (a component of algae) was very high and indicated a dense concentration of algae present. Residents of the lake, and DNR field personnel have not reported dense algae blooms in the lake over the past three years since the start of the flow augmentation program.

Secchi Disc

Transparency in this lake had been extremely poor. The deepest measurement of 6.9 feet was found in the first year of the sampling (1974). The cause of the poor transparency could be due to dense growths of algae or suspended sediment or a combination of the two.

Macrophytes

Macrophyte growth along the shore of Dutch Hollow Lake has been a nuisance to boat access and swimming. European millfoil is the most common species of macrophyte found. Selected areas of the shoreline have been sprayed with an aquatic plant herbicide in 1983, 1984, and 1985 to help control the growth of the plants. The weed beds do not extend far out into the lake because the lake's bottom drops off very steeply and the macrophytes cannot survive in the deep waters. The macrophyte growth is still a nuisance in the lake even with the improvement of the water quality from the groundwater inflow.

Fishery

Before the establishment of the lake, Dutch Hollow Creek supported a forage fishery with a few pan fish found in an April, 1970 survey. Since the formation of the lake it has been stocked several times with various species. In 1979, the property owner's association stocked the lake with smallmouth bass and in 1983 northern pike were stocked by the association. The LaValle Sportsmen Club along with DNR stocked the lake with walleye in 1985. Currently it appears that the lake has a good population of blue gill, crappie, and yellow perch. The northern pike have also survived well and provide a fishable population. It is not known if the northern pike have been able to successfully spawn.

Trophic Status

The trophic status index was calculated for Dutch Hollow Lake using the spring phosphorus level and the summer secchi disc measurements from the period of 1974 through 1978. The calculations resulted in a trophic status between 60 - 65 using these two parameters. The index can also be calculated from the chlorophyll a values, but since there have only been two measurements of this parameter on the lake, the calculation was not done. This index value, compared to Table 5 illustrates the eutrophic nature that this lake once had.

If water quality measurements were obtained now it is likely that the trophic status index would show a much improved lake.

Public Use of the Lake

The lake is heavily used by both the lakeshore property owners and the general public. Fishing is the major recreational use of the lake along with swimming and boating. There are two public boat ramps and a town park on the lake.

Pollution Sources: Before the development of the lake, the land use in this subwatershed was probably similar to the land use of other adjacent lands. In the CC-LBR Watershed, cropland makes up about 40% of the landuse and residential uses account for about 5% of the landuse. The current land use in this subwatershed is quite different from the rest of the watershed. In the Dutch Hollow subwatershed, cropland only accounts for 13% of the landuse and residential plus grassland (vacant land) makes up 53% of the subwatershed. This means that in a subwatershed that likely once had nonpoint source problems much like the rest of the watershed, now has very limited sources of pollutants to the lake. The cropland that does exist contributes 45% of the soil loss within the subwatershed.

There are only five active barnyards in the Dutch Hollow Lake subwatershed. Two of these account for over half the phosphorus load coming from barnyard runoff. As would be expected the livestock numbers in this area are the least of any subwatershed.

There are no point sources of pollution to Dutch Hollow Lake. However, all the developments around the lake are served by private septic systems. Almost all of these systems have been installed after 1977 when the septic codes and enforcement was upgraded. Thus, it is highly likely that these systems are located properly and operating in a safe manner. The soils in this region are generally not well suited for septic system drain fields. Approximately 15 houses are on holding tanks where the soil conditions are not suitable for onsite disposal. With the strict enforcement of the septic codes and the proper maintenance of the holding tanks it is unlikely that the domestic wastes from the lakeshore residences will be a significant source of water quality problems.

There is a potential source of sediment from the construction occurring on the lots around the lake. Since less than 10% of the lots are developed at this time there could be a significant amount of construction in the future. The proximity of the lots to the lake along with the steep slopes provide a chance of construction site runoff contributing sediment to the lake. The lake association does have deed covenants and restrictions to control erosion during the development of the lots. It is the responsibility of the lake association to enforce these restrictions. The amount of sediment from this source may be significant since the watershed does not have a lot of cropland with high erosion rates. The inventory that was conducted was not able to estimate the volume of sediment that would come from the developing sites.

Water Resource Objectives: To protect the current water quality conditions of the lake.

This lake could not be modeled like Lake Redstone to predict conditions with various levels of nutrient reduction. The lake models used cannot take into account the flow augmentation provided by the wells and the fact that there is no surface outflow. Because of the low intensity of agricultural use and the low amount of surface water flow to the lake, there is a good chance for maintaining the lake's water quality.

The major reason for the lake's relatively good conditions is the fact that the lake is being fed by nutrient poor groundwater instead of the fertile surface waters from the watershed. Once the bottom of the lake seals and the groundwater augmentation flow is reduced, the conditions of the lake could revert back to the situation which was monitored in the mid 1970's. The lake district may wish to consider maintaining some groundwater flow augmentation in order to keep the lake low in nutrients.

Nonpoint Source Control Needs:

Source	Reduction Objective %	Number of Landowners Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	70	2	2	4	18
Barnyard Runoff	70	2	2	0	1
Manure Spreading	70	0	1	0	2
Streambank Erosion	70	No Inventory Conducted			

10. Little Baraboo River

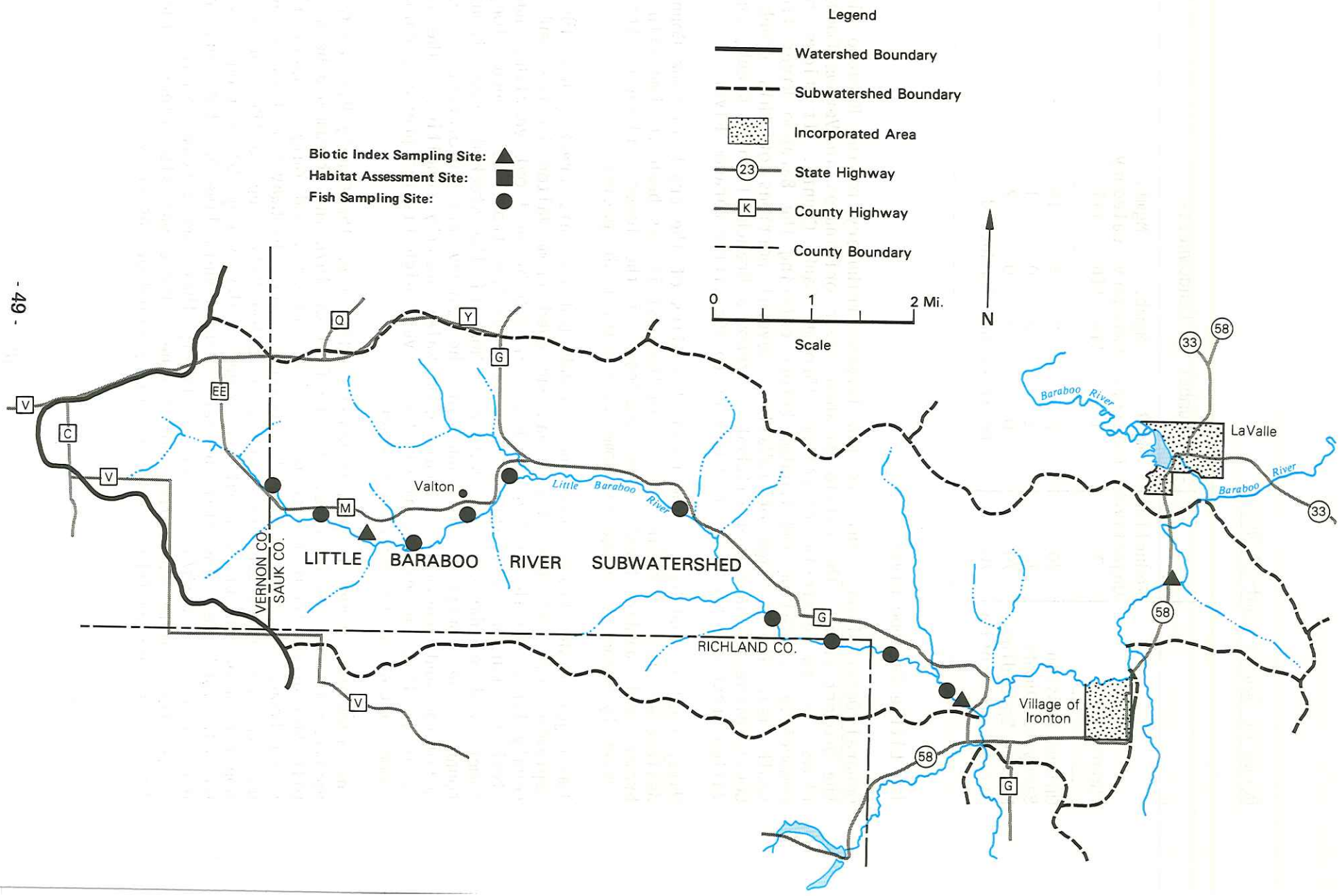
General Description: This is the largest tributary to the Baraboo River in the project area. The Little Baraboo River originates in Vernon County and flows in an easterly direction through Sauk County. It flows by the communities of Valton and Ironton before entering the Baraboo River from the south near the Village of LaValle. Several portions of this creek above County Highway G have been ditched. Cazenovia Branch, Furnace Creek, and Carr Valley Creek are the major tributaries to the Little Baraboo River.

Water Quality and Uses: The upper 4.5 miles of the creek in Sauk County are designated class II trout waters. In the past it has been stocked with brook, brown, and rainbow trout. The remainder of the lower portion of the creek currently supports forage and some warm water fish species.

Two major fish surveys have been conducted on this creek since 1965. In September of 1965 the stream was surveyed from Valton to the Sauk-Vernon county line. In the spring of that year 800 brown trout yearlings had been stocked. During that survey only one rainbow trout was found along with numerous dace, darters, and shiners. None of the stocked brown trout were found. The forage fish found in the survey are intolerant to organic pollution and generally indicate good water quality conditions. The lack of trout in this survey was attributed to very high fishing pressure during the summer according to the fish managers.

The creek was surveyed again in April of 1977 from the County Highway G bridge upstream to the county line. In the fall of 1976 the stream had been stocked with 500 brook trout fingerlings. This survey found only 3 sport fish (1 brown trout and 2 northern pike) between County Highway G and about one mile downstream from Valton. From one mile below Valton up to the county line a population of 542 brook trout were found. The average brook trout population was 207 fish/acre. The station nearest the county line had the highest trout density of 429 fish/acre. It is likely that the stream remains as trout waters for a mile above the county line. There was also clear evidence of trout reproduction taking place in this portion of the creek.

Figure 9: Little Baraboo River Subwatershed



Biotic index samples were obtained from two sites along the Little Baraboo River. The first site is just upstream from Valton in the trout waters. This sample was taken in the fall of 1984 and indicated very good water quality with little organic pollution. This was the best biotic index value found in the project area. The downstream site was at the State Highway 58 bridge crossing, about one mile upstream from the mouth of the river. Two samples were taken at this site; one each in the spring and fall of 1979. These samples indicated that the river in this region has poorer water quality and is more impacted from organic pollution.

Pollution Sources: Overall, the upland erosion rates in this subwatershed are low, with an average soil loss of 3.8 tons/acre/ year. The average soil loss on the croplands in rotation is 6.0 tons/acre/year. This land use accounts for only 46% of the land cover although it contributes 71% of the total soil loss in the subwatershed. In general, erosion from pastures and woodlots is not a significant source of sediment.

The phosphorus coming from barnyard runoff is lower than the average for the entire watershed on a per square mile basis. There are 79 livestock operations in the subwatershed and 12 of them account for half of the phosphorus from barnyard runoff.

Streambank erosion along the Little Baraboo River is also a significant concern. About 14% of the inventoried banks were eroding. The largest eroded sites occur in the lower stretches of the river (below County Highway G), however there are several sites in the designated trout waters that are eroding.

The Village of Cazenovia discharges its treated sewage to the Little Baraboo River just west of Ironton. The treatment facility is a secondary treatment three cell stabilization lagoon system. It was built in 1978 and is operating within its permit limits.

Water Resource Objectives: The Little Baraboo River can be broken up into three segments with different objectives for each segment.

The objective for the upper section of the creek is to protect the water quality and habitat conditions to allow for a stronger class II trout fishery.

The upper most segment is from County Highway EE road in Vernon County down to Rott Road (about a mile east of Valton). This segment has very high quality water and trout habitat and is in need of protection from sediment, organic pollution, and habitat degradation. With the successful control of these factors this stretch likely could become a high quality class II trout stream with some naturally reproducing trout.

The objective for the next segment downstream is to support a valuable forage fishery and allow for seasonal migration of trout into this section.

This segment is from Rott Road to the County Highway G bridge (about 2 miles west of Ironton). The water temperatures are too high to support a trout population and the flow is too low to support a healthy warmwater fishery. With an improvement in water quality and the habitat the trout from the

upstream area would migrate down to this stretch for feeding during the open water periods. Also this stretch could support a valuable forage fishery in support of the sport fish.

The objective for the lowest portion of the Little Baraboo River is to improve the water quality so that the river could support a valuable forage fishery.

This third segment is from the County Highway G bridge to the Baraboo River. This portion of the river has a large enough flow to support a warmwater fishery, however, the water temperatures in this area are too cold in the summer to allow for a good warmwater sport fishery. Another major limiting factor along this stretch is the high amount of sediment on the river bottom and the high suspended sediment load in the water.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	----Number of Landowners----- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	70	29	44	62	49
Barnyard Runoff	70	18	28	0	33
Manure Spreading	70	2	33	0	22
Streambank Erosion	70	6	26	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

11. Cazenovia Creek

General Description: Cazenovia Creek originates in Richland County near the corners of Richland, Sauk, and Vernon Counties. It flows into Cazenovia Millpond (also known as Lee Lake) at the Village of Cazenovia. The creek is the outlet of the impoundment and meets the Little Baraboo River west of Ironton in Sauk County. It is a cold water creek until it reaches the millpond. The creek itself is discussed below; the millpond will be discussed as a separate water body. A portion of the creek on the upper end has been channelized.

Water Quality and Use: Cazenovia Creek is classified as a class II trout stream upstream from the impoundment. It is stocked with brown trout and, in the past, rainbow trout. There is some natural reproduction occurring. Three fish surveys have been conducted on the upper portion of the creek since the mid 1960's. In the fall of 1965 a survey of 4 miles of stream above County highway II found primarily brown trout with one brook trout. A trout density of 53 fish per acre (19.6 pounds per acre) was found at that time. A survey of the same area in August of 1969 found no trout but a mixture of forage fish tolerant and intolerant to organic pollution. In March of 1975 brown and

rainbow trout were found with a density of 40 fish per acre. Above the millpond the water quality is generally good and a Biotic Index value of 2.52 indicates that some minor organic pollution is present. The presence of the intolerant fish species further confirms that the upper stream does not experience chronic low dissolved oxygen conditions. Below Cazenovia Millpond, the creek warms up and does not support trout. The impoundment itself probably is the cause for the warm water. The Biotic Index sampling done on this lower stretch of the creek indicates a higher degree of organic pollution (HBI values of 3.18 and 3.22). The gradient in this lower part also becomes flatter and the stream bottom is more silted in compared with the upstream portion of the creek.

Pollution Sources: Croplands in rotation are the lands which contribute the most sediment to Cazenovia Branch. This land cover makes up only 44% of the watershed, it accounts for 66% of the soil loss. Although individual parcels of woodlots and pastures may contribute high sediment loads to the creek, these land uses on the whole are not major sources of sediment.

This subwatershed has a high number of livestock per square mile (180.2; see table 5) although it ranks 14th in phosphorus load per square mile out of the 16 subwatersheds. This relatively low phosphorus load is reflected in the Biotic Index values found in the stream sampling. Of the 42 barnyards inventoried in this subwatershed, 35 are found in the area above the millpond, which is the trout water part of the stream. This stretch is the most susceptible to degradation from the barnyard runoff.

Streambank erosion was found to be of some concern in Cazenovia Branch. Although there are only 980 feet of bank erosion, 840 feet of it is occurring above the millpond in the trout water stretch. This is the portion of the creek with the highest sport fishery potential and also the portion most sensitive to the impacts of sediment and habitat loss.

There are no point source dischargers to Cazenovia Branch. The Village of Cazenovia does contribute street runoff to the millpond. Given the small size of the Village and the fact that there is no heavy industry it is unlikely that this runoff is a significant source of pollution to Cazenovia Branch.

Water Resource Objectives: To protect the trout fishery in the portion of the creek above the millpond.

The sport fishery in this portion of the stream is currently in good condition. Control of upland erosion and barnyard runoff is recommended in order to maintain this situation. With streambank work and some habitat improvement the stream, under ideal circumstances could become a class I trout stream and support a reproducing trout population.

Below the millpond, the stream's objective is to support a valuable forage fishery.

Because of the millpond, the downstream portion of Cazenovia Branch could not support a cold water fishery. It could be an important source of forage fish for the Little Baraboo River and provide spawning habitat for warm water sport

fish with the control of sediment and organic material entering this portion of the stream. Providing these two functions is the objective for this portion of the creek.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	----Number of Landowners----- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	70	15	24	19	31
Barnyard Runoff	70	13	15	0	12
Manure Spreading	70	0	26	0	9
Streambank Erosion	70	2	9	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

12. Bauer Valley Creek

General Description: Bauer Valley Creek is a small spring fed stream in Richland County. It flows into Cazenovia Branch just west of Lee Lake. It has the highest gradient of any creek in the watershed.

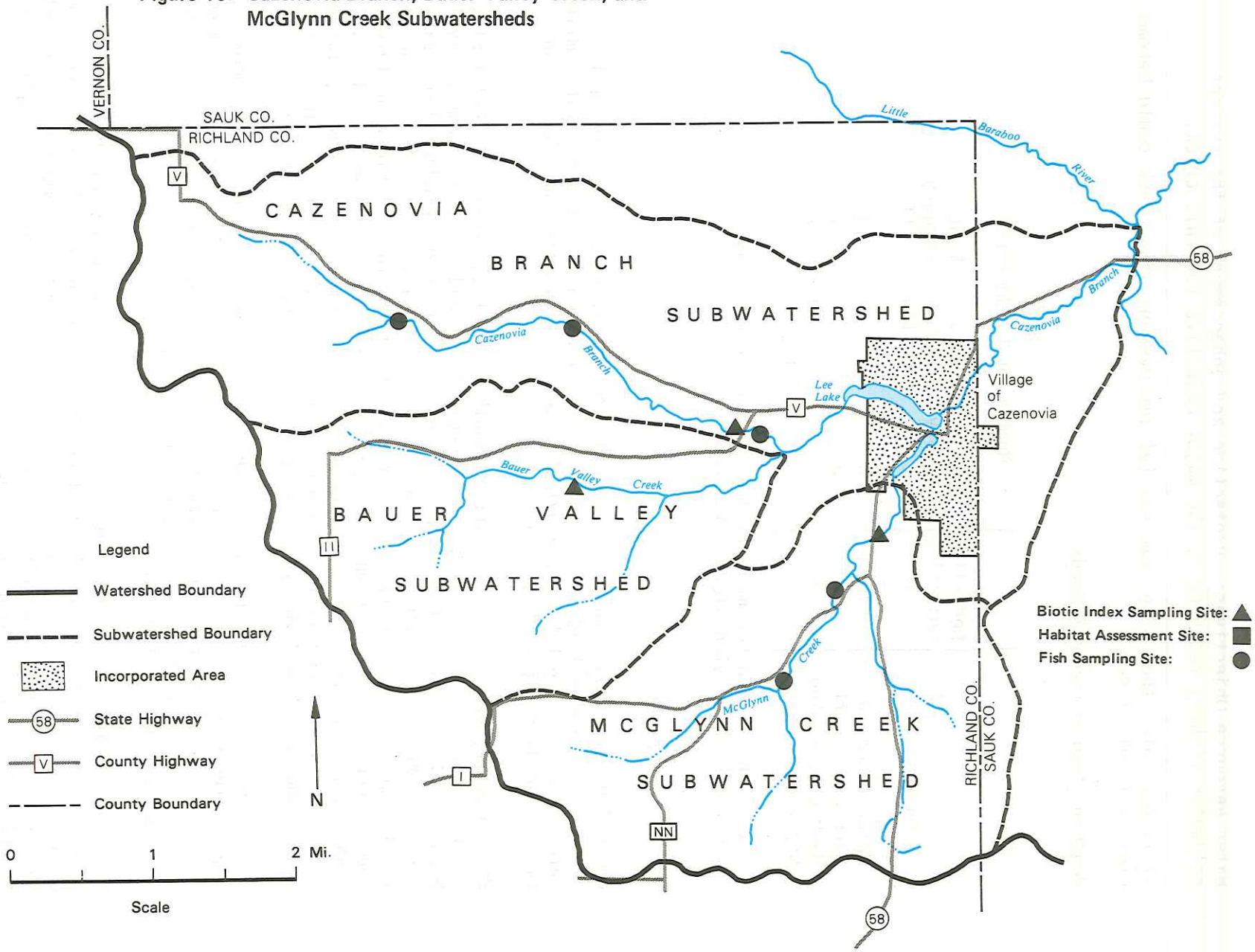
Water Quality and Uses: The good water quality of this stream is shown by the Biotic Index value calculated for a sample taken in the Fall of 1984 (2.22). The entire stream is a class II trout stream and up until 1978 it was stocked with brown trout by the DNR. The high amount of groundwater flow and high gradient keep the creek well oxygenated.

Pollution Sources: The average upland erosion rate in this subwatershed is quite low (3.07) compared to the other subwatersheds in the project. Of the erosion occurring, 75% is coming from the croplands in rotation, although this land use accounts for only 57% of the land cover in the subwatershed. Woodlots and pastures are not significant sources of sediment according to the inventory results.

There are 21 barnyards in the subwatersheds and Bauer Valley has the second highest concentration of livestock on a per unit area basis in the project. Relative to the other subwatersheds Bauer Valley is in the middle with respect to the phosphorus load per square mile from barnyard runoff. Four of the 21 barnyards in the subwatershed account for half of the predicted phosphorus load.

Streambank erosion is not a major concern along this creek. Only 125 feet of erosion were found during the inventory. These eroded sites are in trout waters, but by themselves, they probably are not having a major impact on the trout fishery.

Figure 10: Cazenovia Branch, Bauer Valley Creek, and McGlynn Creek Subwatersheds



No point sources discharge to this creek

Water Resource Objectives: Protection and enhancement of the current coldwater fishery resource is the major objective for this creek.

It is possible, that with some habitat improvement, the creek could become a class I trout stream.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	-----Number of Landowners---- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	70	6	10	7	13
Barnyard Runoff	70	6	8	0	7
Manure Spreading	70	0	9	0	7
Streambank Erosion	70	2	1	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

13. McGlynn Creek

General Description: This seepage fed creek originates about five miles southwest of the Village of Cazenovia. It flows north for about three miles before reaching Lee Lake (Cazenovia Millpond). This creek has the second highest gradient in the watershed.

Water Quality and Uses: The entire length of McGlynn Creek is rated a class II trout stream. It is stocked with brown trout and there are some native brook trout present in the creek. A fish sampling survey conducted on this stream in August of 1969 found a mix of forage fish species tolerant and intolerant to organic pollution. An earlier survey in the summer of 1966 found a density of 239 brown trout per acre (120 pounds per acre). This is a high density of fish. It is not known if this variation in trout population is due to natural population dynamics or environmental factors. The Biotic Index sampling showed the stream to have minimal organic pollution levels.

Pollution Sources: Upland erosion on a per acre basis is not high compared to some of the other areas in the project. Soil loss on croplands in rotation average 4.26 tons/acre/year. Overall soil loss in this subwatershed averages 3.15 tons/acre/ year. Cropland, which makes up 53% of the subwatershed accounts for 70% of the gross soil loss occurring.

There are 14 barnyards in the McGlynn Creek subwatershed with 797 animal units. The calculated phosphorus load from the barnyards in pounds per square mile of watershed is 18.6. This value is relatively low compared to the other subwatersheds. Two barnyards account for half of the barnyard phosphorus load calculated for the McGlynn Creek subwatershed.

Although streambank erosion is not widespread, it is of concern in specific sites. A major tributary, which parallels highway 58 has about 450 feet averaging 2 to 4 feet high of bank erosion. Along the mainstem of the creek 350 feet of bank erosion was found.

In the late 1960's and early 1970's a waste discharge to the creek from a cheese factory resulted in fish kills during that time. The cheese factory has since closed down. There are no current point source dischargers to McGlynn Creek.

Water Resource Objectives: The major objective for this creek is to protect the present trout fishery resource.

The upland erosion and barnyard runoff do not have as high a pollution potential as in the other subwatersheds, however, because McGlynn Creek is a trout stream, it is more sensitive to sediment and organic pollution than warmwater streams. The objective for this stream will be to improve the growth of the stocked trout and (with some streambank improvements) protect and increase the natural spawning in the creek.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	-----Number of Landowners---- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	70	6	13	15	22
Barnyard Runoff	70	3	3	0	5
Manure Spreading	70	0	7	0	3
Streambank Erosion	70	1	2	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

14. Lee Lake (Cazenovia Millpond)

General Description: This 46 acre pond is located in the Village of Cazenovia and is formed by damming Cazenovia Creek. The first dam was constructed at this site in 1853 for the purpose of milling and creating a water supply. Since then the dam has been replaced many times. The three main tributaries to the lake are McGlynn Creek, Bauer Valley Creek, and Cazenovia Creek. The watershed to Lee Lake is about 22 square miles. The lake is very shallow with an average depth of 4 feet.

Water Quality and Use: There is no record of chemical sampling of this impoundment in the DNR files. The lake's major problem from a fishery standpoint is the high sediment deposition occurring near the tributary inlets and,to a somewhat lesser degree, throughout the lake.

There has been little reported nuisance macrophyte growth problems. One reason for this could be that the high carp population is preventing the growth of the macrophytes by the carp's disturbance of the sediment.

Although the trophic status of the lake was not determined through direct water chemistry measurements, the status was estimated through another method. In the late 1970's and early 1980's nearly 3,000 lakes in Wisconsin were monitored through the use of satellite remote sensing. One of the results of this effort was the calculation of the trophic status of these lakes. Lee Lake was one of the lakes monitored. The trophic status for this lake is 59. This places the lake in the eutrophic category.

In 1973 a fish survey was conducted on the lake by the DNR. The most common species found on the lake were bluegills and black crappies. Also found were largemouth bass, northern pike, carp, pumpkin seed, yellow bullhead, and sunfish. Many of the species showed stunted growth. The lake was drawn down in 1970 and again in 1980 by local sportsman groups for the removal of rough fish. There have been no reported winter fish kills on this lake. It is likely that the flow from the tributary trout streams prevents the lake from freezing to the bottom in the winter.

The lake has a public boat ramp and a Village Park for access. There is also a wayside access along highway 58 in the Village. The major recreational use of the pond is for fishing in both the summer and winter. The major species caught on the lake are blue gill, black crappie, and largemouth bass.

Pollution Sources: For information on this topic, refer to the writeups on the three tributaries to Lee Lake.

Objectives: Improve the pan fishery of the lake through the reduction of the sediment load to the lake and the subsequent deposition of sediment on the pond's bottom.

The objectives of the lake will be met primarily through implementing the objectives of each of it's tributaries. Since each tributary is a trout stream, protection of the stream will in turn, protect and perhaps improve the pond.

Nonpoint Source Control Needs: The control needs for each of the tributaries (McGlynn Creek, Bauer Valley Creek, and Cazenovia Creek) should be followed for Lee Lake.

15. Carr Valley Creek

General Description: This stream originates near the community of Lime Ridge and flows north for about five miles where it meets Cazenovia Branch between Cazenovia and Ironton. It has a very high gradient and is a spring and seepage fed creek.

Water Quality and Use: A fish habitat assessment was conducted on this creek in the fall of 1984 in the stretch above Marshall Road. The stream currently supports a forage fish population and is not used as a sport fishery. At the time of the habitat assessment the stream had heavy silt deposits on the

bottom and the pools were very shallow (less than two feet deep). The water was also quite turbid at this time. During a field trip in January of 1985 the stream was completely ice free and the water temperature was 36 degrees F. A biotic index sample obtained in the fall of 1984 indicated that the stream is significantly impacted by organic pollution. The index value of 3.52 was the highest found in the 1984 sampling.

Pollution Sources: Cropland erosion on rotated fields accounts for 76% of the erosion in the subwatershed, although this land use covers only 45% of the area. The soil loss rate on this land is about average compared to the other subwatersheds. Erosion on other lands is not a significant source of sediment to the creek. The density of livestock and the pounds of phosphorus runoff from barnyards is high in this subwatershed compared to the other areas. There are 28 barnyards in this subwatershed and only 2 account for half of the phosphorus runoff.

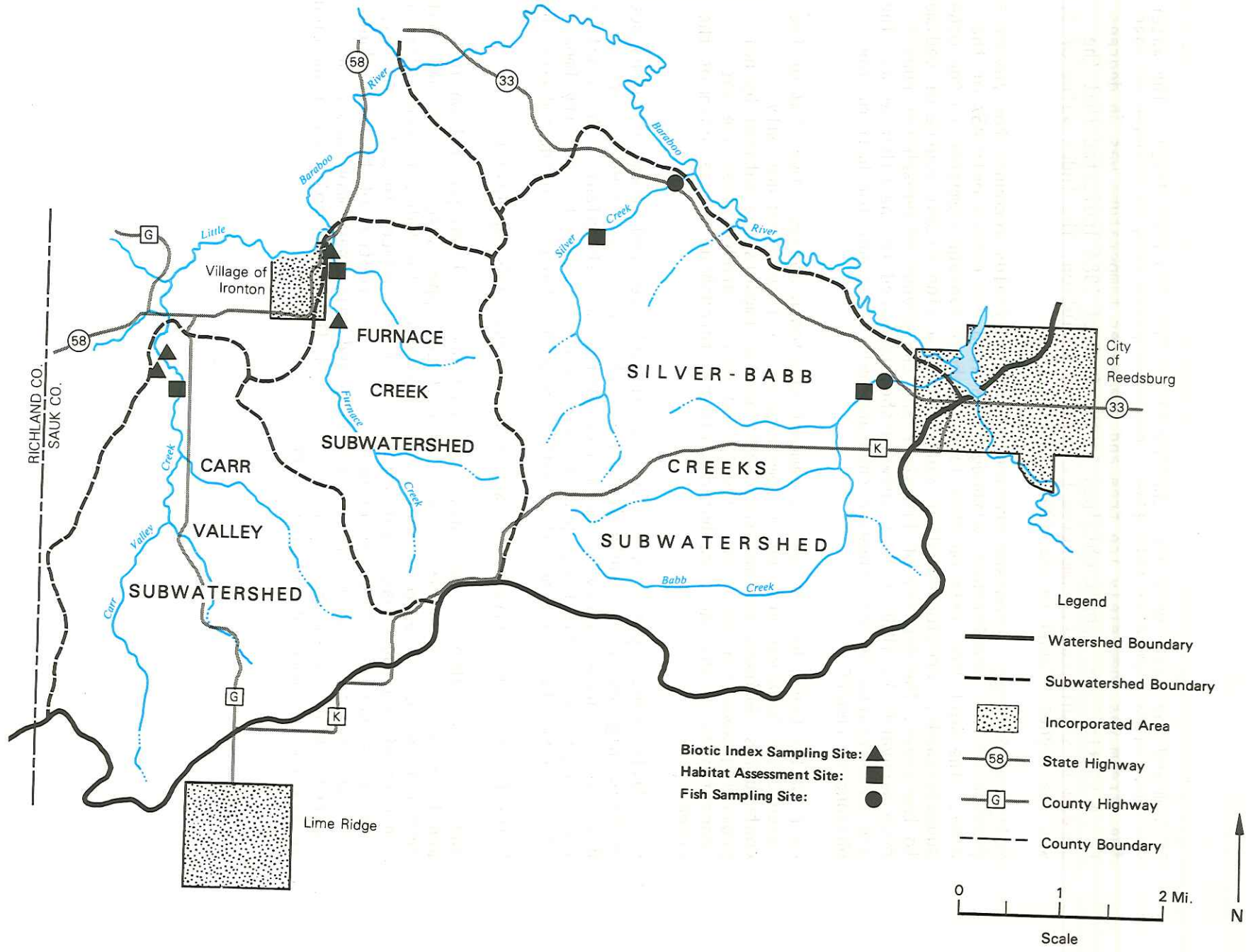
Carr Valley Creek has serious streambank erosion problems. Over 23% of the inventoried bank was eroding to some degree. This erosion not only contributes sediment to the stream but it also impacts the habitat by not providing cover for the fish. The 11,800 feet of eroded sites are not concentrated in any one area but distributed throughout the mainstem of the creek.

Carr Valley Cheese plant is located in this subwatershed about two miles south of State Highway 58 on County Highway G. Its process waste waters are disposed of through spray irrigation on fields near the plant. The plant is complying with its discharge permit and is not causing water quality impacts at this time. There are no other point source dischargers in the subwatershed.

Water Resource Objectives: To improve the forage fish population.

There is some potential for this creek to support a trout population in addition to the forage fish. Carr Valley Creek appears to have adequate water temperatures and flow to support a trout fishery. The habitat needs extensive improvement and the organic pollution needs to be reduced in order for this creek to support a cold water fishery. With the control of the streambank erosion, the barnyard runoff, and the cropland this creek may support a stocked population of trout. For this reason the higher pollutant reduction levels are recommended for this creek.

Figure 11: Carr Valley Creek, Furnace Creek, and Silver -- Babb Creeks Subwatersheds



Nonpoint Source Control Needs:

Sources	Reduction Objective %	Number of Landowners: Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	70	9	11	14	29
Barnyard Runoff	70	5	15	0	8
Manure Spreading	70	0	11	0	10
Streambank Erosion	70	4	9	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

16. Furnace Creek

General Description: Furnace Creek is a small tributary to the Little Baraboo River. It enters the Little Baraboo just north of the Village of Ironton. It is fed through springs and groundwater seepage.

Water Quality and Use: In the past this creek was stocked with trout by a local sports group. Currently only forage fish are supported in this stream. The aquatic insects found in a sample taken in the fall of 1984 indicated that the water is impacted by organic matter. There were not enough insects collected to calculate a biotic index, however, of the insects that were found, three fourths of them had a tolerance value between 3 and 5. This indicates the presence of organic pollution in the stream.

A habitat assessment was conducted on Furnace Creek on September 19, 1984. This assessment was done on a mile stretch of stream south of the State Highway 58 bridge. During this trip it was found that the stream was heavily silted in with very shallow pools (less that three feet deep). There was also a lack of riffle area. The water temperature on that day was 59* F. A field trip to this site in January of 1985 found the creek to be open and a water temperature of 36°F. Flows in this creek have been measured to be as low as .5 cubic feet per second (cfs). In normal years the annual low flow is probably 2 - 5 cfs.

Pollution Sources: As in the surrounding subwatersheds, most of the soil loss is occurring on the croplands in rotation. This land use covers 40% of the subwatershed and accounts for 71% of the total soil loss. The soil loss rates on both the cropland categories are higher than average and these two land uses are the most significant in terms of soil loss that could be controlled through management practices.

On a per square mile basis, Furnace Creek ranks in the middle in relation to phosphorus from barnyard runoff. There are 20 barnyards in the subwatershed and four of them account for half of the calculated phosphorus pollution.

Streambank erosion is not a widespread problem. The erosion that is occurring is in the lower two miles of the creek.

There are no point source dischargers in this subwatershed. The lower portion of Furnace does flow past the Village of Ironton. This community is unsewered and the waste disposal is handled with septic systems. It is not known what impact (if any) these systems are having on the water quality of Furnace Creek.

Water Resource Objectives: To maintain and improve the forage fish population of the creek.

Furnace Creek has adequate water temperatures to support a cold water fishery, however, the flows are too low for the sport fishery. This stream is better suited to supporting a valuable forage fish population which would be important to the sport fishery in the Little Baraboo River. The forage fishery will become stronger and more valuable with the control of the sediment and the livestock wastes in this subwatershed.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	----Number of Landowners---- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	50	7	11	11	12
Barnyard Runoff	50	4	4	0	11
Manure Spreading	50	0	8	0	7
Streambank Erosion	50	0	5	0	? *

* It is not known how many landowners do not have any streambank erosion along this creek.

17. Silver Creek and Babb Creek

General Description: These two creeks are discussed together because the nonpoint source inventory that was conducted grouped these two creeks into one subwatershed. They are both very small tributaries to the Baraboo River. They are just west of Reedsburg and enter the Baraboo River from the south. Both streams are spring and seepage fed.

Water Quality and Use: Both streams support a marginal forage fishery because of their very low flows. Babb Creek was assessed in September of 1984 for its fishery habitat. The stream bottom was totally silt and organic muck. There were very few pools and none deeper than two feet. The flow at the time of the survey was about 1.5 cfs.

Silver Creek was visited in September of 1984 to conduct a habitat assessment. The flow was so low (less than .5 cfs) that an assessment was not

done. With such a low flow, only small forage fish could be supported by this creek.

There were no biotic index samples taken at these two streams.

Pollution Sources: Of the subwatersheds inventoried by Group II, the Silver-Babb Creeks subwatershed has the highest average erosion rate (5.1 t/ac/yr) and the highest cropland in rotation rate (8.4 t/ac/yr). Cropland in rotation makes up about half of the subwatershed and contributes 84% of the total soil loss. Although the erosion rate of croplands in continuous row is relatively high, there are so few acres of that type of cropland, that it is not a significant source of sediment to the creeks.

There are 36 barnyards in this subwatershed and 6 barnyards contribute half of the phosphorus from the calculated runoff load. The phosphorus amount from barnyards in terms of pounds per square mile of subwatershed in this area is about average compared to the other subwatersheds inventoried by Group II.

Streambank erosion was not inventoried on these two streams.

There are no point source dischargers in this subwatershed.

Water Resource Objectives: To reduce the sediment and phosphorus load to the Baraboo River.

In terms of a fishery for these two creeks, the low flow is the major limiting factor. The best these streams could become is a forage fish stream. The major reason for controlling nonpoint sources of pollution in this subwatershed will be to reduce the pollutant load that Silver and Babb Creeks carry to the Baraboo River and to reduce the impacts of these pollutants to the river.

Nonpoint Source Control Needs:

Sources	Reduction Objective %	----Number of Landowners---- Mgmt. Category I	Mgmt. Category IIa	Mgmt. Category IIb	Mgmt. Category III
Upland Erosion	50	8	31	32	46
Barnyard Runoff	50	6	9	0	21
Manure Spreading	50	1	10	0	13
Streambank Erosion	50	No Inventory Conducted			

C. Ground Water Resource Description and Condition

Groundwater is the major source of drinking water in the watershed. The water table varies in depth from 0 to 350 feet below the surface. The major aquifer for water supply, is the porous sandstone bedrock.

Depth to bedrock varies greatly throughout the watershed. Outcrops of bedrock are common on the steepest slopes and along road cuts. On the ridge tops and along the valley bottoms, the bedrock is deeper beneath the land surface. Also the depth to the water table varies within the watershed between the ridge tops and the valley bottoms. Table 16 below shows some values for this information based on the well log records of 26 sites within the watershed.

Table 16: Bedrock and Water Table Depths

	Ridge Tops		Valley Bottoms	
Depth To:	Bedrock (ft)	Water Table (ft)	Bedrock (ft)	Water Table (ft)
Average:	15	200	58	20
Range:	7 - 50	50 - 350	30 - 75	5 - 35

The soil characteristics are important factors in determining the potential for groundwater contamination from land use activities. The soil layer is the major barrier between contaminants on the surface and the groundwater. The soils of the ridge tops (Valton, series) are generally deep (60"), well drained, and a texture of loam to silt loam. These soils are moderately permeable. The valley bottom soils (mainly Ettrick and Orion series) are poorly to very poorly drained, and slowly permeable. They are silt loam in texture. The texture and permeability of both sets of soils indicates that the surface runoff does not freely enter into the groundwater system.ampling 3 sites had nitrates exceeding the safe level. The elevated nitrate concentrations were found in the Ironton area and in one well near LaValle. Elevated nitrate levels indicate the presence of organic wastes in the groundwater. Also a high concentration of nitrates in the drinking water can be harmful to infants. Nitrate levels below 10 (mg/l) are considered safe for all uses.

Potential sources of the nitrates, could include such things as: septic systems, livestock wastes, or cropland fertilizer. It is not known what sources are impacting the groundwater at these sites.

At this time, it is not believed that nonpoint sources are impacting the groundwater on a large scale in this watershed. There may be isolated cases where improperly stored manure or a manure stack is leaching contaminants onto the groundwater. However, the steep topography, and soil types retards

nonpoint source pollutants from infiltrating into the soil, and enhances the runoff of the pollutants to the surface waters. If nonpoint source conditions are found during the implementation of this project that may be impacting the groundwater, management practices for the protection of the groundwater will be eligible for cost sharing.

IMPLEMENTING THE MANAGEMENT PLAN

I. INTRODUCTION

The purpose of this portion of the plan is to serve as a guide for the efficient implementation of the recommendations which were identified in the Management Plan.

This Implementation Plan identifies:

1. the tasks necessary to implement the recommendations in the Management Plan;

2. the agencies and units of government responsible for carrying out those tasks;

3. the time frame for completion of those tasks;

4. the type and amount of staff needed;

5. The cost of carrying out the project; and

6. The information - education program.

The general procedure used for achieving the water quality objectives identified in the Management Plan is through the voluntary installation of corrective land management practices to control the critical nonpoint sources. Cost-share funds are provided to contract with landowners to cover a percentage of the costs of installing the practices. In addition, funds are made available to the local agencies to cover the accelerated work effort required to carry out their responsibilities.

II. AGENCIES INVOLVED AND THEIR RESPONSIBILITIES

A. Management Agencies

Management Agencies are those local units of government identified in the areawide water quality management plans as having responsibility for soil and water conservation, including implementation of best management practices to improve water quality. For unincorporated areas, the Sauk, Juneau, Richland, and Vernon County Boards will serve as the management agencies for their respective counties. These counties are being represented by their respective Land Conservation Committees (LCC's). The City of Reedsburg, and the Villages of Wonewoc, Cazenovia, LaValle, and Ironton are the identified management agencies for nonpoint source responsibilities within their respective incorporated limits. The cities and villages are singled out because the county's authority does not extend into incorporated areas. Together these units of government are able to provide project cost-share funding to landowners and install practices on public lands.

In the Crossman Creek - Little Baraboo River Watershed almost all of the nonpoint source concerns are in the rural, unincorporated areas of the project. For this reason, the management agencies with most of the responsibilities will be the counties through their LCC's.

The Sauk County Land Conservation Committee, acting for the Sauk County Board, was selected as the lead management agency for the Crossman Creek - Little Baraboo River Watershed Project by the other agencies involved. Sauk County is responsible for coordinating activities among all other management agencies in the watershed. The lead agency is also contractually and financially responsible to the State of Wisconsin for overall management of the project, and responsible for coordinating activities of all the agencies involved.

The specific responsibilities for the management agencies, which are defined in the Wisconsin Administrative Rules, NR 120.06, are summarized below:

1. Assist with the development and approval of the priority watershed plan;

2. Recommend revisions to the plan to allow for necessary changes as the project is implemented;

3. Carry out education and information programs about nonpoint source pollution and land management needs within the watershed project area;

4. Administer the cost-sharing element of the project including sign-ups, approval, authorization of payments, and record keeping;

5. Certify installation, operation, and maintenance of best management practices;

6. Coordinate and control cost-sharing monies with local cost-sharing sources;

7. Report to DNR on project progress and recommended project modifications;

8. Screen applications for variances of the established cost-sharing rates; and

9. Determine priority for assistance among grant applications.

All of these activities may be carried out by the management agencies or by delegation to other agencies of units of government. The management agencies are still responsible for the activities whether they are done by the management agency or delegated to another agency.

B. Cooperating Agencies

In addition to the management agencies, the CC-LBR Watershed Project will receive assistance from the other agencies listed below.

1. Soil Conservation Service (SCS): This agency works through the local Land Conservation Committee for the Counties. The SCS provides technical assistance for installing conservation practices. The County SCS personnel worked with other project personnel to provide inventories of conservation

needs, and estimated costs of best management practices. They also will aid the county in planning, designing, layout, supervision, and certification of practice installations.

2. University of Wisconsin Extension (UWEXT): County Extension agents will provide expertise in planning, coordinating and conducting public information, education, and participation efforts. UW-Extension will also assist the counties in the development of watershed tours, workshops, and newsletters.

3. Agricultural Stabilization and Conservation Services (ASCS): Under contract to the Juneau County Land Conservation Committee, the Juneau County ASCS office will provide assistance for fiscal management in the CC-LBR Watershed project. In addition, cost-sharing provided by the ongoing ACP program (Agricultural Conservation Program) will be coordinated with the Wisconsin Fund project in the CC-LBR Watershed.

4. Department of Natural Resources (DNR):4The Department has overall administrative responsibility for the Wisconsin Nonpoint Source Water Pollution Abatement Program of which the CC-LBR Priority Watershed is part. The DNR is responsible for allocation of funds to the project, for water quality and fish surveys and for evaluation of the watershed project.

III. BEST MANAGEMENT PRACTICES

A. Eligible Practices

Those land management practices which will effectively control the nonpoint sources of pollution are called best management practices (BMPs). The practices eligible for the CC-LBR Watershed project for cost-sharing under the Wisconsin Fund program are listed in Table 17. The cost-sharing rates which were determined by the LCC range from 50% to 70% and fall within the maximum state cost-share rates established for the Nonpoint Source Program in Administrative Rule NR 120.

The BMPs included in Table 17 are those practices which will help meet the water quality objectives set for the watershed. The specifications used for these practices must meet the Soil Conservation Service requirements concerning technical design. It is possible some practices may be recommended that are not included on the BMP list. Administrative Rule NR 120.10(4)(b) and (c) provides for substitute practices under conditions which are set on a case by case basis.

Following the table is a brief description of some of the common best management practices and where they are used. Although some other practices may also be appropriate, only those anticipated to meet the most typical situations in the watershed are included in this list. A more detailed description of the practices, and the conditions under which they are cost-shared is given in the Department's Administrative Rules NR 120 which is on file at the county offices.

TABLE 17: Best Management Practices and Maximum Cost-Share Rates

Practice	Maximum Cost Sharing Rate
Terrace	70%
Reduced Tillage	50% (flat rate of $10/ac)
No Till	50% (flat rate of $15/ac)
Contour Strip Cropping	50% (flat rate of $12/ac)
Contour Farming	50% (flat rate of $6/ac)
Diversions	70%
Waterways	70%
Critical Area Stabilization	70%
Critical Pasture Stabilization	50%
Grade Stabilization Structure	70%
Streambank & Shoreline Protection (including livestock crossings)	70%
Streambank Fencing	50% (flat rate of $9/rod)
Settling Basins	70%
Barnyard Runoff Management	70%
Manure Storage Facilities	70% ($6000 max.)
Livestock Exclusions from Woodlots	50% (flat rate of $9/rod)
Street Cleaning	50%
Leaf Collection	50%

1. Contour Strip Cropping - This practice involves rowing crops on the contour of the land in alternated swaths generally of corn, oats, and hay. Contour strip cropping can be used for field that are currently in a hay row crop rotation with high levels of erosion. This normally applies to dairy operations.

2. Terraces and Diversions - These are earthern berms constructed to: a) divert excess water to sites where it can be transported with minimal erosion; and b) break up slope lengths on cropland in order to reduce soil loss.

3. Conservation Tillage - This practice includes a number of different planting, tilling, and cultivating methods all designed to leave a vegetative residue on the surface of the soil in order to reduce both soil erosion and nutrient/pesticide runoff from croplands. Regardless of the terminology used to define these various systems all forms of conservation tillage must conform to the requirements in NR 120 and the conditions described below:

a) insecticides (except for needed mid-season insecticides) and phosphorus fertilizers must be applied through injection, in row applied, or incorporated in some manner. They may not be surface applied with no form of incorporation in order to prevent runoff.

b) manure spreading is not allowed without some form of incorporation.

c) if a surface crust forms, which retards water infiltration, the crust must be broken up.

4. Grassed Waterways - A constructed water course shaped, graded, and established in a suitable vegetative cover as needed to prevent erosion by runoff waters. This practice can be used to stabilize small gullies on croplands.

5. Critical Area Stabilization - Planting suitable vegetation, such as trees or permanent grass on highly erosive areas. These areas may include: roadsides, gullies, intermittent stream channels, and steeply sloped lands.

A special category under this practice is stabilization applied to pastured areas. This practice applies to severely over-grazed pastures with high soil loss. It includes the establishment of a permanent vegetative cover and the installation of permanent and/or moveable fencing to control the livestock access to the various areas of the pasture. The practice must include a management plan for the landowner to follow in order to insure that the pasture is managed in such a way that erosion above 4 t/ac/yr does not occur.

7. Streambank Protection - This practice involves several measures designed to stabilize and protect the banks of streams against erosion. Specifically this practice could include: fencing to control livestock access to streams, rip rap, livestock or machinery stream crossings, and shaping and seeding of eroded banks.

8. Livestock Exclusion from Woodlots - Protection of woodlots, especially those on steep slopes, from livestock grazing by fencing or other means.

9. Barnyard Runoff Management - A system designed to reduce the quantity of manure related pollutants carried by runoff water to streams and lakes. The systems includes: prevention of surface water from running through the livestock concentration area, and the safe distribution or containment of waters leaving the barnyard area.

10. Manure Storage - A structure for the temporary storage of manure. The storage allows the farm operator to time the manure spreading so that runoff to surface waters is minimized.

B. Cost-Sharing Guidelines

Cost-share funding is available to landowners for a percentage of the costs of installing the best management practices on their land that are necessary to meet the watershed project objectives. Landowners have four years to sign up for cost-share dollars after the formal approval of the watershed plan and the implementation phase of the project has begun.

The following general policies apply to the cost-share eligibility under the Wisconsin Fund Program:

1. Only BMPs installed at specific locations necessary to improve or protect water quality are eligible.

2. Rural and incorporated areas are eligible.

3. Cost-sharing is limited to areas of the state with approved areawide water quality management plans.

4. Cost-sharing is limited to priority management areas of priority watersheds.

Cost-sharing is not available for practices which:

1. are normally and routinely used in growing crops;

2. are normally and customarily used in cleaning of streets and roads (increased street cleaning is eligible if it benefits water quality);

3. have drainage of land as the primary objective;

4. installation costs can reasonably be passed on to potential consumers.

It is possible some practices may be "custom" designed and do not fit the established definition for a particular practice. The Nonpoint Source Program will provide for substitute management practices after review and approval by the DNR and the Counties to make a determination on eligibility for cost-sharing and assign a maximum cost-sharing rate. Design specifications may be recommended by the SCS Technical Guide Work Group.

For certain areas within the project, local, state, or federal permits may be needed in order to install some of the management practices. The land areas most likely to require permits are the zoned wetlands of a county and the shoreline of streams and lakes. These permits are required regardless of whether the activity is associated with the watershed project or not. The Planning and Zoning Office or the Land Conservation Office in each county should be consulted to determine if any permits are required in specific cases.

C. The Cost-Share Agreement

The cost-share agreement (see Appendix B for an example) is a legal contract between the landowner and the appropriate management agency. The cost-share agreement includes the number and types of practices that are needed, the estimated installation dates, estimated practice costs, cost-share percentage rate, and estimated cost-share reimbursement amount. The agreements also include practices which are needed to meet water quality objectives but are not cost-shared under the Nonpoint Source Program (such as crop rotation). Once the agreement is signed, the landowner has up to five years to install the practices (depending upon the schedule agreed to on the cost share agreement form. Once this agreement has been signed by both parties, both parties are bound to carry out the provisions in it. If the land which is to receive practices changes ownership, the original owner retains responsibility to carry out the agreement unless the new landowner counter-signs the cost-share agreement.

IV. ADMINISTRATIVE PROCEDURES

A. Introduction

Upon written approval of this plan by the DNR and the Counties the implementation phase of this project will be ready to begin. During the implementation phase of the project the Counties and the DNR are guided and bound by two agreements which are signed by the Department and the lead management agency (Sauk County). These two agreements, and the procedures by which they will be administered are discussed in detail below.

B. Administering the Cost Share Funds

1. DNR - Lead Management Agency Procedures

Cost-share funds are transferred from the state to the lead management agency by the Nonpoint Source Grant Agreement (see Appendix B for a copy of this form). The Grant Agreement only controls the cost share funds, that is, money for the installation of best management practices. Several items are defined on this agreement including:

1. The parties of the agreement (DNR and the County)
2. The Watershed Project the agreement is to be used for
3. The amount of the agreement
4. The eligible period for entering into cost-share agreements
5. The effective period of the grant
6. Eligible practices which can be cost-shared
7. The sites eligible for the cost-sharing funds
8. The conditions which the DNR and the County must follow

Advance money will be available to the lead management agency through the Grant Agreement,in order to establish the watershed cost share fund account in the county. In this way, the landowners can be rapidly reimbursed for the installed practices directly from the county.

As landowners are reimbursed by the county for completed practices and the balance is drawn down, the lead management agency will forward the appropriate documents to DNR. The Department will in turn reimburse the county so that the county's account always has a balance. The necessary documentation for a reimbursement request from the county includes: 1)the "Cost-share Calculation and Practice Certification Form" (Form #3200-53) for each landowner that was reimbursed, 2) a "Request for Advance or Reimbursement Form" (Form #3400-70) which indicates total prior pay requests and the amount of reimbursement being requested, and 3) a "Reimbursement Claims Worksheet" (Form #4400-47) which lists the landowners that were paid from the reimbursement request. Examples of these forms are included in Appendix B.

The initial amount of the Nonpoint Source Grant Agreement is less than the project will likely need throughout the project period. The agreement will be amended to increase this "grant amount" as practices are cost shared. At no time can the total costs of the practices under cost share agreement exceed the total amount of funds in the Grant Agreement.

2. Inter-County Procedures

Sauk County, as the lead management agency, will send reimbursement checks directly to the landowners in Sauk, Richland, and Vernon Counties after the proper documentation has been submitted and approved by the LCC. The check will be accompanied by a cover letter from the landowner's county.

Juneau County will set up its own cost-share account to handle the landowner reimbursements within the county. The funds for this account will come from the advance money given to Sauk County as part of the Nonpoint Source Grant Agreement. The amount of Juneau's advance will be a prorated based on the need of Juneau County compared to the rest of the watershed project. The Juneau County ASCS will then be responsible for disbursement of this money. As necessary the Juneau County ASCS will submit to Sauk County a reimbursement claim worksheet (form 4400-47), a copy of the Cost-Share Agreement (form 3400-68) for each payee listed, and a copy of the Practice Certification Form (form 3200-53) for each practice listed as reimbursed. Sauk County will include copies of these materials in the next payment request submitted to the DNR. Upon payment of the reimbursement request submitted to the DNR from Sauk County, Sauk County will issue to Juneau County ASCS an amount equal to Juneau County's reimbursement request.

Although many of the responsibilities of the fiscal management can be handled by other agencies (such as ASCS) it is understood that the County remains responsible for insuring that the fiscal management activities are carried out in accordance with NR 120.

3. Intra-County Procedures

Within each county of the project, a procedure has been established for the administration of cost share funds from the time a landowner is contacted to the time the landowner is reimbursed for an installed management practice. The procedure is identical for the counties of Sauk, Richland, and Vernon, and there are some variations for the procedure within Juneau County. Below are listed the two procedures agreed upon by the respective counties.

Cost-Share Fund Reimbursement Procedure: Sauk, Richland, and Vernon Counties

1. Landowner and conservation planner meet to discuss watershed project and landowner's management practice needs.
2. Landowner agrees to cooperate with the project
3. Conservation Plan (if necessary) is prepared by the SCS or LCD.
4. Landowner agrees to the plan and a Cost Share Agreement (form 3400-68) is signed by the landowner and the County.
5. Practices designed by SCS or the LCD, copy of the design delivered to the landowner.
6. Landowner obtains contractor.
7. SCS or LCD lay out the practices if necessary
8. Contractor installs practice.
9. SCS or LCD certifies installation (form 3200-53)
10. Landowner submits paid bills and cancelled checks to their county LCD office - (Richland & Vernon Counties approve expenditures and forward this information along with form 3200-53 to Sauk County.)

11. Sauk LCD prepares vouchers for bills from Sauk, Richland, or Vernon Counties.
12. Sauk LCC approves vouchers at regular monthly meeting.
13. Sauk bookkeeping issues check on approved vouchers. Delivers check to LCD office.
14. LCD records check amount, number, date on form 3200-53.
15. Check mailed out by Sauk LCD with appropriate county cover letter directly to the landowner for each of the three counties.

Cost Share Funds Reimbursement Procedure: Juneau County

1. Landowner and conservation planner meet to discuss watershed project and landowner's management practice needs.
2. Landowner agrees cooperate with the project
3. Conservation Plan (if necessary) is prepared by the SCS or LCD.
4. Landowner agrees to the plan and a Cost Share Agreement (form 3400-68) is signed by the landowner and the County.
5. Practices designed by SCS or LCD, copy of the design delivered to the landowner.
6. Landowner obtains contractor.
7. SCS or LCD lay out the practices if necessary
8. Contractor installs practice.
9. SCS or LCD certifies installation (form 3200-53)
10. Landowner submits paid bills and cancelled checks to the county LCD office
11. Juneau LCD reviews the bills for approval and forwards information to the Juneau ASCS office.
12. Juneau ASCS approves bills; and issues check to the landowner.
13. If further clarification is required by the ASCS before issuing check, the Juneau LCD is contacted

C. Administering the Local Assistance Funds

The agreement entered into by each management agency and the DNR during the implementation phase of the project is called the Local Assistance Agreement (see Appendix B for an example). This document provides for the reimbursement to the county for the costs of administering the watershed project. The costs handled in this agreement include the costs to conduct the landowner contacts, conservation planning, and the design and installation of the management practices. Also covered in this agreement are the costs of the information - education program, and the direct costs for attending an annual project manager's meeting. The duration of the agreement is one year, and each year for the life of the project a new agreement is signed.

An important aspect of the Local Assistance Agreement is that it is used to estimate the work load for the project and how much (if any) additional resources are needed by the county in order to complete the projected work load. An estimation of the total project work load is made in the next chapter (V. B. "Local Assistance Costs").

The basic premise of this agreement is that each county agrees to commit a certain amount of their present staff's time on the project. This is called the "base level". The work effort required above this base level will be reimbursed to the counties. This allows the counties to hire additional staff

either directly, or through contractual arrangements, to handle the additional work load. The determination of the base level for each county will be done during the negotiations for each Local Assistance Agreement. The procedure for the base level calculation is outlined in the NR 120 rules. The calculation is based on the amount of staff time each county currently has, multiplied by the amount of the county in the project. This result is then multiplied by 1.5 because the county has agreed that the project area is a priority area in their county and should receive extra attention. For the four counties in the project an initial base level calculation is shown on Table 18. This level can change throughout the project depending upon county's commitments.

Table 18: County Base Level Calculations

County	% of County in Project Area	x	Available Staff Time (LCD & SCS) (hrs/yr)	x 1.5 =	Base Level (hrs/yr)
Sauk Co.	17%		2,987		762
Juneau Co.	6%		2,987		269
Richland Co.	4%		2,987		179
Vernon Co.	1%		2,987		45

D. Project Tracking

For a project as complicated and as long in duration as this watershed project, there is a need for a detailed tracking system. This system will be used to keep up to date on the accomplishments, the work yet to be done, and it will help to schedule activities in the future.

Each project may have a different system for tracking information, but whatever system is used, the following information will be recorded:

1. Landowner contacts: who has been contacted; when; what is their management category; who is left to contact;
2. Update of inventory information: if changes have occurred from the inventoried conditions these changes should be noted
3. Landowner contracts: what sources were controlled; what the new pollutant levels are (new erosion rate, phosphorus runoff, etc.); what does this represent in terms of the objectives set for each subwatershed.
4. Status of the Cost-Share Agreement: what has been designed, installed, certified, and reimbursed; is the schedule of installation still accurate?

The Department and the Counties have agreed on the format for two forms to be used to assist in tracking the project. Examples of both of these forms are in Appendix B. The first form is the "Landowner List". This is a list of all

the rural landowners in the project, their management category for each of the inventoried pollutant sources, and spaces for writing in the dates of contact, and if a contract is signed. This list will be kept by each county, will be updated on a quarterly basis and will be made available for Department review.

The second form is a "Landowner Tracking Form". This form is filled out after the landowner has been contacted. Space is provided for the landowner name; location; and comments from the county field person after each contact. There is also a section for updating the landowners inventory situation if the inventory information is no longer accurate. Finally, if a Cost-Share Agreement is signed with the appropriate management practices, there is space to record the "after" situation of the source conditions. These forms will be kept in the county and made available to the Department for evaluation of the project's progress.

V. PROJECT COSTS

A. Management Practice Needs and Costs

The Best Management Practices needed in the CC-LBR Watershed are listed on Table 18. The quantities of BMPs needed were estimated based on the assumptions outlined on the pages following the table. The estimated costs for each unit of practice were made based on the county's experience and the costs of similar practices in other watershed projects. For 100% landowner cooperation, the estimated state cost-share amounts to $4,500,000. Because 100% participation is not very likely due to the voluntary nature of the Wisconsin Nonpoint Source Water Pollution Abatement Program, a participation level of 75% has been shown to more accurately estimate the budget needs.

The procedures for estimating practice needs in the Crossman Creek - Little Baraboo River Watershed are described on the pages following the table. The estimates on Table 19 are for the total needs, not necessarily what is feasible or practical to accomplish given the limitations on time and money.

Table 19: Estimated Practice Needs and Costs in the Crossman Creek - Little Baraboo River Watershed Project *

PRACTICES	ESTIMATED QUANTITY	COST/UNIT $	TOTAL COST $	COST SHARE RATE	TOTAL COST SHARE AMOUNT $
Contour Farming					
Sauk Co.	219 ac	12.00/ac	2,628	50%	1,314
Juneau Co.	15 ac		180	(flat	90
Richland Co.	40 ac		480	rate)	240
Vernon Co.	0 ac		0	$6/ac	0
Contour Strips					
Sauk Co.	5,203 ac	24.00/ac	124,872	50%	62,436
Juneau Co.	1,287 ac		30,888	(flat	15,444
Richland Co.	1,503 ac		36,072	rate)	18,036
Vernon Co.	645 ac		15,480	$12/ac	7,740

(Continued on Next Page)

Table 19 (con't): Estimated Practice Needs and Costs in the Crossman Creek - Little Baraboo River Watershed Project *

PRACTICES	ESTIMATED QUANTITY	COST/UNIT $	TOTAL COST $	COST SHARE RATE	TOTAL COST SHARE AMOUNT $
Reduced Tillage					
Sauk Co.	4,886 ac	20.00/ac	97,720	50%	48,860
Juneau Co.	2,539 ac		50,780	(flat	25,390
Richland Co.	556 ac		11,120	rate)	5,560
Vernon Co.	33 ac		660	$10/ac	330
Reduced Till. with Contour Strips					
Sauk Co.	4,098 ac	44.00/ac	180,312	50%	90,156
Juneau Co.	3,834 ac		168,696	(flat	84,348
Richland Co.	523 ac		23,012	rate)	11,506
Vernon Co.	122 ac		5,368	$22/ac	2,684
No Tillage					
Sauk Co.	1,855 ac	30.00/ac	55,650	50%	27,825
Juneau Co.	918 ac		27,540	(flat	13,770
Richland Co.	54 ac		1,620	rate)	810
Vernon Co.	0 ac		0	$15/ac	0
No Till. with Contour Strips					
Sauk Co.	5,539 ac	54.00/ac	299,106	50%	149,553
Juneau Co.	2,275 ac		122,850	(flat	61,425
Richland Co.	48 ac		2,592	rate)	1,296
Vernon Co.	7 ac		378	$27/ac	189
Grassed Waterways					
Sauk Co.	380 ac	1500/ac	570,000	70%	399,000
Juneau Co.	115 ac		172,500		120,750
Richland Co.	80 ac		120,000		84,000
Vernon Co.	18 ac		27,000		18,900
Grade Stabilization Structure					
Sauk Co.	48 un	8000/ea	384,000	70%	268,800
Juneau Co.	32 un		256,000		179,200
Richland Co.	16 un		128,000		89,600
Vernon Co.	0 un		0		0
Field & Gully Diversions 96					
Sauk Co.	58,500 ft	2.00/ft	117,000	70%	81,900
Juneau Co.	30,000 ft		60,000		42,000
Richland Co.	16,000 ft		32,000		22,400
Vernon Co.	1,500 ft		3,000		2,100
Woodlot Fencing					
Sauk Co.	31,020 rd	18.00/rd	558,360	50%	279,180
Juneau Co.	8,240 rd		148,320	(flat	74,160
Richland Co.	7,378 rd		132,804	rate)	66,402
Vernon Co.	687 rd		12,366	$9/rod	6,183

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Table 19 (con't): Estimated Practice Needs and Costs in the Crossman Creek - Little Baraboo River Watershed Project *

PRACTICES	ESTIMATED QUANTITY	COST/UNIT $	TOTAL COST $	COST SHARE RATE	TOTAL COST SHARE AMOUNT $
Critical Pasture Stabilization					
Sauk Co.	2,155 ac	30.00/ac	64,650	50%	32,325
Juneau Co.	5,795 ac		173,850		86,925
Richland Co.	53 ac		1,590		795
Vernon Co.	0 ac		0		0
Streambank Rip Rap					
Sauk Co.	538 rd	270.00/rd	145,260	70%	101,682
Juneau Co.	360 rd		97,200		68,040
Richland Co.	100 rd		27,000		18,900
Vernon Co.	0 rd		0		0
Streambank Fencing					
Sauk Co.	318 rd	18.00/rd	5,724	50%	2,862
Juneau Co.	743 rd		13,374	(flat	6,687
Richland Co.	9 rd		162	rate)	81
Vernon Co.	0 rd		0	$9/rod	0
Streambank Shaping, Seeding, & Fencing					
Sauk Co.	413 rd	80.00/rd	33,040	70%	23,128
Juneau Co.	733 rd		58,640		41,048
Richland Co.	12 rd		960		672
Vernon Co.	0 rd		0		0
Stream Crossing					
Sauk Co.	31 ea	1000/ea	31,000	70%	21,700
Juneau Co.	29 ea		29,000		20,300
Richland Co.	2 ea		2,000		1,400
Vernon Co.	0 ea		0		0
Barnlot Runoff Mgmt.					
Sauk Co.	104 ea	12,000/ea	1,248,000	70%	873,600
Juneau Co.	50 ea		600,000		420,000
Richland Co.	33 ea		396,000		277,200
Vernon Co.	2 ea		24,000		16,800
Manure Storage					
Sauk Co.	40 ea	8585 ea	343,400	70%	240,000
Juneau Co.	19 ea		163,115	(6000	114,000
Richland Co.	15 ea		128,775	max.)	90,000
Vernon Co.	1 ea		8,585		6,000
			$7,574,679		$4,827,722
			with 75% participation:		$3,620,792

* An explanation of this table is on the next page

Assumptions Used to Make Table 19.

Cropland Management Practices: Practices were "applied" to each parcel of cropland currently eroding above 4 tons/ac/year through use of the computer by modifying the "C" and "P" factors. The practices were "applied" in order from least intensive to most intensive erosion control. The practices were applied one at a time until the targeted maximum level of erosion was attained or all of the designated practices were used.

For fields in continuous row crop, contour plowing was applied first (modifying the P factor based on the field's slope and slope length). If the soil loss on the field was not reduced to below 4 t/a/y then minimum tillage was applied to the field (modifying the C factor in addition to the P factor). If the field was still eroding above the target level then no-till was "applied" to the field (further modifying the C factor in addition to the P factor). No further practices were applied to a field after this point. In this region of the state terraces are not practical.

For fields in crop rotation, the practice application order was: contour strips (modify the P factor based on slope and slope length of the field); contour strips with minimum tillage (modify the C factor in addition to the P factor); and contour strips with no-tillage (further modify the C factor in addition to the P factor).

Upon completion of these procedures, the acres of each practice were summed as well as the acres of land still eroding above the 4 t/a/y level after the most intensive practice application. This process also generated estimates of the amount of soil erosion controlled through the application of practices for each subwatershed.

Grassed Waterways: Through the past experience of the counties in the project area, it was estimated that there is a need for about 1 acre of waterway for every 100 acres of cropland. Thus the total acres of cropland was used to estimate the waterway needs.

Grade Stabilization Structures: Included in this practice are: toe walls and rock chutes. This need was also estimated based on the past experiences of the technical staff in the counties. The staff estimated that 1 out of 6 farms in the project area needs some type of grade stabilization structure. This ratio was used to estimate the needs in each county.

Field and Gully Diversions: It was estimated by the counties that about half of the farms in the project area need an average of 500 feet of field or gully diversion.

Critical Area Stabilization; Pastures: The upland erosion inventory allowed for the soil loss calculation on lands identified as pasture. All pastures with soil loss above 4 tons/acre/year were selected as needing some type of pasture management. Pasture management includes seeding of a permanent cover and the installation of fencing to control the use of portions of the pasture.

Woodlot Fencing: The upland erosion inventory also identified the grazed woodlots along with their soil loss. All grazed woodlots with soil loss greater than 4 tons/acre/year were assumed to need some fencing in order to exclude cattle and reduce the erosion. The quantity of fencing required was estimated in the following manner:

1. for each county the average size grazed woodlot was determined (acres of grazed woodlots / number of woodlots)
2. the perimeter of the average size grazed woodlot was determined, assuming a square woodlot.
3. it was assumed that on the average one and one half sides of that woodlot would need fencing.
4. the length of 1 1/2 sides of a woodlot was multiplied by the number of grazed woodlots inventoried in each county.

Streambank Rip Rap: Based on the streambank erosion inventory the total length of streambank eroding at the highest lateral recession rate (.6 - 1.0 feet per year) was estimated to need rip rap. This estimate was for all streambank regardless of the cattle access.

Streambank Shaping, Seeding, & Fencing: Based on the streambank erosion inventory the total length of streambank eroding at the medium lateral recession rate (.1 - .5 feet per year) with cattle access was assumed to need this practice.

Streambank Fencing: Based on the streambank erosion inventory the total length of streambank eroding at the lowest lateral recession rate (.05 - .09 feet per year) with cattle access was assumed to only need this practice for control.

Stream Crossing: It was estimated that a crossing was needed for every 1000 feet of eroded streambank with cattle access.

Barnlot Runoff Management: All of the Category I barnyards and one half of the Category II barnyards were used to determine this need. These management categories are explained on page 14.

Manure Storage: All of Category I farms and one third of category II farms were estimated to need some type of storage facility. These management categories are explained on page 14. Farms identified during the inventory as having a storage facility meeting SCS specifications were not included in this estimation.

B. Local Assistance Needs and Costs

Through the planning process, the number of landowners with nonpoint source control needs has been estimated. Table 20 shows this information by county.

Table 20: Numbers of Landowners in the Various Management Categories for Each County

	Sauk	Juneau	Richland	Vernon
Total Landowners Inventoried:	907	306	174	28
Landowners with at least one Mgmt. Category I Source:	126	80	40	6
Landowners with only Mgmt. Category II or IIa Sources:	239	91	49	5
Landowners with only Mgmt. Cat. III or IIb Sources:	542	135	85	17

The quantity and types of practices needed in this project has also been estimated through the planning process. With this information, along with the landowner numbers, an estimate can be made on the time needed to contact the landowners, draft the conservation plans, design the practices, and install/certify the practices.

Table 21 below summarizes the time requirements for this project at the 75% participation level. This is an optimistic level so these estimates should be interpreted as maximum needs.

The estimates made in the table are important because they indicate how much additional staff time will be needed by the counties if the project follows the projected participation rate. The assumptions made to calculate the time requirements shown on Table 21 are explained on the page following the table.

Table 21: Estimated Staff Time Requirements for the Project
(assuming a 75% participation rate and a 9 year project)

ACTIVITY	ESTIMATED QUANTITY NEEDED	RATE (HRS/UNIT)	COUNTY TOTAL HOURS	PROJECT TOTAL HOURS
Project Management				
Sauk Co.	4,500 hrs		4,500 hrs	
Juneau Co.	2,700 hrs		2,700 hrs	
Richland Co.	1,800 hrs		1,800 hrs	
Vernon Co.	900 hrs		900 hrs	9,900 hrs
Landowner Contacts				
Sauk Co.	365	6 hrs ea.	2,190 hrs	
Juneau Co.	171		1,026 hrs	
Richland Co.	89		534 hrs	
Vernon Co.	11		66 hrs	3,816 hrs
Cost Share Agreement Development				
Sauk Co.	273	2 hrs ea.	546 hrs	
Juneau Co.	128		256 hrs	
Richland Co.	67		134 hrs	
Vernon Co.	8		16 hrs	952 hrs
Conservation Planning				
Sauk Co.	18,135 ac	.25 hrs/ac	4,534 hrs	
Juneau Co.	9,105 ac		2,276 hrs	
Richland Co.	2,793 ac		698 hrs	
Vernon Co.	413 ac		103 hrs	7,612 hrs
Practice Design and Installation/Certification				
Terraces				
Sauk Co.	0 ft	.02hr/ft	0 hrs	
Juneau Co.	0 ft		0 hrs	
Richland Co.	0 ft		0 hrs	
Vernon Co.	0 ft		0 hrs	0 hrs
Contour Farming				
Sauk Co.	164 ac	.30hr/ac	49 hrs	
Juneau Co.	11 ac		3 hrs	
Richland Co.	30 ac		9 hrs	
Vernon Co.	0 ac		0 hrs	62 hrs
Contour Strips				
Sauk Co.	3,902 ac	.30hr/ac	1,171 hrs	
Juneau Co.	965 ac		290 hrs	
Richland Co.	1,127 ac		338 hrs	
Vernon Co.	484 ac		145 hrs	1,943 hrs

(Continued Next Page)

Table 21 (con't): Estimated Staff Time Requirements for the Project (assuming a 75% participation rate and a 9 year project)

ACTIVITY	ESTIMATED QUANTITY NEEDED	RATE (HRS/UNIT)	COUNTY TOTAL HOURS	PROJECT TOTAL HOURS
Reduced Tillage				
Sauk Co.	3,665 ac	.30hr/ac	1,100 hrs	
Juneau Co.	1,904 ac		571 hrs	
Richland Co.	417 ac		125 hrs	
Vernon Co.	25 ac		8 hrs	1,803 hrs
Reduced Till. with Contour Strips				
Sauk Co.	3,074 ac	.60hr/ac	1,844 hrs	
Juneau Co.	2,876 ac		863 hrs	
Richland Co.	392 ac		118 hrs	
Vernon Co.	92 ac		28 hrs	2,852 hrs
No Tillage				
Sauk Co.	1,391 ac	.30hr/ac	417 hrs	
Juneau Co.	689 ac		207 hrs	
Richland Co.	41 ac		12 hrs	
Vernon Co.	0 ac		0 hrs	636 hrs
No Till. with Contour Strips				
Sauk Co.	4,154 ac	.60hr/ac	2,492 hrs	
Juneau Co.	1,706 ac		512 hrs	
Richland Co.	36 ac		11 hrs	
Vernon Co.	5 ac		2 hrs	3,017 hrs
Waterways				
Sauk Co.	285 ac	20hr/ac	5,700 hrs	
Juneau Co.	86 ac		1,720 hrs	
Richland Co.	60 ac		1,200 hrs	
Vernon Co.	14 ac		280 hrs	8,900 hrs
Grade Stabilization Structures				
Sauk Co.	36 un	45hr/un	1,620 hrs	
Juneau Co.	24 un		1,080 hrs	
Richland Co.	12 un		540 hrs	
Vernon Co.	0 un		0 hrs	3,240 hrs
Woodlot Fencing				
Sauk Co.	23,265 rd	.20hr/rd	4,653 hrs	
Juneau Co.	6,180 rd		1,236 hrs	
Richland Co.	5,534 rd		1,107 hrs	
Vernon Co.	515 rd		103 hrs	7,099 hrs
Critical Pasture Stabilization				
Sauk Co.	1,616 ac	.30/ac	485 hrs	
Juneau Co.	4,348 ac		1,304 hrs	
Richland Co.	40 ac		12 hrs	
Vernon Co.	0 ac		0 hrs	1,801 hrs

(Continued Next Page)

Table 21 (con't): Estimated Staff Time Requirements for the Project (assuming a 75% participation rate and a 9 year project)

ACTIVITY	ESTIMATED QUANTITY NEEDED	RATE (HRS/UNIT)	COUNTY TOTAL HOURS	PROJECT TOTAL HOURS
Streambank Rip Rap				
Sauk Co.	404 rd	1.12hr/rd	452 hrs	
Juneau Co.	270 rd		302 hrs	
Richland Co.	75 rd		84 hrs	
Vernon Co.	0 rd		0 hrs	839 hrs
Streambank Fencing				
Sauk Co.	239 rd	.20hr/rd	48 hrs	
Juneau Co.	557 rd		111 hrs	
Richland Co.	7 rd		1 hrs	
Vernon Co.	0 rd		0 hrs	161 hrs
Streambank Shaping, Seeding & Fencing				
Sauk Co.	310 rd	1.0hr/rd	310 hrs	
Juneau Co.	550 rd		484 hrs	
Richland Co.	9 rd		8 hrs	
Vernon Co.	0 rd		0 hrs	802 hrs
Stream Crossing				
Sauk Co.	23 ea	9hr/ea	207 hrs	
Juneau Co.	22 ea		198 hrs	
Richland Co.	2 ea		18 hrs	
Vernon Co.	0 ea		0 hrs	423 hrs
Barnlot Runoff Mgmt.				
Sauk Co.	78 ea	80hr/ea	6,240 hrs	
Juneau Co.	38 ea		3,040 hrs	
Richland Co.	25 ea		2,000 hrs	
Vernon Co.	2 ea		160 hrs	11,440 hrs
Manure Storage				
Sauk Co.	30 ea	45hr/ea	1,350 hrs	
Juneau Co.	14 ea		630 hrs	
Richland Co.	11 ea		495 hrs	
Vernon Co.	1 ea		45 hrs	2,520 hrs

Project Total (over 9 years)	County Totals	-	Current Base Level	= Additional Staff Needs
Sauk:	39,908 hrs	-	6,858 hrs	33,050 hrs
Juneau:	18,810 hrs	-	2,421 hrs	16,389 hrs
Richland:	9,244 hrs	-	1,611 hrs	7,633 hrs
Vernon:	1,855 hrs	-	405 hrs	1,450 hrs
Total:	69,817 hrs	-	11,295 hrs	58,522 hrs

Assumptions Used to Make Table 21

Project Management: based on past projects using the following figures:

Sauk Co.	500 hrs/yr
Juneau Co.	300 hrs/yr
Richland Co.	200 hrs/yr
Vernon Co.	100 hrs/yr

The hours varied depending upon the amount of the county in the project and amount of administrative duties (Sauk Co. is the lead management agency, Juneau Co. will be handling its own reimbursement requests and payments).

Landowner Contacts: This estimate is based contacting every landowner with at least 1 nonpoint source in management category I or II (IIa for upland erosion). The rate of six hours assumes 2 hours per contact with an average of six contacts per landowner.

Cost Share Agreement Development: This includes the time required to actually fill in the agreement form and have it signed by the landowner and the County. The number of agreements assumes 75% of the landowners contacted will sign an agreement.

Conservation Planning: This estimate is derived from the number of acres that are eroding above the 4 t/ac/y level and are in Management Category I or IIa. 75% of this value was used and the rate for the planning was obtained from the counties.

Practice Design and Installation/Certification: The quantities of practices are 75% of the values shown in Table 18. The rates for the tasks were obtained from the counties.

VI. Project Schedule

A project schedule has been estimated and is shown in Table 21. The accuracy of this schedule will depend upon the participation of the landowners. The schedule, as presented, is most useful to help determine the staff needs of the counties for the initial one to three years of the project. During this time most of the effort will be spent on landowner contacts and conservation planning and these are activities that will occur independent of the landowner participation rate.

Because of the large projected work load, this project has been allowed to have a four year landowner contact and sign up period rather than the more common three year period. The predicted schedule does show that there will be a need for additional staff above the current county base levels.

The assumptions used to make table 22 are described on the pages following the table.

Table 22: Project Schedule (assuming a 75% participation rate and a 9 year project)

Activity	HOURS								
	Project Year 1	Project Year 2	Project Year 3	Project Year 4	Project Year 5	Project Year 6	Project Year 7	Project Year 8	Project Year 9
Landowner Contacts									
Sauk Co.	913	743	573	403	0	0	0	0	0
Juneau Co.	428	348	268	188	0	0	0	0	0
Richland Co.	223	180	138	95	0	0	0	0	0
Vernon Co.	28	23	18	13	0	0	0	0	0
Pre-Contact Office Inventory									
Sauk Co.	183	0	0	0	0	0	0	0	0
Juneau Co.	86	0	0	0	0	0	0	0	0
Richland Co.	45	0	0	0	0	0	0	0	0
Vernon Co.	6	0	0	0	0	0	0	0	0
Conservation Planning									
Sauk Co.	1,133	1,133	1,133	1,133	0	0	0	0	0
Juneau Co.	569	569	569	569	0	0	0	0	0
Richland Co.	175	175	175	175	0	0	0	0	0
Vernon Co.	26	26	26	26	0	0	0	0	0
Cost Share Agreement Development & Amendments									
Sauk Co.	137	137	137	137	60	60	60	60	0
Juneau Co.	64	64	64	64	25	25	25	25	0
Richland Co.	33	33	33	33	15	15	15	15	0
Vernon Co.	4	4	4	4	15	15	15	15	0
Practice Design & Installation									
Sauk Co.	1,400	1,752	1,922	2,092	4,358	4,358	4,358	4,358	4,358
Juneau Co.	700	865	945	1,025	1,803	1,803	1,803	1,803	1,803
Richland Co.	300	387	430	473	898	898	898	898	898
Vernon Co.	80	90	95	100	100	100	100	100	0
Project Management									
Sauk Co.	500	500	500	500	500	500	500	500	500
Juneau Co.	300	300	300	300	300	300	300	300	300
Richland Co.	200	200	200	200	200	200	200	200	200
Vernon Co.	100	100	100	100	100	100	100	100	100
Total Hours Needed									
Sauk Co.	4,265	4,265	4,265	4,265	4,918	4,918	4,918	4,918	4,858
Juneau Co.	2,146	2,146	2,146	2,146	2,128	2,128	2,128	2,128	2,103
Richland Co.	975	975	976	976	1,113	1,113	1,113	1,113	1,098
Vernon Co.	243	243	243	243	215	215	215	215	100

ASSUMPTIONS MADE IN ESTIMATING THE PROJECT SCHEDULE (Table 22)
-AT A 75% PARTICIPATION RATE

YEAR ONE

Landowner Contacts

Sauk County:	365	x 2	hrs/contact	x 1.25 =	913 hrs
Juneau County:	171	x 2	hrs/contact	x 1.25 =	428 hrs
Richland County:	89	x 2	hrs/contact	x 1.25 =	223 hrs
Vernon County:	11	x 2	hrs/contact	x 1.25 =	28 hrs

Pre-Contact Office Inventory
Organize landowner tracking sheets, air photos, etc

Sauk County:	365	x 0.5 hrs each	=	183 hrs
Juneau County:	171	x 0.5 hrs each	=	86 hrs
Richland County:	89	x 0.5 hrs each	=	45 hrs
Vernon County:	11	x 0.5 hrs each	=	6 hrs

Conservation Planning
Plan 1/4 of total acres at expected participation rate *

Sauk County:	24,180 ac x 1/4 x 75% x .25 hrs/ac. =	1,133 hrs
Juneau County:	12,140 ac x 1/4 x 75% x .25 hrs/ac. =	569 hrs
Richland County:	3,724 ac x 1/4 x 75% x .25 hrs/ac. =	175 hrs
Vernon County:	551 ac x 1/4 x 75% x .25 hrs/ac. =	26 hrs

* acres used are total acres above 4 t/ac/yr in Mgmt. Cat. I or IIa

Cost Share Agreement Development
Assume 1/4 of total expected participants sign cost share agreements *

Sauk County:	365	x 1/4 x 75% x 2 hrs/agrmt. =	137 hrs
Juneau County:	171	x 1/4 x 75% x 2 hrs/agrmt. =	64 hrs
Richland County:	89	x 1/4 x 75% x 2 hrs/agrmt. =	33 hrs
Vernon County:	11	x 1/4 x 75% x 2 hrs/agrmt. =	4 hrs

Design & Installation of Practices *

Sauk County:	1,400 hrs
Juneau County:	700 hrs
Richland County:	300 hrs
Vernon County:	80 hrs

Project Management *

Sauk County:	500 hrs
Juneau County:	300 hrs
Richland County:	200 hrs
Vernon County:	100 hrs

Year One Total

Sauk County:	4,265 hrs
Juneau County:	2,146 hrs
Richland County:	975 hrs
Vernon County:	243 hrs

* These values are based on previous projects

ASSUMPTIONS MADE IN ESTIMATING THE PROJECT SCHEDULE (Table 22)
-AT A 75% PARTICIPATION RATE

YEAR TWO

Landowner Contacts
Contact Remaining Landowners 1 1/4 times

Sauk County:	297	x 2	hrs/contact	x 1.25 =	743 hrs
Juneau County:	139	x 2	hrs/contact	x 1.25 =	348 hrs
Richland County:	72	x 2	hrs/contact	x 1.25 =	180 hrs
Vernon County:	9	x 2	hrs/contact	x 1.25 =	23 hrs

Pre-Contact Office Inventory
None

Conservation Planning
Plan 1/4 of total acres at expected participation rate *

Sauk County:	24,180 ac	x 1/4	x 75%	x .25 hrs/ac. =	1,133 hrs
Juneau County:	12,140 ac	x 1/4	x 75%	x .25 hrs/ac. =	569 hrs
Richland County:	3,724 ac	x 1/4	x 75%	x .25 hrs/ac. =	175 hrs
Vernon County:	551 ac	x 1/4	x 75%	x .25 hrs/ac. =	26 hrs

* acres used are total acres above 4 t/ac/yr in Mgmt. Cat. I or IIa

Cost Share Agreement Development
Assume 1/4 of total expected participants sign cost share agreements *

Sauk County:	365	x 1/4	x 75%	x 2 hrs/agrmt. =	137 hrs
Juneau County:	171	x 1/4	x 75%	x 2 hrs/agrmt. =	64 hrs
Richland County:	89	x 1/4	x 75%	x 2 hrs/agrmt. =	33 hrs
Vernon County:	11	x 1/4	x 75%	x 2 hrs/agrmt. =	4 hrs

Design & Installation of Practices +

Sauk County:	1,752 hrs
Juneau County:	865 hrs
Richland County:	387 hrs
Vernon County:	90 hrs

Project Management *

Sauk County:	500 hrs
Juneau County:	300 hrs
Richland County:	200 hrs
Vernon County:	100 hrs

Year Two Total

Sauk County:	4,265 hrs
Juneau County:	2,146 hrs
Richland County:	975 hrs
Vernon County:	242 hrs

+ This category is increased to maintain a constant total work load for each county.

ASSUMPTIONS MADE IN ESTIMATING THE PROJECT SCHEDULE (Table 22)
-AT A 75% PARTICIPATION RATE

YEAR THREE

Landowner Contacts
Contact Remaining Landowners 1 1/4 times

Sauk County:	229	x 2	hrs/contact	x 1.25 =	573 hrs
Juneau County:	107	x 2	hrs/contact	x 1.25 =	268 hrs
Richland County:	55	x 2	hrs/contact	x 1.25 =	138 hrs
Vernon County:	7	x 2	hrs/contact	x 1.25 =	18 hrs

Pre-Contact Office Inventory
None

Conservation Planning
Plan 1/4 of total acres at expected participation rate *

Sauk County:	24,180 ac	x 1/4	x 75%	x .25 hrs/ac. =	1,133 hrs
Juneau County:	12,140 ac	x 1/4	x 75%	x .25 hrs/ac. =	569 hrs
Richland County:	3,724 ac	x 1/4	x 75%	x .25 hrs/ac. =	175 hrs
Vernon County:	551 ac	x 1/4	x 75%	x .25 hrs/ac. =	26 hrs

* acres used are total acres above 4 t/ac/yr in Mgmt. Cat. I or IIa

Cost Share Agreement Development
Assume 1/4 of total expected participants sign cost share agreements *

Sauk County:	365	x 1/4	x 75%	x 2 hrs/agrmt. =	137 hrs
Juneau County:	171	x 1/4	x 75%	x 2 hrs/agrmt. =	64 hrs
Richland County:	89	x 1/4	x 75%	x 2 hrs/agrmt. =	33 hrs
Vernon County:	11	x 1/4	x 75%	x 2 hrs/agrmt. =	4 hrs

Design & Installation of Practices +

Sauk County:	1,922 hrs
Juneau County:	945 hrs
Richland County:	430 hrs
Vernon County:	95 hrs

Project Management

Sauk County:	500 hrs
Juneau County:	300 hrs
Richland County:	200 hrs
Vernon County:	100 hrs

Year Three Total

Sauk County:	4,265 hrs
Juneau County:	2,146 hrs
Richland County:	975 hrs
Vernon County:	242 hrs

+ This category is increased to maintain a constant total work load for each county.

ASSUMPTIONS MADE IN ESTIMATING THE PROJECT SCHEDULE (Table 22)
-AT A 75% PARTICIPATION RATE

YEAR FOUR

Landowner Contacts
Contact Remaining Landowners 1 1/4 times

Sauk County:	161	x 2	hrs/contact	x 1.25 =	403 hrs
Juneau County:	75	x 2	hrs/contact	x 1.25 =	188 hrs
Richland County:	38	x 2	hrs/contact	x 1.25 =	95 hrs
Vernon County:	5	x 2	hrs/contact	x 1.25 =	13 hrs

Pre-Contact Office Inventory
None

Conservation Planning
Plan 1/4 of total acres at expected participation rate *

Sauk County:	24,180 ac	x 1/4	x 75%	x .25 hrs/ac. =	1,133 hrs
Juneau County:	12,140 ac	x 1/4	x 75%	x .25 hrs/ac. =	569 hrs
Richland County:	3,724 ac	x 1/4	x 75%	x .25 hrs/ac. =	175 hrs
Vernon County:	551 ac	x 1/4	x 75%	x .25 hrs/ac. =	26 hrs

* acres used are total acres above 4 t/ac/yr in Mgmt. Cat. I or IIa

Cost Share Agreement Development
Assume 1/4 of total expected participants sign cost share agreements *

Sauk County:	365	x 1/4	x 75%	x 2 hrs/agrmt. =	137 hrs
Juneau County:	171	x 1/4	x 75%	x 2 hrs/agrmt. =	64 hrs
Richland County:	89	x 1/4	x 75%	x 2 hrs/agrmt. =	33 hrs
Vernon County:	11	x 1/4	x 75%	x 2 hrs/agrmt. =	4 hrs

Design & Installation of Practices +

Sauk County:	2092 hrs
Juneau County:	1025 hrs
Richland County:	473 hrs
Vernon County:	100 hrs

Project Management

Sauk County:	500 hrs
Juneau County:	300 hrs
Richland County:	200 hrs
Vernon County:	100 hrs

Total Year Four

Sauk County:	4,265 hrs
Juneau County:	2,146 hrs
Richland County:	976 hrs
Vernon County:	242 hrs

+ This category is increased to maintain a constant total work load for each county.

ASSUMPTIONS MADE IN ESTIMATING THE PROJECT SCHEDULE (Table 22)
-AT A 75% PARTICIPATION RATE

YEARS FIVE THROUGH NINE

Landowner Contacts	
Sauk County:	0 hrs
Juneau County:	0 hrs
Richland County:	0 hrs
Vernon County:	0 hrs
Pre-Contact Office Inventory	
None	
Conservation Planning	
Sauk County:	0 hrs
Juneau County:	0 hrs
Richland County:	0 hrs
Vernon County:	0 hrs
Cost Share Agreement Modifications	
Assume values based on previous projects	
Sauk County:	60 hrs
Juneau County:	25 hrs
Richland County:	15 hrs
Vernon County:	15 hrs
Design & Installation of Practices +	
Sauk County:	4358 hrs
Juneau County:	1803 hrs
Richland County:	898 hrs
Vernon County:	100 hrs
Project Management	
Sauk County:	500 hrs
Juneau County:	300 hrs
Richland County:	200 hrs
Vernon County:	100 hrs
Total of Each Year (5 - 9)	
Sauk County:	4,918 hrs
Juneau County:	2,128 hrs
Richland County:	1,113 hrs
Vernon County:	215 hrs

+ The values in this category were obtained by dividing the remaining design time needed for each county (based on table 22) over the remaining five years of the project

VII. EDUCATIONAL ACTIVITIES

A. Introduction

The educational activities for the Crossman Creek - Little Baraboo Watershed project are designed to provide current information to all people in the project area. By the use of various educational methods, we will inform landowners and the general public of the location of the project, why the project was selected and how the project will be developed and implemented. Information on the approved conservation practices will increase recognition of how they can reduce erosion and nonpoint source pollution and result in improved water quality.

The objectives of the educational activities are three-fold: 1.) to supply information about the project; 2.) to educate landowners about practices that will result in reduced nonpoint source pollution; and 3.) to teach the skills and management needed by the landowners to become efficient users of the conservation practices. The educational program shall include such things as farm tours, conservation tillage demonstrations, interseeding and pasture management demonstrations and manure handling demonstrations.

B. Newsletters

Newsletters are designed to supply all people in the watershed with the whos, whats, whys, and wheres of the Crossman Creek - Little Baraboo River Watershed project. Emphasis will be placed on increasing landowner understanding of land use/water quality relationships and how the ongoing activities in the watershed can protect and improve water quality.

Goals of the newsletters will include: developing cooperation between all the agencies and individuals involved in the project; giving updates on the progress of the watershed; introducing conservation management practices to the landowners; developing ongoing communication between all the people in the watershed; and encouraging landowners to become involved in the watershed activities.

The theme throughout all of the newsletters should address the relationships of land use to water quality. The newsletters will be a source of information on the people who are involved with the project and what practices are being used to improve water quality.

The responsibility of the newsletters development, writing and printing will lie with the Soil Conservation Service, Land Conservation Department, Agricultural Stabilization and Conservation Service and UW-Extension personnel. The UW Extension will have the lead responsibility in this activity.

C. News Releases

News releases will be used to give short updates on information pertaining to ongoing activities in the watershed. News releases will also highlight landowners who have cooperated in the project. These releases will help to develop a very positive public image toward the watershed project.

They will stress the importance of water quality to all people in the community. These news releases will be the responsibility of the Soil Conservation Service, Land Conservation Department, Agricultural Stabilization and Conservation Service and UW-Extension.

D. Tours, Demonstrations and Field Days

These activities will focus on conservation tillage, manure handling and interseeding and pasture management, including streambank stabilization. It is agreed that these projects will be coordinated between each county in order to avoid saturation.

It is imperative that farmers see first hand how approved practices have been installed and how they have worked for other farmers. Personal exchange between farmers is essential. It sparks the "snowball effect", which is necessary in the farmer's adoption of a conservation practice.

E. Watershed Association

The Watershed Association will be cooperatively organized and implemented by the Soil Conservation Service, Land Conservation Department and UW-Extension. It will be emphasized to all people that this organization will provide leadership and guidance to the watershed project. They will also be a source of dissemination of watershed information and ideas.

This association will be important, since they will carry information back to the watershed, such as: how it was decided to create the project; the history behind the project; explain the need for the project; who is involved in implementing the approved practices proposed to reduce nonpoint source pollution; discuss the area that will be included in the project; inform the farmers of which practices will be cost-shared and at what levels; and explain what educational activities are ongoing in the watershed.

F. Travelling Display

A travelling display is was developed during during the planning phase of this project. It will continue to be used during the sign up period of the Watershed Project. The display was designed to be appealing as well as informative.

The display is to be used as an exhibit at county fairs, local carnivals or festivals, in bank lobbies, at technical and high schools, at farm organization meetings, and other locations where it would expose numbers of people to the watershed project.

The display presents the public with the basic facts concerning the Watershed Project. It visually appealing to attract attention and stimulate interest.

G. Pasture Renovation and Forage Interseeding Demonstration Establishment

To increase productivity, farmers are using more intense cropping practices, some of which sacrifice long run water quality, soil erosion control and profitability in return for short run gains. One segment of cropping practices

could stand additional intensity without sacrificing long run water quality and soil erosion objectives is pasture renovation. In fact, increased pasture productivity might remove some of the pressure to produce short term gains from crop acres. It may also reduce the tendency to pasture woodland.

Research conducted in Lafayette County in the early 1960's on 10-12% slopes showed an average increase in yields from 1 to 2.5 tons per acre from establishing birdsfoot trefoil with various methods. Earlier research in Richland County showed per acre dry matter yields of 1,453 pounds compared to 276 pounds before the pasture was improved. An acre of renovated pasture in research at the U.W. Lancaster Experimental Farm Produced an average of an extra 150 pounds of animal weight gain.

The proposed Baraboo River-Crossman Creek Watershed Project will provide funding to promote practices which will improve water quality within the watershed.

The purpose of this practice is to demonstrate the proper pasture renovation methods and to demonstrate that renovated pasture is a practice that can improve productive and economic efficiency without detracting from water quality and erosion control goals.

Three cooperating landowners in the watershed will be selected to provide sites to demonstrate the establishment, the progress, and the results of pasture renovation. Actual renovation will begin during the spring of 1985 although site selection, soil testing, liming, fertilizing and herbicide application may begin during the fall of 1984.

A planting and/or land preparation field day will be held at the most centrally located site in the spring of 1985. A second field day will be held at the site in the fall of 1985. A third field day will be held during the summer or fall of 1986. Each of the three sites should demonstrate the same principles, but will be located to encourage "from the road" observation by many watershed landowners.

The need for lime will determine the exact renovation practices that will lead to success. Each site should demonstrate both extremes. Each practice should cover about two acres on each site and should have a control or check strip. Therefore, the total number of acres to be renovated will be 12.

Below are the demonstration establishment costs:

	Interseeding, No Lime	Tillage to Incorporate Lime
Soil Test	$ 6.00	$ 6.00
3-ton lime	0.00	40.00
400 lbs. 0-10-40 fertilizer	35.00	35.00
2 quarts Roundup	45.00	45.00
Plowing	0.00	11.00
Discing	0.00	7.00
Seeding	0.00	13.00
Birdsfoot Trefoil Seed 8 lbs.	28.00	28.00
Oats 3 bu.	18.00	18.00
Interseeder Rent	20.00	0.00
	152.00	203.00
Number of Plots:	X 6	X 6
	$912.00	$1,218.00
	Total =	$2,130.00

In addition, it will require about 15 man days of UWEX personnel time to plan and conduct this educational demonstration. Bulletins, promotional materials and signs for the plots will cost an additional $300.00.

From this demonstration farmers will see a way to manage open pastures in a way that enhances their economic situation without jeopardizing water quality and soil erosion control. Some farmers will adopt the demonstrated practices.

H. Conservation Tillage Demonstration Establishment

With a very strong emphasis in our modern day agriculture in the area of continuous cash crops, especially corn, we recognize serious concerns for our land's livelihood. This intensified cropping system increases sediment runoff, degrades water quality, decreases organic matter, and magnifies soil erosion. Conservation tillage is one practice which may correct this devastating problem. By leaving large quantities of corn stubble on the ground the water movement is slowed and little or no erosion or sedimentation will occur.

To a large extent, Conservation Tillage is management of sufficient soil cover. Current research indicates that in a 25 to 30 percent soil cover at planting can provide good to excellent soil erosion control, depending on slope and soil type.

Since the purpose of the Crossman Creek-Little Baraboo River Watershed is enhancement of water quality, this practice will emphasize the water quality virtues of a variety of conservation tillage systems.

Two cooperating landowners in the watershed will be selected to provide sites to demonstrate the use of several different conservation tillage implements. The sites will be five acres each, so the total Conservation Tillage Demonstration will cover ten acres. The actual planting will occur in the Spring of 1985.

A field day was held in the Summer and Fall of 1985 at both sites. Field days will be held annually until the Fall of 1987. Both sites will encourage "from the road" viewing at all times.

Below are the estimated demonstration establishment costs:

Column A - Notill - Sod Column C - Chisel Plow
Column B - Notill Column D - Disk Column E - Mold Board

	Costs Per Acre				
Fixed Costs	A	B	C	D	E
Seed@ (65.00/bag @ .33bag/ac.)	$ 21.45	21.45	21.45	21.45	21.45
Fertilizer					
- 9-23-30 (.107/lb @ 200 lbs/ac)	21.40	21.40	21.40	21.40	21.40
- Anhydrous (.15/lb @ 120 lbs/ac)	18.00	18.00	18.00	18.00	18.00
Chemical					
- Roundup (22.50/qt @ 2 qts/ac)	45.00	----	-----	-----	-----
- Atrazine (2.02/lb @ 2.5 lbs/ac)	5.05	5.05	5.05	5.05	5.05
- Lasso (5.27/qt @ 2 qts/ac)	10.54	10.54	10.54	10.54	10.54
- Counter (1.43/lb @ 10 lbs/ac)	14.30	14.30	14.30	14.30	14.30
Total	135.74	90.74	90.74	90.74	90.74
Variable Costs					
Moldboard Plowing	-----	-----	-----	-----	9.00
Discing (twice)	-----	-----	6.18	12.36	12.36
Chisel Plowing (twice)	-----	-----	16.80	-----	-----
Harrowing	-----	-----	-----	-----	3.17
Conventional Planting	-----	-----	7.52	7.52	7.52
Notill Planting	25.00	25.00	-----	-----	-----
Anhydrous Ammonia Aplc.	4.98	4.98	4.98	4.98	4.98
Cultivating	-----	-----	4.27	4.27	4.27
Combining	20.33	20.33	20.33	20.33	20.33
Land Rent Per Acre	50.00	50.00	50.00	50.00	50.00
TOTALS	236.05	191.05	200.82	190.20	202.37

Table 23: Schedule and Costs of Information/Education Activities

Activity	Cost/Unit ($)	Project Period (years) 1	2	3	4	5	6	7	8	9	Total
Newsletter	450	1,800 (4)*	1,800 (4)	1,800 (4)	1,800 (4)	1,350 (3)	1,350 (3)	450 (1)	450 (1)	450 (1)	11,250
Watershed Tours	250	500 (2)	--	500 (2)	--	--	--	--	--	--	1,000
Pasture & Forage Interseeding Establishment	2,322	2,322 (1)	--	--	--	--	--	--	--	--	2,322
Pasture & Forage Interseeding Demo.	900	--	900 (1)	900 (1)	900 (1)	--	--	--	--	--	2,700
Streambank Stabe. Demonstration	9,500	9,500 (1)	--	--	--	--	--	--	--	--	9,500
Conservation Till. Demo. Establishment	2,350	2,350 (1)	--	--	--	--	--	--	--	--	2,350
Conservation Till Demonstrations	700	--	700 (1)	700 (1)	700 (1)	--	--	--	--	--	2,100
Manure Management Field Days	1,000	--	1,000 (1)	1,000 (1)	1,000 (1)	--	--	--	--	--	3,000
Portable Display Board	1,000	1,000 (1)	--	--	--	--	--	--	--	--	1,000
Watershed Association	250	500 (2)	500 (2)	500 (2)	500 (2)	500 (2)	250 (1)	250 (1)	250 (1)	250 (1)	3,500
Annual Totals:		17,972	4,900	5,400	4,900	1,850	1,600	700	700	700	38,722

VI. PROJECT EVALUATION

Two approaches will be used to evaluate the progress and success of the Crossman Creek - Little Baraboo River Project. One will involve assessing the changes in land use practices and reductions in pollutant loads as a result of the project. The other approach will be measurements of water quality, habitat, and, water resource characteristics. Each approach is discussed in more detail below.

A. Changes in Land Use Practices and Pollutant Loads

Nonpoint sources of pollution have been degrading water quality for a long period of time and the changes in water quality from the control of the sources will occur gradually over a period of time. Because of this, there is a need for an evaluation procedure that will indicate progress before the actual changes in water quality can be measured. This evaluation approach allows for such an assessment of the project to be made.

The base line conditions of the watershed with respect to nonpoint sources of pollution has been documented through the inventory process. The changes in these conditions will be documented throughout the project through the use of tracking forms. Each time a cost share agreement is signed the changes in upland soil loss, barnyard runoff phosphorus load, critical acres of land spread with manure, or streambank erosion will be recorded on the tracking sheet by the county. This will be done for practices that are cost shared through the Nonpoint Source Program as well as those not cost shared. These tracking sheets will be turned in to DNR on an annual basis or upon request by the Department.

Nonpoint source control practices may be installed with cost share funds outside of this program (such as the federal ACP program). The land condition changes that result from these practices will also be recorded by the county on the tracking sheets and kept on file by the county.

This evaluation effort has two benefits. One, as mentioned before, it allows for an indication of the progress of the project before changes in water quality are apparent. Secondly, this evaluation will guide the Department on which water bodies are most likely to show changes as a result of the level of practice installation in its subwatershed.

B. Changes in Water Quality, Habitat, and Water Resource Use

The objectives set for each water body usually related to a fishery change or improvement, or to other recreational uses. In order for those objectives to be met, several steps must be accomplished. First, the pollutant loads must be reduced through the installation of the control practices. Second, the water quality and physical characteristics must respond to the reduction in the loading. Third, the aquatic life (fish, algae, weeds) must, in turn, respond to the improvements in the water quality and habitat.

Several water resource measurements will be used to help indicate if the objectives are being met. Many of these techniques will be the same ones that were used the help determine the present conditions of the water bodies and

are described in Chapter II. Because of the cost and time commitment required for these monitoring techniques, only a few selected sites will be monitored. If improvements can be measured at these sites, it can be concluded that similar landuse changes in other subwatersheds will result in similar water quality changes.

Two streams have been selected for monitoring: the Little Baraboo River, and Carr Valley Creek. These creeks were chosen as representative of the two major creek objectives in this project. One is the protection and improvement in a coldwater fishery (trout), and the other is the improvement of a forage fishery. Improvement in the trout fishery is defined as an increase in the number and the size of the sport fish in the stream. Improvement in the forage fish is defined as an increase in the over all "biomass" of the forage fish in the stream.

Lake Redstone and Dutch Hollow Lake will be monitored also. These two lakes have been selected as part of a statewide lakes ambient monitoring program and this monitoring will be used by this program to track the changes in the water quality throughout the project period.

Table 24 summarizes the evaluation activities and when they are scheduled to take place.

1. Biotic Index

Biotic Index sampling has occurred at 3 sites on the Little Baraboo River and at 1 site on Carr Valley Creek. These sites will be resampled during the spring and fall in 1985 and 1986 and some new sites may be added if good sampling locations are found. The sites will be resampled during the spring and fall for the last three years of the project.

These samples will be used to indicate if there has been a change in the organic loading condition of the streams at those sites. The main source that would affect these conditions is a change in the livestock waste runoff from barnyards or fields.

2. Stream Fishery Habitat Assessment

The habitat assessment has been conducted at 11 sites in the watershed. Further "base line" information will be collected at these 6 to 8 sites on the selected creeks in the summer of 1986. These sites (plus any additional sites) will be re-assessed during the fourth, seventh, and one year after the project's completion.

This assessment will help to measure improvements in the fish habitat. The main activities that will lead to changes in this characteristic would be streambank fencing and upland erosion control practices.

3. Stream Temperature and Flow

Two major factors in the improvement of the trout fishery will be the influence of the flow and the temperature of the streams. Trout survival and production will be enhanced if the minimum stream flow can be increased and the temperature decreased during the mid-summer period.

Many of the upland erosion control practices will help increase the infiltration of water before it can runoff. This increase in water infiltration will help maintain the base flow of the streams and decrease the summer temperatures.

To determine whether the practices are affecting these factors in the Little Baraboo River 3 to 5 sites above County Highway G will be monitored for these parameters. Mid-summer and mid-winter temperatures and flows will be measured at the selected sites each year during the project.

4. Fish Surveys

The selected streams will be surveyed to determine their current sport fishery population and nongame fish condition. The trout population survey will be conducted only if a creel census can be funded along with the survey. The creel census is necessary in order to document the numbers of trout in the stream and numbers taken from the stream. If a creel census cannot be funded, then an indicator nongame species of fish will be surveyed in the Little Baraboo River.

The survey in Carr Valley Creek will be for forage fish so a creel census on this creek will not be necessary.

The base line data will be gathered for these streams during 1986 and 1987. The fish surveys will be repeated upon the completion of the project.

These surveys will be the most important indication of accomplishing the objectives for the selected streams. The response of the fish population will show if all the factors affecting the stream have changed enough to actually affect the stream's capacity for supporting a sport fishery.

5. Lake Water Quality Measurements

Several years of water quality data exist for Redstone Lake and Dutch Hollow lake. At this time no in-lake sampling is being done. Beginning in 1986 spring turn-over and mid-summer samples will be taken for total phosphorus concentration, secchi depth, and chlorophyll a concentration on these two lakes. This will continue on an annual basis for the duration of the project and for one year after the project.

The main purpose of this sampling will be to measure any changes in the trophic status of the lakes. Nutrient reduction to the lakes through the control of upland erosion and livestock waste runoff will be major reason for changes in the lakes' trophic status.

Table 24: Schedule of the Evaluation Procedures

Evaluation Technique	Sites	Year 1	2	3	4	5	6	7	8	9	10	11
Biotic Index	5 sites	x	x						x	x	x	
Habitat Assessment	6-8 sites	x			x			x			x	
Lake Monitoring	2 lakes (4 x's/yr)	x	x	x	x	x	x	x	x	x	x	x
Temperature & Flow	3 sites (2 x's/yr)	x	x	x	x	x	x	x	x	x	x	x
Fish Survey	2 streams	x	x								x	

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APPENDIX A

Lake's Water Quality Data

Redstone Lake Sampling Data (DNR Bureau of Research)

WINTER							SPRING							SUMMER							FALL						
Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments	Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments	Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments	Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
														7-10-67	0	81.0	10.5	0.17	2.5	Total P as	11-7-67	0	44.0	7.9	0.14	7.5	Total P as
															5	73.0	11.3	-		phosphate		20	44.0	7.9	0.20		phosphate
															10	70.0	9.3	-				40	44.0	7.9	0.11		
															15	67.0	5.8	-									
															20	56.0	0.6	0.25									
															25	52.0	0.2	-									
															30	50.0	0.0	-									
															35	49.0	0.0	-									
															40	48.0	0.0	1.88									
							4-29-68	0	53.0	9.5	0.19	8.0	Total P as	7-16-68	0	81.0	10.7	0.04	3.0	Total P as	10-22-68	0	56.0	4.2	0.38	5.0	Total P as
								5	52.0	9.5	-		phosphate		5	78.0	9.7	-		phosphate		10	56.0	4.8	-		phosphate
								10	51.0	9.1	-				10	72.0	3.9	-				20	56.0	5.3	0.21		
								15	51.0	6.5	-				15	65.0	1.6	0.05				35	52.0	5.3	-		
								20	50.0	6.1	0.24				20	62.0	1.0	-				40	51.0	0.5	0.54		
								25	50.0	5.8	-				35	51.0	0.4	1.45									
								30	49.0	3.5	-																
								35	48.0	3.2	0.33																
1-21-69	0	32.0	8.8	0.20	11.0	Total P as	5-6-69	0	55.0	12.9	0.20	6.0	Total P as	9-2-69	0	81.0	5.2	0.10	3.0	Total P as	11-18-69	0	42.0	10.8	0.20	7.5	Total P as
	10	38.0	5.6	-		phosphate		10	50.0	14.2	-		phosphate		10	79.0	4.2	-		phosphate		17	42.0	10.5	0.20		phosphate
	15	38.0	4.7	0.10				20	48.0	11.1	-				18	75.0	3.1	0.10				35	42.0	9.9	0.20		
	20	38.0	4.4	-				33	44.0	5.2	-				20	68.0	0.0	-									
	25	39.0	3.4	-											26	57.0	0.0	-									
	34	39.0	1.9	0.10											30	54.0	0.0	-									
															35	52.0	0.0	1.70									
2-9-70	0	32.0	15.9	0.10	9.0	Total P as	4-27-70	0	57.0	13.7	0.10	4.5	Total P as	7-20-70	0	74.0	6.8	0.21	2.5	Total P as	11-10-70	0	48.0	6.1	0.12	6.0	Total P as
	5	39.0	18.2	-		phosphate		35	44.0	8.6	0.10		phosphate		15	73.0	6.4	0.25		phosphate		18	48.0	5.9	0.12		phosphate
	10	39.0	7.9	-											20	71.0	6.2	-				36	48.0	5.9	0.18		
	18	41.0	5.3	0.10											25	52.0	2.5	-									
	25	41.0	3.3	-											30	49.0	0.4	0.61									
	30	41.0	2.9	-																							
	37	43.0	0.1	0.50										8-24-70	5	74.0	4.4	-	2.5	Total P as							
															10	72.0	3.2	-		phosphate							
															15	72.0	2.7	-									
															20	65.0	0.2	-									
															35	49.0	-	-									

Redstone Lake Sampling Data (DNR Bureau of Research)

WINTER

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
2-9-71	0	32.0	10.0	0.02	9.0	
	10	33.0	7.4	-		
	20	39.0	2.1	0.04		
	30	40.0	1.7	-		
	37	42.0	0.0	0.33		
3-3-71	5	37.0	8.0	-	13.0	
	10	38.5	2.4	-		
	15	39.0	0.7	-		
	20	40.0	0.2	-		
	25	40.0	0.2	-		
	35	41.5	0.0	-		
2-17-72	0	33.0	1.3	0.07	7.0	
	10	39.0	1.2	-		
	18	39.0	1.7	0.11		
	30	40.0	2.9	-		
	35	41.0	1.6	-		
	39	42.0	0.0	0.77		
2-15-73	0	34.5	20.3	0.09	4.0	ice & snow cover
	9	39.0	8.8	-		
	18	41.0	7.5	0.03		
	27	41.0	4.0	-		
	35	42.0	0.2	0.28		
2-8-74	0	38.0	10.1	0.07	4.0	
	15	40.0	6.5	0.10		
	30	40.0	2.1	0.09		

SPRING

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
4-26-71	0	55.0	13.0	-	5.5	
	10	54.0	12.8	-		
	20	48.0	10.3	-		
	29	42.0	2.6			
5-1-72	0	53.0	12.2	0.03	3.5	
	18	50.0	7.8	0.01		
	30	50.0	5.9	-		
	37	49.0	1.9	0.05		
5-1-73	0	54.5	12.4	0.06	4.0	
	10	54.0	12.3	-		
	18	52.0	11.3	0.05		
	25	46.0	9.8	-		
	35	44.0	4.3	0.09		
4-9-74	0	42.5	11.2	0.07	4.0	ice cover
	20	41.5	1.0	-		
	35	42.5	0.0	0.37		
4-19-74	0	48.0	11.8	0.03	2.8	
	4	47.0	11.6	-		
	10	45.5	11.3	-		
	15	45.0	10.4	0.04		
	20	44.0	8.6	-		
	25	43.0	6.4	-		
	30	43.0	4.4	-		
	35	42.0	4.4	0.06		

SUMMER

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
6-28-71	0	80.0	9.2	0.03	6.0	
	10	77.0	9.1	-		
	15	68.0	3.9	-		
	20	58.0	0.8	-		
	30	50.0	-	0.03		
8-20-71	0	77.0	-	-	2.8	
	5	76.5	11.4	-		
	10	74.5	9.5	-		
	15	72.0	3.4	-		
	20	65.0	0.8	-		
	25	55.0	0.0	-		
7-12-72	0	76.5	9.1	0.05	5.0	
	5	76.0	9.2	-		
	10	73.0	7.7	-		
	12	72.0	7.0	-		
	15	70.0	3.3	-		
	18	62.0	2.8	0.08		
	20	58.0	0.1	-		
	37	46.0	0.0	0.36		
8-27-73	0	78.0	6.9	0.06	5.0	algae bim
	10	73.0	5.4	-		
	18	70.0	1.0	0.03		
	20	64.0	0.0	-		
	28	53.0	0.0	-		
	36	50.0	0.0	0.70		
7-10-74	0	79.0	10.7	0.04	3.3	bl-gr bloom
	10	75.0	9.0	-		
	15	68.5	2.4	0.01		
	20	63.0	0.3	-		
	33	51.0	0.0	0.14		

FALL

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
10-11-71	0	62.0	5.5	0.05	4.5	
	15	62.0	5.4	0.06		
	25	62.0	5.2	-		
	31	53.0	2.8	0.15		
10-27-72	0	49.0	7.0	0.09	6.0	
	18	48.0	7.2	0.07		
	30	48.0	7.5	-		
	39	47.5	5.5	0.19		
11-11-73	0	43.0	9.0	0.04	10.0	
	34	41.0	9.1	0.04		
11-13-74	0	47.0	7.5	0.07	10.5	
	34	47.0	7.2	0.05		

Redstone Lake Sampling Data (DNR Bureau of Research)

WINTER

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
2-27-75	0	36.0	6.2	0.01	6.8	
	20	41.0	5.5	0.02		
	33	41.0	5.1	0.02		
2-24-76	0	34.5	11.9	0.05	10.0	
	10	38.0	11.2	-		
	20	39.5	4.1	0.03		
	27	40.0	1.3	-		
	34	40.5	0.5	0.05		
2-8-77	0	33.5	3.7	0.03	6.2	ice & snow
	10	39.5	3.0	-		
	20	40.0	2.3	0.04		
	30	40.0	1.5	-		
	36	40.5	1.0	0.08		
2-27-79	0	38.0	7.0	<.01	13.0	
	10	40.0	3.2	-		
	15	40.0	0.8	0.01		
	30	40.0	0.5	0.01		
Avr.:				0.06	8.45	
Count:				55.00	11.00	

SPRING

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
4-29-75	0	45.5	8.1	<.01	6.8	
	10	44.5	8.3	-		
	20	42.5	5.4	-		
	25	42.0	5.3	-		
	30	41.0	2.1	-		
	38	41.0	0.4	0.10		
4-13-76	0	52.0	13.1	0.06	3.5	
	25	46.0	9.7	-		
	30	43.0	8.1	-		
	34	43.0	3.7	-		
	39	43.0	0.0	0.37		
4-4-77	0	61.7	12.6	0.03	5.0	
	20	57.2	11.6	0.03		
	30	44.6	5.6	-		
	39	42.8	0.9	0.05		
3-17-78	0	33.5	0.9	0.03	18.5	ice cover
	20	38.0	0.6	0.03		
	38	38.5	0.3	0.06		
4-13-78	0	43.5	9.3	-	6.0	
	20	43.0	9.3	-		
5-8-79	0	53.0	11.8	0.01	7.0	
	25	49.0	10.2	-		
	32	43.0	1.1	0.01		
4-14-80	0	40.1	6.7	0.11	4.0	Chlra 16.96
	34	40.1	5.6	0.14		
Avr.:				0.05	5.94	
Count:				54.00	15.00	

SUMMER

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
7-10-75	0	76.5	8.5	<.01	8.2	
	15	72.0	8.0	-		
	20	61.5	4.2	0.04		
	30	49.0	0.1	-		
	33	48.0	0.0	0.21		
7-30-76	0	76.0	6.5	0.07	3.5	Chlra 26.02
	20	66.0	3.6	-		
	24	67.0	0.2	-		
	25	58.0	0.0	0.34		
	30	54.0	0.5	-		
	37	51.0	1.6	0.29		
8-23-77	0	68.0	5.6	0.03	6.8	Chlra 21
	10	68.5	4.9	-		
	15	68.5	4.2	-		
	20	67.0	0.8	0.06		
	25	56.0	0.0	-		
	30	52.0	0.0	-		
	38	48.0	0.0	0.74		
8-25-78	0	76.0	9.2	0.05	4.0	Chlra 29
	15	74.0	6.2	-		Alg. Blm.
	20	68.0	1.8	0.06		
	25	60.0	0.0	-		
	30	54.0	0.0	-		
	37	52.0	0.0	0.47		
Avr.:				0.13	4.15	
Count:				73	14	

FALL

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
11-5-75	0	55.0	6.7	0.04	6.0	
	32	55.0	6.6	0.04		
11-7-77	0	43.0	7.6	0.07	13.0	Chlra 0
	37	42.0	5.2	0.07		
10-26-78	0	42.0	8.3	0.03	6.0	
	38	42.0	8.2	0.03		
11-5-79	0	41.0	8.3	0.06	6.0	Chlora 18.6
	38	41.0	8.2	0.04		Alg. Blm.
Avg.:				0.11	7.33	
Count:				33.00	12.00	

Dutch Hollow Lake Sampling Data (DNR Bureau of Research)

WINTER

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
2-2-74	0	32.9	13.4	0.04	--	
	6	37.8	11.5	0.02		
	13	39.4	6.1	0.03		
	20	39.4	4.2	0.01		
	26	40.6	2.4	0.02		
11-13-74	0	--	--	0.07	--	
	6	--	--	0.04		
	13	--	--	0.04		
	20	--	--	0.04		
	26	--	--	0.03		
12-17-74	0	--	--	0.19	--	
	6	--	--	0.12		
	13	--	--	0.21		
	20	--	--	0.13		
	26	--	--	0.20		
2-25-76	0	31.0	9.1	0.05	6.00	
	10	34.0	7.0	0.02		
	20	34.0	1.7	0.02		

SPRING

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
4-9-74	0	40.8	11.8	0.19	3.3	
	6	40.6	12.0	0.03		
	13	40.1	12.0	0.06		
	20	39.7	11.7	0.05		
	26	40.6	9.4	0.25		
4-13-76	0	52.0	14.3	0.05	4.50	
	15	50.5	11.6	-		
	29	47.0	7.1	0.05		

SUMMER

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
5-7-74	0	57.9	9.5	0.04	6.9	
	6	58.3	9.7	0.03		
	13	56.5	--	0.04		
	20	49.8	9.7	0.04		
	26	48.2	7.9	0.04		
6-12-74	0	67.8	11.6	0.04		
	6	67.4	12.2	0.06		
	13	65.8	8.2	0.09		
	20	55.7	3.8	0.02		
	26	52.5	0.0	0.03		
	29	51.8	0.0	0.06		
7-9-74	0	82.8	10.3	0.10	1.5	
	13	68.0	0.0	0.07		
	20	58.6	--	0.05		
	26	53.9	--	0.16		
8-1-74	0	74.7	4.2	0.06	4.6 alg. dieoff	
	6	74.8	3.6	0.09		
	13	71.6	1.0	0.07		
	20	58.1	0.0	0.11		
	26	54.1	0.0	0.13		
9-5-74	0	68.1	9.9	0.04	3.3 alg. bloom	
	6	67.8	7.9	0.04		
	13	67.6	0.0	0.05		
	20	61.7	0.0	0.05		
	26	55.4	0.0	0.13		
7-12-75	0	76.0	8.1	0.11	2.50	
	16	61.0	2.4	0.05		
	28	50.0	0.0	0.12		
8-30-76	0	75.0	8.5	0.04	1.50 no macros.	
	13	73.0	7.8	-		
	15	71.0	3.5	0.08		
	25	58.5	0.0	0.31		

FALL

Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
9-18-74	0	65.8	8.0	0.05	4.9	
	6	65.5	8.0	0.06		
	13	64.9	6.8	0.06		
	20	64.2	4.7	0.06		
	26	55.9	0.0	0.16		
10-2-74	0	57.4	9.5	0.05	3.9	
	6	56.3	9.2	0.06		
	13	55.9	8.8	0.06		
	20	55.8	8.7	0.04		
	26	55.6	8.3	0.05		
10-29-74	0	52.7	9.6	0.09	4.6	
	6	51.4	9.5	0.08		
	13	50.4	9.2	0.11		
	20	50.2	9.1	0.10		
	26	50.0	7.6	0.06		
11-5-75	0	54.0	10.5	0.08	3.00	
	27	53.0	8.1	0.04		

Dutch Hollow Lake Sampling Data (DNR Bureau of Research)

WINTER							SPRING							SUMMER							FALL						
Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments	Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments	Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments	Date	Depth (ft)	Water Temp (F)	DO (mg/l)	Tot P (mg/l)	Secchi (ft)	Comments
2-8-77	0	32.0	1.9	0.03	4.50		4-25-77	0	60.8	9.6	0.04	4.50		8-23-77	0	67.0	7.1	0.10	1.50	Chlora = 82	10-11-77	0	51.8	9.2	0.10	2.00	
	10	36.5	1.5	0.02				10	59.0	8.6	--				12	68.0	6.7	---		Myriophyllum		23	51.8	9.0	0.12		
	21	38.5	1.1	0.02				20	53.6	1.1	--				19	67.5	2.3	0.19									
								27	52.7	1.0	0.06																
							5-17-78	0	32.0	1.1	0.04	4.50	ice covered	8-25-78	0	75.0	6.5	0.08	2.50	Chlor a = 34	10-26-78	0	47.5	9.9	0.06	2.00	bl-gr bloom
								10	37.5	0.1	0.04				12	72.5	1.8	0.07				23	48.0	9.1	0.06		
								19	38.0	0.1	0.05				15	71.5	0.6	---									
															19	67.0	0.5	0.08									
							6-21-78	0	47.0	11.8	0.04	3.00															
								20	46.0	11.7	0.04																
										AV =	0.07																
										N =	14.00																

APPENDIX B

Forms Used in Administering the Project

Nonpoint Source Grant Agreement (Form 3400-67)

This form is used to convey cost-sharing money for the installation of practices from the Department to the Designated Management Agency. It is in effect for the duration of the project. The amount of the grant increases as the amount of money encumbered increases. The grant is signed by the Department of Natural Resources and the . Designated Management Agency.

Local Assistance Agreement

The Local Assistance Agreement is signed by the Department and the DMA. This agreement outlines what the reimbursement will be to the project for the additional staff needs. It defines the work which needs to be done by the county to implement the project and what the reimbursement for that work will be. The agreement is usually for one year and is renegotiated each year.

Request for Advance or Reimbursement (Form 3200-54)

The county uses this to request their initial "advance" money for cost-sharing funds or to reimburse their cost-sharing account when they have paid landowners for the installation of practices. When used for reimbursment purposes the form must be accompanied by a contractor's itemized invoice, evidence of payment by the landowner, and a copy of the Practice Certification Form (see below).

Landowner Tracking Sheet (No Form Number)

This form has many uses. It is filled out before a landowner contact is made. It indicates the conditions of an individual's land according to the inventory. After a contact it should show any changes in the land from the inventory data. It is also used to justify any changes in a landowner's eligibility status. Finally, if the landowner signs a cost-share agreement it indicates the changes in nonpoint source conditions due to the agreed upon best management practices.

Cost-Share Agreement (Form 3400-68)

This form is signed by the county and the landowner. It outlines the needed practices, the locations of the practices, the estimated total cost, cost-share rate, and cost-share amount; the scheduled year of installation, and the practice maintenance period. The form also describes the responsibilities of both the landowner and the designed management agency. This is a binding contract betwen the two parties.

Cost-Share Agreement Amendment (Form 3400-68A)

This form is used whenever there is a need to change a cost-share agreement. Examples of changes needing an amendment are deletion or addition of a practice, and a change in the cost of a practice by more than $500.00. This form must be signed by the landowner and the DMA before the change becomes effective.

Cost-Share Calculation and Practice Certification (Form 3200-53)

There are two functions served by this form. It is filled out by the county and sent to the Department when requesting reimbursement for cost-share funds. The first part of the form is simply the calculation for the amount of cost-share money the landowner received and is being requested for reimbursement. The second part is the county's certification that the practices on the form meet the required specifications. This replaces the ACP 247 certification form.

State of Wisconsin
Department of Natural Resources

NONPOINT SOURCE GRANT AGREEMENT
Section 144.25, Wis. Stats.
Form 3400-67 Rev. 5-82

Wisconsin Nonpoint Source Water
Pollution Abatement Program

☒ Priority Watershed Project

☐ Local Priority Project

PART I. Purpose

To set out the conditions and restrictions under which the Wisconsin Department of Natural Resources (Department) will reimburse Lake County, lead designated management agency (DMA), for funds used for the cost-sharing of best management practices (BMP) to control nonpoint sources of water pollution through the Clearwater River Priority Watershed project.

PART II. Grant Administration Data

1. Designated Management Agency/Recipient
Lake County

2. Authorized Representative
Dave Soilsaver

Title
County Conservationist

3. Street or Route
101 Main St

City, State, Zip Code
Anytown Wi 53333

4. Telephone Number (Include Area Code)
(414) 123-5000

5. Grant Number
P001

6. Department District
Southeast District

7. Maximum Grant Amount
$ 100,000

8. Eligible Period for Entering Into Cost-Sharing Agreements
July 1 1984 to June 30, 1987

9. Installation Period
5 Years from the signing of the cost-sharing agreement

10. Grant Period
From July 1, 1984 Through June 30, 1992

11. Eligible Costs
Eligible costs are those costs incurred for the installation of the BMPs listed on line 12 of part II on the sites listed on line 13 of part II. Costs for BMPs whose installation is started before the signing of a cost sharing agreement between the landowner or user and the DMA are not eligible costs. Costs for BMPs which do not meet the specifications and conditions of sec. NR 120.13, Wis. Admin. Code, are not eligible costs.

12. **Eligible Best Management Practices**

Terrace
Conservation Tillage
Contour Strip Cropping
Contour Farming
Diversions
Waterways
Critical Area Stabilization
Grade Stabilization Structure
Shoreline Protection
  Shoreline Fencing
  Rip Rap
  Shaping and Seeding
  Livestock and Machinery Crossing
Settling Basin
Barnyard Runoff Management
Manure Storage Facility
Livestock Exclusion from Woodlot
Street Cleaning

13. **Eligible Sites**

Eligible sites are those areas within the Priority Management Area (as defined in the Clearwater River Priority Watershed Plan) which contribute nonpoint sources of pollutants to the surface waters.

PART III. Conditions

The Department and the DMA, in mutual consideration of the provisions of this document, do hereby agree as follows:

1. This agreement is subject to the provisions of Section 144.25, Wis. Stats.

2. This agreement is subject to the provisions of Chapter NR 120, Wis. Admin. Code.

3. The Department shall reimburse the DMA for a percentage of each eligible cost incurred by the DMA during the grant period listed on line 10 of part II. The amount of each eligible cost to be reimbursed shall be determined in accordance with sec. NR 120.14, Wis. Admin. Code. The total amount reimbursed by the Department shall not exceed the maximum grant amount listed on line 7 of part II. The DMA shall provide the Department with itemized payment requests on forms to be provided by the Department.

4. The DMA shall use the cost-sharing agreement form provided by the Department for all contracts reimbursable through this agreement.

5. The DMA shall document that all best management practices for which reimbursement is requested under this agreement meet the technical specifications and design criteria identified in Section NR 120.10(4), Wis. Admin. Code, and any other conditions set out in this agreement.

6. Quarterly during the grant period, the DMA shall submit a progress report to the Department including the following:

   A. The number of cost-sharing agreements signed during that quarter;

   B. The number of eligible grant recipients who have indicated an interest in entering into cost-sharing agreements during that quarter, but have not done so;

   C. The amount of funds included in cost-sharing agreements during that quarter;

   D. The number or units of each best management practice included in cost-sharing agreements during that quarter;

   E. The number or units of each best management practice installed during that quarter; and

   F. Other measurements of participation or accomplishment agreed upon by the DMA and the Department.

7. DMA accountability.

   A. Financial management. The DMA is responsible for maintaining a financial management system which shall adequately provide for:

      (1) Accurate, current and complete disclosure of the financial results of each cost-sharing agreement awarded in accordance with generally accepted accounting principles and practices, consistently applied, regardless of the source of funds.

      (2) Records which identify adequately the source and application of funds for grant-supported activities. These records shall contain information pertaining to grant awards and authorizations, obligations, unobligated balances, assets, liabilities, outlays and income.

      (3) Effective control over and accountability for all project funds, property, and other assets.

      (4) Comparison of actual with budgeted amounts for each grant.

      (5) Procedures for determining the eligibility and allocability of costs in accordance with the provisions of Sections NR 120.10 and NR 120.12, Wis. Admin. Code.

      (6) Accounting records which are supported by source documentation.

      (7) Audits to be made by the DMA or at its direction to determine, at a minimum, the fiscal integrity of financial transactions and reports, and the compliance with the terms of the grant agreement. The DMA shall schedule such audits with reasonable frequency, usually annually, but not less frequently than once every 2 years, considering the nature, size and complexity of the activity.

      (8) A systematic method to assure timely and appropriate resolution of audit findings and recommendations.

   B. Records. The following record and audit policies are applicable to this grant and to all cost-sharing agreements awards under this grant.

      (1) The DMA shall maintain books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly:

         (A) The amount, receipt, and disposition by the DMA of all assistance received for the project, including both state assistance and any matching share or cost-sharing; and

         (B) The total costs of the project, including all direct and indirect costs of whatever nature incurred for the performance of the project for which this grant has been awarded. In addition, contractors of DMAs, including contractors for professional services, shall also maintain books, documents, papers, and records which are pertinent to this grant award. The foregoing constitute "records" for the purposes of this section.

(2) The DMA's records and the records of its contractors, including professional services contracts, shall be subject at all reasonable times to inspection, copying, and audit by the Department.

(3) The DMA and contractors of DMAs shall preserve and make their records available to the Department:

(A) Until expiration of 3 years from the date of final settlement, or

(B) For such longer periods, if required by applicable statute or lawful requirement; or

(C) If a grant is terminated completely or partially, the records relating to the work terminated shall be preserved and made available for a period of 3 years from the date of any resulting final termination settlement.

(4) Records which relate to appeals, disputes, litigation on the settlement of claims arising out of the performance of the project for which a grant was awarded, or costs and expenses of the project to which exception has been taken by the Department or any of its duly authorized representatives, shall be retained until any litigation, claims or exceptions have been finally resolved and all periods of limitation with respect to any and all appeals have expired.

C. Audit.

(1) Preaward or interim audits may be performed on grant applications and awards.

(2) A final audit shall be conducted after the submission of the final payment request. The time of the final audit will be determined by the Department and may be prior or subsequent to final settlement. Any payment made prior to the final audit is subject to adjustment based on the audit. DMAs and subcontractors of DMAs shall preserve and make their records available pursuant to condition 7B of part III of this agreement.

8. This agreement will remain in effect beyond the grant period described in part II, line 10 through the maintenance period for all best management practices cost-shared. During the grant period, either the DMA or the Department may on thirty (30) days written notice, unilaterally and without cause, shorten the grant period of this agreement without liability, except that: (1) the Department shall reimburse the DMA for all eligible costs incurred against cost-sharing agreements signed before the final date of the amended grant period, (2) the DMA shall report to the Department annually providing information as described in condition 6 of part III of this agreement, (3) the DMA shall be accountable to the Department as described in condition 7 of part III of this agreement, and (4) the DMA shall enforce all provisions of all cost-sharing agreements in effect as of the final date of the grant period.

9. In connection with the performance of work under this agreement, the DMA agrees not to discriminate against any employee or applicant for employment because of age, race, religion, color, handicap, sex, physical condition, developmental disability as defined in s. 51.01(5) Wis. Stats., sexual orientation or national origin. This provision shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Except with respect to sexual orientation, the DMA further agrees to take affirmative action to ensure equal employment opportunities. The DMA agrees to post in conspicuous places, available for employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of the nondiscrimination clause.

10. Agreements estimated to be ten thousand dollars ($10,000) or more require the submission of a written affirmative action plan. DMAs with an annual work force of less than ten employees are exempted from this requirement.

11. This agreement, together with the specifications in the bid request (if any), referenced parts and attachments shall constitute the entire agreement and previous communications or agreements pertaining to this agreement are hereby superseded. Any contractual revisions including cost adjustments and time extensions must be made by an amendment to this agreement or other written documentation, signed by both parties at least 30 days prior to the ending date of this agreement.

12. The Department agrees that the DMA shall have sole control of the method, hours worked, and time and manner of any performance under this agreement other than as specifically provided herein. The Department reserves the right only to inspect the job site or premises for the sole purpose of insuring that the performance is progressing or has been completed in compliance with the agreement. The Department takes no responsibility for supervision or direction of the performance of the agreement to be performed by the DNR or the DMA's employees or agents. The Department further agrees that it will exercise no control over the selection and dismissal of the DMA's employees or agents.

State of Wisconsin Department of Natural Resources	Authorized Representative of Lead Designated Management Agency
By _____	By _____
Date Signed _____	Date Signed _____

LOCAL ASSISTANCE AGREEMENT FOR
Clearwater River PRIORITY WATERSHED PROJECT

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
Lake COUNTY

This agreement is entered into by and between the Wisconsin Department of Natural Resources (hereinafter referred to as the Department) and Lake County acting as the designated management agency under section NR 120.02(8), Wisconsin Administrative Code (hereinafter referred to as the County).

I. PURPOSE OF THIS AGREEMENT

The purpose of this agreement is to identify the circumstances under which the Department will reimburse the County for completing tasks, over and above a base level, necessary to implement the Clearwater R. Priority Watershed Plan in accordance with the detailed program for implementation developed as part of that plan. Only tasks over and above the base level, consistent with this agreement, are reimbursed by the Department.

II. PROJECT LIAISONS

For Department:
John G. Konrad, Chief
Nonpoint Source Section
Bureau of Water Resource Management
Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921

For County:
Dave Soilsaver
County Conservationist
Lake County
Courthouse
Anytown, WI 53333

III. DURATION OF AGREEMENT: July 1 1985 to June 30, 1986

IV. MAXIMUM REIMBURSEMENT AMOUNT: $10,000

V. CONDITIONS:

A. The general conditions for conduct of local assistance activities are those appearing in sections NR 120.50 through NR 120.53 of the Wisconsin Administrative Code.

B. Tasks completed prior to July 1, 1985, are not eligible for reimbursement under this contract.

C. The project base level is determined to be 500 hours for the duration of this agreement using the procedure identified in Section NR 120.52(3)(a), Wisconsin Administrative Code based on professional staff levels of the Land Conservation Committee and the Soil Conservation Service.

D. The accelerated task hours are all hours associated with eligible tasks greater than the project base level of hours.

E. All subcontracts shall be submitted to the Department for review prior to signing of the subcontract.

F. Landowner or land user contacts under technical assistance are covered under this agreement only when the lands are within the priority management area identified in the priority watershed plan and are anticipated to have significant nonpoint sources.

G. Conservation plan development is covered under this agreement as follows:

1. For the "most critical" landowners, as defined in Section VI, conservation planning is eligible for reimbursement independent of a signed cost-share agreement.

AND

2. For all other landowners, conservation planning is eligible for reimbursement only when an agreement is reached with the landowner or land user to install all the necessary best management practices.

H. Design, installation and certification of best management practices is covered under this agreement only for landowners and practices identified as eligible in the Clearwater R. Priority Watershed Plan providing:

1. The practices are included in a cost-share agreement (DNR Form 3400-68 or 3400-68A)

OR

2. A written agreement is reached between the County and the landowner or land user to install and maintain the best management practices necessary to control all the critical nonpoint sources on the landowner's/land user's property in accordance with the conditions in NR 120 and the Clearwater River Watershed Plan. This does not include practices designed and installed under the federal ACP program.

VI. SCOPE

This agreement covers the tasks listed in Tables 1, 2, 3, and 4 provided they are carried out within the priority management area identified in the Clearwater River Watershed Plan and meet the intent of that plan.

For purposes of this agreement, "most critical" landowner is defined in the Clearwater River Watershed Plan to be those landowners who are in Management Category I as defined on pages 12 - 14 of the plan.

Table 1. Technical Assistance Tasks and Hours Per Task

TASK	AGREED UPON EFFORT PER TASK
1. Contacts	(See Section VII, Line A.1)
2. Precontact Review of Landowner Information	" "
3. Cost-Share Agreement Development	" "
4. Conservation Plan Development for Landowners Other than the "Most Critical" Landowners	" "
5. Conservation Plan Revisions	" "
6. Conservation Plan Development for the "Most Critical" Landowners	
7. Design of Best Management Practices	
Contour Cropping	____ hr/acre
Contour Strips	____ hr/acre
Diversions	____ hr/foot
Waterways	____ hr/acre
Conservation Tillage	____ hr/acre
Critical Area Stabilization	____ hr/acre
Grade Stabilization Structures	____ hr/structure
Shoreline Fencing	____ hr/foot
Shoreline Shaping/Seeding	____ hr/foot
Shoreline Rip-Rap	____ hr/foot
Stream Crossing	____ hr/crossing
Barnyard Runoff Control	____ hr/site
Manure Storage Facility	____ hr/facility
Livestock Exclusion from Woodlots	____ hr/ft
Other (specify)	
8. Installation & Certification of Best Management Practices	
Contour Cropping	___ hr/acre
Contour Strip Cropping	____ hr/acre
Diversions	____ hr/foot
Waterways	____ hr/acre
Conservation Tillage	____ hr/acre
Critical Area Stabilization	____ hr/acre
Grade Stabilization Structures	____ hr/structure
Shoreline Fencing	____ hr/foot
Shoreline Shaping/Seeding	____ hr/foot

Shoreline Rip-rap	_____ hr/foot
Stream Crossing	____ hr/crossing
Barnyard Runoff Control	____ hr/site
Manure Storage Facility	____ hr/facility
Livestock Exclusion from Woodlots	____ hr/ac
9. Review of Cost Share Agreement	-0- hr/farm or municipality
10. Best Management Practice Maintenance Review	-0- hr/farm or municipality

Table 2. Fiscal Management Tasks

TASK	AGREED UPON HOURS PER TASK
Development of cost-sharing agreement file and update of project ledgers	0.5 hour per cost-share agreement
Handling of requests for reimbursement for installed best management practices	2.0 hours per request[1]

(1) A single request shall include all best management practices installed under a cost-share agreement concurrently.

Table 3. Project Management Tasks

TASK	AGREED UPON HOURS
Coordination of activities between counties; activities with Department; technical assistance tasks; fiscal management tasks; and educational tasks.	500 hours total

Table 4. Education Tasks

TASK	AGREED UPON NUMBER	ESTIMATED DIRECT COSTS	AGREED UPON HOURS
Newsletters	4	1800 00	
Tour	2	1000 00	

VII. REIMBURSEMENT

A. The Department agrees to reimburse the County for completed, eligible tasks for accelerated task hours as follows:

1. For technical assistance, the eligible tasks and agreed upon effort per task are identified in Table 1.

   a. For tasks 1 through 6, Table 1, Section VI, reimbursement shall be based on actual hours for these tasks up to 1500 hours.

   b. For task 7+8, Table 1, Section VI, reimbursement shall be based on the rates for this task up to 700 hours.

2. For fiscal management, the eligible tasks and agreed upon hours per task are identified in Table 2.

3. For project management, the eligible tasks are identified in Table 3. The actual hours incurred in carrying out these tasks up to 500 hours will be eligible for reimbursement plus a maximum of $200 for costs associated with attending an annual meeting with the Department.

4. For educational activities, the eligible tasks are identified in Table 4. The actual direct costs for printing, postage, contractual editing and layout associated with these tasks up to $2800 and for actual hours incurred by LCC or SCS staff in carrying out these tasks up to 100 hours.

B. The reimbursement rate for accelerated task hours shall be $12.50 per hour.

C. Reimbursement shall be requested quarterly within 15 days of the end of the quarter on forms provided by the Department. The quarterly project base level shall be 125 hours for the first quarter ending September 30 1985 and 125 hours per quarter for the second, third and fourth quarters. Any quarterly base level not met in a quarter shall be carried over to the next quarter.

VIII. MODIFICATIONS OF THE AGREEMENT

A. The Department and County agree that any amendments to this contract shall not be effective unless agreed to by the parties in writing.

B. Either the County or the Department may, on thirty (30) days written notice, unilaterally and without cause, terminate this contract without liability, except that the County shall be paid for services actually rendered by it up to and including the termination date and it shall provide to the Department a report summarizing work products to the date of termination.

IX. NONDISCRIMINATION

A. In connection with the performance of work under this contract, the County agrees not to discriminate against any employe or applicant for employment because of age, race, religion, color, handicap, sex, physical condition, developmental disability as defined in Section 51.01(5), Wisconsin Statutes, sexual orientation, or national origin. This provision shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Except with respect to sexual orientation, the county further agrees to take affirmative action to ensure equal employment opportunities. The county agrees to post in conspicuous places, available for employes and applicants for employment, notices to be provided by the county setting forth the provisions of the nondiscrimination clause.

B. A written affirmative action plan is required as a condition for the successful performance of the contract. Excluded from this requirement are contractors whose annual work forces amount to less than ten employes. The affirmative action plan shall be submitted to the Department within fifteen (15) working days after the award of the contract.

X. INDEMNIFICATION

The County agrees to save, keep harmless, defend and indemnify the State of Wisconsin, Department of Natural Resources and all its officers, employees and agents, against any and all liability claims, costs of whatever kind and nature, for injury to or death of any person or persons, and for loss or damage to any property (state or other) occurring in connection with or in any way incident to or arising out of the occupancy, use, service, operation or performance of work in connection with this contract or omissions of the county's employees, agents or representatives.

XI. INDEPENDENT CONTRACTOR

The County is an Independent Contractor for all purposes including Worker's Compensation, and not an employe or agent of the Department.

XII. AUDIT, ACCESS TO RECORD

The County shall, for a period of three (3) years after completion and acceptance of the project by the Department, maintain books, records, documents and other evidence directly pertinent to performance on grant work under this contract in accordance with generally accepted accounting principles and practices. The County shall also maintain the financial information and data used in the preparation or support

of the cost submission in effect on the date of execution of this contract and a copy of the cost summary submitted to the Department. The Department, or any of its duly-authorized representatives, shall have access to such books, records, documents, and other evidence for the purpose of inspection, audit and copying. The County shall provide proper facilities for such access and inspection.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

Date	Paul N. Guthrie, Jr., Director Office of Intergovernmental Programs
Date	_____, Chairman _____ County ____

6406W.PERM
8/9/85

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

REQUEST FOR ADVANCE OR REIMBURSEMENT
WISCONSIN FUND - NONPOINT SOURCE PROGRAM

SECTION 144.25, WIS. STATS.
FORM 3200-54 5-83

Complete Items 1 through 8 and 13 for all payment requests. See instructions on reverse side for completing Items 9 through 12. Send one copy of this form to:

Wisconsin Department of Natural Resources
Bureau of Finance, Audit Section
Box 7921
Madison, Wisconsin 53707

1. GRANTEE/DMA	2. COUNTY	3. GRANT NO.	4. PAY. REQ. NO.
Lake County	Lake	P 555	1

5. MAIL CHECK TO:

Lake County LCC
101 Main St
Anytown, WI. 53333

6. PERIOD COVERED BY THIS REPORT (MO-DAY-YR):
FROM TO

7. TYPE OF PROJECT
- [X] PRIORITY WATERSHED
- [ ] LOCAL PRIORITY

8. TYPE OF REQUEST
- [X] ADVANCE
- [ ] PARTIAL
- [ ] FINAL

	AMOUNT	LEAVE BLANK DNR USE ONLY
9. Request for Advance Payment		
a. Initial State Grant Amount	$300,000	
b. Advance Payment Requested (Maximum 10% of Above)	30,000	
10. Summary of Payment Requests		
a. Reimbursement Requested This Claim		
b. Total Prior Pay Requests (Including Advance)		
c. Total All Payment Requests to Date		
11. Computation of Maximum Partial Payment		
a. Total Cumulative Grant to Date		
b. Enter 95% of Above Total		
12. Computation of Net Payment Due		
a. Enter 95% of Total Cumulative Grant (Line 11b. Above)		
b. Less: Total Prior Payment Requests (Line 10b. Above)		
c. Net Payment Due (Line 12a. Minus Line 12b.)		
	Amount Allowed This Claim	

13. CERTIFICATION:

I certify that to the best of my knowledge and belief the billed costs of expenditures are based on actual payments of record and are in accordance with the terms of the project agreement and the reimbursement represents the grant share due which has not been previously requested.

Auditor Initials _____
Date _____
Bur. Finance Initials _____
Date _____

SIGNATURE OF AUTHORIZED REPRESENTATIVE
Dave Soilsaver

DATE SIGNED
8/1/85

TYPED OR PRINTED NAME AND TITLE
Dave Soilsaver, County Conservationist

TELEPHONE NO. (INCLUDE AREA CODE & EXTENSION)
(414) 123-5000

INSTRUCTIONS

Item 9 - Complete for Advance Payment Request Only

9a Enter the amount of grant shown on the original agreement.
9b Advance requested may not exceed 10% of original grant amount.

Item 10 - Complete for Partial and Final Payment Requests. (See required attachments below.)

10a Enter total amount from worksheet (Form 4400-47) attached to this pay request.
10b Enter total amount of all previous payment requests, including the advance.
10c Sum of 10a and 10b.

Item 11 - Complete for Partial Payment Requests Only

11a Enter the sum of the original grant amount and any amendment increases.
11b Enter 95% of the above amount, which represents the maximum that shall be paid on a grant prior to final accounting and audit. (Compare this amount with Item 10c before completing Item 12.)

Item 12 - Complete for Partial Payment Requests Only when the amount shown on line 10c above exceeds the amount shown on line 11b.

12a & b Self-explanatory.
12c The net result when subtracting line 12b from line 12a is the maximum amount which may be paid with this pay request.

REQUIRED ATTACHMENTS

Attach the following documentation with each Partial and Final Payment Request:

1. One copy of reimbursement claim worksheet (Form 4400-47) listing individual payments on cost share agreements.

2. Photocopy of cost share agreements (Form 3400-68) for each payee listed in this report. (If not previously submitted.)

3. Photocopy of form showing approval of final cost share amount by the DMA for each practice listed in this report.

LANDOWNER TRACKING SHEET

Clearwater River WATERSHED PROJECT

Landowner: A. Landowner

Property Description: T 13 N, R 3 E, Sect.: 7 NE¼, NE¼

Other Identifiers: LT 123 County: Lake

Cost Share Agreement No.: _____

Contact Record	Date	Contacted By	Response
	4/1/84	D. Soilsaver	interested in barnyard + cropland work

Comments: cropland & barnyard inventory data looks accurate; gully formed in woodlot plus some strmbk erosion; will recontact with cost estimates by 4/15/84

Inventory Summary, Update, and BMP Status

Nonpoint Source	Inventory	Update	BMP Status
Animal Lot Runoff Animal Units	65		
Model Results	Eligible-Ess.	same	
Ranking	#3 in LT Subws.		
Streambank Erosion Feet	none	100'	
Severity		medium	
Cropland Erosion acres at 6-10 t/ac	20 ac.		
acres at 11-19	40 ac	same	
acres at 20-29	10 ac		
acres above 30	none		
Other Nonpoint Sources	—	gully in woodlot	

DEPARTMENT OF NATURAL RESOURCES

1 $ 14,854

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT PROGRAM COST-SHARE AGREEMENT
SECTION 144.25, WIS. STATS.
FORM 3400-68 REV. 8-82

Name of Grant Recipient: A. Landowner	Telephone Number: 123-4567
Street or Route: Corn Rd	
City, State, Zip Code: Habale Wi 53333	
Legal Description of Property: NE ¼, NE ¼, Sec 7, T13N R3E	
Name of Landowner (if other than Grant Recipient)	Telephone Number
Name of Designated Mgt. Agency: Lake County	Telephone Number: 414/123-5000
Street or Route: 101 Main St	Street or Route
City, State, Zip Code: Anytown, Wi 53333	City, State, Zip Code
	Installation Period: From To

SECTION 1. AGREEMENT PROVISIONS

1. The grant recipient agrees:
   - A. To install the best management practice(s) listed in section 2 consistent with the specifications listed in section 3 during the installation period identified above.
   - B. To operate and maintain each best management practice for the life span identified in section 2.
   - C. To certify, on forms provided by the designated management agency, best management practices installed under this agreement are being maintained.
   - D. To repay the full amount of the cost-share payments made and forfeit all rights to future cost-share payments if:
     - (1) Any best management practice is rendered ineffective during its life span due to improper maintenance, operation or neglect;
     - (2) The applicable conditions identified in section 3 are not met; or
     - (3) The grant recipient adopts any land use or practice which defeats the purposes of the best management practices.
   - E. To retain responsibility for this agreement if a change in ownership occurs unless the new owner assumes, in writing, the operation and maintenance of the best management practices and other provisions of this agreement pertaining to the grant recipient.
   - F. Not to discriminate against contractors because of age, race, religion, color, handicap, sex, physical condition, developmental disability, or national origin, in the performance of responsibilities under this agreement.
2. The designated management agency agrees:
   - A. To provide technical assistance for best management practices identified in section 2.
   - B. To make cost-share payment after receipt of a payment request and evidence of completion status.
3. Satisfactory evidence of completion status will consist of a technical performance report signed by a technician assigned by the designated management agency.
4. The total state cost-share payment for each practice identified in section 2 shall be based on the cost-share rate for the practice as applied to the eligible costs actually incurred, as substantiated to the designated management agency. If the total cost-share payment for a practice identified in section 2 exceeds the estimated grant amount for that practice, payment of the overrun will be made only if there are funds available.
5. The agreement may be amended, by mutual agreement, during the installation period as long as the changes will provide equal or greater pollution control.

SECTION 2. BEST MANAGEMENT PRACTICES, COSTS, INSTALLATION SCHEDULE, LIFE SPANS

This section contains all best management practices, both those eligible for cost-sharing and those not eligible, needed to control significant nonpoint sources in eligible areas owned or operated by the grant recipient.

1. Cost-shared best management practices

Location (Field Number)	Practice Code	Practice Title	Quantity	Units	Estimated Total Cost	Cost-Share Rate	Estimated Cost-Share Amount	Cost-Sharing From Other Programs*	Year of Installation	Practice Life-span
Farmstead	L1	Barnyard Runoff Mgmt.	1	-	$3,800.00	70%	2660	-	1984	15 yrs
3,5,8,10	C2	Contour Strips	80	ac	1,920.00	50%	960	-	1985	10 yrs
4,6	M3	Shoreline Prot.	2000	ft	—	—	—	—		
4	MF	Str. Bank Fencing	1800	ft	1350.00	70%	945	-	1986	10 yrs
6	MR	Str. Bank Rip Rap	100	ft	1850.00	70%	1,295	-	1986	10 yrs
4	MS	Str. Bank Shape+Seed	200	ft	1200.00	70%	840	-	1986	10 yrs
4,7,9	C5	Grass Waterway	2.0	ac	3049.00	70%	2134	-	1985	10 yrs
Farmstead	L2	Manure Storage	1	-	12,000	50%	$6,000	$2,400*	1984	20 yrs.
				Total	$25,169	Total	$14,834	*Identify program		

2. Noncost-shared best management practices

Location (Field Number)	Practice Code	Practice Title	Quantity	Units	Year of Installation	Practice Life-span	
3,5,8,10	-	Crop Rotation	80	ac	1983	10yrs	*ACP Program

SECTION 3. BEST MANAGEMENT PRACTICE CONDITIONS

Attached are the conditions for each best management practice listed in section 2.

Grant Recipient or Authorized Representative's Signature	Date Signed	Authorized Representative of Des. Mgt. Agency - Signature	Date Signed
A. Landowner	May 1, 1984	J. Supervisor	May 15, 1984
Title: Landowner		Title: L.C.C. Chairman	

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State of Wisconsin
Department of Natural Resources

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT PROGRAM COST-SHARE AGREEMENT AMENDMENT
Section 144.25, Wis. Stats.
Form 3400-68A 4-83

Cost-Share Agreement Number	Amendment Number
001	1

Name of Grant Recipient: A. Landowner

Name of Designated Mgt. Agency: Lake County

New Total Est. Grant Amount: $ 14,834.00 + 2656.50 = $17,490.50

1. Cost-shared best management practices ADDED

Location (Field Number)	Practice Code	Practice Title	Quantity	Units	Estimated Total Cost	Cost-Share Rate	Estimated Cost-Share Amount	Cost-Sharing From Other Programs*	Year of Installation	Practice Life-span
10	CS	Grass Waterway	0.5a	ac	$770.00	70%	$539.00	—	1987	10 yrs
6	MS	Streambank Shape + Seed	100	ft	600.00	70%	$420.00			
6	MF	Streambank Fencing	100	ft	75.00	70%	52.50			
				New Total	$1445.00	New Total +	$1011.50	*Identify program		

2. Cost-shared best management practices DELETED

Location (Field Number)	Practice Code	Practice Title	Quantity	Units	Estimated Total Cost	Cost-Share Rate	Estimated Cost-Share Amount	Cost-Sharing From Other Programs*	Year of Installation	Practice Life-span
6	MR	Streambank Rip Rap	100	ft	$1850.00	70%	$1,295.00			
				New Total		New Total −	$1,295.00	*Identify program		

3. Cost-shared best management practices CHANGED

Location (Field Number)	Practice Code	Practice Title	Updated Quantity	Units	Updated Estimated Total Cost	Cost-Share Rate	Updated Estimated Cost-Share Amount	Cost-Sharing From Other Programs*	Year of Installation	Practice Life-span
Farmstead	L1	Barnyard Runoff Mgmt	1	-	$8,000.00	70%	$5600.00	—	1984	15 yrs
				Change (+/−)	+ $4,200.00	Change (+/−)	+ $2,940.00	*Identify program		

Grant Recipient or Authorized Representative's Signature	Date Signed	Authorized Representative of Des. Mgt. Agency — Signature	Date Signed
A. Landowner	Aug. 12, 1984	J. Supervisor	Aug 20, 1984
Title: Landowner		Title: LCC Chairman	

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State of Wisconsin
Department of Natural Resources
Box 7921
Madison, Wisconsin 53707

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT PROGRAM — COST SHARE CALCULATION AND PRACTICE CERTIFICATION FORM
Section 144.25, Wis. Stats.
Form 3200-53 9-82

Clearwater R. Priority Watershed Project: Lake County

Agreement Number	Name and Address
001	A. Landowner Corn Rd Habale, WI 5333
Telephone Number (Include Area Code) (000) 123-4567	

COST SHARE CALCULATION

Practice Code	Practice Name	Units Installed	*	Total Cost of Practice	Cost Share %	Cost Share For Practice
C5	Waterway	1 ac.	0	$ 1438.00	70%	$ 1,006.60
C2	Contour Strips	80 ac.	1	1920.00	50%	960.00
MF	Strm bank Fencing	800 Ft.	0	648.00	70%	453.60
					TOTAL	$ 2,420.20

*Place 0 if there are more of this type of practice on this agreement to install.
Place 1 if these units complete the installation of this practice for this agreement.

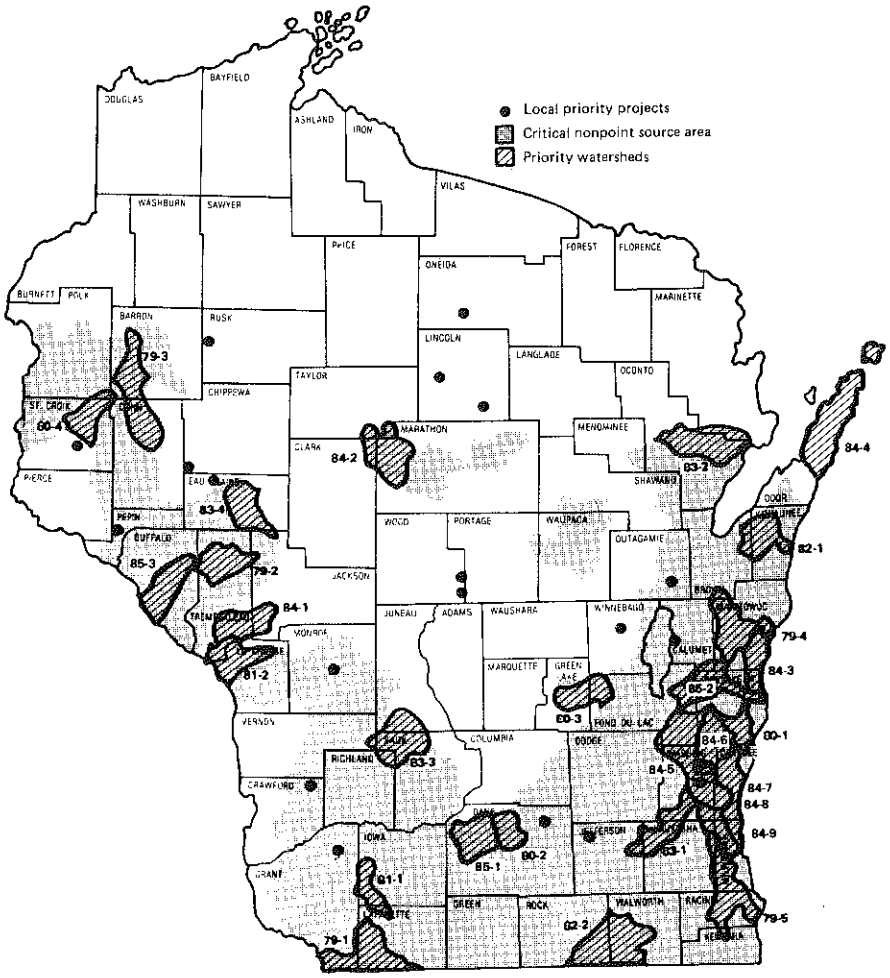
Amount Paid	Check Number	Check Date YY – MM – DD
2,420.20	117	85/9/22

PRACTICE CERTIFICATION

I certify the above practice or practices and practice units have been installed in accordance with the appropriate standards and specifications.

Signature	Title	Date Signed
Dave Soilsaver	County Conservationist	85/9/10

CURRENT PRIORITY WATERSHED PROJECTS IN WISCONSIN



Map Number	*Project*	*County*	*Year Project Selected*
79-1	Galena River	Grant, Lafayette	1979
79-2	Elk Creek	Trempealeau	1979
79-3	Hay River	Barron, Dunn	1979
79-4	Lower Manitowoc River	Manitowoc, Brown	1979
79-5	Root River	Racine, Milwaukee, Waukesha	1979
80-1	Onion River	Sheboygan, Ozaukee	1980
80-2	Sixmile-Pheasant Branch Creek	Dane	1980
80-3	Green Lake	Green Lake, Fond du Lac	1980
80-4	Upper Willow River	Polk, St. Croix	1980
81-1	Upper West Branch Pecatonica River	Iowa, Lafayette	1981
81-2	Lower Black River	La Crosse, Trempealeau	1981
82-1	Kewaunee River	Kewaunee, Brown	1982
82-2	Turtle Creek	Walworth, Rock	1982
83-1	Oconomowoc River	Waukesha, Washington, Jefferson	1983
83-2	Little River	Oconto	1983
83-3	Crossman Creek/Little Baraboo River	Sauk, Juneau, Richland	1983
83-4	Lower Eau Claire River	Eau Claire	1983
84-1	Beaver Creek	Trempealeau, Jackson	1984
84-2	Upper Big Eau Pleine River	Marathon, Taylor, Clark	1984
84-3	Seven Mile-Silver Creeks	Manitowoc, Sheboygan	1984
84-4	Upper Door Peninsula	Door	1984
84-5	East & West Branch Milwaukee River	Fond du Lac, Washington, Sheboygan, Dodge	1984
84-6	North Branch Milwaukee River	Sheboygan, Washington, Ozaukee	1984
84-7	Cedar Creek	Washington, Ozaukee	1984
84-8	Milwaukee River South	Ozaukee, Milwaukee	1984
84-9	Menomonee River	Milwaukee, Waukesha, Ozaukee, Washington	1984
85-1	Black Earth Creek	Dane	1985
85-2	Sheboygan River	Sheboygan, Fond du Lac, Manitowoc, Calumet	1985
85-3	Waumandee Creek	Buffalo	1985