A Nonpoint Source Control Plan for the Little River Priority Watershed Project

This plan was prepared under the provisions of the Wisconsin Nonpoint Source Water Pollution Abatement Program by the **Wisconsin Department of Natural Resources** and the **Marinette and Oconto County Land Conservation Departments.**

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A NONPOINT SOURCE CONTROL PLAN
FOR THE
LITTLE RIVER PRIORITY WATERSHED PROJECT

The Wisconsin Nonpoint Source Water Pollution Abatement Program

May, 1986

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Publication WR-226-86

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

BOX 7921
MADISON, WISCONSIN 53707

May 27, 1986

IN REPLY REFER TO: 3200

Mr. Oscar Tachick, Chair
Oconto County Board of Supervisors
111 Arbutus Avenue, P.O. Box 88
Oconto, Wisconsin 54153

Mr. Theodore Suave, Chair
Marinette County Board of Supervisors
700 Owena St.
Marinette, Wisconsin 54143

Dear Chairmen:

I am pleased to be able to approve the Nonpoint Source Control Plan for the Little River Priority Watershed. As you know, the watershed encompasses portions of Oconto and Marinette 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 estimates total needs in the watershed to be $3,470,647 for installation of Nonpoint Source Management practices and 23 person years of effort to provide administration and technical assistance. Over the eight year project, actual cost and personnel needs will, of course, depend of participation rates during the three 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 hearings on the plan, there is a great opportunity to achieve the water quality goals layed out in the Plan. Enhancement and protection of 20 miles of trout streams, 43 miles of warm water sport fishery streams, 7 lakes and the near shore waters of Green Bay are very worthwhile goals.

The Plan for Control of Nonpoint Source Pollution in the Little 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 Upper Green Bay Basin and is, therefore, approved as an element part of that plan.

Sincerely,

C. D. Besadny
Secretary

CDB:cls/7390T

RESOLUTION # 61 - 1986

TO: HONORABLE CHAIRMAN AND MEMBERS OF THE OCONTO COUNTY BOARD OF SUPERVISORS

RE: COUNTY BOARD APPROVAL OF THE NON-POINT SOURCE CONTROL PLAN FOR THE LITTLE RIVER PRIORITY WATERSHED, LOCAL ASSISTANCE AGREEMENT AND NON-POINT SOURCE GRANT AGREEMENT

WHEREAS this Plan has been prepared by the Department of Natural Resources with assistance from the Oconto and Marinette County Land Conservation Departments,Soil Conservation Service and U.W. Extension

WHEREAS the purpose of this Plan is to help identify land-owners with "Non-Point Runoff" from Ag Waste and Soil Erosion Problems and provide them cost sharing money for those who volunteer to participate

WHEREAS the Local Assistance Agreement between the DNR and Oconto County is to reimburse Oconto County for tasks completed over and above a base level necessary to implement the Lt. River Priority Watershed Plan

WHEREAS the Non-Point Source Grant Agreement reimburses the County for funds used for the Cost-Sharing of best management practices

WHEREAS the maximum Grant Amount is $800,000 in this Agreement and as the County draws down this amount, additional amounts will be allocated as requested. Therefore

LET IT BE RESOLVED that the Oconto County Board of Supervisors approve the Little River Priority Watershed Plan, Local Assistance Agreement and Non-Point Source Grant Agreement and authorize the County Board Chairman to sign all necessary documents.

Submitted this 19th day of June 1986

BY: THE LAND CONSERVATION COMMITTEE

Everett Carlson	Russel Brock
Bev Kussow	Cliff Sellen
Oscar Tachick	Oliver Shallow Jr.

STATE OF WISCONSIN } I, Gaylord Strehlow
County of Oconto } do hereby certify that
the above is a true and correct copy of the
same on file in the office of the County Clerk.

Gaylord Strehlow
County Clerk

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JUN 25 1986
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A NONPOINT SOURCE CONTROL PLAN
FOR THE
LITTLE RIVER PRIORITY WATERSHED PROJECT

SUMMARY

A. Introduction

The Little River Priority Watershed Plan addresses the needs for the control of nonpoint source pollution to the Little River and its tributaries. The watershed is located in Oconto and Marinette Counties in northern Wisconsin. 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 include: upland erosion, streambank erosion, gully erosion, barnyard 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 the agency responsibilities for carrying out the plan. The plan was developed jointly by the Oconto and Marinette County Land Conservation Departments and the Wisconsin Department of Natural Resources.

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

There are 15 streams and 23 lakes, as well as the nearshore waters of Green Bay, in this watershed which are affected by nonpoint source pollution to varying degrees. The watershed area is 218 square miles in size.

B. 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 is currently supporting and the potential use the resource could support if nonpoint source pollution is controlled. Examples of water resource uses are fishing and contact recreational uses such as swimming.

The severity of the nonpoint sources of pollution was 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. The overall watershed was divided into 8 subwatersheds based on the lands draining to the major surface water resources within the watershed. The four major categories of nonpoint sources in the watershed, upland erosion, streambank erosion, barnyard runoff and manure spreading runoff, were inventoried in detail. These inventories included all or portions of the properties of 1,262 landowners. The procedures for these inventories are briefly described below.

1. Upland Erosion: The soil loss on 94,074 acres of cropland, woodland, pasture and grasslands was determined using the Universal Soil Loss Equation. The soil loss (in tons/acre/year) was summed for each landowner within each subwatershed.

2. Streambank Erosion: The four major streams in the watershed, the Little River, Kelly Brook, Daley Creek and Jones Creek, were assessed for this source. The entire length of each stream was walked or canoed and information gathered at each eroded site on its location, length, height, recession rate (amount the bank is cutting back) 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.

3. 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 268 yards in the watershed. Within each subwatershed the yards were ranked as to the severity of the phosphorus load.

4. 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, 206 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 211 landowners who had nonpoint sources of medium importance and 845 landowners who had minor or no nonpoint sources on their lands. Objectives were set for each water resource and the pollution control level needed to reach the objective was determined.

C. Inventory Results and Water Resource Objectives

The attached table summarizes: 1) the objectives for the major streams and lakes in the watershed, 2) the nonpoint source pollution reduction goals for each water resource, and 3) the inventory results for each subwatershed.

D. Administering the Project

The county Land Conservation Departments (LCD) will have the major responsibility for administering this project at the watershed level. The LCDs 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 and information program. The LCDs 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.

E. General Procedures for Implementing the Project

The project will begin in the spring of 1986. There will be a three 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 practices. 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 three year period. A list of the eligible practices and their cost share rates is given in the watershed plan, on Table 18.

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.

F. Project Costs and County Staff Needs

Based on the inventory data, estimates were made of the costs of all the needed practices in the watershed. If there was 100% participation by the landowners and all the needed practices were installed, the total costs (landowner and state share) would be $3,470,647. Of this amount $2,330,375 would be the state cost share portion. A more reasonable estimate of the cost share funds needed for this project is $1,747,781 which is derived from using a 75% 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 2 - 2.5 additional staff each year for the 8 years of the project.

G. Information and Education Program

An information and education program will be conducted throughout the project period. This program will be most intense during the first three 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, and public meetings. Some of this work was begun during the time this plan was being drafted.

H. 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 fish populations) that resulted from the project will be measured. The changes in the water quality will depend upon participation and cooperation of the landowners within the project area.

Table S-1. Water Resource Objectives, Inventory Results and Pollutant Reduction Goals

Subwatershed: Water Resource	Water Resource Objectives	Pollutant Load Reduction	Upland Erosion Acres	Upland Erosion Soil Loss (tons/yr)	Barnyard Runoff # of Yards	Barnyard Runoff Phos. (lbs/yr)	Manure Mgmt Critical Ac. Spread	Streambank Erosion Eroded Sites(ft)	Streambank Erosion Soil Loss (t/yr)
Daley Creek:		70%	11768	8349	29	253	157	900	15.3
Daley Creek	1								
Upper Kelly Br:		70%	2030	3393	20	230	236	2370	26.9
Kelly Brook	1								
Kelly Lake	8								
White Lake	8								
Round Lake	8								
Pecor Lake	8								
Makholm Lake	8								
Cooley Lake	9								
Lower Kelly Br:		70%	513	2516	35	359	183	24484	237.1
Kelly Brook	4,5								
Upper Little R:		70%	1649	3075	38	383	362	8070	66.1
Little River	4								
Creek 18-3	2								
Porcupine Lake	8								
Middle Little R:		70%	1787	4522	35	221	242	980	8.3
Little River	3,5,7								
Lower Little R:		70%	1292	3464	38	351	254	6566	223.6
Little River	3,5,7								
Jones Creek:		70%	1208	1397	17	234	180	10300	105.2
Jones Creek	6								
Green Bay:		70%	1165	2837	29	189	160	na	na
Green Bay	10								

Objectives:

1. Protect the current trout fishery
2. Improve the current trout fishery
3. Protect the current northern pike fishery
4. Improve the northern pike fishery
5. Protect the current smallmouth bass fishery
6. Improve the smallmouth bass fishery
7. Improve the walleye fishery
8. Protect the curent trophic status of lake
9. Improve the trophic status of the lake
10. Protect northernpike & walleye spawning in nearshore waters

PREFACE

A. Purpose and Approach of The Nonpoint Source Water Pollution Abatement Program

The Little River Watershed was selected in June of 1983 as the 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 by Nonpoint Pollution Sources. These sources include: eroding agricultural lands, eroding stream banks and road sides, poorly managed livestock wastes, erosion from established and developing urban areas, and storm water 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, the 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 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 Pollution 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 26 active Priority Watersheds in addition to the Little River Watershed in various stages of planning or implementation.

3. Involvement in the program by landowners, land renters, or municipalities that have critical Nonpoint Pollution Sources is voluntary. Participation is encouraged by state level cost share assistance (to help offset the cost of installing the recommended best 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 best 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 county's 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.

B. How and Why the Little River Watershed Was Selected

Priority watersheds, including the Little 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 obtain the water quality improvement or protection.

3. The capability and willingness of the local government agencies to carry out the planning and implementation of their 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 for their area of the state. Third, the State Nonpoint Source Coordinating Committee recommends watersheds 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.

C. Organization of This Report and How it Was Developed

Priority Watershed Project is carried out in two steps: planning and implementation.

During the planning phase, the Department of Natural Resources, the County Land Conservation Departments and other local agencies work together to produce a watershed plan. The plan evaluates Nonpoint Source problems and proposes methods for solving them. The second phase of the project is the implementation of the plan.

Once the offer of a Priority Watershed Project 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 I assesses 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 II identifies the tasks necessary to carry out 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 for the counties to carry out the recommendations made on the plan. This implementation phase may last up to eight years. During an initial three year period certain landowners in the watershed will be contacted and will be eligible to receive cost sharing for practices recommended in this plan. The cost sharing 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 the signing of 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 phase, requiring changes in this document. Any revisions to this document must be approved by both the County and the Department of Natural Resources.

LITTLE RIVER PRIORITY WATERSHED

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MANAGEMENT PLAN

I. GENERAL WATERSHED DESCRIPTION

A. General Location and Water Resources

The Little River Watershed is located in northern Oconto and southern Marinette Counties on the west shore of Green Bay. It includes the lands draining to the Little River and its tributaries. The Little River junctions with the Oconto River about 11 stream miles from Green Bay. The watershed covers 218 square miles, with 205 square miles in Oconto County and 13 square miles in Marinette County. A map of the watershed is shown in Figure 1. There are 15 streams and 24 lakes within the Little River Watershed as briefly described in Tables 1 and 2 respectively, and shown in Figure 2.

Table 1: Physical Characteristics of the Streams in the Little River Watershed

Stream Name	(1) Sub-watershed	Length (Miles)	(2) Q7,2 Flow (cfs)	Gradient (ft/mile)	Watershed Area (sq miles)
Beaver Creek	LK	3.6	.09	11.0	3.3
Brooks Creek	DC	2.1	.11	13.0	4.1
Daley Creek	DC	7.3	.76	9.5	20.6
Jones Creek	JC	5.3	.35	15.0	11.4
Kelly Brook	UK/LK	21.8	1.39	7.5	74.8
Little River	UL/ML/LL	24.5	2.78	9.5	177.7
Thomas Slough	GB	2.0	.44	9.0	15.1
Un-named Creeks:					
Cr 12-1	UK	1.8	.04	5.0	1.3
Cr 18-2	UK	1.8	.09	10.5	3.1
Cr 18-3	UL	.8	.07	14.0	2.6
Cr 19-13	UK	2.2	.17	10.0	6.1
Cr 20-6	ML	2.0	.12	10.5	4.2
Cr 24-13	LL	3.5	.16	23.0	5.5
Cr 32-6	DC	1.3	.02	12.0	.9
Cr 33-4	GB	3.0	.13	10.0	4.5

(1) The 8 subwatersheds in the Little River Watershed are:
DC = Daley Cr; GB = Green Bay; JC = Jones Creek; LK = Lower Kelly Brook; LL = Lower Little River; ML = Middle Little River; UK = Upper Kelly Brook; and UL = Upper Little River.

(2) Low Flow here is given as the estimated Q7,2 which is the annual minimum 7-day mean flow, below which the flow will fall on an average of once in 2 years. The Q7,2 flows were estimated by the method used in U.S. Geological Survey Report 80-749 Low-Flow Characteristics of Streams in the Menominee-Oconto-Peshtigo River Basin, Wisconsin, based on the drainage area for the streams.

Table 2: Physical Characteristics for the Lakes in the Little River Watershed

Lake Name	Sub Water Shed	Surface Area (acres)	Maximum Depth (feet)	Public Access (type)
Beaver Lake	LK	8.2	22	none
Brooks Lake	DC	8.6	15	none
Company Lake	LK	15.3	49	none
Cooley Lake	UK	52.0	43	adjacent county land
Hoerth Lake	UK	6.0	23	none
Johnson Lake	UK	6.3	6	none
Kelly Lake	UK	326.0	41	1 town park, town roads and 4 ramps
Klaus Lake	DC	22.4	50	none
Kuplie Lake	LK	15.2	22	none
Long Lake	UK	37.9	22	none
MakHolm Lake	UK	12.9	52	adjacent county land
Pecor Lake	UK	18.8	23	town park
Peterson Lake	UK	7.8	56	none
Porcupine Lake	UL	30.3	20	town park-w/ramp
Round Lake	UK	28.0	31	town park-w/o ramp
Spice Lake	DC	19.9	34	none
White Lake	UK	49.5	49	town park
Un-named lakes:				
Lake 1-6	UK	2.6	4	none
Lake 1-16	DC	1.9	9	none
Lake 3-11	LK	3.2	34	town road
Lake 4-6	UL	3.8	3	none
Lake 10-8	DC	3.4	6	none
Lake 14-4	UK	8.7	4	none
Green Bay	GB	4.0 in watershed		2 county parks, 1 state hunting area

Figure 1: Little River Watershed

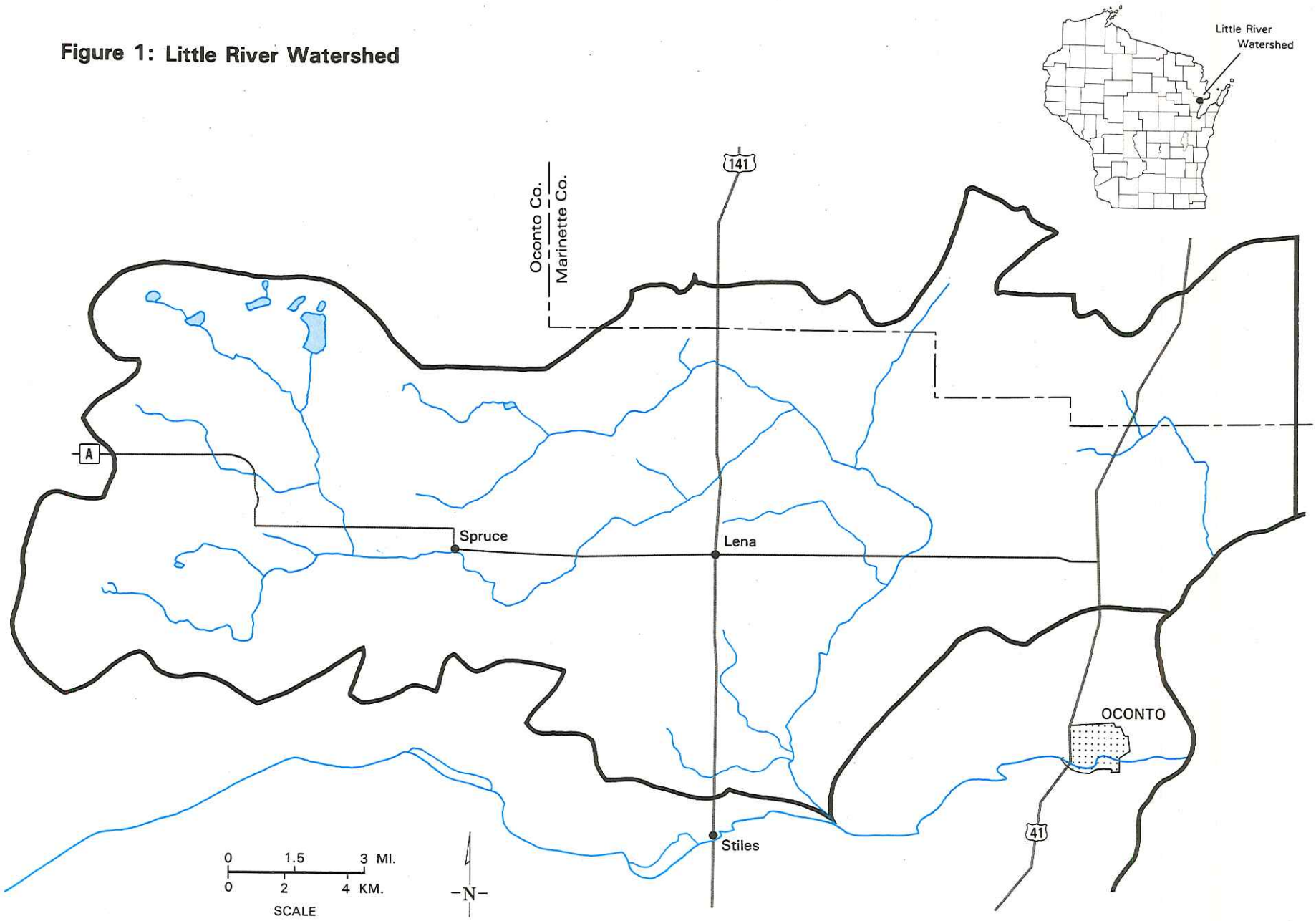
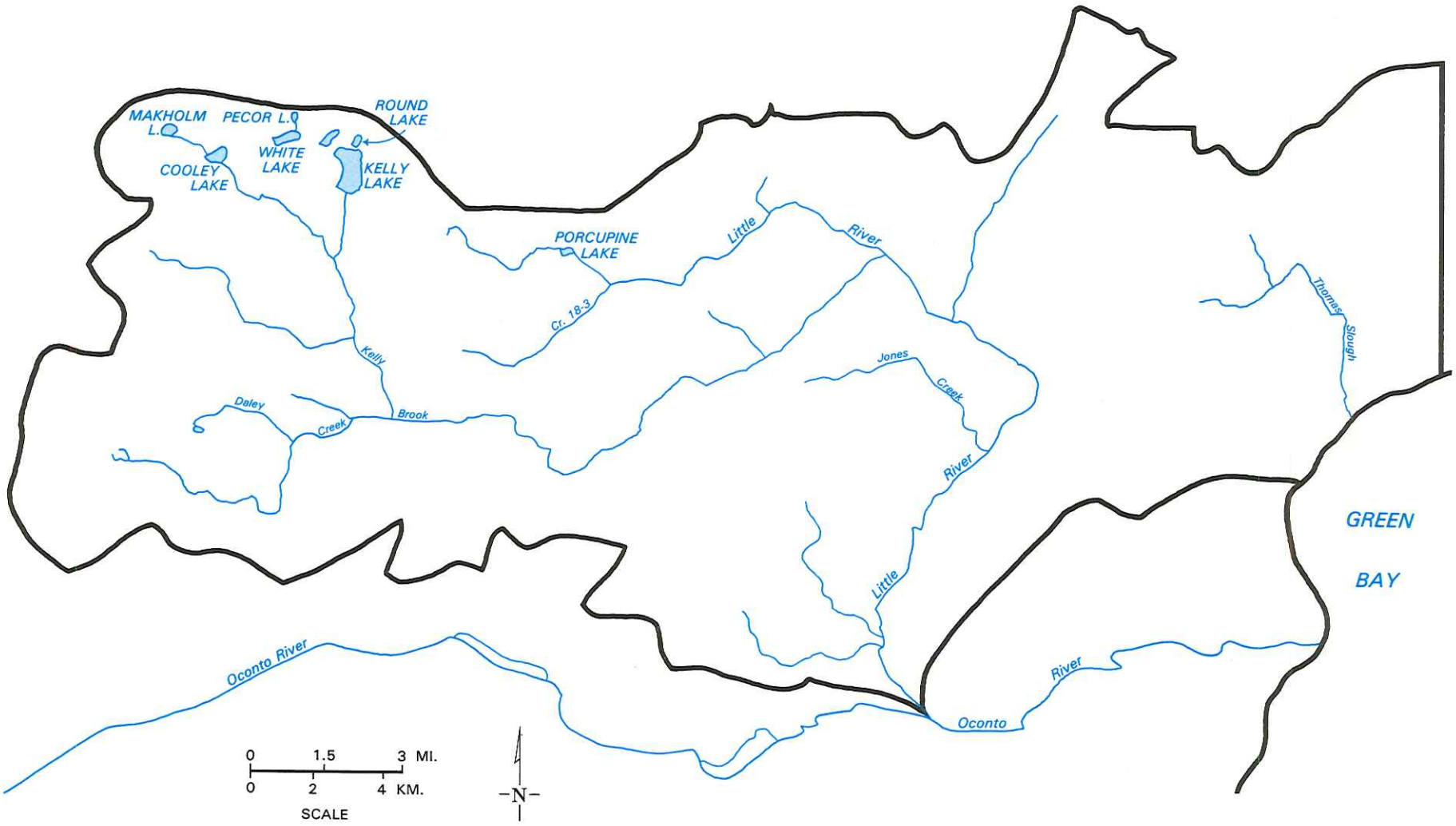


Figure 2: Water Resources in the Little River Watershed



B. Land Use

The watershed is mostly rural in nature with about two thirds of the area in agriculture use and one third of the area in uncultivated wetlands. Dairying is the major type of agriculture in the area, with few other types of livestock operations and very little cash grain. In this watershed there are 268 barnyards. Figure 3 indicates the percentages of different land uses and respective soil losses in the watershed. This information is broken down in more detail by subwatershed in Table 11.

The only incorporated area within the watershed in the Village of Lena. It is a small municipality and runoff in the developed area does not contribute significantly to the water quality conditions relative to the runoff from the rural areas.

C. Soils and Topography

The topography and soils of the Little River Watershed were formed as a result of the last glacier advance. The topography can be divided into three general regions within the watershed due to the glacial deposits. The western quarter of the watershed (the headwaters of Kelly Brook and Daley Creek) has the steepest topography, ranging from undulating to hilly, composed of ground moraine, outwash plain and glacial lake deposits. In the center two-thirds of the watershed (Lower Kelly, Upper Little, Middle Little, Lower Little and Jones Creek Subwatersheds), the slopes of the ground moraine lessen somewhat to become undulating. The eastern quarter of the watershed (Green Bay Subwatershed) is made up of nearly level outwash plains and lake deposits.

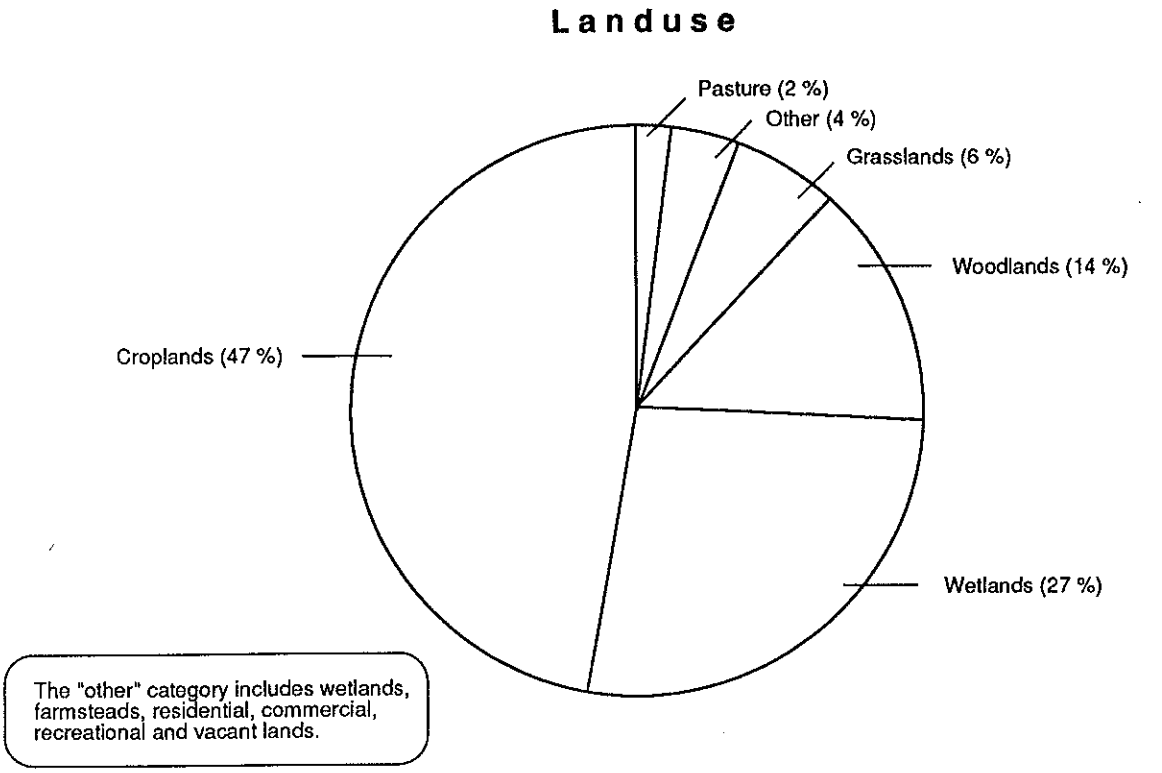
There are many depressions with wetlands throughout the watershed, commonly separating the uplands from surface waters.

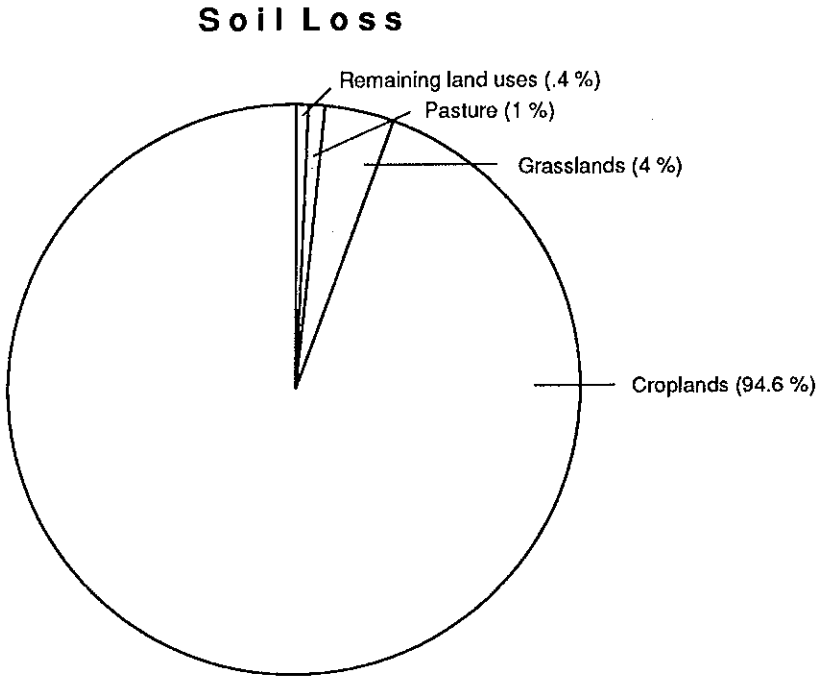
There are two narrow esker ridges in the central area of the watershed (north and northwest of Lena) composed of glacial sand and gravel deposits which are frequently mined.

Most of the upland soils were formed over loamy reddish glacial till. The soils are deep and primarily loams, loamy sands and sandy loams (Onaway, Soloma and Emmet). In general, these soils allow rapid enough percolation for groundwater recharge, but not rapid enough to cause groundwater pollution problems. Where the water table is not too high, they should be suitable for filter strips and manure spreading. Seelyeville and Markey mucks are found in the low areas, along with some mucky loams sands (Ensley and Brevort).

Along the Green Bay shore, the soils become loamy fine sands, fine sandy loams and fine sands (Wainola, Cormant and Deford). The water table in these soils is generally very shallow, making them unsuitable for filter areas or manure management practices.

Figure 3: Landuse and Soil Loss in the Little River Watershed





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

A. Water Resources 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 Oconto County and the Surface Water Resources of Marinette County publications; along with input from county LCD and SCS staff, DNR fish managers, and DNR water quality specialists. Five 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 are reflective of the water conditions of that stream. Certain species of insects will only tolerate unpolluted water while others are able to survive various degrees of water pollution. The term water pollution in this description 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,

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 has been developed in Wisconsin by which the identification of a stream's aquatic insects can be used to develop an index number which indicates the degree of organic pollution in that 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 zero being the least tolerant (insects least tolerant to organic pollution in the streams). The number and types of insects found at a stream site are used to calculate a HBI value between zero and five for the streams. Quantitative descriptions of water quality for the index studies are given in Table 3 below. This procedure was conducted on four streams at eight sites in the watershed in 1980 and at 13 sites in 1982. The results of this sampling are shown in Table 7.

Table 3: Qualitative Descriptions for the Biotic Index (HBI)

HBI Range	Water Quality	Degree Organic Pollution
0.00-1.75	Excellent	No organic pollution
1.76-2.25	Very good	Possible slight organic pollution
2.26-2.67	Good	Some organic pollution
2.78-3.50	Fair	Significant organic pollution
3.51-4.25	Poor	Very significant organic pollution
4.26-5.00	Very poor	Sever organic pollution

Source: DNR Technical Bulletin No. 13 (1982)

3. Stream and Lake Fishery Surveys

The fishery of a water body is a major indication of the health of that water resource. There are several different levels of fishery surveys which give varying levels of detail regarding the existing fishery. The simplest is to conduct a creel census of the anglers using the stream to identify what species are being caught. The most complex is to conduct an intense sampling survey, count the types of fish species and numbers of each species present and determine a species distribution for the stream. It is important to know the type of survey when interpreting the results. Review of historical fishery survey results can give an indication of changes in the fishery over time and thus trends in the water quality of the stream. The available fishery information for the streams and lakes in the watershed are shown in Tables 8a and 8b, respectively.

4. Stream Habitat Rating Assessment

To assist with determining the present and potential future fishery uses of the streams, a procedure developed by Joe Ball of the DNR described in the draft publication Stream Classification Guidelines for Wisconsin (Ball, 1982) was used. The system uses an inventory of the stream's physical fish habitat (stream flow, bed type, amount of riffles and pools, streaming 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 the successful Nonpoint Source Control Project in the watershed. The 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/1)(3)	>4	>3	>3	>1	<1
Temperature (Deg.) (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) Wisconsin DNR
(2) U.S. EPA (1977)
(3) Alabaster & Lloyd (1980)
(4) U.S. EPA (1980)

"<" means "less than"
">" means "more than"

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

Department of Natural Resources (Bureau of Water Resources Management) staff made habitat observations on four streams in the watershed in May 1985 and completed Stream Habitat Ratings for those streams at four sites. The results are shown in Table 9.

5. Limited Stream Water Chemistry Information

There are a variety of water chemistry parameters which can be sampled and analyzed, each giving a different indication of water quality conditions and limitations. Very intensive sampling is needed to draw an accurate representation of water quality because of the complex interactions of the different parameters and the changes within each parameter over hours of the day and days of the year. For streams, five of these parameters are most useful for determining general conditions. Dissolved oxygen is essential for a healthy fishery and extremely high or low values indicate an over abundance of aquatic vegetation such as algae. The amount of oxygen the water can hold varies with water temperature. Suspended solids is a measurement of the turbidity or amount of sediment the stream is carrying. High levels can be detrimental to fish and carry attached nutrients. Total Phosphorus is an indicator of the nutrient levels in the stream which are available for aquatic plants to utilize. Biochemical Oxygen Demand (BOD) represents the amount of organic material available to be decomposed, which uses up dissolved oxygen. Membrane filter coliform counts give an estimate of the levels of bacteria in the water which can enter the water through animal or human wastes. High levels can be a health risk for body contact or drinking.

Very limited water chemistry information is available for streams in the Little River Watershed. However, what is available does help interpret the results of the other water quality assessment tools. Table 10a shows the data available for the watershed, as well as some general ranges of values associated with good water quality conditions.

6. Lake Trophic State Index

An assessment of the lakes in the watershed which have public access was also conducted, based on existing water chemistry information. The water quality condition of a lake 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 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 in the water can be correlated with the amount of algae in the water. The third indicator is the secchi disc depth. This is a measurement of the depth of sunlight penetration and turbidity of the water due to suspended material, especially algae. It is conducted by lowering a secchi disc, a black and white weighted plate, into the water and measuring the depth at which it can no longer been seen.

Values from these three water quality parameters can be used to calculate Carlson's Trophic State Index (TSI) for a lake. The TSI is a numerical rating of 0 to 100 of lake trophic status, from oligotrophic to eutrophic, respectively. Several computer models have been developed to determine the TSI value and predict the future trophic status of a lake given a change in the amount of nutrients entering the lake on a yearly basis. The very general guidelines for phosphorus, chlorophyll a, and secchi depth associated with the different trophic status levels are given below in Table 5.

7. Summary

The Biotic Index, fishery surveys, habitat assessment and water chemistry analyses are important tools for helping to establish the water quality and water use objectives for the watershed project. Although these different water quality assessment techniques cannot predict the changes in water quality and water use with 100% accuracy, they are the appropriate methods for appraising the current and potential future conditions of the water resources in the project area.

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

Water Quality	Approx. Total Phos. (ppm)	Approx. Water Clarity (ft)	Approx. Chloro a (ppm)	Approx. Trophic Status Index	Lake Trophic Status
Excellent	>.001	<20	>1	>34	oligotrophic
V. Good	.001-.01	10-20	1- 5	34-44	oligo/mesotrophic
Good	.01-.03	6-10	5-10	44-50	mesotrophic
Fair	.03-.05	5- 6	10-15	50-54	eutrophic
Poor	.05-.15	3- 5	15-30	54-60	eutrophic
V. Poor	<.15	>3	<30	<60	eutrophic

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

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

Water Chemistry and TSI values for lakes in the Little River Watershed are given in Table 10b.

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 Department (LCDs) with funding support from the DNR. People were hired by the LCDs to gather the actual field data. The quality of these data were reviewed and approved by the LCDs. Then the data was sent to the DNR for analysis. The inventory methods used for each category of nonpoint pollution sources are described below.

Before the inventories were conducted, the watershed was divided into eight sub-watersheds (see Figure 4). 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 were organized by each of the sub-watersheds. With this information, objectives could be set for each water body and the corresponding reduction in pollutants needed to meet the objective 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 the 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 susceptible to disease. The suspended sediment also causes the water to be warmer in the summer, and warmer water cannot hold as much oxygen as cold water. Sediment that

has settled out to the stream or lake bottom can fill up pools and 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 wee growth in lakes and harm the biota 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 the Universal Soil Loss Equation (USLE). This method calculates the soil loss from a field and 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 to be delivered to the surface waters. In the Little River Watershed, however, this delivered sediment is hard to calculate because of the lack of methods available to estimate sediment transport which adequately account for the physical conditions of the watershed, such as lack of well defined drainage patterns, variable topography and the numerous wetlands. Compared to watersheds with steeper topography, the delivery rate in the Little River Watershed is relatively low. However, silt deposits on the streambed of the Little River and Kelly Brook are evidence of some sediment delivery to the streams. The filtering ability of the wetlands adjacent to the surface waters does serve to reduce the amount of soil reaching the streams. However, the sediment that is delivered to the wetlands carries attached nutrients which pass through the wetlands to the receiving water. Therefore, control of upland erosion is necessary to achieve water resource objectives related to nutrient level reductions throughout the watershed and site specific sediment impacts, as well as to protect the filtering capacity of the wetlands. For purposes of the watershed analysis, the USLE soil loss values are used to identify the relative significance of different land areas for potentially contributing nutrients and sediment to the surface waters and wetlands. The soil loss values are also used to estimate the percent of change in sediment pollution which can be expected from the installation of soil erosion control practices.

The entire watershed was inventoried for upland erosion potential on a parcel by parcel (generally a cropped field size parcels) basis, USLE factors plus the location, landowner identification code, and present practice information was collected. A parcel was defined as a field with homogenius individual USLE factors and was bounded by landowner property lines and watershed or subwatershed lines. The parcels generally ranged in size from 2 to 35 acres, and data was collected on about 7,500 parcels in the entire watershed. The results of the upland inventory are shown in Tables 11 through 13.

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.

Figure 4: Subwatersheds in the Little River Watershed

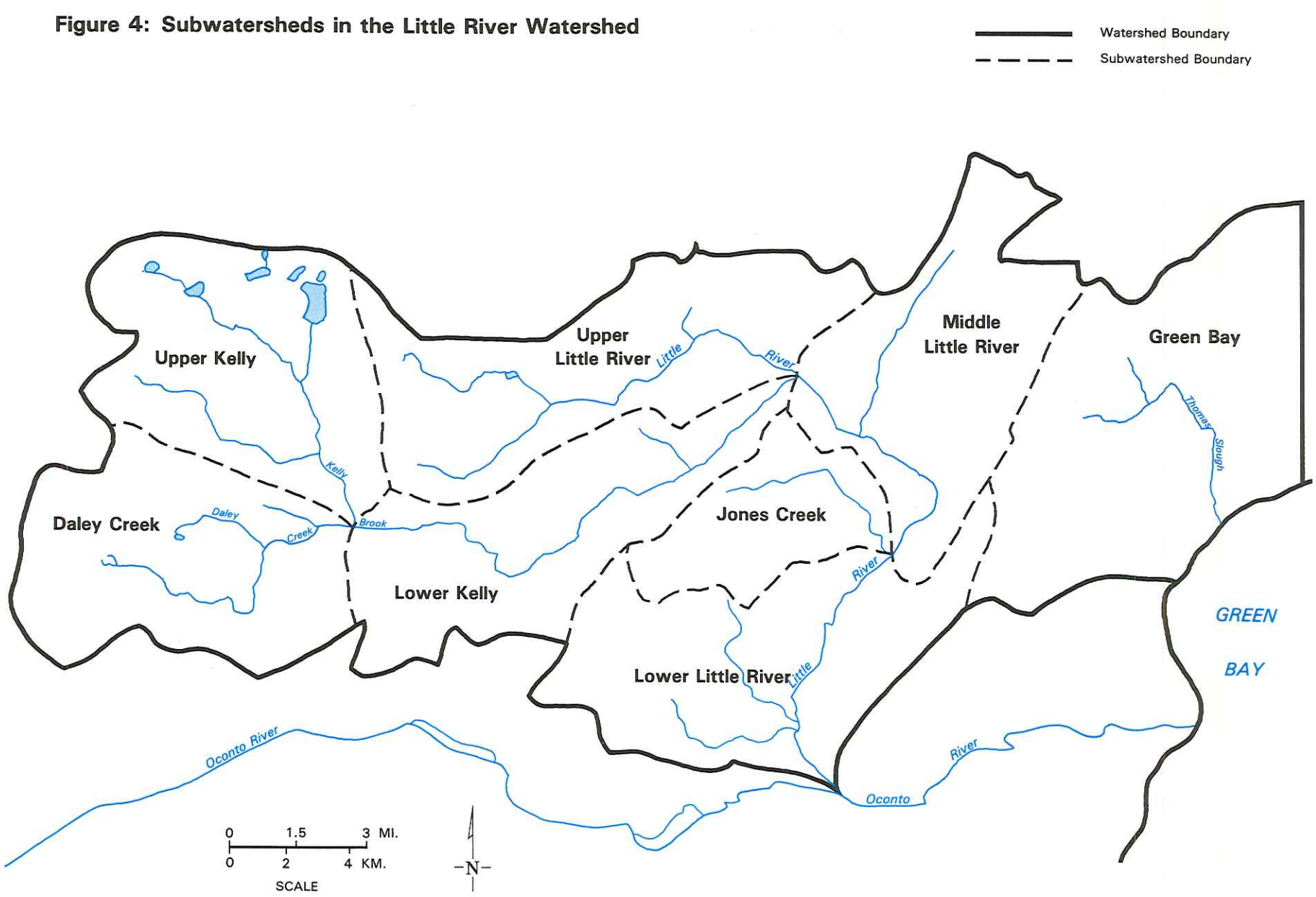


Table 11: Summary of Acres and Tons of Erosion for Each Landuse Category for the Little River Watershed

Landuse	DALY CR		UPPER KELLY		LOWER KELLY		JONES CR		UPPER LITTLE		MIDDLE LITTLE		LOWER LITTLE		GREEN BAY		WATERSHED TOTA	
	Acres	Tons Eroding	Acres	Tons Eroding	Acres	Tons Eroding	Acres	Tons Eroding	Acres	Tons Eroding	Acres	Tons Eroding	Acres	Tons Eroding	Acres	Tons Eroding	Acres	Tons Erodin
Cropland	7366	18404	5242	11023	8778	12085	4489	6557	9575	13171	9542	16689	9567	13479	8753	13250	63312	10465
	(45%)	(90%)	(38%)	(95%)	(57%)	(95%)	(59%)	(95%)	(52%)	(96%)	(51%)	(97%)	(49%)	(95%)	(33%)	(96%)	(47%)	(95%
Pasture	284	241	221	122	379	167	194	82	394	142	418	178	296	148	425	149	2611	122
	(2%)	(1%)	(2%)	(1%)	(2%)	(1%)	(3%)	(1%)	(2%)	(1%)	(2%)	(1%)	(2%)	(1%)	(2%)	(1%)	(2%)	(1%
Grassland	1779	1645	615	287	913	422	456	210	865	345	1071	303	1471	558	1531	415	8701	418
	(11%)	(8%)	(4%)	(3%)	(6%)	(3%)	(6%)	(3%)	(5%)	(3%)	(6%)	(2%)	(8%)	(4%)	(6%)	(3%)	(6%)	(4%
Woodland	2339	154	2590	116	1690	27	867	79	2779	54	2561	39	3886	45	2738	44	19450	55
	(14%)	(1%)	(19%)	(1%)	(11%)	(1%)	(11%)	(1%)	(15%)	---	(14%)	---	(20%)	---	(10%)	---	(14%)	--
Wetland	4172	---	4342	---	3245	---	1165	---	4332	---	4521	---	3553	---	11700	---	37030	---
	(26%)	---	(32%)	---	(21%)	---	(15%)	---	(23%)	---	(24%)	---	(18%)	---	(45%)	---	(27%)	---
Farmstd/ Resident	395	---	663	---	404	---	339	---	428	---	414	---	606	---	685	---	3934	---
	(2%)	---	(5%)	---	(3%)	---	(5%)	---	(2%)	---	(2%)	---	(3%)	---	(3%)	---	(3%)	---
Commercial	1	---	20	---	29	---	69	---	129	---	110	---	92	---	154	---	604	---
	---	---	---	---	---	---	(1%)	---	(1%)	---	(1%)	---	---	---	(1%)	---	(1%)	---
Recreatnl	8	---	0	---	0	---	18	---	24	---	3	---	0	---	31	---	84	---
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Column Total	16344	20444	13693	11548	15438	12701	7597	6928	18526	13712	18640	17209	19471	14230	26017	13858	135726	11063
Square Miles	25.5		21.4		24.1		11.9		28.9		29.1		30.4		40.7		212	
Column Total %	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%
% of Watershed Acres	(12%)		(10%)		(11%)		(6%)		(14%)		(14%)		(14%)		(19%)		(100%)	
% of Watershed Tons		(18%)		(10%)		(11%)		(6%)		(13%)		(16%)		(13%)		(13%)		(100%

Table 12: Upland Erosion Inventory Results in the Little River Watershed - For Landuses where USLE Values were Calculated

Landuse	DALY CR Acres	Before Tons	Before T/A/Y	After Tons	After T/A/Y	Change Tons	Change %	JONES CR Acres	Before Tons	Before T/A/Y	After Tons	After T/A/Y	Change Tons	Change %
Crop Rotatn	5442	7904	1.5	5834	1.0	2070	26%	3661	3973	1.1	3687	1.0	286	7%
Row Crops	1924	10500	5.5	4221	2.0	6279	59%	828	2584	3.1	1473	1.8	1111	43%
(crop tot)	(7366)	(18404)	(2.5)	(10055)	(1.4)	(8349)	(45%)	(4489)	(6557)	(1.5)	(5160)	(1.1)	(1397)	(21%)
Pasture	284	241	1.0	241	1.0	0	0%	194	82	0.4	82	0.4	0	0%
Grassland	1779	1645	1.0	1645	1.0	0	0%	456	210	0.5	210	0.5	0	0%
Woodland	2339	154	---	154	---	0	0%	867	79	---	79	---	0	0%
Subtotal		20444	---	12095	---	8349	40%		6928	---	5531	---	1397	20%

Landuse	UPPER KELLY Acres	Before Tons	Before T/A/Y	After Tons	After T/A/Y	Change Tons	Change %	LOWER KELLY Acres	Before Tons	Before T/A/Y	After Tons	After T/A/Y	Change Tons	Change %
Crop Rotatn	4305	7035	1.6	5628	1.3	1407	20%	7183	7069	1.0	6658	0.9	411	6%
Row Crops	937	3988	4.3	2002	2.1	1986	50%	1595	5016	3.1	2911	1.8	2105	42%
(crop tot	(5242)	(11023)	(2.1)	(7630)	(1.5)	(3393)	(30%)	(8778)	(12085)	(1.4)	(9569)	(1.1)	(2516)	(20%)
Pasture	221	122	0.6	122	0.6	0	0%	379	167	0.4	167	0.4	0	0%
Grassland	615	287	0.5	287	0.5	0	0%	913	422	0.5	422	0.5	0	0%
Woodland	2590	116	---	116	---	0	0%	1690	27	---	27	---	0	0%
Subtotal		11548	---	8155	---	3393	29%		12701	---	10185	---	2516	19%

Landuse	UPPER LITTLE Acres	Before Tons	Before T/A/Y	After Tons	After T/A/Y	Change Tons	Change %	MIDDLE LITTLE Acres	Before Tons	Before T/A/Y	After Tons	After T/A/Y	Change Tons	Change %
Crop Rotatn	8248	7908	1.0	7379	0.9	529	7%	7479	8078	1.1	7570	1.0	508	6%
Row Crops	1327	5263	4.0	2717	2.0	2546	48%	2063	8611	4.2	4597	2.2	4014	47%
(crop tot	(9575)	(13171)	(1.4)	(10097)	(1.1)	(3075)	(23%)	(9542)	(16689)	(1.7)	(12167)	(1.3)	(4522)	(27%)
Pasture	394	142	0.4	142	0.4	0	0%	418	178	0.4	178	0.4	0	0%
Grassland	865	345	0.4	345	0.4	0	0%	1071	303	0.3	303	0.3	0	0%
Woodland	2779	54	---	54	---	0	0%	2561	39	---	39	---	0	0%
Subtotal		13712	---	10637	---	3075	22%		17209	---	12687	---	4522	26%

Landuse	LOWER LITTLE Acres	Before Tons	Before T/A/Y	After Tons	After T/A/Y	Change Tons	Change %	GREEN BAY Acres	Before Tons	Before T/A/Y	After Tons	After T/A/Y	Change Tons	Change %
Crop Rotatn	7169	6365	0.9	5817	0.8	548	8%	6706	6684	1.0	6517	1.0	167	2%
Row Crops	2398	7114	3.0	4198	1.8	2916	40%	2047	6566	3.2	3896	1.9	2670	40%
(crop tot	(9567)	(13479)	(1.4)	(10015)	(1.0)	(3464)	(25%)	(8753)	(13250)	(1.5)	(10413)	(1.2)	(2837)	(21%)
Pasture	296	148	0.5	148	0.5	0	0%	425	149	0.4	149	0.4	0	0%
Grassland	1471	558	0.4	558	0.4	0	0%	1531	415	0.3	415	0.3	0	0%
Woodland	3886	45	---	45	---	0	0%	2738	44	---	44	---	0	0%
Subtotal		14230	---	10766	---	3464	24%		13858	---	11021	---	2837	20%

Table 12: Upland Erosion Inventory Results in the Little River Watershed -
For Landuses where USLE Values were Calculated

		LITTLE RIVER WATERSHED TOTALS					
Landuse	Acres	Before		After		Change	
		Tons	T/A/Y	Tons	T/A/Y	Tons	%
Crop Rotatn	50193	55016	1.1	49090	1.0	5926	10%
Row Crops	13119	49642	3.8	26015	2.0	23627	47%
(crop tot)	(63312)	(104658)	(1.7)	(75105)	(1.2)	(29553)	(28%)
Pasture	2611	1229	0.5	1229	0.5	0	0%
Grassland	8701	4185	0.5	4185	0.5	0	0%
Woodland	19450	558	---	558	---	0	0%
Subtotal		110630	---	81077	---	29553	26%

Table 13: Estimated Change in Tons of Soil Loss by Bringing All Lands Eroding Greater than 3 T/A/Y Down to 3 T/A/Y, Summed by Subwatershed.

Sub Watershed	Total Acres*	Acres Treated	Tons Before	Tons After	Tons Changed	Sub-watershed % Change	% of Total Watershed Change
Daly Cr	11768	2597	20444	12095	8349	40%	28%
Upper Kelly	8668	2030	11548	8155	3393	29%	11%
Lower Kelly	11760	513	12701	10185	2516	20%	9%
Jones Cr	6006	1208	6928	5531	1397	20%	5%
Upper Little	13613	1649	13712	10637	3075	22%	10%
Middle Little	13592	1787	17209	12687	4522	26%	15%
Lower Little	15220	1292	14230	10766	3464	24%	12%
Green Bay	13447	1165	13858	11021	2837	20%	10%
Totals	94074	12241	110630	81077	29553	27%	100%

* Total acres for landuses where USLE values were calculated - includes: cropland, pasture, grassland and woodland.

The inventory method used with a modification of the Phase II of the Land Inventory Monitoring process (SCS). The main channels of four major streams in the watershed (totaling 111 stream miles) were assessed with this method. For each erosion site, the method estimates the volume and the tons of sediment lost of a yearly average. This is 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 lost from the site. Along with 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 the streambank erosion inventory and analysis are summarized on Tables 14a and 14b.

4. Barnyard Runoff

Dairy operations are the major type of agriculture in the Little River Watershed. All of the barnyards were inventoried for the 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. And high enough concentrations can be toxic to fish and other aquatic life. When the manure enters the 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 and manure (including nitrogen and phosphorus) will promote nuisance algae and weed growth in the streams and lakes. Finally, 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. This model does not assess any needs for manure storage for the impact from manure runoff from spread fields - it only assesses the barnyard pollutant qualities.

Information to run this model was collected on 268 barnyards in the Little River Watershed. Of these barnyards, 241 were determined to be potentially draining to surface waters and were included in the following analysis. Twenty seven barnyards were determined to be draining to internally drained areas and will be assessed for groundwater impacts during project implementation. 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 contribute 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 (3.7 inches) was selected. With this information the model calculates the pounds of phosphorous and pounds of Chemical Oxygen Demand (COD) per each barnyard as a result of the selected rainfall event. Chemical Oxygen Demand is a measure of the amount of organic material in a barnyard runoff. The results of the barnyard analysis are given in Table 15.

Table 14a: Streambank Erosion Inventory Results - Length Eroding Analysis

Subwatershed	(1) Length of Strmbnks Inventord (ft)	(2) Length of Strmbnks Eroding (ft)	% of Strmbnks Eroding	(3) Eroding Lengths (ft) Likely to be Controld w/Practices with fencing only	with other practices	total feet controld	% Eroding Length Likely to be Controld w/Practices with fencing only	with other practices	total feet controld	Potential % of Strmbnks Eroding
Daly Cr	76045	900	1%	600	0	600	67%	0%	67%	<1%
Upper Kelly	134061	2370	2%	0	1380	1380	0%	58%	58%	<1%
Lower Kelly	183354	24484	13%	5550	7470	13020	23%	31%	53%	6%
Upper Little	82163	8070	10%	4875	1500	6375	60%	19%	79%	2%
Middle Little	80718	980	1%	0	125	125	0%	13%	13%	1%
Lower Little	51700	6566	13%	900	4730	5630	14%	72%	86%	2%
Jones Cr	47388	10300	22%	5660	2650	8310	55%	26%	81%	4%
	655429	53671	8%	17585	17855	35440	33%	33%	66%	4%

Table 14b: Streambank Erosion Inventory Results - Tons Eroding Analysis

Subwatershed	(1) Length of Strmbnks Inventord (ft)	% of Water-shed Tons	(2) Tons of Soil Loss/ Year	(4) Tons of Soil Loss /Stream Mile	(3) Eroding Tons Likely to be Controld w/Practices with fencing only	with other practices	total tons controld	% Eroding Tons Likely to be Controld w/Practices with fencing only	with other practices	total tons controld	Potential Tons of Soil Loss Stream Mile
Daly Cr	76045	2%	15.3	2.1	13.5	0.0	13.5	88%	0%	88%	.2
Upper Kelly	134061	4%	26.9	2.1	0.0	21.4	21.4	0%	80%	80%	.4
Lower Kelly	183354	34%	237.1	13.7	44.2	113.8	158.0	19%	48%	67%	4.6
Upper Little	82163	10%	66.1	8.5	41.8	14.5	56.3	63%	22%	85%	1.3
Middle Little	80718	1%	8.3	1.1	0.0	2.3	2.3	0%	28%	28%	.8
Lower Little	51700	34%	223.6	45.7	6.7	209.2	215.9	3%	94%	97%	1.6
Jones Cr	47388	15%	105.2	23.4	49.8	45.6	95.4	47%	43%	90%	2.2
	655429	100%	682.5	11.0	156.0	420.3	562.8	23%	62%	82%	1.9

(1) Includes cummulative length of both banks of the stream reaches inventoied.
(2) Sum of lengths of or tons from eroding sites.
(3) For planning purposes, the following assumptions about controlling streambank erosion were made: a) eroding sites with cattle access can be controlled by fencing cattle out of the streambank; b) other eroding sites without cattle access, with moderate or high recession rates will need addtional practices such as shaping and seeding or rip rap; and c) some sites with low recession rates which produce low tons of soil loss may not be cost-effective to control.
(4) Total tons of soil from eroding sites divided by stream length inventoried in miles.

Table 15: Summary of the Barnyard Inventory Results, Based on the ARS Model for a 10 Year-24 Hour Event (3.7 inches)

Subwatershed	(1) No. of Barn-yards	% of Water-shed Total Yards	(2) No. of Animal Units	Total Phos-phorus (lbs)	% of Total Watershd Phos Load from Yards	Animal Unit Density (a.u./mi)	Ave. lbs. Phos./ sq mi (lbs/mi)	No. of Barnyards Contributg Top 50% of Phos. Load
Daly Cr	29	12%	1544	253	11%	61	10	8
Upper Kelly	20	9%	1434	230	10%	67	11	4
Lower Kelly	35	14%	2464	359	16%	102	15	9
Upper Little	38	16%	2682	383	17%	92	13	10
Middle Little	35	14%	1900	221	10%	65	8	8
Lower Little	38	16%	2569	351	16%	85	12	10
Jones Cr	17	7%	1658	234	11%	139	20	5
Green Bay	29	12%	1760	189	9%	43	5	9
Watershd Tot.	241	100%	16011	2220	100%	76	10	63

(1) This is the total number of barnyards in the watershed potentially draining to surface waters. There are an additional 27 barnyards in the watershed which drain to internally drained areas. These 27 barnyards will be assessed on a case by case basis during project implementation to determine if any groundwater contamination problems exist.

(2) An animal unit is equivalent to a 1000 pound dairy cow.

The barnyard model is not designed to assess runoff problems associated with pasture areas which are not confined animal feeding or holding areas. During the watershed inventory, it was found that many pastures in the Little River Watershed are located adjacent to streams and in wet soils. Because of the wet soils and large amount of time the animals spend in the pastures, little vegetation can get established and potentially high erosion rates can result. The high erosion rates can carry especially high nutrient levels to the surface waters off of the pasture. At the time of the inventory, techniques for assessing soil loss and nutrient runoff from pastures on a watershed wide basis were not available. However, assessment and treatment of critical pasture sites will occur on an individual basis during project implementation.

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 rainwater 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 for 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 fields with greater than 6% slopes or those fields in the floodway. In this manner it was estimated, on an average annual basis, how many acres of unsuitable land were 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 their property. In general, the most accessible land is used for disposal of the manure.

A summary of this analysis is shown on Table 16.

6. Point Sources of Pollution

Unlike the activities mentioned above, the point sources of pollution and 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 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 and cleaning up point pollution in the past 20 years, the water quality impacts from these sources in the Little River Watershed has 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 the 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 facility.

C. The Pollutant Control Strategy

1. Introduction

For the Little River Watershed, an inventory of nonpoint source 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, and
c) identification of properties where nonpoint source controls are needed in order to meet the pollutant load reductions.

Two types of information should be 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 effecting a water resource may have several different sources. Phosphorous is one of the principal pollutants of concern which has many sources. Rural sources of phosphorous include runoff from barnyards, manure stacks, winterspread manure and upland erosion. Techniques to determine the relative phosphorous contribution from different agricultural sources are not sufficiently developed for the project area. This means that a comparison of the amount of phosphorous 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 phosphorous source from each category is equally important in terms of potential contribution of phosphorous to the streams and lakes.

It should also be kept in mind that the "source category" can contribute different types of pollutants. The various pollutants coming from the different sources are described in Chapter IIB: "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 Daley Creek Subwatershed for the reason of organic load reduction and in Green Bay Subwatershed for phosphorus load reduction.

Table 16: Summary of Manure Management Analysis

Subwatershed	No. of Land-owners	No. of Barn-yards	% of Water-shed Barn-yards	(1) Acres Needed	(2) Critical Acres Spread	% of Watershd Total Critical Acres Spread	Critical Acres Spread/ Square mile
Daly Cr	28	32	12%	377	157	9%	6.1
Upper Kelly	24	27	10%	500	236	13%	11.0
Lower Kelly	27	33	12%	551	183	10%	7.6
Upper Little	43	49	17%	864	362	20%	12.5
Middle Little	39	43	15%	674	242	14%	8.3
Lower Little	39	41	15%	726	254	15%	8.4
Jones Cr	17	19	7%	492	180	10%	15.1
Green Bay	31	34	12%	496	160	9%	3.9
Watershed Tot.	248	278	100%	4680	1774	100%	8.4

(1) Acres Needed is estimated to be the amount of land needed to dispose of a six month accumulation of manure (based on the number of animals) at a rate of 25 tons/acre.

(2) Critical Acres represent the annual average amount of land that is spread with manure, which is not suitable land for spreading when the ground is frozen.

3. The Relative Importance of Different 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 contributions 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 phosphorous produced, as estimated by the ARS Model.
* Upland Erosion Runoff: The portion of the soil loss occurring at a rate exceeding three tons per acre per year. This portion was sum for each farm and expressed as "tons of soil above target level soil loss" for each farm.
* Runoff from Winter Spread Manure: The number of critical acres estimated to be spread per year.
* Streambank Erosion: The tons of streambank erosion per year per 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 sources on his farm, or cost sharing assistance will be denied. This is knows as "the total package approach" and its 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 an unwanted practice is necessary to control this 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 landowner contacts and 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 waterways 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.

Table 6: Management Categories for all Subwatersheds

Sources	Criteria	Management Categories (1) I	IIa	IIb	III
Upland Erosion	Soil loss above 3 T/A/year (2)	60%	61-85%	86-100%	----
Barnyard Runoff	Phosphorus load (3)	60%	61-80%	----	81-85%
Manure Spreading	Critical acres spread (4)	26% 20 ac	27-63% 10-19 ac	---- <10 ac	64-100%
Streambank Erosion	Tons of soil lost (5)	60%	61-100%	----	----

(1) Based on the pollutant load rankings for each source category for each landowner, management categories are defined by the landowners who together contribute the given percentage of the total pollutant load for each category.

(2) Soil loss as estimated by USLE on lands eroding greater than three T/A/Yr.

(3) Phosphorus load, as estimated by barnyard runoff model, at point below barnyard where channelized flow begins.

(4) Critical acres as estimated by acres of crop land on less than 6% slopes and not on "wet" soils, adjusted for rotations.

(5) Tons of soil estimated to be contributed from all sites with cattle access, and from sites without cattle access with moderate or high recession rates.

* 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 the category on cost share agreements.

For upland erosion this management category is divided into "IIa" and "IIb". Review of the rankings for upland erosion showed that the landowners at the bottom half of this category only accounted for about 10% of the "tons of soil loss above the target level 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 above the three tons per acre per year level are eligible for cost sharing but they will not be contacted if this is their only potential nonpoint source pollution problem. Management Category IIa includes landowners between Category I and IIb (see Table 6).

* 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 are assigned to the four source categories of nonpoint sources listed on Table 6. These were the sources inventoried in the Little River 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 for the property.

The determination of the management categories for each pollutant source was based on the water resource affected by that source. The table below categorizes which criteria are used to determine the management categories for each subwatershed. Table 6 indicate, for each pollutant source category, what percentage of the total pollutant load reduction is included in each of the management categories. For example: for upland erosion, based on the ranking of landowners from highest to lowest, using the criteria of soil loss above three tons per acre per year - the "60%" in Table 6 means that the landowners who, together, make up the top 60% of the soil loss, are in Management Category I for upland erosion.

These management categories apply to all subwatersheds within the Little River Watershed. Including landowners comprising the top 60% of the pollutant load in Management Category I is necessary to both protect the trout streams and lakes within the watershed, and to reduce the overall pollutant load from the Little River Watershed to the Oconto River and Green Bay.

III. DESCRIPTION OF THE WATER RESOURCES: CONDITIONS, POLLUTANT SOURCES, AND 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 which will be referred to often in the discussion and are listed below:

Table 7: Biotic Index Sampling Results
Table 8a: Fishery Information for Streams
Table 8b: Fishery Information for Lakes
Table 9: Stream Habitat Rating Results
Table 10a: Water Chemistry Surveys for Streams
Table 10b: Water Chemistry and Lake Trophic State Index Values for Lakes
Table 11: Summary of Acres and Tons of Erosion for Each Landuse Category
Table 12: Upland Erosion Inventory Results for Landuses where USLE Values were Calculated
Table 13: Estimated Change in Tons of Soil Loss by Bringing All Lands Down to 3 T/A/Y
Table 14a: Streambank Erosion Inventory Results - Length Eroding Analysis
Table 14b: Streambank Erosion Inventory Results - Tons Eroding Analysis
Table 15: Summary of the Barnyard Inventory Results
Table 16: Summary of Manure Management Analysis

As mentioned previously, the pollution source inventory and the analysis of this information was done on a subwatershed basis. A map of the subwatersheds is shown in Figure 4.

B. Surface Water Resources Descriptions

1. Daley Creek Subwatershed

General Description: Daley Creek is the major tributary to Kelly Brook. It is a little over 7 miles long and is spring and seepage fed. The stream gradient is 9.5 feet/mile and it has an estimated low flow (Q 7,2) of 0.8 cfs. It has a shifting sandy substrate and many adjacent wetlands. There are two small tributaries to Daley Creek, Brooks Creek (near the headwaters, about 2 miles long) and Cr 32-6 (near the mouth, about 1.5 miles long). There are five small lakes in the subwatershed, ranging from 2 to 22 acres in size. None of the lakes have public access, all are surrounded by wetlands and support primarily forage fisheries.

Table 7: Biotic Index (HBI) Sampling Results

Sub-watershed	Stream	Sample Site Location	Biotic Index Value Sampling Date 1980 Spring	1980 Fall	1982 Fall	Water Quality Condition
Daly Cr	Daly Cr	CTH K	2.50	2.43	---	good
Upper Kelly	Kelly Br	White L Rd	---	---	2.00	very good
	Kelly Br	Yatso Rd	---	---	2.00	very good
	Kelly Br	CTH A	2.41	2.33	2.06	good/very good
Lower Kelly	Kelly Br	CTH B	2.60	2.35	2.27	good
	Kelly Br	CTH A	---	---	2.53	good
	Kelly Br	Jagiello Rd	---	---	2.31	good
	Kelly Br	Belgian Rd	2.94	2.94	2.56	fair/good
Upper Little	Little R	Charolais Rd	---	---	3.73	poor
	Little R	Belgian Rd	2.52	2.43	---	good
Middle Little	Little R	CTH J	---	---	2.30	good
	Little R	CTH A	2.98	3.19	2.58	fair/good
Lower Little	Little R	CTH J	---	---	2.82	fair
	Little R	StH 22	3.00	2.63	2.63	fair/good
Jones Cr	Jones Cr	CTH A	4.20	3.72	3.58	poor

HBI Value	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 - 2.67	good	some organic pollution
2.68 - 3.50	fair	significant organic pollution
3.51 - 4.25	poor	very significant organic pollution
4.26 - 5.00	very poor	severe organic pollution

Table 8a: Fishery Information for Streams in the Little River Watershed

Subwatershed	Stream	Survey Date	Survey Results	Stream Fishery
Daly Cr	Daly Cr	7/81	12 species: 67% sport 33% tol. forage BrT, NP, RB, PS LMB, BkCr, Pr BkBl, WhSu, JnDr MdMw	Coldwater sport/ tolerant forage
	Cr 32-6 Trib to Daly	7/81	4 species: 25% sport 75% tol. forage BrT, JnDr, WhSu BrSt	Coldwater sport/ tolerant forage
Upper Kelly	Kelly Br	8/82	17 species: 40% sport 30% intol forage 30% tol. forage NP, BrT, BwT,WE RB, PS, Dr, Dc HyCh, WhSu, CmSh MdMw	Coldwater sport/ intolerant forage
Lower Kelly	Kelly Br	8/82	22 species: 32% sport 41% intol forage 27% tol. forage SMB, RB, NP, WE LMB	Warmwater sport/ tolerant forage
		8/73	14 species: 34% sport 33% intol forage 33% tol. forage SMB, RB, BkCr, BkBl NP, Dr, HyCh	
Upper Little	Little R	8/82	8 species: 38% sport 25% intol forage 37% tol. forage NP, PS, BkBl, Dr JnDr, NCCh, SpSh MdMw	Warmwater sport/ intolerant forage
	Cr 18-3 Trib to Little	8/82	6 species: 17% sport 33% intol forage 50% tol. forage BrT, Dr, EmSh NCCh, JnDr	Coldwater sport/ intolerant forage
Middle Little	Little R	8/82	19 species: 32% sport 42% intol forage 33% tol. forage SMB, RB, NP, WE BkBl, YwBl, Dr HyCh, LgDc, CmSh	Warmwater sport/ intolerant forage

Table 8a: Fishery Information for Streams in the Little River Watershed (contd.).

Subwatershed	Stream	Survey Date	Survey Results	Stream Fishery
		10/75	12 species: 42% sport 50% intol forage 8% tol. forage SMB, RB, NP, Dc	
Lower Little	Little R	8/82	25 species: 32% sport 36% intol forage 32% tol. forage RB, SMB, NP, WE PS, BWT	Warmwater sport/ intolerant forage
		10/75	21 species: 34% sport 36% intol forage 30% tol. forage RnT, BwT, BkBl SMB, RB, NP, HyCh	
Jones Cr	Jones Cr	11/83	3 species: 100% tol. forage BrSt, WhSu, MdMw	Warmwater sport(?)/ tolerant forage
		8/82	9 species 11% sport 89% tol. forage SMB, BrSt, WhSu CmSh, BlMw	

BKBl=Black Bullhead	HyCh=Hornyhead Chub	Pr=Perch
BkCr=Black Crappie	JnDr=Johnny Darter	RB=Rock Bass
BrSt=Brook Stickleback	LMB=Largemouth Bass	RnT=Rainbow Trout
BrT=Brook Trout	LnDc=Longnose Dace	SMB=Smallmouth Bass
BwT=Brown Trout	MdMw=Mudminnow	SpSh=Spotfin Shinner
CmSh=Common Shinner	NCCh=N. Cr. Chub	WE=Walleye
Dc=Dace spp	NP=Northern Pike	WhSu=White Sucker
Dr=Darter spp	PS=Pumpkinseed	YwBl=Yellow Bullhead
EmSh=Emerald Shiner	BlMw=Bluntnose Minnow	

Table 8b: Fishery Information for Lakes in the Little River Watershed

Subwatershed	Lake	Survey Date	Survey Results	Lake Fishery
Upper Kelly	Cooley L	(1)	NP, Panfish	Warmwater sport
	Kelly Lake	(1)	NP, WE, Bs Panfish	Warmwater sport
		8/78	BG, Pr, WE, NP LMB, BkCr, PS, RB	
		9/76	BG, LMB, PS, NP BlHd, Pr, BkCr, WE	
		5/75	BG, Pr, LMB, NP	
	MacHolm L	(1)	NP, Bs, Panfish	Warmwater sport
	Pecor L	(1)	NP, Bs, Panfish	Warmwater sport
	White	(1)	NP, Bs, Panfish	Warmwater sport
	Round L	(1)	NP, Bs, Panfish	Warmwater sport
		6/78	LMB, BG, Pr, BlHd	
Upper Little	Porcupine L	(1)	NP, Bs, Panfish	Warmwater Sport
		10/77	LMB, NP, Pr, Cp	
		5/77	BG, BkCr, BlHd WhSu, Np, Pr, LMB	

BG=Bluegill
BkCr=Black Crappie
BlHd=Bullhead
Bs=Bass,Lgmouth +/or Smmouth
LMB=Largemouth Bass
NP=Northern Pike
Panfish=pumpkinseed, bluegill, perch, crappie, sunfish, etc.
Pr=Perch
PS=Pumpkinseed
RB=Rock Bass
WE=Walleye
WhSu=White Sucker
Cp=Carp

(1) From "Wisconsin Lakes", WDNR Publication #7-3600, 1981

Table 9: Stream Habitat Rating Results and Use Classes for Streams in the Little River Watershed (5/85)

Subwatershed	Stream	Habitat Rating Value (1) Warmwater Fishery before	Warmwater Fishery after	Coldwater Fishery before	Coldwater Fishery after	(2),(3) Use Class before	(2),(3) Use Class after
Daly Cr	Daly Cr	---	---	166 fair	134 fair	A	A
Lower Kelly	Kelly Br	114 good	126 good	112 good	106 good	B	B
Upper Little	Little R	167 fair	152 fair	---	---	B	B
Jones Cr	Jones Cr	168 fair	153 fair	---	---	B	B

(1) Habitat Rating Values:
<70 = excellent 130 - 200 = fair
71 - 129 = good >200 = poor

(2) Use Class Codes:
A - capable of supporting a coldwater sport fishery
B - capable of supporting a warmwater sport fishery
C - capable of supporting a valuable intolerant forage fishery
D - capable of supporting only tolerant (rough) fish
E - capable of supporting very tolerant macroinvertebrates or no aquatic life

(3) The habitat rating values, physical and chemical stream paramaters and fishery data were used to estimate the stream use classes. For further interpretation, see the sections for each subwatershed and stream describing the water resource objectives.

Table 10a: Water Chemistry Surveys for Streams in the Little River Watershed

Subwatershed	Stream	Date	Time	Flow (cfs)	Temp (C)	D.O. (ppm)	D.O.* (% sat)	Suspd* Solids (ppm)	TPO4* (ppm)	BOD* (ppm)	MFFCC* (#/ 100 ml)
Lower Kelly	Kelly Br	9/84	24 hr	---	15.0/ 23.0	4.2/ 10.0	44%/ 110%	---	---	---	---
		8/84	24 hr	---	17.5/ 25.2	3.8/ 12.8	43%/ 145%	---	---	---	---
		5/83	---	---	16.0	---	---	8	.12	2.8	6000
		5/83	---	---	12.5	---	---	10	.16	3.4	---
		3/83	---	---	2.0	---	---	4	.09	1.8	30
		12/82	---	82.3	0.0	13.0	89%	10	.13	2.0	---
		9/82	---	21.2	11.0	12.8	113%	---	---	---	---
		8/82	---	5.2	17.5	8.6	89%	2	.04	---	250
Upper Little	Little R	5/83	1600	---	12.0	---	---	10	.14	2.8	---
		5/83	---	---	16.0	---	---	12	.10	2.5	2500
		3/83	---	---	2.0	---	---	---	.07	1.2	10
		12/82	---	24.6	---	---	---	6	.08	1.6	---
		10/82	---	2.4	0.0	13.0	89%	---	---	---	---
		9/82	---	2.8	8.0	10.0	84%	---	---	---	---
		8/82	1201	<.1	16.0	5.6	52%	4	.18	---	140
Middle Little	Little R	5/83	---	---	13.0	---	---	43	.12	3.1	3900
		5/83	---	---	11.5	---	---	12	.14	3.1	---
		3/83	---	---	2.0	---	---	8	.12	1.8	70
		12/82	---	325.3	---	13.0	---	6	.12	1.2	---
		10/82	---	52.1	13.5	---	---	---	---	---	---
		9/82	---	33.3	11.0	11.2	103%	---	---	---	---
		8/82	---	5.5	---	---	---	---	.07	---	160
Lower Little	Little R	5/83	---	---	13.0	---	---	35	.14	2.8	200
		3/83	---	---	2.0	---	---	6	.13	5.0	80
		12/82	---	---	0.0	11.8	81%	7	.12	1.6	---
		9/82	---	---	9.0	10.8	93%	---	---	---	---
		8/82	---	---	17.0	6.8	71%	4	.10	---	170

* This water chemistry information is provided to be used with other water resource information, such as fishery, Biotic Index and Stream Habitat data, to provide a more complete picture of existing and potential water resource conditions. While insufficient water chemistry data exists in the Little River Watershed to make absolute determinations values within the ranges below indicate general good water quality conditions:
  D.O. (dissolved oxygen) - 70%-90% saturation
  Suspended solids - <30 ppm
  TPO4 (total phosphorus) - <.1 ppm
  BOD (biochemical oxygen demand) - < 2 ppm
  MFFCC (membrane filter fecal coliform counts) - <200 counts/100 ml

Table 10b: Water Chemistry and Lake Trophic State Index Values for Lakes in Little River Watershed

Subwatershed	Lake	Date	Secchi Depth (m)	Sample Depth (m)	Temp (C)	D.O. (ppm)	Tot Phos (ppm)	TSI Secchi	TSI Tot P	TSI Chl A	Lake Condition
Upper Kelly	Cooley L	10/77	1.3	1	9.5	12.0	.08	56.8	43.2	---	meso/eutrophic
				3	10.0	11.0	---				
				6	9.0	11.0	---				
		8/77	2.0	1	25.5	7.0	---	50.0	43.2	---	
				3	20.0	7.0	.15				
				4	19.0	2.0	---				
				6	9.0	1.0	---				
				9	9.0	.5	---				
		5/77	2.5	1	25.5	10.5	---	54.2	94.4	---	
				3	16.0	2.5	---				
				4	11.0	1.5	---				
				5	9.0	1.3	.44				
				9	9.0	1.0	---				
				12	8.0	.5	---				
		2/77	---	1	4.0	6.0	---	---	91.5	---	
				3	5.0	5.0	.36				
				6	5.0	4.0	---				
	Kelly L	5/84	---	---	---	---	---	36.4	---	---	oligo/mesotrophic
		3/84	---	1	1.0	10.8	---	---	49.8	---	
				3	1.0	10.6	---				
				6	1.0	10.6	---				
		10/83	---	1	8.0	10.1	---				
				4	8.0	9.0	---				
				5	8.0	9.8	---				
				7	8.0	9.4	---				
		7/83	4.2	1	24.0	8.4	---	39.3	---	---	
				5.5	22.5	7.1	---				
		4/83	3.5	1	6.0	11.5	---	41.9	55.7	39.8	
				5	6.0	11.6	---				
		2/83	---	1	0.0	12.2	---	---	49.8	---	
				2	0.0	11.0	---				
				4	1.0	8.5	---				
				5	1.5	5.5	---				
		10/82	---	1	6.0	9.8	---	---	---	45.8	
				7	6.0	9.8	---				
		7/82	2.7	1	22.8	9.8	---	45.7	---	47.1	
				6.5	22.0	9.0	---				
		5/77	3.6	---	---	---	.02				
		4/68	---	---	---	---	---	---	58.3	---	
		3/68	---	---	---	---	---	---	70.4	---	
		2/68	---	---	---	---	---	---	60.2	---	
		1/68	---	---	---	---	---	---	60.0	---	
Upper Kelly	Round L	5/82	---	---	---	---	---	40.0	---	45.6	oligo/mesotrophic
		3/82	---	---	---	---	---	---	49.8	43.7	
		10/81	---	---	---	---	---	41.9	49.8	55.3	
		9/81	---	---	---	---	---	44.2	49.8	47.1	
		11/80	---	---	---	---	---	36.2	49.8	43.7	
		8/80	---	---	---	---	---	38.0	---	40.9	
	White L	5/82	---	---	---	---	---	26.8	---	---	oligotrophic
		10/81	---	---	---	---	---	28.3	---	---	
		9/81	---	---	---	---	---	31.9	---	---	
		11/80	---	---	---	---	---	39.0	---	40.9	
		8/80	---	---	---	---	---	---	---	40.9	

Table 10b: Water Chemistry and Lake Trophic State Index Values for Lakes in Little River Watershed

Subwatershed	Lake	Date	Secchi Depth (m)	Sample Depth (m)	Temp (C)	D.O. (ppm)	Tot Phos (ppm)	TSI Secchi	TSI Tot P	TSI Chl A	Lake Condition
Upper Little	Porcupine	4/85	---	---	---	---	---	50.0	67.9	64.4	meso/eutrophic
		3/85	---	---	---	---	---	---	87.9	40.9	
		10/84	---	---	---	---	---	46.8	73.0	44.1	
		8/84	---	0	21.5	11.9	---	---	59.8	61.4	
				1	21.0	11.0	---				
				2	19.5	3.6	---				
				3	18.0	.5	---				
				4	13.0	0.0	---				
				5	10.0	0.0	---				
				6	8.0	0.0	---				

* This water chemistry information is provided to be used with other water resource information, such as fishery and Carlson's Lake Trophic State Index, to provide a more complete picture of existing and potential water resource conditions. Carlson's Lake Trophic State Index is a tool available to use limited water chemistry data to determine the classification (water quality conditions) of lakes. The TSI can be calculated using secchi depth, surface total phosphorus concentration, or chlorophyll a values. The TSI ranges and corresponding lake classification conditions are given below:

TSI 0-40 - oligotrophic
TSI 40-50 - mesotrophic
TSI 50-100 - eutrophic

Current Water Quality and Use: Though Daley Creek is not classified as a trout stream, fish surveys conducted in 1981 showed the presence of brook trout in Daley Creek, as well as in Brooks Creek and Creek 32-6. The surveys found young of the year trout, indicating that natural reproduction is occurring. In addition, larger trout have been caught in Daley Creek, which probably migrate up from the Oconto River. Biotic index samples taken near the mouth of Daley Creek in 1980 indicate good water quality conditions, with little organic pollutant impacts. However, the Stream Habitat Rating results from May 1985 indicated only a fair habitat rating, limited primarily by the shifting sand substrate, lack of deep pools and low flow. A reduction in the sediment load to the creek would benefit the habitat by decreasing the filling of the pools and improving the bottom substrate. Though little temperature or water chemistry information is available for Daley Creek or its tributaries, the fish manager feels the temperature is adequate to support a naturally reproducing trout fishery as long as the headwater springs remain protected.

Pollution Sources: The Daley Creek Subwatershed contributes the greatest tons of soil loss in the watershed. The total tons of soil loss from all landuses in the subwatershed make up 18% of the total soil loss occurring in the watershed, even though the land area is only 12% of the total watershed land area. The soil loss rates in the Daley Creek subwatershed are also the highest in the watershed, with the average T/A/Y soil loss for croplands being 2.5 T/A/Y (5 T/A/Y for row crops). Ninety percent of the tons of soil loss in the subwatershed come from croplands, which comprise only 45% of the subwatershed area. Of the croplands, the 1900 acres of row crops (a quarter of the cropland) contribute over half of the tons of soil loss (i.e.: 12% of the subwatershed area produces 90% of the subwatershed tons). Grasslands in the Daley Creek Subwatershed contribute about 1650 tons of soil loss. This is only about 8% of the total subwatershed soil loss, but it is the most significant grassland soil loss in the watershed. Woodlands and pastures are not a significant source of sediment in the subwatershed, but critical sites in all three of these landuses may have site specific impacts on receiving waters. These critical sites will be identified during project implementation. Applying practices to lands eroding at rates greater than 3 T/A/Y to reduce the soil loss values to 3 T/A/Y or less would reduce the total soil loss in the subwatershed by 8,350 tons per year. This is the largest potential reduction for all subwatersheds, and equals 28% of the potential soil loss reduction for the total watershed.

The phosphorus load from barnyards in the Daley Creek Subwatershed is not as significant as in other subwatersheds. There are 29 barnyards (12% of the watershed total) with a combined number of animal units of 1544. The phosphorus load from these yards comprises 11% of the watershed total, and 8 of the 29 yards contribute half of the subwatershed phosphorus load. The estimated number of animals and pounds of phosphorus per square mile is below the average for the watershed.

Streambank erosion, for both tons of soil loss, as well as length of bank eroding, is not a significant problem in the Daley Creek Subwatershed, relative to other subwatersheds. Only about 1% of the streambanks are eroding, contributing 15 tons of sediment a year, with the majority of the problem being due to cattle access.

Using the number of critical acres spread per square mile of subwatershed area as an indicator, manure spreading does not appear to be a significant problem in the Daley Creek Subwatershed compared to other areas of the watershed. There 32 barnyards which spread manure on acres within the subwatershed, and an estimated 157 of those acres are either too steep or too wet to be spread safely during winter months.

There are no municipal or industrial point source discharges in the Daley Creek Subwatershed.

Water Resource Objectives: Protect the existing trout and high quality forage fishery, and specifically to improve the number of mature trout, in Daley Creek and its tributaries.

The factor limiting the number of mature trout in streams in this subwatershed appears to be the filling in of the pools with sediment, along with the sand-silt stream substrate. Reducing the sediment load to the streams should improve the bottom substrate, protect the trout spawning areas and improve the stream invertebrate populations utilized as food sources for the fish. In addition, protecting the headwater springs from degradation from sediment or cattle access will protect the temperature and flow for the length of Daley Creek.

Actions: To achieve the water resource objective, a 70% reduction in the pollutant load occurring above the target levels, from all categories of nonpoint sources in the subwatershed, is needed. Based on the results of the landuse data analysis, to achieve the pollutant load reductions, the following numbers of sites are included in each of the Management Categories for each nonpoint source category:

	Reduction	No. of Sites			
Nonpoint Source Category	Objective for Load > target	Mgmt Category I	Mgmt Category IIa	Mgmt Category IIb	Mgmt Category III
Upland Erosion	70%	25	30	56	67
Barnyard Runoff	70%	10	8	0	11
Manure Management	70%	1	4	0	23
Streambank Erosion	70%	1	0	0	**

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

2. Upper Kelly Brook Subwatershed

General Description: The major stream in this subwatershed is Kelly Brook, from its headwaters at Peterson Lake to its confluence with Daley Creek (about 8.5 miles). The gradient of Kelly Brook in this subwatershed is 6 feet/mile, with an estimated low flow (Q 7,2) of 0.6 cfs.

There are 12 lakes in the subwatershed. Six of the lakes have no public access. They range from 2 to 38 acres in size, are surrounded by wetlands (except for Long Lake) and support limited panfisheries or forage fisheries. There are six lakes with public access. The largest and most heavily used of these is Kelly Lake. Kelly Lake has a surface area of 326 acres and a maximum depth of 41 feet. It drains to Kelly Brook, 2 miles away, via Creek 18-2, is fed by Round Lake and has a watershed area of 2.4 square miles. Round Lake is 28 acres in size, has

a maximum depth of 31 feet and is fed by .2 square miles of wetlands. Two of these lakes are within the channel of Kelly Brook: Makholm Lake, near the headwaters, and Cooley Lake, 1 mile downstream. MakHolm Lake has an area of 13 acres, a maximum depth of 52 feet and a watershed of less than 1 square mile. Cooley Lake is 52 acres, the second largest in the watershed, has a maximum depth of 43 feet and a watershed of a little more than 1 square mile. Between Cooley Lake and Kelly Lake, White Lake drains to Kelly Brook via Creek 12-1. The lake has a surface area of 50 acres, a maximum depth of 49 feet and a .6 square mile watershed which includes Pecor Lake. Pecor Lake is a spring fed lake, 19 acres in size, with a maximum depth of 23 feet.

Current Water Quality and Use: Fish surveys conducted in 1982 in this portion of Kelly Brook found brook and brown trout, along with northern pike, walleye, and a high quality forage fishery. Good numbers of young of the year trout, with few nature fish, indicate the existence of some limitations to the population. The creek is also used seasonally by migratory trout from the Oconto River and Green Bay. Biotic Index samples the same year indicated very good water quality conditions, with only very slight impacts from organic pollution. No Stream Habitat Ratings are available for Kelly Brook in this reach, though observations in May 1985 showed good habitat with adequate vegetative cover and deep pools and no excess algae growth. While no water chemistry samples have been conducted along this stretch of Kelly Brook, poor dissolved oxygen levels have been found at the mouth of the creek, and may occur in this portion as well.

Kelly Lake has a warmwater sport fishery of northern pike, walleye, perch, bluegills and largemouth bass. Secchi and Total Phosphorus values from 1977 to 1983 indicate very good water quality conditions. The Trophic State Index (TSI) values show oligotrophic to mesotrophic conditions. There is one park, three boat ramps, one resort and about 200 recreational type dwellings on the lake.

Similar to Kelly Lake, White, Round, Pecor and Makholm Lakes have warmwater sport fisheries of northern pike, largemouth bass and other panfish. Limited water chemistry information is available for these lakes. White Lake, with about 30 dwellings, shows the best water quality conditions, with very good water clarity and TSI values indicative of oligotrophic conditions. Cooley Lake, however, has TSI values in the mesotrophic-eutrophic range. In 1977, 3 out of 4 Total Phosphorus sample were excessive and the secchi depths showed good to poor water clarity. Cooley Lake has the largest watershed to lake surface area ratio of the lakes in the watershed, indicating the largest potential for pollutants from nonpoint sources to impact water quality. Information for Round Lake from 1980 to 1982 indicates good water clarity and mesotrophic conditions.

Pollution Sources: Tons of soil loss within the Upper Kelly Brook Subwatershed is about average for the watershed. Croplands (38% of the subwatershed area) contribute 95% (11,000 tons) of the subwatershed soil loss. However, the average soil loss rates for lands in crop rotations and row crops are the highest and second highest, respectively, rates for those landuses in the watershed. Pasture, grasslands and woodlands do not contribute significantly to the tons of soil loss in the watershed (525 tons). Bringing all lands eroding at greater than 3 T/A/Y down to at least 3 T/A/Y would reduce the subwatershed soil loss by 3,400 tons, which is 11% of the watershed potential soil loss reduction. Within the Upper Kelly Brook Subwatershed, this is a 29% reduction in the subwatershed soil loss, the second largest potential change of all the subwatersheds.

Relative to other subwatersheds, the Total Phosphorus load from barnyards is not severe. The 20 barnyards in the subwatershed produce 230 pounds of phosphorus (10% of the watershed total). Both the number of animal and the pounds of phosphorus per square mile are average for the watershed. Four of the 20 barnyards contribute a cumulative total of 50% of the subwatershed barnyard phosphorus load.

The streambank survey indicated 2% (2,370 feet) of the streambanks were eroding, and produce about 27 tons of sediment. This is the second lowest tons of sediment per stream mile in the watershed. Cattle access to the streambanks does not appear to be a problem in this subwatershed. Controlling the 4 most critical sites would reduce the tons of sediment by 48% and the length eroding by 630 feet.

Based on the manure spreading analysis, the Upper Kelly Brook Subwatershed has an estimated 236 critical acres spread, which is the third highest number of critical acres spread per square mile in the watershed.

There are no industrial point source discharges in the Upper Kelly Brook Subwatershed. Kelly Lake Sanitary District, which was formed in 1968, operates a lagoon type wastewater treatment facility for the dwellings around Kelly Lake. The Sanitary District has a permit under the Wisconsin Pollution Discharge Elimination System (WPDES) program and the facility is currently working adequately.

Water Resource Objectives: Protect the existing trout and high quality forage fishery, and specifically improve the number of mature trout, in the Kelly Brook above its confluence with Daley Creek. Protect the existing warmwater sport fishery and trophic status of Kelly, White, Round, Pecor and Makholm Lakes and improve the trophic status of Cooley Lake.

A reduction in the sediment load to the creek from croplands will protect the pools and improve the fish habitat and invertebrate populations. Reducing the phosphorus load to the lakes from spread manure and barnyards will protect the lakes from increases in algae growth. Site specific treatment of critical streambank erosion areas will improve fish habitat.

Actions: To achieve the water resource objective, a 70% reduction in the pollutant load occurring above the target levels, from all categories of nonpoint sources in the subwatershed, is needed. Based on the results of the landuse data analysis, to achieve the pollutant load reductions, the following numbers of sites are included in each of the Management Categories for each nonpoint source category:

Nonpoint Source Category	Reduction Objective for Load > target	No. of Sites: Mgmt Category I	Mgmt Category IIa	Mgmt Category IIb	Mgmt Category III
Upland Erosion	70%	14	15	23	81
Barnyard Runoff	70%	6	7	0	7
Manure Management	70%	4	6	0	14
Streambank Erosion	70%	1	2	0	**

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

3. Lower Kelly Brook Subwatershed

General Description: This subwatershed includes Kelly Brook from its confluence with Daley Creek to its confluence with the Little River. Through this stretch, the creek travels 13.5 miles with a gradient of 7.5 feet per mile. The estimated low flow is 0.7 cfs. The major tributary to Kelly Brook in the subwatershed is Beaver Creek, which is 3.6 miles long and has a gradient of 11 feet per mile and a estimated low flow of .09 cfs.

There are 5 lakes in the subwatershed, none of which have public access. The lakes range in size from .2 to 15 acres, all are surrounded by wetlands and have panfish and northern pike fisheries.

Water Quality and Use: Kelly Brook in this area has a warmwater sport and tolerant forage fishery of smallmouth bass and northern pike. It serves as an important smallmouth and rock bass nursery area from the village of Spruce downstream. Unlike Kelly Brook above Daley Creek, no trout fishery has been observed in this stretch of the creek. Again, the fish surveys show a good number of young of the year, indicating natural reproduction is occurring, but few mature fish, indicating a limitation to the population. Biotic Index samples from 1980 and 1982 show good values in the upper parts of the subwatershed, with only fair values further downstream near the mouth, suggesting increased organic loadings as you move downstream. Stream Habitat Survey ratings conducted in May 1985 were good. Good substrate was found at the upper reaches of the creek in this subwatershed, with increasing bottom sediments further downstream and deposition bar where Kelly Brook enters the Little River. There was also an increase in periphyton (algae attached to the rocks) downstream, indicating increased phosphorus loads to the stream. This excess nutrient load was also indicated by high dissolved oxygen (D.O.) fluctuations over a 24 hour period in August 1984. The D.O. fluctuations are generally due to high concentrations of algae photosynthesing and respiring over the course of day and night. The large fluctuations in D.O. concentrations stress the fish populations. In addition, samples taken between August 1982 and May 1985 measured excess Total Phosphorus, B.O.D. (biochemical oxygen demand) and MFFCC (membrane filter fecal coliform counts) values in the majority of the samples, again indicating sediment and organic loadings to the creek.

Pollution Sources: Soil loss in the Lower Kelly Subwatershed is similar to other areas of the watershed. Croplands contribute 12,100 tons of soil loss (95% of the subwatershed tons) and comprise a little over half of the subwatershed area. However, row crops only make up about 1/5 of the cropland area but contribute almost 1/2 of the cropland soil loss. Soil loss from pasture, grassland and woodlands is low. Reducing the soil loss on all lands to 3 T/A/Y or less would reduce the subwatershed soil loss by 2,500 tons per year, which is 9% of the potential overall watershed soil loss change and a 20% reduction in the subwatershed soil loss.

Lower Kelly Brook Subwatershed barnyards contribute the second highest pounds of phosphorus load in the watershed. There are 35 barnyards in the subwatershed which contribute 360 pounds of phosphorus (or 16% of the watershed total) to surface waters. This subwatershed has the second highest number of animals and pounds of phosphorus per square mile of area. Nine of the 35 barnyards together contribute half of the subwatershed barnyard phosphorus load.

Streambank erosion is also a problem in the Lower Kelly Brook Subwatershed relative to other subwatersheds. It has the highest tons of soil loss from streambanks in the watershed (237 tons or 38% of the watershed total streambank tons) and the highest number of feet eroding, with 24,500 feet. This averages to about 14 tons of sediment from streambanks per stream mile. Cattle access is responsible for 1/4 of the feet eroding and 1/5 of the tons. An another critical 10 sites contribute an additional 1/8 of the feet eroding and 1/4 of the tons. Many of the sites are long, with low recession rates and low tons per site and will therefore have to be evaluated for site specific impacts on fish habitat at the time of implementation.

Based on the manure spreading analysis, runoff from manure spread on critical acres does not appear to be a significant problem in the Lower Kelly Brook Subwatershed. With an estimated number of critical acres spread of 183, the number of critical acres spread per square mile is below the watershed average.

There are no municipal or industrial point source discharges in the Lower Kelly Brook Subwatershed.

Water Resource Objectives: Improve the northern pike fishery and protect the existing smalllmouth bass fishery in Kelly Brook below its confluence with Daley Creek.

The wide D.O. fluctuations in the lower reaches of Kelly Brook appear to be limiting the adult smallmouth bass populations and the sediment and organic loads may be limiting the nursery habitat. A decrease in the phosphorus and BOD load from barnyards and sediment load from streambanks and croplands are needed to improve the D.O. and habitat conditions.

Actions: To achieve the water resource objective, a 70% reduction in the pollutant load occurring above the target levels, from all categories of nonpoint sources in the subwatershed, is needed. Based on the results of the landuse data analysis, to achieve the pollutant load reductions, the following numbers of sites are included in each of the Management Categories for each nonpoint source category:

	Reduction	No. of Sites			
Nonpoint Source Category	Objective for Load > target	Mgmt Category I	Mgmt Category IIa	Mgmt Category IIb	Mgmt Category III
Upland Erosion	70%	7	13	24	68
Barnyard Runoff	70%	12	11	0	12
Manure Management	70%	3	3	0	21
Streambank Erosion	70%	6	14	0	**

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

4. Upper Little River Subwatershed

General Description: The upper 10 miles of the Little River, from its head waters to its confluence with Kelly Brook, is the major surface water in this subwatershed. In this reach, the Little River averages 17 feet wide and has an average gradient of 11.3 feet per mile, with an estimated low flow of .87 cfs.

It is spring and seepage fed and has a bottom substrate of sand and soft sediment with few pools or riffles. The major tributary to the Little River in this subwatershed is Creek 18-3, which joins the Little River about 3 miles downstream from the headwaters. Creek 18-3 is a little less than 1 mile long (.8 miles), has a gradient of 14 feet per mile and an estimated low flow of .07 cfs. It is fed by springs upwelling through gravel.

There are two lakes in the subwatershed, one with public access and one without. Lake 4-6 has no access, is 3.8 acres in size, surrounded by wetlands, and has no fishery information available. Porcupine Lake is a 30 acre lake located within the channel of the Little River just upstream from Creek 18-3. It has a maximum depth of 20 feet, is surrounded by wetlands with no dwellings and has a watershed area of 7.8 acres.

Water Quality and Use: Fish surveys conducted in 1982 show the Little River within this subwatershed to support a warm water sport and intolerant forage fishery. Northern pike are the most abundant with many young of the year found. The grassy areas along this stretch serve as northern pike spawning and nursery areas. According to the fish manager, the river also has the potential to be used for Green Bay and Oconto River salmonid spawning runs. Biotic Index samples from 1980 and 1982 show improved water quality conditions from upstream to downstream, being poor a little below Porcupine Lake to good just above the confluence with Kelly Brook, indicating higher organic loadings to the upper reaches. Stream Habitat Ratings from May 1985 gave fair habitat values. The major limiting factors appear to be inadequate flow and pool depth and poor substrate, lacking gravel. Observations indicated improved flow, gradient and riffles as you move downstream from Porcupine Lake. Significant algae and organic sediment deposits were observed throughout the length of the river in this subwatershed. Just above Kelly Brook better substrate and bank vegetation occur. Water chemistry data from August 1982 to May 1983 indicated elevated suspended solids, B.O.D., Total Phosphorus and bacteria levels in about 3/4 of the samples. In this subwatershed, the river is too narrow and shallow to be used for recreational canoeing and shows little sign of public fishing use.

Creek 18-3 has supported a cold water sport and intolerant forage fishery consisting of brook trout and darters, based on fish surveys from August 1982. The fish manager feels there is adequate habitat, flow, temperature and water quality conditions to support a naturally reproducing brook trout population. However, a whey spill in late 1982 decimated the trout population at that time and follow-up fish surveys have not been conducted. No Biotic Index or water chemistry information is available for Creek 18-3.

Porcupine Lake supports a warm water sport fishery of northern pike, largemouth bass and panfish, mostly bluegills and perch. The lake has mesotrophic to eutrophic conditions based on 1984 and 1985 TSI values. In August 1984, the lake was stratified at about 3 meter, with 11.9 ppm D.O. at the surface and 0 ppm D.O. below 4 meters.

Pollution Sources: Soil loss within the subwatershed is average compared to the other subwatersheds. Croplands (9575 acres) contribute 96% (13,200 tons) of the subwatershed soil loss, with land in row crops contributing most significantly. The average T/A/Y for row crops is 4 T/A/Y, slightly higher than the watershed average. As a whole, pasture, grasslands and woodlands are not a significant soil loss problem. If soil erosion on all lands were brought down

to 3 T/A/Y or less, a reduction in 3,200 tons would occur. This is equivalent to 10% of the overall watershed potential change, as well as a 22% reduction within the watershed.

The Upper Little River Subwatershed has the largest number of animals and the largest pounds of phosphorus load from barnyards of the subwatersheds. There are 38 barnyards, with 2682 animal units, which produce an estimated 383 pounds (17% of the watershed total) of phosphorus. This gives the subwatershed the third highest number of animals and number of pounds of phosphorus per square mile in the watershed. Ten of the 38 barnyards together contribute 50% of the subwatershed barnyard phosphorus load.

Moderate streambank erosion problems occur in the Upper Little Subwatershed. Eight thousand seventy feet of eroding streambanks (10% of the subwatershed streambanks) contribute an estimated 66 tons of sediment to the river at a rate of about 8.5 tons per stream mile. This is lower than the watershed average, but fencing cattle away from the streambanks alone would make a significant improvement in both the length eroding and tons eroding (a 60% and 63% reduction, respectively.)

Manure spreading has the potential to be a significant problem in the Upper Little River Subwatershed. The subwatershed has the highest number of critical acres spread, with an estimated 362 acres (20% of the watershed total). This averages to 12.5 critical acres spread per square mile of subwatershed, the second highest density in the watershed.

There are no industrial or municipal point source discharges in the Upper Little River Subwatershed.

Water Resource Objectives: Improve the northern pike fishery, especially the number of mature fish, in the Little River above its confluence with Kelly Brook. Improve the brook trout fishery in Creek 18-3. Protect the warm water sport fishery and improve the trophic status of Porcupine Lake.

To protect the stream fishery, decreases in the sediment and organic deposits, especially in the pools, in the Little River and Creek 18-3 are needed. Decreases in the phosphorus load to Porcupine Lake are needed to improve the trophic status. To accomplish this, decreases in the phosphorus and organic load from manure spreading, as well as barnyards, are needed. The upper ends of the watershed are especially critical because of the low flow of the river near the headwaters. Fencing cattle away from the stream will improve the cover, spawning and nursery habitat and bottom substrate of the river. A reduction in the cropland soil loss will decrease the sediment deposits stream within the subwatershed, as well as the nutrient load carried downstream.

Actions: To achieve the water resource objective, a 70% reduction in the pollutant load occurring above the target levels, from all categories of nonpoint sources in the subwatershed is needed. Based on the results of the landuse data analysis, to achieve the pollutant load reductions, the following numbers of sites are included in each of the Management Categories for each nonpoint source category:

Nonpoint Source Category	Reduction Objective for Load > target	No. of Sites: Mgmt Category I	Mgmt Category IIa	Mgmt Category IIb	Mgmt Category III
Upland Erosion	70%	8	15	30	111
Barnyard Runoff	70%	13	11	0	14
Manure Management	70%	5	7	0	31
Streambank Erosion	70%	3	5	0	**

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

5. Middle Little River Subwatershed

General Description: Within this subwatershed, the Little River travels for 7 miles from its confluence with Kelly Brook to its confluence with Jones Creek. In this reach, the river averages 46 feet wide with a gradient of 9.5 feet per mile. The estimated low flow is 0.88 cfs, but the flows vary widely, with reported flows sometimes exceeding 300 cfs. The bottom substrate is sand with abundant gravel and rubble and many riffles. The Little River in this stretch has physical characteristics more similar to Kelly Brook than the upper Little River itself. The major tributary in the subwatershed it Creek 20-6, which junctions with the Little River about 2 miles downstream from Kelly Brook. Creek 20-6 is 2 miles long, has a gradient of 10.5 feet per mile and an estimated low flow of 0.12 cfs.

Water Quality and Use: The Little River supports a warmwater sport and intolerant forage fishery within the Middle Little River Subwatershed. Fishery surveys conducted in 1975 and 1982 found smallmouth bass, rock bass, and northern pike. In addition, the 1982 sample showed the presence of walleye, but also a larger percentage of tolerant forage species. Many young of the year smallmouth bass were included in the sample populations. This area serves as a spawning and nursery area for smallmouth bass, northern pike, and potentially, walleye. It has abundant gravel and rubble substrate, good cover for young among larger rocks, many riffles and good numbers of aquatic invertebrates for food supplies. No Stream Habitat Ratings were conducted along this stretch of the Little River, but observations from May 1985 also indicated good habitat. 1980 and 1982 Biotic Index samples indicated good water quality just above Creek 20-6 and good to fair water quality further downstream just above Jones Creek. This shows a slight increase in organic loading to the stream within this stretch. Available water chemistry information from 1982 and 1983 also indicates high organic and nutrient loads, with excess total phosphorus in 4 out of 5 samples, excess B.O.D. levels in 2 out of 4 samples and very high MFFCC counts in 1 of the 3 available samples. In addition, fluctuations in D.O. levels during the same period, indicate excess algae productivity.

Along here, the river is suitable for canoeing and other recreational uses and is very aesthetic. Currently, little use is occurring, possibly due to limited access.

Pollution Sources: Soil loss in the Middle Little River Subwatershed is relatively high. The 16,700 tons of soil loss make up 16% of the watershed soil loss, the second highest subwatershed. Of this soil loss, croplands contribute 97% of the tons, with 1/2 of that coming from row crops which only comprise 1/4 of the cropland acres. The average annual soil loss rate for the lands in row crops is 4.2 T/A/Y, which is the third highest in the watershed. Pastures, grasslands, and woodlands together contribute only 480 tons, which is not a significant problem. A reduction in the soil loss on all lands to 3 T/A/Y or less would result in a 4500 ton (16%) decrease in the subwatershed soil loss. This is 15% of the overall watershed potential soil loss reduction.

While the Middle Little River Subwatershed has the second highest number of barnyards with 35, the estimated total phosphorus load is only 10% (221 pounds) of overall watershed phosphorus load from barnyards. Both the number of animals and the pounds of phosphorus per square mile of subwatershed area are lower than the watershed average. Eight of the 35 barnyards cumulatively contribute 1/2 of the subwatershed barnyard phosphorus load.

Streambank erosion is not a significant problem in the Middle Little River Subwatershed. The 980 feet of eroding streambanks (1% of the subwatershed streambanks) contribute 8 tons of sediment to the streams at a rate of 1 ton per streammile. By all these measurements, this subwatershed has the lowest streambank erosion problems in the watershed. Cattle access does not appear to be a problem for these eroding sites. Two of the 8 eroding sites comprise 1/5 of the tons and 1/3 of the feet eroding. Each of the eroding streambank sites within the subwatershed will have to be evaluated during project implementation to identify how significant the impact is on both the immediate stream habitat, as well as the overall sediment load.

There is a relatively high number of critical acres potentially spread with manure within this subwatershed (242 acres - the third highest in the watershed), with an average number of critical acres spread per square mile of subwatershed area (8.3 critical acres spread/square mile).

There are no municipal or industrial point source discharges in the Middle Little River Subwatershed.

Water Resource Objectives: Protect the existing northern pike and smallmouth bass fishery and improve the walleye fishery in the Little River between Kelly Brook and Jones Creek.

The continued ability of the Little River to support these warmwater fisheries depends on protecting the spawning and nursery habitat from degradation from sediment and organic loads. Also, reducing the D.O. fluctuations will reduce a stress to the fish populations which may be limiting the number of mature fish. Based on the water resource information, excess nutrient and organic loads appear to be a greater threat to the habitat than sediment deposits on the substrate. However, the landuse analysis shows cropland erosion to be the greatest potential nonpoint source in the subwatershed. Therefore, reducing the sediment load from croplands is needed to both reduce the nutrient levels carried to the receiving waters attached to the soil and to avoid any future degradation of bottom substrate. Treating the most critical barnyard and manure spreading sources appears to be the most efficient method for achieving additional reductions in the organic load.

Actions: To achieve the water resource objective, a 70% reduction in the pollutant load occurring above the target levels, from all categories of nonpoint sources in the subwatershed is needed. Based on the results of the landuse data analysis, to achieve the pollutant load reductions, the following numbers of sites are included in each of the Management Categories for each nonpoint source category:

Nonpoint Source Category	Reduction Objective for Load > target	No. of Sites: Mgmt Category I	Mgmt Category IIa	Mgmt Category IIb	Mgmt Category III
Upland Erosion	70%	17	17	35	77
Barnyard Runoff	70%	11	13	0	11
Manure Management	70%	1	7	0	31
Streambank Erosion	70%	1	0	0	**

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

6. Lower Little River Subwatershed

General Description: The major water resource in this subwatershed is the lower 7.5 miles of the Little River from Jones Creek downstream to the Oconto River. Along here, the average gradient of the Little River is 9.5 feet per mile and the estimated low flow is 0.92 cfs. The major tributary to the Little River in this subwatershed is Creek 24-13, which joins the Little River about 2 miles above its mouth. Creek 24-13 is 3.5 miles long, has a gradient of 23 feet per mile and an estimated low flow of 0.16 cfs.

Water Quality and Use: Recent fishery surveys (1982) showed the presence of a warmwater, intolerant forage fishery of smallmouth bass, rock bass, northern pike and walleye. The river is also used seasonally by brown and rainbow trout. Like the middle stretches of the Little River, the area serves as a smallmouth bass, northern pike, and (to a limited extent) walleye spawning and nursery area. Biotic Index values from 1980 and 1982 showed fair and good values, indicative of very significant to significant organic pollution. While no Stream Habitat Rating values or observations are available for this stretch of the Little River, the fishery suggests habitat conditions similar to those found in the Middle Little River Subwatershed. Water chemistry samples from 1982 and 1983 did not show any problems with suspended solids or bacteria, but did include high total phosphorus and B.O.D. levels. The measured D.O. values were adequate, but have occasionally been found to be lower then those in the Oconto River at the same time, both above and below the junction.

Pollution Sources: Soil loss in the Lower Little River Subwatershed is moderate relative to other areas of the watershed. Ninety-five percent (13,500 tons) of the subwatershed soil loss is occurring on croplands, which make up 1/2 of the subwatershed acres. Of the croplands, 1/4 are in row crops, which contribute 1/2 of the total cropland soil loss. The soil loss rates for the subwatershed are lower than the watershed average, being 3 T/A/Y for row crops and 1 T/A/Y for crop rotations. Overall, grasslands, woodlands and pastures are not a problem for soil loss. Bringing all lands to erosion rates of 3 T/A/Y or less would reduce the total soil loss by 3,500 tons, which is 12% of possible watershed soil loss reduction. This is a 24% reduction of the subwatershed soil loss.

Phosphorus from barnyards in the Lower Little River Subwatershed is high relative to the other subwatersheds. There are 38 barnyards in the subwatershed which makes this subwatershed tied with the Upper Kelly Brook Subwatershed for highest number of barnyards. These barnyards contribute 351 pounds of phosphorus which is 16% of the watershed barnyard phosphorus load, the third highest in the watershed. Both the numbers of animals and the pounds of phosphorus per square mile of watershed area are slightly higher than the watershed average. Ten of the 38 barnyards together contribute 50% of the subwatershed barnyard phosphorus load.

Streambank erosion in the subwatershed is significant. The 6570 eroding feet (13% of the subwatershed streambanks) produce 224 tons of sediment which is 33% of the total watershed streambank sediment load. This averages to 46 tons of sediment per stream mile, which is the highest rate within the watershed, by 2 times. Restricting cattle access would reduce the feet eroding by 14% and the tons by 3%. Treating an additional 7 critical sites would result in an additional 33% reduction in eroding feet and 52% reduction in eroding tons. Site specific impacts and practice design need to be determined during project implementation.

Manure spreading appears to be a moderate problem in the Lower Little River Subwatershed compared to other subwatersheds. While the estimated number of critical acres (254 acres) is the second highest in the watershed, the critical acres spread per square mile of subwatershed area is equal to the watershed average.

There are no municipal or industrial point source discharges in the Lower Little River Subwatershed.

Water Resource Objectives: Protect the existing smallmouth bass and northern pike fishery and improve the walleye fishery in the Little River downstream from Jones Creek.

Similar to the Middle Little River Subwatershed, the spawning and nursery habitat for the warmwater fishery species needs to be protected from further degradation due to sediment and organic loads, and corresponding improvements in the D.O. should result. Treatment of the most critical barnyards and streambank sites is needed to reduce site-specific habitat impacts and overall treatment of cropland erosion is needed to achieve adequate sediment load reductions.

Actions: To achieve the water resource objective, a 70% reduction in the pollutant load occurring above the target levels, from all categories of nonpoint sources in the subwatershed is needed. Based on the results of the landuse data analysis, to achieve the pollutant load reductions, the following numbers of sites are included in each of the Management Categories for each nonpoint source category:

Nonpoint Source Category	Reduction Objective for Load > target	No. of Sites: Mgmt Category I	Mgmt Category IIa	Mgmt Category IIb	Mgmt Category III
Upland Erosion	70%	15	15	28	122
Barnyard Runoff	70%	14	13	0	11
Manure Management	70%	1	9	0	29
Streambank Erosion	70%	4	11	0	**

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

7. Jones Creek Subwatershed

General Description: Jones Creek, the major stream in the subwatershed, is a tributary to the Little River. The creek passes through the village of Lena and joins the Little River about 7.5 miles upstream from the Oconto River. It is 5.3 miles long, has a gradient of 15 feet per mile and an estimated low flow of 0.35 cfs.

Water Quality and Use: Jones Creek supports a limited warmwater sport and tolerant forage fishery. Forage species of brook sticklebacks and white suckers comprise the upper reaches of the creek, where the flow is very low. Smallmouth bass are found in the lower reaches where there is some evidence of limited natural reproduction occurring. Biotic Index samples from 1980 and 1982 indicate poor water quality conditions and very significant organic pollution impacts. Stream Habitat Rating values from May 1985 showed fair habitat conditions, limited by low flow inadequate pool depth and bank cover. However, additional observations along the creek showed better habitat conditions, with good smallmouth bass nursery habitat near CTH J. No water chemistry information is available for Jones Creek.

Pollution Sources: The Jones Creek Subwatershed has moderate soil erosion problems. It has 6% of the watershed area and produces 6% of the watershed tons. Of this 6,700 tons, 95% comes from croplands, with 39% of that coming from row crops. The average soil loss rates for row crops (3.1 T/A/Y) and rotation crops (1.5 T/A/Y) are slightly less than the watershed average. Pasture, woodlands and grasslands do not present a soil loss problem. Reducing all lands to 3 T/A/Y or less would reduce the subwatershed soil loss by 1,397 tons, a 20% reduction. This comprises 20% of the watershed potential soil loss reduction.

The density of animals and pounds of phosphorus per square mile in the Jones Creek Subwatershed are significantly the highest in the watershed. The estimated total phosphorus load from the 17 barnyards is 234 pounds, or 11% of the watershed barnyard phosphorus load. Fifty percent of the subwatershed barnyard phosphorus load comes from 5 of the 17 barnyards.

Streambank erosion is also a problem in the Jones Creek Subwatershed. The 10,300 feet of eroding streambanks (the highest number and percent in the watershed) produce 105 tons of sediment. This averages out to 23 tons per streammile, the second highest rate in the watershed. Restricting cattle access alone would reduce both the feet eroding and the tons by 1/2.

From a manure management standpoint, the Jones Creek Subwatershed has the greatest number of critical acres spread per square mile of area of all the subwatersheds. The estimated 180 critical acres spread comprise 10% of the overall watershed critical acres spread.

There is one municipal discharge (the village of Lena) and one industrial discharge (Frigo Cheese Corporation in Lena) in the subwatershed. The Lena wastewater treatment plant and the noncontact cooling water from the Frigo plant are discharged to Jones Creek. Currently, both systems are adequately meeting their WPDES permit requirements. Frigo does have some spray irrigation fields for which buffers between the fields and the creek need to be maintained to avoid nutrient runoff problems.

Water Resource Objectives: Improve the smallmouth bass fishery in Jones Creek.

The most significant habitat improvements that can be made in the subwatershed are to restrict cattle access to the creek. Not only will this reduce the sediment load and improve the cover, it will also allow the channel to take a narrower course, increasing the water depth of the limited flow. Additionally, reduction of organic loading to the creek from barnyards and manure spreading is also critical because of the increased impacts of the organic material when water volume is low.

Actions: To achieve the water resource objective, a 70% reduction in the pollutant load occurring above the target levels, from all categories of nonpoint sources in the subwatershed is needed. Based on the results of the landuse data analysis, to achieve the pollutant load reductions, the following numbers of sites are included in each of the Management Categories for each nonpoint source category:

	Reduction	:----------No. of Sites----------:			
Nonpoint Source Category	Objective for Load > target	Mgmt Category I	Mgmt Category IIa	Mgmt Category IIb	Mgmt Category III
Upland Erosion	70%	7	6	9	20
Barnyard Runoff	70%	7	6	0	4
Manure Management	70%	1	5	0	11
Streambank Erosion	70%	2	6	0	**

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

8. Green Bay Subwatershed

General Description: This subwatershed includes tributaries directly to Green Bay, adjacent to the Little River. There are two primary tributaries. Thomas Slough enters Green Bay about 4 miles north of the Oconto River. It is 2 miles long, as a gradient of 9 feet per mile and an estimated low flow of 0.13 cfs. Creek 33-4 is just south of Thomas Slough, is 3 miles long and has a gradient of 10 feet per mile, with an estimated low flow of 0.13 cfs. There are also about 4 miles of Green Bay shoreline in the subwatershed. The shoreline is mostly wetlands, with near shore water levels of less than 8 to 10 feet.

Water Quality and Use: Thomas Slough supports tolerant forage fishes and spring spawning runs of northern pike. Green Bay along this area supports a variety of seasonal sport fisheries including brown trout, rainbow trout, coho salmon, chinook salmon, smallmouth bass, walleye, northern pike and perch.

Neither the Biotic Index or Stream Habitat Rating methods are appropriate assessment techniques for the nature of the water resources in this subwatershed. Water chemistry information is also not available.

There are limited dwellings along the Green Bay shore because of the low nature of the shoreline. There are three recreational areas on the bay within the subwatershed.

Pollution Sources: Soil loss is less than the watershed average in the Green Bay Subwatershed. With 19% of the watershed acres, the subwatershed contributes 13% of the watershed tons of soil loss. The vast majority (96%) of this comes from the croplands. One-fourth of the croplands are in row crops, which cumulatively contribute 1/2 of the subwatershed soil loss. The erosion rates for row crops (1.5 T/A/Y) and crop rotations (1.0 T/A/Y) are lower than the watershed average. Pasture, woodland and grassland soil loss is not a problem in this subwatershed. If practices were applied to the lands to reduce the erosion rates to 3 T/A/Y or less, a 2,800 ton reduction in the soil loss would occur. This is a 20% reduction in the subwatershed soil loss and comprises 10% of the overall watershed potential soil loss reduction.

Phosphorus from barnyards in the subwatershed is low relative to the watershed total. The are 29 barnyards with about 1,760 animal units total. This is a high number of small animal operations compared to other subwatersheds. Together, the barnyards contribute 189 pounds of phosphorus, which is the smallest subwatershed barnyard phosphorus load. Nine of the 29 barnyards contribute 50% of the subwatershed phosphorus load.

Relative to other subwatersheds, manure spreading on critical acres is not significant. The estimated 160 critical acres spread and 3.9 critical acres spread per square mile are the lowest in the watershed.

No streambank erosion inventory was conducted on Thomas Slough or Creek 33-4.

There are no municipal or industrial discharges to surface waters within the subwatershed.

Water Resource Objectives: Protect the northern pike and walleye spawning habitat in near shore areas of Green Bay.

To protect the nearshore wetlands, reductions in primarily in the sediment load and secondarily in the organic load are needed. Treating the overall subwatershed soil loss as well as the most critical barnyards should accomplish this reduction.

Actions: To achieve the water resource objective, a 70% reduction in the pollutant load occurring above the target levels, from all categories of nonpoint sources in the subwatershed is needed. Based on the results of the landuse data analysis, to achieve the pollutant load reductions, the following numbers of sites are included in each of the Management Categories for each nonpoint source category:

Nonpoint Source Category	Reduction Objective for Load > target	No. of Sites: Mgmt Category I	Mgmt Category IIa	Mgmt Category IIb	Mgmt Category III
Upland Erosion	70%	15	16	24	135
Barnyard Runoff	70%	12	11	0	6
Manure Management	70%	0	7	0	24
Streambank Erosion	70%	no inventories were conducted....			

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

9. Overview of Little River Watershed

General Description: The Little River is a major tributary to the Oconto River, and enters the Oconto River downstream from the village of Stiles, about 9 stream miles from Green Bay.

General Water Quality and Use: As a result of recent Oconto River restoration activities in the river below the Stiles dam and in the Machicknee flowage, fisheries are now redeveloping for northern pike, smallmouth bass, walleye, smelt, chinook salmon, rainbow trout, and brown trout in the Oconto River from Stiles to Green Bay. The Little River serves as a major smallmouth bass and northern pike spawning and nursery system for Oconto River and Green Bay fisheries. Additionally, it is used to some extent for seasonal walleye, brown trout, rainbow trout and salmon runs. Because the Oconto River currently has a D.O. variance of 3 ppm and extreme water level fluctuations, the Little River provides a more stable environment for Oconto River fish to move to under adverse conditions.

General Pollution Sources: From the watershed as a whole, there are 110,600 tons of soil loss, 95% of which come from croplands (which make up 47% of the watershed acres). The greatest problems occur in the Daley Creek and Middle Little Subwatersheds. Bringing all lands to soil loss rates of 3 T/A/Y or less would reduce the total tons by 29, 500, a 26% reduction.

There are 241 barnyards in the watershed contributing an estimated 2,220 pounds of phosphorus to the surface waters. The greatest problems occur in the Upper Kelly Brook, Lower Kelly Brook and Lower Little Subwatersheds. Sixty-three of the 241 barnyards cumulative account for 50% of the barnyard phosphorus load.

There are approximately 53,700 feet of eroding streambanks in the Little River Watershed, directly contributing 680 tons of sediment to the streams. The greatest problems with tons of sediment per stream mile occur in the Lower Little River, Jones Creek and Lower Kelly Brook Subwatersheds.

Based on criteria for safe spreading of manure in winter, there are an estimated 1,800 critical acres (greater than 6% slopes or wet soils) spread in the watershed. The subwatersheds with the greatest number of critical acres spread are the Upper Little River, Lower Little River and Upper Kelly Brook Subwatersheds.

Overall Watershed Water Resource Objectives: Improve the lower Oconto River and Green Bay sport fisheries by protecting the smallmouth bass habitat and improving the northern pike, walleye and anadromous trout and salmon habitat in the Little River, Kelly Brook and Daley creeks and reducing the nutrient and BOD load to the near shore waters of Green Bay from the overall Little River system. These objectives will best be accomplished by achieving the individual subwatershed objectives discussed above.

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 60 feet below the surface. The major aquifer for water supply is a sand and gravel aquifer and the porous sandstone bedrock.

Depth to bedrock and the water table varies greatly throughout the watershed. Table 17 below shows some values for this information based on the well log records of 96 sites within the watershed.

Table 17: Bedrock and Water Table Depths

Depth To:	Water Table (ft)	Bedrock (ft)
Average:	22	57
Range:	0 - 60	7 - 230

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. In the western 2/3 of the watershed, the soils of the uplands (Onaway, Solona, Emmet) are generally deep (60"), well to moderately well drained, and a texture of loam to sandy loam. These soils are moderately permeable. The texture and permeability of these soils indicates that the surface runoff does not freely enter into the groundwater system. The soils along Green Bay (Wainola, Cormant, Deford) and in depression throughout the watershed are poorly to very poorly drained loamy fine sands to fine sands with shallow water tables, indicating that surface runoff does have the potential to reach the groundwater with these soils. As an indicator, elevated nitrate levels in well water indicate the presence of organic wastes in the groundwater. Review of the available private well records showed no indication of elevated nitrate levels in wells in the Little River Watershed. Nitrate levels below 10 (mg/l) are considered safe for all uses, but high concentrations in drinking water can be harmful to infants.

At this time, it is not believed that nonpoint sources are impacting the groundwater on a large scale in this watershed. It is possible there may be isolated cases where improperly stored manure or a manure stack is leaching contaminants onto the groundwater. However, the common upland soil types should generally protect against this situation. If nonpoint source conditions are found during the implementation of the 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 and 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 Oconto and Marinette County Boards will serve as the management agencies for their respective counties. These counties are being represented by their respective Land Conservation Committees (LCCs). The Village of Lena is also an identified management agency for nonpoint source responsibilities within its incorporated limits. The village is included as a management agency 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 Little 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 LCCs.

The Oconto County Land Conservation Committee, acting for the Oconto County Board, was selected as the lead management agency for the Little River Watershed Project by the other agencies involved. Oconto 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 recordkeeping;

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 Little River 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 (UW-EXT): 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): Cost-sharing provided by the ongoing ACP program (Agricultural Conservation Program) will be coordinated with the Wisconsin Fund project in the Little River Watershed.

4. Department of Natural Resources (DNR): The Department has overall administrative responsibility for the Wisconsin Nonpoint Source Water Pollution Abatement Program of which the Little River 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 Little River Watershed project for cost-sharing under the Wisconsin Fund program are listed in Table 18. 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.

Table 18: Best Management Practices and Maximum Cost-Share Rates

Practice	Maximum Cost Sharing Rate
Terrace	70%
Reduced Tillage	50% (flat rate of $45/ac over three years)
Contour Strip & Field Strip Cropping	50% (flat rate of $12/ac)
Contour Cropping	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 $10/rod)
Settling Basins	70%
Barnyard Runoff Management	70%
Manure Storage Facilities	70% (currently,$6000 max.)(1)
Livestock Exclusions from Woodlots	50% (flat rate of $10/rod)
Street Cleaning	50%

(1) Cost sharing for manure storage facilities will be expanded to include long term manure storage facilities, with a maximum of $10,000 cost sharing and short term storage, with a maximum of $6,000 cost sharing, with the formal approval of the revisions to NR 120, scheduled for July 1986.

The BMPs included in Table 18 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.

Below 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.

1. Contour Strip Cropping - This practice involves growing 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 earthen 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 3 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 A 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 (Oconto 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 A 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 A.

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

Oconto County, as the lead management agency, will send reimbursement checks directly to the landowners in Oconto and Marinette 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.

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 similar for the counties of Oconto and Marinette. Below is listed the procedure agreed upon by the counties.

Cost-Share Fund Reimbursement Procedure: Oconto and Marinette Counties

1. Landowner and conservation planner for respective county meet to discuss watershed project and landowner's management practice needs.
2. Landowner agrees to cooperate with the project and apply conservation practices.
3. Cost-share Agreement (form 3400-68) is developed with landowner and respective county conservation planner.
4. Cost-share Agreement is signed by landowner.
5. Cost-share Agreement is signed by respective county LCC chair.
6. Cost-share Agreements from both counties will be approved by Oconto County Board by resolution, with instructions to the Oconto County Clerk to pay the amounts upon completion of the project and approval of the respective LCCs.
7. "Cost Share Calculation and Practice Certification" forms (form 3200-53) are prepared by the respective county LCD offices for each Cost-share Agreement, for each years practices, including the installation date. Marinette County forwards the 3200-53 to Oconto County with the Cost-share Agreement.
8. Practices are designed by respective county SCS or LCD, copy of the design delivered to the landowner.
9. Landowner contacts Contractor and Technician. Landowner may have bids or not exceed the range of cost for any one project.
10. Respective county SCS or LCD lay out the practices if necessary.
11. Contractor installs practice.
12. Respective county SCS or LCD certifies installation (form 3200-53), technician returns form to LCD file.
13. Landowner submits paid bills and copies of bids, if needed, and cancelled checks to their county LCD office, and certifies project complete on form 3200-53.
14. Respective county LCD prepares vouchers for bills.
15. Marinette County LCC reviews and approves payment of Marinette County 3200-53s and forwards to Oconto LCD.
16. Oconto County LCC reviews and approves 3200-53s from both counties and instructs the Oconto County Clerk to issue payment, with a cover letter from the appropriate county. A copy of the check number, with amount and date, will be kept in the Oconto LCD office as evidence of payment.

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 A for an example). This document provides for the reimbursement to the county for costs of administering the watershed project. The costs handled in this agreement include the costs for conducting 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 under "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 two counties in the project an initial base level calculation is shown on Table 19. This level can change throughout the project depending upon county's commitments. (Note: The county commitment will be changed from this calculated "base level" to project and fiscal management activities after the formal approval of the revisions to NR 120 (effective July 1986).

Table 19: 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)
Oconto Co.	20%		2,382		715
Marinette Co.	6%		1,707		154

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. 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 Little River Watershed are listed on Table 20. The quantities of BMPs needed were estimated based on the assumptions given below. 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 $2,330,375. 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 and workload needs.

The assumptions used to estimate the practice needs given in Table 20 are as follows:

1. The number of units of each practice are estimated based on the inventory results and include the all the landowners in Management Categories I and II for each nonpoint source category.

a) Cropland Management Practices - Practices were "applied" to each parcel of cropland currently eroding above 3 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 crop rotation, the practice application order was: change in rotation - add one year of hay, subtract one year of corn, a second change in rotation as above, contour strips, then conservation tillage. (Note: Marinette County technical staff feel that the landowners in Marinette County are more likely to apply conservation tillage before contour strips. Therefore, the practices actually implemented in Marinette County may result in higher numbers of acres of conservation tillage and lower acres of contour strips than are estimated here.)

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 3 t/a/y then conservation 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 no further practices were applied to a field after this point. In this region of the state terraces are not practical.

Upon completion of these procedures, the acres of each practice were summed as well as the acres of land still eroding above the 3 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.

b) Grassed Waterways - Through the past experience of the counties in the project area, it was estimated that each landowner in Management Category I for cropland would need 1½ waterways at 0.85 acres per waterway.

c) Critical Area Stabilization - Based on the past experience of the county technical staff, critical acres needing stabilizing through such practices as shaping and seeding of critical sites and tree planting were estimated.

d) Pasture Management/Critical Area Stabilization for Pastures- The upland erosion inventory allowed for the calculation of soil loss on lands identified as pasture. All pastures with soil loss above 3 tons/acre/year were selected as needing some type of pasture management. In the Little River Watershed, this is particularly important for pastures in wet soils adjacent to surface waters where adequate vegetative cover is difficult to maintain with heavy cattle use. Pasture management includes seeding of a permanent cover and the installation of fencing to control the use of portions of the pasture.

e) Grade Stabilization Structures - The practices most likely to be used are sod chutes and aluminum toe walls. This need was also estimated based on the past experiences of the technical staff in the counties. The staff estimated that 26 landowners in the project area need some type of grade stabilization structure.

f) Barnyard Runoff Management - All of the Management Category I and II landowners from the barnyard runoff analysis are assumed to need some type of barnyard runoff work, though the type of needs and costs will vary with each situation.

g) Manure Storage - All of the Category I and II landowners from the manure management analysis are assumed to need a manure management plan which may or may not include short or long term storage. This estimate reflects all the Category I and II landowners. As previously mentioned, the maximum cost share rates for manure storage will be increased to $10,000 for long term storage and $6,000 for short term storage with the formal approval of the revisions to NR 120 in July 1986.

Table 20: Estimated Practice Needs and Costs in the Little River Watershed

Practice	Number of Units Needed (100%)	Cost/ Unit ($)	Cost for All Practices			Cost Share Rate (%)	Cost Share for All Practices		
			Oc. Co. ($)	Mar. Co. ($)	Total ($)		Oc. Co. ($)	Mar.Co. ($)	Total ($)
Rotation Change: (a)									
Oconto Co.	1,969 ac	$0	$0			0%	$0		
Marinette Co.	193 ac	$0		$0		0%		$0	
Watershed Total	2,162 ac	$0			$0	0%			$0
Contour Crop: (a)									
Oconto Co.	4,750 ac	$12	$57,000			50%	$28,500		
Marinette Co.	1,456 ac	$12		$17,472		50%		$8,736	
Watershed Total	6,206 ac	$12			$74,472	50%			$37,236
Contour Strips: (a)									
Oconto Co.	215 ac	$12	$2,580			50%	$1,290		
Marinette Co.	5 ac	$12		$60		50%		$30	
Watershed Total	220 ac	$12			$2,640	50%			$1,320
Cons. Tillage: (a)									
Oconto Co.	1,023 ac	$90	$92,070			50%	$46,035		
Marinette Co.	69 ac	$90		$6,210		50%		$3,105	
Watershed Total	1,092 ac	$90			$98,280	50%			$49,140
Grassed Waterways: (b)									
Oconto Co.	240 ac	$1,750	$420,000			70%	$294,000		
Marinette Co.	60 ac	$1,750		$105,000		70%		$73,500	
Watershed Total	300 ac	$1,750			$525,000	70%			$367,500
Critical Area Stabilization: (c)									
Oconto Co.	20 ac	$500	$10,000			70%	$7,000		
Marinette Co.	5 ac	$500		$2,500		70%		$1,750	
Watershed Total	25 ac	$500			$12,500	70%			$8,750
Pasture Management: (d)									
Oconto Co.	591 ac	$30	$17,730			70%	$12,411		
Marinette Co.	0 ac	$30		$0		70%		$0	
Watershed Total	591 ac	$30			$17,730	70%			$12,411
Grade Stab. - sod chute: (e)									
Oconto Co.	16 units	$800	$12,800			70%	$8,960		
Marinette Co.	2 units	$800		$1,600		70%		$1,120	
Watershed Total	18 units	$800			$14,400	70%			$10,080
Grade Stab. - aluminum toe wall: (e)									
Oconto Co.	7 units	$3,000	$21,000			70%	$14,700		
Marinette Co.	1 units	$3,000		$3,000		70%		$2,100	
Watershed Total	8 units	$3,000			$24,000	70%			$16,800
Barnyard Runoff: (f)									
Oconto Co.	143 units	$11,000	$1,573,000			70%	$1,101,100		
Marinette Co.	22 units	$11,000		$242,000		70%		$169,400	
Watershed Total	165 units	$11,000			$1,815,000	70%			$1,270,500
Manure Mgmt: (g)									
Oconto Co.	62 units	$10,000	$620,000			$6000 max	$372,000		
Marinette Co.	2 units	$10,000		$20,000		$6000 max		$12,000	
Watershed Total	64 units	$10,000			$640,000	$6000 max			$384,000
Streambank Fencing: (h)									
Oconto Co.	1,044 rods	$10	$10,440			70%	$7,308		
Marinette Co.	62 rods	$10		$620		70%		$434	
Watershed Total	1,106 rods	$10			$11,060	70%			$7,742
Streambank Shape & Seed: (i)									
Oconto Co.	1,515 rods	$33	$49,995			70%	$34,997		
Marinette Co.	90 rods	$33		$2,970		70%		$2,079	
Watershed Total	1,605 rods	$33			$52,965	70%			$37,076
Streambank Rip Rap: (j)									
Oconto Co.	500 rods	$320	$160,000			70%	$112,000		
Marinette Co.	30 rods	$320		$9,600		70%		$6,720	
Watershed Total	530 rods	$320			$169,600	70%			$118,720

Table 20: Estimated Practice Needs and Costs in the Little River Watershed (con't)

Practice	Number of Units Needed (100%)	Cost/ Unit ($)	Cost for All Practices			Cost Share Rate (%)	Cost Share for All Practices		
			Oc. Co. ($)	Mar. Co. ($)	Total ($)		Oc. Co. ($)	Mar.Co. ($)	Total ($)
Streambank Crossings: (k)									
Oconto Co.	10 units	$1,000	$10,000			70%	$7,000		
Marinette Co.	3 units	$1,000		$3,000		70%		$2,100	
Watershed Total	13 units	$1,000			$13,000	70%			$9,100
Total for All Practices at 100% Participation:									
Oconto Co.			$3,056,615				$2,047,301		
Marinette Co.				$414,032				$283,047	
Watershed Total					$3,470,647				$2,330,375
Cost Share for All Practices at 75% Participation - for Workload and Budget Estimates:									
Oconto Co.							$1,535,476		
Marinette Co.								$212,305	
Watershed Total									$1,747,781

h) Streambank Fencing - Based on the streambank erosion inventory the total length of streambank eroding with cattle access was assumed to need at least this practice for control. Because no streambank inventory was conducted on the tributaries in Marinette County, the estimates for that county are based on 6% of Oconto County's needs which is the same ratio as the land areas of the two counties within the watershed.

i) Streambank Shaping, Seeding, & Fencing - Based on the streambank erosion inventory the total length of streambank eroding at the medium lateral recession rate without cattle access, or at the low or medium lateral recession rate with cattle access, was assumed to need this practice. Streambank fencing is required with shaping and seed where cattle are present.

j) Streambank Rip Rap - Based on the streambank erosion inventory the total length of streambank eroding at the highest lateral recession rate was estimated to need rip rap, regardless of cattle access. The Inventory results indicated that no sites were eroding at this high recession rate, but county LCC and SCS staff felt that about 1/3 of the sites needing shaping and seeding would also need rip rap, primarily due to the large drainage area above many of the sites.

k) Stream Crossings - Through past experience of the counties, it was estimated that between 1/4 and 1/3 of the landowners needing streambank work would need crossings. This number was estimated to be 13 for the watershed.

Note: Woodlot Fencing - The upland erosion inventory also identified the grazed woodlots along with their soil loss. All grazed woodlots with soil loss greater than 3 tons/acre/year would be assumed to need some fencing. However, the inventory showed no grazed woodlots eroding at 3 tons/acre/year or greater, so no woodlot fencing estimates were included in the cost estimates for the project. If grazed woodlots with soil losses greater than 3 tons/acre/year are found during implementation, they will be eligible for cost sharing for fencing.

B. Local Assistance Needs and Costs

Through the planning process, the number of landowners with nonpoint source control needs has been estimated. Table 21 shows this information by county.

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

	Oconto	Marinette	Total
Total Landowners Inventoried:	1,049	213	1,262
Landowners with at least one Mgmt Category I Sources:	175	31	206
Landowners with at least one Mgmt II or IIa Sources, but no Mgmt I Category Sources:	175	36	211
Landowners with only Mgmt Category IIb or III Sources:	699	146	845

Table 22 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 used to calculate the time requirements shown on Table 21 are explained below.

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

Oconto Co.	400 hrs/yr
Marinette Co.	200 hrs/yr

The hours varied depending upon the amount of the county in the project and amount of administrative duties.

2. 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) three times at two hours per contact.

3. 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.

4. Conservation Planning: Conservation planning estimates are based on 75% of landowners with croplands in Management Category I or IIa for upland erosion times 40 hours per plan.

5. Practice Design and Installation/Certification: The quantities of practices are 75% of the values shown in Table 20. The rates for the tasks were obtained from the counties.

6. Cost Share Agreement Review: These estimates are based on 2 reviews per cost share agreement during the 5 year installation period.

7. Education/Information Hours: These hours are based on the activities in the Information and Education Program included in Chapter VII of the plan. Only County LCC and SCS hours are included in the estimate.

8. Fiscal Management: These hours include 1 hour per cost share agreement to set up the county cost share agreement file; 1/2 hour each for Oconto County to add Marinette County's cost share agreements to the total watershed project cost share agreement file; and 4 reimbursement requests per cost share agreement at 1.25 hours per request, spread over the 8 year project period.

Table 22: Estimated Staff Time Requirements for the Little River Watershed Project (assuming a 75% participation rate and an 8 year project)

Activity	Number of Units Needed	Rate (hrs/ unit)	BMP Design & Install. Hours	Hours Per Activity: Oc. Co. (hours)	Mar. Co. (hours)	Total (hours)
Landowner Contacts:						
Oconto Co.	1,050	2		2,100		
Marinette Co.	201	2			402	
Watershed Total	1,251	2				2,502
Conservatn Planning:						
Oconto Co.	143	40		5,720		
Marinette Co.	34	40			1,360	
Watershed Total	177	40				7,080
Cost-share Agreement Development:						
Oconto Co.	263	2		526		
Marinette Co.	50	2			100	
Watershed Total	313	2				626
Practice Design & Installation:						
Oconto Co.						
Contour Farming	3,563 ac	0.3	1,069			
Contour Strips	162 ac	0.3	49			
Cons. Tillage	768 ac	0.3	230			
Grassed Waterway	180 ac	25	4,500			
Grade Stab Struct	17 unit	45	765			
Pasture Mgmt	444 ac	0.3	133			
Streambank Fencing	783 rods	0.2	157			
Streambk Shape/Seed	1,136 rods	0.8	909			
Streambank Rip Rap	375 rods	1.12	420			
Stream Crossing	8 units	15	120			
Barnyd Runoff Mgmt	107 units	72	7,704			
Manure Storage	46 units	50	2,300			
Critcl Area Stab	15 ac	2	30	18,386		
Marinette Co.						
Contour Farming	1,092 ac	0.3	328			
Contour Strips	5 ac	0.3	2			
Cons. Tillage	52 ac	0.3	16			
Grassed Waterway	45 ac	25	1,125			
Grade Stab Struct	2 unit	45	90			
Pasture Mgmt	0 ac	0.3	0			
Streambank Fencing	47 rods	0.2	10			
Streambk Shape/Seed	68 rods	0.8	55			
Streambank Rip Rap	23 rods	1.12	26			
Stream Crossing	2 units	15	30			
Barnyd Runoff Mgmt	17 units	72	1,224			
Manure Storage	2 units	50	100			
Critcl Area Stab	4 ac	2	8		3,014	
Watershed Total						
Contour Farming	4,655 ac	0.3	1,397			
Contour Strips	167 ac	0.3	51			
Cons. Tillage	820 ac	0.3	246			
Grassed Waterway	225 ac	25	5,625			
Grade Stab Struct	19 unit	45	855			
Pasture Mgmt	444 ac	0.3	133			
Streambank Fencing	830 rods	0.2	167			
Streambk Shape/Seed	1,204 rods	0.8	964			
Streambank Rip Rap	398 rods	1.12	446			
Stream Crossing	10 units	15	150			
Barnyd Runoff Mgmt	124 units	72	8,928			
Manure Storage	48 units	50	2,400			
Critcl Area Stab	19 ac	2	38			21,400

Table 22: Estimated Staff Time Requirements for the Little River Watershed Project (assuming a 75% participation rate and an 8 year project)

Activity	Number of Units Needed	Rate (hrs/ unit)	BMP Design & Install. Hours	Hours Per Activity		
				Oc. Co. (hours)	Mar. Co. (hours)	Total (hours)
Cost-share Agree Review:						
Oconto Co.	526	1		526		
Marinette Co.	100	1			100	
Watershed Total	626	1				626
Project Management:						
Oconto Co.		400		3,200		
Marinette Co.		200			1,600	
Watershed Total		600				4,800
Fiscal Management:						
Oconto Co.				1,700		
Marinette Co.					300	
Watershed Total						2,000
Education/Information:						
Oconto Co.				2,294		
Marinette Co.					439	
Watershed Total						2,733
TOTAL PROJECT HOURS						
Oconto Co.				34,452		
Marinette Co.					6,982	
Watershed Total						41,434

VI. Project Schedule

Project schedules have been developed for Oconto and Marinette Counties and are shown in Tables 23a, 23b and 23c, respectively. The accuracy of the schedules will depend upon the participation of the landowners. The schedules, as presented, are most useful for determining staff needs for the counties during 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, which are activities that will occur independent of the landowner participation rate. During the last 5 years of the project, the workload will shift to include more design and installation of practices, which will be determined by how the staff schedule practice installation with the landowners. It is important for the staff to work with the landowners to schedule practice installation when it is both convenient for the landowner as well as when it fits with the county's future staffing strategy.

The assumptions used to make Tables 23a, 23b and 23c are described below:

1. Landowner Contacts: All contacts need to be made during the first 3 years of the project. Each contact is estimated to take 2 hours. All landowners with at least one Management Category I or II/IIa source need to be contacted the first year, with about 1/4 of them contacted 2 times the first year. During the second year, all landowners which have not yet signed a cost share agreement need to be contacted at least one time. During the last year of sign-up, all landowners remaining without signed cost share agreements need to contacted 1 time, with about 1/3 of them contacted 2 times.

2. Conservation Planning: The total conservation planning hours are based on the number of landowners in Management Categories I or IIa X 75% X 40 hours per plan. It was estimated that 1/4 of these plans would be completed during year 1, with the remaining plans being equally divided during year 2 and 3.

3. Cost Share Agreement Development: All cost share agreements need to be developed and signed during the first 3 years of the project. The total hours were based on the number of landowners with at least one source in Management Category I or II/IIa X 75% X 2 hours per agreement. It was estimated that 1/4 of the cost share agreements would be signed year 1, 1/3 would be signed year 2, and the remaining 40-45% would be signed year three.

4. Practice Design & Installation: Based on the estimated total practice needs at 75% participation, these hours were concentrated in the last 5 years of the project and adjusted to make a consistent staff level need over the project period. To assure that consistent staff level need occurs, the staff working with the landowners need to carefully schedule practice design and installation accordingly when developing the cost share agreements.

5. Cost Share Agreement Review: These hours indicate that each landowner with a cost share agreement will be contacted 2 times during the installation period to assure that their practices are being installed on schedule. About 1/3 of the agreements will be reviewed with the landowner each year during the last 5 years.

6. Project Management: These activities were assumed to occur at a consistent level during each year of project implementation.

7. Education/Information: The scheduling and hours for these activities are given in detail in Chapter VII.

Table 23a: Oconto County - Little River Watershed Project Workload
Scheduled Over 8 Years, Assuming 75% Participation Level

Activity	Project Total Hours	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8
Lndownr Contacts	2,100	915	700	485	0	0	0	0	0
Cons. Plan.	5,720	1,500	2,040	2,180	0	0	0	0	0
Cost-share Agree Development	526	100	200	226	0	0	0	0	0
Practice Design & Installation	18,386	347	143	1,194	3,407	3,407	3,407	3,407	3,074
Cost-share Agree Review	526	0	25	75	85	85	85	85	86
Project Mgmt	3,200	400	400	400	400	400	400	400	400
Education	2,294	922	492	340	108	108	108	108	108
Fiscal Mgmt	1,700	131	347	298	213	213	213	213	72
TOTAL PROJECT HOURS	34,452	4,315	4,347	5,198	4,213	4,213	4,213	4,213	3,740
Estimated County Committment (1)		715	747	698	613	613	613	613	472
Est. Additional Staff Needs		3,600	3,600	4,500	3,600	3,600	3,600	3,600	3,268

(1) Estimated County Committment is given as "base level" for year 1 and the sum of fiscal and projectment hours for years 2 through 8.

Table 23b: Marinette County - Little River Watershed Project Workload
Scheduled Over 8 Years, Assuming 75% Participation Level
Option A - Half-time person for 5 years

Activity	Project Total Hours	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8
Lndownr Contacts	402	175	125	102	0	0	0	0	0
Cons. Plan.	1,360	480	440	440	0	0	0	0	0
Cost-share Agree Development	100	24	36	40	0	0	0	0	0
Practice Design & Installation	3,014	115	225	199	875	875	310	309	106
Cost-share Agree Review	100	0	10	15	15	15	15	15	15
Project Mgmt	1,600	200	200	200	200	200	200	200	200
Education	439	216	64	104	11	11	11	11	11
Fiscal Mgmt	300	22	53	55	57	58	35	10	10
TOTAL PROJECT HOURS	6,982	1,057	1,153	1,155	1,158	1,159	571	545	342
Estimated County Committment (1)		154	253	255	257	258	235	210	210
Est. Additional Staff Needs		903	900	900	901	901	336	335	132

(1) Estimated County Committment is given as "base level" for year 1 and the sum of fiscal and project management hours for years 2 through 8.

Table 23c: Marinette County - Little River Watershed Project Workload
Scheduled Over 8 Years, Assuming 75% Participation Level
Option B - Full-time person for 2 years

Activity	Project Total Hours	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8
Lndownr Contacts	402	150	150	102	0	0	0	0	0
Cons. Plan.	1,360	330	515	515	0	0	0	0	0
Cost-share Agree Development	100	24	36	40	0	0	0	0	0
Practice Design & Installation	3,014	115	119	1,024	1,756	0	0	0	0
Cost-share Agree Review	100	0	10	15	15	15	15	15	15
Project Mgmt	1,600	200	200	200	200	200	200	200	200
Education	439	216	64	104	11	11	11	11	11
Fiscal Mgmt	300	22	53	55	57	58	35	10	10
TOTAL PROJECT HOURS	6,982	1,057	1,153	2,049	2,039	284	261	236	236
Estimated County Committment (1)		154	253	255	257	258	235	210	210
Est. Additional Staff Needs		903	900	1,794	1,782	26	26	26	26

(1) Estimated County Committment is given as "base level" for year 1 and the sum of fiscal and project management hours for years 2 through 8.

8. Fiscal Management: Using the 4 reimbursements per cost share agreement at 1.25 hour/reimbursement and 1 hour per agreement to set up the file as guidelines, it was assumed that the majority of the reimbursement requests would occur equally distribute between years 2 through 7 of the project and that all cost share agreement filing would occur during the first 3 year, consistent with the developing and signing of the agreements.

VII. Education Activities

A. Introduction

The educational activities for the Little River Watershed project are designed to provide current information to all people in the project area. By the use of various educational methods, project staff 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 the landowners can reduce nonpoint source pollution which will result in improved water quality.

The four major objectives of the educational program are:

1. to provide information about the Little River Watershed and the watershed program;
2. to make people aware of water quality problems arising from animal production, what can be done to alleviate these problems and what the alternatives and consequences are;
3. to educate people on the causes and various remedial actions of water pollution resulting from crop production; and
4. to increase the awareness of the problem of streambank erosion and provide information on techniques to reduce the problem.

The six audiences that the education program will focus on are:

1. dairy farmers;
2. cash grain farmers and land renters;
3. people who own land that is rented for agricultural production;
4. the general public;
5. elected officials; and
6. special interest groups.

B. Description of Activities

1. Newsletters: The newsletters will provide general progress reports of watershed activities and each will include an in depth discussion of a highlighted issue, a calendar of events and the major points to be covered in the next issue. The newsletters will be published quarterly during the landowner sign-up period and twice annually for the remaining five years. The major issues to be highlighted include: general introduction to the project, barnyard management, manure management, soil erosion and field runoff, streambank protection, conservation tillage and information specific to land renter/rentee needs.

2. General Watershed Brochure: The watershed brochure will be printed during the first year of the project. It will be designed to explain the technical and policy aspects of the watershed project to the general public, and answer general questions about participating in the project.

3. Watershed Folder: These will be pocket folders with the watershed name printed on them, produced during the first year of the project and distributed to landowners during farm visits and watershed meetings. Each folder will contain materials such as the watershed brochure, cost sharing information, and fact sheets on management practices, and will serve as a convenient filing system for watershed information for the landowners.

4. News Releases: News releases on watershed activities and related topics will be prepared 6 times per year during the 3 year landowner sign-up period and 3 times per year during the last 5 years of the project.

5. Watershed Meetings: There will be one watershed meeting each year during the first 3 years of the project to discuss a particular topic in depth (such as manure management and conservation tillage), as well as to update landowners on the status of the watershed project.

6. Neighborhood Group/Township Meetings: These will be small group meetings, occurring throughout the watershed, directed towards rural landowners to discuss the available practices, encourage participation and facilitate landowner decision making regarding practice installation.

7. Best Management Practice Demonstrations: During the first two years of the project, management practice demonstration sites will be developed to allow landowners to see effective barnyard runoff systems, manure management techniques, contour cropping, conservation tillage and streambank protection practices. During the early period of the project, sites with already established good management practices (such as contour strip cropping) will be highlighted. Demonstrations of the more intensive practices, such as barnyard runoff controls and manure management, will be developed as the practices are installed under project cost share agreements.

8. Watershed Tours for the Public: One tour will be sponsored during each of the first three years of the project to acquaint landowners with the project, the types of practices available and cost sharing conditions, designed to encourage participation.

9. Watershed Tours for County Board Supervisors: These tours are designed to acquaint the County Board Supervisors with the purpose, implementation methods and benefits of the watershed project to the county, to encourage their support throughout the project period. The first year tour will discuss the role of the county in assisting project implementation and adequately managing public lands. The third year tour will emphasize accomplishments to date and discuss the need for supervisors to make their constituents aware of the deadline for landowner sign-up.

10. Best Management Practice Album: This is a three-ring binder with color photographs of land management practices used to provide visual and written information on the merits and "how-to"s of the practices. Three such albums will be developed during the first project year to be used during farm visits and watershed meetings.

11. Slide Program: One slide program will be developed during the first year of the project, to be used throughout the project period to explain the project, BMPs, cost sharing, etc.

12. School and Organization Meetings: Three meetings will occur each of the first three years of the project to discuss appropriate watershed related topics.

C. Objectives for Each Target Audience

The education objectives for each target audience are given below. The specific activities designed to accomplish the objectives are also given, with the understanding that the newsletters, neighborhood and watershed meetings and tours will be used to meet the needs of all the audiences listed below.

1. Dairy Farmers:

a) Reduce surface water contamination by animal waste - BMP demonstrations on barnyards, filter areas and milkhouse waste disposal, activities for 4-H clubs.

b) Reduce soil loss and sedimentation of streams from surface erosion - BMP demonstrations on conservation tillage, contour strips and crop rotations, 4-H club activities.

c) Reduce streambank erosion - BMP demonstrations on cattle crossings and watering access, volunteer training for fencing installation and maintenance.

d) Reduce runoff of fertilizers and pesticides - BMP demonstrations on conservation tillage and contour strips, integrated pest management workshop, soil testing, 4-H club activities.

e) Improve the handling of hazardous materials - information sheet in watershed folder.

2. Cash Grain Farmers and Land Renters:

a) Reduce soil loss - BMP demonstrations on conservation tillage and contour strips, 4-H club activities.

b) Reduce fertilizer and pesticide runoff - BMP demonstrations on conservation tillage and contour strips, integrated pest management workshop, soil testing, 4-H club activities.

c) Improve the handling of hazardous materials - information sheet in watershed folder.

3. People Who Own Rental Agricultural Land:

a) Reduce soil loss and sedimentation.- specific newsletter highlighting the economics of soil and water conservation and ways of developing rental agreements to promote conservation.

b) Reduce degradation of water quality - (same as above).

4. General Public:

a) Improve the understanding of the consequences of nonpoint source pollution - news releases, watershed signs, newsletter articles.

b) Improve the understanding of the consequences of soil erosion on water quality - (same as above)

c) Increase the public's understanding of the importance of the watershed project - (same as above).

5. Elected Officials:

a) Strengthen their awareness of the goals of the project - County Board presentations, tour, elected official quarterly updates.

b) Improve the awareness of the economics of nonpoint source pollution - (same as above).

c) Increase the awareness of the economics of soil erosion and its impact on water quality - (same as above).

d) Improve the understanding of the economic impact of the watershed program - (same as above).

6. Interest Groups:

a) Strengthen their awareness of the goals of the project - news releases, group presentations.

b) Improve the awareness of the economics of nonpoint source pollution - (same as above).

D. Schedule and Costs for Information and Educational Activities

The numbers of each activity which will occur each year of the project, as well as the associated costs are given in Table 24. The estimated staff hours necessary to carry out the activities are given in Table 25.

VIII. PROJECT EVALUATION

Two approaches will be used to evaluate the progress and success of the Little 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

Table 24: Schedule and Costs of Information/Education Activities (1)

Activity	Cost/ Unit ($)	Project Year 1	2	3	4	5	6	7	8	Total Number	Total Cost
General Brochure											
number		1	--	--	--	--	--	--	--	1	
cost	$550	$ 550	$ --	$ --	$ --	$ --	$ --	$ --	$ --		$ 550
Newsletters											
number		4	4	4	2	2	2	2	2	22	
cost	$500	$ 2,000	$2,000	$2,000	$1,000	$1,000	$1,000	$1,000	$1,000		$11,000
News Releases											
number		6	6	6	3	3	3	3	3	33	
cost	$ 15	$ 90	$ 90	$ 90	$ 45	$ 45	$ 45	$ 45	$ 45		$ 495
BMP Demonstration											
number		8	4	--	--	--	--	--	--	10	
cost	$725	$ 5,800	$2,900	$ --	$ --	$ --	$ --	$ --	$ --		$ 8,700
Bmp Album											
number		3	--	--	--	--	--	--	--	3	
cost	$100	$ 300	$ --	$ --	$ --	$ --	$ --	$ --	$ --		$ 300
Township Meeting											
number		9	--	9	--	--	--	--	--	18	
cost	$ 70	$ 630	$ --	$ 630	$ --	$ --	$ --	$ --	$ --		$ 1,260
Tours											
number		1	1	1	--	--	--	--	--	3	
cost	$600	$ 600	$ 600	$ 600	$ --	$ --	$ --	$ --	$ --		$ 1,800
Organization/School Meeting											
number		3	3	3	--	--	--	--	--	9	
cost	$ 35	$ 105	$ 105	$ 105	$ --	$ --	$ --	$ --	$ --		$ 315
Slide Program											
number		1	--	--	--	--	--	--	--	1	
cost	$400	$ 400	$ --	$ --	$ --	$ --	$ --	$ --	$ --		$ 400
Co. Board Tour											
number		1	--	1	--	--	--	--	--	2	
cost	$515	$ 515	$ --	$ 515	$ --	$ --	$ --	$ --	$ --		$ 1,030
Watershed Meeting											
number		1	1	1	--	--	--	--	--	3	
cost	$375	$ 375	$ 375	$ 375	$ --	$ --	$ --	$ --	$ --		$ 1,125
Watershed Folder											
number		1	--	--	--	--	--	--	--	1	
cost	$550	$ 550	$ --	$ --	$ --	$ --	$ --	$ --	$ --		$ 550
Total Cost		$11,915	$6,070	$4,315	$1,045	$1,045	$1,045	$1,045	$1,045		$27,525

(1) Costs do not include personnel costs.

Table 25: Estimated Hours for Information/Education Activities

Activity	Hours /Unit (hours)	Number of Each Activity per Project Year 1	2	3	4	5	6	7	8	Total Number	Hours/Agency Oc. LCC	Oc. UWEx	Mar. LCC	Total Hours
General Brochure		1	--	--	--	--	--	--	--	1				26
Oc. LCC hours	18	18	--	--	--	--	--	--	--		18			
Oc. UWEx hours	4	4	--	--	--	--	--	--	--			4		
Mar. LCC hours	4	4	--	--	--	--	--	--	--				4	
Newsletters		4	4	4	2	2	2	2	2	22				900
Oc. LCC hours	30	120	120	120	60	60	60	60	60		660			
Oc. UWEx hours	8	24	24	24	16	16	16	16	16			152		
Mar. LCC hours	4	16	16	16	8	8	8	8	8				88	
News Releases		6	6	6	3	3	3	3	3	33				1023
Oc. LCC hours	16	96	96	96	48	48	48	48	48		528			
Oc. UWEx hours	16	84	84	84	42	42	42	42	42			462		
Mar. LCC hours	1	6	6	6	3	3	3	3	3				33	
BMP Demonstration		8	4	--	--	--	--	--	--	12				952
Oc. LCC hours	60	480	240	--	--	--	--	--	--		720			
Oc. UWEx hours	10	80	40	--	--	--	--	--	--			120		
Mar. LCC hours	24	96	16	--	--	--	--	--	--				112	
Bmp Album		3	--	--	--	--	--	--	--	3				72
Oc. LCC hours	16	48	--	--	--	--	--	--	--		48			
Oc. UWEx hours	8	24	--	--	--	--	--	--	--			24		
Mar. LCC hours	--	--	--	--	--	--	--	--	--				--	
Township Meeting		9	--	9	--	--	--	--	--	18				312
Oc. LCC hours	12	72	--	72	--	--	--	--	--		144			
Oc. UWEx hours	8	48	--	48	--	--	--	--	--			96		
Mar. LCC hours	12	36	--	36	--	--	--	--	--				72	
Tours		1	1	1	--	--	--	--	--	3				156
Oc. LCC hours	24	24	24	24	--	--	--	--	--		72			
Oc. UWEx hours	12	12	12	12	--	--	--	--	--			36		
Mar. LCC hours	16	16	16	16	--	--	--	--	--				48	
Organization/ School Meeting		3	3	3	--	--	--	--	--	9				18
Oc. LCC hours	2	4	4	4	--	--	--	--	--		12			
Oc. UWEx hours	--	--	--	--	--	--	--	--	--			--		
Mar. LCC hours	2	2	2	2	--	--	--	--	--				6	
Slide Program		1	--	--	--	--	--	--	--	1				56
Oc. LCC hours	32	32	--	--	--	--	--	--	--		32			
Oc. UWEx hours	16	16	--	--	--	--	--	--	--			16		
Mar. LCC hours	8	8	--	--	--	--	--	--	--				8	
Co. Board Tour		1	--	1	--	--	--	--	--	2				88
Oc. LCC hours	16	16	--	16	--	--	--	--	--		32			
Oc. UWEx hours	8	8	--	8	--	--	--	--	--			16		
Mar. LCC hours	20	20	--	20	--	--	--	--	--				40	
Watershed Meeting		1	1	1	--	--	--	--	--	3				156
Oc. LCC hours	8	8	8	8	--	--	--	--	--		24			
Oc. UWEx hours	36	36	36	36	--	--	--	--	--			108		
Mar. LCC hours	8	8	8	8	--	--	--	--	--				24	
Watershed Folder		1	--	--	--	--	--	--	--	1				10
Oc. LCC hours	4	4	--	--	--	--	--	--	--		4			
Oc. UWEx hours	2	2	--	--	--	--	--	--	--			2		
Mar. LCC hours	4	4	--	--	--	--	--	--	--				4	
Annual Totals for All Activities														
Oc. LCC hours		922	492	340	108	108	108	108	108		2294			
Oc. UWEx hours		338	196	212	58	58	58	58	58			1036		
Mar. LCC hours		216	64	104	11	11	11	11	11				439	
Total Hours		1476	752	656	177	177	177	177	177					3769

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.

Four streams have been selected for monitoring: the Little River, Daley Creek, Kelly Brook and Jones Creek. These streams were chosen as representative of the two major creek objectives in this project: the protection of a coldwater fishery (trout) and the improvement of a warm water (smallmouth bass, northern pike) fishery. Improvement in the sport 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.

Kelly Lake, Porcupine Lake, and Cooley Lakes will be monitored also, to track the changes in the water quality throughout the project period.

Table 26 summarizes the evaluation activities and when they are scheduled to take place.

1. Biotic Index

Biotic Index sampling has occurred at 6 sites on the Little River, 7 on Kelly Brook, 1 on Daley Creek and 1 on Jones Creek in spring and fall 1980 and fall 1982. 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

A limited habitat assessment has been conducted at 4 sites in the watershed. Further "Base line" information will be collected at 4 to 8 sites on the selected creeks in the summer 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 b 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 Daley Creek, Kelly Brook and Jones Creek. Three sites 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. Daley Creek and Jones Creek will monitored in summer 1986, and repeated again in year 10 of the project, along with surveys of Kelly Brook and the Little River.

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 Kelly Lake. Beginning in 1988 spring turn-over and mid-summer samples will be taken for total phosphorus concentration, secchi depth, and chlorophyll_a concentration on Kelly, Cooley, and Porcupine 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 26: Schedule of the Evaluation Procedures

Evaluation Technique	Sites	Year 1	2	3	4	5	6	7	8	9	10	11
Biotic Index	15 sites								x	x	x	
Habitat Assessment*	4-8 sites	x			x			x		x		
Lake Monitoring	3 lakes (4 x's/yr)			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	
	2 additional streams										x	

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APPENDIX A

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 Lead 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 Lead Designated Management Agency.

Local Assistance Agreement

The Local Assistance Agreement is signed by the Department and the Lead 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. All amendments to this agreement shall be executed in writing and be mutually agreed upon between the Department and DMA.
5. The DMA shall use the cost-sharing agreement form provided by the Department for all contracts reimbursable through this agreement.
6. 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.
7. 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 a cost-sharing agreement 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.
8. 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 appeals, litigation, claims or exceptions have been finally resolved.

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 8B of part III of this agreement.

9. 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 annually shall report to the Department as described in condition 7 of part III of this agreement, (3) the DMA shall be accountable to the Department as described in condition 8 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.

10. In connection with the performance of work under this agreement, the DMA 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), Wis. Stats., 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. The DMA agrees to post in a conspicuous place available for employes and applicants for employment, notices to be provided by the Department setting forth the provisions of this clause.

11. Disputes regarding quality and quantity may be settled by arbitration in accordance with Chapter 298, Wis. Stats., if the party alleging such a dispute notifies the other party in writing thereof within ten (10) days after the notifying party became aware of, or reasonably could have become aware of, such dispute.

State of Wisconsin
Department of Natural Resources

By Secretary of DNR

Date Signed _____

Authorized Representative of Lead
Designated Management Agency

By County Board Chairman

Date Signed _____

GLOSSARY 0016 (P)

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 lead 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 River 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

III. DURATION OF AGREEMENT: July 1, 1984 to June 30, 1985

IV. MAXIMUM REIMBURSEMENT AMOUNT: $ 10,000

V. GUARANTEED MINIMUM REIMBURSEMENT AMOUNT: $ 6,000

VI. 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, 1984, are not eligible for reimbursement under this contract.

C. The project base level is determined to be 1,000 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 VII, conservation planning is eligible for reimbursement independent of a signed cost-share agreement.

OR

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 River 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 Priority Watershed Plan.

VII. 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 Priority Watershed Plan and meet the intent of that plan.

For purposes of this agreement, "most critical" landowner is defined in the Clearwater River Priority Watershed Plan to be:

Table 1. Technical Assistance Tasks and Hours Per Task

TASK	AGREED UPON EFFORT PER TASK
1. Contacts	(See Section VIII, 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/foot
Diversions	____ hr/foot
Terraces	____ hr/acre
Waterways	____ hr/acre
Minimum Tillage	____ hr/acre
Critical Area Stabilization	____ hr/structure
Grade Stabilization Structures	____ hr/foot
Shoreline Fencing	____ hr/foot
Shoreline Shaping/Seeding	____ hr/foot
Shoreline Rip-Rap	____ hr/crossing
Stream Crossing	____ hr/site
Barnyard Runoff Control	____ hr/facility
Manure Storage Facility	____
Livestock Exclusion from Woodlots	____
Other (specify)	____
8. Installation & Certification of Best Management Practices	
Contour Cropping	____
Contour Strip Cropping	____
Diversions	____ hr/foot
Terraces	____ hr/foot
Waterways	____ hr/acre
Minimum Tillage	____ hr/acre

	Critical Area Stabilization	_____ hr/structure
	Grade Stabilization Structures	_____ hr/structure
	Shoreline Fencing	_____ hr/foot
	Shoreline Shaping/Seeding	_____ hr/foot
	Shoreline Rip-rap	_____ hr/foot
	Stream Crossing	_____
	Barnyard Runoff Control	_____ hr/site
	Manure Storage Facility	_____ hr/facility
	Livestock Exclusion from Woodlots	_____
9.	Review of Cost Share Agreement	_____ hr/farm or municipality
10.	Best Management Practice Maintenance Review	_____ 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 PER TASK
Coordination of activities between counties; activities with Department; technical assistance tasks; fiscal management tasks; and educational tasks.	550

Table 4. Education Tasks

TASK	AGREED UPON NUMBER	ESTIMATED DIRECT COSTS
Newsletters	4	$1,800

VIII. 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 5, Table 1, Section VII, reimbursement shall be based on actual hours for these tasks up to 1500 hours.

   b. For task 6, Table 1, Section VII, reimbursement shall be based on the actual hours for this task up to 750 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 550 hours will be eligible for reimbursement plus a maximum of $ 150.00 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 $ 1800.00 and for actual hours incurred by LCC or SCS staff in carrying out these tasks up to 40 hours.

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

C. The guaranteed minimum reimbursement in Section V of this agreement will be made to the County even if the total accelerated task hours actually expended by the County under the agreement is less than 1000 hours provided:

1. That 1500 task hours have been spent on tasks 1) through 5) of Table 1, Section VII, and

2. That a minimum of 20 conservation plans for "most critical" landowners [task 6), Table 1, Section VII] have been developed, and

3. That the county has provided .5 additional full time equivalent staff years for the period covered by this agreement through either direct hiring or contracting.

D. 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 250 hours. Any quarterly base level not met in a quarter shall be carried over to the next quarter.

IX. 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.

X. 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.

XI. HOLD HARMLESS CLAUSE

"HOLD-HARMLESS: The Contractor 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 or contractor's employees, agents or representatives."

XII. INDEPENDENT CONTRACTOR

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

XIII. 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

Secretary of DNR
C. D. Besadny, Secretary

Date

County Board Chair
Chair
County Board

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 ~~(From Form 4468-47)~~		
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
3/1/84

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-Gss.	same	
Ranking	#3 in LT Subus.		
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	

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT PROGRAM COST-SHARE AGREEMENT

SECTION 144.25, WIS. STATS.
FORM 3400-68 REV. 8-82

Cost-Share Agreement Number: 1	Total Est. Grant Amount: $ 14,834 00
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
Street or Route	
City, State, Zip Code	
Installation Period: From	To

Name of Designated Mgt. Agency: Lake County	Telephone Number: 414/123-5000
Street or Route: 101 Main St	
City, State, Zip Code: Anytown, Wi 53333	

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	1920.00	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	

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: $ 14534.00 + 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	C5	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: A. Landowner
Title: Landowner
Date Signed: Aug. 12, 1984

Authorized Representative of Des. Mgt. Agency — Signature: J. Supervisor
Title: [illegible]
Date Signed: Aug 20, 1984

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

APPENDIX B

CURRENT (5/86) COST SHAREING GUIDELINES FOR BMPS

C1 Contour Cropping

Maximum cost-share rate or flat rate per acre 50% ~~$6/ac~~

Definition - Farming sloped land so all cultural operations from seed bed preparation to harvest are done on the contour.

Conditions:

1. Cost-sharing is limited to establishment of a contour farming system and the removal of obstacles, where applicable.

2. All agricultural operations must be performed as nearly as practicable on the contour.

3. To the extent practical, on acreage devoted to rowcrops:

   a) A crop stuble or residue must be left on the surface over the winter;

   b) A winter cover crop must be established; or

   c) Protective tillage operations must be performed.

4. The contour cropping system must be maintained for 5 years after the year of establishment.

Specifications: SCS technical guide specifications 330 and 344

9/79

C2 Strip cropping

Maximum cost-share rate or flat rate per acre 50% ~~$10/ac~~

Definition: Growing crops, usually on the contour, in alternated strips of close growing crops, clean tilled row crops, and grass-legumes.

Conditions:

1. Cost-sharing is limited to establishment of the strip-cropping system and, if necessary, removal of obstacles.

2. All cultural operations must be performed as nearly as practicable on the contour.

3. To the extent practical, on acreage devoted to row crops:

   a) A crop stuble or residue must be left on the surface over the winter;

   b) A winter cover crop must be established; or

   c) Protective tillage operation must be performed.

4. The strip cropping system must be maintained for 10 years after the year of establishment.

Specifications: SCS Technical Guide specifications 585A, 585B, 585C

9/79

C5 Waterways Maximum cost-share rate 70%

Definition: A natural or constructed watercourse shaped, graded and established in suitable cover as needed to prevent erosion by runoff waters.

Conditions:

1. Cost-sharing is authorized for site preparation, grading, shaping, filling, and establishing permanent vegetative cover. Cost-sharing is also authorized for subsurface drains necessary for proper functioning of the waterway.

2. The cover may consist of sod-forming grasses, legumes, mixtures of grasses and legumes or other types of vegetative cover that will provide the needed protection from erosion.

3. Close-sown small grains, annuals or mulching may be used for temporary protection if followed by eligible permanent vegetative cover established by seeding or natural revegetation.

4. The practice shall be maintained for a minimum of 10 years following the year of installation.

Specifications: SCS Technical Guide specifications 342, 412, 484, and 606

9/79

C6 Minimum tillage system (Conservation tillage) Maximum cost-share rate or flat rate per acre 50%

Definition: Tillage practices which disturb and roughen the entire soil surface but not to the extent of mold board tillage systems. Some vegetative residue must remain on the surface.

Conditions:

1. Cost-sharing is based on the custom rate for minimum tillage plowing for a single year.

2. Cost-sharing is not authorized where the farmer has already adopted a satisfactory tillage system.

3. Cost-sharing for this practice will not be approved for a person more than once.

4. The land involved must be protected by crop residue, temporary cover, or other permitted management methods to the extent practical from harvest until the next planting.

5. Eligible tillage operations include:

   a) Chisel plowing with other limited operations,

   b) Plow-plant, or

   c) Light tillage without plowing.

6. On sloping land all tillage operations must be performed as nearly as practicable on the contour or parallel to terraces.

7. The system must be maintained for a minimum of 5 years following the initial year.

Specifications: SCS Technical Guide specification 478.

9/79

C3 Diversions Maximum cost-share rate 70%

Definition: Structure installed to divert water from areas where it is in excess to sites where it can be used or transported safely. Usually the system is a channel with a supporting ridge on the lower side constructed across the slope at a suitable grade.

Conditions:

1. An adequate outlet must exist.

2. Cost-sharing is authorized for:

   a) Diversions, ditches, dikes or subsurface drains. Cost-sharing for subsurface drains is limited to areas on sloping land where the internal water seeps to the surface and causes the land or cover to lose its stability.

   b) Installation of structures such as pipe, underground outlets, or other outlets, if needed, for proper functioning to a ditch or dike, for more even flow, or to protect outlets from erosion.

   c) Necessary leveling and filling to permit installation of an effective system.

   d) Removing obstructions necessary to permit establishment of the practice.

3. Cost-sharing is not authorized for ditches or dikes designed to impound water for later use, or which will be a part of a regular irrigation system.

4. The system must be maintained for a minimum of 15 years following the year of installation.

Specifications: SCS Technical Guide specifications 362, 606, 607, 412

9/79

C4 Terrace Systems Maximum cost-share rate 70%

Definition: A system of ridges and channels constructed across the slope on a non-erosive grade at a suitable spacing.

Conditions:

1. Cost-sharing is authorized for:

   a) Terraces and the necessary leveling and filling to permit installation of an effective system.

   b) Removal of obstructions necessary to permit installation of an effective system.

   c) Materials and installation of underground pipe outlets and other mechanical outlets.

   d) Converting the present system to a new system only if the present system is not serving its intended conservation purpose. Cost-sharing will not be authorized if the sole purpose of the conversion is to accommodate changes in cropping patterns or equipment used by the farmer.

2. A protective outlet or waterway is required.

3. The system shall be maintained for a minimum of 20 years following the year of installation.

Specifications: SCS Technical Guide specifications 412, 600 and 606

9/79

M1 Critical Area Stabilization Maximum cost-share rate 70%

Definition: Planting suitable vegetation on highly erodable areas (e.g. gulleys, roadsides, construction activities on public lands).

1. Cost-sharing is authorized for:

   a) Permanent fencing to protect the site.

   b) Planting trees, shrubs, perennial grass cover.

   c) For shaping and smoothing prior to the installation of protective structures or plantings.

2. The practice must be maintained for a mimum of 25 years after the year of installation.

Specifications: SCS Technical Guide specifications 342, 472, 484, 512 and 612.

9/79

M2 Grade Stabilization Structures Maximum cost-share rate 70%

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

Conditions:

1. Cost-sharing is authorized for:

   a) Channel linings, chutes, drop spillways, and pipe drops to discharge excess water.

   b) Fencing and vegetative cover (including mulching needed to protect the structure) and for leveling and filling to permit the installation of the structure.

2. The structure shall be maintained for a minimum of 25 years following the year of installation.

Specifications: SCS Technical Guide specifications 402, 350, 382, 410, 425 and 468.

9/79

M3 Shoreline Protection (Streambank Protection) Maximum cost-share rate 50%

Definition: Stabilizing and protecting banks of streams and lakes against erosion.

Conditions:

1. Cost-sharing is authorized:

   a) For permanent fencing to protect banks from damage by domestic livestock.

   b) For planting trees, shrubs, perennial grass cover as filter strips or buffer zones along banks.

   c) To limit livestock access to water.

   d) To install livestock and machinery crossings that will minimize disturbance of the stream channel and banks.

   e) For placement of riprap and other materials on the bank when other practices are not practical.

   f) For shaping and smoothing banks prior to the installation of protective structures or plantings.

2. Livestock must be excluded from the sloped and planted area.

3. The practice shall be maintained for a minimum of 10 years following the calendar year of installation.

Specifications: SCS Technical guide specifications 326, 382, 580 and 342

9/79

M4 Settling Basin Maximum cost-share rate 70%

Definition: An impoundment created to retain sediment and other pollutants carried by runoff waters.

Conditions:

1. Cost-sharing is authorized:

   a) For detention or retention structures, such as erosion control dams (excluding water storage type dams), desilting reservoirs, sediment basins, debris basins, or similar structures.

   b) For channel linings, chutes, drop spillways, and pipe drops that dispose of excess water.

   c) For fencing and vegetative cover (including mulching needed to protect the structure) and for leveling and filling to permit the installation of the structure.

2. Cost-sharing is not authorized for structures with a primary purpose of flood control or creation of a permanent pool.

3. The structure must be maintained for a minimum of 25 years following the year of installation.

Specifications: SCS Technical Guide specifications 402, 350, 382, 410, 425 and 468

9/79

L1 Barnyard Runoff Management Maximum cost-share rate 70%

Definition: Using structural practices such as gutters, downspouts and diversions to intercept and redirect surface runoff around the barnyard, feeding area or farmstead, and/or to collect, convey and temporarily store runoff from the barnyard, feeding area or farmstead.

Conditions:

1. Cost-sharing is authorized for:

   a) Diversions, gutters, downspouts, collection basins, infiltration areas, waterway outlet structures, piping and land shaping needed to manage runoff from areas where livestock manure accumulates.

   b) Measures needed for the establishment of perennial grasses, including fertilizers and other minerals.

   c) Permanent fencing.

2. The practice must be maintained for a minimum of 15 years following the year of installation.

Specifications: SCS Technical Guide specifications 312, 342, 362, 382, 412, 425 and 606.

9/79

L2 Manure Storage Facilities Maximum cost-share rate 70% $6000 max prior to 7/86

Definition: A structure for temporary storage of manure.

Conditions:

1. Cost-sharing is authorized for:

   a. Aerobic or anaerobic lagoons, liquid manure tanks and solid manure stacking facilities and equipment necessary for transporting manure to the storage facility required as part of a manure management plan.

2. Cost-sharing is not authorized for:

   a. Operations where manure can be spread on location which are nearly flat land or which do not drain to surface waters.

   b. Portable pumps and other portable equipment;

   c. Buildings or modifications to buildings;

   d. Equipment for spreading or incorporating manure; and

   e. That portion of the facility installed under or attached to buildings serving as part of the building or its foundation.

3. Storage facility must have a minimum of 180-day storage capacity.

4. Runoff from solid manure stacking facilities must be controlled.

5. Manure must not be spread when the ground is frozen or saturated.

6. Manure must be incorporated into the soil as soon as practicable after spreading.

7. Lagoons must be constructed to assure sealing of the bottom and sides in order to prevent contamination of wells and groundwater.

8. The practice must be maintained for a minimum of 20 years following the year of installation.

Specifications: SCS Technical Guide specifications 313, 425 and 359

9/79

L3 Livestock Exclusion from Woodlots* Maximum cost-share rate 50%

Definition: Protection of woodlots from livestock grazing by fencing or other means.

Conditions:

1. Cost-sharing is authorized for permanent fencing.
2. Livestock must be excluded from the woodlot.
3. The practice must be maintained for a minimum of 20 years following the year of installation.

Specifications: SCS Technical Guide specifications 382, 472.

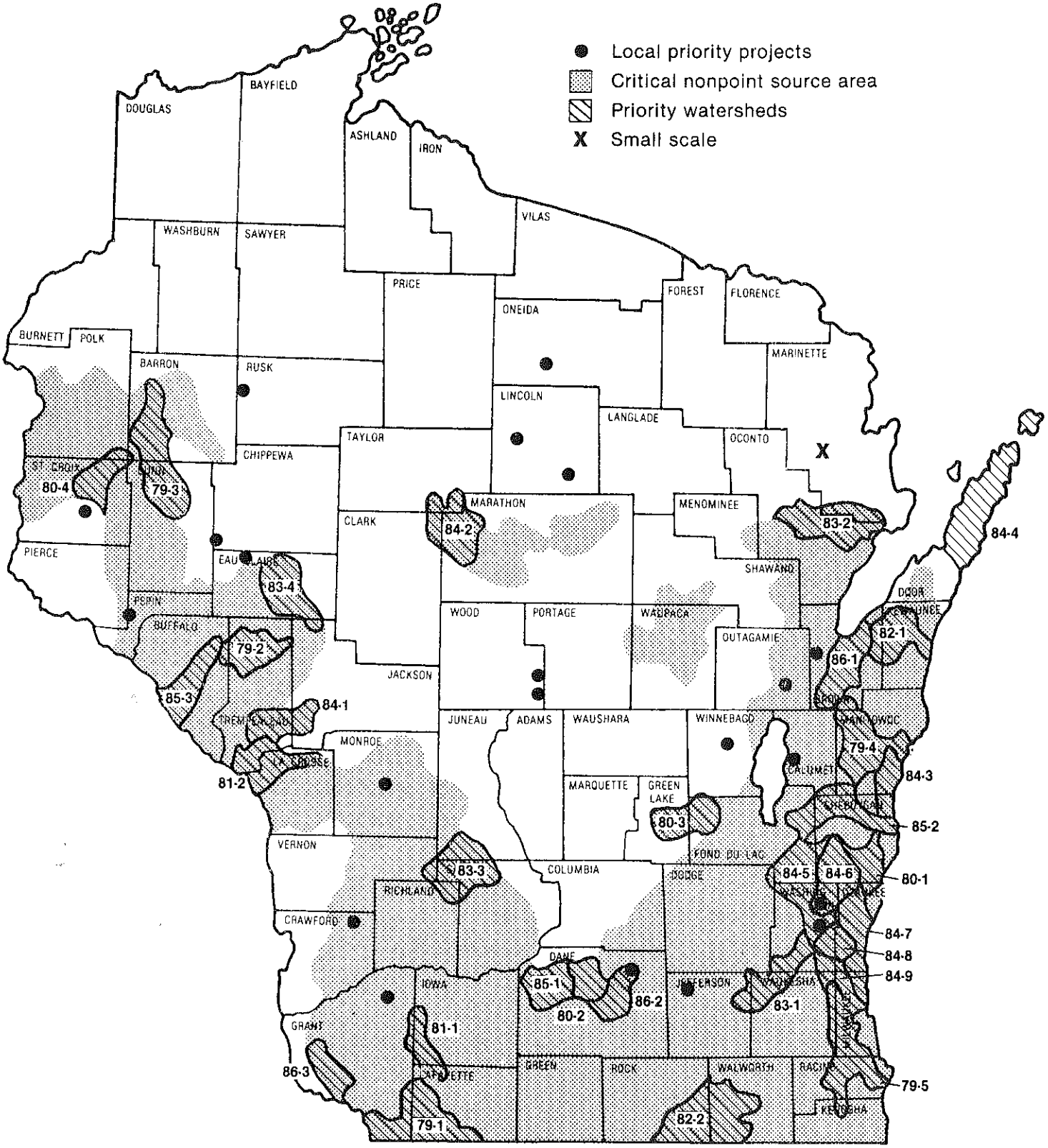
* Livestock exclusion from streambanks is included as part of shoreline protection.

9/79

PRIORITY WATERSHED PROJECTS IN WISCONSIN

Map Number	Project	County(ies)	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
86-1	East River	Brown	1986
86-2	Yahara River — Lake Monona	Dane	1986
86-3	Lower Grant River	Grant	1986

PRIORITY WATERSHED PROJECTS IN WISCONSIN



OUR MISSION:
To protect and enhance our Natural Resources —
our air, land and water;
our wildlife, fish and forests.
To provide a clean environment
and a full range of outdoor opportunities.
To insure the right of all Wisconsin citizens
to use and enjoy these resources in
their work and leisure.
And in cooperation with all our citizens
to consider the future
and those who will follow us.
Wisconsin
Dept. of Natural Resources