A Nonpoint Source Control Plan for the Eau Claire 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 **Eau Claire County Land Conservation Commission.**

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A Nonpoint Source Control Plan for the Lower Eau Claire River Priority Watershed Project

The Wisconsin Nonpoint Source Water Pollution Abatement Program

August, 1985

Wisconsin Department of Natural Resources
Bureau of Water Resources Management
Nonpoint Source and Land Management Section
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In Cooperation With:

The Eau Claire County Land Conservation Commission
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Publication WR-210-85

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

BOX 7921
MADISON, WISCONSIN 53707

August 15, 1985

IN REPLY REFER TO: 2600

Mr. Clifford Chatterson, Chairperson
County Board of Supervisors
Eau Claire County Courthouse
721 Oxford
Eau Claire, WI 54703

Dear Mr. Chatterson:

I am pleased to be able to approve the Nonpoint Source Control Plan for the Lower Eau Claire River Priority Watershed in eastern Eau Claire County. Your county is to be congratulated for its efforts in assisting in development of the Plan and preparing for its implementation. The County has laid a firm foundation for the project by providing county cost share funds and additional project staff.

As you know, the Plan estimated total needs in the watershed to be $3,159,621 for installation of nonpoint source management practices and 18 person years of effort to provide administration and technical assistance. Actual cost and personnel needs will, of course, depend on participation rates during the 3 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 excellent response to the first public hearing on the Plan there is great opportunity to achieve the water quality goals laid out in this Plan. Enhancement and protection of the 52 miles of trout streams, 12 miles of forage fishery streams, 68 acre warmwater fishery pond, and the wetland/wildlife area are very worthwhile goals. In addition to the benefits of the primary watershed project goals, there should be a reduction of downstream water quality impairments to the Eau Claire River and Lake Altoona.

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

Sincerely,

C. D. Besadny
Secretary

CDB:JL:jd:5281V

Eau Claire County
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August 12, 1985

Mr. C.D. Besadny, Secretary
Department of Natural Resources
Box 7921
Madison, WI 53707

Dear Mr. Besadny,

The Eau Claire County Land Conservation Commission, functioning as the Designated Management Agency for the Lower Eau Claire River Watershed Project, has reviewed and approved the Lower Eau Claire River Watershed Plan.

The Land Conservation Division will proceed with the watershed plan implementation upon final Department of Natural Resources approval.

Sincerely,

Dorothy F. Linse

Dorothy F. Linse, Chairperson
Land Conservation Commission

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A NONPOINT SOURCE CONTROL PLAN FOR THE LOWER EAU CLAIRE RIVER PRIORITY WATERSHED PROJECT

PLAN SUMMARY

INTRODUCTION

The Nonpoint Source Control Plan for the Lower Eau Claire River Priority Watershed Project identifies the nonpoint sources of pollutants to the water resources of this watershed and the management practices which are needed to control these pollutants.

The project area consists of the Lower Eau Claire River Watershed, which is located almost entirely in eastern Eau Claire County in west central Wisconsin. Very small portions of the watershed are located in Chippewa and Jackson counties. The watershed is 142 square miles in size. It is located just to the east of the City of Eau Claire. The watershed is tributary to the Eau Claire River below Lake Eau Claire and above Lake Altoona. However the Eau Claire River itself is not considered a part of this project.

The overall reasons for the selection of the Lower Eau Claire River Priority Watershed project are to protect water quality in this watershed. While groundwater concerns have been considered in this project, the surface water resources are the primary concern. These surface waters include the eleven following streams: Fall Creek, Pine Creek, Beaver Creek, Bears Grass Creek, Browns Creek, Rush Creek, Bridge Creek, Thompson Valley Creek, Diamond Valley Creek, Hay Creek, and Travis Creek. The lone impoundment is Dells Pond, a 68 acre warmwater pond which is located on Bridge Creek. Fall Creek Pond was located on Fall Creek near U.S. Highway 12 until 1984, when its dam failed and it was drained. It has not been restored.

Approximately 52 miles of the streams mentioned above are classified as trout streams. The remainder of the streams support warm water and forage fisheries.

This watershed plan sets objectives for the water resources in the project area and establishes target levels of pollutant control to protect these resources. These water quality objectives (and, in turn, the project eligibility limits) in the Lower Eau Claire River Watershed were set according to the classification and condition of the waterbodies in each subwatershed. Higher levels of protection are being sought for subwatersheds with existing high water quality or with the potential for high water quality. Therefore, subwatersheds with trout streams, impoundments with warmwater fisheries, and valuable wetland and wildlife areas are being given a high level of protection. Subwatersheds with forage fishery steams were given goals of somewhat lower levels of protection since they have less sensitive, although still valuable, waterbodies. While the primary objective of the Lower Eau Claire River Priority Watershed Project is the improvement of water quality within the watershed, important downstream improvements such as reductions in sediment and nutrients in Lake Altoona will also result.

The plan also describes the administrative procedures and agency responsibilities for carrying out the plan. The document was developed jointly by the Eau Claire County Land Conservation Commission and the Wisconsin Department of Natural Resources.

The funding for developing this document and implementing its recommendations is provided mainly by the Wisconsin Nonpoint Source Water Pollution Abatement Program. This state-funded program is administered by the Wisconsin Department of Natural Resources. Eau Claire County will provide some direct funding as well as some project administration support.

SURFACE WATER QUALITY

The water quality of the streams in this watershed varies greatly from high quality to highly degraded. This is reflected in the watershed stream classifications which range from Class I trout streams to forage fisheries. Dells Pond is turbid with aquatic plant growth.

SOURCES OF POLLUTANTS

The water quality of the streams and Dells Pond was assessed using several methods. The basic goal of these assessments was to determine what use each water resource was currently supporting, and the use each resource could support if nonpoint source pollutants were controlled. For the purposes of both this assessment and, eventually, project implementation, this watershed was delineated into 14 subwatersheds. Each subwatershed is discussed in this plan.

The work on this project began in 1984 with an inventory of all potential nonpoint source pollutant problems in the watershed by Eau Claire County staff.

The inventory of existing land erosion was limited to a one-quarter mile wide corridor surrounding the stream network, since this is the area most likely to contribute sediment to streams in this watershed. Soil loss in the inventoried area (40,300 acres) was estimated by the Department of Natural Resources through the use of the Universal Soil Loss Equation.

The Eau Claire County staff also inventoried all 156 animal lots located in the watershed, regardless of distance from streams. The resulting data were used to estimate the chemical oxygen demand (COD) and phosphorus runoff from each individual lot. Subwatershed COD total loads from animal lots were also computed. Information on manure storage and landspreading needs was also recorded.

All streams in the watershed were surveyed for streambank erosion using a modification of the Land Inventory Monitoring process used by the Soil Conservation Service.

Urban land uses were recorded, however the USLE method of evaluating runoff cannot be applied to these areas. Four point sources and the landspreading of wastewater treatment plant sludge from City of Eau Claire were also investigated during the inventory phase of this project.

RESULTS OF THE POLLUTANT SOURCE INVENTORIES

Soil Erosion

Cropland erosion was found to be the major source of the sediment which enters the watershed's surface waters. It was estimated that 129,107 tons of soil per year are eroded from the 40,300 acres of inventoried land in the stream corridor. On 11,754 acres in the corridor, soil loss rates were found to be above four tons per acre per year (T/A/Y). These acres contributed 105,948 tons per year, which equaled 82% of the total of 129,107 tons of soil per year soil loss.

It is estimated that applying management practices to lands eroding above the target level of four tons per acre per year (T/A/Y) would result in saving 77,941 tons of soil per year, which would be a 60% reduction. All of the lands eroding above the target level of four T/A/Y in the corridor are eligible for participation in this project. Landowners whose lands contribute the top 50% of soil loss in their respective subwatersheds are defined as the highest priority category, called "eligible-essential", for soil loss management. That means that if these landowners wish to receive any funds to cost share the installation of management practices from the Nonpoint Source Control Program they must install soil loss management practices on all of their eligible lands.

Animal Lots

After assessing all of the watershed's 156 animal lots, it was determined that project eligibility should be granted to those lot owners whose lots together contributed the top 80% of the estimated COD to a subwatershed. Exceptions were made in two subwatersheds, where the cutoff was set at the top 70% of COD load, due to the fact that the fish populations in those subwatersheds are less sensitive to COD impacts. Lot owners whose lots rank in the top 50% of the eligible lots are determined to be in the "eligible-essential" category for animal lot control.

A total of 58 animal lots were found to be eligible to participate in this program. Of the 58 lots, were 21 classified as "eligible-essential". It was estimated that the control of these 58 lots would result in a 70% reduction in chemical oxygen demand load to the watershed. The total reduction was estimated by assuming that installing management practices on an animal lot is likely to produce a 85% reduction in COD.

Streambanks and Manure Spreading

Eligibility criteria for controlling streambank erosion and proper manure management are outlined in the watershed plan.

Other Management Needs

Other management practice needs, such as waterways, diversions, and grade stabilization, were estimated by the Eau Claire County Land Conservation Division staff, based on field experience in the watershed. These needs are also discussed in this plan.

ADMINISTERING THE PROJECT

The approval of this watershed plan by the Wisconsin Department of Natural Resources and the Eau Claire County Land Conservation Commission formally establishes the Lower Eau Claire River Priority Watershed Project in the Wisconsin Nonpoint Source Water Pollution Abatement Program. Under this program, state funds are made available to landowners and operators to cost share the construction of the recommended land management practices, called Best Management Practices, in the critical areas of the watershed. Participation in the program by landowners and operators is voluntary.

The Eau Claire County Land Conservation Commission will have the major responsibility for administering the Lower Eau Claire River Priority Watershed Project at the watershed level. The LCC will 1) contact the landowners, 2) sign the cost share agreements, 3) design the control practices, 4) certify the proper installation of the practices, 5) make the cost share payments to the landowners, 6) keep all records, and 7) conduct an education and information program. The LCC will receive assistance for these responsibilities from the Soil Conservation Service (SCS) and University of Wisconsin-Extension. The county will receive funds for both the administrative needs to carry out the project and to cost share the installation of practices. These funds will come from the State of Wisconsin through the Department of Natural Resources.

During the life of the project, the Department of Natural Resources will evaluate progress in the installation of practices; write annual agreements for the funding of the additional county staff which will be needed; reimburse the county for cost sharing the installation of practices; and evaluate water quality improvements.

GENERAL PROCEDURES FOR IMPLEMENTING THE PROJECT

In order to control the pollution of surface water resources, the implementation activities of this project will focus mainly on the control of eroding croplands, livestock wastes from barnyards, and eroding streambanks. In order to achieve the desired levels of control, landowners or operators with critical nonpoint sources on their lands will be contacted, have the program explained to them, and be encouraged to install the recommended control practices as determined by this watershed plan and the Eau Claire County staff. The practices agreed to by the landowner and the county will be cost shared with state funds administered by the county and county funds.

Upon the approval of this project, the Nonpoint Source Control Plan will be used by the Eau Claire County Land Conservation Commission to establish priorities and eligibility for installing the approved Best Management Practices for this watershed project. The county will have three years during which it can sign cost share agreements with landowners for the installation of eligible management practices. Among other things, the cost share agreement will list the practices, the cost share amounts, and the schedule for the installation of the practices.

After the agreement is signed by the landowner and Door 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 is 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.

A landowner may take up to five years to install these practices, so the maximum length of the project including the three year sign up period is eight years.

The Wisconsin Department of Natural Resources will also use the Nonpoint Source Control Plan as a guide for its administrative responsibilities during project implementation.

PROJECT COSTS

Based on the inventory data, estimates were made on the costs of all of the needed control practices in the Lower Eau Claire River Priority Watershed Project.

The cost for the installation of all needed management practices in the watershed is estimated at $3,159,621. If the maximum use is made of state and Eau Claire County cost share funds, the cost to these two units of government would be $1,885,166 and $315,962 respectively. The landowners' share would be $958,493. The actual project costs will, of course, ultimately depend on the participation rate.

INFORMATION AND EDUCATION PROGRAM

An information and education program will be conducted throughout the project period. This program will be most intensive during the first 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.

PROJECT EVALUATION

Progress in the Lower Eau Claire River Priority Watershed Project will be evaluated during the life of the project and the success of the project will be evaluated at the end of the project. Various methods will be used in these evaluations.

During the duration of the project, a tracking system will be used to keep project staff up-to-date on various aspects of the project, including landowner contacts, inventory data, cost share agreements and levels of nonpoint source control. This information will be reviewed quarterly by the Eau Claire County Land Conservation Commission. Annual project reviews will be conducted annually by the LCC and the DNR.

At the end of the project, the evaluation of the project's success will be based on information in three specific areas. These areas are 1) the number, location and rate of landowner or operator participation in the project; 2) calculations of nonpoint source pollutant reduction due to changes in land management; and 3) actual measured changes in water quality.

In order to determine the actual changes in water quality in the watershed, specific quantifiable biological and physical water quality information will be collected at the beginning of implementation of the watershed project and again after all practices have been installed. Habitat evaluation on selected stream segments; physical and chemical evaluations; and aquatic insect evaluation on selected stream segments will be performed before and after project implementation. Chapter X of the watershed plan contains a discussion of the various aspects of the evaluation plan.

PREFACE

The Lower Eau Claire River Watershed was selected in 1983 as a priority watershed project under the Wisconsin Nonpoint Source Water Pollution Abatement Program. Since the program was enacted by the State Legislature in 1978, twenty-five other priority watershed projects have been selected.

Water pollution sources generally are separated into two categories: point sources and nonpoint sources. Point sources can be defined as concentrated discharges of wastewater from such sources as municipal and industrial wastewater treatment plants. These discharges can cause acute, highly visible water quality impacts.

Nonpoint sources are generally defined as diffuse discharges of pollutants that cause either acute or chronic water quality impacts. Examples of nonpoint sources include stormwater and snowmelt runoff from urban areas, agricultural fields, livestock operations and construction sites.

Point and nonpoint sources require different management approaches to achieve water quality objectives. Point source control requires the treatment of a specific, and often contained discharge, while the control of nonpoint sources usually requires a comprehensive approach which addresses a number of land management problems which occur over a large land area. Nonpoint source pollution is most effectively addressed when an entire watershed is assessed and then treated as a whole when control measures are installed. The Wisconsin Nonpoint Source Control Program utilizes this approach.

The Wisconsin program was developed to provide cost sharing and technical assistance to landowners and operators for the control of critical nonpoint sources of pollutants. It is the primary source of funding available for implementing nonpoint source controls in Wisconsin.

The purposes of the program are 1) to reduce water pollution in watersheds with severely degraded water quality, and 2) to preserve higher quality streams and lakes. The selection process for the Wisconsin Nonpoint Source Control Program weighs three primary criteria to determine the order in which individual watersheds will be treated. These criteria are: 1) the severity of water quality problems in the watershed; 2) the importance of controlling nonpoint sources of pollutants in order to attain water quality standards; and 3) the capability and willingness of local government agencies to carry out the planning and implementation of the project.

The watersheds are selected through a three-step process involving 1) an impartially ranked list of watersheds, 2) regional advisory groups, and 3) the State Nonpoint Source Coordinating Committee. Once a priority watershed project is selected, the appropriate local agencies and the Department of Natural Resources prepare a Nonpoint Source Control Plan, such as this document.

The plan for the Lower Eau Claire River Priority Watershed Project is divided into four parts. Following an introductory section, Section Two consists of an assessment of existing water quality and watershed conditions, and the identification of the actions necessary to reduce the water quality problems in the watershed. Section Three identifies the tasks necessary to carry out the actions identified in the plan and the agencies responsibilities for each task. The time frame necessary for completing those tasks is also included. Section Four discusses plans for evaluating the results of the watershed project.

A NONPOINT SOURCE CONTROL PLAN
FOR THE
LOWER EAU CLAIRE RIVER
PRIORITY WATERSHED PROJECT

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A NONPOINT SOURCE CONTROL PLAN FOR THE

LOWER EAU CLAIRE RIVER PRIORITY WATERSHED PROJECT

SECTION ONE:

INTRODUCTION TO THE WATERSHED PLAN

CHAPTER I. PLAN PURPOSE AND LEGAL STATUS

A. Introduction

The Lower Eau Claire River Watershed is located in west central Wisconsin, just to the east of the City of Eau Claire (1980 population: 51,509, according to the U.S. Department of Commerce, 1982). The watershed lies almost entirely in eastern Eau Claire County, although very small portions of the drainage basin extend northward into Chippewa County and southward into Jackson County. The only two small incorporated areas in the watershed are the Village of Fall Creek (population 1148) and the City of Augusta (population 1560). The watershed is shown in Figure 1, located in Chapter II.

The watershed includes 142 square miles of mostly agricultural lands that drain into the Eau Claire River from below Lake Eau Claire to above Lake Altoona. The Eau Claire River flows to the northwest, first into Altoona Lake, and then into the Chippewa River.

There are 11 named streams in the watershed: Fall, Pine, Beaver, Bears Grass, Browns, Rush, Bridge, Thompson Valley, Diamond Valley, Hay, and Travis creeks. Approximately 52 miles of these above-named creeks are classified as trout streams, while the remainder support warmwater or forage fisheries. There is also 68-acre Dells Pond, a warmwater fishery, on Bridge Creek. Fall Creek Pond was located on Fall Creek near U.S. Highway 12 until 1984, when its dam failed and the pond drained. Twelve percent of the land inventoried for this project were classified as wetlands.

Fourteen subwatersheds were delineated in the Lower Eau Claire River Watershed. A wide variety of water conditions currently exist in these subwatersheds, ranging from good quality in some trout streams to turbid conditions. Fifty-one percent of the inventoried lands in the watershed are croplands, meaning a high potential exists for sediment, nutrient and pesticide loading from runoff entering surface waters. Livestock are watered in the streams, creating the potential for streambank destruction, the direct deposit of animal wastes and the resuspension of streambed sediment. All of these agricultural impacts are causing the deterioration of the water quality and consequentially, the fisheries (especially trout), in the streams.

B. Project Objectives and Goals

This plan for the Lower Eau Claire River Priority Watershed Project establishes objectives and specific goals for each of the subwatersheds. The objectives, in general, are to increase fish populations by 1) improving water quality (which is usually tied to reducing sediment) and 2) reducing toxic substances (such as ammonia from animal wastes). Specific goals focus on land erosion control, animal lot runoff control, manure spreading control, and streambank erosion control. The specific objectives and goals for each subwatershed are discussed in Chapter II. The implementation section of this plan discusses the specific land management practices which are needed for these goals to be met.

C. Watershed Plan Preparation

In order to meet the project objectives mentioned briefly above and in greater detail later in this Nonpoint Source Control Plan, water quality and land management information was collected and assessed for the Lower Eau Claire River Watershed. This information was used to identify critical nonpoint sources of pollutants and the most practical means of controlling these sources. The watershed information and source control strategy are included in this plan.

The plan was prepared jointly by the Nonpoint Source and Land Management Section of the Wisconsin Department of Natural Resources and the Eau Claire County Land Conservation Commission. Assistance was provided by the West Central District of the Department of Natural Resources, which is headquartered in Eau Claire.

Other agencies involved in the assessment and planning processes were the U.S. Department of Agriculture (the Soil Conservation Service and the Agricultural Stabilization and Conservation Service) and the University of Wisconsin - Extension.

Principal individual participants in the planning process are identified on the inside of the front cover of this plan.

D. Purpose of the Watershed Plan

This plan has been prepared to guide the implementation of a priority watershed project for the Lower Eau Claire River Watershed, located primarily in Eau Claire County, with additional acreage in Chippewa and Jackson counties, as part of the Wisconsin Nonpoint Source Water Pollution Abatement Program. The plan is divided into four major sections:

1. an introduction to the watershed plan;

2. a watershed assessment;

3. a detailed program for implementation; and

4. a project evaluation.

The purpose of The Watershed Assessment portion of the plan is to set the goals and objectives for the watershed project by:

1. assessing the existing water quality problems;

2. identifying the significant nonpoint sources of pollutants and determining the significance of other pollutant sources such as point sources;

3. identifying the water quality improvements or objectives that can be reasonably achieved through nonpoint source controls;

4. identifying the Priority Management Area for the project and the Best Management Practices that will be effective in controlling the sources of nonpoint pollutants, and

5. estimating the costs of implementing the recommended nonpoint source control practices.

The purpose of the Detailed Program for Implementation portion of the plan is to outline a strategy for achieving the project objectives. This will be done by assisting landowners and land operators in installing needed Best Management Practices to control the nonpoint sources of pollutants. This strategy includes:

1. the tasks necessary to accomplish the needs identified in the Watershed Assessment;

2. the agencies responsible for carrying out those tasks;

3. the time frame for carrying out the tasks;

4. the estimated hours of staff time needed to carry out the project; and

5. the administrative procedures to be used in carrying out the program.

The purpose of the Project Evaluation portion of the plan is to identify procedures and schedules for determining project progress and accomplishment. This includes estimating pollutant load reductions resulting from the installation of Best Management Practices, and measuring changes in water quality.

The Nonpoint Source Control Plan serves as a guide for managing the watershed project and details procedures and responsibilities to aid staff in working more effectively. The plan has two other important uses. Because the plan represents a thorough inventory of pollution sources and control needs within the watershed, it can be used to pinpoint critical areas of the watershed where other resource management efforts can be directed. And it can also serve an important education function by showing the cause and effect relationship between land management and water quality.

E. Legal Status of the Watershed Plan

This plan has been prepared under the authority of the Wisconsin Nonpoint Source Water Pollution Abatement Program described in s. 144.25, Wisconsin Statutes, and Chapter NR 120 of the Wisconsin Administrative Code.

This plan is the basis for cost share and local assistance grants through the Nonpoint Source Water Pollution Abatement Program administered by the Wisconsin Department of Natural Resources. The Wisconsin Statutes and Chapter NR 120 of the Wisconsin Administrative Code, however, govern the conduct of the Nonpoint Source Water Pollution Abatement Program. In the event a discrepancy occurs between this plan and the statutes or the administrative rules or if the statutes or administrative rule are changed, the statutes and rules override this plan.

This plan, once approved through the procedures described in Chapter NR 121, Wisconsin Administrative Code, is an update of the Areawide Water Quality Management Plan for the Lower Chippewa River Basin (Vodacek 1979).

SECTION TWO:

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SECTION TWO:

THE WATERSHED ASSESSMENT

CHAPTER II. GENERAL DESCRIPTION OF THE WATERSHED

A. Location

The Lower Eau Claire River Watershed is located almost entirely in eastern Eau Claire County in west central Wisconsin, with only very small portions of the watershed located in Chippewa and Jackson counties (Figure 1). It is located just to the east of the City of Eau Claire. The watershed is 142 square miles in size.

The watershed is tributary to the Eau Claire River below Lake Eau Claire and above Lake Altoona.

B. Surface Water Resources

1. Major Water Resources

The major surface water resources in the watershed are shown in Figures 1 through 4. The named streams are Fall Creek, Pine Creek, Beaver Creek, Bears Grass Creek, Browns Creek, Rush Creek, Bridge Creek, Thompson Valley Creek, Diamond Valley Creek, Hay Creek, and Travis Creek.

Dells Pond, a 68 acre warmwater pond, is located on Bridge Creek. Fall Creek Pond was located on Fall Creek near Highway 12 until 1984, when its dam failed and it was drained.

2. Trout Streams

Approximately 52 miles of the streams mentioned above are classified as trout streams. Wisconsin trout streams are divided into three classes for fish management purposes (Kmiotek, 1980). These classes are closely related to water and habitat quality. The classes are:

Class I: high quality trout waters which have sufficient natural reproduction to sustain wild trout populations at or near the carrying capacity with no stocking of hatchery trout.

Class II: streams which may have some natural trout reproduction but not enough to utilize the food and space that are available. Hatchery trout may be stocked to maintain the sport fishery.

Class III: Streams with marginal trout habitat with no natural trout reproduction. Annual stocking of legal-sized fish is necessary to provide trout fishing.

Figure 4 (later in plan) shows the classifications of the trout streams in the Lower Eau Claire River Priority Watershed Project.

The remainder of the streams support warm water and forage fisheries.

3. Relationship to the Eau Claire River

The Eau Claire River, also shown in Figures 1 through 4, forms part of the boundary of this watershed. As mentioned earlier, it is the receiving body for water drained from this watershed. However, it is not considered part of the Lower Eau Claire River Watershed; no nonpoint source control work is to be done directly along the river; and it is not discussed in any detail in this plan.

4. Precipitation and Runoff

Eau Claire County has an average annual precipitation of about 30.2 inches. Out of this amount, six to nine inches runs off in surface water courses. Peak flows generally occur in the spring with heavy snow melt.

C. Groundwater

The chief groundwater-bearing strata are the sandstone in the uplands and the alluvial (materials deposited by running water) sands and gravels in the valley bottoms. Both of these formations are quite porous and furnish abundant supplies of water. In general, a common water level prevails, tilted in the direction of slopes and streams in the immediate locality. Springs are located along the stream valleys near outcropping beds of sandstone.

The groundwater in the watershed provides a safe source of drinking water since it has not been significantly contaminated. Groundwater supplies are easily reached and thus are an economical source of water.

D. Soils and Topography

A generalized soil map for the Lower Eau Claire River Watershed is shown in Figure 2.

The soils covering the uplands in this watershed are generally well drained silt loams and sandy loams. The soils on stream terraces vary from well-drained to poorly-drained. The stream network is dendritic (branching like a tree), not having been covered by the most recent (Wisconsin stage) glacier. Outcropping rock formations in the watershed are sandstone, except that granite is found along part of the Eau Claire River.

E. Land Use

The Lower Eau Claire River Watershed is mostly rural with agriculture accounting for most of the rural land uses. The acreages devoted to various agricultural uses are shown by subwatershed in Table 1.

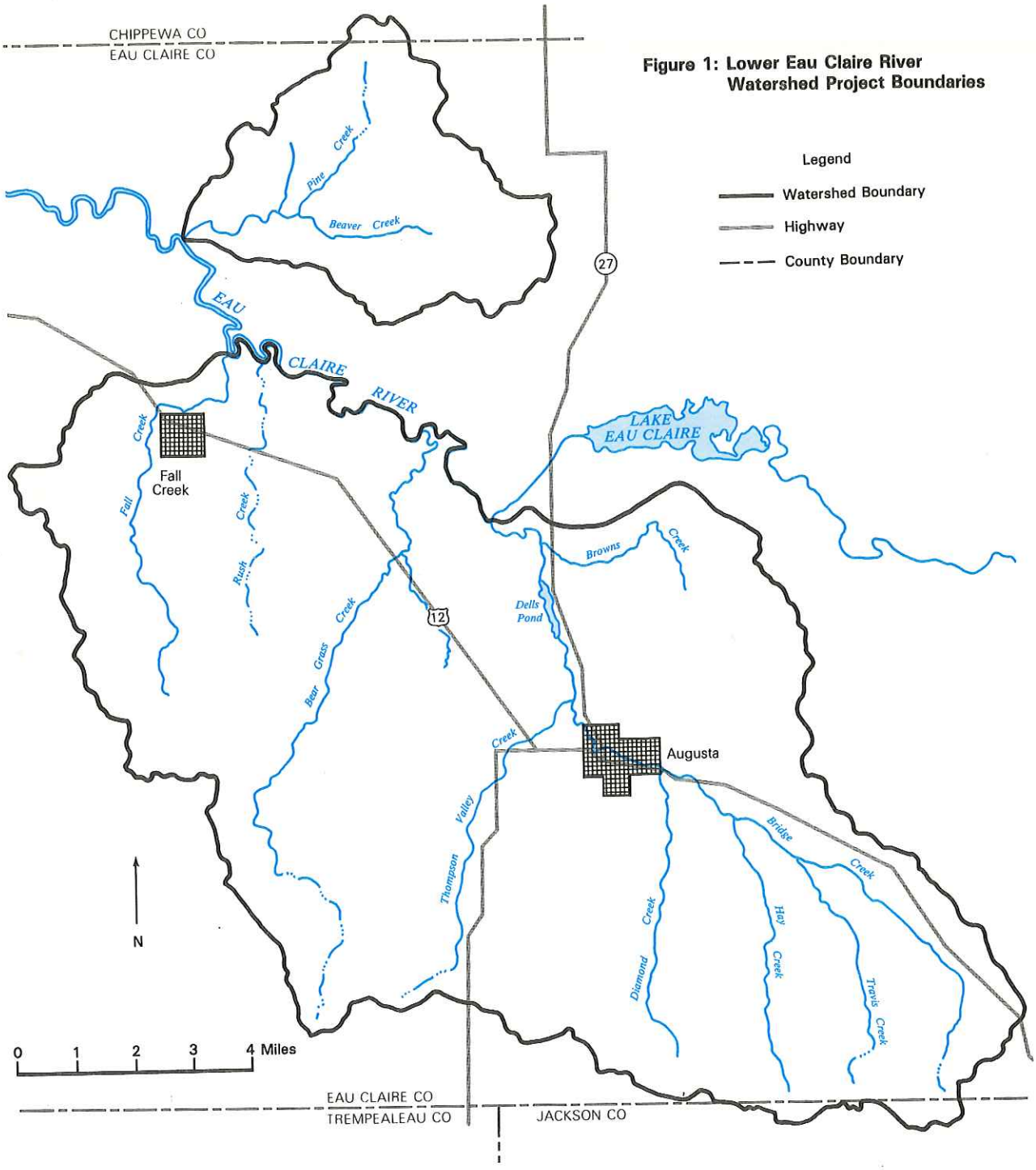


Figure 1: Lower Eau Claire River Watershed Project Boundaries

Table 1 indicates that over half of the inventoried lands are used for crops. This high percentage of cropland is indicative of the high potential for sediment and nutrient loading to the surface waters. Erosion rates on these lands are presented later in the inventory portion of the plan.

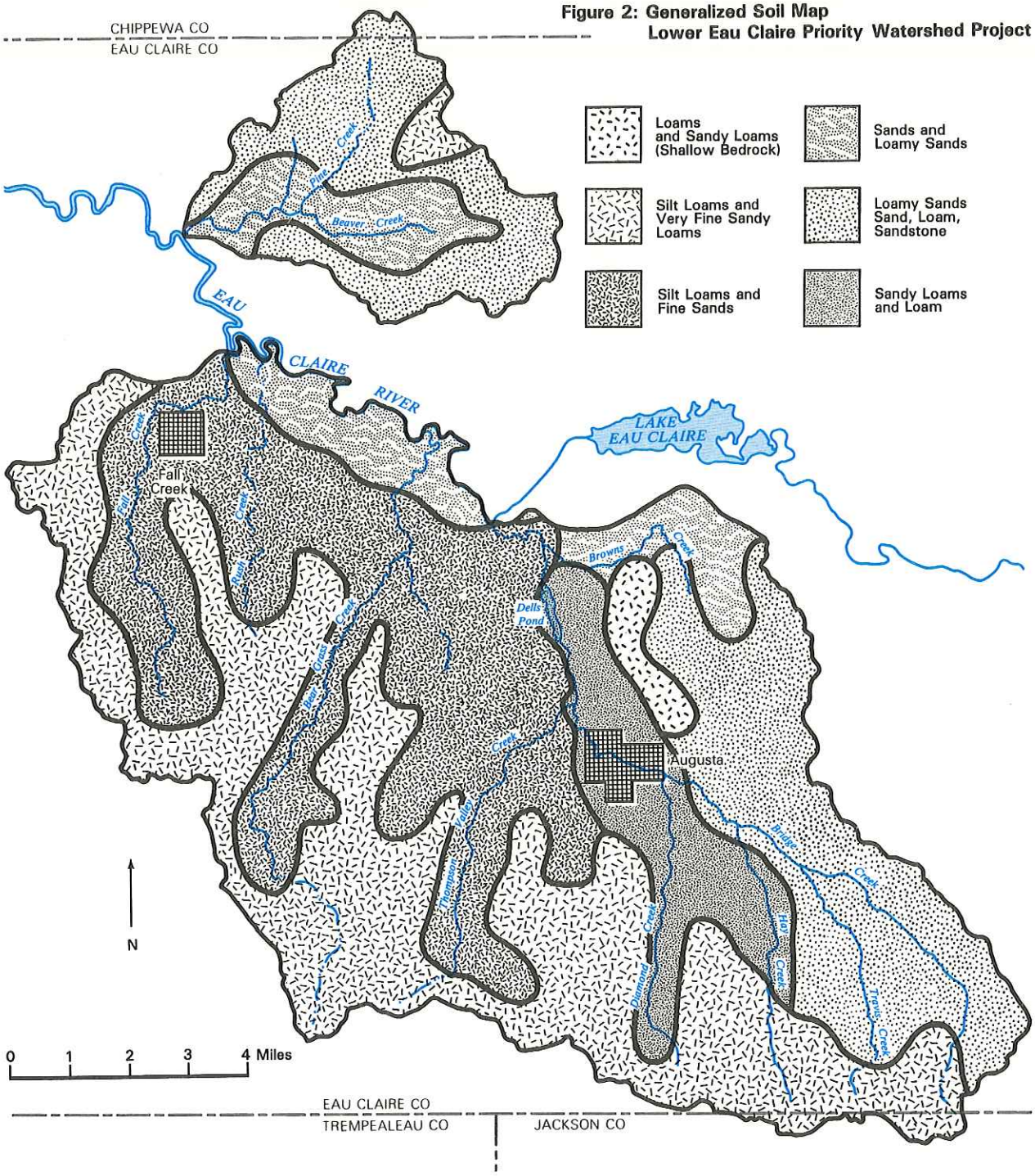
The only incorporated areas within the watershed are Fall Creek with a 1980 population of 1,148 and Augusta with a 1980 population of 1,560 (U.S. Department of Commerce, 1982).

Table 1. Acreage by Land Use in the Inventory Corridor of the Lower Eau Claire River Priority Watershed Project

Subwatershed	Cropland	Woodlot	Vacant Grassland	Pasture	Wetland	Farmstead	Residential	Commercial	Total Acres
Fall Creek	4,114	931	295	419	140	80	23	2	6,004
Upper Bears Grass	3,594	614	358	113	176	93	3	0	4,951
Thompson Valley	2,779	398	226	86	312	120	7	10	3,938
Lower Bears Grass	2,913	659	392	70	188	84	35	0	4,341
Upper Bridge	1,463	1,261	335	134	1,600	106	12	9	4,920
Beaver Creek	1,273	2,926	169	68	32	29	5	0	4,502
Diamond Valley	1,526	438	108	164	36	34	4	0	2,310
Hay Creek	1,011	760	139	157	760	44	26	0	2,897
Middle Bridge	1,361	499	208	153	474	81	117	0	2,893
Brown's Creek	667	1,289	408	7	1,186	15	17	0	3,589
Rush Creek	1,649	242	36	3	25	54	2	0	2,011
Pine Creek	715	858	63	238	3	19	3	0	1,899
Lower Bridge	536	385	72	16	97	29	43	0	1,178
Travis Creek	349	551	76	0	644	2	0	0	1,622
Total Acres	23,950	11,811	2,885	1,628	5,673	790	297	21	47,055

Source: Lower Eau Claire River Watershed Project Inventory (1985) by the Eau Claire County Land Conservation Commission.

Figure 2: Generalized Soil Map
Lower Eau Claire Priority Watershed Project



CHAPTER III. INVENTORY PROCEDURES AND WATERSHED POLLUTANT LOADS

A. Scope of the Watershed Assessment

The inventory of nonpoint sources of pollutants for the Lower Eau Claire River Watershed included an assessment of land erosion and runoff, barnyard manure runoff, streambank erosion, and urban runoff. The assessment of each of these nonpoint sources is discussed in detail in this chapter.

In addition to the inventory of the nonpoint sources, four wastewater treatment plant discharges and landspreading of municipal wastewater treatment plant sludge are also discussed in this chapter.

The potential erosion from harvesting timber was not inventoried since it has not been known to be a problem in this part of the state. Public hearing comments included a suggestion that timber removal from County Forests may contribute sediment to the watershed. However, the Eau Claire County Forestry Department follows the Department of Natural Resources guidelines contained in the DNR's Silvicultural and Forest Aesthetics Handbook (WDNR, no date) which should minimize any problems.

The inventory process is very important since information can be obtained on:

1. the location of the most severe nonpoint sources of pollutants;
2. the quantity and costs of management practices needed to control the pollutants;
3. the staff time needed to design and install these practices; and
4. the conditions in the watershed prior to the start of the project, so this information can be compared with the post-project conditions to determine project accomplishments.

B. Delineation of Subwatersheds for Inventory and Management Purposes

Prior to the inventory process, the watershed was divided into fourteen subwatersheds as shown in Figure 4. Chapter IV of this plan contains discussions of each subwatershed, including physical description, water quality, pollutant sources and project objectives.

C. Use of the Channel Corridor Inventory Approach

For each subwatershed, all of the permanent and intermittent streams were located and drawn on air photos. Then all land within ¼ mile of the channel system was inventoried. The assumption made in using this "corridor" approach is that erosion occurring more than ¼ mile from a defined channel has very little potential for affecting water quality.

However, all animal lots, regardless of distance to the channel system, were inventoried since some pollutants from animal lots may be carried long distances in runoff.

Table 2. Streambank Erosion Ranked by Total Tons of Sediment Produced Within a Subwatershed

Subwatershed	Site No.	Owner ID	Town	Range	Section 1/4	Horiz. Feet	Vert. Feet	Rate Ft/Yr	Tons/ Year	Cattle Access
BC	06	BC007	26N	06W	17/SW	400	80.0	.3	432	N
BC	05	BC007	26N	06W	17/SW	200	60.0	.3	162	N
BC	07	BC007	26N	06W	17/SW	200	60.0	.3	162	N
BC	08	BC007	26N	36W	17/SW	200	60.0	.3	162	N
BC	11	BC037	26N	06W	16/SW	200	60.0	.3	162	N
OBC	12	BE006	26N	06W	16/SW	200	60.0	.3	162	N
BC	10	BC006	26N	06W	17/SE	400	8.0	.3	43.4	N
BC	01	BC001	26N	06W	17/SW	60	20.0	.3	16.2	N
BC	02	BC011	26N	06W	17/SW	200	6.0	.3	16.2	N
BC	03	BC011	26N	06W	17/SW	100	12.0	.3	16.2	N
BC	09	BC007	26N	06W	17/SE	150	6.0	.3	12.2	N
BC	04	BC011	26N	06W	17/SW	300	10.0	.07	9.5	N
BE	01	BE023	27N	07W	23/NW	600	8.0	.3	64.8	Y
BE	03	BE020	27W	07W	16/SE	100	15.0	.3	20.3	N
BE	02	BE021	27W	07W	21/NE	150	20.0	.07	9.5	N
BE	04	BE003	27N	07W	13/NW	200	3.0	.07	1.9	Y
BL	02	BL041	26N	07W	23/SW	1,100	10.0	.07	34.7	Y
BL	03	BL014	26N	07W	24/SE	900	8.0	.07	22.7	N
BL	01	BU038	26N	07W	22/SW	400	3.0	.07	3.8	Y
BU	01	BU051	25N	07W	22/NW	4,000	4.0	.07	50.4	Y
BU	08	BU056	26N	07W	27/NW	1,200	3.0	.07	11.3	Y
BU	04	BU018	25N	07W	04/SW	1,600	2.0	.07	10.1	Y
BU	07	BU039	26N	07W	27/SW	1,000	3.0	.07	9.5	Y
BU	06	BU029	26N	07W	33/SE	5,200	.5	.07	8.2	Y
BU	03	BU055	25N	07W	05/SE	500	2.0	.07	3.2	Y
BU	05	BU019	26N	07W	33/SW	1,200	.5	.07	1.9	Y
BU	02	BU015	25N	07W	09/SE	200	.03	.07	.0	Y
DV	06	MB001	25N	06W	04/SW	5,800	6.0	.07	109.6	Y
DV	05	DV001	25N	06W	09/NE	4,800	6.0	.07	90.7	Y
DV	03	DV033	25N	06W	21/NE	900	3.0	.07	8.5	Y

Table 2. Streambank Erosion Ranked by Total Tons of Sediment Produced Within a Subwatershed - cont.

Subwatershed	Site No.	Owner ID	Town	Range	Section 1/4	Horiz. Feet	Vert. Feet	Rate Ft/Yr	Tons/ Year	Cattle Access
DV	04	DV005	25N	06W	09/SE	150	6.0	.07	2.8	Y
DV	02	DV031	25N	06W	28/NW	100	3.0	.07	1.0	Y
DV	01	DV035	25N	06W	33/NW	300	.5	.07	.5	Y
FC	05	FC004	26N	07W	06/NE	300	40.0	.7	378	N
FC	04	FC003	26N	07W	06/NE	140	30.0	.7	132	N
FC	03	FC003	26N	07W	06/NE	100	15.0	.7	47.3	N
FC	01	FC033	26N	07W	13/SE	300	3.0	.03	1.2	Y
FC	02	FC044	26N	07W	13/SE	300	3.0	.03	1.2	Y
HC	01	HC009	25N	06W	23/NW	400	6.0	.07	7.6	Y
LB	02	LB036	26N	06W	18/SE	1,600	80.0	.3	1728	N
LB	01	LB036	26N	06W	18/SE	600	70.0	.3	567	N
LB	06	LB038	26N	06W	18/NE	400	60.0	.3	324	N
LB	05	LB038	26N	06W	18/NE	1,620	12.0	.3	262	N
LB	07	LB038	26N	06W	18/NE	1,600	12.0	.3	259	N
LB	03	LB036	26N	06W	18/SE	1,000	15.0	.3	202.5	N
LB	04	LB037	26N	06W	18/NE	1,000	15.0	.3	202.5	N
LB	08	LB039	26N	06W	18/NE	700	10.0	.3	94.5	N
LB	12	LB041	26N	06W	18/NW	200	20.0	.3	94.5	N
LB	09	LB039	26N	06W	18/NE	270	6.0	.3	21.9	N
LB	11	LB040	26N	06W	18/NE	160	10.0	.3	21.6	N
LB	10	LB039	26N	06W	18/NE	700	6.0	.07	13.2	N
MB	01	MB006	25N	06W	03/SE	800	4.0	.07	10.1	Y
MB	02	MB056	25N	06W	04/NE	800	4.0	.07	10.1	N
PC	04	PC034	27N	07W	16/SE	60	10.0	.3	8.1	N
PC	01	PC009	27N	07W	03/N3	350	3.0	.07	3.3	Y
PC	02	PC013	27N	07W	10/NE	300	3.0	.07	2.8	Y
PC	03	PC010	27N	07W	03/SE	300	2.0	.07	1.9	Y
RC	01	FC016	26N	07W	04/SW	400	10.0	.3	54.0	Y
RC	02	RC029	26N	07W	04/SW	200	10.0	.3	27.0	
TV	02	MB036	25N	07W	26/NW	2,000	5.0	.07	31.5	Y

Table 2. Streambank Erosion Ranked by Total Tons of Sediment Produced Within a Subwatershed - cont.

Subwatershed	Site No.	Owner ID	Town	Range	Section 1/4	Horiz. Feet	Vert. Feet	Rate Ft/Yr	Tons/ Year	Cattle Access
TV	04	BU015	25N	07W	14/SE	1,600	3.0	.07	15.1	Y
TV	03	MB035	25N	07W	26/NE	1,000	3.0	.07	9.5	Y
TV	06	TV034	25N	07W	14/NW	1,000	2.0	.07	6.3	Y
TV	07	TV032	25N	07W	14/SW	1,000	2.0	.07	6.3	N
TV	05	TV029	25N	07W	14/NE	600	2.0	.07	3.8	Y
TV	08	TV027	25N	07W	12/SE	200	6.0	.07	3.8	N
TV	01	TV047	25N	07W	13/SW	2,600	0.4	.07	3.3	Y
UB	02	UB055	25N	05W	32/NE	200	2.0	.07	1.3	Y
UB	01	UB048	25N	05W	32/NE	400	.6	.07	.8	Y

Key to Subwatershed:

BC = Brown's Creek
BE = Beaver Creek
BL = Lower Bears Grass Creek
BU = Upper Bears Grass Creek
DV = Diamond Valley Creek
FC = Fall Creek
HC = Hay Creek
LB = Lower Bridge Creek
MB = Middle Bridge Creek
PC = Pine Creek
RC = Rush Creek
TV = Thompson Valley Creek
UB = Upper Bridge Creek

Cattle Access

Y = Yes
N = No

D. Pollutant Source Assessment Methods and Results

1. Introduction

Assessment methods and results for streambanks, lands within the ¼ mile-wide stream corridor, animal lots and urban areas are discussed in this section.

The results of the watershed inventory are summarized in several tables. Table 1 summarizes by subwatershed the acreages of the various land uses which were determined by the inventory. Tables 2, 3 and 4 summarize the cropland erosion and streambank erosion inventory results.

Information on treatment plant discharges and landspreading of sludge is also included here.

2. Streambank Erosion

All streams in the watershed were surveyed for streambank erosion using a modification of the Land Inventory Monitoring (LIM) process (SCS, 1977). The LIM process is commonly used by the Soil Conservation Service (SCS) to estimate streambank erosion.

This process ranks streambank erosion according to the following four categories: none, slight, moderate and severe. The ranking is based on three parameters: 1) the length, 2) the height, and 3) the estimated lateral recession rate of each area of eroding streambank. Slight bank erosion is defined as occurring when the bank is bare, but lateral recession is not obvious. Moderate bank erosion is identified by actively eroding banks with many exposed roots, fallen vegetation and cave-ins. Severe bank erosion is generally associated with meanders and is characterized by massive washouts and slumps.

The results of the LIM process can also be used to estimate the number of tons of soil eroding from streambanks by assigning an estimated average weight per cubic foot of soil lost. It is important to note that the actual volume of sediment coming from a streambank may not be as detrimental to the fish population in a stream as the loss of fish habitat and cover due to an eroding streambank. Table 2 summarizes streambank erosion in the watershed.

3. Land Erosion

a. Land Inventory Methods

All of the 40,300 acres of land in the Lower Eau Claire River Watershed that are located within one-quarter mile of the channel network were inventoried for soil loss potential.

Table 3. Acreage and Erosion Losses by Land Use in the Lower Eau Claire River Subwatersheds

Subwatershed	Cropland		Woodlot		Grassland		Pasture		Total	
	AC	T/YR	AC	T/YR	AC	T/YR	AC	T/YR	AC	T/YR
Fall Creek	4,114	26,962 (92%)	931	417 (1%)	295	388 (1%)	419	1,438 (6%)	5,759	29,250 (100%)
Upper Bears Grass	3,594	26,448 (95%)	614	145 (1%)	358	1,050 (4%)	113	81 (0%)	4,679	27,724 (100%)
Thompson Valley	799	13,848 (93%)	398	78 (0%)	266	109 (1%)	86	819 (6%)	3,489	14,854 (100%)
Lower Bears Grass	2,913	12,440 (95%)	659	80 (1%)	392	336 3%)	70	256 (2%)	4,034	13,112 (100%)
Upper Bridge	1,463	3,182 (89%)	1,261	93 (3%)	335	122 3%)	134	188 (5%)	3,193	3,585 (100%)
Beaver	1,273	3,599 (79%)	2,926	143 (3%)	169	210 5%)	68	561 (12%)	4,436	4,513 (100%)
Diamond Valley	***1,426	9,322 (82%)	438	122 (1%)	108	342 3%)	164	1,527 (13%)	2,236	11,313 (100%)
Hay Creek	1,011	2,849 (79%)	760	110 (3%)	139	68 2%)	157	569 (16%)	2,067	3,596 (100%)
Middle Bridge Cr.	1,360	4,764 (86%)	499	186 (3%)	208	140 3%)	153	444 (8%)	2,221	5,534 (100%)
Brown's Creek	667	561 (64%)	1,289	268 (31%)	408	43 5%)	7	4 (1%)	2,371	876 (100%)
Rush Creek	1,649	8,313 (99%)	242	66 (1%)	36	6 0%)	3	4 (0%)	1,930	8,389 (100%)
Pine Creek	715	3,985 (84%)	858	56 (1%)	63	41 1%)	238	685 (14%)	1,874	4,767 (100%)
Lower Bridge Creek	536	538 (70%)	385	205 (26%)	72	15 2%)	16	13 (2%)	1,009	771 (100%)
Travis Creek	349	717 (87%)	551	56 (7%)	76	50 6%)	0	0 (0%)	976	823 (100%)
TOTALS	23,950	117,528 (91%)*	11,800	2,025 (2%)*	2,885	2,920 (2%)*	1,628	6,634 (5%)*	40,300	129,107 (100%)

% = percentage of erosion by subwatershed

%* = percentage of total erosion

AC = acres

T/YR = tons per year of erosion

Source: Lower Eau Claire River Priority Watershed Project Inventory, 1985.

On air photos, the channel network and ¼ mile-wide corridor were drawn for the entire watershed. Within this corridor, parcels of lands were inventoried for their soil loss potential using the Universal Soil Loss Equation, referred to as the USLE (SCS, 1974). In order to calculate an average annual soil loss in tons of soil per acre per year (T/A/Y), this equation utilizes the following six factors: 1) rainfall, 2) soil erodibility, 3) slope (percent), 4) slope length, 5) cropping cover and management, and 6) support practice. The parcels were drawn so that the USLE factors were as uniform as possible within each parcel. Over 4,500 parcels were delineated in this manner and inventoried.

It is important to note that the soil loss calculation does not determine the amount of soil which actually enters the surface waters. It is only an estimate of the sheet and rill erosion occurring on a given parcel of land. It is assumed that lands with high soil loss rates in this corridor are contributing the most sediment to the surface waters.

Although the inventory data were collected on all of the lands within the corridor, the calculation of soil loss was done only on the croplands, pastures, woodlots, and vacant grasslands. Soil loss calculations were not done for wetlands, farmsteads, and established residential/commercial areas which, because of their vegetative land cover, have very little eroding soil.

b. Land Erosion Inventory Results

The results of the land erosion inventory are summarized by subwatershed in Tables 3, 4 and 5. Table 3 shows the estimated soil loss within each subwatershed and for the entire watershed by land use. This table indicates that a very high percentage (91%) of the total soil erosion is occurring on cropland. The cropland category includes both continuous row crop and rotation crop practices. Based on this information, the effective control of the sediment that enters the surface waters in this watershed can be largely achieved by controlling the cropland erosion problems. Sediment from the other land uses appears to be of less concern, though some woodlot and pasture practices are needed in the watershed.

c. Erosion Control Goals

It is not known precisely to what level soil erosion must be reduced in order to protect the water quality and fishery within the watershed. However, an average target rate of four tons per acre per year was chosen as a reasonable rate of erosion to use in designing management practices. Table 4 gives an indication of how much of the present soil erosion would be controlled if all the lands currently eroding at four tons/acre/year or greater were reduced to at least the level of four tons/acre/year.

Table 4. Soil Erosion Losses by Rate Groups and Reduction Potential

Subwatershed		Erosion Rate Changes (T/A/yr) 0-1.99	2-2.99	3-3.99	4-4.99	5+	Total	Reduction	Total After Reduction	Reduction % of Total
Fall Creek	Ac	2,224	474	98	620	2,343	5,759			
	T/yr	1,284	1,049	363	2,593	23,961	29,250	19,672	9,578	67%
Upper Bears Grass	Ac	1,775	309	176	420	1,999	4,679			
	T/yr	1,198	720	639	1,865	23,302	27,724	19,212	8,512	69%
Thompson Valley	Ac	1,459	425	62	318	1,196	3,489			
	T/yr	1,078	1,022	223	1,465	11,066	14,854	8,943	5,911	60%
Lower Bears Grass	Ac	2,294	288	122	417	913	4,034			
	T/yr	1,608	652	410	1,819	8,623	13,112	7,307	5,805	56%
Upper Bridge	Ac	2,754	86	85	105	163	3,193			
	T/yr	1,389	214	289	450	1,243	3,585	1,036	2,549	29%
Beaver Creek	Ac	3,745	207	170	78	236	4,436			
	T/yr	985	479	561	341	2,147	4,513	1,819	2,694	40%
Diamond Valley	Ac	829	415	78	148	766	2,236			
	T/yr	453	1,008	273	647	8,932	11,313	7,358	3,955	65%
Hay Creek	Ac	1,436	232	59	165	175	2,067			
	T/yr	657	525	187	709	1,518	3,596	1,388	2,208	39%
Middle Bridge	Ac	1,584	157	53	95	332	2,221			
	T/yr	1,041	383	191	409	3,510	5,534	2,910	2,624	53%
Browns Creek	Ac	2,333	34	4	0	0	2,371			
	T/yr	785	77	14	0	0	876	0	876	0%
Rush Creek	Ac	1,013	69	37	192	619	1,930			
	T/yr	786	149	125	838	6,491	8,389	5,290	3,099	63%
Pine Creek	Ac	1,234	221	38	134	247	1,874			
	T/yr	424	579	135	586	3,043	4,767	2,813	1,054	59%
Lower Bridge	Ac	956	35	2	11	5	1,009			
	T/yr	591	77	6	47	50	771	57	714	7%
Travis Creek	Ac	837	68	14	26	31	976			
	T/yr	318	162	50	112	181	823	135	688	17%
TOTALS	Ac	24,500	3,049	998	2,729	9,025	40,300			
	T/yr	12,597	7,096	3,466	11,881	94,067	129,107			

T/A/yr = tons per acre per year

Ac = acre

T/yr = tons per year

Source: Lower Eau Claire River Watershed Project Inventory, 1985.

The amount of sediment control that can be expected from this proposal varies from zero percent for the Browns Creek Subwatershed to 69% for the Upper Bears Grass Subwatershed. The reason that the Browns Creek Subwatershed shows zero reduction in overall sheet and rill erosion is that it has no land presently eroding at greater than four T/A/Y inside the ¼ mile-wide corridor. In the Diamond Valley, Upper Bears Grass, and Fall Creek subwatersheds, much more of the soil loss is occurring in the higher erosion rate categories.

The use of this data in determining which fields are the most critical from the standpoint of sediment contribution is explained later in this plan, in Section Three "A Detailed Program for Implementation."

Table 5. Total Soil Loss by Erosion Rate Groups, for All Subwatersheds Combined

Present Conditions (According to the Inventory*)

Erosion Rate Category (tons/acre/year)	Number of Acres	Total Soil Loss (tons/year)
0.00 - 1.99	24,500	12,597
2.00 - 2.99	3,049	7,096
3.00 - 3.99	998	3,466
4.00 - 4.99	2,729	11,881
5.00 or more	9,025	94,067
Totals	40,301*	129,107

*This does not include the 6,781 acres of wetlands, farmsteads, residential and commercial lands within ¼ mile of the channel system, on which the USLE was not applied.

SOURCE: 1985 Lower Eau Claire River Priority Watershed Project inventory data, Eau Claire County Land Conservation Commission.

Table 5 indicates that a very high percentage of existing soil loss occurs at a rate of over four T/A/Y. The sum of the tons of soil lost in the two categories above four T/A/Y is 105,948 T/A/Y, which constitutes 82% of the total 129,107 T/A/Y of soil lost that was estimated by using the inventory data.

d. Land Erosion Control Practices

Table 6 contains information on the types of management practices which were estimated to be needed to attain the reduction of soil loss to target levels. The Wisconsin Department of Natural Resources uses computer programs which assess the land management inventory data to determine what type of change in management practice or practices is needed to reduce the soil loss on a given parcel to the desired target level.

It should be pointed out that the application of new management practices often brings soil loss below the four T/A/Y target level. However there are some parcels of land that cannot achieve the target level of erosion with the management practices that are presently available.

Table 6. Estimated Land Erosion Control Practice Installation Needs for the Lower Eau Claire River Watershed

Practices Needed	Number of Fields	Number of Acres
Contour Cropping	187	2,041
Contour Strips	430	5,012
Conservation Tillage	26	181
Minimum Tillage plus Contour Strips	341	3,808
Pasture Renovation	57	614
	1,041	11,656

SOURCE: DNR application of "MANAGEMENT" Program to Land Inventory Data.

4. Animal Lot Runoff

a. Animal Lot Assessment Methods

A total of 156 animal lots were assessed for their livestock waste runoff potential. This was the total number of animal lots in operation within the watershed when the inventory was conducted.

Information on 1) the number and types of animals, 2) the size of areas draining through the lots, 3) the distance of the lot from the stream, 4) the vegetative cover on the buffer area and 5) the existing management practices was all collected by Eau Claire County LCD personnel. At the same time, information on manure storage needs was recorded for each lot.

The information on all of the animal lots in the watershed was collected for use in a mathematical model developed by the U.S. Department of Agriculture (Young et al. 1982). This model, called the ARS model (after the Agricultural Research Service, estimates both the phosphorus and chemical oxygen demand (COD) load which is contributed from each animal lot to the stream during a rain storm. Chemical oxygen demand is a measure of how much of the stream's dissolved oxygen is potentially used up during the decomposition of the organic material from the animal lots. The animal lot runoff model is used to evaluate the potential pollution problems from animal feedlots.

b. Animal Lot Assessment Results

The estimated chemical oxygen demand of runoff from each barnyard was used to rank all lots relative to each other in terms of how critical they are to water quality. In this manner the most important and least important lots can be determined. During the analysis of the animal lot inventory results, lots were ranked from highest potential pollutant loading to lowest in each subwatershed. The lots in each subwatershed were ranked as high, medium, or low priority.

The high priority lots are those which contribute the most pollutants and probably are the most cost effective to control. These are the lots which contributed the top 40% of controllable pollutant loading (except in Rush Creek and Lower Bears Grass where the cutoff was 35%). The medium priority lots are those yards which are less cost effective to control but, when grouped with the high priority lots, contribute at least 80% of the total controllable pollutants from animal lot runoff within a subwatershed. Exceptions were made for the Rush Creek and Lower Bears Grass subwatersheds, where the cutoff is set at 70% because these warmwater fishery streams have less sensitivity to organic pollutants than the trout streams or impoundments in the other subwatersheds. Those lots which collectively contribute less than the 80% (or 70%) level are ranked as low priority. Animal lots draining to groundwater were automatically ranked "low". However, these lots will be re-assessed at the time of the landowner contacts to determine whether they may cause any groundwater problems.

In addition to the criteria discussed above, animal lots which are subject to frequent flooding will be included in the "high" priority category. A preliminary evaluation of this status will be made by determining whether the lot is located on soils indicated to be flood prone. A list of such soils was compiled by the DNR and the LCD. The final determination of whether the lot is subject to frequent flooding will be based on inspection by LCD staff.

Table 10 shows the number of lots which fall into these categories in the Lower Eau Claire River Watershed. Table 10 does not include any lots which would qualify only by being subject to frequent flooding.

5. Urban Runoff

During the land management survey, the acres of land in urban land cover within the corridors were recorded. The land uses that fell into this urban category included residential, commercial, and industrial. The USLE cannot be applied to these land uses. It is believed that the Fall Creek and Augusta urban areas are not contributing large amounts of nonpoint source pollutants, although there are some potential sources in all urban areas.

6. Point Sources of Pollution

There are four point sources that discharge wastewater to the inventoried areas of the watershed. They are the municipal wastewater treatment plants of Augusta and Fall Creek, and the industrial wastewater treatment plants of the Bush Brothers Canning Company and Dairy Maid Coop Creamery.

In Wisconsin every point source is required to meet standards governing the quality and quantity of effluent that is allowed to be discharged to the state's surface waters. These limits are established for each point source to protect the water quality of the receiving stream. Each facility is discussed below.

a. Augusta Municipal Wastewater Treatment Plant

This plant discharges 340,000 gallons per day (design flow) of municipal wastewater treated to average (monthly) limits of 20 milligrams per liter (mg/l) BOD (Biochemical Oxygen Demand) and 20 mg/l suspended solids. The plant had been creating a polluted aquatic environment in Bridge Creek until it was upgraded in 1980.

b. Fall Creek Municipal Wastewater Treatment Plant

Fall Creek's treatment plant had also created some adverse effects by its discharge of inadequately treated sewage until it was upgraded in 1984. The plant now discharges 100,000 gallons (design flow) per day to groundwater through seepage cells, and has been operating properly since the new system was put into operation in January 1985.

c. Bush Brothers Canning Company Wastewater Treatment Plant

Bush Brothers Canning Company treats 85,000 to 125,000 gallons per day of wastewater from its vegetable processing plant. None of this wastewater is discharged to surface waters, instead Bush Brothers uses spray irrigation on land for final disposal. No problems have resulted from this system.

A potential for chlorine and low pH (high acidity) in the cooling water which the plant discharges to Bridge Creek was noted in 1983 and is being monitored along with monitoring of nitrate levels in the groundwater below the spray irrigation fields. If nitrate levels begin to approach levels of concern, Bush Brothers would be required to discharge less wastewater to the site.

d. Dairy Maid Coop Creamery Wastewater Treatment Plant

A cheese producer, Dairy Maid discharges a low volume (less than 100,000 gallons per day) of treated wastewater to groundwater. The groundwater downgradient from the site is monitored.

7. Wastewater Sludge Disposal

Sludge from the City of Eau Claire municipal wastewater treatment plant occasionally is spread on land in the Lower Eau Claire River Watershed. This wastewater sludge contains the concentrated waste from the municipal sewage treatment and is a valuable source of organic material and nutrients. When properly applied to the land, sludge can improve soil productivity. However, when improperly handled, wastewater sludge can become a potential source of pollutants. Major water quality concerns include the contamination of waterways from the runoff of 1) nutrients, 2) organic material, 3) pathogens and 4) heavy metals.

To control the land application of wastewater sludge, the Wisconsin Department of Natural Resources requires all sludge applicators to acquire a permit for each field (State Administrative Code NR 110.26). Under this permit program all sites must meet the minimum requirements outlined in Table 7. As a condition of the permit the applicator must meet the requirements listed below. If these requirements are followed there should be little potential for surface runoff affecting surface waters.

In this watershed project, no inventory or additional monitoring of sludge application is recommended beyond the following conditions which apply to all sludge landspreading sites.

a. For areas where sludge <u>is</u> incorporated into the soil:

1. The sludge must be immediately incorporated with the soil.

2. The sludge must be applied at a rate in accordance with the latest application rate as determined on DNR form 3400-54.

3. The sludge must be applied at a minimum distance of 200 feet from the nearest residence.

4. The sludge must be applied at a minimum distance of 200 feet from the nearest private water supply and 1000 feet from the nearest public water supply well.

5. The sludge must be applied at a minimum distance of 50 feet from streams, ponds and other channelized waterways if a grass buffer strip is present between the sludge disposal site and the water source. A minimum distance of 100 feet must be maintained from streams, ponds and other channelized waterways when there is no buffer zone.

6. A minimum distance of 25 feet must be maintained to dry runs unless conservation practices are installed in accordance with Soil Conservation Service specifications.

b. The following additional conditions apply if the sludge is <u>not</u> incorporated into the soil:

7. The sludge must be applied at a minimum of 500 feet from a residence unless the house occupants agree to a smaller distance. However the minimum distance must be maintained.

8. The sludge must be applied at a minimum of 200 feet from a private water supply and 1000 feet from a public water supply.

9. The sludge must be applied at a minimum distance of 100 feet from streams, ponds and other channelized waterways if a grass buffer is between the site and the water source. A minimum distance of 200 feet must be maintained from streams, ponds and channelized waterways when there is no buffer zone.

10. The sludge must be applied at a minimum distance of 50 feet of any dry runs unless conservation practices are installed in accordance with Soil Conservation Service specifications.

11. No sludge can be spread in a single application greater than the soil can accept without causing runoff. The remainder of the allowable nitrogen loading may be applied at a later time.

12. No raw sludge can be surface applied.

13. The DNR also recommends: (1) that there be close monitoring of runoff in areas where sludge is surface applied; and (2) the sludge be broken up with a drag or raking device.

14. No sludge can be applied to soils within the 10-year frequency or less floodplain.

c. The following conditions apply at <u>all</u> times:

15. The soil pH must be maintained at 6.5 or above.

16. A competent resident inspector must be provided during the time of application.

17. The sludge must be applied in accordance with all other recommendations identified in DNR Technical Bulletin No. 88 which are not discussed above.

18. No sludge can be applied to soil from December 1 to April 1 due to frozen ground conditions unless permitted by the DNR.

Table 7. Soil Limitations for Sludge Spreading

	Slight Limitation[1]	Moderate Limitation[2]	Severe Limitation[3]
Slope	Less than 6%	6 to 12%	More than 12%
Depth to Water Table	More than 5 ft	3 to 5 ft	Less than 3 ft
Flooding & Ponding	None	Rare	Common to frequent
Permeability (in/hr)	0.6 to 0.2	0.2 to 0.6 2.0 to 6.0	Less than 0.2 More than 6.0
Available Water Capacity	More than 6 in.	3 to 6 in.	Less than 3 in.

1 Slight is acceptable for year-round application, except for winter spreading restrictions.

2 Moderate soils are acceptable for restricted periods of application.

3 Severe soils are not acceptable for any sludge spreading, except as determined on a case-by-case basis.

SOURCE: WDNR

E. Priority Management Area for Erosion Control

The Priority Management Area (PMA) of the watershed is that part of the land area where pollutant-laden runoff has the greatest potential to reach streams and channels, and where application of Best Management Practices will be the most effective in improving water quality. In general, the areas near streams and lakes are the most critical because they contribute high pollutant loads to those waters.

In the Lower Eau Claire River Priority Watershed Project, the PMA is defined as a corridor one-eighth mile on either side of the defined channel network. The channels were defined by county staff during the inventory phase of the project as described earlier. If individual channels were overlooked during the inventory, the PMA can be revised upon agreement by both the LCD and the DNR.

Only landowners in the PMA with significant erosion are eligible for cost sharing assistance to install Best Management Practices under the Lower Eau Claire River Priority Watershed Project. In areas where erosion problems are occurring, but are not a source of water quality impacts, existing cost share programs, such as ACP (Agricultural Conservation Program), may be used.

Detailed maps showing the lands within the PMA are available in the Eau Claire County Land Conservation Division offices. These maps should be consulted by any landowner interested in determining if his or her land is located within the PMA.

CHAPTER IV. DESCRIPTION OF WATER RESOURCES, POLLUTANT SOURCES AND OBJECTIVES BY SUBWATERSHED

A. Surface Water Resources

The Lower Eau Claire River Watershed was divided into 14 subwatersheds for assessment and implementation purposes in this project. The subwatersheds are shown in Figure 3 and are individually discussed in this extensive chapter.

The subwatershed discussions are in the following order: 1) Beaver Creek, 2) Pine Creek, 3) Lower Bears Grass Creek, 4) Upper Bears Grass Creek, 5) Upper Bridge Creek, 6) Middle Bridge Creek, 7) Lower Bridge Creek, 8) Diamond Valley Creek, 9) Hay Creek, 10) Travis Creek, 11) Thompson Valley Creek, 12) Fall Creek, 13) Brown's Creek, and 14) Rush Creek.

In addition to Figure 3 (the subwatershed map), Figures 1 and 4 also refer to the watershed's water resources.

1. Beaver Creek Subwatershed

Physical Description and Water Quality:

Beaver Creek is classified as a Class I brook and brown trout stream, which means that it currently has both the water quality and habitat necessary to support natural trout reproduction at near-carrying capacity. The stream is 6.2 miles long, has a gradient of 26 feet per mile, and has a ratio of 30% riffle to 70% pool segments. It is spring-fed and has summer temperatures of 55F to 68F.

The streambank vegetation is upland hardwood and tag alder. The creek is accessible at two town and two county road bridges. Eau Claire County owns 2.5 miles of frontage on this stream.

Extensive water quality and fish surveys were done in the mid-1970s when portions of Beaver and Pine creeks were proposed to be purchased for public use. That proposal was strongly objected to by local land owners and therefore was dropped. The data on fish populations collected during those surveys showed 470-500 trout per acre in Beaver Creek. Other fish species found in the surveys included stone roller, white sucker, mud minnow, Johnny Darter, brook stickleback, and common shiner. Heavy early season and moderate late season trout fishing was recorded in a 1969 stream summary report by the Department's Fish Management staff (R. L. Fassbender, WDNR, to R. F. Wendt, WDNR, in memorandum 1969).

A negative impact on the stream has been caused by the loss of streambank cover which was removed for the maintenance of a high voltage power line which crosses Beaver Creek and parallels the creek for several miles. The loss of this cover may elevate summer stream temperatures. The use of herbicides by the company maintaining the power lines may affect the stream, though no acute effects such as fish kills have been recorded.

Pine Creek, discussed later in this chapter, is a tributary to Beaver Creek and contributes sediment and nutrients to Beaver Creek.

Pollution Sources:

All of the inventoried types of nonpoint pollutant sources (animal lots, field spread manure, land erosion, and eroded streambanks) occur in the Beaver Creek Subwatershed, but at a much lower density than in most other subwatersheds.

There are four animal lots in the subwatershed which together produce over 32 pounds of phosphorus and 3,832 pounds of chemical oxygen demand (COD), as computed by the ARS model mentioned earlier (Young et al. 1982).

It was also determined that the four animal lots in the subwatershed require a total of 89 acres of land suitable for the winter spreading of manure.

In the ¼ mile-wide (1/8 mile radius) corridor around the stream there are 341 acres of land which are eroding at four to five tons/acre/year (T/A/Y) and 2,147 acres of land eroding at greater than five T/A/Y, all of which need to be controlled.

The streambank inventory recorded 1,050 feet of eroding banks that need to be controlled.

Objectives:

The protection of the current Class I trout fisheries from future degradation is the objective in the Beaver Creek Subwatershed. The reduction of sediment and organic loading through the installation of the eligible management practices will improve water quality in Beaver Creek. The control of sediment should improve the reproduction of trout and the control of ammonia from organic runoff should help avoid fish kills.

Specific goals in the Beaver Creek Subwatershed include:

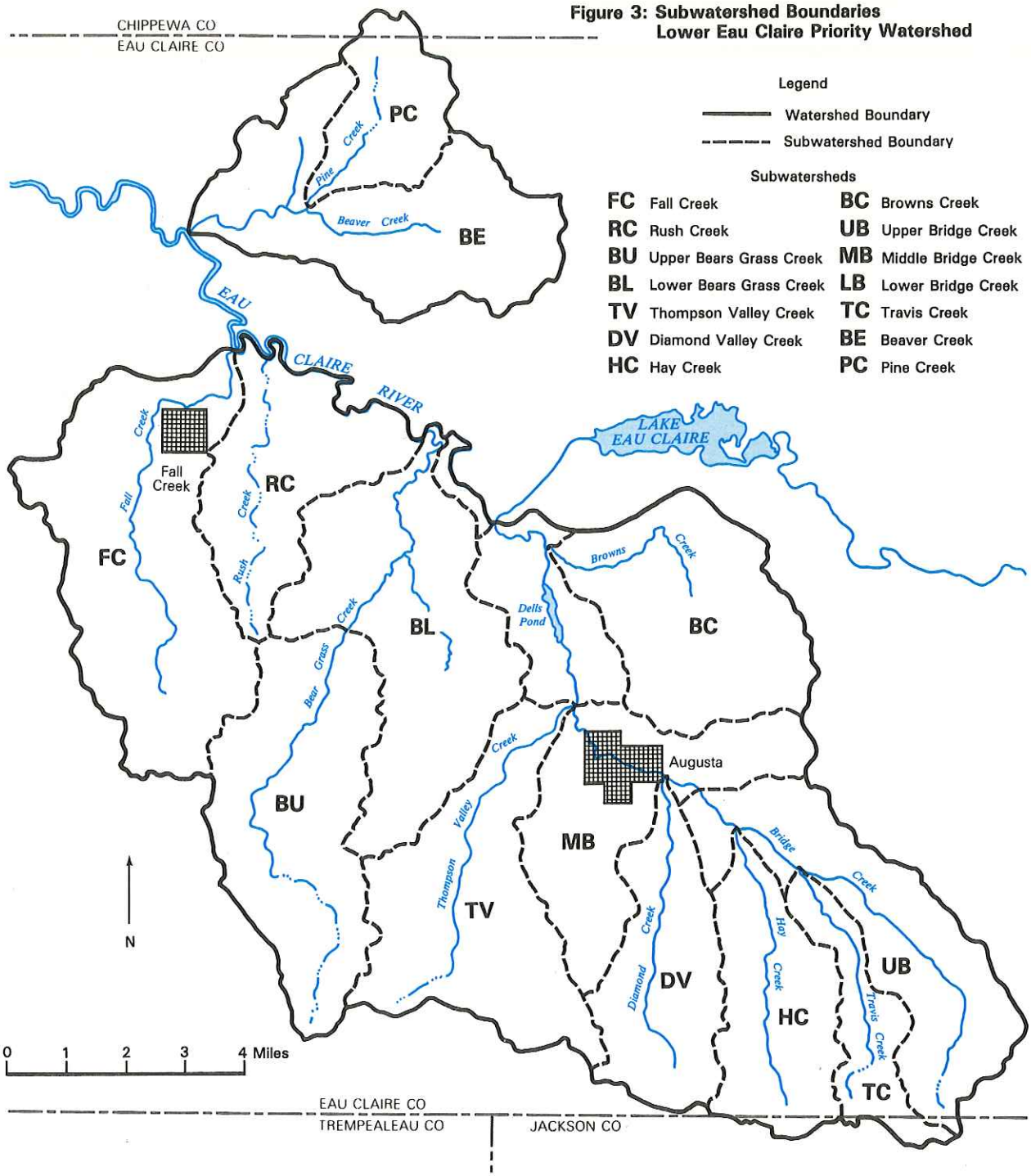
a. Land erosion control goal: 1,819 tons/year total sediment reduction from 14 landowners.

b. Animal lot runoff control goal: 3,088 pounds (81%) COD total reduction from two animal lots.

c. Streambank erosion control goal: 96 tons total sediment reduction from four sites.

d. Manure spreading control goal: eliminate spreading on unsuitable acres.

Figure 3: Subwatershed Boundaries
Lower Eau Claire Priority Watershed



2. Pine Creek Subwatershed

Physical Description and Water Quality:

Pine Creek is a 4.0 mile long Class II brown and brook trout stream which is tributary to Beaver Creek, which was described previously. Limited stocking of brook trout is done by the DNR to supplement the native population. Other fish species found in the stream include white sucker, brook stickleback, stoneroller, brook lamprey, and mud minnow.

Pine Creek is spring-fed, and thus has summer temperatures of between 62F and 59F. A 1969 stream survey estimated a pool-to-riffle ratio of 38% to 62% respectively. Sand and silt is impairing trout production by covering the gravel and rubble substrate needed for egg protection. It is estimated that 55% of the bottom is covered with sand and silt and 45% is gravel (R. L. Fassbender, WDNR - West Central District, to R. F. Wendt, WDNR in 1969 memorandum).

Pollutant Sources:

In the ¼ mile-wide corridor around Pine Creek, there are 247 acres which are eroding at a rate of over five tons/acre/year, and 134 acres which are eroding at between four and five tons/acre/year. The application of management practices with a target soil loss of four tons/acre/year would result in a 59% reduction in soil loss.

Streambank erosion is occurring on about 1,100 linear feet of bank and contributes an estimated 16 tons of sediment per year to the stream.

The Pine Creek subwatershed contains eight animal lots which contribute a total COD loading of 3372 pounds in the modeled 4.2 inch rainfall event. The five lots with the highest output generate 82% of this load.

The spreading of manure is a potential source of ammonia and organic loading, although the sizes of the individual operations in the subwatershed are not large. The largest animal lot operation requires 38 acres of suitable land to be able to spread manure during winter months, and all of the operations combined require approximately 337 acres for winter spreading.

Objectives:

The objective for Pine Creek is to increase trout productivity by reducing potential ammonia toxicity caused by organic runoff and reducing sediment loading. Reducing the sediment that enters the creek by controlling both upland and streambank erosion would allow the natural scouring action of the creek to increase the amount of stream bed suitable for reproduction.

Specific goals in the Pine Creek Subwatershed are:

a. Land erosion control goal: 2,813 tons/year total sediment reduction from 15 landowners.

b. Animal lot runoff control goal: 2,328 pounds (69%) COD total reduction from five lots.

c. Streambank erosion control goal: 16 tons/year total sediment reduction from three sites.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

3. Lower Bears Grass Creek Subwatershed

Physical Description and Water Quality:

Lower Bears Grass Creek is a forage fish stream approximately five miles in length with an eight-foot per mile gradient. It empties into the Eau Claire River. A survey by the DNR's Fish Management Bureau (Doug Erickson, West Central District - WDNR, to Bert Apelgren, in 1980 memo) found temperatures as high as 72F in September, 1979, which was attributed to a lack of streambank cover for shading. That survey also described the bottom as mostly shifting sand and silt, and noted that substantial turbidity was inhibiting fish life by reducing the ability of fish to visually locate food. The scarcity of both aquatic vegetation and insect life was attributed to the shifting and scouring of the sand bottom.

Although the 1979 survey found some brook trout in Lower Bears Grass Creek, this segment is not currently listed as even a Class III trout stream. This is due to the fact that trout generally do not survive periods of high water temperature and turbidity, both of which occur in Lower Bears Grass Creek.

Forage fish found in the stream included hog nose sucker, burbot, brook lamprey, mottled Sculpin, river shiner, golden shiner, stone roller, big mouth shiner, black size darter, Johnny darter, creek chub, white sucker, brook stickelback, bud minnow, common shiner, longnose dace, and fat head minnow.

Access to the stream is provided by six road crossings, but public use is very limited due the lack of sport fish and the impaired aesthetic quality caused by turbidity.

Pollutant Sources:

Inside the ¼ mile corridor of Lower Bears Grass Creek, the erosion of between four and five tons/acre/year of soil occurs on 417 acres and contributes 1,119 tons of sediment to the stream. Erosion above five tons/acre/year occurs on an additional 913 acres and contributes 8,623 tons/year of sediment.

Erosion also occurs on at least 2,400 linear feet of streambank, adding over 61 tons per year of sediment to the creek. Cattle access to the streambank is found on two-thirds of the eroding sites.

Animal lots contribute a total modeled COD load of 3,640 pounds and a phosphorus load of 37 pounds in the 4.2 inch modeled rainfall. A total of 61% of the COD load is produced by the two largest contributing animal lots. Manure spreading needs totaled 246 acres for winter spreading of manure from the 10 animal lots in the subwatershed.

Objectives:

The objectives for Lower Bears Grass Creek are to improve the productivity of the forage fishery and increase the diversity of the aquatic community, including insects, fish, and plants.

Specific goals for the Lower Bears Grass Creek Subwatershed include:

a. Land erosion control goal: 2,813 tons per year total sediment reduction from 15 landowners.

b. Animal lot runoff control goal: 52% COD reduction (5,167 pounds) from two lots.

c. Streambank erosion control goal: 61 tons per year total sediment reduction from three sites.

d. Manure spreading control goal: eliminate spreading on unsuitable acres.

4. Upper Bears Grass Creek Subwatershed

Physical Description and Water Quality:

Upper Bears Grass Creek is a Class III trout stream with a gradient of 12 feet per mile over its approximate five-mile length. The lower end of this stream segment is delineated by the crossing of County Trunk V in Section 22 of T26N, R7W.

The stream bottom is predominantly shifting sand, although some gravel and bedrock is found in the upper portion. The minimum water temperature measured in a March, 1980 survey by the Department's Bureau of Fish Management (Burnett, 1980) was 63F. Bank cover is mostly pasture and marsh grass vegetation, but the lack of cover contributes to higher water temperatures than desirable for trout habitat.

Fish species found in this stream include: brook trout, red side dace, hog nose sucker, horney head chub, burbot, brook lamprey, mottled Sculpin, river shiner, golden shiner, stoneroller, bigmouth shiner, blackside darter, Johnny darter, creek chub, white sucker, brook stickelback, mud minnow, common shiner, longnose dace, and fathead minnow.

Access to the stream is provided by six road crossings, but public use is light since trout populations are low and the aesthetic value of the stream is impaired by turbidity. The 1980 Fish Management Survey (Burnett, 1980) of Bears Grass Creek noted significant flooding (approximate rise: eight feet), a problem which reduces opportunities to fence the stream since fence damage is a problem at high flows.

The primary impairment of the stream is caused by excessive siltation which limits trout reproduction and diversity of aquatic life. Another possible problem is high runoff rates from croplands, a result of intensive cropping, which reduces the recharge of the groundwater. This recharge is needed for the maintenance of an adequate winter streamflow, which may be a factor limiting trout carryover.

In addition, organic loading from animal operations and improper manure spreading may cause ammonia toxicity on occasion.

Pollutant Sources:

Approximately 95% of the erosion in the corridor comes from cropland. The ¼ mile-wide corridor around Upper Bears Grass Creek contains 420 acres of land which are eroding at four to five tons/acre/year, which amounts to approximately 1,865 tons/year of sediment. The corridor also contains 1,999 acres of land which are eroding at five tons/acre/year or more, which contributes an additional 23,302 tons of sediment per year.

The inventory of the streambanks indicated 942 tons/year of sediment were being contributed by 14,900 linear feet of eroding banks on eight sites. All of these sites had cattle access.

The 25 animal lots in the subwatershed generated a modeled COD load of 24,059 pounds in the 4.2 inch rainfall. Over 80% of the COD load was produced by the eight highest contributors.

In order to avoid water quality problems, livestock operations in this subwatershed require 693 acres of land suitable for winter spreading of manure.

Objectives:

The objectives for Upper Bears Grass Creek are to increase trout reproduction and survival by reducing sediment loads and organic pollution.

Specific goals for the Upper Bears Grass Creek Subwatershed are:

a. Land erosion control goal: 19,212 tons per year total sediment reduction from 50 landowners.

b. Animal lot runoff control goal: 68% (16,360 pounds) total COD reduction from eight lots.

c. Streambank erosion control goal: 94 tons per year total sediment reduction from eight sites.

d. Manure spreading control goal: eliminate spreading on unsuitable acres.

5. Upper Bridge Creek Subwatershed

Physical Description and Water Quality:

Upper Bridge Creek is an approximately seven mile-long Class III brook and brown trout stream. It has an approximate gradient of 14 feet per mile. This stream segment ends at US Highway 12, one-half mile east of Augusta, where the Middle Bridge Creek segment begins.

The Surface Water Resources of Eau Claire County (Sather and Threinen, 1964) noted wetland habitat for muskrats, puddle ducks and mergansers along the Upper Bridge Creek segment. A cranberry operation is located at the mid-point of this segment. However little data has been collected on existing water quality or fish species inhabiting the stream. Five road crossings offer access to the stream but public use of the stream is not known.

Of the 4,920 acres of land inventoried in the ¼ mile-wide corridor surrounding the stream, wetlands were the most abundant land use, occupying 16,000 acres. Cropland use occupied 14,063 acres. Woodlots totaled 1,261 acres and all other acres totaled 596 acres.

The impacts of nonpoint source pollutants on Bridge Creek at Augusta were noted in a 1980 study done by the Department's West Central District basin assessment survey program (Eslien, 1980). This survey was designed to examine impacts of wastewater treatment plants. The elevation of BOD, suspended solids and ammonia concentrations, and a decrease in dissolved oxygen in the spring high flow periods were attributed to agricultural runoff.

A comparison with other similar trout streams in the watershed would indicate that trout production is limited by sediment and organic loading from agricultural use.

Pollutant Sources:

Of the lands inventoried within the ¼ mile-wide corridor, 105 acres are eroding at four to five tons/acre/year and producing 450 tons/year of sediment. Another 163 acres were eroding at over five tons/acre/year and producing 1,243 tons/year of sediment. Erosion from croplands produced 87% of this sediment.

Streambank erosion contributes over five tons/year of sediment from the two sites inventoried on this segment. Cattle have access to both sites.

Animal lots in the Upper Bridge Creek Subwatershed would contribute 2,542 pounds of chemical oxygen demand (COD), according to the 10-year, 24-hour storm model (a 4.2 inch rainfall). Over 80% of this COD load is contributed by the top four of the seven lots in the subwatershed which drain to surface waters. One additional lot in the subwatershed drains to surface depressions, making a total of eight lots which generate manure. An estimate of the total manure generated over a six month winter period indicates that 137 acres of suitable land are needed to safely spread the manure.

Objectives:

The primary water quality objective for Upper Bridge Creek is to increase trout productivity by reducing sediment loading and reducing potential ammonia toxicity caused by organic runoff. Secondary objectives in the subwatershed are to 1) increase water clarity, 2) maintain stream depth, and 3) increase the warm water fishery in the Dells Mill Pond which is located downstream.

Specific goals in the Upper Bridge Creek Subwatershed are:

a. Land erosion control goal: 1,036 tons/year total sediment reduction from 15 landowners.

b. Animal lot control goal: 1,783 pounds total COD reduction (70% of total controllable COD in the subwatershed) from four lots.

c. Streambank erosion control goal: two tons/year total sediment reduction from two sites.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

6. Middle Bridge Creek Subwatershed

Physical Description and Water Quality

The Middle Bridge segment of Middle Bridge Creek is delineated for this plan as the segment starting at the crossing of US Highway 12 and ending at the junction with Thompson Valley Creek. It is approximately 2.5 miles long and is rated as a Class II brown and brook trout stream.

Extensive water quality analysis has been done on this segment due to the discharge of the Augusta municipal wastewater treatment plant into this segment. That plant was last upgraded in 1984. It is now meeting effluent limits of 20 milligrams per liter (mg/l) suspended solids and 20 mg/l BOD on a monthly average in the summer, and 30 mg/l for those parameters during the winter. These discharge limits change from summer to winter because the stream is better able to assimilate waste in the winter due to higher dissolved oxygen levels

and slower uptake of oxygen by organic material in the effluents at lower water temperatures. These effluent limits are set low enough to protect the stream (at its low flow of 2.6 cubic feet per second) from having less than the six mg/l of dissolved oxygen needed for trout.

A biotic index value of 1.98 was recorded upstream of the treatment plant in the 1980 pre-operative point source study by the Department's West Central District staff (Eslien, 1980). The biotic index value is established by examining aquatic insects located in the streambed which are known to be indicators of water quality. The 1.98 value corresponds to a rating of "good water quality with some enrichment or disturbance" (Hilsenhoff, 1977). According to the Eslien report, the factor which lowered the water quality of Bridge Creek from excellent to good at this location was agricultural nonpoint source runoff.

The average daytime water temperature sampled on August 21, 1978 above the treatment plant was 61.6F; dissolved oxygen was 8.3 mg/l at 7:57 a.m. and 8.6 mg/l at 12:30 p.m.; and the suspended solids were recorded at 20 mg/l. The flow was 9.3 cubic feet per second (cfs) and the fecal coliform count was 1400/100 ml. The bottom material of the stream in this segment is mostly sand. This segment has reduced trout production and reduced aquatic life diversity due to agricultural nonpoint source pollutant impacts.

Pollutant Sources:

The cooling water discharge from the Bush Brothers canning plant and the discharge from Augusta's wastewater treatment plant have little effect on this stream segment as long as these discharges meet discharge permit limits, which they have consistently done over the last year. Augusta's urban runoff may have an effect on the stream from occasional spillage incidents or improper cleanup of commercial operations (such as automobile service stations), but these effects are not large compared to the impact of agricultural nonpoint pollutant sources.

In addition to sediment from the upstream subwatersheds (Upper Bridge Creek, Hay Creek, and Diamond Valley Creek), Middle Bridge Creek receives sediment from 95 acres eroding at four to five tons/acre/year (total yield 838 tons/year) and 332 acres of land which are eroding at over five tons/acre/year (producing 3,500 tons/year total sediment). This figure includes only that erosion occurring in the ¼ mile-wide corridor around Middle Bridge Creek's channel network. Eighty-six percent of sediment generated in the corridor is from cropland.

The inventory of streambanks in the Middle Bridge Creek Subwatershed found that 1,600 linear feet of eroding banks were yielding over 20 tons/year of sediment. Cattle had access to one-half of the total length of these eroding banks.

The inventory of animal lots identified one very large potential contributor of COD (with a maximum potential modeled COD of 19,477 pounds/year), depending on the number of animals present at the lot. This lot is used for sales and thus has a significant fluctuation in the number of animals present from day-to-day. Two other lots in the subwatershed each produce over 1,000 pounds COD, based on the 4.2 inch rainfall modeled runoff.

The calculation of manure spreading needs also has a large variance due to the large fluctuation in number of animals at the sale lot; but manure generation from all six lots in the subwatershed would require 194 acres for winter spreading of manure on suitable land, based on at the maximum possible number of animals present in the sale lot.

Objectives

The primary water quality objectives for Middle Bridge Creek are 1) the reduction of potential ammonia toxicity caused by organic runoff and 2) the reduction of sediment loading. A secondary objective in the subwatershed is to improve conditions in the Dells Mill Pond, which is located downstream, by increasing water clarity, decreasing volume loss, and increasing the warm water fishery.

Specific goals in the Middle Bridge Creek Subwatershed are:

a. Land erosion control goal: 2,624 tons/year total sediment reduction from 18 landowners.

b. Animal lot runoff control goal: 10,451 pound COD (77% of total COD) from three animal lots (However, due to the uncertainty of the COD produced by the large animal sale lot in this subwatershed, the next two lowest contributing lots - which both contribute over 1,000 pounds COD each - are both eligible for participation in the watershed project).

c. Streambank erosion control goal: 20.4 tons/year total sediment reduction from 62 sites.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

7. Lower Bridge Creek Subwatershed

Physical Description and Water Quality:

Lower Bridge Creek is considered a Class III brook and brown trout stream from the beginning of the segment at Thompson Valley Creek to the head of Dells Pond, approximately 1.0 miles downstream. Dells Pond is primarily a bass and panfish impoundment, and Bridge Creek becomes a warm water fishery over its remaining length to the Eau Claire River.

Above Dells Pond, Lower Bridge Creek is much like the Middle Bridge in regards to water quality. The flow from the tributary watershed limits trout production due to sediment and organic loading from nonpoint pollutant sources located upstream.

Dells Pond is a 68-acre impoundment with a maximum depth of 17 feet. It is managed for largemouth bass and panfish although it contains some walleyed pike. The turbidity of the water and aquatic plant growth both limit clarity and impair aesthetic quality. Very little shoreline is publicly owned, only an undeveloped access point consisting of 0.02 miles which is owned by Eau Claire County. Infilling caused by sediment from upstream nonpoint sources and a reduced warm water fishery are the major impairments caused by nonpoint source pollutants.

Below Dells Pond, Bridge Creek is considered a forage fishery. The stream bottom is mostly sand and fish production may be limited by sediment and organic loading.

Pollutant Sources:

In addition to the upstream loading previously mentioned, Lower Bridge Creek receives pollutants from a number of agricultural nonpoint sources in the subwatershed. Compared to other subwatersheds in the Lower Eau Claire River Watershed, Lower Bridge Creek Subwatershed has a very low amount of land erosion. Only 16 acres are eroding at a rate over four tons/acre in the ¼ mile-wide corridor, producing 97 tons/year of sediment. Seventy percent of land erosion in the corridor is from cropland and 26% is from woodland.

While land erosion is low, streambank erosion is very high, producing 3,700 tons/year of sediment. However many of the eroding banks are at the downstream end of the segment and may not have a significant effect on the Lower Bridge Creek water quality objectives. Site inspection by Eau Claire County LCD staff and DNR District staff will determine whether the sites in this stream segment are in need of control. Cattle have access to none of these sites, according to the inventory.

Only one animal lot is located in the subwatershed. The lot is located upstream of Dells Pond and produces 968 pounds of COD in the model rainfall.

Manure spreading needs are very limited. Since there is only one animal lot in the subwatershed, only 29 acres are needed for winter spreading on suitable land.

Objectives:

Three different objectives are set for the Lower Bridge Creek Subwatershed since there are three types of waters present. The primary water quality objective for Lower Bridge Creek is to increase trout productivity by reducing potential ammonia toxicity caused by organic runoff and reducing sediment loading. A secondary objective

in this subwatershed is to improve conditions in Dells Pond by increasing clarity, decreasing volume loss, and increasing the warm water fishery. The third objective is to increase forage fishery production below the Dells Pond by reducing sediment and organic loading.

Specific goals for the Lower Bridge Creek Subwatershed are:

a. Land erosion control goal: 57 tons/year total sediment reduction from five landowners.

b. Animal lot runoff control goal: 823 pounds total COD reduction (85%) from one animal lot.

c. Streambank erosion control goal: 3,700 tons/year total sediment reduction (subject to site inspection by the DNR and Eau Claire County LCD).

8. Diamond Valley Creek Subwatershed

Physical Description and Water Quality:

Diamond Valley Creek is an approximately five mile long Class III brook trout stream that flows north to discharge into Bridge Creek at Augusta (Gerald Jackelan, West Central District - WDNR, to Arthur Oehmke, WDNR, in 1972 memo). The stream bottom is primarily silt and sand, with some gravel. Pools and aquatic vegetation are good at the upper end. The streambanks are mostly grassed with little tree cover, however the lower part has little streambank vegetative cover due to heavy pasturing. The lack of streambank cover results in higher stream temperatures and more erosion.

According to a 1972 survey by the Department's Bureau of Fish Management, the gradient is 17 feet/mile. An extreme variation in flow is due to the steep topography and a very high percentage of land being cropped or pastured. Although public interest in the stream has been noted, fishing pressure on the stream was moderate on opening day, progressing to very light later in the season, according to the fish management report. Six road crossings provide access to the stream.

Besides brook trout, fish species found by the fish management survey included white sucker, fantail darter, emerald shiner, creek chub, fathead minnow, bud minnow, blacknose dace, brook stickleback, southern redbelly dace and Johnny darter.

Brown trout are stocked to compensate for the lack of natural production. Trout production and aquatic diversity in the stream are limited by sediment and possible organic overloading.

Pollutant Sources:

It was calculated that inside the ¼ mile-wide corridor, 148 acres lost four to five tons/acre/year, resulting in 647 tons/year sediment loss, while 766 acres eroding at over five tons/acre/year lost an additional 8,932 tons/year of sediment. Croplands accounted for 82% of total erosion losses and pastures accounted for 13% of those losses.

The erosion on 12,500 feet of streambanks at six sites accounted for 211 tons/year of sediment loss to the stream. Cattle had access to all of these sites.

A total of 18 animal lots in this subwatershed yielded 9,645 pounds of COD in the 4.2 inch rainfall model. Eighty percent of this COD is generated by the top seven animal lots.

Manure from the 18 lots (involving 17 owners) would require 351 suitable acres of land for winter spreading. It may be difficult to locate this much suitable land, given the steep topography in this subwatershed.

Objectives:

The primary water quality objective for Diamond Valley Creek is to increase trout productivity through the reduction of potential ammonia toxicity (a result of organic runoff) and the reduction of sediment loading.

Specific goals for the Diamond Valley Creek Subwatershed are:

a. Land erosion control goal: 7,358 tons/year from 23 landowners.

b. Animal lot runoff control goal: 6,936 total pounds COD reduction (72% reduction) from seven lots.

c. Streambank erosion control goal: 211 total tons sediment reduction from six sites.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

9. Hay Creek Subwatershed

Physical Description and Water Quality:

Hay Creek is a 5.3 mile Class I brook and trout stream which flows north into Bridge Creek. The stream is spring-fed and is subject to less severe flooding than Diamond Valley because of less steep topography and more woodland in the subwatershed.

A 1972 survey by the DNR's Bureau of Fish Management noted that the stream appeared to have less siltation than it did in 1957 when another survey was conducted. The 1972 survey attributed this improvement to reduced use of land for pasturing. The stream has only three road crossings and had heavy tag alder growth at the time of the 1972 survey.

The bottom of the stream is mostly sand with some silt and gravel present. Spawning was limited by a lack of gravel substrate. According to the Bureau of Fish Management, the amount of gravel present could be increased by reducing the sand and silt loading, which covers the gravel. Good cover for trout was noted to be present in the lower stream reaches where better instream vegetation, deep riffles, pools, and alder root systems existed.

Pollutant Sources:

Within the ¼ mile-wide corridor around the channel network, 165 acres of land were found to be eroding at four to five tons/acre/year, which produces 709 tons/year sediment. An additional 175 acres were eroding at over five tons/acre/year with a yield of 1,518 tons/year. Of all erosion occurring in the corridor, 79% was from cropland and 16% was from pasture.

Streambank erosion generated 7.5 tons of sediment per year from the one site found in the inventory. Cattle had access to that site, which had 400 feet of eroding bank.

A total of 8,276 pounds of COD was predicted by the 4.2 inch rainfall model to be lost from the 10 animal lots in the subwatershed. The top four lots produced just over 80% of that load.

Manure spreading in winter in this subwatershed would require 128 acres of suitable land.

Objectives:

The water quality objective for Hay Creek is to increase trout productivity by reducing potential ammonia toxicity, which is caused by organic runoff, and by reducing sediment loading.

The specific goals are:

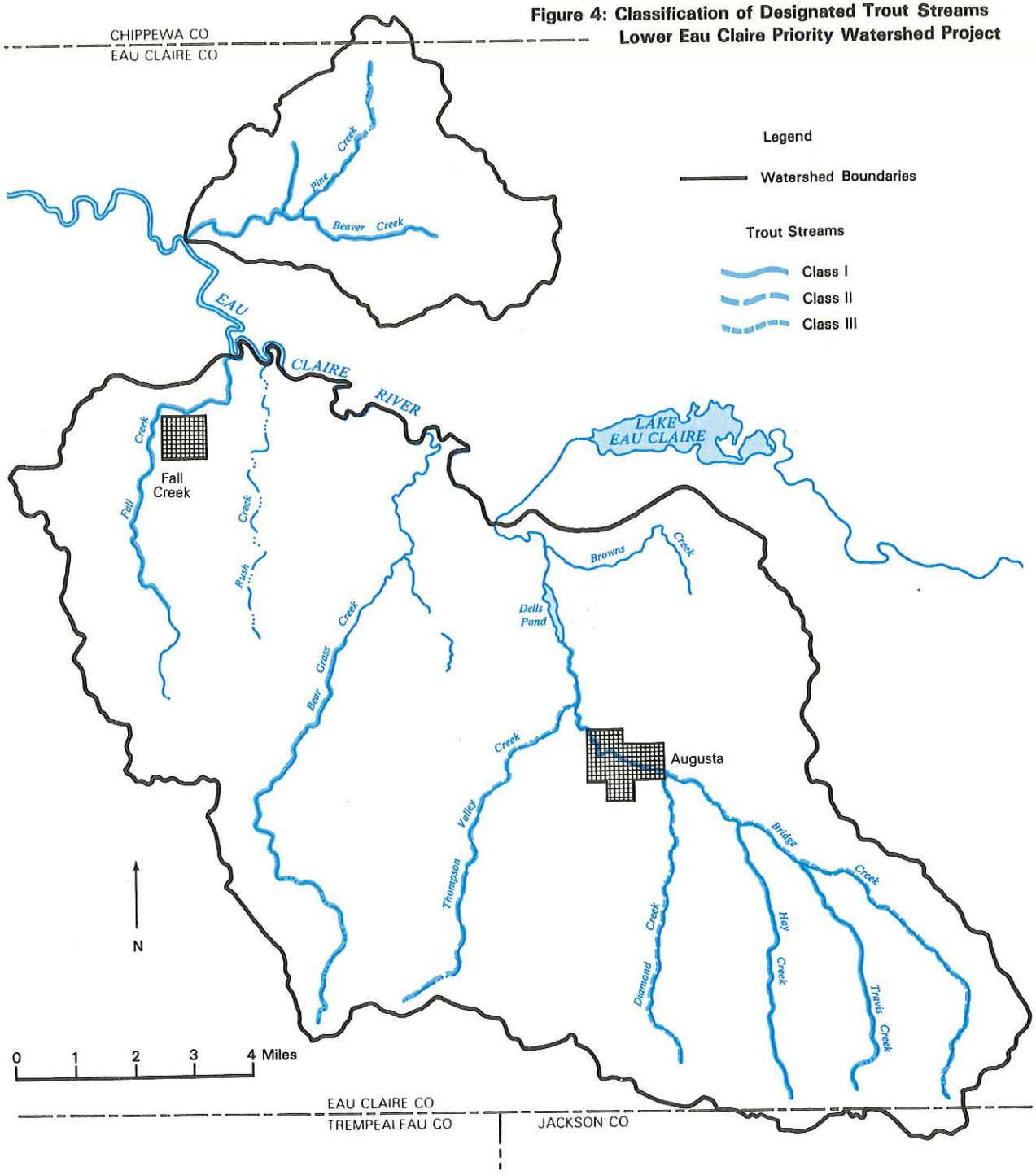
a. Land erosion control goal: 1,388 tons/year total sediment reduction from 17 landowners.

b. Animal lot runoff control goal: 5,172 pounds COD (69%) reduction from four lots.

c. Streambank erosion control goal: 7.5 tons/year total sediment reduction from one site.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

Figure 4: Classification of Designated Trout Streams
Lower Eau Claire Priority Watershed Project



10. Travis Creek Subwatershed

Physical Description and Water Quality:

Travis Creek is a 3.8 mile Class III brook trout stream with a gradient of over 22 feet per mile. It flows north from its headwaters in Jackson County to its intersection with Upper Bridge Creek. The southern half of the Travis Creek Subwatershed has very steep topography while the northern half contains mostly wetland. The 250-acre wetland is made up of tag alder, marsh grasses and tamarack, and provides habitat for muskrat and beaver, according to Sather and Threinen (1964).

Water quality and fishery data for the subwatershed are scant. The stream bottom is mostly sand and silt (Sather and Threinen, 1964), which would limit trout production and aquatic insect diversity. No public frontage is available, but three road crossings provide access.

Pollutant Sources:

The inventory of the ¼ mile-wide corridor surrounding the Travis Creek channel network found 26 acres eroding at a rate over five tons/acre/year, which produced 112 tons/year of sediment. Another 31 acres eroding at between four and five tons/acre/year produced 181 tons/year of sediment. Cropland accounted for 70% of all sediment losses in the inventory corridor, and woodland contributed 26 percent.

No eroding streambank sites were found during the inventory of the Travis Creek Subwatershed.

Only two animal lots were found during the inventory and these produced a relatively low modeled output of 444 total pounds COD in the 4.2 inch rainfall.

Manure spreading would require only 12 acres of suitable land for wintertime removal of manure from the two animal lots.

Objectives:

As in a number of the other subwatersheds, the water quality objective for Travis Creek is to increase trout productivity through the reduction of potential ammonia toxicity and the reduction of excessive sediment loading.

Specific goals are:

a. Land erosion control goal: 135 tons/year total sediment reduction by four landowners.

b. Animal lot runoff control goal: 378 pounds (85%) total COD reduction from two lots.

c. Streambank erosion control goal: Maintenance of existing streambanks.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

11. Thompson Valley Creek Subwatershed

Physical Description and Water Quality:

Thompson Valley Creek is a Class III brown trout stream from its intersection with Lower Bridge Creek to State Highway 27, an upstream distance of 2.7 miles. At Highway 27 the classification is upgraded to a Class II brown trout stream, and the stream retains that classification for the remaining 5.0 miles of stream. The gradient over the stream's total length is 18 feet/mile and its 7-year, 10-day low flow is two cfs.

A point source impact study (Eslien, 1980) was conducted in 1978-79 by the Department's West Central District staff to examine the effects of the Dairy Maid Coop Creamery wastewater discharge (which is now treated by spray irrigation) provides substantial documentation of stream water quality and other parameters.

According to the study, the stream bottom in the upper reaches is 80% rock and gravel and 20% sand and silt. In the lower reaches of the stream the bottom is sand, silt and organic muck. Streambanks are not undercut and are described as gently sloped and vegetated by grasses, elm and willow.

Only the data collected above the Dairy Maid Coop Creamery discharge point is described here since it is more representative of the stream's present condition. Dissolved oxygen was measured at 7.7 mg/l on August 21, 1978 at 6:20 a.m., at a point 50 feet downstream of the County Highway R bridge. The water temperature at that point was 14C (58.5F).

Aquatic macroinvertebrates were collected for the establishment of a biotic index rating (Hilsenhoff, 1977) which indicated only fair water quality at the same sample point described for chemical sampling. The biotic index sample value at the site (2.32) falls in the 2.25-3.00 range which indicates that the stream is subject to "moderate enrichment or disturbance". This disturbance is due to agricultural nonpoint source pollutants upstream of the sampling site.

Pollutant Sources:

Erosion on 318 acres in the ½ mile-wide corridor around the Thompson Valley stream network is between four and five tons/acre/year, yielding 1,465 tons/year of sediment. Erosion rates over five tons/acre/year occurs on 1,196 acres, yielding 11,066 tons of sediment per year. Cropland contributes 93% of this total load.

10. Travis Creek Subwatershed

Physical Description and Water Quality:

Travis Creek is a 3.8 mile Class III brook trout stream with a gradient of over 22 feet per mile. It flows north from its headwaters in Jackson County to its intersection with Upper Bridge Creek. The southern half of the Travis Creek Subwatershed has very steep topography while the northern half contains mostly wetland. The 250-acre wetland is made up of tag alder, marsh grasses and tamarack, and provides habitat for muskrat and beaver, according to Sather and Threinen (1964).

Water quality and fishery data for the subwatershed are scant. The stream bottom is mostly sand and silt (Sather and Threinen, 1964), which would limit trout production and aquatic insect diversity. No public frontage is available, but three road crossings provide access.

Pollutant Sources:

The inventory of the ¼ mile-wide corridor surrounding the Travis Creek channel network found 26 acres eroding at a rate over five tons/acre/year, which produced 112 tons/year of sediment. Another 31 acres eroding at between four and five tons/acre/year produced 181 tons/year of sediment. Cropland accounted for 70% of all sediment losses in the inventory corridor, and woodland contributed 26 percent.

No eroding streambank sites were found during the inventory of the Travis Creek Subwatershed.

Only two animal lots were found during the inventory and these produced a relatively low modeled output of 444 total pounds COD in the 4.2 inch rainfall.

Manure spreading would require only 12 acres of suitable land for wintertime removal of manure from the two animal lots.

Objectives:

As in a number of the other subwatersheds, the water quality objective for Travis Creek is to increase trout productivity through the reduction of potential ammonia toxicity and the reduction of excessive sediment loading.

Specific goals are:

a. Land erosion control goal: 135 tons/year total sediment reduction by four landowners.

b. Animal lot runoff control goal: 378 pounds (85%) total COD reduction from two lots.

c. Streambank erosion control goal: Maintenance of existing streambanks.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

11. Thompson Valley Creek Subwatershed

Physical Description and Water Quality:

Thompson Valley Creek is a Class III brown trout stream from its intersection with Lower Bridge Creek to State Highway 27, an upstream distance of 2.7 miles. At Highway 27 the classification is upgraded to a Class II brown trout stream, and the stream retains that classification for the remaining 5.0 miles of stream. The gradient over the stream's total length is 18 feet/mile and its 7-year, 10-day low flow is two cfs.

A point source impact study (Eslien, 1980) was conducted in 1978-79 by the Department's West Central District staff to examine the effects of the Dairy Maid Coop Creamery wastewater discharge (which is now treated by spray irrigation) provides substantial documentation of stream water quality and other parameters.

According to the study, the stream bottom in the upper reaches is 80% rock and gravel and 20% sand and silt. In the lower reaches of the stream the bottom is sand, silt and organic muck. Streambanks are not undercut and are described as gently sloped and vegetated by grasses, elm and willow.

Only the data collected above the Dairy Maid Coop Creamery discharge point is described here since it is more representative of the stream's present condition. Dissolved oxygen was measured at 7.7 mg/l on August 21, 1978 at 6:20 a.m., at a point 50 feet downstream of the County Highway R bridge. The water temperature at that point was 14C (58.5F).

Aquatic macroinvertebrates were collected for the establishment of a biotic index rating (Hilsenhoff, 1977) which indicated only fair water quality at the same sample point described for chemical sampling. The biotic index sample value at the site (2.32) falls in the 2.25-3.00 range which indicates that the stream is subject to "moderate enrichment or disturbance". This disturbance is due to agricultural nonpoint source pollutants upstream of the sampling site.

Pollutant Sources:

Erosion on 318 acres in the ¼ mile-wide corridor around the Thompson Valley stream network is between four and five tons/acre/year, yielding 1,465 tons/year of sediment. Erosion rates over five tons/acre/year occurs on 1,196 acres, yielding 11,066 tons of sediment per year. Cropland contributes 93% of this total load.

Streambank erosion contributes 79.8 tons of sediment annually to Thompson Valley Creek from 10,000 linear feet at eight different inventoried sites. Six of these sites had cattle access.

Animal lots generated a total load of 17,155 pounds of COD in the modeled 4.2 inch rainfall. Although 26 animal lots were inventoried in the watershed, many of these had relatively low output (less than 100 pounds COD), and the top eight lots in the subwatershed contributed approximately 80% of the subwatershed COD total.

In order to properly spread manure, 531 acres of suitable land in the subwatershed are required.

Objectives:

The water quality objective for Thompson Valley Creek is to increase trout productivity through the reduction of potential ammonia toxicity and the reduction of excessive sediment loading.

Specific subwatershed goals are:

a. Land erosion control goal: 8,943 tons per year total sediment reduction by 39 landowners.

b. Animal lot runoff control: 11,738 pounds (68%) total COD reduction from eight lots.

c. Streambank erosion control goal: 79.8 tons per year total sediment reduction from eight sites.

d. Manure spreading control goals: Eliminate spreading on unsuitable acres.

12. Fall Creek Subwatershed

Physical Description and Water Quality:

While Fall Creek's total length is approximately six miles, it is rated as a Class III brown trout stream over 4.0 miles upstream of the bed of the now-drained Fall Creek Pond. The pond's dam collapsed in 1984, and there currently is no application to refill the impoundment. The stream segment downstream of the old Fall Creek Pond supports forage fish. The overall gradient of Fall Creek is 10 feet per mile.

A survey funded by the Inland Lake Renewal Program in 1981 (Wisconsin Department of Natural Resources, 1981) sampled temperature and a number of other parameters in order to assess alternatives for future use of Fall Creek Pond. The temperature at the inlet to the pond was a recorded minimum of 35.6F in December 1979, as well as in January and February, 1980. The maximum temperature recorded during the study was 69.8F in August 1980.

Suspended solids carried by the stream, as measured at the pond inlet, varied from 98.0 mg/l in March 1980, to 2.0 mg/l in June 1980. It is interesting to note that precipitation records showed only 0.35 inch rainfall for February 1980 and 0.59 rainfall for March 1980 as measured at Eau Claire and Fall Creek. It is possible that a localized storm not measured in the Village of Fall Creek caused the high suspended solids reading. No value for average suspended solids loading is offered in this plan, because the scarcity of data would make it difficult to draw accurate conclusions. An estimate of total sediment reaching the pond was made at 7,000 cubic yards per year. Assuming 90 pounds per cubic foot, this amounts to 8,505 tons of sediment per year. That amount is small relative to the total soil loss inventoried in the ¼ mile-wide Fall Creek corridor, which was 29,250 tons per year.

The inland lake study noted that the habitat downstream of the old Fall Creek Pond is suitable for trout, and that annual stocking of brown trout occurs above the location of the now-drained pond. The study concluded that agricultural nonpoint sources of pollutants have a significant negative impact on Fall Creek water quality. The impairment of fish production (trout) is also noted in the Surface Water Resources of Eau Claire County (Sather and Threinen, 1964) as being attributed to extreme fluctuations in water levels, excessive sediment and turbidity. Accessibility to the stream is provided by six road bridges.

Pollutant Sources:

The inventory of the ¼ mile-wide corridor identified 620 acres eroding between four and five tons per acre per year, which produced 2,593 tons per year of sediment. Eroding at over five tons per acre per year were 2,343 acres, which produced 23,961 tons per year of sediment.

Most of the streambank erosion that was inventoried occurred below the old Fall Creek Pond location and may or may not be a threat to Fall Creek fish and aquatic life. Seven and a half tons of sediment per year were generated by 1,140 feet of eroding streambank on five sites. According to the inventory data, two of these sites had cattle access.

A total of 37 animal lots were found to produce 35,391 pounds of COD in the 4.2 inch rainfall model. Over 80% of this load is produced by the top 10 lots.

Wintertime manure spreading would require 772 acres of suitable land according to estimates of total manure generated over a six month period.

Objectives:

Again, the water quality objective for Fall Creek is to increase trout productivity by the reduction of potential ammonia toxicity and the reduction of excessive sediment loading.

The specific goals include:

a. Land erosion control goal: 19,672 tons total sediment reduction by 41 landowners.

b. Animal lot runoff control goal: 24,427 pounds (69%) total COD reduction from 10 lots.

c. Streambank erosion control goal: 7.5 tons per year total sediment reduction from three sites. This goal may be revised after inspection by Land Conservation Division (LCD) and DNR staff to determine the degree of benefit to water quality.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

13. Browns Creek Subwatershed

Physical Description and Water Quality:

Browns Creek is a 2.5 mile forage fish stream with a gradient of 25 feet per mile. The bottom is mostly sand. During dry months, it is fed by groundwater from a large wetland in the Augusta Wildlife Area. The stream is accessible by two road bridges and a small undeveloped parcel of public land owned by the Department of Natural Resources. Browns Creek is impaired by the loading of sediment from nonpoint sources, which reduces total forage fish production.

Within the upstream wetland is a small (1.6 acre) seepage lake with intermittent outlet flow to Browns Creek. The unnamed lake has a maximum depth of only five feet, and is subject to winter kill. The lake has only minnows for a fish population, but serves as a nesting site for a number of duck species including mallards, blue winged teal, mergansers and wood ducks. Filling of the wetland due to sedimentation is a nonpoint source pollution hazard. The lake's longevity is dependent on the life of the wetland and is therefore indirectly threatened by nonpoint source loading.

Pollutant Sources:

No land in the ¼ mile-wide corridor around the stream channel was shown in the inventory as eroding at a rate of more than four tons/acre/year. Lands surrounding the wetland are included in the area inventory.

Streambank erosion is severe but is located at the downstream end of the creek, and may not be a threat to water quality. This will be determined later by field inspections by Department and LCD staff. The inventory estimated 1,352 tons/year of sediment being produced by 2,610 linear feet of eroding streambank. Cattle did not have access to these banks.

No animal lots were found in this subwatershed.

Objectives:

The objectives for this subwatershed are to increase forage fish productivity in Browns Creek and to prevent the loss of wetlands because of sedimentation.

Specific goals include:

a. Land erosion control goal: Since no fields were found to be eroding above four T/A/Y, no sediment reduction is targeted.

b. Animal lot runoff control goal: Since no lots were found to contribute COD to surface waters, no animal lot runoff control is targeted.

c. Streambank erosion control goal: 1,352 tons/year total sediment reduction from 12 sites (subject to site inspection by DNR and the LCD).

d. Manure spreading control goal: Continuation of no spreading on unsuitable acres.

14. Rush Creek Subwatershed

Physical Description and Water Quality:

Rush Creek is a 2.0 mile long forage fish stream which is tributary to the Eau Claire River. The flow becomes very low during dry periods and the entire length is indicated on USGS topographic maps to be intermittent.

Pollutant Sources:

The inventory of land erosion found 192 acres eroding at between four and five tons/acre/year which produced 838 tons/year of sediment. Another 619 acres were eroding at five tons/acre/year or greater, and produced 6,491 tons/year of sediment. Cropland accounted for 99% of the total land erosion losses.

Streambank erosion may or may not affect the water quality of Rush Creek since the two inventoried sites are located at the downstream end of this creek. Eighty-one tons of sediment per year are contributed to the stream by 600 linear feet of eroding streambank.

The total COD contributed to surface waters from the eight inventoried animal lots in the subwatershed was determined by the model to be 1,741 pounds in a 4.2 inch rainfall. Two of these lots produced 74.9% of the total load. These eight animal lots together would require an estimated 319 acres of suitable land for safe winter spreading of manure.

Two additional animal lots in the subwatershed discharged runoff to surface depressions.

Objectives:

The water quality objective for Rush Creek is to increase forage fish productivity by the reduction of excessive sediment loading to the stream.

Specific goals include:

a. Land erosion control goal: 5,290 tons/year total sediment reduction by 17 landowners.

b. Animal lot runoff control goal: 1108 pounds (63%) total COD reduction from three animal lots.

c. Streambank erosion control goal: 81 tons/year total sediment reduction at two sites, subject to field inspection by DNR and LCD staff.

d. Manure spreading control goal: Eliminate spreading on unsuitable acres.

B. Groundwater Resources

No significant groundwater problems have yet been detected in the Lower Eau Claire River Watershed where sampling has indicated safe water in both municipal and private wells. Isolated potential hazards (such as leaking underground storage tanks, dumping of solvents into septic systems, malfunctioning septic systems, improper manure storage and surface spillage of contaminants) do exist, but are minimized by public information and education programs, leakage testing of underground tanks, and spill control programs.

CHAPTER V. NONPOINT SOURCE CONTROL RECOMMENDATIONS

A. Introduction

The recommendations presented in this chapter are based on the results of the water quality conditions identified in the watershed, and the inventoried nonpoint sources of pollutants. The recommendations are also based on the Lower Chippewa River Areawide Water Quality Management Plan (Vodocek, 1979) which was prepared for this area. That document contains recommendations for the reduction of pollutants from nonpoint sources within the watershed.

The recommendations discussed below are as stringent or more than those made in the areawide water quality management plan. This is because the areawide plans are general documents designed to guide agencies in making decisions on water quality management issues. The nonpoint source control plan for the Lower Eau Claire River Priority Watershed Project is a more detailed plan for a much smaller area, which allows for more specific recommendations.

B. Cropland Erosion

Cropland erosion is the major source of sediment which enters the watershed's streams. As discussed in Chapter III, there are over 11,754 acres of land in the PMA which are losing soil at a rate greater than four tons/acre/year. These are the acres eligible for participation in this program.

Control practices should be installed on these lands in order to bring the calculated soil loss down to the target level of an average of four tons/acre/year. If this recommendation is carried out on all of the 11,754 acres mentioned above, it would result in about a 60 percent reduction in gross soil loss from sheet and rill erosion in the PMA. As discussed earlier, it is believed that little sediment from lands outside of the PMA is likely to reach the channel network.

C. Barnyard Runoff

The major nonpoint source of organic wastes to the watershed's surface waters is livestock waste runoff from barnyards. There are 58 barnyards determined to need treatment because of their potential for causing water quality impacts.

The runoff from these barnyards should be controlled to minimize the organic loadings to the surface waters. If this recommendation is carried out on all of the 58 eligible barnyards in the watershed, it would result in approximately a 70 percent reduction in the calculated chemical oxygen demand (COD) load to the surface waters. Considerable reductions would also be made in bacteria levels and sediment load.

Since the installation of a barnyard practice usually achieves 85% control of the runoff from a yard, in this project eligibility has been set to offer cost sharing to all animal yards which make up the top 80% of COD load in trout stream subwatersheds and the top 70% of COD load in forage fishery subwatersheds.

D. Streambank Erosion

Although streambank erosion may not be as major a source of sediment as croplands, degraded streambanks can cause very significant impacts on the fish habitat of streams since nearly all of the eroded sediment is deposited directly into the streams. It is recommended in this project that all of the identified eroding sites be stabilized, with a case-by-case review required for certain areas previously identified.

E. Manure Spreading

Manure can be a major source of organic loading and bacterial contamination of surface waters if it is not properly spread on suitable lands. Manure spreading on all unsuitable lands should be eliminated.

F. Other Nonpoint Pollutant Sources

There are other sources of sediment and nutrients, such as gullies, which were not discussed above. These additional sources will be identified by the field staff during the landowner contacts. These sources and the related needed management practice needs will then be assessed. Eligible sources can then be controlled through the development of cost share agreements and the subsequent installation of management practices.

SECTION THREE:

A DETAILED PROGRAM FOR IMPLEMENTATION

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A DETAILED PROGRAM FOR IMPLEMENTATION

CHAPTER VI. IMPLEMENTATION PROGRAM INTRODUCTION AND AGENCY INVOLVEMENT

A. Introduction

The purpose of the Implementation Program is to serve as a guide for the efficient implementation of the recommendations which were identified in the Watershed Assessment (Section Two of this plan).

The Implementation Program for the Lower Eau Claire River Priority Watershed Project identifies:

1. the quantities, costs, and eligibility criteria for needed Best Management Practices;

2. the tasks necessary to implement the recommendations in the Watershed Assessment;

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

4. the time frame for the completion of those tasks; and

5. the type and amount of staff needed.

The general procedure used for achieving the water quality objectives identified in the Watershed Assessment is the voluntary installation of corrective land management practices to control the critical nonpoint sources of pollutants. Cost share funds are provided by the state (and in some cases by the county) to contract with landowners to cover a percentage of the costs of designing and installing these practices. In addition, funds are made available to the implementing agencies to cover the expanded work effort required to carry out their responsibilities.

B. Participating Agencies and Responsibilities

1. Management Agency

The County of Eau Claire is the local unit of government identified as having the responsibility for the implementation of Best Management Practices to improve water quality. The Eau Claire County Land Conservation Commission (LCC), acting for the Eau Claire County Board, is the management agency for the Lower Eau Claire River Priority Watershed Project. The LCC is responsible for coordinating the implementation of the project and is also contractually and financially responsible to the State of Wisconsin for the management of the project. Funding for any cost share agreements in Chippewa or Jackson Counties, where small portions of the watershed are located, will be directed through the grant awarded to Eau Claire County, although the cost share agreement would be signed by the county in which the land is located.

The LCC has been named by the DNR to carry out the responsibilities defined in the Wisconsin Administrative Rules, NR 120.06, which are summarized below:

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

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

c. Carry out education and information programs about nonpoint source pollutants and land management needs;

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

e. Certify installation, operation, and maintenance of Best Management Practices;

f. Coordinate and control cost sharing monies with local contributions;

g. Report to the DNR on project progress and recommended project modifications;

h. Screen applications for variances to established cost sharing rates; and

i. Determine the priority for assistance among the grant applications.

All of these activities may be carried out by the LCC or by delegation to other agencies or units of government.

2. Cooperating Agencies

In addition to the LCC, the Lower Eau Claire River Priority Watershed Project will receive assistance from the other agencies listed below:

a. Soil Conservation Service (SCS). This federal agency (U.S. Department of Agriculture) works through the local Land Conservation Commission for Eau Claire County. The SCS provides technical assistance for installing conservation practices. The Eau Claire County SCS personnel worked with other project personnel to provide inventories of conservation needs, and to estimate the costs of Best Management Practices. The SCS staff also will aid the county in planning, designing, layout, supervision, and certification of practice installations.

b. University of Wisconsin Extension. County Extension agents will provide expertise in planning, coordinating and conducting public information, education, and participation efforts. UW-Extension will also assist the LCC in the development of watershed tours, workshops, and newsletters.

c. Agricultural Stabilization and Conservation Service (ASCS). The Eau Claire ASCS office of the U.S. Department of Agriculture will cooperate with the watershed project by coordinating the use of ACP (Agricultural Conservation Program) funds and informing potential candidates for priority watershed participation about the availability of funding.

d. Wisconsin Department of Natural Resources (DNR). The Department has the overall administrative responsibility for the Wisconsin Nonpoint Source Water Pollution Abatement Program (also called the Nonpoint Source Control Program), of which the Lower Eau Claire River Priority Watershed Project is a part. The DNR is responsible for the watershed plan preparation, for the allocation of funds to the project, for water quality surveys, and for the evaluation of watershed project progress.

CHAPTER VII. BEST MANAGEMENT PRACTICES

A. Best Management Practices

The land management practices which effectively control pollutants from nonpoint sources are called Best Management Practices (BMPs). Best Management Practices are defined as the practices, techniques, or measures which have been identified to be the most effective and practical means of eliminating or reducing nonpoint source pollutants.

B. Best Management Practice Descriptions

The Best Management Practices needed in the Lower Eau Claire River Watershed are listed below. 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 can be cost shared, is included in the Department's Administrative Rules NR 120 which is on file at the county offices.

1. Contour Strip Cropping - This practice of contour strip cropping involves growing crops on the contour of the land in alternated strips which generally are corn, oats, and hay. Contour strip cropping can be used for fields that are currently in hay-row crop rotations which are producing high levels of erosion. This situation normally applies to dairy operations.

2. Contour Cropping - Contour cropping consists of growing crops on the contour of the land, however the crops are not in strips of alternating crop types.

3. Diversions - Diversions are earthen berms constructed to divert excess water to sites where it can be transported safely in order to reduce soil loss.

4. Conservation or Minimum Tillage - Conservation tillage includes a number of different planting, tilling, and cultivating methods all of which are designed to leave a vegetative residue on the surface of the soil. This residue reduces 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 the Department's administrative rules (NR 120) and to 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. In order to prevent runoff, the insecticides may not be surface applied with no form of incorporation.

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

Table 8. Best Management Practices and Maximum Cost-Share Rates

Practice	Maximum Project Cost Sharing Rate		
	State	County	Total
Contour Cropping	$6/acre	$.60/acre	$6.60/acre
Minimum Tillage	$8/acre	$.80/acre	$8.80/acre
Contour Strip Cropping	$10/acre	$1/acre	$11/acre
Diversions	70%	10%	80%
Waterways	70%	10%	80%
Critical Area Stabilization	80%	10%	90%
Grade Stabilization Structure	80%	10%	90%
Streambank & Shoreline Protection (including livestock crossings, riprap, shaping/seeding, and watering ramps)	80%	10%	90%
Stream bank fencing[1]	$8/Rod	$.80/Rod	$8.80/Rod
Barnyard Runoff Management	70%	10%	80%
Manure Storage Facilities	70% ($6000 max.)	10%	variable
Livestock Exclusion from Woodlots	$8/Rod	$.80/Rod	$8.80/Rod
[1]Fencing Options: 3 Strand or more	$8/Rod	$.80/Rod	$8.80/Rod
2 Strand (1 Barb)	$6/Rod	$.60/Rod	$6.60/Rod
1 Strand (Electric)	$4/Rod	$.40/Rod	$4.40/Rod

* These practices have had 10% additional state funding added due to county cost sharing being available.

SOURCE: WDNR

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

5. Grassed Waterways - A grassed waterway is a natural or constructed water course which is 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.

6. Critical Area Stabilization - This stabilization practice involves planting suitable vegetation, such as trees or permanent grass, on highly erosive areas. These erosive areas may include roadsides, gullies, intermittent stream channels, and steeply sloped lands.

7. Grade Stabilization Structure - This practice involves the construction of a structure designed to stabilize the grade in a channel or to prevent the formation or advance of gullies.

8. Streambank Protection - Streambank protection involves several measures which are designed to stabilize and protect the banks of streams against erosive action. More specifically, this practice could include fencing to control livestock access to streams; riprap; livestock or machinery stream crossings; and shaping and seeding of eroded banks.

9. Livestock Exclusion from Woodlots - The protection of woodlots, especially those on steep slopes, from livestock grazing is accomplished by fencing or other means.

10. Barnyard Runoff Management - This practice consists of a system designed to reduce the quantity of manure-related pollutants which are carried from barnyards by runoff water into streams and lakes. The system includes preventing surface water from running through the livestock concentration area, and safely distributing or containing waters leaving the barnyard area.

11. Manure Storage - Manure storage utilizes structures for the temporary storage of manure. This storage allows the farm operator to time manure spreading so runoff to surface waters is minimized.

The BMPs listed in Tables 8 and 9 are the 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 that 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.

C. Cost Sharing Guidelines

1. Cost Share Rates

The practices eligible in the Lower Eau Claire River Priority Watershed Project for cost sharing under the Nonpoint Source Control Program are listed in Table 8. The cost sharing rates which were determined by the LCC range from 50% to 80% for the state share, which falls within the maximum state cost share rates established for the Nonpoint Source Control Program in Administrative Rule NR 120. Eau Claire County will add 10% to all cost share agreements, regardless of the need for county match funds which are needed to obtain the added 10% state funding provided for certain practices.

2. General Guidelines

The following general policies apply to the cost share eligibility under the Nonpoint Source Control Program:

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

b. Cost sharing is limited to Priority Management Areas (PMA) of priority watershed projects. For the Lower Eau Claire River Watershed, the PMA is a ¼ mile-wide corridor around the channel network for all sources, except for manure spreading and animal lots, for which the whole watershed is considered the PMA.

c. Cost sharing is not available for practices which:

1) are normally and routinely used in growing crops;

2) have drainage of land as the primary objective;

3) involve installation costs which can reasonably be passed on to potential consumers.

d. It is possible that some practices may be "custom" designed and do not fit the established definition for a particular practice. The Nonpoint Source Control Program will provide for substitute management practices after review and approval by both the DNR and the Eau Claire County LCC. If a substitute management practice is approved, the two agencies then jointly make a determination on the eligibility of the practice for cost sharing and assign a maximum cost sharing rate. Design specifications will be recommended by the SCS Technical Guide Work Group.

e. For certain areas within the project, specific 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 or not the activity is associated with the watershed project. 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.

D. Eligibility Categories

During the preparation of this plan, the landowners within the Priority Management Area were ranked as to their need for nonpoint source pollutant control practices for cropland erosion and barnyard runoff management. The landowners were ranked as: "eligible-essential", "eligible-nonessential", and "not eligible". Table 9 shows how many landowners are in the eligible categories for cropland erosion and animal lot runoff.

1. Cropland Erosion

For cropland erosion, eligibility categories were determined as follows:

a. Eligible-essential - includes those landowners in a subwatershed whose combined lands accounted for 50% of the total targeted erosion in the subwatershed

b. Eligible-nonessential - includes the landowners whose combined lands make up the bottom 50% of the total targeted soil loss within a subwatershed.

c. Not eligible - includes the landowners whose lands are not eroding above the target value of four tons/acre/year. These lands may have needs for erosion control practices but it generally is not efficient to control these lands in order to achieve water quality problems.

2. Animal Lots

Animal lots were ranked by the procedures described in Chapter III. They are rated for eligibility as follows:

a. Eligible essential - a) those animal lots which make up the top 50% of pollutant loading in a subwatershed and b) those lots which are located in flood-prone areas (as defined by soil type)

b. Eligible nonessential - those animal lots which contribute the top 80% of the pollutant load in each subwatershed, except for the Rush Creek and Lower Bears Grass Creek subwatersheds where the cutoff is the top 70%

c. Not eligible - All animal lots except those specified above

Animal lots which have revisions made to their predicted COD load would qualify for the next higher category of eligibility if their revised loading falls above the lowest ranked lot in the next higher category (within a subwatershed).

3. Streambank Erosion

All streambank erosion sites are considered eligible-nonessential except as follows: 1) those sites noted in Chapter IV as requiring further evaluation prior to eligibility determination, and 2) sites where the streambanks contribute greater than 20% of the subwatershed's total streambank erosion load shall be considered eligible-essential. Streambank eligibility category must be determined before a cost share agreement is signed for other practices.

4. Manure Management

Manure management eligibility categories, which are to be determined by site visits and data evaluation prior to signing cost share agreements for other practices, are determined by the following criteria:

a. Eligible essential - includes those animal lots which require more than 50 acres of suitable land for winter spreading above that non-critical acreage which they have available

b. Eligible-nonessential - Includes those lots which have a need for 10 to 50 acres of suitable land for winter spreading above that non-critical acreage available

c. Not eligible - Includes lots with a need for less than 10 acres additional suitable land for winter spreading above that non-critical acreage available. There may be a lower value established for cutoff if requested by the LCC and reviewed by the DNR on a case-by-case basis. The determination of "availability" may take into consideration reasonable hauling distance.

The formula used for determining needed acreage for winter spreading is as follows:

$$\text{EAU} \times \frac{\text{Tons}^*}{\text{EAU}} \times \frac{1 \text{ acre}}{25 \text{ tons}} \times \frac{180}{365} = \_\_\_\_ \text{ acres}$$

*Tons per EAU (Equivalent Animal Unit) from the SCS Technical Guide 633-7 (Table 3).

Critical lands are those which exceed the "slight limitations" category of SCS Technical Guide 633-1, Waste Utilization, or which exceed the minimum safety criteria discussed in Guidelines for the Land Application of Animal Wastes (Peterson et al., 1985).

E. Eligibility Categories and Best Management Practice Installation

What these categories mean in terms of the installation of Best Management Practices is described below:

1. Eligible-essential: These are nonpoint sources of pollutants which must be controlled in order to achieve a significant effect on the pollutant load in a subwatershed. A landowner with needs in this category must agree to control these sources in order to have other practices on the land cost shared. The control of the nonpoint sources in this category would be the county's first priority.

2. Eligible-nonessential: Sources in this category are less critical in the effects on water quality. Practices on these lands are eligible for cost sharing dollars but it is not mandatory that a landowner control these sources in order to receive cost sharing for other critical needs on his or her land.

3. Not eligible: This category includes sources that are not efficient to control to improve water quality. Cost share money is generally not available for sources in this category.

One of the reasons for establishing these management categories is that it is a policy of the Lower Eau Claire River Priority Watershed Project to control all critical nonpoint sources on a landowner's property. This means that if a landowner is in the "eligible-essential" category for barnyard runoff and in the "eligible-nonessential" category for cropland erosion, the landowner must agree to control the barnyard runoff in order to receive cost sharing for the cropland erosion. The control of nonpoint sources in the "eligible-nonessential" category is optional for the landowner.

It is important to note that the ranking of landowners in these categories is based on the inventory data that was collected in 1984. Nonpoint source conditions may change during the project. Changes in these conditions may result in changes in the eligibility of certain landowners for the cost sharing of practices. The number of landowners eligible for cropland and animal lot management practices are shown in Table 10.

Table 9. The Number of Landowners Eligible for Cropland and Animal Lot Management Practices*

	Cropland Erosion		Animal Lot Runoff	
	Eligible-Essential	Eligible-Not Essential	Eligible-Essential	Eligible-Not Essential
Number of landowners:	60	237	21	37

* There is some overlap among the categories so the actual total number of eligible landowners is less than the total of the numbers on the table.

SOURCE: WDNR

F. The Cost Share Agreement

As previously described, cost share funding is available to landowners for a percentage of the costs of installing on their lands the Best Management Practices that are necessary to meet the watershed project objectives. Landowners have three years to sign a cost share agreement after the formal approval of the watershed plan and grant agreement development.

The cost share agreement is a legal contract between the landowner and the Eau Claire County Land Conservation Department. The cost share agreement includes the following items related to the eligible BMPs: 1) the number and types of practices that are needed; 2) the estimated installation dates; 3) the estimated practice costs; 4) the cost share percentage rate; and 5) the estimated cost share reimbursement amount.

The cost share agreement also includes practices which are needed to meet water quality objectives but are not eligible for cost sharing under the Nonpoint Source Control Program. Once the agreement is signed, the landowner has five years to install the practices.

CHAPTER VIII. PROJECT NEEDS AND COSTS

A. Introduction

This chapter on project needs and costs addresses two major types of activities which receive funding under the Nonpoint Source Control Program. The first category includes the actual installation of the land management practices that are designed to control pollutants. This chapter discusses the types and quantities of these practices which are needed in this project, and the costs of these practices. These practices are cost shared by the state and county at rates set forth in this chapter.

The second category of activities includes the costs incurred by the county in administering the project, called local assistance costs. Most of these costs are reimbursed by the state, as explained later in this chapter.

B. Management Practice Needs and Costs

The quantity and costs of the Best Management Practices needed in the Lower Eau Claire River Watershed are listed in Table 10. The quantities of BMPs needed were estimated based on the assumptions outlined following this paragraph. The estimated costs for each unit of practice were made based on the county's experience and the costs of similar practices in other priority watershed projects.

The estimates for the BMP needs in the Lower Eau Claire River Watershed were determined as discussed below:

1. Cropland Management Practices: Practices were "applied" to each parcel of cropland currently eroding above four T/A/Y through the use of the computer by modifying the "C" (cropping) and "P" (management practices) factors. The practices were "applied" in order from the least intensive to the most intensive erosion control. The practices were applied one at a time until either the targeted maximum level of erosion was attained or all of the designated practices were used.

   The "C" factor refers to cropping rotations used on a field. The "P" factor refers to conservation practices, such as contour cropping, used on a field.

2. Waterways: The quantity of needed waterways was based on the county estimates. Several farm plans within each county were used to determine the acres of waterway per total acres of cropland, this ratio was then applied to the whole watershed. A 50-foot wide waterway was used to convert acres to feet.

3. Grade Stabilization Structures: This need was based on county estimates.

4. Streambank Stabilization: Fencing, shaping and seeding, and riprap estimates were based on the streambank erosion site inventory.

Table 10. The Quantity and Costs of Rural Best Management Practices Needed in the Lower Eau Claire River Priority Watershed Project*

Practice	Estimated Quantity	Cost/Unit	Total Cost	Cost Share Rates State	Cost Share Rates County	Total Cost Share State	Total Cost Share County
Cropland							
contour cropping	2,041 ac	12.00/ac	24,492	50%	10%	12,246	2,449
contour strips	5,012 ac	20.00/ac	100,240	50%	10%	50,120	10,024
conservation tillage	3,989 ac	16.00/ac	63,824	50%	10%	31,912	6,382
diversions	30,000 LF	2.00/LF	60,000	70%	10%	42,000	6,000
Grade Stable. Str.	50 un	5,000 ea	250,000	80%***	10%	200,000	25,000
Woodlot Fencing	1,000 rd	1,600/rd	16,000	50%	10%	8,000	1,600
Streambank							
rip rap	13,300 LF	20.00/LF	266,000	80%***	10%	212,800	26,600
shaping & seeding	45,850 LF	1.25/LF	573,125	80%***	10%	45,850	57,313
fencing	2,600 rd	16.00/rd	41,600	50%	10%	20,800	4,160
livestock crossing	100 un	20.00 ea	200,000	80%***	10%	160,000	20,000
Waterways	235,170 LF	2.00/LF	470,340	70%	10%	329,238	47,034
Critical Area Stabilization	20	700 ac	14,000	80%***	10%	11,200	1,400
Barnyard Runoff Management	58	10,000	580,000	70%	10%	406,000	58,000
Manure Storage	50	10,000	500,000	70% ($6,000 max)	10%	300,000	50,000
			$3,159,621			$1,885,166	315,962

Total state cost share with 75% participation: $1,413,875**

* This table is to be used to estimate budget needs only; it does not limit the amount of funding that will be available. The streambank riprapping of banks in some areas will require approval by the Department on a case-by-case basis during the implementation phase of the project.

** The 75% participation level is not a project goal; it is used for the purpose of budget estimation only.

*** These state cost share rates are boosted by 10% due to county cost sharing.

Practice Units:

ac = acre
LF = linear foot
un = unit
rd = rod

SOURCE: WDNR

5. Critical Area Stabilization: The number of acres of land needing stabilization was based on a county estimate.

6. Barnlot Runoff Management: The number of barnyards included was based on inventory data, and includes all lots in the "essential" and the "eligible non-essential" categories.

7. Manure Storage: The need for manure storage was based on county estimates.

8. Diversions: This need was based on county estimates.

9. Project Costs: For 100% landowner cooperation in this project, the estimated state cost share portion would amount to $1,413,875. 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 used to more accurately estimate the budget needs.

C. Local Assistance Needs and Costs

1. Introduction

Local assistance is the extra staff and direct costs the county will incur in carrying out this project.

Local assistance includes 1) the information and education program that is an integral part of all watershed projects; 2) direct project needs such as travel and supplies; and 3) the technical assistance which county and other agencies utilize to implement the management practices portion of the watershed plan.

2. Technical Assistance

Technical assistance in this project will include 1) contacting landowners, 2) assessing site needs, 3) developing cost sharing agreements, 4) designing Best Management Practices, 5) certifying the completion of practices, and 6) inspecting the operation and maintenance of the practices. The Soil Conservation Service (SCS) will provide some of the technical assistance to the Eau Claire County LCD.

3. Total Estimated Work Hours Needed

Tables 10 and 11 show the estimated quantity of needed Best Management Practices. Table 11 also estimates needed project activities. The average amount of time that will be needed to perform each project management and technical assistance activity in the project is estimated in Table 11, based on the county's experience. Combining these facts, the total number of hours for each BMP and local assistance activity are also shown in Table 11, including project totals. These totals are shown for 100% participation in the project, which reflects an optimistic level of landowner participation so these estimates should be interpreted as maximum needs.

Table 11. Estimated Project Management and Technical Assistance Hours Needed for the Lower Eau Claire River Priority Watershed Project

Activity	Total Watershed Needs	Rate Hrs./unit	Hours @ 100% Participation	Hours @ 75% Participation
Project Management	2,900 hrs		2,900	2,900
Landowner Contacts	1,065	2 hrs ea.	2,130	2,130
Pre-contract Review			591	591
Cost Share Agr. Devel.	355	2 hrs ea.	710	533
Conservation Planning	355	27.5 hrs/pl	9,763	7,322
Contour Cropping	2,041 ac	0.2 hr/ac	408	306
Contour Strips	5,012 ac	0.3 hr/ac	1,504	1,128
Conservation Tillage	3,989 ac	0.04 hr/ac	1,200	900
Waterways	270 ac	15 hrs/ac	4,050	3.038
Diversion	30,000 ft	0.02 hr/ft	600	450
Grade Stabilization Structure	50	50 hrs/ea	2,500	1,875
Woodlot Fencing	140 ac	0.3 hr/ac	42	32
Streambank Riprap	13,300 ft	0.05 hr/ft	665	499
Streambank Shape & Seed	45,850 ft	0.05 hr/ft	2,293	1,720
Streambank Fencing	42,900 ft	0.01 hr/ft	429	332
Livestock & Machinery Stream Crossings	100	8 hr/ea	800	600
Critical Area Stabilization	20 ac	2 hr/ac	40	30
Barnyard Runoff Management	58	72 hr/ea	4,176	3,132
Manure Storage	50	50 hr/ea	2,500	1,875
Cost Share Review	355	1 hr/ea	355	266
Fiscal Management	355	6.5 hr/ea	2,308	1,731
Practice Maintenance Check	355	1 hr/ea	355	266
Totals:			37,617 hrs.	31,794 hrs.

Totals are also given for a 75% participation rate to more accurately estimate budget and staff needs. This participation rate should not be interpreted as a project goal.

4. Distribution of Work Hours by Project Schedule

The total amount of work effort needed to implement the recommendations of the Implementation Plan, including education, project management, fiscal management, and technical assistance needs, was estimated in Table 11. Since the activity focus of the watershed project will change over its eight-year duration, the number of work hours needed for each activity will also change over the life of the project. Figure 5 presents a graphic representation of this workload over the eight-year project life. Since the technical assistance hours comprise the majority of the project hours, the distribution of technical assistance hours is estimated by project year in Table 12. Fiscal and project management hours are also estimated by year in Table 12.

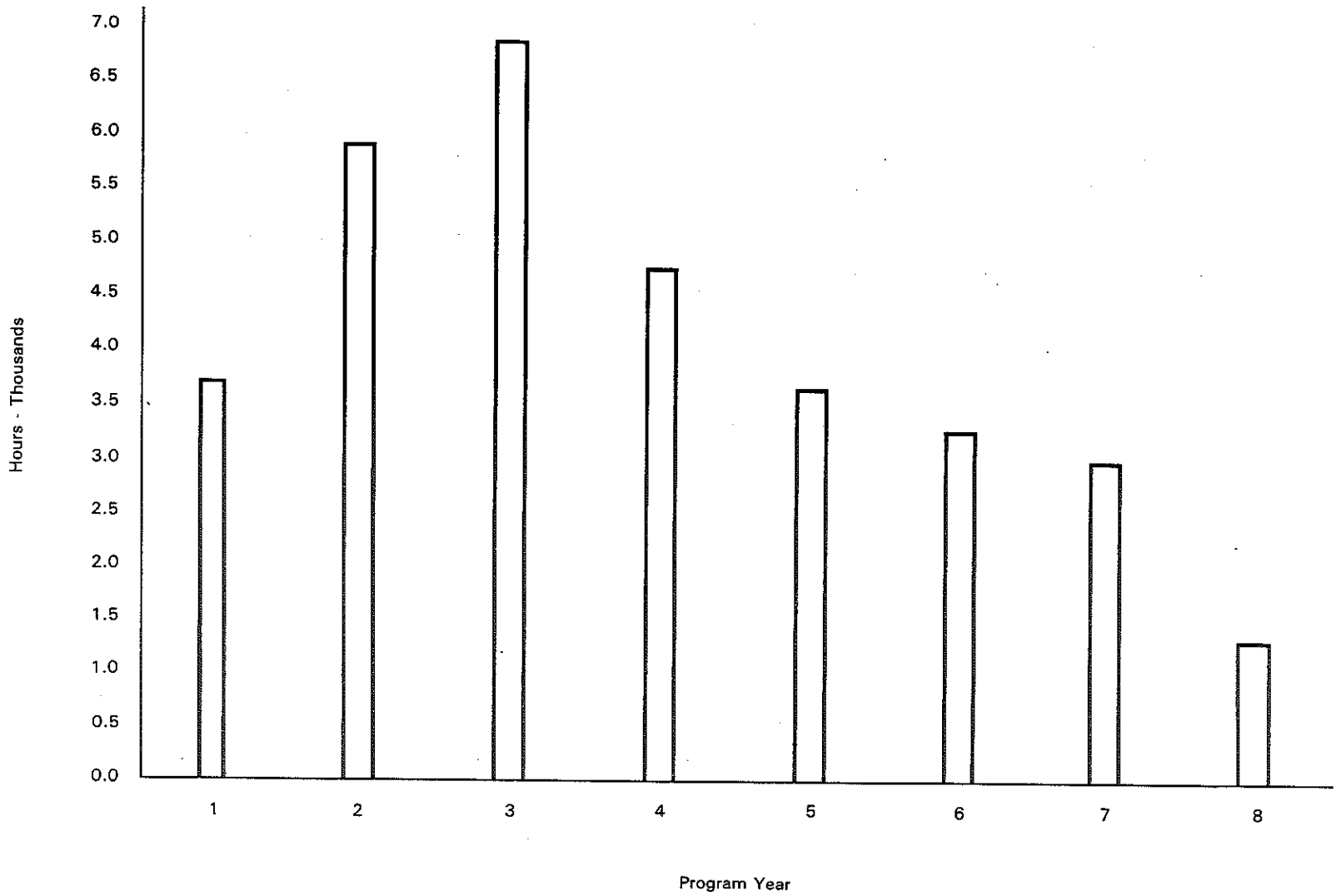
This estimated schedule showing how project management and technical assistance are likely to be spread over the project duration will assist the Eau Claire County LCC in determining both the quantity and type of staff which will be needed throughout the project to ensure successful project implementation.

Table 12 shows that at different times during the project there will be a need for staff with different abilities. In the first three years, the major portion of the work consists of contacting landowners and planning practices. After that period, the design, installation, and certification of the practices make up the major portion of the effort. Figure 5 is a graphical representation of that work load.

The costs of the educational activities completed each year are eligible for reimbursement under the Local Assistance Agreement. The activities, and subsequently the hours, will be greatest during the first three years of the project and will taper off towards the later years. The University of Wisconsin-Extension will be responsible for some of the educational activities but the LCD will be responsible for most of these activities.

The number of hours necessary to complete the fiscal management tasks will be dependent on the number of landowners who sign cost share agreements. As an example, if 266 landowners sign cost share agreements (the 75% participation level), approximately 1,731 hours of fiscal management time will be needed spread over the eight-year project life. This estimate is based on 0.5 hour for the development of the paperwork for each cost share agreement.

Figure 5: Work Hours By Program Year



Source: WDNR

Table 12. Estimated Work Hours Over the 8 Year Lower Eau Claire River Priority Watershed Project*

	Adjustment for 75% Part. Hours	Project Year 1	Project Year 2	Project Year 3	Project Year 4	Project Year 5	Project Year 6	Project Year 7	Project Year 8
Land Owner Contacts (355 x 1/hr x 3 yrs)	2,130	710	710	710	0	0	0	0	0
Pre-Contact Review:									
Animal Lot & Cropland	266	266	0	0	0	0	0	0	0
Streambank	238	238	0	0	0	0	0	0	0
Manure Spreading	87	87	0	0	0	0	0	0	0
Conservation Planning	7,322	915	2,661	3,746	0	0	0	0	0
Cost Share Agreement Dev.	533	67	267	199	0	0	0	0	0
Design & Cert. Subtotals	16,055	707	1,250	1,400	4,000	3,000	2,500	2,300	898
Practice Maintenance Check	266	0	45	45	45	45	45	41	0
Cost Share Review	266	0	45	45	45	45	45	41	0
Fiscal Management	1,731	275	250	250	250	250	250	250	81
Project Management	2,900	500	400	400	300	300	300	300	300
Subtotals	31,794	3,665	5,728	6,795	4,640	3,640	3,240	2,432	1,279
Information & Education	790	156	182	164	54	54	50	50	50
Totals:	32,584	3,821	5,910	6,959	4,724	3,694	3,190	2,982	1,329

* = Estimates based on a 75% participation rate

5. Project Base Hours

As mentioned elsewhere, the LCD, along with the SCS, will assume most of the project management and technical assistance responsibilities. The LCC will be reimbursed for the work done above a certain level called the project's base level. The determination of this base level takes into account the number of personnel available in the county's offices and the percent of the county within the watershed. This base level may change throughout the project, however for the first year, a base level of 556 hours was used.

CHAPTER IX. ADMINISTRATIVE PROCEDURES

A. Introduction

The program management procedures needed for carrying out the Lower Eau Claire River Priority Watershed Project have been developed by the Eau Claire County LCC along with the DNR. A large number of the program management activities involve fiscal management.

B. Administering the Cost Share Funds

1. Land Conservation Commission Responsibilities

The Eau Claire County Land Conservation Commission (LCC) will be responsible for the day-to-day operations of the project and coordination with the other governmental agencies, groups, organizations and educational institutions.

The LCC will maintain complete project records at the county LCD office. These records should include 1) correspondence; 2) contracts and subcontracts; 3) financial transactions; 4) memoranda of understanding; 5) project status and evaluation reports; 6) landowner contacts; and 7) landowner cost share agreements. A system of recording landowner contacts and project progress, including a map of areas under cost share agreement, will be developed. The map should be of sufficient detail to identify the upland, barnyard and streambank practices which are needed and have been installed.

The watershed project landowner files will be kept separate from LCC cooperator files. For each landowner who has signed a cost share agreement, the file should include 1) the agreement with any amendments; 2) conservation plan; 3) practice design information; 4) practice certification, 5) progress reports, 6) bills, proofs of payment and other records of financial transactions; and 7) the Landowner Tracking Form.

The LCD will be accountable to the Department of Natural Resources for maintaining complete records.

2. Project Manager Responsibilities

The Project Manager will serve as a liaison between the state and federal agencies involved in the project and the LCC. The Eau Claire County Conservationist will act as the project manager.

The major responsibilities of the project manager include 1) monitoring contracts between the LCC and other agencies, organizations and individuals throughout project implementation; 2) managing finances; 3) supervising project staff; and 4) coordinating technical assistance with information and educational activities. The project manager will keep track of landowner cost share encumbrances and Nonpoint Source Control Program grant balances. The manager will also process the local assistance reimbursement through the DNR on a quarterly basis.

3. Fiscal Management

Once a landowner has signed a cost share agreement, the LCC will be responsible for approving the cost share agreement. A complete file of all the landowners in the watershed with cost share agreements will be kept at the LCC office. The county LCC will also be responsible for the design, layout, installation and certification of BMPs.

The landowner will be responsible for contacting the contractor who will install the BMPs, unless a bid is required. For practices requiring bids, the LCD will advertise for bids under guidelines set under the Quotation Procedure that has been established.

The following Quotation Procedure will be utilized for conservation projects in the Lower Eau Claire River Priority Watershed Project that are estimated to cost in excess of $2,000. These projects include diversions, waterways, streambank riprap, grade stabilization structures, barnyard runoff systems, and manure storage facilities. A minimum of two bids will be required for any practice estimated over $2,000 total cost.

Steps in the Quotation Procedure include:

a. Area contractors will be notified of upcoming projects by mail or newspaper notice.

b. If necessary, the Land Conservation Division will set up a site showing of the projects with prospective bidders. The landowner should be present for this site showing. If a site showing is not needed, the contractors will be notified by letter, on the same date that plans are delivered to the landowner.

c. Contractors must submit all quotations to the Land Conservation Commission (or their designee), at the Courthouse, Eau Claire, Wisconsin 54703. The landowner and contractors will be notified of the deadline date for accepting quotations. All bids will be publicly opened and read on the specified date. After the deadline date, a letter listing the contractors and their quotations will be sent to the landowner and to the contractors who presented quotations.

d. It is the Land Conservation Commission policy that the landowner must select the lowest quotation. It is also the policy of the Land Conservation Commission to cost share on the basis of the lowest quotations. Only contractors who have submitted a written quotation are eligible for consideration. The landowner must notify the contractor who is awarded the project within five days of his or her receipt of the letter informing him/her of the quotations.

e. The quotation price will be the official cost when the project is constructed according to design. Authorized changes from the design will result in the adjustment of the unit price. Any revision of the design will be cost shared on the basis of the additional cost as agreed on by the farmer, contractor, and Land Conservation Department Technician. Land Conservation Commission approval is needed for the costs that exceed a 25% increase or decrease of the quantities specified for any unit of work, or plus or minus $500 on any lump sum bid. This amount will be recorded on the contractor change order form. Additional work will not be cost shared without a signed change order.

f. All required seeding, fertilizing, and mulching must be completed before the project can be certified for payment. Payments will not be made to the landowner/contractor until protective fences are installed around the practices if the project design and/or contract requires protective fencing.

g. Payments cannot be processed on the project until itemized receipts for all expenditures are turned into the Land Conservation Commission or designee.

Once the practice is installed, a county technician certifies that it is completed. The technician has the responsibility to make sure the installation meets proper standards and specifications. All steps in the fiscal management procedure are outlined in Table 13.

The Nonpoint Source Control Program is designed for the county to reimburse the landowner for the cost share amount after the practice has been installed, has been certified by the technician, and the contractor has been paid by the landowner. In the watershed project there are two ways a landowner can be reimbursed: 1) the landowner could pay the full bill, submit the paid bill and receive a check from the County Clerk in the landowner's name, or 2), if the bill is not paid in full, a check would be issued by the County Clerk in both the landowner's and contractor's name for the states' portion of the total costs. In any event, the county can only send in a request for reimbursement to the state on practices which have been paid in full.

The reimbursement of the watershed project by the DNR for payment of landowners will occur as needed. Initially an "up front" amount of funds will be made available to the project to establish the watershed checking account. As landowners are reimbursed for completed practices and the balance is drawn down, the Project Manager will forward the appropriate documents to DNR who will in turn reimburse the project. The necessary documentation includes: 1) a Cost share Calculation and Practice Certification Form (Form #3200-53) for each landowner being reimbursed, and 2) a Request for Advance or Reimbursement Form (Form #3400-70) which indicates total prior pay requests.

Table 13. Fiscal Management Procedures for the Lower Eau Claire River Priority Watershed Project

1. The landowner signs the Cost Share Agreement.

2. A Cost Share Agreement is received by the Land Conservation Commission and is approved.

3. A file is initiated for the Cost Share Agreement.

4. A farm plan is written.

5. Control practices (BMPs) are designed.

6. Bids are received on all projects over $2,000.

7. The landowner arranges for a contractor to construct the practice.

8. The practice is laid out by the Land Conservation Division staff when the contractor is scheduled to start.

9. Upon completion of installation, the practice is certified complete using DNR Practice Certification Form #3200-53.

10. The landowner submits all bills to the Land Conservation Division.

11. A Request for Reimbursement form is used to itemize the costs, and the eligibility of the costs for cost sharing is determined.

12. The itemized Request for Reimbursement form is reviewed and signed by the Technician, Accountant and Land Conservation Division Administrator.

13. An Eau Claire County Voucher is made out.

14. The Cost Share Expense Ledger is updated.

15. The Voucher and Request for Reimbursement form are forwarded to the Land Conservation Commission through the Land Conservation Division staff on the second Monday of each month.

16. Payment is made by the County Clerk after review by the Finance and Budget Committee no later than the 15th of each month.

17. Checks are printed by the 25th of each month by the County Clerk's office and mailed out directly to the landowner/contractor.

18. Voucher and Check numbers are obtained from the County Clerk's office and recorded on the Cost Share Expense Ledger at the end of each month.

The Nonpoint Source Grant Agreement covers the cost share funds available to the watershed project and will be amended to cover increased encumbrances as additional landowners sign cost share agreements.

C. Administering the Local Assistance Funds

The agreement entered into by the LCC and the DNR during the implementation phase of the project is called the Local Assistance Agreement.

The Local Assistance Agreement provides for the state to reimburse the county for the costs expended in implementing the watershed project. This agreement covers 1) the costs to conduct the landowner contacts; 2) the cost of conservation planning; 3) the cost of designing the needed management practices; 4) the costs of the information and education program; and 5) the direct costs for the project such as travel and supplies. 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 both the workload for the project and the amount of additional resources are needed by the county in order to complete the projected workload. An estimate of the total project workload for the Upper Door Priority Watershed Project is made in chapter VIII (Project Needs and Costs).

The Local Assistance Agreement provides funding for activities necessary to implement the watershed project. All activities generally grouped under the term "technical assistance" are eligible for funding, provided that additional staff or staff time is required to carry out the activity. These technical assistance activities include 1) contacting landowners, 2) identifying site-specific Best Management Practices, 3) developing cost share agreements, 4) designing and certifying Best Management Practices, and 5) reviewing practice operation and maintenance. Direct costs for education materials and other materials are also eligible for funding, as are transportation costs.

D. Activities not Eligible for Funding

Project management and fiscal management activities are not eligible for funding. These two activities represent the Eau Claire County's commitment to the project. Additional count staff hired for the purpose of conducting the activities listed above or for allowing present county staff to work on project-eligible activities are eligible for funding.

E. Progress Evaluation

Project progress will be evaluated quarterly and reported to the DNR by the LCC, using the forms provided by DNR. More detailed evaluations will be conducted annually by DNR and the LCC.

F. Plan Review

At the end of the first and second project years, the practice needs and costs per practice identified in this plan will be reviewed and adjusted as needed.

The Lower Eau Claire River Watershed plan was written with the best information available at the time of preparation. Situations and conditions may change during the implementation of this plan which may require changes in this document. The plan may be revised at any time upon agreement by both Eau Claire County and the Department of Natural Resources.

CHAPTER X. INFORMATION AND EDUCATION PROGRAM

A. Introduction

The purposes of the information and education program are to 1) create an awareness and understanding of the Lower Eau Claire River Priority Watershed Project and 2) to generate interest and support among landowners. It is the intent of this program to develop and distribute sufficient information to allow the landowner to evaluate and make intelligent decisions regarding his or her involvement and participation in this water quality program.

Specific objectives of the information and education program are to create awareness of nonpoint pollutant sources and impacts, to explain the voluntary nature of the project, to present the financial incentives available through participation in the project, and to motivate landowners to action and convince them to alter land management procedures in order to control the nonpoint pollutant sources which are degrading water quality.

The selection and timing of activities and events is designed to move through the phases of project plan preparation, public awareness, BMP implementation and evaluation. A variety of methods of providing information will be utilized in order to reach as many people as possible. Most of the activities will occur during the early stages of this project, and activities will gradually taper off through the later stages of project implementation as the contract sign-up period ends.

In order to meet objectives, specific goals have been established for information and education activities. These goals are to be viewed as minimum efforts to be accomplished, and will be reviewed annually to insure that the project objectives are being met. The annual review may result in alterations of the goal components to meet identified needs.

The audience for these education and information activities has been identified to be 1) specific eligible landowners in the watershed, 2) local officials and lawmakers, 3) civic groups and 4) the general public.

B. Activities

The following pages describe each of the activities to be undertaken during the eight-year implementation period. A schedule for these activities is found in Table 14.

1. Newsletters

Newsletters are the major communication means to provide all landowners and units of government in the watershed with both awareness about the project and specific information about the control practices and the policies of the project regarding the implementation of these practices.

Table 14. Information and Education Program Schedule

	AUDIENCE	NUMBER OF ACTIVITIES 1985	1986	1987	1988	1989	1990	1991	1992	1993
Newsletter	Landowners & Officials	3	4	4	1	1	1	1	1	1
News Releases	General Public	6	6	6	4	3	3	3	3	3
Conservation Tillage Demo.	Potential Cooperators	1	1	1	1					
Conservation Tillage Day	Potential Cooperators	-	1							
Conservation Tillage Tour	Potential Cooperators	1	-	1						
Animal Waste Tour & Streambank Protection Tour	Interested Landowners	1[a]	1[b]	1	1					
Radio	General Public	4	4	4	4	4	2	2	2	2
Television	General Public	2	2	1	1	1	1	1	1	1
Information Packet	Potential Cooperators	1	1 Update							
Public Hearing (Info. Meeting)	Watershed Landowners	1	1							
Small Group Meetings	Potential Cooperators	2	2	2	2					
Meetings with Organizations	Civic Groups	2	1	1	1					
Posters	General Public	1	1	1						
Slide Presentation	Watershed Landowners General Public Civic Groups	3	3	3	1	1	1	1	1	1
Contractor Workshop	Local Contractors	-	1	1	1	1	1	1	1	1
Group Planning Session	Watershed Landowners	-	1	1	1	1	1	1	1	1

[a] Trempealeau County
[b] Eau Claire County

The goals of the newsletters will include: 1) developing cooperation between all the agencies and individuals involved in the project; 2) supplying needed facts to the public; 3) giving updates on the progress of the watershed project; 4) introducing conservation management practices to the landowners; 5) developing ongoing communication between all of the people in the watershed; and 6) encouraging landowners to become involved in the watershed activities.

The responsibility for the newsletters' development and printing will lie with the Land Conservation Division. Articles will be contributed by the county Land Conservation Division, the Soil Conservation Service and U.W. Extension.

2. News Releases

News releases will be used to give short updates on information pertaining to ongoing activities in the watershed. They will also highlight landowners who have cooperated in the project. These releases will help to develop a very positive public image toward the watershed project. Contributions will be made by the Land Conservation Division, the Soil Conservation Service and the U.W. Extension.

3. Conservation Tillage Demonstration and Tour

The tillage demonstration is designed to provide local first-hand evidence and information about the effects and importance of conservation tillage.

A tillage tour is designed to acquaint interested landowners with the methods and results of conservation tillage and to explain the importance of conservation tillage in meeting the goals of the watershed project. The tour will feature the various methods of tillage and the experiences of the individual farmers will be shared with the tour participants. The U.W. Extension is the contact agency.

4. Best Management Practice Tours

Tours of BMPs are being planned to acquaint landowners within the Fall Creek, Bears Grass Creek and Bridge Creek subwatersheds with successful practices, especially barnyard management practices, that have been previously implemented in the Elk Creek Priority Watershed Project in Trempealeau County. When some initial BMPs have been installed in the Lower Eau Claire Priority Watershed Project, an additional tour will be developed to feature these control practices. These tours will provide landowners with examples of solutions to serious environmental problems. The tours will also give landowners a chance to talk with the farmers and landowners who have participated in a priority watershed project. It is the goal of the tours to provide as many examples of varying kinds of management as are available. An interagency effort will be utilized in developing the tour.

5. Radio and Television Communication

Implementing a watershed project that is located near an urban area the size of the City of Eau Claire has the advantage of being able to publicize the program through the mass media. This educational/informational tool will be utilized throughout the program by the Land Conservation Division, the Soil Conservation Service and the U.W. Extension.

6. Information Packet

An information packet consisting of a pocket folder with the watershed name and map printed on the front will be developed. The packet will contain materials that explain the purpose of the watershed project, who is involved, the responsibilities and benefits of landowners receiving cost sharing, and fact sheets. The folder will also contain a BMP brochure with photos and write-ups that describe what each of the conservation practices eligible for funding are designed to control. An information packet will be distributed to each landowner at the initial contact. This information packet is being designed by the Land Conservation Division.

7. Group Meetings and Informational Meetings

Group meetings will be organized and implemented cooperatively through an interagency effort. It will be emphasized that this is a project encompassing the entire watershed which needs the cooperation of all groups and individuals in order to be successful in improving water quality in the Lower Eau Claire River Watershed.

The public hearing and subsequent informational meetings will explain the following items to the general public: how it was decided to create the project; the history behind the project; the need for the project; the area that will be included in the project; who is involved in implementing the project activities; the origin and impacts of nonpoint source pollutants; examples of the approved practices proposed to reduce nonpoint source pollutants; which practices will be cost shared and at what levels; and what educational activities will be used in implementing the plan.

8. Posters

Posters will be designed and posted through the watershed area at local farmer-patronized businesses. The information that will be included on the poster will be related to the location of the project, what the problems are, and what solutions are needed to control the nonpoint sources of pollution. These posters will be designed by the Land Conservation Division staff.

9. Best Management Practice Slide Presentation

A slide set will be used to create an awareness of the watershed project and promote approved conservation practices. The set has been developed by Land Conservation Division staff. A "before - after" technique will be utilized to demonstrate what each BMP is and

how it effectively controls nonpoint sources of pollutants. The presentation will be used at information meetings for landowners, conservation groups and local officials.

10. Contractor Workshops

Contractor workshops will be planned on an annual basis to give the contractors who will be installing the control practices the appropriate training and information. The LCD technical staff will be used to assist contractors in becoming more skillful in the application of conservation practices. Information will be distributed that is related to the quotation procedure and upcoming scheduled installations of practices for that construction season. A cooperative effort between the Soil Conservation Service and the Land Conservation Division will be used to organize the workshops.

11. Group Planning Sessions

Group planning sessions will be used to expedite farm planning for cooperators in the watershed project. The participating farmers will attend training sessions one day a week for four weeks. After learning how to calculate erosion rates, each farmer will plan a management system to keep topsoil losses within recommended limits. Theoretically, at the end of the sessions, each farmer will have developed a conservation plan addressing all of the nonpoint source pollution problems on his or her farm.

SECTION FOUR:

THE PROJECT EVALUATION

Chapter XI. Evaluation Plan

SECTION FOUR:

THE PROJECT EVALUATION

CHAPTER XI. EVALUATION PLAN

A. Introduction

The success of the Lower Eau Claire River Priority Watershed Project will depend on the number of critical landowners who choose to participate in the project. Evaluating the success of the project will include:

1. An analysis of the actual rate and location of landowner participation;

2. A review of the calculated nonpoint source pollutant reductions due to changes in land management; and

3. Actual measured changes in water quality following the installation of land management practices.

B. Indirect Project Evaluation

Indirect measurements of project achievements, as indicated by the number of practice sign-ups and the calculated reduction in the pollutant loads, will be used one form of project evaluation. Because this type of evaluation will be based on the calculated reduction in pollutant loadings, it will be very important for project staff to keep careful records of 1) the condition of a landowner's property before practice installation (based on the inventory and farm visits), and 2) the condition of the property after practice installation. A "landowner tracking" form will be provided to Eau Claire County by the Department of Natural Resources for this purpose.

Eau Claire County staff will prepare maps showing the acres under cost share agreement and the units of practices planned and installed, in addition to tables summarizing the total practices installed. Both will be reviewed quarterly and will be compared with project goals. Maps will indicate whether landowner contacts and practices are directed purposefully toward critical areas and critical landowners according to the implementation schedule identified in the implementation plan. Written reports will be prepared jointly by the Department and the LCD to evaluate progress.

C. Direct Evaluation of Physical and Biological Stream Characteristics

1. Introduction

The Lower Eau Claire River Priority Watershed Project will utilize various water quality monitoring methods to document water quality conditions both prior to and following the installation of the land management practices already discussed in this plan.

Quantifiable biological and physical water quality information will be collected at the beginning of implementation of the watershed project and again after all practices have been installed. Habitat evaluation on selected stream segments; trout population surveys on selected streams now classified as supporting trout; and aquatic insect evaluation on selected stream segments will be performed (subject to staff availability) before and after project implementation.

This chapter identifies the locations in watershed streams which will be used for sampling and discusses the evaluation monitoring methods which will be used.

2. Monitoring Steps

The watershed evaluation monitoring includes the following steps:

a. the intensive monitoring of selected subwatersheds prior to the installation of land management practices,
b. the intensive monitoring of selected subwatersheds following the installation of practices, and
c. the interpretation of both the pre- and post-implementation monitoring.

3. Monitoring Criteria

In order to design the monitoring program which would best accommodate the evaluation of water quality conditions in the watershed, a number of criteria were selected from the criteria discussed earlier in this plan. They are:

a. possible extreme water temperatures in some streams,
b. depressed dissolved oxygen conditions, especially during storm events,
c. high organic loading, and
d. aggradation (deposition) and scour action of some streams because of velocity and hydraulic volume.

Monitoring will begin with the habitat and physical sampling work to be performed in the summer of 1986, while the macroinvertebrate work will be conducted in the fall of 1986.

4. Stream Monitoring Sites

Table 15 identifies the streams to be monitored, monitoring site locations (by township and range), site number, and monitoring methods to be used. The stream monitoring sites are shown in Figure 6.

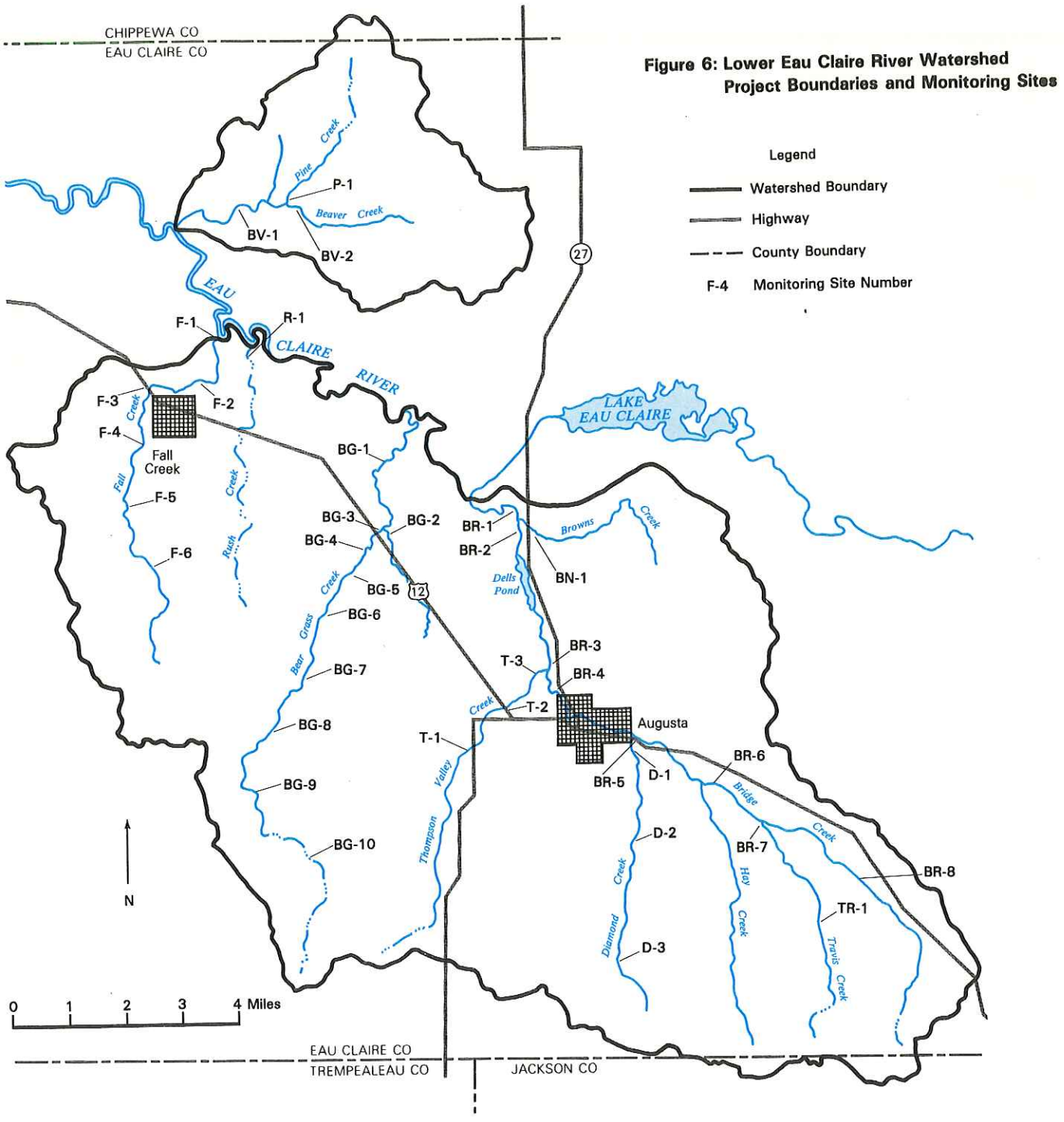


Figure 6: Lower Eau Claire River Watershed Project Boundaries and Monitoring Sites

D. Monitoring Methods

1. Habitat Monitoring

A modified version of the habitat rating system developed by Joe Ball of the DNR (Ball, 1982) will be performed at all sites identified in the site location table (Table 13). Field procedures of the Ball habitat evaluation method were modified by Mike Bosak of the DNR's Southeast District to make the habitat assessment more detailed. The forms used in this procedure are shown in Appendix A. After field personnel walk a large portion of the stream and evaluate the habitat, the form will be completed. This form will be used later to complete the Ball Habitat Rating Form. Numerical ratings will be assigned to the various rating items and totaled. Under the modified system, an excellent habitat rating is less than 62; a good rating ranges between 63 and 114; a fair rating ranges between 115 and 176; and a poor rating is greater than 176.

2. Physical Monitoring

Physical sampling consists of monitoring stream flow, dissolved oxygen (DO), pH (which is a scale representing the degree of acidity or alkalinity), and temperature. Physical sampling will be conducted at all watershed monitoring sites. In addition, maximum/minimum thermometers will be used at a number of monitoring sites in Fall Creek and Bears Grass Creek. Due to the lack of a tree canopy upstream from Highway 12, and the heavy surface runoff from pasture and cropland that occurs during rain events, some streams become quite warm. Both warm temperatures and organic loading reduce the dissolved oxygen content of a stream, which in turn stresses the stream biota.

3. Macroinvertebrate Monitoring

Another tool commonly used to assess water quality is the Hilsenhoff Biotic Index (Hilsenhoff, 1982). Using this method, aquatic insects are collected and identified at various locations in a stream. Since some aquatic insects are more tolerant of organic pollution than others, tolerant and intolerant aquatic insect species are quantified and given a rating. This rating indicates relative water quality.

Using aquatic insects to evaluate water quality works well in streams which have been polluted by high organic loading. However, most streams in the Lower Eau Claire River Watershed do not receive high organic loads except occasionally during heavy rain events. The substrate in these streams is essentially sand and silt and, except for some bank vegetation and snags, contains little suitable habitat for macroinvertebrates. Therefore macroinvertebrate monitoring in this watershed will be used only on a limited basis.

Table 15. Lower Eau Claire River Watershed Monitoring Sites and Methods.

Stream	Site Location	Site No.	Monitoring Sampling
Hay Creek	T25N, R6W, Sec. 11, NW, SW	1	habitat, physical sampling
Beaver Creek	T27N, R7W, Sec. 20, NW, NW	1	habitat, macroinvertebrates physical sampling
	T27N, R7W, Sec. 21, NW, NE	2	habitat, physical sampling
Pine Creek	T27N, R7W, Sec. 16, SE, SE	1	habitat, physical sampling
Rush Creek	T27N, R7W, Sec. 33, NW, SW	1	habitat, physical sampling
Lower Bridge Creek	T26N, R7W, Sec. 13, NE, NE	1	habitat, macroinvertebrates physical sampling
	T26N, R6W, Sec. 19, NE, NE	2	habitat, physical sampling
	T26N, R6W, Sec. 29, SE, SW	3	habitat, macroinvertebrates, physical sampling

Table 15, continued (Page 2 of 5)

Middle Bridge Creek	T26N, R6W, Sec. 32, SW, SE	4	habitat, macroinvertebrates, physical sampling
	T25N, R6W, Sec. 3, SE, NW	5	habitat, macroinvertebrates, physical sampling
Upper Bridge Creek	T25N, R6W, Sec. 11, NW, NW	6	habitat, macroinvertebrates, physical sampling
	T25N, R6W, Sec. 12, SW, SW	7	habitat, physical sampling
	T25N, R5W, Sec. 18, NW, SE	8	habitat, macroinvertebrates physical sampling
Thompson Valley Creek	T25N, R7W, Sec. 12, NW, SE	1	habitat, physical sampling
	T26N, R6W, Sec. 31, SW, SW	2	habitat, macroinvertebrates physical sampling
	T26N, R6W, Sec. 32, NW, SE	3	habitat, macroinvertebrates, physical sampling

Table 15, continued (Page 3 of 5)

Stream	Site Location	Site No.	Monitoring Sampling
Diamond Valley Creek	T25N, R6W, Sec. 4, SE, NE	1	habitat, macroinvertebrates, physical sampling
	T26N, R6W, Sec. 16, SE, NE	2	habitat, physical sampling
	T25N, R6W, Sec. 28, NW, NE	3	habitat, physical sampling
Browns Creek	T26N, R6W, Sec. 18, NE, SW	1	habitat, macroinvertebrates, physical sampling
Travis Creek	T25, R5W, Sec. 18, SW, SW	1	habitat, physical sampling
Fall Creek	T27N, R7W, SEC. 32, NE, SW	1	habitat, macroinvertebrates, physical sampling (high/low temp.)
	T26N, R7W, Sec. 5, NW, NW	2	habitat, physical sampling (high/low temp.)
	T26N, R7W, Sec. 6, SW, SW	3	habitat, physical sampling (high/low temp.)
	T26N, R8W, Sec. 12, NE, SE	4	habitat, physical sampling (high/low temp.)

Table 15, continued (Page 4 of 5)

	T26N, R8W, Sec. 13, NE, SE	5	habitat, physical sampling (high/low temp.)
	T26N, R7W, Sec. 19, NW, NW	6	habitat, physical sampling (high low temp.)
Lower Bears Grass Creek	T26N, R7W, Sec. 11, SW, NE	1	habitat, macroinvertebrates, physical sampling (high/low temp.)
Upper Bears Grass Creek	T26N, R7W, Sec. 14, NW, SE	2	habitat, physical sampling (high/low temp.)
	T26N, R7W, Sec. 14, NE, SW	3	habitat, macroinvertebrates, physical sampling (high/low temp.)
	T26N, R7W, Sec. 23, SE, NW	4	habitat, physical sampling
	T26N, R7W, Sec. 23, SW, SE	5	habitat, macroinvertebrates, physical sampling
	T26N, R7W, Sec. 27, SW, NE	6	habitat, physical sampling (high/low sampling)

Table 15, continued (page 5 of 5)

Stream	Site Location	Site No.	Monitoring Sampling
	T26N, R7W, Sec. 33, NE, NE	7	habitat, macroinvertebrates, physical sampling
	T26N, R7W, Sec. 33, SW, SE	8	habitat, physical sampling
	T25N, R7W, SEc. 9, SW, NW	9	habitat, macroinvertebrates, physical sampling
	T25N, R7W, Sec. 15, NW, SW	10	habitat, physical sampling (high/low temp.)

4. Chemical Monitoring

As mentioned earlier in this watershed plan, some of the Lower Eau Claire River Watershed streams receive a high loading of organic material from agricultural lands. In these streams there is a need to quantify the amount of nitrogen, phosphorus and sediment loading. This was done to a limited degree during the Fall Creek Pond feasibility study (WDNR 1981). Chemical sampling in this project will be limited to one stream (Fall Creek), and will be limited to the following parameters: dissolved oxygen, temperature, total phosphorus, ammonia nitrogen, and solids, including sediment and organic matter.

Fall Creek was selected for chemical monitoring for the following reasons:

a. Organic loading and dissolved oxygen/temperature changes which occur during periods of spring runoff and event flows should be quantified. This will help project staff determine the effectiveness of the land management practices that will be installed in the Fall Creek Subwatershed.

b. It should be possible to use the data from the Fall Creek Subwatershed to extrapolate loading rates in other subwatersheds both before and after the installation of management practices.

c. Fall Creek has some previously collected physical and chemical sampling data (WDNR, 1981). However dissolved oxygen, flow, and total phosphorus data are either totally lacking or limited in regard to event monitoring.

d. There is excellent accessibility to Fall Creek which would facilitate monitoring. Subject to the availability of funding, a continuous monitoring station will be established at the U.S. Highway 12 crossing, which is located just above the Fall Creek Pond.

e. More accurate sediment loading data in the Fall Creek Subwatershed is needed. Currently there is a discrepancy regarding the annual total sediment loading to Fall Creek Pond and the Eau Claire River. Earlier in this watershed plan (Chapter IV) it was noted that an estimate of total sediment loading to the pond was made at 7000 cubic yards per year. Assuming 90 pounds per cubic foot, this amounts to 8505 tons of soil per year, which appears small relative to the total soil loss inventoried in the ¼ mile-wide Fall Creek corridor, which was 29,250 tons per year (which is equivalent to 24,074 cubic yards).

   By obtaining continuous flow data from Fall Creek, a more accurate picture of sediment loading should be obtained. In addition, project staff should be able to extrapolate these data to similar streams within the watershed.

Table 16. Priority Watershed Project Field Work Time Study

	Lower Eau Claire River Project
Total Miles	611
Number of Sites	17
Type of Sampling	Habitat
Number of Limited Term of Employee Hours	57
Number of Full-Time Employee Hours	16
Travel Time, Total Hours	22
Sampling Time, Total Hours	51
Miles per Hour	36
Sampling Time Per Site	3
Total Time, in Hours	73
Total Time Per Site, in Hours	4

5. Fish Surveys

Staff from the DNR's Eau Claire Area Office is currently conducting an intensive fish survey on both Bears Grass and Fall creeks. The results of this survey will be compared with a post-implementation survey in order to evaluate changes in the fishery.

D. Evaluation Monitoring Accounting

In order to facilitate better program planning in the future, the DNR's West Central District has incorporated a method to account for time and travel in the field. The results of this accounting will enable staff to more efficiently structure monitoring methods, make better use of vehicles and time, and more accurately predict time and costs for future monitoring programs. Time studies were performed for field work in several watersheds, including the Lower Eau Claire River Watershed. The results of this field work time study, including the Lower Eau Claire River Watershed, are shown in Table 16.

BIBLIOGRAPHY

BIBLIOGRAPHY
FOR THE
LOWER EAU CLAIRE RIVER PRIORITY WATERSHED PROJECT
PLAN

Ball, J.

1982. Stream classification guidelines for Wisconsin. Wisconsin Department of Natural Resources Technical Bulletin (unpublished). 13 pp.

Burnett, Timothy F.

1980. Stream survey of Bear Grass Creek in Eau Claire County. Wisconsin Department of Natural Resources, West Central District, Eau Claire, Wisconsin. 36 pp.

Eslien, Jack.

1980. Report of a pre-operative point source impact study on Bridge Creek below the Augusta wastewater treatment plant. Wisconsin Department of Natural Resources, West Central District, Eau Claire, Wisconsin. 43 pp.

Hilsenhoff, W.

1982. Using a biotic index to evaluate water quality in streams. Wisconsin Department of Natural Resources Technical Bulletin 132. Madison, Wisconsin. 22 pp.

Kmiotek, Stan.

1980. Wisconsin Trout Streams. Wisconsin Department of Natural Resources. 67 pp. (plus stream listings by county)

Petersen, James B., Keith Kelling, Tommy Daniel, Fred Madison, Gary Jackson, Leonard Massie and Carol Steinhart.

1984. Applying manure to Wisconsin's cropland: benefits and problems. Cooperative Extension Service, University of Wisconsin-Extension. 111 pp.

Sather, L. M. and C. W. Threinen.

1964. Surface water resources of Eau Claire County. Wisconsin Conservation Commission (Wisconsin Department of Natural Resources), Madison, Wisconsin. 54 pp.

Soil Conservation Service

1974. Soil survey of Eau Claire County, Wisconsin. Soil Conservation Service (U.S. Department of Agriculture). 144 pp.

1977. Soil Conservation Service erosion inventory phase II, instructions for phase II data collection. Soil Conservation Service (U.S. Department of Agriculture), Washington, D.C.

1978. Wisconsin erosion inventory - phase II. Soil Conservation Service (U.S. Department of Agriculture), Madison, Wisconsin.

1985. Wisconsin field office technical guide. Soil Conservation Service (U.S. Department of Agriculture), Madison, Wisconsin.

U.S. Department of Commerce.

1980. Census of population 1982, volume 1, chapter B, part 51, Wisconsin. PC80-1-B51. U.S. Department of Commerce, Washington, D.C. 349 pp. plus appendixes.

Vodacek, J.

1979. Lower Chippewa River Basin areawide water quality management plan. Wisconsin Department of Natural Resources, Madison, Wisconsin. Approx. 360 pp.

Wisconsin Department of Natural Resources (WDNR)

n.d. Silvicultural and forest aesthetics handbook, Wisconsin Department of Natural Resources (Bureau of Forestry), Madison, Wisconsin. 135 pp.

1981. Fall Creek's pond feasibility study results and management alternatives. Wisconsin Department of Natural Resources (Office of Inland Lake Renewal), Madison, Wisconsin. 18 pp.

Young, R. A., M. A. Otterby and A. Roos.

1982. An evaluation system to rate feedlot potential. U.S. Department of Agriculture - Agricultural Research Service. 78 pp.

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APPENDIX A:
WATERSHED EVALUATION FORMS

Department of Natural Resources

Appendix A-1.

STREAM SYSTEM HABITAT RATING FORM
Form 3200-68 1-85

Stream _____ Reach Location _____ Reach Score/Rating _____

County _____ Date _____ Evaluator _____ Classification _____

Rating Item	Category			
	Excellect	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio <7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 14	Inadequate, overbank flow common. W/D ratio >25. 16
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 20
Bottom Substrate/ Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble gravel or other stable habitat. Lack of habitat is obvious. 22
Avg. Depth Riffles and Runs	Cold >1′ 0 Warm >1.5′ 0	6″ to 1′ 6 10″ to 1.5′ 6	3″ to 6″ 18 6″ to 10″ 18	<3″ 24 <6″ 24
Avg. Depth of Pools	Cold >4′ 0 Warm >5′ 0	3′ to 4′ 6 4′ to 5′ 6	2′ to 3′ 18 3′ to 4′ 18	<2′ 24 <3′ 24
Flow, at Rep. Low Flow	Cold >2 cfs 0 Warm >5 cfs 0	1-2 cfs 6 2-5 cfs 6	.5-1 cfs 18 1-2 cfs 18	<.5 cfs 24 <1 cfs 24
Pool/Riffle, Run/Bend Ratio (distance between riffles ÷ stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or unpastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not inhance aesthetics. Condition of stream is offensive. 16
Column Totals:	_____	_____	_____	_____

Column Scores E _____ +G _____ +F _____ +P _____ = _____ = Score

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

Appendix A-2.
Nonpoint Source Stream Evaluation Form
(Page 1 of 6)

Stream Name_____ Evaluator_____

Location_____ Date_____

_____ Time_____

____1/4, ____1/4,S____,T____N,R____

DO____(mg/1) Flow____

DO____(%sat) Conductivity_____

Temp____°C Additional Samples_____

Habitat Rating_____ _____

_____

Macroinvertebrates_____

_____

_____

_____

_____

Substrate Examined_____

Riparian Land Use_____

Riparian Vegetation/Soils_____

_____

_____

Riparian Wildlife_____

Aquatic Life (fish, vegetation, etc)_____

_____

_____

_____

Segment No.

Length _____ _____ _____ _____ _____ _____

Distance between

Segments _____ _____ _____ _____

Total distance _____

Substrate

Bedrock	_____	_____	_____	_____	_____	_____
Boulders	_____	_____	_____	_____	_____	_____
Rubble	_____	_____	_____	_____	_____	_____
Gravel	_____	_____	_____	_____	_____	_____
Sand	_____	_____	_____	_____	_____	_____
Silt	_____	_____	_____	_____	_____	_____
Clay	_____	_____	_____	_____	_____	_____
Detritus	_____	_____	_____	_____	_____	_____
Muck	_____	_____	_____	_____	_____	_____
Debris	_____	_____	_____	_____	_____	_____
Total	_____	_____	_____	_____	_____	_____

Comments_____

_____

_____

Banks

Width						
Height						
Bank						
Condition:						
Raw areas						
Sloughing (%)						
Stable (%)						
Vegetated (%)						

Comments_____

_____

_____

Overhanging

Banks

Width						
Height						

Comments_____

_____

Bottom

Deposition

Area Covered						
Average depth						
Maximum depth						
Composition (%)						
Detritus						
Silt						
Sand						
Gravel						

Comments_____

_____

_____

Pools

Coverage (%)						
Depth						
Substrate						

Comments_____

_____

Water

mean depth						

mean width _____ _____ _____ _____ _____ _____

aquatic

vegetation

% coverage _____ _____ _____ _____ _____ _____

Comments_____

_____

REACH SUMMARY

_____

_____

_____

_____

_____

_____

_____

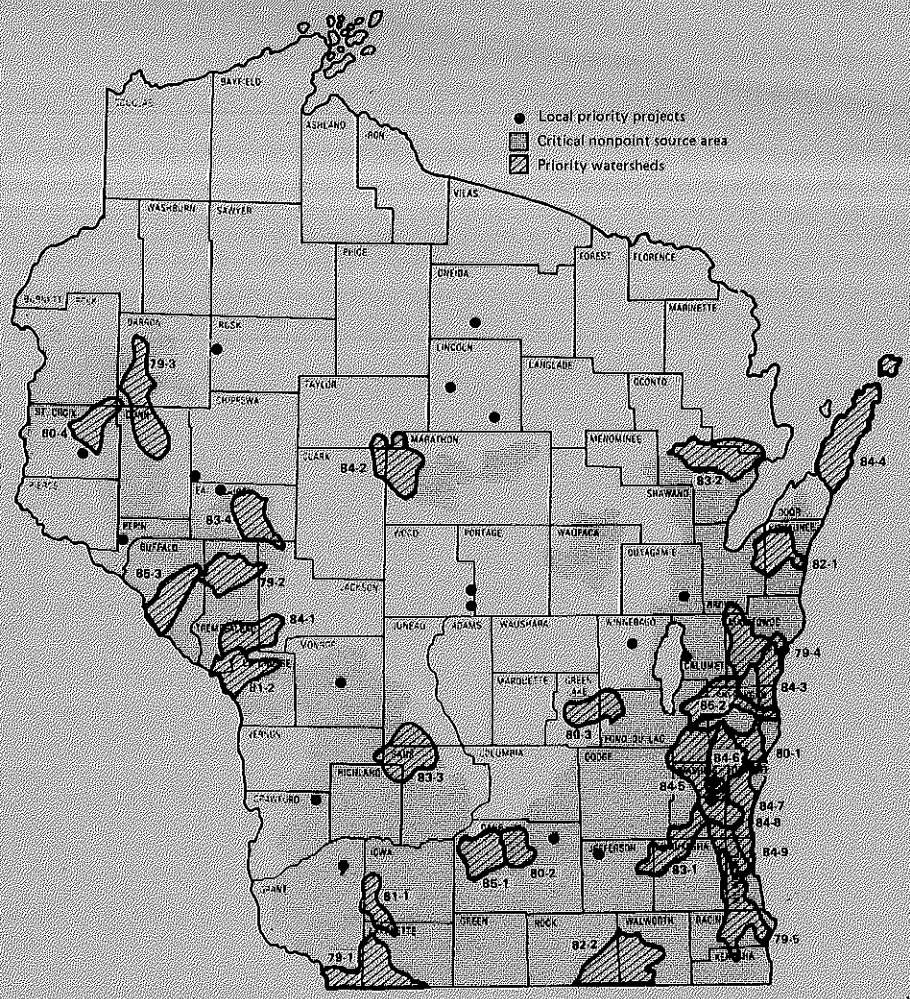
Appendix A-3.

Evaluation Monitoring Accounting Form

Watershed:_____

Date	Total Mileage	Cost/ Mile	LTE Cost	FTE Cost	Volunteer	Number of Habitat Sites	Number of Macroinverte-brate Sites	Number of Other Sampling Sites	Sampling Time (hr)	Travel Time (hrs)	Misc.

CURRENT PRIORITY WATERSHED PROJECTS IN WISCONSIN



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


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