

# **Nonpoint Source Control Plan for the Duncan Creek Priority Watershed Project**



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

# Watershed Plan Organization Information

## Natural Resources Board 1995

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Bruce Baker, Director, Bureau of Water Resources Management  
Rebecca Wallace, Chief, Nonpoint Source & Land Management Section

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

# **A NONPOINT SOURCE CONTROL PLAN FOR THE DUNCAN CREEK PRIORITY WATERSHED PROJECT**

The Wisconsin Nonpoint Source Water Pollution Abatement Program

Plan Published

September, 1995

## **This Plan Was Cooperatively Prepared By:**

The Department of Natural Resources  
The Department of Agriculture, Trade and Consumer Protection  
The Chippewa County Land Conservation Department  
The University of Wisconsin Extension Service  
The Duncan Creek Advisory Committee

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For copies of this document please contact:

Department of Natural Resources  
Bureau of Water Resources Management  
Nonpoint Source and Land Management Section  
P.O. Box 7291  
Madison, WI 53707

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# **WATERSHED PLAN ACKNOWLEDGEMENTS**

## **Authors**

Dan Simonson, Department of Natural Resources - Western District  
Jane Tetzloff-Jensen, Chippewa County Land Conservation Department  
Lynn Hess, Department of Agriculture, Trade, and Consumer Protection

## **Principal Contributors**

Ken Baun, Nonpoint Source and Land Management Section, DNR  
Nick Stadnyk, Chippewa County Land Conservation Department  
Dan Masterpole, Chippewa County Land Conservation Department  
Dan Girolamo, formerly of the Chippewa County Land Conservation Department  
Ron Struss, University of Wisconsin - Extension  
Laura Chern, Groundwater Management Section, DNR  
Duncan Creek Citizen Advisory Committee  
West Central Regional Planning Commission  
Ken Schreiber, Department of Natural Resources - Western District  
Keith Foye, Department of Agriculture, Trade and Consumer Protection  
Kevan Klingberg, Chippewa County Land Conservation Department

## **Editor**

Sabrina D. Charney, DNR, Bureau of Water Resources Management

## **Graphics/maps**

Nick Stadnyk, Chippewa County Land Conservation Department  
BIM/GEO Services Section, DNR

## **Word Processing**

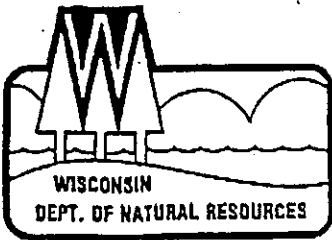
Word Processing Staff, DNR



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Jeff Prey, Nonpoint Source and Land Management Section, DNR  
Dave Nashold, Chippewa County Land Conservation Department  
Todd Prill, Chippewa County Land Conservation Department  
Elaine Misfeldt, Chippewa County Land Conservation Department  
Chippewa County Land Conservation Committee  
Joe Kurz, Fish Manager, DNR Chippewa Falls  
Karen Voss, Department of Natural Resources - Western District  
Karen Rahmeier, Nonpoint Source and Land Management Section, DNR



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

George E. Meyer  
Secretary

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

September 22, 1993

FILE REF: 2600

Mr. Tom Goettl, Chair  
Chippewa County Board  
619 North Bridge Street  
Chippewa Falls, WI 54729

Mr. Clifford W. Chatterson, Chair  
Eau Claire County Board  
227 First Street West  
Altoona, WI 54720

Mr. Randy Summerfield  
Mayor, City of Bloomer  
R1, Bloomer, WI 54724

Mr. James Pingel  
Village President of New Auburn  
1434 West Highway M  
New Auburn, WI 54757

RECEIVED

Mr. Dan Norrell  
City Manager of Eau Claire  
721 Oxford Avenue  
Eau Claire, WI 54703

Ms. Virginia O. Smith  
Mayor, City of Chippewa Falls  
30 West Central Street  
Chippewa Falls, WI 54729

RELEASED

I am pleased to approve the Duncan Creek Priority Watershed Plan prepared through the Wisconsin Nonpoint Source Water Pollution Abatement Program. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. I am also designating this plan to be an element of the Chippewa River Areawide Water Quality Management Plan.

I would like to express the Department's appreciation to the Chippewa County staff that participated in preparing this plan. We look forward to assisting Chippewa County and the cities and villages in the watershed in the implementation of the Duncan Creek Priority Watershed Plan.

Sincerely,

George E. Meyer  
Secretary

- cc -> Dan Masterpole - Chippewa Co. LCD
- Dan Simonson - WD
- Dave Jelinski - DATCP
- Becky Wallace - WR/2
- Cindy Hoffland - CA/8
- Richard Wedepohl - WR/2

RESOLUTION NO. 40-93

WHEREAS, the Chippewa County Board of Supervisors has sponsored the Duncan Creek Clean Water Project to improve local water quality, and

WHEREAS, Wisconsin Administrative Code NR120 requires that a watershed plan be developed; and that it be approved by the County, the WI Department of Natural Resources and the WI Dept. of Agriculture, Trade and Consumer Protection, and

WHEREAS, the Land Conservation Committee has conducted an extensive public participation process, to develop policies and procedures to guide the implementation phase of the project, and

WHEREAS, the Duncan Creek Watershed Plan has been drafted to achieve local water quality objectives at least public cost.

NOW THEREFORE BE IT RESOLVED, the Chippewa County Board of Supervisors approve the Duncan Creek Clean Water Project Watershed Plan, and

BE IT FURTHER RESOLVED, that the Land Conservation Committee be authorized to implement the plan, using statutory powers established in 92.07, and

BE IT FURTHER RESOLVED, if significant changes in policy are proposed or needed during the course of the project, the plan will be formally amended by resolution of the Chippewa County Board of Supervisors.

Dated this 11th day of May 1993.

LAND CONSERVATION COMMITTEE

Duane Bowe  
Duane Bowe

Emery Sedlacek  
Emery Sedlacek

Marilyn Holte  
Marilyn Holte

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Ronald Steinmetz

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Jim Dahl

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Vernon Kellen

Evelyn Maloney  
Evelyn Maloney

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APPROVED

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gem  
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County Board

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# SUMMARY

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## Introduction

The Duncan Creek Priority Watershed Project plan assesses the nonpoint sources of pollution in the Duncan Creek Watershed and guides the implementation of nonpoint source control measures. These control measures are needed to meet specific water resource objectives for Duncan Creek and its tributaries. The primary objective of the project is to reduce nonpoint source pollution to the surface water and groundwater, and to enhance and protect the water quality of streams in the Duncan Creek Watershed.

Nonpoint sources of pollution most commonly found in this watershed include: polluted runoff from barnyards and feedlots; sediment from cropland erosion; urban sources, streambank and gully erosion; runoff from winterspread manure, and infiltration of pollutants to groundwater. The purpose of this project is to reduce the amount of pollutants originating from nonpoint sources that reach surface water and groundwater within the Duncan Creek Priority Watershed Project area.

This plan was prepared by the Department of Natural Resources (DNR), the Department of Agriculture, Trade, and Consumer Protection (DATCP) and the Chippewa County Land Conservation Department. The DNR selected the Duncan Creek Watershed as a priority watershed project through the Wisconsin Nonpoint Source Water Pollution Abatement Program in 1990. It joined approximately 50 similar watershed projects statewide in which nonpoint source control measures are being planned and implemented. The Nonpoint Source Water Pollution Abatement Program was created in 1978 by the Wisconsin State Legislature. The program provides financial and technical assistance to landowners and local governments to reduce nonpoint source pollution.

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

## General Watershed Characteristics

The Duncan Creek Watershed drains 193 square miles of land in Chippewa and Eau Claire County in West Central, Wisconsin (Map S-1). The watershed is part of the Lower Chippewa River Sub Basin. The Duncan Creek Watershed drains to the Chippewa River .

The Duncan Creek Watershed was divided into 13 smaller drainage areas, called subwatersheds, for this planning effort.

Landuse in the watershed, as shown in table S-1, is mainly agricultural, and is currently dominated by dairy farming. The watershed population is growing, with urban areas showing the largest increases. Nonfarm rural residential accounts for an increasing share of the population in the rural areas.

**Table S-1. Landuse in the Duncan Creek Watershed**

Landuse	Percent of Watershed
Agricultural	
pasture	1-20
cropland	52-81
Grassland	0-18
Woodlots	5-31
Developed	2-17
Wetlands <sup>1</sup>	0-2
<sup>1</sup> These are estimates of wetland acres based on WIN sampling inventory data. See wetland section in Chapter Two for a more comprehensive estimate of wetland acreage.	
Source: DNR	

## Water Quality

Duncan Creek and several impoundments support a warm water sport fishery. The streams of the watershed are not reaching their highest potential use due to pollution from point and nonpoint sources. Eroding croplands and streambanks and improperly managed livestock operations are the major source of nonpoint pollution in the watershed.

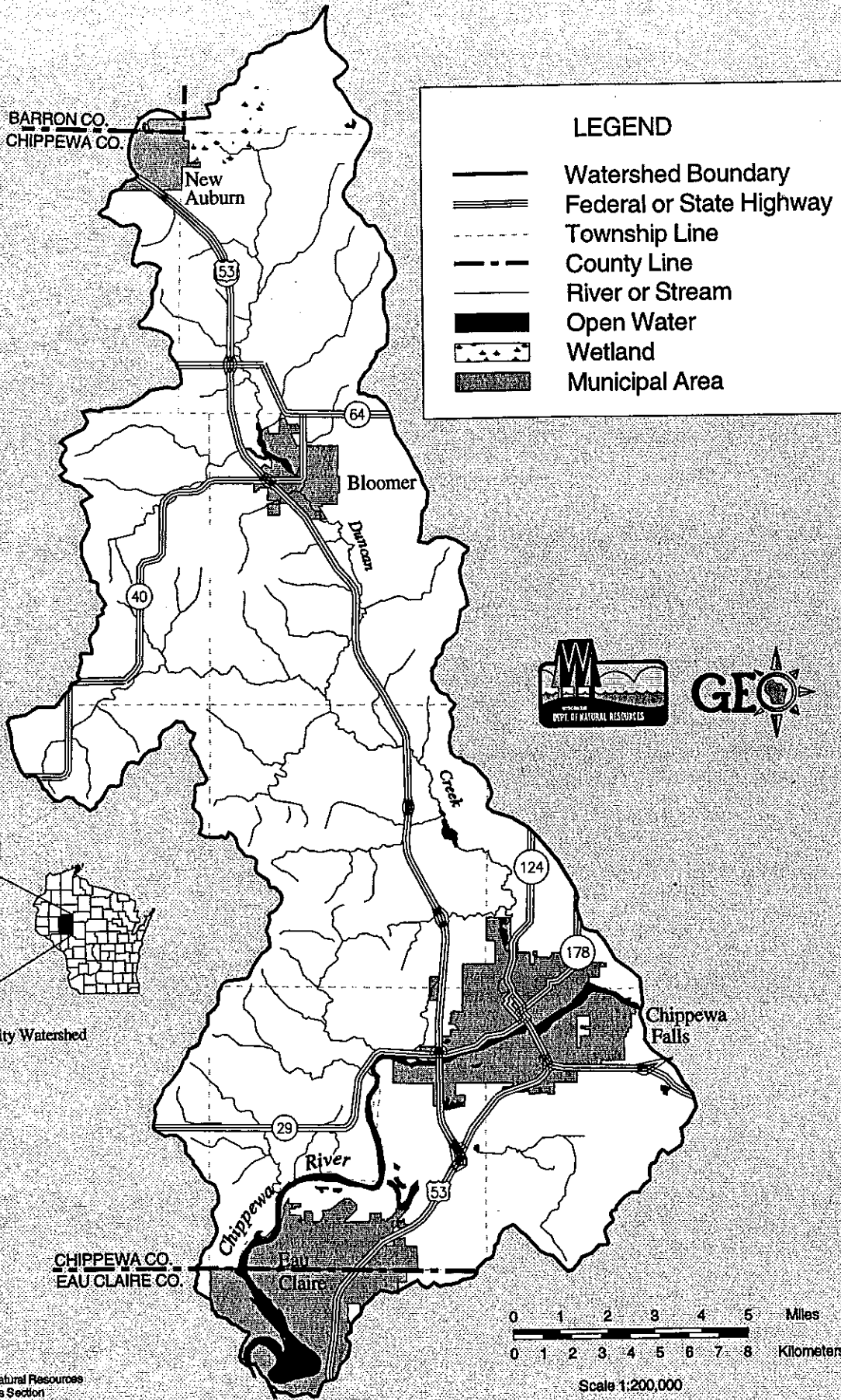
As an example, Duncan Creek below the city of Bloomer is currently classified as a warm water fishery because current water quality conditions are not adequate for trout. The project predicts this water body can achieve a class 2 trout status if nonpoint sources of pollution are controlled. The details of these assessments are discussed later in this watershed plan.

An assessment of groundwater quality was completed by sampling private wells for nitrate + nitrite and triazine. Results show that of the well samples collected, 8.6 percent had nitrate



levels over the enforcement standard (health advisory level) of 10 milligrams per liter (mg/L), and 39.3 percent had nitrate levels between 2 mg/L, the preventative action limit, and 10 mg/L. These nitrate levels are significant and illustrate that nitrogen is reaching groundwater in levels that exceed natural background levels. Nitrate + Nitrite levels greater than the 2 mg/L preventative action limit show that human activities are affecting groundwater quality.

# Map S-1 Duncan Creek Priority Watershed

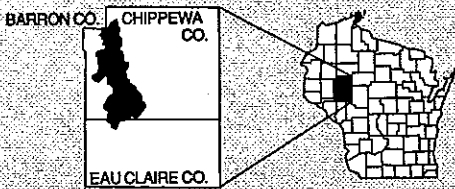


**LEGEND**

- Watershed Boundary
- Federal or State Highway
- Township Line
- County Line
- Open Water
- Wetland
- Municipal Area



STUDY AREA



Duncan Creek Priority Watershed



Scale 1:200,000

Well sampling for triazine showed that several samples collected had triazine levels over 3.0 micrograms per liter  $\mu\text{g/L}$ , which is the enforcement standard for atrazine plus its breakdown components, called metabolites. Triazines are a family of herbicides which include atrazine and its metabolites which when present in groundwater indicates groundwater contamination. 6.1 percent of the samples collected had triazine levels between 0.3 and 3.0  $\mu\text{g/L}$ . The preventative action limit for triazine is 0.3  $\mu\text{g/L}$ .

## Sources of Water Pollution

The Chippewa County LCD collected data on all agricultural lands, barnyards, manure storage sites, and streambanks in the watershed. These data were used to estimate the pollutant potentials of these nonpoint sources. The amount of phosphorus carried in runoff from each barnyard to a receiving stream was calculated. The amount of sediment reaching streams from eroding agricultural lands and streambanks was also determined. In the Duncan Creek Watershed, about 95 percent of the sediment deposited in streams annually is derived from agricultural upland erosion. 2.5 percent of the sediment reaching streams originates from streambank erosion. Approximately 2.5 percent of the total sediment is contributed from gully erosion.

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

### Barnyard Runoff Inventory Results:

- 325 barnyards were assessed.
- These barnyards were found to contribute 10,159 pounds of phosphorus to surface waters, annually.

### Streambank Erosion Inventory Results:

- An unknown number of stream miles were inventoried
- 1,052 tons of sediment reach streams from eroding sites (2 percent of total sediment)
- There are an unknown number of miles of eroding sites (and an unknown percent of streambanks inventoried).

### Upland Sediment Inventory Results:

- An unknown number of acres were inventoried.
- 44,615 tons of sediment are delivered to streams: (95 percent of total sediment).
- An unknown percent from cropland.
- An unknown percent from grazed woodlots and woodlots.
- An unknown percent from pastures.

Wetland Inventory Results:

- 7,211 State and 5,633 Federal publically owned acres of wetlands inventoried.
- An unknown number of acres of converted but restorable wetlands.
- An unknown number of acres of grazed wetlands.

\* This inventory reflects all publically owned wetlands in this watershed

## Pollutant Reduction Goals

Pollutant load reductions are developed according to activities needed to achieve the water quality objectives. The following is a summary of reductions to be targeted for the entire watershed.

**Sediment Goal:** Reduce overall sediment delivered by 50 percent. To meet this goal, the following is needed:

- 50 percent reduction in sediment reaching streams from agricultural uplands in all subwatersheds.
- 55 percent reduction in streambank sediment delivered to all streams and an unknown percent overall repair of streambank habitat in all subwatersheds.

**Phosphorus Goal:** Reduce overall phosphorus load by 49 percent. To meet this goal, the following is needed:

- 90 percent reduction in organic pollutants from barnyards in all subwatersheds.
- 50 percent reduction in organic pollutants from winterspread manure on "unsuitable" acres in all subwatersheds.

## Management Actions

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

The Chippewa County LCD will contact all landowners who are eligible to receive cost-share funds during the project's implementation. All Category I sources of nonpoint pollutants must be controlled if a landowner wishes to participate in any aspect of the program. Category I represents the level of pollution control needed to achieve water quality goals in

the watershed. Nonpoint sources in Category II contribute less of the pollutant load than those in Category I. They are included in cost sharing eligibility to further insure that water quality goals are met. Controlling sources in this category is not mandatory for a landowner to be funded for controlling other sources.

The Chippewa County LCD will assist landowners in applying BMPs. Practices range from alterations in farm management (such as changes in manure-spreading and crop rotations) to engineered structures (such as diversions, sediment basins, and manure storage facilities), and are tailored to specific landowner situations. Participation in the program is voluntary.

The following is a brief description of critical nonpoint pollutant sources, project eligibility criteria, and BMP design targets for the project.

- **Agricultural Lands**

All agricultural lands contributing sediment to streams and other surface waters at a rate greater than .3 tons/acre/year and greater than "T" will be classified as Category I for cost sharing and must be brought down to a rate of .3 tons/acre/year. 50 percent of the upland sediment in the watershed will be controlled with these management actions. Category II will include all lands contributing sediment to surface waters at a rate of .3 tons/acre/year and less than "T".

In addition to the BMPs identified for cropland soil erosion control, the county will require each participant to meet the minimum management standards for streambank buffer strips and vegetated areas of concentrated water flow.

- **Animal Lots**

Barnyard runoff controls for this project call for all barnyards with more than 50 lbs./year of phosphorus to be classified as Category I for cost sharing. They must reduce their discharge to 15 lbs./year.

There are 92 barnyards in the Category I classification, out of a total of 325 inventoried barnyards. Category II barnyards which contribute between 15 and 50 lbs./year of phosphorus annually must be reduced to 15 lbs./year. There are 77 barnyards in the Category II classification for a total of 169 eligible barnyards or 52% of all barnyards in this watershed.

**Table S-2. Best Management Practices Eligible for Cost Sharing Through the Duncan Creek Priority Watershed Project**

Best Management Practices	State Cost-Share Rate
Contour Farming	50% (flat rate: \$6/acre)
Strip Cropping	50% (flat rate: \$10/acre)
Field Diversions and Terraces	70%
Grassed Waterways	70%
Reduced Tillage (No Till)	\$20/acre
Critical Area Stabilization	70% <sup>1, 2</sup>
Grade Stabilization Structures	70% <sup>2</sup>
Agricultural Sediment Basins	70%
Shoreline and Streambank Stabilization	70% <sup>2</sup>
Shoreline Buffers	70% <sup>1, 2</sup>
Barnyard Runoff Management	70%
Animal Lot Relocation	70% <sup>2</sup>
Manure Storage Facilities	70% <sup>3</sup>
Livestock Exclusion From Woodlots	50%
Wetland Restoration*	70%
Nutrient and Pesticide Management	50%
<sup>1</sup>	Easements may be entered into with landowners identified in the watershed plan in conjunction with these BMPs. See "Management Actions" in this summary for areas where easements may apply.
<sup>2</sup>	Maximum cost-share amount is \$20,000 including no more than \$15,000 for manure transfer equipment.
<sup>3</sup>	With a matching local share, the state share cost sharing level may be increased up to 80 percent.

- **Manure Spreading**

Deductions in critical acre animal manure spreading are targeted for 9,771 acres or 50% of the critically spread areas. All project participants that agree to install barnyard runoff management, diversions, or relocations of barnyards are required as a

Category I action to develop and implement a nutrient management plan according to SCS Technical Standard 590.

In addition to the 590 planning requirements, the landowners required to do 590 planning will also have to comply with the following provisions;

1. No manure spreading at any time in:
  - A. Wetlands
  - B. Grassed waterways
  - C. Areas of concentrated flow
2. Floodplain spreading only if it is incorporated within 72 hours
3. No manure spreading on slopes greater than 12% between November 15 and March 15.

- **Streambanks**

Project participants with individual streambank erosion sites that exceed 30 tons/year of soil loss are required as a Category I requirement, to control those sites. Category II landowners are eligible, but not required, to control streambank erosion if an individual site has between 2 and 30 tons/year of soil loss. Sites with less than 2 tons/year of soil loss are not eligible for cost sharing.



## Funds Needed for Cost Sharing, Staffing, and Educational Activities

Grants will be awarded to Chippewa County by the DNR for cost sharing, staff support and educational activities. Table S-3 includes estimates of the financial assistance needed to implement needed nonpoint source controls in the Duncan Creek Watershed, assuming a 75 percent participation rate of eligible landowners.

**Table S-3. Cost Estimates for the Duncan Creek Priority Watershed Project**

Eligible Activity	Total Cost <sup>1</sup>	State Share <sup>1</sup>
Cost Sharing	\$7,687,225	\$3,779,260
Easements	\$1,820,364	\$1,365,273
Chippewa County Staffing	\$3,333,480	\$3,333,480
Educational Activities	\$493,365	\$493,365
<b>Totals</b>	<b>\$13,334,434</b>	<b>\$8,971,378</b>

<sup>1</sup> Estimates based on 75% participation.

## Project Implementation

The first three years of implementation is the period for participants to sign cost-share agreements. There is a five-year period for practice installation. While an eligible landowner or operator has three years to determine whether to participate in the program, the installation of BMPs can usually begin as soon as a landowner has signed a cost-share agreement with the Chippewa County LCD.

## Information and Education

An information and education program will be conducted throughout the project period with the Chippewa County LCD having overall responsibility for the program. University of Wisconsin-Extension staff in the county will provide assistance. This program will be most intensive during the first three years of the project as landowners and local governments sign up for state cost sharing for pollution control. The program includes:

- Activities to inform various groups of the recreational uses of water resources in the project.

- Activities to inform various groups of the recreational uses of water resources in the project.
- Activities to increase public awareness of the local ecology and bio-diversity in the watershed.
- Activities to increase public awareness that landuse and nonpoint source pollution affects water quality.
- Educating landowners about the management practices that can be applied to reduce nonpoint source pollution.

Educating municipalities about landuse decisions and the effect on water quality.

## Further Information

If you want more information about the Duncan Creek Priority Watershed Project, or a copy of the watershed plan, contact one of the following:

Dan Simonson, Coordinator  
DNR  
Western District Headquarters  
Eau Claire, WI  
(715) 839-3725

Jane Tetzloff-Jensen  
Chippewa County Land Conservation Department  
Chippewa Falls, WI  
(715) 726-7920

# Project Evaluation and Monitoring

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

- **Administrative**

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

- **Pollutant Reduction Levels**

The Chippewa County LCD will calculate the reductions in nonpoint source pollutant loadings resulting from changes in landuse practices and report to the DNR.

- **Water Resources**

The DNR will monitor changes in water quality, habitat, and water resource characteristics periodically during the project and at the end of the project period.

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# **CHAPTER ONE**

## **Introduction, Purpose, Legal Status, and Plan Organization**

---

### **Introduction**

The Duncan Creek watershed was selected in October 1990 as a large-scale priority watershed project through the Wisconsin Nonpoint Source Water Pollution Abatement Program. The purpose of the priority watershed program is to achieve and maintain the water quality of lakes, streams, wetlands, and groundwater in the watershed and downstream in an efficient and effective manner.

The watershed was selected because of the water quality problems in the watershed's lakes and streams. The land use in the watershed is primarily agricultural. Dairy farming is the predominant agricultural land use with some related uses, and the area is experiencing rural residential development.

### **Legal Status of the Nonpoint Source Water Pollution Abatement Program**

The Wisconsin Nonpoint Source Water Pollution Abatement Program was created in 1978 by the Wisconsin Legislature and Governor. They recognized the need to address the extensive water quality threats and problems in Wisconsin's lakes, streams, and groundwater that are not caused by point sources. The program is administered by the Department of Natural Resources (DNR) with assistance from the Department of Agriculture, Trade and Consumer Protection. Section 144.25 of the Wisconsin Statutes authorizes the program, and Chapter NR 120 of the Wisconsin Administrative Code governs its operation.

The Duncan Creek Watershed Plan was prepared under the authority of the Wisconsin Nonpoint Source Water Pollution Abatement Program described in Section 144.25 of the Wisconsin Statutes and Chapter NR 120 of the Wisconsin Administrative Code. Similarly, this plan is subject to the amendment process under NR120.08 (e) for substantive changes. The Department of Natural Resources will make determination if a proposed change will require plan amendment. This plan was prepared under the cooperative efforts of the Department of Natural Resources, the Department of Agriculture, Trade and Consumer

Protection, the Chippewa County Land Conservation Departments, local units of government, and the Duncan Creek Priority Watershed Citizens Advisory Committee.

The nonpoint source program operates on a project basis where the project area is a watershed. State funds are available to cost-share the installation of urban and rural nonpoint source controls termed "best management practices" on critical sites within the priority watershed. Cost-share rates range from 50 to 70 percent. State funds are also available to hire additional local staff to implement the priority watershed project. State funding is also available for cost sharing activities related to nutrient management and information and education. Participation by landowners is voluntary.

Each project is divided into two phases. In the first phase, the project development phase, a priority watershed plan is developed jointly by DNR, DATCP, and local units of government. Generally, the county Land Conservation Committee represents the county government. The purpose of this plan is to guide the second phase of the project, the implementation phase, towards achieving the water quality needs. The project development phase lasts up to 18 months. Program funds are provided to local units of government to hire staff to participate in developing the plan. Assistance is also provided by the University of Wisconsin-Extension.

The implementation phase is normally eight years. During the first three years, landowners may sign cost-share agreements with local units of government. These agreements must contain all of the best management practices needed to control the nonpoint sources identified as critical in the watershed plan. Landowners have up to five years after signing a cost-share agreement to install all of the best management practices on the cost-share agreement. Municipalities are also eligible to enter into agreements. Similar to the plan development phase, program funds are available to local units of government to support staff needed to assist landowners and conduct other implementation activities. All best management practices must be maintained for ten years starting with the installation of the last practice on the cost-share agreement. Presently there are over 50 priority watershed projects statewide.

## Purpose

The program for abating nonpoint sources is based on establishing projects in priority areas. There are several steps involved in developing a project from start to finish, and they involve different state agencies, local governments, citizen groups, and landowners.

- A. The Plan - A priority watershed project is guided by a plan prepared cooperatively by the DNR, DATCP, and local units of government, with input from a local citizens advisory committee. Project staff evaluate the conditions of surface water and groundwater, and inventory the types of landuse and nonpoint sources of pollution throughout the watershed. The priority watershed plan assesses nonpoint and other sources of water pollution and identifies best management practices needed to control

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

Upon approval by state and local authorities, the plan is implemented by local units of government. Water quality improvement is achieved through implementation of nonpoint source controls (Best Management Practices) and the adoption of ordinances. Landowners, land renters, counties, cities, villages, towns, metropolitan Sewerage Districts, sanitary districts, lake districts, and regional planning commissions are eligible to participate.

- B. Implementation - Technical assistance is provided to aid in the design of best management practices. State level cost-share assistance is available to help offset the cost of installing these practices. Eligible landowners and local units of government are contacted by the county Land Conservation Departments to determine their interest in installing the best management practices identified in the plan. Cost-share agreements are signed, listing the practices, costs, cost-share amounts, and a schedule for installation of management practices.

Implementation of the watershed plan is assisted by an information and education component. Specific activities are undertaken according to the plan that will allow the agencies and local governments to conduct the project in a successful manner. The DNR and DATCP review the progress of the counties and other implementing units of government, and provide assistance throughout the eight-year project. The DNR monitors improvements in water quality resulting from control of nonpoint sources in the watershed.

## **Plan Organization**

The remainder of this plan is divided into four parts: The Watershed Plan Introduction, The Watershed Assessment, Management and Implementation, and Project Evaluation. The contents of each part are described below:

### **Part 1 - The Watershed Plan Introduction**

The plan organization and the planning approach used for this project are explained in this chapter.

### **Part 2 - The Watershed Assessment**

This part includes Chapters 2, and 3. It contains identification of the watershed and its subwatersheds, water quality problems, water quality objectives, pollutant load reductions, nonpoint sources, and the project management area.

Chapter 2 - "General Watershed Characteristics" is an overview of the cultural and natural resource features important to planning and implementation efforts for the priority watershed project.

Chapter 3 - "Water Quality Conditions, Objectives, and Nonpoint Sources" presents field inventory results and identifies the water quality or water resource problems and improvements that can be obtained through implementation of a nonpoint source control project. The chapter discusses the level of pollutant control needed to achieve the water resource objectives and describes the nonpoint sources and other sources of pollution.

### **Part 3 - Management and Implementation**

Chapters 4,5,6,7,8,9, and 10 are contained in this part and explain the administrative structure and procedures for conducting the project.

Chapter 4 - "Management Actions" identifies the level of urban and rural nonpoint source pollution control needed to meet the water quality objectives. Eligibility criteria for funding to control nonpoint sources under the priority watershed project are also presented.

Chapter 5 - "Local Government Implementation Program" describes the manner by which the local units of government administer the project. Budgets for time and money are detailed in this chapter. This chapter was prepared by the Chippewa County LCD and DATCP.

Chapter 6 - The urban implementation strategy is presented in this chapter and includes those management recommendations needed for the identified urban areas.

Chapter 7 - Nutrient and Pest Management implementation activities are explained in this chapter. Chippewa County LCD prepared this portion of the plan.

Chapter 8 - Information Implementation is a complete chapter in this plan and it was prepared by Chippewa County LCD and was reviewed by the UWEX Water Quality Agent for Western Wisconsin.

Chapter 9 - The Education Implementation chapter contains plans for educational programming that is distinct from the informational activities covered in chapter 8. This chapter was also prepared by the Chippewa County LCD and reviewed by the UWEX Water Quality Agent.

Chapter 10 - Integrated Resource Management is discussed in this chapter and includes methods and administrative relationships that cross into other areas of programming that relate to water quality. Chapter 10 was completed by the Chippewa County LCD.

## **Part 4 - Project Evaluation**

Chapter 11 - Progress assessments are explained in this chapter and the requirements for project tracking of pollutant load reductions are also detailed.

Chapter 12 - "Evaluation Monitoring" presents a strategy and schedule for monitoring to determine the water quality impacts of implementing nonpoint source management changes, landuse changes and best management practices in the Duncan Creek Watershed.



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# **CHAPTER TWO**

## **General Description of the Watershed**

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### **Location**

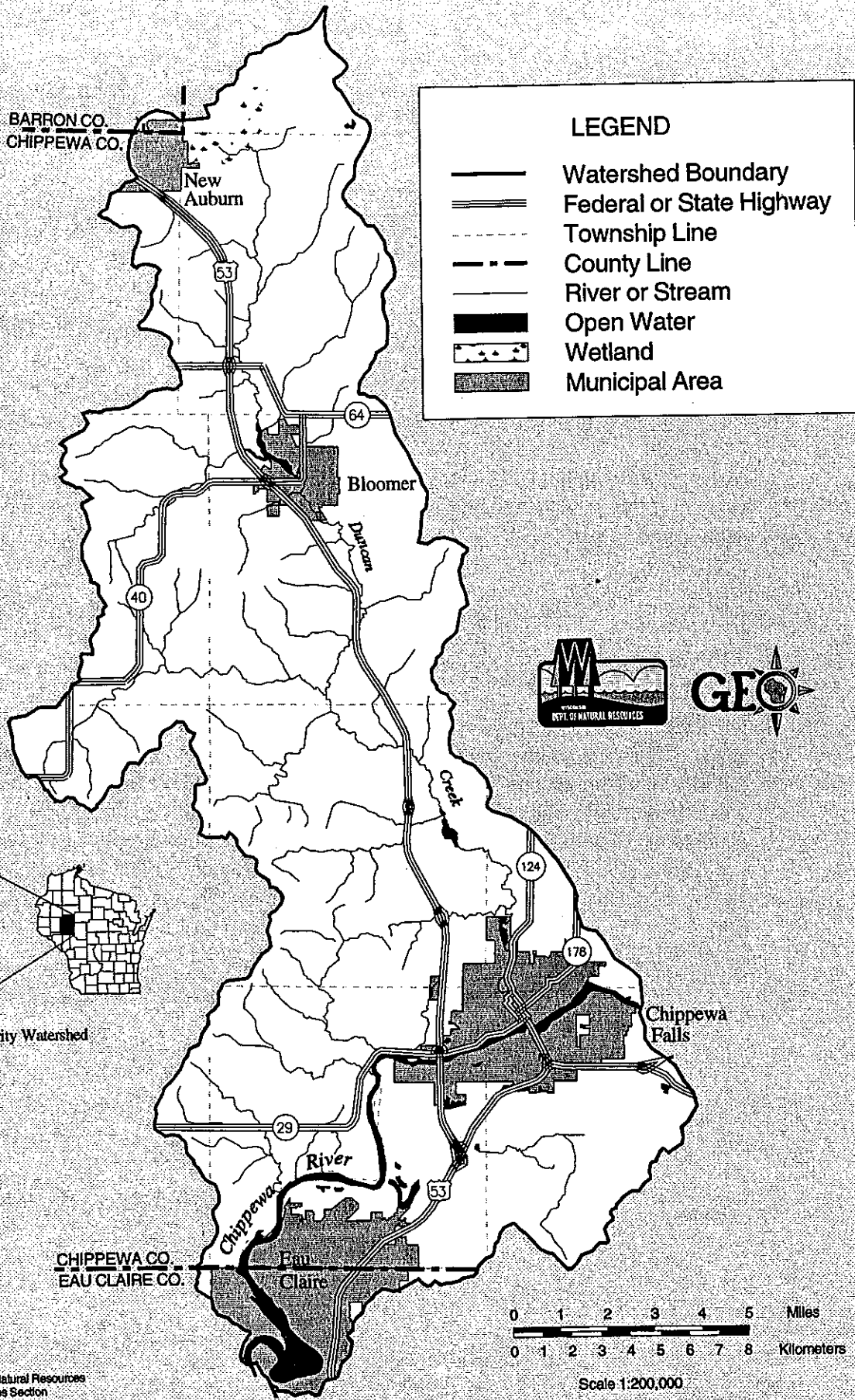
The Duncan Creek Watershed is located in west central Wisconsin in Chippewa and Eau Claire Counties (Map 2-1).

The watershed is part of the Chippewa River drainage basin. The Duncan Creek Watershed encompasses an area of approximately 123,520 acres (193 square miles) with 120,960 acres (189 square miles) in Chippewa County. The project area includes Duncan Creek and its tributaries and a portion of the Chippewa River and its tributaries.

### **Cultural Features**

Ninety eight percent of the Duncan Creek Watershed lies in Chippewa County with a small percentage of the watershed in Eau Claire County. The city of Chippewa Falls, the city of Bloomer and the village of New Auburn are all located entirely within the watershed, while only the northern portion of the city of Eau Claire is in the watershed. The watershed lies totally or partially within the civil town of Wheaton, Lafayette, Hallie, Eagle Point, Howard, Tilden, Cooks Valley, Auburn, Woodmohr, Bloomer and Sampson. Important publicly managed lands in the watershed include public fishing grounds on the upper part of Duncan Creek, most of Hay Creek and part of the Chippewa River.

# Map 2-1 Duncan Creek Priority Watershed



# Physical Setting

The distribution of stream segments in the upper and middle basins are characteristic of a dendritic drainage pattern, formed in a bedrock controlled landscape. On average the slope of intermittent streams is an order of magnitude larger than the slope of perennial streams.

The geology of the Duncan Creek basin consists of glacial drift overlying Cambrian aged sandstone and Precambrian aged igneous and metamorphic rocks. The glacially deposited sand and gravel occur as moraine deposits in the northern half of the watershed and as a broad outwash plain in the east. The sand and gravel is highly variable in terms of material, ranging from significant clays to large diameter sand and gravel.

The soils in the watershed can be divided into 5 major associations. They are as follows:

1. Menahga-Friendship - Deep, nearly level to sloping excessively drained and moderately well drained sandy soils formed on glacial outwash plains and stream terraces.
2. Spencer-Magnor-Almena - Deep, nearly level to sloping, moderately well drained and somewhat poorly drained, silty soils formed on moraines.
3. Elkmound-Plainbo-Eleva - Shallow and moderately deep, gently sloping to very steep, well drained to excessively drained, loamy and sandy soils formed on uplands, glacial outwash plains and stream terraces.
4. Billett-Rosholt-Oesterle - Deep, nearly level to sloping, well drained to somewhat poorly drained, loamy soils on outwash plains and stream terraces.
5. Seaton-Gale - Deep and moderately deep, nearly level to steep, moderately well drained and well drained, silty soils formed on uplands.

# Water Resources

## Surface Waters

Thirteen major subwatersheds drain the Duncan Creek basin. Nine of these subwatersheds drain into Duncan Creek while the remaining subwatersheds drain

directly into the Chippewa River. Approximately 200 miles of stream occur in the basin.

Specific information on the condition of each major waterbody is included in Chapter 3 of this plan.

## Wetlands

The watershed contains many wetlands located in different physiographic areas of the basin.

Surface water depression wetlands occur mainly within the till plain while groundwater depression wetlands occur mostly in the outwash plain. Groundwater slope and surface water slope wetlands occur on the bedrock control landscape and within stream corridors. Table 2-1 shows the acres of wetlands and acres of hydric soils, by subwatershed.

**Table 2-1. Acres of State and Federal Inventoried Wetlands and Acres of Hydric Soil, by Subwatershed**

Subwatershed	Acres of Hydric Soil	Acres of State Wetlands	Acres of Federal Wetlands
Upper Duncan	1740	1523	621
Middle Duncan	910	475	382
Como Creek	604	451	548
Bloomer	1572	1123	847
Hay Creek	850	773	794
Lower Duncan	307	311	327
Tilden Creek	283	201	159
Glen Loch	208	205	217
Chippewa Falls	350	287	229
Trout Creek	272	299	121
Beaver Creek	733	506	359
Hallie	1603	1039	1029
Lake Hallie	4	18	0

Wetland vegetative types consist mainly of emergent/wet meadow and forest.

Chippewa county has produced a wetland inventory and appraisal which is included in Appendix B. Chapter 3 of the plan includes additional information about the condition of wetlands in the Duncan Creek project.

## Groundwater

Groundwater in the Duncan Creek Basin occurs mainly in two aquifers. They are the sand and gravel aquifer and the sandstone aquifer. Figure 2-1 is a generalized geologic cross-section of the area. A cross-section is a vertical slice through the land showing the rock and soil layers. The sand and gravel aquifer is composed of variable materials deposited by glacial activity. This aquifer is generally shallow, 30 to 60 feet, and can produce large quantities of water. The sandstone aquifer lies below the sand and gravel and is generally 100 to 200 feet thick. Although these are considered two separate aquifers, there is a high degree of water movement between the two, due to the lack of a significant impermeable layer.

The groundwater resources of the Duncan Creek watershed supply 100% of the water for homes, industries and municipalities.

### 1) Rural, Private Groundwater Use

Of the wells of record, 68 percent draw water from the sand and gravel aquifer. Less than 5 percent draw water from the granite. Because of the lack of information, the granite aquifer was not considered in this study.

### 2) Municipal Groundwater Use

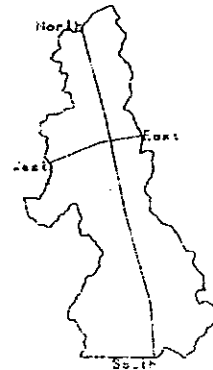
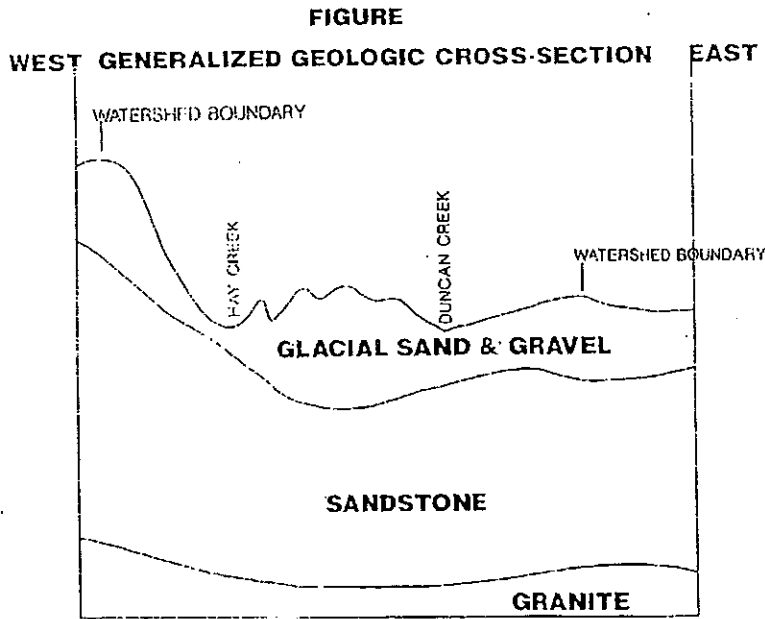
All communities within the watershed obtain their municipal drinking water from groundwater. The village of New Auburn, city of Bloomer and town of Hallie wells are all completed in the sandstone aquifer. All wells serving the city of Chippewa Falls are completed in the sand and gravel aquifer.

## Land Use

Landuses in the Duncan Creek project consist of dairy, agriculture, grain cropping, forest products, wetlands, open water, urban development, recreational lands, and transportation routes. The southern one-fourth of the watershed is being urbanized by expansion of the cities of Chippewa Falls and Eau Claire.

Table 2.2 summarizes the different land uses inventoried and predicted from the modified WIN analysis.

Figure 2-1. Generalized Geologic Cross-Section



**Table 2-2. Percent of Rural Land Cover by Type in the Duncan Creek Watershed**

Type	% Range of Coverage by Subwatershed
Cropland	52 - 81
Developed	2 - 17
Grassland	0 - 8
Pasture	1 - 20
Woodland	5 - 31
Wetland	0 - 2

## **Archaeological Resources**

Projects using state and federal funding, assistance, licenses and permits are required by law to consider the effects of their actions on archaeological and historical sites, and historical structures. The watershed project is a joint cooperative effort between federal, state and county agencies as well as the private landowners who volunteer to participate in the program. As a result, the federal Historic Preservation Act of 1966, as amended, and the state historic preservation statute, s. 44.40, Wis. Stats., have been blended to produce a cultural resource management program which is both compatible to preserving cultural sites and implementing the watershed project.

Known archaeological sites will receive special consideration when structural best management practices are being considered. State and federal laws require preservation of archaeological resources within the framework of the NPS program.

The Duncan Creek project will address these concerns with the following procedures;

1. Chippewa County will obtain inventory maps from the regional Wisconsin State Historical Society office, and will plot archaeological sites on topographic maps. The County will also obtain a supply of landowner questionnaires from the Historical Society which will be used to identify additional sites on private lands.
2. Landowners' questionnaires will then be sent to the State Historical Society for determination of archaeological significance. County staff will use the

topographic maps to compare known sites with each landowner that has an interest in the nonpoint program. The Historical Society will determine the need for additional surveys after consultation with County and DNR staff.

3. If the inventory or the questionnaire reveals a site that may be involved with a best management practice an archaeological survey conducted by a qualified archaeologist is required. Management decisions will be based on the need established in the survey.

## Endangered Resources

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

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

Endangered species are any species whose continued existence as a viable component of this state's wild animals or wild plants is determined by the DNR to be in jeopardy on the basis of scientific evidence.

Threatened species are any species which appears likely to become endangered. Species of special concern are any species about which some problem of abundance or distribution is suspected in Wisconsin, but not yet proven.

The following species are reported by the Bureau of Endangered Resources for the Duncan Creek project area;

Wisconsin Endangered Species - Loggerhead Shrike

Wisconsin Threatened Species - Bald Eagle  
Greater Prairie Chicken  
Blue Sucker  
Greater Redhorse  
River Redhorse  
Regal Fritillary  
New England Violet

Wisconsin Special Concern - Lake Sturgeon  
Redside Dace



A comprehensive endangered resource survey has not been completed for the entire Duncan Creek Priority Watershed. The lack of additional occurrence records does not preclude the possibility that other endangered resources are present in the watershed.

The Bureau's endangered resource files are continuously updated from ongoing field work. There may be other records of rare species and natural communities which are in the process of being added to the database and so are not in the lists contained in this plan.

The Duncan Creek project will address concerns regarding endangered species as follows:

- a) Chippewa County will obtain existing inventory maps from the Bureau of Endangered Resources to identify known sites of threatened or endangered resources.
- b) The county will request that the Bureau of Endangered Resources conduct a survey of native plant communities within the basin.
- c) The Duncan Creek project will recognize the existence of these species and conduct the watershed project in a manner that is consistent with the preservation and protection of endangered resources.

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# CHAPTER THREE

## Water Quality Conditions, Objectives, and Nonpoint Sources

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### Introduction

This chapter will include an explanation of the water resource problems documented in the project area by subwatershed. The impact of nonpoint source pollutants on the major streams is also presented by watershed. The water resource appraisal conducted in 1991 described the existing water resource conditions, the potential for improvement, the existing nonpoint problems, and the water resource objectives. Pollutant load reductions for each category of nonpoint source pollution were established and are more fully described in Chapter 4. The actual nonpoint source types are described in chapter 3, and the amount of each source is presented in table 3-4.

### Water Quality Basics

Nonpoint source pollutants are the primary cause of water quality problems in the Duncan Creek Watershed. Pollutants such as sediment, bacteria, organic material, and animal wastes contribute to the existing water quality problems. By controlling the sources of these pollutants, the expected improvements should allow these water resources to reach their potential. In addition to the pollutants which flow into waterways and streams, added problems are occurring due to degradation of valuable streambanks. Erosion and instability of streambanks is a problem in the project area and results in increased sedimentation and removal of important habitat for aquatic life, especially trout. Sedimentation of pools and filling in of spawning substrate in riffle areas are results of streambank erosion. The filling in of riffle areas reduces reproductive success of trout by reducing oxygen levels in stream bottoms. Sedimentation of stream bottoms also reduces the abundance of invertebrates that constitute a valuable fish food resource.

Streambank erosion can also have an impact on water temperatures by causing channel widening and increased warming of the water. As streambanks erode and quickly widen the channel, they create a larger water surface exposure to the sun and decrease the stream velocity which adds to the warming effect. Slower moving water also means that sediment is much more likely to settle and accumulate at wide points.

The types of nonpoint source pollutants that have been documented in the Duncan Creek Watershed include the following:

- Sediment - Sources of sediment have been identified as upland erosion and delivery of sediment to streams, streambank erosion, and gully erosion. The amounts of sediment have been measured and are presented in detail later in this chapter.
- Organic loading - The sources identified for this pollutant include barnyard runoff and manure spreading. The amounts of this pollutant have been measured and are also presented in detail later in this chapter.
- Water temperature - Although this is not considered a nonpoint source, it is nevertheless a significant problem for trout survival in several streams.
- Bacteria - This pollutant is associated with organic loading and has been measured at several sites in the watershed. There are possibly multiple sources of this pollutant, but it is assumed that animal waste runoff from barnyards and manure-spread crop fields are the most common sources.
- Nitrates - This pollutant was found in well water tests taken during the inventory phase of this project. Sources of nitrates can be associated with land applications of nitrogen-containing fertilizer and manure along with septic systems. Well construction or failure can also allow infiltration of contaminated surface water directly into the well shaft.
- Atrazine - This pollutant was also found in public and private wells in the project area. Atrazine is a herbicide used in controlling weeds especially in corn producing land.

## **Water Quality Impacts of Nonpoint Sources**

Uncontrolled nonpoint pollutants in this project are causing serious water resource problems. The consequences of sedimentation and streambank erosion have been discussed in the Water Quality Basics section. Organic loading can cause stream oxygen levels to be depleted, and this condition results in stress on fish and other aquatic life. Agricultural practices can also cause water resource problems by allowing wetland or spring areas to become disturbed from uncontrolled cattle grazing. This activity can cause spring flow to be altered, with possible effects on water temperature and supply. Agricultural landuses are often associated with increased runoff volume of water. For example, corn fields will contribute a significantly larger volume of runoff water to local streams than undisturbed lands will contribute. The cumulative effect of numerous crop fields in the watershed is frequent high flow events and increased streambank instability on area streams. Although high flows and flooding events are not considered nonpoint sources in themselves, they contribute to the problems with the water resources in this project. High flows can be controlled and reduced to some extent by

installing best management practices that provide secondary benefits for increasing infiltration and reducing peak runoff volumes.

Cultural landuse in the basin is also contributing to the degradation of groundwater. 100% of homes, businesses and industry get their water from groundwater sources.

Controlling and reducing the degrading water quality impacts of nonpoint sources by installing best management practices in the watershed would have a number of positive effects on streams, groundwater and wetlands within the basin. Stabilizing streambanks would increase available cover for adult trout and reduce sedimentation of riffles and pools. The effect of increased cover and overall habitat improvement would be an increase in carryover and survival of adult fish. Reduced sedimentation of riffle areas would increase trout reproduction, provided other factors such as oxygen and temperature conditions are suitable. Reduced sedimentation and bank erosion would also result in narrower and deeper streams, providing cooler temperatures and improved cover for adult fish. Reducing the intensity of streambank grazing would increase bank stability and increase stream cover and shading by allowing growth of shrubs and grasses along the stream corridor. Reducing organic and associated bacterial loading would improve overall dissolved oxygen conditions and reduce fecal coliform bacteria levels for recreational users of Duncan Creek.

Reduced nutrient and pesticide use would also help in reducing nitrates and atrazine in the groundwater supplies of the basin.

## **Nonpoint Source Inventory Results From Rural Areas**

### **Sediment (upland erosion)**

This inventory was estimated for all agricultural fields in the watershed. Erosion from crop fields and agricultural lands represents a significant source of sediment in streams. Not all sediment eroded from a field reaches a stream. A certain proportion will be retained on land, while some will actually enter a water course. The amount of sediment entering a stream was measured from sampled areas and is presented in table 3-1. Soil eroded from agricultural fields reaches streams by flowing from the field into a channel, ditch, or waterway that eventually leads to a stream.

**Table 3-1. Upland Sediment Loading Estimates for Each Subwatershed in the Duncan Creek Project by Source (in tons/year)**

Subwatershed	Sediment Load
Upper Duncan	4206
Middle Duncan	3095
Como Creek	2558
Bloomer	6826
Hay Creek	8854
Lower Duncan	2236
Tilden Creek	2281
Glen Loch	2076
Chippewa Falls	771
Trout Creek	4468
Beaver Creek	4568
Hallie	2227
Lake Hallie	449
<b>TOTAL TONS/YEAR</b>	<b>44,615</b>

Sediment loading was estimated using the WIN inventory technique for sample areas within selected subwatersheds. The sediment delivery estimated in the sampled areas was then extrapolated to the entire area of the subwatershed. Sediment loading from upland sources is the single largest source of sediment in this watershed. Because of a combination of geographic and management factors the control of this sediment will be difficult to achieve for some subwatersheds. The strategy to achieve this control is explained in chapter 4 for upland sediment control. The pollution reduction goal for control of upland sediment is set at 50 percent. The methods for accomplishing this level of control are explained in chapter 4. Estimates for the Chippewa Falls and Lake Hallie subwatersheds were estimated by creating a landuse analysis and assigning a sediment delivery mass load to each major type of urban landuse.

### **Sediment (streambank erosion)**

The amount of sediment generated by eroding streambanks can be a very significant part of the overall sediment load to streams. A total of 1052 tons of sediment comes from eroding

streambanks which represents 2 percent of the total sediment load in the Duncan Creek project. The significance of the problem of streambank erosion is increased when the added problem of habitat loss is considered. Table 3-2 summarizes the amount of streambank erosion. The amount of streambank erosion in this project is considerably less in proportion to uplands than some of the other driftless area projects.

**Table 3-2. Streambank Sediment Loading for Each Subwatershed in the Duncan Creek Project (in tons/year)**

Subwatershed	Sediment Load (Tons/Year)
Upper Duncan	9
Middle Duncan	1
Como Creek	3
Bloomer	199
Hay Creek	6
Lower Duncan	121
Tilden Creek	13
Glen Loch	94
Chippewa Falls	<1
Trout Creek	499
Beaver Creek	108
Hallie	0
Lake Hallie	<1
<b>TOTAL TONS/YEAR</b>	<b>1,051</b>

### **Sediment (gully erosion)**

The amount of sediment generated from gullies was not inventoried in this project; however, based on estimates by the county LCD offices, gully erosion constitutes 3 percent of the total sediment load or about 1373 tons per year in this project.

### Organic pollutants (animal lot runoff)

Runoff from barnyards and feedlots was measured for each one of these sites in the project. The inventories for this project included the use of the BARNY model. The measurement made an estimate of the amount of phosphorous loading to project streams caused by annual runoff events. The analysis included a total of 325 individual barnyards. A total of 10,159 pounds of phosphorus enters the project area streams each year from barnyard runoff. Table 3-3 summarizes the organic loading inventory for the project area.

**Table 3-3. Organic Pollutant Loading from Barnyards for Each Subwatershed in the Duncan Creek Project Area (Phosphorus in lbs/year)**

Subwatershed	Phosphorus Load (lbs.)	Percent of Total
Upper Duncan	837	8.2
Trout Creek	231	2.3
Tilden Creek	1553	15.3
Middle Duncan	736	7.2
Lower Duncan	511	5.0
Hay Creek	1508	14.8
Hallie	589	5.8
Glen Loch	506	5.0
Chippewa Falls	309	3.0
Como Creek	1619	16.0
Bloomer	1321	13.0
Beaver Creek	439	13.0
<b>TOTAL LBS/YEAR</b>	<b>10,159</b>	

The average amount of phosphorus from each barnyard in each subwatershed found that Como Creek had over 67 Lbs/year per barnyard, Hallie 65 Lbs/year per barnyard while subwatersheds like Trout Creek averaged 10 Lbs/year per barnyard.

### Organic Pollutants (upland runoff)

Runoff of water from the land not only carries soil as documented in the sediment loading information, but it also carries with it organic pollutants like phosphorus. By using an estimated amount of phosphorus loss from each unit of land an estimate can be made of the

phosphorus load from uplands. Although these estimates are not based on any specific water quality monitoring information for this area other studies indicate that agricultural lands can contribute very large amounts of phosphorus when compared to all sources. The Chippewa County LCD made such an analysis and reported a total of 93,781 Lbs of phosphorus reaching surface waters in the Duncan Creek project from upland runoff each year. A similar analysis in a Dunn County watershed predicted that the total phosphorus load from upland sources could be as much as 70 to 80 percent of all sources of phosphorus. In order to reach phosphorus reduction goals this source will require significant control in the Duncan Creek project.

The management strategy in chapter 4 proposes to control phosphorus in several ways. Control of barnyards has been set at 90 percent which is a very high level of control for a priority watershed project. The distribution of barnyard runoff indicates that there are a significant number of yards with low phosphorus runoff rates and another large group with relatively high rates of runoff. It is expected that if most of the larger polluting barnyards are controlled that it is possible to achieve a 90 percent control. Another source of phosphorus includes runoff from lands that have been spread with animal wastes. Chapter 4 discusses the management strategy planned for control of animal waste spreading. Another method of control will be achieved by implementing nutrient management planning for farms that will allow growers to balance the nutrient inputs with their plant needs. This method has great potential to reduce nutrient loss to both surface and groundwaters. The amount of control achieved from nutrient management is dependent on the amount of nutrients currently applied and the amount adjusted by a nutrient management plan. Studies conducted by the University of Wisconsin Extension recently have indicated that some growers apply much more nutrient than needed by plants. Simply reducing these field applications can achieve a significant reduction in nutrient runoff and at the same time reduce costs associated with purchased inputs. Another method for control of upland phosphorus includes the traditional soil erosion control practices like tillage management, rotational adjustments in crops, strip cropping and several other methods that have proven to be useful and effective for many years. The Duncan Creek project is planning to implement some additional practices that will help control upland soil erosion and increase upland water runoff infiltration. These practices include the use of buffer strips along streams and around some crop field borders. Restoration of wetlands is another practice which has potential as a phosphorus control method and it is planned for implementation in this project.

Other sources of phosphorus planned for control include milk house waste control, urban runoff, and the Bloomer wastewater treatment plant. The management strategies for controlling these sources are further explained in chapter 4, but it should be noted that the Chippewa County LCD has applied for approval to use an alternative BMP for milk house waste control. Currently, critical milk house drains can be controlled if the drainage can be directed to a manure storage system. The use of an alternative management system could greatly increase the ability of the project to control milk house waste. The DNR and DATCP will make a decision on the use of the alternative BMP sometime after the project begins implementation. Urban runoff is planned for control and the management strategy for this source is explained in chapter 4. Most of the urban areas have a 50% reduction goal set for phosphorus with a higher goal for Bloomer. The treatment plant is a large producer of phosphorus and its discharge into Duncan Creek can be substantially reduced by requiring a



1 mg/l concentration limit for phosphorus. A 90 percent control of phosphorus is possible from this source if the treatment plant achieves the 1 mg/l limit.

### Organic pollutants (manure spreading)

Runoff from croplands that have received animal waste applications were inventoried by estimating the amount of acreage that received manure. Field studies have shown that of all the acres receiving manure, 19,543 of those acres are considered critical because they are prone to excessive runoff and consequent loss of manure to nearby streams. Some studies have estimated that for each acre of manure spreading on critical sites, one pound of phosphorous can be lost. A high level of control is required from this nonpoint source. Landowners that come into the program and need animal waste practices like a barnyard runoff system will be required to develop and comply with an animal waste management plan according to the SCS 590 technical guide. The project goal for reducing animal waste spreading on critical acres is set at 50 percent or 9771 acres.

The amount of pollutants from rural sources is presented in table 3-4 and represents the mass loads of inventoried nonpoint sources for this project.

**Table 3-4. Mass Loads of Inventoried Pollutant Sources in the Duncan Creek Watershed Project (for rural areas only)**

Upland Sediment *	44,615 tons of sediment
Streambank Sediment	1,052 tons of sediment
Gullies Sediment*	1,373 tons of sediment
Barnyard Runoff	10,159 lbs. of phosphorus
Critical Acres Spread	19,543 acres of land
Milk-House Waste *	6,809 lbs. of phosphorus
Upland Runoff	93,781 lbs. of phosphorus

\*Milk-house waste is an estimate based on a nutrient survey conducted by Chippewa County. Upland sediment was estimated using a WIN inventory on a sampled area which does not include the urban sites. Gully erosion was estimated from those areas of concentrated flow marked on 7.5 minute USGS maps.

# Nonpoint Source Inventory Results From Urban Areas

Urban sources of pollution were estimated in the Duncan Creek project by using land use area analysis and modelling the pollutant loading. This process involves identification of urban areas, estimating acreages of various types of landuse occurring in the urban areas, and modelling the pollutant loads by using pre-existing water quality information from studies completed in other parts of the State. The urban areas do not represent a very large part of the total area of land surface in the project area, but they are known to contribute pollutants at a higher rate than equivalent areas in rural settings. The four areas of urban analysis include the cities of Bloomer, Chippewa Falls, Eau Claire and Hallie township. The West Central Regional Planning Commission was contracted by the DNR to develop the urban landuse information that was used in the modelling effort.

The urban inventories were designed to determine the estimated loads of pollutants most commonly found in areas that are developed with homes, offices, industrial, and commercial buildings. These pollutants reach surface waters by flowing with runoff water into storm sewer drains and then into nearby streams or lakes. Urban areas also use surface drainage systems like ditches or swales to convey runoff water. Runoff water from any land surface will increase as the amount of impermeable surface increases. Downtown areas often have more than 90 percent of their area in streets, sidewalks, parking lots, and rooftops which result in fast and immediate runoff of water. This kind of runoff will catch nonpoint pollutants and carry them quickly into nearby water bodies. The amount and volume of water reflects precipitation falling on the impermeable surfaces. Such fast and large runoff events can cause very high stream flows in urban areas and aggravate problems associated with streambank erosion and flooding. Where water once infiltrated into the ground the urban areas now cut this groundwater recharge off and contribute to excessively low dry weather flows in streams. Sometimes this low flow problem becomes so acute as to prevent the stream from sustaining aquatic life.

The degree of the water resource problems in urban areas is a function of the relative amounts of different landuses. The urban inventory evaluated the 1992 urban landuse distribution and also made predictions about the distribution of landuses in the year 2010. Various types of landuses were inventoried and are listed in table 3-5. Tables 3-5 through 3-14 were developed with information provided by the West Central Regional Planning Commission by contract with the DNR.

**Table 3-5. Landuse Types Recorded in the Duncan Creek Urban Analysis**

Mobile Homes
One and Two Family
Multi-Family
Commercial
Industrial
Miscellaneous
Parks
Open Water
Open Space
Freeway
Railroad

Each of the four urban sites were evaluated for the various landuse types and their respective acreages are reported in table 3-6. The method used to make calculations for landuse distributions included computer mapping techniques and digitization of specific landuse classifications. The West Central Regional Planning Commission developed the landuse analysis and the DNR used this information in the SLAMM model to make predictions about current and future pollution loads from urban areas.

**Table 3-6. Urban Areas and Their Total Drainage Acres in the Duncan Creek Watershed Project**

	Acres in 1992
Bloomer	1,605
Chippewa Falls	6,576
Hallie	12,994
Eau Claire	6,852
<b>TOTAL ACRES</b>	<b>28,029</b>

Pollutant loading from urban areas was assessed for sediment, phosphorus, lead, copper, zinc, and cadmium. The mass loads for these pollutants is reported in table 3-7 for each urban site. The data reported in table 3-7 is for 1992 only.

**Table 3-7. Pollutant Mass Loads by Urban Area for 1992**

Pollutant Type	Bloomer	Hallie	Chippewa Falls	Eau Claire
Suspended Solids (tons)	120	449	771	861
Phosphorus (lbs.)	420	1,833	2,408	3,241
Lead (lbs.)	110	495	799	831
Copper (lbs.)	61	204	793	325
Zinc (lbs.)	364	1,242	3,304	2,479
Cadmium (lbs.)	2	8	22	9

Predictions of pollutant loads in the year 2010 are based on expected expansion of developed areas. Landuse plans and zoning are analyzed to make predictions about how areas are currently developing and what can be expected in the future. It is important to point out a difference between the rural nonpoint sources and the urban sources that affect how the watershed plan is written. The rural nonpoint sources are not expected to increase in the year 2010 and in fact the number of farms may actually decline as land use changes. Urban areas are expected to increase and will grow in the amount of pollution produced unless something is done to limit the creation of pollutants. Plans for urban areas must address future conditions as well as existing conditions if pollution control is to be successful. The management strategy for urban areas takes this difference into account and requires those areas to reduce future pollution through planning. Table 3-8 reports the expected pollutant loads for the year 2010.

**Table 3-8. Expected Pollutant Loads by Urban Area for 2010**

Pollutant Type	Bloomer	Hallie	Chippewa Falls	Eau Claire
Suspended Solids (tons)	193	1,099	1,265	921
Phosphorus (lbs.)	682	4,723	4,188	3,489
Lead (lbs.)	189	1,006	1,314	880
Copper (lbs.)	92	481	990	376
Zinc (lbs.)	572	2,777	4,812	2,662
Cadmium (lbs.)	3	16	29	11

The control of pollutants in the urban areas has been set as a percentage reduction of each pollutant inventoried. Tables 3-9 to 3-14 define the urban area, the expected 2010 pollutant load by source, and report the mass load reduction required. Chapter 4 of the watershed plan contains an explanation of the entire management strategy for controlling urban sources of nonpoint pollution. Pollutant load reductions are set for urban areas as well as rural areas, however, the rural sources are to be reduced from existing sources while the urban sources are to be reduced from the expected loads produced in the year 2010. An important difference between planning pollutant loads in urban versus rural areas involves the changing and developing nature of the urban environment. The strategy developed for the Duncan Creek urban area control recognizes the importance of the expected increases of pollutants in urban areas if no controls are implemented. The largest effort at controlling urban sources of pollution is expected to come from future planning.

**Table 3-9. Urban Pollutant Load Reductions for Suspended Solids (tons/year)**

Urban Area	2010 Load	Percent Reduction	Load Reduced
Bloomer	193	50%	97
Hallie	1,099	70%	769
Chippewa Falls	1,265	50%	632
Eau Claire	921	50%	460
TOTAL TONS			1,958

**Table 3-10. Urban Pollutant Load Reductions for Phosphorus (lbs./year)**

Urban Area	2010 Load	Percent Reduction	Load Reduced
Bloomer	682	70%	477
Hallie	4,723	70%	3,306
Chippewa Falls	4,188	50%	2,094
Eau Claire	3,489	50%	1,744
TOTAL LBS.			7,621

**Table 3-11. Urban Pollutant Load Reductions for Lead (lbs./year)**

Urban Area	2010 Load	Percent Reduction	Load Reduced
Bloomer	189	50%	94
Hallie	1,006	70%	704
Chippewa Falls	1,314	50%	567
Eau Claire	880	50%	440
TOTAL LBS.			1,805

**Table 3-12. Urban Pollutant Load Reductions for Copper (lbs./year)**

Urban Area	2010 Load	Percent Reduction	Load Reduced
Bloomer	92	50%	46
Hallie	481	70%	336
Chippewa Falls	990	50%	495
Eau Claire	376	50%	188
TOTAL LBS.			1,065

**Table 3-13. Urban Pollutant Load Reductions for Zinc (lbs./year)**

Urban Area	2010 Load	Percent Reduction	Load Reduced
Bloomer	572	50%	286
Hallie	2,777	70%	1,943
Chippewa Falls	4,812	50%	2,406
Eau Claire	2,662	50%	1,331
TOTAL LBS.			5,966

**Table 3-14. Urban Pollutant Load Reductions for Cadmium (lbs./year)**

Urban Area	2010 Load	Percent Reduction	Load Reduced
Bloomer	3	50%	2
Hallie	16	70%	11
Chippewa Falls	29	50%	14
Eau Claire	11	50%	6
TOTAL LBS.			33

The urban management strategy outlines how pollutant load reductions will be achieved. The information obtained in the landuse analysis can be used to target and prioritize sub-drainage areas in each municipality in order to maximize the effectiveness of control and reduce cost. Because some of the urban landuse types produce more pollutants than others it makes sense to apply best management practices to those areas likely to see the greatest reductions. Stormwater management planning will be a major tool to further define the needs for water quality improvement and protection in the urban areas.

## Water Quality Objectives

An important part of a watershed protection plan is deciding what accomplishments can be reasonably expected from implementing a program of best management practice application. The project team was consulted on many occasions to assist the DNR in developing a set of water resource objectives that considered the existing conditions of the water resources and what potential existed for improvement. The subwatershed discussions contained in this chapter include a listing of the specific surface water resource objectives for each subwatershed. Groundwater and wetland management objectives follow the subwatershed discussions. Setting water resource objectives is particularly important for the following reasons:

- \* Water resource objectives represent the desired future condition of the water resource.
- \* Objective setting provides a goal that can be used to measure the success of a nonpoint source pollution abatement project.
- \* Water resource objectives set the framework for developing a management strategy.

The development and listing of all surface water resource objectives, surface water quality conditions, and methods of surface water quality investigations are discussed in a separate report, "Duncan Creek Priority Watershed Surface Water Appraisal Report" prepared by Ken Schreiber, DNR (Feb., 1992).

Groundwater resource conditions and methods of investigation are discussed in "Duncan Creek Watershed Groundwater Appraisal Report", N. Stadnyk, (Nov. 1992). Groundwater management objectives and management strategies are discussed in Appendix A. Wetland resource conditions and methods of inventory are discussed in "Duncan Creek Watershed Wetland Appraisal Report, N. Stadnyk, (Nov. 1992). Wetland management objectives and management strategies are discussed in Appendix B.

A large part of the remainder of this chapter will come from these appraisal reports and management strategies. Some text will be taken directly while some may be in summary form.

## **Summary of Surface Water Resource Conditions**

The Duncan Creek Watershed is 193 square miles with 189 square miles (98%) in Chippewa County and 4 square miles (2%) in Eau Claire County. The watershed drains gently rolling agricultural and wooded lands and features a number of cold and warmwater streams and several impoundments. The watershed also drains urban areas including the cities of Bloomer, Chippewa Falls and portions of Eau Claire and the township of Hallie.

Several perennial streams in the watershed support coldwater communities with trout fisheries. The Duncan Creek Watershed has three Class I, one Class II and one Class III trout and several warmwater forage fishery streams. Duncan Creek supports a highly productive Class I brook trout fishery in the headwaters area and is a warmwater forage fishery from Lake Como dam to Tilden Millpond. The remainder of the stream supports a warmwater sport fishery. Fish surveys conducted at nine sites in the watershed in 1991 found brook trout and fifteen minnow and forage fish species. White sucker, brook stickleback and blacknose dace were the most common forage species.

Common water resource problems in the watershed include streambank erosion, sedimentation of riffle and pool areas, organic and nutrient loading from animal waste, flooding and elevated stream temperatures. The primary cause of streambank erosion appears to be a combination of excessive cattle grazing of streambanks and occasional flooding. A frequent result of streambank erosion is sedimentation of pools, filling-in of spawning substrate in riffle areas and elimination of bank cover. Filling-in of spawning substrate in riffle areas (measured as embeddedness) reduces reproductive success of trout by reducing inter-gravel flow which is necessary to maintain suitable temperature and oxygen conditions for eggs and larval fish. Sedimentation of riffle areas also destroys habitat for macroinvertebrates and other fish food organisms. Filling-in of pools reduces the amount of available cover for juvenile and adult fish.

Organic loading (in the form of animal waste) affects water quality by reducing stream dissolved oxygen conditions which stress fish and other aquatic life. Based on appraisal findings, overall oxygen conditions are generally good in the watershed streams, however, some streams show evidence of organic pollution. The primary source of this organic



loading is likely livestock waste from barnyards, feedlots and field spread manure. Animal waste may also be a source of un-ionized ammonia which is toxic to aquatic organisms.

Several of the watershed streams have summer water temperatures in excess of conditions necessary for coldwater fish species. The elevated water temperatures may be the result of a number of factors including lack of stream shading, impoundments and stream morphometry. The elimination of streambank vegetation reduces shading and increases solar radiation which may increase stream temperatures. Streambank erosion and resulting sedimentation of the stream bottom may result in wider, shallower streams which could indirectly cause increased water temperatures. Impoundments (built by humans or beaver) on streams or spring areas may increase downstream water temperatures. The cumulative effect of these impacts may be the conversion of a coldwater trout stream to a warmwater forage fishery.

The impoundments on Duncan Creek are generally small, shallow and eutrophic. They experience algae blooms, heavy duckweed growth, sedimentation and turbidity. Lake Hallie is an oxbow lake (formed from the Chippewa River) and has higher quality water than the Duncan Creek impoundments. Chippewa Falls Flowage and Dells Pond are impoundments on the Chippewa River that are primarily riverine systems greatly influenced by hydropower peaking operations.

Implementation of Best Management Practices (BMPs) in the watershed would have a number of positive effects on the watershed fisheries. Stabilizing streambanks would increase available cover for adult trout and reduce sedimentation of riffles and pools. The effect of increased cover and overall habitat improvement would be an increase in carryover and survival of adult fish. Reduced sedimentation of riffle areas would increase trout reproduction, provided other factors such as oxygen and temperature conditions are suitable. Reduced sedimentation of riffle areas would also improve habitat for macroinvertebrates and other fish food organisms. Control of sedimentation and bank erosion would result in narrower and deeper streams, providing cooler temperatures and improved cover for adult fish. Eliminating excessive streambank grazing would increase bank stability, stream cover and shading by allowing growth of shrubs and grasses along the stream corridor.

Successful installation of BMPs in the watershed will likely increase trout reproduction where limited reproduction is already occurring and improve survival of adult fish in streams where limited trout populations already exist. Reduced bank erosion and sediment loading to Duncan Creek would improve the warmwater sport fishery or provide more suitable trout conditions and reduce sedimentation rates in the impoundments. Finally, reducing organic and associated bacterial loading would improve dissolved oxygen conditions and reduce fecal coliform bacteria levels for recreational users of Duncan Creek and the watershed impoundments.

## Results and Discussion

Following is a discussion of surface water appraisal monitoring results for each subwatershed in the Duncan Creek Priority Watershed. The subwatershed descriptions provide a summary of available information on each major waterbody including a discussion of water resource conditions and problems affecting the resource, loading reduction goals and water resource management objectives. A separate section of this report discusses the impoundments on Duncan Creek. Loading reduction goals are indicated as requiring high, medium or low levels of control. Actual numerical values for these control levels will be identified during the watershed planning process.

Water resource objectives and goals are only identified for major, perennial streams in each subwatershed. However, it is likely that the objectives for major streams can only be achieved by also improving water resource conditions in other streams in the watershed. Three different terms are used to describe water resource objectives, including;

Enhance - used to describe improvements in water quality and habitat within a designated biological use category (ex. improving spawning habitat in a Class I trout stream, to increase natural reproduction).

Improve - describes improvements in water quality and habitat sufficient to upgrade the biological use category (ex. improving conditions sufficient to allow trout reproduction where none occurred previously, resulting in a change in trout stream classification - from Class III to Class II or I).

Maintain - to protect the existing biological use from further degradation. This term is reserved for waterbodies that either have little or no potential for improvement, or are fully meeting their designated use.

### Upper and Middle Duncan Subwatersheds

The Upper Duncan subwatershed is 20.5 square miles and is located in the headwater area of Duncan Creek (Map 3-1). The Middle Duncan subwatershed is 13.8 square miles and is located downstream of the Upper Duncan subwatershed and directly above Lake Como in Bloomer (Map 3-2). These two watersheds are combined in this report because of their similarity and common water resource objectives. Duncan Creek is the only perennial stream in these subwatersheds.

The headwaters area of Duncan Creek is a high quality Class I brook trout stream. A fish survey conducted in 1989 found 1,023 brook trout ranging from <3 to 12.4 inches. The stream bottom is primarily sand and silt, with gravel in the riffle areas. The stream corridor is wooded and much of it is in State Fishery Area. Overhanging grasses, instream

macrophytes and fallen trees provide trout cover. The stream HBI was 4.38 (very good) and the Habitat Rating was "good". The stream in this reach has few limiting factors or pollutant sources except for a few small barnyards near the streambank.

## Water Resource Objectives

The following water resource objectives are recommended for the Upper and Middle Duncan subwatersheds:

1. Maintain the Class I trout fishery in Duncan Creek.
2. Reduce sediment and nutrient loading to Lake Como.

Pollutant reduction goals for these subwatersheds are medium for sediment and high for nutrient and organic control.

## Como Creek Subwatershed

The Como Creek subwatershed (Map 3-3) is 12.1 square miles and is located southwest of the village of Bloomer. Como Creek is the only perennial stream in the subwatershed. Lake Como is also located in this subwatershed.

Como Creek - flows northeasterly 2.8 miles to Lake Como in Bloomer. The stream is classified as a Class I brook trout fishery, however, the stream may have deteriorated somewhat since it was originally classified. A 1977 fish survey found brook trout at 5 of 8 stations (trout were not present in the 3 headwater stations). A fish survey conducted in 1991 at the furthest downstream station found 9 brook trout ranging from 4.5 - 12 inches. The stream has an HBI of 5.86 (fair) and Habitat Rating of "good".

Como Creek has a shifting sand substrate with some gravel riffle areas in the upstream reaches. The stream is low-gradient and much of the corridor is wetland with extensive tag alder growth along its streambanks. Stream water quality at the STH 40 bridge does not appear suitable for a coldwater fishery. A maximum stream temperature of 27.8° C. was recorded at the STH 40 site, which is above the lethal limit for brook or brown trout. Low dissolved oxygen levels were also recorded at the STH 40 site, including a minimum D.O. of 3.8 mg/L that occurred between June 26 - 29, 1991. The recorded D.O. levels were well below the Wisconsin water quality standard of 6.0 mg/L for trout streams. The maximum stream temperature reached during D.O. monitoring was 27.6° C.

The cause of low D.O. and high temperature conditions was not determined, but the stream is sluggish and passes through wetlands above the monitoring site. A local landowner indicated that several beaver dams were located above the STH 40 bridge.

## **Water Resource Objectives**

The following water resource objectives are recommended for the Como Creek subwatershed:

1. Enhance the Class I trout fishery in Como Creek.
2. Reduce sediment and nutrient loading to Lake Como.

Pollutant reduction goals for this subwatershed are high for sediment and organic loading.

## **Bloomer Subwatershed**

The Bloomer subwatershed is 21.3 square miles and is located directly downstream of Como Lake dam (Map 3-4). Duncan Creek is the only perennial stream in the subwatershed.

### **Duncan Creek**

This portion of the watershed is managed as a warmwater forage fishery. The fishery in this reach is primarily limited by elevated stream temperatures due to the Lake Como discharge and a lack of stream shading. Stream temperatures were generally above optimal temperatures for brown trout during summer 1991. White suckers are the predominant fish species although an occasional large brown trout is caught in this reach.

The stream substrate is primarily sand with some gravel and rubble in the riffle areas. The mean stream HBI is 5.28 (good) and the Habitat Rating is "fair". Water resource problems include streambank erosion due to cattle access, sedimentation and organic and nutrient loading from point and nonpoint sources. Duncan Creek is currently managed as a forage fishery but has potential as a Class II trout fishery with several management efforts including trout stocking and installation of BMPs to reduce sedimentation and increase stream shading.

The Bloomer Wastewater Treatment Plant (WWTP) discharge has a significant impact on stream water quality in this reach. Monthly monitoring conducted from August 1987 to June 1989 shows the WWTP discharge elevates several stream water quality parameters including suspended solids (80%), total phosphorus (131%), nitrate-nitrogen (64%) and chlorides (168%). While problems from this discharge are not apparently manifested in Duncan Creek (such as excessive macrophyte growth or D.O. depletion), the discharge likely aggravates water quality problems in the downstream impoundments. The Bloomer WWTP currently discharges total phosphorus at a concentration of about 12 mg/L based on limited sampling of the effluent. A proposed Administrative Rule (NR 217) would require phosphorus treatment to 1 mg/L from several categories of point sources, including the Bloomer WWTP discharge.

## **Water Resource Objectives**

The following water resource objectives are recommended for the Bloomer subwatershed:

1. Improve Duncan Creek to a Class II trout fishery.
2. Reduce sediment and nutrient loading to Tilden Millpond.

Pollutant reduction goals for this subwatershed are high for sediment and nutrient loading.

## **Hay Creek Subwatershed**

The Hay Creek subwatershed is 25.2 square miles and is located in the central portion of the Duncan Creek watershed. Perennial streams in the subwatershed include Hay and Little Hay creeks.

### **Hay Creek**

This creek is a spring fed 7.9 mile coldwater stream that flows easterly to Duncan Creek. The stream is managed as a Class II brook and brown trout fishery. Much of the stream corridor is within the Hay Creek State Fishery Area and considerable streambank fencing and instream habitat improvement has occurred since 1972. Refer to Map 3-5.

Thirteen fish surveys were conducted on Hay Creek between 1961-1981. The surveys generally show an increase in trout populations since 1969. Almost no natural trout reproduction occurs in Hay Creek, but survival and holdover of annually stocked trout is good. The stream experiences heavy early season fishing pressure which seriously depletes the adult brown trout population.

The stream HBI is 4.15 (very good) and Habitat Rating is "good". Temperatures in Hay Creek generally remained within the optimal range for brook and brown trout. The streambanks are generally well protected and the stream has a predominantly gravel/sand substrate.

### **Little Hay Creek**

Little Hay Creek flows northwest 1.8 miles to Duncan Creek near the village of Tilden. The stream is managed as a forage fishery and surveys conducted in 1980 and 1991 found an abundant and diverse forage fish community with a few brown and one brook trout. The stream HBI was 4.02 (very good) and Habitat Rating was "good".

Water resource problems include streambank erosion, dissolved oxygen depletion, and scarcity of instream cover. The stream has a shifting sand/silt substrate with considerable silt accumulations in pools and runs in the middle segment.

Stream water temperatures were elevated during summer 1991 but generally remained within tolerable limits for brown trout. Dissolved oxygen depletion was recorded in the headwater area including a minimum D.O. level of 2.0 mg/L. Dissolved oxygen conditions in the stream remained well below water quality standards for extended periods between May 14 and June 3, 1991. The cause of oxygen depletion was likely organic loading from upstream barnyards.

## **Water Resource Objectives**

The following water resource objectives are recommended for the Hay Creek subwatershed:

1. Enhance the Class II trout fishery in Hay Creek.
2. Improve Little Hay Creek to a Class II trout fishery.

Pollutant loading reduction goals for this subwatershed are high for sediment and organic loading.

## **Lower Duncan Subwatershed**

The Lower Duncan subwatershed is 7.9 square miles and is located in the central portion of the watershed above Tilden Millpond. Duncan Creek is the only perennial stream in the subwatershed. Refer to Map 3-6.

### **Duncan Creek**

Duncan Creek is 5.0 miles in this subwatershed and is managed as a warmwater forage fishery. The stream is generally wide and shallow with a shifting sand substrate. Stream temperatures in this reach were generally above the optimal range for brown trout during summer 1991. The likely cause of elevated stream temperatures is a combination of a shallow, wide stream profile and inadequate stream shading. Stream temperatures were also likely influenced by the Lake Como discharge.

Duncan Creek would benefit from streambank erosion control, animal waste management and streambank fencing. The stream has potential to become a Class II trout stream if temperatures can be lowered by increasing stream depth through sedimentation control and increased shading by limiting cattle access.

## **Water Resource Objectives**

The following water resource objectives are recommended for the Lower Duncan subwatershed:

1. Improve Duncan Creek to a Class II trout stream.
2. Reduce sediment and nutrient loading to Tilden Millpond.

Pollutant reduction goals for this subwatershed are high for sediment and nutrient control.

## **Tilden Creek Subwatershed**

The Tilden Creek subwatershed (Map 3-7) is 8.1 square miles and is located in the central portion of the watershed. Tilden Creek and Duncan Creek are the only perennial streams in the subwatershed. Tilden Millpond is also located in this subwatershed.

### **Tilden Creek**

This creek is a 5.0 mile warmwater stream draining to Duncan Creek directly upstream of Tilden Millpond. The stream is managed as a forage fishery and the 1991 survey found 3 brook trout, several largemouth bass, northern pike and forage species. The stream corridor is primarily wetland but some serious streambank erosion problems exist. Tilden Creek is a low gradient, sluggish stream with little potential as a trout fishery.

The Tilden Creek subwatershed is included in a Wisconsin Farmers Fund project that was initiated in 1988. The project has already addressed most of the barnyard and manure spreading runoff problems in the subwatershed. The stream has an HBI of 4.56 (good) and Habitat Rating of "fair".

A USGS water quality monitoring station was operated on Tilden Creek at Robin Drive from December, 1986 to September, 1989. The USGS data shows that the stream occasionally experiences low dissolved oxygen conditions and elevated stream temperatures (USGS, 1987-90). A maximum stream temperature of 26.5° C. was recorded on August 1, 1988, which is well above the optimal range for brown trout.

### **Duncan Creek**

Tilden Millpond is the only portion of Duncan Creek in this subwatershed. Temperature extremes are somewhat moderated in Duncan Creek by Tilden Millpond. Overall, the impoundment increases mean and maximum stream temperatures by about 1° Centigrade. The impoundment increases minimum stream temperatures and generally decreases daily maximum temperatures. Apparently, the millpond allows mixing of cool night water with

warm daytime water to produce moderated temperatures downstream. Increasing the mean and maximum stream temperatures would be adverse to a coldwater fishery.

## **Water Resource Objectives**

The following water resource objectives are recommended for the Tilden Creek subwatershed:

1. Maintain the forage fishery in Tilden Creek.
2. Reduce sediment and nutrient loading to Tilden Millpond.

Pollutant reduction goals for the subwatershed are medium for sediment and nutrient control.

## **Glen Loch Subwatershed**

The Glen Loch subwatershed is 8.1 square miles and is located north of Chippewa Falls (Map 3-8). Duncan Creek is the only perennial stream in the subwatershed. Glen Loch Lake is also located in this subwatershed.

## **Water Resource Conditions**

### **Duncan Creek**

Duncan Creek is 3.6 miles in this subwatershed and supports a warmwater sport fishery comprised of largemouth bass, northern pike and panfish. This reach of Duncan Creek has limited streambank erosion and high aesthetic value. The stream HBI is 5.41 (good) and the Habitat Rating is "good". The stream is currently meeting its potential use as a warmwater sport fishery.

A stream known locally as Rheingen Creek was determined to be intermittent based on a fish survey, macroinvertebrate sampling and observations during summer 1991. No fish were found in the stream during the 1991 fish survey and the HBI was 9.15 (very poor). The stream had no measurable flow during a portion of summer 1991, consequently water quality objectives were not identified for this stream.



## **Water Resource Objectives**

The following water resource objectives are recommended for the Glen Loch subwatershed:

1. Maintain the warmwater sport fishery in Duncan Creek.
2. Reduce sediment and nutrient loading to Glen Loch Lake.

Pollutant reduction goals for this subwatershed are low for sediment and nutrient control.

## **Chippewa Falls Subwatershed**

The Chippewa Falls subwatershed is 15.9 square miles and includes the city of Chippewa Falls. Duncan Creek and the Chippewa River are the only perennial streams in the subwatershed. Chippewa Falls Flowage is located in this subwatershed. Refer to Map 3-9.

### **Duncan Creek**

Duncan Creek is 2.6 miles in this subwatershed and flows from the Glen Loch dam to the Chippewa River. The stream has a high gradient in this reach and is managed as a warmwater sport fishery. The stream HBI is 5.23 (good) and Habitat Rating is "good".

The stream receives urban runoff from several storm sewer discharges in this reach. The steep gradient and high streamflow velocities generally prevent significant accumulation of sediment or other water quality problems from occurring. The stream substrate is primarily rubble and bedrock and the streambanks are well protected. The stream currently meets its potential use as a warmwater sport fishery.

### **Chippewa River**

Chippewa River is 6.1 miles in this subwatershed, flowing from the Lake Wissota dam to the upstream end of Dells Pond. The river and Chippewa River Flowage are managed as a warmwater sport fishery but are not likely meeting their potential use due to streamflow fluctuations caused by hydropower peaking operations. The impact of hydropower on the Chippewa River was the subject of studies conducted in 1988 as part of the Federal Energy Regulatory Commission re-licensing procedure.

Several storm sewers and the city of Chippewa Falls WWTP discharge to the river in this reach. The impact of Duncan Creek on the Chippewa River is probably minimal since the stream only contributes about 2 percent of the total flow in the river. However, since minimal sediment probably leaves Lake Wissota, the primary source of sediment to Dells

Pond is likely Duncan Creek. It is expected that sediment from Duncan Creek is deposited in the Chippewa River and Dells Pond during runoff periods.

## **Chippewa Falls Flowage**

Chippewa Falls Flowage is a 282 acre impoundment of the Chippewa River in the city of Chippewa Falls. The flowage dam is located about 2.5 miles below the Lake Wissota dam. The impoundment is more riverine than lake, with an average residence time of about 5 hours. Since Duncan Creek discharges to the Chippewa River below the flowage dam, very little of the watershed project area drains to Chippewa Falls Flowage. Water quality in the flowage is determined by the discharge from Lake Wissota. Based on monitoring conducted in 1989, the flowage has poor water quality (DNR, 1989).

## **Water Resource Objectives**

The following water resource objective is recommended for the Chippewa Falls subwatershed:

1. Reduce sediment and nutrient loading to Dells Pond.

Pollutant reduction goals are low for sediment and nutrient controls in this watershed.

## **Trout Creek Subwatershed**

The Trout Creek subwatershed is 9.9 square miles and is located west of Chippewa Falls. Trout Creek is the only perennial stream in the subwatershed. Refer to Map 3-10.

### **Trout Creek**

Trout Creek flows 2.8 miles to the Chippewa River and is managed as a Class I brook trout stream. The 1991 fish survey found a total of 25 brook trout in two 1000 ft. stream reaches, ranging from 3 - 10.4 inches in length. Apparently, limited natural reproduction occurs but adult and fingerling trout densities are very low. The stream is severely impacted by streambank erosion, sedimentation and streamflow extremes. The stream corridor is wooded, but the headwaters area receives drainage from agricultural croplands. High discharge rates from the headwaters area during runoff events causes considerable streambank erosion and sedimentation in the downstream portions. Consequently, the stream pool and riffle areas are shallow and provide little cover for adult and juvenile trout.

The stream substrate is predominately shifting sand with some gravel in riffle areas. The stream HBI is 4.21 (very good) and the Habitat Rating is "fair". The maximum recorded stream temperature was 21.6° C., slightly above optimal conditions for brook trout.

The fishery in Trout Creek would be improved by reduced sedimentation and peak streamflow rates. Control of streambank erosion and increased infiltration of upland runoff would allow the stream to deepen and narrow, and reduce embeddedness of gravel in the riffle areas. These changes would likely increase trout reproduction and improve overall habitat for trout and macroinvertebrates.

## **Water Resource Objectives**

The following water resource objectives are recommended for the Trout Creek subwatershed:

1. Enhance the Class I trout fishery of Trout Creek.

Pollutant reduction goals for this subwatershed are high for sediment and medium for organic loading.

## **Beaver Creek Subwatershed**

The Beaver Creek subwatershed (Map 3-11) is 22.1 square miles and is located in the southwest portion of the watershed, west of Chippewa Falls. Perennial streams in the watershed include Beaver Creek and the Chippewa River. Dells Pond on the Chippewa River is located in this subwatershed.

### **Beaver Creek**

Beaver Creek is an approximate 3.0 mile, high gradient tributary of the Chippewa River. The stream is identified as an intermittent stream on the USGS Chippewa Falls quadrangle map, however, appraisal findings indicate Beaver Creek is perennial. The 1991 fish survey found 167 brook trout of 3 different age classes, ranging from 2.0 - 10.9 inches in a 1000 ft. reach. The stream has good natural reproduction and carryover of adult trout. Beaver Creek is not currently classified as a trout stream, but should probably be classified as a coldwater Class I or II fishery based the survey findings. The stream HBI was 2.57 (excellent) and the Habitat Rating was "fair".

Beaver Creek is small (baseflow is about 2 cfs at STH 29), shallow (mean depth is 4 inches) and apparently experiences extreme flow fluctuations. Most of the stream corridor is wooded, however, severe streambank erosion is occurring at several locations due to excessive runoff rates from cropland in the headwaters area. The stream substrate is

primarily shifting sand with some moderately embedded gravel riffle areas. Fish habitat is generally limited by shallow pools and riffle areas and inadequate cover.

Beaver Creek would benefit from reduced sedimentation of riffle and pool areas and stabilized streambank and flow conditions. Reduced sediment loading would result in deeper riffle and pool areas and increased habitat for adult trout.

## **Dells Pond**

Dells Pond is a 727 acre impoundment of the Chippewa River within the city of Eau Claire. A 26-foot water control structure at the outlet is operated by Northern States Power Company. The impoundment supports a warmwater sport fishery consisting of northern pike, walleye, smallmouth bass and panfish. Adjacent wetlands provide habitat for waterfowl and fur bearing mammals.

Water sampling conducted in 1989 found mean TSI values for chlorophyll, secchi depth and phosphorus values ranging from 58-68, indicating poor to very poor water quality (DNR, 1989). The Chippewa River is the primary source of nutrients, and Duncan Creek is likely a primary source of sediment to Dells Pond.

## **Water Resource Objectives**

The following water resource objectives are recommended for the Beaver Creek subwatershed:

1. Improve trout habitat by reducing sedimentation and streamflow extremes in Beaver Creek.
2. Improve Beaver Creek to a Class I trout fishery.
3. Reduce sediment loading to Dells Pond.

Pollutant load reduction goals for this subwatershed are high for sediment and low for organic waste control.

## **Lake Hallie Subwatershed**

The Lake Hallie subwatershed is 0.7 square miles and primarily drains urban runoff from a portion of the township of Hallie. Lake Hallie is the primary water resource in the subwatershed. Refer to Map 3-12.

## Lake Hallie

Lake Hallie is a 79 acre oxbow lake formed by the Chippewa River. The lake has a small dam which raises the lake level 5 feet. The lake is managed as a 2-story fishery consisting of a warmwater sport fishery and a coldwater trout fishery. The lake is stocked annually with rainbow trout, and supports a largemouth bass and panfish sport fishery.

Lake Hallie is shallow (mean depth is 6 feet) and the entire lake bottom is covered with a rich diversity of 23 macrophytes species during summer. Some of the plant species are indicators of good water quality, including largeleaf pondweed (*Potamogeton amplifolius*) and water crowfoot (*Ranunculus sp.*). The lake is frequently covered with large filamentous algae mats and duckweed which limit recreational use. The lake does not have appreciable planktonic algae blooms.

The lake is slightly eutrophic, but has better water quality than the Duncan Creek impoundments. The primary external source of nutrients to the lake is urban runoff including a stormwater discharge near the northeast end of the lake. The impact of this storm sewer on lake water quality should be further evaluated.

## Duncan Creek Impoundments

The impoundments on Duncan Creek are generally shallow, eutrophic and support a warmwater fishery. Algae blooms, heavy duckweed growth, sedimentation and high phosphorus levels are limiting factors in the impoundments. Although phosphorus levels are extremely high, algal blooms are limited by short residence times (about 24 hours) and shading from dense duckweed mats. Algal growth in the impoundments may also be limited by nitrogen, since nitrogen:phosphorus ratios are greater than 10, which usually indicates nitrogen limitation.

Although nutrient loading reductions are desirable, it is not expected that measurable changes in trophic conditions will occur in the impoundments. However, a reduction in nutrient levels may reduce the density of duckweed growth and make the lakes more suitable for summer recreational use. Reductions in sediment loading would decrease sedimentation rates and lengthen the useful life of the impoundments.

The submerged aquatic plant communities in the Duncan Creek impoundments were limited to species that can tolerate very eutrophic, light-limiting conditions. Glen Loch and Lake Como have coontail, elodea, nitella, longleaf pondweed and small pondweed. Tilden Millpond has coontail, elodea, longleaf pondweed, small pondweed and flatstem pondweed.

Another indication of high nutrient conditions in these waterbodies is the abundance of duckweed. Duckweed is a free-floating aquatic plant that relies exclusively on nutrients in the water for its survival. Small duckweed (*Lemna minor*) was present at 100 percent of the

sampling sites in Tilden Millpond, 93.5 percent in Lake Como and 80 percent of the sites in Glen Loch.

Several emergent macrophyte species are present in all three impoundments, including burreed, cattail, arrowhead, wild rice, reed canary grass, softstem bulrush and sedges.

## **Water Resource Objectives**

Water resource management objectives are not specifically identified for the Duncan Creek impoundments, but rather for individual tributaries to the impoundments. An overall project objective is to reduce sediment and nutrient loading to all of the watershed impoundments.

A brief description of each of the Duncan Creek impoundments follows:

### **Lake Como**

Lake Como is a 98 acre impoundment of Duncan Creek with a maximum depth of 6 feet. The lake is managed as a warmwater sport fishery with largemouth bass, northern pike and panfish as the primary species.

Lake Como is highly eutrophic and experiences algae blooms, dense duckweed growth, sedimentation and turbid water. The lake Trophic Status Index (TSI) indicates the lake is very eutrophic, with high phosphorus levels and poor water clarity. The TSI plot exhibits a discrepancy between total phosphorus and the other water quality parameters. The graph suggests that chlorophyll and secchi depth values should be higher based on the phosphorus values. This discrepancy is likely due to the short water retention time in the impoundment (about 24 hours) preventing excessive algae blooms from occurring. Algal growth may also be inhibited by shading from dense duckweed growth on the surface. This phenomenon was observed on all of the Duncan Creek impoundments.

Bacteria levels generally decrease as they move through the lake on the survey dates. Fecal coliform concentrations did not pose a health threat to lake users on the survey dates.

Phosphorus levels in Lake Como are excessive and most of the nutrient load likely comes from the Como Creek subwatershed. Although a reduction in nutrient loading to the lake would be beneficial, the lake would likely remain highly eutrophic. Reduced nutrient conditions in the lake may reduce the density of duckweed growth which would benefit summer lake users. Reducing the sediment load would extend the useful life of the lake.

## **Tilden Millpond**

Tilden Millpond is a 61 acre impoundment with a mean depth of 3 feet. The lake is managed as a warmwater fishery with largemouth bass, northern pike and panfish as the primary species.

Similar to Lake Como, Tilden Millpond is shallow and eutrophic. The lake has a high phosphorus TSI, with lower secchi depth and chlorophyll values. Duncan Creek is the primary source of nutrient and sediment to Tilden Millpond. An extensive sediment delta has formed where Duncan Creek enters the millpond. It appears the lake has lost considerable volume due to sediment in-filling. Reduced sediment and nutrient loading would be beneficial to the millpond.

## **Glen Loch Lake**

Glen Loch Lake is a 44 acre impoundment of Duncan Creek located north of Chippewa Falls. The lake is managed as a warmwater sport fishery with largemouth bass, northern pike and panfish as the primary species.

Glen Loch is shallow, eutrophic and experiences dense duckweed growth during summer. The lake has a high phosphorus TSI, and lower secchi depth and chlorophyll TSI levels. Duncan Creek is the primary source of nutrients and sediment to Glen Loch Lake.

# **Summary of Groundwater Resource Conditions and Objectives**

Groundwater chemistry inventories were conducted in the Duncan Creek project and consisted of well water sampling for nitrates and atrazine. The results of testing indicated that nitrates appear to be encountered with the same frequency and in similar concentrations as other parts of the state.

## **Rural Groundwater Chemistry**

Groundwater chemistry was characterized for both aquifers based on results of earlier sampling efforts. The results of the groundwater chemistry appraisal are presented in the groundwater appraisal report.

The 1988, WGNHS groundwater inventory was used as a baseline for providing information on pH and specific conductivity. These parameters reflect the chemical nature of the aquifer material, depositional environment and residence time of groundwater in the aquifer.

Nitrate and atrazine were used as chemical parameters which reflect cultural impacts to groundwater. Nitrate-nitrogen can occur naturally, however concentrations over 3 ppm reflect cultural impacts. Any occurrence of atrazine is an indication of cultural impacts.

Results were compiled from the following sampling efforts:

- 1) 1988 WGNHS Chippewa County Groundwater Inventory
- 2) 1990 DATCP Atrazine Sampling Program
- 3) 1991 Duncan Creek Watershed Project
- 4) 1988-92 Chippewa County Sampling Program

Table A-3 (appendix A) shows results of sampling for nitrate-nitrogen and atrazine.

Natural parameters, pH and specific conductivity, are generally similar from north to south within the basin and between the sand and gravel and sandstone aquifer.

Nitrate and atrazine results are similar across the basin and between the sand and gravel and sandstone aquifer, however, in some areas nitrate concentrations are higher in the sandstone than in the sand and gravel.

Groundwater in the basin does show cultural impacts from nitrate and atrazine. Within the basin, 62 percent of wells sampled in 1991 show nitrate concentrations over the preventative action limit (PAL) of 2 ppm while 10 percent show nitrate above the enforcement standard (ES) of 10 ppm.

Both the sand and gravel and sandstone aquifers show impacts by atrazine. 27 percent of all wells sampled show atrazine detects below the state's preventative action limit (PAL) while 8 percent show atrazine above the PAL.

Atrazine exceeded the public health standard in 2 wells. These exceedances for atrazine have caused the DATCP to declare an atrazine prohibition area for two places in the Duncan Creek Watershed project. One area is located in the town of Auburn just south of New Auburn and includes all of Section 3 between town Hall road and Cook's Valley road. The other area is located in the town of Bloomer and includes all of section 30, 31, and the western parts of section 29 and 32. Atrazine prohibition areas are defined in Chapter 30 of the DATCP Administrative Rules.

## **Municipal Wellhead Chemistry**

Information concerning water quality in municipal wells was gathered from drinking water supply records maintained by the city of Chippewa Falls, township of Hallie, city of Bloomer, village of New Auburn and WI. DNR.

Data collected from municipal wells reflect groundwater chemistry before treatment or mixing. Table A-4 (appendix A) shows results from municipal wells within the basin.



The city of Chippewa Falls, east well field, has been degraded by elevated levels of nitrate-nitrogen. Atrazine has also been detected, at levels below the PAL, in both the east and west well fields.

## **Groundwater Management Objectives**

Chapters NR 109 and NR 140, WI. Administrative Code, establish two levels for the protection of groundwater; an enforcement standard (ES), set at the allowable maximum concentration and a preventative action limit (PAL), set as a percentage of the ES. The ES and PAL are set for specific, potential groundwater pollutants.

Groundwater management objectives for major aquifers and type of use have been established based upon the administrative code and documented groundwater chemistry within the basin.

Groundwater management objectives for the upper, middle and lower basins are established to protect rural, domestic use and to protect municipal well fields. Table A-5 (appendix A) shows the groundwater management objectives, by aquifer and basin.

Specific management objectives are outlined below and can be found in Appendix A.

- A) Limit/reduce groundwater concentrations of nitrate, atrazine and other NR 140 contaminants to within respective Preventative Action Limits (PAL) in rural areas.
- B) Limit/reduce groundwater concentrations of nitrate, atrazine and other NR 140 contaminants to within respective preventative action limits in municipal wellhead areas.
- C) Monitor groundwater quality and conduct hydrologic studies in rural and municipal wellhead areas as needed to assess groundwater quality changes over time.

## **Summary of Wetland Resource Conditions and Objectives**

Wetlands within the Duncan Creek basin serve a variety of important functions. Depending on their position in the landscape, wetlands may provide flood storage, filtering of surface water, groundwater discharge/recharge and/or wildlife habitat in both urban and rural areas.

Wetlands in the basin have been degraded from sedimentation, drainage and conversion to agricultural or urban landuses. Degradation of wetlands has reduced their functional values.

Many of these wetlands are not subject to regulation under current federal, state or county law. As such, these sites are subject to conversion and further degradation of the resource base.

## **Wetland Management Objectives**

Wetland management objectives for the Duncan Creek watershed are based on the results of the Wetland Appraisal Report, WI. Administrative Codes, Chapters NR115, NR103, and NR120 and provisions of the 1990 Clean Water Act.

The wetland management objectives will serve to protect existing sites, increase biodiversity, restore degraded or destroyed sites and protect the hydrologic functions that wetlands provide within the basin in both urban and rural areas.

The specific management objectives are listed below, and can be found in Appendix B.

- A) Avoid destruction of urban and rural wetlands; and maintain the hydrologic and water quality functions that these sites provide within the watershed
- B) Minimize the further degradation of urban and rural wetlands and wetland functions within the watershed
- C) Compensate for the loss of urban and rural wetlands through watershed based mitigation
- D) Restore degraded wetlands to reestablish natural functions and functions and hydrologic values provided within the basin.

## **Other Pollutant Sources**

The watershed plan is primarily designed to control nonpoint pollution sources, especially those sources which are indeed manageable. There are some sources in the Duncan Creek Watershed project area which affect water quality, but are not directly involved in the nonpoint pollution control program. Evidence of known or suspected groundwater or surface water contamination identified by other programs is discussed below.

## **Emergency and Remedial Response Program**

A wide variety of hazardous waste sites are evaluated and remediated through the Emergency and Remedial Response Program (ERR) of the Wisconsin DNR's Bureau of Solid and

Hazardous Waste Management. Environmental programs managed by ERR that are discussed here include:

- Superfund
- The Environmental Repair Program (ERP)
- The Leaking Underground Storage Tank Program (LUST)

A wide variety of sites have been identified within the Duncan Creek watershed for evaluation and remediation through these programs, including abandoned landfills, spill sites, pesticide mixing and storage sites, leaking underground storage tanks, contaminated salvage yards and other hazardous waste sites. Potential sites are added to the ERR list through a variety of means, including citizen complaints, Department investigations or observations, referrals from other programs and required notification of hazardous substance discharges. The list is dynamic, as site cleanups are completed and new sites identified. Sites are evaluated and ranked based on the degree to which they pose a substantial danger to public health, welfare or the environment. The Duncan Creek watershed sites and their rankings in each of these programs will be described below.

### **Leaking Underground Storage Tanks**

The LUST program is a federal program administered cooperatively by DILHR, U.S. EPA and the DNR. Sites are ranked in one of four categories:

- (1) High - Where there is actual or high potential of causing threat to human health or property; or where there is high potential of substantial impacts to soils, water or air.
- (2) Medium - Where there is not an immediate threat to human health or the environment, but where contamination may cause substantial damage if left unaddressed.
- (3) Low - Where contamination has been documented, but presents limited potential for threat to human health or the environment.
- (4) Unknown - Where an indication of contamination is present, but incomplete information prevents ranking.

Sixty-six LUST sites are currently listed within the Duncan Creek watershed. These sites are concentrated in urban areas, with 13 sites in or near Bloomer, 11 in the city of Eau Claire, about 30 in Chippewa Falls, and most of the remainder in the vicinity of Highway 53 between Eau Claire and Chippewa Falls.

Of these sites, 22 are known sources of groundwater contamination, and an additional 22 are potential sources of groundwater contamination. The priority rankings for these sites are as follows:

High	Medium	Low	Unknown
24	18	20	4

Sites include gas stations, auto repair shops, car sales businesses, oil companies, town and county highway shops and other small businesses.

### **Environmental Repair Program**

The ERP program is funded by the state, and provides the means to correct environmental contamination problems which are not eligible for remedial action under Superfund, but which still endanger the public health, welfare, or safety, or threaten to cause environmental pollution. Funding of this program also allows the state to meet cost share requirements for participation in the federal Superfund program. Sites are ranked in one of three categories:

- (1) High - Where human health, welfare or safety are threatened, groundwater pollution exceeds preventive action limits for any hazardous substance, surface water pollution attributable to the site violates water quality standards, air quality standards are violated, or conditions indicate a high potential for threat to human health or the environment.
- (2) Low - Where conditions indicate that the threat to human health or the environment are negligible or there is a low potential for such a threat.
- (3) Unknown - Where a site cannot be classified due to lack of necessary information.

Ten sites within the watershed have been inventoried under the ERP program. Three of those are also Superfund sites, and will be discussed separately. The seven remaining sites are ranked High. These sites are summarized below:

#### **Better Brite Plating Co.**

This site is on the northeast edge of Chippewa Falls, and is known to have groundwater and soil contamination. Metals are the primary hazardous substance. The site has received preliminary inspection as a Superfund site, but is not on the Superfund National Priority List (NPL) yet.

#### **Chippewa Falls Landfill**

This site is east of Chippewa Falls and just south of the Chippewa River at Hwy. 53. It is known to have groundwater and private well contamination and potential soil and surface

(Chippewa River) water contamination. Methane gas has been detected as well as high chlorides and VOCs. The site is 100 feet from the Chippewa River. No corrective action has been taken.

### **Town of Hallie Halogenated Organics**

This site is an old landfill approximately 1/2 mile north of Lake Hallie and just east of the Chippewa River. It has potential impacts on private wells, groundwater and soil. Low level VOC's have been found in private wells downgradient, but it is not established that they originated at the landfill. The site has had a Superfund Preliminary Assessment and a screening site inspection has been conducted.

### **Hallie town Landfill**

This site is located between Eau Claire and Chippewa Falls, about one mile north of Lake Hallie. It is an old landfill where VOC's were detected in monitoring wells. No private wells are yet affected.

### **Northern Crossarm**

This lumber preservative operation is located approximately 1.5 miles east of Chippewa Falls, and is just north of the Chippewa River. No action has been taken on this site yet.

### **Thaler Oil Company**

This site is located on the northeast edge of Chippewa Falls. It has known soil and potential groundwater contamination. Extensive spillage of product has occurred around fill hoses, tank valves and on the driveway. The company has hired a consultant and is currently doing a site assessment.

### **Max Phillips and Son Scrap Yard**

This site is located on the north edge of Eau Claire, west of Hwy. 53. It has known soil and potential groundwater contamination. Poor operating practices have resulted in extensive areas of spillage of petroleum products, PCB's, engine coolants, and other hazardous wastes. The company hired a consultant to do a site assessment in the spring of 1992, including soil sampling and installation of monitoring wells. There appears to be VOC and lead contamination in soils. No information on groundwater contamination is available yet.

Additional sites with potential groundwater contamination concerns were identified by DNR Groundwater staff:

### **Old landfill at Bloomer**

This site is at the intersection of Hwy Q and Hwy F on the south side of Bloomer. Monitoring wells have been installed at this site and water samples have confirmed impacts

to groundwater. The site is abandoned and has been capped to minimize surface water infiltration into the landfill. There is no evidence of surface water contamination.

### **New Auburn Landfill**

This abandoned landfill has no monitoring wells and does not indicate any contamination of ground or surface water.

### **Tilden Dump**

This site is just East of Hwy 53, approximately one mile north of Tilden. It was closed in the 1970's.

### **Old Tilden Dump**

This site is about 1/2 mile north of Tilden, and on the south bank of Duncan Creek.

### **Town of Hallie**

There are two additional sites in this township that are abandoned landfills. One site has indications of groundwater impacts and is capped. The other site is not capped and may be a potential problem with groundwater contamination.

### **Perrenoud, Inc.**

This is an active landfill site with monitoring wells that indicate some groundwater impacts. The site is located in the southeastern part of the Chippewa Falls urban area. An abandonment plan is being developed for this site that will call for an impermeable cap to be installed.

## **Superfund Program**

Superfund is a federal program administered by the DNR under a cooperative agreement with the U.S. EPA. It was created in 1980 to address environmental problems due to uncontrolled and abandoned hazardous waste sites. There are three Superfund sites in the Duncan Creek Watershed, though the Eau Claire Well Field site has recently been combined with the National Presto Company site.

### **National Presto Company**

This 300 acre site is located on the northeast edge of the city of Eau Claire, just east of Hwy 53. Several contaminated groundwater plumes extend north and west from the site, impacting private wells and the Eau Claire Well Field. The remedial investigation is continuing, and a draft feasibility study is being prepared. The primary pollutants are

VOC's. Interim remedial action has included connection of affected town of Hallie residents to municipal water, and treatment at the Eau Claire Well Field.

### **Eau Claire Well Field**

This site is located in northern Eau Claire, just east of the Chippewa River and approximately one mile north of Dells Pond. Several wells are contaminated with VOC's. An air stripping tower has been installed to remove VOC's. The site is now included with the Presto Superfund site.

### **Schneider and Son Salvage Yard**

This site is located approximately 1/4 mile north of the eastern end of Lake Hallie, just west of Hwy 53. It is an active scrap metal processing facility with a history of environmental violations. The contaminants of concern are PCB's and lead. A Department of Justice stipulation and judgement in October, 1991 requires the owner to hire a consultant and clean up the site. The site has had a preliminary site assessment, and screening site inspection completed. It is not on the National Priority List at this time.

### **Municipal Well Triazine Study**

The DNR Water Supply section has conducted tests for triazine contamination of municipal water supplies in many counties in western Wisconsin. These tests were conducted as part of a study to determine the vulnerability of public water supplies to pesticide contamination. Triazine was not found in the four wells tested in Bloomer, nor in the well tested in Hallie. However, six of the seven wells of the Chippewa Falls Waterworks showed triazine contamination:

West Well #1 - 0.1 ppb  
West Well #2 - 0.0 ppb  
East Well #1 - 0.1 ppb  
East Well #2 - 0.1 ppb  
East Well #3 - 0.2 ppb  
East Well #4 - 0.2 ppb  
East Well #5 - 0.2 ppb

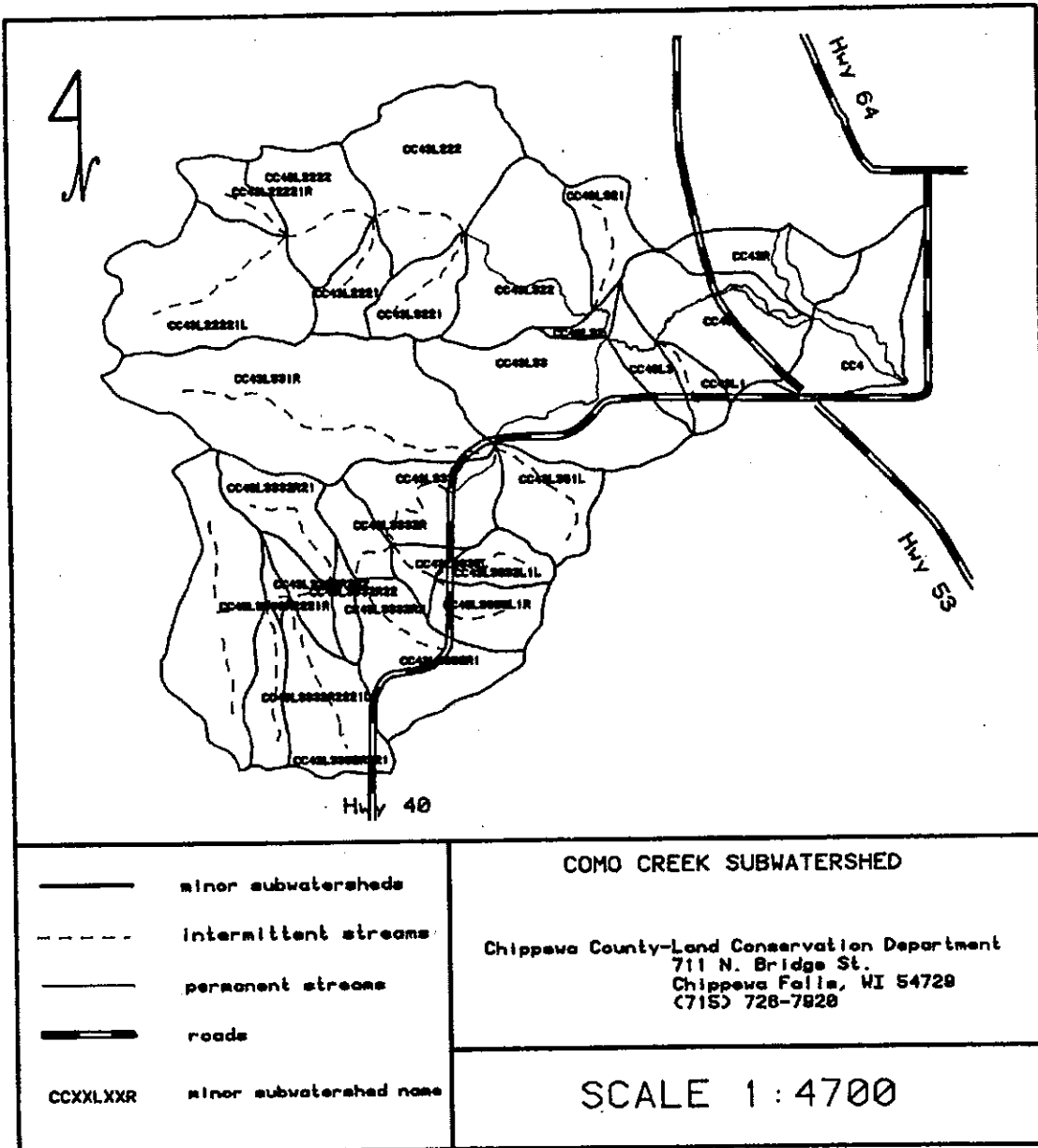
At the Eau Claire Waterworks, twelve wells were tested. Two, #9 and #14, had 0.1 ppb of triazine. The preventive action level for triazine is 0.3 ppb. The preventive action limit (PAL) serves as an "early warning" system. When a PAL is attained, the Department reviews the conditions at the site of the exceedance, and may make recommendations for further action, in accordance with Administrative Rule NR 140. Should the PAL be exceeded at a public well site, continued monitoring would likely be recommended to determine trends in triazine concentration.



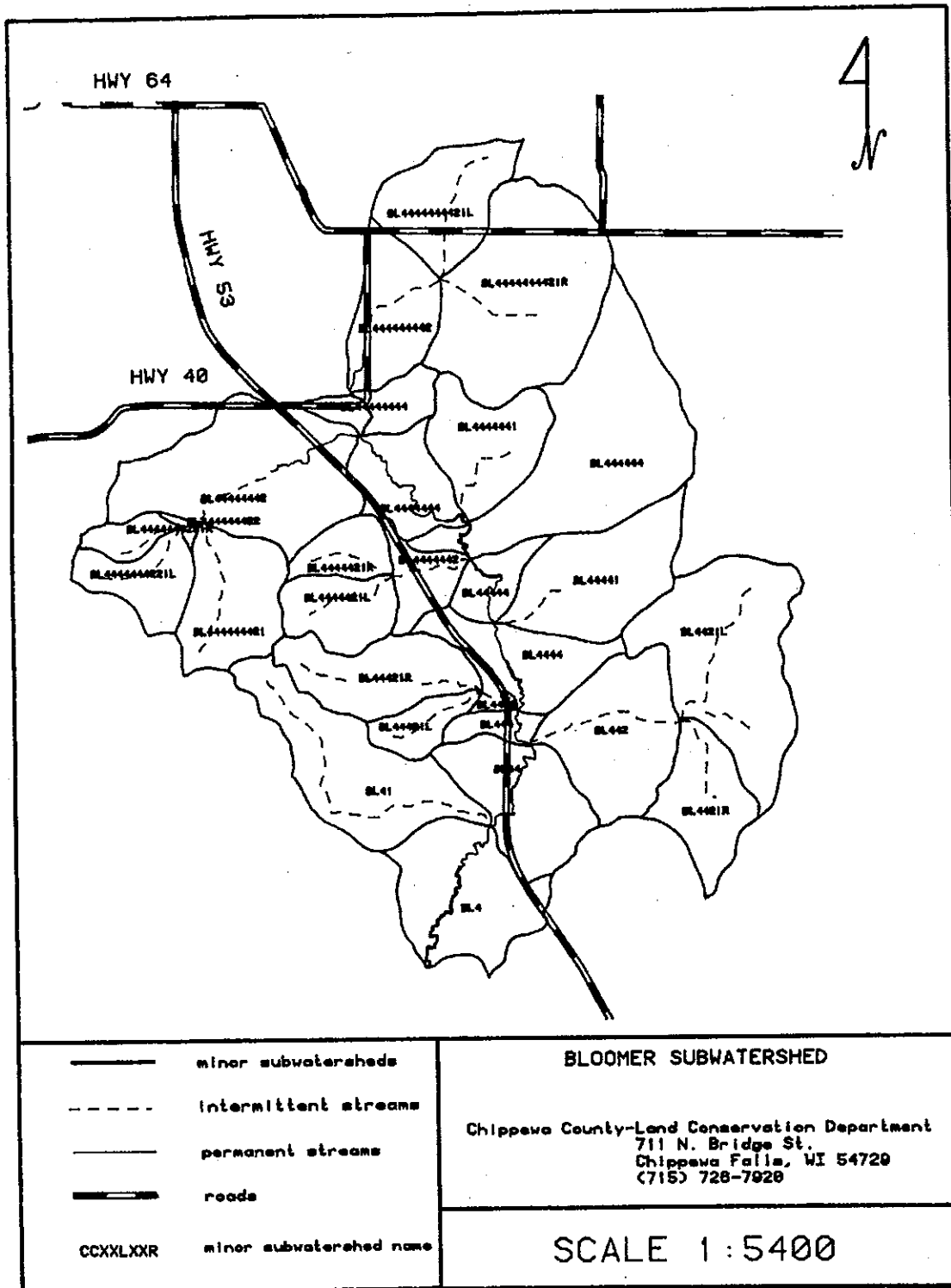




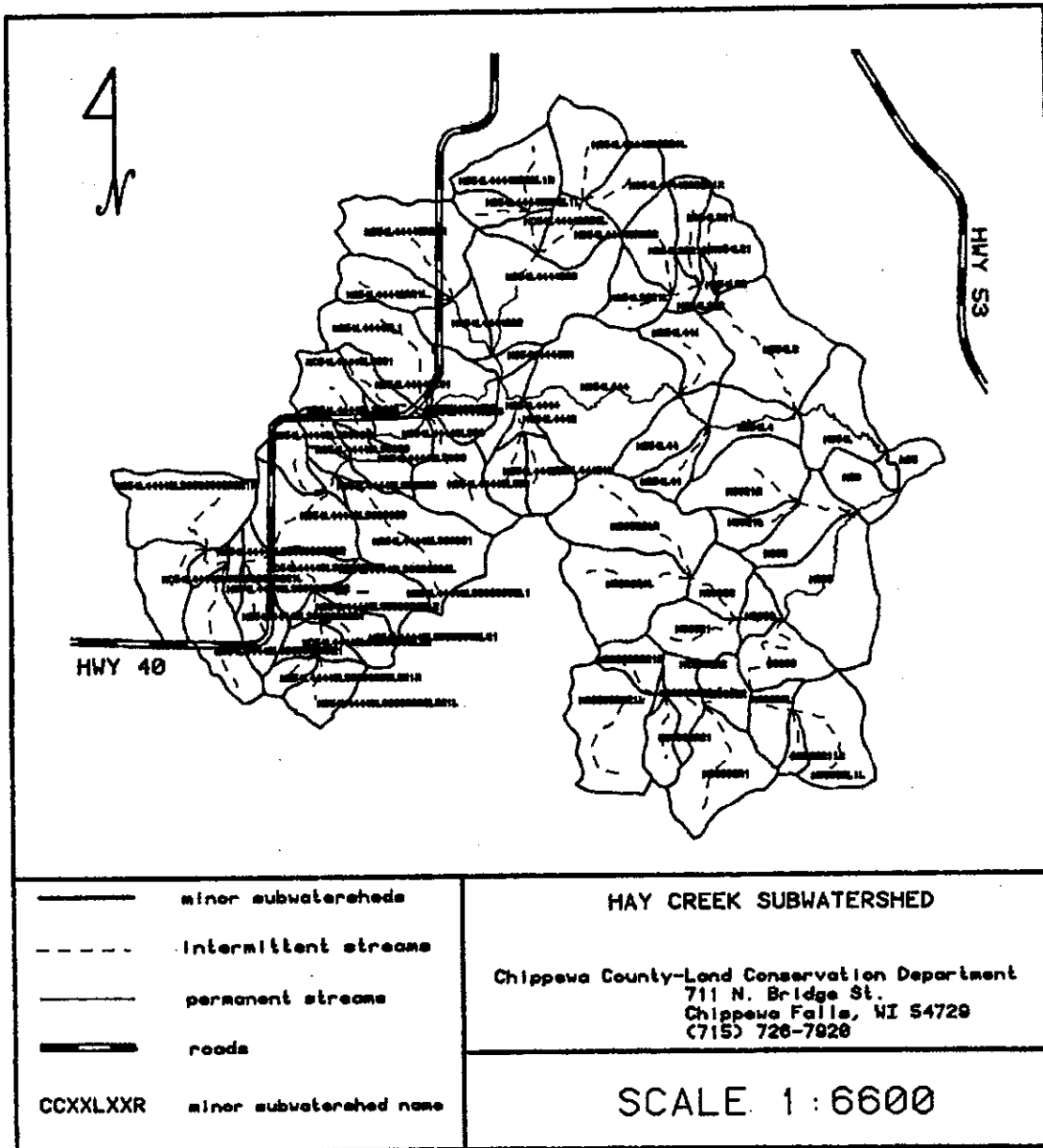
Map 3-3. Como Creek Subwatershed



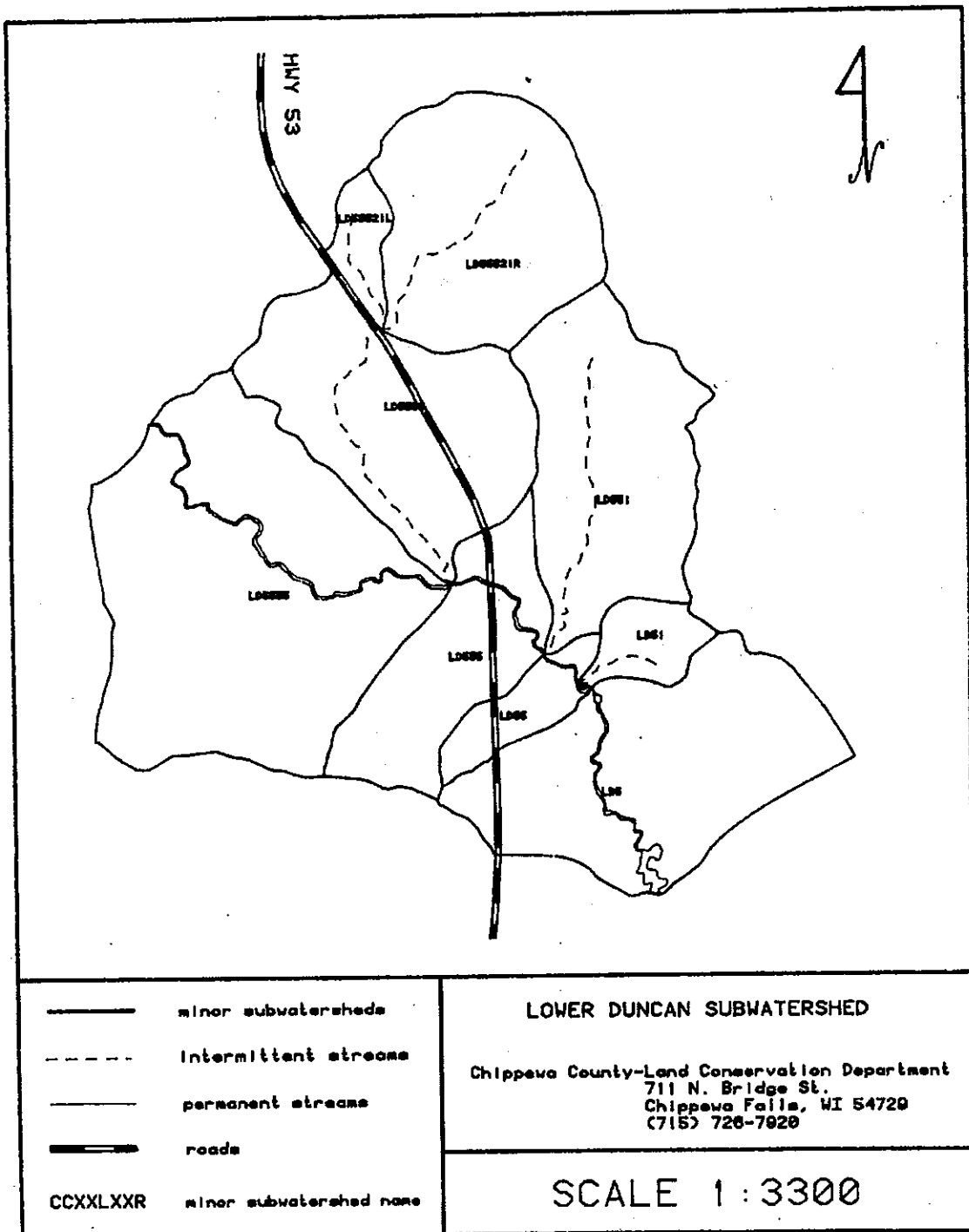
Map 3-4. Bloomer Subwatershed



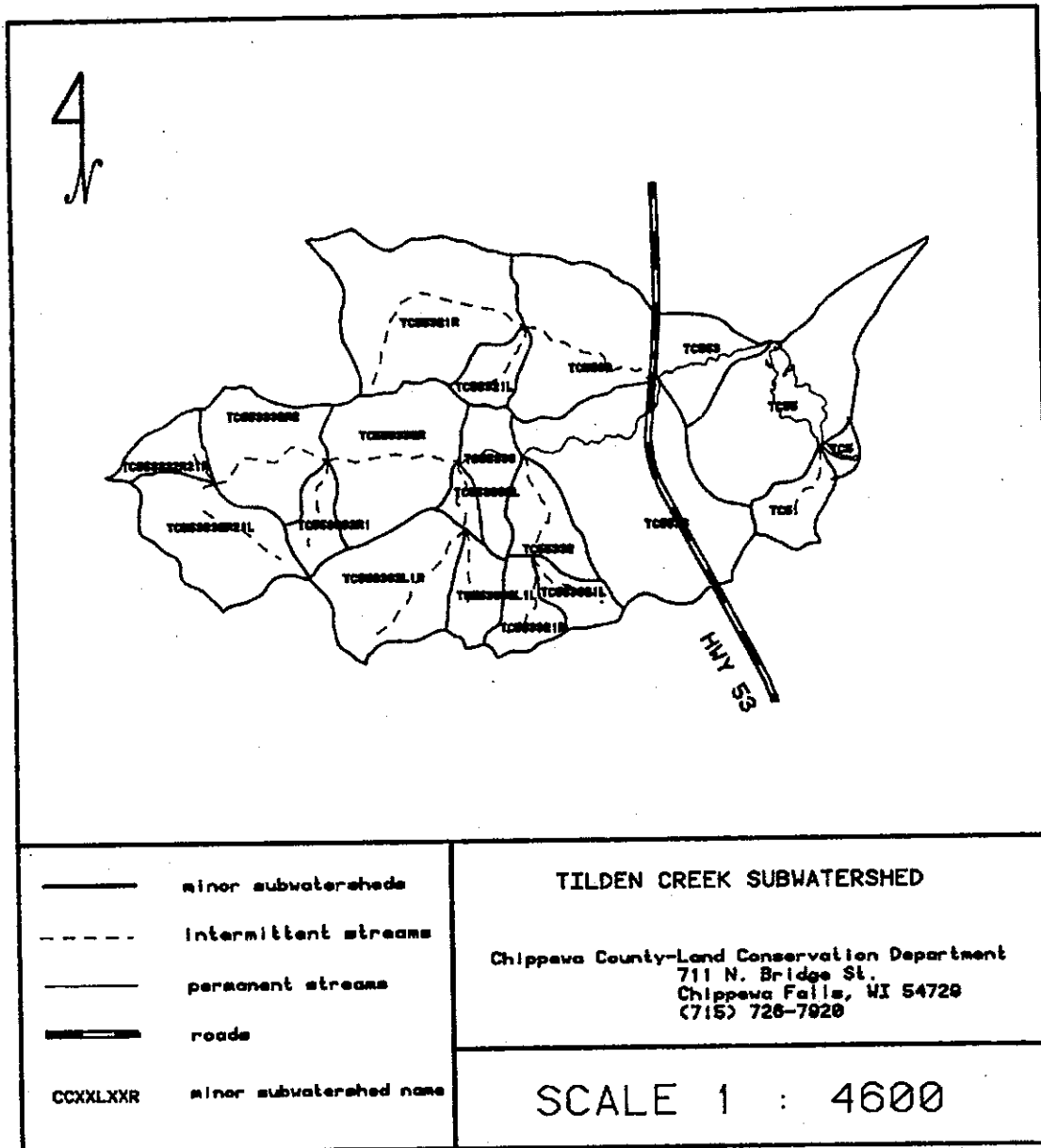
Map 3-5. Hay Creek Subwatershed



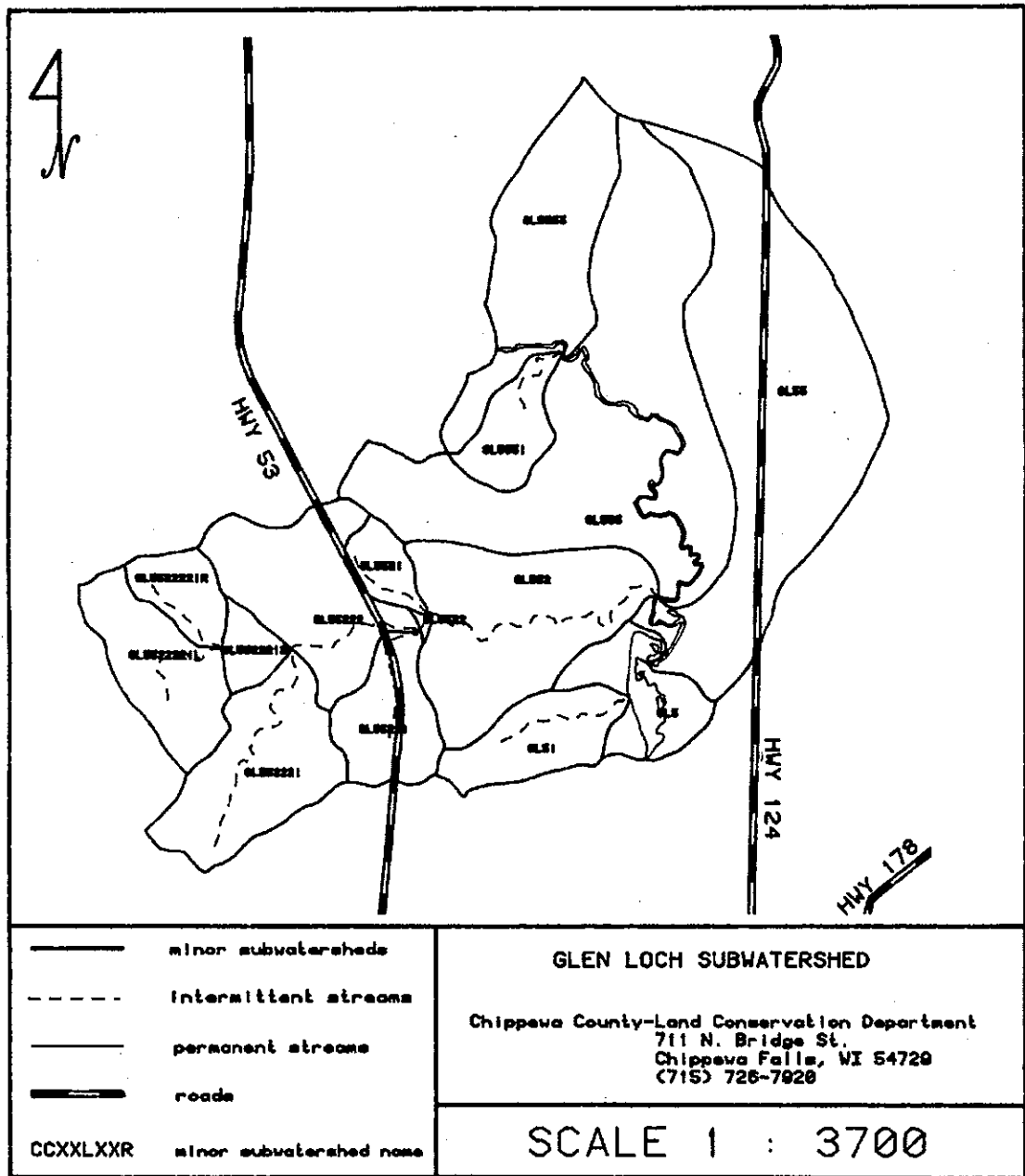
Map 3-6. Lower Duncan Subwatershed



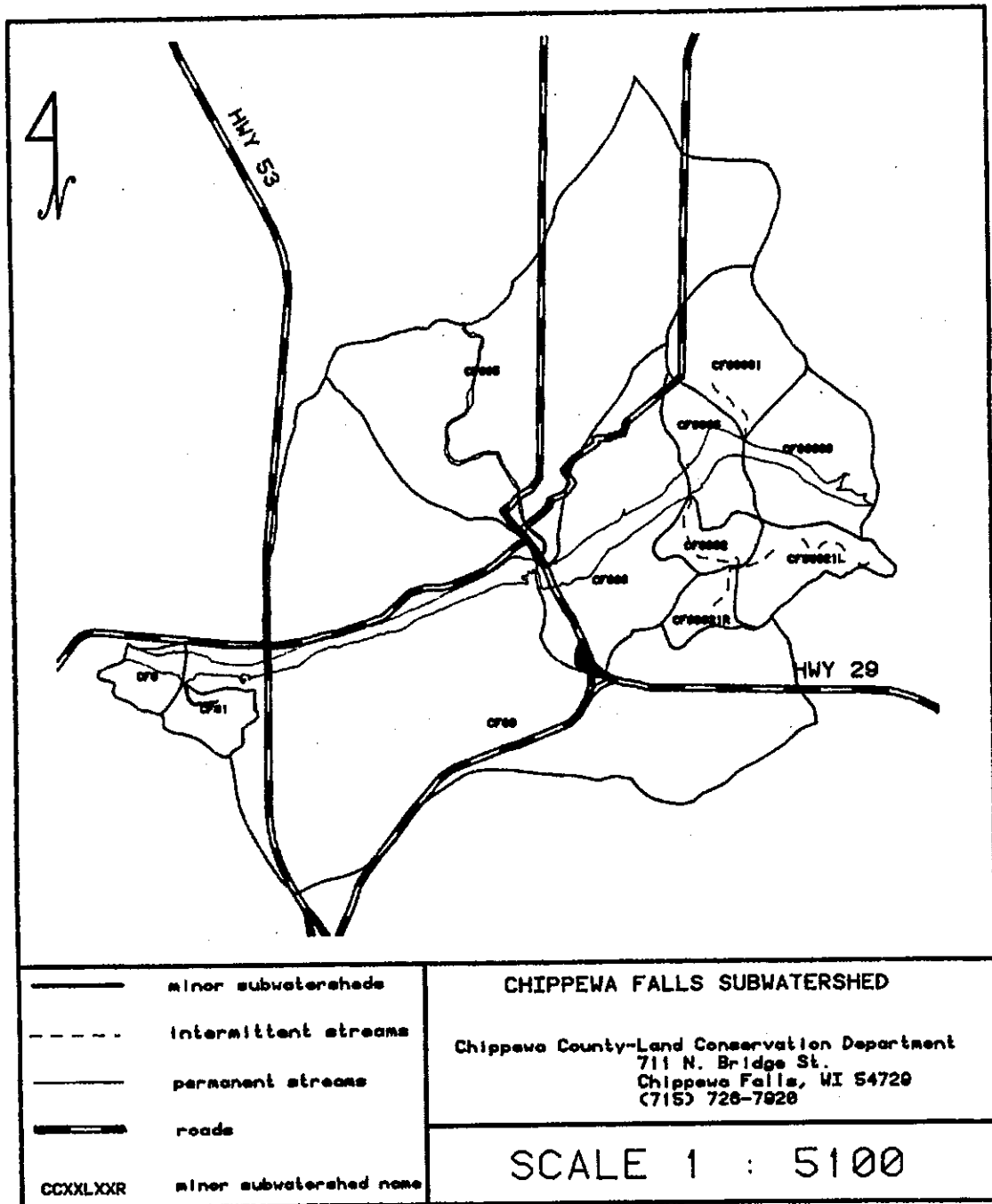
Map 3-7. Tilden Creek Subwatershed



Map 3-8. Glen Loch Subwatershed

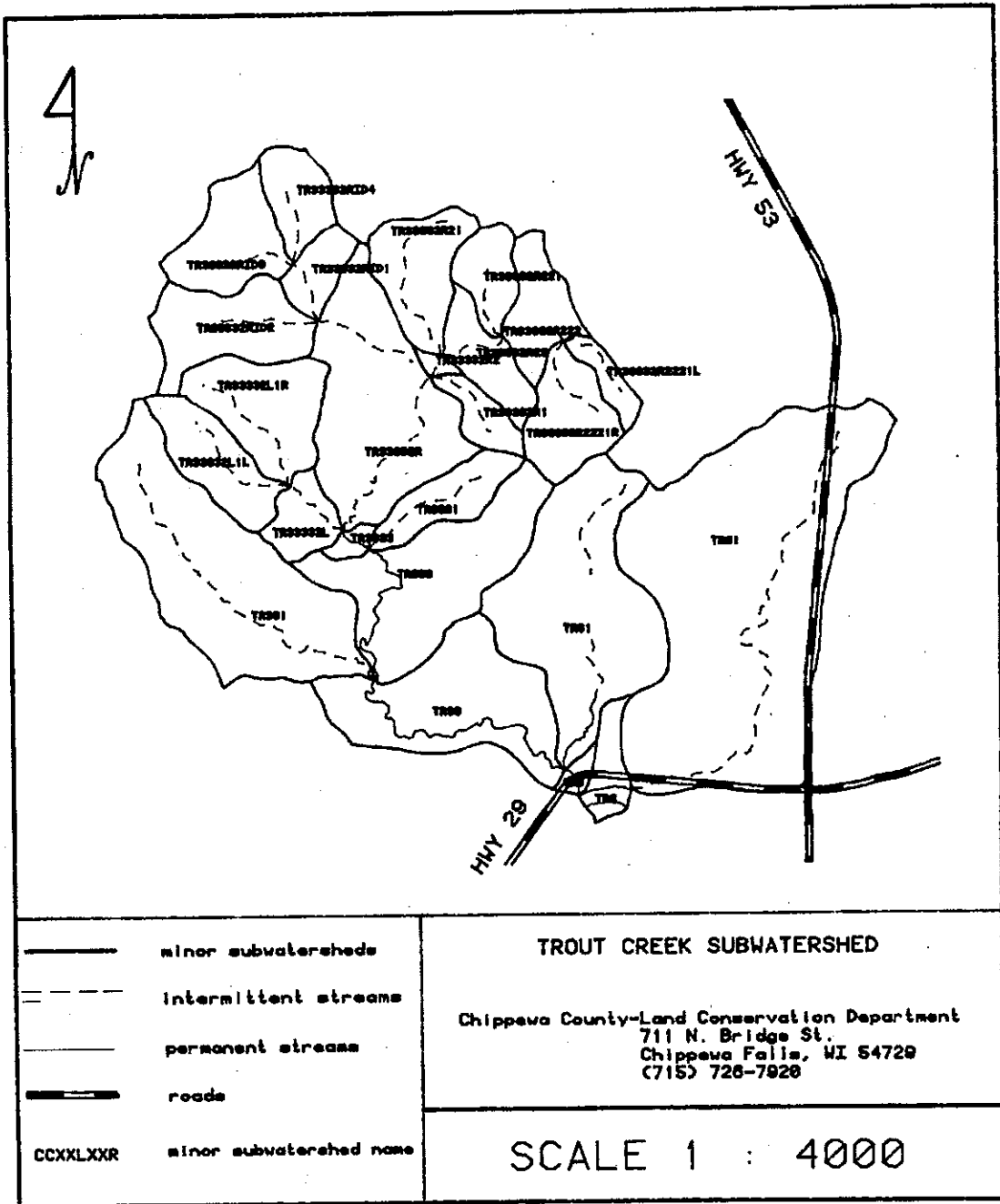


Map 3-9. Chippewa Falls Subwatershed



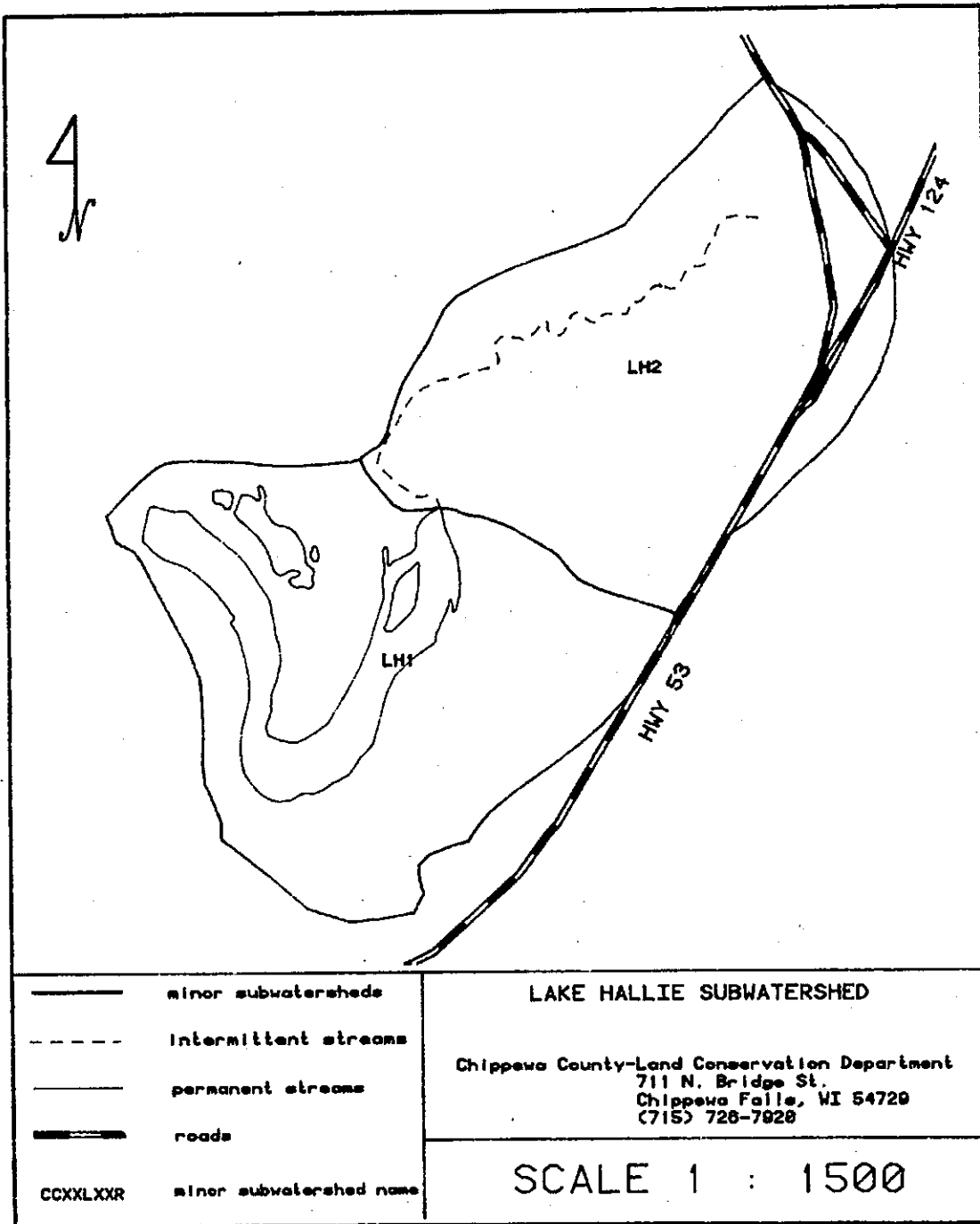


Map 3-10. Trout Creek Subwatershed





Map 3-12. Lake Haillie Subwatershed



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# CHAPTER FOUR

## Management Actions

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### Introduction

The development of management actions is based on the planning activities accomplished during the initial phase of the project. The land and water inventories of non-point pollution problems described in chapter 3 are analyzed in association with previously determined water resource objectives and pollutant reduction amounts required to achieve the objectives. The management actions will determine how many units of best management practices will be targeted for reduction. Landowner eligibility for cost-sharing will depend on whether that landowner's non-point source pollution levels fall within the targeted range of pollution quantities. For eligible landowners, all sources of pollution categorized as essential and required (Category I) must be controlled as a requirement of participation in the cost-sharing program. The control of Category I sites is essential to achieving the water quality objectives. Category II sites are those sites which are considered eligible, but not required. The use of Category II allows a greater degree of flexibility for the landowner and provides a reasonable approach to controlling non-point sources that are difficult to correct.

The use of cost effective approaches allows the implementation of best management practices on those sites which are most likely to provide the most pollution control. The range of practices includes farm management activities like crop rotations and manure management planning to more structural practices like manure storage and streambank riprap. The implementation of the best management practices is further described in chapter 5.

The management strategy incorporates standards developed to provide a basic level of water resource protection, these standards have been developed by the Chippewa County Land Conservation Committee and apply to all contracts, cost share agreements, and easements involved with this project. A participant must agree to minimum management standards for uplands and stream corridors as a condition of eligibility to participate in the program. Minimum management standards will ensure a comprehensive resource management approach in an effort to achieve multiple resource objectives at the lowest public cost. There are four standards that apply in this project as follows;

1. Control upland soil erosion to "T" and leave grassed waterways vegetated.
2. Do not alter, drain, or fill wetlands.
3. Do not ditch streams; leave vegetated buffers.

4. Remove or restrict livestock from streams.

Additional standards have been developed for animal waste management systems and nutrient management. These minimum standards apply to any landowner participating in the program and installing an animal waste system, storage facility or nutrient management project.

1. Animal waste management systems
  - a. Reduce barnyard phosphorus to 15 Lbs/year
  - b. Do not spread manure in wetlands or floodplains
  - c. Do not winter spread manure on slopes greater than 9%
2. Manure storage facility
  - a. Reduce barnyard phosphorus to 15 Lbs/year
  - b. Do not spread manure in wetlands or floodplains
  - c. No winter spreading of manure
  - d. Meet nutrient management standards (590)
  - e. Must treat critical milkhouse drains
3. Nutrient management
  - a. Reduce barnyard phosphorus to 15 Lbs/year
  - b. Do not spread manure in wetlands or floodplains
  - c. Do not winter spread manure on slopes greater than 6%
  - d. Meet nutrient management standards (590)

## **Specific Management Actions by Pollutant Source and Type**

Sediment and nutrients from agricultural fields are potential nonpoint sources which affect surface water and groundwater. Efforts to control these sources will be based upon mandatory management standards for project participants. These standards are:

1. Control sheet and rill erosion from farm fields.
2. Control ephemeral erosion in areas of concentrated flow.
3. Control animal waste runoff and nutrients conveyed from farm fields.

These mandatory standards will be augmented by positive incentives to encourage further control of these potential nonpoint sources.

Minimum management standards will be augmented by other more specific requirements of all cost share agreements. The specific management requirements are explained by pollutant source or type.

# Croplands and Other Rural Lands

## Upland Erosion Control and Sediment Management Strategy

The upland inventory for this project consisted of a sampled area WIN analysis for each subwatershed. This analysis has indicated that sediment reduction goals can be achieved in three of the subwatersheds by reducing all fields to the "T" value. Reducing erosion to the "T" value in other subwatersheds can only achieve a 38 percent reduction or less.

The management strategy for upland sediment control will require that all participants in cost share agreements must plan and implement field based practices that reduce all fields to the "T" value. Trout Creek, Glen Loch and Beaver Creek subwatersheds will reach the required upland sediment reduction goal by applying the "T" value to all fields ( 60 percent reduction achieved ). The remainder of the subwatersheds are also required to reduce all fields above "T" to "T". In addition, landowners with croplands in all subwatersheds must comply with the following minimum standards applied to all cost share recipients in order to reduce erosion. Landowners will be encouraged to manage fields to below "T".

## Sediment Buffers

- A. Shoreline buffer strips ( see chapter 5 practice definition ) are required (category I) for all intermittent or perennial streams having a definable bed and bank with adjacent croplands. All subwatersheds are included in this requirement.
- B. Shoreline buffer strips receiving concentrated flows of water from upland areas must be protected from erosion. Tillage practices, contour cropping, critical area stabilization, grassed waterways, strip cropping, terrace systems and grade stabilization structures are eligible practices to be used for shoreline buffer strip protection. The use of these practices is required (category I) whenever shoreline buffer strips are subjected to concentrated flows capable of causing erosion through the buffer strip.
- C. All areas of concentrated flow in croplands must be vegetated.

The eligibility criteria presented in table 4-1 apply to all cost share recipients. A 45 to 50 percent reduction in upland sediment, or more, is expected in all subwatersheds by requiring landowners to reduce cropland erosion to the "T" value and meet reduced rates of sediment delivery by the use of buffer strips and vegetated concentrated flow areas. This level of reduction meets or exceeds the water resource pollutant load reduction level set in Chapter 3 for each of these subwatersheds. The amount of upland sediment targeted for control is 21,697 tons, which is 50 percent of the total sediment (43,395 tons). Refer to table 4-2.

**Table 4-1. Upland Sediment Eligibility Criteria**

Management Category	Rate of Sediment Delivery (tons/ac./yr.)	Inventoried USLE Rate (tons/ac./yr.)	Target Reductions
1	> .3	> T	.3 or T
2	> .3	< T	≤ .3
3	< .3	< T	none

Requiring additional practices like vegetated concentrated flow areas and buffer strips for permanent streams and riparian wetlands will allow sediment delivery reductions to reach objectives. The management strategy adopted by this watershed plan is designed to reduce all croplands over the "T" level to "T" in all subwatersheds and to additionally require that all perennial streams and riparian wetlands be protected with shoreline buffer strips in cases of croplands and farm fields adjacent to the streambank. Each participant in a cost share agreement is required to reach the target level of sediment reduction by a combination of applying the "T" value and installing the required buffer strips and vegetated flow areas. The purpose of requiring a constructed buffer strip is to insure that for a minimum distance a vegetated strip will provide a reasonable level of protection and the edge of the cropland will not encroach within the minimum distance of 66 feet. The use of easements and shoreline buffer strips is another method for encouraging landowners to come into the program. Easements are more fully explained in another section of this chapter.

The use of in field buffer strips and the design standards for this type of practice are further explained in chapter 5. Buffer strips should be a priority in certain subwatersheds that are in need of high levels of pollutant control. These subwatersheds are as follows:

- Upper and Middle Duncan
- Como Creek
- Bloomer
- Hay Creek
- Lower Duncan
- Trout Creek
- Lake Hallie

**Table 4-2. Target Reduction Levels for Landowners that are Required to Control Upland Erosion (Information obtained from sediment control graphs developed from the WIN analysis.)**

Subwatershed/Reduction Goal	Inventoried Average Sediment Delivery (tons/acre)	Target Sediment Level Delivery (tons/acre)	% Control Possible (from WIN)
Upper Duncan (M)	.32	.30	45
Middle Duncan (M)	.35	.30	45
Tilden Creek (M)	.44	.30	45
Como Creek (H)	.33	.20	50
Bloomer (H)	.50	.30	55
Hay Creek (H)	.54	.35	50
Lower Duncan (H)	.44	.35	50
Hallie (H)	.29	.18	50
Chippewa Falls (L)	Urban Inventory	---	--

The watershed plan must specify the physical dimensions and the vegetative cover of the shoreline buffer. Because there are no standards or technical guidelines for this specific practice to refer too a set of guidelines has been prepared by Chippewa County LCD. Read the discussion of the technical requirements in chapter 5 under best management practices for a more complete description of shoreline buffers. Buffer strips require a minimum width as follows:

1. 4 rods as measured from the bank of the stream  
or
2. the vegetated floodway as defined by soil type and wetland maps.

Vegetation can include native grass communities or grass and legume mixtures. Cattle will be fenced out of the buffer area. The general purpose of the buffer strips is to provide a vegetated area with a well developed sod and root zone capable of filtering pollutants and maximizing infiltration. Easements are available for all those eligible streams listed in this chapter and can be used whenever segments of these streams require buffer strips.

## Gullies

Minimum management standards have also been applied to control erosion from areas of concentrated flow. Areas that are defined as concentrated flow must remain in a vegetated



state as a condition of the cost share agreement. This standard will apply to all areas of concentrated flow as identified on soil maps or 7.5 minute topographic maps.

Gullies were not field inventoried in this project. Gully erosion will be a factor for those lands that are receiving buffer strips and it is important that all installed and natural buffer strips be protected from development of small gully erosion which could defeat the purpose of the buffer strip. Existing gullies which are present on natural or constructed buffer strips are eligible and required for control using any of the appropriate gully control management practices available in NR 120. The management strategy allows eligibility for gully erosion control associated with buffer strips. A cost effective approach will be used as described in Chapter five that permits practice installations for gully control in buffer strip areas. Many of these gullies will be quite small in size, but must be controlled as a category 1 requirement. Development of gullies on buffer strips after the buffer strip is installed are also required to be controlled over the 10 year maintenance period.

Inventories of the possible extent of gullies were estimated from map analysis as explained in chapter 3. Twenty six miles of concentrated flow routes were identified for waterway construction involving 95 acres of waterway. Thirty critical sites were estimated to be in need of structural installations. Estimates of costs associated with these gully erosion control needs are further described in chapter 5.

**Table 4-3. Gully Erosion Control Eligibility Criteria**

Management Category	Site	Target Reduction Level
1	All buffer strips	< 1 ton/landowner
1	Any gullies > 50 tons/year	50% of sediment loss
2	Cropland gullies < 50 tons/year	< 1 ton/landowner
3	All other gullies	none

Table 4-3 describes the eligibility criteria for control of gully erosion. There are two conditions which are considered category 1 and will require control as a condition of the cost share agreement for any landowner coming into the program.

Gully erosion control is also an eligible practice for some sites not in association with buffer strips. Gullies located in inaccessible sites or sites that prevent a cost effective solution are not eligible and are considered category 3 gullies. Gullies located in croplands or pastures are also eligible for control as a category 2 source if there is evidence of bare soil and active gully formation. Control of gully erosion on croplands or pastures is required as a category 1 source if the gully is currently eroding at a rate that exceeds 50 tons/year when using the

## **Streambank Corridor Management**

The Duncan Creek project has developed management strategies for streambanks that recognizes the importance of these areas for water resource protection and habitat improvement. Even though the current level of streambank erosion is relatively low compared to upland sources the riparian zone is important to manage for its ability to treat runoff water and the habitat value it can provide. The streambank inventory did find that many of the worst sites along streams had livestock access in this project. Because of these considerations the following management strategies are proposed as category I requirements;

1. In all cases, intermittent or perennial streams with a definable bed and bank must not be ditched.
2. In all cases, cattle must be restricted from intermittent and perennial streams with a definable bed and bank.
3. Limited cattle access will be allowed, through a controlled grazing permit, in stream corridors which do not have a definable bed and bank. Conditions of the controlled grazing permit are explained in chapter 5.

Areas that have needs for livestock restrictions will be eligible for cost sharing fencing, cattle crossings and watering facilities. Cattle crossings and/or watering facilities will be restricted to 2 per quarter mile.

### **Streambanks**

Sediment loss and delivery to streams in this watershed is a relatively small amount when compared to sediment sources from uplands. In order to reach project goals for pollutant reduction of sediment the management strategy will have to rely on obtaining most of the control from upland areas. Streambanks have an inventoried sediment loss of 1052 tons per year with almost half of this from the Trout Creek subwatershed alone. Chapter 3 table 3-2 lists all of the streambank sediment loss. A high proportion of the eroded streambanks have been identified in the inventory as pastured which indicates that livestock access and eroded streambanks are common to one another in this project. A minimum standard for this project requires that all participants restrict livestock from streambanks as a condition of the

cost share agreement. Streambank erosion sites will be controlled using the following strategy:

1. Critical sites (category I) are those sites which are required to be corrected as part of a cost share agreement. Within the basin, a minimum of 30 tons/year/site, sediment delivered, will define critical sites.
2. Category II sites are those sites which are somewhat significant, but are not required as part of a cost share agreement. Money will be provided to correct these sites if the landowner agrees. A range of 2 tons/year/site to 29 tons/year/site, sediment delivered, will define these category 2 sites.
3. Any site with a sediment delivery of less than 2 tons/year/site will not be eligible for cost sharing.

Table 4-4 shows the eligibility criteria for streambank erosion control.

**Table 4-4. Eligibility Criteria for Streambank Erosion Control**

Management Category	Sediment Delivery	# of Sites	% Control
1	> 30 tons/year	10	55%
2	2 - 30 tons/year	44	36%
3	< 2 ton/year	143	none

By controlling 55 percent of the streambank erosion in this project a total of 578 tons of sediment is prevented from entering streams in this project. Control of streambank erosion will also be enhanced by implementing a livestock access policy along with easement acquisitions designed to improve streambank habitat.

With the assistance of DNR Fish Management personnel, fish structures will be installed at controlled erosion sites. Fish structures will be placed in locations and stream reaches where DNR decides they are suitable.

## Easements

Stewardship easements have been identified in this project. NR 120 easements are available for certain streams. The following streams and stream segments are eligible for NR 120 type easements:

Trout Creek  
 Beaver Creek  
 Tilden Creek  
 Rheingen Creek

Streams that have been identified for other easement acquisition that are unsuccessful will also be eligible for NR 120 type easements as long as they meet DNR guidelines for NR 120 type easements. As an example, if Stewardship easements are identified and unsuccessfully pursued these same sites can be considered for NR 120 type easements if they meet the guidelines of the nonpoint program.

Priority for easements will be given to stream corridors which act as buffers and corridors to riparian areas and are open to cattle access. Tributary areas that contribute flow of water to intermittent or perennial streams are also eligible for NR 120 type easements. All intermittent and perennial streams with a definable bed and bank, not eligible for fish management or stewardship easements are eligible for NR 120 easements.

NR 120 easements can be considered when the following management practices are planned; shoreline buffers, critical area stabilization, and wetland restoration. The County LCD must indicate to the DNR how an easement will be used in conjunction with the best management practice. NR 120 easements will usually be riparian lands or wetlands. Riparian areas that have high sediment delivery, but low soil loss rates are examples of situations that may use easements. Chippewa Co. LCD will use information and education activities to promote the acquisition of easements. Chippewa County will be the owner of the NR 120 easements.

The management strategy for NR 120 type easements includes a long range funding proposal designed to allow the County to continue some maintenance activities for the life of the easement. The funds requested are equal to the amount of interest earned on the interest account established for the nonpoint source grant. The County has requested that the funds accumulated in this special account be turned over to the County after the close of the project in order to be used as a continuing source of funding for NR 120 easement maintenance costs. Each NR 120 easement developed must include an estimate of costs for maintenance performed over the life of the easement. Approval of the watershed plan indicates approval of the concept of long range funding for NR 120 easement maintenance. The actual allocation of funds for this purpose must be approved through the grant application process. NR 120 easement proposals for the Duncan Creek project will be reviewed for approval by the DNR Nonpoint Source Coordinator.

NR 120 easements will be negotiated between Chippewa County and eligible landowners. Interested landowners that meet all eligibility requirements will be appraised by a qualified appraiser using criteria developed by the DNR Property Management Bureau. The use of NR 120 type easements must follow all DNR guidelines and policies. Chippewa County agrees to contract a qualified appraiser and conduct appraisals according to DNR requirements. In all cases the Chippewa County LCD must obtain approval for every easement from the DNR.

Stewardship easements are also planned for this watershed and currently are eligible on Como Creek. Additional streams have been suggested for addition to the eligible list including parts of Duncan Creek and Little Hay Creek. There are Fish Management easements in several of the project streams and combined with the availability of other easements gives this project a wide opportunity to acquire rights to a significant portion of

riparian habitat. Chippewa County will be involved in the acquisition of easements for NR 120 and Stewardship programs. If Stewardship type easements are not approved for any reason they will then be considered for NR 120 type easement acquisition. The management strategy is to use the existing County priority watershed staff to contact landowners and negotiate easements. This effort requires County staff training and considerable staff time that is further detailed in Chapter 5.

The DNR Property Management Program will provide assistance to the Chippewa County LCD for developing a contract proposal for hiring appraisals and will provide written policy for review and approval of proposed easements.

Easements in urban areas are planned for the those sites within the ZOC of municipal wells and will be based on wellfield management zones as identified in an approved wellhead protection plan. The highest priority for easement acquisition will be areas within the primary wellfield management zone. Lesser priority will be given to areas within the secondary wellfield management zone.

The primary and secondary wellfield management zones will be delineated in a wellhead protection plan, based upon time of travel, aquifer characteristics, depth to groundwater, soil attenuation and existing or proposed landuse. Easements in these areas will be used to restrict or minimize any potential landuse impact on groundwater supplies. Rights to be purchased will be negotiated at the time of easement acquisition.

## **Animal Waste Management**

### **Animal Lot Runoff**

Control of phosphorus from barnyards is set at 90 percent (9143 lbs) of the total load (10160 lbs) from this source. The management strategy for control of barnyard runoff includes a provision for applying the State law for animal waste control administered under the NR 243 rules of the Wisconsin Administrative Code. This rule will be applied to barnyards that exceed 100 lbs of phosphorus loading. Landowners that have barnyards in excess of the 100 lb limit are eligible for cost sharing. After the three year sign up period any unsigned landowners with barnyards identified previously as over the 100 lb limit will be subject to the NR 243 rule.

The management strategy for animal lot runoff with phosphorus loading in excess of 15 lbs is eligibility for control and those in excess of 50 lbs are eligible and required to be controlled as a condition of the cost share agreement. There are 169 barnyards eligible in this project.

**Table 4-5. Animal Lot Runoff Control Criteria**

Management Category	Organic Load (lbs. p/yr.)	# of Yards	lbs. p	% reduc
Cat. 1 and Regulated	> 100	31	5180	51
1	> 50	61	2130	21
2	15 - 50	77	2235	22
3	< 15	187	610	6

Table 4-5 describes the eligibility criteria for barnyard runoff control. The table includes the regulated component of this management strategy.

The design target for organic pollutant control is set at 15 lbs for each barnyard that receives cost sharing. For those barnyards that can be reduced to 30 lbs/year by the use of a low cost diversion then 30 lbs will be the design target. If a barnyard cannot be reduced to 30 lbs/year by use of a low cost diversion then additional measures will be required to reduce the organic load to 15 lbs/year.

## **Manure Spreading**

Control of manure spreading will be accomplished mainly through 590 nutrient management plans developed for animal waste storage and barnyard runoff management practices.

Developing and implementing a 590 nutrient management plan is required as a category 1 management activity for any landowner that comes into the program and agrees to install a barnyard runoff system, manure storage, or barnyard relocation. In addition to the provisions of the manure spreading requirements these landowners are also required to comply with the following provisions:

1. Do not spread manure at any time in the following locations:
  - a. Wetlands
  - b. Grassed waterways
  - c. Areas of concentrated flow
2. Manure spreading in a floodplain is only allowed if it is incorporated within 72 hours.
3. Do not spread manure on slopes greater than 9% between November 15 and March 15.

These landowners will be required to comply with all the provisions of the 590 plan including the animal waste spreading requirements and the soil fertility requirements. Winter spreading of manure is prohibited with the only exceptions being that manure sources from

calf and heifer pens can be spread according to the 590 plan provisions. Additional parts of this chapter provide management strategies for nutrient management on lands that become involved in the whole farm nutrient management practice. Landowners who cannot meet 590 standards may request a variance from the standard by asking the Chippewa County LCC. The administrative procedures for granting variances to the 590 standard are further defined in chapter 5.

## **Nutrient Management**

This strategy should specify when nutrient management activities will be required or be eligible under a cost share agreement. The nutrient management for this project will conform to tech. guide 590 (see chapter 5). In addition nutrient management will be consistent with the Best Management Practices Handbook produced by UWEX and DATCP (tech. bulletin ARM-1). This project will make specific information and education activities available to assist landowners with planning and implementing nutrient management needs (see chapter 5 for I and E planning).

### **When is a 590 plan required?**

A 590 plan or nutrient management plan is required for certain landowners in this project. Any landowner that comes into the program and has a 590 plan completed that indicates the need for animal waste storage (as defined in SCS tech guide 312) and agrees to install a waste storage system is required to comply with all the provisions in the 590 standard. For landowners that are eligible for barnyard runoff management and sign cost share agreements for runoff control systems a 590 plan is also required. These landowners installing barnyard runoff control systems are required to comply with the 590 standard for the manure from the cost shared system at a minimum.

Nutrient Management plans are also available to other landowners under certain conditions that involve groundwater quality. Chapter three details the result of the well testing in this project and reveals some problem with nitrate concentrations in the groundwater supply for certain well owners. Because of the relationship between land applications of nitrogen containing substances and the movement of these substances into groundwater a management strategy is necessary that will minimize the problem of nitrate movement into the groundwater supply. Nutrient management plans will be eligible as category 2 (eligible but not required) for well owners with nitrate concentrations that exceed the public health standard ( 2 mg/l). Table 4-6 establishes the eligibility criteria for nutrient management.

**Table 4-6. Eligibility Criteria for Nutrient Management Plans to Manage Nitrate Pollution of Groundwater Well Supplies**

Management Category	Nitrate Level	# of Affected Landowners
2	> 2 mg/1	194
3	< 2 mg/1	76

Another eligible activity for these same landowners involves technical assistance for proper well abandonment. The priority watershed program cannot cost share the actual abandonment of a well, but it can provide the information on how to accomplish this activity.

The use of crop consulting is an eligible activity for any landowner who is eligible for nutrient management planning. This practice is explained in chapter 5. Costs associated with crop consulting will be granted through the nonpoint source grant or the local assistance grant for this project. The County may use contracting as the method for delivery for the crop consulting activities. Landowners that are currently eligible for nutrient management or pesticide management can receive the crop consulting practice.

Chippewa County will monitor compliance and enforce the 590 Standard following administrative procedures outlined in Chapter 5, Policies and Procedures, 1-8.

An initial funding commitment of \$300,000 will be allocated to support nutrient and pest management activities through the Local Assistance Grant and Nonpoint Source Grant during project years 1994, 1995, and 1996. This allocation will be used to fund educational and service related activities as scheduled in the Nutrient and Pest Management Implementation Strategy (Chapter 7). This allocation will be subject to an annual review.

As part of this review and evaluation, a target group of participants will be monitored annually for a minimum of three years to document changes in nutrient management practices and associated changes in on-farm soil fertility resulting from support services. Results of this evaluation will be documented in an annual written report and a three year project report to be compiled at the end of the 1996 cropping season. These reports will be prepared by the Land Conservation Department and submitted to the DNR and DATCP for agency review.

Funding for the remainder of the implementation period (project years 1997-2001) will be adjusted either up or down, based upon the level of participation and cost effectiveness of public expenditures. If after the normal contracting period, the additional funds are needed (to complete educational or service related activities), the DNR may allocate these funds through either the Local Assistance Grant or Nonpoint Source Grant.



# Wetland Management Strategy

Under certain conditions easements for wetland restoration can be used. Criteria for eligibility have been developed to facilitate wetland restoration. Wetland restoration can be a cost shared practice with or without an easement. Eligibility for wetland restoration includes areas identified by the County LCD which were previous wetlands. Wetland restoration is a category 2 management action. The purchase of an easement for these sites must be approved by the District Nonpoint Source Coordinator. Easements are not required for wetland restoration practices and the restoration is a cost sharable item with or without an easement. Wetland restoration is an eligible practice when one of the following landuse conditions are present:

1. Cultivated organic soils with tile or open channel drainage systems discharging to a permanent flowing stream (defined by chapter 30).
2. Pastured wetlands riparian to streams (defined by chapter 30).
3. Prior converted wetlands downslope or upslope from fields identified as critical upland sediment sources in the WIN inventory. Upland fields must be controlled to ("T"). In addition upland fields must have a sediment loss rate greater than .3 tons per acre.

The review of each easement will include a cost effective analysis and an evaluation of the water quality problems associated with the water resource. Chippewa County will submit a cost effective analysis and report the water quality problems associated with the easement.

Additional activities are planned to be implemented that affect wetland owners and the general public in this project. These activities are in recognition of importance placed on wetlands in this project. The specific management actions are listed in below and a more detailed discussion of the wetland management strategy is contained in appendix B of this watershed plan.

1. Information and education - The specific actions for this management activity are described in the I and E section of chapter 5.
2. Special studies - Grants will be sought to fund site specific studies of important high priority wetlands. These studies must be reviewed and approved by the DNR prior to implementation. The studies will be used to make decisions about management alternatives and wetland protection activities.
3. On farm visits - During the cost share sign up period landowner contacts will include identification of all prior converted wetlands. Landowners have the opportunity to install wetland restoration practices as a category II activity.

4. Improved use of existing regulations - Chippewa County will make a special effort to identify and establish a clear jurisdiction for wetlands by seeking a grant professional services contract for this service.
5. Permit review - Chippewa County will conduct permit technical review, when law allows, in order to establish an evaluation procedure for permit requests that affect wetlands in the project area. The County proposes to involve a number of other agencies as explained in appendix B.
6. Mitigation - Chippewa County will become involved in mitigation projects for the purpose of wetland protection. This management activity can allow staff from the project to work with other units of government for wetland protection purposes.
7. Inventory and monitor wetlands - Chippewa County will select 10 to 12 wetlands for inventory each year of the sign up period. The inventory will be used to establish wetland management plans and the inventory will include wetlands in urban areas.

Activities 2 and 4 are not eligible for nonpoint source program funding. Costs associated with these activities must be covered from other programs.

## **General Groundwater Management Strategies**

In addition to the groundwater management strategies for pesticides and nutrients, the Chippewa County LCD will implement several other activities for rural well owners. These activities are intended to protect water quality in rural aquifers outside of municipal wellheads. The following actions are planned for the rural well owners (see appendix A for more discussion of groundwater management plans):

1. Target these well owners with information and education efforts. Refer to chapter 5 for additional explanation of this activity.
2. Use a well abandonment demonstration to illustrate the process of abandonment. This activity is also more fully explained in chapter 5.
3. Secure grants to assist local units of government with hydrogeological studies in site specific areas of concern. Grants obtained with the assistance of the watershed project will require review and approval by the DNR nonpoint section.

4. The Chippewa County LCD will work with the Chippewa County Zoning office to make estimates of the need for septic system surveys in the project area. The estimates will be used to document problems that are potential or actual water quality impacts on groundwater.
5. A monitoring plan will be developed by the Chippewa County LCD and is further described in chapter 8 of this plan. The monitoring will be used to identify areas of groundwater concern and to track well water quality in wells eligible for nutrient management planning or pesticide management.
6. Chippewa County will inventory existing underground storage tanks for potential groundwater contamination.
7. Chippewa County will develop an administrative procedure to review existing discharge permits for impact on groundwater.

## Pesticide Management

Both pesticide management and nutrient management should consider the results of the well testing reports. Information and education activities will be used to assist well owners in proper abandonment of old and unused wells. DATCP will review the results of the well testing program and determine if any Administrative rules apply to the existing condition of Atrazine contamination. Reductions and management alternatives for Atrazine applications should be developed by the County LCD, DATCP and UWEX. Pesticide Management practices that can be used in this project are described in NR120.14(10) and include pest scouting and spill control basins. Landowners with well tests showing Atrazine concentrations above .3  $\mu\text{g}/\text{l}$  (ppb) are eligible for pesticide management as a category II action. Table 4-7 describes the eligibility criteria for controlling pesticide problems.

**Table 4-7. Eligibility Criteria for Pesticide Management**

Management Category	Atrazine Concentration	# of Affected Landowners
2	> .3 ug/l	17
3	< .3 ug/l	253

The delivery of pesticide management can be accomplished in this project with the use of agronomic consultants. The method for implementing this practice is further defined in Chapter 5.

# Ordinances

Chippewa County has a manure storage ordinance and therefore will not be required to develop one. The manure storage ordinance must be consistent with the watershed plan and will be required to be revised in the event that all or parts of the existing ordinance are in conflict with the provisions of the watershed plan.

Ordinances affecting municipal and urban areas are discussed in the urban section of this chapter and relate to control of construction site erosion and hazardous materials. Ordinances are required in this project and are more fully discussed in Chapter 5.

## Management Strategy For Municipal And Urban Areas

### Groundwater Management

Groundwater management strategies have also been developed to address the problem of contamination for municipal or publicly used well water sources. Problems that affect rural wells are often similar to municipal well problems concerning the types of contaminants. The groundwater strategy for municipal groundwaters include wellhead protection planning for Chippewa Falls, and Bloomer. Funds to support these planning efforts are not available at this time from the Nonpoint Source Program, but will be applied for by requesting grants whenever the opportunity presents itself. Sources of grants will be explored by the DNR to cover costs related to planning and implementation activities designed to protect and improve groundwater quality.

Contracts will be developed for the purpose of providing the detail of what needs to be done with groundwater related activities that are funded by grants outside of the priority watershed program. The elements required within the scope of a wellhead protection plan will include such activities as special studies, monitoring wells, contingency plans, public education, zoning proposals, easements, and proposed regulations or ordinances. Additional detail of how wellhead protection planning will be implemented is included in chapter 5. The use of wellhead protection planning in the Duncan Creek Watershed Project is a category II activity for all eligible municipal well fields currently providing water to the public. Wellhead protection planning activities for new or yet to be constructed wells are not eligible for funding through the watershed project and would not be considered for grant funding. For those projects that are eligible the Duncan Creek Watershed Plan allows for a 50 percent cost share to eligible well owners that develop contracts with the DNR for completing wellhead protection plans.

Whenever wellhead protection planning is implemented in this project the planning procedure must be consistent with DNR guidelines. These guidelines are available from the

Groundwater Section of the Department's Bureau of Water Resource Management. Wellhead plans can include the following kinds of activities, but are not restricted to these activities:

1. Hydrologic studies
2. Land use management alternatives
3. Contingency plans
4. Easement acquisition
5. Monitoring well installations
6. Delineation of potential contaminant sources
7. Public education and information activities
8. Development of ordinances

## **Urban Surface Water Management**

The management strategy for controlling urban sources of nonpoint source pollution is developed in this section of chapter 4. Land use inventories were accomplished for the urban sites by the West Central Regional Planning Commission under contract to the DNR. The information obtained by the Planning Commission was used in modeling the flow of pollutants from the urban sites to area streams and lakes. The mass load of pollutants for various types is discussed in chapter 3 and is compared to pollutant loads from the rural areas. The urban management strategy must recognize the pollution load reduction goals for this project. For phosphorus and sediment control the rural loads are compared with the urban loads and the location of the receiving water becomes an important factor in determining the need to control these sources. Other nonpoint urban sources like lead, copper, zinc, and cadmium were estimated for this project, but they cannot be compared to rural sources because these sources were not identified in rural areas. Since four urban areas were evaluated each one will have a separate management strategy because of the relative amounts of pollutants and the location of their entry into nearby surface waters. Each urban area inventoried will have a strategy designed to reduce and control pollutants according to need. The reductions of pollutants and the mass load reductions required in the urban management strategy are based on the predicted loads for the year 2010. The water resource appraisal cannot separate the influence of nonpoint sources from urban and rural runoff and therefore the control strategy is based on an assumption that increased future pollutant loads will cause more problems unless controlled. This type of strategy means that after a stormwater plan is developed during the cost share period of this project, the urban areas will target the loads based on a future condition. If the percentage reduction is based on this future condition then the urban area can include the pollutant load reductions in their future stormwater plans.

As an example, the city of Chippewa Falls is targeted for a 50 percent reduction in phosphorus based on the 2010 load of 4188 lbs, which equals 2094 lbs. The current phosphorus load of 2408 lbs would have to be drastically reduced (by 87 percent) if the 1992 inventory was used to estimate the needed phosphorus reduction level. By using the 2010 estimate of pollutant loading the city has the ability to reduce phosphorus from both existing areas and future developed areas at variable rates which can be assigned to both sources in

the most cost effective manner. The stormwater management plans developed for the Duncan Creek project urban areas must contain a mass balance for pollutant loading. This balance will allow the plan to target the level of control needed and the sites which can achieve the highest level of control in the most cost effective manner. Site specific stormwater management practices will need to be modeled for pollutant flows in order to make estimates about the amount of pollutant control possible from each practice. The planning considerations required for stormwater management plans will be incorporated in the contract or grant developed for the urban governments. These planning considerations provide the framework for the scope of the stormwater management plans.

The use of category I, II, or III management criteria has not been applied to the urban control plans for this project. Instead, management actions indicated will be required as a condition of any grants from the Nonpoint Source Control Program to the urban governments involved in this project. The development of the stormwater management plans being called for in this watershed plan are scheduled to be completed within three years of accepting a grant agreement. The grant agreements will be developed over the three year sign up period and each agreement will indicate the schedule for completion of the stormwater management plan.

### **Eau Claire Urban Area**

The city of Eau Claire has no stream tributaries in the Duncan Creek project area, but there is considerable amount of urban developed area that contributes pollutants directly through stormwater flows to the Chippewa River. Several factors contribute to a moderate need for urban pollution control:

1. The Chippewa River does not show a high degree of water quality problems due to nonpoint sources.
2. The major water quality concern is considered to be the peaking operations of the Northern States Power Company Hydroelectric Dams.
3. The city of Eau Claire is involved in the Lowes Creek Watershed project that is requiring a high level of pollutant control and consequently some of the planning and implementation activities in the Lowes Creek project will affect the Duncan Creek project.

The management strategy for that part of the city of Eau Claire in the Duncan Creek project consists of the following actions:

1. Develop a stormwater management plan that incorporates specific water quality practices designed to reduce sediment, phosphorus and metals flow into the Chippewa River for existing and future sources. The specific management actions required in the stormwater management plan are more fully described in chapter 5 under urban management practices.

2. Develop and implement a construction site erosion control ordinance.
3. Coordinate planning and management activities between the Lowes Creek project and Duncan Creek.
4. Develop and implement an information and education plan, with the assistance of the UWEX area water quality agent, designed to increase awareness of nonpoint source problems in urban areas. This I and E plan should be developed as part of the stormwater management plan.

A goal of reducing pollutants for all the nonpoint sources inventoried in the urban evaluation is set at 50 percent for the Eau Claire urban area in the Duncan Creek watershed. The stormwater management plan, when developed, must indicate the cost effectiveness of controlling these sources in existing urban areas or in newly developed areas. The stormwater management plan will be the tool for decision making on specific best management practices needed to reach the goal of a 50 percent pollutant reduction. The priority watershed project will support the development of the stormwater plan through a contract and grant process with the DNR.

The stormwater plan must be completed during the sign up phase of the project scheduled for a three year period.

The pollutant reduction goals require that the management strategy for Eau Claire be successful in controlling 460 tons of sediment, 1744 lbs of phosphorus, 440 lbs of lead, 188 lbs of copper, 1331 lbs of Zinc, and 6 lbs of Cadmium.

### **Chippewa Falls Urban Area**

The city of Chippewa Falls inventory found the largest pollutant loads of all the four urban inventories conducted in this project. The city has drainage directly into two water bodies, involving the Chippewa River, and Duncan Creek. The impacts of the nonpoint sources on these water bodies is discussed in chapter 3. The inventories also found that the expected increase in pollutants in the year 2010 was substantial due to predicted increases in urban development. The need for control of pollutants flowing to the Chippewa River is similar to that established for the city of Eau Claire and is set at 50 percent.

Urban runoff to Duncan Creek in the city of Chippewa Falls was not found to have a serious affect on water quality. This segment of Duncan Creek has a very steep gradient and the water resource appraisal did not document any significant impacts from nonpoint sources along Duncan Creek in the city of Chippewa Falls. Control of pollutants in this part of Duncan Creek is set at 50 percent.

The management strategy for Chippewa Falls will require a 50 percent overall reduction in pollutants. The following management actions are recommended for the entire Chippewa Falls urban area:

1. Develop and implement a construction site erosion control ordinance that addresses all those construction sites currently not regulated.
2. Develop and implement a stormwater management plan. The scope of the plan must include water quality practices designed to reduce the inventoried pollutants by 50 percent.
3. Develop and implement an I and E plan as part of the stormwater management plan.

The pollution reduction goal is set for this urban area primarily because of the water quality concern for Duncan Creek and the Chippewa River. A 50 percent reduction in all the inventoried pollutants for this area will result in control of 632 tons of sediment, 2094 lbs of phosphorus, 567 lbs of lead, 495 lbs of copper, 2406 lbs of Zinc, and 14 lbs of Cadmium. Glen Loch is a water body that could be affected by future development and the immediate drainage area of this water body must be considered in any water quality plans developed from funds approved through this plan or contracted through special grants arranged by watershed project staff.

## **Hallie Area**

The management strategy for Hallie includes the following management actions:

1. Develop and implement a construction site erosion control ordinance for construction sites not currently regulated.
2. Develop and implement a stormwater management plan.
3. Include an I and E component in the stormwater management plan.

Part of the Hallie urban area consists of a drainage area that flows into Lake Hallie. This drainage area has been altered from the natural grade and is essentially divided into west and east sections. The eastern part of the drainage area is internally drained and is mostly rural in landuse. The western section is undergoing residential and commercial development that has direct water quality impacts on Lake Hallie. The water resource appraisal indicated that Lake Hallie is on a threshold of phosphorus loading that if increased could significantly change the trophic relationships in the Lake. The pollutant reduction goal for the western part of this drainage area requires a 70 percent reduction in the inventoried pollutants. Reaching the pollutant reduction goal will reduce sediment by 769 tons, phosphorus 3306 lbs, Lead 704 lbs, Copper 336 lbs, Zinc 1943 lbs, and Cadmium 11 lbs. The stormwater management planning for the Lake Hallie area is the highest priority among the four urban



areas inventoried. The Department of Transportation plans for this area include a significant expansion of major roads and interchanges likely to attract residential, commercial and industrial development to this drainage area.

## **Bloomer Urban Area**

The management strategy for Bloomer includes a similar approach as the other three urban areas. The following management actions are recommended for the city of Bloomer:

1. Develop and implement a construction site erosion control ordinance that includes construction activities not currently regulated.
2. Develop and implement a stormwater management plan with special provisions designed to address control of water temperature in Duncan Creek.
3. Incorporate an I and E component into the stormwater management plan.
4. The city wastewater treatment plant must reduce phosphorus discharge by treating effluent to a level that results in a concentration of 1 mg/l. This reduction cannot be cost shared by the nonpoint source program. Current State law now regulates the discharge from this treatment plant and this law will be applied to achieve the reduction.

The city of Bloomer is in a sensitive area concerning stormwater discharge to Duncan Creek. The water resource appraisal for this project indicated that the downstream segment of Duncan Creek is affected by warm stream temperatures. Increased warm water flows from stormwater discharges could limit the stream's potential for Trout. The stormwater management plan for this urban area must include provisions for controlling water temperature as well as the other pollutants. The pollutant reduction goals for this urban area require a 50 percent reduction in sediment and the inventoried metals. A higher level of control is set for phosphorus due to the need for reducing the flow of this pollutant to the Tilden and Glen Loch impoundments. The reduction for phosphorus in Bloomer is set at 70 percent. The reductions of pollutants by the indicated percentages will reduce sediment by 96 tons, Phosphorus 477 lbs, Lead 94 lbs, Copper 46 lbs, Zinc 286 lbs and Cadmium 2 lbs.

The implementation of the urban management strategies for Bloomer are next in priority after Hallie. Chippewa Falls and Eau Claire receive the next level of priority for the implementation of the urban surface water management strategy.

# Ordinances

If construction site erosion threatens water resources the appropriate local governments will be required to adopt an ordinance that meets DNR approval. Because of the presence of storm sewers and discharge of stormwater directly into surface waters the potential exists for sedimentation by uncontrolled runoff from construction especially in the developing areas..

Recent state law changes now require municipalities with populations over 2500 with code enforcement responsibilities to implement the provisions of the DILHR code for construction site erosion control. These provisions require control of construction site erosion on one and two family dwellings. In addition to this requirement any land disturbing activity of more than five acres now requires a construction site erosion control and stormwater management permit to be issued by the DNR. These changes have strengthened water resource protection across the state but do not address construction erosion problems associated with commercial, transportation and rural activities.

The Duncan Creek watershed project recognizes the need for controlling sediment from construction sites and the project is also aware of the recent plans to construct a number of major highways. These new transportation projects will change planning estimates for growth and could indicate a greater need for construction site erosion control on lands currently not required to control erosion. Because of these new developments in state law and transportation plans a construction site erosion control ordinance is required as a condition of the project. This ordinance will have to address construction activities that are not currently covered under existing state law.

The construction site erosion control ordinance must address the watershed project area. The areas required for ordinance adoption include all or portions of the municipalities of Eau Claire, Chippewa Falls, and Bloomer. The Hallie area and its governmental unit (township) is included in the construction site erosion control ordinance requirement. Chapter three details the existing condition of these areas concerning sediment loads and the loads indicate significant sediment is generated in these areas. Increased development combined with existing and future stormwater conveyance systems support the need for controlling construction site erosion. The ordinance development should occur over the three years of cost share sign up in the watershed project. All of the governmental units in the watershed project are eligible for technical assistance from the Priority Watershed Project for help in developing and planning a construction site erosion control ordinance. The affected units of government are also eligible for support in the form of local assistance grants designed to provide resources for ordinance development and administration.

The Chippewa County LCD will develop a hazardous materials storage, handling and reporting ordinance. The form of this ordinance will be consistent with DNR regulations affecting this activity and must be reviewed by DNR and approved prior to implementation.

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# **CHAPTER FIVE**

## **Chippewa County Implementation Program**

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This chapter outlines methods to implement the management actions described in Chapter 4. The success of this priority watershed project depends on the implementation of these nonpoint source control strategies.

More specifically this chapter defines:

1. Project participants including landowners, cooperating agencies, municipalities, and civic groups.
2. Implementation strategies for information, education, easement acquisition, groundwater, wetlands and nutrient and pest management.
3. Which agencies and units of government are responsible for carrying out the identified tasks and schedules for implementing the program.
4. The best management practices (BMPs) necessary to control pollutants on the critical sites identified in Chapter 5.
5. Minimum management standards and eligibility requirements
6. County policies and procedures for delivery of services and administration of standards.
7. The project budget including the expenses for education, information, cost-sharing, easements, monitoring and staff.

# County Implementation Strategy Outline

## A. ADMINISTRATION

1. Authority
  - a. Chapter 92.07
  - b. Resolution 117-90
  - c. Resolution 95-91
  - d. Chapter NR120
2. Project Management Schedule

## B. PROJECT PARTICIPANTS

1. Landowners and Operators
2. Civic Groups
3. Municipalities
4. State and Federal Agencies

## C. MINIMUM ELIGIBILITY REQUIREMENTS

1. Minimum Land Management Standards
2. Minimum Performance Standards for Animal Waste Management Systems

## D. IMPLEMENTATION STRATEGIES

1. Control of Upland Soil Erosion and Sediment/Nutrient Delivery
  - a. Control of Sheet and Rill Erosion from Farm Fields
  - b. Control of Ephemeral Erosion Conveyed from Areas of Concentrated Flow
  - c. Control of Animal Waste Runoff and Nutrients Conveyed from Farm Fields
2. Control of Animal Waste from Barnyards and Feedlots
  - a. Minimum Management Standards
  - b. Best Management Practices
  - c. Improved Use of Existing Regulation
3. Stream Corridor
  - a. Minimum Management Standards to Restrict Stream Ditching and Cattle Access
  - b. Easements to Preserve Environmental Corridors
  - c. Best Management Practices to Control Streambank Erosion
  - d. Improved Use of Existing Regulations
4. Wetland Implementation Strategy
  - a. Avoid Destruction of Wetlands
  - b. Minimize the Further Degradation of Wetlands
  - c. Compensate for the Loss of Wetlands
  - d. Restore Degraded Wetlands
5. Groundwater Implementation Strategy
  - a. Information and Education
  - b. Easements to Protect Urban Wellheads
  - c. BMPs/Positive Incentives

- d. Develop/Maintain Active Groundwater Inventory
- e. Improved Use of Existing Regulations

**E. BEST MANAGEMENT PRACTICES**

- 1. Eligible BMPs
  - a. cost-share percentage rates
  - b. flat rates
  - c. description
- 2. Ineligible BMPs
- 3. Activities Not Eligible for Cost share Assistance

**F. FISCAL REQUIREMENTS**

- 1. Information
- 2. Education
- 3. Best Management Practices
- 4. Easements
- 5. Staff

**G. POLICIES AND PROCEDURES**

- 1. Landowner Contact Strategy
  - a. Stream Corridor
  - b. Barnyard Phosphorous Delivery
  - c. Other
- 2. Resource Conservation Planning
  - a. Resource Conservation Development
  - b. Resource Conservation Plan Content
  - c. Resource Conservation Plan Follow-Up
- 3. Cost-share Agreement Development and Execution
- 4. Administration of Standards
  - a. Standards and Annual Certification
  - b. Compliance of Minimum Management Standards
  - c. Operations and Maintenance Violations
- 5. Engineering Services
  - a. Engineering Services Provided
  - b. Services Related to Practice Construction NOT Provided by Engineering Staff
- 6. Cost Containment
  - a. Bids
  - b. Flat Rates
  - c. Other
- 7. Contracts
- 8. Reimbursement Procedures
  - a. Grant disbursement
    - 1) Local Assistance Grant
    - 2) Nonpoint Source Grant
  - b. Cost-share agreement

# Administration

## Authority

The Chippewa County Land Conservation Committee will be recognized as the lead management agency for the Duncan Creek Clean Water Project. The Committee will coordinate the efforts of participating municipalities and cooperating federal and state agencies.

-The Chippewa County Land Conservation Committee (LCC) will act for the County Board and be responsible to the State of Wisconsin for management of the project.

-The County Conservationist or a designee shall serve as governmental representative during the Implementation Phase.

-The Chippewa County Land Conservation Committee will administer the Duncan Creek Clean Water Project following state and county statutory powers as defined by Wisconsin Statutes Chapter 92.07, Chapter NR120, Resolution 117-90 and Resolution 95-91.

**a. Chapter 92.07**

Chapter 92.07 lists delegated powers of county Land Conservation Committees for the protection of soil and water resources.

**b. Resolution 117-90**

Chippewa County Resolution 117-90 accepts the states offer to sponsor the Duncan Creek Clean Water Project.

**c. Resolution 95-91**

Chippewa County Resolution 95-91 authorizes the Land Conservation Committee to administer the Duncan Creek Clean Water Project by carrying out their statutory powers as outlined in Chapter 92.07.

**d. Chapter NR120**

Chapter NR120 is the administrative framework for the Nonpoint Source Pollution Abatement Program.

The specific responsibilities are defined in the Wisconsin Administrative Rules, s. NR 120.04. To implement this plan, the county will:

- 1) Identify in writing a person to represent the county during implementation of the project.
- 2) Contact all owners or operators of lands identified as significant nonpoint sources (Category I) within one year of signing the nonpoint source grant

agreement. The strategies for contacting landowners are included in this chapter.

- 3) Develop farm conservation plans consistent with the needs of the project.
- 4) Enter into nonpoint source cost-share agreements with eligible landowners and enforce the terms and conditions of cost-share agreements as defined in s. NR 120.13, Wisconsin Administrative Code.
- 5) For lands the county owns or operates, enter into cost-share agreements with DNR to correct identified nonpoint sources and fulfill their obligations as a cost-share recipient.
- 6) Design best management practices and verify proper practice installation.
- 7) Reimburse cost share recipients for the eligible costs of installing BMPs at the rates consistent with administrative rules and established in this plan.
- 8) Prepare and submit annual work plans for activities necessary to implement the project. The Chippewa County LCD shall submit a workload analysis and grant application to the DATCP as required in s. Ag. 166.50.
- 9) Prepare and submit to the DNR (DNR) and the DATCP the annual resource management report required under s. NR 120.21(7) to monitor project implementation by tracking changes in the nonpoint source inventory, and quantifying pollutant load reductions which result from installing BMPs.
- 10) Participate in the annual watershed project review meeting.
- 11) Conduct the information and education activities identified in this plan for which they are responsible.

## **Project Management Schedule**

Project implementation will begin upon approval of this watershed plan. The project will be implemented by landowners and municipalities working through the Land Conservation Committee.

Project implementation is scheduled to begin no later than July 1, 1993.

The priority watershed project implementation period lasts eight years. It includes an initial three year period for contacting eligible landowners and signing cost-share agreements. Practices on any cost-share agreement must be installed within a five year period.

For purposes of acquiring and administering easements, the eight year implementation period will be recognized as the period of contracting and implementation.

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

## **Project Participants**

### **Landowners and Land Operators**

The owners and operators of public and private lands are recognized as critical program participants responsible for ongoing landuse decisions in the project area. These managers will be encouraged to adopt Best Management Practices designed to reduce nonpoint pollution and improve water related resources. Those eligible for direct technical and financial assistance are as follows:

- individuals landowners and operators
- Chippewa County
- other governmental units described in NR 120.02(19)
- corporations
- State of Wisconsin

### **Civic Groups**

Civic Groups will be recognized as organizations which may share common resource objectives with the project. Potential participants are as follows:

- |                          |                  |            |
|--------------------------|------------------|------------|
| -Chippewa Rod & Gun Club | -Trout Unlimited | -Lake Como |
| -Bloomer Rod & Gun Club  | -4-H             | -District  |
| -FFA                     | -Boy/Girl Scouts |            |
| -Mainstreet              | -Optimist Clubs  |            |

Civic groups will be encouraged to participate in the project as a means to meet their individual goals. See Chapter 10 for more information.



## Municipalities

The Land Conservation Committee will recognize existing authorities and work with the following municipalities:

<u>cities</u>	<u>village</u>	<u>townships</u>	
Chippewa Falls	N Auburn	Sampson	Howard
Eau Claire		Auburn	Tilden
Bloomer		Bloomer	Wheaton
		Cooks Valley	Hallie
		Woodmohr	

See Chapter 10 for more information.

## State and Federal Agencies

The Land Conservation Committee will recognize existing authorities and work with the following public agencies:

<u>Federal</u>	<u>State</u>	<u>County</u>
USDA SCS	DNR	UWEX
USDA ASCS	DATCP	Zoning
USFWS	DILHR	
US Army Corp	UWEX-NPM	
	WCC	

See Chapter 10 for more information.

## Minimum Eligibility Requirements

Minimum management standards will be used to insure a comprehensive resource management approach while achieving water quality at least public cost. A participant must be in compliance with eligibility standards before entering individual cost share agreements or easements.

### Minimum Land Management Standards

- a. Maintain a rate of soil erosion on individual farm fields within the tolerable rate (T value) as calculated by USLE and/or RUSLE.

- b. Control ephemeral and gully erosion in areas of concentrated flow through use of protective sod cover. This standard will apply to all areas of concentrated flow as identified on soil maps or 7.5' topographic maps. The minimum width of natural waterways will be 1 rod. The minimum width of constructed, grassed waterways will be established by basin hydrology and design criteria of the USDA-SCS Tech. guide.
- c. Conduct landuse activities without draining, filling, flooding, or otherwise altering the hydrology of wetlands.

This standard shall apply to all wetlands meeting state definition.

The approximate location of wetland boundaries will be identified using the Chippewa County Soil Survey, the 1983 Chippewa County Wetland Inventory, and on the 1991 USDA Wetland Inventory. Field specific delineations will be made using the Federal manual for Identifying and Delineating Jurisdictional Wetlands (1987 Edition).

- d. Conduct landuse activities without ditching streams.
- e. Restrict livestock from streams.

All streams which have a definable bed and bank shall restrict cattle access with the exception of areas for crossings and watering.

If a fence is required to restrict livestock, the fence will be constructed a minimum of 33 feet from each edge of the streambank or out of the floodplain (whichever is less).

Limited cattle access will be allowed, through a controlled grazing permit, in stream corridors which do not have a definable bed and bank. Conditions of the controlled grazing permit will be as follows:

- \* Livestock numbers allowed on the stream corridor pasture will be calculated based on pasture area, pasture quality, length of time pastured and livestock average weight.
- \* Livestock will be allowed to access stream corridor pastures from May 1 through October 15.
- \* If pasture or streambank damage occurs or if livestock numbers are too small to control vegetation, livestock numbers will be adjusted by agreement by the landowner and the LCD.
- \* Permit conditions may be temporarily altered, by agreement between the landowner and the LCD, in cases of disaster.

- \* Permit conditions must be followed at all times. Permits will be subject to periodic announced review.
- f. Leave 66 ft. buffer adjacent to streams. Maintain a permanently vegetated perennial buffer along all intermittent or perennial streams with a definable bed and bank. The minimum width of this buffers will be:
  - 1) 4 rods as measured from the bank of the stream, or,
  - 2) The vegetated floodway as defined by soil type and wetland maps.

### **Minimum Performance Standards for Animal Waste Management Systems**

Eligible participants who choose to install an animal waste management system(s) or receive nutrient management services must meet performance standards for pollution control.

Eligibility and performance standards required for Animal Waste Management Systems are as follows: (Animal Waste Management Systems are defined as: barnyard runoff management systems, clean water diversions, roof runoff management, barnyard relocation.)

- Reduce barnyard phosphorous runoff to 15 lbs/year
- No spreading of manure in wetlands or floodplain
- No spreading of manure on fields with frozen ground and slopes of greater than 9%

Additional eligibility and performance standards required for manure storage facilities are as follows:

- Reduce barnyard phosphorous runoff to 15 lbs/year
- No spreading manure in wetlands or flood plain
- No winter spreading of manure
- Prepare and implement annual field nutrient budget to limit nutrients applied to meet plant needs
- Treat critical milkhouse drains

Additional eligibility performance standards required for nutrient and pest management services are as follows:

- Reduce barnyard phosphorous runoff to 15 lbs/year
- No winter spreading of manure in wetlands or floodplain
- No spreading of manure on fields with frozen ground and slopes of greater than 9%
- Prepare and implement annual field nutrient budget to limit nutrients applied to meet plant needs

# Implementation Strategies

Detailed appraisals of surface water, groundwater, wetlands, and agricultural nutrients have been conducted as part of the planning process.

## Control of Upland Soil Erosion and Sediment/Nutrient Delivery

Results of these appraisals indicated sediment and nutrients from agricultural fields are significant nonpoint sources which affect surface water and groundwater.

A comprehensive management strategy will be applied to reduce sediment and nutrients delivered to surface water, wetlands, and groundwater from agricultural sources.

Efforts to control these agricultural sources will be based upon management standards adopted to:

- Control sheet and rill erosion from farm fields
- Control ephemeral erosion in areas of concentrated flow
- Control animal waste runoff and nutrients conveyed from farm fields.

Minimum management standards will be augmented by positive incentives to encourage further control of these potential nonpoint sources.

### A. Control of Sheet and Rill Erosion from Farm Fields

- 1) Minimum Management Standards  
(See Chapter 5, Section C.)
- 2) Positive Incentives
  - a) BMPs to Encourage Farming below "T"  
Landowners will be encouraged to manage fields below the tolerable soil loss.

The following BMPs will be cost shared as an incentive:

- No Till
- Minimum Till
- Contour Farming
- Contour Strip Cropping

**B. Control of Ephemeral and Gully Erosion Conveyed from Areas of Concentrated Flow**

- 1) Minimum Management Standards
  - a) Control ephemeral erosion in areas of concentrated flow through use of protective sod cover. (See Chapter 5, Section C.)
  - b) Control of Gully Erosion  
Critical gullies (Category I) eroding at a rate greater than 50 tons/ac/yr will be corrected as a condition of all cost share agreements. (See Chapter 4.)
- 2) Positive Incentives
  - a) BMPs to Control Ephemeral Erosion  
Best Management Practices will be used to protect areas of concentrated flow, repair gullies and control sediment. These management practices are as follows:
    - Critical area seeding
    - Diversions
    - Grassed waterways
    - Sediment basins
    - Drop structures

**C. Control of Animal Waste Runoff and Nutrients Conveyed from Farm Fields**

- 1) Minimum Management Standards
  - a) Require Buffers Adjacent to Intermittent and Perennial Streams  
(See Chapter 5, Section C.)
  - b) Animal Waste Management Systems  
Participants implementing animal waste management systems must meet performance standards for manure spreading and nutrient and pest management. (See Chapter 5, Section C.)
- 2) Positive Incentives
  - a) Waterway Buffers  
Waterway buffers will be encouraged as a component of the resource management plan for each farm. As part of the planning process, ASCS corn base and average set aside acreage will be calculated. Landowners will be encouraged to commit annual set aside acreage as multi-year buffers.

Waterway buffers will be offered as a Category II practice along all streams and upland waterways.

The following components of the waterway buffer will be cost shared, at a rate of 70 percent:

- Establishment of vegetative cover
- Construction of level spreading structures
- Grading
- Removal of obstructions
- Establishment of wildlife habitat

If cost shared, the vegetated waterway buffer must remain in place for the contract period.

If the waterway buffer is not shared through the Duncan Creek project but is established as a voluntary ASCS set aside buffer, there is no contract obligation to maintain the buffer.

b) **Field Buffers**

Contour and field border buffers will be offered as a cost shareable (category II) practice as a component of the resource management plan for each farm.

The following components of contour and field border buffers will be cost shared, at a rate of 70 percent:

- Permanent fencing
- Establishment of vegetative cover
- Shaping and smoothing
- Establishment of wildlife habitat

If cost shared, the vegetated buffer must remain in place for the contract period.

c) **Nutrient and Pest Management Services**

Nutrient and pest management services will be offered as a Category II practice for eligible landowners. (See Chapter 4 for eligibility criteria; See Chapter 7 for Nutrient And Pest Management Implementation Strategy.)

## **Control of Animal Waste and Nutrients from Barnyards and Feedlots**

A surface water appraisal has been conducted as part of the planning process. Animal waste and nutrients from barnyards and feedlots are a significant source of nonpoint pollutants. A summary of the results of the barnyard inventory are presented in table 5-1.

**Table 5-1. Barnyard Inventory Results**

	Number of Sites
"Critical" barnyards > 100 lbs.	33
Category 1 50-100 lbs.	29
Category 2 50-115 lbs.	79
Ineligible < 15 lbs.	184
Total	329

A comprehensive management strategy will be used to reduce these pollutants based upon minimum management standards, best management practices, and the improved use of existing regulation.

**a. Minimum Management Standards**

All landowners who receive cost share on barnyards will meet the minimum management standards for upland erosion control, manure spreading, and livestock exclusion from streams. ( See Chapter 5, Section C.) For those choosing a higher level of nutrient management, nutrient management services will be made available.

**b. Best Management Practices**

The following components of a barnyard runoff management systems will be cost-shared at a rate of 70 percent:

- clean water diversions
- grassed waterways
- critical area stabilization
- agricultural sediment basins
- barnyard runoff management
- animal lot relocation

**c. Improved Use of Existing Regulation**

The animal waste management strategy requires all barnyards contributing more than 100 lbs. of phosphorous be recognized as "critical sites: subject to regulation under Administrative Rule NR243.

In circumstances where landowners have not committed to reduce phosphorous from critical sites to 15 lbs./year, the following measures will be implemented:

- 1) Chippewa County would serve as complainant under prescribed NR243 procedures.

- 2) The DNR and county will conduct an onsite investigation to verify and document estimated phosphorous discharge.
- 3) The DNR will determine whether discharge has a significant impact on water quality.
- 4) If the DNR issues a Notice of Discharge, the landowner will be eligible for financial and technical assistance as rendered through NR243.

A list of locations and phosphorous loads are included in Appendix F.

Low cost practices will be encouraged to remedy barnyard problems. Landowners will also be made aware of the WHEDA Nonpoint Source Water Pollution Loan Program (NSPL) currently being developed.

Chippewa County will initiate the NR243 procedure by filing a complaint with the DNR. The procedure will follow the usual process set forth in NR243.

## **Stream Corridors**

Stream corridors are recognized as critical environmental areas within the Duncan Creek basin. Stream corridors act as buffers to reduce sediment and nutrient delivery to streams, support native plant communities, serve as critical wildlife habitat and provide biodiversity.

Stream corridors will be managed through use of minimum management standards, stream corridor easements and structural measures.

### **a. Minimum Management Standards to Restrict Stream Ditching and Cattle Access**

All participants who sign cost share agreements will be required to meet a set of minimum management standards. These standards restrict stream ditching and establish limits on cattle access in the stream corridors.

- 1) Intermittent or perennial streams with a definable bed and bank must not be ditched or straightened.
- 2) Cattle must be restricted from intermittent and perennial streams with a definable bed and bank.

### **b. Easements to Preserve Environmental Corridors**

Easements are recognized as a cost effective means to achieve resource management objectives in the project area. Three types of easements will be used and targeted to specific stream reaches, as identified in table 5-2.



**Table 5-2. Easement Type and Eligible Stream Corridor within the Duncan Creek Basin**

Easement Type	Grantee	Eligible Stream Corridors
Fish Management	DNR	Hay Creek, Upper Duncan Creek
Stewardship	DNR	Como Creek, Middle duncan Creek <sup>1</sup> , Little Hay Creek <sup>1</sup> , Chippewa River <sup>1</sup>
NR120 Easement <sup>2</sup>	Chippewa County - LCD	

<sup>1</sup> To be approved

<sup>2</sup> All intermittent and perennial streams with a definable bed and bank, not eligible for fish management or stewardship easements.

Fish management easements will be pursued on designated streams to protect and improve the fishery. Ongoing management of these easements is the responsibility of the DNR. Fencing, installation and maintenance of fences will be the responsibility of the DNR.

Stewardship easements and fee title acquisition will be used to improve water quality with emphasis on protecting the native plant communities and the quality of the fishery. All sites along the stream will be eligible for easement acquisition. Stewardship easements will be managed by the DNR or a Non Profit Conservation Organization (NPO). Stewardship easements pay 100 percent of fencing and installation. Maintenance of the fence will be the responsibility of the DNR or NCO. Public access will be required for Stewardship easements.

NR120 easements will be used to limit upland sediment and nutrient delivery, which now effects water quality. As part of the priority watershed project, 70% of the cost of fencing and installation is provided. Maintenance of the fence will be the responsibility of the landowner.

Priorities for easement acquisition will be given to:

- stream corridors which contain wetlands or act as buffers;
- corridors which currently have cattle access;
- tributary flow areas which contribute runoff water to intermittent or perennial streams.

The minimum width of an easement will be 66 feet as measured from the streambank or the vegetated floodway, whichever is larger. Variances will be allowed subject to review and approval by the Chippewa Co. Land Conservation Committee. Variances will be considered for cases of extreme stream meandering or large floodways.

There will be no maximum width of the easement.

The proposed contact strategy is detailed in Chapter 5, Policies and Procedures.

Table 5-3 shows the roles and responsibilities of agencies involved in NR120 easement acquisition and management.

**Table 5-3. Agency Roles/Responsibilities in NR120 Easement Acquisition and Management**

Acquisition	Activity	Agency	
		County-LCD	DNR
	Initial Contact	X	
	Easement Request Prepared	X	
	Proposal Approval		X
	Appraisal (contracted)	X	
	Appraisal Review		X
	Negotiations with Landowner	X	
	Survey/Boundary Marking (contracted)		
<b>Management</b>			
	Contract Maintenance	X	
	Annual Report	X	

Table 5-4 shows the steps which will be followed during an NR120 easement acquisition.

**Table 5-4. Easement Acquisition Process**

LCD develops easement proposal and forwards to NPS coordinator.
NPS coordinator reviews the proposal.
NPS coordinator approves the request.
LCD contracts appraisal.
Bureau of Property Management reviews appraisal.
LCD meets with landowner to negotiate easement.
Landowner signs contract and DNR has 90 days to approve/disapprove.
DNR informs landowner of acceptance and orders title insurance. Once title is clear, check is issued.

In cases where there is no cattle access, fencing will not be required.

In cases where fencing is required, the initial cost of installing the fence will be cost shared at a rate of 70 percent. Constructed cattle access and constructed cattle/machinery crossings will be allowed at no more than 2 per quarter mile.

The Wisconsin Conservation Corp will be contracted to supply the labor for initial fence installation. Maintenance will be the responsibility of the landowner once the fence is installed. Private, non-profit organizations, community groups, schools and other conservation organizations will be encouraged to participate in fence maintenance.

At the time of easement negotiation, the issue of public access will be negotiated in a manner acceptable to the landowner. The general rule is that the public may only enter the eased area from other lands open to the public, and can only travel by foot, snowshoe or ski.

**c. Best Management Practices to Control Streambank Erosion**

Results of the streambank erosion and cattle access inventory are presented in Chapter 3.

**1. Minimum Management Standards**

-Fencing to Control Cattle Access  
(See Chapter 5, Section C.)

All locations of cattle access will be eligible for cost sharing on fencing, cattle crossings and/or watering facilities. Cattle crossings and watering facilities will be restricted to 2 per quarter mile.

**2. Best Management Practices**

-Instreambank Erosion

Streambank erosion sites contributing more than 2 tons/year/site will be eligible for control. Streambank erosion sites contributing more than 30 tons/acre/year are required to be corrected.

Designs for streambank protection shall be according to the following principles:

- a) Streambank protection will be started and ended at a stabilized point.
- b) Channel clearing, if needed, will be the first step of streambank protection work.
- c) Structural measures must be effective for the design flow and be able to withstand flow and be able to withstand greater floods and avoid damage to downstream existing structures.
- d) Vegetative measures will be considered first. Erosion that cannot be controlled by vegetative measures must be controlled by structural measures along with vegetative measures.
- e) Riprap rock size, gradation and cross-section shall conform to the USDA-SCS specifications.

Cost shareable practices for the control of streambank erosion will include the following:

- a) Removal of fallen trees, stumps, debris or sand bars which may cause local current turbulence and deflection.

- b) Removal of trees and brush that adversely affect the growth of desirable bank vegetation.
- c) Reduction of the slope of streambanks to provide suitable conditions for vegetative establishment.
- d) Rock riprap, properly underlain with a filter blanket, if necessary, to provide protection for streambanks.
- e) Deflectors, constructed of posts, pilings, fencing, rock, brush or other materials, that project into the stream to protect banks at curves and reaches subject to high velocity currents.
- f) Pervious or impervious structures built on or parallel to the stream to prevent scouring velocities adjacent to the streambank.
- g) Fences to protect vegetation and streambank from damage by cattle and vehicular traffic.
- h) Establishment of suitable vegetation, normally done in conjunction with other work.

With the assistance of DNR-Fish Management, fish structures will be installed at controlled erosion sites, These fish structures will be placed in locations and stream reaches where fish management feels existing structure is inadequate.

#### **d. Improved Use of Existing Regulations**

The Land Conservation Committee will work with the Chippewa County Zoning Committee and Zoning Administrator to amend the county shoreland zoning ordinance; to add standards for construction site erosion control and administrative provisions for plan review by the Land Conservation Department.

### **Wetland Implementation Strategy**

A wetland appraisal was conducted as part of the planning process. (Stadnyk, 1992.) A Wetland Implementation Strategy was developed to achieve objectives documented in Chapter 3.

Management activities are grouped by the following objectives:

- Avoid destruction of wetlands
- Minimize the further degradation of wetlands
- Compensate for the loss of wetlands
- Restore degraded wetlands.

The following is a list of activities which will be implemented to achieve wetland management objectives.

**a. Avoid Destruction of Wetlands**

- 1) Develop/maintain active wetland inventory to document the current location, use, condition and quality of wetlands.
- 2) Implement an information and education strategy which focuses on wetland functions and values within the watershed.
- 3) Administer NR120 easements to preserve selected wetlands in designated environmental corridors.
- 4) Improve use and administration of existing regulations. Administrative process will be developed to establish jurisdictions, provide for technical review of permits/plans, provide for engineering compliance checks and for projects permitted in wetlands.

**b. Minimize the Further Degradation of Wetlands**

- 1) Record the locations of wetland sites and plan these sites as a component of all resource conservation plans.
- 2) Provide funds for detailed studies of urban wetlands to document existing condition and use as a component of urban stormwater management plans.
- 3) Provide cost share funds for agricultural and urban BMPs to limit degradation of wetlands from upland sediment and runoff sources.

**c. Compensate for the Loss of Wetlands**

- 1) Actively participate in the wetland mitigation processes authorized by state and federal agencies.
- 2) Identify and maintain inventory of prior converted wetland as potential mitigation sites.
- 3) Recognize that mitigation will occur on prior converted wetland sites within the subwatershed of taking.

**d. Restore Degraded Wetlands**

- 1) Administer technical assistance and cost share funds to urban and rural landowners for the purpose of restoring prior converted wetlands to their original wetland type and plant community.

Funding for these activities will be provided through the project as authorized under NR120. Funding for activities not covered by NR120 will be sought by the DNR through other state or federal sources.

A more detailed description of management activities is provided in appendix B.

## **Groundwater Implementation Strategy**

A groundwater appraisal for the Duncan Creek Watershed has been conducted as part of the planning process.

Groundwater management objectives have been adopted based upon results of the appraisal and groundwater managed standards established. These management objectives are outlined in Chapter 3, and are contained in appendix A.

The groundwater management strategy has been developed to achieve the groundwater management objectives. Table 5-5 summarizes the groundwater management strategy.

**Table 5-5. Groundwater Management Strategy Summary**

	<b>Protect water quality in aquifers within municipal wellhead areas</b>	<b>Protect water quality in aquifers in rural areas</b>
<b>I&amp;E</b>	<p>Target Groups: Urban residents, Municipal wellhead residents</p> <p>Messages: Groundwater is the source of all drinking water; landuse affects water quality</p>	<p>Target Groups: Rural landowners, students, civic/sportsmen groups, well drillers, businesses, local elected officials</p> <p>Messages: Landuse affects Groundwater quality; Prevention is the most cost effective method of protection; accurate geologic information is important</p>
<b>Positive Incentives/ BMPs</b>	<p>Grants to municipalities for wellhead protection planning and implementation</p> <p>Grants to facilitate easement purchases in zone of contribution</p>	<p>Grants to municipalities or townships for hydrologic studies in areas of concern</p> <p>NPM assessment and services available to rural landowners, based on well test</p>
<b>Regulation</b>	<p>Review of permits granted through existing pollution prevention programs</p> <p>Amend county subdivision ordinance</p>	<p>Underground storage tank inventory</p>
<b>Develop/ Maintain Active Inventories</b>	<p>Installation of monitoring wells upgradient from municipal wells for:</p> <ul style="list-style-type: none"> <li>- Determination of hydrogeologies parameters</li> <li>- Semi-annual sampling for pH, specific conductivity, nitrate and atrazine</li> </ul> <p>Compile monthly water quality data from results collected by the city for nitrate and atrazine</p>	<p>Network of rural, domestic wells, sampled annually for pH, specific conductivity, nitrate and atrazine</p> <p>Continue ongoing, voluntary well sampling program for nitrate and atrazine</p> <p>Maintain inventory of subsurface geology and well construction through existing well permit/well construction program</p> <p>Abandoned well inventory</p> <p>Groundwater baseflow measurements at 8 stream sites, biannually</p>

Management activities are defined by four broad categories as follows:

- Information and Education
- Easements to Protect Urban Wellheads
- BMPs/Positive Incentives
- Develop/Maintain Active Inventory
- Improved Use of Existing Regulations

The following is a list of management activities and Best Management Practices which will be used to achieve target levels of pollution abatement for groundwater management.

**a. Information and Education**

Information and Education activities for groundwater messages are detailed in Chapters 8 and 9. Activities have been designed to target individuals or groups in both urban and rural areas.



**b. Easements to Protect Urban Wellheads**

Easements are recognized as a cost effective means to achieve resource management objectives in the project area. NR120 easements will be used and targeted to protect zones of contribution in approved municipal wellhead protection plans.

**c. BMPs/Positive Incentives**

- 1) Grants to municipalities to:
  - a) Conduct special hydrologic studies. These studies will document the physical and chemical characteristics of groundwater in sensitive or future use areas.
  - b) Conduct wellhead protection planning and implementation. Grant money will be requested from USEPA and/or DNR sources. Wellhead programs will be compatible with state recommended activities.
  - c) Grants to municipalities to facilitate easement purchases within municipal wellhead areas. The rights to be purchased with these easements include prohibition of hazardous material storage and landuse development rights.
- 2) NPM assessment and services provided to landowners based on results of groundwater well tests. Specific activities are outlined in Chapter 4.

**d. Develop/Maintain Active Groundwater Inventory**

- 1) Maintain record of new well permit/well construction reports, and hydrogeological characterization based on county parcel number and Wisconsin Unique Well Number. As a component of this inventory, document location and status of abandoned wells.
- 2) Establish rural, private water sampling/monitoring network. Approximately 75 wells will be tested on a yearly basis for nitrate, atrazine, pH and specific conductivity.
- 3) Provide basin wide drinking water testing service. Testing will be conducted for nitrate and atrazine. Record results by county parcel number and Wisconsin Unique Well Number.
- 4) Record and maintain water chemistry information obtained as a result of ongoing water quality monitoring efforts.
- 5) Install monitoring wells as part of wellhead protection programs; monitor for nitrate and atrazine.

- 6) Monitor public water supply wells. Municipal wells in the basin will be tested semi-annually for nitrate and atrazine.
- 7) Monitor the effectiveness of NPM activities on protecting groundwater quality. A small test area located at the county farm will be used to monitor the effect of landuse and NPM management on groundwater quality.
- 8) Monitor groundwater baseflow to streams. Baseflow will be monitored to better define the relationship between surface water and groundwater within the basin.

**e) Improved Use of Existing Regulation**

- 1) Phased inventory of existing, underground storage tanks including size, age, location and contents.
- 2) Develop administrative procedure, through MOU's, for review of existing point/nonpoint source permits within watershed. These permits are administered through other state and federal programs.

Funding for most activities will be provided by NR120. Funding for activities not covered by NR120 will be sought by the DNR through the following sources:

- Wellhead Protection Plans - USEPA (604b grants), DNR (water supply)
- Easement Purchases in Zone of Contribution - USEPA, DNR (water supply, property management)
- Special Hydrologic Studies - DNR, USGS, W GNHS, UW System
- Underground Storage Tank Inventory - DILHR, LCD
- Detailed Monitoring Activities - DNR (groundwater), DATCP, Groundwater Coord. Council

A more detailed description of management activities can be found in Appendix A.

## **Best Management Practices**

### **Eligible Best Management Practices (BMPs)**

Best management practices are those practices used to control nonpoint source pollution. The Best Management Practices eligible for cost-sharing under the Duncan Creek Watershed Project and the cost share rates for each BMP are listed in tables 5-6 and 5-7 below.

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

Best management practices, receiving cost share funds, must be constructed according to specifications outlined in the Wisconsin construction site best management practice handbook, April 1989 and/or SCS field office technical guide standards and specifications as of May, 1989.

a. Cost-share Percentage Rates

Table 5-6. Cost-share Rates for Best Management Practices

Best Management Practice for Best Management Practices	
Field Diversions and Terraces	70%
Field Buffers	70% <sup>4</sup>
Grassed Waterways	70%
Grassed Waterway Buffers	70% <sup>4</sup>
Critical Area Stabilization	70% <sup>1**</sup>
Grade Stabilization Structures	70%
Agricultural Sediment Basins	70%
Shoreline and Streambank Stabilization	70% <sup>2</sup>
Shoreline Buffers	70% <sup>1</sup>
Barnyard Runoff Management	70%
Animal Lot Relocation	70%
Manure Storage Facilities	70% <sup>3</sup>
Wetland Restoration	70% <sup>1</sup>
Nutrient and Pesticide Management	50% <sup>5</sup>
Trout Structures	70%
Spring Development	70%

<sup>1</sup> Easements may be entered into with landowners identified in the watershed plan in conjunction with these BMPs. See Chapter IV for an explanation of where easements may apply. Wetland enhancements will not be cost-shared.

<sup>2</sup> Pasture pumps are an eligible component to this BMP.

<sup>3</sup> Maximum cost share amount is \$20,000 including no more than \$5,000 for manure transfer equipment.

<sup>4</sup> This BMP is included as an alternative best management practice based upon provision of NR120.15. Specifications for this practice are provided in Chapter 5, Section C.

<sup>5</sup> Mixing and loading sites are cost-shared at a rate of 70%.

\*\* This is critical area stabilization other than tree planting. See table 5-7 for the tree planting flat rate.

**b. Flat Rates**

**Table 5-7. Practices Using a Flat Rate for State Cost-Share Funding**

Best Management Practices	Flat Rate
Reduced Tillage	\$ 15.00/acre
Contour Farming	\$ 6.00 acre <sup>1</sup> *
Field Strip Cropping	NA <sup>1</sup> *
Contour Strip Cropping	\$ 12.00/acre <sup>1</sup>
Streambank Fencing 3 strand barbed wire electric	\$ 12.00/rod \$ 8.00/rod
Woodland Fencing 3 strand barbed wire electric	\$ 8.50/rod \$ 5.50/rod
Critical Area Stabilization Tree Planting	\$125.00/acre

<sup>1</sup> Wildlife habitat restoration components of this practice are cost-shared at 70%.

\* NA means that cost share funds are not available for this practice.

**c. Description**

Following is a brief description of some of the most commonly used BMPs included in table 5-6 and 5-7. A more detailed description of these practices can be found in NR 120.14.

- 1) Contour Farming - The farming of sloped land so that all operations from seed bed preparation to harvest are done on the contour.
- 2) Contour and Field Stripcropping - Growing crops in a systematic arrangement, usually on the contour, in alternate strips of close grown crops, such as grasses or legumes, and tilled row crops.
- 3) Reduced Tillage - A system which leaves a roughened surface or substantial amounts of crop residue in or on the soil surface after crops are planted. The system consists of no more than one primary tillage pass in the fall or spring and no more than 2 passes with light or secondary tillage equipment

prior to planting. It is utilized in two situations; one for continuous row crops or long corn rotations, the other for short crop rotations or for the establishment of forages and small grains.

- 4) **Critical Area Stabilization** - The planting of suitable vegetation on critical nonpoint source sites and other treatment necessary to stabilize a specific location.
- 5) **Grassed Waterways** - A natural or constructed channel shaped, graded and established with suitable cover as needed to prevent erosion by runoff waters.
- 6) **Grade Stabilization Structure** - A structure used to reduce the grade in a channel to protect the channel from erosion or to prevent the formation or advance of gullies.
- 7) **Livestock Exclusion from Woodlots** - The exclusion of livestock from woodlots to protect the woodlots from grazing by fencing or other means.
- 8) **Shoreline and Streambank Stabilization** - The stabilization and protection of stream and lake banks against erosion and the protection of fish habitat and water quality from livestock access. This practice includes streambank riprap, streambank sloping and seeding, stream crossings, watering ramps, streambank fencing and fish habitat structures. This practice may include pasture pumps for watering livestock.
- 9) **Terraces** - A system of ridges and channels with suitable spacing and constructed on the contour with a suitable grade to prevent erosion in the channel.
- 10) **Field Diversions** - The purpose of this practice is primarily to divert water from areas it is in excess or is doing damage to where it can be transported safely.
- 11) **Barnyard Runoff Management** - Structural measures such as filter systems and/or diversions and rain gutters to redirect surface runoff around the barnyard, and collect, convey or temporarily store runoff from the barnyard.
- 12) **Manure Storage Facility** - A structure for the storage of manure for a period of time that is needed to reduce the impact of manure as a nonpoint source of pollution. Livestock operations where this practice applies are those where manure is winter spread on fields that have a high potential for runoff to lakes, streams and groundwater. The facility is needed to store and properly spread manure according to a management plan.

- 13) **Agricultural Sediment Basins** - A structure designed to reduce the transport of sediment eroded from critical agricultural fields and other pollutants to surface waters and wetlands.
- 14) **Shoreline Buffers** - A permanently vegetated area immediately adjacent to lakes, streams, channels and wetlands designed and constructed to manage critical nonpoint sources or to filter pollutants from nonpoint sources.
- 15) **Animal Lot Relocation** - Relocation of an animal lot from a critical site such as a floodway to a suitable site to minimize the amount of pollutants from the lot to surface or groundwater.
- 16) **Wetland Restoration** - Restoring converted or degraded wetlands to their original functions through construction of berms or destruction of the function of tile lines or drainage ditches.
- 17) **Nutrient Management** - The management and crediting of nutrients for the application of manure and commercial fertilizers, and crediting for nutrients from legumes. Management includes the rate, method and timing of the application of all sources of nutrients to minimize the amount of nutrients entering surface or groundwater. This practice includes manure nutrient testing, routine soil testing, and residual nitrogen testing.
- 18) **Pesticide Management** - The management of the handling, disposal and application of pesticides including the rate, method and timing of application to minimize the amount of pesticides entering surface and groundwater.
- 19) **Spring Development** - Improving springs and seeps by excavating cleaning, capping, or providing collection and storage facilities in order to provide a watering area for livestock and restrict their access to the total spring area to reduce damage to the wet area and improve water quality.
- 20) **Shoreland Grazing Management** - A management plan that provides for the maintenance of a vegetated buffer along the banks of streams, lakes and drainage ways in the presence of livestock. The objectives of the practice are to buffer nutrient runoff, protect fish and wildlife habitat, reduce bank erosion and instream turbidity, and preserve stream channel structure. Plans will be based on SCS Std. 510 and UWEX guidelines. Structural practices such as fencing, stream crossings, watering access, watering facilities, spring development, and streambank and shoreland protection may be included in the practice. Implementation of shoreland grazing management will take one of the following forms based on an evaluation of both environmental and management factors:
  - a) **Livestock Exclusion** - Total livestock exclusion through the use of fencing or relocation, from all or portions of the shoreland. Used

when other means can not be expected to provide adequate shoreland protection.

- b) Limited Term or Deferred Grazing - Controls animal density (stocking rate) to maintain vegetative cover and limits grazing to a period from late Spring to early Fall.
  - c) Rotational Grazing - A grazing management scheme that divides the pasture into multiple cells (usually 5 to 30) that receive a short but intensive grazing period followed by a recovery period of approximately 28 days. Rotational grazing increases pasture production while enhancing a dense, stable vegetative cover.
- 21) Easements - Legal method used to purchase a limited set of landowner rights. Applicability is defined in Chapter IV.
  - 22) Manure field stacking - Temporary and unconfined solid manure which is stacked on the ground without use of a constructed platform or manure storage facility. Manure may not be stacked in grassed waterways, drainage ways, ditches, floodways, flood fringes, quarries or wetlands.
  - 23) Crop consulting - providing integrated crop and pest management services to agriculture producers using private sector crop consultants via a professional services contract between private consultants and Chippewa County.
  - 24) Waste spreading plan - plan based upon Technical Guide standards which identify 1) prohibited sites of manure disposal and 2) appropriate fields for winter manure disposal
  - 25) Vegetated waterways - Areas which convey concentrated flow and runoff. These areas are identified on soil maps or 7.5' topographic maps.
  - 26) Waterway buffers - A strip of grass, hay or permanent vegetation located adjacent areas of concentrated flow. Minimum requirement width is two rods; maximum width is 10 rods from edge of the vegetated channel.
  - 27) Field Buffers - A strip of vegetation left between fields to serve as sediment and nutrient trap. The minimum width of these buffers will be two rods. The maximum width will be ten rods.

### **Ineligible Best Management Practices**

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



- a. That portion of a practice to be funded through other programs.
- b. Practices previously installed and necessary to support cost-shared practices.
- c. Changes in crop rotations and other activities normally and routinely used in growing crops or which have installation costs that can be passed on to potential consumers.
- d. Changes in location of unconfined manure stacks involving no capital cost.
- e. Manure spreading management.
- f. Other activities the DNR, DATCP, and the Counties determine are necessary to achieve the objectives of the watershed project.

## **Activities Not Eligible For Cost Share Assistance**

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

- a. Operation and maintenance of cost-shared BMPs
- b. Actions which have drainage of land or clearing of land as the primary objective
- c. Practices already installed, with the exception of repairs to practices which were rendered ineffective do to circumstances beyond the landowners control
- d. Activities covered under the Wisconsin Pollution Discharge Elimination System (WPDES) Program or covered in other ways by Chapter 147 of Wis. Stats. (including livestock operations with more than 1,000 animal units, or livestock operations issued a notice of discharge under ch. NR 243)
- e. Septic system controls or maintenance
- f. Dredging activities
- g. Silvicultural activities
- h. Bulk storage of fertilizers and pesticides
- i. Activities and structures intended primarily for flood control
- j. Practices required to control sources which were adequately controlled at the time the cost-share agreement was signed, with the exception of those that occur beyond the control of the landowner
- k. Other practices or activities determined by DNR not to meet the objectives of the program

## **Fiscal Requirements**

Water quality objectives are outlined in Chapter 3. The management strategy to achieve these objectives are provided in Chapter 4. Implementation strategies are explained in chapter 5.

The estimated level of state funding needed to implement these strategies is presented in table 5-8. These estimates assume full participation by local municipalities and by individual landowners.

**Table 5-8. Estimated Level of State Funding for the Duncan Creek Clean Water Project**

		100% Participation		75% Participation	
Program Area	Total Cost	State Share	Local Share	State Share	Local Share
Information & Education	493,365	493,365		493,365	
Easements	1,820,364	1,820,364		1,365,273	
Groundwater Management	150,000	150,000		112,500	
Wetland Management	50,000	50,000		37,500	
<b>Best Management Practices</b>					
Erosion & Sediment Control	1,036,525	879,265	157,260	659,449	117,945
Animal Waste	4,999,500	3,850,650	1,658,350	2,341,217	999,637
Nutrient/Pest Management	593,850	296,925	296,925	222,694	222,694
Stream Corridor	1,052,550	736,785	315,765	553,380	236,823
Wetland Restoration	4,800	3,360	1,440	2,520	1,080
<b>Local Assistance Grant</b>					
Staff	2,997,480	2,997,480		2,362,260	
Travel	192,000	192,000		144,000	
Support Costs	112,000	112,000		112,000	
Professional Services Contracts	200,000	200,000		150,000	
Office Supplies	32,000	22,400	9,600	22,400	9,600
Field Equipment	32,000	22,400	9,600	22,400	9,600
Equipment	75,000	52,500	22,500	52,500	22,500
Urban Activities	401,000	321,500	79,000		
Monitoring	50,400	50,400			
<b>TOTAL</b>	<b>14,292,834</b>	<b>12,251,394</b>	<b>2,550,440</b>	<b>8,653,458</b>	<b>1,619,879</b>

The estimated cost to the state would be \$12 million and \$2.5 million in Chippewa County. This figure includes the capital cost of practices, staff support, and easement costs.

See tables 5-9 and 5-10.

## Information

**Table 5-9. Staff Hours and Cost Estimates for the Implementation of the Information Strategy**

Year	Agency/Hours	Cost
1993	LCD-812	17175
1994	LCD-1144	28250
1995	LCD-1152	25150
1996	LCD-952	25550
1997	LCD-912	23700
1998	LCD-812	22200
1999	LCD-872	22700
2000	LCD-872	22700
2001	LCD-468	11375
Total	LCD-7996	198800

## Education

**Table 5-10. Staff Hours and Cost Estimates for the Implementation of the Education Strategy**

Year	Agency/Hours	Cost
1993	LCD-764	21900
1994	LCD-1999 AUWEX-80 RUWEX-320 AGUWEX-80	UWEX-NPM-520 DILHR-40 COZON-10 62900
1995	LCD-1009 AUWEX-40 DILHR-40	RUWEX-80 AGUWEX-80 35400
1996	LCD-919 AUWEX-40 AGUWEX-80	RUWEX-80 DILHR-40 32650
1997	LCD-839 DILHR-40 AUWEX-40	RUWEX-80 AGUWEX-80 30900
1998	LCD-879 DILHR-40 AUWEX-40	AGUWEX-80 RUWEX-80 32150
1999	LCD-839 DILHR-40 AUWEX-40	AGUWEX-80 RUWEX-80 30790
2000	LCD-879 DILHR-40 AUWEX-40	AGUWEX-80 RUWEX-80 32150
2001	LCD-501 DILHR-40 AUWEX-40	AGUWEX-80 RUWEX-80 15725
Total	LCD-8628 AUWEX-360 RUWEX-680 AGUWEX-640	UWEX-NPM-520 DILHR-320 COZON-10 294565

Note: AUWEX-Area Water Quality Specialist, University of Wisconsin-Extension. Education Steering Committee member.

AGUWEX-Crop and Soils Agent, Cooperative Extension Service. Education Steering Committee and Nutrient and Pest Management Technical Advisory Group.

RUWEX-Resource Management Agent, Cooperative Extension Service. Education Steering Committee.

## **Best Management Practices**

The type, quantity and estimated cost of best management practices required to meet this projects water quality objectives are listed in table 5-11a-d. Estimates of capital cost of assume landowner participation rates of 100 percent and 75 percent. Also included are the units of measurement and cost share amount per unit for the various BMPs.

The capital cost of installing the Best Management Practices is approximately \$7.7 million assuming 100 percent participation. State funds necessary to cost-share this level of control would be about \$5.8 million. The local share provided by landowners and other cost-share recipients would be about \$2.4 million. At a 75 percent level of participation, the state funds needed to cover capital installation would be about \$3.8 million.

**Table 5-11a. Cost Estimates for the Duncan Creek Clean Water Project**

<b>EROSION AND SEDIMENT CONTROL</b>				<b>100% Participation</b>		<b>75% Participation</b>	
<b>Practice</b>	<b>Number</b>	<b>Cost/Unit</b>	<b>Total Cost</b>	<b>State Share</b>	<b>Local Share</b>	<b>State Share</b>	<b>Local Share</b>
<b>FIELD</b>							
Change in Rotation	24,700 ac	NA (1)					
Contour cropping (2)	9,800 ac	6/ac	59,280	59,280		44,460	
Reduced Tillage (2)(7)	12,460 ac	15/ac	186,900	186,900		140,175	
Reduced tillage (2)(7)	5,585 ac	45/ac	251,325	251,325		188,494	
Contour strips (3)	1,235 ac	12/ac	14,820	14,820		11,115	
<b>EPHEMERAL</b>							
Vegetate Waterways(4)	348 ac	200/ac	69,600	48,720	20,880	36,540	15,660
Waterway Buffers (5)	348 ac	200/ac	69,600	48,720	20,880	36,540	15,660
<b>GULLIES</b>							
Grade Stab. Struc.	30 ea	5,000/ea	150,000	105,000	45,000	78,750	33,750
Critical Area Stab.	30 ea	1,500/ea	45,000	31,500	13,500	23,625	10,125
Grassed Waterways (6)	95 ac	2,000/ea	190,000	133,000	57,000	99,750	42,750
<p>(1)NA means cost share funds are not available for this practice.</p> <p>(2)Cropland acreage needing treatment, estimate of 24,700 acres. Estimate based on acreage without conservation plan from WIN model, landuse and Chippewa County Erosion Control Plan, 1985. Estimates based on 40% of participants choosing contour farming, 40% choosing conservation tillage, and 20% choosing no-till.</p> <p>(3)Acreage based on 24,700 acres needing treatment; 5% choosing or fields are conducive to strips.</p> <p>(4)Critical areas; estimate of 520 miles of ww's and concentrated flow areas from WIN model; 67% of areas are in cropland. 520 m. x 67% = 348 miles. A 16.5 ft. width of concentrated flow area yields 698 ac. Approx. 50% of these areas will need seeding = 348 ac.</p> <p>(5)Critical areas; estimate of 520 miles off ww's and concentrated flow areas from WIN model; 67% of areas are cropland. 520 m. x 67% = 348 m. A 33 ft. buffer on either side yields approx 2784 ac. Approx. 25% may participate; 50% of these areas will need seeding.</p> <p>(6)Length 1st order concentrated flow from 7.5 topographic + length of concentrated flow channels from soil survey. Estimate of 5% of this area or 26 miles x 5280 ft./mile x 30' wide /43560 ft<sup>2</sup>/ac = 95 acres.</p> <p>(7)Also includes estimate of cropland practice estimates that landowners will do to farm below T; 5% of cropland; 80% of landowners choose conservation tillage (2580 ac.); 20% of landowners choose no-till</p>							

**Table 5-11b. Cost Estimates for the Duncan Creek Clean Water Project**

<b>ANIMAL WASTE &amp; NUTRIENT/PEST MANAGEMENT</b>				<b>100% Participation</b>		<b>75% Participation</b>	
<b>Practice</b>	<b>Number</b>	<b>Cost/Unit</b>	<b>Total Cost</b>	<b>State Share</b>	<b>Local Share</b>	<b>State Share</b>	<b>Local Share</b>
<b>ANIMAL WASTE</b>							
Critical Barnyards	31	35,000	1,085,000	759,000	325,500		
Category 1 Barnyards	51	25,000	1,275,000	892,500	382,500	669,355	286,875
Category 1 Diversions	10	7,100	71,000	49,700	21,300	37,275	15,975
Category 2 Barnyards	52	18,000	396,000	655,200	280,800	491,400	210,600
Category 2 Diversions	25	7,100	177,500	124,250	53,250	93,187	39,937
Manure Storage	70	28,500	1,995,000	1,400,000	595,000	1,050,000	446,250
Manure Spreading Management	180 plans	NA (1)					
<b>NUTRIENT/PEST MANAGEMENT</b>							
Crop Consulting (2)	100	4,782/fm	478,200	239,100	239,100	179,325	179,325
Testing (3)	300	15/5/15	115,650	57,825	57,825	43,369	43,369
(1) NA means cost share funds are not available for this practice. (2) As defined in "Duncan Creek Clean Water Crop Consulting Project" (Klingberg, 1992). (3) Testing for manure analysis (\$15), soil sampling (\$5), deep nitrogen profile (\$15). 300 x \$15 (manure analysis) = \$4500. 195 acres average farm x 300 = 58500 acres/5 acres per soil sample = \$58500. 58500 acres x 1/3 acres in corn /5 acres per sample x \$15 = \$52650.							



**Table 5-11c. Cost Estimates for the Duncan Creek Clean Water Project**

<b>STREAM CORRIDOR</b>				<b>100% Participation</b>		<b>75% Participation</b>	
Practice	Number	Cost/Unit	Total Cost	State Share	Local Share	State Share	Local Share
<b>BUFFERS</b>							
Stream buffer (1)	496 ac	200/ac	148,800	104,160	44,640	78,120	33,480
Easements-NR120 Stream (2)	1993 ac	600/ac	1,196,364	1,196,364		897,273	
Easements-Wetland (6)	360 ac	400/ac	144,000	144,000		108,000	
<b>CATTLE ACCESS</b>							
Streambank Fencing (3)	20,800/rd	12/rd	249,600	174,720	74,880	131,040	56,160
Stream Crossings	36	4,000/ea	144,000	100,800	43,200	75,600	32,400
Watering Facilities	36	3,000/ea	108,000	75,600	32,400	56,700	24,300
<b>STREAMBANK EROSION CONTROL</b>							
Rip-rap Category 1	1,070 ft	70/ft	74,900	52,430	22,470	39,322	16,852
Rip-rap Cat. 2 (4)	4,475 ft	50/ft	223,750	156,625	67,125	117,468	50,343
Fish Structures (5)	27	500/ea	13,500	9,450	4,050	7,880	3,038
Sediment Basins	30	3,000/ea	90,000	63,000	27,000	47,250	20,250
(1) Est. 222 mi. of streams; 70% of streams are Chpt. 30 = 155 mi. 40% of buffers areas will need establishment = 62 miles. 62 mi. x 5280 ft. x 66 ft. / 43560 = 496 ac. (2) Est. 222 mi. of streams; 70% of streams are Chpt. 30 = 155 mi. Est. 30% eligible easements = 47 miles. 47 miles x 5280 x 350 ft. / 43560 = 1993 ac. (3) Est. 222 mi. of streams; 70% of streams are Chpt. 30 = 155 mi. Est. 8% subject to cattle access = 13 miles. Est. 520 mi. of concentrated flow areas; 10% subject to cattle access = 52 mi. 13 mi. + 52 mi. = 65 mi. (4) Includes seeding and shaping. (5) Est. 50% of rip-rap sites to install fish structures. (6) Est. of 3600 ac. of wetlands within 300 feet of streams; est. 10% participation.							

**Table 5-11d. Cost Estimates for the Duncan Creek Clean Water Project**

<b>WETLAND RESTORATION &amp; GROUNDWATER</b>				<b>100% Participation</b>		<b>75% Participation</b>	
<b>Practice</b>	<b>Number</b>	<b>Cost/Unit</b>	<b>Total Cost</b>	<b>State Share</b>	<b>Local Share</b>	<b>State Share</b>	<b>Local Share</b>
<b>WETLAND RESTORATION</b>							
Wetland Restoration (1)	24 sites	200/ea	4,800	3,360	1,440	2,520	1,080
Wetland Monitoring			2,480	2,480			
Landuse/cover analysis			18,000	18,000			
<b>GROUNDWATER</b>							
Wellhead Protection (2)	3	50,000	150,000	150,000		112,500	
Wellhead Easements	800 ac	600/ac	480,000	480,000		360,000	
Groundwater Monitoring	1,056		29,916	29,916			
(1) Estimate of 3 sites per year restored. (2) 604B grant							

## Easements

Chapter 4 specifies when and where nonpoint source program funds can be used to purchase nonpoint source easements. The estimated cost of purchasing easements in eligible environmental corridors is shown in table 5-11c.

At 100 percent participation, the estimated purchase price of easements on eligible lands would be \$1.8 million. At 75 percent participation, the cost would be \$1.4 million.

## Staff

This section estimates the funding and staffing required to provide technical assistance for the rural portion of this project.

Tables 5-12a-d list the total estimated staff needed to implement the project in Chippewa County. Staff estimates are summarized in table 5-13. Figures are provided for both the 100 percent and 75 percent levels of participation. A total of about 118,000 staff hours is required to implement this plan at a 75 percent landowner participation rate. This includes 18,000 staff hours to carry out the information and education program.

**Table 5-12a. Staff Estimates for the Implementation of the Duncan Creek Clean Water Project**

Activity	Years to be Done	Units	Hours/Unit	100% Particip.*	75% Particip.*
<b>Project Administration</b>					
Project Management	1993-2001	350 hr/yr	2,800 (1)	2,080	1,560
Financial Management	1993-2001	208 hr/yr	1,664 (1)	1,664	1,248
Database Administration	1993-2001	206 hr/yr	2,080 (1)	2,080	1,560
Landowner Contacts	1993-1996	700	4 ea	2,800	2,800
<b>Resource Conservation Planning</b>					
Plan Development	1993-1996	160 plans (2)	40 ea	6,400	4,800
Agronomic Follow-up	1993-2001	180 plans (3)	8 hr/yr	10,800	7,560
On-Farm Spot Checks	1993-2001	45 (4)	4 hr/check	1,440	1,080
<b>Cost Share Agreements</b>					
Development	1993-1996	200 csa	30 ea	6,000	4,500
Amendments	1993-2001	150 csa	4 ea	600	450
Monitoring	1993-2001	200 csa	2 hr/yr	3,200	2,400
<b>Monitoring</b>					
Landuse	1993-2001	112 hr/yr	896 (1)(5)	896	896
Annual Reporting/Compliance	1993-2001	180 plans	2 hr/yr	2,880	2,160
(1) Total hours for the eight year project. (2) Estimate of 180 farmers entering the program; 160 will need resource conservation plans. (3) Estimate of 180 resource conservation plans; Year 1 = 60; Year 2 = 120; Year 3 = 180; Years 5-8 = 180. Quarterly visits, 2 hours per visit = 10080 hours. (4) 25% will be spot checked annually. (5) Assumes remote sensing and computer monitoring of landuse applications * Total hours for 8 year implementation period.					

**Table 5-12b. Staff Estimates for the Implementation of the Duncan Creek Clean Water Project**

Activity	Years to be Done	Units	Hours/Unit	100% Particip. *	75% Particip. *
Information Strategy	1993-2001	1,000 hr/yr	8,000 (1)	8,000	8,000
Education Strategy	1993-2001	1,250 hr/yr	10,000 (1)	10,000	10,000
<b>Stream Corridor</b>					
Buffer Establishment	1993-2001	496 ac	.5 hr/ac	248	186
Fencing	1993-2001	20,800 rd	.2 hr/rd	4,160	3,120
Crossings	1993-2001	36 ea	32 hr/ea	1,152	864
Watering Facilities	1993-2001	36 ea	36 hr/ea	1,269	972
Rip-rap	1993-2001	5,545 ft	1 hr/ft	5,545	4,159
Fish Structures	1993-2001	27 struc	12 hr/ea	324	243
Sediment Basins	1993-2001	30 ea	80 hr/ea	2,400	1,800
<b>Easements</b>					
Acquisition (2)	1993-2001		936 yr	3,978	2,106
Administration	1993-2001		104 yr	832	624
(1) Total estimated hours for project; see Education or Information Strategies					
(2) Years 1993-1996 = 936 hours/year and years 1997-2001 = 234 hours per year or 1170					
*Hours					

**Table 5-12c. Staff Estimates for the Implementation of the Duncan Creek Clean Water Project**

Activity	Years to be Done	Units	Hours/Unit	100% Particip.*	75% Particip.*
<b>Erosion/Sediment Control</b>					
Change Crop Rotation	1993-2001	24,700 ac	.1 hr/ac	2,470	1,853
Contour Cropping	1993-2001	9,880 ac	.3 hr/ac	2,964	2,223
Strip Cropping	1993-2001	1,235 ac	.5 hr/ac	618	463
Reduced Tillage	1993-2001	9,880 ac	.2 hr/ac	1,976	1,482
No-Till	1993-2001	4,940 ac	.2 hr/ac	988	741
Vegetate Waterways	1993-1996	1,400 ac	.5 hr/ac	700	525
Grade Stabilization	1993-2001	30 ea	50 hr/ea	1,500	1,125
Grassed Waterways	1993-2001	95 ac	22 hr/ac	2,090	1,568
Wetland Restoration	1993-2001		80 hr/yr	640	480
<b>Animal Waste</b>					
Barnyards	1993-2001	134 by's	150 hr/ea	20,100	15,075
Diversions	1993-2001	35 div	32 hr/ea	1,120	840
Manure Storage	1993-2001	70 ms	200 hr/ea	14,000	10,500
<b>Nutrient Management</b>					
Farm Appraisals	1993-1996	180 appr	4 hr/ea	720	540
Manure Spreading Plan	1993-1996	180 plans	8 hr/ea	1,440	1,080
1:1 On-Farm Field Trials	1993-2001	80 farms	156 hr/ea	12,480	9,360
Crop Consultant Administration	1993-2001	100 farms	2 hr/yr (1)	600	450
(1) Landowners are in for three years					

**Table 5-12d. Staff Estimates for the Implementation of the Duncan Creek Clean Water Project**

Activity	Years to be Done	Units	Hours/Unit	100% Particip.*	75% Particip.*
<b>Groundwater - Strategy Implementation</b>					
Maintain Inventory	1993-2001		80 hr/yr	640	640
Special Studies	1993-2001		80 hr/yr	640	640
Wellhead Protection	1993-2001		120 hr/yr	960	960
Improved Use of Regulation	1993-2001		80 hr/yr	640	640
Monitoring	1993-2001		80 hr/yr	640	640
<b>Wetland - Strategy Implementation</b>					
Maintain Inventory	1993-2001		80 hr/yr	640	640
Special Studies	1993-2001		80 hr/yr	640	640
Improved Use of Regulation	1993-2001		160 hr/yr	1,280	1,280
Monitoring	1993-2001		80 hr/yr	640	640
Urban	1993-2001		2,080 hr/yr	16,640	12,480

**Table 5-13. Summary of Staff Hours for the Duncan Creek Clean Water Project**

<b>Program Area</b>	<b>100% Participation</b>	<b>75% Participation</b>
Project Administration	5,824	4,368
Information & Education	18,000	18,000
Landowner Interactions	37,486	28,499
Engineering & Design	61,794	46,366
Easements	4,810	2,730
Nutrient Management	15,240	11,430
Groundwater	3,520	3,520
Wetlands	3,200	3,200
Urban	16,640	12,480
<b>TOTAL</b>	<b>166,514</b>	<b>130,593</b>

The estimated cost for staff at this landowner participation rate (see table 5-8) is approximately \$2.3 million. All of these costs, with the exception of some direct cost items, would be paid for by the state.

## **Policies and Procedures**

### **Landowner Contact Strategy**

The Land Conservation Committee will use a targeted, multi-visit approach to contact landowners.

#### **a. Stream Corridor**

Direct mailing to landowners with property adjacent to streambanks by neighborhood.

Hold neighborhood meeting to inform landowners of:

- condition of the stream
- water quality objectives
- types of easements available
- easement acquisition process
- explanation of next step

"Neighborhood" appraisal. Hire appraiser to perform stream corridor appraisals by neighborhood.

Negotiate individual easements.

To limit duplication of efforts and coordinate administration of these easements, priorities will be set to explain easement options by subbasin. Priorities for landowner contacts will be as follows:

1. Subbasins and associated streams with stewardship corridors. Streams, in order of priority are; Little Hay Creek; Como Creek; Middle Duncan Creek; and the Chippewa River.
2. Subbasins and associated streams in designated fish management corridors. Streams, in order of priority, are; Hay Creek; and Upper Duncan Creek.
3. Subbasins and associated streams without designated stewardship or fish management corridors. Streams, in order of priority, are; Tilden Creek; Beaver Creek; Trout Creek; all other intermittent or perennial streams which act as buffers and corridors and currently contain cattle access.

**b. Barnyard Phosphorous Delivery**

Direct mailing to all landowners who participated in barnyard inventory will be made by the LCD.

Focus of communication depends on the phosphorous management category and will also contain information on manure storage and nutrient management.

	<u># of Barnyards</u>
"Critical" barnyards > 100 lbs.	33
Category I 50-100 lbs.	29
Category II 50-15 lbs.	79
Ineligible < 15 lbs.	<u>185</u>
Total	326

Communications will encourage landowners to contact the LCD office if interested in a farm visit. Farm visitations are required for "Critical" and Category I barnyards.

Follow-up communications with landowners who did not respond ("Regulated", Category I, or Category II only) will be conducted by the Chippewa County LCD.

**c. Other**

A direct mailing will be sent to all rural and urban landowners in the basin explaining the program and possible cost-share benefits (i.e. gully erosion control).

Communications will encourage landowners to contact our office with site specific questions. Field investigation of sites may be necessary to determine eligibility status.

## **Resource Conservation Planning**

**a. Resource Conservation Plan Development**

To be eligible for a contract or easement, a participant must develop a resource conservation plan for all land they own. The Land Conservation Committee must approve the plan before engineering and financial assistance is provided through the contract. A resource conservation plan must also be developed for rented land in the watershed.

The signed plan will be recognized as a contractual component of the cost share agreement.

Technical assistance for development of the resource conservation plan will be provided by the Land Conservation Committee with NR120 LAG funding.

The Land Conservation Committee will provide planning follow-up to all recipients of NR120 funding.

Before a Resource Conservation Plan is approved the following criteria must be met:

- Landowner and conservationist walk land
- Landowner identifies current management
- Conservationist documents current management and informs landowner of minimum management standards as they apply to the operation

**b. Resource Conservation Plan Content**

A resource conservation plan and folder are assembled and contain:

- Aerial photo identifying field boundaries and wetlands
- Soil map identifying fields
- SCS CPA-6 Field Assistance Notes



- SCS CPA 15 identifying current/planned management practices and soil loss. Soil erosion rates shall be determined through use of the Universal Soil Loss Equation (USLE)
- SCS 68 identifying scheduled upland practices and components of the cost share agreement.
- Aerial map identifying wetlands

**c. Resource Conservation Plan Follow-Up**

Planning follow-up will be recognized as a separate and integral component of plan implementation.

The resource conservation plan follow up shall consist of quarterly farm visits.

Revisions to conservation plans will be authorized during the implementation phase of the watershed project. Watershed staff will revise the conservation plans as requested by the landowner if proposed changes are within minimum management standards and contract commitments of cost share agreement. SCS will be informed of all changes in plans as they affect administration of FACTA.

In circumstances where proposed revisions are not within minimum management standards, formal variance procedures will be followed.

**Cost-Share Agreement Development and Execution**

Cost-share agreements will be drafted in conjunction with the development of the resource conservation plan. The following steps will be used:

- Review case file and eligibility status
- Conduct initial On-Farm Contact

Explain positive incentives available through the project; Best Management Practices, Easements, technical assistance, water quality benefits

Explain minimum eligibility requirements and positive incentives available to meet minimum eligibility requirements

If landowner is interested in participating, collect information about: land owned and operated; current rotation and tillage; number of cows.

- Determine Eligibility and Develop Resource Conservation Plan
  - Determine actual erosion based upon cropping history and field management.
  - Determine manure storage eligibility
  - Draft resource conservation plan
  - Draft contract

- Review draft resource conservation plan and contract with landowner
- Conduct preliminary survey to estimate costs
- Complete resource conservation plan and watershed contract; obtain landowners signature
- Complete engineering design
- Construct BMP

The order of practice installation will be as follows: diversion, barnyard runoff management system, manure storage when implementing a 312 system.

- Certify of practice complete , including final costs by engineering department.
- Submit bills; complete and sign amendments.
- Pay landowner
- Spot check proper maintenance of BMP and minimum eligibility requirements.

## **Administration of Standards**

### **a. Standards and Annual Certification**

Standards to be administered are those adopted by the county, in the Technical Guide, and others as outlined in the watershed plan.

An initial screening will be conducted to document whether the operator is currently meeting standards. In circumstances where standards are not being met, a schedule of compliance will be developed to document management practices to be applied.

Landowner will participate in an annual reporting and certification process conducted to certify compliance with standards and contract provisions. A 25 percent spotcheck will be conducted annually by the Land Conservation Department.

A landowner may request a variance if standards cannot be met. A Notice of Noncompliance will be issued if the landowner is not meeting standards.

General administrative requirements and agency responsibilities for annual certification are established in the Chippewa County Soil and Water Conservation Policy for the Farmland Preservation Program (5/11/86).

All participants receiving public assistance under resource management programs administered by the Chippewa County Land Conservation Committee will be required to provide the following information on an annual basis.

-An ASCS air photo delineating TRACT and field boundaries, field #'s, estimated field acres, and field crop for the current crop year.

-Tillage information for each cultivated field including: season tilled, type of tillage, and estimated percent ground cover at time of planting.

-The type and estimated rate of lime, manure, fertilizer and pesticides applied.

-Field conservation practices applied or scheduled in the current crop year including contour plowing, contour strip cropping etc.

The landowner will be asked to provide information during or immediately after ASCS annual crop reporting and certification. Information will be recorded for each TRACT and field on a survey form developed to meet common program needs.

#### **b. Noncompliance with Minimum Management Standards**

Landowners who are found to be out of compliance with eligibility status will be notified by LCD staff.

A meeting will be held to review information regarding the noncompliance. If standards have been exceeded, a schedule of compliance will be developed and approved by the landowner and the Land Conservation Committee.

In circumstances where minimum management standards or provisions of the schedule of compliance are not met a formal letter of noncompliance will be forwarded to the participant and to the Land Conservation Committee for a decision regarding legal process.

#### **c. Operations and Maintenance Violations**

If practices are found to be improperly maintained, the participant will be informed of inconsistency. A meeting will be scheduled and a schedule of compliance will be developed to correct the situation. A second review will be conducted to document compliance.

A letter identifying compliance or noncompliance will be sent to the landowner.

In circumstances of noncompliance, a formal letter of noncompliance will be sent the participant and forwarded to the Land Conservation Committee for a decision regarding legal process.

## **Engineering Services**

All listed services will be provided by county engineering staff with assistance from SCS and DATCP engineering staff. The Duncan Creek Clean Water Project engineering staff will not provide engineering services unrelated to the project.

The Department of Natural Resource and Chippewa County have entered into an engineering agreement by which Chippewa County will provide 50 percent of a Professional Engineer Services to the project. The Department will reimburse the county at the State Engineers rate for these services. This agreement is Appendix E.

### **a. Engineering Services Provided**

- 1) **Inventory and Evaluation - site and practice**
  - appropriateness of specific practices
  - feasibility of specific practices
- 2) **Site Survey and Data Collection**
  - field survey
  - plots and contour maps developed
  - data collection
  - soils, geologic, groundwater and vegetation analysis
  - landowner consultation
- 3) **Design**
  - preliminary design
  - design computations
  - landowner consultation
  - prepare final design packet
    - \* plan views
    - \* cross-section and profile views
    - \* design details
    - \* standards and specifications
    - \* cost estimates
  - design approval
  - Operation and Maintenance agreements
  - construction inspection plans
- 4) **Contracting**
  - organize contractor workshops
  - prepare bid documents
  - organize site showings
  - review bids with landowners
  - pre-construction meeting
- 5) **Construction Inspection**
  - layout of practice
  - inspection of materials
  - inspection of construction work and activities
  - interpretation of design sheets

- prepare change orders as needed
- 6) Practice Certification
  - final practice inspection
  - final survey of practice
  - review of supplier certifications
  - prepare as built plans
  - confirm final in-place quantities
  - review final costs, quantities and change orders with landowner and contractor

The above steps will be tracked and documented by engineering staff on a Planning and Application Steps Worksheet.

**b. Services Related to Practice Construction NOT Provided by Engineering Staff**

- documentation as to need for specific practice  
(rely on inventories performed by projects, and needs recognized during conservation plan development)
- development of resource conservation plans
- develop appropriate nutrient management plans
- develop narrations for conservation plans describing Best Management practices planned or installed

## **Cost Containment**

Chapter NR 120 requires that cost containment procedures be identified in this plan. The following methods will be used to contain costs.

**a. Bids**

The Land Conservation Committee will require competitive bids for structural best management practices.

Nonstructural BMPs are subject to average costs to verify cost containment. A copy of the bid procedure will be made available to contractors and participants.

### **Bid Procedure**

- 1) Notification of Projects

Contractors will be notified by letter of upcoming projects.

2) Site Showing

The Land Conservation Department will organize site showings to view projects. Engineering plans will be available at the site showing.

In some cases where a site showing is not scheduled, contractors will be notified of projects and bid deadlines.

3) Submitting Bids

Landowners and contractors will be notified of the deadline for submitting bids. Bids will be submitted in a sealed envelope labeled "Duncan Creek Watershed" and the name of the landowner. Bids must be submitted by 3:30 p.m. of the deadline date.

Bids may be mailed or hand delivered to:

Chippewa County Land Conservation Department  
711 N. Bridge St.  
Chippewa Falls, WI 54729

4) Format for Bids

Bids are to be made on standard bid sheets provided by the Land Conservation Department.

Each item should have a separate line with unit costs and total costs. One bid will be made for an entire job.

5) Acceptance of Bids

Incomplete or late bids will not be accepted. The Land Conservation Department reserves the right to reject any or all bids. After the deadline date, the Land Conservation Department will open bids and send the landowner a list of contractors and their bids. The landowner must select a contractor within 5 days of receiving the bid list. The landowner will notify the contractor and Land Conservation Dept. of the selection. The Land Conservation Dept. will notify contractors whose bids were not accepted.

The Land Conservation Committee bid policy states it will cost-share on the amount of the low bid only. If the landowner elects to accept another bid, no cost sharing will be provided for that amount above the low bid cost, except where authorized changes were made in the design.

The low bid price will be the official cost for the project when constructed according to design. Unit changes from the plan will result in adjustment to the bid price according to the unit price of the accepted bid. Such changes must be authorized by a Land Conservation Dept. representative. Authorized changes in the plan not covered in the unit prices will be cost shared as agreed by the farmer, contractor and LCD staff. Any changes must be recorded on a Change Order Form before the changed item is to be constructed. Additional work will not be cost shared without a signed Change Order Form.

The Land Conservation Dept. will contact the successful bidder to arrange a date for the start of construction that is acceptable to both the contractor and landowner.

**b. Flat Rates**

See table 5-7.

The counties have established flat rates for determining labor rates for the farmer and his machinery. See the county's policy for these rates.

**c. Other**

Gully erosion in shoreline buffers: The cost containment strategy for shoreline buffers will be a maximum rate per acre of cost share for vegetative seed down and repair. The maximum rate shall be \$200 for vegetative seed down and repair. A maximum of \$5000 per 1/2 mile of buffers will be cost-shared if structural practices are needed.

Wetland Restoration: Restoration costs shall not exceed \$2000 per acre.

Easements: Chippewa County shall provide a brief description for the need of acquiring the easement. Purchase of the easement will provide water quality benefits and assist in meeting watershed plan water quality goals. The easement will also provide more pollution control than engineering solutions.

**Contracts**

Chippewa County will limit additional watershed staff by contracting the public or private sector for needed services.

Contracts will be bid in a fair and equitable manner. Chippewa County reserves the right to accept the lowest responsible bid and the right to reject any or all bids for contracted services.

Chippewa County will follow the county procedure in securing contracted services. The Land Conservation Department will work with Corporate Council in the development of the contract(s). Contracts shall contain at a minimum the scope of tasks to be completed, responsibility of the county and contracted party, timeline, payment schedule, and rate of payment.

The contracts shall be submitted to the DNR. Contracts in excess of \$10000 shall be submitted to the DNR for review and approval prior to signing per Adm. Rule NR120.21 (4)(c)(6).

Table 5-14 outlines the contracts needed to implement the management strategies.

**Table 5-14. Contracts Needed for Duncan Creek Project**

TYPE OF SERVICE	SUBCONTRACTS
<b>Information/Education</b>	
Informational Activities (Newsletters, public meetings, etc.)	Educational Specialist
Educational Activities (Curriculum development, I/E Committee)	Educational Specialist School Districts
<b>Technical Services</b>	
Nutrient/Pest Management -1:1 On Farm Education	UWEX Specialist School Districts
-Consulting Services	Certified Crop Consultant
Easement Appraisal	Appraisal Firm
Groundwater & Stormwater Management Firms	Engineering Consulting Firm
Streambank Fencing	WCC
<b>Program Evaluation</b>	
Resource Monitoring	GeoCode
-Landuse/land cover	School Districts, USGS, Non Profit Community Groups
-Surface Water	



## Reimbursement Procedures

### a. Grant Disbursement

The disbursement of the grants (Local Assistance and Nonpoint Source) to Chippewa County will be based on an annual workload analysis and grant application process.

#### 1) Local Assistance Grant

The Local Assistance Grant Agreement (LAGA) is a grant from the DNR to Chippewa County for supporting their staffing and support costs of carrying out this watershed plan. The county will use funds from the LAGA for additional staff to implement the project and conduct information and education activities. Other items such as travel, training, and certain office supplies are also supported by the LAGA. Further clarification of eligible costs supported by this grant is given in NR 120.14(4) and (6).

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

Chippewa County agrees to maintain a financial management system that accurately tracks the disbursement of all funds used for the Duncan Creek Watershed Project. The records of all watershed transactions will be retained for 3 years after the date of final project settlement. A more detailed description of the fiscal management procedures can be found in NR 120.25 and NR 120.26.

Chippewa County will file quarterly reports to DATCP in accordance with s. Ag. 166.40(4). These reports will account for staff time, expenditures, and accomplishments regarding activities funded through the watershed project. Reimbursement requests will be included with the submittal of the quarterly project reports.

#### 2) Nonpoint Source Grant

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

A portion of the Nonpoint Source Grant will be forwarded to Chippewa County to allow the county to set up an "up front" account. Funds from this account will be used by the county to pay landowners after practices are installed under the project. The county will request reimbursements from DNR to replenish the account, through reimbursement requests submitted on a quarterly basis (or sooner if needed). This reimbursement schedule will insure that the "up front" account balance is maintained at an adequate level. The NPS Grant Agreement will be amended annually to provide funding needed for cost sharing for the year. The funds obligated under cost share agreements may not exceed the total funds in the NPS Grant Agreement.

Chippewa County will maintain a financial management system which accurately tracks the disbursement of all funds used for the Duncan Creek Watershed Project. The records of all watershed transactions will be retained for 3 years after the date of final project settlement. A more detailed description of the fiscal management procedures can be found in NR 120.25 and NR 120.26.

**b. Cost-share Agreement**

Cost-share funding will be available to landowners for a portion of the costs of installing BMPs to meet the project objectives. Landowners have three years after formal approval of the watershed plan to enter into cost-share agreements.

Practices included on cost-share agreements must be installed within the schedule agreed to on the cost-share agreement. Unless otherwise approved, the schedule of installing BMPs will be within 5 years of signing of the cost-share agreement. Practices will be maintained for a minimum of ten years from the date of installing the final practice included in the cost-share agreement.

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

The agreements also identify and provide information on practices not cost-shared through the nonpoint program but that are essential to controlling pollution sources (such as crop rotations). These items will be completely listed in the conservation plan and the conservation plan is tied to the CSA via addendum 2 of the CSA. If landownership changes, the cost-share agreement remains with the property and the new owner is legally bound to carry out the provisions. NR 120.13(9) and (10) has more information on changes of landownership and the recording of cost-share agreements.

Local, state, or federal permits may be needed prior to installation of some BMPs. The areas most likely to need permits are zoned wetlands and the shoreline areas of lakes and streams. These permits are needed whether the activity is a part of the watershed project or not. Landowners should consult with the County Planning and Zoning Department or the Land Conservation Department offices to determine if any permits are required. The landowner is responsible for acquiring the needed permits prior to installation of practices.

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

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

Cost-share payments will be based on actual installation costs. If actual installation costs exceed the amount of cost-sharing determined by the bidding, range of costs and average cost methods the amount paid the grantee may be increased with the approval of the Land Conservation Committee. Appropriate documentation regarding the need for changes will be submitted to DNR. Cost-share agreements do not need prior approval from DNR, except in the following instances:

- 1) where cost-share funds are to be used for practices on land owned or controlled by the county.
- 2) agreements or amendments where the cost-share amount for all practices for a landowner exceeds \$50,000 in state funds.
- 3) grade stabilization structures and agricultural sediment basins with embankment heights between 15 and 25 feet and impoundment capacities of 15 to 50 acre feet.
- 4) Streambanks to be controlled using riprap or other materials with banks over 6 feet high, according to NR120.14. If applications are similar to each other in content, they will be reviewed to determine if future applications need be subject to this approval procedure.
- 5) animal lot relocation.
- 6) roofs over barnyards or manure storage facilities.

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# **CHAPTER SIX**

## **Urban Nonpoint Source Implementation Program**

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### **Introduction**

The urban management strategy is explained in chapter 4 and chapter 5 includes the details of how the strategies are going to be implemented by the various agencies and organizations involved in the project. The roles and responsibilities for each agency and organization are also included in Chapter 5 for both rural and urban areas. BMP types and minimum standards for certain management practices are part of Chapter 5. Ordinances and stormwater management planning activities are further explained in this Chapter. Costs and implementation schedules are detailed for the recommended practices in the urban areas as they are for the rural areas in Chapter 5.

### **Roles and Responsibilities of Agencies**

The implementation of the recommended management activities in the urban areas will require cooperation among several groups including Chippewa County and affected townships, the city of Chippewa Falls, city of Bloomer, city of Eau Claire, Eau Claire County, township of Hallie, DNR, Department of Agricultural, Trade and Consumer Protection, West Central Regional Planning Commission and the University of Wisconsin Extension. Private consultants will also have a role in the implementation of the urban management activities.

#### **Municipal Agencies**

The cities in the Duncan Creek project will have important roles in implementing the recommended practices and activities planned. The primary role for the cities will be identifying methods and procedures that will allow the management practices to be fully implemented. The cities will be the local government managers of projects within their jurisdiction and will work with other agencies to facilitate project implementation. They can accept grant offers from the DNR for cost sharing a wide variety of tasks associated with implementation activities. The city can work with the DNR to identify needs in annual work

planning sessions and can make grant applications to the DNR for financial and technical support. As a condition of the grants the municipalities will be asked to develop and implement the recommended practices detailed in Chapter 4. The priority watershed program can fund a number of items needed to accomplish the recommendations. Grants can be offered directly to the municipality or other arrangements can include a broader range of agencies. Urban areas will also be able to enter into cost share agreements with eligible landowners.

## **County Government**

Both Eau Claire and Chippewa County can become involved with the urban areas in implementing management practices. As cities expand and urban landuses continue to move into areas surrounding the cities other local government agencies like counties and townships will have an interest in how the expansions proceed. To achieve water resource protection for the water resources of the urbanizing areas a combined and cooperative effort is important to project success. The use of ordinances and stormwater management planning will involve land areas that overlap different political jurisdictions. The job of protecting water resources requires that hydrologic units be used in planning so that the maximum cost efficiencies can be realized and priority sites are addressed in a cost effective manner. Plans produced jointly by adjacent units of government can take advantage of the limited resources provided in the grant program. The task of coordinating the various units of local government will fall into the hands of the watershed project team formed early in the planning phase of the Duncan Creek project. The DNR nonpoint source coordinator in the Western District is available to assist the communities in working in a cooperative manner.

## **State Government**

Both the DNR and the DATCP are committed to providing assistance to local government in this project. The State will be providing technical assistance and financial aid by grant agreement. Approval of the watershed plan and development of specific grants with local government is an important role of the State agencies. Standards concerning stormwater management planning and the development of ordinances will be provided by the DNR. These standards will be used in setting the minimum acceptable level of implementation in urban areas. For example, the watershed plan calls for the reduction of 50% of the sediments delivered to surface waters in many of the urban areas in the Duncan Creek project, and the DNR will require that stormwater management plans be developed with this level of pollutant control incorporated in the plan as a goal. Other standards will involve the ordinances and the need to meet some set of minimum guidelines provided by the state for these ordinances.

## **West Central Regional Planning Commission**

The use of consultants can include the Regional Planning Commission located in Eau Claire. This agency can provide planning assistance to local units of government and their specific role will be determined during the annual work planning sessions conducted with the project participants.

## **Management Practices for Urban Areas**

The use of planning and implementation of practices in the urban areas includes a number of activities that are defined in this section of Chapter 5. Eligible activities include the following:

### **Stormwater Management Planning**

Elements of a stormwater management plan must include some items that insure that the plan will address water quality. Table 6-1 lists those major elements that are considered for a water quality based stormwater management plan and will be required as part of the scope of such a plan. Stormwater management plans funded by the Nonpoint Source Program must meet all minimum requirements concerning the scope and content area for a stormwater management plan as a condition of the grant.

**Table 6-1. Elements of a Stormwater Management Plan Incorporating Water Quality Considerations**

1.	Landuse planning for existing and future conditions.
2.	Pollutant sources, loads, problems, and potential uses of water resources.
3.	Water resource objectives.
4.	Pollutant load reductions needed to meet objectives.
5.	Recommended BMPs including design and performance criteria. Planning and management activities recommended for water quality protection.
6.	Implementation strategy which indicates when and where BMPs will be installed and the decision criteria used for making determinations on specific BMP installations.
7.	Financing alternatives and a schedule of implementation activities.
8.	Information and education plans designed to increase public participation and awareness for the need of water quality based stormwater management planning.
9.	Adoption of a stormwater management ordinance that achieves water quality objectives and includes construction site erosion control.

### **Stormwater Ordinances**

Ordinances used to control stormwater flows are usually adopted to address volume and flow conditions in developing areas. Often flood control is the only criteria for creating these ordinances, so water quality considerations become somewhat overlooked. The nonpoint program will assist local units of government in developing stormwater ordinances that control both water volume and water quality. Cost sharing is provided for the development of stormwater management ordinances and some technical assistance is available from the DNR. A stormwater management ordinance needs to contain the following elements:

- \* Findings of fact/purpose and objectives
- \* Authority and jurisdiction
- \* Definitions
- \* Applicability
- \* Plan review
- \* Performance standards/design specifications

- \* Off-site management facilities
- \* Maintenance
- \* Performance bonds
- \* Enforcement provisions
- \* Appeals
- \* Variance procedures

## Construction Site Erosion Control

Construction site erosion control is currently regulated for two types of construction involving single family dwellings and larger land disturbances over 5 acres in size. Other types of construction is not regulated currently and it is this kind of construction that must be controlled in the Duncan Creek municipalities. The ordinance must include some specific provisions as indicated in table 6-2.

**Table 6-2. Elements of a Construction Site Erosion Control Ordinance**

1. Activities covered under the ordinance.
2. Standards and criteria applicable to water quality protection.
3. Permit requirements.
4. Administration and enforcement provisions.
5. Violation penalties and appeal procedures.
6. DNR approval.

## Information and Education

Activities required in this plan include an educational program as a condition of nonpoint grants to eligible units of local government. The educational and information program must be planned with the assistance of the UWEX Area Water Agent and the DNR. The I and E plan can be incorporated into the stormwater management plan or it can be developed as a stand alone document. The water resource objectives and the pollutant load reductions set for each local unit of government will be used in the plan to guide it's development. Table 6-3 lists the elements of an I and E plan for water quality protection.



**Table 6-3. Elements of an Information and Educational Water Resource Protection Plan**

1. Explanation of the water resource concerns.
2. Objectives of the I and E plan.
3. Specific activities proposed.
4. Responsible parties committed to the plan.
5. Schedule of activities indicating specific dates.
6. Estimate of the staff hours needed to develop and implement the I and E plan.
7. Estimate of the costs of the plan.
8. Identification of the target audiences.
9. Development of a demonstration practice.

### **Demonstration Practices**

Demonstration practices are projects that can be undertaken by the eligible local units of government to demonstrate how water quality best management practices are used in urban areas of a priority watershed. The units of government and the DNR cooperatively plan a demonstration to be an example of needed practices in the urban area of the project. Grants are developed to fund the demonstrations and the I and E plan will designate the specific details of the demonstration concerning what will be built, by whom, when, and how it will be used. The watershed plan is to have each municipality develop a demonstration activity that is consistent with the watershed objectives. The dates for completion of a demonstration practice are the same dates scheduled for completion of the I and E plans for each municipality. Costs associated with the demonstration practices and staff time planned for this activity are only very general approximations. Individual I and E plans and stormwater management plans will disclose more of the detail to demonstration practices. Separate grant applications will also serve as methods for requesting approval and funding of demonstration activities. All demonstration activities require DNR approval.

### **Best Management Practices**

The use of specific management practices for water quality protection include a wide range of activities. Stormwater management practices recommended in the stormwater management plans must include a list of best management practices to be used in the project area. The technical specifications for these practices must be consistent with The Wisconsin Municipal Stormwater Manual volumes currently under development by the DNR Bureau of

Water Resource Management. Practices used for construction site erosion control must be consistent with the Wisconsin Construction Site Best Management Practice Handbook. Ordinances for both stormwater management and construction site erosion control must also be consistent with the Manual and the Handbook.

## Implementation Schedule

Table 6-4 indicates the schedule to be used for the implementation of the urban management strategy.

**Table 6-4. Schedule of the Urban Implementation Plan Showing Completion Dates**

Municipality	Stormwater Management Plan	Construction Site Control	I and E Plan
Eau Claire	1996	1996	1995
Chippewa Falls	1996	1996	1995
Hallie	1996	1996	1994
Bloomer	1995	1996	1994

The scheduled activities to be completed in 1996 need to be finished prior to the end of the grant period. The dates reflect some priority in developing plans according to the water resource need and the experience of the municipality in conducting planning and implementation activities.

## Urban Implementation Costs

The costs of planning and implementation for the various urban activities are based on similar planned projects. It is impossible to determine the costs of such activities when the activities have yet to be identified, however, estimates can be derived by assigning unit costs for similar work predicted in other plans. Tables 6-5 to table 6-8 show some of the estimated costs for accomplishing the urban management strategy by municipality. Cost similarities are based on the Lowes Creek project in Eau Claire and a stormwater management planning project in the city of River Falls.

**Table 6-5. Estimated Urban Implementation Costs for the city of Eau Claire For 1993 - 1996 years**

Management Activity	State Share	Local Share	Total Cost
Local Assistance	90%	10%	\$10,000
Stormwater Planning	70%	30%	\$50,000
Construction Erosion Control	0%	100%	\$ 0
Construction Erosion Control and I and E Staff	100%	0%	\$30,000 <sup>1</sup>
Information and Education	100%	0%	\$ 6,000
Demonstrations	50%	50%	\$ 0
Total			\$96,000
State Total			\$80,000
Eau Claire Total			\$16,000

<sup>1</sup> Staff from the Lowes Creek project can combine with the Duncan Creek project to reduce total costs.

**Table 6-6. Estimated Urban Implementation Costs for the city of Chippewa Falls For 1993 - 1996 years**

Management Activity	State Share	Local Share	Total Cost
Local Assistance	90%	10%	\$ 20,000
Stormwater Planning	70%	30%	\$ 40,000
Construction Erosion Control	0%	100%	\$ 0
Construction Erosion Control and I and E Staff	100%	0%	\$30,000 <sup>1</sup>
Information and Education	100%	0%	\$ 10,000
Demonstrations	50%	50%	\$ 10,000
Total			\$110,000
State Total			\$ 91,000
Chippewa Falls Total			\$ 19,000

<sup>1</sup> Staff from the Duncan Creek project can provide hours to Bloomer and Hallie for similar services.

**Table 6-7. Estimated Urban Implementation Costs for Hallie township For 1993 - 1996 years**

Management Activity	State Share	Local Share	Total Cost
Local Assistance	90%	10%	\$ 5,000
Stormwater Planning	70%	30%	\$ 90,000
Construction Erosion Control	0%	100%	\$ 0
Construction Erosion Control and I and E Staff	100%	0%	\$30,000 <sup>1</sup>
Information and Education	100%	0%	\$ 10,000
Demonstrations	50%	50%	\$ 10,000
Total			\$145,000
State Total			\$112,500
Hallie Total			\$ 32,500

<sup>1</sup> Staff from the Duncan Creek project can provide hours to Bloomer and Chippewa Falls for similar services.

**Table 6-8. Estimated Urban Implementation Costs for the city of Bloomer For 1993 - 1996 years**

Management Activity	State Share	Local Share	Total Cost
Local Assistance	90%	10%	\$ 5,000
Stormwater Planning	70%	30%	\$20,000
Construction Erosion Control	0%	100%	\$ 0
Construction Erosion Control and I and E Staff	100%	0%	\$10,000 <sup>1</sup>
Information and Education	100%	0%	\$ 5,000
Demonstrations	50%	50%	\$10,000
Total			\$50,000
State Total			\$38,500
Hallie Total			\$11,500

<sup>1</sup> Staff from the Duncan Creek project can provide hours to Chippewa Falls and Hallie for similar services.

The amount of funds needed to support the Duncan Creek urban projects have been estimated in the preceding tables for only those years when the project is in the cost share sign up phase. Costs for future work in the 5 years after the cost share sign up period will be disclosed after the 3 year urban planning efforts are completed as scheduled in this watershed plan. The stormwater management plan will contain a detailed estimate of costs from planned activities recommended in that plan with a schedule of implementation activities. Total overall costs for the urban program in the first 3 years of the sign up period are \$401,000. State costs for the same 3 year period are \$322,000.

## **Urban Implementation Staff**

The urban implementation strategy requires some staff support to work on various activities previously identified. The scope of work associated with construction site erosion control will determine the need for some of the staff hours required. The urban part of the Duncan Creek project will require staff support and the local assistance grants developed for the urban areas must identify the hours and assigned activities for all staff. Stormwater management planning requires a contract and the use of consultants, but it will also require some staff time to manage the plan and coordinate activities between municipalities. Information and education is another activity that requires staff. Some of the I and E work can be accomplished through the Chippewa County LCD, but much of the urban area is expected to have unique and specific needs that are not likely to be filled by the County LCD. The urban staff requirements must take advantage of the Lowes Creek project and its need for staff. Whenever possible urban based staff must work between projects and prevent redundancy in activities. The Duncan Creek project predicts a need for one staff person for each of the first three years of the project. This staff person will be dedicated to assisting the urban implementation strategy for both the Duncan Creek project and Lowes Creek. The development of the local assistance grants with the urban areas will make the specific commitment for staff hours and activities.

The staff assigned to work in the urban portion of the project will become involved in the following types of activities in the first three years of the project:

- \* Develop a construction site erosion control ordinance for each municipality. The ordinance development would include public participation meetings, I and E efforts, and city council meetings.
- \* Develop and implement an I and E program for the urban areas designed to build public support for construction site erosion control and stormwater management planning. The I and E program would also develop landuse planning principles that protect natural resources and create a foundation for public participation in landuse planning.

- \* Establish a school program that meets the objectives of both the rural and urban I and E plans. Curriculum development, teaching, and educational activity coordination are important activities for this staff person.
- \* Seek to find ways for the Lowes Creek project and the Duncan Creek project to share the workload and create a higher level of efficiency by avoiding duplication of effort.
- \* Work with an engineering consultant to assist in the development and implementation of a stormwater management plan. Play an active role in writing an I and E chapter for stormwater management plans.
- \* Work with DNR to plan and develop urban demonstration projects for the various communities.
- \* Assist the municipalities in understanding the watershed plan and the administrative requirements of the priority watershed program.
- \* Assist the municipalities with grant applications and management of grants.
- \* Provide water quality monitoring assistance to the Chippewa County LCD and the DNR for monitoring in the urban areas.
- \* Coordinate easement acquisitions in the urban areas.
- \* Assist the city of Chippewa Falls with the development and implementation of the wellhead protection program.

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# CHAPTER SEVEN

## Nutrient and Pest Management Implementation Strategy

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Education is the core component of the Management Strategy for the Duncan Creek Clean Water Project Watershed Plan.

A comprehensive Nutrient and Pest Management Implementation Strategy has been developed as a component of the project's information and education effort.

The Nutrient and Pest Management Implementation Strategy has been developed based upon the results of a *Nutrient and Pest Management Appraisal in the Duncan Creek Watershed* (Klingberg, 1993). The appraisal documents current fertility and field management practices in the basin.

Results of earlier investigations suggests that a comprehensive delivery system is needed to inform and educate rural landowners about nutrient and pest management; and to provide on-farm services to help farmers make needed changes in their agricultural operations.

### Problem

Surface water and groundwater are being degraded by nonpoint pollution sources in the basin. (Surface Water Appraisal; Ken Schrieber, June 1992; Groundwater Appraisal; Nick Stadnyk, February 1993). Pollutants include phosphorous to surface water and nitrates to groundwater. These nutrients are widely managed for agriculture crop production in the basin.

### Goal

The goal of the Nutrient and Pest Management Implementation Strategy is to reduce delivery of nitrates to groundwater and phosphorous to surface water.

# Objectives

- A. Increase public awareness that landuse effects water quality; and the management of on-farm nutrients can produce the same yield and increase profits.
- B. Accelerate and enhance local educational efforts.
- C. Provide 1:1 on-farm education through field trials and technical assistance.
- D. Provide professional services for full farm nutrient and pest management to landowners by certified crop consultants.

# Methods

## Form Technical Advisory Group

### 1. Formation of a Nutrient and Pest Management Technical Advisory Group

Many different agencies and private sector groups deliver information and education to Chippewa County residents on nutrient and pest management. A Technical Advisory Group will be formed to coordinate the delivery of nutrient and pest management information, education and services within the watershed.

The Technical Advisory Group will meet monthly during the first year of implementation to document current efforts, assess local needs, and develop project designs to implement planned activities. The group will meet quarterly thereafter to monitor, review and update nutrient and pest educational efforts.

### 2. Scope of Tasks

- a. Identify current Nutrient and Pest Management educational efforts in the watershed
- b. Assess educational needs of local producers, educators and farm supply professionals
- c. Design educational programs to meet educational needs
- d. Supervise and implementation of nutrient and pest management educational projects

### 3. Proposed Membership

- a. Land Conservation Department  
Program Agronomist, Project Agronomist, County Conservationist,  
Watershed Manager
- b. University of Wisconsin - Extension



- c. Crops & Soils Agent, NPM Regional Specialist  
Chippewa Valley Technical College  
Agriculture Teacher
- d. OTHER  
Representatives from school agriculture departments in New Auburn,  
Bloomer, Chippewa Falls; Education Committee member; Private crop  
consultant representatives, Cooperative representative, Farmer

## **Implement Comprehensive Nutrient And Pest Management Delivery System**

A delivery system for nutrient and pest management is summarized in table 7-1.

The table outlines a comprehensive approach to deliver information, education and on-farm services.

Components 1, 2 and 3 are general information and education activities. The activities are proposed to reach a diverse group of decision makers. These components provide baseline information to raise public awareness and encourage change on individual farms.

Components 4, 5 and 6 target farmers with on-farm nutrient management education and/or services. Implementing components 4, 5 and 6 would result in a high degree of farm specific change and water quality benefits.

### **1. Information**

- Component 1 targets the general public with basic nutrient management information.

The purpose is to:

- a) increase public awareness that routine nutrient and pest management decisions effect water quality
- b) improved use of on-farm nutrients produce the same yield and increase profits

Delivery systems include newspapers, newsletters, radio, and billboard advertisements.

Farmers will be targeted with a seasonal pest scouting report and nutrient demonstration plot results.

Parcel-owners (urban and rural) will be targeted with a biannual workshop on nutrient and pest management for lawn and garden.

**Table 7-1. Nutrient and Pest Management Implementation Strategy**

6. 1:1 WHOLE FARM NUTRIENT AND PEST MANAGEMENT CONSULTING	
Target Group	Farmers
Delivery System	Whole farm nutrient and pest management technical assistance
5. 1:1 WHOLE FARM NUTRIENT MANAGEMENT CONSULTING	
Target Group	Farmers
Delivery System	Whole farm nutrient management technical assistance; Farm * A * Syst Assessment
4. 1:1 ON-FARM EDUCATION	
Target Group	Farmers, Rural Landowners
Delivery System	Direct field comparisons with multi farm visits and technical assistance to teach nutrient management; Farm * A * Syst Assessment
3. STRUCTURED GROUP EDUCATION	
Target Group	Farmers, agribusiness, agricultural educators, students
Delivery Systems	Nutrient Management Training with Certificate, Nutrient Management curriculum addition
2. UNSTRUCTURED GROUP EDUCATION	
Target Group	Farmers, Agribusiness, agricultural educators
Delivery Systems	Fields days, topical presentations, NPM demonstrations
1. INFORMATION	
Target Group	General Public (Rural and Urban)
Delivery Systems	Seasonal pest scouting reports, workshops, newspaper articles, biweekly radio, plot demonstration results, billboards, newsletters
Graphic by Kevan Klingberg (1992)	

## **2. Unstructured Group Education**

Unstructured group education targets farmers, agribusiness, agricultural educators and students.

The purpose of Unstructured Group Education is to disseminate information from University of Wisconsin research trials or other on-farm experiences which would be of value to educators, agribusiness and individual producers.

Delivery methods include nutrient and pest management demonstrations and associated field days; and topical presentations at appropriate meetings (i.e., Chippewa Valley Forage Council, UWEX Crop Production Meeting, or Chippewa County Soil Judging Contest, etc.).

## **3. Structured Group Education**

Structured group education targets agricultural educators and students, agribusiness, and farmers in the basin.

The purpose is to provide classroom instruction on the principles of soil fertility and nutrient crediting as applied to production agriculture.

Delivery methods include high school agricultural classes and training sessions at District 1 Technical College.

High school agriculture teachers NPM training needs will be assessed. A unit on soil fertility and nutrient crediting will be designed by the Regional UWEX-NPM representative. The unit will then be presented to local agriculture teachers for incorporation into their present curriculum.

A Nutrient Management Training class will be developed for agribusiness. The training session will be designed to teach private sector fertilizer dealers the basics of soil fertility and nutrient crediting. It will be presented to private sector fertilizer dealers as a professional improvement course with a Certificate of Achievement.

A Nutrient Management Training class will be developed for farmers. The training session will be designed to teach farmers the skills associated with on-farm nutrient budgeting.

## **4. 1:1 On-Farm Education**

One-to-one on-farm education is directed to farmers and focuses on their individual farm operation.

One-to-one on-farm education will be conducted to teach farmers nutrient crediting on two fields as defined by *Use of On-Farm Field Trials to Teach the*

*Nutrient Crediting Process* (Klingberg, Prill and Masterpole; March 1993). The delivery system is a multi farm visit approach to introduce the nutrient crediting process.

**5. 1:1 Whole Farm Nutrient Management Consulting**

One-to-one whole farm nutrient management consulting targets farmers.

The purpose is to teach farmers how to apply the nutrient crediting process on their whole farm as defined by *Use of On-Farm Field Trial to Teach the Nutrient Crediting Process* (Klingberg, Prill and Masterpole; March 1993).

The delivery system is be a multi farm visit approach to provide technical assistance for nutrient crediting on all farm fields. It will be completed by a crop consultant through a service contract or other contracted public sector staff. The project will provide 50 percent of the cost for a three year period through a direct service contract with crop consultants.

**6. 1:1 Whole Farm Nutrient And Pest Management Consulting**

One-to-one whole farm nutrient and pest management consulting targets farmers.

The purpose is to supply farmers with whole farm NPM consulting services. Services are defined in *Duncan Creek Clean Water Crop Consulting Project* (Klingberg; January 1992).

Delivery system will be through a subcontract with private crop consulting firms. Private firms will provide the technical assistance. The project will provide 50 percent of the cost for a three year period through a direct service contract. Educational benefits are limited.

**Table 7-2. Information Activities**

Activity *	Agency/Hours	Estimated Cost	Implementation Date(s)
Pest Scouting Report	LCD-1536	10,000	93-01
Workshop	LCD-80	1,000	94,96
Newspaper Articles	LCD-320		93-01
Radio			
Plot Demo Results			
Billboard	LCD-24	2,500	4-95
Newsletters	LCD-1920	41,600	93-01
* These activities are also included in the Duncan Creek Education Strategy and/or Information Strategy.			

**Explanation of Activities**

See table 7-2.

A scouting report emphasizing the principles of Integrated Pest Management (Integrated Pest management is a pest control strategy which utilizes appropriate methods of control while minimizing detrimental impacts to the environment) will be developed and sent to cropland managers bi-monthly during May, June, July, and August throughout the project.

Workshops will be held to teach watershed residents how to manage lawn and garden inputs. Components of the workshop will be soil testing and interpretation, fertilizer application, and "natural pesticides."

Newspaper articles will be written and appear in the Chippewa Herald Telegram and Bloomer Advance as opportunities present themselves. Newsletters will contain information on nutrient and past management.

Billboards will be rented to advertise messages.

Three newsletters will be mailed each year to rural landowners; one of the three will also be mailed to urban residents.

**Table 7-3. Unstructured Group Education Activities**

Activity	Agency/Hours	Estimated Cost	Implementation Date(s)
Topical Presentations	LCD	\$ 800	93-01
NPM Demonstrations and Field Days	LCD	\$6,000	94-96

**Explanation of Activities**

See table 7-3.

Topical presentations at appropriate meetings (i.e. Chippewa Valley Forage Council, UWEX Crop Production Meeting, or the Chippewa county Soil Judging Contest, etc.) will be delivered as opportunities present themselves.

Nutrient Management demonstrations will be held in the watershed. (\$2000 per year.)

**Table 7-4. Structured Group Education Activities**

Activity	Agency/Hours	Estimated Cost	Implementation Date(s)
VoAg Class Nutrient Crediting Curriculum/Training	UWEX-NPM-520	\$10,000	94
Nutrient Management Training (Agribusiness)	UWEX-130	\$12,000	94-01
Nutrient Management Training (Farmers)	UWEX-130	\$12,000	94-01

**Explanation of Activities**

See table 7-4.

A unit on soil fertility and nutrient crediting will be designed by the Regional UWEX-NPM representative and presented to agriculture teachers.

A Nutrient Management Training class will be developed for agribusiness and farmers.

**Table 7-5. 1:1 On Farm Education Using Field Trials**

Activity	Agency/Hours	Estimated Cost	Implementation Date(s)
Farm Visits	Sub-13520	\$299,000*	93-01

\* Does not include soil sampling.

**Explanation of Activities**

Subcontract with public sector agency. Years 1 through 3 of Implementation would be spent part-time (1040 hours) doing 1:1 on-farm education. Years 4 through 8 would be full time. (1040 hours X 3 years = 3120 hours. 3 years (PT) x \$23000/yr. = \$69000; 5 years x 2080 hours = 10400 hours. 5 years (FT)x \$46000/year = \$230000. \$69000 + \$230000 = \$299000.)

**Table 7-6. 1:1 Whole Farm Nutrient Management Consulting**

Activity	Agency/Hours	Estimated Cost	Implementation Date(s)
Farm Visits	Sub-13520	\$299,000*	93-01

\* Does not include soil sampling.

**Explanation of Activities**

See table 7-5, 7-6 or table 7-7.

**Table 7-7. 1:1 Whole Farm Nutrient and Pest Management Consulting**

Activity	Agency/Hours	Estimated Cost	Implementation Date(s)
Crop Consulting	contract	\$239,100*	93-01

\* Does not include soil sampling.

## Explanation of Activities

195 acres average farm. Consulting costs: \$1000 for first 100 acres; \$6.25 each additional acre.

$\$1000 + (\$6.25 \times 95 \text{ acres}) = \$1594$ .  $\$1594 \times 3 \text{ years} \times .5 = \$2391 \text{ per farm}$ .  $\$2391 \times 100 \text{ farms (est.)} = 239100$ .



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# **CHAPTER EIGHT**

## **Information Strategy**

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The Information Strategy is a lead component of project implementation.

The strategy was developed by a Citizens Advisory Group with technical support from an Information and Education Work Group. A Public Opinion Survey (April 1992) was incorporated to solicit input and define informational needs.

### **Purpose**

The purpose of the Information Strategy is to:

- 1) raise public awareness and appreciation of land and water resources in the basin;
- 2) raise public awareness of nonpoint pollution sources, landuse activities which degrade the resources, and opportunities available through the project.

### **Implementation Overview**

The Information Strategy will be conducted throughout the Implementation Phase of the project.

The Information Strategy will be supervised by the Education Steering Committee (See Education Strategy, Part III.)

Components of the Information Strategy will be implemented by an Education Specialist (part-time) subcontracted by the Chippewa County Land Conservation Committee working with existing Land Conservation Department watershed staff.

Informational components will be delivered in conjunction with existing events whenever possible.

# Goals

An outline of the informational goals is provided in table 8-1. Specific activities and target audiences are provided in tables 8-2 through 8-13.

**Table 8-1. Summary table of Informational Goals, Target Audiences and Messages**

<p><b>Goal A.</b></p>	<p><b>Increase Public Appreciation and Recreational Use of the Land and Water Resources in the Basin.</b></p> <p>table 8-2 Activities to Inform the General Public</p> <ol style="list-style-type: none"> <li>1) Our land and water resources make this area a good place to live.</li> <li>2) Water resources from part of our shared history and heritage.</li> <li>3) Surface water resources provide many recreational opportunities.</li> </ol>
<p><b>Goal B.</b></p>	<p><b>Increase Public Awareness of the Local Ecology and Bio-Diversity in the Watershed.</b></p> <p>table 8-3 Activities to Inform the General Public Throughout Project Implementation          Table 8-4 Activities to Inform the General Public          Table 8-5 Activities to Inform Wetlandowners</p> <ol style="list-style-type: none"> <li>1) There are many native plant communities in the basin.</li> <li>2) Wetlands provide unique habitat and functions.</li> <li>3) Surface water resources are ecologically divers.</li> <li>4) Many different species of wildlife live in the basin.</li> <li>5) Humans impact the natural environment.</li> </ol>
<p><b>Goal C.</b></p>	<p><b>Increase Public Awareness that Landuse and Nonpoint Source Pollution Affect Water Quality.</b></p> <p>table 8-6 Activities to Inform the General Public          Table 8-7 Activities to Inform Rural Well Users          Table 8-8 Activities to Inform Urban Residents</p> <ol style="list-style-type: none"> <li>1) Nonpoint source pollution is associated with familiar everyday activities.</li> <li>2) What we do on the surface effects the quality of our drinking water and surface water.</li> <li>3) Storm sewers serve as conduits for nonpoint source pollution and area direct outlet to surface water.</li> <li>4) Health homes and businesses depend on clean and safe groundwater.</li> <li>5) Sediment deposition degrades water quality.</li> </ol>
<p><b>Goal D.</b></p>	<p><b>Increase Public Awareness of the Financial Benefits of Best Management Practices Available Through the Project.</b></p> <p>table 8-9 Activities to Inform Participants          Table 8-10 Activities to Inform the General Public</p> <ol style="list-style-type: none"> <li>1) Best Management Practices can save money.</li> <li>2) Best Management Practices improve water quality.</li> <li>3) Water quality contracts are available.</li> <li>4) Technical and financial assistance is available.</li> </ol>
<p><b>Goal E.</b></p>	<p><b>Increase Public Awareness that the Duncan Creek Clean Water Project is a Community Effort.</b></p> <p>table 8-11 Activities to Inform the General Public          Table 8-12 Activities to Inform Civic Groups          Table 8-13 Activities to Inform Local Elected Officials</p> <ol style="list-style-type: none"> <li>1) Everyone is responsible for the quality of our resources.</li> <li>2) Everyone can participate.</li> <li>3) Landowners who have installed BMPs have done a good job and have contributed to the effort.</li> <li>4) Progress is being made.</li> </ol>

**Increase Public Appreciation and Recreational Use of the Land and Water Resources in the Basin.**

**Table 8-2. Activities to Inform the General Public**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Pure Water Days	1	LCD-192	2,000	93-01
Special Projects	1, 3	LCD-320	40,000	93-00
Calendar	2, 3	LCD-40	3,000	8-94
Photography Contest	1	LCD-80	2,000	8-96
Billboard	1	LCD-40	2,500	9-00

**Focus:**

- 1) Our land and water resources make this area a good place to live.
- 2) Water resources from part of our shared history and heritage.
- 3) Surface water resources provide many recreational opportunities.

**Explanation of Activities**

The project will directly support efforts of Mainstreet for Pure Water Days with financial contributions or sponsorship of activities.

The project, through local community groups (i.e. Mainstreet, Lake Como Management District, etc.), will support their educational efforts to enhance public appreciation and recreational use of resources in the basin. The project will financially support one activity or group per year (5000/yr.) in an effort to build and sustain community support for the project.

A calendar will be developed in cooperation with the Chippewa Valley Historical Society depicting shared history and heritage of the basin's water resources.

A photography contest will be held in conjunction with Pure Water Days. Contestants will be judged by age group in categories of: surface water, wetlands, water recreation, and best management practices.

Billboard(s) will be rented to advertise message.

## Increase Public Awareness of the Local Ecology and Bio-Diversity in the Watershed.

**Table 8-3. Activities to Inform the General Public Throughout Project Implementation**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Newsletters	All	LCD-1920	43,200	93-01
Newspaper Articles	All	LCD-320		93-01
Bulletins	All	LCD-384	4,000	93-01

### Explanation of Activities

Three newsletters will be mailed each year to rural landowners; one of the three will also be mailed to urban residents. Newsletter will focus on goals and objectives of the Information Strategy and Education Program.

Newspaper articles will be written and appear in the Chippewa Herald Telegram and Bloomer Advance as opportunities present themselves.

Bulletin racks will be maintained with publications.

**Table 8-4. Activities to Inform the General Public**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Signs	2	LCD-192	2,800	93-01
Pure Water Days	1, 2, 3, 4, 5	LCD		93-01
Fair Booth	1	LCD-60	500	7-96
Fair Booth	3	LCD-60	500	7-97
Billboard	5	LCD-40	2,500	9-99
Fair Booth	4	LCD-60	500	7-99

**Focus:**

- 1) There are many native plant communities in the basin.
- 2) Wetlands provide unique habitat and functions.
- 3) Surface water resources are ecologically diverse.
- 4) Many different species of wildlife live in the basin.
- 5) Humans impact the natural environment.

**Explanation of Activities**

Signs will be erected at sites of wetland easement areas and restoration project sites. The signs will provide information on wetlands and project sites.

The project will work with schools and Mainstreet toward institutionalizing a Science Fair in conjunction with the local Pure Water Day's celebration. (See also Goal A, table 8-1.)

Fair Booth(s) will be designed with appropriate message.

Billboard(s) will be rented to advertise message.

**Table 8-5. Activities to Inform Wetlandowners**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Pamphlet	1, 2	LCD-80	1,000	2-94
Direct Mailing	1, 2	LCD-80	750	10-93
Pamphlet Update	1, 2	LCD-40	1,000	2-97
Billboard	2	LCD-40	2,500	8-98

**Focus:**

- 1) Wetlands provide unique habitat and functions.
- 2) Humans impact the natural environment.
- 3) Surface water resources are ecologically diverse.
- 4) Many different species of wildlife live in the basin.
- 5) Humans impact the natural environment.

**Explanation of Activities**

A mailing will be sent to all landowners who have wetlands. The mailing will highlight the importance of wetlands, the habitat they provide, and opportunities available (easements, restoration, etc.) through the project.

A pamphlet will be developed and distributed explaining the value and importance of wetlands. The pamphlet will be made available at all public meetings, fairs, and other applicable activities. It will be updated (if necessary) and reprinted in 1997.

A billboard will be developed emphasizing the importance of wetlands.

## Increase Public Awareness that Landuse and Nonpoint Source Pollution Affect Water Quality

**Table 8-6. Activities to Inform the General Public**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Public Meeting	2	LCD-360	18,000	93-01
Promotional Items	1, 2, 3, 4, 5	LCD-360	9,000	93-01
Fair Booth	1	LCD-60	500	7-93
Newspaper Articles	1	LCD-24	100	6-94
Fair	2	LCD-60	500	7-94
Billboard	2	LCD-40	2,500	4-95
Fair Booth	2	LCD-60	500	7-00

Focus:

- 1) Nonpoint source pollution is associated with familiar everyday activities.
- 2) What we do on the surface effects the quality of our drinking water and surface water.
- 3) Storm sewers serve as conduits for nonpoint source pollution and area direct outlet to surface water.
- 4) Health homes and businesses depend on clean and safe groundwater.
- 5) Sediment deposition degrades water quality.

## **Explanation of Activities**

A public meeting will be held to solicit watershed residents who are interested in monitoring activities. Annually, monitoring program volunteers will be invited to a meeting to view the results of their efforts.

The project will develop and distribute promotional items such as placemats, grocery bags, yard sticks, Earth Day stickers, etc. to deliver messages.

Local reporters from Bloomer Advance and/or Chippewa Herald Telegram will be contacted to write a series of articles to explain the groundwater resource in Chippewa County and how people can protect it.

Several dump trucks will be displayed at the Northern Wisconsin State Fair. The dump trucks, loaded with sand, will emphasize the amount of sediment deposited in the surface waters.



**Table 8-7. Activities to Inform Rural Well Users**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Water Testing	2	LCD-640	24,000	93-00
Publications	2, 4	LCD-192	800	93-01
Direct Mailing	2	LCD-24	500	8-96

**Focus:**

- 1) Nonpoint source pollution is associated with familiar everyday activities.
- 2) What we do on the surface effects the quality of our drinking water and surface water.
- 3) Storm sewers serve as conduits for nonpoint source pollution and area direct outlet to surface water.
- 4) Health homes and businesses depend on clean and safe groundwater.
- 5) Sediment deposition degrades water quality.

**Explanation of Activities**

Rural well water testing for nitrates and atrazine will be provided to encourage landowners to annually sample their wells. The sampling will also assist in groundwater quality monitoring.

Publications on groundwater and drinking water quality will be purchased and distributed.

A direct mailing to residents in the municipal groundwater recharge zone will inform them of this, in an effort to raise awareness of their responsibility in assisting in the maintenance of groundwater quality.

A summer intern will field visit rural non-farm landowners to provide information on their private well and explain how landuse affects water quality.

**Table 8-8. Activities to Inform Urban Residents**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Earth Day	3	LCD-80	750	4-95
Water Bill Enclosure	4	LCD-80	1,000	8-95

**Focus:**

- 1) Nonpoint source pollution is associated with familiar everyday activities.
- 2) What we do on the surface effects the quality of our drinking water and surface water.
- 3) Storm sewers serve as conduits for nonpoint source pollution and area direct outlets to surface water.
- 4) Health homes and businesses depend on clean and safe groundwater.
- 5) Sediment deposition degrades water quality.

**Explanation of Activities**

Volunteers will assist in labeling key storm sewer outlets with "Dump No Waste - Drains to Stream" in Chippewa Falls and Bloomer. The storm sewer stenciling will coincide with established Earth Day activities.

An enclosure with urban residents' water bill will explain where their water comes from.

## Increase Public Awareness of the Financial Benefits of Best Management Practices Available Through the Project

**Table 8-9. Activities to Inform Participants**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Personal Contacts	1, 2, 3, 4	UWEX-3120	69,000	93-96
Fact Sheet	1, 2	LCD-160	1,000	6-94

Focus:

- 1) Best Management Practices can save money.
- 2) Best Management Practices improve water quality.
- 3) Water quality contracts are available.

### Explanation of Activities

UWEX will be subcontracted to perform initial contacts with landowners to explain the project and the sources of nonpoint pollution under their control.

A fact sheet will be developed and distributed which identifies financial benefits by installing Best Management Practices.

**Table 8-10. Activities to Inform the General Public**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Direct Mailing	1	LCD-40	250	3-94
Fair Booth	2	LCD-60	500	7-95
Contractor's Meeting	2	LCD-192	2,400	94-01

Focus:

- 1) Best Management Practices (BMPs) save money.
- 2) Best Management Practices improve water quality.
- 3) Water quality contracts are available.

**Explanation of Activities**

A mailing to the lending institutions will explain economical benefits of Best Management Practices.

Fair Booth(s) will be designed with appropriate message.

A Contractor's Meeting will be held annually to inform contractors of upcoming jobs, revised standards and specifications and the bidding procedure.

## Increase Public Awareness of a Community Effort

**Table 8-11. Activities to Inform the General Public**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Newspaper Ad	3	LCD-192	4,000	93-01
Farmstead Signs	3	LCD-96	1,200	93-01
Certificates of Recognition	1, 3	LCD-180	1,200	93-01
Family Photos	3	LCD-192	4,000	93-01
Earth Day	2	LCD-40	2,500	4-94
Billboard	2	LCD-40	2,500	8-93
June Diary Days	3	LCD-40	500	6-95
Billboard	4	LCD-40	2,500	9-96
Tour	3	LCD-40	500	10-96
Earth Day	2	LCD-40	2,500	4-97

**Focus:**

- 1) Everyone is responsible for the quality of our resources.
- 2) Everyone can participate.
- 3) Landowners who have installed Best Management Practices have done a good job and have contributed to the effort.
- 4) Progress is being made.

## **Explanation of Activities**

A newspaper ad will be purchased identifying participants who have installed best management practices.

Signs will be distributed to participants identifying their contribution to the project.

Certificates of Recognition will be sent to participants after completion of a water quality contract.

Family photos will be taken of participants who have installed best management practices and used for mobile displays.

Residents will be encouraged to enhance wildlife habitat with appropriate landscaping and feeding techniques in conjunction with established Earth Day activities.

A participant who has installed several best management practices will be asked to host a June Dairy Days brunch. A tour of the practices shall be included in the days events.

Billboard(s) will be rented to advertise message.

A tour will be organized to inform citizens of the purpose and function of best management practices.

**Table 8-12. Activities to Inform Civic Groups**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Presentations	2	LCD-240	600	93-96

Focus:

- 1) Everyone is responsible for the quality of our resources.
- 2) Everyone can participate.
- 3) Landowners who have installed Best Management Practices have done a good job and have contributed to the effort.
- 4) Progress is being made.

**Explanation of Activities**

Presentations will be given to local civic and sportsmen's groups to inform them about the project and solicit ideas or proposals for increased involvement in the project. Examples of civic groups are Bloomer Rod & Gun Club, Chippewa Falls Rod & Gun Club, Trout Unlimited, Wildlife Society, Boy Scouts, Girl Scouts, 4-H, etc.

**Table 8-13. Activities to Inform Local Elected Officials**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Direct Mailing	4	LCD-576	1,200	93-01
Airplane Tour	1	LCD-80	5,000	9-93

Focus:

- 1) Everyone is responsible for the quality of our resources.
- 2) Everyone can participate.
- 3) Landowners who have installed Best Management Practices have done a good job and have contributed to the effort.
- 4) Progress is being made.

**Explanation of Activities**

A direct mailing will be sent to local officials three times a year. The update will keep officials informed of the project's progress.

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# **CHAPTER NINE**

## **Education Strategy**

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The Education Strategy is the lead component of project implementation.

The strategy was developed by a Citizens Advisory Group with technical support from an Information and Education Work Group. A Public Opinion Survey (April 1992) was incorporated to solicit input and define educational needs.

### **Purpose**

The purpose of the Education Strategy is to educate decision makers in order to change their behavior as needed to achieve resource management objectives.

### **Implementation Overview**

The Education Program will be conducted throughout the Implementation Phase of the project.

The Education Strategy will be supervised by an Education Steering Committee.

Duties of the Committee will be to: review and direct educational activities; assist in ongoing identification of educational needs; and participate in evaluation of educational activities.

The Committee will meet quarterly to guide delivery of the education component.

Educational components will be delivered through existing educational institutions; school districts and the University of Wisconsin-Extension.

The Education Program is designed to be implemented by a part-time Education Specialist subcontracted by the Chippewa County Land Conservation Committee. (See Informational Strategy.) Educational components of the nutrient management strategy will be implemented by the University of Wisconsin-Extension.



# Goals

A summary of educational goals and messages is presented in table 9-1. Specific activities and target audiences are in tables 9-2 through 9-9.

**Table 9-1. Summary table of Educational Goals, Target Audiences and Messages**

<p><b>Goal A.</b></p>	<p><b>Educate Landowners About the Causes of Nonpoint Source Pollution and Management practices That can be Applied to Reduce Pollution Sources</b></p> <p>table 9-2 Activities to Educate Farmers</p> <ol style="list-style-type: none"> <li>1) On-farm nutrients can supply most of plant fertility needs.</li> <li>2) Nutrient management is profitable and enhances water quality.</li> <li>3) Integrated Pest Management is influenced by seasonal changes, weather, soil conditions, and crop rotations.</li> <li>4) Integrated pest Management is economical and enhances water quality.</li> <li>5) Crop scouting is essential for Integrated Pest Management.</li> </ol> <p>Table 9-3 Activities to Educate Rural and Urban Landowners</p> <ol style="list-style-type: none"> <li>1) Best Management Practices require routine maintenance.</li> <li>2) Nutrient and pest management is profitable and enhances water quality.</li> <li>3) Easements for streambanks are available.</li> <li>4) Unrestricted cattle access to streambanks is detrimental to animal health and degrades water quality.</li> <li>5) Many everyday activities can cause groundwater contamination.</li> </ol>
<p><b>Goal B.</b></p>	<p><b>Educate Municipalities About Landuse Decisions and the Effect on Water Quality.</b></p> <p>table 9-4 Activities to Educate Municipalities</p> <p>Table 9-5 Activities to Assist in the Development of Ordinances</p> <ol style="list-style-type: none"> <li>1) Uncontrolled construction site erosion effects water quality.</li> <li>2) Technical and financial assistance are available.</li> <li>3) Mismanaged stormwater effect water quality.</li> </ol>
<p><b>Goal C.</b></p>	<p><b>Educate Watershed Residents and Students About Local Land and Water Resources, Native Plant Communities and Resource Ecology.</b></p> <p>table 9-6 Activities to Educate Watershed Residents</p> <p>Table 9-7 Activities to Educate Students</p> <ol style="list-style-type: none"> <li>1) On-farm nutrients can supply most of plant fertility needs.</li> <li>2) Nutrient management is profitable and enhances water quality.</li> <li>3) Water resources (groundwater, surface water, and wetlands) are interrelated.</li> <li>4) Our local topography (soils and landscape) was influences by glacial activity.</li> <li>5) Native plant communities provide bio-diversity.</li> <li>6) Local landuse decisions effect everyone.</li> <li>7) There are different methods to solve local resource management problems.</li> <li>8) Local landuse issues can be resolved by community participation and action.</li> </ol>
<p><b>Goal D.</b></p>	<p><b>Educate Public and Private Sector About Regulations Regarding Water Resources in the Basin.</b></p> <p>table 9-8 Activities to Educate the Private Sector</p> <p>Table 9-9 Activities to Educate the Public Sector</p> <ol style="list-style-type: none"> <li>1) There are regulations to protect groundwater.</li> <li>2) There are regulations to protect wetlands.</li> </ol>

## Educate Landowners About the Causes of Nonpoint Source Pollution and Management Practices That can be Applied to Reduce Pollution Sources

**Table 9-2. Activities to Educate Farmers**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
NPM Demos	1, 2	LCD-360	6,000	94-96
Topical Presentations	1-5	LCD-216	900	93-01
Nutrient Management Training (Agribusiness)	1, 2		12,000	94-01
Nutrient Management Training	1, 2		12,000	94-01
Scouting Report	3, 4, 5	LCD-1536	10,000	93-00

**Focus:**

- 1) On-farm nutrients can supply most of plant fertility needs.
- 2) Nutrient management is profitable and enhances water quality.
- 3) Integrated Pest Management is influenced by seasonal changes, weather, soil conditions, and crop rotations.
- 4) Integrated Pest Management is economical and enhances water quality.
- 5) Crop scouting is essential for Integrated Pest Management.

**Explanation of Activities**

Nutrient Management demonstrations will be held in the watershed.

Topical presentations at appropriate meetings (i.e. Chippewa Valley Forage Council, UWEX Crop Production Meeting, or the Chippewa County Soil Judging Contest, etc.) will be delivered as opportunities present themselves.

A Nutrient Management Training Class will be developed for agribusiness and farmers. A scouting report emphasizing the principles of Integrated Pest Management (Integrated Pest Management is a pest control strategy which utilizes appropriate methods of control while minimizing detrimental impacts to the environment) will be developed and sent to cropland managers bi-monthly during May, June, July, and August throughout the project.

**Table 9-3. Activities to Educate Rural And Urban Landowners**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Public Meeting	1	LCD-256	2,000	93-00
O&M Plans	1	LCD-200		93-01
Workshop	2	LCD-80	1,000	94, 96
Direct Mailing	3, 4	LCD-40	500	10-93

**Focus:**

- 1) Best Management Practices require routine maintenance.
- 2) Nutrient and pest management is profitable and enhances water quality.
- 3) Easements for streambanks are available.
- 4) Unrestricted cattle access to streambanks is detrimental to animal health and degrades water quality.
- 5) Many everyday activities can cause groundwater contamination.

**Explanation of Activities**

A meeting will be held each fall to explain routine maintenance on Best Management Practices. Participants who have installed BMPs and/or scheduled to install practices the following year will be invited.

Operations and Maintenance Plans will be revised and distributed at the time of contract signing.

Workshops will be held to teach watershed residents how to manage lawn and garden inputs. Components of the workshop will be soil testing and interpretation, fertilizer application, and "natural pesticides."

A direct mailing will be sent to all landowners who own land adjacent to a stream. A fact sheet will be included detailing the purpose and value of livestock exclusion. The mechanisms available to assist landowners (financial and technical) will be outlined.

**Educate Municipalities About the Causes of Nonpoint Source Pollution Under Their Direct Control and Management Practices That can be Applied to Reduce the Pollution Source**

**Table 9-4. Activities to Educate Municipalities**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Seminars	1	LCD-160 RUWEX-420	5,000	94, 96, 98, 00
Presentations	1	LCD-128	400	93-00
Watershed Tour	1	LCD-100	5,000	93, 95

Focus:

- 1) Landuse decisions affect water quality.

**Explanation of Activities**

A series of five seminars will be developed and conducted to educate local elected officials. The focus will be the landuse decision making process and its effect on water quality.

Meet every other year with town boards in the watershed to discuss local actions (i.e. road building, road salt spreading, etc.) and their effect on water quality.

Hold watershed air tour to educate officials on local physical features, landuses, and water quality.

**Table 9-5. Activities to Assist in the Development of Ordinances**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Presentations	1, 2, 3	LCD-100	800	12-94

Focus:

- 1) Uncontrolled construction site erosion effects water quality.
- 2) Technical and financial assistance are available.
- 3) Mismanaged stormwater effect water quality.

**Explanation of Activities**

Meet with municipalities (Bloomer, Eau Claire, Chippewa Falls, and town of Hallie) to explain options available through the Duncan Creek Clean Water Project for construction site erosion control ordinance development and stormwater management plans.

**Educate Watershed Residents and Students About Local Land and Water Resources, Native Plant Communities and Resource Ecology**

Structured education of youth is a major planned effort of the project. The major components of this effort are as follows:

1. Develop Surface Water Quality Monitoring Program.

Work with school districts, civic groups and community volunteers to develop and implement a surface water quality monitoring program. The following methods will be used:

- a. Assess schools' interest
- b. Form Surface Water Quality Monitoring Committee.
- c. Explain proposed program
- d. Obtain school commitment
- e. Provide equipment and training
- f. Implement monitoring
- g. Evaluate program

2. Develop Units on Local Resource Management with Schools.

Work with school districts to develop and implement or enhance environmental curriculum. The following methods will be used.

- a. Assess schools' interest
- b. Form Local Resource Education Enhancement Committee
- c. Explain proposed scope of project
- d. Obtain school commitment
- e. Develop local resource education units
- f. Provide materials and training to implement units
- g. Evaluate program

Specific activities to educate watershed residents and students are outlined in tables 9-5 and 9-6.

**Table 9-6. Activities to Educate Watershed Residents**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Presentations	1, 2	LCD-320	1,000	93-00
Tour	2, 3, 4, 5	LCD-80	1,000	8-94
Presentations	2, 3, 4, 5	LCD-320	1,000	93-00

**Focus:**

- 1) The local geology effects groundwater quality.
- 2) Water resources are interrelated.
- 3) Native plant communities provide bio-diversity.
- 4) Wetlands provide flood storage and filter pollutants.
- 5) Wetlands provide unique and needed wildlife habitat.

**Explanation of Activities**

Programs will be presented to local organizations explaining groundwater chemistry and groundwater geology. Potential organizations include local rod and gun clubs, 4-H, FFA, scouts, schools, etc.

A tour will feature the different types of wetlands and emphasize their value and function.

Programs on wetlands will be presented to local organizations explaining the physical and biological aspect of wetlands.

**Table 9-7. Activities to Educate Students**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
NPM Curriculum/Training	1, 2	UWEX-NPM-520	10,000	94
Field Record Keeping Class	1, 2	LCD-80	12,000	93-00
Environmental Curriculum	3-8	LCD-3120	200,000	93-01

**Focus:**

- 1) On-farm nutrients can supply most of plant fertility needs.
- 2) Nutrient management is profitable and enhances water quality.
- 3) Water resources (groundwater, surface water, and wetlands) are interrelated.
- 4) Our local topography (soils and landscape) was influenced by glacial activity.
- 5) Native plant communities provide bio-diversity.
- 6) Local landuse decisions effect everyone.
- 7) There are different methods to solve local resource management problems.
- 8) Local landuse issues can be resolved by community participation and action.

**Explanation of Activities**

A unit on nutrient crediting will be developed for school districts. The Regional UWEX-NPM representative will design and deliver an NPM training program for agricultural teachers.

A class will be developed in cooperation with the Chippewa Valley Technical College to teach methods of Farm Management and Field Record Keeping.

A curriculum will be developed in cooperation with the local school districts in the watershed to teach the principles of earth sciences, ecology, and environmental science with focus on local landuse and resource management issues.

The fundamentals of local resources and how the local agricultural economy affects landuse will be emphasized.

## Educate Public and Private Sector About Regulations Regarding Water Resources in the Basin

**Table 9-8. Activities to Educate the Private Sector**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Well Driller Workshop	1	LCD-40 CO ZON-10	300	2-94
Hazardous Matr. Workshops, Brochures	1	LCD-320 DILHR-160	4,000	94-01

Focus:

- 1) There are regulations to protect groundwater.
- 2) There are regulations to protect wetlands.

### Explanation of Activities

Workshops will be conducted for well drillers to relay the importance of well logs and the accuracy in describing the geology, well construction and pump test. The workshop will also explain what the well information is used for and what it tells us.

Public education programs will be conducted for industry and households concerning hazardous materials. Educational materials will also be developed. Clean Sweeps will be coordinated with Solid Waste and DATCP.



**Table 9-9. Activities to Educate the General Public**

Activity	Focus	Agency/Hours	Estimated Cost	Implementation Date
Abandoned Well Demo	1	LCD-80	5,000	9-94
UST Workshops, Brochures	1	LCD-320 DILHR-160	4,000	94-01
Seminar	2	LCD-60	1,000	4-94

Focus:

- 1) There are regulations to protect groundwater.
- 2) There are regulations to protect wetlands.

#### **Explanation of Activities**

A demonstration will be conducted to teach watershed residents the proper procedure of abandoning a well.

Public education programs will be conducted for owners and operators of Underground Storage Tanks (UST). The programs will focus on how leaking UST's can cause groundwater contamination and how owners and operators can prevent contamination. The program will also encourage voluntary management options such as containment structures, equipment maintenance, operation and safety procedures and contingency spill plans.

A seminar will be organized and presented for agriculture, business, conservation organizations and other effected landowners. The seminar will review wetland functions and importance. Highlighted will be applicable regulations and what a landowners obligations are in regards to regulatory compliance.

Note: Agency abbreviations are: LCD=Land Conservation Department; UWEX=County Cooperative Extension Service; UWEX-NPM=University of Wisconsin Extension-Nutrient Pest Management representative.

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# **CHAPTER TEN**

## **Integrated Resource Management**

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### **Introduction**

Individual landowners are responsible for ongoing landuse decisions for properties that they own or manage.

Public responsibility for land, water, and natural resource management in the project area has been delegated to a wide range of local units of government, public agencies and private organizations. These agencies are identified as program participants in Chapter 5.

The Duncan Creek Clean Water Project and the Wisconsin Nonpoint Pollution Abatement Program will work with all responsible parties to achieve resource management objectives established in Chapter 3.

### **Purpose**

Chapter 6 provides an overview of public authorities and programs which affect landuse and nonpoint source pollution.

It also offers structured mechanisms to improve the efficiency and cost effectiveness of resource management programs administered in the watershed.

### **Project Participants**

#### **Landowners and Land Operators**

The owners and operators of public and private lands are recognized as critical program participants responsible for ongoing landuse decisions in the project area. These managers will be encouraged to adopt Best Management Practices designed to reduce nonpoint

pollution and improve water related resources. Those eligible for direct technical and financial assistance are as follows:

- individuals landowners and operators
- Chippewa County
- other governmental units described in NR 120.02(19)
- corporations
- State of Wisconsin

## Civic Groups

Civic groups will be recognized as organizations which may share common resource objectives with the project. Potential organizations are as follows:

- |                          |                  |           |
|--------------------------|------------------|-----------|
| -Chippewa Rod & Gun Club | -Trout Unlimited | Lake Como |
| -Bloomer Rod & Gun Club  | -4-H             | District  |
| -FFA                     | -boy/girl scouts |           |
| -Mainstreet              | -Optimist Clubs  |           |

Civic groups will be encouraged to participate in the project as a means to meet their individual goals. The project will work through local community groups (i.e. Mainstreet, Lake Como Management District, etc.) and directly support their educational efforts to enhance public appreciation and recreational use of resources in the basin.

The Land Conservation Committee will explore the potential to execute subcontracts with civic groups for the purpose of completing scheduled activities or providing needed services.

## Municipalities

The Land Conservation Committee will recognize existing authorities and will encourage them to participate by developing special landuse planning studies, incorporating Best Management Practices, and developing landuse and nonpoint source pollution ordinances. The municipalities are as follows:

<u>cities</u>	<u>village</u>	<u>townships</u>
Chippewa Falls	N Auburn	Sampson
Eau Claire		Howard
Bloomer		Tilden
		Wheaton
		Hallie
		Woodmohr

## State and Federal Agencies

The Land Conservation Committee will actively coordinate local program delivery between the county and the following public agencies:

<u>Federal</u>	<u>State</u>	<u>County</u>
USDA SCS	DNR	UWEX
USDA ASCS	DATCP	Zoning
USFWS	DILHR	
US Army Corp	UWEX-NPM	

## Structured Methods to Achieve Common Resource Management Goals

### Communication

The Land Conservation Committee will facilitate active communication among program participants to limit duplication of effort and improve efficiency.

#### 1. Municipalities

The Land Conservation Committee will conduct the following activities to achieve communication with and among municipalities:

- Continue Local Elected Officials Update to inform elected officials of activities in the watershed. (See Information Strategy.)
- Conduct training sessions for local elected officials focusing on landuse planning and control of nonpoint source pollution.
- Meet with towns every other year to discuss project progress and identify local concerns.
- Distribute annual report.

#### 2. Agencies

The Committee will conduct the following activities to achieve communication among agencies:

- Form Technical Advisory Group of local agency heads and bureau representatives. Schedule quarterly meetings to provide progress updates and exchange program goals and directives that impact the Duncan Creek watershed.

-Inform local, state and federal agencies of watershed administrative policies; and provide agencies a copy of the watershed plan.

-Sponsor an annual watershed project review to assess progress toward implementing scheduled activities and to identify constraints to achieving management objectives.

-Develop and distribute joint interagency annual report to local agency heads and bureau representatives.

### **3. Civic Groups**

The Land Conservation Committee will conduct the following activities to assure structured communication with civic groups:

-Present educational programs to organizations. (See Education Strategy.)

-Inform civic groups of watershed goals and objectives; provide copy of watershed plan.

-Meet with civic groups to identify issues of common concern to assess how the project might serve to meet the needs of the civic group.

-Distribute annual report.

## **Integrated Resource Planning**

The Land Conservation Committee and cooperating agencies will work within existing Memorandums of Understanding to meet designated responsibilities of individual agencies and agency bureaus.

1. The Land Conservation Committee will administer an annual process of integrated resource planning to identify issue areas of resource management concern and to set local priorities for resource management activities in the basin.

-The Duncan Creek planning process will be administered as a component of the Land Conservation Committee annual work planning/budgeting process.

-All agencies with significant responsibilities for landuse and resource management as outlined in table 10-1 will be invited to participate.

2. The Land Conservation Committee will provide input into mid- and long range administrative, staffing and program management plans developed for Chippewa County by public agencies and DNR bureaus. (i.e. - ASCS, SCS, UWEX, DNR Wildlife, DNR Fisheries).

**Table 10-1. Agencies with Resource Management Responsibilities in the Duncan Creek Basin**

<b>FEDERAL AGENCIES</b>		
<b>Agency</b>	<b>Program</b>	<b>Type*</b>
Agriculture Stabilization and Conservation Service	ACP	F
	Water Bank	F
	Wetland Reserve	F
	CRP	F
	Commodity Support/Loan	F
Soil Conservation Service	FACTA	T
	ACP	T
US Fish and Wildlife Service	Wetland Restoration	T, F
Farmers Home Administration	Wetland Easements	F
Army Corp Engineers	404 Permits	R
Environmental Protection Agency	Superfund Clean-Up	F
	604B Grant	F
<b>STATE AGENCIES</b>		
<b>Agency</b>	<b>Program</b>	<b>Type*</b>
<b>DNR</b>		
Water Resource Management	NPS	F
Resource Management Fish Wildlife Forestry	Fish Easements, Stewardship	F
	Joint Venture	T
	SIP, Woodland Tax	F
		T
Water Regulations/Zoning	Chapter 30/Shoreland Zoning NR243	R T
Environmental Standards	Water Quality Monitoring	T, F
DATCP	Chapter 91	
	Chapter 92	F
	Ag. 30	T
	NR243	F

FEDERAL AGENCIES		
University of Wisconsin-Extension	County Cooperative Ext. Area Specialist Nutrient/Pest Management	E E E
Wisconsin Conservation Corp		
District 1 Technical College		E
Department of Transportation	Road, bridge repair	F
LOCAL AGENCIES		
COUNTY		
Agency	Program	Type*
Land Conservation Department	Wildlife Grant Farmland Preservation Manure Storage Ordinance	F R R
School Districts		E
Solid Waste	Clean Sweeps	T, F
Zoning	Well Permits, Subdivision Ord. Shoreland Zoning, Comprehensive Zoning	R
Bloomer FFA	BYOC	E
MUNICIPALITIES		
Agency	Program	Type*
Bloomer		
Chippewa Falls		
Eau Claire		
Hallie	Sanitary District	
New Auburn		
Eau Claire County LCD	Duncan Creek, Lowes Creek	
PRIVATE AND NON PROFIT		
Agency	Program	Type*
4-H		E

FEDERAL AGENCIES		
Bloomer Rod and Gun		Pr
Chippewa Rod and Gun		Pr
Main Street		Pr
Trout Unlimited		Pr
*Type: T = Technical    E = Educational    F = Funding    R = Regulatory = Private		

### **Use Common Land Records and Data Base Formats**

The Land Conservation Committee will limit duplication of effort and assure consistency in program administration by using common land records and record keeping formats used by other resource management agencies.

The Land Conservation Committee will use the ASCS air photo tract numbers and field boundaries; and the Chippewa County real property tax listing as the basis for land resource planning, record keeping and monitoring.

The Land Conservation Committee will develop and maintain a joint data base of common landowner files to meet the needs of all state and federal programs administered by the Land Conservation Committee and Soil Conservation Service.

### **Develop and Maintain Common Landuse and Resource Inventories**

The Land Conservation Department will develop and maintain inventories of landuse: well locations and groundwater chemistry, and wetland locations and conditions. (See Chapter 5.) This information will be made available to all public agencies upon request.

The Land Conservation Department will generate and distribute annual reports showing ongoing changes in landuse and the resource base within the watershed.

### **Participate in Jurisdictional Reviews; Permitting and Regulatory Processes**

To limit duplication of effort and improve administration of existing regulations, agencies will be encouraged to cooperate in permitting processes.



A joint administrative process will be developed to conduct necessary site investigations and plan reviews under the following jurisdictions:

- 1) Chapter 30, and the Chippewa County zoning and subdivision ordinances;
- 2) Local, state and federal wetland jurisdictions;
- 3) NPDES surface water and groundwater permits;
- 4) Local DOT, county, and town road projects.

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# **CHAPTER ELEVEN**

## **Progress Assessments**

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### **Introduction**

This chapter describes how progress will be monitored in the Duncan Creek Watershed Project. The strategy contains two components:

1. administrative review
2. pollution reduction evaluation

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

Each year during project implementation the County LCD, DNR, and DATCP will conduct an annual meeting. The County reports and other available information will be collected to make an evaluation of the progress and status of the project.

### **Administrative Review**

This component will focus on the progress of the counties in implementing the project. The project will be evaluated with respect to 1) amount and types of BMPs on Cost Share Agreements and installed (accomplishment reporting), 2) financial expenditures, and 3) staff time spent on project activities.

# Accomplishment Reporting

The County shall supply information to the State agencies using an acceptable system of data management. The County LCD's will provide the following data to DNR and DATCP on a quarterly basis:

- 1) number of personal contacts made with landowners,
- 2) completed I & E activities,
- 3) number of farm conservation plans prepared for the project,
- 4) number of cost share agreements signed,
- 5) number of farm conservation plan and cost share agreement status reviews completed, and
- 6) number of farms and acres of cropland checked for proper maintenance of Best Management Practices.

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

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

- 1) number of landowner cost share agreements signed,
- 2) amount of money committed on cost share agreements,
- 3) number of landowner reimbursements made, and amount paid for BMP installation,
- 4) expenditures for staff travel,
- 5) expenditures for information and education program,
- 6) expenditures for equipment, materials and supplies,
- 7) expenditures for professional services and staff support costs,
- 8) total project expenditures for LCD staff,
- 9) staff training expenditures,
- 10) interest in money earned and expended, and
- 11) total county LCD budget and expenditures on the project.

**Time Spent on Project Activities** The LCD will provide time summaries to both departments for the following activities on a quarterly basis:

- 1) project and fiscal management,
- 2) clerical assistance,
- 3) pre-design and conservation planning activities,
- 4) technical assistance: practice design, installation, cost share agreement status review, and monitoring,
- 5) educational activities,

- 6) training activities, and
- 7) leave time.

## **Annual Review**

Each year the project progress will be evaluated by DNR, DATCP, and UWEX. An annual meeting conducted sometime after the end of the year will review the status of the project. The DNR will conduct the meeting and supply information requests to Chippewa County for review purposes. Results of this meeting will be used to guide the future of the project and to make appropriate adjustments as needed. Each annual review will be summarized and distributed by the DNR in report format. The content and type of information requested by the DNR concerns specific data on pollutant load reductions achieved, cost share agreement sign up numbers, landowner contacts, administrative procedures, engineering designs completed, BMPs planned and installed, easement activity, nutrient management activity, staff, and grants.

## **Pollutant Reduction Evaluation**

### **Purpose**

The purpose of this evaluation component is to calculate reductions in the amount of key pollutants as a result of installing Best Management Practices. Five key sources have been identified for estimating changes in pollutant loads in the Duncan Creek Watershed: a) upland sediment b) runoff from barnyards c) critical fields winter spread with manure d) gully erosion, and e) streambank erosion. Tracking procedures for all sources is described below.

### **Procedure**

#### **1) Upland Sediment Sources**

The County LCD will use USLE erosion control procedures with WIN derived coefficients to estimate reductions due to changes in cropping practices. The reporting must include the amount of upland sediment reduced for each cost share agreement developed. The sediment amount controlled must be reported to the DNR as a unit of mass or weight. Tons/year is an acceptable unit for reporting on each cost share tracking sheet. Sediment reductions from buffer strips must also be reported on the tracking sheets. Appendix D contains a more detailed explanation for sediment tracking.

**2) Barnyard Runoff**

Each county will use BARNY (Modified ARS) model to estimate phosphorus reductions due to the installation of barnyard control practices. The county will report the information to DNR through an acceptable system of tracking that reports the amount of phosphorus reduced for each cost share agreement. The amount reduced must be reported on the cost share tracking sheet.

**3) Manure Spreading**

The county will record for each landowner, the actual number of critical acres which are no longer spread with winter manure. This change will be recorded using an acceptable system of tracking and will be reported on every cost share tracking sheet.

**4) Gully Erosion**

The county will record for each landowner, the actual number of gullies present at the time of contact and the number of gullies to be controlled through Best Management Practices identified on the Cost Share Agreement. The mass of sediment saved from gully erosion control will be reported for every cost share agreement using the cost share tracking sheet.

**5) Streambanks**

The county LCD will calculate changes in streambank sediment in terms of tons of sediment. A tally will be kept of landowners contacted, the amount of streambank being generated at the time of contact, and changes in erosion levels estimated from the BMP application.

**6) Easements**

The County LCD will report annually the number of easement agreements developed and proposed in the Duncan Creek project.

**7) Nutrient Management**

The County will calculate the pollutant load reductions achieved through nutrient management activities. These activities will be analyzed to include an annual report, to the DNR, of the amount of nutrients that have been reduced by nutrient management planning. Records of each landowners nutrient management work will be available to the County to allow for determinations of the effectiveness of nutrient management activities. The mass of nitrogen and phosphorus reduced by landowner per year is a measure of the nutrient management practice effectiveness and is the required unit for reporting.

# Tracking of Cost Share Agreements

Every cost share agreement and amendment shall be submitted to the DNR Nonpoint Source Coordinator as explained in Chapter 5 along with a tracking sheet. The tracking sheet will be a form prepared by the County that meets DNR approval. The tracking sheet must contain the following types of information:

- Landowner name
- ID number
- Cost share agreement number
- Amendment number
- Subwatershed
- Contact records
- Inventoried pollutant loads - original and updated
  - upland sediment
  - barnyard runoff (phosphorus )
  - manure spreading
  - Streambank erosion
  - gully erosion
  - livestock restrictions
- Comments explaining circumstances not readily apparent.

Cost share agreements that are sent to the DNR without the required tracking sheets will not be approved and they will be returned to the County LCD. Amendments submitted because of cost changes do not require a tracking sheet. Any other changes to an agreement require a tracking sheet.

Chippewa County LCD has proposed to not use the CAMPS program for tracking, but they have another system they would like to use. The County will meet all of the required tracking through the use of a dBase 4 computer program developed by Chippewa County. The system is a series of databases which record cost share agreement information and specific information related to the various pollutant sources previously listed. Chippewa County agrees to provide all of the necessary information requested by DNR and agrees to provide exactly the same information provided by the current CAMPS system.

Chippewa County also agrees to provide a complete WIN analysis of the sampled sub-areas used in the original inventory. The County will produce this information at the end of the implementation period.

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# **CHAPTER TWELVE**

## **Water Resource Evaluation Monitoring**

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### **Introduction**

The primary purpose of evaluation monitoring is to determine how well the Duncan Creek Priority Watershed project achieves identified objectives for selected water resources in the watershed. This plan identifies monitoring locations, methods and analysis techniques that will be used in the assessment. The principal methods proposed for the evaluation include fish surveys, habitat evaluation, macroinvertebrate sampling, flow and water chemistry monitoring.

### **Objectives of the Watershed Project**

All monitoring in the Duncan Creek watershed will necessarily be related to project objectives as identified in the watershed plan. Following is a general summary of the Duncan Creek Priority Watershed project objectives:

1. Improve or enhance existing trout fisheries by improving overall coldwater habitat conditions.
2. Reduce sediment and nutrient loading to the watershed impoundments.

Most of the streams in the Duncan Creek watershed are capable of supporting viable trout populations with a significant reduction in nonpoint source loadings.

### **Water Resources to be Monitored**

Due to workload and financial constraints, it will not be possible to assess all water resources in the Duncan Creek watershed. Rather, monitoring will primarily focus on a limited number of waterbodies that generally meet the following criteria:

1. The water resource is currently being impacted by nonpoint source pollution and has significant potential for improvement;

2. The waterbody is affected by landowners that are likely to become cooperators in the watershed project. Sites where landowners have signed a cost-share agreement will receive highest priority for evaluation monitoring.
3. The study site is well suited for the monitoring techniques to be used;
4. And, the waterbody is representative of other water resources with similar management objectives in the watershed.

## **Monitoring Approach**

Several levels of evaluation monitoring are proposed in the Duncan Creek Priority Watershed. The most intensive level includes establishment of a Master Monitoring Site on one stream in the watershed. This level of monitoring would be contingent on availability of Federal funds. A second level of monitoring would measure short-term habitat changes at individual BMP installation sites. The third level would measure changes at the end of the watershed project using methods and sites similar to those used during the watershed appraisal.

### **Master Monitoring Site**

Currently, 11 Master Monitoring Sites have been established in Priority Watersheds throughout the state. Monitoring at these sites generally includes intensive fish surveys, habitat evaluation, macroinvertebrate sampling and water quality and streamflow monitoring. However, development of a Master Monitoring Site in the Duncan Creek Watershed is contingent on availability of Federal funding. State funding is not currently available for development of additional Master Monitoring Sites.

Habitat evaluation and fish surveys will be conducted annually throughout implementation of the watershed project by a state Evaluation Monitoring Team at the Master Monitoring Site and several additional sites on the stream. Monitoring will also be conducted at several reference sites in watersheds adjacent to the Duncan Creek Watershed. Annual macroinvertebrate monitoring will be conducted at the Master Monitoring Site and reference sites as a special project by DNR District Water Resources staff.

A continuous streamflow and water quality monitoring station will be installed and operated at the Master Monitoring Site by U.S. Geological Survey staff.

At this time, a potential Master Monitoring Site should be identified in the watershed using the following criteria:

1. The stream is currently impacted by nonpoint sources and has significant potential for improvement through the watershed project.



2. The monitoring site is situated in a drainage area of less than 20 square miles.
3. A majority of eligible landowners in the study watershed are likely to participate in the watershed project.

### **"Signs of Success" Sites**

Several sites will be monitored to demonstrate short-term improvements as a result of installation of BMPs, called "Signs of Success" sites. These sites will be used to show how BMPs in the immediate stream corridor (such as streambank fencing, riprapping and fish structures) benefit the stream. Results of this monitoring can be incorporated into the watershed newsletter to promote the project.

Chippewa County LCD staff will be asked to identify potential "Signs of Success" sites during implementation of the watershed project. The county will be asked to use quarterly reports to identify possible monitoring sites that meet the following guidelines:

1. The site is currently impacted by nonpoint sources and has significant potential for improvement.
2. A cost-share agreement has been signed by the landowner and implementation will likely begin within 6 months.
3. The proposed BMPs will directly affect the stream corridor at the site (i.e. barnyard management, streambank fencing, riprapping, fish structures, shaping and seeding, etc.).

A variety of methods may be used in assessing the effectiveness of BMP installation at the site, including habitat evaluation, fish surveys, macroinvertebrate sampling, and physical, chemical and biological monitoring. Photographs will also be taken of the stream corridor before and after installation of BMPs. Monitoring will be conducted as a special project by DNR District Water Resources staff.

### **Post-implementation Monitoring**

A final level of evaluation monitoring will occur after completion of the watershed project and will repeat methods and sites used during the watershed appraisal. Site selection will be based on implementation levels on individual streams, at sites used during the watershed appraisal.

Generally, post-implementation monitoring will only be conducted at stream appraisal monitoring sites where a high level of implementation has occurred. Appraisal monitoring sites will be evaluated at the end of the project to determine the level of participation in the watershed above the site. Post implementation monitoring will be conducted only where at

least 75 percent of the eligible landowners upstream of the appraisal site have installed practices.

## **Groundwater Monitoring**

The Duncan Creek project has a substantial plan for groundwater management. A monitoring plan for groundwater was developed by the Chippewa County LCD staff and is contained in appendix A. The groundwater monitoring strategy plans to accomplish a number of activities outlined below;

- Document new well construction
- Monitor basin wide groundwater chemistry
- Monitor effectiveness of NPM activities
- Monitor groundwater baseflow to streams

## **Wetland Monitoring**

Chippewa County has a wetland monitoring strategy designed to quantify the physical and biological aspects of wetlands in the project area. Using a system for monitoring explained in appendix B, Chippewa County LCD will request funding for the monitoring activities from the nonpoint program.

Funding of the surface water monitoring plan is the responsibility of the DNR and may be obtained from existing budgets in programs outside of the Nonpoint Source Program. Chippewa County will seek grants from the Nonpoint Source Program to fund the activities associated with wetland and groundwater monitoring plans. The grant amendment process or the annual grant application can be used to apply for these funds. Availability of funds to cover costs associated with wetland and groundwater monitoring will depend on State allocations of dollars and on the approval of the DNR Nonpoint Section.

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# Appendix A

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## GROUNDWATER MANAGEMENT PLAN

### I. INTRODUCTION

Wis. Administrative Code, Chapter NR120 states that a watershed appraisal be conducted to assess the water resources of the basin, including groundwater. A detailed groundwater appraisal was conducted as part of the Duncan Creek watershed planning process. The appraisal documents the physical characteristics of basin hydrogeology, groundwater chemistry and groundwater use. The groundwater appraisal is available as a separate document.

The groundwater component of the watershed plan provides an overview of these findings and establishes groundwater management objectives and implementation strategies.

### II. PHYSICAL AND CULTURAL CHARACTERISTICS OF THE BASIN

#### A. Physical Characteristics of the Basin

##### 1. Basin Physiography

For the purposes of analysis and management, the watershed was divided into 13 major subwatersheds based on surface water and topographic characteristics.

The distribution of stream segments in the upper and middle basins are characteristic of a dendritic drainage pattern, formed in a bedrock controlled landscape. On average the slope of intermittent streams is an order of magnitude larger than the slope of perennial streams.

##### 2. Basin Geology

The geology of the basin is composed of precambrian, crystalline bedrock overlain, in most areas, by a 100 to 200 foot deposit of Cambrian age sandstone. The Cambrian sandstone is overlain by glacial drift deposits, ranging in depth from 0 to 100 feet. A generalized, geologic cross-section is shown in figure A-1.

##### 3. Basin Soils

Soils within the basin can be grouped into 5 major soil associations based on drainage, texture and parent material. 60 percent of the watershed contains soils which have a poor to marginal ability to attenuate pollutants.

Figure A-1. Generalized Geologic Cross-Section

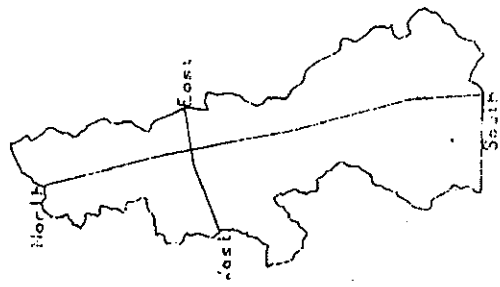
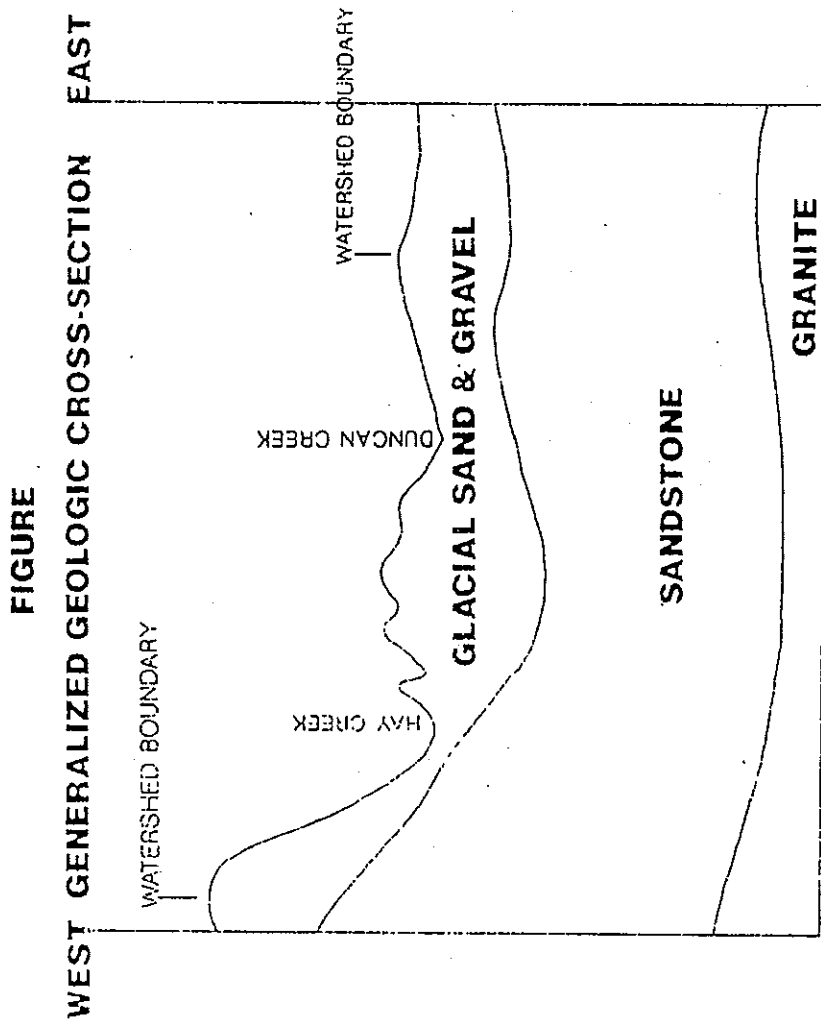
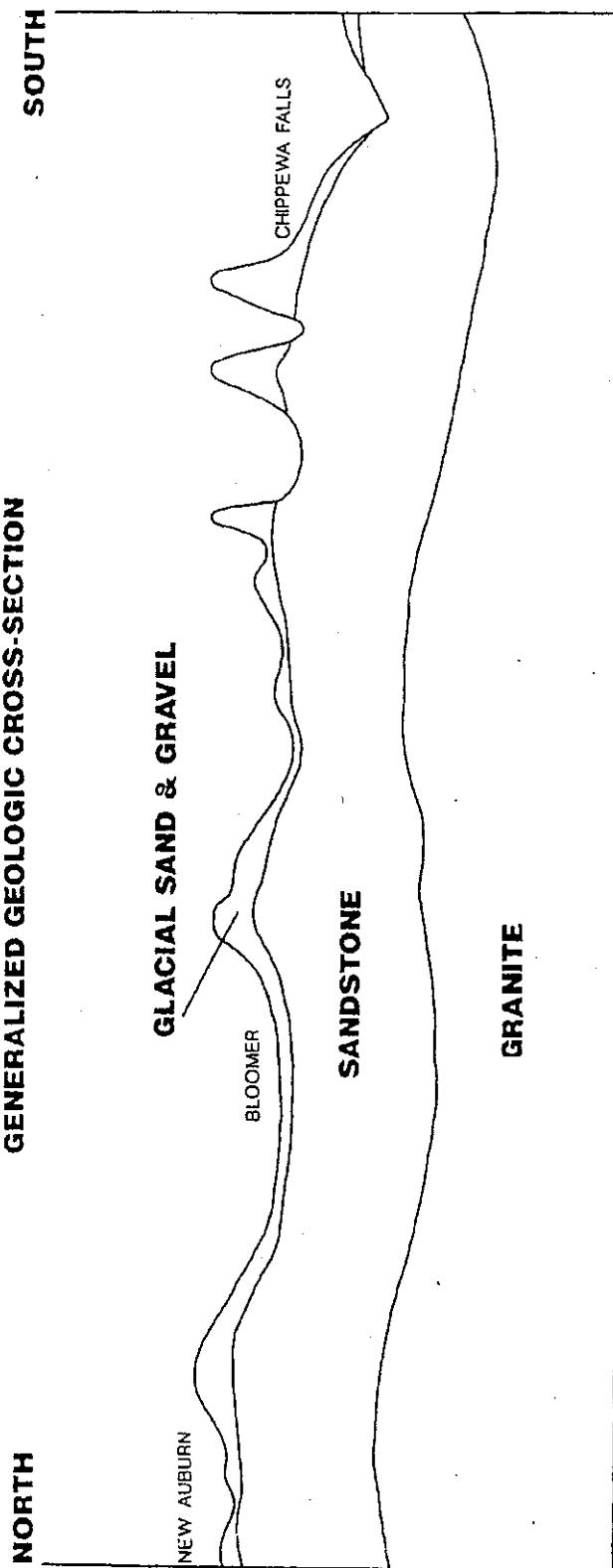


Figure A-1. Generalized Geologic Cross-Section Continued

**FIGURE  
GENERALIZED GEOLOGIC CROSS-SECTION**



## B. Basin Hydrogeology

Groundwater is part of the hydrologic cycle and is connected to all other parts of the cycle, most importantly precipitation and surface water.

The geologic and groundwater quality inventory conducted by the WGNHS provided a basis for conducting this hydrogeologic analysis.

Groundwater divides within the Duncan Creek basin, in general, correspond to surface water divides with the exception of the lower basin. This has important implications for the management of a watershed to protect groundwater quality.

Within the Duncan Creek basin, groundwater occurs in 3 aquifers. These aquifers consist of a Precambrian granite, a Cambrian sandstone and a glacially deposited sand and gravel. The sand and gravel and sandstone aquifers are the most common for well development.

In most cases, the sand and gravel lies directly over the sandstone. The lack of a significant impermeable layer between the sand and gravel and sandstone suggests that water may move between these two aquifers. A generalized geologic cross-section is shown in the groundwater appraisal report.

Within the watershed, most wells draw water from within a mile or two of the well. Groundwater from these local recharge areas is affected by landowner actions.

On a regional scale, groundwater generally flows from upland areas to discharge areas, such as perennial streams, lakes and rivers. The rate and direction of groundwater flow is dependent on the aquifer material, surface topography, climate, surface water hydrology and cultural use.

Based on aquifer parameters, the average velocity of groundwater in the sand and gravel is estimated at 12 feet/day and in the sandstone aquifer, 4 feet/day.

## C. Groundwater Use

The groundwater resources of the Duncan Creek watershed supply 100 percent of the water for homes, industries and municipalities.

### 1. Rural, Private Groundwater Use

Of the wells of record, 68 percent draw water from the sand and gravel aquifer. Less than 5 percent draw water from the granite. Because of a lack of information, the granite aquifer was not considered in this study. The extent of groundwater use in the sand and gravel and sandstone aquifers is shown in figure A-2.

Rural, private wells account for nearly 90 percent of all wells within the Duncan Creek basin.

Figure A-2. Percent Well Type by Class in the Sand & Gravel and Sandstone Aquifer

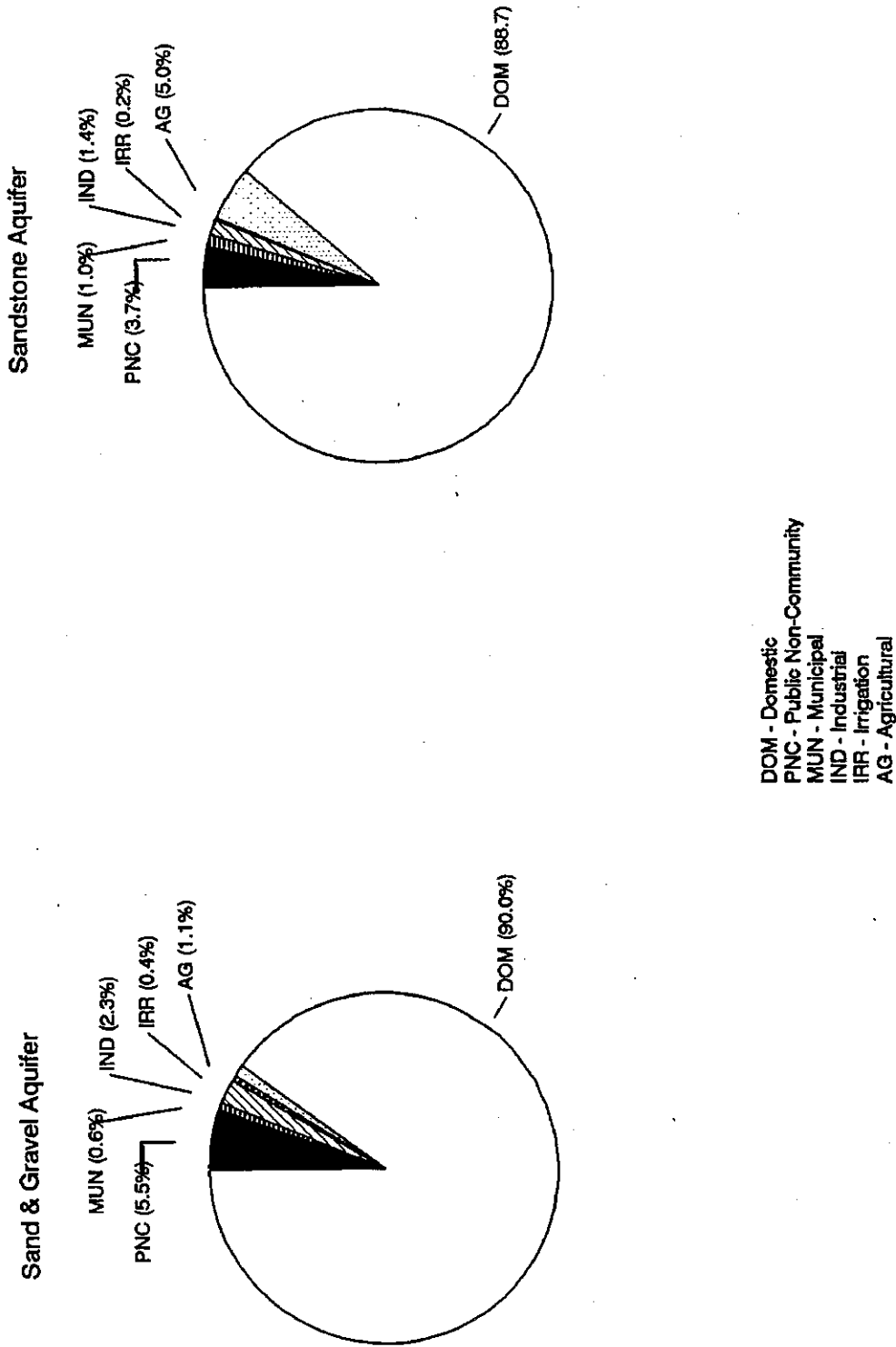


Figure 2: Percent Well Type, by Class, in the Sand & Gravel and Sandstone Aquifer; Based on Wells of Known Location and Construction as Documented on Chippewa County Groundwater Inventory

## 2. Municipal Groundwater Use

All communities within the watershed obtain their municipal drinking water from groundwater. The village of New Auburn and the city of Bloomer wells are all completed in the sandstone aquifer. All wells serving the city of Chippewa Falls are completed in the sand and gravel aquifer.

### III. POLLUTANT SOURCES

Pollutant sources within the Duncan Creek basin are varied in both type and distribution. Table 1 shows the types of potential pollutant sources in the watershed. There are two broad categories of groundwater contamination sources, point and non-point sources.

**Table A-1. Point and Non-Point Sources of Groundwater Contamination Within the Duncan Creek Basin**

Point Sources	Non-Point Sources
Underground Storage	Petroleum Products from Streets and Highways
Pesticide Mixing/Loading Sites	Pesticide Applications to Agricultural Land and Urban Areas
Bulk Fertilizer Storage	Fertilizer Applications to Agricultural Land and Urban Areas
Bulk Road Salt Storage	Salt Applications to Roads
Landfills	
Waste Treatment Lagoons/Holding Ponds	Landspreading of Sludge/Waste
Manure Storage Structure	Landspreading of Animal Waste

Point sources of degradation in the watershed include septic systems, landfills, underground storage tanks (UST) and various industries and businesses. Point sources are subject to regulation by the Wis. DNR (DNR) and/or Wis. Department of Industry, Labor and Human Relations (DILHR). Point sources often represent the potential for greater health threats due to the type of material, proximity to wells and the higher concentrations at a small area.



Non-point sources of nutrient contamination are generally not regulated by state agencies. Non-point sources of pesticide contamination due to misuse and improper handling are regulated by the DATCP (DATCP).

More specific information concerning septic systems, landfills, underground storage tanks and other point sources of pollution including NPDES, ERP and superfund sites is located in the groundwater appraisal report and chapter 3, "Other Pollutant Sources".

### III. GROUNDWATER CHEMISTRY

#### A. Rural Groundwater Chemistry

Groundwater chemistry was characterized for both aquifers based on results of earlier sampling efforts. The results of the groundwater chemistry appraisal are presented in the groundwater appraisal report.

The 1988, WGNHS groundwater inventory was used as a baseline for providing information on Ph and specific conductivity. Table A-2 shows results of these parameters, which reflect the chemical nature of the aquifer material, depositional environment and residence time of groundwater in the aquifer.

Nitrate and atrazine were used as chemical parameters which reflect cultural impacts to groundwater. Nitrate-nitrogen can occur naturally, however concentrations over 3 ppm reflect cultural impacts. Any occurrence of atrazine is an indication of cultural impacts.

Results were compiled from the following sampling efforts:

- 1988 WGNHS Chippewa County Groundwater Inventory
- 1990 DATCP Atrazine Sampling Program
- 1991 Duncan Creek Watershed Project
- 1988-92 Chippewa County Sampling Program

Table A-3 shows results of sampling for nitrate-nitrogen and atrazine. Figure A-3 shows the number of well tests within important concentration ranges.

Natural parameters, Ph and specific conductivity, are generally similar from north to south within the basin and between the sand and gravel and sandstone aquifer.

Nitrate and atrazine results are similar across the basin and between the sand and gravel and sandstone aquifer, however, in some areas nitrate concentrations are higher in the sandstone than in the sand and gravel.

Groundwater in the basin does show cultural impacts from nitrate and atrazine. Within the basin, 62 percent of wells sampled in 1991 show nitrate concentrations over the preventative action limit (PAL) of 2 ppm while 10 percent show nitrate above the enforcement standard (ES) of 10 ppm.

Both the sand and gravel and sandstone aquifers show impacts by atrazine. 27 percent of all wells sampled show atrazine detects below the state's preventative action limit (PAL) while 8 percent show atrazine above the PAL. Figure A-4 shows results of atrazine sampling in the basin.

Figure A-3. Results of Nitrate-Nitrogen Sampling in the Basin

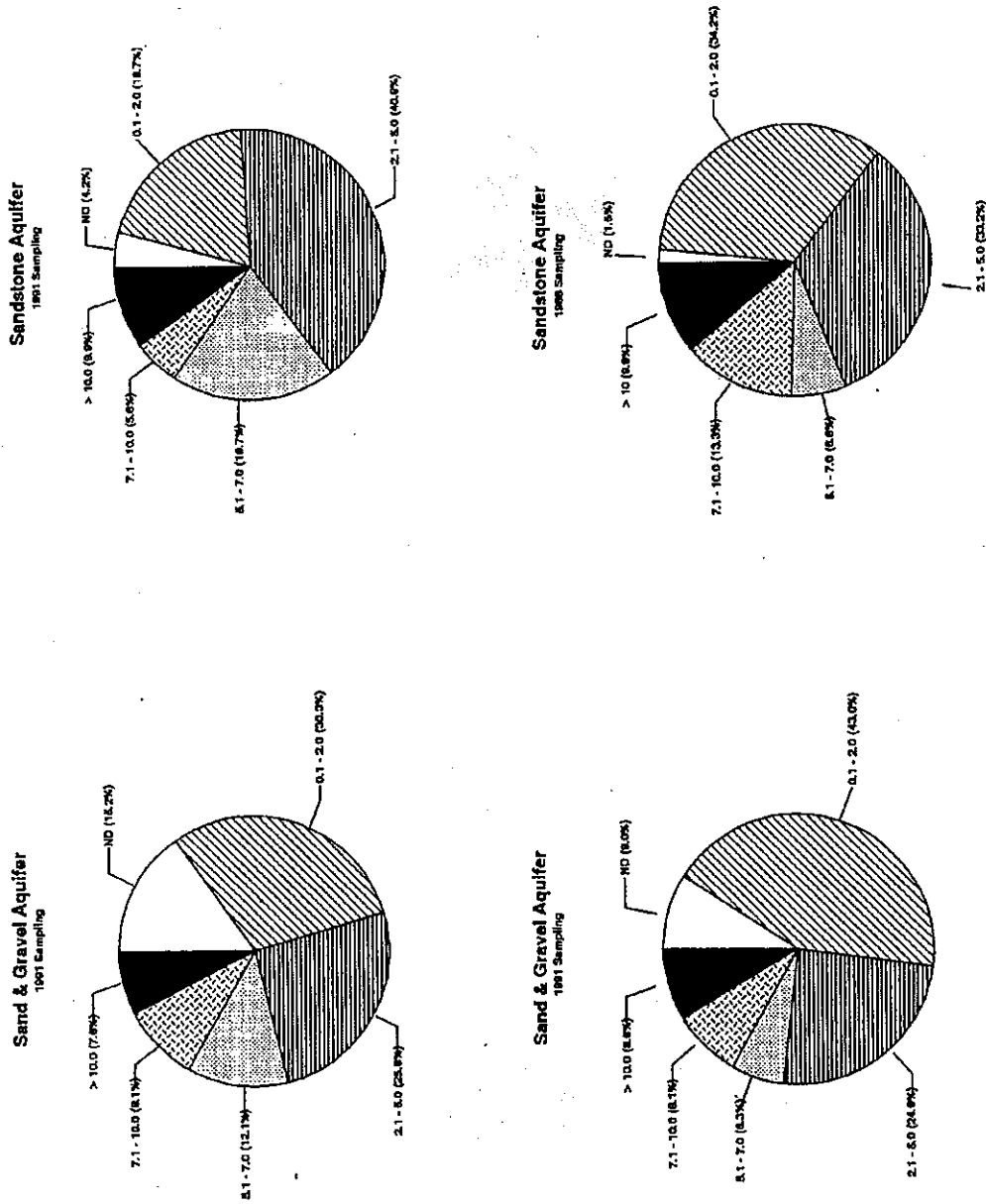


Figure 3: Results of Nitrate-Nitrogen Sampling in the Basin, by Aquifer, Based on Wells of Known Location and Construction

Figure A-4. Results of Atrazine Sampling in the Basin

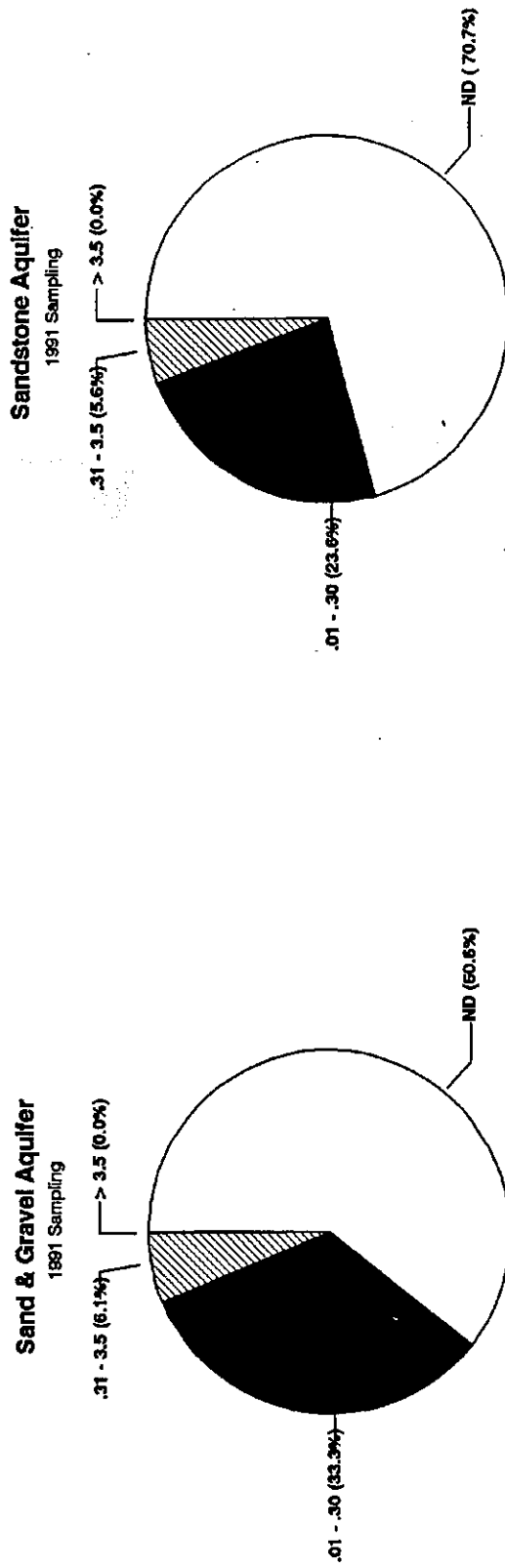


Figure 4: Results of Atrazine Sampling in the Basin, by Aquifer, Based on 140 Wells of Known Location and Construction

**Table A-2. pH and Specific Conductivity Results of Groundwater Samples in the Duncan Creek Watershed, by Subwatershed, from 1988 and 1991 Sampling Programs**

	pH						Specific Conductivity					
	Sand and Gravel			Sandstone			Sand and Gravel			Sandstone		
	1988	1991	1988	1988	1991	1991	1988	1991	1988	1991	1988	1991
Subwatershed												
Upper Basin	8.0	7.3	6.8	6.8	6.8	6.8	178.3	118.3	120.0	120.0	128.6	
Middle Basin	7.0	6.9	6.7	6.7	5.9	6.7	138.3	101.7	120.0	120.0	27.5	
	6.8	6.4	6.7	6.7	6.6	6.6	273.0	131.5	128.3	128.3	110.0	
	7.1	6.9	6.5	6.5	6.8	6.8	189.2	143.5	123.0	123.0	146.0	
	6.6	6.5	6.5	6.5	6.5	6.5	27.5	90.0	128.4	98.1		
	6.6	6.7	8.9	6.4	6.4	6.4	382.0	210.0	104.0	104.0	73.5	
	6.8	6.7	7.4	6.2	6.2	6.2	272.5	278.0	127.3	127.3	197.5	
	6.6	6.5	6.6	6.2	6.2	6.2	218.0	176.0	176.0	176.0	-	
	7.0	6.4	6.1	6.1	6.1	6.1	167.2	127.4	447.0	447.0	165.0	
Lower Basin	-	-	7.8	6.4	6.4	6.4	-	-	196.0	196.0	159.8	
	7.1	7.0	7.3	6.7	6.7	6.7	147.4	110.6	144.2	144.2	111.4	
	7.1	9.5	6.4	5.9	5.9	5.9	207.2	158.3	223.5	223.5	173.8	
	6.5	6.2	-	6.5	6.5	6.5	185.0	112.0	-	-	234.5	
Total Watershed	7.2	8.7	7.6	6.6	6.6	6.6	169.4	130.6	148.4	148.4	130.9	

Table A-3. Mean NO3-N and Atrazine Concentrations Reported by Aquifer and Subwatershed

	Subwatershed	Sand and Gravel				Sandstone			
		1988		1991		1988		1991	
		NO <sub>3</sub>	NO <sub>3</sub>	Atrazine	Atrazine	NO <sub>3</sub>	NO <sub>3</sub>	NO <sub>3</sub>	Atrazine
Upper Basin	Upper Duncan	6.0	2.5	.02		4.1	7.4		.19
	Middle Duncan	3.1	4.8	.17		3.3	3.2		0
	Como Creek	4.6	4.0	0		3.5	3.6		.04
Middle Basin	Bloomer	7.4	6.7	.07		5.2	5.1		.05
	Hay Creek	1.7	4.3	.05		3.4	3.2		.03
	Lower Duncan	17.0	5.9	.10		2.8	2.9		0
	Tilden Creek	7.6	6.3	.12		2.8	5.1		.10
	Glen Loch	6.9	4.6	0		3.7	3.4		.07
Lower Basin	Chippewa Falls	2.5	4.5	.05		12.0	7.3		.35
	Trout Creek	-	-	-		3.4	4.4		.04
	Beaver Creek	3.4	2.8	0		3.9	5.3		0
	Hallie	1.1	1.3	.25		8.9	5.8		.12
	Lake Hallie	2.6	1.6	.05		0	2.3		.05
Total Watershed		4.4	3.7	.09		4.5	4.8		.07

## B. Municipal Wellhead Chemistry

Information concerning water quality in municipal wells was gathered from drinking water supply records maintained by the city of Chippewa Falls, township of Hallie, city of Bloomer, village of New Auburn and Wi. DNR.

Data collected from municipal wells reflect groundwater chemistry before treatment or mixing. Table A-4 shows results from municipal wells within the basin.

The city of Chippewa Falls, east well field, has been degraded by unacceptable levels of nitrate-nitrogen. Atrazine has also been detected in both the east and west well fields.

## IV. MANAGEMENT OBJECTIVES

Chapter NR 120.08, Wis. Administrative Code, requires that a watershed assessment identify the "water quality objectives to maintain the quality of groundwater of the watershed" and to develop "A listing and analysis of need for best management practices which will significantly aid in the achievement of the target level of pollution abatement". Specific practices to reach groundwater management objectives are presented later.

Chapter NR 140, Wis. Administrative Code, establishes two levels for the protection of groundwater; an enforcement standard (ES), set at the allowable maximum concentration and a preventative action limit (PAL), set as a percentage of the ES. The ES and PAL are set for specific, potential groundwater pollutants.

Chapter NR 112, Wis. Administrative Code, establishes standards for the design, construction and sampling of municipal wells within the State of Wisconsin.

Groundwater management objectives for major aquifers and type of use have been established based upon the administrative code and documented groundwater chemistry within the basin.

Groundwater management objectives for the upper, middle and lower basins are established to protect rural, domestic use and to protect municipal well fields. Table A-5 shows the groundwater management objectives, by aquifer and basin.

Specific management objectives are outlined below.

### A. Limit/Reduce Groundwater Concentrations of Nitrate, Atrazine and other NR 140 Contaminants to within Respective Preventative Action Limits (PAL) in Rural Areas.

To protect groundwater quality, the watershed program will provide practices to control nonpoint sources of nitrate, atrazine and other NR 140 contaminants as measured through private wells within the basin.

**Table A-4. Available Groundwater Chemistry Data from Municipal Wells Within the Duncan Creek Watershed**

Public Water Supply System	Well Number	Date Sampled	pH	Hardness ppm	Nitrogen NO <sub>3</sub> + NO <sub>2</sub>	Atrazine ppb
New Auburn	1	1/29/87	8.5	34	2.3	
Bloomer	2	6/1/77	6.5	36	2.8	
	2	5/3/91				ND
	3	6/1/77	6.5	45	3.5	
	3	5/3/91				ND
	4	6/1/77	6.4	27	ND	
	4	5/3/91				ND
	5	6/1/77	6.3	32	ND	
	5	5/3/91				ND
Chippewa Falls	1-East	4/24/91				0.1
	1-East	12/22/92			9.1	
	2-East	4/24/91				0.1
	2-East	12/22/92			9.3	
	3-East	4/24/91				0.2
	3-East	12/22/92			8.5	
	4-East	4/24/92				0.2
	4-East	12/22/92			8.9	
	5-East	4/24/91				0.2
	5-East	12/22/92			4.9	
	1-West	4/24/91				0.1
	1-West	5/30/89			trace	
	2-West	4/24/91				ND
	2-West	5/30/89			trace	
Hallie	1					ND
	1	7/9/91	6.4	19	2.01	



**Table A-5. Groundwater Management Objectives for the Duncan Creek Watershed, by Basin and Aquifer**

	Sand and Gravel	Sandstone
Upper Basin	*Limit/Reduce Nitrate and Atrazine Concentrations to PAL in Rural Areas	*Limit/Reduce Nitrate and Atrazine Concentrations to PAL in Rural Areas
	*Monitor Groundwater Quality in Rural Areas	*Limit/Reduce Nitrate and Atrazine Concentrations to PAL in Municipal Wellhead Areas
		*Monitor Groundwater Quality in Rural Municipal Wellhead Areas
Middle Basin	*Limit/Reduce Nitrate and Atrazine concentrations to PAL in Rural Areas	*Limit/Reduce Nitrate and Atrazine Concentrations to PAL in Rural Areas
	*Monitor Groundwater Quality in Rural Areas	*Limit/Reduce Nitrate and Atrazine Concentrations to PAL in Municipal Wellhead Areas
		*Monitor Groundwater Quality in Rural and Municipal Wellhead Areas
Lower Basin	*Limit/Reduce Nitrate and Atrazine Concentrations to PAL in Rural Areas	*Limit/Reduce Nitrate and Atrazine Concentrations to PAL in Rural Areas
	*Limit/Reduce Nitrate and Atrazine Concentrations to PAL in Municipal Wellhead Areas	*Monitor Groundwater Quality in Rural Areas
	*Monitor Groundwater Quality in Rural and Municipal Wellhead Areas	

The PAL for NO<sub>3</sub>-N is set at 2.0 ppm and the PAL for atrazine is set at .3 ppb. The PAL for other potential contaminants are set in Wis. Administrative Code, Chapter NR 140.

- B. Limit/Reduce Groundwater Concentrations of Nitrate, Atrazine and other NR 140 Contaminants to within Respective Preventative Action Limits in Municipal Wellhead Areas.

Municipal wells supply water to a significant number of individuals and businesses in the Duncan Creek basin. The considerable cost of treating contaminated groundwater or drilling new wells in order to protect public health can be avoided through the use of wellhead protection programs. Protection of these water supplies will provide safe, reliable drinking water to households and businesses within the basin.

Groundwater quality will be measured at the individual well, not the point of use.

- C. Monitor Groundwater Quality and Conduct Hydrologic Studies in Rural and Municipal Wellhead Areas as Needed to Assess Groundwater Quality Changes Over Time.

In order to further quantify groundwater quality within rural and municipal wellhead areas, groundwater monitoring will be conducted within the basin.

Groundwater monitoring will also aid in determining the effectiveness of management actions at reaching groundwater management objectives.

**Table A-6. Groundwater Management Strategy Summary**

	<b>Protect water quality in aquifers within municipal wellhead areas</b>	<b>Protect water quality in aquifers in rural areas</b>
<b>I&amp;E</b>	<p>Target Groups: Urban residents, Municipal wellhead residents</p> <p>Messages: Groundwater is the source of all drinking water; landuse affects water quality</p>	<p>Target Groups: Rural landowners, students, civic/sportsmen groups, well drillers, businesses, local elected officials</p> <p>Messages: Landuse affects Groundwater quality; Prevention is the most cost effective method of protection; accurate geologic information is important</p>
<b>Positive Incentives/ BMPs</b>	<p>Grants to municipalities for wellhead protection planning and implementation</p> <p>Grants to facilitate easement purchases in zone of contribution</p>	<p>Grants to municipalities or townships for hydrologic studies in areas of concern</p> <p>NPM assessment and services available to rural landowners, based on well test</p>
<b>Regulation</b>	<p>Review of permits granted through existing pollution prevention programs</p> <p>Amend county subdivision ordinance</p>	<p>Underground storage tank inventory</p>
<b>Develop/ Maintain Active Inventories</b>	<p>Installation of monitoring wells upgradient from municipal wells for:</p> <ul style="list-style-type: none"> <li>- Determination of hydrogeologic parameters</li> <li>- Semi-annual sampling for pH, specific conductivity, nitrate and atrazine</li> </ul> <p>Compile monthly water quality data from results collected by the city for nitrate and atrazine</p>	<p>Network of rural, domestic wells, sampled annually for pH, specific conductivity, nitrate and atrazine</p> <p>Continue ongoing, voluntary well sampling program for nitrate and atrazine</p> <p>Maintain inventory of subsurface geology and well construction through existing well permit/well construction program</p> <p>Abandoned well inventory</p> <p>Groundwater baseflow measurements at 8 stream sites, biannually</p>

**V. GROUNDWATER MANAGEMENT STRATEGY**

In order to successfully achieve the groundwater management objectives, the following management strategy will be applied. The management strategy contains activities which will protect groundwater quality in the basin and further define the physical and chemical aspects of groundwater in the basin.

The groundwater management strategy is based on information gathered during the groundwater appraisal and on groundwater management objectives established in Wis. Administrative Code, chapters NR 120 and NR 140.

Table A-6 shows the generalized groundwater management strategy. Management activities are defined by four broad categories of information and education, BMPs/positive incentives, regulations and monitoring.

The following is a list of BMPs/management activities which will significantly aid in the achievement of target levels of pollution abatement.

#### Information and Education

##### Information

Target information to individuals or groups in both urban and rural areas

##### Education

Target activities to specific groups to change behavior. Activities will include:

- Elementary and high school education programs

##### Abandoned well demonstrations

- Direct mailings to residents.

#### BMPs/Positive Incentives

- Grants to municipalities for conducting wellhead protection planning and implementation. Grant money will be obtained from USEPA and/or WiDNR sources. Wellhead programs will be compatible with state recommended activities.
- Grants to municipalities to facilitate easement purchases within municipal wellhead areas.
- Grants to municipalities or townships to conduct special hydrologic studies. These studies will document the physical and chemical characteristics of groundwater in sensitive or future use areas.
- Program to facilitate proper well abandonment through cost sharing and technical assistance. Inventory of existing, abandoned wells.
- NPM assessment and services provided to landowners based on results of groundwater well tests. Specific activities are outlined in chapter 4.

#### Regulation

- Phased inventory of existing, underground storage tanks including size, age, location and contents.
- Develop administrative procedure, through MOU's, for review of existing point/nonpoint source permits within watershed. These permits are administered through other state and federal programs.
- Development of a hazardous materials ordinance to document the storage, handling and use of hazardous materials. Make better use of existing SARA regulations.

#### Monitoring

- Document new well permit/well construction within the basin. Record construction information and location.
- Continue basin wide drinking water testing service. Testing will be conducted for nitrate and atrazine.

- Rural, private water sampling/monitoring network. Approximately 75 wells will be tested on a yearly basis for nitrate, atrazine, pH and specific conductivity.
- Municipal zone of contribution monitoring. Monitoring wells installed as part of wellhead protection programs will be monitored for nitrate and atrazine.
- Monitoring of public water supply wells. Municipal wells in the basin will be tested semi-annually for nitrate and atrazine.
- Monitoring the effectiveness of NPM activities on protecting groundwater quality. A small test area located at the county farm will be used to monitor the effect of landuse and NPM management on groundwater quality.
- Monitor groundwater baseflow to streams. Baseflow will be monitored to better define the relationship between surface water and groundwater within the basin.

Funding for most activities will be provided by NR120. Funding for activities not covered by NR120 will be sought by the project through the following sources:

- Wellhead Protection Plans - USEPA(604b grants),DNR(water supply)
- Easement Purchases in Zone of Contribution - USEPA,DNR (water supply,property management)
- Special Hydrologic Studies - DNR,USGS,WGNHS,UW System
- Underground Storage Tank Inventory - DILHR,LCD
- Detailed Monitoring Activities - DNR(groundwater),DATCP, Groundwater Coordinating Council

A more detailed description of management activities follows.

## A. Information and Education

### 1. Information

Throughout the implementation of the watershed project, specific information will be targeted to select groups of decision makers. These include landowners, civic/sportsmen groups, local elected officials, students, well drillers and businesses. These activities will carry specific information aimed at changing the awareness and of watershed residents.

### 2. Education

Like information, activities will be conducted within the watershed aimed at changing the behavior of residents and decision makers.

Details concerning this information and education strategy can be found in chapter 5.

### 3. Abandoned Well Demonstration

Recognizing that improperly abandoned wells can be significant sources of groundwater contamination, the Duncan Creek Watershed will cost share a demonstration project on the proper sealing of abandoned or non-complying wells.

The demonstration project will occur in a highly visible area, accessible from a major road. The site will be marked by a sign identifying the project and funding source. Literature concerning the project will also be available on site. A certified well driller will conduct the well abandonment.

Proper abandonment of wells is defined as filling an unused, unsafe or contaminated well with an approved material, i.e., neat cement or bentonite, so as to prevent the downward movement of potential contaminants in the drill hole.

### B. Best Management Practices/Positive Incentives

#### 1. Grants to Local Units of Government to Plan and Implement Municipal Wellhead Protection Programs.

Wellhead protection is the concept of protecting the land area that contributes to groundwater recharge of wells. Generally, wellhead protection is only pursued for large scale areas which contribute to municipal wells. One of the major elements of the Wellhead Protection (WHP) program is the determination of zones within which contaminant source assessment and management will be addressed by the well or well field owner.

Current regulations require a wellhead protection program for all new municipal wells constructed after 1991. Wells installed before this date would benefit from a wellhead protection plan.

The Duncan Creek project will administer grant money needed to prepare and implement the wellhead protection plan. This grant will apply to existing municipal wells only. The following activities will be part of the municipal wellhead protection plan.

- a. Hydrologic studies, by a qualified hydrogeologist, to determine the zone of contribution and to identify the location of potential contamination sources. The wells zone of contribution (ZOC) must be determined using an accepted method. Documents are available to assist in determining the ZOC including the EPA's 'Guidelines for Delineation of Wellhead Protection Areas'.

Delineation of potential contaminant sources must include the location of potential source, type of source, type of contaminant and any relevant information. This inventory of existing sources will serve 2 purposes. First, it emphasizes the potential for contamination of wells to local officials, and

secondly, it provides information which is useful in evaluating different controls.

- b. Studies to determine the best way to implement the wellhead protection program and integrate the WHP program with other applicable programs. The implementation procedures should include recommendations for remedial action zones, attenuation zones and/or wellfield management zones. In addition, the management plan should include, but not be limited to, some or all of the following tools; zoning ordinances, subdivision ordinances, site plan review, design standards, operating standards, source prohibitions, purchase of property or development rights, public education, household hazardous waste collection and water conservation. These tools are explained in more detail in the EPA's 'Wellhead Protection Programs: Tools for Local Governments' document or 'A Guide to Groundwater Quality Planning and Management for Local Governments', WGNHS, 1987.

Many programs currently exist for the control of specific activities and contaminant types. In order to cost effectively implement the WHP program, management activities must be coordinated with these existing programs.

The WHP plan should include a discussion of applicable programs and how they should be integrated into the overall management plan. These programs include, but are not limited to, the safe drinking water act, the resource conservation and recovery act, superfund and its amendments and the national pollutant discharge elimination system. In addition to these programs, programs which provide funding for wellhead protection programs and potential contaminant source removal, purchase or relocation should be investigated.

- c. The wellhead protection program must contain provisions for the installation of monitoring wells and periodic sampling. These monitoring wells will be used to determine hydrologic parameters near the municipal wells and potential contaminant sources. Hydrologic parameters include hydraulic conductivity, geology and water quality. Monitoring wells will also serve to detect contamination prior to its affect on municipal wells. Monitoring well installations must comply with Wis. Administrative Code, Chapter NR 141.

Monitoring wells will be sampled on at least a semi-annual basis for the following minimum set of parameters; pH, specific conductivity, nitrate and atrazine, and at least annually, a VOC scan shall be performed.

- d. The wellhead protection program must also include the development of a contingency plan for the public water supply system to respond to well or well field contamination. This contingency plan will contain provisions for alternate water supplies, contaminant remediation and/or mixing of water to provide safe drinking water to municipal areas.

- e. Public education will be conducted by both the LCD and the municipality. The purpose of this public education program will be to build support for regulatory programs and implement voluntary groundwater protection by individuals. The specific activities to implement public education are outlined in chapter 5.
- f. The Chippewa County - LCD, Duncan Creek Watershed will work with municipalities and county zoning to facilitate changes in zoning outside of municipalities. The cooperative effort between the city and the county will include zoning requirements for lots with private septic systems, in both plats and certified surveys, to have a minimum size of 1/2 acres.

Parts a,b,c and d of the wellhead protection program will be developed by a private consulting firm or qualified hydrogeologist. Municipalities included in this WHP program will include the cities of Eau Claire, Chippewa Falls and Bloomer and the village of New Auburn.

## 2. Special Hydrologic Studies

Grants will be made available to municipalities and/or townships to conduct small scale hydrologic studies of sensitive or important areas. Eligible areas may include future well heads or areas of concern due to the density of private wells or density of potential contamination sources.

These hydrologic studies will determine the groundwater chemistry, aquifer properties and actual or potential contaminant sources in the area of interest.

The DNR and Chip.Co.-LCD will pursue opportunities to provide grants for these hydrologic studies. The grant will be administered by the Chip. Co. - LCD. Activities will be conducted by a private consulting firm or qualified hydrogeologist.

## 3. Easement Purchases in the ZOC

Grants will be pursued and made available to municipalities and/or townships to purchase easements in municipal wellhead areas.

These easements will provide significant protection of groundwater quality in municipal wellhead areas by restricting or eliminating potentially harmful cultural landuse.

Easements will be for a period of no less than 20 years and preferably perpetual. The easement will be between the municipality or township and the landowner. Grant amounts to cover easement payments will be based on the appraised, fair market value of the land. Grants for perpetual easements will be given priority over grants of 20 years.



#### 4. Proper Well Abandonment Program and Inventory

Wis. Administrative Code NR 112.26(2) states that wells must be properly abandoned if one of the following conditions exist; the well is contaminated, the well poses a hazard, the well does not comply with standards or the well has been taken out of service.

Many old, unused wells exist and have never been properly abandoned. These unused wells are of unknown location, age construction and condition. There is also no mechanism to insure that wells are properly abandoned. As part of the groundwater management strategy, the following inventory will be undertaken.

This inventory will identify the location of abandoned wells as well as the estimated size and depth. This information will be used to prioritize locations which are in most need of proper abandonment. The highest priority for abandonment will be those wells located in or adjacent to potential contamination sources and within a mile of wells used for potable water supply.

The inventory will be conducted through a self reporting system. All individuals in the basin will be contacted regarding the location and age of any abandoned wells that they own. In addition, information from existing well permits and the County Zoning Departments well abandonment records will be used to locate abandoned wells. Individuals identified as owning abandoned wells will be contacted regarding programs for proper abandonment.

#### 5. Underground Storage Tank (UST) Inventory

Currently city, village and town fire chiefs administer the UST rules as DILHR designated deputies. As part of the watershed management plan, the Chippewa County - LCD will inventory the location, contents, age, and construction materials of UST's within the basin. This inventory will serve to keep the DILHR inventory up to date as well as provide a means of identifying areas with a high density of UST's.

This inventory will not only document regulated UST's, but will also identify private tanks of less than 60 gallons. In this way the potential impact of unregulated UST's can be evaluated and appropriate activities can be undertaken such as information and education programs.

The inventory will be conducted in two phases within the basin. The first phase will be an inventory within municipal wellhead areas, using the existing DILHR inventory, to determine the size, contents, age and location of underground storage tanks. A mailing will then be sent to all landowners within the wellhead area explaining the existing regulations and the potential environmental impact of underground tanks. Landowners will be asked to voluntarily provide the location of any owned underground tanks. Information gained through the inventory process will be recorded in a database and on 7.5' topographic maps.

This first phase will determine potential sources of groundwater contamination within municipal wellhead areas and will also be used to determine the best method to inventory UST's basin wide.

All UST owners will be encouraged to properly maintain and abandon UST's as well as construct spill prevention systems.

## 6. NPM Management

The most significant source of groundwater protection from nitrate and atrazine contamination will be the use of nutrient and pesticide management techniques.

Within the watershed, any landowner which has nitrate or atrazine above the respective PAL in their well will be eligible for a homestead assessment, NPM assessment and any recommended NPM services. For those wells with nitrate or atrazine below the PAL, no assessments will be provided.

Guidelines for conducting the NPM and homestead assessments and NPM services are outlined in the nutrient appraisal report and chapter 4 part IIC and IID.

Landowners who did not have an initial groundwater sample may request one during the sign-up period of the project, at no cost to the landowner. The determination of assessments and/or services will be based on this groundwater sample.

## C. Improved use of Existing Regulations and Ordinances

### 1. Review of Permits Granted Through Existing Programs

Many activities within the watershed are regulated through a permit process under existing state or federal programs. In order to determine all existing or potential sources of contamination within the watershed, a formal process will be initiated for review of new and existing permits.

Programs such as the National Pollutant Discharge Elimination System (NPDES), Environmental Repair Program (ERP), Leaking Underground Storage Tanks (LUST) and superfund will be contacted to determine agency responsibilities and the LCD will cooperate with agencies concerning permit changes, permit renewals, permit violations and any monitoring data. Through this coordination, the LCD will assist in administering existing regulations.

A complete list of programs to be contacted will be developed at the time of implementation.

### 2. Groundwater Monitoring and Reporting

The LCD will work with state agencies such as DATCP and DNR which have responsibilities for managing and protecting groundwater before or after

contamination. The LCD will inform the appropriate agency of the need for groundwater protection based on groundwater chemistry results.

If these agencies are involved with development and adoption of groundwater related regulations which affect the Duncan Creek watershed, the LCD would like to assist.

### 3. Hazardous Material Ordinance

Wisconsin statutes set significant criteria for the management of hazardous waste, which is defined in sec. NR 191.12 and NR 181.15. These rules permit the transportation, storage, treatment and disposal of hazardous waste by only licensed operators and encourages reuse and reduction of hazardous waste.

Hazardous materials are regulated only for bulk fertilizer storage, bulk pesticide storage, storage for petroleum products, engine waste collection, storage and transportation and hazardous substance spills. Many hazardous materials remain unregulated at the state level.

A hazardous substance is defined by WI. law as a substance which poses a substantial present or potential hazard to human health or the environment.

A hazardous waste is a material that is intended to be discarded or is no longer useable for its originally intended purpose. The waste is usually subject to regulation because the law specifically lists it as hazardous or because it exhibits a hazardous characteristic i.e., corrosive, reactive, toxic.

For the purpose of protecting groundwater, the Duncan Creek project will pursue, with state agency coordination, an ordinance establishing standards for hazardous material storage and handling, modeled after the state technical standards. The DNR is currently preparing rules which will regulate certain industries and municipalities that have potential of pollutant runoff in stormwater. The regulation is in the form of a permitting process designed to reduce pollutant runoff from stormwater drainage. Hazardous materials are going to be addressed in the new rules. The Duncan Creek project and any local ordinances developed must be consistent with State law and administrative rules.

This ordinance would require the following:

1. Identification of hazardous substances used or stored on sites within the watershed.
2. Require reporting by new and existing facilities when changes in the type or quantity of hazardous materials used or stored on site occur.
3. Establish standards for storage and handling of hazardous materials. These standards will include construction of storage and handling pads, groundwater

monitoring, provisions for periodic checks of storage equipment and secondary containment structures.

4. Require preparation and use of an emergency spill plan, to contain spills before it causes significant environmental damage or threatens human health.

Identification of hazardous material sites and reporting of hazardous materials will be handled through a self reporting system.

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# Appendix B

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## WETLAND MANAGEMENT PLAN

### I. INTRODUCTION

Wetlands within the Duncan Creek basin serve a variety of important functions. Depending on their position in the landscape, wetlands may provide flood storage, filtering of surface water, groundwater discharge/recharge and/or wildlife habitat in both urban and rural areas.

Across the watershed, approximately 53-63 percent of wetlands are within 300 feet of streams as mapped on USGS 7.5' topographic maps. These wetlands would fall under shoreland zoning ordinances.

Within the basin, approximately 50 percent of all wetlands are dependent on groundwater in some manner. Of these groundwater dependent wetlands, 73 percent are depression wetlands found in upland areas. Of the wetlands which interact with surface water only, 75% are classified as depressions in upland areas.

Wetlands within the basin generally fall into two vegetative classes, emergent/wet meadow and forested cover.

All wetlands in the basin, regardless of hydrologic or vegetative class, provide significant wildlife habitat. Wildlife species observed in wetlands in the basin are listed in table A-6 in the wetland appraisal report.

Based on the wetland analysis, approximately 8 percent of the total basin area is composed of wetlands.

Wetlands within the basin are showing signs of degradation from cultural landuse. Of the 19 sites inventoried, 16 or 84 percent were moderately to significantly impacted by cultural activities. In wetlands adjacent to streams, most have about 4 feet of colluvium overlying the original organic and clay layers.

### II. WETLAND MANAGEMENT OBJECTIVES

Wetland management objectives for the Duncan Creek watershed are based on the results of the wetland appraisal report, Wis. Administrative Code, chapters NR 1 and NR 120 and U.S. Army Corps regulations.

Wetlands in the basin are showing signs of degradation from sedimentation, drainage and conversion to agricultural or urban landuses. Many of these wetlands are not covered by current federal, state or county regulations.

The wetland management objectives will serve to protect existing sites, increase biodiversity, restore degraded or destroyed sites and protect the hydrologic functions that wetlands provide within the basin in both urban and rural areas. The specific management objectives are listed below.

A. Avoid Conversion/Destruction of Urban and Rural Wetlands and the Hydrologic Functions Provided within the Watershed.

The Duncan Creek project will work to promote projects which avoid degradation of wetlands. As per Wis. Administrative Code, chapter NR 1, the presumption is "that wetlands are not adversely impacted or destroyed and that the least overall adverse environmental impact shall result."

B. Minimize the Further Degradation of Urban and Rural Wetlands and Wetland Functions within the Watershed.

By necessity, some projects may result in unavoidable, adverse impacts to wetlands. These projects will be conducted in a way which minimizes the impact to wetland values and functions.

C. Compensate for the loss of urban and rural wetlands

When projects result in the degradation or destruction of wetlands, the Duncan Creek project will work to regain the area of wetland lost. This compensation will preserve the acreage of wetlands and the values and functions they provide.

D. Restore degraded or destroyed wetlands to reestablish natural functions and hydrologic values provided by urban and rural wetlands.

While there is a significant amount of wetland area in the basin, there is a significant amount of wetland area which has been degraded or destroyed.

By restoring these wetland sites, the ability of wetlands, basin wide, to control sedimentation, improve water quality, control flood flow and provide wildlife habitat will be enhanced

### III. WETLAND MANAGEMENT STRATEGY

A. Information and Education

One of the most effective tools for the protection of regulated and unregulated wetlands by the public is education. Through information and education, people will

learn the values and importance of wetlands in the local hydrologic cycle. The specific activities which will be pursued in the Duncan Creek watershed are outlined in chapter 5.

1. Information

Specific information such as the importance and value of wetlands, what constitutes a wetland and what can be done to protect wetlands will be made available to both urban and rural landowners.

2. Education

Specific educational materials will be made available to urban and rural landowners who own or have control over wetlands in the basin, assessors and local elected officials. These materials will be aimed at changing landowner perception of wetlands and conducting activities in a way which does not damage or destroy wetlands.

- B. Best Management Practices/Positive Incentives

1. Easements

Easements will be used to protect or enhance wetlands within urban and rural areas in the basin. Recognizing the importance of wetlands as sediment and nutrient traps, flood flow stabilization areas, groundwater discharge/recharge areas and wildlife habitat, all wetlands in the basin will be eligible for easements.

Wetland easements will be pursued to both protect wetlands from alteration due to ditching, tiling, drainage or filling and to protect or enhance wetlands through restriction of livestock access.

Easements shall be for a period of no less than 20 years, although perpetual easements are preferred. The easement will be developed as part of any cost share agreement. The easement contract will be between the landowner and the department. The LCD will identify the location of easements and the values or functions the wetland easement will provide.

The LCD will forward the easement proposal to the DNR, district office, non-point source coordinator. The coordinator will obtain comments from wildlife management, fish management and water regulation, zoning and property management. The proposal will then be forwarded to the bureau office for review by water resource management, property management and other appropriate offices.

## 2. Special Studies

Grant money will be made available to agencies and municipalities for special studies of important or sensitive wetland areas within the basin. These studies will be conducted by a private consultant.

The studies will be conducted in order to better define the class, function and distribution of wetlands within the basin. The study will contain provisions for vegetative analysis, wetland mapping, wetland cross-sections and hydrologic class determinations.

These activities will be conducted between May and September of 1994.

## D. Agricultural and Urban Best Management Practice's (BMPs)

Recognizing the impact that cultural landuse activities can have on wetlands, the Duncan Creek watershed project will administer cost shared activities which protect wetlands and associated hydrologic functions from further degradation. These landuse activities can include upland erosion and sediment delivery, livestock access, filling, dredging, draining or tiling.

Cost shared practices include, but are not limited to, the following:

1. Sediment basins
2. Vegetative practices including vegetative buffers, permanent seed covers or mulching.
3. Conservation cropping systems including reduced till, no till, field operation timing, winter cover crops or terraces.
4. Filter strips
5. Crop residue use
6. Diversions
7. Grassed waterways
8. Contour farming
9. Nutrient and pesticide management including controlled applications, incorporation, green crop plow down, crop rotations, crop scouting or biological pest control.
10. Controlled grazing



11. Fencing

12. Alternate watering systems

3. Wetland Restoration

Many activities within the watershed are designed to protect existing wetlands. Another important part of the wetland management strategy will be the restoration of wetland sites degraded by cultural activities.

During all on farm visits by LCD staff, the location of existing, converted wetlands will be identified as to location, size and conversion method. These landowners will be contacted concerning possible restoration.

Cost sharing will be made available for tile drain breaking, drainage plugging, berm construction or removal of sediment. These activities should allow an area to return to its natural state and perform the functions inherent to wetlands.

Municipalities in the basin will be contacted to determine any possible wetland restoration sites. Sites could serve as flood stabilization areas, sediment/nutrient traps or wildlife habitat/natural areas.

Each year, during March, the LCD will hold meetings with town boards to stress the importance of maintaining wetlands, review existing regulations which govern wetlands and surface water and review any known, upcoming maintenance projects.

An administrative procedure will be developed, through the use of a memo of understanding (MOU) for the review of road ditch maintenance and construction. The LCD will function in an advisory role, to recommend potential impacts of the project and, if requested, the extent, type and original depth of the wetland in question.

C. Improved Use of Existing Regulations

1. Identify Wetland Jurisdiction

Various federal, state and local programs have jurisdiction over some wetlands in the basin. In order to determine the extent of wetland jurisdiction and where management actions could be concentrated, a private contractor will be hired to document the location of wetlands subject to regulations as well as overlapping jurisdiction and wetlands which are not subject to regulation.

## 2. Jurisdictional Review

Based on the above inventory, a procedure will be developed to conduct jurisdictional review of all wetland related administrative decisions within the watershed.

This procedure will be instituted through the use of memo's of understanding (MOU).

Programs which could potentially involve wetlands include NR 103, Wis. DOT, municipal highway departments, army corps 404 permits, USDA-FSA program and county zoning.

This jurisdictional review would serve to inform landowners and cooperating agencies of applicable regulations and bring programs which involve wetlands closer together.

## 3. Technical Review of Wetland Permits and Projects

When projects are proposed or permits are applied for by public or private landowners, the Chip. Co. - Land Conservation Department (LCD), in cooperation with the Wis. DNR (DNR), Soil Conservation Service (SCS), Agricultural Stabilization and Conservation Service (ASCS) and U.S. Army Corps will provide assistance in evaluation of the proposed project to ensure no or minimal wetland impact. This review will also serve to determine agency jurisdiction and evaluate alternative project plans. The LCD will review projects initiated through USDA 1026 requests, U.S. Army Corps 404 permits, DNR chapter NR103 regulation, Wis. DOT projects, County Zoning regulations and municipal highway projects.

Each year, during March, the LCD will hold meetings with town boards to stress the importance of maintaining wetlands, review existing regulations which govern wetlands and surface water and review any known, upcoming maintenance or construction projects.

An administrative procedure will be developed, through the use of a MOU for the review of road ditch maintenance and construction. The LCD will function in an advisory role to recommend potential impacts of the project and, if requested, the extent, type and original depth of the wetland in question.

## 4. Mitigation

When wetlands are degraded or destroyed during implementation of landuse projects, the values and functions they provide are lost. One way to regain those values or functions is through reconstruction of wetlands near the original site.

Currently, mitigation is practiced only by the state DOT.

The following provisions will be followed for all permitted projects involving wetland conversion:

- a. For projects involving wetland conversion, the amount of wetland created must be equal to or greater than the amount of wetland destroyed.
- b. Wetland mitigation must occur within the subbasin where the original wetland occurred. This will preserve the functions that wetlands provide within the local hydrologic cycle.
- c. Wetland mitigation will occur in prescribed environmental corridors or prior converted wetlands. Environmental corridors include all intermittent and perennial streams as mapped on USGS 7.5' topographic maps.

These mitigation procedures will be implemented as a condition of all projects involving wetlands within the basin. Cost share money will be distributed for activities included in the BMP and restoration strategies described earlier.

#### D. Maintain Active Inventory and Monitor Wetlands.

1. An inventory of wetlands within the basin will be maintained for use by individuals and agencies. This inventory will be based on the existing USDA and DNR inventories.

The inventory will document the location, size, vegetative class, hydrologic class and agency jurisdiction of wetlands in the basin. The inventory will also be used to document changes in wetland area due to restoration, mitigation and conversion to other landuses.

2. Each year, 10-12 wetland sites within the basin will be inventoried to document the condition, hydrologic class, vegetative class and agency jurisdiction. Sites selected will be spatially distributed across the watershed. This information will help in determining the status of wetlands in the basin and the functions and values the wetlands provide.

This inventory will consist of a jurisdictional review, determination of surface water and groundwater interactions, vegetative diversity calculations, determination of functions and values and three transects per wetland site to document soil types and sedimentation.

3. Using existing satellite imagery and field gathered data, the gain or loss of wetlands within the basin will be monitored. Wetlands may be lost through

conversion, ditching, tiling or filling. Wetland gains may be through restoration or mitigation.

A yearly analysis of the gain or loss of wetlands will be conducted and a report will be generated to document the changes in wetland area.

4. An inventory of urban wetlands will be conducted to determine the current level of use and current condition. Recommendations will be made concerning the proper use of the wetland area and any alternatives to current use.

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# Appendix C

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## METHODS TO MONITOR SOIL EROSION/SEDIMENT DELIVERY ON UPLAND FARM FIELDS AND METHODS TO MONITOR LAND COVER AND PHOSPHOROUS DELIVERY

Soil erosion and associated sediment delivery from agricultural fields is a significant source of nonpoint pollution within subwatersheds of the Duncan Creek basin.

As part of the watershed inventory process, the Wisconsin Nonpoint (WIN) model was used on 33 individual hydrologic units to estimate sediment delivery.

WIN results give a good approximation of sediment delivery, however, data collection and data entry requirements are extremely time and labor intensive. In addition, this model requires data from all parcels between the farm or field and stream and therefore cannot be run on an individual farm or field basis.

In order to track and monitor soil erosion and sediment delivery, without increasing current staff time significantly or requiring additional staff, the following procedure is proposed.

### A. Monitoring to Estimate Soil Erosion and Sediment Delivery.

Information generated by WIN reports soil loss and associated sediment delivery for cropped fields within the hydrologic unit. In most cases, sediment delivery is closely associated with soil loss.

Based on this relationship, linear regression was used to calculate a sediment delivery coefficient for each major subwatershed. Linear regression is a technique to describe the relationship between 2 or more data sets where one is dependent on one or more independent sets. This relationship is approximated by a straight line. The resulting coefficient, which is simply the slope of the straight line, can be used with USLE calculated soil erosion to estimate sediment delivered. The sediment delivery coefficients are presented in table A-1.

The calculation of sediment delivery coefficients was based on existing, inventoried USLE data and associated WIN calculated sediment delivery. The sediment delivery coefficients inherently contain information concerning the slope and flow length of fields in the individual subwatersheds. When combined with USLE calculated soil erosion, field specific information is also accounted for.

A sediment delivery coefficient such as above can be used on a farm or field specific basis, eliminating the need to collect and input data from parcels within the hydrologic unit(s).

Within the watershed, all fields will be required to meet T. If meeting T will not reach water quality objectives, other practices will be used to reduce soil erosion to less than T. The sediment delivery coefficient will be used to roughly estimate sediment delivery and sediment delivery changes over time for participating landowners. This coefficient could also be used to estimate sediment delivery from fields operated by non-participants, thus giving an estimate of actual, total soil loss/sediment delivery.

To more efficiently apply the USLE and sediment delivery coefficient an application was developed in dbase IV and pc ARC/INFO, version 3.4D+. This application makes use of the existing digital soil survey, digitized according to USDA-SCS specifications, and aerial photographs which delineate field boundaries and associated cropping and management.

Approximate field boundaries are digitized and combined with the appropriate soil map to generate the acres of each soil type within specific fields. Field cropping and management information is recorded for fields and used to calculate actual soil erosion. The appropriate sediment delivery coefficient can then be applied to calculate estimated sediment delivery.

If it is determined that soil and sediment management practices are needed and cost shareable, current management and cropping practices will be inventoried to establish a baseline sediment loss/sediment delivery.

During cost share development, the soil loss/sediment delivery application will be used as a planning tool to predict the effect of different cropping and management actions on soil loss and sediment delivery. Cropping and management actions which reach the desired reduction can then be written into the cost share agreement.

From this point on, the landowner will be required to report the cropping and management practices actually applied on all owned and rented fields. Reporting will occur annually.

Based on this annual reporting, annual soil erosion and estimated sediment delivery from individual farm units will be calculated, regardless of changes in farm field boundaries or field management.

In this way the actual soil loss and sediment delivery can be monitored and any changes in sediment delivery can be tracked to ensure project goals are being met. In addition, soil erosion and sediment delivery can be monitored basin wide.

#### B. Basin Wide Monitoring Using Percent Land Cover and Phosphorous Coefficients.

In order to monitor landuse across the entire basin, remotely sensed data covering the Duncan Creek watershed will be obtained, on a yearly basis, using June data if possible. The cost of obtaining and analyzing the data will be covered by application for an automation grant through DATCP.

Baseline land cover and phosphorous delivery will be calculated based on 1992 satellite data and phosphorous coefficients used during the Lake Wissota study.

Remotely sensed data will be classified into six or more land cover categories including rowcrops, hay, wetland, woodland and urban use.

The percentage of each land cover class will be calculated for each subwatershed. A report will be generated showing the total area and percentage of land cover classes and the percent change over time.

These land cover classes will then be assigned appropriate phosphorous coefficients to calculate total phosphorous delivery. The total phosphorous delivery could be further quantified based on the known percentage of farm field management activities and the associated change in phosphorous coefficients.

Land cover monitoring will give a good indication of land cover across the entire basin regardless of participatory status.

Land cover monitoring will also help in determining the gain or loss of wetlands as outlined in the watershed management plan.

This land cover monitoring will produce the following information; basin wide estimates of soil erosion regardless of participation; estimated basin wide changes in phosphorous delivery; estimates of the net gain or loss of wetlands which act as natural filters and sediment traps.

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# Appendix D

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## MEMORANDUM OF AGREEMENT

**Subject:** Assignment of time of Chippewa County Environmental Engineer Position to the Duncan Creek Clean Water Project

The following items are agreed to by Chippewa County and the DNR (DNR), State of Wisconsin. These items represent a mutual agreement for use of the county employed Environmental Engineer on the Duncan Creek Clean Water Project. The Land Conservation Committee (LCC) or staff assigned by the LCC will represent the county in items pertaining to this agreement.

### 1. Assignment of Time

The LCC will, in consultation with Land Conservation Department (LCD) and Duncan Creek Clean Water Project (DCCWP) staff, determine the amount of time the engineer will be assigned to the DCCWP. This planning will be considered in the committee's Annual Work Plan process.

The state will reimburse the county for time used on the DCCWP. Time spent on other county, state, or federal program areas may not be charged to the project. In circumstances where the engineer provides time to federal Agricultural Conservation Program (ACP) or Long Term Agreements (LTAs) that time may be charged to the project only when engineering services provided are provided in concert with DCCWP services.

### 2. Assignment of Salary

Chippewa County will support the Environmental Engineer position with salary and fringe benefits at rates specified in the Management/Professional contract. That portion of the position's time spent on county projects will be reimbursed at the contract rate.

The state will support salary and fringe benefits at state engineering rates. These rates are presented in State of Wisconsin Engineering Salary Rate table. That portion of the position's time spent on state projects will be reimbursed at state rates.

### 3. Salary Rates

#### a. County Rates

County hourly salary rates will be as documented in the management contract for the Environmental Engineer position.



In 1993 and 1994 county rates will be as they appear in Chippewa County Management/Professional - Wages, Hours, and Conditions of Employment, 1992-1994. The MP-20, 30 month rate will be used.

Future reclassifications of wage rates for the position to levels above the MP-20 rate will be applied to county designated time.

b. State Rates

State hourly salary rates will be as documented in State of Wisconsin Engineering Salary Rate table. The DNR will provide the LCD with current state contract salary data. This data is included in Schedule 14: Professional Engineering Hourly Pay Ranges. Salary data will be provided to the LCD on a yearly basis to provide for yearly salary adjustments.

For purposes of grant administration the salary range is divided into four equal step levels (PSICM through maximum). A 2 percent adjustment is made to Schedule 14 data to reflect midyear changes under the July 1 - June 30 state fiscal year.

In 1993 the second level of the Advanced 1 range will be used. In 1994 and subsequent years the salary will advance one level per year within this range using the Salary Rate table. The DNR, in consultation with project staff, reserves the right to consider pay ranges above the Advanced 1 level as needed.

4. Assignment of Fringe Benefits

The state and county will provide fringe benefits for the position. Fringe benefits are documented in Chippewa County Management/Professional Contract. The county and state will pay for fringe benefits based on the proportion of salary contribution to the position from county and project funds, respectively.

State and federal withholdings (medicare, social security, state and federal taxes) will be based on total wages paid by the county and state.

Vacation, holidays, and sick time will be charged to the project in proportion to the percent of time used by the project in each quarter.

5. Reimbursement to the County for Time Used on the Project

The state will provide funds to the Duncan Creek Clean Water Project for all expenses charged to the project under this arrangement. Funds will be provided through the Local Assistance Grant.

6. Duties of Engineer

The Environmental Engineer will provide a full range of engineering services to the project. Particular emphasis will be directed toward review and approval of work of

other DCCWP engineering staff, design of practices above job approval ratings of other DCCWP staff, and review of design work provided to the project by engineering consultants.

7. Employment Status

The Environmental Engineer position will remain 100% employed by Chippewa County. The position will continue to be classified in the Management/Professional Contract.

8. Recruitment

Per Chippewa County Board resolution the county's existing Environmental Engineer is assigned to the DCCWP according to terms of this agreement.

At the time a vacancy would occur in the Environmental Engineer position the county will recruit to fill the position and continue to provide services to the DCCWP. The hire rate for county time will be the hire rate for the Environmental Engineer as documented in the Management/Professional Contract, with step increases according to contract details. The state rate for DCCWP time will be that documented under the section 3.b. State Rates of this agreement, initiate at a rate commensurate with skills and education.

9. Withdrawal and Alteration

Assignment of Engineer's time is contingent upon continued state funding, and will be terminated at the conclusion of the DCCWP. This agreement will remain in effect over the duration of the DCCWP. Alterations to this agreement require mutual written consent of LCC designated representatives and DNR authorized representatives.

10. Other Agreements

This agreement in no way restricts the county and other agencies, including the DNR, from developing similar agreements for provision of engineering services.

11. Updating Agreement Details

In cases where this document uses data from other sources and such data is updated, changes will be considered part of this agreement.



1994 COMPUTATION

1. Salary

A. State Engineering Rate: Level 3, State of Wisconsin Engineering Salary Rate, provided by DNR.

Hourly Basis  
Level 3 = 25.142

B. County Rate: Management/Professional, MP-20 position, 30 month rate. Based on 1993 M/P contract.

Hourly Basis  
15.91

2. Fringe Benefits

Combined Rate: Assumes 50 % of time assigned to state project.

Hourly Basis

State Rate: 25.142 X 50% = 12.571  
County Rate: 15.30 X 50% = 7.955

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20.526

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# Appendix E

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## Land Parcels and Barnyard Discharges Subject to NR243 Site Investigation at Conclusion of Project Sign-Up Period

Parcel Number	Location	Annual Phosphorous Load
23009-0124-0000-0000	T30N R 9W Sect. 1	401.8
23010-0231-0000-0000	T30N R10W Sect. 2	379.9
22808-2944-0002-0000	T28N R 8W Sect. 29	279.2
23109-3244-0625-0000	T30N R 9W Sect. 32	294.0
22909-2214-0000-0000	T29N R 9W Sect. 22	245.0
22909-1334-0925-0000	T29N R 9W Sect. 13	236.5
22909-1242-0002-0000	T28B R 9W Sect. 12	215.5
23109-2834-0000-0000	T31N R 9W Sect. 28	213.6
22909-2642-0002-0000	T29N R 9W Sect. 26	187.0
22908-2933-0002-0000	T29N R 8W Sect. 29	183.7
22909-1632-0000-0000	T29N R 9W Sect. 16	179.8
23010-1413-0000-0000	T30N R10W Sect. 14	166.0
22810-1323-0000-0000	T28N R10W Sect. 13	161.0
22909-0813-0000-0000	T29N R 9W Sect. 8	153.8
22808-3211-0000-0000	T28N R 8W Sect. 32	139.1
22909-1734-0002-0000	T29N R 9W Sect. 17	138.0
22909-2232-0000-0000	T29N R 9W Sect. 22	130.9
23109-1713-0000-0000	T31N R 9W Sect. 17	125.3
23109-2012-0521-0000	T31N R 9W Sect. 20	123.7
22909-2221-0000-0000	T29N R 9W Sect. 22	121.7
23009-1532-0002-0000	T30N R 9W Sect. 15	115.6
22808-2023-0000-0000	T28N R 8W Sect. 20	113.5
23009-2911-0625-0000	T30N R 9W Sect. 29	110.5
23010-1142-0000-0000	T30N R10W Sect. 11	109.2
22908-2933-0002-0000	T29N R 8W Sect. 29	108.4
22909-2121-0000-0000	T29N R 9W Sect. 21	107.6
23110-2612-0002-0000	T31N R10W Sect. 26	105.6

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# Appendix F

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Duncan Creek Watershed

Costs of Educational and Information

Activities

Chippewa County - Land Conservation Department  
711 n. Bridge St.  
Chippewa Falls, WI 54729

July 27, 1993

1993 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
Topical Presentations	9.2	LCD - 24	100
Operations & Maintenance Mtg	9.3	* 32	250
Operations & Maintenance Plans	9.3	15	-
Direct Mailing-Streambank	9.3	40	500
Presentations-groundwater	9.6	40	125
Presentations-wetlands	9.6	40	125
Field Record Keeping Class	9.7	10	1500
Environment Curriculum	9.7	195	12500
		<hr/>	
		LCD 396	15100

\*LCD unless otherwise noted

1994 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
NPM Demos	9.2	LCD - 120	2000
Topical Presentations	9.2	* 24	100
NPM Training Agribusiness	9.2		1500
NPM Training Farmers	9.2		1500
Scouting Report	9.2	192	1250
Operations Maintenance Mtg.	9.3	32	250
Lawn and Garden Workshop	9.3	40	500
Operations and Maintenance	9.3	25	-
Landuse Seminar	9.4	40	1250
		RUWEX - 105	
Town Board Meetings	9.4	32	100
Urban Meetings	9.5	100	800
Presentations-groundwater	9.6	40	125
Tour - wetlands	9.6	80	1000
Presentations-wetlands	9.6	40	125
NPM Curriculum	9.7	NPM - 520	10000
Field Record Keeping	9.7	10	1500
Environmental Curriculum	9.7	390	25000
Well Driller Workshop	9.8	40	300
		Zon - 10	
Hazardous Materials Workshop	9.8	40	500
		DILHR - 20	
Abandoned Well Demo	9.9	80	5000
Seminar Wetland Regulations	9.9	60	1000
UST Program	9.9	40	500
		DILHR - 20	
		<hr/>	
		LCD - 1425	54300

\*LCD unless otherwise noted

RWEX-Resource Development Agent-UWEX

ZON - County Zoning

DILHR - Dept. of Industry, Labor  
and Human Relations

NPM - Nutrient & Pest Management Regional Specialist

RUWEX - 105

NPM - 520

ZON - 10

DILHR - 40



1995 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
NPM demos	9.2	LCD - 120	2000
Topical Presentations	9.2	* 24	100
NPM Training - Agribusiness	9.2		1500
NPM Training - Farmers	9.2		1500
Scouting Report	9.2	192	1250
Operations Maintenance Mtg.	9.3	32	250
Operations and Maintenance Tour	9.3	25	-
	9.4	50	2500
Presentations - Groundwater	9.6	40	125
Presentations - Wetlands	9.6	40	125
Field Record Keeping	9.7	10	1500
Environmental Curriculum	9.7	390	25000
Hazardous Materials Workshop	9.8	40	500
		DILHR - 20	
UST Program	9.9	40	500
		DILHR - 20	
<hr/>			
		LCD-1003	36850
		DILHR- 40	

\*LCD unless otherwise noted

1996 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
NPM demos	9.2	LCD -120      2000	
Topical Presentations	9.2	* 24      100	
NPM Training - Agribusiness	9.2		1500
NPM Training - Farmers	9.2		1500
Scouting Report	9.2	192	1250
Operations Maintenance Mtg.	9.3	32	250
Lawn and Garden Workshop	9.3	40	500
Operations and Maintenance	9.3	25	-
Landuse Seminar	9.4	40	1250
		RUWEX - 105	
town Board Meetings	9.4	32	100
Presentations - Groundwater	9.6	40	125
Presentations - Wetlands	9.6	40	125
Field Record Keeping Class	9.7	10	1500
Environmental Curriculum	9.7	390	25000
Hazardous Materials Workshop	9.8	40	500
		DILHR - 20	
UST Program	9.9	40	500
		DILHR - 20	
		<hr/>	
		LCD -1065	36200
		RUWEX - 105	
		DILHR - 40	

\*LCD unless otherwise noted

1997 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
Topical Presentations	9.2	LCD - 24	100
NPM Training - Agribusiness	9.2		1500
NPM Training - Farmers	9.2		1500
Scouting Report	9.2	* 192	1250
Operations Maintenance Mtg.	9.3	32	250
Operations and Maintenance	9.3	25	-
Lawn and Garden Workshop	9.3	40	500
Presentations - Groundwater	9.6	40	125
Presentations - Wetlands	9.6	40	125
Field Record Keeping	9.7	10	1500
Environmental Curriculum	9.7	390	25000
Hazardous Materials Workshop	9.8	40	500
		DILHR - 20	
UST Program	9.9	40	500
		DILHR - 20	
<hr/>			
		LCD - 833	32350
		DILHR - 40	

\*LCD unless otherwise noted

1998 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
Topical Presentations	9.2	LCD - 24	100
NPM Training - Agribusiness	9.2		1500
NPM Training - Farmers	9.2		1500
Scouting Report	9.2	* 192	1250
Operations Maintenance Mtg.	9.3	32	250
Operations and Maintenance	9.3	25	-
Landuse Seminar	9.4	40	1250
		RUWEX -105	
town Board Meetings	9.4	32	100
Presentations - Groundwater	9.6	40	125
Presentations - Wetlands	9.6	40	125
Field Record Keeping	9.7	10	1500
Environmental Curriculum	9.7	390	25000
Hazardous Materials Workshop	9.8	40	500
		DILHR - 20	
UST Program	9.9	40	500
		DILHR - 20	
<hr/>			
		LCD - 905	33700
		RUWEX - 105	
		DILHR - 40	

\*LCD unless otherwise noted

1999 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
Topical Presentations	9.2	LCD - 24	100
NPM Training - Agribusiness	9.2		1500
NPM Training - Farmers	9.2		1500
Scouting Report	9.2	* 192	1250
Operations Maintenance Mtg.	9.3	32	250
Operations and Maintenance	9.3	25	-
Presentations - Groundwater	9.6	40	125
Presentations - Wetlands	9.6	40	125
Field Record Keeping	9.7	10	1500
Environmental Curriculum	9.7	390	25000
Hazardous Materials Workshop	9.8	40	500
UST Program	9.9	DILHR - 20	
		40	500
		DILHR - 20	
<hr/>			
		LCD - 833	32350
		DILHR - 40	

\*LCD unless otherwise noted

2000 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
Topical Presentations	9.2	LCD - 24	100
NPM Training - Agribusiness	9.2		1500
NPM Training - Farmers	9.2		1500
Scouting Report	9.2	* 192	1250
Operations Maintenance Mtg.	9.3	32	250
Operations and Maintenance	9.3	25	-
Landuse Seminar	9.4	40	1250
		RUWEX - 105	
town Board Meetings	9.4	32	100
Presentations - Groundwater	9.6	40	125
Presentations - Wetlands	9.6	40	125
Field Record Keeping	9.7	10	1500
Environmental Curriculum	9.7	390	25000
Hazardous Materials Workshop	9.8	40	500
		DILHR - 20	
UST Program	9.9	40	500
		DILHR - 20	
<hr/>			
		LCD - 905	33700
		RUWEX - 105	
		DILHR - 40	

\*LCD unless otherwise noted

2001 EDUCATION ACTIVITIES

<u>ACTIVITY</u>	<u>table</u>	<u>AGENCY/ HOURS</u>	<u>EST. COST</u>
Topical Presentations	9.2	LCD - 24	100
NPM Training - Agribusiness	9.2		1500
NPM Training - Farmers	9.2		1500
Scouting Report	9.2	* 192	1250
Operations & Maintenance	9.3	10	
Environmental Curriculum	9.7	195	12500
Hazardous Materials Workshop	9.8	40	500
		DILHR - 20	
UST Program	9.9	40	500
		DILHR - 20	
<hr/>			
		LCD - 501	17850
		DILHR - 40	

\*LCD unless otherwise noted

Information Strategy  
Summary tables

1993 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE table</u>	<u>AGENCY/HOURS</u>	<u>EST. COST</u>
Pure Water Days	8.2	LCD - 24	250
Special Projects	8.2	* 40	5000
Newsletter	8.3	120	2700
News Article	8.3	20	-
Bulletins	8.3	24	250
Wetland Signs	8.4	12	175
Direct Mailing-Wetlands	8.5	80	750
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
Water Testing	8.7	40	1500
Groundwater Publications	8.7	12	50
Personal Contacts	8.9	UWEX - 520	11500
Newspaper Ad	8.11	LCD - 12	250
Farmstead Signs	8.11	6	75
Recognition Certificates	8.11	20	75
Family Photos	8.11	12	250
Billboard	8.11	40	2500
Presentations	8.12	40	100
Local Officials Update	8.12	48	100

\*LCD unless otherwise noted

LCD - 630 28525  
UWEX - 520



1994 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE</u> <u>table</u>	<u>AGENCY/</u> <u>HOURS</u>	<u>EST.</u> <u>COST</u>
Pure Water Days	8.2	LCD - 24	250
Special Projects	8.2	* 40	5000
Calendar	8.2	40	3000
Newsletter	8.3	240	5400
News Article	8.3	40	-
Bulletins	8.3	48	500
Wetland Signs	8.3	24	350
Pamphlet	8.5	80	1000
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
News Article	8.6	24	100
Fair Booth	8.6	60	500
Water Testing	8.7	80	3000
Rural Well Audit	8.7	520	4576
Groundwater Publications	8.7	24	100
Personal Contacts	8.9	UWEX - 1040	23000
Fact Sheet	8.9	160	1000
Direct Mailing	8.10	40	250
Contractors Meeting	8.10	24	300
Newspaper Ad	8.11	24	500
Farmstead Signs	8.11	12	150
Recognition Certificates	8.11	20	150
Family Photos	8.11	24	500
Earth Day	8.11	40	2500
Presentations	8.11	80	200
Local Officials Update	8.13	72	150
		LCD - 1820	55476
		UWEX - 1040	

\*LCD unless otherwise noted

1995 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE</u> <u>table</u>	<u>AGENCY/</u> <u>HOURS</u>	<u>EST.</u> <u>COST</u>
Pure Water Days	8.2	LCD - 24	250
Special Projects	8.2	* 40	5000
Newsletter	8.3	240	5400
News Article	8.3	40	-
Bulletins	8.3	48	500
Wetland Signs	8.3	24	350
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
Billboard	8.6	40	2500
Water Testing	8.7	80	3000
Groundwater Publications	8.7	24	100
Earth Day	8.8	80	750
Water Bill Enclosure	8.8	80	1000
Personal Contacts	8.9	UWEX - 1040	23000
Fair Booth	8.10	60	500
Contractors Meeting	8.10	24	300
Newspaper Ad	8.11	24	500
Farmstead Signs	8.11	12	150
Recognition Certificates	8.11	20	150
Family Photos	8.11	24	500
June Dairy Days	8.11	40	500
Presentations	8.12	80	200
Local Officials Update	8.13	72	150
		LCD - 1156	
		UWEX - 1040	47800

\*LCD unless otherwise noted

1996 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE</u> <u>table</u>	<u>AGENCY/</u> <u>HOURS</u>	<u>EST.</u> <u>COST</u>
PW Days - Photo Contest	8.2	LCD - 80	2000
Special Projects	8.2	* 40	5000
Newsletter	8.3	240	5400
News Article	8.3	40	-
Bulletins	8.3	48	500
Wetland Signs	8.4	24	350
Fair Booth	8.4	60	500
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
Water Testing	8.7	80	3000
Rural Well Audit	8.7	520	4576
Groundwater Publications	8.7	24	100
Direct Mailing	8.7	24	500
Personal Contacts	8.9	UWEX - 520	11500
Contractors Meeting	8.10	24	300
Newspaper Ad	8.11	24	500
Farmstead Signs	8.11	12	150
Recognition Certificates	8.11	20	150
Family Photos	8.11	24	500
Billboard	8.11	40	2500
Tour	8.11	40	500
Presentations	8.12	40	100
Local Officials Update	8.13	72	150
		LCD - 1556	41276
		UWEX - 520	

\*LCD unless otherwise noted

1997 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE</u> <u>table</u>	<u>AGENCY/</u> <u>HOURS</u>	<u>EST.</u> <u>COST</u>
Pure Water Days	8.2	LCD - 24	250
Special Projects	8.2	* 40	5000
Newsletter	8.3	240	5400
News Article	8.3	40	-
Bulletins	8.3	48	500
Wetland Signs	8.4	24	350
Fair Booth	8.4	60	500
Pamphlet Update Wetland	8.5	40	1000
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
Water Testing	8.7	80	3000
Groundwater Publications	8.7	24	100
Contractors Meeting	8.10	24	300
Newspaper Ad	8.11	24	500
Farmstead Signs	8.11	12	150
Recognition Certificates	8.11	20	150
Family Photos	8.11	24	500
Earth Day	8.11	40	2500
Local Officials Update	8.13	72	150
		LCD - 916	23350

\*LCD unless otherwise noted

1998 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE</u> <u>table</u>	<u>AGENCY/</u> <u>HOURS</u>	<u>EST</u> <u>COST</u>
Pure Water Days	8.2	LCD - 24	250
Special Projects	8.2	* 40	5000
Newsletter	8.3	240	5400
News Article	8.3	40	-
Bulletins	8.3	48	500
Wetland Signs	8.3	24	350
Billboard	8.5	40	2500
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
Water Testing	8.7	80	3000
Groundwater Publications	8.7	24	100
Contractors Meeting	8.10	24	300
Newspaper Ad	8.11	24	500
Farmstead Signs	8.11	12	150
Recognition Certificates	8.11	20	150
Family Photos	8.11	24	500
Local Officials Update	8.13	72	150
		LCD - 816	21850

\*LCD unless otherwise noted

1999 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE</u> <u>table</u>	<u>AGENCY/</u> <u>HOURS</u>	<u>EST.</u> <u>COST</u>
Pure Water Days	8.2	LCD - 24	250
Special Projects	8.2	* 40	5000
Newsletter	8.3	240	5400
News Article	8.3	40	-
Bulletins	8.3	48	500
Wetland Signs	8.4	24	350
Billboard	8.4	40	2500
Fair Booth	8.4	60	500
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
Water testing	8.7	80	3000
Groundwater publications	8.7	24	100
Contractors Meeting	8.10	24	300
Newspaper Ad	8.11	24	500
Farmstead Signs	8.11	12	150
Recognition Certificates	8.11	20	150
Family Photos	8.11	24	500
Local Officials Update	8.13	72	150
		LCD - 876	22350

\*LCD unless otherwise noted

2000 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE</u> <u>table</u>	<u>AGENCY/</u> <u>HOURS</u>	<u>EST.</u> <u>COST</u>
Pure Water Days	8.2	LCD - 24	250
Special Projects	8.2	* 40	5000
Billboard	8.2	40	2500
Newsletter	8.3	240	5400
News Article	8.3	40	-
Bulletins	8.3	48	500
Wetland Signs	8.4	24	350
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
Fair Booth	8.6	60	500
Water Testing	8.7	80	3000
Groundwater publications	8.7	24	100
Contractors Meeting	8.10	24	300
Newspaper Ad	8.11	24	500
Farmstead Signs	8.11	12	150
Recognition Certificates	8.11	20	150
Family Photos	8.11	24	500
Local Officials Update	8.13	72	150
		LCD - 876	22350

\*LCD unless otherwise noted

2001 INFORMATION ACTIVITIES

<u>ACTIVITY</u>	<u>REFERENCE</u> <u>table</u>	<u>AGENCY/</u> <u>HOURS</u>	<u>EST.</u> <u>COST</u>
Pure Water Days	8.2	LCD - 24	250
Newsletter	8.3	* 120	2700
News Article	8.3	20	-
Bulletins	8.3	24	250
Wetland Signs	8.4	12	175
Monitoring Meeting	8.6	40	2000
Promotional Items	8.6	40	1000
Water Testing	8.7	40	1500
Groundwater Publications	8.7	12	50
Contractors Meeting	8.10	24	300
Newspaper Ad	8.11	12	250
Farmstead Signs	8.11	6	75
Recognition Certificates	8.11	20	75
Family Photos	8.11	12	250
Local Officials Update	8.13	24	50
		LCD - 430	8925

\*LCD unless otherwise noted

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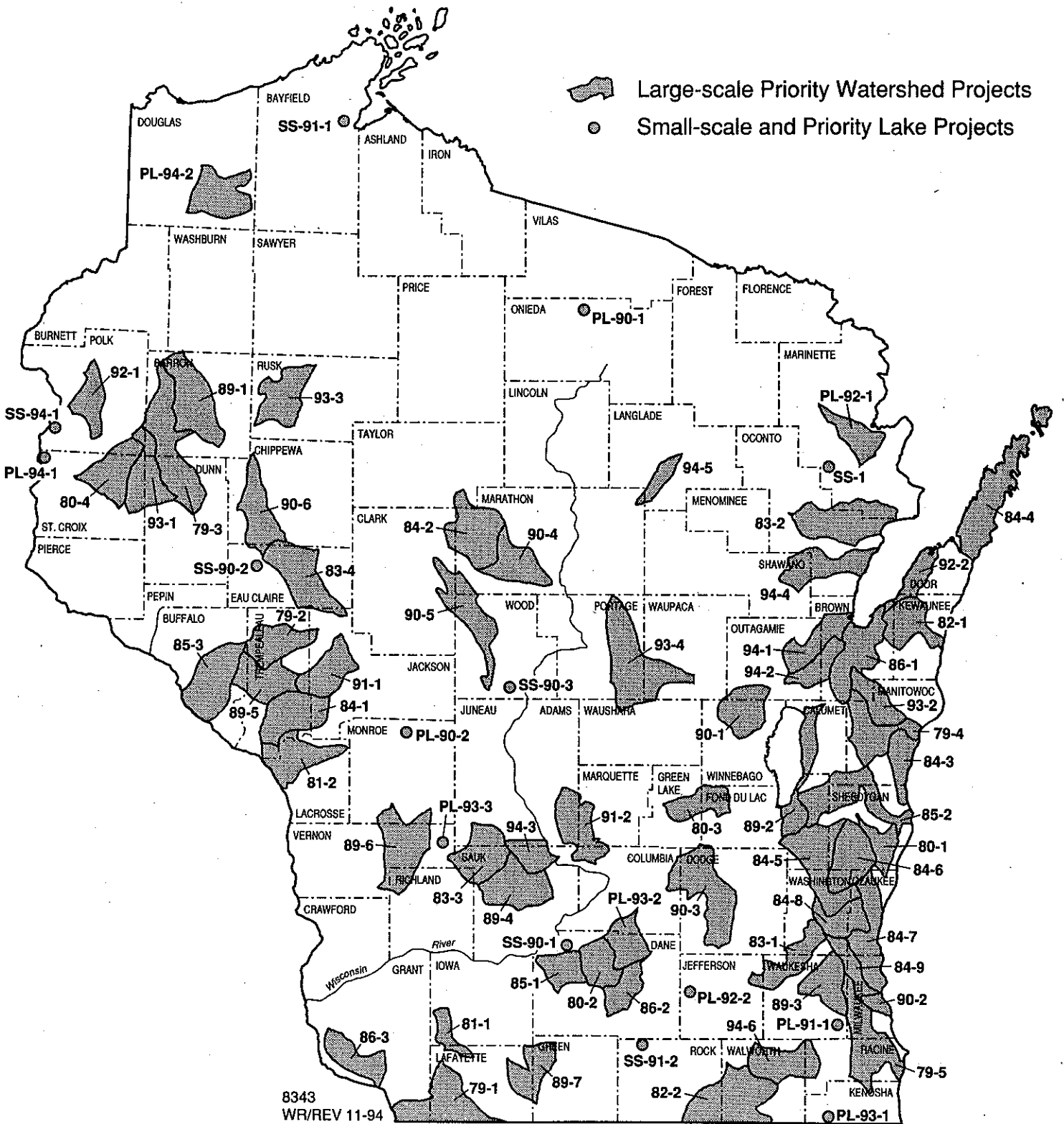
**Priority Watershed Projects in Wisconsin — Selected as of 1994**

Year Selected- Map Number	Large-scale Priority Watershed Project	County(ies)	Year Selected- Map Number	Small-scale Priority Watershed Project	County(ies)
79-1	Galena River*	Grant, Lafayette	90-2	Kinnickinnic River	Milwaukee
79-2	Elk Creek*	Trempealeau	90-3	Beaverdam River	Dodge, Columbia, Green Lake
79-3	Hay River*	Barron, Dunn	90-4	Lower Big Eau Pleine River	Marathon
79-4	Lower Manitowoc River*	Manitowoc, Brown	90-5	Upper Yellow River	Wood, Marathon, Clark
79-5	Root River*	Racine, Milwaukee, Waukesha	90-6	Duncan Creek	Chippewa, Eau Claire
80-1	Onion River*	Sheboygan, Ozaukee	91-1	Upper Trempealeau River	Jackson, Trempealeau
80-2	Sixmile-Pheasant Branch Creek*	Dane	91-2	Neenah Creek	Adams, Marquette, Columbia
80-3	Big Green Lake*	Green Lake, Fond du Lac	92-1	Balsam Branch	Polk
80-4	Upper Willow River*	Polk, St. Croix	92-2	Red River - Little Sturgeon Bay	Door, Brown, Kewaunee
81-1	Upper West Branch Pecatonica River*	Iowa, Lafayette	93-1	South Fork Hay River	Dunn, Polk, Barron, St. Croix
81-2	Lower Black River*	La Crosse, Trempealeau	93-2	Branch River	Manitowoc, Brown
82-1	Kewaunee River*	Kewaunee, Brown	93-3	Soft Maple/Hay Creek	Rusk
82-2	Turtle Creek*	Walworth, Rock	93-4	Tomorrow/Waupaca River	Portage, Waupaca, Waushara
83-1	Oconomowoc River	Waukesha, Washington, Jefferson	94-1	Duck Creek	Outagamie, Brown
83-2	Little River	Oconto, Marinette	94-2	Apple/Ashwaubenon Creeks	Outagamie, Brown
83-3	Crossman Creek/Little Baraboo River	Sauk, Juneau, Richland	94-3	Deil Creek	Sauk, Juneau
83-4	Lower Eau Claire River*	Eau Claire	94-4	Pensaukee River	Shawano, Oconto
84-1	Beaver Creek	Trempealeau, Jackson	94-5	Springbrook Creek	Langlade, Marathon
84-2	Upper Big Eau Pleine River	Marathon, Taylor, Clark	94-6	Sugar/Honey Creeks	Walworth, Racine
84-3	Sevenmile-Silver Creeks	Manitowoc, Sheboygan			
84-4	Upper Door Peninsula	Door			
84-5	East & West Branch Milwaukee River	Fond du Lac, Washington, Sheboygan, Dodge, Ozaukee			
84-6	North Branch Milwaukee River	Sheboygan, Washington, Ozaukee, Fond du Lac			
84-7	Milwaukee River South	Ozaukee, Milwaukee			
84-8	Cedar Creek	Washington, Ozaukee			
84-9	Menomonee River	Milwaukee, Waukesha, Ozaukee, Washington			
85-1	Black Earth Creek	Dane			
85-2	Sheboygan River	Sheboygan, Fond du Lac, Manitowoc, Calumet			
85-3	Waumandee Creek	Buffalo			
86-1	East River	Brown, Calumet			
86-2	Yahara River - Lake Monona	Dane			
86-3	Lower Grant River	Grant			
89-1	Yellow River	Barron			
89-2	Lake Winnebago East	Calumet, Fond du Lac			
89-3	Upper Fox River (Ill.)	Waukesha			
89-4	Narrows Creek - Baraboo River	Sauk			
89-5	Middle Trempealeau River	Trempealeau, Buffalo			
89-6	Middle Kickapoo River	Vernon, Monroe, Richland			
89-7	Lower East Branch Pecatonica River	Green, Lafayette			
90-1	Arrowhead River & Daggets Creek	Winnebago, Outagamie, Waupaca			

\* Project completed

# Priority Watershed Projects in Wisconsin

## Selected as of 1994







## 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.

