

Nonpoint Source Control Plan for the Lake Tomah Priority Lake 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, USDA - Soil Conservation Service, and the Monroe County Department of Land Conservation.**

Nonpoint Source Control Plan for the Lake Tomah Priority Lake Project

The Wisconsin Nonpoint Source Water Pollution Abatement Program

June, 1994

This Plan Was Cooperatively Prepared By:

The Wisconsin Department of Natural Resources
The Department of Agriculture, Trade and Consumer Protection and
USDA - Soil Conservation Service
In cooperation with
The Dane County Land Conservation Department

Publication WR-365-94

For copies of this document please contact:

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Watershed Plan Credits

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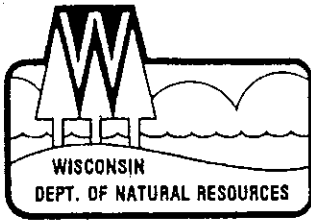
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Lake Tomah Priority Lake Citizens Advisory Committee



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January 15, 1993

File Ref: 8250

Mr. Harv Simmons
County Board Chairman
Monroe County
Sparta, WI 54656

Dear Mr. Simmons:

I am pleased to approve "A Nonpoint Source Control Plan for the Lake Tomah Priority Lake Project" prepared through the Wisconsin Nonpoint Source Water Pollution Abatement Program. This plan was prepared jointly and now has been approved by Monroe County Department of Land Conservation, the Department of Agriculture, Trade and Consumer Protection and the Department of Natural Resources.

This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. The Department of Natural Resources's approval authorizes the use of state Nonpoint Source Water Pollution Abatement Program funds for the control of urban and rural nonpoint sources in the Lake Tomah watershed. These funds must be used consistent with state law, administrative code and the approved priority watershed plan.

I am pleased with these cooperative efforts to improve and protect the Lake Tomah watershed and am confident that the cooperative spirit shown throughout the development of this plan will continue during the implementation of this project.

Sincerely,

Bruce B. Braun
Acting Secretary

c: Ron McMullen - Chairman, Monroe County Land Conservation Committee

hsro15



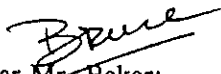
State of Wisconsin
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Alan T. Tracy, Secretary

801 West Badger Road • PO Box 8911
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December 8, 1992

Mr. Bruce Baker, Director
Bureau of Water Resources Management
Wisconsin Department of Natural Resources
Box 7921
Madison, WI 53707


Dear Mr. Baker:

The Department of Agriculture, Trade and Consumer Protection has reviewed the "Nonpoint Source Control Plan" for the Lake Tomah Priority Lake Project.

We would like the addition of this statement to the end of the paragraph on page 53 to more clearly define the **Total Project Cost**:

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

With the addition of this statement, the Department of Agriculture, Trade and Consumer Protection hereby approves the "Nonpoint Source Control Plan" for the Lake Tomah Priority Lake Project. We look forward to assisting DNR and the Land Conservation Committees in Monroe County in implementing the project.

Please contact Sue Porter (273-6205) if we can be of any further assistance in moving the project to implementation.

Sincerely,



Dave Jelinski, Director
Land and Water Resources Bureau
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
(608) 273-6411

cc: Becky Wallace, NPS Section Chief
Allen Hoff, Monroe County Land Conservation Dept.

RESOLUTION NO. 78-92

RESOLUTION AUTHORIZING THE ADOPTION OF THE
LAKE TOMAH PRIORITY LAKE PROJECT PLAN WITH ADDENDUM

WHEREAS, the State Department of Natural Resources designated a priority watershed through the Wisconsin Nonpoint Source Pollution Abatement Program in 1990; and

WHEREAS, the staff of the Monroe County Land Conservation Department has cooperated with state and federal agencies to complete A Nonpoint Source Control Plan for the Lake Tomah Priority Lake Project; and

WHEREAS, the watershed plan details actions and resources needed to address water quality problems in the Lake Tomah Watershed; and

WHEREAS, the watershed plan must be reviewed and approved by the Monroe County Board of Supervisors prior to receiving state cost-sharing and technical assistance funds for best management practice installation; and

WHEREAS, the Monroe County Land Conservation Committee has reviewed the Lake Tomah Priority Lake Project Plan with addendum on October 26, 1992 and does recommend to the Monroe County Board of Supervisors that they do adopt the Lake Tomah Priority Lake Plan with addendum of which a summary had been distributed to the members in September of 1992 by mail, and the full draft and summary is on file in the Monroe County Clerk's Office for review.

NOW, THEREFORE, BE IT RESOLVED by the Monroe County Board of Supervisors that they do hereby approve the Lake Tomah Priority Lake Project Plan with addendum and they do hereby authorize the implementation of the plan with addendum by the Monroe County Department of Land Conservation. Said plan with addendum is on file with the Monroe County Clerk which is incorporated herein and made a part hereof.

Dated this 4th day of November, 1992

OFFERED BY THE LAND CONSERVATION COMMITTEE:

Ronald F. Mc Mullin
Alan Balthasar
Harward Gastropel
Alma Kottler

Approved by:

David A. Shudlick
David A. Shudlick

STATE OF WISCONSIN }
COUNTY OF MONROE } SS

I, DAVID L. HEERING, Monroe County Clerk DO HEREBY CERTIFY that the foregoing is a true and correct copy of

Res. 78-92

adopted by the County Board of Supervisors

at the meeting held 11-4-92

David L. Heering

DAVID L. HEERING, MONROE COUNTY CLERK

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CHAPTER ONE

Introduction, Purpose, and Legal Status

Nonpoint Source Water Pollution Abatement Program

The Wisconsin Nonpoint Source Water Pollution Abatement Program was created in 1978 by the State Legislature. The goal of the program is to improve and protect the water quality of streams, lakes, wetlands, and groundwater by reducing pollutants from the urban and rural nonpoint sources. The 30 square-mile Lake Tomah Priority Lake Project, located in Monroe County, was designated as a "Priority Lake Project" in 1990.

Nonpoint sources of pollution include: eroding agricultural lands, streambanks, roadsides, developing urban areas, runoff from livestock wastes, and established urban areas. Pollutants from nonpoint sources are carried to the surface water or groundwater through the action of rainfall runoff, snowmelt, and seepage.

The following is an overview of the Program:

The program is administered by the DNR (DNR) and the DATCP (DATCP). It focuses on critical hydrologic units called priority watersheds. The program is implemented through priority watershed projects.

- 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 land use 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 in order 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 voluntary 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.

- 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 the local units of government are contacted by the County Land Conservation Departments to determine their interest in voluntarily installing 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.
- Informational and educational activities are offered to encourage participation.
- 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 the control of nonpoint sources in the watershed.

Legal Status of the Nonpoint Source Control Plan

The Lake Tomah Priority Lake Plan was prepared under the authority of the Wisconsin Nonpoint Source Water Pollution Abatement Program described in Section 144.25 of the Wisconsin Statutes and Chapter NR 120 of the Wisconsin Administrative Code. It was prepared under the cooperative efforts of DNR, DATCP, the Monroe County Land Conservation Department, local units of government, and the Lake Tomah Priority Lake Citizens Advisory Committee.

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

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

Plan Organization

The remainder of this plan is divided into three parts: The Watershed Assessment, A Detailed Program for Implementation, and Project Evaluation. The contents of each part are described below:

Part I - The Watershed Assessment

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

Chapter Three. "Water Quality Conditions, Objectives, and Nonpoint Pollution 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 as well as other sources of pollution.

Chapter Four. "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 lake project are also presented.

Part II - Detailed Program for Implementation

Chapter Five. "Local Government Implementation Program," describes the means by which the local units of government administer the project, estimates a local assistance and management practice cost-share budget, and identifies an Information and Education program.

Chapter Six. "Integrated Resource Management," presents the strategy for involving DNR resource management programs (fisheries, wildlife, forestry etc.) in the nonpoint source pollution abatement efforts in the Lake Tomah Priority Lake Project.

Part III - Project Evaluation

Chapter Seven. "Progress Assessments," discusses the means for assessing the amount of nonpoint source control gained through installation of best management practices in the watershed.

Chapter Eight. "Water Resources Evaluation Monitoring," presents a strategy and schedule for monitoring to determine water quality impacts of implementing nonpoint source controls in the Lake Tomah Priority Lake Project.

CHAPTER TWO

General Watershed Characteristics

Location

The Lake Tomah Watershed is a 30 square mile drainage basin located approximately 40 miles east of the Mississippi River. (See map 2-1.) The watershed contains the South Fork of the Lemonweir River as the major tributary. The South Fork and other smaller tributaries enter the impoundment of Lake Tomah on the northwest corner of the city of Tomah. After leaving the watershed the Lemonweir joins with the East Fork of the Lemonweir River and proceeds to enter the Wisconsin River near Mauston.

Lake Tomah is currently being dredged and work is being done to replace the existing dam. These improvements will allow Lake Tomah to again become a popular warm water fishery. This 225 acre lake will contain Bluegill, Crappie, Largemouth Bass, Northern Pike, and Flathead Catfish.

Cultural Features

Governmental Units

All 30 square miles of the watershed lie within Monroe County. Incorporated areas include a portion of the city of Tomah and the townships of Adrian, Greenfield, LaGrange, Ridgeville, Tomah, and Wilton.

Population

The 1990 population is estimated to be at 3,500 persons, with the majority living within the city of Tomah (of which 1/3 is contained in the watershed). Regional trends suggest that the population will increase moderately over the next 20 years.

Land Use

Agriculture and related space are the most important land uses, comprising 60% of the land area. Woodlands make up 25% of the land area, while Wetlands, Surface Waters, and Urban areas each comprise 5% of the land area.

Sanitary Sewer Service

Sanitary sewer service is available in the city of Tomah. The wastewater treatment plant discharge occurs below the Lake Tomah Dam. The remainder of the watershed residents rely on private onsite systems.

Public Water Sources

All potable water in the watershed is obtained from groundwater sources. The principle aquifers are the Prairie du Chien dolomite and Upper Cambrian sandstone in the uplands, and the alluvial sands and gravel in the valleys. Water obtained from these aquifers is either pumped from individual wells owned by homeowners or businesses, or is obtained by municipal pumping facilities. The city of Tomah operates a municipal water supply system.

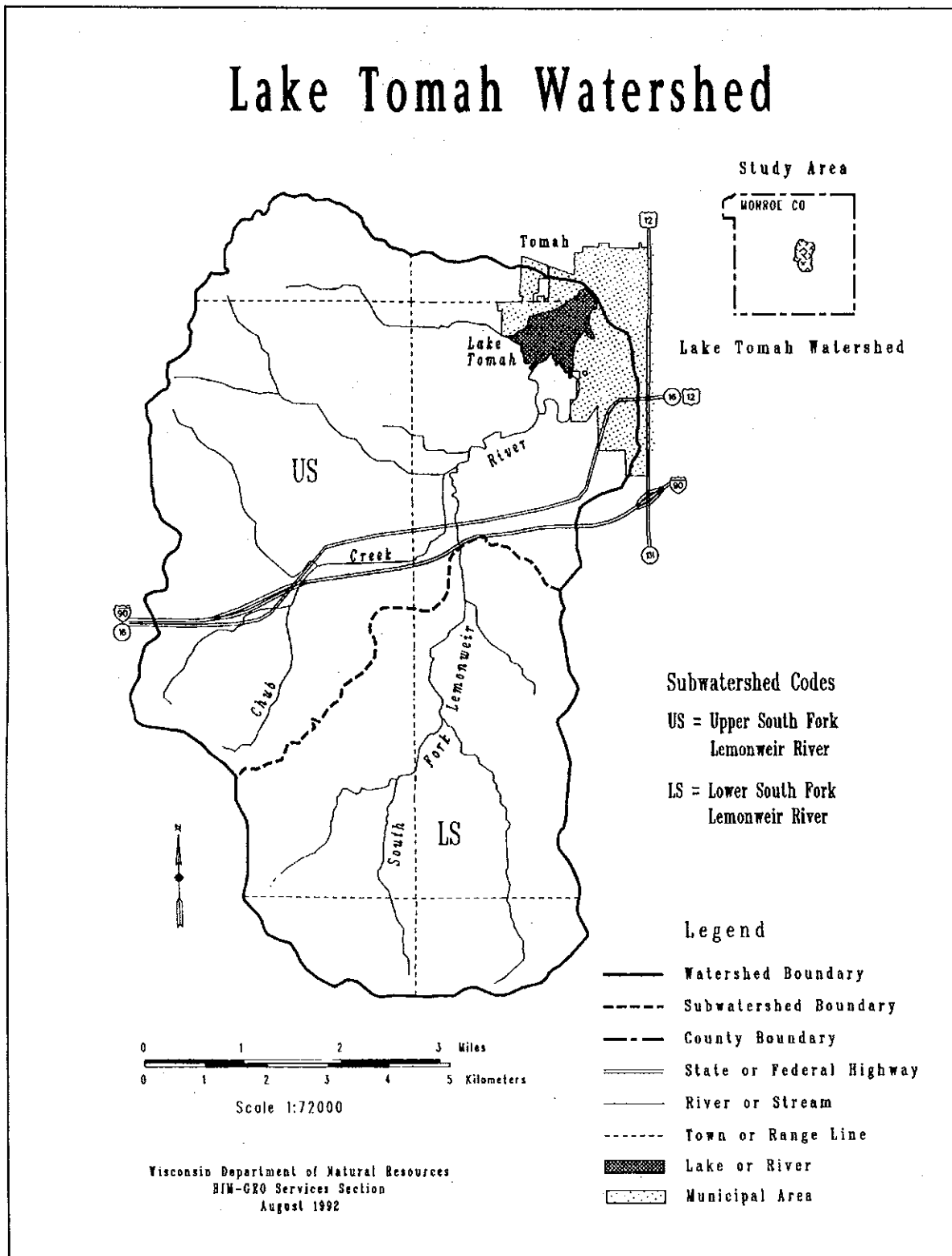
Physical Setting

Climate and Precipitation

The frequency, duration, and amount of precipitation influences quality of surface and groundwater. The Lake Tomah Watershed is located in the temperate continental zone. Winters are cold and snowy and summers are mostly warm with periods of hot humid conditions. Average annual precipitation for the region is about 28 inches of rain and melted snow. The majority of precipitation falls as rain, in the form of thunderstorms during the growing season (May - September).

The ridge and valley topography of the area is conducive to fast runoff and often results in flash flooding. Runoff averages about 8 inches per year; however, enough water percolates to the water table to ensure maintenance of abundant spring flow during normal periods. Most runoff occurs in March, April, and May when the land surface is either frozen or saturated following the spring thaw.

Map 2-1. Lake Tomah Watershed



Topography

The Lake Tomah Watershed is located in both the unglaciated Wisconsin Driftless Area, and the geological province known as Lake Basin. Twenty five percent of the watershed is within the lake basin region, with the remaining 75 percent lying in the Driftless Area. The Driftless Area topography is characterized by an upland plateau dissected by a maze of steep ridges, deep narrow valleys, and springfed streams. Topography of the Lake Basin Region is characterized by nearly level and gently sloping, very poorly drained to somewhat poorly drained, peaty and sandy soils on flood plains, lake basins, and stream terraces.

Soil and Geology

Most of the Watershed is underlain with Cambrian Sandstone, with some dolomite and shale. Watershed soils within the basin consist of sandy and clayey deposits, while the uplands are underlain with sandstone. The valley slopes formed in Loess, Loess and residuum, or in colluvium and erosional deposits.

The predominant soils in the watershed are the silty loams of the uplands, and the sands and sandy loams of the valleys. Soils of the valley slopes and upland ridges are generally rapid to well drained with a high potential for soil loss. In the lower portion of the watershed, soils are composed of fine textured materials washed down from the uplands and are moderately to poorly drained.

Surface Water Resources

Land drainage patterns in the Lake Tomah Watershed are delineated as two subwatersheds. Both convey surface water directly, or via tributaries, to Lake Tomah. Tributaries and subwatershed division are shown on map 2-2.

Lakes

Lake Tomah is located in Monroe County, Wisconsin (T17N R1W SEC.5) The lake was formed in 1936-1937 as a drainage impoundment on the South Fork of the Lemonweir River, in the city of Tomah. Lake Tomah is 225 acres in area, with a dredging project and dam reconstruction scheduled to be completed by Summer of 1993. Dredging is being done to restore the volume of Lake Tomah to 100% of capacity. Currently the lake is at 46% of its original volume.

Streams

The South Fork of the Lemonweir River is the major tributary to Lake Tomah. A 9.9 mile stretch above Lake Tomah is classified as full fish and aquatic life. Fish sampled are predominantly forage species. Because of the high gradient of streams within the watershed, flooding is common among all of the streams both perennial and intermittent. Other streams contributing to Lake Tomah include; Chub Creek, which is a 3.5 mile tributary to the South Fork of the Lemonweir River. It is a predominantly forage species stream. Unnamed Creeks 5-1 and 30-5 are also forage streams which contribute to Lake Tomah.

Wetlands

Wetlands are valuable natural resource features. Their values include wildlife habitat, fish spawning and rearing, and removal of pollutants. Wetlands comprise 150 acres, or less than 1 percent of the watershed.

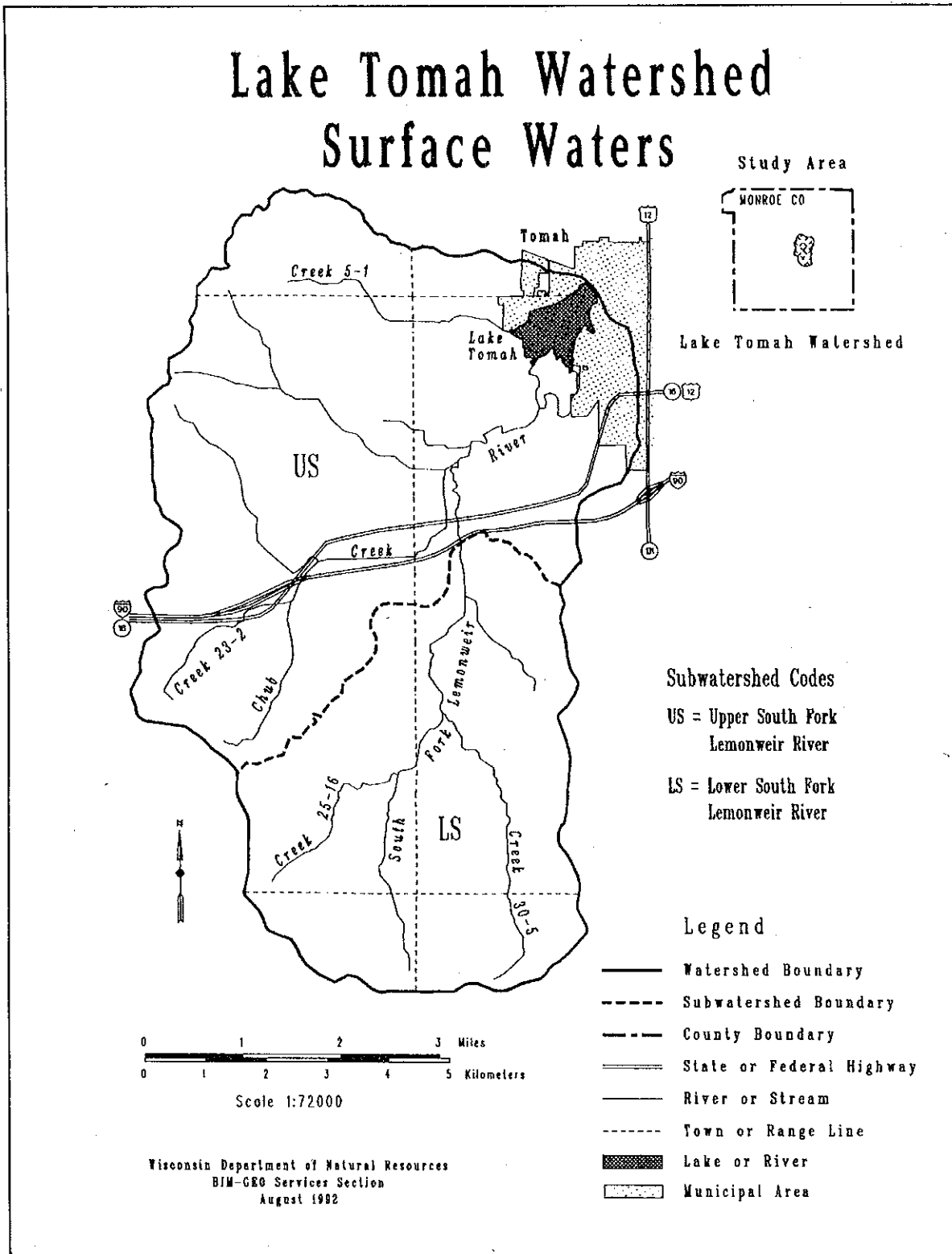
Endangered/Threatened Resources

Two threatened animal species are listed as being present in the Lake Tomah Watershed. These are the Wood Turtle and the Blandings Turtle. The Wisconsin DNR Bureau of Endangered Resources recommends that an endangered resource reconnaissance survey be conducted in the project area. The survey should focus on the stream headwaters for fish and macroinvertebrates. Comprehensive surveys have not yet been completed for this project. Updates or revisions of this watershed plan should be reviewed by the Bureau of Endangered Resources to include new records. There are no natural areas identified in the Lake Tomah Watershed that qualify as official natural areas designated by DNR.

Groundwater Resources

An aquifer is an underground rock or soil formation that stores and transmits water to lakes, streams, springs, and wells. Groundwater is available mainly from the sand and gravel aquifer, and the sandstone aquifer underlying the watershed. Aquifers in the Lake Tomah Watershed are discussed in order of occurrence beneath the surface.

Map 2-2. Lake Tomah Watershed: Surface Waters



Sand and Gravel Aquifer

The sand and gravel aquifer is found in limited areas within the watershed. The main location is along the valley of the Lemonweir River in the lower portions, near Lake Tomah. The aquifer is composed of alluvial materials that contain water at depths of less than 50 feet. Water yields to wells in this aquifer are generally low (less than 100 GPM).

Groundwater in these deposits occurs and moves in the void spaces among grains of sand and gravel. Relatively thick, saturated, unconsolidated deposits are locally important as a source of groundwater for private use. The potential for contamination is high because the rapid infiltration and shallow depth to groundwater provide little attenuation of contaminants.

Sandstone Aquifer

The sandstone aquifer is the most important source of groundwater in the watershed. This bedrock sandstone layer occurs at depths of 60 to 1000 feet and is composed of several geologic formations including the Cambrian sandstone and Prairie du Chien dolomite. The Cambrian sandstone is the most important water yielding formation and occurs throughout the southern portion of the Lake Tomah Watershed. The Prairie du Chien formation is dense dolomitic rock that has low permeability and is discontinuous in the watershed.

The sandstone aquifer is more than 50 feet thick in the region and provides reliable supplies of water suitable for municipal, industrial, and agricultural uses. On ridge tops in the Driftless Area, this bedrock layer is commonly within five feet of the surface, and in places is exposed at the surface.

The sandstone aquifer in this region of the state is unconfined and is hydraulically connected to the above mentioned aquifer. Recharge to the sandstone aquifer passes through the unconsolidated sand and gravel aquifer where present, or through surface soils, rendering this aquifer susceptible to contamination from surface land uses.

Crystalline Bedrock Aquifer

The crystalline bedrock aquifer is located beneath the sandstone aquifer in formations more than 600 million years old. This aquifer is not an important source of water in the watershed. Most of the deposits are very dense, extremely deep, crystalline rock which normally yield small amounts of water.

Private Well Monitoring Results

In order to acquire initial environmental health information on the quality of groundwater in the watershed, a monitoring survey was conducted during 1991 to measure well water nitrate and triazine concentrations. The results of this survey are summarized in table 2-1.

Nitrates

Nitrate levels ranged from 0 to 26.4mg/L, eighteen wells, or 47% of the wells monitored fell within the range of 2mg/L to 10mg/L. This is commonly known as the Preventative Action Range from Chapter NR140, Wis. Adm. Code. Twelve wells, or 33% of the wells monitored were over 10mg/L. This level is over the State Nitrate Limit of 10mg/L.

Triazine

Triazine is a family of chemical compounds which contain the herbicide atrazine. Two wells, or 5% of the wells sampled contained triazine levels above Preventative Action Limit of 0.3 μ g/l from Chapter NR 140, Wis. Adm.Code. Overall, the triazine compound is found in 72% of the thirty six samples taken, ranging from 0.1 μ g/l to 14.4 μ g/l.

The survey gives an overall assessment of nitrate and triazine within the watershed, and indicates that continued monitoring is important.

Table 2-1. Results of Well Sampling in the Lake Tomah Watershed Project

Pollutant	Range of Concentration	Average Concentration
Atrazine	0-14.4 ppb	0.81 ppb
Nitrates	0-26.4 ppm	6.53 ppm

CHAPTER THREE

Water Quality Conditions, Objectives, and Nonpoint Sources

Introduction

The first part of this chapter presents a general description of how nonpoint pollutants impact water quality. The remainder of the chapter discusses: 1) the water resource conditions present in the 19,000 acre Lake Tomah Watershed, 2) the results of the nonpoint source inventories, 3) other potential pollution sources, 4) the conditions that could be achieved in the streams if nonpoint sources of pollution were controlled, and 5) the amount of pollutant control necessary to achieve the desired water resource conditions.

The amount of pollutants generated from the following five nonpoint sources were inventoried and analyzed in the Lake Tomah Watershed.

- Eroding uplands (sediment and nutrients)
- Eroding and trampled streambanks (sediment and habitat impairment)
- Eroding gullies (sediment and nutrients)
- Animal lots (oxygen demand and nutrients)
- Winter spread manure (oxygen demand and nutrients)

One of the key indicators of the health of a stream in the Lake Tomah Watershed is the ability or inability of that stream to maintain or improve upon a forage fishery. The primary goal of the watershed is to reduce the amount of sediment that enters Lake Tomah. Therefore, many of the water resource objectives for this project involve reducing sediment to the streams and the lake.

Water Quality Basics

Nonpoint source pollution is responsible for degraded conditions of the streams in this watershed. Excessive amounts of sediment, nutrients, organic material, and bacteria degrade the water quality resulting in the streams (and Lake Tomah) not meeting their full use potential. In this watershed the two most serious pollutants are sediment and animal waste.

Sediment

Sediment adversely impacts water resources in many ways including:

- suspended sediment makes it difficult for fish to see and catch food.
- high sediment concentrations abrade fish gills making the fish more susceptible to disease, and
- sediment that settles out in watershed streams and in Lake Tomah fills deep pools and the lake bottom, eliminating cover and aquatic plant growth that are critical to fish habitat.
- major sources of sediment in this watershed are upland erosion (primarily from cropland erosion, and streambank erosion).

Manure

Manure contains several components that adversely affect water quality and aquatic life. Manure entering a stream breaks down, resulting in depletion of oxygen in water which fish need to survive. Also, manure contains ammonia, which in high concentrations is toxic to fish and other aquatic life. The nutrients in manure (including nitrogen and phosphorus) also promote nuisance algae and weed growth in lakes and streams. Finally, bacteria found in livestock manure may be harmful to livestock drinking the contaminated water, and to humans using the water for recreation.

The major sources of manure in this watershed are runoff from animal concentration areas (barnyards) and runoff from improperly field spread manure (winter spreading on steep crop fields and on floodplain crop fields).

Nitrates

Nitrate levels in the groundwater exceeding a concentration of 10.0 mg/L violates groundwater standards. At this level it is recommended that infants not consume the water because the nitrate interferes with the ability of the blood to carry oxygen. High levels of nitrates may be an indication that other contaminants are present in the drinking water. High nitrate concentrations in the drinking water have also been linked to spontaneous abortions in livestock.

The most likely source of nitrates in the groundwater in this watershed are nitrogen fertilizers applied to croplands and failing septic systems.

Establishing Water Resource Objectives

Water quality objectives were developed by DNR staff with assistance from the Monroe County Staff, and the DATCP. Because of the size of this watershed, the objectives were identified for the entire watershed, not by subwatersheds. These objectives are presented at the conclusion of the Surface Water Appraisal Report. Due to the relatively small size of the Lake Tomah Watershed, this report will be included at the end of this chapter, in lieu of discussions of individual subwatersheds.

The management strategies developed to achieve the water resource objectives are based on voluntary participants in the program controlling all nonpoint sources on their property identified as critical. Further clarification of the voluntary nature of the program and the requirements of the participants may be found in chapter 4.

Results of Nonpoint Source Inventories

Upland Sediment

Intensive agricultural practices cause considerable amounts of soil to erode and reach the surface waters of the Lake Tomah Watershed. Upland erosion and streambank erosion are the major source of sediments reaching Lake Tomah. Gully erosion from upland fields also contributes sediment, but to a lesser degree.

Upland sediment sources were evaluated for the entire watershed (30 square miles). An estimated 1,115 tons of sediment per year (40% of all sediment) are delivered to surface waters in the watershed from croplands, developed areas, pastures, woodlots, and grasslands. Erosion from gullies was estimated using an average size and frequency of occurrence. Estimates indicate gullies contribute 545 tons (20%) of the total sediment delivered to surface waters. Table 3-1 summarizes sediment loading from all sources.

In general, the inventory found that many farmers in the watershed are already controlling upland erosion on their fields to some degree through contour strip cropping and other techniques.

Water quality objectives require sediment to be reduced by 60% throughout the watershed. This is a high level of control. The objective will be met if the following is achieved:

1. Reduce erosion on fields identified as Category I to T ** (see chapter 4)
2. Reduce mass load of gully erosion by 70%
3. Reduce sediment tonnage from streambanks impacted by agriculture by 70%.

** "T" is the tolerable soil loss, or that amount of soil which can be lost from a given soil type and have that particular soil retain its productivity.

Table 3-1. Summary of Sediment Loads to Lake Tomah

Streambanks	1,103 tons
Gullies	545 tons (estimated delivery)
Uplands	1,115 tons
Urban	84 tons
Total	2,764

Streambank Erosion

Streambank erosion from agriculturally impacted banks contributes an estimated 1103 tons of sediment per year (40% of total). Streambank erosion from urban areas around the lake found 21 tons of soil loss. This quantity was inventoried by the Monroe County Land Conservation Department using the same method as the rural inventory.

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

- 1) Reduce sediment tonnage from streambank sites impacted by agriculture by 70%.
- 2) 10% of the mass load can be controlled by pasture management, and the remaining 60% will be controlled with structural applications.

Animal Lot Runoff

Runoff carrying a variety of pollutants from barnyards and other livestock feeding, loafing, and pasturing areas is a significant source of pollutants in the Lake Tomah Watershed. Inventory results show that 45 animal lots contribute 2,511 pounds of phosphorus, based on a 10-year, 24-hour rainfall event. Most of the oxygen demanding pollutants and nutrients associated with these operations drain via concentrated flow to the creeks in the watershed.

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

- 1) Reduce organic pollution from livestock waste by 75%.

Winter Spreading of Manure

The most significant water quality problems associated with the landspreading of livestock manure occur when wastes are spread on "critical" areas such as steeply sloped frozen ground, land in floodplains, or areas with shallow depth to groundwater. There are currently 29 inventories landowners spreading on 506 critical acres. Runoff from these acres has a high potential to convey pollutants to the surface waters of the Lake Tomah Watershed.

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

- 1) Category I landowners who are participating in the project will be required to implement and adhere to a SCS 590 nutrient management plan (see chapter 4).

Lake Tomah Watershed Surface Water Appraisal Report

Introduction

The purpose of this appraisal is to summarize the condition of water resources in the Lake Tomah Priority Watershed and provide water resource objectives for important waterbodies in the watershed. The preliminary water resource objectives will be combined with results of land use inventories conducted in the watershed to produce final water resource objectives and pollutant load reduction goals for the project.

Summary of Water Resource Conditions

The Lake Tomah Watershed is 30 square miles and is located entirely in Monroe County. The watershed drains gently rolling agricultural and wooded lands and features a number of warmwater streams and Lake Tomah. The watershed also drains a 172 acre urban area in the city of Tomah.

Recreational use of Lake Tomah has historically been limited by excessive macrophyte growth and shallow depth. The current dredging project will reduce macrophyte growth, increase depth and possible increase algae concentrations in the lake.

Most of the perennial streams in the watershed support a warmwater forage fishery. A summary of perennial streams in the watershed including physical characteristics and some of

the monitoring results are presented in table 3-2. Lake Tomah and the South Fork Lemonweir River below State Highway 16 support a warmwater sport fishery. Stream fish surveys conducted in 1991 found 11 forage species, with white sucker, creek chub and Johnny darter the most common species. Fish surveys conducted in Lake Tomah found bluegill, perch, bullhead and 5 forage species.

Common water resource problems in the watershed include streambank erosion, sedimentation, 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. Streambank erosion results in sedimentation of pools, filling-in of spawning substrate in riffle areas and elimination of bank cover for fish. Filling-in of spawning substrate in riffle areas (measured as embeddedness) reduces reproductive success of some fish species by reducing inter-gravel flow which is necessary to maintain suitable temperature and oxygen conditions for eggs and larval fish. Sediment 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. Stream biological use classification, limiting factors and water resource objectives for each stream are presented in table 3-3.

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 fair to good in the watershed streams, but some streams show evidence of significant 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.

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 stream morphology, insufficient springflow, ditching and lack of stream shading. The elimination of streambank vegetation reduces shading and increased 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. Stream ditching and wetland drainage reduces the ability of wetlands to filter pollutants and augment streamflow during low-flow periods.

Implementation of Best Management Practices (BMPs) in the watershed would have a number of positive effects on the watershed streams. Stabilizing streambanks would increase available cover for adult fish and reduce sedimentation of riffles and pools. Increased cover and overall habitat improvement would improve carryover and survival of adult fish. Reduced sedimentation of riffle areas would increase fish reproduction and 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 and increase stream cover and shading by allowing growth of shrubs and grasses along the stream corridor.

Table 3-2. Summary of Perennial Streams in the Lake Tomah Watershed

Subwatershed	Stream	Length (miles)	Gradient Ft./mile	Streamflow Cu.ft.sec.	HBI*	Habitat Rating**
Lower Lake Tomah	Unnamed Stream 5-7	0.8	29			
	23rd Ave. (Site #1)				4.26	114
	S.F. Lemonweir River	2.9	8.5			
	STH 16 (Site #2)				6.14	142
	Chub Creek	3.5	35			
	STH 16 (Site #3)				5.40	143
Upper Lake Tomah	S.F. Lemonweir River	5.8	10			
	Cliff Avenue			2.29		
	CTH M (Site #4)				3.89	166
	Cypress Avenue			0.91		
	21st Drive (Site #6)				3.50	147
	Unnamed Creek 30-5	2.3	67			
	CTH M (Site #5)				4.84	163
	Unnamed Creek 25-16	1.4	86			
	Unnamed Creek 23-2	0.6	80			

* Hilsenhoff Biotic Index (Hilsenhoff, 1987):

** Stream Habitat Ratings (Ball, 1982):

Biotic Index	Water Quality	Degree of Organic Pollution	Range	Rating
0.00-3.50	Excellent	No apparent organic pollution		
3.51-4.50	Very Good	Possible slight organic pollution		
4.51-5.50	Good	Some organic pollution		
5.51-6.50	Fair	Fairly significant organic pollution		
6.51-7.50	Fairly Poor	Significant organic pollution		
7.51-8.50	Poor	Very significant organic pollution		
8.51-10.00	Very Poor	Severe organic pollution (putrid!)		

Table 3-3. Water Resource Conditions and Objections for Major Streams in the Lake Tomah Watershed

Subwatershed	Stream	Length (miles)	Biological Use*		Limiting Factors**	Observed or Potential Sources**	Water Resource Objectives
			Current Use/Miles	Potential Use/Miles			
Lower Lake Tomah	Unnamed Stream 5-7	0.8	WWFF/0.8	WWFF/0.8	SED		Maintain Forage Fishery
	S.F. Lemonweir River	2.9	WWSF/2.9	WWSF/2.9	SED, TEMP, HAB	CG, SE, BY, CR	Enhance Sport Fishery
	Chub Creek	3.5	WWFF/3.5	WWFF/3.5	SED, TEMP, DO	CG, SE, BY, CR	Maintain Forage Fishery
Upper Lake Tomah	S.F. Lemonweir River	5.8	WWFF/5.8	WWFF/5.8	SED, TEMP, HAB	CG, BY, SE, CR	Maintain Forage Fishery
	Unnamed Creek 30-5	2.3	WWFF/2.3	WWFF/2.3	SED, TEMP, DO	CG, BY, SE	Maintain Forage Fishery
	Unnamed Creek 25-16	1.4	WWFF/1.4	WWFF/1.4	SED, TEMP, DO	CG, BY, SE	Maintain Forage Fishery
	Unnamed Creek 23-2	0.6	WWFF/0.6	WWFF/0.6	SED, TEMP, DO	CG, BY, SE	Maintain Forage Fishery

* Biological Use Classification

WWSF - Warmwater Sport Fishery
 WWFF - Warmwater Forage Fishery
 LFF - Limited Forage Fishery

** Limiting Factors

HAB - Habitat (fish)
 SED - Sedimentation
 TEMP - Temperature (too warm)
 D.O. - Dissolved Oxygen (too low)
 FL - Flooding

*** Observed or Potential Sources:

CG - Cattle Grazing
 SE - Streambank Erosion
 BY - Barnyards
 CR - Cropland Runoff

Successful installation of BMPs in the watershed would reduce sediment and nutrient loading to Lake Tomah. Reduced sediment loading to the lake would extend the useful life of the dredging project. Reducing the nutrient load to Lake Tomah would have a positive, but limited effect on decreasing algal growth in the lake. Streambank erosion and sediment loading reductions to the South Fork Lemonweir River would improve warmwater sport fishery conditions by increasing available cover and pool depth. And finally, reducing organic and associated bacterial loading would improve dissolved oxygen conditions in the watershed streams and reduce fecal coliform bacteria levels for recreational users of Lake Tomah.

Methods

Appraisal monitoring activities were initiated in May 1991 and completed in October 1991. Following is a summary of methods used to collect appraisal information.

Macroinvertebrates

Aquatic macroinvertebrates were collected at 6 sites in the watershed in May 1991. Samples were collected with a D-frame net using methods outlined in Hilsenhoff (1977 and 1982). The samples were preserved in 70% ethanol and sent to UW-Stevens Point for sorting and identification. Results were reported using the Hilsenhoff Biotic Index which provides a relative measure of organic loading to streams.

Stream habitat conditions were evaluated at each of the macroinvertebrate sites using a procedure modified from Ball (1985).

Temperature and Dissolved Oxygen

Maximum/minimum thermometers were placed at 5 sites in watershed streams to measure temperature extremes during summer conditions. The thermometers were checked and re-installed on a 2-3 week basis from June through September 1991. In addition, a RYAN TempMentor recording thermometer was placed in the South Fork Lemonweir River at CTH M. The recording thermometer recorded stream temperatures on a 30-minute interval from July through September 1991.

Hourly stream dissolved oxygen and temperature was monitored for 3-4 day periods at 9 sites on 7 streams between June and August 1991. Streams were monitored using a YSI D.O. and temperature meter connected to a LICOR datalogger. Temperature and dissolved oxygen monitoring results are presented in tables 3-4 and 3-5.

Table 3-4. 1991 Temperature and D.O. Survey Results - Lake Tomah Watershed

Stream	Location	Time Period	D.O. (mg/L)		Temperature (C.)	
			Max.	Min.	Max.	Min.
Unnamed Creek 5-7	23rd Ave. (Site #1)	7/24-7/29/91	10.01	9.15	15.6	9.8
S.F. Lemonweir River	STH 16 (Site #2)	7/24-7/29/91	8.17	6.04	-	-
Chub Creek	STH 16 (Site #3)	7/29-8/2/91	5.82	1.83	-	-
S.F. Lemonweir River	CTH M (Site #4)	7/29-8/7/91	11.23	4.62	25.9	15.4
Unnamed Stream 30-5	CTH M (Site #5)	8/2-8/7/91	9.98	3.69	-	-

Table 3-5. 1991 Maximum/Minimum Stream Temperatures - Lake Tomah Watershed

Stream	Location	Time Period	Days of Record	Temperature (C.)	
				Max.	Min.
Unnamed Creek 5-7	23rd Ave. (Site #1)	6/19-7/1/91	12	17.8	11.1
		8/7-9/4/91	27	20	10
S.F. Lemonweir River	STH 16 (Site #2)	6/19-9/4/91	77	30	8.9
Chub Creek	STH 16 (Site #3)	6/19-9/4/91	77	26.1	14.4
S.F. Lemonweir River	CTH M (Site #4)	6/19-9/4/91	77	33.3	13.3
Unnamed Stream 30-5	CTH M (Site #5)	6/19-9/4/91	77	22.2	10

Fish Surveys

Electrofishing surveys were conducted during summer 1991 at 4 sites on 2 streams, and 2 sites in Lake Tomah. Surveys were conducted on 500-1000 foot reaches using either an AbP-3 backpack shocker or a 230 volt D.C. generator-type stream shocker, depending on waterbody size. All fish collected were identified to species.

Physical stream conditions including streamflow, width, depth, substrate composition and streambank characteristics were measured or estimated at each fish survey site. Stream survey data was recorded on DNR fish survey forms and forms developed by Lyons (1990).

A summary of 1991 fish survey findings are presented in table 3-6.

Table 3-6. 1991 Fish Survey Results - Lake Tomah Watershed

Species	Site Number: [*]	1	2	3	4
Bluntnose minnow		A	A	U	C
Common creek chub		A	A	A	A
Johnny darter		A	A	C	A
White sucker		C	C	A	A
Central mudminnow			A	U	
Fantail darter		A	A	U	A
Blacknose dace			U	U	C
Brown bullhead			U		
Common shiner			U		
Pumpkinseed		U			
Northern redbelly dace		U		U	
Largescale stonerunner				U	
Brook stickleback					C

^{*} Site Descriptions:

#1 - Creek 30-5 @ 23rd Ave.
 #2 - S.F. Lemonweir R. @ Cliff Ave.
 #3 - S.F. Lemonweir R. @ D. Ritter property
 #4 - S.F. Lemonweir R. @ Cypress Rd.

^{**} Relative abundance:

A - Abundant (> 100 fish per 1000 ft.)
 C - Common (10-100 fish per 1000 ft.)
 U - Uncommon (< 10 fish per 1000 ft.)

Bacteria

Bi-weekly bacteriological samples were collected from 3 sites in the watershed from June through September 1991. Samples were collected by Monroe County LCD staff and shipped with ice to the State Laboratory of Hygiene (SLOH) for fecal coliform and fecal streptococcus analysis. Bacteriological sampling results are presented in table 3-7.

Table 3-7. 1991 Bacteriological Sampling Results - Lake Tomah Watershed

Location	Date	F. coli. (col./100 mL)	F. strep. col./100 mL
South Fork Lemonweir River @ Cypress Ave.	6/03/91	1400	270
	7/01/91	2500	320
	7/15/91	3700	260
	8/12/91	550	390
	8/26/91	2300	150
	9/23/91	7000	1100
South Fork Lemonweir River @ CTH C	6/03/91	1100	2800
	7/01/91	880	310
	7/15/91	680	690
	8/12/91	2300	250
	8/26/91	1100	470
	9/23/91	1800	410
Unnamed Stream 5-7 @ 23rd Ave.	9/03/91	250	450
	7/01/91	2600	1600
	7/15/91	350	400
	8/12/91	2400	180
	8/26/91	500	740
	9/23/91	210	340
Storm Sewer Outfall in Winnebago Park	9/24/91	2500	7000
Storm Sewer Outfall @ Juneau Ave.	9/24/91	7300	14000

Water Chemistry

Water chemistry and bacteria samples were collected from 2 storm sewer outfalls to Lake Tomah during two rainfall events. The samples were collected by Monroe County LCD staff and sent with ice to the SLOH for analysis of nutrients, suspended solids, metal and bacteria. Storm sewer monitoring results are found in table 3-8.

Table 3-8. Storm Sewer Monitoring Results

Location	Date	Lab pH	BOD ₅ (mg/L)	Hardness (mg/L)	Susp. Solids (mg/L)	Tot. P. (mg/L)	Chromium (µg/l)	Copper (µg/l)	Lead (µg/l)	Zinc (µg/l)
Lake Tomah - storm sewer @ west end of Juneau St.	7/17/91	7.00	36	400	940	1.02	34	42	51	3600*
Lake Tomah - storm sewer in Winnebago Park	7/17/91	7.30	22	410	700	1.42	40	34	53	250

* Acute and Chronic toxicity (Wis. Admin. Rule NR 105)

Results and Discussion

Following is a discussion of Lake Tomah and streams in the Lake Tomah Priority Watershed. The descriptions provide a summary of available information on each waterbody including a discussion of water resource conditions and problems affecting the resource.

Lake Tomah

Lake Tomah is an impoundment of the South Fork Lemonweir River adjacent to the city of Tomah. The lake has a surface area of 225 acres and a mean depth of 4.4 feet. The dam that create the lake was built in 1936-37 and raises the water surface 11 feet above the original streambed elevation. The lake has a watershed to lake surface area ratio of about 75:1 and a sediment trapping efficiency of about 80 percent. The lake was estimated to accumulate 5,618 to 13,600 cubic yards of sediment per year (DNR, 1979).

Lake Tomah is managed as a multiple-use recreational lake. The city of Tomah owns and maintains two public boat launches, three public accesses and two parks on the lake. The Department occasionally stocks the lake with gamefish including northern pike and largemouth bass. The lake fishery is limited by a stunted panfish population and an abundance of forage fish. The Lake Tomah fishery has experienced partial winterkills in the past. Boating and waterskiing are allowed on the lake but a city ordinance restricts boating during spring waterfowl migrations.

Recreational use of the lake has historically been limited by excessive macrophyte growth and shallow depth in most areas. In 1985, the city of Tomah purchased a weed harvester and initiated an aquatic plant harvesting program (Wolbert and Sorge, 1989).

Numerous studies have been conducted in the past to develop and implement a lake restoration project for Lake Tomah. A feasibility study conducted in 1975 found mean total

phosphorus concentrations in the lake of 382 $\mu\text{g}/\text{l}$, which would classify the lake as highly eutrophic (DNR, 1979). Another study also concluded that because of the excessive phosphorus load and large watershed to lake area ratio, a 50% reduction in phosphorus loading would not have a significant effect on Lake Tomah (Massie and Gibson, 1983).

A study was conducted in 1984 to analyze dredging alternatives and recommend a lake restoration plan. Dredging of Lake Tomah was initiated in 1991 and is expected to be completed in 1993. A portion of the lake will be dredged to a maximum depth of 12 feet, increasing the overall lake volume by about 40 percent. The dredging project will increase the useable area of the lake and eliminate nuisance macrophyte conditions. However, the lake will likely experience algae blooms due to longer water retention times and excessive phosphorus loading from the watershed. Greater retention time will also increase sediment trapping efficiency of the lake.

Limited event monitoring of two storm sewer discharges to Lake Tomah found significant levels of suspended solids, bacteria and zinc (tables 3-7 and 3-8). Bacteria concentrations were well above the recreational use standard of 400 colonies/100 mL and the zinc concentration from the Juneau Street storm sewer was over 10 times the acute toxicity standard in NR 105 (Wis. Adm. Code). The source of high zinc levels in the storm sewer discharge will be further investigated.

The prime objective of the watershed project is to reduce sedimentation rates in Lake Tomah. Implementation of BMPs in the watershed would reduce sediment loading and extend the project life of the dredging effort. The project will require a high level of sediment control and maintenance of the sediment trap being constructed above the lake to achieve the project objective. Even though reducing the watershed nutrient load would be a positive step, it is unlikely the overall trophic condition of Lake Tomah will change substantially.

Watershed Streams

South Fork Lemonweir River

This river drains northeasterly 8.8 miles to Lake Tomah. The stream supports a marginal warmwater sport fishery including northern pike and panfish. The 1991 fish survey found pumpkinseed, bullhead, and 11 forage fish species. The most common forage species were white sucker, Johnny darter, common creek chub, and bluntnose minnow (table 3-4).

Water quality problems in the river include sedimentation, occasional flooding, turbidity and dissolved and dissolved oxygen depletion. The stream is adversely impacted by streambank erosion, ditching, wetland drainage, and organic loading from animal waste. Land use in the stream corridor is primarily pasture in the upper two-thirds and wetland in the lower portion. The wetland complex directly upstream of the lake likely provides important spawning habitat for northern pike and other species. Efforts should be made to protect these wetlands from further degradation.

Water quality and fish habitat conditions generally deteriorate moving downstream in the river. The upstream area had HBI values in the very good to excellent range, and the downstream HBI was fair (table 3-2). Stream dissolved oxygen concentrations fell below the Wisconsin water quality standard of 5.0 mg/L at the CTH M site. The stream above and below this site is highly degraded by cattle pasturing on the streambanks.

Habitat ratings were fair throughout the stream, but substrate composition generally becomes increasingly dominated by sand and silt moving downstream. Undercut streambanks, overhanging vegetation and macrophytes provide cover in the upstream portion, and overhanging vegetation and macrophytes provide minimal cover in the lower portion. The stream lacks adequate pool depths and clean gravel riffle areas necessary to support a viable warmwater sport fishery. Severe streambank erosion due to excessive cattle grazing is evident in some of the upstream areas.

Maximum stream temperatures in the river were generally well in excess of optimal conditions for a coldwater fishery (table 3-5). However, the maximum stream temperature recorded at the 21st Avenue site was 22° C., which is above the optimal range, but below the upper limiting temperature for brown trout. The substrate at this site also appeared suitable for a trout fishery.

Fecal coliform levels in the South Fork Lemonweir River above Lake Tomah were consistently above 400 colonies/100mL, the state water quality standard for recreational use (table 3-7). Animal waste from the watershed is likely the major source of bacteria in Lake Tomah.

Chub Creek

This is a 3.0 mile tributary of the South Fork Lemonweir River. The stream is managed as a warmwater forage fishery and the stream substrate is primarily silt and sand with some gravel and rubble. The stream HBI is 5.40 (good) and habitat rating is "fair".

The stream is limited by sedimentation, low dissolved levels, turbidity and sluggish flow. A low D.O. level of 1.83 was recorded during summer 1991, which is well below the water quality standard of 5.0 mg/L (table 3-4).

Creek 5-1

This tributary flows easterly 0.8 miles to the west side of Lake Tomah. The stream is managed as a warmwater forage fishery. The stream HBI is 4.26 (very good) and habitat rating is "good".

Fecal coliform levels were above the recreational use standard of 400 colonies/100ml on 50% of the sampling dates, indicating organic loading from animal waste (table 3-7). Most of the stream corridor is woodland or wetland.

Creek 30-5

Creek 30-5 flows 2.3 miles to the South Fork Lemonweir River. The stream is managed as a warmwater forage fishery and the 1991 fish survey found pumpkinseed and 6 forage species. The most common forage species were bluntnose minnow, common creek chub, Johnny darter and fantail darter.

Water resource problems include streambank erosion, sedimentation of the stream bottom and low D.O. levels due to organic loading. Most of the stream corridor is in cattle pasture and streambank erosion is evident. A D.O. level of 3.69 was recorded during summer 1991, which is below the water quality standard (table 3-4). The stream HBI is 4.84 (good) and habitat rating is "fair".

Creek 25-16

This is a 1.4 mile high gradient tributary to the South Fork Lemonweir River. The stream is managed as a warmwater forage fishery and the stream substrate is primarily rubble, silt and gravel.

Creek 23-2

This creek is a 0.6 mile high gradient tributary of Chub Creek. The stream is managed as a warmwater forage fishery and the stream substrate is primarily rubble and sand, with some gravel and silt.

Water Resources Objectives

Following are recommended water resource management objectives and loading reduction goals for the watershed project. Note that loading reduction goals are identified in relative terms (ie. high, low, etc.). Numerical values for these control levels will be identified during the watershed planning process.

Lake Tomah

The primary water resource objective of the watershed project is to reduce sediment loading to Lake Tomah. The project will attempt to control sediment loading sufficiently to maintain the post-dredged lake volume. Attainment of this objective will require a high level of sediment control in the watershed and routine maintenance of the sediment trap being constructed above Lake Tomah.

A secondary objective of the watershed project is to reduce nutrient loading to the lake. Upon completion of the dredging project the lake will likely experience significant algae blooms. The project will attempt to offset the effects of dredging by reducing phosphorus

loading sufficient to prevent the severity and frequency of algae blooms in Lake Tomah from getting worse. The project will require the highest practical level of control of nutrient loading to achieve this objective.

Watershed Streams

An additional objective of the watershed project is to reduce sediment and organic loading sufficient to improve habitat for forage and sport fish species in the watershed streams. The project will attempt to control organic loading to prevent violations of dissolved oxygen water quality standards in the watershed streams. In order to achieve these objectives, the project will require a high level of control of sediment and organic loading.

Literature Cited

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Wis. Dept. of Natural Resources. 1979. *Lake Tomah - Feasibility study results and management alternatives*. Office of Inland Lake Renewal. Madison, WI. 23pp.

Wolbert, B. and B. Sorge. 1989. *Lake Tomah restoration, protection and management plan*. Wis. Dept. of Natural Resources. Madison, Wis. 19pp.

Other Pollutant Sources

There are two other sources of pollution that need to be described in the watershed plan although they constitute only a small portion of the total pollutant load. These sources remain to be a previous landfill, as well as estimated urban sources. The old landfill of concern is located at the Tomah Fairgrounds. This landfill was used for the dumping of inks and solvents and occupied a 10 acre parcel within the fairground area. There are an estimated 60 cubic yards of solvents at this site which was closed in 1960. Since 1984, the landfill has been on the EPA National Priorities List awaiting remediation.

Urban sources of pollutants were estimated by determining the extent of various types of urban land use and assigning a pollutant load to that land use. By using this approach an estimate of the amount of pollutants can be made. Five different kinds of urban land uses were used in this analysis. Table 3-9 indicates the pollutant loading associated with the urban area of the city of Tomah.

Table 3-9. Urban Stormwater Analysis for Tomah

Land Uses	Acres	Suspended Solids	Phosphorus
Multifamily	6.5	487 lbs/ac./year	1.12 lbs/ac./year
Residential	151	216 lbs/ac./year	0.58 lbs/ac./year
Commercial	3.2	957 lbs/ac./year	1.4 lbs/ac./year
Open Space	11.22	3 lbs/ac./year	0.03 lbs/ac./year
Industrial	0	0 lbs/ac./year	0 lbs/ac./year
Total	171.92	1,663 lbs/ac./year	3.13 lbs/ac./year

The urban sources represent a small fraction of the overall load of pollutants compared to the same sources from the rural areas.

CHAPTER FOUR

Management Actions

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 nonpoint 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 1) must be controlled as a requirement of participation in the cost-sharing program. The control of Category 1 sites is essential to achieving the water quality objectives. Category 2 sites are those sites which are considered eligible, but not required. The use of Category 2 allows a greater degree of flexibility for the landowner and provides a reasonable approach to controlling nonpoint 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.

Specific Management Actions by Source and Type

Croplands and Other Rural Lands

Uplands - The water resource appraisal indicated a need for a "high" level of control of sediment. The upland sediment inventory estimated that 1115 tons enter surface waters annually in the project area. Analysis of USLE data when compared to sediment delivery indicates reducing erosion on upland fields will also reduce the sediment delivered to streams by a certain percentage. Table 4-1 shows the eligibility criteria for management required on eroding uplands. A "high" level of control is a 60% reduction of upland sediment.

Table 4-1. Upland Sediment Eligibility Criteria

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

Streambanks

Sediments from streambanks deliver 1,103 tons per year to surface waters in this project. A "high " level of control is indicated for this source. All participants in the program that sign a cost-share agreement must control 70 % of their inventoried sediment load. Reducing the mass load of sediment can be accomplished by applying a variety of BMPs that are more fully explained in chapter 5. It is estimated that pasture management practices can control 10% of the mass load and the remaining erosion will need structural applications. All landowners entering a cost-share agreement must address streambank habitat destruction outlined under the management strategy for livestock access. Table 4-2 defines the eligibility categories for streambank erosion control.

Table 4-2. Eligibility Criteria for Streambank Erosion Control

Management Category	Sediment Delivery (tons/land-owner/yr.)	Target Reduction
1	> 5 tons/yr.	70% of mass load
2	> 5 tons/yr.	Any portion of the remaining eroded banks
3	< 5 tons/yr.	none

Gullies

Sediment from gullies is a fraction of the overall sediment load to surface waters in this project. Inventoried amounts are 545 tons per year of sediment delivery. Control of gully erosion is set at 70%. All landowners participating in the project must control 70% of the mass load from gullies that have sediment delivery to surface waters. Control of the remaining 30% of gully erosion for each participating landowner is a Category 2 activity. Table 4-3 defines the gully erosion control eligibility criteria for participating landowners.

Table 4-3. Gully Erosion Control Eligibility Criteria Applied To Each Participating Landowner

Management Category	Sediment Loss	Target Reduction Level
1	> 5 tons	5 tons or 70% of the mass load
2	All remaining gullies contributing	30% of the mass load.

Animal Lot Runoff

The control of barnyard runoff is set at 75 %. Landowners that are contributing a phosphorus load listed above 57 lbs/yr. are Category 1 and are required to control barnyard runoff as a condition of the cost-share agreement. Category 2 barnyards include a smaller number of yards and allow for some phosphorus loading control beyond the Category 1 yards. The management strategy for phosphorus control requires a level that represents the "highest practical" control possible. Landowners that have annual phosphorus loads between 25 lbs and 57 lbs are Category 2. Landowners with less than 25 lbs/yr. are Category 3. Table 4-4 defines the eligibility for animal lot runoff control.

Table 4-4. Animal Lot Runoff Control Criteria

Management Category	Phosphorus Load (lbs/yr.)	Target Reduction Level	# of Yards
1	> 57	15 lbs/yr	17
2	25 - 57	15 lbs/yr.	3
3	< 25	none	25

Barnyards that have phosphorus loads above 25 lbs/year that can be reduced to 25 lbs by the use of low cost clean water diversions use a 25 lb/year target reduction level. If a clean water diversion cannot achieve a 25 lb level then additional measures will be required and the barnyard would have to reduce the phosphorus load to 15 lbs.

Manure Spreading

There are 506 critically spread acres on the inventoried farms in this watershed. Control of phosphorous loading is set at the "highest practical level" for manure management. A nutrient management plan conforming to SCS-WI technical guide 590 (Including Appendix B) will be required for all Category I barnyard runoff control systems installed in the watershed. A 590 plan on the farms where Category I barnyards exist will control spreading on 385 critical acres (76% phosphorous reduction based on 1 lb. of phosphorous runoff/acre/year). A 590 plan on the Category II barnyards would control an additional 19 critical acres (4%). The 590 plans will be used to determine the need for manure storage systems where barnyard systems are required for project participation. Table 4-5 defines the eligibility criteria for controlling manure spreading. Total phosphorous reduction is 75% (this includes barnyard and critical acres phosphorous reduction). See table 4-4 for barnyards targeted for runoff control, including critical spread acres.

→ old #; general assumption that includes all ag. land

Table 4-5. Eligibility Criteria For 590 Planning and Control of Livestock Waste Spreading

Mgmt. Cat.	Landowner Status	Target Level	# of affected Landowners
1	Cat. 1 for barnyard runoff mgmt.	Compliance with 590	14
2	> 1 critical spread acre	Compliance with 590	13
3	< 1 critical spread acre	None	2

Manure Storage

SS-WI Technical Guide 590 (including Appendix B) nutrient management plans will be used to determine manure storage eligibility. All Category 1 landowners for barnyard runoff management will be required to comply with a 590 plan. Those Category 1 landowners owning enough suitable land according to the 590 standard to winter spread 150 or more days of manure will not be eligible for cost-sharing on long-term manure storage. Those landowners not owning enough suitable land to winter spread 150 days of manure will be eligible for cost-sharing on long-term manure storage. Although these landowners may be eligible for cost-sharing on long-term storage, they may choose to meet their 590 requirements using other approved methods.

Any landowner who is not Category 1 for barnyard runoff control would need to meet the above criteria in order to determine long-term manure storage eligibility. These landowners would be Category 2 for manure storage. There are no category 1 landowners for manure storage.

Livestock Access

Eighty Six percent of eroded streambanks are pastured. The management strategy must plan for some type of livestock management that will reduce the amount of habitat loss and destruction associated with livestock access to streambanks. In addition to the mass load reductions required for streambank erosion control, each landowner that has streambanks with livestock access showing evidence of trampling or stomping must control that access as a Category I management procedure. For example, if this management strategy were applied to the South Fork of the Lemonweir River, correction of all streambanks contributing greater than 5 tons of sediment would result in approximately 4,170 feet (54%) of streambanks with cattle access would be addressed. Chapter 5 details the eligible practices for controlling

livestock access. Monroe County LCD will work with landowners that have streambank problems in the following streams:

- South Fork of the Lemonweir
- Creek 30-5
- Creek 25-16
- Chub Creek

The LCD will determine pasture stocking rates and the length of grazing periods using University of Wisconsin - Extension publication A3529 "Wisconsin Pastures For Profit". The permitted grazing period for streambanks in the Lake Tomah Watershed will be between May 15 and September 15. This policy will minimize cattle-caused streambank damage by controlling cattle numbers and grazing periods. A factor of 1.2 will be applied to the stocking rate equation from publication A3529 to reflect water quality concerns.

Easements

Stewardship easements have not been identified in this project. NR 120 easements are available for certain streams. The individual streams eligible for NR 120 easements must be indicated in the plan. The following streams and stream segments are eligible for NR 120 type easements: South Fork of the Lemonweir extending from the headwaters to 8.7 miles downstream at the point of entry into Lake Tomah.

NR 120 easements can be considered when certain best management practices are planned. Shoreline buffers, critical area stabilization, and wetland restoration are practices that can be used along with NR 120 easements. 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. Easements cannot be purchased with program funds to facilitate or create limited grazing, rotational grazing, streambank fencing or structural measures like rock riprap. Riparian areas that have high sediment delivery, but low soil loss rates are examples of situations that may use easements.

Wetland Restoration

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 any areas identified by the County LCD which were previous wetlands. The purchase of an easement for these sites must be approved by the nonpoint source and land management section of the DNR Bureau of Water Resources. Wetland restoration is an eligible practice when the following land use conditions are present:

1. Cultivated organic soils with tile or open channel drainage systems discharging to a permanent flowing stream.

2. Pastured wetlands riparian to permanent flowing streams.
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-effectiveness analysis and an evaluation of the water quality problems associated with the water resource.

Ordinances

The assessment for the need to control construction site erosion has indicated only slight evidence of construction activity at this time. Currently the city of Tomah is considering an ordinance to control construction site erosion. Recent proposed legislation could require an ordinance within the implementation period of this project. The urban sources of suspended solids have been estimated.

Multi-family residential	1.6 tons
Med. density residential	16.0 tons
Commercial	1.5 tons
Open space	< 1.0 ton
Industrial	0.0
Total	< 20.0 tons

Although construction is minimal at this time the need for a construction site erosion control ordinance will occur if construction should increase significantly. 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 Lake Tomah the potential exists for sedimentation by uncontrolled runoff from construction especially in the city of Tomah. An animal waste ordinance is currently being developed by Monroe County for County wide implementation. The animal waste ordinance is required to be developed and implemented in the Lake Tomah project.

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 Technical Guide 590 (see chapter 5). In addition nutrient management will be consistent with the Best Management Practices Handbook produced by UWEX and DATCP (Technical 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). 26% of the wells tested had levels of nitrate that exceed

the public water supply standard of 10 mg/l. This frequency of nitrate exceedances is above the state average and confirms the sensitivity of groundwaters in this project area.

Landowners with wells tested that show nitrate levels above 10 mg/l are Category 2 for nutrient management.

Landowners with well tests that have reported nitrate levels above 10 mg/l will be eligible for nutrient management planning assistance according to the 590 technical guide or revisions of the guide. Technical assistance will be provided by the Monroe County Land Conservation Department. Nutrient management practices available to eligible landowners include those listed in NR 120.14(9). Manure spreading planning will be part of the 590 plan and is considered a non-cost shared practice. Cost sharing for nutrient management is set at 50% (routine soil tests, residual nitrogen tests and manure analysis).

Table 4-6. Eligibility Criteria For Groundwater Protection

Management Category	Nitrate Level	# of affected Landowners
2	> 10mg/l	9
3	< 10 mg/l	25

Pesticide Management

Both pesticide management and nutrient management should consider the results of the well testing reports. The well test reports (table 2-1) indicate 23% of wells sampled for Atrazine had levels above the Preventive Action Limit. 47% of all wells tested were found to have detectable levels of Atrazine. 70% of all wells tested have some level of Atrazine. At a minimum the results of the well testing program indicate a need to help well owners maintain groundwater quality and reduce contamination of groundwater supplies. 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. The groundwater resource objective for this project is to prevent groundwater from exceeding the standards currently established for public health and safety and to reduce contamination levels to meet the standards where they are exceeded. Landowners with Atrazine levels above the preventive action limit are Category 2 for pesticide management activities. The cost-shareable and noncost-shareable practices for landowners with Atrazine levels above 0.30 ppb are listed in chapter 5.

Pesticide management will consist of those cost shared practices listed in NR 120.14(10). Integrated pest management scouting is available to eligible landowners. The technical

assistance required for pest scouting is available through the Monroe County Land Conservation District and may be provided by contract with private consultants. Funding of contracted consultants will require Monroe County to request funds through the annual grant application process. Pest scouting must include an assessment of the landowners use of atrazine and the prospect for reducing atrazine inputs on the farm. A cost share rate of 50% will be paid on integrated pest management scouting.

Table 4-7. Eligibility Criteria For Groundwater Protection

Management Category	Atrazine Level	# of affected landowners
2	> 0.30 ppb	8
3	< 0.30 ppb	10

Urban Nonpoint Sources

The urban land use analysis found less than 20 tons of sediment being delivered to the Lake Tomah impoundment from urban land uses. Another source of sediment inventoried along the lakeshore found 21 tons of delivery associated with shoreline erosion. Phosphorus loads from urban land uses were estimated at 99 lbs/yr. A program of Information and Education along with some basic housekeeping type activities can be used to reduce phosphorus loads to the lake. Control of sediment from the urban area can also be reduced by increasing the level of street cleaning in the drainage area. Leaf collection programs can help reduce nutrient loading. Reducing applications of road de-icing materials is another way to reduce phosphorus and sediment. Cost-sharing for these activities is available and must be approved by the DNR nonpoint source and land management section. Under the current management strategy, control of streambank erosion is eligible and control of lakeshore erosion is also eligible. The eligibility criteria for lakeshore erosion control is similar to that for streambank erosion control and must comply with the same standards and specifications used in rural portion of this project.

CHAPTER FIVE

Local Government Implementation Program

Introduction

This chapter identifies the means for implementing the management actions for nonpoint source control described in chapter 4, and describes the county's nonpoint source implementation strategy for rural areas. Included in the implementation program for rural areas is an Information and Education Strategy. The success of this priority watershed project depends on the aggressive implementation of these nonpoint source control strategies.

Specifically this chapter identifies:

- Agencies and units of government responsible for carrying out the identified tasks,
- Best management practices (BMPs) necessary to control pollutants on the critical sites identified in chapter 4,
- Cost-share budget,
- Cost containment policies,
- Cost-share agreement reimbursement procedures including administrative procedures for carrying out the project,
- Staffing needs including total hours per year and number of staff to be hired,
- Schedules for implementing the project,
- Involvement of other programs,
- Information and Education activities that will be carried out in the project area, and
- The project budget including the expense for cost-sharing, staffing for technical assistance, administration, and the Information and Education program.

Project Participants: Roles and Responsibilities

Landowners and Land Operators

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

Monroe County is the primary unit of government responsible for implementing this plan in rural areas. The city of Tomah and the Tomah Lake Protection and Rehabilitation District will be involved in urban areas.

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

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

1. Identify a person in writing to represent the county during implementation of the project.
2. Contact all owners or operators of lands identified as significant nonpoint sources at least once during the cost sharing sign-up period. The county's 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 terms and conditions of cost-share agreements as defined in s. NR 120.13, Wisconsin Administrative Code.
5. For lands the county owns and operates, to enter into cost-share agreements with DNR to correct identified nonpoint sources and fulfill their obligations as a cost-share recipient.
6. Design best management practices and verify proper practice installation.
7. Reimburse cost share recipients for the eligible costs of installing BMPs at the rates consistent with administrative rules and established in this plan.

8. Prepare and submit annual work plans for activities necessary to implement the project. The Monroe 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 and 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 for 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 and coordinate I&E activities assigned to other agencies.

Department of Natural Resources

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

Project Administration

Project administration includes working with the counties to ensure that work commitments required during the 8-year project implementation phase are met. The DNR will participate in the annual work planning process with the county.

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

Financial Support

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

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

Project Evaluation

The DNR has responsibility for priority watershed project monitoring and evaluation activities. These efforts determine if changes in water quality occur as best management

practices and other pollution controls are installed or implemented. The water quality evaluation and monitoring strategy for the Lake Tomah Watershed is included in chapter 8. The DNR documents the results of monitoring and evaluation activities in interim and final priority watershed project reports.

Technical Assistance

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

Other Responsibilities

These include:

- The Western District Nonpoint Source Coordinator to arrange for DNR staff to assist county staff with site reviews to determine the impacts of nonpoint sources on wetlands and/or groundwater quality.
- Assisting county staff to integrate wildlife and fish management concerns into selection and design of BMPs.

Department of Agriculture, Trade and Consumer Protection

The role of the DATCP is identified in s. 144.25, stats., ch 92 stats., and NR 120. In summary, the DATCP will:

- Manage a training program for the staff involved with project implementation.
- Cooperate with the University of Wisconsin - Extension to act as a clearinghouse for information related to agricultural best management practices, sustainable agriculture and nutrient and pest management.
- Assist the counties in carrying out the information and education activities described in this plan.
- Assist county staff to identify watershed participants subject to federal or state conservation compliance programs.
- Assist counties, if requested, to develop a manure storage ordinance.
- Assist county staff to complete annual workload analyses and grant applications for work conducted under the project.
- Participate in the annual project review meetings.

- If the need arises, assist in developing technical standards for agricultural BMPs, and provide technical assistance to county staff concerning application of these practices.
- Assist county staff to evaluate the site specific practicality of implementing rural BMPs.

Other Agencies

The Lake Tomah Priority Lake Project will receive assistance from the agencies listed below.

Soil Conservation Service (SCS)

This agency works through the local Land Conservation Department (LCD) to provide technical assistance for planning and installing conservation practices. Local SCS personnel will work with the county staff to provide technical assistance when requested by the LCC and if SCS staff time is available. Personnel for the Area SCS office will provide staff training and engineering assistance for best management practices. Efforts will be made by the DATCP to assist SCS to coordinate the Lake Tomah Priority Lake Project with the conservation compliance and other conservation provisions of the 1985 and subsequent Federal Farm Bills.

University of Wisconsin Extension (UWEX)

County, Area, and State Extension agents will provide support in developing and conducting a public information and education program aimed at increasing voluntary participation in the project. This will include assistance to carry out the Information and Education activities identified in this plan.

Agricultural Stabilization and Conservation Service (ASCS)

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

Agricultural Best Management Practices (BMPs)

BMPs Eligible For Cost-Sharing And Their Rates

Best Management Practices eligible for cost-sharing are those included in NR 120 which are identified by this watershed plan to be the most effective controls of the nonpoint sources of pollution. The practices eligible for cost-sharing under the Lake Tomah Priority Lake Project are listed in table 5-1. The cost-share rates for each BMP are also found in table 5-1.

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 DNR 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.

Table 5-1. State Cost-share % Rates for Best Management Practices*

Best management Practices	State Cost-Share Rate
Contour and field stripcropping	50% * ¹
Reduced tillage	50% *
Shoreline and streambank stabilization	70% *
Livestock exclusion from woodlots	50% *
Field diversions and terraces	70%
Grassed waterways	70%
Critical Area Stabilization	70% ²
Grade Stabilization Structures	70%
Agricultural Sediment Basins	70%
Shoreline Buffers	70% ²
Wetland Restoration	70% ²
Nutrient management	50%
Pesticide management	50% ³
Barnyard Runoff Management	70%
Manure Storage Facilities	70% ⁴
Sinkhole and Crevice Treatment	70%

(1) Wildlife habitat recreation has a state cost share rate of 70%.

(2) 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.

(3) Spill control basins have a state cost share rate of 70%.

(4) Maximum cost share amount is \$20,000 including no more than \$5,000 for manure transfer equipment.

* See table 5-2 for BMPs cost shared at a flat rate. Table 5-2 lists maximum state cost share flat rates. The priority lake project should use either a percentage cost share rate or a flat cost share rate for each practice.

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

BEST MANAGEMENT PRACTICE	FLAT RATE
Contour Strip Cropping	\$ 12.00/ac *
Reduced tillage	\$ 15.00/ac ¹
	crop rotations using hay
Reduced tillage	\$ 45.00/ac ²
	more than three years of continuous row crops
Fencing	Multi strand barbed wire\$ 12.60/rod
	High tensile electric\$ 14.00/rod
	Single strand electric\$ 8.40/rod
Nutrient and Pest Management	\$ 25.00/ac ³

* Wildlife habitat restoration components of this practice are cost-shared at 70%.

¹ Reduced tillage systems for short crop rotations, and establishment of forages and small grains (includes no-till). One year only.

² Reduced tillage systems for continuous row cropping over three years (excluding no-till).

³ Nutrient and pest management practices will be cost-shared on a flat rate per practice. \$25.00/ac is the total cost-share rate over three years.

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

Contour and Field Strip-Cropping

Growing crops in a systematic arrangement, usually on the contour, in alternate strips of close grown crops, such as grasses and legumes, and tilled row crops.

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 two 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.

Critical Area Stabilization

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

Grassed Waterways

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

Grade Stabilization Structure

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

Livestock Exclusion from Woodlots

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

Shoreline and Streambank Stabilization

The stabilization and protection of stream and lake banks against erosion and the protection of fish habitat and water quality by protecting shorelines and streambanks from high stream flows and livestock traffic. This practice includes streambank fencing and rip rap it may also include pasture pumps for watering livestock excluded from water bodies.

Terraces

A system of ridges and channels with suitable spacing and constructed on the contour with a suitable grade to prevent erosion in the channel.

Field Diversions

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

Barnyard Runoff Management

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

Manure Storage Facility

A structure for the storage of manure for a period of time that is needed to reduce the impact of manure as a nonpoint source of pollution. Livestock operations where this practice applies are those where manure is winter spread on fields that have a high potential for runoff to lakes, streams, and groundwater. Facilities need to store and spread manure according to a nutrient management plan.

Agricultural Sediment Basins

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

Shoreline Buffers

A permanently vegetated area immediately adjacent to lakes, streams, channels, and wetlands designed and constructed to manage critical nonpoint sources or to filter pollutants from nonpoint sources.

Animal Lot Relocation

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

Wetland Restoration

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

Sinkhole and Crevice Treatment

The protection of groundwater by diverting surface runoff away from critical sites.

Nutrient Management

The management and crediting of nutrients from the application of manure and commercial fertilizers, and crediting of 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.

Pesticide Management/Spill Control Basin

Management of the handling, disposal, and application of pesticides including the rate, method, and timing of application to minimize the amount of pesticide entering surface and groundwater.

Shoreland/Upland 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 Standard 510, 512 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:

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.

Limited Term Grazing

A grazing plan developed using SCS 510 as a general guideline, and generally used in conjunction with other streambank and woodlot protection BMPs, to ensure the protection of surface waters from livestock. Controls animal density (stocking rate) to maintain vegetative cover and limits grazing to a period from late spring to early fall.

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.

Easements

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

Under some circumstances, practices may be recommended that are not included on the BMP list. Administrative Rule NR 120.15 provides for alternative practices where necessary to meet the water resource objectives identified in the watershed plan. The Department shall identify in the nonpoint source grant agreement the design criteria and standards and specifications where appropriate, cost share conditions, and cost share rates for each alternative best management practice.

BMPs Not Cost-Shared

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

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

Activities and Sources of Pollution Not Eligible for Cost Share Assistance

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

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

- Activities and structures intended primarily for flood control,
- Practices required to control sources which were adequately controlled at the time the cost-share agreement was signed,
- Other practices or activities determined by the DNR not to meet the objectives of the program.

Cost-Share Budget

Costs of Installing BMPs

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

The capital cost of installing the Best Management Practices in Monroe County is approximately \$1,186,330, assuming 100% participation.

- State funds necessary to cost-share this level of control would be about \$856,895, for Monroe County.
- The local share provided by landowners and other cost-share recipients would be about \$329,435.

At a 75% level of participation, the state funds needed to cover capital installation would be about \$619,046 for Monroe County.

Easement Costs

Chapter 4 identifies where nonpoint source program funds can be used to purchase easements. The estimated cost for purchasing easements on eligible lands in Monroe County is shown in table 5-3. At 100% participation, the estimated purchase price of easements on eligible lands would be \$10,000 and \$7,500 for 75% participation. The easement costs would be paid for entirely by the state.

Table 5-3. Cost-Share Budget Needs for Rural Management Practices in Monroe County

Management Needs	Number	Cost/Unit	Total Cost ¹	100% Participation		75% Participation	
				State Share	Local Share	State Share	Local Share
Best Management Practices							
Upland NPS Control							
Change in Crop Rotation	4,000 ac	NA ²	0	0	0	0	0
Contour Strip Cropping	2,150 ac	\$12.00	25,800	25,800	³	19,350	³
Reduced Tillage ⁴	1,800 ac	\$45.00	81,000	81,000	0	60,750	0
Reduced Tillage ⁵	400 ac	\$15.00	6,000	6,000	0	4,500	0
Critical Area Stabilization	20 ac	\$800.00	16,000	11,200	4,800	8,400	3,600
Grass Waterways	20 ac	\$2,800.00	56,000	39,200	16,800	29,400	12,600
Field Diversions & Terraces	2,000 ft	\$3.00	6,000	4,200	1,800	3,150	1,350
Grade Stabilization	50 ea	\$3,000.00	150,000	105,000	45,000	78,750	33,750
Agricultural Sediment Basin	2 ea	\$9,000.00	18,000	12,600	5,400	9,450	4,050
Nutrient and Pest Mgmt.	2,000 ac	\$25.00	50,000	25,000	25,000	18,750	18,750
Spill Control Basin	3 ea	\$15,000.00	45,000	31,500	13,500		
Shoreline Buffers ⁶	3 ea	\$150.00	450	315	135	236	101
Wetland Restoration	3 ea	\$3,000.00	9,000	6,300	2,700	4,725	2,025
Livestock Exclusion to Woodlots	320 rods	\$14.00	4,480	4,480	³	3,260	³
Sinkhole and Crevice Treat	10 ea	\$1,000.00	10,000	7,000	3,000	5,250	2,250
Animal Waste Management							
Barnyard Runoff Control							
Complete System	10 ea	\$20,000.00	200,000	140,000	60,000	105,000	45,000
Roof Gutters	16 ea	\$1,000.00	16,000	11,200	4,800	8,400	3,600
Clean Water Diversion	12 ea	\$5,000.00	60,000	42,000	18,000	31,500	13,500

Table 5-3. Cost-Share Budget Needs for Rural Management Practices in Monroe County (con't)

Management Needs	Number	Cost/Unit	Total Cost ¹	100% Participation		75% Participation	
				State Share	Local Share	State Share	Local Share
Best Management Practices							
Manure Storage Facility ⁷	7 ea	\$30,000.00	210,000	140,000	70,000	105,000	52,500
Streambank Erosion Control							
Shape and Seeding	1,000 ft	\$4.00	4,000	2,800	1,200	2,100	900
Fencing Riparian Areas	1,600 rods	\$11.00	17,600	17,600	³	13,200	³
Riprap	6,800 feet	\$20.00	136,000	95,200	40,800	71,400	30,600
Livestock/Machinery							
Crossing/Watering Ramp	20 ea	\$2,500.00	50,000	35,000	15,000	26,250	11,250
Remote Watering Systems	10 ea	\$500.00	5,000	3,500	1,500	2,625	1,125
Subtotal:			\$1,176,330	\$846,895	\$329,435	\$611,546	\$236,951
Easements	10 ea	\$1,000.00	10,000	10,000	0	7,500	0
TOTALS			\$1,186,330	\$856,895	\$329,435	\$619,046	\$236,951

¹ Total cost to control identified critical pollution sources
² NA means that cost share funds are not available for this practice
³ Local share consists of labor and any additional equipment costs, also see flat rates
⁴ Reduced tillage on continuous row crops, greater than 3 years
⁵ Reduced tillage, including no-till, on rotations including hay
⁶ Shoreline Buffer practice needs will be determined during implementation
⁷ Maximum cost-share is \$20,000 of which a maximum of \$5000 can be for waste transfer

Source: DNR; DATCP; and the Monroe County Land Conservation Department

Cost Containment

Cost Containment Procedures

Chapter NR 120 requires that cost containment procedures be identified in this plan. The cost containment procedures to be used by Monroe County are described below.

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 to the grantee may be increased with the approval of the Monroe County Land Conservation committee. Appropriate documentation regarding the need for changes will be submitted to the DNR.

Bids

Competitive bids will be required in Monroe County for all structural BMPs with estimated total costs, as determined by the project technician, exceeding \$5,000. The bidding process requires the cost-share recipient to receive a minimum of two bids from qualified contractors in lump sum bid. The cost-share recipient must provide copies of the bids to the county prior to initiating construction. In cases where the cost-share recipient provides proof that bids were requested from a minimum of three qualified contractors but only one bid was received, the county will determine if the bid constitutes an appropriate cost for the project. If no bids are received or if the lone bid is not deemed appropriate, Monroe County will limit cost-sharing based on average costs.

Average Costs

Average costs will be used in Monroe County for all structural BMPs with an estimated cost equal to or less than \$5,000 and for all non-structural BMPs not using a flat rate, unless the cost-share recipient decides, and the county agrees, to bid the installation of the BMPs.

The average cost list will be reviewed periodically and appropriate changes made. If changes are made, the list will be forwarded to the DNR and the DATCP for final approval before the changes are used for calculating cost-share agreements and payments.

Flat Rates

BMPs using flat rates are shown in Table 5-2. The rates shown are the states share of the practice installation costs.

There will be a maximum for rock riprap. This practice will be cost shared at the 70% level up to a maximum dollar per foot.

Cost-Share Agreement Reimbursement Procedures

Nonpoint Source Grant Agreement and Administration

General Information

The Nonpoint Source Grant Agreement is the means for transmitting funds from the DNR (through the Nonpoint Source Program) to Monroe County for use in funding the state's share of cost-share agreements. Cost-share agreements are the means to transmit funds from the county to the landowners. A portion of the Nonpoint Source Grant is forwarded to Monroe County to allow the county to set up an "up front" account. Funds from this account are used by the county to pay landowners after practices are installed under the project. As this account is drawn down, the county will request reimbursements from the DNR to replenish the account. The counties will submit reimbursement requests on a quarterly basis. 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 must never exceed the total funds in the NPS Grant Agreement.

Fiscal Management Procedures, Reporting Requirements

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

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

Activity	Project Years When Work Will Be Done	75% Landowner Participation (Staff Hours)	Monroe County 50% Landowner Participation (Staff Hours)
Project & Financial Mgmt.	1-8	2,800	2,800
Information & Education Program	1-8	582	582
Pre-Contact Office Inventory; Landowner Contacts, & Progress Tracking	1-3	1,275	850
Conservation Planning & Cost Share Agreement Development	1-3	750	500
Plan Revisions and Monitoring	1-8	225	150
Practice Design & Installation	1-8		
Upland Sediment Control		7,875	5,250
Animal Waste Management		1,800	1,200
Streambank Erosion Control		3,000	2,000
Training	1-8	1,200	1,200
Total LCD Workload:		19,507	14,532
Estimated Staff Required for Years 1-3: hours		1.5 per yr	1.1 per yr
		3,140 per yr	2,318 per yr
Estimated Staff Required for Years 4-8: hours		1.2 per yr	0.9 per yr
		2,526 per yr	1,895 per yr

Source: DNR; WI Department of Agriculture, Trade and Consumer Trade and Consumer Protection; and the Monroe County Land Conservation Department

Cost-Share Agreement and Administration

Purpose and Responsibilities

Consistent with s. 144.25, Stats. and NR 120, Wis Adm. Code, cost share funding is available to landowners for a percent of 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 must be maintained for a minimum of ten years from the date of installing the final practice included in the cost-share agreement.

The cost-share agreement is a legal contract between the landowner and the county. The agreement includes the name and other information about the landowner and grant recipient, conditions of the agreement, the practices involved and their location, the quantities and units of measurement involved, the estimated total cost, the cost-share rate and amount, the timetable for installation, and number of years the practice must be maintained. The agreements also identify and provide information on practices not cost-shared through the nonpoint program but that are essential to controlling pollution sources (such as crop rotations). Once it is signed by both parties, they are legally bound to carry out the provisions in it.

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 office 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.

Monroe County is responsible for enforcing compliance of cost-share agreements to which they are party. Where the 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. Monroe County will check for compliance with practice maintenance provisions once every

three years after the last practice has been installed. The county must check maintenance at its own expense after the Nonpoint Source Agreement has lapsed, unless state funding for this activity becomes available during the implementation or monitoring phase of the project.

Landowner Contact Strategy

The following procedure will be used to make landowner contacts.

- a. During the first three months of the implementation period, all landowners or operators with eligible nonpoint sources will receive from the county, a mailing explaining the project and how they can become involved.
- b. After the initial landowner mailings, county staff will make personal contacts with all landowners that have been identified as having critical nonpoint sources of pollution (Management Category 1). These contacts will occur during the cost share period.
- c. The county will continue to make contacts with eligible (Management Categories 1 and 2) landowners and operators until they have made a definite decision regarding participation in the program.
- d. The county will contact all eligible landowners (as defined in C. above) not signing cost-share agreements by personal letter, six months prior to the end of the cost-share sign up period.

Procedure for Developing a Cost Share-Agreement

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

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

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

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

- a. Landowner and county staff meet to discuss the watershed project, nonpoint source control practice needs, and coordination with conservation compliance provisions is applicable.
- b. Landowner agrees to participate with the watershed project.
- c. A farm conservation plan is prepared by the county.
- d. The landowner agrees with the plan, a Cost-Share Agreement is prepared and both documents are signed by the landowner and the county. A copy of the Cost-Share Agreement (CSA) is sent to the DNR Western District Nonpoint Source Coordinator, and a copy given to the landowner. The CSA will be recorded by the county with the County Register of Deeds.
- e. Practices are designed by the county or designee, and a copy of the design is provided to the landowner.
- f. Landowner obtains 2 or more bids or other information required in the cost containment policy.
- g. Amendments to the CSA are made if necessary.
- h. The county staff oversee practice installation
- i. The county verifies the installation.
- j. The landowner submits bills and proof of payment (canceled checks or receipts marked paid) to the county.
- k. Land Conservation Committee or the designated representative and if required, county boards, approve cost-share payments to landowners.
- l. Checks are issued by the county to the respective landowners and project ledgers are updated.
- m. The county records the check amount, number, and date.
- n. DNR reimburses the county for expended cost-share funds.

Identifying Wildlife and Fishery Needs

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

The DNR staff will assist county staff by:

- a. Identifying streambank protection practices that benefit fish and wildlife.
- b. Identifying wildlife habitat components that could be incorporated into vegetative filter strips along streams or in uplands.

- c. Recommending wildlife habitat components and reviewing placement of agricultural sediment basins to assure that negative impacts on fish and aquatic life do not occur.
- d. Providing technical assistance when the installation of BMPs will require the removal of obstructions or other wildlife habitat by proposing measures to minimize impact on wildlife habitat.
- e. Helping to resolve questions concerning effects of agricultural nonpoint source BMPs on wetlands.

Submittal to the DNR

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

- a. where cost-share funds are to be used for practices on land owned or controlled by the county.
- b. for agreements or amendments where the cost-share amount for all practices for a landowner exceeds \$50,000 in state funds.
- c. for grade stabilization structures and agricultural sediment basins with embankment heights between 15 and 25 feet and impoundment capacities of 15 to 50 acre feet.
- d. for 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 to be subjected to this approval procedure.
- e. for animal lot relocation.
- f. for roofs over barnyards or manure storage facilities.

Local Assistance Grant Agreement Administration

General Information

The Local Assistance Grant Agreement (LAGA) is a grant from the DNR to Monroe County for support of staff and support costs to carry out this watershed plan. Consistent with NR120, Monroe County will use funds from the LAGA for additional staff to implement the project and conduct information and educational activities. Other items such as travel, training, and certain office supplies are also supported by the LAGA. Further clarification of eligible costs supported by this grant is given in NR 120.14 (4) and (6).

Grant Agreement Application Procedures

An annual review of the Local Assistance Grant Agreement is conducted through the development of an annual workload analysis by the county. This analysis estimates the work needed to be accomplished each year. The workload is provided to the DATCP and the DNR for review and clarification. Along with the workload analysis, a grant application

form is sent. Funds needed to complete the agreed upon annual workload are amended to the local assistance grant agreement.

Fiscal Management Procedures, Reporting Requirements

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

NR 120 requires quarterly reports to the DATCP from each county in accordance with s. Ag. 166.40 (4) accounting for staff time, expenditures, and accomplishments regarding activities funded through the watershed project. Reimbursement requests may be included with the submittal of the quarterly project reports.

Staffing Needs

Budget and Staffing Needs

This section estimates the funding and staffing required to provide technical assistance for the rural portion of this project. These estimates are based on needs identified for Monroe County.

Staff Needs

Table 5-4 lists the total estimated staff needed to implement the Lake Tomah Priority Lake Project. Figures are provided for both the 50% and 75% levels of participation. A total of about 19,507 staff hours are needed to implement this plan at 75% landowner participation. This includes 582 staff hours to carry out the information and education program.

The Land Conservation Department in Monroe County will employ 1 project staff during the first year of the project. The workload estimate in table 5-4 is not feasible at the present time. Monroe County will assess the number and type of staff required for the remainder of the project based on the experience gained during the first year of implementation.

Staffing Costs

The estimated cost for staff at this landowner participation rate (see table 5-5) is approximately \$360,518 in Monroe County. All of these costs, with the exception of some direct cost items, would be paid for by the state.

Schedules

Grant Disbursement and Project Management Schedules

Implementation may begin upon approval of this watershed plan by the Monroe County Board; DATCP; and the DNR. The priority lake 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 agreements must be installed within a five year period.

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 the DNR and the DATCP.

The disbursement of the grants (Local Assistance and Nonpoint Source) to Monroe County will be based on an annual workload analysis and grant application process. The estimated grant disbursement schedule based on 75% participation by eligible landowners can be found in table 5-6.

Total Project Cost

The total state funding required to meet the rural nonpoint source pollution control needs at 75% level of landowner participation is presented in table 5-5. This figure includes the capital cost of practices, staff support, and easement costs presented above. The estimated cost to the state would be \$1,144,194.

Table 5-5. Total Project Costs to State at 75% Landowner Participation Rate

Item	Costs (State Share)	
Cost Share Funds: Practices	\$611,546	table 5-3 75% participation, state share
Cost Share Funds: Easements	\$7,500	table 5-3 75% participation, state share
Local Assistance Staff Support*	\$355,302	table 5-4 total LCD workload x \$16.35
Information/Education Direct	\$90,846	from I & E chapter does not include staff
Other Direct (travel, supplies, etc.)	\$55,000	from county's calculations
Engineering Assistance	\$24,000	from county's calculations
TOTAL	\$1,144,194	

* Salary + Indirect = \$34,000/year

Source: DNR; DATCP; and the Monroe County Land Conservation Department

Table 5-6. Grant Disbursement Schedule at 75% Landowner Participation

Item	Project Year				Total
	1	2	3	4 - 8	
Cost-Share Funds: Practices	\$122,309	\$244,618	\$244,618	\$0	\$611,546
Cost-Share Funds: Easements	\$1,500	\$3,000	\$3,000	\$0	\$7,500
Local Assistance Staff Support	\$51,339	\$51,339	\$51,339	\$206,501	\$360,518
Information/Education: Direct	\$72,500	\$5,000	\$4,550	\$8,796	\$90,846
Other Direct: (travel, supplies, etc.)	\$8,800	\$8,800	\$8,800	\$28,600	\$55,000
Engineering Assistance	\$3,840	\$3,840	\$3,840	\$12,480	\$24,000
TOTAL	\$260,288	\$316,597	\$316,147	\$256,377	\$1,149,409

Involvement of Other Programs

Coordination With State and Federal Conservation Compliance Programs

The Lake Tomah Priority Lake Project will be coordinated with the conservation compliance features of the Wisconsin Farmland Preservation Program (FPP) administered by the DATCP, and the Federal Food Security Act (FSA) administered by the Soil Conservation Service, USDA. The DATCP will assist Monroe county and the SCS office to identify landowners within the watershed that are subject to the compliance provisions of FPP and FSA. Conservation Farm Plans were completed for all landowners in FSA and FPP on December 31, 1989.

There will be a need to implement the conservation plans, and in the future, amend these plans during the implementation phase of the priority lake project. Priority lake project supported staff will revise the conservation plans developed for FPP, and will inform SCS of changes in FSA resulting from management decisions and the installation of BMPs for nonpoint source pollution abatement. This comprehensive approach to farm planning will facilitate consideration of the various goals and objectives for all the programs which the landowner participates.

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

Information and Education Program

Program Objective

The objective of the Information and Education (I&E) Program is clean water, specifically, reaching the pollutant reduction targets as outlined in chapter 4. The I&E program will work together with the project's technical assistance and cost-sharing programs to assist watershed residents with the adoption of Best Management Practices that will protect and improve water quality and wildlife habitat.

Core Program Messages

The following core messages will be emphasized:

- Clean water and healthy wildlife habitats are important to our well being and to the well being of our economy and communities.

- How we use and manage our land has a direct impact on the quality of our lakes, streams, and groundwater.
- Water quality and wildlife habitat can be protected and improved through the adoption of Best Management Practices.
- In addition to protecting and improving water quality and wildlife habitat, many Best Management Practices also provide direct economic benefits to those who adopt them.
- The Lake Tomah Watershed Project is a voluntary community based effort that makes local and state resources available to watershed residents for water quality and wildlife habitat improvement projects.
- The long-term success of the rehabilitation project at Lake Tomah is heavily dependent on controlling sediment delivered to the lake and to the streams in the watershed.

Target Audiences

Target audiences for the Information and Education Program can be divided into two groups, those who need to act for change to occur, and those who can support change:

Those who will need to act:

Farm owners and/or operators
 Rural watershed homeowners
 Urban watershed homeowners
 Lakeshore property landowners
 Builders and contractors
 County and town government
 Elected officials
 Lake Tomah Rehabilitation District

Those who can support change:

Ag business (Co-ops)
 Banks and loan institutions
 Farm organizations
 Youth (FFA, 4-H, schools)
 Outdoor sports organizations
 Conservation/environmental organizations
 Civic service clubs/organizations
 Print, radio and TV media

Mediums for Message Delivery

The following have been identified as being effective mediums to "get the message out":

Print media

Agri-View
 Country Today
 Monroe Co. Democrat
 Sparta Herald
 Tomah Journal
 Tomah Monitor-Herald

Radio

WAXX - Eau Claire
 WBOG - Tomah
 WCOW - Sparta
 WKTY - La Crosse
 WRJC - Mauston
 WTMB - Tomah
 WVCX - Tomah
 WZFR - Tomah

Television

Ch. 8 - La Crosse
 Ch. 13 - Eau Claire
 Ch. 19 - La Crosse
 Tomah cable TV
 Ch. 25 - La Crosse
 Ch. 31 - La Crosse

Newsletters

ASCS
Monroe Co. Forester
Oakdale Electric
Cooperative
UWEX - Family Living
UWEX - 4-H/Youth
UWEX - Agriculture

Agri-business

Heilman Elevator -
Norwalk
Hillsboro Coop Exchange
-
Wilton and Kendall
Branches
Sorenson Inc.
Sparta Coop Exchange
Tomah Coop Services

Government Agencies

ASCS - USDA
Lake Tomah Rehab.
District
Monroe Co. LCD
DATCP
DNR
SCS - USDA
UWEX
City of Tomah

Public schools

Tomah School District

Private schools

St. Mary's (Catholic)
St. Paul's (Lutheran)

Vo-Ag Programs/FFA

Tomah High School

Youth

Boy Scouts
Girl Scouts
4-H/Youth Programs

Service organizations

Jaycees
Kiwanis
Lions
Rotary

**Outdoor/environmental
org.**

Tomah Bass Masters
Ducks Unlimited
Tomah Sportsman Club

Meeting locales

F&M Bank
Legion Hall
City Hall

Sediment Trap

The Tomah Lake Protection & Rehabilitation District proposes to construct a sediment trap at the inlet of Lake Tomah. The purpose of the trap is to collect sediment transported by the South Fork of the Lemonweir River before it reaches Lake Tomah. River flows will be diverted from the existing river channel to a new channel which will lead to a sedimentation pond. This pond will be approximately 800 feet long, 60 feet wide, and 10 feet deep. It will reduce river velocity and allow sediment to settle in the pond upstream from the lake. The new river channel and the sedimentation pond will be protected with rip rap. The estimated cost of this proposal is \$95,000. The proposal will be installed as a demonstration project.

There is a direct link between controlling sources of sediment delivery in the watershed and the long-term success of the rehabilitation project at Lake Tomah. The sediment trap is not intended to be a substitute for sediment control in the watershed. The sediment trap will be installed to protect Lake Tomah from sediment sources not controlled under the management strategies in chapter 4 and from sediment already present in the bed of watershed streams.

The Tomah Lake Protection & Rehabilitation District will be responsible for operation and maintenance of the sediment trap. The District will be required to develop a monitoring program as part of the demonstration project. The frequency of dredging will need to be identified. Disposal sites for the dredged sediments must be obtained. The quantity of dredged sediment should be estimated, and periodic sampling of the sediment quality should also be performed. An initial monitoring program for the sediment trap is outlined in chapter 8.

Selected Information and Education Activities

The following I&E activities were selected for each of the project's management actions:

Upland cropland erosion control

- Crop residue management: Newsletter, media, demos, individual contacts
- Crop rotation: Newsletter, media, individual contacts
- Strip cropping: Newsletter, media, individual contacts

Streambank erosion control

- Rip rap: Newsletter, media, demos, video, example book, publications
- Livestock access management: Newsletter, media, demos, individual contacts, video, example book

Gully erosion control

Newsletter, media, demos, individual contacts, video, example book

Animal lot runoff control

Newsletter, media, demos, individual contacts, video, example book, publications

Manure spreading management

Newsletter, media, demos, individual contacts, publications, calibration sessions

Nutrient management

Newsletter, media, demos, individual contacts, publications

Pesticide management

Newsletter, media, demos, individual contacts, publications, FAS program

Easements

Newsletter, media, individual contacts, publications

Wildlife management

Roadside mowing: Awareness letter to town boards

Wetland restoration: Newsletter, media, individual contacts, publications

Wetland Reserve Program: Newsletter, media, individual contacts, publications

Purple Loosestrife control: Newsletter, media, display, individual contacts, publications

Forestry management

Livestock exclusion: Newsletter, media, individual contacts, publications, field day

Managed Forest Law and Tree Farm System: Newsletter, media, individual contacts, publications, field day

Tree planting: Newsletter, media, individual contacts, publications, field day

Forest regeneration and harvesting: Newsletter, media, individual contacts, publications, field day

ACP, FIP, and SIP programs: Newsletter, media, individual contacts, publications, field day

Fisheries management

Newsletter

Construction site erosion control ordinance

Newsletter, media, publications, video

Urban nonpoint sources

Newsletter, media, display, storm drain stenciling, publications, school programs

F. The Lake Tomah School District proposes to develop a water resource educational curriculum designed for all grades that will use the watershed as a focus of study. This proposal requests \$7,500 from the nonpoint program to develop and implement the following activities;

1. Prepare innovative interdisciplinary teaching units for K through 12 grades.
2. Insert these units on watershed management and water quality into the existing curriculum.
3. Work with the DNR to prepare detailed learning objectives designed to enhance the ability of the students to make decisions favorable to water resource protection and improvement.

The dollars requested for this project will be used in the following manner;

1. Provide for teacher training to develop a knowledge base regarding watershed concepts.
2. Pay for teacher hourly compensation for time spent writing the teaching units.
3. Purchase classroom teaching materials.

The project would start in July of 1003 and continue through the end of the sign up period for cost share agreements. The Department's Western District would manage this grant.

G. INFORMATION AND EDUCATION ACTIVITIES BY YEAR

Year of 1992 (Starting 9/92)

Activity	Schedule	Audience	Assignments	Materials & Costs
Personal contacts	Farm visits - 30 Informal contacts - ?	Rural watershed residents	LCD - No direct hours UWEX/C - 20 hrs	No direct costs
Newsletter	10/92	Watershed residents	LCD - 8 hrs SCS - 2 hrs UWEX/C - 4 hrs UWEX/A - 8 hrs UWEX/S - 12 hrs	Printing - \$ 600 Postage - 45 TOTAL - \$ 645
Media coverage	Articles - 1 Radio spots - 1	General public	LCD - 2 hrs UWEX/C - 2 hrs	No direct costs
Presentations to groups	As requested Est.- 2	General public	LCD - 8 hrs	No direct costs
BMP example picture book	One books by 10/92	Potential contract signers	LCD - 8 hrs	Photos - \$ 20 Binders - 10 Dividers - 5 TOTAL - \$ 35
Annual Totals			DNR - 4 hrs LCD - 34 hrs NPM - 8 hrs SCS - 2 hrs UWEX/C - 30 hrs UWEX/A - 8 hrs UWEX/S - 12 hrs	\$ 680

UWEX/C = County level Extension, UWEX/A = Area level Extension, UWEX/S = State level Extension

Year of 1993

Activity	Schedule	Audience	Assignments	Materials & Costs
Personal contacts	Farm visits - 30 Informal contacts - ?	Rural watershed residents	LCD - No direct hours UWEX/C - 20 hrs	No direct costs
Newsletter	1/93 4/93 7/93 10/93	Watershed residents	DNR - 4 hrs LCD - 32 hrs SCS - 8 hrs UWEX/C - 16 hrs UWEX/A - 32 hrs UWEX/S - 48 hrs	Printing - \$ 2,520 Postage - 189 TOTAL - \$ 2,709
Media Coverage	Articles - 4 Radio spots - 4	General public	LCD - 8 hrs UWEX/C - 8 hrs	No direct costs
Presentations to groups	As requested Est. - 3	General public	LCD - 12 hrs	No direct costs
Watershed display	Dairy b/fast - 6/93 County fair - 7/93 Other locations - ?	General public	LCD - 8 hrs	Update photos - \$ 25
Facilitate availability of dealer-rented no-till seeder in watershed	2/93 (Year 1 of 3)	Equipment dealers	UWEX/C - 10 hrs	No direct costs
Promote use of no-till alfalfa seeding	5/93 (Year 1 of 3)	Crop producers	SCS - 8 hrs UWEX/C - 10 hrs	No direct costs
NPM demo (both nutrient and pesticide management aspects)	1 plot in '92 Field day - 8/93 (Year 1 of 3)	Crop producers	LCD - 8 hrs UWEX/C - 8 hrs UWEX/A - 4 hrs NPM - 80 hrs	\$ 1,500
Letter to town boards concerning roadside mowing and wildlife	4/93	Town boards County highway commission	DNR - 2 hrs LCD - 4 hrs	No direct costs

Activity	Schedule	Audience	Assignments	Materials & Costs
Forestry field day	10/93	Woodlot owners	DNR - 40 hrs LCD - 16 hrs UWEX/S - 8 hrs	No direct costs
Structural BMP demos	On-going individual visits	Watershed residents	LCD - 8 hrs	No direct costs
BMP video featuring barnyard systems, manure storage and streambank protection	10/93	Potential contract signers	LCD - 24 hrs UWEX/C - 4 hrs UWEX/A - 2 hrs	\$ 250
"Lawn Care and the Environment" publication mailing via city billings	5/93	Urban watershed residents	UWEX/C - 4 hrs	No direct costs
Sediment Trap	construction 2/93	Western Wisconsin Lake Management Districts	DNR - 12 hrs TLPRD - 12 hrs	\$66,500
Composting publication via city billings	9/93	Urban watershed residents	UWEX/C - 4 hrs	No direct costs
Water resource education via classroom presentations	As requested	K-12 students	LCD - 10 hrs	No direct costs
Farmstead Assessment System (groundwater pollution potential)	Est. - 2	Landowners with above PAL atrazine	UWEX/C - 12 hrs	Printed materials - \$ 20
Annual Totals			DNR - 46 hrs LCD - 130 hrs NPM - 80 hrs SCS - 16 hrs UWEX/C - 96 hrs UWEX/A - 38 hrs UWEX/S - 56 hrs	\$ 71,754

UWEX/C = County level Extension. UWEX/A = Area level Extension. UWEX/S = State level Extension
TLPRD = Tomah Lake Protection and Rehabilitation District

Year of 1994

Activity	Schedule	Audience	Assignments	Materials & Costs
Personal contacts	Farm visits - 30 Informal contacts - ?	Rural watershed residents	LCD - No direct hours UWEX/C - 20 hrs	No direct costs
Newsletter	1/94 4/94 7/94 10/94	Watershed residents	DNR - 4 hrs LCD - 32 hrs SCS - 8 hrs UWEX/C - 16 hrs UWEX/A - 32 hrs UWEX/S - 48 hrs	Printing - \$ 2,646 Postage - 198 TOTAL - \$ 2,844
Media Coverage	Articles - 4 Radio spots - 4	General public	LCD - 8 hrs UWEX/C - 8 hrs	No direct costs
Presentations to groups	As requested Est. - 3	General public	LCD - 12 hrs	No direct costs
Watershed display	County fair - 7/94 Other locations - ?	General public	LCD - 8 hrs	Update photos - \$ 25
Promote use of no-till alfalfa seeding	5/94 (Year 2 of 3)	Crop producers	SCS - 8 hrs UWEX/C - 10 hrs	No direct costs
NPM demo (both nutrient and pesticide management aspects)	1 plot in '94 Field day - 8/94 (Year 2 of 3)	Crop producers	LCD - 8 hrs UWEX/C - 8 hrs UWEX/A - 4 hrs NPM - 80 hrs	\$ 1,500
Structural BMP demos	On-going individual visits	Watershed residents	LCD - 8 hrs	No direct costs
Nutrient and pest management sessions (manure management, weed mapping, reduced herbicide rate techniques)	Workshop - 3/94	County-wide program targeted to watershed farmers	UWEX/C - 10 hrs NPM - 8 hrs	Facility rental - \$ 50 Refreshments - 50 TOTAL - \$ 100

Water resource education via classroom presentations	As requested	K-12 students	LCD - 10 hrs	No direct costs
Sediment Trap	Field Day 7/94	Western Wisconsin Lake Management Districts	DNR - 8 hrs TLPRD - 8 hrs UWEX/C - 8 hrs	Printed Materials \$20 Refreshments \$50 Total \$70
Farmstead Assessment System (groundwater pollution potential)	Est. - 2	Landowners with above PAL atrazine	UWEX/C - 12 hrs	Printed materials - \$20
Annual Totals			DNR - 4 hrs LCD - 98 hrs NPM - 88 hrs SCS - 16 hrs TLPRD - 8 hrs UWEX/C - 88 hrs UWEX/A - 36 hrs UWEX/S - 48 hrs	\$ 4,559

UWEX/C = County level Extension, UWEX/A = Area level Extension, UWEX/S = State level Extension
 TLPRD = Tomah Lake Protection and Rehabilitation District

Year of 1995

Activity	Schedule	Audience	Assignments	Materials & Costs
Personal contacts	Farm visits - 30 Informal contacts - ?	Rural watershed residents	LCD - No direct hours UWEX/C - 20 hrs	No direct costs
Newsletter	1/95 4/95 7/95 10/95	Watershed residents	DNR - 4 hrs LCD - 32 hrs SCS - 8 hrs UWEX/C - 16 hrs UWEX/A - 32 hrs UWEX/S - 48 hrs	Printing - \$ 2,778 Postage - 208 TOTAL - \$ 2,986
Media Coverage	Articles - 4 Radio spots - 4	General public	LCD - 8 hrs UWEX/C - 8 hrs	No direct costs
Presentations to groups	As requested Est. - 3	General public	LCD - 12 hrs	No direct costs
Watershed display	County fair - 7/95 Other locations - ?	General public	LCD - 8 hrs	Update photos - \$ 25
Promote use of no-till alfalfa seeding	5/95 (Year 3 of 3)	Crop producers	SCS - 8 hrs UWEX/C - 10 hrs	No direct costs
NPM demo (both nutrient and pesticide management aspects)	1 plot in '95 Field day - 8/95 (Year 3 of 3)	Crop producers	LCD - 8 hrs UWEX/C - 8 hrs UWEX/A - 4 hrs NPM - 80 hrs	\$ 1,500
Structural BMP demos	On-going individual visits	Watershed residents	LCD - 8 hrs	No direct costs
Water resource education via classroom presentations	As requested	K-12 students	LCD - 10 hrs	No direct costs

Activity	Schedule	Audience	Assignments	Materials & Costs
Farmstead Assessment System (groundwater pollution potential)	Est. - 2	Landowners with above PAL atrazine	UWEX/C - 12 hrs	Printed materials - \$ 20
Annual Totals			DNR - 4 hrs LCD - 86 hrs NPM - 80 hrs SCS - 16 hrs UWEX/C - 82 hrs UWEX/A - 36 hrs UWEX/S - 48 hrs	\$ 4,531

UWEX/C = County level Extension, UWEX/A = Area level Extension, UWEX/S = State level Extension

Year of 1996

Activity	Schedule	Audience	Assignments	Materials & Costs
Newsletter	1/96 4/96	Watershed residents	DNR - 2 hrs LCD - 16 hrs SCS - 4 hrs UWEX/C - 8 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	Printing - \$ 1,458 Postage - 109 TOTAL - \$ 1,567
Media Coverage	Articles - 2 Radio spots - 2	General public	LCD - 4 hrs UWEX/C - 4 hrs	No direct costs
Presentations to groups	As requested Est. - 1	General public	LCD - 4 hrs	No direct costs
Watershed display	County fair - 7/96 Other locations - ?	General public	LCD - 8 hrs	Update photos - \$ 150
Structural BMP demos	On-going individual visits	Watershed residents	LCD - 8 hrs	No direct costs
Water resource education via classroom presentations	As requested	K-12 students	LCD - 10 hrs	No direct costs
Annual Totals			DNR - 2 hrs LCD - 50 hrs SCS - 4 hrs UWEX/C - 12 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	\$ 1,717

UWEX/C = County level Extension, UWEX/A = Area level Extension, UWEX/S = State level Extension

Year of 1997

Activity	Schedule	Audience	Assignments	Materials & Costs
Newsletter	1/97 4/97	Watershed residents	DNR - 2 hrs LCD - 16 hrs SCS - 4 hrs UWEX/C - 8 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	Printing - \$ 1,532 Postage - 115 TOTAL - \$ 1,647
Media Coverage	Articles - 2 Radio spots - 2	General public	LCD - 4 hrs UWEX/C - 4 hrs	No direct costs
Presentations to groups	As requested Est. - 1	General public	LCD - 4 hrs	No direct costs
Watershed display	County fair - 7/97 Other locations - ?	General public	LCD - 8 hrs	Update photos - \$ 25
Structural BMP demos	On-going individual visits	Watershed residents	LCD - 8 hrs	No direct costs
Water resource education via classroom presentations	As requested	K-12 students	LCD - 10 hrs	No direct costs
Annual Totals			DNR - 2 hrs LCD - 50 hrs SCS - 4 hrs UWEX/C - 12 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	\$ 1,672

UWEX/C = County level Extension. UWEX/A = Area level Extension. UWEX/S = State level Extension

Year of 1998

Activity	Schedule	Audience	Assignments	Materials & Costs
Newsletter	1/98 4/98	Watershed residents	DNR - 2 hrs LCD - 16 hrs SCS - 4 hrs UWEX/C - 8 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	Printing - \$ 1,608 Postage - 120 TOTAL - \$ 1,728
Media Coverage	Articles - 2 Radio spots - 2	General public	LCD - 4 hrs UWEX/C - 4 hrs	No direct costs
Presentations to groups	As requested Est. - 1	General public	LCD - 4 hrs	No direct costs
Watershed display	County fair - 7/98 Other locations - ?	General public	LCD - 8 hrs	Update photos - \$ 25
Structural BMP demos	On-going individual visits	Watershed residents	LCD - 8 hrs	No direct costs
Water resource education via classroom presentations	As requested	K-12 students	LCD - 10 hrs	No direct costs
Annual Totals			DNR - 2 hrs LCD - 50 hrs SCS - 4 hrs UWEX/C - 12 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	\$ 1,753

UWEX/C = County level Extension, UWEX/A = Area level Extension, UWEX/S = State level Extension

Year of 1999

Activity	Schedule	Audience	Assignments	Materials & Costs
Newsletter	1/99 4/99	Watershed residents	DNR - 2 hrs LCD - 16 hrs SCS - 4 hrs UWEX/C - 8 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	Printing - \$ 1,689 Postage - 126 TOTAL - \$ 1,815
Media Coverage	Articles - 2 Radio spots - 2	General public	LCD - 4 hrs UWEX/C - 4 hrs	No direct costs
Presentations to groups	As requested Est. - 1	General public	LCD - 4 hrs	No direct costs
Structural BMP demos	On-going individual visits	Watershed residents	LCD - 8 hrs	No direct costs
Water resource education via classroom presentations	As requested	K-12 students	LCD - 10 hrs	No direct costs
Annual Totals			DNR - 2 hrs LCD - 42 hrs SCS - 4 hrs UWEX/C - 12 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	\$ 1,815

UWEX/C = County level Extension, UWEX/A = Area level Extension, UWEX/S = State level Extension

Year of 2000

Activity	Schedule	Audience	Assignments	Materials & Costs
Newsletter	1/00 4/00	Watershed residents	DNR - 2 hrs LCD - 16 hrs SCS - 4 hrs UWEX/C - 8 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	Printing - \$ 1,773 Postage - 132 TOTAL - \$ 1,905
Media Coverage	Articles - 2 Radio spots - 2	General public	LCD - 4 hrs UWEX/C - 4 hrs	No direct costs
Presentations to groups	As requested Est. - 1	General public	LCD - 4 hrs	No direct costs
Structural BMP demos	On-going individual visits	Watershed residents	LCD - 8 hrs	No direct costs
Water resource education via classroom presentations	As requested	K-12 students	LCD - 10 hrs	No direct costs
Annual Totals			DNR - 2 hrs LCD - 42 hrs SCS - 4 hrs UWEX/C - 12 hrs UWEX/A - 16 hrs UWEX/S - 24 hrs	\$ 1,905

UWEX/C = County level Extension, UWEX/A = Area level Extension, UWEX/S = State level Extension

INFORMATION AND EDUCATION TOTALS - 1992-2000

Hours:	DNR	88
	LCD	582
	NPM	256
	SCS	70
	TLPRD	20
	UWEX/C	364
	UWEX/A	198
	UWEX/S	284
Dollars:		\$90,846

CHAPTER SIX

Integrated Resource Management

Introduction

The integration of resource management activities in the Lake Tomah Watershed will coordinate existing federal, state, and local programs. The ability to integrate programs will help achieve the best possible management of land and water resources in the project area. There are a number of specific program activities which will need coordination in the project and will involve several different agencies.

Agricultural Programs

USDA programs, like the conservation reserve program (CRP), and the Agricultural Conservation Program (ACP) provide funding for projects that have a direct impact on water quality. Although these programs are not targeted towards water quality, the continued or expanded use of them should help in protecting water resources. These programs will continue to be used in the project area and will provide additional funding to landowners.

DNR Resource Management Programs

The Wisconsin DNR Wildlife and Forestry objectives for the Lake Tomah Priority Lake Project have been identified and implementation activities developed. Some of these activities have a very direct relationship to water quality, while others are more indirect as a result of improved resource management. Information and Education activities described in chapter 5 will be used to help implement resource management objectives. These activities are listed at the end of this chapter. Staff requirements are listed in chapter 5.

Wildlife Management

Objective #1

Enroll all eligible farmed wetlands into the Wetland Reserve Program of the 1990 farm bill.

- The implementation approach for this activity includes specific activities included in the I&E Program.

Objective #2

Promote the use of no-till and conservation tillage systems to provide additional wildlife food and cover on agricultural lands.

- The use of tillage systems are cost sharable activities and are included in chapter 5 as available best management practices. An Information and Education strategy for crop residue management is included in the I&E Program.

Objective #3

Promote roadside mowing according to a plan which is beneficial to wildlife.

- The implementation approach for this objective includes Information and Education activities and direct contacts with the town boards.
- The county LCD staff and the wildlife manager will draft a letter to be sent to the town Board of each township during the first two years of the project. The letter will present information on beneficial roadside management alternatives.

Objective #4

Restore the wetland basins not eligible for the Wetland Reserve Program.

- The implementation activity identified for this objective is providing wetland restoration as a cost sharable best management practice. Guidelines for wetland restoration are included in chapter 4.
- Easement acquisitions will assist in meeting this objective.
- Information and Education activities focusing on wetland restoration are included in the I&E Program.

Objective #5

Promote control of Purple Loosestrife

- The control of this plant is an objective of the wildlife management program. The plant is a problem because of its propensity to displace more desirable vegetation, especially in wetland environments. The plant's value as wildlife cover or food is minimal, and it is considered a nuisance invader. Implementation of this objective would be through specific Information and Education activities included in the I&E Program.

Objective #6

Encourage upland nesting cover establishment.

- For some land management practices, planting of desirable species that benefit nesting cover will be used.
- Assistance in identifying desirable species for planting will be provided by DNR wildlife.
- The use of beneficial plant species will be encouraged by the County LCD staff.
- Cost sharing for wildlife plantings will be available through the critical area stabilization management practice.

Objective #7

Encourage reproduction of cavity nesting species of birds through the use of nest boxes.

- Use of nest boxes have proven successful for waterfowl, primarily wood ducks. The county LCD staff will make referrals to the DNR wildlife manager of sites that may be suitable for nest construction.
- DNR Wildlife manager will provide information to the county staff on appropriate site conditions necessary for successful nest box placement.

Objective #8

Encourage Osprey nesting platforms.

- Because the use of artificially constructed Osprey nesting platforms has proven effective in the re-establishment of this species, the County LCD staff will make referrals to the DNR wildlife manager of sites that may be suitable for nest construction.
- DNR wildlife manager will provide information to the county staff on appropriate site conditions necessary for Osprey nesting.

Objective #9

Encourage the enhancement of the habitat for the Wood Turtle and Blandings Turtle.

- This objective could be implemented by accommodating the habitat preferences of these species when installing BMPs, especially along streambanks.

Objective #10

Ensure wildlife habitat redevelopment where habitat is lost due to construction of Best Management Practices.

- Wildlife protection is required by administrative rule for a number of best management practices that will be installed in the project. Wildlife habitat shall be recreated to replace wildlife habitat lost through removal due to the construction of the following best management practices:

- Contour and field stripcropping
- Field diversions
- Terraces
- Grassed Waterways
- Critical Area Stabilization
- Grade Stabilization Structures
- Shoreline Buffers

Assistance in recreating lost wildlife habitat will be provided by the DNR wildlife manager on an as-needed basis.

Forestry Management

Objective #1

Protecting grazed woodlots from further access by livestock.

- The priority watershed project has included the use of woodlot fencing as a cost-sharing practice.
- The county LCD will make referrals to the DNR forester whenever landowner contacts reveal needs for woodlot protection from livestock access.
- The DNR forester will make a personal contact with the landowner after referral from the County LCD.

- Information and Education activities that will be used to encourage landowners to protect woodlands from livestock damage, are included in the I&E Program.

Objective #2

Enter eligible woodlands into forest management programs such as the Managed Forest Law, the American Tree Farm System and the Stewardship Incentive program.

- At the time of landowner contact, the County LCD staff will refer landowners to the DNR forester for a followup contact.
- The potential of woodlands to be eligible for forestry programs will need to be determined initially by the County LCD.
- A brief training session will be provided by the DNR forester so that county staff will be able to recognize the potential eligibility of a landowner for a forestry program.
- Information and Education activities that will be used to make landowners aware of the Managed Forest Law and American Tree Farm System, are included in the I&E Program.

Objective #3

Plant trees on nonproductive fields, pasture, and CRP acreage.

- The use of trees for establishing critical area control is encouraged and is provided for in NR 120.14(11). For conditions which do not meet project eligibility criteria (tree planting on non-eroded areas) specific Information and Education activities are included in the I&E Program.
- County LCD staff will make referrals to the DNR foresters wherever conditions favorable to tree planting occur.

Objective #4

Advocate proper planning, construction, and maintenance of logging and skidding trails to prevent soil and water erosion.

- Soil erosion in logging areas has been identified as a water quality problem and presents a need for water quality protection. The best management practices used to control this kind of problem are either included in chapter 5 or will be pursued through the alternative design procedures in NR 120.15.
- County LCD staff will use eligibility criteria for cost-sharing existing erosion problems in logging operation areas within the project. The criteria is explained in chapter 4 under management actions.

Objective #5

Support Information and Education efforts about forest regeneration and proper harvesting techniques.

- The implementation approach for this objective is included in the Information and Education Program.

Objective #6

Foster participation in the Agricultural Conservation Program (ACP), Forestry Incentive Program (FIP), and Stewardship Incentive Program (SIP) practices administered by ASCS.

- The implementation approach for this objective is included in the Information and Education Program.

Fisheries Management

The fishery management objectives have been listed in the water resource appraisal compiled by Ken Schreiber, DNR Eau Claire, and are found in chapter 3.

Information and Education Activities

Information and Education activities which will be used to help implement integrated resource management objectives included:

- Information sharing through direct landowner contacts made by project staff,
- Facilitate sharing of information between project area landowners,
- Radio, television, and/or local press coverage when feasible,
- Featuring practices on project tours and field days whenever practical,
- Feature practices on project's display exhibit,
- Articles in the project's newsletter and other newsletters servicing the project area, and
- Distributing existing printed material where feasible.

Detailed information on staff time requirements and budget estimates is included in chapter 5.

CHAPTER SEVEN

Progress Assessments

Introduction

This chapter describes how progress will be monitored in the Lake Tomah Priority Lake Project. The strategy contains two components:

- Administrative review
- 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 Computer Assisted Management and Planning System (CAMPS) is a computer data management system that has been developed by the U.S. Soil Conservation Service (SCS). It is used by SCS, DNR, and DATCP to meet the accomplishment reporting requirements of all three agencies. Data on administrative accomplishments will be collected by the LCD using

CAMPS or its replacement, and will be provided to DNR and DATCP for program evaluation.

The County LCDs will provide the following data to DNR and DATCP on a quarterly basis:

- number of personal contacts made with landowners,
- completed I & E activities,
- number of farm conservation plans prepared for the project,
- number of cost-share agreements signed,
- number of farm conservation plan and cost-share agreement status reviews completed, and
- number of farms and acres of cropland checked for proper maintenance of Best Management Practices.

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

Financial Expenditures

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

- number of landowner cost-share agreements signed,
- amount of money committed on cost-share agreements,
- number of landowner reimbursements made, and amount paid for BMP installation,
- expenditures for staff travel,
- expenditures for information and education program,
- expenditures for equipment, materials and supplies,
- expenditures for professional services and staff support costs,
- total project expenditures for LCD staff,
- staff training expenditures,
- interest in money earned and expended, and
- 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:

- project and fiscal management,
- clerical assistance,
- predesign and conservation planning activities,

- technical assistance: practice design, installation, cost-share agreement status review, and monitoring,
- educational activities,
- training activities, and
- leave time.

Pollutant Reduction Evaluation

Purpose

The purpose of 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 Lake Tomah 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 each source is described below.

Procedure

Upland Sediment Sources

The County LCD will use the WINHUSLE (Wisconsin Nonpoint Source) model to estimate reductions due to changes in cropping practices. Data for the WINHUSLE model will be provided quarterly by the LCD through CAMPS or its replacement, as described above.

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 CAMPS or its replacement.

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 the CAMPS system.

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.

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 erosion being generated at the time of contact, and changes in erosion levels estimated after installing Best Management Practices. Length of streambank erosion controlled is to be reported along with tons of sediment controlled.

The County LCD may also consider the use of a tracking system that reports reductions in pollutant quantities on a form. The form is presently available from DNR or another type of form could be developed by the County and DNR that meets the same requirements for reporting pollutant load reductions by quantity. Length of streambank erosion controlled is to be reported along with tons of sediment controlled.

CHAPTER EIGHT

Water Resources Evaluation Monitoring

Goal and Objectives

The goal of the priority watershed evaluation monitoring program is to evaluate the progress of the nonpoint source control program toward improving the quality of water resources.

Evaluation monitoring objectives are to:

1. Evaluate the attainment of water quality "objectives" that result from implementation of best management practices at specific sites.
2. Evaluate the attainment of pollutant load reduction goals, and the effectiveness of those goals in improving water quality at specific sites.
3. Evaluate the implementation of BMPs needed, and their effectiveness in reducing the problems that contribute to the non-attainment of water quality objectives at specific sites.
4. Evaluate the priority watershed plans applicability to the management of water resources, and the attainment of water quality standards and beneficial uses.

Program Organization

1. Evaluation monitoring activities in priority watersheds will be planned and conducted according to monitoring program guidance in the Bureau's Surface Water Monitoring Strategy.

Evaluation monitoring can be conducted at selected sites in basins on the 5-year basin assessment schedule. Or, can be conducted at selected sites as special projects, depending on other monitoring priorities.

2. Evaluation monitoring may be conducted on selected waterbodies in priority watersheds that meet specific site selection criteria. These sites would be part of a statewide strategy designed to meet the program evaluation monitoring goal and objectives.

3. Evaluation monitoring need not be conducted in each priority watershed.

Site Selection Criteria

The following criteria are suggested for site selection in agricultural watersheds to be intensively evaluated as part of basin assessments, or as special projects:

Location

1. Where BMPs are planned but yet to be implemented in priority watersheds;
2. Where serious water quality, habitat or both problems exist, and a direct cause/effect relationship between problems and nonpoint sources are obvious;
3. Where a high probability exists that appropriate BMPs will be installed in the site's watershed. If possible, final monitoring site selection should come after cost share agreements have been signed. Extra effort should be made to achieve full participation by all landowners;
4. Where sites are not meeting attainable uses and have a high potential to improve following management of nonpoint sources;
5. Where reference sites with similar characteristics, including attainable uses, are available in the same or adjacent watersheds. A reference site can be either an impacted site that will not be managed, or preferably, a site without water quality problems and meeting attainable uses. The important consideration is that reference site conditions are not expected to change except due to climatic conditions; and
6. Where sites have adequate access for sampling personnel and equipment.

Size

1. Sites should be located on permanent streams large enough to support well developed fish communities. Streams should be 5 to 30 feet wide with base flows of 1 to 20 cfs; and
2. Watersheds should be manageable with areas of 5 to 50 sq. miles.

Water Quality

1. Suspected or known water quality problems should be caused by manageable nonpoint sources, such as barnyards or feedlots;
2. Point sources should not be present or not significant; and
3. Potential sources of problems that cannot or are unlikely to be managed should not be present.

Habitat

1. Habitat problems should be caused by poor land use practices immediately adjacent to or near sites, and in-stream habitat should have a high potential to improve following implementation of BMPs; and
2. Sites should not be selected that have been ditched within 10 to 15 years.

Site Selection Process

Potential evaluation monitoring sites can be located while conducting basin assessments, or conducting appraisal monitoring in newly selected priority watersheds. Selecting potential sites during the appraisal monitoring process is recommended.

Reconnaissance surveys can be conducted to locate sites that meet evaluation monitoring criteria in on-going priority watershed projects. When potential sites are located by reconnaissance, data should be obtained to determine if site selection criteria are met. And, county staffs should be contacted to determine the potential for landowner participation.

Sites selected for evaluation should meet most of the selection criteria, including the presence of appropriate reference sites.

Evaluation Monitoring Approaches

Priority watershed evaluation monitoring projects can be conducted as part of basin assessments on a 5-year schedule, or as special projects subject to Bureau approval of annual monitoring plans. Intensive evaluation monitoring will continue to be conducted at "master monitoring" sites by the Bureau of Research, USGS and WRM staff. Basin assessments, special projects and monitoring project work planning are discussed in the Bureau's Monitoring Strategy.

The following evaluation monitoring options are provided as guidance for developing monitoring plans. Any option, or a combination of options, may be used for evaluating priority watershed projects.

Basin Assessment Approach

1. Select specific sites in priority watersheds that meet site selection criteria, including at least one reference site per treatment site. Intensively monitor these sites during the basin assessment year to establish pre-implementation surface water conditions. Evaluation monitoring projects should be designed to fit individual site characteristics, but should generally include collection of water chemistry, habitat, fish community and macroinvertebrate data.

These same sites should be monitored again in 5-years (post-implementation) when the basin is scheduled to be reassessed. These data would be compared to pre-implementation data to evaluate site specific improvements resulting from implementation of BMPs. Monitoring on a 5-year schedule could continue if appropriate.

2. Repeat appraisal type monitoring at selected sites in priority watersheds on the 5-year basin assessment schedule.

The general water resource conditions in all priority watersheds will be assessed by conducting appraisal monitoring for developing priority watershed management plans. Appraisal monitoring provides a general water resource quality and problems assessment that, when repeated during future basin assessments, can be used to evaluate surface water quality improvements, especially where they are significant.

When conducted on the 5-year basin assessment schedule, pre-implementation appraisal monitoring data may be compared to watershed wide assessment (using appraisal monitoring techniques) data, to provide a general, but adequate priority watershed project evaluation.

This approach would provide an evaluation of more surface waters in a priority watershed, and an evaluation of the overall results of a priority watershed project.

Special Project Approach

3. This approach is essentially the same as the basin assessment intensive monitoring approach (option 1), except that sites may be monitored more frequently, and would be planned as special projects. Guidance for special project planning is provided in the Bureau's Monitoring Strategy.

The Bureau recommends a 5-year basin assessment monitoring approach, as discussed in option 2. With the exception that an intensive special project monitoring approach may be recommended at unique sites where problems are severe, the resource has a high value, participation levels are high, and a measurable response is anticipated.

In the Lake Tomah Watershed, emphasis will be placed on monitoring the effectiveness of rotational grazing practices. Periodically DNR Western District and Monroe County staff will survey areas under rotational grazing to evaluate the degree of streambank habitat degradation.

The Tomah Lake Protection and Rehabilitation District will be responsible for conducting a monitoring and reporting program for the proposed sediment trap. Initially, the District should measure the depth of sediment in the trap on a semiannual basis. The trap should be dredged before the sediment in the trap reaches a depth of 7 feet. Adjustments to both the frequency of measurement and dredging intervals can be made after evaluating the effectiveness of the trap. For example, if the trap fills at a faster rate, the frequency of measurement may need to be increased. If scouring of sediment occurs with a sediment depth of 7 feet, the dredging interval may need to be increased. If the approach described above is not effective, an in-depth study such as a cross-sectional velocity profile or a bedload analysis may be required.

The Lake Tomah District will report information on the sediment trap operation annually. The information reported will include the following;

1. Measurements of the sediment depth at start up and once a year thereafter. These measurements will be taken over an area of the trap that will allow for a clear determination of the rate of sedimentation and the location of sediment accumulation in the trap. Additional measurements need to be taken after major storm events exceeding the 10 year 24 hour event (approximately 4 plus inches).
2. Sediment particle size analysis for sampled sediment cores prior to first dredging. Particle size analysis sampling needs to be accomplished once more at the end of the priority watershed implementation period (1999).
3. Volume dredged, date dredged and cost associated with dredging.
4. Other biological, physical or chemical information necessary to determine effectiveness of the practice.
5. Methods used to meet standards as defined by the DNR.

APPENDIX A

Glossary

ACUTE TOXICITY:

Any poisonous effect produced by a single short-term exposure to a chemical that results in a rapid onset of severe symptoms.

ADVANCED WASTEWATER TREATMENT:

The highest level of wastewater treatment for municipal treatment systems. It requires removal of all but 10 parts per million of suspended solids and biological oxygen and/or 50 percent of the total nitrogen. Advanced wastewater treatment is also known as "tertiary treatment."

AGRICULTURAL CONSERVATION PROGRAM (ACP):

A federal cost-sharing program to help landowners install measures to conserve soil and water resources. ACP is administered by the USDA ASCS through county ACP committees.

ALGAE:

A group of microscopic, photosynthetic water plants. Algae give off oxygen during the day as a product of photosynthesis and consume oxygen during the night as a result of respiration. Therefore, algae effect the oxygen content of water. Nutrient-enriched water increases algae growth.

AMMONIA:

A form of nitrogen (NH_3) found in human and animal wastes. Ammonia can be toxic to aquatic life.

ANAEROBIC:

Without oxygen.

AREA OF CONCERN:

Areas of the Great Lakes identified by the International Joint Commission (IJC) as having serious water pollution problems.

AREAWIDE WATER QUALITY MANAGEMENT PLANS (208 PLANS):

A plan to document water quality conditions in a drainage basin and make recommendations to protect and improve basin water quality. Each basin in Wisconsin must have a plan prepared for it, according to section 208 of the Clean Water Act.

ANTIDegradation:

A policy stating that water quality will not be lowered below background levels unless justified by economic and social development considerations. Wisconsin's antidegradation policy is currently being revised to make it more specific and meet EPA guidelines.

AVAILABILITY:

The degree to which toxic substances or other pollutants are present in sediments or elsewhere in the ecosystem and are available to affect or be taken up by organisms. Some pollutants may be "bound up" or unavailable because they are attached to clay particles or are buried by sediment. Oxygen content, pH, temperature and other conditions in the water can affect availability.

BACTERIA:

Single-cell, microscopic organisms. Some can cause disease, but others are important in organic waste stabilization.

BASIN PLAN:

See "Areawide Water Quality Management Plan".

BENTHIC ORGANISMS (BENTHOS):

Organisms living in or on the bottom of a lake or stream.

BEST MANAGEMENT PRACTICE (BMP):

The most effective, practical measures to control nonpoint sources of pollutants that runoff from land surfaces.

BIOACCUMULATION:

The uptake and retention of substances by an organism from its surrounding medium and food. As chemicals move through the food chain, they tend to increase in concentration in organisms at the upper end of the food chain such as predator fish, or in people or birds that eat these fish.

BIOASSAY STUDY:

A test for pollutant toxicity. Tanks of fish or other organisms are exposed to varying doses of treatment plant effluent. Lethal doses of pollutants in the effluent are then determined.

BIOCHEMICAL OXYGEN DEMAND (BOD):

A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. BOD₅ is the biochemical oxygen demand measured in a five day test. The greater the degree of pollution, the higher the BOD₅.

BIODEGRADABLE:

Waste that can be broken down by bacteria into basic elements. Most organic wastes such as food remains and paper are biodegradable.

BIOTA:

All living organisms that exist in an area.

BUFFER STRIPS:

Strips of grass or other erosion-resisting vegetation between disturbed areas and a stream or lake.

BULKHEAD LINES:

Legally established lines that indicate how far into a stream or lake an adjacent property owner has the right to fill. Many of these lines were established many years ago and allow substantial filling of the bed of the river and bay. Other environmental laws may limit filling to some degree.

CARCINOGENIC:

A chemical capable of causing cancer.

CATEGORICAL LIMITS:

All point source discharges are required to provide a basic level of treatment. For municipal wastewater treatment plants this is secondary treatment (30 mg/1 effluent limits for SS and BOD). For industry the level depends on the type of industry and the level of production. More stringent effluent limits are required, if necessary, to meet water quality standards.

CHLORINATION:

The application of chlorine to wastewater to disinfect it and kill bacteria and other organisms.

CHLORORGANIC COMPOUNDS (CHLORORGANICS):

A class of chemicals that contain chlorine, carbon and hydrocarbon. This generally refers to pesticides and herbicides that can be toxic. Examples include PCB's and pesticides such as DDT and dieldrin.

CHRONIC TOXICITY:

The effects of long-term exposure of organisms to concentrations of a toxic chemical that are not lethal, but is injurious or debilitating in one or more ways. An example of the effect of chronic toxicity is reduced reproductive success.

CLEAN WATER ACT:

See "Public Law 92-500."

COMBINED SEWERS:

A wastewater collection system that carries both sanitary sewage and stormwater runoff. During dry weather, combined sewers carry only wastewater to the treatment plant. During heavy rainfall, the sewer becomes swollen with stormwater. Because the treatment plant cannot process the excess flow, untreated sewage is discharged to the plant's receiving waters, i.e., combined sewer outflow.

CONFINED DISPOSAL FACILITY (CDF):

A structure built to contain and dispose of dredged material.

CONGENERERS:

Chemical compounds that have the same molecular composition, but have different molecular structures and formula. For example, the congeners of PCB have chlorine located at different spots on the molecule. These differences can cause differences in the properties and toxicity of the congeners.

CONSERVATION TILLAGE:

Planting row crops while only slightly disturbing the soil. In this way a protective layer of plant residue stays on the surface. Erosion rates decrease.

CONSUMPTION ADVISORY:

A health warning issued by DNR and WDHSS that recommends people limit the fish they eat from some rivers and lakes based on the levels of toxic contaminants found in the fish.

CONTAMINANT:

Some material that has been added to water that is not normally present. This is different from a pollutant, which suggests there is too much of the material present.

CONVENTIONAL POLLUTANT:

Refers to suspended solids, fecal coliforms, biochemical oxygen demand, and pH, as opposed to toxic pollutants

COST-EFFECTIVE:

A level of treatment or management with the greatest incremental benefit for the money spent.

CRITERIA:

See water quality standard criteria.

DDT:

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

DIOXIN (2,3,7,8-tetrachlorodibenzo-p-dioxin):

A chlorinated organic chemical which is highly toxic.

DISINFECTION:

A chemical or physical process that kills organism that cause disease. Chlorine is often used to disinfect wastewater.

DISSOLVED OXYGEN (DO):

Oxygen dissolved in water. Low levels of dissolved oxygen cause bad smelling water and threaten fish survival. Low levels of dissolved oxygen often result from inadequate wastewater treatment. The DNR considers 5 ppm DO necessary for fish and aquatic life.

DREDGING:

Removal of sediment from the bottom of water bodies.

ECOSYSTEM:

The interacting system of biological community and its nonliving surrounding.

EFFLUENT:

Solid, liquid or gas wastes (byproducts) that are disposed on land, in water or in air. As used in the RAP, effluent generally means wastewater discharges.

EFFLUENT LIMITS:

The DNR issues WPDES permits establishing the maximum amount of pollutant to be discharged to a receiving stream. Limits depend on the pollutant and the water quality standards that apply for the receiving waters.

EMISSION:

A direct (smokestack particles) or indirect (busy shopping center parking lot) release of any contaminant into the air.

ENVIRONMENTAL PROTECTION AGENCY (USEPA):

The federal agency responsible for enforcing federal environmental regulations. The Environmental Protection Agency delegates some of its responsibilities for water, air and solid waste pollution control to state agencies.

ENVIRONMENTAL REPAIR FUND:

A fund established by the Wisconsin Legislature to deal with abandoned landfills.

EPIDEMIOLOGY:

The study of diseases as they affect populations rather than individuals, including the distribution and incidence of a disease mortality and morbidity rates, and the relationship of climate, age, sex, race and other factors. EPA uses such data to establish national air quality standards.

EROSION:

The wearing away of the land surface by wind or water.

EUTROPHIC:

Refers to a nutrient-rich lake. Large amounts of algae and weeds characterize a eutrophic lake (see also "Oligotrophic" and "Mesotrophic").

EUTROPHICATION:

The process of nutrient enrichment of a lake leading to increased production of aquatic organisms. Eutrophication can be accelerated by human activity such as agriculture and improper waste disposal.

FACILITY PLAN:

A preliminary planning and engineering document that identifies alternative solutions to a community's wastewater treatment problems.

FECAL COLIFORM:

A group of bacteria used to indicate the presence of other bacteria that cause disease. The number of coliform is particularly important when water is used for drinking and swimming.

FISHABLE AND SWIMMABLE:

Refers to the water quality goal set for the nation's surface waters by Congress in the Clean Water Act. All waters were to meet this goal by 1984.

FLUORANTHENE:

A polyaromatic hydrocarbon (PHA) with toxic properties.

FLY ASH:

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

FOOD CHAIN:

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

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

A chlorinated organic compound which is highly toxic.

GREEN STRIPS:

See buffer strip.

GROUNDWATER:

Undergroundwater-bearing areas generally within the boundaries of a watershed, which fill internal passageways of porous geologic formations (aquifers) with water that flows in response to gravity and pressure. Often used as the source of water for communities and industries.

HABITAT:

The place or type of site where a plant or animal naturally lives and grows.

HEAVY METALS:

Metals present in municipal and industrial wastes that pose long-term environmental hazards if not properly disposed. Heavy metals can contaminate ground and surface waters, fish and other food stuffs. The metals of most concern are: arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium and zinc (see also separate listings of these metals for their health effects).

HERBICIDE:

A type of pesticide that is specifically designed to kill plants and can also be toxic to other organisms.

HYDROCARBONS:

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

INCINERATOR:

A furnace designed to burn wastes.

INFLUENT:

Influent for an industry would be the river water that the plant intakes for use in its processing. Influent to a municipal treatment plant is untreated wastewater.

IN-PLACE POLLUTION:

As used in the RAP, refers to pollution from contaminated sediments. These sediments are polluted from past discharges from municipal and industrial sources.

INTERNATIONAL JOINT COMMISSION (IJC):

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

ISOROPYLBIPHENYL:

A chemical compound used as a substitute for PCB.

LANDFILL:

A conventional sanitary landfill is "a land disposal site employing an engineered method of disposing of solid wastes on land in a manner that minimizes environmental hazards by spreading solid wastes in thin layers, materials at the end of each operating day". Hazardous wastes frequently require various types of pretreatment before they are disposed of, i.e., neutralization chemical fixation encapsulation. Neutralizing and disposing of wastes should be considered a last resort. Repurifying and reusing waste materials or recycling them for another use may be less costly.

LC-1:

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

LC₅₀:

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

LD₅₀:

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

LEACHATE:

The contaminated liquid which seeps from a pile or cell of solid materials and which contains water, dissolved and decomposing solids. Leachate may enter the groundwater and contaminate drinking water supplies.

LOAD:

The total amount of materials or pollutants reaching a given local.

MACROPHYTE:

A rooted aquatic plant.

MASS:

The amount of material a substance contains causing it to have weight in a gravitational field.

MASS BALANCE:

A study that examines all parts of the ecosystem to determine the amount of toxic or other pollutant present, its sources, and the processes by which the chemical moves through the ecosystem.

MESOTROPHIC:

Refers to a moderately fertile nutrient level of a lake between the oligotrophic and eutrophic levels. (See also "Eutrophic" and "Oligotrophic.")

MILLIGRAMS PER LITER (mg/l):

A measure of the concentration of substance in water. For most pollution measurement this is the equivalent of "parts per million".

MITIGATION:

The effort to lessen the damages caused, by modifying a project, providing alternatives, compensating for losses or replacing lost values.

MIXING ZONE:

The portion of a stream or lake where effluent is allowed to mix with the receiving water. The size of the area depends on the volume and flow of the discharge and receiving water. For streams the mixing zone it is one-third of the lowest flow that occurs once every 10 years for a seven day period.

NONPOINT SOURCE POLLUTION (NSP):

Pollution whose sources cannot be traced to a single point such as a municipal or industrial wastewater treatment plant discharge pipe. Nonpoint sources include eroding farmland and construction sites, urban streets, and barnyards. Pollutants from these sources reach water bodies in runoff, which can best be controlled by proper land management.

NPS:

See nonpoint source pollution.

OLIGOTROPHIC:

Refers to an unproductive and nutrient-poor lake. Such lakes typically have very clear water. (See also "Eutrophic" and "Mesotrophic.")

OUTFALL:

The mouth of a sewer, drain, or pipe where effluent from a wastewater treatment plant is discharged.

PATHOGEN:

Any infective agent capable of producing disease. It may be a virus, bacterium, protozoan, etc.

PELAGIC:

Referring to open water portion of a lake.

PESTICIDE:

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

PH:

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

PHENOLS:

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

PHOSPHORUS:

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

PLANKTON:

Tiny plants and animals that live in water.

POINT SOURCES:

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

POLLUTION:

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

POLYCHLORINATED BIPHENYLS(PCBs):

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

POLYCHLORINATED ORGANIC COMPOUNDS:

A group of toxic chemicals which contain several chlorine atoms.

PRETREATMENT:

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

PRIORITY POLLUTANT:

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

PRIORITY WATERSHED:

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

PRODUCTIVITY:

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

PUBLIC LAW 92-500 (CLEAN WATER ACT):

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

PUBLIC PARTICIPATION:

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

PUBLICLY OWNED TREATMENT WORKS (POTW):

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

RAP:

See Remedial Action Plan.

RECYCLING:

The process that transforms waste materials into new products.

REMEDIAL ACTION PLAN:

A plan designed to restore beneficial uses to a Great Lakes Area of Concern.

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS):

An investigation of problems and assessment of management options conducted as part of a superfund project.

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 (RCRA):

This federal law amends the Solid Waste Disposal Act of 1965 and expands on the Resource Recovery Act of 1970 to provide a program that regulates hazardous wastes, to eliminate open dumping and to promote solid waste management programs.

RETRO-FIT:

The placement of an urban structural practice in an existing urban area, which may involve rerouting existing storm sewers and/or relocating existing buildings or other structures.

RIPARIAN:

Belonging or relating to the bank of a lake, river or stream.

RIPRAP:

Broken rock, cobbles, or boulders placed on the bank of a stream to protect it against erosion.

RULE:

Refers to Wisconsin administrative rules. See Wisconsin Administrative Code.

RUNOFF:

Water from rain, snowmelt, or irrigation that flows over the ground surface and returns to streams. Runoff can collect pollutants from air or land and carry them to receiving waters.

SECONDARY IMPACTS:

The indirect effects that an action can have on the health of the ecosystem or the economy.

SECONDARY TREATMENT:

Two-stage wastewater treatment that allows the coarse particles to settle out, as in primary treatment, followed by biological breakdowns of the remaining impurities. Secondary treatment commonly removes 90% of the impurities. Sometimes "secondary treatment" refers simply to the biological part of the treatment process.

SEDIMENT:

Soil particles suspended in and carried by water as a result of erosion.

SEICHES:

Changes in water levels due to the tipping of water in an elongated lake basin whereby water is raised in one end of the basin and lowered in the other.

SEPTIC SYSTEM:

Sewage treatment and disposal for homes not connected to sewer lines. Usually the system includes a tank and drain field. Solids settle to the bottom of the tank. Liquid percolates through the drain field.

SLUDGE:

A byproduct of wastewater treatment; waste solids suspended in water.

SOLID WASTE:

Unwanted or discharged material with insufficient liquid to be free flowing.

STANDARDS:

See water quality standards.

STORM SEWERS:

A system of sewers that collect and transport rain and snow runoff. In areas that have separated sewers, such stormwater is not mixed with sanitary sewage.

SUPERFUND:

A federal program that provides for cleanup of major hazardous landfills and land disposal areas.

SUSPENDED SOLIDS (SS):

Small particles of solid pollutants suspended in water.

SYNERGISM:

The total effect is greater than the sum of the individual effects. For example, the characteristic property of a mixture of toxicants that exhibits a greater-than-additive cumulative toxic effect.

TACs:

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

TERTIARY TREATMENT:

See advanced wastewater treatment.

TOP-DOWN MANAGEMENT:

A management theory that uses biomanipulation, specifically the stocking of predator species of fish to improve water quality.

TOTAL MAXIMUM DAILY LOADS:

The maximum amount of a pollutant that can be discharged into a stream without causing a violation of water quality standards.

TOXIC:

An adjective that describes a substance which is poisonous, or can kill or injure a person or plants and animals upon direct contact or long-term exposure. (Also, see toxic substance.)

TOXIC SUBSTANCE:

A chemical or mixture of chemicals which, through sufficient exposure, or ingestion, inhalation or assimilation by an organism, either directly from the environment or indirectly by ingestion through the food chain, will, on the basis of available information cause death, disease, behavioral or immunologic abnormalities, cancer, genetic mutations, or development of physiological malfunctions, including malfunctions in reproduction or physical deformations, in organisms or their offspring.

TOXICANT:

See toxic substance.

TOXICITY:

The degree of danger posed by a toxic substance to animal or plant life. Also see acute toxicity, chronic toxicity and additivity.

TOXICITY REDUCTION EVALUATION:

A requirement for a discharger that the causes of toxicity in an effluent be determined and measures taken to eliminate the toxicity. The measures may be treatment, product substitution, chemical use reduction or other actions that will achieve the desired result.

TREATMENT PLANT:

See wastewater treatment plant.

TROPHIC STATUS:

The level of growth or productivity of a lake as measured by phosphorus content, algae abundance, and depth of light penetration.

TURBIDITY:

Lack of water clarity. Turbidity is usually closely related to the amount of suspended solids in water.

UNIVERSITY OF WISCONSIN-EXTENSION (UWEX):

A special outreach, education branch of the state university system.

VARIANCE:

Government permission for a delay or exception in the application of a given law, ordinance or regulation. Also, see water quality standard variance.

VOLATILE:

Any substance that evaporates at a low temperature.

WASTELOAD ALLOCATION:

Division of the amount of waste a stream can assimilate among the various dischargers to the stream. This limits the amount (in pounds) of chemical or biological constituent discharged from a wastewater treatment plant to a water body.

WASTEWATER:

Water that has become contaminated as a byproduct of some human activity. Wastewater includes sewage, washwater and the water-borne wastes of industrial processes.

WASTE:

Unwanted materials left over from manufacturing processes, refuse from places of human habitation or animal habitation.

WASTEWATER TREATMENT PLANT:

A facility for purifying wastewater. Modern wastewater treatment plants are capable of removing 95% of organic pollutants.

WATER QUALITY AGREEMENT:

The Great Lakes Water Quality agreement was initially signed by Canada and the United States in 1972 and was subsequently revised in 1978 and 1987. It provides guidance for the management of water quality, specifically phosphorus and toxics, in the Great Lakes.

WATER QUALITY LIMITED SEGMENT:

A section of river where water quality standards will not be met if only categorical effluent standards are met.

WATER QUALITY CRITERIA:

A measure of the physical, chemical or biological characteristics of a water body necessary to protect and maintain different water uses (fish and aquatic life, swimming, etc.).

WATER QUALITY STANDARDS:

The legal basis and determination of the use of a water body and the water quality criteria, physical, chemical, or biological characteristics of a water body, that must be met to make it suitable for the specified use.

WATER QUALITY STANDARD VARIANCE:

When natural conditions of a water body preclude meeting all conditions necessary to maintain full fish and aquatic life and swimming, a variance may be granted.

WATERSHED:

The land area that drains into a lake or river.

WETLANDS:

Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a variety of vegetative or aquatic life. Wetland vegetation requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs and similar areas.

WISCONSIN ADMINISTRATIVE CODE:

The set of rules written and used by state agencies to implement state statutes. Administrative codes are subject to public hearing and have the force of law.

WISCONSIN FUND:

A state program that helps pay the cost of reducing water pollution. Funding for the program comes from general revenues and bonds and is based on a percentage of the state's taxable property value. The Wisconsin Fund includes these programs:

Point Source Water Pollution Abatement Grant Program - Provides grants for 60% of the cost of constructing wastewater treatment facilities. Most of this program's money goes for treatment plant construction, but three percent of this fund is available for repair or replacement of private, on-site sewer systems.

Nonpoint Source Water Pollution Abatement Grant Program - Funds to share the cost of reducing water pollution. Nonspecified sources are available in selected priority watersheds.

Solid Waste Grant Program - Communities planning for solid waste disposal sites are eligible for grant money. \$500,000 will be available each year to help with planning costs.

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT GRANT PROGRAM:

A state cost-share program established by the State Legislature in 1978 to help pay the costs of controlling nonpoint source pollution. Also known as the nonpoint source element of the Wisconsin Fund or the Priority Watershed Program.

WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES):

A permit system to monitor and control the point source dischargers of wastewater in Wisconsin. Dischargers are required to have a discharge permit and meet the conditions it specifies.

PRIORITY WATERSHED PROJECTS IN WISCONSIN

1992

<u>Map Number</u>	<u>Large-scale Priority Watershed Project</u>	<u>County(ies)</u>	<u>Year Project Selected</u>
79-1	Galena River*	Grant, Lafayette	1979
79-2	Elk Creek*	Trempealeau	1979
79-3	Hay River*	Barron, Dunn	1979
79-4	Lower Manitowoc River*	Manitowoc, Brown	1979
79-5	Root River*	Racine, Milwaukee, Waukesha	1979
80-1	Onion River*	Sheboygan, Ozaukee	1980
80-2	Sixmile-Pheasant Branch Creek*	Dane	1980
80-3	Big Green Lake*	Green Lake, Fond du Lac	1980
80-4	Upper Willow River*	Polk, St. Crox	1980
81-1	Upper West Branch Pecatonica River*	Iowa, Lafayette	1981
81-2	Lower Black River	La Crosse, Trempealeau	1981
82-1	Kewaunee River*	Kewaunee, Brown	1982
82-2	Turtle Creek	Walworth, Rock	1982
83-1	Oconomowoc River	Waukesha, Washington, Jefferson	1983
83-2	Little River	Oconto, Marinette	1983
83-3	Crossman Creek/Little Baraboo River	Sauk, Juneau, Richland	1983
83-4	Lower Eau Claire River	Eau Claire	1983
84-1	Beaver Creek	Trempealeau, Jackson	1984
84-2	Upper Big Eau Pleine River	Marathon, Taylor, Clark	1984
84-3	Sevenmile-Silver Creeks	Manitowoc, Sheboygan	1984
84-4	Upper Door Peninsula	Door	1984
84-5	East & West Branch Milwaukee River	Fond du Lac, Washington, Sheboygan, Dodge, Ozaukee	1984
84-6	North Branch Milwaukee River	Sheboygan, Washington, Ozaukee, Fond du Lac	1984
84-7	Milwaukee River South	Ozaukee, Milwaukee	1984
84-8	Cedar Creek	Washington, Ozaukee	1984
84-9	Menomonee River	Milwaukee, Waukesha, Ozaukee, Washington	1984
85-1	Black Earth Creek	Dane	1985
85-2	Sheboygan River	Sheboygan, Fond du Lac, Manitowoc, Calumet	1985
85-3	Waumandee Creek	Buffalo	1985
86-1	East River	Brown, Calumet	1986
86-2	Yahara River - Lake Monona	Dane	1986
86-3	Lower Grant River	Grant	1986
89-1	Yellow River	Barron	1989
89-2	Lake Winnebago East	Calumet, Fond du Lac	1989
89-3	Upper Fox River (Ill.)	Waukesha	1989
89-4	Narrows Creek - Baraboo River	Sauk	1989
89-5	Middle Trempealeau River	Trempealeau, Buffalo	1989
89-6	Middle Kickapoo River	Vernon, Monroe, Richland	1989
89-7	Lower East Branch Pecatonica River	Green, Lafayette	1989
90-1	Arrowhead River & Daggets Creek	Winnebago, Outagamie, Waupaca	1990
90-2	Kinnickinnic River	Milwaukee	1990
90-3	Beaverdam River	Dodge, Columbia, Green Lake	1990
90-4	Lower Big Eau Pleine River	Marathon	1990
90-5	Upper Yellow River	Wood, Marathon, Clark	1990
90-6	Duncan Creek	Chippewa, Eau Claire	1990
91-1	Upper Trempealeau River	Jackson, Trempealeau	1991
91-2	Neenah Creek	Adams, Marquette, Columbia	1991
92-1	Balsam Branch	Polk	1992
92-2	Red River - Little Sturgeon Bay	Door, Brown, Kewaunee	1992

<u>Map Number</u>	<u>Small-scale Priority Watershed Project</u>	<u>County(ies)</u>	<u>Year Project Selected</u>
SS-1	Bass Lake*	Marinette	1985
SS-90-1	Dunlap Creek	Dane	1990
SS-90-2	Lowes Creek	Eau Claire	1990
SS-90-3	Port Edwards - Groundwater Prototype	Wood	1990
SS-91-1	Whittlesey Creek	Bayfield	1991
SS-91-2	Spring Creek	Rock	1991

<u>Map Number</u>	<u>Priority Lake Project</u>	<u>County(ies)</u>	<u>Year Project Selected</u>
PL-90-1	Minocqua Lake	Oneida	1990
PL-90-2	Lake Tomah	Monroe	1990
PL-91-1	Little Muskego, Big Muskego and Wind Lakes	Waukesha, Racine, Milwaukee	1991
PL-92-1	Lake Noquebay	Marinette	1992
PL-92-2	Lake Ripley	Jefferson	1992

* Project completed



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.

