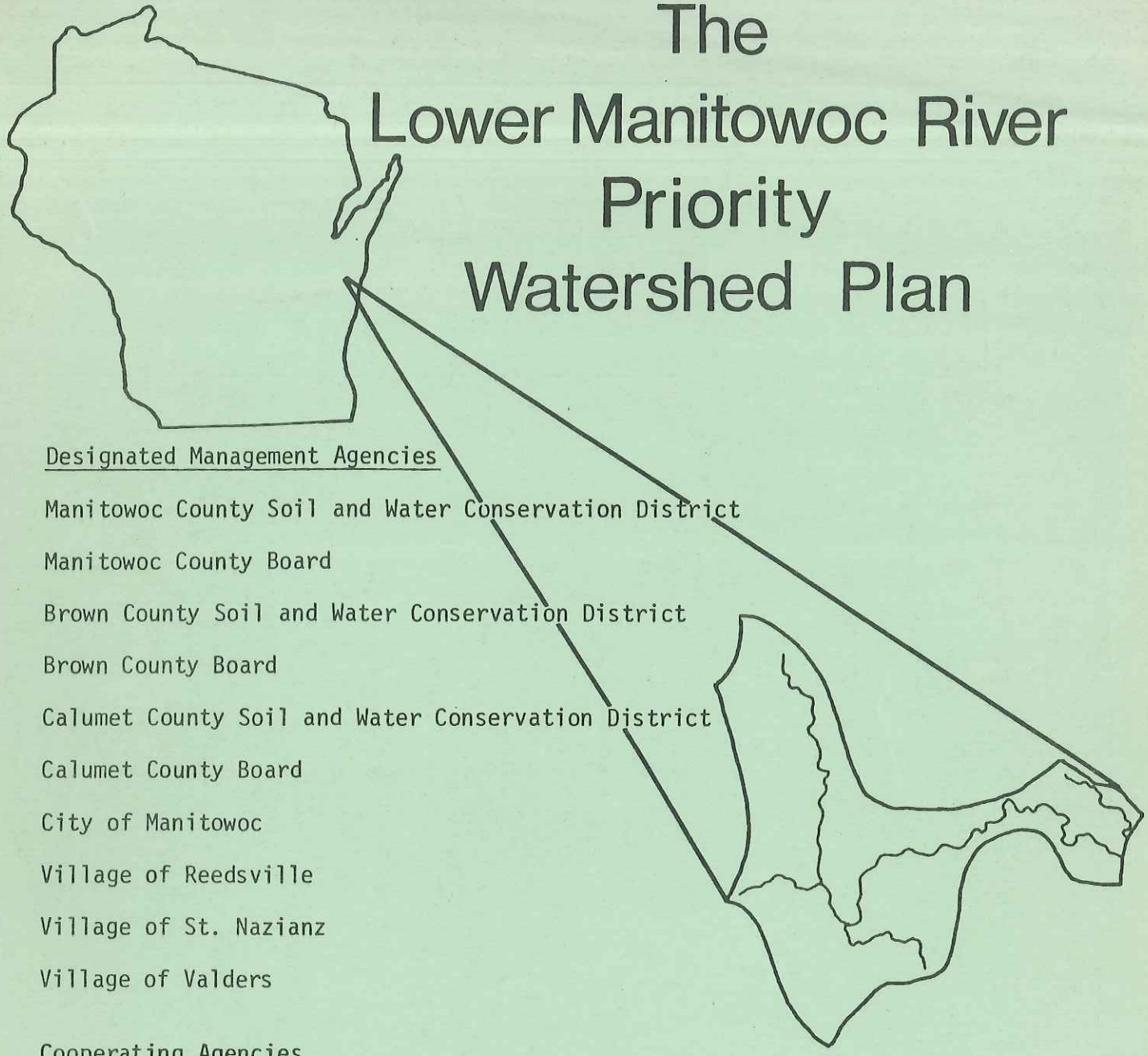
The Lower Manitowoc River Priority Watershed Plan



Designated Management Agencies

Manitowoc County Soil and Water Conservation District

Manitowoc County Board

Brown County Soil and Water Conservation District

Brown County Board

Calumet County Soil and Water Conservation District

Calumet County Board

City of Manitowoc

Village of Reedsville

Village of St. Nazianz

Village of Valders

Cooperating Agencies

U.S.D.A. Agricultural Stabilization and Conservation Service

U.S.D.A. Soil Conservation Service

University of Wisconsin Extension

Wisconsin Board of Soil and Water Conservation Districts

Wisconsin Department of Natural Resources

This plan was prepared with the assistance of the Wisconsin Department of Natural Resources and the Wisconsin Board of Soil and Water Conservation Districts under the provisions of the Wisconsin Nonpoint Source Water Pollution Abatement Program.

TABLE OF CONTENTS

Lower Manitowoc River Priority Watershed Plan

Program for Implementation

Lower Manitowoc River Watershed: Priority Watershed Plan

Introduction

The Lower Manitowoc River Watershed is one of the first five priority watersheds selected under the Wisconsin Nonpoint Source Water Pollution Abatement Program established by the Wisconsin Legislature in 1978. The overall purpose of the program is to achieve and maintain fishable and swimmable water quality. It is an implementation program directed towards meeting the needs identified in the areawide water quality management plans.

Cost-sharing monies are available to municipalities, landowners and land operators for installing best management practices. The majority of the funds are focused into priority watersheds where nonpoint source control needs are critical. Cost-sharing is available only in those portions of the watershed impacting water quality.

The Lower Manitowoc River Watershed was selected through a three-step process. First, the watershed was identified in the top 25 percent of watersheds in the state. Second, the Lake Michigan Regional Policy Advisory Committee, a committee consisting of representatives from each of 19 counties, reviewed the top 25 percent list and recommended the watershed. Finally, the Department of Natural Resources upon the advice of the State Nonpoint Source Coordinating Committee, comprising representatives of local interests and state and federal agencies, selected the Lower Manitowoc River Watershed. The selection of the Lower Manitowoc River Watershed was based on three major criteria: (1) the severity of the water quality problems; (2) the seriousness of the nonpoint sources; and (3) the capability and willingness of the local units of government and agencies to carry out the implementation program.

WATERSHED DESCRIPTION

The Lower Manitowoc River Watershed is located in east-central Wisconsin on the western shore of Lake Michigan and comprises about 160 square miles or 102,000 acres. The watershed extends from the confluence of the North and South Branches of the Manitowoc River near the Manitowoc-Calumet County line downstream to the mouth of the river in the City of Manitowoc. It is the downstream-most watershed of the four watersheds within the Manitowoc River Basin. Over 90 percent of the watershed is within Manitowoc County; the remaining portions lie within Brown and Calumet Counties. (See figure 1).

About 67 percent of the watershed is in agricultural land use and about 5 percent is in urban land use. The rest is primarily wetlands and woods. Dairying is the primary farming activity. The farms in the watershed are small, averaging 148 acres. The livestock population is about 13,000 cows. About two-thirds of the City of Manitowoc and Villages of Valders, St. Nazianz and Reedsville comprise the incorporated areas. Although the human population of the watershed is about 30,000 an additional 10,000 people in the City of Manitowoc outside the boundaries of the watershed will also be affected by the watershed project.

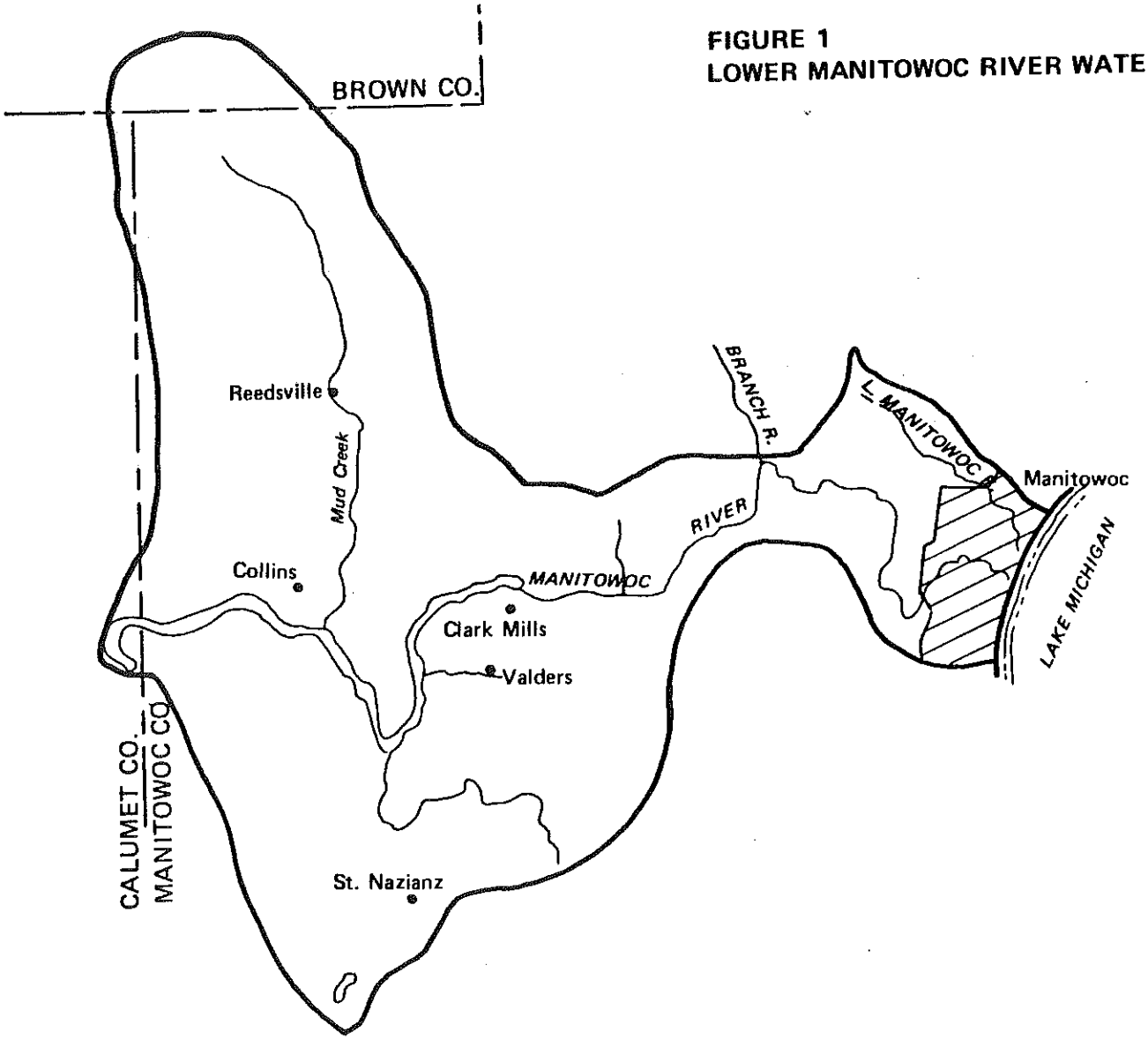


FIGURE 1
LOWER MANITOWOC RIVER WATERSHED

The watershed's topography varies from rolling to moderately steep. Some steep slopes exist along the Manitowoc River in the eastern half of the watershed. The soils are generally fine-textured; clay loams predominate. (See figure 2). Precipitation does not readily infiltrate into these heavy soils, and runoff is great.

Because it is close to Lake Michigan, Manitowoc County has a modified continental climate. The average annual rainfall is about 29 inches, the average annual snowfall 40 inches; and the average temperature is about 46°F. The growing season for the area is about 160 days. During 1976-1978 about 70 percent of the volume of runoff occurs during the early spring and is associated with snowmelt.

IMPLEMENTING AGENCIES AND UNITS OF GOVERNMENT

The areawide water quality management plan for the Manitowoc River Basin identifies the following designated management agencies:

In rural (unincorporated) areas:

Manitowoc County Soil and Water Conservation District jointly with Manitowoc County Board:

Brown County Soil and Water Conservation District jointly with Brown County Board; and

Calumet County Soil and Water Conservation District jointly with Calumet County Board.

In incorporated areas:

City of Manitowoc;
Village of Reedsville;
Village of St. Nazianz; and
Village of Valders.

Each designated management agency is responsible for coordinating implementation within its jurisdiction.

The Manitowoc County Soil and Water Conservation District is the lead designated management agency. As such, it is responsible for coordinating activities among all other designated management agencies within the watershed. Manitowoc County Soil and Water Conservation District has also taken the lead in identifying nonpoint sources within the watershed.

Several U.S. Department of Agriculture agencies will assist the local designated management agencies: the Soil Conservation Service will help provide technical assistance to landowners and operators; the Agricultural Stabilization and Conservation Service will perform certain fiscal management and sign-up functions; and te University of Wisconsin Extension will assist in information and education activities. (Further discussion of agency roles is contained in the Program for Implementation, Part 2 of this plan.)

Table 1. Phosphorus Levels Measured At Mouth Of Manitowoc River

Year	Pounds of Phosphorus Per Year
1973	211,000
1974	196,000
1975	106,000
1976	103,000
1977	39,000
1978	182,000
Average	139,000

During 1976, approximately 24,000 pounds of phosphorus were discharged from municipal wastewater treatment plants. The majority-but not all-of the phosphorus will reach the mouth of the Manitowoc River. The impoundments on the river will retain some portion. Assuming 80 percent of the phorphorus from the treatment plants reach the mouth, on the average approximately 19,000 pounds of phosphorus at the river mouth are from point sources and the remaining 120,000 from nonpoint sources.

To illustrate the seriousness of this quantity of phosphorus, data from the Manitowoc River is compared to data from the Peshtigo River, (figure 3 and 4) a forested area. These data indicate a 50 percent reduction in phosphorus from nonpoint sources within the watershed is a reasonable objective (figure 4). Implementation activities within the Lower Manitowoc River Watershed alone will reduce the phosphorus load by 20-30 percent.

Bullhead Lake

Bullhead Lake is a landlocked seepage lake in the western portion of the watershed. Its surface area is 67 acres; its maximum depth is 35 feet; and its drainage area is about three square miles. The lake supports a naturally reproducing walleye and largemouth bass fishery. Musky have been stocked.

The lake has serious algae problems and is classified as eutrophic or very eutrophic. In 1978, the lake was treated with aluminum sulfate to reduce the amount of phosphorus released from the lake bottom's sediments.

Manitowoc River

The main stem (lower) Manitowoc River is formed by the confluence of the North and South Branches and flows eastwardly for about 36 miles before entering Lake Michigan. This river has two distinct portions. The upper half, above Clark Mills, is wide and slow-moving. Flooding problems have occurred in the spring during recent years. The lower half has a larger gradient and rocky channel. Flows are high in the spring but shallow the rest of the year.

The river supports a warm water fishery - primarily northern pike, channel catfish, and black bullheads. Trout from Lake Michigan use the downstream-most section for spawning migrations. A whitewater canoe race from Oslo Dam to Manitowoc is held each April.

The overall water quality, based on the Hilsenhoff Biotic Index, varies from poor to very poor upstream of Clarks Mills and fair to good downstream of Clarks Mills. (See Figure 5) The biotic index is based on the type and number of aquatic insects at specific sites. Certain insects can only live in good quality waters. Others tolerate poor quality waters. The index is most responsive to levels of organic pollution affecting the amount of oxygen in the water.

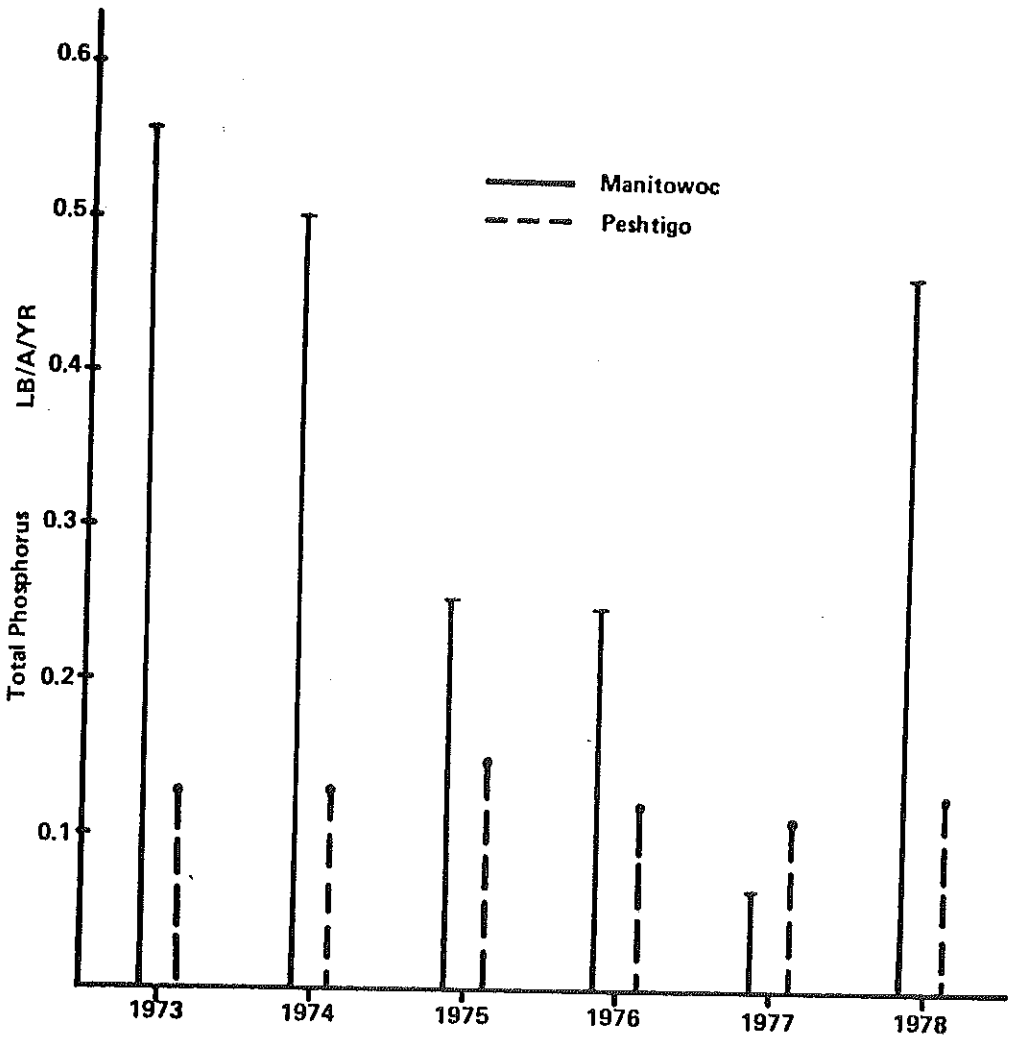


FIGURE 3
ANNUAL NONPOINT SOURCE PHOSPHORUS YIELD FOR THE MANITOWOC RIVER (1973-1978) AS COMPARED TO THE PESHTIGO RIVER.

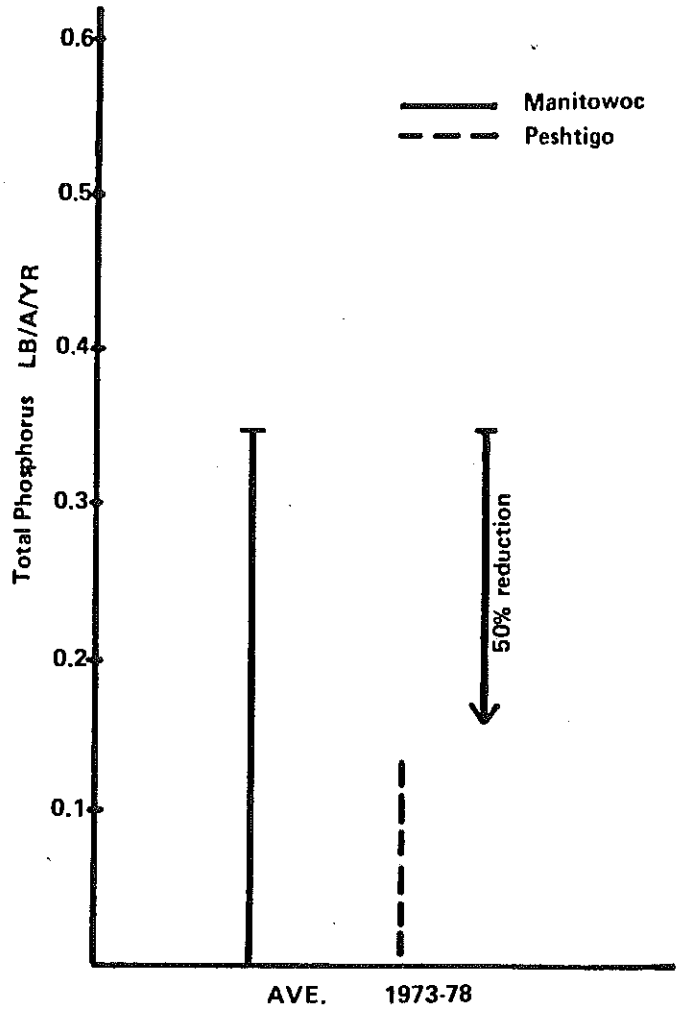


FIGURE 4
AVERAGE ANNUAL (1973-1978) NONPOINT SOURCE PHOSPHORUS YIELD FROM THE MANITOWOC AND PESHTIGO RIVERS AND 50 PERCENT TARGET LEVEL OF REDUCTION.

Fish and aquatic life and recreational water quality standards must be met in the Manitowoc River. Dissolved oxygen standards are met but fecal coliform standards are not. Water quality samples collected in the spring of 1979 found fecal coliform counts above 200 (the standard) in the segment from Clark Mills downstream. Counts were as high as 5,400 (see figure 6). These levels are potentially harmful to human health.

Phosphorus levels are also high. Fifteen years of water quality monitoring at the west side of the City of Manitowoc show an average phosphorus concentration of about 0.35 milligrams per liter.

Additional problems include sedimentation on the riverbed - especially in the segment upstream from Clark Mills - and the harbor area.

Little Manitowoc River

The Little Manitowoc River is a small tributary to Lake Michigan. It is about 5 miles in length with the lower 1 1/2 miles being within the City of Manitowoc. The stream is required to meet fish and aquatic life and recreational use standards.

Spring and fall runs of smelt and spawning lake trout make up the primary fishery.

The overall water quality, based on the Hilsenhoff Biotic Index, is fair. Data on phosphorus, dissolved oxygen and fecal coliform is not sufficient to assess standards violations.

Mud Creek, St. Nazianz Creek and Valders Creek

Mud Creek, St. Nazianz, Valders Creek, and several of other small tributaries are intermittent. Therefore, they are required to meet marginal or intermediate use standards but not fish aquatic life and recreational use standards. The biotic index rating (shown on figure 5) are generally very poor, poor, or fair. The ratings for Valders and St. Nazianz Tributary's are potentially affected by discharges from sewage treatment plants.

Water Quality Objectives

The water quality objectives for the Lower Manitowoc River Watershed are:

1. Reduce the phosphorus from the watershed entering the nearshore waters of Lake Michigan by 50 percent.

2. Reduce the phorphorus entering Bullhead Lake to the extent practicable.

3. Improve the overall water quality in the Lower Manitowoc and Little Manitowoc Rivers to a good rating as indicated by the Hilsenhoff Biotic Index.

4. Reduce to fecal coliform counts in the Manitowoc River to 200 counts per 100 milliliters.

SOURCES

Almost all areas of the watershed, with the exception of the drainage area to Bullhead Lake, eventually drain into Lake Michigan. However, lands 1/8 mile

FIGURE 5
HILSENHOFF BIOTIC INDEX RATINGS FOR THE LOWER MANITOWOC RIVER WATERSHED.

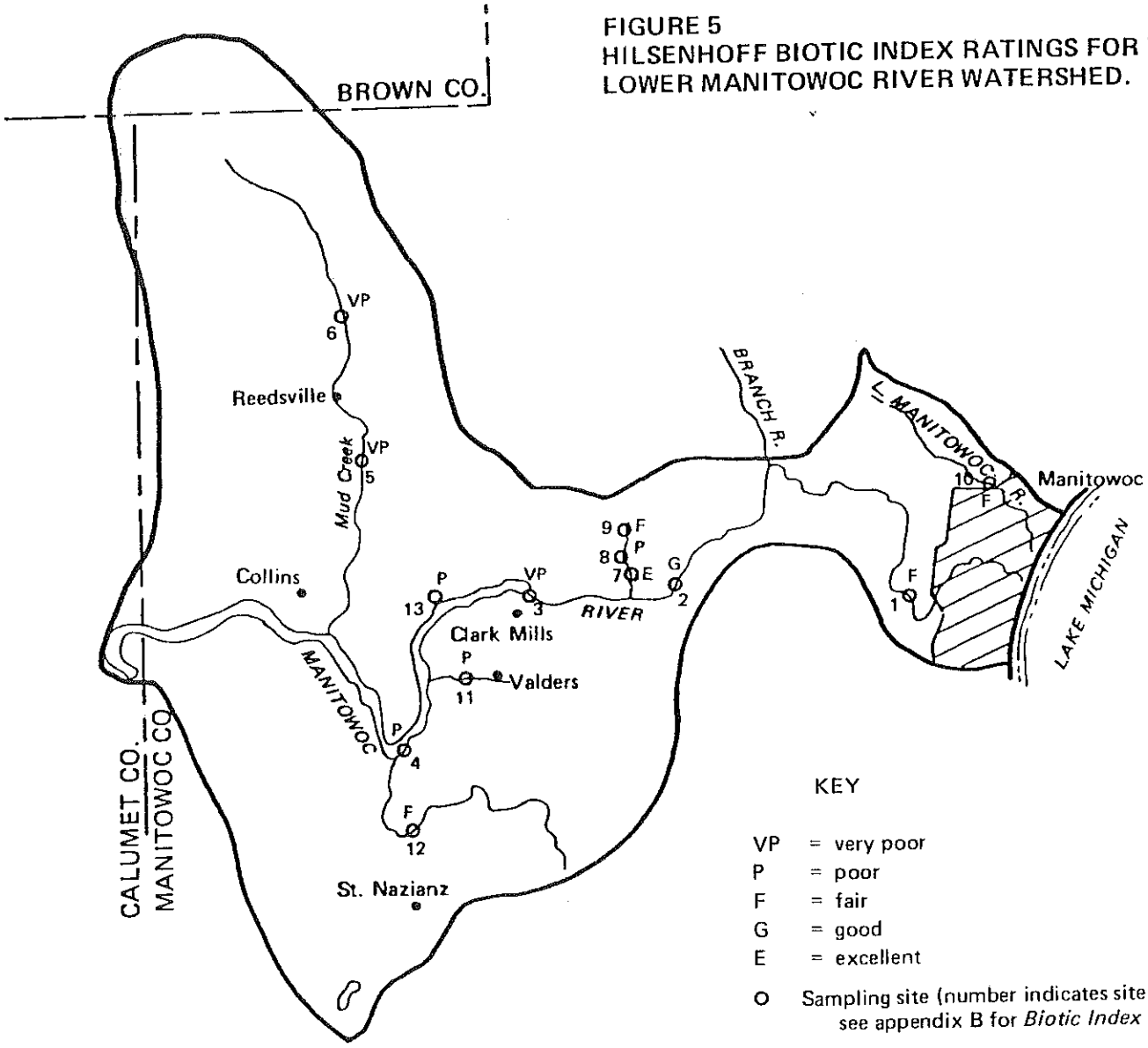
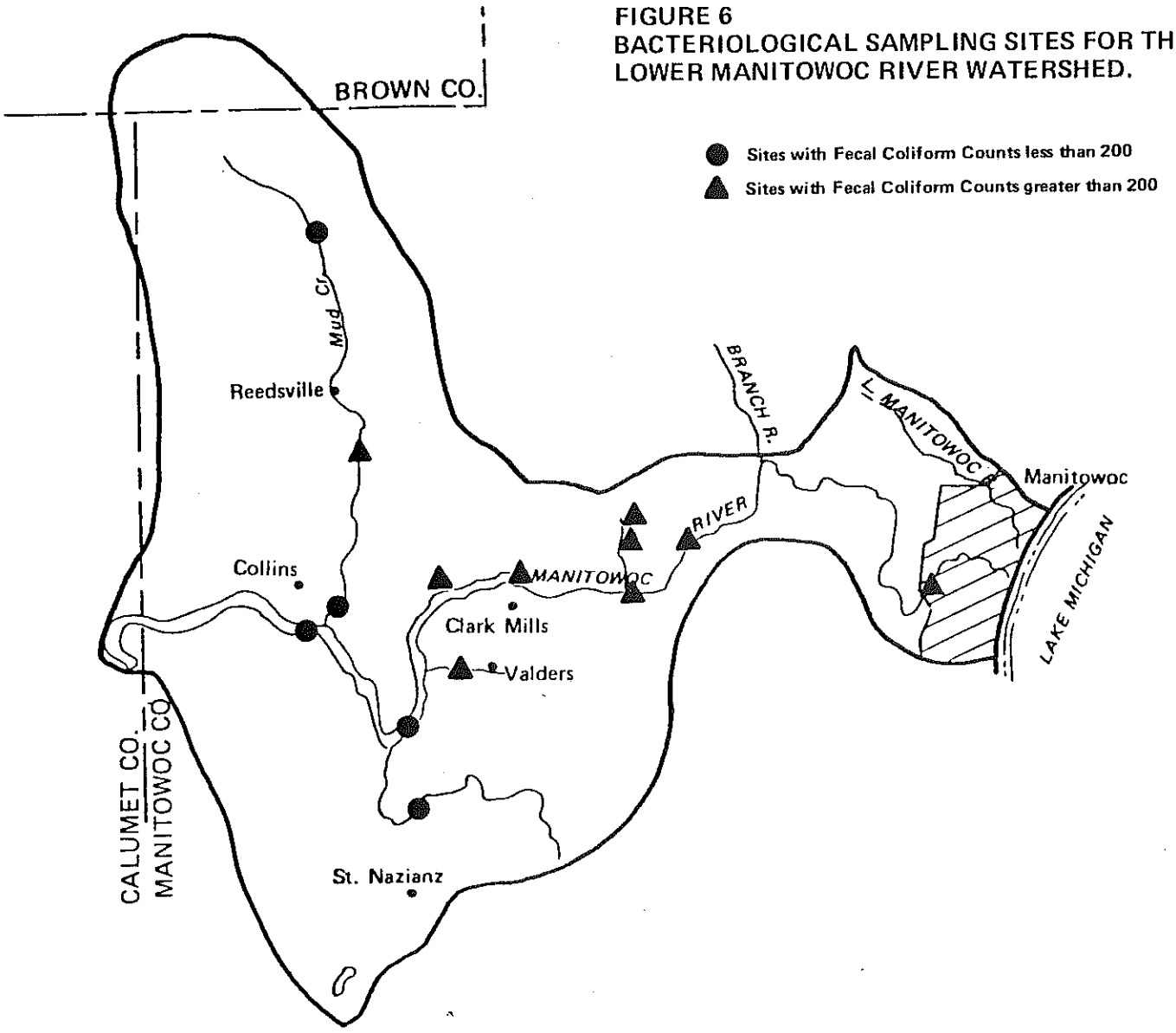


FIGURE 6
BACTERIOLOGICAL SAMPLING SITES FOR THE LOWER MANITOWOC RIVER WATERSHED.



or less from a watercourse (or 1/4 mile for slopes 6 percent or greater) are considered to be the most critical. Watercourses include all perennial and intermittent streams, wetlands and storm sewers and gutters. Nonpoint sources in this critical area were inventoried and evaluated for their phosphorus loss.

Livestock Wastes

Livestock wastes carried in runoff water from barnyards and frozen or saturated fields are a source of phosphorus and fecal coliform bacteria. According to assessors data 333 livestock operations are located within the watershed. Livestock operations can be divided into two groups: smaller herds and larger herds. Smaller herds are defined as less than 20 milk cows (about 30 animal units). Larger herds are 20 or more cows.

The 83 smaller herds constitute 25 percent of the operations but less than 10 percent of the livestock. The barnyards of 35 smaller operations (constituting approximately 525 animal units) are located within 1/8 mile of a watercourse, the most critical area. In addition to the 35 operations, 30 smaller operations (constituting 450 animal units) potentially spread manure in the critical area. Eighteen smaller operations are not in the critical area. (See figure 7 for a summary.)

Figuring 2 pounds of phosphorus per animal unit* for barnyard runoff for the 525 animal units yields an estimated 1,050 lbs. of phosphorus per year. Phosphorus from manure spread on fields is also estimated to be 2 lbs. per animal unit. The phosphorus yield from manure spreading is estimated at 1,950 lbs./year from the 975 animal units.

Forty-five of the 250 larger operations have barnyards immediately adjacent to a stream. Another 59 have barnyards within 1/8 mile of a watercourse. Together these 104 operations comprise about 4,600 cows (6,425 animal units). In addition, 88 operations (3,200 cows or 4,175 animal units) have fields within the critical area. The remaining 58 operations are not in the critical area.

The estimated amount of phosphorus is 21,800 lbs./year from manure spread on frozen or saturated fields and 12,850 lbs./year from manure carried in runoff from barnyards.

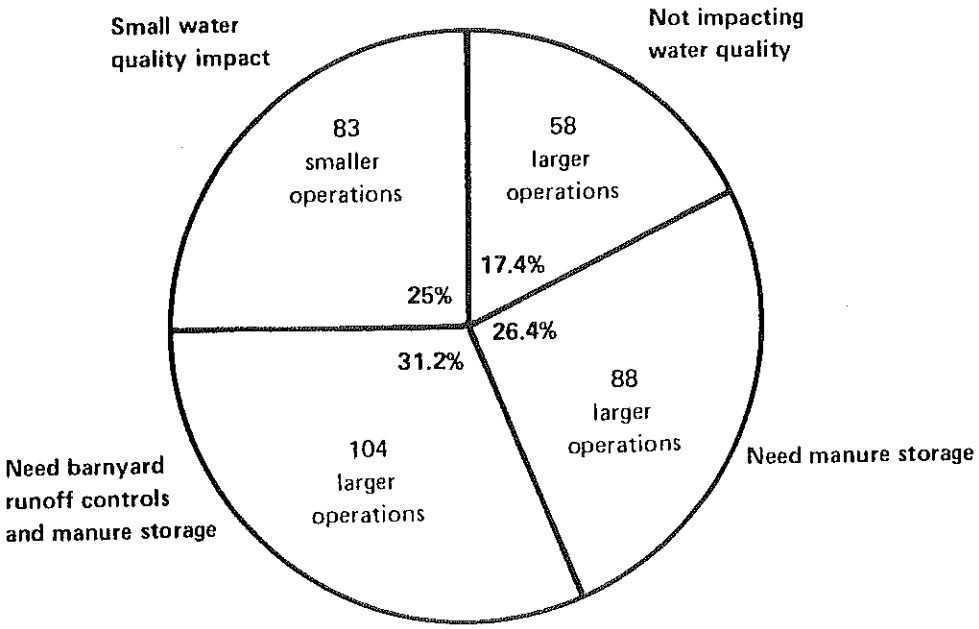
Cropland Erosion

Dairy farming is the primary agricultural activity. Cash cropping is only minimal. Practically all of the cropland is in a corn-oats-hay rotation. All of the plowing is done in the fall due to the clayey soils.

About 23 percent of the cropland in Manitowoc County has soil losses greater than 5 tons/acre/year. Almost all (95%) is from steeper slopes, (6 percent or greater). Also, 99 percent of the cropland with steeper slopes have soil losses greater than 5 tons/acres/year. About 15,835 acres having slopes 6 percent or greater within the critical area of the watershed.

*Draper 1978

FIGURE 7
SUMMARY OF THE 333 LIVESTOCK OPERATIONS
IN THE LOWER MANITOWOC RIVER WATERSHED.



To estimate amounts of phosphorus associated with cropland erosion, 0.8 lbs./acre/year is used for steep slopes and 0.2 lbs./acre/year for shallow slopes. Therefore, 15,835 acres of steep slopes would lose 12,600 lbs. of phosphorus per year. The 50,000 acres having shallow slopes would lose 10,000 lbs. of phosphorus.

Streambank Erosion in Rural Areas

Streambank erosion in rural areas is scattered. At nine sites livestock have access to streams. In addition, croplands are plowed up to the streams at five locations.

Roadside Erosion

Roadside erosion is a scattered problem throughout the watershed. The impact on water quality is relatively small.

Urban Nonpoint Sources

About two-thirds of the City of Manitowoc is within the watershed. This urban area constitutes about 5 percent of the watershed. Urban nonpoint sources include dirt and debris accumulating on streets from atmospheric fallout and vehicular exhaust and leaves collecting in gutters.

The City of Manitowoc's street sweeping and leaf collection is much better than average. The downtown commercial area is swept two times a week and the rest of the city once a week. Sweeping begins in early spring, before the snow melts completely to remove sand used on snow and ice covered streets. Citizens are encouraged to either bag leaves or rake them onto the area between the sidewalk and the street - but not into the street. Leaves are picked up by city crews.

Values for phosphorus loss from urban areas range from 1 to 3 lbs./acre/year. Because of better than average street sweeping and leaf collection, the amount of phosphorus flushed from city streets is probably below average. Figuring 1 lb./acre/year, the 5,000 acres of urban land will lose 5,000 lbs. of phosphorus per year.

Two sites along the Little Manitowoc River within the city boundaries are eroding due to scour from storm sewer discharges. Another 2-acre site on a very steep slope along the Manitowoc River is eroding.

Construction

There are two major construction activities within the Lower Manitowoc River watershed: home construction and highway construction.

No subdivisions have been created in Manitowoc County during the last 8 years. Land divisions with more than 5 lots or less than 5 acres are covered under a county development plan. However to avoid state and county restrictions, most land divisions are made through certified surveys. Certified surveys allow land divisions of lots smaller than 1.5 acres or fewer than 5 lots in a year.

Most of the building sites are scattered, construction occurs on one or two lots at a time. Manitowoc County issued 200 building permits in 1978. About 50 were within the watershed.

Road construction preceding sale of lots impacts water quality in scattered locations. Currently, a development area within the Little Manitowoc River subwatershed has eroding roadside ditches discharging sediment into a stream.

Another major construction project is Interstate Highway 43 just west of the City of Manitowoc. Road construction on steep, clayey soiled slopes is causing severe erosion problems. Construction of a bridge over the Manitowoc River is disturbing a very steep streambank and impacting on water quality.

Municipal Wastewater Treatment Plants

Most of the point sources within this watershed are small in size. Their impact on the Manitowoc River and the nearshore waters of Lake Michigan is relatively insignificant. However, the impact of a few of the point sources on small intermittent tributaries is significant.

Reedsville (population 1,000) completed construction of a new wastewater treatment plant in 1973. The plant is meeting its permit conditions. Estimated phosphorus load is 2,000 pounds per year based on 8 milligrams per liter (mg/l) in the discharge.

St. Nazianz's (population 806) wastewater treatment plant is not achieving secondary treatment standards and degrades the water quality of St. Nazianz Creek. St. Nazianz is number 107 on the federal priority list. A facility plan is being developed. Estimated phosphorus load is 2,300 lbs./year.

Valders' (population 966) wastewater treatment plant is providing secondary treatment. However, advanced wastewater treatment is required to retain marginal use water quality standards on Valders Tributary. Valders is number 94 on the federal priority list. Estimated phosphorus load is 3,500 lbs./year.

Collins (population 150) uses a lagoon system for wastewater treatment. No discharge has been recorded.

Construction of the Manitowoc wastewater treatment plant was completed in 1978. The plant discharges directly to Lake Michigan. It discharges phosphorus at concentrations less than 1 mg/l. Estimated phosphorus load is 28,500 lbs./year.

Septic Systems

Generally, the heavy, fine-textured soils covering much of the watershed are not suitable for septic systems and a substantial number of failing systems can be expected. However, very little information is available on the number of inadequate systems.

The two major concentrations of septic systems are within Clark Mills (population 200) and Kellners Corners (population 800). The areawide water quality management plan stated over 10 percent of the septic systems in Clark Mills are malfunctioning. The federal priority number for Clark Mills is 364. Kellners Corners, adjoining the City of Manitowoc, has a significant number of malfunctioning septic systems causing public health problems. Effluents are discharged into roadside ditches and intermittent streams.

The Manitowoc County Planning and Park Commission has an ongoing septic system permit and inspection program. Since the program started in 1967, 70-80 percent of the new installations have been inspected. During 1978, 291 sanitary permits were issued for the entire county. About one-quarter were within the Lower Manitowoc River Watershed. Septic system malfunctioning is caused by older systems installed on unsuitable soils or newer systems not being maintained.

Summary

Manure carried in runoff from barnyards and frozen or saturated fields is the most serious source of phosphorus. Livestock operations having 20 cows or more and cropland erosion on steep slopes within the critical area are the most serious sources. Table 2 shows these sources contribute 65 percent of the phorphorus to lakes and streams within the watershed.

Table 2. Sources of Phosphorus in the Lower Manitowoc Watershed

Nonpoint Sources	Phosphorus (lbs/year)	Percent of Total
Livestock Wastes		
Operations with more than 20 cows		
Manure Spreading	22,000 lbs/yr	30%
Barnyard Runoff	13,000	18%
Operations with 20 cows or less		
Manure Spreading	2,000	3%
Barnyard Runoff	1,000	1.4%
Cropland Erosion		
Steep slopes	13,000	17%
Shallow slopes	10,000	14%
Urban Areas	5,000	7%
Streambank Erosion	NA*	
Septic Systems	NA	
Roadside Erosion Construct	NA	
Construction Activities	NA	
Total Nonpoint Sources	66,000	
Point Sources		
Municipal Treatment Plants		
Within Watershed	8,000	
Directly to Lake Michigan	28,500	
Total Point Sources	36,500	

*NA - Not Available

OBJECTIVES, PLANNED ACTION, AND EFFECTS

The priority management area (PMA) is the portion of the watershed where pollutants carried in runoff have the greatest potential to reach watercourses and where installation of best management practices will be effective in controlling nonpoint sources. The priority management area for this watershed is defined as all lands within 1/8 mile of an intermittent or perennial stream, lake, wetland or storm sewer system. The priority management area is extended to 1/4 mile for lands with slopes 6 percent or greater. In practice, the priority management area will include all fields falling within the defined area.

Agricultural Lands Within the PMA

Within the PMA barnyard runoff and manure spreading from operations with 20 or more cows and cropland erosion on slopes 6 percent or greater will have to be controlled to achieve a 50 percent reduction in the amount of phosphorus entering the nearshore and other waters of Lake Michigan. Table 3 shows the existing amount, expected reduction and remaining amount of phosphorus from each category of sources. A 75 percent reduction is assumed for best management practices to control manure from barnyards and fields and to reduce erosion from the steeper croplands to the T factor for the clayey soils.

Table 3. Phosphorus Reduction by Source Categories

	Phosphorus Yield in lbs/year		
Nonpoint Sources	Existing	Expected Reduction	Remaining
Urban Nonpoint Sources	5,000	0	5,000
Livestock Waste			
Operations with 20 cows or more			
Manure Spreading	22,000	16,000	6,000
Barnyard Runoff	13,000	10,000	3,000
Operations with less than 20 cows			
Manure Spreading	2,000	0	2,000
Barnyard Runoff	1,000	0	1,000
Cropland			
Steep slopes	13,000	9,000	4,000
Shallow slopes	10,000	0	10,000
TOTAL	66,000	35,000	31,000
Point Sources			
Municipal Treatment Plants			
Within Watershed	8,000	0	8,000
Directly to Lake Michigan	28,500	0	28,500
Total	36,500		36,500

Livestock wastes can be controlled through barnyard runoff and manure spreading management. Manure spreading management includes storage and spreading when immediate incorporation is possible as well as spreading on very shallow slopes, within internally drained areas or on fields away from watercourses. The number of practices by each subwatershed is summarized in table 4.

Table 4. Livestock Waste Management Practice Needs

	Number of Livestock Practices Needed		
Sub watershed	Barnyard Runoff Management	Storage	Spreading on Suitable Areas Without Storage
Mainstem of the Manitowoc River	30	45	5
Little Manitowoc River	5	6	0
Mud Creek	41	65	8
Valder's - St. Nazianz	23	43	8
Bullhead Lake	5	11	2
Total	104	170	24

Cropland nonpoint source control on steeper slopes can be achieved through erosion control. Grassed waterways, contour strips, terraces, channel stabilization, and critical area stabilization are commonly needed. The estimated number of each practice needed by subwatershed is summarized on Table 5. Channel stabilization is primarily rock structures. Tree planting is the most common method of critical area stabilization.

Table 5. Cropland Management Practice Needs

		Number of Cropland Practices Needed				
Subwatershed	Lands with Steeper Slopes Within priority Management area (acres)	Waterways (feet)	Contour Strip (acres)	Terraces (feet)	Channel Stabilization (number of structure)	Critical Area Stabilization (acres)
Mainstem of the Manitowoc River	7,750	45,420	890	10,600	18	106
Little Manitowoc	680	4,080	80	950	2	10
Mud Creek	1,700	10,030	200	2,370	4	24
Valders-St. Nazianz	5,210	31,260	610	7,300	12	73
Bullhead Lake	675	4,020	80	930	2	9
Total	15,835	95,010	1,810	22,150	38	222

Streambank protection and other practices are also needed. Livestock exclusion is needed at nine locations and buffer strips along cropland at five locations.

Other best management practices not itemized are:

Contour cropping
Diversions
Minimum tillage
Livestock exclusion from woodlots
Pesticide management
Pasture and hayland planting
Cultural management
Crop rotation
Facility location
Fertilizer management
Crop residue use

Practice definitions are included in Appendix A.

Construction Activities

Erosion from construction sites in general and "subdivision" roadsides in specific must be controlled. Control programs must involve the Manitowoc County Planning Commission, Towns, and the Manitowoc Soil and Water Conservation District. Specific recommendations are as follows:

1. The Planning Commission should expand its program for informing developers of the pollution potential from roadside erosions.

   Generally, through issuing permits, the Planning Commission is notified of proposed construction in advance of any earth disturbance. The Commission is in the best position to discuss the seriousness of the problem with the developer.

2. Towns should enact ordinances requiring adequate vegetative cover on ditches and roadsides before the Town accepts the road. The Planning Commission and Soil and Water Conservation District can assist towns in this effort.

   Roads are graded before they are turned over to towns for public ownership. Once the road is publicly owned, towns are hesitant to seed and mulch since they must pay for it. To stabilize the ditches and roadsides as soon as practical and have the developer bear the costs, permanent vegetation cover should be a requirement of town acceptance of roads.

3. The Soil and Water Conservation District should inform developers of potential management practices to help select the best practices for specific projects.

Urban Areas

The City of Manitowoc should maintain its current street sweeping and leaf collection programs. These programs could serve as an example for other cities. Additional recommendations may be necessary in the future as results from ongoing research becomes available. However, these programs are sufficient at this time.

No recommendations are made for the Villages of Reedsville, St. Nazianz, and Valders. Since the urbanized area constitutes a very small portion of the watershed detailed inventories were not conducted.

ESTIMATED COSTS

Total cost estimates are based on $2,500 for each barnyard runoff control practice and $11,000 for each storage facility (see Table 6). Cost-sharing needs are based on 70% for each barnyard runoff control practice and $5,000 for each manure storage facility.

Table 6. Livestock Waste Management Practice Costs

Practice	No of Practices	Total Cost	Cost-sharing
Barnyard Runoff Control	104	$ 260,000	$ 182,000
Manure Storage	170	1,904,000	850,000
		$2,164,000	$1,032,000

Cost estimates for cropland management practices are shown on table 7. Cost-sharing is based on 50% for contour strips and 70% for the other practices.

Table 7. Cropland Management Practice Costs

	No of Practices	Total Costs	(Unit Costs)	Cost-sharing
Waterways (feet)	95,010	$166,600	($1.75/ft)	$ 116,620
Contour Strips (acres)	1,810	22,160	($12/acre)	11,080
Terraces (feet)	22,150	38,800	($1.75/ft)	27,160
Channel Stabilization (structures)	38	30,400	($800 each)	21,280
Critical Area Stabilization (acres)	222	26,640	($120/acre)	18,650
		$284,600		$194,790

Streambank protection and other practices, livestock exclusion at nine locations, and buffer strips along cropland are needed at an estimated cost of $42,000.

Table 8. Summary of Costs to Implement BMPs

Source Category	Total Cost	Cost-sharing
Livestock waste management	$2,164,000	$1,032,000
Cropland	284,600	194,790
Other Rural	42,000	29,400
Urban	3,300	2,310
Total	$2,493,900	$1,258,500

PROJECT MONITORING AND EVALUATION PLAN

The Wisconsin Department of Natural Resources will continue to monitor the water quality within the Lower Manitowoc River watershed. Currently a water quality monitoring station is located just west of the City of Manitowoc. Water samples are collected monthly and analyzed for solids, nutrients, and bacteria. The U.S. Geological Survey maintains a flow monitoring station at the same site. Comprehensive water quality assessments are conducted every five years throughout the Manitowoc River Basin.

To assess water quality improvements, the following activities are identified (in order of decreasing priority):

1. Monthly monitoring at established station.

   An ongoing activity.

2. Biotic monitoring at 15 sites.

   Sampling two times per year. Projected cost - $1,000/year.

3. Monthly monitoring at the mouth of the Branch River and on the Manitowoc River downstream from the confluence of the North and South Branches. Complementary to the monitoring at the established station.

4. Bacteriological monitoring at 15 sites.

   Five samples should be collected at each site during a month, three monitoring months each year. Projected cost - $2,250/year.

5. Fish survey - 1984.

   Repetition of the 1979 fish survey. Projected cost - $5,000

6. Runoff event monitoring at one site.

   All runoff events will be monitored with an automated station. The site is the same as the monthly monitoring station. Projected cost - $17,000/year.

Detailed Program for Implementation

I. INTRODUCTION

The Detailed Program for Implementation (DPI) has been developed by the Manitowoc County Soil & Water Conservation District, the Lead Designated Management Agency (LDMA). The detailed program for implementation identifies: (1) the tasks necessary to implement the Lower Manitowoc River priority watershed plan, (2) agencies are responsible for carrying out those tasks, (3) the time frame for carrying out tasks, (4) and the kind and amount of resources needed. A series of public and agency meetings were conducted to obtain commitments and to define program responsibilities.

Objectives, goals and strategy for implementation identified in the priority watershed plan are based on the results of the inventory and water quality monitoring data. This program for implementation serves as a general guide for the Designated Management Agencies (DMAs) involved in the watershed program. It must be reviewed periodically and updated as experience and developments occur in the program.

A. Designated Management Agencies

DMAs are those units of government that have been recommended in the Manitowoc River Basin Plan (208 Plan) and are able to facilitate the implementation of Best Management Practices (BMPs). For unincorporated areas, the Soil and Water Conservation Districts (SWCDs) of Manitowoc, Brown and Calumet Counties will serve as DMAs jointly with the County Boards. Together these units of government are able to assist with program funding to cost share with landowners, to install practices on public lands, and develop regulatory processes to protect water resources if voluntary programs prove unsuccessful.

In incorporated areas, the city and villages of Manitowoc, Reedsville, St. Nazianz and Valders can implement or bring about needed Best Management Practices (BMPs). They may need to implement these BMPs through zoning, subdivision regulations, or activities carried out by public employees and private citizens.

B. Lead Designated Management Agency

The Manitowoc County Soil and Water Conservation District is the Lead Designated Management Agency (LDMA). As such, it is responsible for coordinating activities among all other designated managment agencies within the watershed. The contracts between assisting agencies or services will be made with the LDMA. The LDMA will be fiscally responsible for both the cost share monies and the local assistance funds.

II. AGENCIES AND GOVERNMENTAL UNITS

The following agencies and groups may assist the lead DMA and DMAs in the implementation of the program. Many aspects of existing programs and various agency missions correlate directly with the objectives of the wastershed program. Identification of specific roles and responsibilities for each agency that has a possible involvement in the watershed is detailed to insure a maximum cooperative effort. No one agency would be capable of accomplishing the needed objectives. This new approach to consolidate existing programs and create a team effort will require a clear understanding

of each agency's role and responsibilities. Open lines of communications between parties will be necessary to assure perfect understanding and smooth operation of the program.

A. Soil and Water Conservation Districts (SWCD) - will serve as DMAs in unincorporated areas of the watershed. Staff will be provided to carry out the technical, fiscal and educational activities of the program. Districts will maintain budget responsibilities for staffing and program operation costs.

B. Soil Conservation Service (SCS) - SCS relationship to the District is set forth in a Memorandum of Understanding. The District Conservationist is responsible for insuring that BMPs installed will meet the need for pollution abatement and technical specifications. SCS technical staff will assist with practice design and layout. Area and State Office will provide staff specialists to provide for specific needs such as training in water quality planning and engineering and technical and engineering assistance. By means of contract, a resource planner, equipment and transportation will also be provided to the DMAs.

C. Agriculture Stabilization and Conservation Service (ASCS) - ASCS will be providing assistance under contract for the fiscal management of the cost share program. Direct coordination will be needed to prevent overlap with two similar programs. The existing ACP programs can be correlated with the Wisconsin Fund in Manitowoc, Brown and Calumet Counties to encompass those areas not located within 1/8 mile of a stream (1/4 mile if on 6% slope or greater, the priority managment area (PMA)). ASCS Staff can provide advice on cost share practices, rates and administration of the cost share program. A need for the development of special best managment practices through the ACP Program may arise as experience or situations in this program develop. The Manitowoc ASCS County Committee has applied for Water Bank Program to protect wetland areas. This could be correlated very well with the Watershed Program.

D. UW-Extension (UWEX) - UWEX technical and educational experts will serve as consultants and administrators in developing an educational program for the various target audiences. The DMAs and the LDMA will consult with the various local agent specialists to develop educational programs, workships, handouts, questionnaires, award programs, newsletter and bulletins. Media facilities and equipment can also be made available from UWEX offices. Agents will incorporate water quality information in their present activities, serve as advisors in developing cost share programs and overall watershed program management. County agent contact with landowners and local problems will make it possible to refer landowners to DMAs.

E. The Department of Natural Resources - The Department and various sections will each have specific roles that can assist the DMA and must be coordinated by the project manager.

1. Special Studies Section - Bureau of Water Quality - This section will assist in implementation and administration of the watershed program. Department contracts and transfer of

The DMAs of Brown and Calument County will maintain their own landowner files for their respective watershed areas. However, copies of the landowner agreements, BMP certification and progress reports will be mailed to the lead DMA.

The lead DMA will be responsible for filing reports and accountability with the Board of Soil & Water Conservation Districts and the DNR.

C. Project Manager

The Manitowoc County SWCD District Coordinator and Chairman will jointly serve as the Project Manager. They will serve as a liason between the state and federal agencies involved in the program and the DMAs. They will monitor contracts between DMAs and other agencies, organizations or individuals with the implementation program.

The District Coordinator will coordinate the educational, technical and fiscal elements. He will prepare and submit the necessary reports and maintain project record accountability.

The District Chairman will serve as a liason between the County Board, Lake Michigan and Wisconsin Association of Conservation Districts and legislators.

IV. WORK PLAN

The Work Plan is a schedule of work activities. It must be flexible, understood by all parties, and reviewed periodically to be effective.

The first step of the Work Plan is to identify a starting point, where the water quality problems are the most severe. This approach allows for efficient use of man-power and cost share funds. Landowners previously expressing a desire to cooperate will be given first priority.

The physical inventory of the watershed and monitoring data has indicated the Mud Creek tributary north of Collins Marsh contains the greatest number of livestock operations and has severe water quality problems. This tributary which extends north into Brown County will be the DMA's first focus of attention. A subwatershed meeting will be held in the Village of Reedsville and a mailing of information to landowners will be conducted during the fall of 1979 to introduce landowners to the program. Water quality planning and technical assistance will then be directed to this area during the early fall and winter planning season.

The second most important area, especially for erosion control, will be the main stem of the Manitowoc River and Schisel Lake between upper Cato Falls and the Manitowoc city limits. Planning and technical assistance will be directed into this area during the first six months of 1980 to correlate with the spring planning season.

The third area of operation will be centered on the Valders-St. Nazianz stem which contains a large number of livestock operations and has a large portion of the steeper slopes.

OBJECTIVE I: CONTROL RUNOFF OF 48% OF THE TOTAL PHOSPHORUS PER YEAR IN THE WATERSHED FROM LIVESTOCK WASTES.

Goals	Action	Who	When
1. To reduce phosphorus by 18%, 104 barnyard runoff control systems will be installed on farms with herds of 20 cows or more in the priority management area.	a. install 6 systems	DMAs, SCS	FY 1980
	b. install 20 systems	DMAs, SCS	FY 1981
	c. install 35 systems	DMAs, SCS	FY 1982
	d. install 30 systems	DMAs, SCS	FY 1983
	e. install 13 systems	DMAs, SCS	FY 1984
	f. Animal Waste Mgt. Workshop	SCS, UWEX DMAs	October 1979 April 1980
	g. accept DNR field personnel referrals	DMAs, SCS	Continuous
2. To reduce phosphorus by 30% per year from animal wastes disposed on frozen or saturated fields, 170 storage facilities will be installed on livestock operations which are in the priority management area.	a. install 20 facilities	DMAs, SCS	FY 1980
	b. install 45 facilities	DMAs, SCS	FY 1981
	c. install 50 facilities	DMAs, SCS	FY 1982
	d. install 40 facilities	DMAs, SCS	FY 1983
	e. install 15 facilities	DMAs, SCS	FY 1984
	f. Animal Waste Mgt. Workshop	DMAs, SCS UWEX	October 1979 April 1980 annually
	g. Spring aerial flight of watershed to determine area of manure disposal on frozen ground	DMA and DNR	FY 1981
	h. handout UWEX waste handling bulletins	UWEX, DMAs	Continuous

OBJECTIVE II: REDUCE 17% OF THE PHOSPHORUS PER YEAR IN THE WATERSHED, FROM 15,835 ACRES OF CROPLAND ON SLOPES 6% OR GREATER.

Goals	Action	Who	When
1. Control 1,000 acres of erosion with installation of 22,150 ft. of terraces.	a. install 2000' of terraces	DMAs, SCS	FY 1980
	b. install 4000' of terraces	DMAs, SCS	FY 1981
	c. install 6000' of terraces	DMAs, SCS	FY 1982

OBJECTIVE II (CONTINUED)

Goals	Action	Who	When
	d. install 7100' of terraces	DMAs, SCS	FY 1983
	e. install 3050' of terraces	DMAs, SCS	FY 1984
	f. Water Quality Practice Tour	DMAs, SCS and UWEX	June 1980 annually
2. To apply contour strips on 1,810 acres of steeper slopes.	a. install 100 acres of contour strips	DMAs, SCS	FY 1980
	b. install 300 acres of contour strips	DMAs, SCS	FY 1981
	c. install 530 acres of contour strips	DMAs, SCS	FY 1982
	d. install 600 acres of contour strips	DMAs, SCS	FY 1983
	e. install 280 acres of contour strips	DMAs, SCS	FY 1984
	f. Water Quality Tour	UWEX, SCS	June 1980 annually
3. To apply 3,000 acres of strip-cropping, controlling erosion on steeper slopes	a. install 600 acres of strip crops	DMAs, SCS	FY 1980
	b. install 800 acres of strip crops	DMAs, SCS	FY 1981
	c. install 800 acres of strip crops	DMAs SCS	FY 1982
	d. install 500 acres of strip crops	DMAs, SCS	FY 1983
	e. install 300 acres of strip crops	DMAs, SCS	FY 1984
4. To incorporate a crop rotation that yields less than 2.5 tons/ acre of soil loss per year on 6,000 acres of steep crop land.	a. apply 1,500 acres per year of crop rotation	DMAs, SCS	annually
5. To control 4,000 acres of erosion on steeper slopes by some form of reduced tillage	a. apply 500 acres	DMAs, SCS	FY 1980
	b. apply 1 000 acres	DMAs, SCS	FY 1981
	c. apply 1 000 acres	DMAs, SCS	FY 1982

OBJECTIVE II (CONTINUED)

Goals	Action	Who	When
	d. apply 1,000 acres	DMAs, SCS	FY 1983
	e. apply 1,000 acres	DMAs, SCS	FY 1984
	f. Water Quality Tour	UWEX, SCS	FY 1981
	g. Minimum Tillage Workshop	UWEX, SCS and DMA	October 19
	h. develop a brochure on minimum tillage for eastern counties	UWEX, SCS	January 1981

OBJECTIVE III: CONTROL THE REMAINING DIRECT SOURCES OF EROSION AND PHOSPHORUS IN THE WATERSHED

Goals	Action	Who	When
1. To control erosion on 216 acres of roadside by 1984	a. Spring towns meeting	Co. Hwy Dept and DMAs	Annually
	b. personal contact of town chairmen	DMA	Annually
	c summer demonstration	DMA	summer annually
	d. contact Highway Dept for list of roads to be built	DMA	May - annually
	e. encourage towns to adopt road standards that require seeding	Planning & Parks, DMA	1981 - annually
2. To stabilize 284 acres of eroded stream banks or steep lands adjacent to stream banks.	a. apply 80 acres annually of tree planting or permanent cover	DMAs, SCS, Civic Organizations	annually
3. To install 95,010' of waterways or 66 acres to control erosion of channels and serve as filter areas adjacent to cropland	a install 4.5 acres	DMAs, SCS	FY 1980
	b install 19 acres	DMAs, SCS	FY 1981
	c. install 18 acres	DMAs, SCS	FY 1982
	d. install 18 acres	DMAs, SCS	FY 1983
	e. install 8 acres	DMAs, SCS	FY 1984

OBJECTIVE III (CONTINUED)

Goal	Action	Who	When
4. To construct 38 channel stabilization structures to control gully erosion by 1984	a. install 3 structures	DMAs, SCS	FY 1980
	b. install 12 structures	DMAs, SCS	FY 1981
	c. install 10 structures	DMAs, SCS	FY 1982
	d. install 9 structures	DMAs, SCS	FY 1983
	e. install 4 structures	DMAs, SCS	FY 1984
5. To install 40 systems of shoreline protection such as rip-rap, buffer and filter strips, livestock exclusion and stream crossings by 1984	a. install 10 systems	DNR, DMAs, SCS	FY 1980
	b. install 14 systems	DNR, DMAs, SCS	FY 1981
	c. install 5 systems	DNR, DMAs, SCS	FY 1982
	d. install 4 systems	DNR, DMAs, SCS	FY 1983
	e. install 9 systems	DNR, DMAs, SCS	FY 1984

OBJECTIVE IV: OBTAIN A HIGH RATE OF VOLUNTARY PARTICIPATION AND ACCEPTANCE OF NEEDED WATER QUALITY BEST MANAGEMENT PRACTICES, AMONG LANDOWNERS, OPERATORS AND LAND USERS.

Goal	Action	Who	When
1. Develop 320 water quality plans with land users, to bring the priority area up to water quality standards	a. implement 60 plans	DMA, SCS	FY 1980
	b. implement 80 plans	DMA, SCS	FY 1981
	c. implement 90 plans	DMA, SCS	FY 1982
	d. implement 60 plans	DMA, SCS	FY 1983
	e. implement 30 plans	DMA, SCS	FY 1984
2. Pursue a vigorous follow-up program with 500 land users to insure implementation and maintenance of the BMP	a. follow-up on 140 former District Cooperators	DMA, SCS	FY 1980
	b. follow-up on 200 previous contacts	DMA, SCS	FY 1981
	c. follow up on 300 previous contacts	DMA, SCS	FY 1982
	d. follow up on 374 previous contacts	DMA, SCS	FY 1983
	e. follow up on 480 previous contacts	DMA, SCS	FY 1984

Goal	Action	Who	When
3. Develop an information and recognition program for land users in the watershed	a. direct mailings of special announcements	UWEX, DMA	August 1980 Sept. 1980 Jan. 1980 annually as needed
	b. mailing of newsletter to land users in watershed @ 6 per year	UWEX, DMA	6 per year
	c. placement of cooperator signs on landowner property recognizing them as a participant	UWEX, DMA	FY 1981 continuous
	d. recognize with awards & news articles of those landowners doing an outstanding job	UWEX, DMA	
	e. conduct sub-watershed meetings to concentrate in priority areas	UWEX, DMA	October 1979 April 1980
	f. develop a self-evaluation questionnaire for landowners in the watershed	UWEX, DMA	October 1979 annually

OBJECTIVE V: DEVELOP A COALITION OF INTEREST GROUPS THAT CAN ASSIST IN IMPLEMENTATION AND CREATE A PUBLIC RECOGNITION OF THE CAUSES OF POOR WATER QUALITY, AND AS A RESULT OF THEIR ACTIONS, LANDOWNERS AND THE PUBLIC WILL BE ABLE TO DEVELOP A CONCERN AND LOCAL AWARENESS, CREATING AN INCREASED ACCEPTANCE LEVEL OF IMPLEMENTATION AND CHANGES IN MUNICIPAL AND GOVERNMENTAL FORMS OF INVOLVEMENT.

Goal	Action	Who	When
1. Involve teachers and groups in planning process and implementation	a. in-service day training	DNR,UWEX,DMA	August 1979 every fall
	b. mailings of informational materials	UWEX, DMA	continuously
	c. Conservation Education Workshop	CEI, DMA	August 1979 August 1980 annually
	d. Biology class observe gathering of biological data	DNR, DMA	October 1980 Spring 1980 annually

OBJECTIVE V (CONTINUED)

Goal	Action	Who	When
2. Develop special projects with sportman's groups, 4-H, scouts, church groups, schools and youth groups	a. streambank stabilization projects or tree planting	all groups	FY 1980-81
	b. develop displays & exhibits	schools	FY 1980
	c. clean-up campaigns	all	FY 1980-84
	d. construction of land-owner recognition signs	vo-ag classes, industrial arts and 4-H	FY 1980-84
	e. develop informational brochure	UWEX, schools and DMA	FY 1980

To provide direction and guidance in conducting the activities in the program, objectives and goals have been developed. These objectives and goals or number of best management practices (BMP) were determined from the detailed inventory and actual count of livestock operations. The cropland treatment needs were derived from a random sample of District Cooperators in the watershed with resource plans. The kinds and amounts of BMPs installed per acres planned were then applied as a rate, to the critical acres identified in the inventory.

As the watershed program progresses, the lead DMA will measure progress and monitor the rate of accomplishments. A large scale base map of the watershed will be maintained in the Manitowoc SWCD office depicting areas of planning and location of BMPs planned and applied. Reports of progress will be made by the lead DMA to assisting agencies and DMAs. If the goals are not being accomplished as scheduled, the implementation strategy will be re-evaluated and modified as necessary.

A. Objectives and Goals

The mission of the Priority Watershed Project will be "To reduce phosphorus levels by 50% in the near shore waters of Lake Michigan and control phosphorus entering Bullhead Lake, by reducing 75% of the total pounds of phosphorus per year, from livestock waste operations with more than 20 cows, and on cropland with slopes steeper than 6%.

V. TECHNICAL ASSISTANCE

The technical assistance section of the plan identifies the processes of developing landowner agreements; implementing practices and their design; and resource planning in the watershed.

The LDMA will contract with SCS to provide the additional technical services and resource planning expertise needed for the accelerated program. To assure timely completion of goals, proper staffing will be needed to install practices during a limited installation season of the year. Even more importantly, without top priority of the resource planning phase with the landowner, the less acceptable practices in the areas of erosion control will not come about. A vigorous follow-up program with a staff of well trained individuals will be necessary to insure success.

A. Water Quality Planning Operations

Following a preliminary information program and subwatershed meeting, the SCS and District Staff will begin planning in subwatersheds according to Section IV of this program for implementation.

1. Water Quality Plan - will be prepared by a physical inspection of the priority area by the resource planner. A plan will be developed showing present land use activity and any needed BMP to bring the priority area up to water quality standards. To expedite the resource planning process, field sheets and soils maps will be provided by the DMA, until such time planning photos can be ordered. Upon receipt of the final aerial photos, the District secretary will transfer the field sheet information and compile the plan according to SCS Resource Planning Standards.

If the landowner agrees to specific alternatives or implementation of BMP practices, a completion schedule will be developed. When the plan calls for an installation of a cost shared practice, the landowner will be encouraged to enter into a cost-sharing agreement.

2. Cost Share Agreement - The cost share agreement is a contract between the DMA and landowner which specifies the best management practices that the landowner will install during a given period of time. The agreement will allow the DMA to appropriate funds for each cost shared practice at its given cost share rate. The contract will also contain in Section 2, the non-cost shared practices that the farmer must incorporate to meet water quality standards for the priority management area.

B. Technical Assistance Needs (Work Load)

The technical assistance rates expressed in man-days are based on prior experience and SCS timekeeping system which documents the various categories of time expenditures. The goals and numbers of BMP practices which are explained in Section IV of this strategy are based on the actual county of livestock operations of District Cooperators in the watershed with resource plans. The kinds and amounts of BMP installed per acres planned, were then applied to the critical acres identified in the inventory to determine the BMP needs.

Fiscal year 80's work load and estimated accomplishments are based on the limited application season prior to June 31, 1980 and the current lag time between planning and the final landowner commitment. The DMA's current manpower strength per year is as follows:

Soil Conservationist (SCS contract)	@ 75% of 238 available man days	=	179
SWCD Conservation Engineer	@ 60% of 240 available man days	=	144
SWCD Coordinator	@ 50% of 240 available man days	=	120
SCS District Conservationist	@ 30% of 225 available man days	=	68
			511 available man days

Sufficient man days would be available for FY 80 to maintain the desired application rate. However, at the present rate of available man days 511, there will be a deficit of approximately 2 man years for the needed 902 man days in FY 81 and FY 82.

To help alleviate the man day deficit, the DMA can hire limited term help (maximum of 6 months) during the construction season when the work load will be at its peak. The adjoining Districts

of Calumet and Brown counties will provide personnel for design, layout and planning in their respective areas.

The SCS will privide employee training for the assisting management agencies technical personnel as the need arises.

C. Technical Assistance in Urban Areas

SWCD personnel will entend limited technical assistance to urban areas of the watershed. SCS engineers would be made available from the Area SCS Office to assist the DMA and City Engineers in design of BMPs. Coordination of urban BMP will be arranged with the city of Manitowoc planner and engineer, the village presidents, and the LDMA. The cost share agreement form will be utilized as the contract arrangement for BMPs.

In the unincorporated areas, technical assistance will be provided to towns, sanitary districts and villages as necessary. Priority for assistance will be given to critical area stabilization, such as, roadside seeding, culvert location and stabilization structures. The DMA will make the District owned hydroseeder, mulcher and one man available to be used on seeding projects.

The DMA will provide assistance jointly with the Manitowoc County Planning and Parks Department to units of government in developing erosion control ordinances or road standards that incorporate such provisions.

VI. FINANCIAL MANAGEMENT

The lead DMA has contracted with the Manitowoc County ASCS Committee of the USDA agricultural Stabilization and Conservation Service for various administrative functions of cost sharing BMP's for the Wisconsin Non-point Source Pollution Abatement Program. The contract will be reviewed annually by both parties. Joseph Janowski, Executive Director of the Manitowoc ASCS Office, will serve as contact agent for ASCS.

The ASCS and DMA will provide sufficient time annually to meet audit responsibilities. The ASCS will submit a monthly financial progress summary report and an annual report.

Cost sharing grant monies will be received by the lead DMA and deposited in a special revenue account established by the Manitowoc County Comptroller. As monies are committed by means of the landowner agreements, funds will be transferred to a checking account, which the Manitowoc County ASCS Office will administer and maintain audit responsibility. The Executive Director of the Manitowoc County ASCS Office has been authorized to sign and issue the cost share payment checks.

The cost share payment checks will be enclosed with a summary letter from the LDMA or DMA of the respective county explaining the Wisconsin Fund Program.

Applications for cost sharing will be received by the Manitowoc County ASCS Office for the portion of the watershed in Manitowoc County. For those areas of the watershed in Brown and Calumet counties, the DMA's personnel will accept the landowner's application for cost sharing and forward it to the Manitowoc ASCS Office for processing.

CONSERVATION NEEDS

Total Units	Best Mgt. Practices	Total BMP Needed	FY '80 Rate/ Man Days	FY '80 Amount	FY '80 Total Man Days	FY '81 Rate/ Man Days	FY '81 Amount	FY '81 Total Man Days	FY '82 Rate/ Man Days	FY '82 Amount	FY '82 Total Man Days	FY '83 Rate/ Man Days	FY '83 Amount	FY '83 Total Man Days	FY '84 Rate/ Man Days	FY '84 Amount	FY '84 Total Man Days
1000 farms	Contract Agreements & Plan	320	4.5	60	270	4.5	80	360	4.0	90	360	4.0	60	240	4.0	30	120
333 animal operations	Barnyard Runoff Mgt.	104	2	6	12	2	20	40	2	35	70	2	30	60	2	13	36
	Storage Facilities	170	5	20	100	5	45	225	5	50	250	5	40	200	5	15	75
15,835 acres cropland	Waterways	95,010' 66 ac.	1.5	3	4.5	1.5	19	28.5	1.5	18	27	1.5	18	27	1.5	8	12
	Terraces	22,150'	.003	2000'	6	.003	4000'	12	.003	6000'	18	.003	7100'	21.3	.003	3050'	9.15
	Contour Strips	1810 ac	.033	100	3.3	.033	300	9.9	.033	530	17.5	.033	600	19.8	.033	280	9.24
	Channel Stabilization	38	3	3	9	3	12	36	3	10	30	3	9	27	3	4	12
	Critical Area Stabilization	500 ac	.5	60	30	.5	120	60	.5	200	100	.5	80	40	.5	17	8.5
	Minimum Tillage	5000 ac	.013	500	6.5	.013	1000	13	.013	1000	13	.013	1000	13	.013	500	6.5
	Shoreline Protection	40 systems	3	10	30	3	14	42	3	5	15	3	4	12	3	9	27
	Landowner Follow-up	500	.3	140	42	.3	200	60	.3	300	90	.3	374	112	.3	480	144
	Strip Cropping	3000 ac	.02	600	12	.02	800	16	.02	800	16	.02	500	10	.02	300	6
		TOTAL			525			902			993			782			445

A. Landowner Assistance

1. Cost share agreement - The cost share agreement is a contract between the LDMA and landowners which specifies the best management proctices that the landowner will install during a given fiscal year. Upon completion of the cost share agreement and approval by the DMA's District Supervisors of that respective Soil & Water Conservation District, the agreement will be forwarded to the Manitowoc County ASCS Office.

2. On receipt of the agreement by the ASCS Office, monies will be appropriated. Form RE 247, Referral for Technical Determination will be issued on those practices for that particular year as determined by the agreement.

3. The responsible DMA will receive Form 247 and a detailed cost estimate of the BMP and completion date will be determined.

4. On return of the RE 247, Determination of Needs, the ASCS Office will complete Form 245, Request for Cost Sharing. This form and an attached letter advising the landowner of practice approval, rate of cost sharing, and amount of eligible funds will be mailed to the landowner by the ASCS Office.

5. Following construction of the BMP, the landowner will submit itemized bills and construction costs to the ASCS Office.

6. The DMA's, Brown, Calumet and Manitowoc SWCD will complete a performance report and certification that the practice meets SCS Technical Guide Specifications.

7. Upon receipt of landowner construction costs and DMA certification reports, the ASCS will issue a payment check.

VII. EDUCATIONAL PROGRAM

The Educational Program has been developed to reach three main target audiences. The general public, landowner and operators, and organizational and educational groups.

Project monies have been requested by the Lead DMA to support a vigorous educational effort. The Lead DMA will be responsible for the implementation of the educational program. The DMAs will be working jointly with UWEX Specialists in the implementation and revisions of the educational program. SCS, ASCS, UWEX, and BSWCD will assist the DMA in development of educational materials. To assure proper emphasis on the educational program, the Lead DMA will consider hiring a student under the Work Study Program to assist in implementing the Educational Program for 1980.

A. General Public - The informational program for the general public would be directed to developing an awareness of the project, with an emphasis on the causes of water quality problems and suggested solutions. Results of water monitoring activities will be conveyed through this phase of the educational program.

1. News media release - August 1979 articles and radio announcements

2. Monthly news releases

3. Informational brochure - March 1980

4. UWEX handouts

5. Display and exhibits - County fair, area banks, libraries, etc.

B. Landowners and/or operators - This phase of the program will be oriented to reaching the landowner or persons responsible for management of non-point source. Emphasis will be placed on educational modes that generate acceptance of needed practices on the part of the landowner. The educational phase will need to illustrate the water quality problems, causes and consequences to the land user, and be linked closely to the water monitoring program. Once an understanding is developed by the landowner, alternatives and solutions can be discussed. At this point, information on funding and the program functions can be introduced.

The next and most difficult step will be to initiate change, in long time cultural agricultural activities, and implementation of sometimes new and different ideas. The more skeptic landowners will need to physically see application and participation in their neighborhoods. During the early stages of implementation DMA personnel will need to be aware of landowner attitudes and present themselves in an enthusiastic manner. Attention to rumors and points of misunderstanding must be brought to the attention of the LDMA. Jointly with the DMAs the rumors and misunderstandings can be clarified through the educational system.

The following is the first year's schedule:

1.	Direct mailing to landowners in basin, meeting notices and informational data.	August 1979
2.	Mailing of a landowner self-evaluation form to people in Mud Creek sub-watershed prior to planning in the field.	September 1979
3.	Informational news articles in area newspapers.	September - monthly
4.	Animal Waste Handling Workshop	October 1979
5.	Newsletter to landowner in the watershed	March 1980
6.	Mailing of self-evaluation questionnaire to landowners in the main stem of the Manitowoc River.	February 1980
7.	Nominate landowners for Water Quality Management Awards	June 1980
8.	Tour of Water Quality Practices	June 1980
9.	Place District Cooperators or Watershed participant signs on lands or farmsteads that are participating	July 1980

C. Organizational and Educational Groups - A coalition of interest groups can assist in actual implementation and education facets of the watershed program. Educational institutions have a role in assisting the DMAs to develop an understanding of the non-point water quality concept. Technical schools or programs that offer adult education can incorporate these principles into their curriculum.

The LDMA will take the initiative in contacting Lakeshore Technical Institute and area high schools for possible participation in the program. The Manitowoc Lincoln biology class will be working with the DNR and LDMA personnel in developing displays and educational activities. JFK Prep from St. Nazianz conducted part of the physical inventory of the watershed and will continue monitoring activities.

The LDMA will approach area vocational agricultural classes to inquire of their participation. The LDMA will contract with a school group to construct District Cooperator signs and place them on the landowner sites. The placement of signs would allow direct involvement by students, allowing them to see the BMPs and develop a sense of pride in their community.

Many of the labor intensive practices such as tree planting, rip rap, fencing, and debris clean up could be conducted by scout organizations, 4-H and youth groups and sportman's clubs.

The following is the first year's schedule:

1.	Development of a mailing list of educational leaders	Sept. 1979
2.	In-service training days - at Lincoln High School	August 29, 1979
3.	Contact vocational agricultural school and classes	October 1979
4.	Students accompany DNR monitoring teams	October 1979
5.	Development of educational displays	January 1980
6.	Special Implementation Projects	April-July 1980
7.	Nominate group water quality awards	

APPENDIX A

Cost-sharing for Best Management Practices

I. Introduction

The overall goal of the Wisconsin Nonpoint Source Water Pollution Abatement Program is to make the state's lakes and streams swimmable and fishable. In order to help meet this goal the program offers financial assistance to landowners, operators and municipalities for installing or applying best management practices. Best management practices are defined as:

> practices, techniques or measures which are determined to be most effective, practicable means of preventing or reducing pollutants generated from nonpoint sources to a level compatible with water quality goals. They are identified in the areawide water quality management plans and priority watershed plans.

The purposes of this booklet are to identify: 1. the rural and urban best management practices and the components of those practices eligible for cost-sharing; 2. the state maximum cost-share rates for each eligible practice; 3. the cost-sharing conditions designated management agencies must certify are being met by land users; and 4. the minimum cost-sharing conditions the land user must meet to comply with the cost-sharing agreement. Some best management practices do not require cost-sharing because they are low-cost or no-cost or provide a high degree of benefit to the land user. The practices which will not be cost-shared are listed in Section VI of the booklet. Efforts have been made to make the cost-sharing under this program as compatible as possible with the Agricultural Conservation Program (ACP), administered by the Agricultural Stabilization and Conservation Service. This booklet will be reviewed annually.

II. Cost-share rates

The Department of Natural Resources in consultation with the Board of Soil and Water Conservation Districts is required to identify a maximum cost-sharing rate for each best management practice. The maximum cost-sharing rate identified in this booklet represents a ceiling. Local designated management agencies may use any rate at or below the ceiling.

Section 144.25 of the Wisconsin Statutes states cost-share payments shall not exceed 50% of the cost of implementing the best management practice except as follows:

1. The maximum rate may be increased to as much as 70% where: a) the practice produces benefits for the applicant but the main benefits to be derived are related to improving offsite water quality and b) limiting the cost-sharing to 50% would place an unreasonable cost burden on applicants.

2. The maximum rate may be increased above 70% for certain practice where: a) the practice produces negligible benefit to the applicant with the benefits to be derived related to improving offsite water quality and b) limiting the cost-sharing payment to 70% would place an unreasonable cost burden on applicants.

In order for a specific practice to receive cost-sharing above 70%, county cost-sharing must be provided. The county cost-sharing may be matched by supplemental state cost-sharing up to 10%. For example, a streambank protection practice could have 80% state cost-sharing if the county provides 10% cost-sharing.

State funds may be the sole source of cost-sharing or may be used together with federal cost-sharing, such as ACP, up to 70%. The remaining costs must be met by county cost-sharing or borne by the landowner. For example, a manure storage facility could receive 70% cost-sharing in state funds or 35% federal funds and 35% state funds. In either case, the cost to the land user is the remaining 30%.

Additional guidance for determining cost-share rates is provided in NR 120 of the Wisconsin Administrative Code. They are:

1. Practices which are very effective for pollution control and which have high capital costs should have higher rates.

2. Practices normally used for crop or livestock production or street sweeping should have lower rates.

Table 1. summarizes an evaluation of the cost-share eligible practices in relation to four major criteria and identifies the state's maximum cost-share rate.

III. General Policies

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

2. Rural and urban areas are eligible.

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

4. Cost-sharing is limited to priority management areas in priority watersheds or areas likely to be within a priority management area in other watersheds.

5. Cost-sharing is not available for the following:

   a. mining activities
   b. construction activities* on privately-owned lands (e.g. erosion control practices for construction of subdivisions)
   c. silviculture activities (excluding farm woodlots)
   d. septic systems (small scale onsite human domestic waste disposal systems)
   e. dredging activities
   f. practices installed primarily for flood control purposes

6. When two or more practices are of equal pollution control effectiveness and compatible with the use and management of the land, the maximum cost-share will be based on the least-cost practice. For example, a manure storage tank ($50,000) and a solid stacking pad ($8,000) may provide equal pollution control of manure. While the farmer may desire to install the more expensive manure storage facility in order to enhance his operation, cost-sharing will be based on the least cost alternative.

7. Cost-sharing is not available for practices which:

   a. are normally and routinely used in growing crops

   b. are normally and customarily used in cleaning of streets and roads

   c. have drainage of land as the primary objective

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

*This does not include construction of best management practices.

IV. Best Management Practices Eligible for Cost-Sharing

The pages following Table 1 identify the best management practices and their components eligible for cost-sharing and conditions the land user must meet to comply with the cost-sharing agreement. The conditions represent a statewide minimum. Designated management agencies may make the conditions more stringent.

Designated management agencies are encouraged to coordinate local adjustments to cost-share rates and conditions with the County Agricultural Stabilization and Conservation Committees.

Table 1.

		Effectiveness	Capital Cost	Private On-site Benefit	Relationship to Customary Operating Practices	Maximum State Cost-sharing
C1	Contour Cropping	High	Low	Moderate	Moderate	50%***
C2	Strip Cropping	High	Low	Moderate	Moderate	50%***
C3	Diversions	High	Moderate	Moderate	Low	70%
C4	Terraces	High	Moderate	Moderate	Low	70%
C5	Waterways	High	Moderate	Moderate	Moderate	70%
C6	Minimum Tillage	High	Low	Moderate	High	50%***
C7	No-till	High	Low	Moderate	High	50%***
M1	Critical Area Stabilization	High	High	Low	Low	70%*
M2	Grade Stabilization Structure	High	High	Low	Low	70%*
M3	Shoreline Protection	High	High	Low	Low	70%*
M4	Settling Basins	High	High	Low	Low	70%*
L1	Barnyard Runoff Management	High	Moderate	Moderate	Low	70%
L2	Manure Storage Facilities	High	High	Moderate	Moderate	70%**
L3	Livestock Exclusion From Woodlots	High	Low	Low	Moderate	50%
U1	Leaf Collection	High	Low	Low	High	50%
U2	Street Sweeping	Moderate	Low	Low	High	50%
U3	Infiltration System	Moderate to High	Moderate	Low	Low	70%

C: Generally used in cropland but may be applicable in urban areas as well
M: Applicable in both rural and urban areas
L: Livestock
U: Urban

* May be increased to 80% according to the conditions in section II on page 1
** A dollar ceiling of $6,000 is set for priority watershed projects and $4,000 is set for local priority projects
*** A flat rate per acre equal to the cost-share rate applied to an average installation may be used

C1 Contour Cropping

Maximum cost-share rate _____
or flat rate per acre _____

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

Conditions:

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

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

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

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

   b) A winter cover crop must be established; or

   c) Protective tillage operations must be performed.

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

Specifications: SCS technical guide specifications 330 and 344

9/79

C2 Strip cropping

Maximum cost-share rate _____
or flat rate per acre _____

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

Conditions:

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

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

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

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

   b) A winter cover crop must be established; or

   c) Protective tillage operation must be performed.

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

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

9/79

C3 Diversions

Maximum cost-share rate _____

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

Conditions:

1. An adequate outlet must exist.

2. Cost-sharing is authorized for:

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

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

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

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

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

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

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

9/79

C4 Terrace Systems Maximum cost-share rate _____

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

Conditions:

1. Cost-sharing is authorized for:

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

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

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

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

2. A protective outlet or waterway is required.

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

Specifications: SCS Technical Guide specifications 412, 600 and 606

9/79

C5 Waterways Maximum cost-share rate _____

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

Conditions:

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

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

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

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

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

9/79

C6 Minimum tillage system (Conservation tillage)

Maximum cost-share rate _____
or flat rate per acre _____

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

Conditions:

1. Cost-sharing is based on the custom rate for minimum tillage plowing for a single year.
2. Cost-sharing is not authorized where the farmer has already adopted a satisfactory tillage system.
3. Cost-sharing for this practice will not be approved for a person more than once.
4. The land involved must be protected by crop residue, temporary cover, or other permitted management methods to the extent practical from harvest until the next planting.
5. Eligible tillage operations include:
   a) Chisel plowing with other limited operations,
   b) Plow-plant, or
   c) Light tillage without plowing.
6. On sloping land all tillage operations must be performed as nearly as practicable on the contour or parallel to terraces.
7. The system must be maintained for a minimum of 5 years following the initial year.

Specifications: SCS Technical Guide specification 478.

9/79

C7 No-till system (conservation tillage)

Maximum cost-share rate _____
or flat rate per acre _____

Definition: Planting systems using a narrow slot or disturbing a narrow strip of soil rather than disturbing and roughening the entire soil system.

Conditions:

1. Cost-sharing is based on the custom rate for no-till planting.
2. Cost-sharing is not authorized where the farmer has already adopted a satisfactory tillage system.
3. Cost-sharing for this practice will not be approved for a person more than once.
4. On sloping land all operations must be performed as nearly as practicable on the contour or parallel to terraces.
5. The system must be maintained for a minimum of 5 years following the initial year.

Specifications: SCS Technical Guide specification 378.

9/79

M1 Critical Area Stabilization Maximum cost-share rate _____

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

1. Cost-sharing is authorized for:

   a) Permanent fencing to protect the site.

   b) Planting trees, shrubs, perennial grass cover.

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

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

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

9/79

M2 Grade Stabilization Structures Maximum cost-share rate _____

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

Conditions:

1. Cost-sharing is authorized for:

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

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

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

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

9/79

M3 Shoreline Protection (Streambank Protection) Maximum cost-share rate _____

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

Conditions:

1. Cost-sharing is authorized:

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

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

   c) To limit livestock access to water.

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

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

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

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

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

Specifications: SCS Technical guide specifications 326, 382, 580 and 342 and DNR fish management specifications.

9/79

M4 Settling Basin

Maximum cost-share rate _____

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

Conditions:

1. Cost-sharing is authorized:

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

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

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

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

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

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

Maintenance requirements, including dredging, need to be addressed in the design of the structure.

9/79

L1 Barnyard Runoff Management Maximum cost-share rate _____

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

Conditions:

1. Cost-sharing is authorized for:

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

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

   c) Permanent fencing.

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

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

9/79

L2 Manure Storage Facilities Maximum cost-share rate _____

Definition: A structure for temporary storage of manure.

Conditions:

1. Cost-sharing is authorized for:

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

2. Cost-sharing is not authorized for:

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

   b. Portable pumps and other portable equipment;

   c. Buildings or modifications to buildings;

   d. Equipment for spreading or incorporating manure; and

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

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

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

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

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

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

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

Specifications: SCS Technical Guide specifications 313, 425 and 359

9/79

L3 Livestock Exclusion from Woodlots* Maximum cost-share rate _____

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

Conditions:

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

Specifications: SCS Technical Guide specifications 382, 472.

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

9/79

U1 Leaf collection Maximum cost-share rate _____

Definition: Collection or management of leaves, seeds, grass clippings and other vegetative matter in order to prevent accumulation in gutters and leaching of nutrients.

Conditions:

1. Cost-sharing is authorized for equipment (or prorated portion of time that equipment is used) or manpower required to increase the frequency and/or efficiency of vegetative matter collection for a one-year period.

2. Cost-sharing for this practice will not be approved for a municipality more than once.

3. The practice must be maintained for a minimum of 5 years after the initial year.

9/79

U2. Street sweeping Maximum cost-share rate _____

Definition: Mechanical street sweeping to remove vegetative matter, debris and particulates from gutters.

Conditions:

1. Cost-sharing is authorized for equipment (or prorated portion of time that equipment is used) and manpower required to increase street sweeping efficiency or frequency to more than once every two weeks during the period of April 1 to November 1 for a one-year period.

2. Cost-sharing for this practice will not be approved for a municipality more than once.

3. The practice must be maintained for a minimum of 5 years after the initial year.

9/79

U3 Infiltration systems

Maximum cost-share rate _____

Definition: Structures such as dutch drains, porous pavement, lattice blocks and dry wells which increase infiltration and reduce runoff from impervious surfaces.

Conditions:

1. Cost-sharing is authorized for:

   a) excavation, grading and shaping;

   b) construction materials and

   c) installation of materials

2. Cost-sharing is not authorized for the portion of the total costs normally associated with conventional systems (i.e. costs associated with conventional paving of parking lots or roadways is not considered as an eligible cost).

3. The practice must be maintained for a minimum of 10 years after the year of installation.

9/79

V. Substitute Practices

The Wisconsin Nonpoint Source Water Pollution Abatement Program allows for substitute management practices. Substitute management practices are simply innovative or rarely used - yet effective and practicable management practices-not identified as best management practices in areawide water quality management plans. They may be eligible for cost-sharing.

Substitute management practices must be reviewed and approved by the designated management agency and the Board of Soil and Water Conservation Districts. The Department of Natural Resources will identify whether the practice is eligible for cost-sharing and assign a maximum cost-sharing rate.

SCS Technical Guide standards and specifications will be used where available. If standards and specifications are not available, the SCS Technical Guide work group will review the request and recommend design criteria.

VI. Best Management Practices not Eligible for Cost-sharing

The following best management practices are not eligible for cost-sharing. All are very effective practices. However, they are either low-cost no-cost or high benefit to the land user. Their use should be encouraged.

Cultural Management - Proper timing, location, and intensity of cropping operations from seedbed preparation to harvest to reduce nonpoint source pollution while achieving optimum production. Spring plowing as opposed to fall plowing is an example of a type of cultural management prevalent in Wisconsin.

Facility Location - An alternative pollution control measure for barnyards, feedlots, and supporting activities is properly locating the facility.

Fertilizer nd Irrigation Water Management - The correct application of fertilizers to reduce their potential a. a pollutant. This will involve the proper timing and placement of fertilizer applications and using the proper type and quantities for the crops being grown. While excessive fertilizer applications can be detrimental to water quality, soils low in fertility are often more subject to erosion because of reduced ground cover. Fertilizer management is most critical in irrigated areas where proper coordination of fertilizer application with irrigation activities is essential.

Livestock Management - To prevent damages from overgrazing. This can involve rotational grazing, measures to promote uniform grazing, and delayed or deferred grazing to allow plant growth. Livestock management is also applicable in barnyards and feedlots for animal waste control.

Pesticide Management - The proper timing, placement, and quantities of pesticides to prevent degradation of water quality. Also included are proper container disposal and proper clean-up methods.

Waste Disposal Management - The proper timing, rate, and location of animal waste disposal to prevent discharge of organic wastes and nutrients into receiving waters. Wastes would include manure and collected barnyard runoff.

Winter Cover Crop - A crop of close-growing grasses, legumes, or small grain used to control erosion during periods when the major crops do not furnish adequate cover. In Wisconsin these crops are applicable on sloping land where corn is removed for silage, soybeans harvested, and in orchards. Cover crops are also used following removal of tobacco, potatoes, and canning crops.

Crop Residue Use - Using plant residues to protect the soil during critical erosion periods. This involves leaving plant residues on the surface after harvesting and incorporation into the soil just prior to planting operations. The protection afforded the soil varies with the amount of residues produced and amount remaining on the surface after tillage. Crop residues also conserve moisture and increase infiltration. Crop residues can be a source of organic wastes if subjected to excessive runoff and utlimate discharge into receiving waters. Decay of plant residue makes soluble phosphorus available to runoff.

Crop Rotation - Growing different crops in a regular sequence as part of a planned cropping system to reduce erosion. Crop rotation is routinely used by many landowners in Wisconsin and serves as an example of a management practice that is beneficial to the farmer and reduces pollutant discharge.

Pasture and Hayland Planting - Establishing and reestablishing long-term stands of adapted species of perennial or reseeding forage plants.

Appendix B

Biotic Index Values and Ratings

Aquatic insect sampling was conducted in the Spring of 1979. Insects in each sample were identified and assigned values developed by Dr. Hilsenhoff for the purpose of calculating the biotic index.

Table B-1 shows the water quality rating for the range of biotic index values.

Table B-1 Water quality determination from biotic index values

Biotic Index*	Water Quality	State of the Stream
<1.75	Excellent	Clean undisturbed
1.75-2.25	Good	Some enrichment or disturbance
2.25-3.00	Fair	Moderate enrichment or disturbance
3.00-3.75	Poor	Significant enrichment or disturbance
>3.75	Very Poor	Gross enrichment or disturbance

* Biotic index values are based on combined samples collected in late spring, early summer, late summer, and late autumn. For summer samples only, 0.18 would be subtracted from calculated biotic indexes for evaluation, and for spring and autumn samples 0.13 would be added to calculated values.

Table B-2 shows the biotic index values and rating for each site. The sites are identified on figure 5.

Stream	Biotic Index Value	Rating
Manitowoc River #1	2.33	Fair
Manitowoc River #2	2.19	Good
Manitowoc River #3	3.88	Very Poor
Manitowoc River #4	3.19	Poor
Mud Creek #5	3.93	Very Poor
Mud Creek #6	4.47	Very Poor
Schissel Creek #7	1.62	Excellent
Schissel Creek #8	3.26	Poor
Schissel Creek #9	2.26	Fair
Little Manitowoc River #10	2.60	Fair
Valders Creek #11	3.42	Poor
Hills Creek #12	2.55	Fair
Trib. to Manitowoc River #13	3.62	Poor

Appendix C

Municipal Point Sources in Manitowoc River Basin

	Phosphorus (lbs/yr)
Discharge to Lake Michigan	
Manitowoc STP	28,500
TOTAL	28,500
Discharge to Manitowoc River Tributaries	
Lower Manitowoc River Watershed	
Reedsville	2,000*
St. Nazianz	2,300*
Valders	3,500*
South Branch Manitowoc River Watershed	
Chilton	4,500
New Holstein	1,000
North Branch Manitowoc River Watershed	
Brillion	6,600*
Hilbert	2,000*
Potter	500*
Branch River Watershed	
Whitelaw	1,200*
TOTAL	23,600

*Assumes 8 mg/l of phorphorus in discharge.