

A Nonpoint Source Control Plan For The Lower Grant River Priority Watershed



Prepared Cooperatively By:

Grant County Land Conservation Department
Wisconsin Dept. of Agriculture, Trade, and Consumer Protection
Wisconsin Dept. of Natural Resources

WATERSHED PLAN ORGANIZATION INFORMATION

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Dave Jelinski, Director, Bureau of Land and Water Resources

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

Wisconsin Nonpoint Source Water Pollution Abatement Program

December 1991

Plan Prepared Cooperatively By:

Wisconsin Department of Natural Resources
Wisconsin Department of Agriculture, Trade and Consumer Protection
and Grant County

Publication WR 293-91

For copies of this document please contact:

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WATERSHED PLAN CREDITS

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

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27 September 1991

File REF: 3200

Mr. Neil Gardner, Chair
Grant County Board of Supervisors
Courthouse
Lancaster, WI 53813

Dear Mr. Gardner;

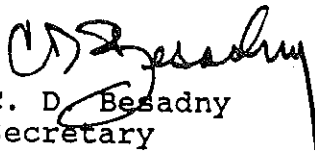
I am pleased to approve A Nonpoint Source Control Plan For The Lower Grant River Watershed. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120 of the Wisconsin Administrative Code.

The plan has been approved by Grant County and the Wisconsin Department of Agriculture, Trade, and Consumer Protection. This letter completes the approval process set forth in Wisconsin Statutes and allows for granting of funds through the Nonpoint Source and Water Pollution Abatement Program to implement the project.

I am also approving this plan as an amendment to the areawide water quality management plan for the Lower Grant River Basin.

This plan, prepared jointly by the Department of Natural Resources, the Department of Agriculture, Trade, and Consumer Protection, and Grant County Land Conservation Department staffs is an example of the cooperative efforts that can help improve and protect the streams, rivers, and wetlands of the Lower Grant River Watershed. I'm confident the cooperative spirit shown throughout the development of this plan will continue during the implementation of this project.

Sincerely,


C. D. Besadny
Secretary

cc: Richard Markus, Chair, Grant County LCC



State of Wisconsin

Department of Agriculture, Trade & Consumer Protection

Alan T. Tracy
Secretary

801 West Badger Road
PO Box 8911
Madison, WI 53708-8911

September 6, 1991

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

Bruce
Dear ~~Mr.~~ Baker:

The Department of Agriculture, Trade and Consumer Protection has received your request to approve "A Nonpoint Source Control Plan For The Lower Grant River Priority Watershed Project". The Department, hereby, approves the Lower Grant River Watershed plan.

A great deal of this plan was written by staff from the Grant County Land Conservation Department. Our two agencies are continually striving to delegate more responsibility to the local units of government for watershed planning. The interaction between the county and Jim Bachhuber of your staff allowed this plan to be an excellent example of local involvement.

We look forward to assisting DNR and the Grant County Land Conservation Committee in implementing the project.

Please contact Keith Foye (266-9496) if we can be of any further assistance in moving the project to implementation.

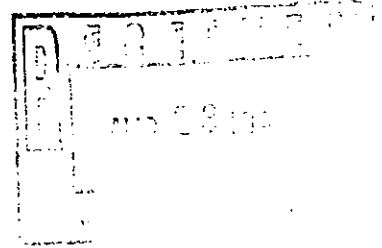
Sincerely,

Dave Jelinski, Director
Land and Water Resources Bureau
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
(608) 266-0157

cc: Becky Wallace
Barbara Thompson, Grant County Land Conservation Department

GRANT COUNTY LAND CONSERVATION DEPT.

1000 N. ADAMS P.O. BOX 329
LANCASTER, WI 53813
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August 21, 1991

Jim Bachhuber
Dept. of Natural Resources
WR/2
P.O. Box 7921
Madison, WI 53707

Dear Jim:

The Grant County Board of Supervisors passed the enclosed resolution adopting the Lower Grant River Watershed Plan at their August 20, 1991 meeting. The meeting was held at 7:30 pm at the County Board Room, Law Enforcement Center. The resolution passed with a majority vote.

Thus, we are asking for a Nonpoint Source Grant for the first year of implementation for \$800,000 in accordance with the Lower Grant River Watershed Plan.

If you have any questions, please call me. Thank you.

Sincerely,

Rita C. Moore

Rita C. Moore
Project Manager
Lower Grant River Watershed

Enc.

RESOLUTION

Adopting the Lower Grant River Priority Watershed

Whereas, the Grant County Land Conservation Committee prepared and adopted the Grant County Soil Erosion Control Plan in 1986; and

Whereas, the Soil Erosion Control Plan described and analyzed nonpoint source pollution and water quality problems throughout Grant County and proposed nonpoint source pollution abatement programs and policies to address those problems; and

Whereas, the Grant County Land Conservation Department along with the Wisconsin Department of Agriculture, Trade, and Consumer Protection and the Wisconsin Department of Natural Resources have prepared the Lower Grant River Priority Watershed Plan detailing nonpoint source pollution problems and proposing management practices to address those problems in the Lower Grant River Watershed; and

Whereas, the findings and management proposals recommended in the Lower Grant River Priority Watershed Plan are fully consistent with the findings, policies and recommendations of the Grant County Soil Erosion Control Plan and will serve to implement those policies and recommendations;

Now, Therefore, Be It Resolved, that the Grant County Board of Supervisors, hereby, approves the Lower Grant River Priority Watershed Plan and supports its implementation.

Submitted by:

Richard Markus
Richard Markus

Ambrose Margan
Ambrose Margan

Donald Splinter
Don Splinter

Ivan Bendorf
Ivan Bendorf

Marion Martin
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Dale Rawson

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Dale Bevan
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Don Kuhls
Don Kuhls

Donald W Kuhls

Recommended for adoption by the
Grant County Land Conservation
Committee Aug. 5, 1991

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CHAPTER I

INTRODUCTION, PURPOSE, AND LEGAL STATUS

NONPOINT SOURCE WATER POLLUTION ABATEMENT PROGRAM

The Wisconsin Nonpoint Source Water Pollution Abatement Program (the NPS program) was created in 1978 by the state Legislature. The program's goal is to improve and protect the water quality of streams, lakes, wetlands, and groundwater by reducing pollutants from urban and rural nonpoint sources. The 130 square-mile Lower Grant River Watershed, located completely within Grant County, was designated as a "priority watershed" in 1982 under the NPS program.

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

The following is an overview of the NPS program:

- * The Department of Natural Resources (DNR) and the Department of Agriculture, Trade, and Consumer Protection (DATCP) administer the program. It focuses on critical hydrologic units called priority watersheds. The program is implemented through priority watershed projects.
- * A priority watershed project is guided by a plan. The DNR, DATCP and local units of government cooperatively prepare the plan with input from a local citizen's advisory committee. Project staff evaluate the conditions of surface water and groundwater, and inventory the types of land use and nonpoint sources of pollution throughout the watershed. The priority watershed plan assesses nonpoint and other sources of water pollution and identifies best management practices (BMPs) needed to control pollutants to meet specific water resource objectives. The plan guides implementation of these practices in an effort to improve water quality.
- * Upon approval by state and local authorities, local units of government implement the plan. Water quality improvement is achieved through voluntary implementation of nonpoint source controls--best management practices--and the adoption of ordinances. Landowners, land renters, counties, cities, villages, towns, metropolitan sewage districts, sanitary districts, lake districts, and regional planning commissions are eligible to participate.

- * The County Land Conservation Departments contact eligible landowners to determine interest in voluntarily installing the BMPs identified in the plan. State level cost-share assistance is available to help offset the cost of installing these practices. Cost-share agreements are signed listing the practices, costs, cost-share amounts and a schedule for installation of management practices. Technical assistance is provided to aid in the design of BMPs.
- * Informational and educational activities are conducted to raise public awareness of the program, and to encourage participation.
- * The DNR and the DATCP review the progress of the counties and other implementing units of government, and provide assistance throughout the eight-year project. The DNR monitors improvements in water quality resulting from control of nonpoint sources in the watershed.

LEGAL STATUS OF THE NONPOINT SOURCE CONTROL PLAN

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

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

PLAN ORGANIZATION

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

PART I: THE WATERSHED ASSESSMENT

- * **Chapter II: "General Watershed Characteristics"** is an overview of the cultural and natural resource features pertinent to planning and implementation efforts for the priority watershed project.
- * **Chapter III: "Water Quality Conditions, Objectives and Nonpoint Sources"** presents field inventory results and identifies the water quality or water resource problems and improvements that can be obtained through implementation of a nonpoint source control project. The chapter describes

the nonpoint sources and other sources of pollution, and discusses the level of pollutant control needed to achieve the water resource objectives.

- * **Chapter IV: "Management Actions: Control Needs and Eligibility for Cost-Share Funding"** identifies the level of urban and rural nonpoint source pollution control needed to meet the water quality objectives. Eligibility criteria for funding to control nonpoint sources under the priority watershed project are also presented.

PART II: A DETAILED PROGRAM FOR IMPLEMENTATION

- * **Chapter V: "Local Government Implementation Program"** describes the means by which the local units of government administer the project, estimates a local assistance and management practice cost-share budget, and identifies an information and education program.
- * **Chapter VI: "Information and Education Program"** discusses the activities that are to take place during the implementation period to generate landowner awareness of the project and acceptance of the proposed BMPs. The chapter also outlines the budget, staff-time needs, and responsible agencies.
- * **Chapter VII: "Integrated Resource Management"** presents the strategy for involving DNR resource management programs (fisheries management, wildlife, etc.) in the nonpoint source pollution abatement efforts in the Lower Grant River Watershed.

PART III: PROJECT EVALUATION

- * **Chapter VIII: "Progress Assessments"** describes the means for assessing the amount of nonpoint source control gained through installation of BMPs in the watershed.
- * **Chapter IX: "Water Resources Evaluation Monitoring Plan"** presents a strategy and schedule for monitoring to determine the water quality impacts of implementing nonpoint source controls in the Lower Grant River Watershed.

PART I

THE WATERSHED ASSESSMENT

CHAPTER II

GENERAL WATERSHED CHARACTERISTICS

LOCATION

The Lower Grant River Watershed is located in southwestern Wisconsin in Grant County (See map of Watershed, page 9). The Grant River flows into the Mississippi River. The watershed project includes only the lower portion of the Grant River Watershed (the lands draining into the Grant River below the river's confluence with the Pigeon River). The watershed project is bounded on the north by the Middle Grant River Watershed, to the east and northeast by the Platte River Watershed, and to the west by the Sandy Creek Watershed. The Lower Grant River Watershed drains 130 square miles, which is 11 percent of Grant County.

CULTURAL FEATURES

GOVERNMENTAL UNITS

The Lower Grant River Watershed lies entirely within Grant County. There are no incorporated areas included in the watershed. Unincorporated areas include all or portions of seven surrounding townships. Beetown, North Andover and Burton are three unincorporated communities found within the watershed. Public lands within the watershed include portions of the Upper Mississippi River National Wildlife and Fish Refuge.

POPULATION

The 1989 population estimate is about 2,637 people. Ninety five percent of the residents live on farmsteads with the remaining five percent living in unincorporated communities. Overall, Grant County has shown a slight population decline (one percent) since 1980, a trend consistent with other agricultural counties in Wisconsin. The Lower Grant River Watershed reflects this data with a 3.4 percent decline in population.

LAND USE

Land uses in the watershed are mostly rural. Agricultural lands and related open space account for 86 percent of the drainage area. Woodlands cover about 12 percent of the area. Developed land uses, such as farmsteads, roads, and communities, occupy two percent of the watershed (Table 2-1).

Grant County agriculture can be traced back to the lead mining days of the early 1800's. Wheat was the county's major crop, with corn production surpassing wheat in 1879. For the state, Grant County ranked third in production of corn for grain and third for hay produced in 1989. The county also ranked first in the total number of cattle, calves, and hogs. The Lower Grant River Watershed is consistent with these numbers since 62 percent (50,859 acres) of the watershed is cropland. The major crops in the watershed are corn and alfalfa. Livestock enterprises include dairy, beef and swine operations with many of the farms having more than one enterprise. Farms in the Lower Grant River Watershed are relatively large, with an average farm size of 310 acres.

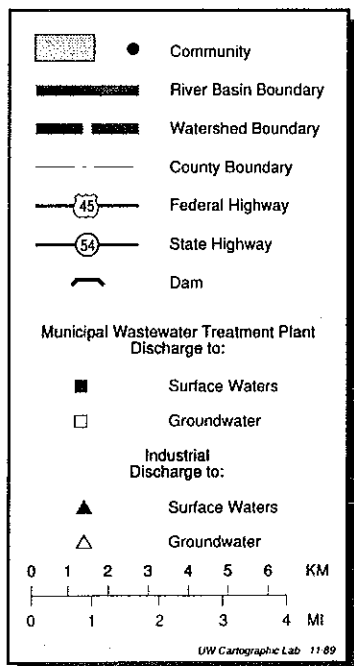
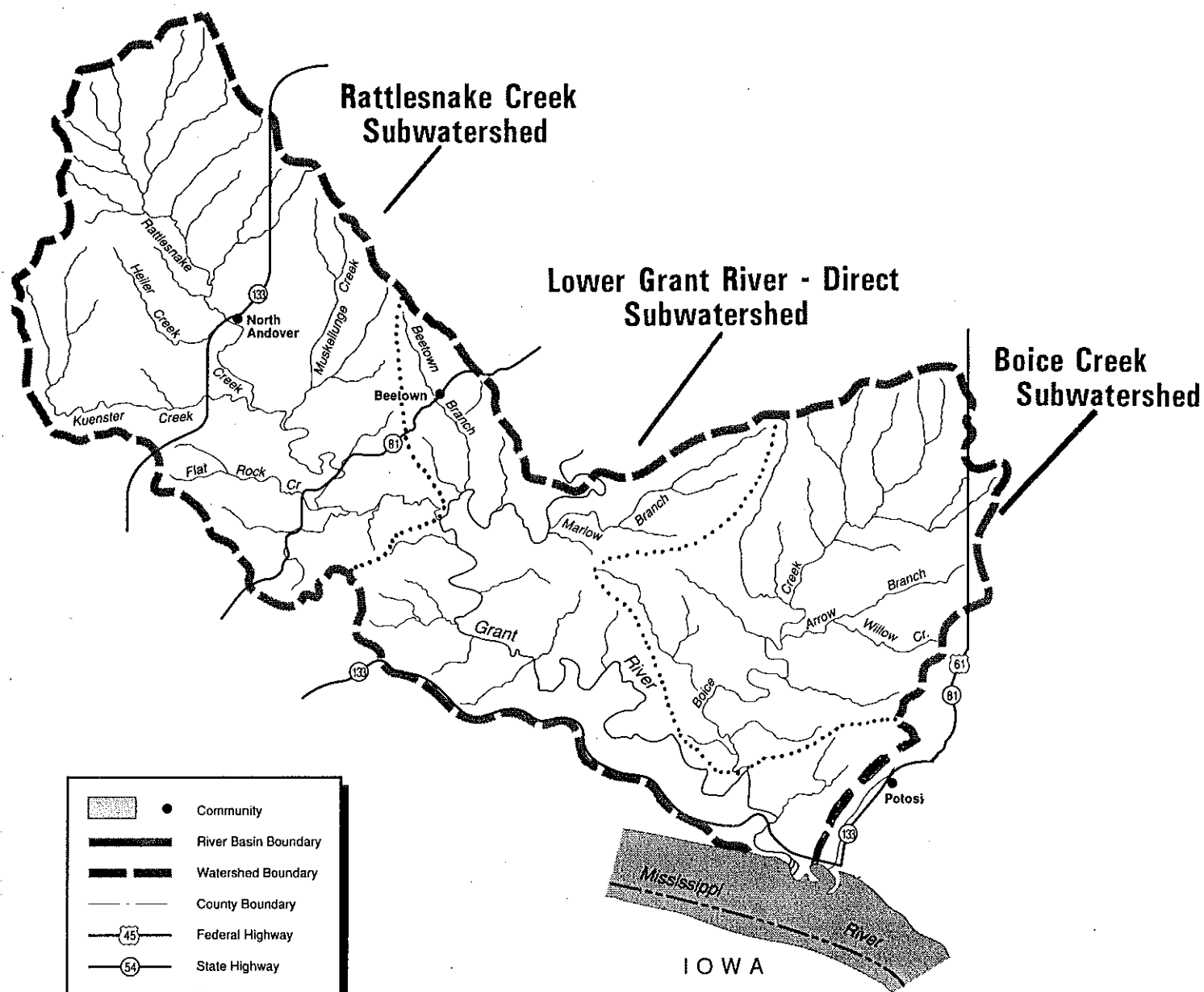
PUBLIC WATER SOURCES

Groundwater is the source of all potable water in the watershed. The entire population relies upon individual, privately-owned water systems. There are no municipal wastewater treatment facilities in the Lower Grant River Watershed. All of the residents treat their waste with private septic systems.

Table 2-1: Land Use in the Lower Grant River Watershed

Land Use	Acres	%
Cropland	47,695	58%
Grassland	3,164	4%
Pasture	20,197	24%
Woodlot	10,036	12%
Developed	1,606	2%
	82,698	100%

Lower Grant River Watershed



PHYSICAL SETTING

CLIMATE AND PRECIPITATION

The frequency, duration, and quantity of precipitation influences quality of the surface water and groundwater. The Lower Grant River Watershed lies in the temperate continental zone which is characterized by cold, snowy winters and hot, humid summers. Average annual precipitation for the watershed is about 32.9 inches; the majority falls in the form of thunderstorms during the growing season (May to September). About 40 inches of snow (four to five inches of rain when melted) falls during a typical winter. Runoff averages nine inches per year.

TOPOGRAPHY

The Lower Grant River Watershed is part of the unglaciated Driftless Area. In the Upper Rattlesnake, Kuenster Creek, and Upper Boice Subwatersheds, the terrain is long gentle slopes between one percent and five percent. In the rest of the Lower Grant River Watershed, the terrain is much rougher with slopes of 20 percent or more. The ridge tops of these hills are flatter with many small streams running between the hills.

SOILS AND GEOLOGY

Soils derived from sedimentary rocks underlay most of the basin. Bedrock consists mainly of Middle Ordovician carbonate formations, with the Galena dolomite commonly as the uppermost unit. The main soils of the watershed are the Dubuque, Fayette, and Tama soil series. These soils are deep, silty, and usually well drained. Silt depth can be 48 inches or more, but is much less in many areas due to erosion over the years. These soils can be nearly level to steeply sloping. They are moderate to high in fertility depending upon the specific site and do require careful use and management to maintain their fertility.

The Lower Grant River Watershed also has Arenzville soils which are found in flood plains. These soils are usually well drained and can be cultivated. They are found next to streams where flooding occurs in the early spring. The water table is generally high.

WATER RESOURCES

STREAMS

There are three major stream systems within the watershed: Rattlesnake Creek, Boice Creek, and the Grant River direct drainage (See map of watershed). Approximately 162 miles of streams drain the Lower Grant River Watershed, providing numerous recreational opportunities for anglers, canoeists, hunters, and trappers.

Rattlesnake Creek is well known for the smallmouth bass fishery it supports, but this has been severely impacted in recent years. Boice Creek can support a marginal smallmouth

bass fishery but appears to have a limited population at present. The other smaller streams and tributaries presently support relatively good forage fish populations. The Grant River itself supports a warm water sport fishery and is also a popular canoeing area.

Both Rattlesnake and Boice Creeks are relatively shallow and, consequently, warm very quickly. The base flow of the streams is dominated by spring discharge, yet during rain events or spring runoff enormous increases in flow occur. As the stream system receives sediment loads from uplands and eroding streambanks, downstream segments have generally become shallower, wider and warmer, and more likely to overflow their banks.

LAKES

Lakes are not a common feature of the driftless landscape; only a few private ponds are present in the Lower Grant River Watershed.

WETLANDS

The Mississippi River backwater complex at its junction with the Grant River plays an important role in the ecology of the Mississippi River system. This area contains diverse fish habitat and is a critical spawning, rearing, dwelling and over-wintering area for fish and wildlife.

This area receives all of the water carried by the Grant River as well as the pollutant load associated with it. The backwater complex will continue to serve as an important fish and wildlife area as long as freshwater inflows to it are maintained. This function is critical to maintaining oxygenated water and aquatic habitat in the backwater complex. The major impact to this area from the Grant River is the sediment load which settles out and fills in the macrophyte beds and channel areas.

GROUNDWATER

This county has an abundant supply of underground water. All of the geological formations underlying soils contain water. The Upper Cambrian sandstone is the principal source throughout the county including the Lower Grant River Watershed. Water for domestic use can come from two sources: alluvial fans in the valleys and springs where strata of shale outcrop occur. The water from these shallow wells and springs is hard and contains a moderate amount of minerals.

The soils in the alluvial fans are sandy and silty sediments. The water table is at or within five feet of the surface most of the year. Internal drainage ranges from slow to very slow, but because of the high water table, there is very little protection from infiltrating contaminants.

The predominant soils in the uplands are the Dubuque and Fayette series. Although the heavier texture of these soils can provide some protection to the groundwater from infiltrating contaminants, the thin soil depths reduce the soil's attenuation capability.

Most of the values describing groundwater quality were found in references not specific to the watershed area. The values presented in Table 2-2 are from well samples collected during the preparation of this plan.

A general description of the quality of the sandstone aquifer can be found in the United States Geological Survey Water Resources Investigations Report titled An Overview of Groundwater Quality Data in Wisconsin (Kammerer, 1984). This sandstone layer encompasses a large area of western Wisconsin from Barron County in the north to the southern boundary of the state. The water is generally quite hard, although the dissolved solids, chlorides, and sulfate levels were below the state's drinking water standards. Iron concentrations can be an aesthetic problem in this aquifer. Of the 454 wells sampled in the Cambrian sandstone layer throughout western Wisconsin, 25 percent of the wells exceeded the drinking water standard for iron. Nitrate concentrations were monitored in 413 wells throughout the Cambrian sandstone layer. Less than 10 percent of these wells had nitrate levels exceeding the 10 mg/l (milligrams per liter) state standard.

The data shown in Table 2-2 indicate that nitrate contamination of the groundwater is a widespread problem in the Lower Grant River Watershed. The combination of the thin soils and sandstone bedrock allow contaminants on the land surface to be carried easily into the groundwater from infiltrating water. Because of these conditions, nonpoint pollutants such as fertilizers, pesticides, and livestock wastes have high potentials for infiltrating the groundwater. A discussion of critical sites and eligibility for cost sharing is included in Chapter 4, "Management Actions, Control Needs, and Eligibility for Cost-Share Funding".

ENDANGERED AND THREATENED RESOURCES

BACKGROUND

Information on endangered resources was obtained from the DNR Bureau of Endangered Resources. It should be noted that comprehensive endangered resource surveys have not been completed for the entire Lower Grant River Priority Watershed Project area. Since data files may be incomplete, the absence of records for known occurrences for any species does not preclude the possibility of their presence in the project area.

Table 2-2: Lower Grant River Well Monitoring Results

Subwatershed	# of Samples	Nitrate Analysis Results					
		Samples 2.0 – 9.9 mg/l		Samples > 10.0 mg/l		Avg. (mg/l)	Max. (mg/l)
		#	%	#	%		
Rattlesnake Creek	73	34	47%	17	23%	6.6	43.4
Boice Creek	86	42	49%	14	16%	5.4	18.4
Lower Grant R. Direct	71	42	59%	13	18%	6.1	39.9
Totals:	230	118	51%	44	19%	5.7	43.4

THREATENED AND ENDANGERED ANIMAL SPECIES

Migratory bald eagles and peregrine falcons (both listed as federally endangered species) and ospreys (a state endangered species), have been sighted in the wildlife area of the Mississippi River backwater complex. Bureau of Endangered Resources data files indicate the great egret nests on the wildlife area, and the red-shouldered hawk has been sighted in the area. Both are threatened species in Wisconsin. Several threatened and endangered fish species have been found in the Mississippi River in the area near the mouth of the Grant River. These include: Speckled Chub, River Redhorse, and the Crystal Darter.

OTHER ANIMAL SPECIES OF CONCERN

Several "species of concern" in Wisconsin occur in or near the Lower Grant River Watershed. These are species which are suspected to have a problem of abundance or distribution. The purpose of this category is to focus attention on certain species before they become endangered or threatened. Fish species in the Mississippi River in the area on this list include: the Pugnose Minnow, Mud Darter, Pallid Shiner, and Western Sand Darter.

Since this project calls for no construction or practices installed directly on the Mississippi River, the project will not have any negative impacts on these fish species.

PLANT COMMUNITIES OF CONCERN

There are several remnants of native plant communities present within the watershed. These include: Southern Dry-Mesic Forest, White Pine Relics, Sugar Maple Woods, Open Cliff Communities, and Dry Prairies. These communities represent the vegetation of this area before settlement times and contain individual plant species, or communities of plants that are rare in Wisconsin.

The County Land Conservation Department (LCD) staff are directed to contact the DNR project manager whenever they suspect that the installation of a best management practice may affect one of these plant communities.

CHAPTER III

WATER QUALITY CONDITIONS, OBJECTIVES, AND NONPOINT SOURCES

INTRODUCTION

The first part of this chapter presents a general description of how nonpoint source pollutants impact water quality. The remainder of the chapter discusses:

- * The water resource conditions of each stream.
- * The results of the nonpoint source inventories.
- * Other potential pollutant sources.
- * The conditions that could be achieved in the streams if nonpoint sources of pollution were controlled.
- * The amount of pollutant control necessary to achieve the desired water resource conditions.

WATER POLLUTION BASICS

Nonpoint sources are responsible for the degraded conditions of the streams in this watershed. Excessive amounts of sediment, nutrients, and bacteria degrade the water quality causing an unbalanced fish community with depressed populations and limited diversity. Furthermore, sediment from the watershed settles out in the Mississippi River backwater area causing the pool to fill in. In this watershed the two most serious pollutants are manure and sediment. These are discussed below.

MANURE

Manure contains several components that adversely affect the water quality and aquatic life. Manure breaks down when entering a stream resulting in depletion of the oxygen in the water, which fish require to survive. Also, manure contains nitrogen which can form ammonia in the streams and lakes. In high concentrations the ammonia is toxic to fish and other aquatic life. The nutrients in manure (including nitrogen and phosphorus) also

promote nuisance algae and weed growth in the streams and lakes. Finally, the bacteria found in livestock manure is harmful to livestock drinking the water, and to humans using the water for recreation.

The major sources of manure in this watershed are runoff from animal concentration areas (barnyards) and runoff from improperly field-spread manure. Manure runoff to streams is the major cause of the poor sport fish populations in Rattlesnake Creek. It is suspected by the DNR fish biologists that oxygen depletion from manure is the reason for the limited sport fish population in Rattlesnake Creek.

SEDIMENT

Sediment adversely impacts the water resources in many ways. The suspended sediment makes it difficult for fish to see and catch food. High sediment concentrations abrade fish gills making the fish more susceptible to disease. Suspended sediment also causes the water to be warmer in the summer, and warm water cannot hold as much oxygen as cold water. Sediment that settles out in the Mississippi River fill up pools and bays eliminating the aquatic habitat critical to several species of fish, waterfowl, and other wildlife.

The major sources of sediment in this watershed are upland erosion from croplands, gully erosion, and streambank erosion.

NITRATES

Nitrate levels in the groundwater exceeding a concentration of 10.0 mg/l (milligrams per liter) violate state groundwater standards. At this level it is recommended that infants not consume the water because the nitrate interferes with the ability of the blood to carry oxygen. High levels of nitrates may also indicate other contaminants in the drinking water. High nitrate concentrations in the drinking water are also linked to spontaneous abortions in livestock.

The most likely source of nitrates in the groundwater in this watershed is nitrogen fertilizers applied to croplands.

SUBWATERSHED DISCUSSION

RATTLESNAKE CREEK DRAINAGE AREA

General Description: The Rattlesnake Creek drainage area is nearly 54 square miles in size. It includes the mainstream of Rattlesnake Creek, and the tributaries of Kuenster Creek, Muskellunge Creek, Heiler Creek, and Flat Rock Creek.

This subwatershed has a higher percentage of croplands than the other subwatersheds of the project. The ridgetops are broad and gently sloping (two to six percent) with steeper sloping lands near the creek. The soils are mostly deep, well drained prairie soils (Tama series) which are well suited for crop production. Pastures and woodlots are found on the steeper lands that cannot be cropped. Table 3-1 summarizes the land uses and related sediment pollution from the uplands within the subwatershed.

The barnyard density is average for the watershed and the modeled pollutant load from the barnyards is also average for the watershed (Table 3-3). Of the 237 barnyards inventoried, 34 of them (15 percent) account for 50 percent of the modeled pollutant load.

The summary of the streambank erosion inventory is shown on table 3-2. Sediment entering the stream and tributaries from streambank erosion is about half of that from the upland sources. Although the amount of cattle access is not as high as in the other subwatersheds, there are significant problems with cattle access affecting the fish habitat in the lower reaches of the main stem.

Water Resource Conditions: The lower portions of the Rattlesnake Creek Main Stem (below North Andover) was the focus of intense studies in recent years, hence existing information for the water resource appraisal is quite good. Those studies are part of an interagency effort aimed at determining the reasons behind the decline of smallmouth bass populations in southwestern Wisconsin.

A complete list of monitoring activity and sources of information is found in the report: "Resource Appraisal of the Lower Grant River Watershed" (DNR-Southern District Office). This list includes fish shocking surveys, water chemistry monitoring, macroinvertebrate studies, and habitat evaluations.

Water quality is quite variable from year to year and within the season in this reach of stream. Diurnal oxygen variations occur following rain events. Dissolved oxygen levels have been as low as zero (1987), or have approached zero (1989), following a heavy rainfall/runoff events. Large numbers of fish have died during these oxygen depletions. The low level of oxygen is likely due to high levels of organic matter (manure) entering the streams.

The mean annual base flow in Rattlesnake Creek is 12.3 cubic feet per second (cfs). During flood stages it may reach 150 cfs or more (Water Resources Management Program, 1989). The maximum periods of discharge occur during the early spring snow melt (February-March). During 1988, a USGS monitoring station indicated stream temperatures up to a high of 88.7°F during July. The average temperature from June through August was above 68°F (USGS, 1988). Intensive macroinvertebrate sampling in the lower reach of Rattlesnake Creek has shown the Hilsenhoff Biotic Index (HBI) value to be fairly poor (6.62). The HBI indicates high organic loading to the streams.

There are no known point sources of pollution on this stream. In selected areas of the downstream reaches of the main stem, poor streambank habitat have also impacted the sport fishery. The streambed is somewhat impacted from sediment covering up rocky areas and filling in the deeper pools.

Water Resource Objectives: The objectives for controlling nonpoint sources of pollution in this subwatershed are to:

- * Improve the current smallmouth bass fishery.
- * Improve riparian habitat to support waterfowl and other wildlife.

To meet these objectives the following items need to be achieved:

- * Reduce organic pollution from livestock wastes by 75 percent.
- * Reduce riparian habitat destruction from livestock access by 50 percent.

BOICE CREEK DRAINAGE AREA

General Description: Boice Creek enters the main stem of the Grant River about two river miles above the outlet of the Grant River. The drainage area is about 37.5 square miles. Major tributaries to Boice Creek include: Arrow Branch, Willow Creek, and Graham Hollow Creek. Soils of the ridgetops are deep, silty, and well drained (Downs, Fayette, and Tama series). Alluvial soils are found in the lower valley of the main stem of Boice Creek. The topography of this drainage area is somewhat more steep than the Rattlesnake Creek drainage area. Also, the ridgetops are not as broad and gently sloped as in the Rattlesnake Creek area.

In comparison to the Rattlesnake Subwatershed, less land is used for cropping (56 percent). Lands used for pasturing are proportionally higher, and vacant lands with permanent vegetative cover account for a considerable portion of the land use (six percent). Table 3-1 shows the land cover and sediment amounts for this subwatershed.

There were 141 barnyards inventoried for potential manure runoff within this subwatershed (Table 3-3). The top 19 yards contribute 50 percent of the manure runoff for the subwatershed.

Streambank erosion accounts for about as much sediment entering the stream systems as the upland erosion sources (Table 3-2). There is a very high percent of the streambanks with unrestricted livestock access.

Water Resource Conditions: The streams in the upper reaches of this system (Arrow Creek, Willow Creek, Graham Hollow, and upper Boice Creek) are very similar in nature. The streams are relatively narrow (two to 10 feet wide), shallow (one to four feet deep), and have a moderately steep gradient. In some cases, riparian vegetation borders the stream but large reaches are cropped or have unlimited cattle access.

Past fisheries studies indicate that streams are dominated by a forage fishery with game fish--primarily smallmouth bass--only occasionally present. Where vegetation occurs along the stream and where nesting sites in trees are available, wood duck nesting habitat is present. The stream is susceptible to diurnal oxygen swings because of heavy sediment loads and organic material (manure) entering the stream.

It is possible that re-suspension of sediments and organic material which have a high biological oxygen demand (BOD) during rain events and high flows is causing some of the oxygen depletion.

According to samples collected in 1980 and 1982, biotic index values for these tributaries, based on the presence of aquatic macroinvertebrate species, range from fair to good.

The lower portion of Boice Creek can be compared to the Rattlesnake Creek in land use, chemistry, and drainage pattern although the Boice Creek Subwatershed is not as large as Rattlesnake Creek. The average width is eight to 10 feet, while the average width of Rattlesnake Creek is 15 feet. Although it would seem that Boice Creek should support a good smallmouth bass fishery, recent and historic fish population surveys have shown this creek to support a marginal smallmouth bass population. Like Rattlesnake Creek, this stream appears to suffer dissolved oxygen problems following high flow or rainfall events. According to past and recent fish population surveys, the forage fish species diversity and population levels are good.

The riparian vegetation along Boice Creek is also valuable wildlife habitat for species such as wood ducks.

Water Resource Objectives: The objectives for controlling nonpoint sources of pollution in this subwatershed are to:

- * Change the current forage fish population to support a limited smallmouth bass fishery.
- * Improve riparian habitat to support waterfowl and other wildlife.

To meet these objectives the following items need to be achieved:

- * Reduce organic pollution from livestock wastes by 75 percent.

Table 3-1 Summary of Upland Sediment Loading by Land Use

Subwatershed		Cropland (%)	Grassland (%)	Pasture (%)	Woodlot (%)	Other+ (%)	Totals (%)
Rattlesnake Creek	Acres	25,256 73%	41 0%	5,463 16%	2,869 8%	864 3%	34,493 42%
	Sediment*	12,795 95%	3 0%	407 3%	49 0%	272 2%	13,526 56%
Boice Creek	Acres	13,134 56%	1,366 6%	7,684 33%	1,030 4%	393 2%	23,607 29%
	Sediment	4,792 83%	233 4%	602 10%	23 0%	117 2%	5,767 24%
Grant River, Direct	Acres	9,305 38%	1,757 7%	7,050 29%	6,137 25%	349 1%	24,598 30%
	Sediment	3,786 79%	258 5%	526 11%	95 2%	100 2%	4,765 20%
Totals	Acres	47,695 58%	3,164 4%	20,197 24%	10,036 12%	1,606 2%	82,698 100%
	Sediment	21,373 89%	494 2%	1,535 6%	167 1%	489 2%	24,058 100%

* Sediment is reported in tons/year delivered to a stream

+ "Other" lands include: farmsteads, roads, and communities

Table 3-2: Inventory Results: Streambank Erosion and Habitat Degradation

Subwatershed	Total Stream Length * (ft)	# of Eroding Sites	Length of Eroding Sites		Total Sediment Loss (tons/yr)	Sediment Loss Rate (tns/stream mile/year)	Banks With Cattle Access (ft)
			(ft)	% of Total			
Rattlesnake Cr.	661,725	471	473,885	72%	6,598	53	209,642
Boice Creek	485,609	419	436,929	90%	5,399	59	379,419
Grant R. Direct	558,110	359	549,410	98%	34,578	327	325,210
Totals:	1,705,444	1,249	1,460,224	86%	46,575	144	914,271

* This is the total length of both banks on the mainstem and all permanent tributaries inventoried

Table 3-3 : Inventory Results: Barnyard Runoff Summary

Subwatershed	Yards with Runoff to Surface Waters			Yards Internally Drained
	Total # of Yards	Phosphorus Load (lbs)	% of Total Watershed Load	
Rattlesnake Cr.	237	6,605	47%	0
Boice Creek	140	4,487	32%	1
Grant R. Direct	112	2,993	21%	1
Total:	489	14,085	100%	2

- * Reduce riparian habitat destruction from livestock access by 50 percent.

LOWER GRANT RIVER - DIRECT DRAINAGE AREA

General Description: This subwatershed includes the direct drainage to the main stem of the Grant River from its confluence with Pigeon Branch (T3N R4W S4) downstream to the Mississippi River. The major tributaries to the Grant River in this drainage area are Marlow Branch, Beetown Branch, and Rigsby Hollow. This subwatershed also includes the floodplain-wetlands complex at the mouth of the Grant River where it enters into the Mississippi River. There are 37 square miles within this subwatershed. The Grant River, above the confluence with Pigeon Branch, has a drainage area of about 140 square miles. Although this portion of the Grant River Watershed is not within the project area, land activities in this region affect the water quality of the Grant River.

Lands in this subwatershed are less intensely cropped compared with the other portions of the watershed project area. Woodlots and pastures are more common because of the steeper terrain. Sediment pollution from the upland areas is less severe because of this land use pattern.

One hundred twelve barnyards were inventoried for their manure runoff potential. Of these yards, 16 contribute about half of the estimated phosphorus load from this source.

Streambank erosion is very severe in this subwatershed especially along the Grant River itself. The river is very entrenched with nearly 20 percent of the eroding banks measuring 10 to 12 feet high. Most of the cattle access is located on the tributary streams because the high banks of the river prevent cattle from reaching the water.

Water Resource Conditions: The river has a fishery of relatively varied composition. Game fish include smallmouth bass, walleye, sauger, and catfish. An assortment of minnow species and other fishes are also present. This reach of the river is heavily used for canoeing, hunting, fishing, and other types of non-contact recreation. Surveys by the DNR's Bureau of Wildlife Management indicate that waterfowl heavily use the area for nesting (wood ducks) and during migration. Mallards, wood ducks, and blue-winged teal also use the scattered wetlands in the floodplain during the nesting season and migration.

The floodplain-wetlands complex at the mouth of the river provides a highly productive habitat for waterfowl, nongame species, and sport fish. This is also the area where endangered and threatened species, such as the bald eagle, and osprey are found.

Biotic index values indicate good water quality in terms of dissolved oxygen levels. However, the sediment load that this river carries is one of the highest ever recorded in the state. These sediment loads are so high that the U.S. Fish and Wildlife Service is beginning

a project to divert flows from the Grant River away from Pool 11 and prevent siltation of the slackwater pool area.

Existing uses of the river are fishing, hunting, canoeing, and non-contact recreation. The river bottom lands are also valuable for wildlife habitat, especially waterfowl.

Water Resource Objectives: The objectives for controlling nonpoint sources of pollution in this subwatershed are to:

- * Maintain the current warmwater sport fish population.
- * Improve riparian habitat to support waterfowl and other wildlife.
- * Reduce the habitat degradation in the Mississippi Pool area from sediment.

To meet these objectives the following items need to be achieved:

- * Reduce organic pollution from livestock wastes by 75 percent.
- * Reduce riparian habitat destruction from livestock access by 50 percent.
- * Reduce sediment from upland sources (throughout the project area) by 30 percent.
- * Reduce sediment from streambank sources (throughout the project area) by 50 percent.

Control of nonpoint source pollution in the watershed would only slightly improve the water quality of the Grant River because of the sources that are upstream of the designated watershed. Control of streambank erosion on the Grant River would directly benefit this portion of the watershed.

CHAPTER IV

MANAGEMENT ACTIONS: CONTROL NEEDS AND ELIGIBILITY FOR COST-SHARE FUNDING

INTRODUCTION

This chapter describes the management actions developed to meet the pollution reduction goals established during the water resource appraisal process. Also described below are the criteria which will determine the eligibility of each pollutant source for cost-share funding through the Wisconsin Nonpoint Source Water Pollution Abatement Program (nonpoint source program).

MANAGEMENT CATEGORIES

Management categories define which nonpoint sources are eligible for financial and technical assistance under the priority watershed project. Categories are based on the amount of pollutants the source generates, and the feasibility of controlling the source. Eligibility criteria for management categories are expressed in terms of:

- * **Tons of sediment** delivered to surface waters from eroding uplands and streambanks.
- * **Pounds of phosphorus** delivered to surface waters during a 10-year, 24-hour storm from barnyard runoff.
- * **Critical acres** of winter-spread manure on an annual basis.

A definition of each management category is given below. Following the definitions are the criteria used to define the management categories for each pollutant source for this project.

County staff must confirm the criteria used to define these management categories at the time of a site visit. A source may be put into a different management category depending on the conditions found at the time of the visit. The management category for a source may be revised up to the point when the landowner signs the cost-share agreement. Sources meeting the Management Category I criteria (as defined in this chapter), which the landowner creates after signing the cost-share agreement, must be controlled at the landowner's expense.

MANAGEMENT CATEGORY I

Nonpoint sources included in this category contribute a significant amount of the pollutants that impact surface waters. A reduction in their pollutant load is essential for achieving the water quality objectives in the watershed project. If all Management Category I sources are controlled, water resource objectives for pollutant control are met.

Nonpoint sources in Management Category I are eligible for funding and/or technical assistance under the priority watershed project. As a condition of funding, all sources in Management Category I must be controlled if a landowner wishes to participate in any aspect of the watershed project.

MANAGEMENT CATEGORY II

Nonpoint sources in this category collectively contribute less of the pollutant load than those in Management Category I. These nonpoint sources are identified and included in cost-sharing eligibility to provide alternate means of pollutant reductions in the event that all sources in Management Category I are not controlled. Nonpoint sources in this category are eligible for funding and/or technical assistance under the priority watershed project. Controlling sources in this category is not mandatory for a landowner to be funded for controlling other sources.

MANAGEMENT CATEGORY III

Nonpoint sources of pollution in this category do not contribute a significant amount of the pollutants impacting surface waters and are not eligible for funding and/or technical assistance under the priority watershed project. Other DNR programs (e.g. wildlife and fisheries management), if warranted, can assist county project staff to control these sources as implementation of the integrated resource management plan for this watershed. Other federal programs may also be applicable to these sources.

CRITERIA FOR ELIGIBILITY OF NONPOINT POLLUTANT SOURCES & MANAGEMENT CATEGORY DESIGNATIONS

CROPLANDS AND OTHER UPLAND SEDIMENT SOURCES

Management Category	Eligibility Criteria		USLE Design Target *
	Sediment Delivery (tns/ac/yr)	Soil Loss (tns/ac/yr)	
I	over 0.15 &	over "T"	"T"
II	over 0.15 &	under "T"	"T-1"
II	under 0.15 &	over "T"	"T"
III	under 0.15 &	under "T"	N/A

* These are maximum design targets - design targets may be lower if feasible

The number of acres that meet each management category criteria is shown on Table 4-1.

There are two ways that a participating landowner can meet the upland sediment control requirements as defined in the above box:

1. The installation of best management practices (BMPs) on all Management Category I fields which meet the design target. Management Category II fields are also eligible for cost-shared BMP's although it is not required. The best management practices on Management Category II fields are eligible for cost sharing as long as high cost practices (terraces or agricultural sediment basins) are not used.
2. In meeting the upland sediment control requirements for a landowner, the county may wish to use a "whole farm approach". Under this system, the amount of sediment that is controlled through meeting the Management Category I criterion listed in box above is calculated for a landowner. This "farm target number" must then be met through any combination of sediment control measures applied to any of the lands on the farm. The best management practices are eligible for cost sharing as long as high cost practices (terraces or agricultural sediment basins) are not used on fields fitting the Management Category II criteria.

Either of these alternatives may be used throughout the watershed depending on which system best suits the needs of a participating landowner.

ANIMAL LOT RUNOFF

Management Category I Phosphorus Load	Management Category III Phosphorus Load
15 lbs or greater*	less than 15 lbs*
* This is the phosphorus load result from the Wisconsin Revised ARS model under a 4.3" rainfall.	
The required phosphorus design target level for all eligible yards < 15 lbs.	

The number of barnyards eligible for funding of runoff control practices according to the inventory for each management category is shown on Table 4-2. Any landowner receiving cost share funds for barnyard runoff controls will also be required to follow a manure spreading plan developed under the SCD Technical Guideline 590, "Nutrient Management".

MANURE SPREADING RUNOFF

Number of Critical Acres Winter Spread*	Management Category
15 acres or more	I
10 - 14 acres	II
less than 10 acres	III
* These acreages apply to individual landowners	

The actual critical acres winterspread by a landowner must be confirmed at the time of a farm visit. The decision on whether an operation needs a storage facility is based upon an individual's ability to safely spread manure (according to an SCS Technical Guide Standard "590: Nutrient Management" plan) on not more than 10 acres of critical lands. If a landowner is unable to meet this plan, then a short or long term storage system is necessary. **If a storage system is cost shared through the watershed project then no critical lands (as defined by the SCS Specification 590) may be winterspread. Also, a manure management**

Table 4-1: Rural Uplands Targeted for Sediment Control

Subwatershed	Total Sediment (tons/yr)	Management Category I			Management Category II			Mgmt. Cat. III (acres)
		Acres	Control (tons/yr)	Control (%)	Acres	Control (tons/yr)	Control (%)	
Rattlesnake Cr.	13,526	12,437	4,295	32%	9,873	1,584	12%	12,183
Boice Creek	5,767	3,983	1,197	21%	5,522	878	15%	14,102
Grant R. (Direct)	4,765	6,540	1,212	25%	4,883	661	14%	13,175
Total:	24,058	22,960	6,704	28%	20,278	3,123	13%	39,460

Table 4-2: Barnyards Targeted for Runoff Control

Subwatershed	Total Phos. (pounds)	Management Category I			Mgmt. Cat. III (yards)
		Yards (#)	Control (pounds)	Control (%)	
Rattlesnake Cr.	6,605	123	5,016	76%	114
Boice Creek	4,487	77	3,477	77%	63
Grant R. (Direct)	2,993	61	2,237	75%	51
Total:	14,085	261	10,730	76%	228

* Control based on reducing yards with phosphorus load ≥ 15 lbs to < 15 lbs

Table 4-3: Manure Spreading Operations Targeted for Management

Subwatershed	Total Critical Acres	Management Category I			Management Category II			Mgmt. Category III	
		Estimated # of Operations	Estimated * Critical Acres Controlled	% of Critical Acres Controlled	Estimated # of Operations	Estimated * Critical Acres Controlled	% of Critical Acres Controlled	Estimated # of Operations	Est. Critical Acres
Rattlesnake Cr.	5010	77	3,720	74%	9	104	2%	39	71
Boice Creek	2012	37	1,317	65%	3	37	2%	34	57
Grant R. (Direct)	1433	22	864	60%	8	96	7%	24	32
Total:	8,455	136	5,901	70%	20	237	3%	97	160

* The "Estimated Critical Acres Controlled" assumes landowners with greater than 10 "critical acres" are managed to a level equal to 10 critical acres spread.

Sources: Wisconsin Department of Natural Resources; Wisconsin Department of Agriculture, Trade, and Consumer Protection, and Grant County Land Conservation Department

plan is required for any storage system cost shared through the watershed project. Table 4-3 shows the estimated acres and operations that this project will affect.

STREAMBANK EROSION

Streambank erosion control measures and cattle access restrictions are eligible for cost-share funding throughout the watershed where there is active streambank erosion and/or unrestricted livestock access to a stream. These measures are required of participating landowners who meet the criterion listed in the box below.

Stream	Management Category	Criteria *
Grant River (mainstream)	I	For each participating landowner: reduce sediment load by a minimum of 50% from sites with lateral recession rates > .10 t/yr.
All other permanent streams and tributaries	II	Streambank erosion control practices and livestock access control practices.
* Sediment load reductions are applied on a riparian landowner basis.		

GULLY EROSION CONTROL

There was no inventory conducted for gully erosion. This means that there is no estimate of the percentage of sediment control targeted for this source. There also is no estimate of the number of landowners eligible for gully erosion control measures. The criteria for the management categories will be reviewed after the first year of project implementation.

Management Category	Criteria
I	Sites with: 1) gully depths of at least 5 vertical feet; 2) bare soils and evidence of active erosion; 3) direct connection with streams via channelized flow during runoff events; <u>and</u> 4) reasonable access to necessary machinery.
II	Sites with less than 5 vertical feet and <u>all</u> of the other criterium listed in Category I.

NUTRIENT AND PESTICIDE INFILTRATION TO GROUNDWATER

Because of the physical characteristics of the watershed--soils, bedrock, and land use--and the results of the well sampling, it is likely that fertilizer and pesticide applications are having an impact on the groundwater quality.

Farms where manure management plans are completed will also include the SCS Technical Guide's Nutrient Management Standards. DATCP Pesticide Management Standards are being developed and this plan may be amended to provide for these standards.

CRITERIA FOR ELIGIBILITY OF EASEMENTS

Nonpoint Source Program funds may be used to purchase land easements in order to support specified best management practices. These practices, all of which involve the establishment of permanent vegetative cover, include:

- * Shoreline buffers.
- * Critical area stabilization.
- * Wetland restoration.

In addition to supporting the practices listed above, easements may also be purchased for the support of a wetland restoration practice. These two applications are described below.

NOTE: In addition to the criterium described below, the landowners must control all "Management Category I" sources (through a Cost Share Agreement) to be eligible for an easement through the Lower Grant River Priority Watershed Project.

EASEMENTS TO SUPPORT CRITICAL AREA STABILIZATION AND SHORELINE BUFFERS

The following guidelines and criteria are for the purchase of easements used to support critical area stabilization, and shoreline buffers exclusive of wetland restoration. Guidelines for using easements to support wetland restoration are presented later in this chapter.

1. **Riparian Lands Along "High Priority" Water Resources:** These are the highest priority areas for obtaining easements to support critical area stabilization and shoreline buffer practices and include those streams that are most sensitive to nonpoint pollution. These water resources will experience added benefits of permanent vegetative cover, enhancements to aquatic habitat, and, if the landowner agrees, improved public access to surface waters.

In this watershed "high priority" waters include the perennial streams in the Rattlesnake Creek Subwatershed. Rattlesnake Creek has a high potential to receive public use through sport fishing improvements. The lower nine miles of Rattlesnake Creek main stem is also eligible for easement funding through Wisconsin's Stewardship Program. Along this stretch of the main stem easements from either the Stewardship Program or nonpoint source program will be available.

Easements to allow the establishment of permanent vegetative cover in this subwatershed will be considered even though other lower cost practices, such as changes in crop rotation, reduced tillage, contour plowing, or contour strips may provide an adequate level of control. Easements in these areas will also be considered as a cost-effective alternative to more expensive practices such as cropland terraces or agricultural sedimentation basins.

2. **Other Portions of the Watershed:** Easements may also be used to support critical area stabilization and shoreline buffers in other portions of the watershed, although additional restrictions apply.

In these areas, the easement must offer pollution control at a cost that is competitive with that of other controls, as required by NR 120. For example, the easement should be lower or similar in cost to expensive practices (such as terraces or agricultural sediment basins) for continuous row crops where the only other alternative is retiring the land.

Easements may not be purchased with program funds to establish shoreline protection or critical area stabilization practices outside high priority areas if significantly lower cost practices, such as changes in crop rotation, reduced tillage, contour plowing, or contour strips, provide an adequate level of control.

EASEMENTS TO SUPPORT WETLAND RESTORATION

Easements may be used to support eligible wetland restoration projects. The cost-effectiveness criterion for using wetland restoration is relaxed everywhere in the watershed, being similar to the criterion for easements for shoreline buffers and critical area stabilization in areas adjacent to "high priority waters".

If wetland restoration does not involve the purchase of an easement, then the Land Conservation Department (LCD) may sign a cost-share agreement for the required costs and proceed to implement the practice. Further discussion on the Wetland Restoration Practice is given below.

ADMINISTRATION OF EASEMENTS

Easements shall be for a period of no less than 20 years, although perpetual easements are preferred. The easement will be developed as an agreement separate from the cost-sharing agreement for the best management practice.

Easements may be contracts between the landowner and the Department of Natural Resources, or between the landowner and the local unit of government. The local unit of government will retain responsibility for identifying how the easement will be used in controlling targeted pollution sources. Final approval of the easement rests with the DNR's Bureau of Water Resources Management.

To initiate the process, the local unit of government shall forward the easement proposal to the DNR District Nonpoint Source Coordinator. The Nonpoint Source Coordinator will be responsible for obtaining review comments from local DNR staff including those from Wildlife Management, Fish Management, and Water Regulation and Zoning. The Nonpoint Source Coordinator will then forward the proposal to DNR bureau offices for Water Resources Management, Property Management, and other disciplines as appropriate.

ESTIMATED NEED FOR EASEMENTS

The estimated number of acres needed to control targeted pollution sources located adjacent to "high priority waters" is shown in Table 5-3. No estimate is available for other easement needs.

CRITERIA FOR ELIGIBILITY OF WETLANDS RESTORATION

Wetland restoration is an eligible best management practice for the purpose of controlling nonpoint sources of pollution. Secondary benefits of wetland restoration may be

enhancement of fish and wildlife habitat. However the primary justification for restoration under this nonpoint source pollution control project must be water quality improvement.

Wetland restoration includes: the plugging or breaking up of existing tile drainage systems, the plugging of open channel drainage systems, other methods of restoring the pre-development water levels of an altered wetland, or fencing of livestock out of a wetland.

Wetland restoration is an eligible practice when applied to any of the following:

- * Cultivated organic soils with tile or open channel drainage systems discharging to a stream or tributary.

Wetland restoration will reduce the amount of nutrients and pesticides draining from the altered wetland to a water resource. Establishing permanent vegetation and disabling the drainage system will control this pollutant source.

- * Pastured wetlands riparian to streams, or tributaries.

Eliminating livestock grazing within wetlands will reduce the organic and sediment loading to the wetland and adjacent water resource, and reduce the direct damage to the wetland from the livestock. Fencing to exclude livestock will control the pollutants and restore the wetland.

- * Prior converted wetlands downslope or upslope from fields identified as critical upland sediment sources (Management Category I) in this chapter.

Restoration of wetlands in these situations will do one of two things:

1) Create a wetland filter which reduces the pollutants from an upslope field(s) to a water resource.

2) Reduce the volume and/or velocity of water flowing from an upslope wetland to a downslope critical field. Two eligibility conditions must be met to use wetland restoration in this situation:

a) All upland fields draining to the wetland must be controlled to a soil loss rate that is less than or equal to the soils "T" value.

b) One or more of these same fields must still have a sediment loss rate (after the application of any erosion control measures) greater than 0.15 tons/acre/year.

ORDINANCE FOR THE CONTROL OF NONPOINT SOURCE POLLUTION

Grant County is encouraged to adopt the ordinances discussed below. These ordinances are not required for the county's participation in the Lower Grant Priority Watershed Project; however, the ordinances would provide another useful means of controlling nonpoint pollution. The ordinances described below will likely be required for the county to participate in any future priority watershed projects.

MANURE STORAGE

The Department of Agriculture, Trade, and Consumer Protection (DATCP) has produced a model manure storage ordinance for consideration by the counties (under SS 92.16). At a minimum, the ordinance requires all newly constructed animal waste storage ponds to meet technical standards that the county adopts. Also, a waste spreading plan must be developed for each of the storage ponds.

Grant County is currently in the process of adopting a manure storage ordinance. In addition to the minimum requirements, Grant County's ordinance requires technical standards to meet all newly constructed waste storage structures (both ponds and other storage structures). The Land Conservation Committee has tabled this proposed ordinance.

CONSTRUCTION EROSION CONTROL

Sediment loss rates from construction sites can be many times greater than rural cropland erosion. In response to this the legislature authorized the Department of Natural Resource to develop a "model construction site erosion control ordinance" for use by the local municipalities. This ordinance is available for adoption along with a handbook on designing construction erosion control practices. Many cities and villages, and a few counties have already adopted the ordinance.

Construction erosion control measures will be used on all construction related to the BMPs installed through the Lower Grant Watershed Project.

PART TWO

DETAILED PROGRAM FOR IMPLEMENTATION

CHAPTER V

LOCAL GOVERNMENT'S IMPLEMENTATION PROGRAM

INTRODUCTION

This chapter identifies the means for implementing the rural and urban management actions for nonpoint source control described in Chapter IV, "Management Actions: Control Needs and Eligibility for Cost-Share Funding". Included in the implementation program for rural areas is an information and education strategy. The success of this priority watershed project depends on the aggressive implementation of the total nonpoint source control strategy.

More specifically this chapter identifies:

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

PROJECT PARTICIPANTS: ROLES AND RESPONSIBILITIES

LANDOWNERS AND LAND OPERATORS

Landowners and operators of public and private lands are important participants in the priority watershed program. They adopt BMPs that reduce nonpoint sources of water pollution, and protect and enhance fish, wildlife and other resources. Landowners and land operators in the Lower Grant River Watershed eligible for cost-share assistance through the priority watershed program include:

- * Individuals.
- * Grant County.
- * Other governmental units described in NR 120.02(19).
- * Corporations.
- * The state of Wisconsin.

Grant County is the primary unit of government responsible for implementing this plan in rural areas.

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

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

1. Identify in writing a person to represent the county during implementation of the project.
2. Contact all owners or operators of lands identified as significant nonpoint sources within one year of signing the nonpoint source grant agreement. The county's strategy for contacting landowners are included in this chapter.
3. Develop farm conservation plans consistent with the needs of the project.

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

DEPARTMENT OF NATURAL RESOURCES

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

Project Administration: Project administration includes working with the county to ensure that work commitments required during the eight-year project implementation phase can be met. The DNR will participate in the annual work planning process with the county.

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

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

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

Project Evaluation: The DNR has responsibility for priority watershed project monitoring and evaluation activities. These efforts determine if changes in water quality occur as best management practices and other pollution controls are installed or implemented. The water quality evaluation and monitoring strategy for the Lower Grant River Watershed are included in Chapter 9, "Water Resources Evaluation Monitoring Plan". The DNR documents the results of monitoring and evaluation activities in interim and final priority watershed project reports.

Technical Assistance: The DNR provides technical assistance to the county on the design and application of best management practices.

Other Responsibilities: These include:

- * Assisting county staff with site reviews to determine the impacts of nonpoint sources on wetlands and/or groundwater quality.
- * Assisting county staff to integrate wildlife and fish management concerns into selection and design of BMPs.

DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION

The role of the Department of Agriculture, Trade and Consumer Protection (DATCP) is identified in s. 144.25, stats., ch. 92 stats., and NR 120. In summary, the DATCP will:

- * Manage a training program for the staff involved with the project's implementation.
- * Cooperate with the University of Wisconsin - Extension to act as a clearinghouse for information related to agricultural best management practices, sustainable agriculture, and nutrient and pest management.
- * Assist the counties to carry out the information and education activities or tasks described in this plan.
- * Assist county staff to identify watershed participants subject to federal or state conservation compliance programs.

- * Assist counties, if requested, to develop a manure storage ordinance.
- * Assist county staff to complete annual workload analyses and grant applications for work conducted under the priority watershed project.
- * Participate in the annual project review meetings.
- * If the need arises, assist in developing technical standards for agricultural BMPs, and provide technical assistance to county staff concerning application of these practices.
- * Assist county staff to evaluate the site-specific practicality of implementing rural best management practices.

OTHER AGENCIES

The Lower Grant River Watershed Project will receive assistance from the agencies listed below.

Soil Conservation Service (SCS): This agency works through the local LCC to provide technical assistance for planning and installing conservation practices. The local SCS personnel will work with the county staff to provide assistance with technical work. Personnel from the area's SCS office will provide staff training and engineering assistance for best management practices. The DATCP will make efforts to assist SCS in coordinating the Lower Grant River Priority Watershed Project with the conservation compliance and other conservation provisions of the 1985 and subsequent Federal Farm Bills.

University of Wisconsin Extension (UWEX): County Extension agents, as time allows, will provide support in developing and conducting a public information and education program aimed at increasing voluntary participation in the project. This will include assistance to carry out the information and education activities identified in this plan.

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

AGRICULTURAL BEST MANAGEMENT PRACTICES (BMPs)

BMPs ELIGIBLE FOR COST-SHARING AND THEIR RATES

Best management practices are those practices identified in NR 120 that are determined in this watershed plan to be the most effective controls of the nonpoint sources of pollution. The practices eligible for cost sharing under the Lower Grant River Priority Watershed Project are listed in Table 5-1. The cost-share rates for each BMP are in the table Tables 5-1 and 5-2.

The design and installation of all BMPs must meet the conditions listed in NR 120. Generally these practices use specific standard specifications included in "The SCS Field Office Technical Guide". In some cases additional specifications may apply. The applicable specifications for each BMP are found in NR 120.14.

The following is a brief description of some of the most commonly used cost-shared BMPs included in Table 5-1. A more detailed description of these practices are found in NR 120.14.

- * Contour Farming. The farming of sloped land so that all operations from seed bed preparation to harvest are done on the contour.
- * Contour Stripcropping. Growing crops in a systematic arrangement, on the contour, in alternate strips of closely grown crops, such as grasses or legumes, and tilled row crops.
- * Reduced Tillage (No-till). A system which leaves substantial amounts of crop residue on the soil surface after crops are planted. Cost sharing will be restricted to no-till systems with short crop rotations or for establishing forages and small grains.
- * Critical Area Stabilization. The planting of suitable vegetation on critical nonpoint source sites.
- * Grassed Waterways. A natural or constructed channel that is shaped, graded and established with suitable cover as needed to prevent erosion by runoff waters.
- * Grade Stabilization Structure. A structure used to reduce the grade in a channel to protect the channel from erosion or to prevent the formation or advance of gullies.

- * Livestock Exclusion from Woodlots. Fencing or other means excludes livestock from woodlots to protect the woodlots from livestock grazing.
- * Shoreline and Streambank Stabilization. The stabilization and protection of stream and lake banks against erosion and the protection of fish habitat and water quality from livestock access. This practice includes streambank fencing.
- * Terraces. A system of ridges and channels with suitable spacing and constructed on the contour with a suitable grade to prevent erosion in the channel.
- * Field Diversions. The purpose of this practice is primarily to divert water from areas where it is in excess or is doing damage to an area where it can be transported safely.
- * Barnyard Runoff Management. Structural measures such as gutters, downspouts, or diversions that redirect surface runoff around the barnyard, and collect, convey and temporarily store runoff from the barnyard.
- * Manure Storage Facility. A structure for the storage of manure over a period of time to reduce the impact of manure as a nonpoint source of pollution. Livestock operations where this practice applies are those where manure is winterspread on fields that have a high potential for runoff to lakes, streams and groundwater. The facility is needed to store and properly spread manure according to a management plan.
- * Agricultural Sediment Basins. A structure designed to reduce the transport of pollutants to surface waters and wetlands of sediment eroded from critical agricultural fields.
- * Shoreline Buffers. A permanently vegetated area immediately adjacent to lakes, streams, and wetlands designed and constructed to manage critical nonpoint sources or to filter pollutants from nonpoint sources.
- * Animal Lot Relocation. Relocation of an animal lot from a critical site such as a floodway to a suitable site to minimize the amount of pollutants from the lot to surface or groundwater.
- * Wetland Restoration. The construction of berms or destruction of the function of tile lines or drainage ditches to create conditions suitable for wetland vegetation.
- * Nutrient Management. The management and crediting of nutrients for the application of manure and commercial fertilizers, and crediting for nutrients

from legumes. Management includes the rate, method and timing of the application of all sources of nutrients to minimize the amount of nutrients entering surface or groundwater.

- * Pesticide Management. The management of the handling, disposal and application of pesticides including the rate, method and timing of application to minimize the amount of pesticides entering surface and groundwater.

BMPs NOT COST-SHARED

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

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

ACTIVITIES AND SOURCES OF POLLUTION NOT ELIGIBLE FOR COST-SHARE ASSISTANCE

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

- * Operation and maintenance of cost-shared BMPs.
- * Actions that have drainage of land or clearing of land as the primary objective.
- * Practices already installed.

Table 5-1: State Cost-share Rates for Best Management Practices

Best Management Practice	State Cost Share Rate
Contour Farming	50% (1)*
Contour Strip Cropping	50% (1)*
Field Diversions and Terraces	70%
Grassed Waterways	70%
Reduced Tillage (No-till)	50% (1)*
Critical Area Stabilization +	70% (2)
Grade Stabilization Structures +	70%
Agricultural Sediment Basins	70%
Shoreline and Streambank Stabilization +	70% (1)
Shoreline Buffers +	70% (2)
Wetland Restoration +	70% (2)
Barnyard Runoff Management	70%
Animal Lot Relocation +	70%
Manure Storage Facilities	70% **
Roofs for Barnyard Runoff Management and Manure Storage Facilities	70%
Livestock Exclusion from Woodlots	50% (1)
Nutrient and Pesticide Management	50% (3)

(1) Flat rates for these BMPs can be found in Table 5-2

(2) Easements may be entered into with landowners identified in the watershed plan in Chapter 4 with these BMPs. See Chapter 4 for where easements apply.

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

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

** Maximum cost share is \$10,000 including no more than \$5,000 for manure transfer equipment

+ State share can be raised to 80% if County provides 10% cost sharing

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

Best Management Practice	Flat Rate
Contour Farming	\$6.00/ac.
Strip Cropping	\$12.00/ac.
Reduced Tillage	\$15.00/a (1)
Fencing	
Single strand electric	\$1.00/rod
High tensile	\$20/rod.
4 strand barbed wire	\$12/rod.

(1) Reduced tillage systems for short crop rotations, and establishment of forages and small grains by no-till methods

- * Activities covered under the Wisconsin Pollution Discharge Elimination System (WPDES) Program or covered in other ways by Chapter 147 of Wis. Stats. (including livestock operations with more than 1,000 animal units, or livestock operations issued a notice of discharge under ch. NR 243).
- * Septic system controls or maintenance.
- * Dredging activities.
- * Silvicultural activities.
- * Bulk storage of fertilizers and pesticides.
- * Activities and structures intended primarily for flood control.
- * Practices required to control sources which were adequately controlled at the time the cost-share agreement was signed.
- * Other practices or activities determined by the DNR not to meet the objectives of the program.

COST-SHARE BUDGET

COSTS OF INSTALLING BMPs

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

The capital cost of installing the BMPs in Grant County is approximately \$8.0 million assuming 100 percent participation.

- * State funds necessary to cost share this level of control would be about \$5,247,410.
- * The landowners and other cost-share recipients would provide the local share of about \$2,298,840.

At a 75 percent level of participation, the state funds needed to cover capital installation would be about \$3.9 million.

EASEMENT COSTS

Chapter IV identifies where nonpoint source program funds can be used to purchase easements. The estimated cost of purchasing easements on eligible lands in Grant County is shown in Table 5-3. At 100 percent participation, the estimated purchase price of easements on eligible lands would be \$100,000 in Grant County. At 75 percent participation, the cost would be \$75,000. The state of Wisconsin will entirely pay for the easement costs.

COST CONTAINMENT PROCEDURES

COST CONTAINMENT PROCEDURES

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

Cost-share payments will be based on actual installation costs. If actual installation costs exceed the amount of cost sharing, determined by the bidding and average cost methods, the amount paid the grantee may be increased with the approval of the appropriate land conservation committee. Appropriate documentation regarding the need for changes will be submitted to the DNR.

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

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

The average costs to be used will be sent to the DNR and the DATCP for approval prior to the counties signing cost-share agreements. This average cost list will be reviewed periodically and appropriate changes made. If changes are made the list will be forwarded

to the DNR and the DATCP for final approval before the changes are used for calculating cost-share agreements and payments.

Flat Rates: BMPs using flat rates are shown in Table 5-2. The rates shown are the state's share of the practice installation costs.

COST-SHARE AGREEMENT REIMBURSEMENT PROCEDURES

NONPOINT SOURCE GRANT AGREEMENT AND ADMINISTRATION

General Information: The Nonpoint Source Grant Agreement is the means for transmitting funds from the DNR (through the Nonpoint Source Program) to Grant County for use in funding the state's share of cost-share agreements. Cost-share agreements are the means to transmit funds from the counties to the landowners.

A portion of the Nonpoint Source Grant is forwarded to Grant County to allow the county to set up an "up front" account. Funds from this account are used by the county to pay landowners after practices are installed under the project. As this account is drawn down, the county will request reimbursements from the DNR to replenish the account. The counties will submit reimbursement requests on a quarterly basis. This reimbursement schedule will insure that the "up front" account balance is maintained at an adequate level. The NPS Grant Agreement will be amended annually to provide funding needed for cost sharing for the year. The funds obligated under cost-share agreements must never exceed the total funds in the NPS Grant Agreement.

Fiscal Management Procedures, Reporting Requirements: Counties are required by NR 120 to maintain a financial management system that accurately tracks the disbursement of all funds used for the Lower Grant River Watershed Project. The records of all watershed transactions must be retained for 3 years after the date of final project settlement. A more detailed description of the fiscal management procedures can be found in NR 120.25 and NR 120.26.

COST-SHARE AGREEMENT AND ADMINISTRATION

Purpose and Responsibilities: Consistent with s. 144.25, Stats. and NR 120, Wis. Adm. Code, cost-share funding is available to landowners for a percent of the costs of installing BMPs to meet the project objectives. Landowners have three years after formal approval of the watershed plan to enter into cost-share agreements. Practices included on cost-share

Table 5-3: Cost-Share Budget Needs for Rural Management Practices

Management Needs	Number	Cost/Unit	Total Cost (1)	100% Participation		75% Participation	
				State Share	Local Share	State Share	Local Share
BEST MANAGEMENT PRACTICES							
Upland Sediment Control							
Change Crop Rotation	10,500 ac	NA(3)	0	0	0	0	0
Contour Cropping	13,500 ac	\$6	78,000	78,000	(2)	58,500	(2)
Contour Strip Crop.	16,600 ac	\$12	199,200	199,200	(2)	149,400	(2)
Nutrient Mgmt. (4)	270 ac	\$200	54,000	54,000	(2)	40,500	(2)
Reduced Till. (5)	150 ac	\$15	2,250	2,250	(2)	1,688	(2)
Critical Area Stabe.	700 ac	\$700	490,000	343,000	147,000	257,250	110,250
Grass Waterways	40 ac	\$2,200	88,000	61,600	26,400	46,200	19,800
Field Diversions & Terraces							
Terraces	2,400 ft	\$2	4,800	3,360	1,440	2,520	1,080
Grade Stabilization	100 ea	\$7,000	700,000	490,000	210,000	367,500	157,500
Ag. Sediment Basin	3 ea	\$15,000	45,000	31,500	13,500	23,625	10,125
Pasture Management	100 ac	NA	0	0	0	0	0
Shoreline Buffers (6)	20 ac	\$150	3,000	2,100	900	1,575	675
Wetland Restoration	10 ea	\$2,000	20,000	14,000	6,000	10,500	4,500
Animal Waste Mgmt.							
Barnyard Runoff Mgmt.							
Complete System	146 ea	\$20,000	2,920,000	2,044,000	876,000	1,533,000	657,000
Clean Water Diversion	108 ea	\$4,000	432,000	302,400	129,600	226,800	97,200
Manure Storage (7)	60 ea	\$25,000	1,500,000	600,000	450,000	450,000	337,500
Manure Spread. Mgmt.	10,000 ac	NA	0	0	0	0	0
Streambank Sed. Control							
Shape and Seeding	100,000 ft	\$4	400,000	280,000	120,000	210,000	90,000
Fencing	30,000 ft	\$12	360,000	252,000	108,000	189,000	81,000
Rip-Rap	22,000 ft	\$25	550,000	385,000	165,000	288,750	123,750
Livestock/Machinery Crossing							
Crossing	100 ea	\$1,500	150,000	105,000	45,000	78,750	33,750
Subtotal:			\$7,996,250	\$5,247,410	\$2,298,840	\$3,935,558	\$1,724,130
EASEMENTS	100 ac	\$1,000	100,000	100,000	0	75,000	0
TOTALS			\$8,096,250	\$5,347,410	\$2,298,840	\$4,010,558	\$1,724,130

- (1) Total cost to control identified critical pollution sources
- (2) Local share consists of labor and any additional equipment costs.
- (3) NA means that cost share funds are not available for this practice
- (4) This practice is nutrient management which includes costs for up to three years for soil and manure testing
- (5) This practice is reduced tillage (no-till) on short rotation croplands or for establishing forage crops
- (6) Shoreline Bufer practice needs will be determined during implementation
- (7) Maximum cost-share is \$10,000 of which a maximum of \$5,000 can be for waste transfer

Source: Wisconsin Department of Natural Resources; Wisc. Department of Agriculture, Trade and Consumer Protection; and the Grant County Land Conservation Department

agreements must be installed within the schedule agreed to on the cost-share agreement. Unless otherwise approved, the schedule of installing BMPs will be within five years of signing the cost-share agreement. Practices must be maintained for a minimum of ten years from the date of installing the final practice included in the cost-share agreement.

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

If landownership changes, the cost-share agreement remains with the property and the new owner is legally bound to carry out the provisions. NR 120.13(9) and (10) has more information on changes of landownership and the recording of cost-share agreements.

Local, state, or federal permits may be needed prior to installation of some BMPs. The areas most likely to need permits are zoned wetlands and the shoreline areas of lakes and streams. These permits are needed whether the activity is a part of the watershed project or not. Landowners should consult with the County Planning and Zoning Department or the Land Conservation Department offices to determine if any permits are required. The landowner is responsible for acquiring the needed permits prior to installation of practices.

The cost-share agreement binds the county to provide the technical assistance needed for the planning, design, and verification of the practices on the agreement, and to provide the cost-share portion of the practice costs.

Counties are responsible for enforcing compliance of cost-share agreements to which they are a party. Where the DNR serves as a party to an agreement with a unit of government, the DNR will take responsibility for monitoring compliance. The responsible party will insure that BMPs, which are installed through the program, are maintained in accordance with the operation and maintenance plan for the practice for the appropriate length of time. Grant County will check for compliance with practice maintenance provisions once every three years after the last practice has been installed. The county must check maintenance at its own expense after the nonpoint source agreement has lapsed.

Landowner Contact Strategy: The following procedure will be used to make landowner contacts.

1. During the first three months of the implementation period, all landowners or operators with eligible nonpoint sources will receive from the county a mailing explaining the project and how they can become involved.
2. After the initial landowner mailings, county staff will make personal contacts with all landowners that have been identified as having critical nonpoint sources of pollution (Management Category I). These contacts will occur within a year of receiving the nonpoint source agreement. The landowners with the highest pollutant loads will be contacted first.
3. The county will continue to make contacts with eligible (Management Category I and II) landowners and operators until they have made a definite decision regarding participation in the program.
4. Six months prior to the end of the cost-share sign-up period, the county will contact, through personal letter, all eligible landowners (Management Categories I and II) who have not signed cost-share agreements.

Procedure for Developing a Cost-Share Agreement: Eligibility for cost sharing is verified following a site visit, using the criteria described in Chapter IV.

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

Landowners which spread livestock manure on critical acres (defined in Chapter IV) during the winter period, and who have Management Category I sources of pollution, will have a manure spreading plan developed for their livestock operation if they elect to participate in the program. Landowners with Management Category II sources of pollution may have a spreading plan developed. Participants in the watershed project will be required to limit winterspreading of livestock manure in accordance with the criteria listed in Chapter IV.

If manure storage facilities or barnyard runoff control systems are cost-shared, a manure spreading plan is required. The plan will not allow winterspreading of manure on critical acres for landowners receiving cost sharing for manure storage facilities.

Chapter IV also gives the eligibility criteria and procedures for nutrient and pest management for landowners. At a minimum all landowners with cost-shared manure storage facilities must prepare a nutrient management plan based on SCS Technical Guide Standard 590.

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

Each county will use the following procedure for developing and administering agreements. Below are the steps from the initial landowner contact through the completion of BMP maintenance.

1. Landowner and county staff meet to discuss the watershed project, NPS control practice needs, and coordination with conservation compliance provisions if applicable.
2. Landowner agrees to participate with the watershed project.
3. The county prepares a farm conservation plan.
4. The landowner agrees with the plan, a cost-share agreement is prepared, and the landowner and the county sign both documents. Two copies of the cost-share agreement (CSA) are sent to the DNR Southern District nonpoint source coordinator, one copy is given to the landowner, and a copy is kept on file in the LCD office. The county will record the CSA with the County Register of Deeds.
5. The landowner signs an earnest money agreement and pays 10 percent down (up to \$1500) of the estimated cost of the barnyard or manure storage structure before surveying and designing begin.
6. The county, or their designee, designs the practices with a copy of the design provided to the landowner.
7. The landowner obtains the necessary bids or other information required in the cost containment policy.
8. Amendments to the CSA are made if necessary.
9. The county staff marks off the practices included in the CSA or conservation plan as they are scheduled to be completed.

10. The contractor installs the practice, with the county (LCD or SCS) inspecting the installation during construction.
11. The county verifies the installation and completion of the project.
12. The landowner submits paid bills and proof of payment (cancelled checks) to the county.
13. The county prepares a voucher for reimbursement. The county treasurer writes a check and returns it to the LCD office to be mailed to the landowner.
14. The county records the check amount, number, and date.
15. The DNR reimburses the county for expended cost-share funds.

Identifying Wildlife and Fishery Needs: The Grant County staff will consult with the DNR's Southern District wildlife management and fisheries management staff to optimize the wildlife and fisheries management benefits of nonpoint source control BMPs. Specifically, the county staff will contact the DNR staff if:

- * Streambank protection practices, agricultural sediment basins, or critical area stabilization practices are being considered.
- * Installation of agricultural BMPs adversely affect fence rows, rock piles, wetlands, or other wildlife habitat components.

The DNR staff will assist county staff by:

- * Identifying streambank protection practices that benefit fish and wildlife.
- * Identifying wildlife habitat components that could be incorporated into vegetative filter strips along streams or in upland areas.
- * Reviewing placement of agricultural sediment basins to assure that negative impacts on stream fish and aquatic life do not occur and recommending wildlife habitat components.
- * Providing technical assistance when the installation of BMPs will require the removal of obstructions or other wildlife habitat. The DNR staff will propose measures to minimize impact on wildlife habitat.

- * Assisting to resolve questions concerning effects of agricultural nonpoint source BMPs on wetlands.

Submittal to the Department of Natural Resources: Cost-share agreements do not need prior approval from the DNR, except in the following instances:

- * Where cost-share funds are to be used for practices on county-owned or controlled land.
- * For agreements or amendments where the cost-share amount for all practices for a landowner exceeds \$50,000 in state funds.
- * For grade stabilization structures and agricultural sediment basins with embankment heights between 15 and 25 feet and impoundment capacities of 15 to 50 acre feet.
- * For streambanks to be controlled using riprap or other materials with banks over six feet high.
- * For animal lot relocation.
- * For roofs over barnyards or manure storage facilities.
- * For all repairs to BMPs unless a variance has been granted

LOCAL ASSISTANCE GRANT AGREEMENT ADMINISTRATION

General Information: The Local Assistance Grant Agreement (LAGA) is a grant from the DNR to Grant County for supporting their staff and other support costs of carrying out this watershed plan. Consistent with NR 120, the county will use funds from the LAGA for additional staff to implement the project and conduct information and education activities. The LAGA also supports other items such as travel, training, and certain office supplies. Further clarification of eligible costs, which this grant supports, is given in NR 120.14(4) and (6).

Grant Agreement Application Procedures: An annual review of the Local Assistance Grant Agreement is conducted through the development of an annual workload by the county. This workload estimates the work needed to be accomplished each year. The workload is provided to the DATCP and the DNR for review and clarification. Along with the workload analysis, a grant application form is sent. Funds needed to complete the agreed upon annual workload are amended to the local assistance grant agreement.

Fiscal Management Procedures, Reporting Requirements: Grant County is required by NR 120 to maintain a financial management system that accurately tracks the disbursement of all funds used for the Lower Grant River Watershed Project. The records of all watershed transactions must be retained for three years after the date of final project settlement. A more detailed description of the fiscal management procedures can be found in NR 120.25 and NR 120.26.

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

STAFFING NEEDS

BUDGET AND STAFFING NEEDS

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

Staffing Needs: Table 5-4 lists the total estimated staff needed to implement the project in Grant County. Figures are provided for both the 50 percent and 75 percent levels of participation. A total of about 71,404 staff hours is required (1,840 hours per staff year) in Grant County to implement this plan at a 75 percent landowner participation rate. This includes 1,740 staff hours in Grant County to carry out the information and education program.

The Land Conservation Department in Grant County will hire three staff in each of the first three years of the project. The county will assess the number and type of staff required for the final five years of the project based on the actual landowner participation following the three year cost-share sign-up period.

SCHEDULES

Grant Disbursement and Project Management Schedule: Implementation may begin upon approval of this watershed plan by the Grant County Board; Wisconsin Department of Agriculture, Trade and Consumer Protection; and the Wisconsin Department of Natural Resources. The priority watershed project implementation period lasts eight years. It includes an initial three-year period for contacting eligible landowners and signing cost-share agreements. Practices on any cost-share agreement must be installed within a five-year period.

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

Activity	Project Years When Work Will Be Done	GRANT COUNTY	
		75% Landowner Participation (Staff Hours)	50% Landowner Participation (Staff Hours)
Project & Financial Mgmt.	1-8	6,000	5,000
Information & Education Program	1-8	1,740	1,740
Pre-Contact Office Inventory; Landowner Contacts, & Progress Tracking	1-8	2,000	1,334
Conservation Planning; Cost Share Agrmt. Development	1-3	5,334	3,556
Plan Revisions & Monitoring	1-8	1,334	889
Practice Design & Installation	1-8		
Upland Best Management Practices		15,207	10,138
Barnyard Runoff Control		15,084	10,056
Manure Spreading Mgmt. & Storage, Nutrient Mgmt.		7,830	5,220
Streambank Erosion Control		15,375	10,250
Training	1-4	1,500	1,500
Total LCD Workload:		71,404	49,683

Estimated Staff Required for Years 1-3: (hrs/yr):	10,472	7,265
(staff/yr):	5.8	4.0
Estimated Staff Required for Years 4-8: (hrs/yr):	7,998	5,577
(staff/yr):	4.4	3.0

Source: Wisconsin Department of Natural Resources; Wisc. Department of Agriculture, Trade and Consumer Protection; and the Grant County Land Conservation Department

Table 5-5: Total Project Costs at 75% Landowner Participation Rate

Item	Costs (State Share)
Cost Share Funds: Practices	\$3,935,558
Cost Share Funds: Easements	\$75,000
Local Assistance Staff Support *	\$1,164,192
Information/Education Direct	\$17,430
Other Direct (travel, supplies, etc.):	\$59,832
Total:	\$5,252,012

* Salary + Indirect = \$30,000/person/year

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

Item	Project Year			
	1	2	3	4-8
Cost-Share Funds: Practices	\$787,112	\$1,574,224	\$1,574,224	\$0
Cost-Share Funds: Easements	15,000	30,000	30,000	0
Local Assistance Staff Support	170,739	170,739	170,739	651,975
Information/Education: Direct	6,870	2,170	2,170	6,220
Other Direct (travel, supplies, etc.):	11,966	11,966	11,966	23,933
Total:	\$991,687	\$1,789,099	\$1,789,099	\$682,128

Source: Wisconsin Department of Natural Resources; Wisc. Dept. of Agriculture, Trade, and Consumer Protection; and the Grant County Land Conservation Department

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

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

INVOLVEMENT OF OTHER PROGRAMS

COORDINATION WITH STATE AND FEDERAL CONSERVATION COMPLIANCE PROGRAMS

The Lower Grant River Watershed Project will be coordinated with the conservation compliance features of the Wisconsin Farmland Preservation Program (FPP) administered by the DATCP, and the Federal Food Security Act (FSA) administered by the Soil Conservation Service. The DATCP will assist Grant County and the SCS offices to identify landowners within the watershed that are subject to the compliance provisions of the FPP and the FSA. Conservation Farm Plans were completed for all landowners in the FSA in 1990. There will be a need to implement the conservation plans and in the future amend these plans during the implementation phase of the watershed project. Watershed project-supported staff will revise the conservation plans developed for the FPP and the FSA to include management decisions and the installation of needed BMPs for nonpoint source pollution abatement while addressing other resource conservation problems. This comprehensive approach to farm planning will facilitate consideration of the various goals and objectives for all the programs in which the landowner participates.

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

PROJECT BUDGET

COST-SHARE BUDGET COSTS

The total budget for cost sharing can be found in Table 5-3. The capital cost of installing the Best Management Practices in Grant County is approximately \$8.0 million, assuming 100 percent participation.

- * State funds necessary to cost share this level of control would be about \$5.2 million.
- * The landowners and other cost-share recipients would provide the local share of about \$2.3 million.

At a 75 percent level of participation, the state funds needed to cover capital installation would be about \$3.9 million.

EASEMENT COSTS

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

STAFFING COSTS

The estimated cost for staff at a 75 percent landowner participation rate (see Table 5-5) is approximately \$1.2 million. The state would pay for all of these costs with the exception of some direct-cost items.

INFORMATION AND EDUCATION COSTS

The estimated cost for the information and education program is shown in Table 5-5. The states share is approximately \$17,430. More detailed information on this budget is in Table 5-1.

TOTAL PROJECT COST

The total state funding required to meet the rural nonpoint source pollution control needs at a 75 percent level of landowner participation is presented in Table 5-5. This figure includes the capital cost of practices, staff support, and easement costs presented above. The estimated cost to the state would be \$5.2 million.

CHAPTER VI

INFORMATION AND EDUCATION PROGRAM

OBJECTIVE

The objective of the Information and Education (I&E) Program is to improve water quality by maximizing landowner participation in the Lower Grant River Priority Watershed Project.

GOALS OF THE PROGRAM

To achieve its objective of cleaner water, the I&E program has been structured around the following goals:

- * Increased awareness, understanding and appreciation of the water resources in the Lower Grant River Priority Watershed Project.
- * Increased understanding of the principles of water pollution, especially nonpoint source water pollution as experienced in the Lower Grant River Priority Watershed Project.
- * Increased awareness and understanding of Best Management Practices (BMPs) being promoted through the Lower Grant River Priority Watershed Project, including how these practices can lead to cleaner water and improved farm management.
- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

The program activities described later in this chapter identify which of these four goals are the targeted goals for each individual activity.

AUDIENCE

The primary audience of the I&E Program are priority watershed landowners who have been classified as eligible for project participation. Secondary audiences are priority watershed landowners that are not eligible for project participation, suppliers of services to the priority watershed, interest groups, and the general public.

Table 6-1: Information & Education Program Budget and Staff Requirements

Activity	Total Number	Total Direct Costs	ANNUAL Require Staff Hours Years 1 - 3				TOTAL Required Staff Hours Years 4 - 8			
			LCD	UWEX	DNR	DATCP	LCD	UWEX	DNR	DATCP
Newsletters	19	\$9,500	60	60	0	0	200	200	0	0
News Releases	16	160	20	0	0	0	100	0	0	0
Radio	16	0	10	0	0	0	50	0	0	0
Field Days	5	2,750	48	48	8	8	24	24	8	8
Nutrient/Pesticide Demo Plot	8	0	20	176	0	0	100	880	0	0
Signs: Watershed	2	600	20	(1st year only)			0	0	0	0
Landowner	125	2,500	20	0	0	0	100	0	0	0
Promotional Items										
Caps	200	800	20	(1st year only)			0	0	0	0
Mugs	200	800								
Student Education	8	800	64	8	8	8	320	40	40	40

Table 6-2: Summary of Information Education Program Costs and Staff Needs

	Costs (\$)	LCD (hrs)	UWEX (hrs)	DNR (hrs)	DATCP (hrs)
1st Year Costs & Staff Needs:	\$6,870	282	292	16	16
2nd Year Costs & Staff Needs:	\$2,170	282	292	16	16
3rd Year Costs & Staff Needs:	\$2,170	282	292	16	16
4th - 8th Year Estimated Total Cost and Staff Needs:	\$6,220	894	1,144	48	48
Totals:	\$17,430	1,740	2,020	96	96

DELIVERY TEAM

The Grant County Land Conservation Department (LCD) will take lead responsibility for delivery of the I&E program, with the University of Wisconsin Cooperative Extension (UWEX), the Department of Natural Resources (DNR) and the Department of Agriculture, Trade and Consumer Protection (DATCP) providing supporting assistance. Table 6-2 shows the agencies which will be involved in each activity along with the funding and staffing needs.

ACTIVITIES

Brief program information is presented for each of the I&E program activities listed below.

NEWSLETTERS

Targeted I&E Goals:

- * Increased awareness, understanding and appreciation of the water resources in the Lower Grant River Priority Watershed Project.
- * Increased understanding of the principles of water pollution, especially nonpoint source water pollution as experienced in the Lower Grant River Priority Watershed Project.
- * Increased awareness and understanding of Best Management Practices (BMPs) being promoted through the Lower Grant River Priority Watershed Project, including how these practices can lead to cleaner water and improved farm management.
- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

Audience:

- * Owners and operators of agricultural lands in the priority watershed.
- * Non-farm residents in the priority watershed.
- * Agribusinesses.
- * Recreational, environmental or other public interest groups involved in the project.
- * Local state government and governmental agencies.

Description:

Newsletters have proven to be an effective I&E activity in previous priority watershed projects, and will be a major component of the I&E program in this watershed project. During the initial three-year sign-up period, newsletters will focus on eligibility requirements, cost shareable BMPs, and benefits derived from BMP application. During the five-year implementation period following contract sign-up, newsletters will focus on the operation and maintenance of BMPs and the water quality improvements realized through BMP application. The LCDs will use other agencies (University of Wisconsin Extension, the ASCS, etc.) to publicize the project. This involves no cost.

Materials required:

- * Logo/format.
- * Articles.
- * Photographs/illustrations.
- * Mailing list.
- * Postage.

Schedule:

- * 1991 to 1993: Three newsletters per year.
- * 1994 to 1998: Two newsletters per year.

Primary Responsible Agency:

- * Grant County Land Conservation Department(LCD).

NEWS RELEASES**Targeted I&E Program Goals:**

- * Increased awareness, understanding and appreciation of the water resources in the Lower Grant River Priority Watershed Project.

- * Increased understanding of the principles of water pollution, especially nonpoint source water pollution as experienced in the Lower Grant River Priority Watershed Project.
- * Increased awareness and understanding of Best Management Practices (BMPs) being promoted through the Lower Grant River Priority Watershed Project, including how these practices can lead to cleaner water and improved farm management.
- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

Audience:

- * Owners and operators of agricultural land in the priority watershed.
- * General public.

Note: To gain access to these audiences, news releases will be prepared for the "Grant County Herald Independent" and other area newspapers.

Description:

- * News releases will be published frequently so that the purpose and progress of the watershed project remain clear in the mind of watershed residents. Topics for news releases include:
 - Current status of watershed project progress.
 - Explanation of BMPs being assisted by project.
 - Success stories of landowners improving water quality through BMPs.
 - Description of the water resources in the watershed and impacts of nonpoint source pollutants.
 - Educational activities for students

Materials Required:

- * Story ideas.
- * Photographs/illustrations.

- * Media contacts.

Schedule: Minimum of two releases per year.

Primary Responsible Agency: Grant County LCD.

RADIO PUBLICITY

Targeted I&E Program Goals:

- * Increased awareness, understanding and appreciation of the water resources in the Lower Grant River Priority Watershed Project.
- * Increased understanding of the principles of water pollution, especially nonpoint source water pollution as experienced in the Lower Grant River Priority Watershed Project.
- * Increased awareness and understanding of Best Management Practices (BMPs) being promoted through the Lower Grant River Priority Watershed Project, including how these practices can lead to cleaner water and improved farm management.
- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

Audience:

- * Owners and operators of agricultural land in the priority watershed project.
- * General public.

Note: To reach these audiences, contact area radio stations.

Description:

Radio coverage of the project is limited. Unlike some agricultural communities, there is not one morning or noon show that "everyone" listens to. However, a moderate level of effort in using the media would help raise the general public's awareness of the project.

Materials required:

- * Story ideas.

- * Scripts.
- * Media contacts.

Schedule: Two radio releases per year.

Primary Responsible Agency: Grant County LCD.

FIELD DAYS

Targeted I&E Goals:

- * Increased awareness and understanding of Best Management Practices (BMPs) being promoted through the Lower Grant River Priority Watershed Project, including how these practices can lead to cleaner water and improved farm management.
- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

Audience:

- * Owners and operators of agricultural land.
- * Interest groups.
- * General public.

Description:

Field days will be conducted on farms with installed BMPs to demonstrate the operation and effectiveness of these practices. Observing BMPs first hand and meeting with farmers who have installed BMPs hopefully will encourage landowners attending the tours to participate in the project themselves. Tours conducted after the sign-up period ends will concentrate on the proper maintenance of BMPs. The field day of the second year will be an expanded event to attract the most attention during the most active period of landowner sign-ups.

Materials required:

- * Demonstration sites.
- * Transportation.

- * Audio equipment.
- * Handouts/displays.
- * Refreshments/meal.
- * Invitation/program.

Schedule:

- * 1991 to 1993: once per year.
- * 1994 to 1998: every third year.

Primary Responsible Agency: Grant County LCD.

NUTRIENT/PESTICIDE MANAGEMENT DEMONSTRATION PLOT

Targeted I&E Goals:

- * Increased awareness and understanding of Best Management Practices (BMPs) being promoted through the Lower Grant River Priority Watershed Project, including how these practices can lead to cleaner water and improved farm management.
- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

Audience:

- * Owners and operators of agricultural land.
- * Interest groups.
- * General public.

Description:

A demonstration plot will be established on a two-acre parcel in the watershed. The demonstration plot will begin the first year of implementation and will end at the completion of the watershed project. The plot will be used to demonstrate the benefits of nutrient and pesticide management in farming operations. The plot will include the use of nutrient and pesticide BMPs as recommended in the DATCP

Technical Bulletin ARM-1. This demonstration will be carried out in cooperation with the UW-Extension Nutrient and Management Program.

Demonstration Will Include:

- * Comparisons of the effects of crop rotation versus continuous corn.
- * The use of manure and legume credits versus nitrogen fertilizer application.
- * The calibration of manure spreaders and how to use manure analysis in determining fertilizer application rates.
- * The benefits and types of soil testing for determining fertilizer needs.
- * The use of the rotary hoe and proper cultivation techniques.

Materials required:

- * Seed, fertilizer, pesticides.
- * Soil and manure nutrient testing.
- * Land rent.
- * Implement rental.
- * Educational signs and fact sheets.

Schedule:

Establishment of the plot to be completed by the end of the 1991 planting season.

Primary Responsible Agency:

UW-Madison Nutrient and Pesticide Management Program.

SIGNS

Targeted I&E Goals:

- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

Audience:

- * General public.

Description:

Two sets of signs will be utilized to increase awareness of project activity: "Lower Grant River Watershed " sign to mark project boundaries on major roads; and "Lower Grant River Priority Watershed Project Participant" signs for display at each contract farm.

Materials required:

- * Logo.
- * Signs.
- * Posts/mounting material.

Schedule:

- * Boundary signs installed in the spring of 1992.
- * Participant signs installed as contracts are signed.

Primary Responsible Agency: Grant County LCD.

PROMOTIONAL ITEMS**Targeted I&E Goals:**

- * Increased awareness, understanding and appreciation of the water resources in the Lower Grant River Priority Watershed Project.
- * Increased awareness and understanding of Best Management Practices (BMPs) being promoted through the Lower Grant River Priority Watershed Project, including how these practices can lead to cleaner water and improved farm management.
- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

Audience:

- * Priority watershed landowners.

Description:

The following items will be produced for distribution within the watershed:

Two hundred baseball-style caps with project logo, for use by project staff and contract landowners.

Two hundred coffee cups with logo for use by project staff and contract landowners.

The purpose of the promotional items is to increase the project's recognition in the watershed and to stimulate conversation about the project among landowners.

Materials required:

- * Logo.
- * Caps and mugs.

Schedule:

Caps and mugs produced during the spring of 1992.

Primary Responsible Agency: Grant County LCD.

YOUTH EDUCATION ACTIVITIES**Targeted I&E Goals:**

- * Increased awareness, understanding and appreciation of the water resources in the Lower Grant River Priority Watershed Project.
- * Increased understanding of the principles of water pollution, especially nonpoint source water pollution as experienced in the Lower Grant River Priority Watershed Project.
- * Increased awareness and understanding of Best Management Practices (BMPs) being promoted through the Lower Grant River Priority Watershed Project,

including how these practices can lead to cleaner water and improved farm management.

- * Increased awareness and understanding of the purpose, operation and benefits of the Lower Grant River Priority Watershed Project.

Audience:

- * Students in school districts associated with the Lower Grant River Watershed area.
- * 4-H and FFA Groups.

Description:

Field days or classroom visits will be scheduled to educate youth about water quality and practices that can be used to improve and maintain water quality. Youth will be encouraged to talk with their parents and participate in activities that can improve water quality.

Materials required:

- * Audio/visual equipment.
- * Demonstration sites.
- * Handouts/displays.
- * Refreshments/meals.
- * Invitation/program.

Schedule: Throughout the length of the project.

Primary Responsible Agency: Grant County LCD.

CHAPTER VII

INTEGRATED RESOURCE MANAGEMENT

The purpose of this chapter is to define the principles and guidelines for making sure that the watershed project is coordinated with other DNR resource management programs and activities. Each activity is described below.

FISHERIES

The DNR has actively studied ways to improve the smallmouth bass fishery in this watershed—particularly in Rattlesnake Creek. Watershed practices, such as streambank protection, shoreline buffer strips, and easements should be implemented in such a way that will enhance the fishery management goals. Specifically, all streambank protection BMP's, wherever possible, will be installed in such a way that the fisheries habitat is enhanced. Rock riprap will be installed so that the placement and size of rock will positively benefit smallmouth bass habitat. The fishery manager will be consulted for input in the design of each streambank protection BMP.

WETLAND RESTORATION

Significant amounts of restorable wetland areas exist in this watershed. This is especially so for the floodplain areas along the main stem of the Lower Grant River. The general guidelines for wetland restoration, easement acquisition, and shoreline buffers to protect existing wetlands (see chapter 4) should be followed. Wetlands that are important wildlife habitats will be identified by the U.S. Fish and Wildlife Service in consultation with the Wisconsin Department of Natural Resources private lands manager. Buffer strips may be installed adjacent to these wetlands for better protection from sedimentation.

RIPARIAN ZONES

Where possible, riparian zones along creeks should be protected with fencing to protect them from grazing and trampling. These can be acquired through easements so that they receive lasting protection. These areas are important wildlife habitats, particularly wood ducks.

WISCONSIN'S STEWARDSHIP PROGRAM

The state's Stewardship Program identified the main stem of Rattlesnake Creek for streambank protection. This means that this portion of the stream is eligible for funding of streambank protection practices under this program. Nonpoint source streambank protection easements should be used on the tributaries to Rattlesnake Creek. The specific miles eligible for acquisition is specified under the streambank protection criteria in Chapter IV.

PART III

PROJECT EVALUATION

CHAPTER VIII

PROGRESS ASSESSMENTS

INTRODUCTION

This chapter describes how progress will be monitored in the Lower Grant River Priority Watershed Project. The strategy includes two components:

- * Administrative review.
- * Pollution reduction evaluation.

Information on these components will be collected by the county Land Conservation Department (LCD) and reported to the Department of Natural Resources (DNR) and the Department of Agriculture, Trade, and Consumer Protection (DATCP). Additional information on the numbers and types of practices on cost-share agreements, funds encumbered on cost-share agreements, and funds expended will be provided by the DNR's Bureau of Community Assistance.

Upon completion of the landowner sign-up period, an interim report will be prepared cooperatively by the LCD's, the cities and villages, the DATCP, and the DNR. This report will summarize the administrative, pollutant load reduction, and water quality information that is available at that time. The report will make preliminary conclusions on the success of the project to date and will recommend actions to be taken during the rest of the implementation phase.

ADMINISTRATIVE REVIEW

This component will focus on the progress of the counties in implementing the project. The project will be evaluated with respect to:

- * Amount and types of BMPs on cost-share agreements and installed (accomplishment reporting).
- * Financial expenditures.
- * Staff time spent on project activities.

ACCOMPLISHMENT REPORTING

The Computer Assisted Management and Planning System (CAMPS) is a computer data management system, which the U.S. Soil Conservation Service (SCS) has developed. The SCS, the DNR, and the DATCP use CAMPS to meet the accomplishment reporting requirements of all three agencies. Each county LCD will use CAMPS to collect data on administrative accomplishments. This data will be provided to the DNR and the DATCP for program evaluation.

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

- * Number of personal contacts made with landowners.
- * Completed information and education activities.
- * Number of farm conservation plans prepared for the project.
- * Number of cost-share agreements signed.
- * Number of farm conservation plan and cost-share agreement status reviews completed.
- * Number of farms and acres of cropland checked for proper maintenance of best management practices(BMPs).

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

FINANCIAL EXPENDITURES

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

- * Number of landowner cost share agreements signed.
- * Amount of money committed on cost-share agreements.
- * Number of landowner reimbursement payments made, and amount paid for BMP installation.
- * Expenditures for staff travel.
- * Expenditures for information and education program.

- * Expenditures for equipment, materials, and supplies.
- * Expenditures for professional services and staff support costs.
- * Total project expenditures for LCD staff.
- * Staff training expenditures.
- * Interest money earned and expended.
- * Total county LCD budget and expenditures on the project.

TIME SPENT ON PROJECT ACTIVITIES

The LCD will provide time summaries to both departments for the following activities on a quarterly basis:

- * Project and fiscal management.
- * Clerical assistance.
- * Pre-design and conservation planning activities.
- * Technical assistance: practice design, installation, cost-share agreement status review and monitoring.
- * Educational activities.
- * Training activities.
- * Leave time.

POLLUTANT REDUCTION EVALUATION

PURPOSE

The purpose of this evaluation component is to calculate reductions in the amount of key pollutants as a result of installing BMPs. Four key sources were identified for estimating changes in pollutant loads in the Lower Grant River Watershed:

- * Upland sediment.

- * Runoff from barnyards.
- * Critical fields winterspread with manure.
- * Streambank erosion.

PROCEDURE

The tracking procedure for each of these sources is described below.

- * Upland sediment sources: The DNR will use the WIN (Wisconsin Nonpoint Source) model to estimate sediment reductions due to changes in cropping practices. Each county LCD will provide data for the WIN model quarterly through CAMPS, as described above.
- * Barnyard runoff: Each county will use the BARNY (modified ARS) model to estimate phosphorus reductions due to the installation of barnyard control practices. The county will report the information to the DNR through CAMPS.
- * Manure Spreading: The county will record, for each landowner, the actual number of critical acres which are no longer winterspread with manure. This change will be recorded using the CAMPS system.
- * Streambanks: The county LCD will calculate changes in streambank sediment in terms of tons of sediment and length of eroding sites. A tally will be kept of landowners contacted, the amount of streambank sediment being generated at the time of contact, and changes in erosion levels estimated after installing BMPs.

CHAPTER IX

WATER RESOURCES EVALUATION

MONITORING PLAN

INTRODUCTION

The primary purpose of the monitoring plan is to evaluate how well the Lower Grant Priority Watershed project achieves the identified water quality objectives for selected water resources. This plan identifies the monitoring locations, the methods, and the analysis techniques that the Department of Natural Resources (DNR) will use. The principal methods include fishery surveys, habitat evaluation, macroinvertebrate sampling, temperature and dissolved oxygen monitoring, and flow and water chemistry monitoring.

The data collected will be used to monitor changes of both instream and riparian habitat and selected water quality parameters and biological communities before, during, and after the installation of best management practices.

The evaluation monitoring plan objectives are to assess:

- * Changes in the bacterial, sediment, and nutrient inputs associated with installation of agricultural and barnyard BMPs.
- * Changes in instream dissolved oxygen, both diurnal fluctuations and storm events, through reduction of organic loadings.
- * Changes in the fish and macroinvertebrate communities as a direct result of nutrient and sediment reduction and stabilized dissolved oxygen levels.

The DNR's Bureau of Research will conduct a large portion of the monitoring including water quality and fisheries data collection. In addition, Rattlesnake Creek has been selected as one of seven "Master Monitoring Sites" in the state. A U.S. Geological Survey (USGS) monitoring station has been in place at Atkinson Road since 1987, and will continue to collect data under this project. A second USGS station is in place on Rattlesnake Creek at Rattlesnake Road approximately two miles below the above site. This station was used to collect flow and water quality data in 1990 and will continue in operation through September 1991. This station was installed to aid in the analysis of the dissolved oxygen crashes after major storm events. Retention of this station within the watershed will be discussed later.

Monitoring will be conducted primarily in spring, summer, and fall. Depending on the monitoring activity, data will be collected during one or all three periods (Table 9-1). The majority of the monitoring will be a concentrated effort in Rattlesnake Creek, Kuenster Creek, and Muskellunge Creek.

MONITORING ACTIVITIES

BIOLOGICAL MONITORING

Biological monitoring will consist of both macroinvertebrate and fish collections. Sampling is proposed for six major sites. Four on Rattlesnake Creek and two on Kuenster Creek. On Rattlesnake Creek the locations are:

- * Upstream of Rattlesnake Road.
- * Upstream (HBI) and downstream (fish) at Atkinson Road.
- * Downstream of the confluence with Kuenster Creek.
- * Upstream of Muskellunge Road.

On Kuenster Creek the locations are upstream of Muskellunge Road and Texas Road. The DNR's Bureau of Water Resource Management staff will collect macroinvertebrate samples from riffle areas using a D-frame net and kick method. Three replicates will be collected, spring and fall, at each site. Samples will be stored in denatured alcohol and sent to the University of Wisconsin Stevens Point for analysis and computation of the Hilsenhoff Biotic Index and other biometrics as appropriate.

The DNR's Bureau of Research will collect fish samples with a backpack or stream shocker at the same six sites in the watershed. Length, weight, and population estimates, will be determined for several species along with the possible computation of the IBI. The details of their study are contained in a report titled "Procedures For Evaluation and Monitoring of Fish and Habitat During Priority Watershed Projects".

Site length will be approximately one-half mile and will concentrate on smallmouth bass populations in Rattlesnake Creek. Surveys will likely occur in May\June and late August. In addition, once a year all forage will be collected in a 200-300 meter section in Rattlesnake Creek upstream of Rattlesnake Road and Muskellunge Road. Since Kuenster Creek may not contain much of a smallmouth bass population, fish surveys here will likely concentrate on the forage populations.

WATER CHEMISTRY

There are two major components to the water chemistry portion of the evaluation monitoring. The first component is the two USGS monitoring stations. It is critical that these stations remain in the watershed. Due to time constraints the water quality data collected by these stations are an essential part of the evaluation monitoring phase. One station has been located at Atkinson Road on Rattlesnake Creek since 1987. A second station currently located on Rattlesnake Road on Rattlesnake Creek will be moved to Kuenster Creek. Past studies have indicated that Kuenster Creek is a major organic loading source which has contributed to low dissolved oxygens in Rattlesnake Creek, and resultant fish kills. The exact location has not been selected but Muskellunge Road would be the preferred site. Data collected at these stations include nutrients, sediments, and organic matter along with flow, dissolved oxygen (DO), and temperature.

The second component is a two-year water quality study being done by the DNR's Bureau of Research which began in 1990 and will continue through 1991. The details of the study are contained in a report titled "Dissolved Oxygen Dynamics in Wisconsin Streams; 1990 Annual Report". Water chemistry samples are being collected from various land use practices to determine sources of low dissolved oxygen. The sampling is confined to three streams and their watersheds; Rattlesnake Creek, Kuenster Creek, and Muskellunge Creek. Instream water chemistry samples are collected along with sediment samples. Depending upon the sample site, water quality parameters collected include DO, temperature, nutrient and sediment series, and bacteria. In addition, two portable data loggers will be installed in Kuenster Creek in 1991 to record dissolved oxygen levels during storm events. This data will characterize the water quality of Kuenster Creek in 1991 until October when the USGS station is relocated to this stream. Consequently, the USGS station is essential to the continued collection of water quality data on Kuenster Creek.

PHYSICAL MONITORING

In addition to the fish and macroinvertebrates collected at the six previously mentioned sites, physical habitat measurements will be made at each one. These measurements will be part of the fishery study. Measurements will be made for stream depths, widths, substrate, bank vegetation, etc. A relationship can then be made between the present fishery and the fishery potential at each site. Also changes in habitat can be made from pre-implementation to post-implementation.

ADDITIONAL MONITORING

The DNR's Bureau of Water Resource Management staff may complete additional monitoring if an exceptional site lends itself to a pre-post implementation water quality survey. One or two of these individual projects could be monitored anywhere within the watershed boundaries. Sampling may include water chemistry, macroinvertebrates, or fish.

Because this watershed has a "Master Monitoring Site", monitoring sites outside of the watershed will be selected as "reference sites" for fishery research. Macroinvertebrate monitoring at these reference sites may be requested. Consequently, additional staff time may be needed to complete this part of the project.

REPORTING PROCEDURES

Monitoring results will be reported in an interim report in 1994 and will contain a summary of the pre-implementation data from the watershed. A final report summarizing and evaluating the effectiveness and success of the priority watershed will be completed in 1999.

The following tables lists the monitoring activities, staff time and costs by evaluation project. These are preliminary figures and may change with additional survey sites.

Table 9-1: Evaluation Monitoring Sites and Activities

Water Body & Location	Monitoring Activity	Schedule +								
		1991	1992	1993	1994	1995	1996	1997	1998	1999
Rattlesnake Cr.	Fish Survey	S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.
Rattlesnake Rd.	Habitat Assessment	S.	S.	S.	S.	S.	S.	S.	S.	S.
	Macroinvertebrates	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.
	USGS Monitor. Sta.	Sp.-F.								
Rattlesnake Cr.	Fish Survey	S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.
Atkinson Rd.	Habitat Assessment	S.	S.	S.	S.	S.	S.	S.	S.	S.
	Macroinvertebrates	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.
	USGS Monitor. Sta.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.
Rattlesnake Cr.	Fish Survey	S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.
Below Confluence	Habitat Assessment	S.	S.	S.	S.	S.	S.	S.	S.	S.
with Kuenster Creek	Macroinvertebrates	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.
Rattlesnake Cr.	Fish Survey	S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.
Muskellunge Rd.	Habitat Assessment	S.	S.	S.	S.	S.	S.	S.	S.	S.
	Macroinvertebrates	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.
Muskellunge Cr.	D.O. Dynamics Study	Sp.-F.								
Muskellunge Rd.										
Kuenster Cr.	Fish Survey	S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.
Muskellunge Rd.	Habitat Assessment	S.	S.	S.	S.	S.	S.	S.	S.	S.
	Macroinvertebrates	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.
	USGS Monitor. Sta. *	F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.	Sp.-F.
	D.O. Dynamics Study	Sp.-F.								
Kuenster Cr.	D.O. Dynamics Study	Sp.-F.								
Hwy. 133										
Kuenster Cr.	Fish Survey	S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.	Sp.,S.
Texas Rd.	Habitat Assessment	S.	S.	S.	S.	S.	S.	S.	S.	S.
	Macroinvertebrates	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.	Sp.,F.
	D.O. Dynamics Study	Sp.-F.								
Kuenster Cr.	D.O. Dynamics Study	Sp.-F.								
See Map #1 for additional sampling locations										

+ Schedule: Spring = Sp.; Summer = S.; Fall = F.

* Tentative Location

Table 9-2: Staff Time and Costs for Monitoring/Evaluation Activities

Evaluation Location	Monitoring Activity	Staffing Needs	WRM Staff Time/Yr.	Cost
Rattlesnake Creek	Fish Surveys	Bur. of Research - Fishery Section	28	\$828/Sample I.D./Yr.
	Habitat Assessment	Bur. of Research - Fishery Section		
	W.Q. Monitoring	USGS		
	D.O. Dynamics Study	Bur. of Research - Water Res. Section		
	Macroinvertebrates	Bur. of Water Resources (1FTE; 1LTE)		
Kuenster Creek	Fish Surveys	Bur. of Research - Fishery Section	12	\$414/Sample I.D./Yr.
	Habitat Assessment	Bur. of Research - Fishery Section		
	W.Q. Monitoring	USGS		
	D.O. Dynamics Study	Bur. of Research - Water Res. Section		
	Macroinvertebrates	Bur. of Water Resources (1FTE; 1LTE)		
Muskellunge Creek	D.O. Dynamics Study	Bur. of Research - Water Res. Section		

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APPENDIX A

GLOSSARY

ACUTE TOXICITY:

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

ADDITIVITY:

The characteristic property of a mixture of toxicants that exhibit a cumulative toxic effect equal to the arithmetic sum of the individual toxicants.

ADVANCED WASTEWATER TREATMENT:

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

AGRICULTURAL CONSERVATION PROGRAM (ACP):

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

AIR POLLUTION:

Contamination of the atmosphere by human activities.

ALGAE:

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

AMMONIA:

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

ANAEROBIC:

Without oxygen.

AREA OF CONCERN:

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

AREAWIDE WATER QUALITY MANAGEMENT PLANS (208 PLANS):

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

ANTIDegradation:

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

ASSIMILATIVE CAPACITY:

The ability of a water body to purify itself of pollutants.

AVAILABILITY:

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

BACTERIA:

Single-cell, microscopic organisms. Some can cause disease, and some are important in the stabilization of organic wastes.

BASIN PLAN:

See "Areawide Water Quality Management Plan".

BENTHIC ORGANISMS (BENTHOS):

The organisms living in or on the bottom of a lake or stream.

BEST MANAGEMENT PRACTICE (BMP):

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

BIOACCUMULATION:

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

BIOASSAY STUDY:

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

BIOCHEMICAL OXYGEN DEMAND (BOD):

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

BIODEGRADABLE:

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

BIOTA:

All living organisms that exist in an area.

BUFFER STRIPS:

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

BULKHEAD LINES:

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

CARCINOGENIC:

A chemical capable of causing cancer.

CATEGORICAL LIMITS:

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

CHLORINATION:

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

CHRONIC TOXICITY:

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

CLEAN WATER ACT:

See "Public Law 92-500."

COMBINED SEWERS:

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

CONFINED DISPOSAL FACILITY (CDF):

A structure built for the containment and disposal of dredged material.

CONGENERS:

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

CONSERVATION TILLAGE:

Planting row crops while disturbing the soil only slightly. In this way a protective layer of plant residue says in the surface; erosion is decreases.

CONSUMPTION ADVISORY:

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

CONTAMINANT:

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

CONVENTIONAL POLLUTANT:

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

COST-EFFECTIVE:

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

CRITERIA:

See water quality standard criteria.

DISINFECTION:

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

DISSOLVED OXYGEN (DO):

Oxygen dissolved in water. Low levels of dissolved oxygen cause bad smelling water and threaten fish survival. Low levels of dissolved oxygen are often due to inadequate wastewater treatment. The Department of Natural Resources considers 5 ppm DO necessary for fish and aquatic life.

DREDGING:

Removal of sediment from the bottom of water bodies.

ECOSYSTEM:

The interacting system of biological community and its nonliving surrounding.

EFFLUENT:

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

EFFLUENT LIMITS:

The Department of Natural Resources issues WPDES permits that establish the maximum amount of pollutant that can be discharged to a receiving stream. Limits depend on the pollutant involved and the water quality standards that apply for the receiving waters.

EMISSION:

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

ENVIRONMENTAL PROTECTION AGENCY (USEPA):

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

EPIDEMIOLOGY:

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

EROSION:

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

EUTROPHIC:

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

EUTROPHICATION:

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

FACILITY PLAN:

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

FISHABLE AND SWIMMABLE:

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

FOOD CHAIN:

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

GREEN STRIPS:

See buffer strip.

GROUNDWATER:

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

HABITAT:

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

HEAVY METALS:

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

HERBICIDE:

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

HYDROCARBONS:

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

INFLUENT:

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

IN-PLACE POLLUTION:

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

INTERNATIONAL JOINT COMMISSION (IJC):

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

LANDFILL:

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

LC-1:

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

LC₅₀:

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

LD₅₀:

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

LEACHATE:

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

LOAD:

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

MACROPHYTE:

A rooted aquatic plant.

MASS:

The amount of material a substance contains after measured by its weight (in a gravitational field).

MASS BALANCE:

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

MESOTROPHIC:

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

MILLIGRAMS PER LITER (mg/l):1

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

MITIGATION:

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

MIXING ZONE:

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

NONPOINT SOURCE POLLUTION (NSP):

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

NPS:

See nonpoint source pollution.

OLIGOTROPHIC:

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

OUTFALL:

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

PATHOGEN:

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

PESTICIDE:

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

PH:

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

PLANKTON:

Tiny plants and animals that live in water.

POINT SOURCES:

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

POLLUTION:

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

PRETREATMENT:

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

PRIORITY POLLUTANT:

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

PRIORITY WATERSHED:

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

PRODUCTIVITY:

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

PUBLIC LAW 92-500 (CLEAN WATER ACT):

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

PUBLIC PARTICIPATION:

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

PUBLICLY OWNED TREATMENT WORKS (POTW):

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

RAP:

See Remedial Action Plan.

RECYCLING:

The process by which waste materials are transformed into new products.

REMEDIAL ACTION PLAN:

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

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS):

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

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 (RCRA):

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

RETRO-FIT:

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

RIPARIAN:

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

RIPRAP:

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

RULE:

Refers to Wisconsin administrative rules. See Wisconsin Administrative Code.

RUNOFF:

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

SECONDARY IMPACTS:

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

SECONDARY TREATMENT:

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

SEDIMENT:

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

SEICHES:

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

SEPTIC SYSTEM:

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

SLUDGE:

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

SOLID WASTE:

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

STANDARDS:

See water quality standards.

STORM SEWERS:

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

SUPERFUND:

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

SUSPENDED SOLIDS (SS):

Small particles of solid pollutants suspended in water.

SYNERGISM:

The characteristic property of a mixture of toxicants that exhibits a greater-than-additive cumulative toxic effect.

TACs:

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

TERTIARY TREATMENT:

See advanced wastewater treatment.

TOP-DOWN MANAGEMENT:

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

TOTAL MAXIMUM DAILY LOADS:

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

TOXIC:

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

TOXIC SUBSTANCE:

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

TOXICANT:

See toxic substance.

TOXICITY:

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

TOXICITY REDUCTION EVALUATION:

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

TREATMENT PLANT:

See wastewater treatment plant.

TROPHIC STATUS:

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

TURBIDITY:

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

UNIVERSITY OF WISCONSIN-EXTENSION (UWEX):

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

VARIANCE:

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

VOLATILE:

Any substance that evaporates at a low temperature.

WASTELOAD ALLOCATION:

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

WASTEWATER:

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

WASTE:

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

WASTEWATER TREATMENT PLANT:

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

WATER QUALITY AGREEMENT:

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

WATER QUALITY LIMITED SEGMENT:

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

WATER QUALITY CRITERIA:

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

WATER QUALITY STANDARDS:

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

WATER QUALITY STANDARD VARIANCE:

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

WATERSHED:

The land area that drains into a lake or river.

WETLANDS:

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

WISCONSIN ADMINISTRATIVE CODE:

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

WISCONSIN FUND:

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

Point Source Water Pollution Abatement Grant Program - Provides grants for 60% of the cost of constructing wastewater treatment facilities. Most of this program's money goes for treatment plant construction, but 3% of this fund is available for repair or replacement of private , onsite sewer systems.

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

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

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT GRANT PROGRAM:

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

WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES):

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

PRIORITY WATERSHED PROJECTS IN WISCONSIN
1990

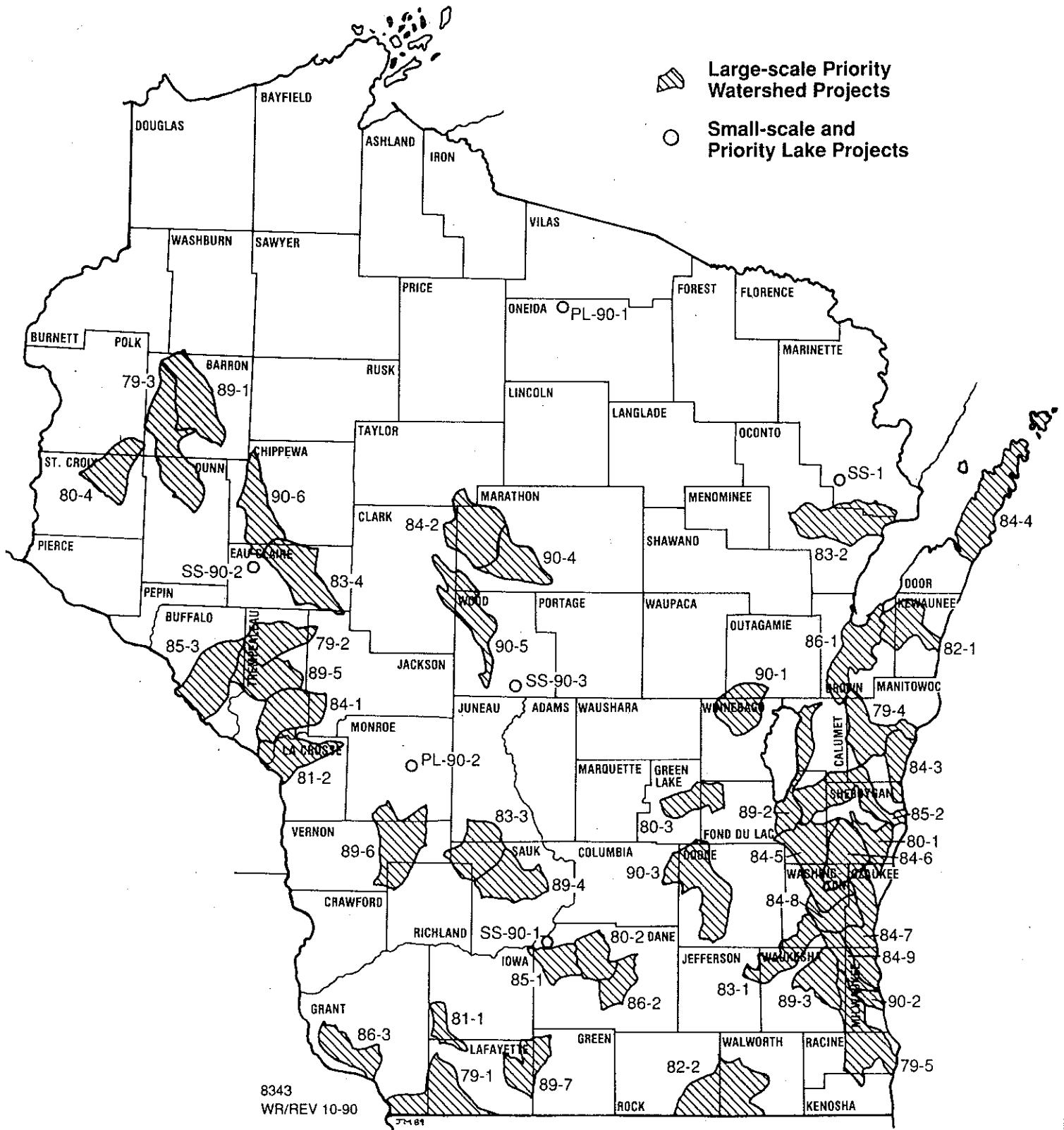
Map Number	Large-scale Priority Watershed Project	County(ies)	Year Project Selected
79-1	Galena River	Grant, Lafayette	1979
79-2	Elk Creek*	Trempealeau	1979
79-3	Hay River*	Barron, Dunn	1979
79-4	Lower Manitowoc River*	Manitowoc, Brown	1979
79-5	Root River	Racine, Milwaukee, Waukesha	1979
80-1	Onion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

Map Number	Small-scale Priority Watershed Project	County(ies)	Year Project Selected
SS-1	Bass Lake	Marinette	1985
SS-90-1	Dunlap Creek	Dane	1990
SS-90-2	Lowes Creek	Eau Claire	1990
SS-90-3	Wood County Groundwater Prototype	Wood	1990

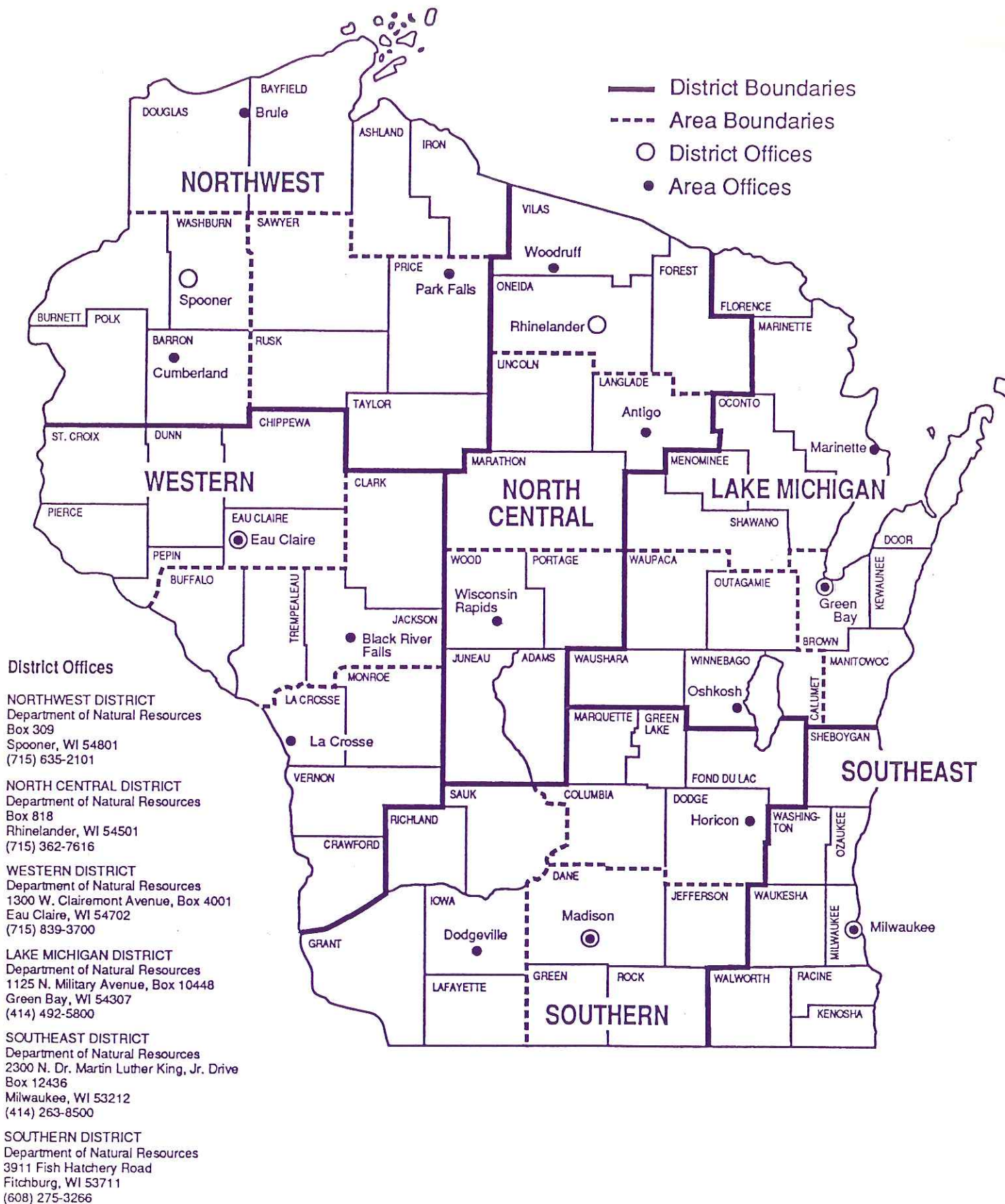
Map Number	Priority Lake Project	County(ies)	Year Project Selected
PL-90-1	Minocqua Lake	Oneida	1990
PL-90-2	Lake Tomah	Monroe	1990

* Project completed

Priority Watershed Projects in Wisconsin 1990



DNR Field Districts and Areas



OUR MISSION:

To protect and enhance our Natural Resources —
our air, land and water;
our wildlife, fish and forests.

To provide a clean environment
and a full range of outdoor opportunities.

To insure the right of all Wisconsin citizens
to use and enjoy these resources in
their work and leisure.

And in cooperation with all our citizens
to consider the future
and those who will follow us.



Wisconsin
Dept. of Natural Resources