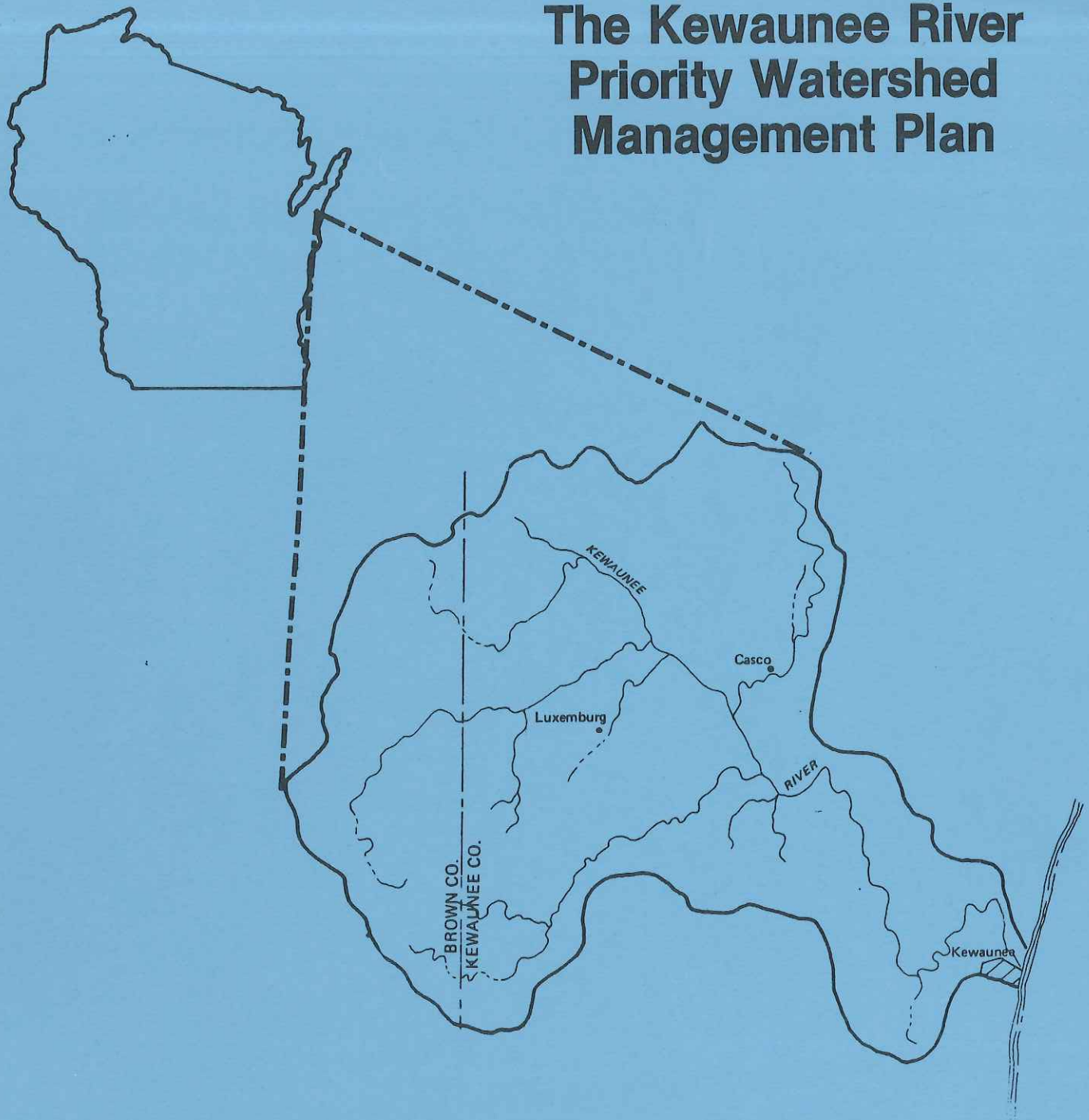
The Kewaunee River Priority Watershed Management Plan



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

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

BOX 7921
MADISON, WISCONSIN 53707

File Ref: 3200

The Kewaunee River Priority Watershed Plan and the Program for Implementation for the plan have been reviewed by Department staff. They meet the intent and conditions of s. 144.25, Statutes, and NR 120, Wisconsin Administrative Code. They are consistent with the areawide water quality plan (Section 208, PL 92-500) for the Twin-Door, Kewaunee River Basin and serve to implement it. They are hereby approved and become part of the areawide water quality plan.

Sincerely,

C. D. Besadny
Secretary

Kewaunee County
Land Conservation Office

COURTHOUSE KEWAUNEE, WISCONSIN 54216 PHONE (414) 388-4410

February 21, 1984

Carroll D. Besadny
Secretary
Dept. of Natural Resources
Box 7921
Madison, WI 53711

Dear Mr. Besadny:

The Department of Land Conservation has applied for, and has been approved for funding the Kewaunee River Watershed Project under the non-point portion of the Wisconsin Fund.

The Department staff, with cooperation from Brown County Department of Land Conservation and the Department of Natural Resources, has inventoried the Kewaunee River Watershed and has set up a procedure for cost-sharing with landowners on various practices to improve water quality within the watershed. The plan has been reviewed by the public during a public hearing which was held on February 10, 1984.

The supervisors of the Land Conservation Committee have also reviewed the plan and have approved the plan via a county board resolution which was accepted today, February 21, 1984.

Sincerely,

Gary Thayse

Gary Thayse, Chairman
Land Conservation Committee

GT/ta

Brown County Soil and Water Conservation District
Agriculture and Extension Service Center - 1150 Bellevue Street - Green Bay, WI 54302

February 22, 1984 414-497-3368

FEB 28 1984

Mr. John Konrad, Chief
Nonpoint Source Section
Bureau of Water Resources Mgm't
Dept. of Natural Resources
Box 7921
Madison, Wi 53707

Dear Mr. Konrad:

We have reviewed the Kewaunee River Priority Watershed Plan. The plan meets our approval and the Brown County Land Conservation Committee will cooperate fully on the implementation of the plan.

Sincerely,

BROWN COUNTY LAND CONSERVATION COMMITTEE

Eunice M. Garsow, Chairman

BH/mlp

cc: Dennis Weisensel, DNR
P.O. Box 3600, Green Bay 54303

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PREFACE

The Kewaunee River Watershed was selected in 1982 as a priority watershed under the Wisconsin Nonpoint Source Water Pollution Abatement Program. Since the program was enacted by the State Legislature in 1978, sixteen other priority watersheds have been selected.

Control of nonpoint sources requires a comprehensive approach which addresses a number of land management problems over a large land area, most effectively an entire watershed. The Wisconsin Nonpoint Source Water Pollution Abatement Program was developed to provide cost-sharing and technical assistance to landowners and operators for the control of nonpoint sources of pollution. It is the primary source of funding available for implementing nonpoint source controls in Wisconsin. The overall purpose of the program is to abate water pollution in areas with severely degraded water quality while preserving good water quality in less disturbed areas.

Priority watersheds, including the Kewaunee River Watershed, are selected, in general, because of the severity of water quality problems in the watershed, the importance of controlling nonpoint sources in order to attain water quality standards, and the capability and willingness of local governmental agencies to carry out the planning and implementation of the project. The watersheds are selected through a three-step process involving an impartially ranked list of watersheds, regional advisory groups and the State Nonpoint Source Coordinating Committee. Once a priority watershed is selected, local agencies, with assistance from the Department of Natural Resources, prepare a watershed plan.

INTRODUCTION

PURPOSE

The purpose of this priority watershed plan is to consolidate water quality and land use information about the Kewaunee River Watershed so that the specific causes and critical areas contributing to nonpoint source pollution in the watershed can be identified and the most practical means for abating the pollution can be developed.

The priority watershed plan that follows is divided into two parts. Part 1: The Management Plan, sets the goals and objectives for the watershed project by:

a) assessing the existing water quality problems;
b) identifying the significant nonpoint sources of pollution and determining the significance of other pollution sources such as point sources and septic systems;
c) identifying the water quality improvements or objectives that can be reasonably achieved through nonpoint source controls;
d) identifying the priority management area and the best management practices which will be effective in abating the nonpoint source pollution; and
e) estimating the cost-share dollars needed to implement the recommended nonpoint source control needs.

Part II: The Implementation Strategy, outlines the process for achieving the project objectives. It identifies:

a) the tasks necessary to accomplish the needs identified in the Management Plan;
b) the agencies responsible for carrying out those tasks;
c) the time frame for carrying out the tasks; and
d) the estimated hours of staff needs for carrying out the project.

In addition to the above purposes, the Priority Watershed Plan has several other uses. Because the plan represents a thorough inventory of pollution sources and control needs within the watershed, it can be used to pinpoint critical areas of the watershed where other resource management efforts can be directed. It can also serve an important educational function by showing the cause and effect relationship between land management and water quality. The plan is a guide for managing the watershed project and details procedures and responsibilities to aid staff in working more effectively. And, finally, the watershed plan can serve as an application for other state and federal funding programs which may become available.

PART I: THE MANAGEMENT PLAN

WATERSHED DESCRIPTION

The Kewaunee River Watershed is located in central Kewaunee County and eastern Brown County. The watershed includes 139 square miles (89,000 acres) of land draining to the Kewaunee River. Twenty-five square miles, or 18% of the watershed, are in Brown County; 114 square miles, or 82% of the watershed, are in Kewaunee County.

Major tributaries in the watershed include School Creek, Scarboro Creek, Little Scarboro Creek, and Casco Creek. The watershed has been subdivided into seven subwatersheds based on these tributaries, topography, and land use. A map of the watershed is shown in Figure 1, and the subwatersheds are shown on the map in Figure 2.

The bedrock formations of Kewaunee County are sedimentary deposits. The Niagra Dolomite forms the caprock of most of the County, and is a major source of the area's water supply. Glacial ice scoured northeastern Wisconsin several times. In some places the glacial drift is up to 100 feet deep; in others the bedrock is at or near to the surface.

A generalized soils map for the watershed is shown in Figure 3. The Kewaunee-Manawa soils dominate the western half of the watershed, including the School Creek and Martinville School-Champion Tributary subwatersheds. These soils also dominate the upper portion of the Scarboro Creek subwatershed. About 60% of the these soils are Kewaunee soils, having a high percentage of fine clay. These clays are easily suspended in water, and once eroded have a high potential for delivery to waterways. Since phosphorus and herbicides readily attach to these clay particles, these soils can be important contributors of pollutants to waterways if not properly managed.

Hortonville-Symco soils dominate the Upper Kewaunee subwatershed, and the uplands of the Lower Kewaunee and Casco Creek subwatersheds. These soils are mostly Hortonville, which is a clayey soil having the same significance for water quality as the Kewaunee soils. Erosion is the main hazard for cultivating crops on these soils.

The Casco-Boyer soils are prevalent in the central portion of the watershed. They occur along the Kewaunee River from the mouth of School Creek all the way to Kewaunee Harbour, and form a significant portion of the Casco Creek and lower Scarboro Creek subwatersheds. These soils are well drained, sandy soils with a coarse textured subsoil over sand and gravel. These soils are significant in providing base flow to the trout streams in the watershed, including Rogers Creek, Little Scarboro Creek, lower Casco Creek, lower Scarboro Creek, and the middle Kewaunee River. Although there is an erosion hazard on these soils where slopes are steep, the hazard is not as great as with the Kewaunee-Manawa and Hortonville-Symco soils. The groundwater contamination potential of the Casco-Boyer soils is of some concern where the pollution source is in direct contact with the porous subsoil.

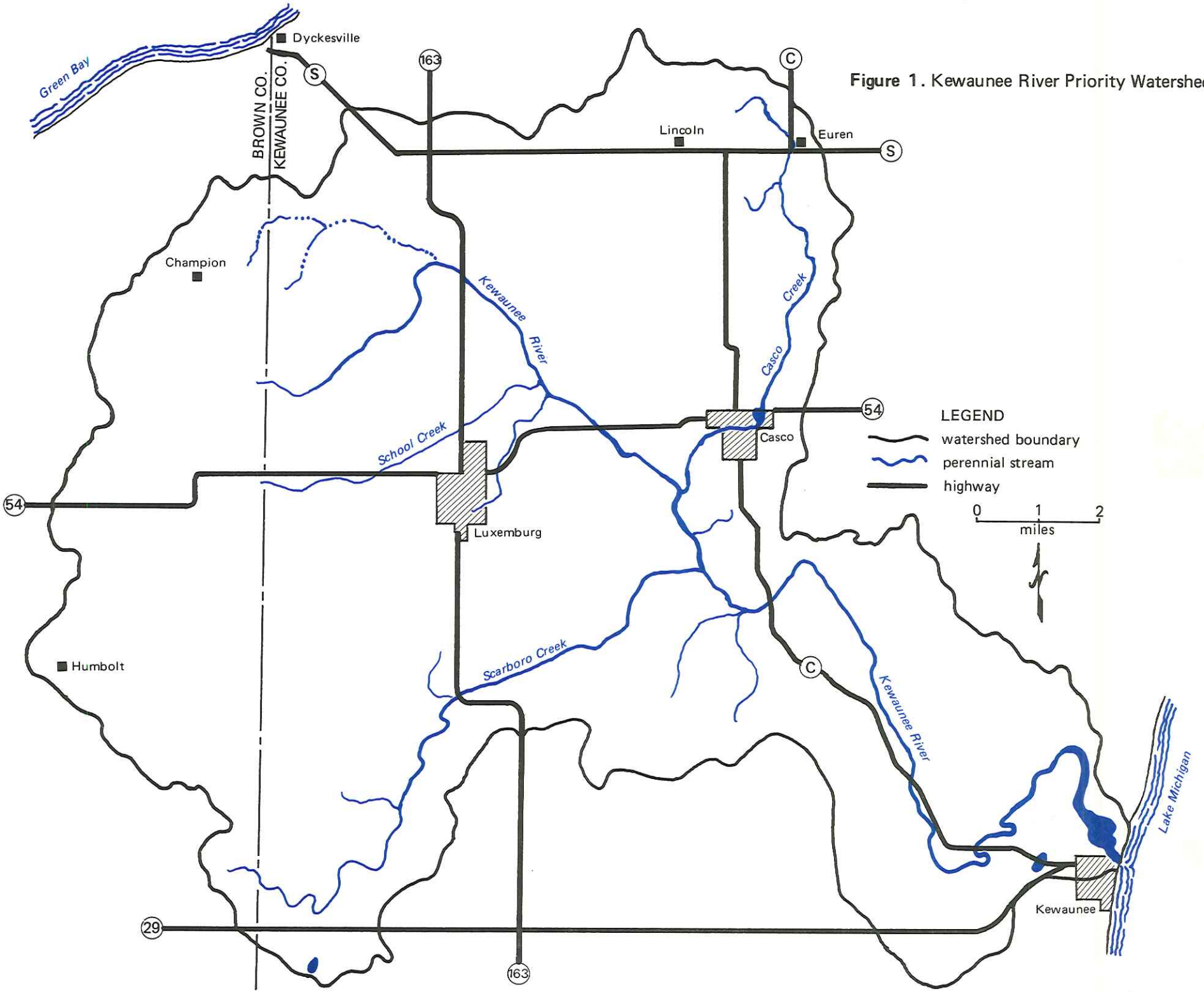


Figure 1. Kewaunee River Priority Watershed.

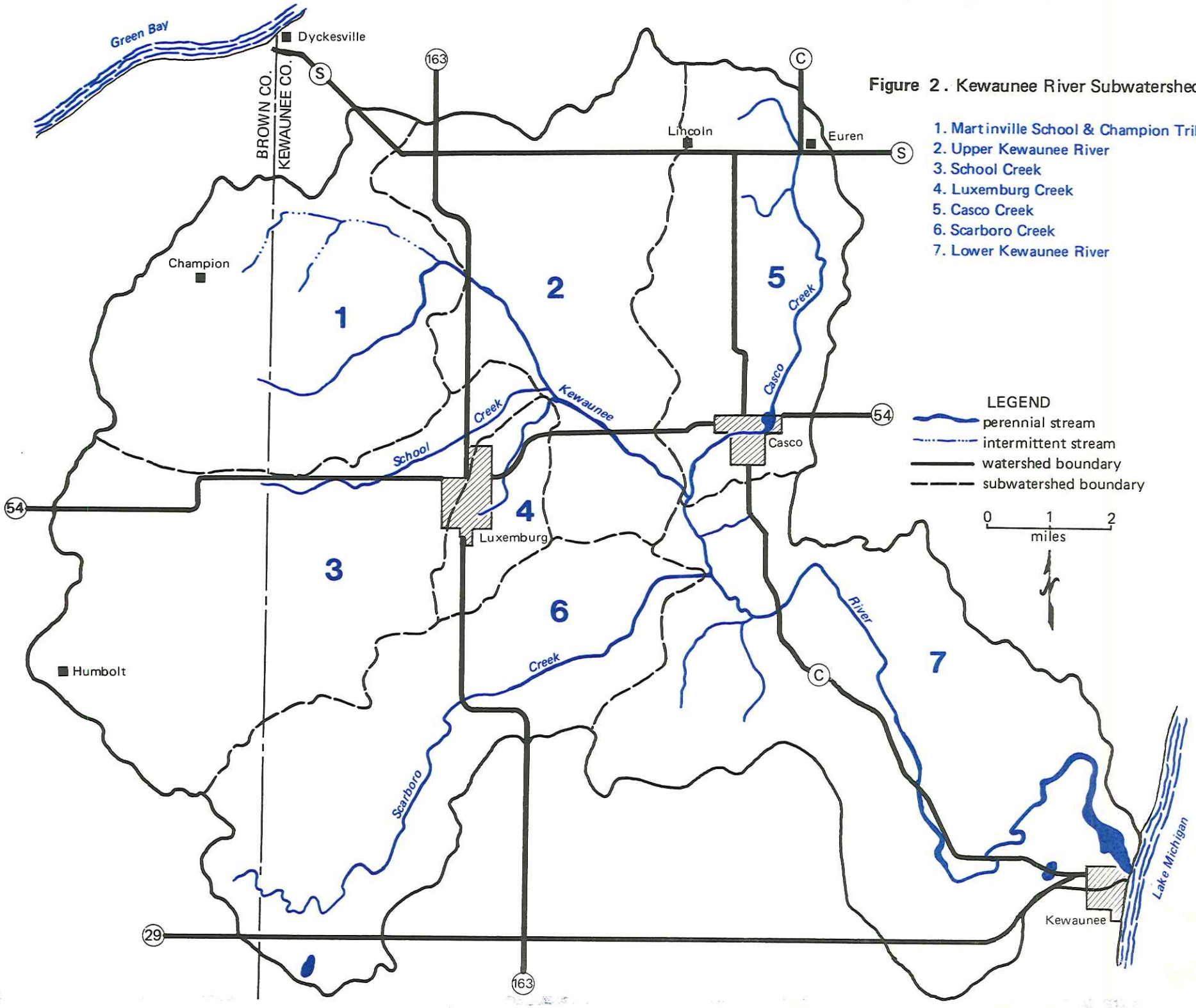


Figure 2. Kewaunee River Subwatersheds.

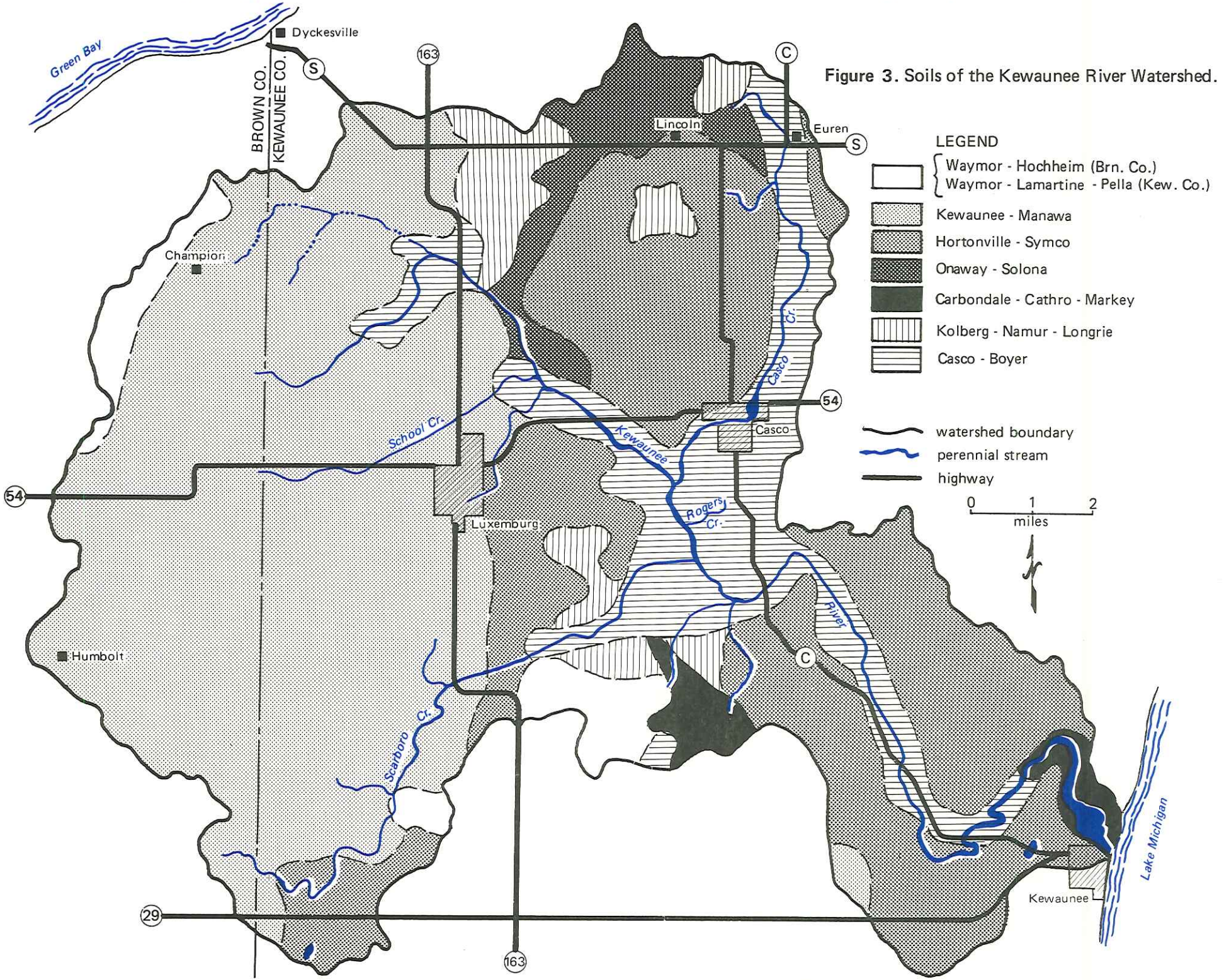


Figure 3. Soils of the Kewaunee River Watershed.

The Kolberg-Namur-Longrie soils are relatively shallow with the dolomite caprock at or near the surface. Their distribution is centered in Kewaunee County, both in the northern portion of the watershed and in the area southeast of Luxemburg.

Although these soils do not cover a large portion of the watershed, they are significant because the groundwater contamination potential of the dolomite aquifer is high where these soils occur.

The overall relief of the watershed is about 300 feet, ranging from about 900 feet above sea level in Lincoln and Montpelier Townships to 580 feet above sea level at the mouth of Kewaunee Harbour. Slopes in the watershed are generally shallow in the uplands, typically in the 0-6% range. Slopes are greatest along the edges of the Kewaunee River Valley. These steeper slopes are greatest in the Lower Kewaunee subwatershed, where the valley floor is up to 100 feet lower than the uplands.

Table 1 shows the general land uses in the watershed. Dairy agriculture is the dominant rural land use. Urbanization is limited to areas in and near to the Villages of Casco and Luxemburg, and the City of Kewaunee.

Table 1
General Land Use in the Kewaunee River Watershed

Land Uses	Area (acres)	Percent of Total Area
Cropland	70,480	79%
Woodland	11,950	14%
Grassland, Wildlife	5,330	6%
Urban, Other	1,240	1%
	89,000	100%

SURFACE WATER SECTION

DESCRIPTION OF SURFACE WATER RESOURCES AND PROBLEMS

The water resources in this watershed include the Kewaunee River and its tributaries, the Kewaunee Harbour, and the nearshore waters of Lake Michigan. Important tributaries to the Kewaunee River include the Champion Tributary, School Creek, Luxemburg Creek, Casco Creek, Rogers Creek, Scarboro Creek, and Little Scarboro Creek.

Some of these waterbodies are significant recreational and fishery resources. These include Lake Michigan, the Kewaunee River from Casco Creek to its mouth, lower Casco Creek, Rogers Creek, lower Scarboro Creek, and Little Scarboro Creek. The Kewaunee Harbour has additional importance as a shipping center. The other streams have limited potentials as fishery resources, but constitute a significant portion of the channel network via which pollutants make their

way to the more significant waters. In addition, the upper Kewaunee River is an important aesthetic resource with the river meandering through woodlands and wetlands. The principal water resources in the watershed are shown on the map in Figure 4.

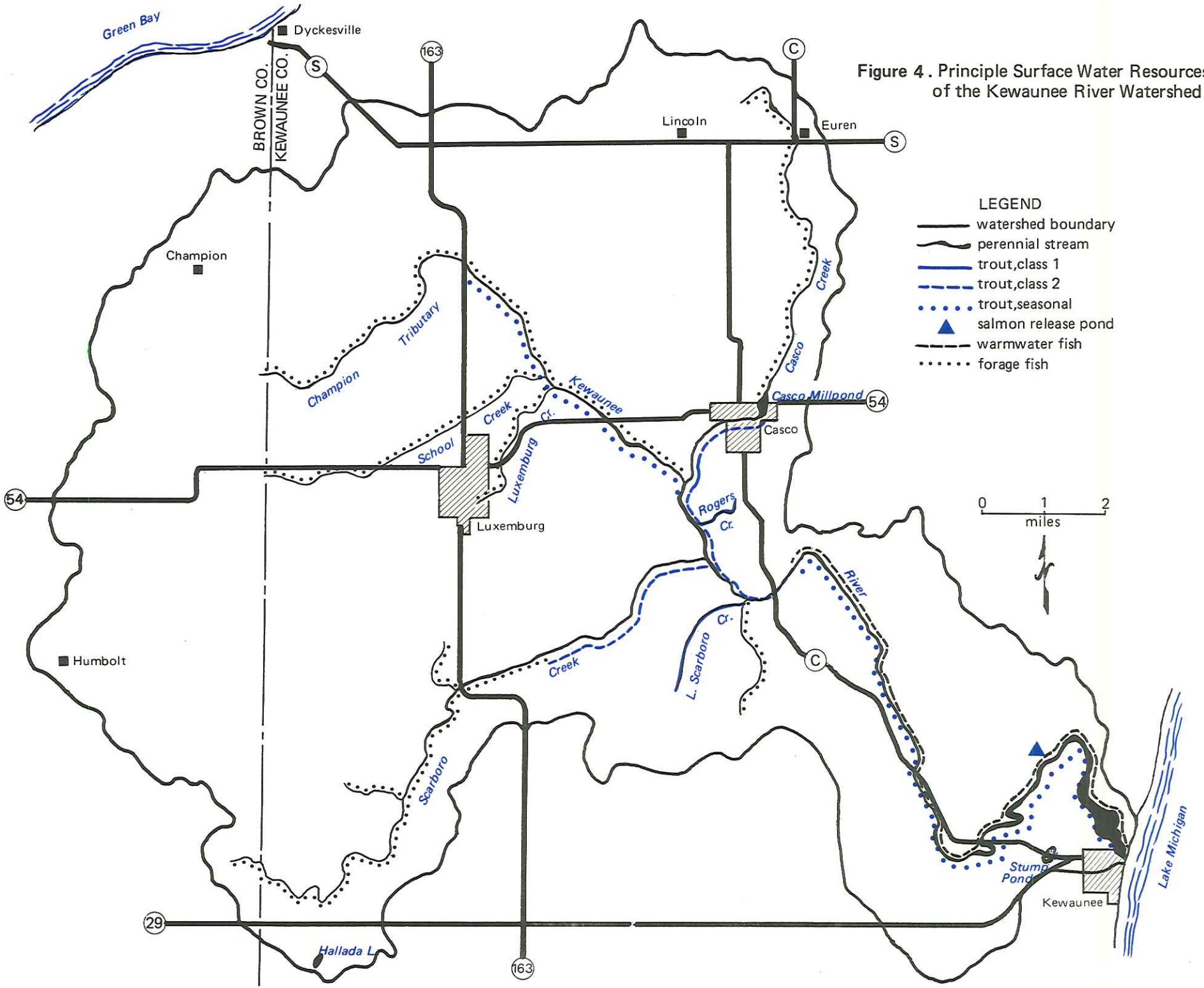


Figure 4. Principle Surface Water Resources of the Kewaunee River Watershed

These resources are discussed below in more detail. Following that, there is a discussion of water quality improvement and protection objectives for the watershed project.

Lower Kewaunee River Subwatershed

Water resources are divided into three groups for discussion. These are: 1) the nearshore waters of Lake Michigan and the Kewaunee Harbour, 2) the lower Kewaunee river, and 3) Rogers and Little Scarboro Creeks.

Lake Michigan and the Kewaunee Harbour

Public recreation includes sport fishing, boating, and swimming. Public access includes a boat ramp just above the harbour, and city park land, including a swimming beach, along the lakeshore just south of the harbour.

The DNR operates a salmonid fish stocking program from a fish stocking pond on the lower Kewaunee River. Stocked fish include chinook salmon, rainbow trout, lake trout, brown trout, and brook trout. These fish, with the exception of the lake trout, are anadromous meaning that they run free in Lake Michigan and return to the river to spawn when they are mature. The major attraction is the spring run of rainbow trout and the fall runs of brown trout and chinook salmon. These fish are caught from the piers at the harbor mouth, and from boats that troll within several miles of the lakeshore. Recent yield estimates indicate about 10,000 trout and salmon are being taken annually from the harbour area and nearshore waters near Kewaunee. This stocking program is expected to continue. The sport fishery also includes warm water fishes such as yellow perch, smallmouth bass, northern pike, walleye, rock bass, and bullhead.

The Port of Kewaunee is the only surviving facility that offers trans-lake ferry service between Michigan and Wisconsin. The demand for passenger and freight service across the lake is projected to increase.

Water quality and flow data relevant to the harbour and lake have been collected at Footbridge since 1966. The data shows that between 1969 and 1978, the phosphorus load to Lake Michigan varied from 11,000 lbs/year to 106,000 lbs/year. The average loading was 42,000 lbs/year. This indicates a unit area loading of .5 lbs/acre/year, most of which comes from agricultural sources. Based on 1978 data, the springtime (March 1 through May 31st) accounts for 80% of the phosphorus loading. This is due to the fact that 63% of the annual stream discharge occurs during the spring, and because phosphorus concentrations in the water are higher during the spring.

The suspended sediment load to the harbour and lake during 1978 was 1899 tons. This indicates a unit area load of 40 lbs/acre of sediment per year. As with total phosphorus, most of this loading (92%) occurs during the spring, when stream flows and sediment concentrations are highest. It is not known how much of the sediment load is trapped in the harbour, although it is suspected that much of it passes through the harbour to the lake.

Sediment is a problem because a portion of it settles out in the harbour,

contributing to the maintenance problems that have occurred with the shipping channel. The harbour channel is currently being dredged by the Army Corps of Engineers. This has been costly, and has required the construction of a dredge disposal containment facility located on the north edge of the harbour. The suspended sediment passing through the harbour forms a noticeable plume during the spring and after major rainstorms in the summer and fall. This is not just an aesthetic concern. This sediment is principally composed of fine clay materials that have a high affinity for phosphorus and agricultural chemicals. These clay particles thus bear a load of associated pollutants into the lake. Phosphorus is of concern because it leads to the general nutrient enrichment of the shallow waters along the lakeshore. This enrichment is a longstanding concern, and reduction of phosphorus to Lake Michigan has been a mutually agreed upon objective by the U.S. and Canada for over 10 years.

Lower Kewaunee River

This portion of the river is 15 miles long and has a gradient of 4-6 feet per mile. There is marked variation in habitat and fishery along its length.

The 6 mile portion below Footbridge is strongly influenced by Lake Michigan, with tidal effects noted as far upstream as 3 miles from the river mouth. Extensive wetlands occur along the river in this area making the river a valuable nursery area for 28 species of fish including perch, bass, pike, walleye, and salmonids. This portion of the river provides some of the best ice fishing in the area.

The 6.5 mile portion of the river between County Trunk C and Footbridge has many riffle areas separated by pools. This habitat attracts migratory trout and salmon and holds resident warmwater sport fish such as northern pike, smallmouth bass, sunfish, and rock bass.

The 2.5 mile long segment between Casco Creek and County Trunk C is a Class II brown trout stream. Water temperatures are strongly influenced by the many trout streams which are tributary to this section of the river.

Public access along the lower Kewaunee River is excellent. From Scarboro Creek to the river's mouth, there are 670 acres of public recreation land that provide right-of-way to 7 out of 10 stream miles. A state master plan for this area calls for the expansion of these public lands so that public right-of-way could eventually border 100% of the river bank below Scarboro Creek.

Water quality data for the Lower Kewaunee River indicates that overall, water quality is fair to good. The major concern is turbidity of the river due to the suspended sediment load, and the silt deposits observed in portions of the lower river. Both could be adversely affecting the fish. Nutrient enrichment could also be a concern in portions of the lower river during the summer, when nuisance growths of algae and weeds typically develop.

Rogers and Little Scarboro Creek

Both streams are Class I trout waters.

Rogers Creek is a small, clear, springfed stream that enters the Kewaunee River south of Casco. The stream is .7 miles long and has a gradient of 86 feet per mile. The entire stream supports a native brook trout population. Public access to the stream is not available.

Little Scarboro Creek is a cold water, high gradient stream (43 feet/mile that originates in the Lipsky Swamp and flows 1.5 miles to the Kewaunee River. The East Branch also is a high gradient, coldwater stream that originates in the swamp and enters Little Scarboro Creek near its mouth. Little Scarboro Creek is one of the most productive trout streams in northeastern Wisconsin. It is the only Lake Michigan tributary in Wisconsin with significant natural reproduction of coho salmon and rainbow trout. Brook trout also reproduce in the creek. Public access is excellent, with 432 acres of the Little Scarboro State Public Fishing Area bordering 1.4 miles of the creek.

There is no water quality data available for Roger's Creek. An analysis of aquatic insects collected from Little Scarboro Creek indicates the water quality is excellent.

Upper Kewaunee River Subwatershed

Upper Kewaunee River

The major water resource in this subwatershed is the Kewaunee River between Frog Station and Casco Creek. This section of the river is 5 miles long, has a low gradient, and exhibits spring flooding and very low summertime flows. The present fish community is limited by low flows and high temperatures during the summer. During the spring and fall, migratory trout and salmon use this portion of the river providing flows are adequate, although no natural reproduction occurs. Public access in this section of the river is limited to road crossings.

Water quality data for the Upper Kewaunee River shows fair water quality. Natural limitations include flow and temperature. Man-induced problems include turbidity, and possibly nutrient enrichment and some sedimentation.

Minor Tributaries

Lincoln Church, McKinley School, and Thiry Daems tributaries are small streams that join the Upper Kewaunee River from the north. These streams are mostly intermittent, and their natural flow and temperature limitations preclude significant fish communities, or any recreational potential. The streams are, however, an important part of the pollutant transport system in the watershed.

Casco Creek Subwatershed

Casco Creek

Casco Creek is a small, clear, springfed stream that flows 9 miles to the Kewaunee River. Stream habitat and its fish resource varies considerably over the length of the stream.

The 1.4 mile long segment between the Village of Casco and the Kewaunee River has a steep gradient (30 feet/mile), gravel substrate, wooded banks, and well shaded banks. The .4 mile long segment near the creek's mouth is a Class I brook trout stream; the remaining mile is a Class II brook trout stream. Public access is limited, on this reach of Casco Creek, to one road crossing.

Casco Creek is dammed in Casco forming the Casco Millpond. The millpond has a surface area of 1.3 acres, a maximum depth of 5 feet, and does not support a healthy sport fishery due to natural limitations. There is no public access and the pond cannot be considered a significant resource.

The 7 mile portion above the millpond has a moderate gradient (10-feet/mile) and flows through wetlands over much of its length. Some warmwater fishes have been found in the lower 2/3 of this segment, including northern pike, rock bass, and black bullhead. The fish community is mainly composed of forage fish species, however, particularly near the headwaters near Euren. Public access is limited to road crossings.

Water quality conditions are very good in the stream segment below Casco. Above Casco, chemical water quality is very good, but heavy siltation has been noted in many areas.

Scarboro Creek Subwatershed

Scarboro Creek

Scarboro Creek is a clear stream that flows 12 miles from its headwaters in Brown County to its confluence with the Kewaunee River. The stream gradient is about 10 feet per mile until it flows into the Kewaunee Valley -- here the gradient increases to 30 feet per mile.

The lower four miles are Class II brown trout waters; this section is stocked annually. This segment also supports brook trout where the gradient is steepest. There is some carry-over of these trout, and trout eggs have been observed on the bottom. The three miles above Valley Road shows a fish community in transition, with some warmwater species present but the community dominated by forage species. Above Hill Road, the stream, narrows and supports mainly forage fishes. Most of the stream in Brown County is intermittent.

In the lower portions of Scarboro Creek, public access is limited to one road crossing. Access via road crossings increases above Valley Road.

Water quality data indicates the trout waters on Scarboro Creek are degraded, but that the stream has excellent potential for improvement. Sedimentation of the stream substrate has been noted, and is expected to be affecting trout

reproduction. Flow and temperature conditions are excellent. Dissolved oxygen conditions are probably degraded at times, as indicated by the aquatic insects in the stream. Nutrients and organic matter in polluted runoff are associated with this problem. In addition, turbidity could have an impact on the fish. Overall, water quality in this portion of the creek is fair to good.

Data indicates water quality degradation has occurred in the 3 mile segment between Valley and Hill Roads. Overall water quality is fair. Specific problems include low dissolved oxygen saturations, and the dissolved oxygen standard established for the protection of warmwater fishes has been violated. These general problems become more severe in the 2.5 mile long stream segment above Hill Road. Overall water quality is poor, and dissolved oxygen depression is more marked. Some of these limitations for fish may be related to natural flow and temperature conditions, but some is undoubtedly due to nutrient enrichment and decomposition of organic materials from agricultural sources.

Turbidity is also a concern in these upper sections of Scarboro Creek. However, sedimentation does not appear to be much of a problem.

Luxemburg Creek Subwatershed

Luxemburg Creek

Luxemburg Creek is a short (2.8 miles), moderate to high gradient (18-62 feet/mile) stream tributary to the Kewaunee River. The creek has poor baseflow and is limited throughout most of its length to forage fishes. The stream is heavily channelized along state highway 54.

School Creek Subwatershed

School Creek

School Creek has only 5.6 miles of perennial flow, yet drains a large subwatershed 25 square miles in size. Although over one-half of this drainage area is in Brown County, the perennial stream flow does not begin until the stream channel enters Kewaunee County. Stream flows in both the perennial and intermittent portions of the creek are flashy, and spring flooding is common.

The lower 1.6 miles of School Creek has a fairly high gradient of 30 feet/mile. Forage species dominate the fish community. Low flows and high temperatures are probably the principal limitations for developing a good warm water sport fish community, although turbidity may also be a seasonal problem when flows and temperatures are otherwise adequate. Sedimentation does not appear to be a serious problem. Overall, the water quality in this lower part of the Creek is good, given the natural limitations.

The 4 miles of stream between the Brown County line and CTHY A in Kewaunee County has a low gradient (7 feet/mile) and is even more severely limited by low flows and high temperatures. Overall, water quality is very poor.

Martinville School/Champion Tributary Subwatershed

This subwatershed includes the headwaters of the Kewaunee and the major tributary by which the subwatershed is named. There is no water quality data for these waters, although it is suspected that they are naturally limited to forage fish species.

Surface Water Quality Objectives

Not all surface waters in the watershed can be made into high quality resources. Each stream has its own potential to provide habitat for fish or recreational opportunities for man, and these potentials vary widely. In some instances, there is a natural limitation, or a limitation that is manmade yet irreversible. In the Kewaunee River Watershed, these tend to be limitations due to streamflow or stream temperature. In other cases, the limitations are caused by man and are reversible. In this watershed, these limitations are related primarily to agricultural pollutants such as suspended and deposited sediment, phosphorus, and organic matter. The suspended sediment causes turbidity problems in the waterways, causing stress in the fish population. Deposited sediment decreases valuable spawning habitat, fills in pools needed by fish during the summer months, and fills in important navigation channels in the harbour area. Phosphorus causes overenrichment of the waterways and can lead to nuisance growths of aquatic plants and consequent dissolved oxygen problems.

Organic materials that flush into the waterways also stress dissolved oxygen when they decompose.

The following are major project objectives that recognize the natural and irreversible limitations that the project cannot affect, and that reflect the existing or potential future problems where it is felt the project can have an impact.

Lower Kewaunee River Subwatershed

1. Protect the nearshore waters of Lake Michigan by reducing the phosphorus loading to the Lake from the Kewaunee River.

2. Reduce siltation of Kewaunee Harbour, by reducing sediment loads carried to the harbour by the river.

3. Improve the warmwater sport fishery by reducing pool sedimentation and turbidity, and by improving dissolved oxygen.

4. Improve the Class II trout waters on the Kewaunee river by reducing turbidity and improving dissolved oxygen.

5. Protect the Class I trout waters of Little Scarboro and Roger's Creek by maintaining dissolved oxygen.

Scarboro Creek Subwatershed

1. Improve the Class II trout waters on Scarboro Creek by decreasing substrate sedimentation, reducing turbidity, and improving dissolved oxygen.

2. Improve the warmwater sport and forage fish communities of the middle portion (Valley Road to Hill Road) of Scarboro Creek by reducing turbidity and improving dissolved oxygen.

Casco Creek Subwatershed

1. Protect the Class I and II trout waters on Casco Creek by maintaining dissolved oxygen.

In addition the project has minor objectives. These are to improve the biological community and the water quality in the following stream reaches:
-lower 1-2 miles of School Creek,
-Casco Creek above the Casco Millpond,
-Kewaunee River below Frog Station and above the mouth of Casco Creek.

NONPOINT SOURCES OF POLLUTION

The Priority Management Area and Pollution Management Categories

The Priority Management Area for surface water protection is that area where poor land management has the potential to contribute to water quality problems. In the Kewaunee River Watershed, this includes all land within the watershed boundary.

Management categories have been identified for nonpoint sources of pollution to surface waters. These management categories, and the criteria that characterize them, are presented in the inventory and recommendations sections which follow. The purpose of identifying management categories is two-fold.

First, the management category is an indication of the priority the pollution source should be given for technical assistance. Site specific sources in Management Category I should be given high priority and those in Category II should be given medium priority. Those in Category III should be given lowest priority. Landowners having pollution sources in management categories I and II will be actively solicited for their participation in the Nonpoint Source Program. Best management practices to address sources in management categories I and II will be emphasized for people in this group. If people also have sources in Management Category III, applicable best management practices should not be emphasized but are available if asked for. Landowners that only have nonpoint sources in Management Category III will not be actively solicited to participate in the program, but will be eligible for technical assistance if it is requested.

The management categories are also used to determine the eligibility and obligations that a landowner has to include specific practices on his cost-share agreement. The Nonpoint Source Program requires that a landowner agree to install all best management practices necessary to protect water quality in order to enter into the program. It also recognized, however,

that not all eligible pollution sources on a persons land are equally severe. The following conditions will be used in developing cost-share agreements for eligible landowners in the watershed.

- The landowner must agree to install best management practices for pollution sources on his land that are determined to be in management categories I or II. If he does not agree to do this, he will not be eligible for technical or financial assistance under this program.

- The landowner may agree, at his option, to install best management practices for pollution sources on his land that are determined to be in Management Category III. Unwillingness of a landowner to install practices for a pollution source in this category will not jeopardize his participation in the program.

- If landowners do not have any pollution sources in management categories I - III, they are not eligible to participate in this program unless the original determination of the management categories was made using inaccurate or incomplete information.

More information concerning administrative details of the program, and how landowners can become involved, is presented in Part II of this plan.

Barnyard Runoff: Inventory and Recommendations

Barnyards and exercise lots in the watershed constitute a major source of pollutants entering the Kewaunee River, its tributaries, and ultimately, Lake Michigan. Major pollutants associated with these sources of animal waste include nutrients, decomposable organic materials, pathogens, and sediment. The pollutants are carried in particulate and dissolved form from the barnyards by snowmelt and rainfall runoff waters. Once these pollutants enter the network of surface water channels, they make their way to larger streams, and the nearshore waters of Lake Michigan, where water quality problems result.

All barnyards and exercise lots in the watershed were inventoried. Of the 382 operations identified through this inventory, 327 were determined to be potential contributors of polluted runoff to surface waters. The remainder were either internally drained (see Groundwater Section), or were centered mainly around pastures rotated between crops and grazing.

Table 2 shows the distribution of these 327 operations by subwatershed. The average livestock operation is approximately 78 animal units, and is maintained for milk production. There are, however, a few beef operations in the watershed, and small numbers of hogs and horses are also found. Operations range in size from under 10 animal units to 450 animal units. On the average, operations are largest in Upper Kewaunee, Lower Kewaunee, Martinville/Champion, and Scarboro Creek subwatersheds. They are below average in School, Luxemburg Tributary, and Casco Creek subwatersheds.

A variety of factors determines the potential that each of these operations has to pollute surface waters. One factor is the amount of manure generated and its density on the animal yard surface. A second is the volume of water

that flows across the animal yard during a rainfall event (or snowmelt), and picks up and transports pollutants away from the animal yard. A third factor is the presence of landcover types, below the animal yard, that might serve to filter pollutants from the barnyard runoff before it becomes channelized. Because all of these factors vary from one animal yard to the next, the pollution potential of yards will also vary.

Table 2
Distribution of 327 Livestock Operations in the Kewaunee River Watershed Which Potentially Contribute Pollutants to Surface Waters.

	Subwatershed[1]							Whole
	CO	SL	SO	UK	LK	MC	LT	Watershed
No. of Operations[2]	24	111	70	32	26	55	9	327
Range of Operation Size[3] (Animal Units)	15-165	7-411	9-450	24-214	14-174	8-400	20-128	8-450
Average Operation Size (Animal Units)	58	71	81	94	87	84	67	78

[1]Subwatershed Codes are: CO, Casco Creek; SL, School Creek; SO, Scarboro Creek; UK, Upper Kewaunee River; LK, Lower Kewaunee River; MC, Martinville/Champion Tributaries; LT, Luxemburg Tributary.

[2]Includes only those for which the barnyard runoff model was used. Internally drained yards, or small numbers of animals rotated on large pastures, are not included.

[3]Animal Units are calculated based on animal number and type.

It is difficult to determine the pollution potential of any one yard with respect to others without using a quantitative tool that consistently evaluates all animal yards. Information collected for each barnyard was therefore used in a mathematical model that estimates the load of two pollutants, phosphorus and chemical oxygen demand, entering the stream channel network from each yard . Specific information collected for each animal yard includes the number and types of livestock, the size and surface condition of the animal yard, the landcover and size of areas providing drainage across the animal lot, and the length and type of any potential buffering area that lies between the animal yard and the point where pollutants are considered "discharged" into the watershed's network of stream channels.

Once the model is run and a calculation of the pollutant load is made for each animal yard, then the yards can be compared to determine which ones need control the most, and which are generating so few pollutants that control of runoff, for purposes of surface water protection, is not a good use of public monies.

The model was run for these 327 yards in the Kewaunee River Watershed using the 10-year - 24-hour rainfall event (3.6 inches of rain in 24 hours). Landcover characteristic of springtime conditions was used. The results were evaluated with respect to phosphorus loads only, since this pollutant is most closely tied to the project's water quality objectives.

In order to determine the relative pollution potential of the 327 animal yards, the yards were ranked in descending order based on their calculated phosphorus loadings. This ranking was done for each subwatershed, and for the watershed as a whole. The ranking based on all 327 yards is the most valid approach based on water quality objectives for Lake Michigan. This is because it makes no differences in this case which subwatershed the phosphorus originates from. The subwatershed rankings are valid for Scarboro Creek, Casco Creek, and the Lower Kewaunee River, since these inland waterbodies have important water quality objectives of their own. In order to determine management categories for the 327 barnyards, the watershed ranking was used to make a preliminary decision, and then adjusted in Casco Creek, Scarboro Creek, and Lower Kewaunee subwatersheds by using the respective subwatershed rankings.

Figure 5 shows the cumulative percent of the phosphorus load, from the entire watershed, that can be controlled as management practices are installed on barnyards. The figure assumes that the yards are treated in order of their pollution potential, that is, that the yard with the highest pollutant load is treated first and that the least is treated last. In addition, the figure assumes that, on the average, only 85% of the phosphorus load from a yard can be controlled.

This figure reveals that most of the phosphorus load to Lake Michigan coming from barnyard runoff can be controlled by addressing relatively few barnyards. The thirty barnyards with the highest phosphorus loads represent about only 10% of the 327 barnyards, but account for about 60% of the controllable phosphorus load from the watershed. In contrast, control of the 100 yards having the lowest phosphorus loads would achieve only a 5% increase in the percent phosphorus controlled.

There is a point on the graph in Figure 5 where the increase in total phosphorus controlled occurs too slowly, with respect to the increase in public monies needed to treat those additional yards. This point can be used as a criteria for determining eligibility of landowners for receiving cost-share monies for barnyard runoff controls.

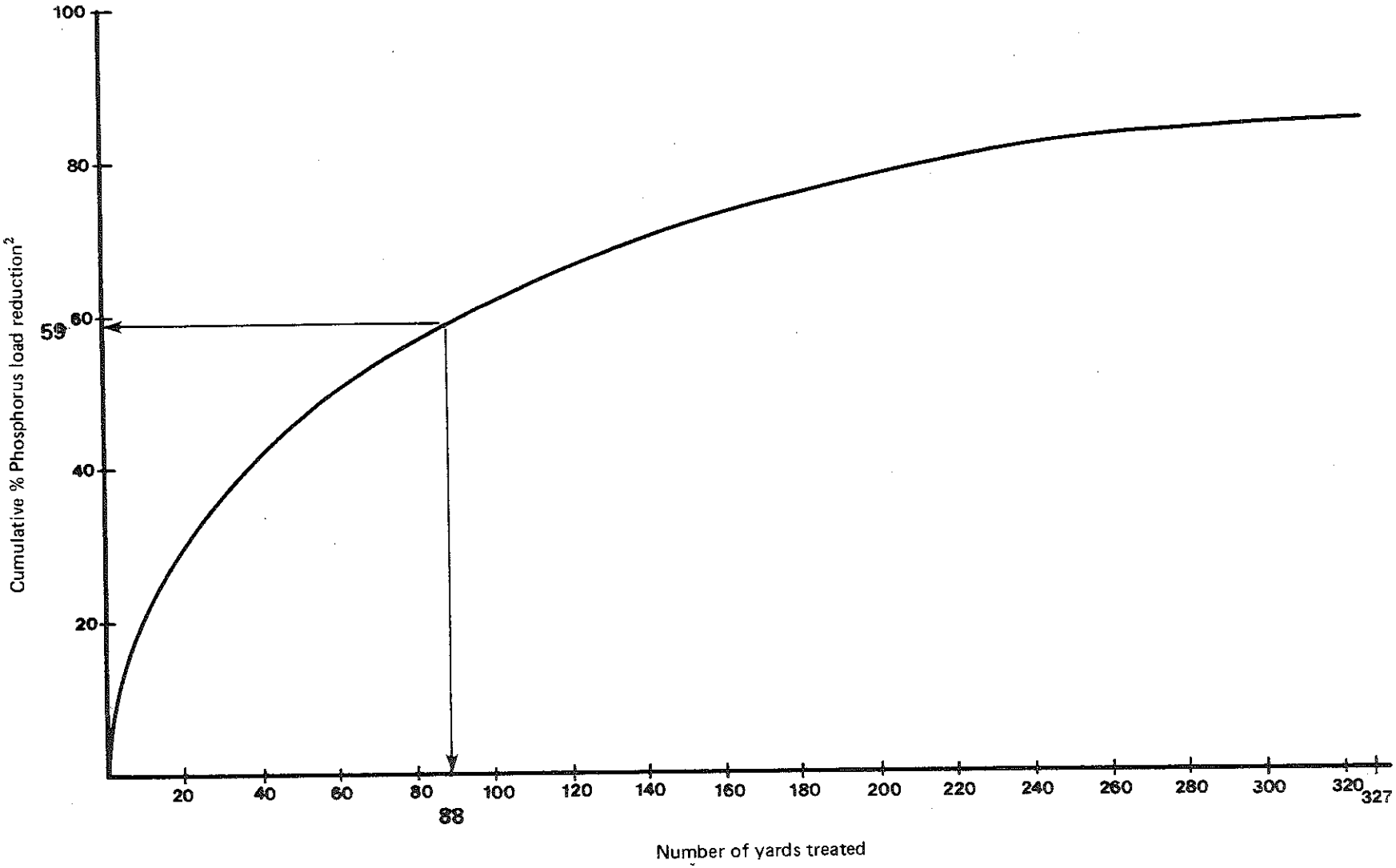
The phosphorus load contributed by eligible landowners is the load that we have agreed to control. Figure 5 shows that this point occurs at the 88th most severely polluting barnyard in the watershed. Establishing an eligibility cutoff at this point will provide for 59% reduction in the phosphorus load from barnyards.

This barnyard ranking scheme will be used to determine eligibility of barnyards in the School Creek, Upper Kewaunee, Martinville/Champion, and Luxemburg Tributary Subwatersheds. Barnyards in these subwatersheds, that are ranked #1-88 on the basis of the entire watershed, will be eligible. Other barnyards in these subwatersheds will not be eligible unless new information indicates otherwise. The eligible barnyards will be divided into three management categories.

Management Category I: This category includes those barnyards that cumulatively account for 50% of the phosphorus load we have agreed to control.

This category includes #'s 1-20 on the Watershed Ranking List. These barnyards are high level contributors within the eligible group, and are thus high priority for barnyard runoff controls.

Figure 5. Cumulative percent phosphorus reduction predicted for the Kewaunee River watershed barnyards.[1]



1. Figure assumes yards are treated in order of pollution potential. Pollution potential is based on phosphorus loads calculated using the barnyard runoff model.

2. Figure assumes average phosphorus control for barnyards is 85%.

Management Category II: This category includes those barnyards that cumulatively account for the next 25% of the phosphorus load we have agreed to control from barnyards.

This category includes #'s 21-44 on the Watershed Ranking List. These barnyards are intermediate level contributors within the eligible group, but are still very important to get under control. These barnyards are medium priority for barnyard runoff controls.

Management Category III: This category includes those barnyards that cumulatively account for the remaining 25% of the phosphorus load we have agreed to control.

This category includes barnyard #'s 45-88 on the Watershed Ranking List. These barnyards are eligible for cost-sharing, but are low priority.

Modifications were made to this approach for the Scarboro Creek, Casco Creek, and Lower Kewaunee River subwatersheds since there are additional water quality objectives for these streams. The rationale for defining management category cutoffs was varied in all three subwatersheds, and the number of operations eligible for barnyard runoff controls was increased in the Casco Creek Subwatershed. The modifications are as follows:

Scarboro Creek: The list of eligible barnyards does not change, but the management category criteria do change. Management Category I was expanded to include 75% of the phosphorus load we have agreed to control in the subwatershed. Therefore, this category includes #'s 1-10 on the Subwatershed Ranking List.

Management Category II includes #'s 11-18 on the Subwatershed Ranking List.

Management Category III includes #'s 19-23 on the Subwatershed Ranking List.

The cutoff between management categories II and III is based on the fact that it is not really cost-efficient to treat barnyards 19-23 for reasons of water quality improvement in Scarboro Creek. These yards are included only because they take on significance from a watershed standpoint. Since they are classified as Management Category III on a watershed bases, they should remain in that category. Numbers 11-18 are all cost-efficient for this subwatershed, however, and are all being placed in Management Category II.

Casco Creek: The list of eligible operations is increased to include those that are cost-efficient from a subwatershed standpoint. This includes #'s 1-8 on the Subwatershed Ranking List.

Management Category I is meant to include operations contributing 75% of the phosphorus load we have agreed to control. This includes #'s 1-4 on the Subwatershed Ranking List.

Management Category II includes the remainder of the eight eligible operations in the watershed.

There is no Management Category III for operations in this subwatershed.

Lower Kewaunee: The list of eligible operations remains unchanged. The rationale for management categories I-III parallels that for Scarboro Creek. Management Category I includes #'s 1-3 on the Subwatershed Ranking List; Category II includes number 4, and Category III includes numbers 5-7 on the list.

Table 3 summarizes the plan to reduce phosphorus loading from barnyards in the watershed. Ninety-three of 327, or 28% of the operations, are eligible for cost-sharing on barnyard runoff controls. This should control 59% of the phosphorus load from barnyards.

Table 3
Summary of Plan to Reduce Phosphorus Loading from Barnyards to Surface Waters In the Kewaunee River Watershed[1]

	Subwatershed[2]							Total
	CO	LK	UK	SL	SO	MC	LT	Watershed
No. Of Operations Having Runoff To Surface Water	24	26	32	111	70	55	9	327
Lbs Of Phosphorus Contributed To Surface Waters By Barnyards During Design Storm (10 yr - 24 hr.)	368	820	978	2,353	2,603	918	186	8,271
No. Of Eligible Operation In Management Categories								
I-III	8	7	13	30	23	9	3	93
- (I)	(4)	(3)	(4)	(6)	(10)	(2)	(0)	(29)
- (II)	(4)	(1)	(2)	(6)	(8)	(1)	(1)	(23)
- (III)	(0)	(3)	(7)	(18)	(5)	(6)	(2)	(41)
% Of Subwatershed Phosphorus Load In Management Categories I-III	63%	61%	68%	53%	68%	43%	51%	
% of Total Watershed Phosphorus Load In Management Categories I-III	3%	6%	8%	15%	21%	5%	1%	59%

[1]The plan is based on water quality objectives for the nearshore waters of Lake Michigan. Some modification was then made in the Scarboro, Creek, Casco Creek, and Lower Kewaunee subwatershed to account for additional water quality objectives for these inland waters.

[2]CO = Casco Creek, LK = Lower Kewaunee, UK = Upper Kewaunee, SC = School Creek, SO = Scarboro Creek, MC = Martinville/Champion Tributaries, LT = Luxemburg Creek.

Manure Spreading: Inventory and Recommendations

Manure is a valuable resource, as it contains nutrients and organic materials important for crop production.

The most practical way to handle manure is to recycle its nutrients and organic materials by applying it to agricultural land. When manure is applied properly to cropland the risk of causing a surface water pollution problem is minimized. Several factors need to be considered in developing an environmentally safe manure management program. These include timing of application, application rate, degree of incorporation into the soil, and characteristics of the land upon which manure is being spread. Important land characteristics include slope and proximity of land to surface water channels. Slope length is also felt to be important in this area. Improper manure disposal can result in environmental problems as phosphorus, decomposable organics, and ammonia are washed into surface waters.

Agricultural operations that do not have manure storage capacity sufficient to allow proper timing of manure spreading can be sources of surface water pollution. The greatest potential occurs when manure is spread on snow or frozen ground in areas where soils are easily saturated, the surface water channel network is highly developed, and the length-slope factor of the area is relatively high. Snowmelt or spring rains that occur on frozen or saturated soils provide a large volume of runoff water capable of transporting manure to the channel network. The momentum of the runoff will increase with increases in either the slope (which increases runoff velocity) or slope length (which results in greater accumulation of runoff water). This in turn increases the potential of the runoff water to detach and transport manure lying on the soil surface.

Animal operations in the watershed that are not currently equipped with storage were evaluated to determine their potential for causing surface water pollution related to manure spreading. Pollution potential was evaluated solely on the basis of the percent slope and slope length characteristics of the cropland on which manure from the operation was being spread. These two factors are combined into an LS factor, which is normally used in calculating average annual soil loss. The LS factor concept was adopted as an indicator of the potential need for a manure management system. To develop an indicator value for each animal operation, all cropland owned by the operator was identified and divided into 10 acre cells for analysis. The LS factor was determined for each 10 acre cell, and these were averaged together to calculate an LS factor representative of the cropland where manure from the operation was likely to be spread.

Three management categories were then identified. These are as follows:

Management Category I: These operations are highest priority for investigating the need for manure management. They include those operations that have an average LS value, for the cropland, greater than 1.0.

Management Category II: These operations are medium priority for investigating the need for manure management. They include operations that have an average LS value, for the cropland, between .75 and 1.0.

Management Category III: These operations are low priority. They include operations that have an average LS factor, for cropland, between .50 and .75.

Operations in these management categories may or may not need better manure management. Further site specific investigations will be necessary when landowner contacts are made during the implementation phase of the project. In each category, the larger operations should be investigated first.

Operations with an average LS factors less than .50 for the cropland were not considered critical enough to warrant cost-sharing for manure management. In addition, operations having fewer than 30 animal units will not generally be eligible for cost-sharing on manure storage. This minimum herd size qualification is being imposed because it is not felt that manure storage for fewer than 30 animal units is a cost-effective use of Nonpoint Source Program monies in this watershed. If, however, a field determination is made that manure storage is needed to prevent significant water pollution from a herd size of less than 30 animal units, then this qualification can be over-ridden. In order for the minimum herd size qualification to be over-ridden, the field data must be presented to the LCC committee, which will make the final determination on cost-sharing eligibility.

Table 4 summarizes the potential need for improved manure management, including manure storage, in the Kewaunee River Watershed. About one-third (124) of the 382 operations fall into management categories I-III, indicating a potential need for better manure management. These operations constitute about one-third (8,770) of the 27,888 animal units in the watershed. The greatest potential need for operations in categories I and II exists in the Scarboro Creek Subwatershed (25 operations), followed by the Lower Kewaunee (11 operations), Martinville/Champion (10 operations), Casco Creek (9 operations), Upper Kewaunee (7 operations), School Creek (5 operations), and Luxemburg Tributary (4 operations) subwatersheds.

These figures in Table 4 do not include operations with fewer than 30 animal units.

Table 4
Summary of Plan to Reduce Pollutant Loading to Surface Waters from Manure Spreading.

	Subwatershed							Entire
	CO	UK	LK	SL	SO	MC	LT	Watershed
Total Number of Animal Operations	34	43	50	109	79	57	10	382
Total Number of Animal Units (ave.)	1763 (52)	3573 (83)	3029 (61)	7957 (73)	6030 (76)	4867 (85)	669 (67)	27,888 (73)
Number of Operations Under Management Categories I-III	15	12	15	26	31	19	6	124
(I)	(6)	(4)	(8)	(2)	(13)	(4)	(1)	(38)
(II)	(3)	(3)	(3)	(3)	(12)	(6)	(3)	(33)
(III)	(6)	(5)	(4)	(21)	(6)	(9)	(2)	(53)
Number of Animal Units Under Management Categories I-III	943	950	886	1820	1698	2062	411	8770
(I)	(455)	(277)	(546)	(105)	(603)	(331)	(37)	(2354)
(II)	(186)	(213)	(167)	(132)	(782)	(798)	(235)	(2513)
(III)	(302)	(460)	(173)	(1583)	(313)	(933)	(139)	(3903)

[1]Subwatersheds are: CO = Casco Creek, UK = Upper Kewaunee, LK = Lower Kewaunee, SL = School Creek, SO = Scarboro Creek, MC = Martinville/Champion Tributaries, LT = Luxemburg Creek.

Eroding Agricultural Land: Inventory and Recommendations

Soil erosion connected with agricultural activities is the major source of sediment in the Kewaunee River Watershed. Although eroding construction sites can be significant sediment source, they are not significant in the Kewaunee River Watershed at this time.

The actual amount of sediment that an eroding parcel of land contributes to surface waters depends upon the rate of soil loss on the land parcel and the proportion of that erosion that is transported all the way to a surface water. Because average sediment delivery ratios are far less than 100% for rural lands, the amount of soil eroding from an area cannot be equated with the amount of stream sediment contributed by the area. However, if an assumption is made that delivery ratios are fairly uniform across the watershed, then soil loss can be used to identify the potential for a parcel of land to contribute sediment to a surface water. This assumption was made for the Kewaunee River Watershed, and average annual soil loss was used as an indicator of the potential for an area to contribute sediment to surface waters.

Eighty seven thousand, seven hundred and sixty (87,760) acres were inventoried to determine average annual soil loss. The inventory data included land use, soil type, slope and slope length, and current land management. The data were collected for each ten acre parcel of land. If characteristics varied within a ten acre parcel, an average condition was depicted.

Four land uses were identified for areas where soil loss was being estimated: cropland, woodland, pasture, and hayland-wildlife. The acreage of each land use inventoried, and the distribution of the acreage amongst the seven sub-watersheds, is shown in Table 5. Cropland constitutes 70,480 acres, or 80% of the total area inventoried. Woodland constitutes 11,950 acres, or 15% of the total. Pasture and hayland-wildlife are minor land uses, with a combined total acreage of 5,330, or 6% of the total area inventoried.

Table 5. Land Uses in the Kewaunee River Watershed

Subwatershed	Land Use: Cropland	Woodland	Pasture	Hayland & Wildlife	Total Area
Scarboro Creek					
Acreage	12,090	1,850	310	360	14,610
% of Land Use Category	17%	15%	36%	8%	-
% of Total Watershed Area	14%	2%	1%	1%	17%
Lower Kewaunee River					
Acreage	12,300	4,110	280	2,400	19,090
% of Land Use Category	17%	34%	32%	53%	-
% of Total Watershed Area	14%	5%	1%	2%	21%
Casco Creek					
Acreage	7,700	1,820	10	650	10,180
% of Land Use Category	11%	15%	1%	15%	-
% of Total Watershed Area	9%	2%	1%	1%	12%
School Creek					
Acreage	15,460	820	180	160	16,620
% of Land Use Category	22%	7%	20%	4%	-
% of Total Watershed Area	18%	1%	1%	1%	19%
Martinville/Champion Tributary					
Acreage	11,520	1,500	10	200	13,230
% of Land Use Category	16%	13%	1%	4%	-
% of Total Watershed Area	13%	2%	1%	1%	15%
Upper Kewaunee River					
Acreage	9,640	1,600	80	660	11,990
% of Land Use Category	14%	14%	9%	15%	-
% of Total Watershed Area	11%	2%	1%	1%	14%
Luxemburg Creek					
Acreage	1,770	240	10	20	2,040
% of Land Use Category	3%	2%	1%	1%	-
% of Total Watershed Area	2%	1%	1%	1%	2%
Total Watershed					
Acreage	70,480	11,950	880	4,450	87,760
% of Total Watershed Area	80%	14%	1%	5%	100%

Table 6 summarizes the total soil loss (tons/year) and average annual soil loss (tons/acre/year) for each land use category. The significance of the total soil loss (tons/year) to water quality in the watershed is not known, because the proportion of this soil that is delivered to streams has not been measured. The soil loss rates (tons/acre/year) can be interpreted, however. Three T/A/Yr has been selected for this project as a target level for soil loss control in order to reduce the potential of the land for contributing sediment to waterways. This relatively stringent target level reflects the nature of the clay soil particles that are causing the turbidity and sedimentation problems in the watershed. These particles are small, easily transported, and have phosphorus attached to them.

Table 6 indicates that the average soil erosion rates are low in each land use category of every subwatershed. This does not mean, however, that further soil erosion controls are unnecessary to enhance water quality. Whereas the data in Table 6 represent average conditions, many lands are eroding above the average, and in fact, above the established target level of 3 T/A/Yr.

Table 7 summarizes that fraction of the total soil loss that is targeted for control. All data in this table represents soil being lost above 3 T/A/Yr.

Table 7 shows that 12,230 acres, or 14% of the acreage inventoried, are losing soil at rates exceeding 3 T/A/Yr. Cropland represents 11,790 acres, or over 96% of this amount. The proportion of the total soil loss targeted in the watershed that comes from cropland is even higher, at 98%. On the average, these croplands are eroding at a rate of 5.8 T/A/Yr, giving an average soil loss targeted for control of 2.8 T/A/Yr.

Most of these critical cropland acres occur in the Scarboro Creek (29%) and Lower Kewaunee River (25%) subwatersheds. Few of these acres occur in the Luxemburg Tributary Subwatershed (3%). Distribution of acres losing over 3 T/A/Yr is fairly uniform amongst the remaining subwatersheds, ranging from 9% to 13%.

Table 6.
Total Soil Loss, by Land Use
In the Kewaunee River Watershed

	Land Use				
	Cropland	Woodland	Pasture	Hayland-Wildlife	All Land
Scarboro Creek					
Acres	12,090	1,850	310	360	14,610
Soil Loss (T/Yr)	31,690	1,360	240	160	33,450
Average Soil Loss (T/A/Yr)	2.6	0.7	0.8	.4	2.3
Lower Kewaunee River					
Acres	12,300	4,110	280	2,400	19,090
Soil Loss (T/Yr)	30,200	2,830	640	540	34,210
Average Soil Loss (T/A/Yr)	2.4	0.7	2.3	0.2	1.8
Casco Creek					
Acres	7,700	1,820	10	650	10,180
Soil Loss (T/Yr)	14,430	410	1.0	50	14,890
Average Soil Loss (T/A/Yr)	1.9	0.2	0.1	0.1	1.5
School Creek					
Acres	15,460	820	180	160	16,620
Soil Loss (T/Yr)	22,630	350	60	10	23,050
Average Soil Loss (T/A/Yr)	1.5	0.4	0.3	0.1	1.4
Martinville/Champion					
Acres	11,520	1,500	10	200	13,230
Soil Loss (T/Yr)	17,120	470	1.0	20	17,610
Average Soil Loss (T/A/Yr)	1.5	0.3	0.1	0.1	1.3
Upper Kewaunee					
Acres	9,640	1,610	80	660	11,990
Soil Loss (T/Yr)	14,310	590	20	70	14,990
Average Soil Loss (T/A/Yr)	1.5	0.4	0.2	0.1	1.3
Luxemburg Tributary					
Acres	1,770	240	10	20	2,040
Soil Loss (T/Yr)	3,370	30	2	-	3,400
Average Soil Loss (T/A/Yr)	1.9	0.1	0.2	-	1.7
Entire Watershed					
Acres	70,480	11,950	880	4,450	87,760
Soil Loss (T/Yr)	133,750	6,040	960	850	141,600
Average Soil Loss (T/A/Yr)	1.9	0.5	1.1	0.2	1.6

Table 7.
Soil Loss In The Kewaunee River Watershed Targeted For Control[1]

	Land Use				
	Cropland	Woodland	Pasture	Hayland-Wildlife	All Land
Scarboro Creek					
Acres	3,370	90	10	10	3,480
Soil Loss (T/Yr)	10,480	180	20	60	10,740
Average Soil Loss (T/A/Yr)	3.1	2.0	2.0	6.0	3.1
Lower Kewaunee					
Acres	2,950	210	60	0	3,220
Soil Loss (T/Yr)	11,070	220	180		11,470
Average Soil Loss (T/A/Yr)	3.8	1.0	3.0		3.6
Casco Creek					
Acres	1,370	10	0	0	1,380
Soil Loss (T/Yr)	3,180	0			3,180
Average Soil Loss (T/A/Yr)	2.3	0			2.3
School Creek					
Acres	1,530	20	0	0	1,550
Soil Loss (T/Yr)	2,440	60			2,500
Average Soil Loss (T/A/Yr)	1.6	3.0			1.6
Martinville/Champion					
Acres	1,250	30	0	0	1,280
Soil Loss (T/Yr)	2,870	20			2,890
Average Soil Loss (T/A/Yr)	2.3	0.6			2.3
Upper Kewaunee					
Acres	1,020	0	0	0	1,020
Soil Loss (T/Yr)	2,430				2,430
Average Soil Loss (T/A/Yr)	2.4				2.4
Luxemburg Tributary					
Acres	300	0	0	0	300
Soil Loss (T/Yr)	770				770
Average Soil Loss (T/A/Yr)	2.6				2.6
Entire Watershed					
Acres	11,790	360	70	10	12,230
Soil Loss (T/Yr)	33,240	480	200	60	33,980
Average Soil Loss (T/A/Yr)	2.8	1.3	2.9	6.0	2.8

1. All data in this table represents only that fraction of the total soil loss that is above 3 T/A/Yr.

The highest rates of soil loss on critical croplands are in the Lower Kewaunee and Scarboro Creek subwatersheds. This large proportion of critical acres, combined with the relatively high rates of targeted soil loss, results in a large proportion of the total targeted soil loss occurring in these two subwatersheds. 33% occurs in the Lower Kewaunee subwatershed, and 32% occurs in the Scarboro Creek subwatershed. Excepting Luxemburg Tributary, the proportion of soil loss targeted for control in the rest of the watershed is fairly uniform, ranging from 7% (Upper Kewaunee) to 10% (Casco Creek).

Although the acreage is almost negligible compared to cropland, there are critically eroding woodlands and pasturelands in the watershed that need better management. Most of these lands occur in the Scarboro Creek and Lower Kewaunee subwatersheds.

In order to develop management categories for control of soil loss above the 3 T/A/Yr target level, the following procedure was used.

All landowners having lands losing soil above the target level were identified and arranged by subwatershed. For each landowner, the total amount of soil, in tons/year, eroding above the target level was estimated using the inventory data. The landowners in each subwatershed were then ranked, from having the greatest management need to having the least management need, based on the total soil loss above the target level. Cutoffs for management categories were then established for each subwatershed.

In establishing management categories, the subwatersheds were placed into two groups. The first group includes Scarboro Creek, Lower Kewaunee River, and Casco Creek subwatersheds. These subwatersheds reflect areas that have strong water quality objectives in addition to the more general objectives for Kewaunee Harbour and the nearshore waters of Lake Michigan. The second group includes the remaining four subwatersheds where the strongest water quality objectives for controlling nonpoint source pollution are related to the harbour and the lake. In general, a greater degree of emphasis is desired on sediment sources in the three subwatersheds in the first group, since they impact not only the lake and harbour but major inland water resources as well.

Management categories were then developed for each group of subwatersheds as follows:

Management Category I. Landowners in this category are the highest priority. They represent the top 50% of the total targeted soil loss in Scarboro, Lower Kewaunee, and Casco Creek subwatersheds, and the top 25% of the targeted soil loss in the other subwatersheds.

Management Category II. Landowners in this category are of medium priority. They represent the next 35% of the total targeted soil loss in Scarboro, Lower Kewaunee, and Casco Creek subwatersheds, and the next 25% of the targeted soil loss in the other subwatersheds.

Management Category III. Landowners in this category are low priority. They represent the last 15% of the total targeted soil loss in Scarboro, Lower Kewaunee, and Casco Creek subwatersheds, and the last 50% of the total targeted soil loss in the other subwatersheds.

Table 8 presents summary data concerning numbers of landowners, acreages, and total tons of soil needing control under each management category for each of the subwatersheds, and for the watershed as a whole. For the watershed as a whole, 31% of the landowners having targeted soil loss are in management categories I and II. These same landowners are contributing 66% of the soil loss targeted for control. In Scarboro Creek, Lower Kewaunee, and Casco Creek subwatersheds, 40-45% of the landowners are being targeted for 85% of the targeted soil loss in these areas.

Because gully erosion is not included in these assessments, the eligibility of landowners for gully control measures will be made on a case-by-case basis and will not be influenced by the priorities established above, although the intent of the priority system will be preserved as gullies are evaluated.

Table 8
Summary of Plan to Reduce Sediment Transport To Waterways in the Kewaunee River Watershed

	Subwatershed							Total
	SO	LK	CO	SL	MC	UK	LT	Watershed
Management Category I								
Range of Target Soil Loss/Owner (T/Yr)	220-1050	230-1670	145-205	200-265	175-220	280-430	130-255	
Number of Landowners In Priority Category	14	14	10	4	4	2	1	49
Target Soil Loss (T/Yr) In Priority Category	5370	5740	1590	630	720	610	190	14,850
Acreage in Priority Category	1110	1020	540	330	200	110	40	3350
Management Category II								
Range of Target Soil Loss/Owner (T/Yr)	80-215	95-220	35-95	65-150	90-160	75-190	120-125	
Number of Landowners In Priority Category	33	33	20	7	7	6	2	108
Target Soil Loss (T/Yr) In Priority Category	3760	4010	1110	630	720	610	190	11,030
Acreage in Priority Category	1560	1370	570	240	240	240	90	4310
Management Category III								
Range of Target Soil Loss/Owner (T/Yr)	10-75	5-90	5-30	5-60	10-75	5-70	5-85	
Number of Landowners In Priority Category	59	70	36	67	51	54	11	348
Target Soil Loss (T/Yr) In Priority Category	1610	1720	480	1240	1450	1210	390	8100
Acreage in Priority Category	1090	1150	510	1150	920	800	210	5830
Total for All Management Categories								
Number of Priority Landowners	106	117	66	78	62	62	14	505
Target Soil Loss (T/Yr)	10,740	11,470	3180	2500	2890	2430	770	33,980
Acreage	3760	3540	1620	1720	1360	1150	340	13,490

Eroding Streambanks: Inventory and Recommendations

Streambank erosion is not considered to be a significant source of sediment to streams in the watershed. In general, streambanks are fairly low in height and are well vegetated.

There are locations in the watershed, however, where localized water quality problems may occur as a result of uncontrolled livestock access to streams. Streambank breakdown and the destruction of fish habitat is one problem where livestock access is not properly managed. General nutrient enrichment and pathogen problems related to animal waste are other problems which can occur where livestock wallow in waterways.

Inventory data collected on livestock in the watershed were reviewed to determine locations where problems related to livestock access are most likely to occur. Locations where livestock are confined on perennial streams were identified. In each case, an estimate was made of the feet of streambank needing protection. The estimates reflect both banks of the stream at locations where livestock use land on both sides of the stream. In these situations, a controlled livestock crossing was also assumed to be needed.

Table 9 is a summary of these streambank protection needs. A total of eighteen potential problem areas are anticipated to require approximately 31,000 feet of streambank protection, including 10 livestock crossings. Most of this need occurs in the School and Scarboro Creek subwatersheds.

Streambank protection on intermittent streams may also be needed in this watershed project because these areas tend to form gullies that contribute sediment. These sites will be identified during the implementation phase of this project.

Eroding Roadsides: Inventory and Recommendations

In general, soil erosion on existing roadcuts is not a significant source of sediment to waterways in the Kewaunee River Watershed. Isolated sites may occur where erosion is significant, however. Under these circumstances, the county technical staff will document the problem, and present the evidence to the appropriate LCC committee for review. Problems considered significant by the LCC will be eligible for cost-sharing through this program.

Limitations on cost-sharing of best management practices for eroding roadsides are presented on page 67 of this plan.

Table 9
Summary of the Potential Livestock Access Control Needs For Perennial Streams In the Kewaunee River Watershed

	Subwatershed[1]						
	SL	SO	LK	LT	MC	CO	Total
Potential Problem Areas	7	4	1	2	2	2	18
Feet of Streambank w/ Potential Protection Need[2]	10,950	11,000	2,600	2,200	2,300	2,200	31,250
Livestock Crossing Needs	3	3	1	1	2		10

1. Subwatersheds are: SL = School Creek; So = Scarboro Creek; LK = Lower Kewaunee; LT = Luxemburg Tributary; MC = Martinville/Champion Tributary; Co = Casco Creek

2. Includes banks on both sides of the stream where appropriate.

POINT SOURCES OF POLLUTION

There are eight sources of municipal or industrial waste and cooling water that discharge to surface waters in the watershed. None of these sources result in water quality problems that would mask the benefits to be attained by controlling nonpoint sources of pollution in the watershed.

Six of the point sources discharge to the Kewaunee River near its mouth, or to the nearshore waters of Lake Michigan. Discharges to the river include:

- -Kewaunee Sewage Treatment Plant (secondary treatment with phosphorus reduction; 334,000 gallons per day discharged),
- -Kewaunee Bottling Company (cooling water discharge),
- -Kewaunee Equipment Company (cooling water; 351,000 gallons per day discharged).

Discharges to Lake Michigan include:

- -Leyse Aluminum (cooling water; 50,000 gallons per day discharged),
- -Frank Hamacheck Machine Company (cooling water; 30,000 gallons per day),
- -Army Corps of Engineers (return carriage water from the dredge spoil containment facility).

The Village of Luxemburg Sewage Treatment Plant and the Village of Casco Sewage Treatment Plant are the other sources of effluent discharged to surface waters. The Luxemburg plant discharges 141,000 gallons per day of wastewater to the Kewaunee River. The discharge point is located between the mouths of School Creek and Luxemburg Tributary. The plant provides secondary treatment. The Village of Casco plant discharges 42,000 gallons per day of wastewater to Casco Creek about one-half mile below the Casco Millpond. This facility is designed to provide advanced secondary treatment, including ammonia reduction and effluent dechlorination, in order to protect the trout waters of Casco Creek. The treatment plant has had problems meeting the required permit limits during periods of high stream flow when flooding occurs. No significant water quality problems have been noted, however, and the village is working with the Department of Natural Resources to bring the problem under control.

BEST MANAGEMENT PRACTICES FOR SURFACE WATER PROTECTION

Best management practices (BMPs) are defined as practices, techniques, or measures identified to be the most effective and practical means of eliminating or reducing nonpoint source pollutants.

The best management practices needed in the Kewaunee River Watershed are listed below. Although other practices may also be appropriate, only those anticipated to meet most typical situations in the watershed are included in this list. See Appendix A of this plan for a complete list of BMPs cost-sharable under the Nonpoint Source Program.

1. Contour Strip Cropping - Growing crops on the contour in alternated strips of close growing crops, clean tilled row crops, and grass legumes. This practice will be heavily used throughout the watershed, since it is compatible with the dairy based agriculture that dominates in the watershed. This practice includes field strips which are used on undulating topography but are not placed entirely on the contour.

2. Terraces and Diversions - Earthen berms constructed to a) divert excess water to sites where it can be transported safely, and b) to break up slope lengths on cropland, thereby reducing soil loss.

3. Minimum Tillage - Reduced tillage practices, which leave vegetative residue from the previous crop on the soil surface. Chisel plowing is the predominant type of minimum tillage on dairy oriented cropland and is compatible with contour strip cropping.

4. Grassed Waterways - A natural or constructed water course shaped, graded and established in suitable cover as needed to prevent erosion by runoff waters. This practice is heavily used throughout the watershed.

5. Grade Stabilization Structure - A structure used to stabilize the grade in a channel or to prevent the formation or advancement of gullies. In this watershed, most structures will be toe walls and small dry dams. In a limited number of situations, some larger dams having permanent pools may be needed.

6. Critical Area Stabilization - Planting suitable vegetation, such as trees or permanent hay or grassland, on highly erosive areas. These areas may include roadsides, gullies or intermittent stream channels, and steeply sloped cropland.

7. Barnyard Runoff Management - A system designed to reduce the mass of pollutants carried by runoff water to surface waters.

8. Manure Storage - A structure for the temporary storage of manure. The storage allows the farmer to time his manure spreading so that runoff to surface waters is minimized.

9. Streambank Protection - The practice is designed to stabilize and protect banks of streams against erosion. In this watershed, most of this protection will involve controlling livestock access to streams through fencing and livestock crossings. The practice includes fencing, rip-rapping, shaping and seeding, livestock and machinery crossings, and buffer strips.

10. Livestock Exclusion from Woodlots - Protection of woodlots, especially those on steep slopes, from livestock grazing by fencing or other means.

PROJECT EVALUATION

Two project evaluations will be made. An interim evaluation will be made during the summer and fall of 1987. This evaluation will be based on the nonpoint source controls scheduled on cost-share agreements for installation. A final evaluation will be made after all of the scheduled best management practices have been installed. This final evaluation will be based on observed changes in water quality. These two evaluations are discussed below.

Interim Evaluation (1987)

This evaluation will reflect the amount of pollutant reduction we will expect to occur as a result of management practices being installed through the program. The reduction in pollutant load will depend on how many of the critical pollutant sources are brought under cost-share agreement.

This evaluation will look at the following indicators of accomplishment.

- -Barnyard Runoff: the % of the phosphorus load reduction, achievable by controlling pollution from barnyards in management categories I and II, that is covered under cost-share agreements,
- -Manure Spreading: the % of the animal operations identified in management categories I and II that is covered under cost-share agreements,
- -Eroding Cropland: the % of the targeted soil loss (that over 3 T/A/Y) on lands in management categories I and II that is covered under cost-share agreements,
- -Livestock Access To Streams: the % of the total streambank feet (perennial streams) needing control that is covered under cost-share agreements,
- -Eroding Streambanks and Roadsides: the % of the total feet needing control that is covered on cost-share agreements.

The indicators will be evaluated for the watershed as a whole, and also for the Scarboro Creek, Casco Creek, and Lower Kewaunee River subwatersheds. The indicators will be evaluated separately with respect to ground waters and surface waters.

Final Evaluation (1992-)

This evaluation will reflect whether or not the water quality objectives of the project were actually realized. Data on the biological and physical characteristics of waterways in the project area will be collected during the 1984-5 field season by the Department of Natural Resources in order to better characterize existing water quality conditions. This is called "baseline data collection". The same data will be collected at the same locations and using the same field techniques after all of the management practices have been installed. Comparison of these two data sets, in light of the water quality objectives presented in this plan, will form the basis of the evaluation.

The following data will be collected:

- -Biotic Index: This technique involves collecting and identifying aquatic arthropods from the stream bed. The numbers and types of organisms are used to indicate the general water quality at the site.
- -Fish Habitat Evaluation Survey: This technique is based on the Wisconsin Small Stream Classification Guidelines (DNR, 1983). The technique looks primarily at physical stream characteristics, such as streamflow and streambed siltation, and can be used to identify two things. These are what type of fish community the stream is capable of supporting if the pollution sources are cleaned up, and what the primary problems are in the stream that are keeping it from meeting its potential.
- -Fish Relative Abundance Survey: This technique involves making collections representative of fish communities at each sampling site, and using the information on numbers and types of fish present to evaluate the stream condition and changes in water quality.

Sample collection sites will be chosen to allow evaluation of whether the project objectives have been met. These objectives are listed on page ___ of this plan. The package of tools that will be used to evaluate each of these objectives is as follows.

-Major Water Quality Objectives

Lower Kewaunee River Subwatershed

Objective 1: The interim evaluation indicator will be used.

Objective 2: The interim evaluation indicator will be used.

Objective 3: Biotic Index at two sites above Footbridge; Fish Habitat Evaluation Survey at three sites; Fish Relative Abundance Surveys at three sites.

Objective 4: Biotic Index at two sites; Fish Habitat Evaluation Survey at two sites; Fish Relative Abundance Survey at two sites.

Objective 5: Biotic Index at two sites, one on Rogers Creek and one on Little Scarboro Creek.

Scarboro Creek Watershed

Objective 1: Biotic Index at two sites; Fish Habitat Evaluation Survey at two sites; Fish Relative Abundance Survey at two sites.

Objective 2: Biotic Index at two sites; Fish Habitat Evaluation Survey at two sites; Fish Relative Abundance Survey at two sites.

Casco Creek Subwatershed

Objective 1: Biotic Index at two sites, one in the class I trout waters and one in the class II trout waters.

-Minor Water Quality Objectives

In addition to the above, the following three stream reaches should be sampled using the three techniques mentioned. One site on each stream should be sampled.

-lower School Creek
-upper Casco Creek
-Kewaunee River, between U.S. HY 54 and Casco Creek.

The estimated time needed to collect the baseline data mentioned above is:

-Biotic Index: 30 hours,
-Fish Habitat Evaluation Survey: 100 hours,
-Fish Relative Abundance Survey: 450 hours.
TOTAL: 580 hours.

GROUNDWATER SECTION

DESCRIPTION OF THE GROUNDWATER RESOURCE

Groundwater is that water which lies hidden beneath the land surface in the pores and crevices of both unconsolidated glacial deposits (such as sand and gravel) and bedrock (such as sandstone or dolomite). In the Kewaunee River Watershed, groundwater aquifers, or water bearing rock units, are the major sources of water for agricultural and industrial use, and the only economical source of water used for domestic consumption.

Three major aquifers are tapped for water supplies in the watershed. The surficial sand and gravel aquifer is used to a limited extent. Wells in this formation are relatively shallow. The Silurian dolomite aquifer is that most commonly used as a groundwater supply. Water taken from this formation comes mainly from interconnected joints and solution channels in the otherwise slowly permeable bedrock. The third aquifer is below the dolomite and is generally too deep for tapping by individuals. This sandstone aquifer requires well depths of 1,000 to 1,800 feet and its use is primarily limited to public water supplies such as that of Kewaunee.

Groundwater contamination from pollutants in percolating surface waters is normally minimized by the filtering action of the soil layer overlying the aquifer. However, where this filtering action is reduced or eliminated, pollutants carried to the groundwater can make it unsuitable for use. Shallow or highly permeable soils over fractured bedrock (the Silurian Dolomite aquifer) or a high water table (surficial aquifer) create a situation where a high contamination potential exists.

The heavily used Silurian dolomite aquifer is very susceptible to contamination in areas where these bedrock soils form the only protective mantle. These areas are shown in Figure 6. Soils include the Kolberg Series, Namur Series, the Kolberg Variant, the Longrie Series, the Bonduel Series, and the Ruse Series. These soils vary in their depth to bedrock, permeability and content of clay and organic matter which are most active in adsorbing pollutants or serving as biochemical transformation sites. The Kolberg Variant Silt Loam and the Namur Loam are the shallowest soils in this group, with depths to bedrock of 10-20 inches and 5-12 inches respectively. The Kolberg Variant has silty to fine clay in its subsoil, whereas the Namur loam has no clay component and is more permeable. The Kolberg and Longrie series are somewhat deeper soils (20-40 inches of soil over bedrock), and are loamy soils on the surface and have clay in the subsoil.

Rock outcrops, exposed surface crevices, and sinkholes appear in these bedrock soils. In addition, where the bedrock soils are thin and clayey, frost heaving during the spring results in cracks in the soil which leave the bedrock seasonally exposed. This occurs in soils up to 10-20 inches deep.

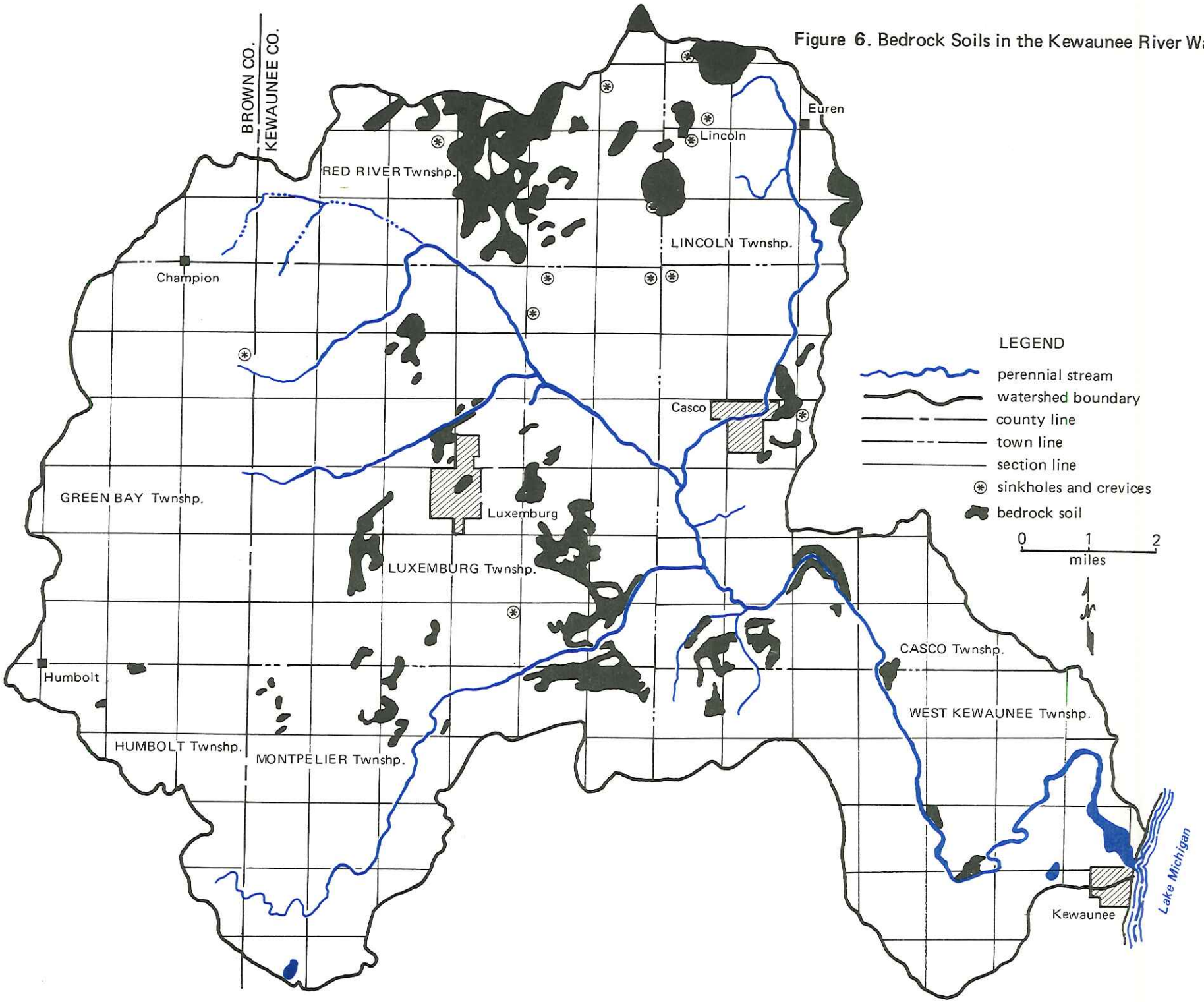


Figure 6. Bedrock Soils in the Kewaunee River Watershed.

Although exposed bedrock, sinkholes and crevices are found in the bedrock soils listed above, their occurrence is not limited to these soils. Field investigations over the years by Kewaunee County and SCS staff have identified the occurrence of these areas in other soils mapping units. Table 10 shows where exposed bedrock has been found in "nonbedrock soil" mapping units. It appears to occur frequently in soils mapped as Hortonville and Symco Silt Loams. It also appears repeatedly in the Kewaunee Silty Clay Loam and the Manawa Silt Loam. Table 11 shows where sinkholes and surface crevices in the bedrock have been identified to date. Hortonville and Symco Silt Loam Soils again appear frequently. The sinkholes and crevices listed in Table 11 are shown on the maps in Figure 6. Although few areas of exposed bedrock or sinkholes have been identified in Brown County, this is due in part to a lack of past field investigation. As the project progresses, more of these areas are expected to be found in Brown County.

It is apparent from Tables 10 and 11 and Figure 6 that areas predisposed to contamination of the Silurian dolomite aquifer can be located only in a general sense. Site specific investigation is still necessary to fully assess the contamination potential of the dolomite aquifer on any specific farm.

The contamination potential of the surficial sand and gravel aquifer is some cause for concern when it is overlain by soils in the Casco and Boyer Series. The distribution of these soils is shown on the map in Figure 3. Soils in the Casco series have a surface solum 18 inches thick, composed of sandy and friable loam. Permeability of this solum is moderate. The substratum is sand and gravel, with the water table over 5 feet from the land surface. The Boyer Series has a thicker solum (20-40 inches), but the soil is a rapidly permeable loamy sand underlain by a sandy loam lens that is up to 10 inches thick and of moderately rapid permeability. The substratum in the soil is also sand and gravel, with the water table depth in excess of five feet.

Soils in both series have severe limitations for septic system drain fields due to the potential for groundwater contamination from rapidly percolating effluent. There is a more limited, yet defensible, cause for concern that polluted surface runoff percolating through these soils might contaminate groundwater. In some situations where the hydraulic loading of polluted water percolating through these soils is high, contamination of the surficial aquifer is a possibility.

GROUNDWATER PROBLEMS

Nonpoint source pollutants of greatest concern in the watershed include: nitrates; pathogens; color, taste, and odor causing materials; and agricultural pesticides. Evidence that these materials are entering the groundwater varies.

Evidence is strongest for nitrates, pathogens, and the organic materials causing color, taste, and odor problems.

Table 10
Sinkholes and Crevices Located To Date In the Kewaunee River Watershed[1]

Township	1/4 Section	Soils In Which Crevice or Sinkhole Located	Soil Symbol
Luxemburg	1 nene	Symco Silt Loam	(SyA)
	2 nwsw	Hortonville Silt Loam	(HrB)
	2 nenw	Hortonville Silt Loam	(HrD_2)
	34 nene	Hortonville Silt Loam	(HrB)
Red River	24 swnw	Symco Silt Loam	(SyA)
	28 nwne	Kewaunee Silty Clay Loam	(KpC_2)
	36 nene	Kolberg Silt Loam	(KwB)
Lincoln	18 sesw	Onaway Loam	(OhB)
	19 swse	Hortonville Silt Loam	(HrB)
	30 nenw	Hortonville Silt Loam	(HrB)
	30 swsw	Kolberg Silt Loam	(KwB)
Casco	6 nwnw	Pella Silt Loam	(Pe)
	16-17	Bonduel Loam	(Br)

[1]Data from SCS and County Files, Kewaunee County.

Table 11
Exposed Bedrock Found in "Nonbedrock" Soils As Mapped in the Kewaunee County Soil Survey[1]

Township	1/4 Section	Soils In Which Exposed Bedrock Identified	Soil Symbol
Luxemburg	4 swse	Manawa Silt Loam	(McA)
	15 nwne	Boyer Loamy Sand	(BrB)
	28 sene	Omro Silt Loam	(OdB)
	26 sesw	Symco Silt Loam	(SyA)
	26 swse	Symco Silt Loam	(SyA)
	35 nwnw	Hortonville Silt Loam	(HrB)
	35 nenw	Hortonville Silt Loam	(HrB)
Montpelier	5 sesw	Kewaunee Silty Clay Loam	(kpC_2)
	3 swne	Hortonville-Boyer-Zurich Complex	(HzC_2)
	3 nesw	Hortonville Silty Loam	(HrB)
	18 nene	Kewaunee Silty Clay Loam	(KpC_2)
	18 neww	Poygon Silty Clay Loam; Kewaunee Silt Loam	(Po; Khb)
	4 nwsw	Manawa Silt Loam	(McA)
Red River	23 sese	Hortonville Silt Loam	(HrB)
	21 sese	Manawa Silt Loam	(McA)
	31 nenw	Kibbie Silt Loam	(KuA)
	25 nwnw	Symco Silt Loam	(SyA)
	25 nesw	Mosil Loam	(MtA)

[1]Data from SCS and County Files, Kewaunee County

Department of Natural Resources private water supply records were investigated to determine the extent of nitrate and coliform bacteria contamination of water supplies in the watershed. The water samples reported in these files are collected by, or at the request of, the landowner. In some cases, the well from which the sample was taken did not meet well codes and in a few cases polluted surface water may have been entering the well due to improper pump installation or location of the well in a subsurface depression. Thus, data indicating high nitrate or bacterial contamination of the water supply may or may not indicate that the aquifer has been contaminated. Recognizing these limitations, the data was reviewed and is summarized in Table 12.

Samples were collected between 1970 and 1982 with most samples collected during the spring and fall of 1981 at the request of concerned users of the groundwater resource. Some samples were taken from the kitchen tap, some from the milkhouse tap. Some wells were sampled several times, others only once. Samples were analyzed for nitrate-nitrogen and the presence or absence of coliform bacteria. Although the coliform bacteria are not hazardous to humans, their presence indicates the possibility that other pathogens, which may be harmful, are present. Nitrate-nitrogen can cause methemoglobanemia or "blue baby syndrome" in infants under 6 months of age. Reasonable protection is afforded to infants by the drinking water standard of 10 mg/l NO_3-N.

Sample collection has been limited to the Kewaunee County portion of the watershed, in Red River, Luxemburg, Montpelier, Casco and Lincoln Townships. Sample locations are in or near areas having bedrock soils, sinkholes, crevices, or exposed bedrock. Most samples were collected in the spring and early summer. All samples having over 10 mg/l NO_3-N are in excess of the safe drinking water standard. Samples in the 5.0 - 9.9 mg/l range represent contaminated well water, but are below the drinking water standard violation limit. Many samples also registered coliform bacteria.

The specific source of contamination to each of the wells represented in Table 12, and the duration of contamination in each well, is not easily determined.

Well water tainted with dark stained materials has been reported in the watershed, particularly in the spring. In addition, ephemeral lakes forming over sinkholes plugged with ice are known to occur in the spring. When the ice plug melts, the ephemeral lake, with its load of pollutants, disappears into the dolomite aquifer.

There has been a lack of sampling that might indicate whether agricultural pesticides are entering the groundwater in this watershed. However, these materials are being used and may be accompanying runoff through sinkholes or crevices into the dolomite aquifer during periods of aquifer recharge.

An inventory was made of pesticide use in the Kewaunee River Watershed to determine which ones are being used and how much they are being used. The list of pesticides inventoried was taken from a priority list compiled by DATCP.

Table 12
Results of Sampling for Nitrates[1] in
Groundwater of the Kewaunee River Watershed

Sample Location		0.5 - 4.9 mg/l		5.0 - 9.9 mg/l		10.0 - mg/l	
Town	Section	No. Wells	Range[2]	No. Wells	Range[2]	No. Wells	Range[2]
Red River	22	1	(4.6)	1	(9.5)		
	24	1	(2.3)			2	13.0-26
	25	1	(1.9)				
	26	1	(2.9)	1	(6.3)	2	10.9-20
	27	1	(4.9)			1	(33.9)
	34	1	(3.6)				
	35			3	8.1-9.6	3	10.9-18.9
	36			1	(6.3)		
Luxemburg	2	3	2.0-2.6				
	13					1	(10.0)
	26					2	10.3-25
	27					1	(12.5)
	34					1	(10.9)
	35					2	17-27
Montelier	2					1	(11.5)
	5					1	(10.6)
Casco	9					1	(11.7)
Lincoln	29			1	(5.0)		
	30	1	(4.1)	1	(5.6)		
	32					1	(51.)

[1]Where more than one well was sampled, the range represents the lowest value from one well and the highest value from the highest well. Each well is classed by its highest concentration. All values represent NO_3-N.

[2]Only samples above detectability are summarized in the table. Where only one sample was taken from a well, the concentration appears in parenthesis.

The DATCP made a preliminary qualitative assessment of priority pesticides in the state by evaluating existing information concerning the amount and type of pesticides used and the solubility and toxicity of those chemicals. Particular emphasis was given to pesticides used in the "central sands" region of Wisconsin. Those pesticides of greatest concern were designated as Priority One compounds. Included as Priority One substances were those pesticides occurring in groundwater at concentrations representing potential public health risks. Additional pesticides with high toxicity, high solubility and extensive use are also ranked as Priority One. Priority Two chemicals included additional pesticides detected in groundwater but at levels representing less of a health concern than Priority One substances. Also included were pesticides used as substitutes for aldicarb and other compounds that are fairly toxic and water soluble and for which sufficient use information is not available.

The results of the pesticide use survey for the Kewaunee County portion of the watershed are shown in Table 13.

GROUNDWATER QUALITY OBJECTIVES

The objective of installing best management practices for groundwater protection is to reduce as much as possible the contamination potential of the Silurian dolomite and surficial sand and gravel aquifers. The project will not necessarily result in "safe" tap water in areas where it is currently tainted. This is, in part, because unsafe tap water can be the result of factors other than groundwater contamination: the well may be improperly located or constructed. Where the unsafe tap water is caused by contaminated groundwater, the degree to which the problem is resolved will depend on whether or not the specific source(s) responsible for the contamination of the specific well are controlled.

NONPOINT SOURCES OF POLLUTION TO GROUNDWATER

The dolomite aquifer is recharged mostly during the early spring, after frost leaves the ground, with some additional recharge possible during the fall, after the first killing frost but before the ground freezes. The aquifer is recharged principally through precipitation that enters through surface joints either at or near the land surface.

The surficial aquifer is recharged rapidly, due to its proximity to the land surface and its high permeability.

Two major classes of nonpoint pollution sources were inventoried for their potential to contribute contaminants to the groundwater during periods of aquifer recharge. These include 1) sources of animal waste (barnyards, manure spreading) which could lead to elevated nitrates, pathogens, and color, taste and odor problems and 2) sources of agricultural chemicals.

The Priority Management Area and Pollution Source Management Categories

The Priority Management Area for groundwater protection is that area where poor land management has the potential to contaminate the sand and gravel of the Silurian dolomite aquifer. In the Kewaunee River Priority Watershed this includes the following:

Table 13

Inventory of Pesticide Use In The Kewaunee River Priority Watershed

Chemical Priority Class[1]	Chemical Name (Trade Name)	Level of Use In Watershed	Crop Applied To	Time of Year Applied	Comment on Compound[2] Persistent & Leachable	Toxic	Carcinogen
I	Alachlor (Lasso)	Medium	Corn	Spring At Planting	Yes		
I	Carbaryl (Sevin)	Low	Farm Gardens Corn	Spring	Yes		Yes
I	Carbo-furan (Furadan)	Medium	Corn Alfalfa	Spring	Yes	High	
I	Disulfoton (Disyston)	Low	Garden Ornamental	Spring	Yes	High	
I	MBC (MBC)	Low	Snapbeans	Late Summer	Yes	Unknown	
I	Metolachlor (Dual)	Medium	Corn	Spring At Planting	Yes		
I	Phorate (Thimet)	Low	Corn	Spring	Yes	High	
I	Picloram (Tordon)	Low	Road Ditches Brush Control	Growing Season	Yes		Yes
I	Terbofos (Counter)	Low	Corn	Spring	Yes	High	
II	Atrazine (Aatrex)	High	Corn	Spring At Planting	Yes	Low	
II	DCPA (Dacthal)	Low	Gardens	Spring Summer	Yes	Low	
II	Dicambra (Banvil)	Low	Corn	Spring At Planting	Yes	Medium	
II	Metribuzin (Sencor)	Low	Alfalfa	Spring	Yes		
II	2,4-D (2,4-D)	High	Small Grains	June	No		

[1]See text. Priority class originally determined for pesticide use in the Central Sands region of Wisconsin.

[2]From: "Project Report, Groundwater Pesticide Surveillance Committee", April 15, 1983.

1. Areas having bedrock soils, or soils with similar characteristics. Bedrock soils in this watershed include the following soil series: Kolberg, Kolberg Variant, Longrie, Namur, Bonduel and Ruse.

2. Sites where sinkholes to the bedrock have appeared, regardless of the soil in which they have developed.

3. Areas having highly permeable soils over the sand and gravel aquifer. Soils of this type include those in the Casco and Boyer series.

Nonpoint pollution sources may be eligible for cost-sharing if they are located in the Priority Management Area. Sources that are not in the Priority Management Area are not eligible for cost-sharing.

Management categories have been identified for potential nonpoint sources of pollution to groundwater. These categories, and the criteria by which they are characterized, are presented in the Inventory and Recommendations sections which follow. The purpose of identifying management categories is two-fold. First, it determines eligibility of a potential pollution source for cost-sharing under the Nonpoint Source Program. Only sources that meet the criteria for inclusion in Management Category I or II are eligible. In addition, those sources identified and confirmed to be in these two management categories must be part of any cost-sharing agreement that the landowner agrees to enter into with the local designated management agency. If a landowner does not agree to include best management practices for sources on his farm in either of these management categories, then his water quality protection package will be considered incomplete. Under the administrative rules of the Nonpoint Source Program, cost-share agreements must cover all significant pollutant sources to be valid.

Secondly, the management category designation provides a way for the county to set work priorities. Sources in Management Category I should be given priority during the period of landowner contacts. Sources in Category II should be given next highest priority.

During detailed conservation planning, the assessment of particular groundwater pollution sources may change. The list of eligible sources and those which must appear on any cost-share agreement will change as needed. These changes will be made consistent with the criteria layed out for the three management categories. In circumstances where the attempt to alleviate a potential groundwater pollution source may lead to a more severe pollution problem, the management practice will not be included as part of the cost-share agreement.

Barnyard Runoff: Inventory and Recommendations

All livestock operations in the watershed were inventoried for evaluation of their potential to pollute ground waters. During this inventory, characteristics that indicate a potential for groundwater contamination directly from the lot surface, or due to runoff from the lot surface, were noted.

Three barnyard characteristics were identified as increasing the potential for groundwater contamination. These are:

1) Location of the barnyard on bedrock soils;
2) Known or suspected bedrock crevices or sinkholes in the barnyard or drainage path leading from the barnyard; and
3) Internally drained barnyard runoff.

Thirty-eight barnyards in the Kewaunee River Watershed were identified as having one or more of these characteristics. These 38 operations were then divided into three management categories based on the severity of the contamination potential.

Management Category I: These animal yards have the highest potential to contaminate groundwater in the dolomite aquifer. The yards in this category:

- have a known or probable bedrock crevice or sinkhole in the yard or the drainage path leading from the yard, or

- are internally drained to bedrock.

Management Category II: These animal lots have the next highest potential to contaminate groundwater in the dolomite aquifer. The yards in this category are:

- located on bedrock soils or have a drainage path over bedrock soils but some runoff may still reach surface waters.

In addition, there are barnyards that are internally drained that are located on deeper soils of the Casco-Boyer series. Under special circumstances, these barnyards may contaminate the surficial sand and gravel aquifer. Although groundwater quality problems related to barnyards on these soils is not expected to occur very often, barnyards with these characteristics are being placed in Management Category II. Although this places a slightly lower priority on these barnyards for purposes of technical assistance, it does assure that the landowner will be contacted and the sites investigated in more detail.

Manure Spreading: Inventory and Recommendations

Manure can find its way into the dolomite aquifer if it is spread on fields having sinkholes or bedrock outcrops. Nitrate leaching from manure can also make its way to groundwater if the manure is spread on shallow bedrock soils. Waste spread on soils less than one foot thick over fractured bedrock, or waste spread on soils 1-2 foot thick over bedrock and not incorporated into the soil within 72 hours, is considered a potential source of groundwater contamination.

Cropland acres owned by people having livestock were inventoried to determine the potential for groundwater contamination should manure be improperly spread. Factors considered indicative of a potential for groundwater contamination included the presence of known crevices, sinkholes or exposed bedrock in the cropped field and the percent of cropland soils mapped as bedrock soils.

Forty-eight animal operations were identified that did not have existing manure storage and that could be spreading manure on cropland in such a way as to constitute a groundwater contamination hazard.

Two management categories were created based on the severity of the hazard:

Management Category I: Operations in this category have cropland acres with exposed bedrock, or sinkholes.

Management Category II: Operations in this category have at least 25% of the cropland acres on bedrock soils, or soils with similar characteristics.

These conditions do not automatically mean that manure storage is needed to reduce the groundwater contamination potential. Other changes in manure management may achieve the same objective.

Agricultural Chemicals (Pesticides, Fertilizers): Inventory and Recommendations

Agricultural chemicals can find their way into the dolomite aquifer if contaminated surface runoff encounters exposed bedrock, surface crevices, or sinkholes. Contamination of the surficial sand and gravel aquifer is not a major concern, since these chemicals will tend to bind to the clay and organic fractions of the soil solum unless grossly and repeatedly overapplied.

The operations in Management Category I for manure spreading should also be placed in Management Category I for reducing the potential for groundwater contamination from agricultural chemicals. Similarly, those operations in Management Category II for manure spreading should be placed in Management Category II for consideration of the groundwater pollution hazard from these chemicals. Further investigation of these areas may indicate a need for substantial changes in management to reduce the hazard of contamination. However, where the soils adequately shield the bedrock, management above and beyond using proper chemical application rates may not be warranted.

Other croplands that may not have been evaluated in the manure spreading assessment should be evaluated using the same criteria as just explained. The areas of exposed bedrock and sinkholes identified in tables 10 and 11 should be reviewed to identify areas that were not part of the manure management evaluation. Any additional areas from these tables should be placed in Management Category I for agricultural chemicals.

SUMMARY OF TARGETED SOURCES OF POLLUTION TO GROUNDWATER

Table 14 summarizes the potential nonpoint sources of pollution to the groundwater in the Kewaunee River Watershed. The information is presented on a subwatershed basis for organization purposes only. It should be recognized that the groundwater flow pattern is not normally affected by local surface water divides. This is particularly true for the Silurian dolomite aquifer.

Table 14
Summary of Proposed Nonpoint Source Control Plan
For Protecting Groundwater in the Kewaunee River Watershed
From Animal Waste

	Subwatersheds[1]							Watershed Total
	UK	LK	CO	SL	SO	MC	LT	
Total Number of Operations	43	50	34	109	79	57	10	382
Numer of Operations Under Management Categories I-III, Manure Spreading	13	3	13	1	11	4	3	48
Number of Operations under Management Categories I-III, Barnyard Runoff Control	10	6	7	4	8	2	1	38
Total Number of Operations under Management Categories I-III	18	8	16	5	15	4	3	69
Total Number of Animal Units	3,573	3,029	1,763	7,957	6,030	4,867	669	27,888
Number of Animal Units Under Management Categories I-III Manure Spreading	695	133	737	14	766	316	173	2,834
Number of Animal Units Under Management Categories I-III Barnyard Runoff	773	450	674	312	407	180	37	2,833
Total Number of Animal Units Under Management Categories I-III	1,060	542	1,294	316	914	316	173	4,615

[1]Subwatershed are: UK = Upper Kewaunee, LK = Lower Kewaunee, CO = Casco Creek, SL = School Creek, SO = Scarboro Creek, MC = Martinville/Champion Tributary, LT = Luxemburg Tributary

Table 15
Distribution of Livestock Operations and Animal Units in Management Categories for Barnyard Runoff and Manure Spreading

Pollution Source	Management Category I	II	III	Total
Barnyard Runoff				
Operations	11	18	9	38
Animal Units	990	1,192	651	2,833
Manure Spreading				
Operations	26	22		48
Animal Units	1,617	1,217		2,834

There are 382 livestock operations in the watershed. Sixty-nine or 18% of the total are eligible targets for cost-sharing. This targeting will concentrate on manure generated by 4615 animal units, or 17% of the 27,888 in the watershed.

Forty-eight of the 382 operations will be targeted due to concerns over manure spreading. The sensitive areas in the Upper Kewaunee, Casco, and Scarboro Creek subwatersheds will be emphasized. These areas contain 2,198 target animal units, or 78% of the total animal units targeted in the watershed for livestock waste management.

Thirty-eight of the 382 operations will be targeted due to the concern over barnyard runoff. Effort will be targeted most heavily in the sensitive areas of the Upper Kewaunee subwatershed. In this subarea, about one third of the barnyards are of concern due to potential contamination of the surficial sand and gravel aquifer, with the others of concern due to potential contamination of the dolomite aquifer. Three other subwatershed will have their sensitive areas targeted: Lower Kewaunee, Casco Creek, and Scarboro Creek. The major concern in the Casco and Scarboro areas is the dolomite aquifer. In the Lower Kewaunee, the major barnyard runoff concern is due to potential contamination of the surficial sand and gravel aquifer.

These four areas contain 2,304 target animal units, or 81% of the animal units targeted in the watershed for this purpose.

Table 15 shows the distribution of animal operations and animal units included in each management category for barnyard runoff and manure spreading.

Pesticide runoff sources parallel the manure spreading runoff sources.

BEST MANAGEMENT PRACTICES FOR GROUNDWATER PROTECTION

There are four types of bedrock or thin soil situations found in the Kewaunee River Watershed. Each situation requires a slightly different approach to using best management practices. For the purposes of this program, best management practices to protect groundwater will be treated as critical area stabilization for purposes of cost-sharing. Exceptions to this are manure storage and barnyard runoff management, which will be cost-shared as separate practices.

Four Types of Situations

The four types of bedrock or thin soil situations are described below:

A. Bedrock (dolomite) is located within 40 inches of the surface, but for the majority of the year there are no visible cracks, sinkholes, or crevices exposed at the surface. Particularly during the Spring, surface runoff from various nonpoint sources tends to infiltrate or penetrate with little contact with the soils.

B. An exposed sinkhole or temporary ponded area with the potential of developing an alternate gravity outlet. In this situation, surface runoff enters the sinkhole, for example, without any percolation or seepage

through a soil profile. An acceptable outlet constructed for this situation, for example, may be a grassed waterway discharging to a wetland that can assimilate the nutrients and organic materials in the runoff.

C. An exposed sinkhole or temporary ponded area with no potential for developing an alternate gravity outlet. This situation differs from B in that the topography or manmade structures such as embankments or roadbeds prohibit the construction of a waterway to outlet the water.

D. An area with a number of exposed crevices, cracks, etc. with no potential for developing an alternate gravity outlet. This situation differs from C in that the area of crevices is not limited to a single point such as a sinkhole.

Approach to Situation A: Bedrock Near Surface

In general, the approach is to reduce the pollutant generation and pollutant transport through improved management of the nonpoint sources. In situation A, but particularly situations B, C, and D, consideration should be given to changing the use of the land by placing the drainage area in permanent grasses or trees. If this is not practical, the general approach is to change the management of the land through the use of best management practices. Specific best management practices for situation A are as follows:

1. Animal lot runoff management - Diverts runoff around lot or yard and increased on-site holding and infiltration of manure. Includes SCS standards and specifications*:

   Diversion (362)
   Filter Strip (586)
   Heavy Use Area Protection (561)
   Roof Runoff Management (558, 620)
   Waste Management System (312)
   Livestock Exclusion (472)

2. Manure spreading management - Proper scheduling and incorporation of manure, regardless of slope, to reduce the amount of manure carried in runoff. Manure should not be spread in winter. Fall spreading and incorporation of manure is allowed. If manure is spread during the spring, it should be incorporated the same day. Manure storage facilities are needed to provide storage adequate enough to permit spreading at the scheduled times. Includes SCS standards and specifications*:

   Waste Utilization (with modifications) (633)
   Waste Management System (312)
   Waste Storage Pond (425)
   Waste Storage Structure (313)
   Waste Transfer ( )

3. Fertilizer management - Emphasis on sidedressing during growing season, and on nitrogen inhibitors. The objective is to reduce amount of nitrogen in surface runoff or seepage by matching the nitrogen availability to crop uptake. Includes SCS standards and specifications:

Conservation Cropping (with modifications) (328)

4. Runoff reduction to area - Increasing infiltration through a number of structural and management practices so that runoff to the sensitive area is decreased. Includes SCS standard and specifications:

   Conservation Cropping (328)
   Contour Farming (330)
   Diversion (362)
   Stripcropping, Contour (585)
   Stripcropping, Field (586)
   Terrace (612)
   Water and Sediment Control Basin (638)
   Grassed Waterway (412)

*This list is intended to include the primary standards and specifications and does not include each and every standard or specification that may be needed.

Approach to Situation B: Sinkholes With Potential for Alternate Outlet

The approach is similar to situation A with the addition of sealing the sinkhole and diverting the water elsewhere. Specific best management practices in addition to those in A above are as follows:

1. Sinkhole treatment - Closing off or minimizing the inflow into the sinkhole. SCS interim standard and specification (571).

2. Diverting runoff water around sinkhole. This can include surface waterways or subsurface pipes. Included are SCS standards and specifications:

   Diversion (362)
   Grassed Waterway (412)
   Subsurface Drain (606)
   Underground Outlet (620)
   Water and Sediment Control Basin (638)

3. The discharge of the diversion around the sinkhole should be a) a wetland or other noncropped internally drained area with more than 40 inches of soil over bedrock, or b) a surface water if discharge to a suitable internally drained or wetland is not practical.

Approach to Situation C: Sinkholes With No Potential for Alternate Outlet

The general approach is similar to situation A with the addition of a filter or buffer strip surrounding the sinkhole. SCS standard and specification 586.

Approach to Situation D: Crevices Area With No Potential for Alternate Outlet

The approach is the same as situation C with the enlargement of the buffered area. In addition to the SCS standards and specifications for C, the following are added:

Livestock Exclusion (472)
Tree Planting (612)

POINT SOURCES OF POLLUTION

There are three industries which use land disposal for their wastes. Thiry Daems Cheese disposes of process and wash waters in an absorption pond located in section 4 of Luxemburg Township. Tonet Farmer's Co-op disposes of process and wash waters in a seepage ditch located in section 32 of Red River Township, and spreads whey on land located in section 30 of Red River Township. Packerland Whey land spreads wash waters and process waste waters in section 21 of Luxemburg Township. These discharges pose no serious threat to groundwater quality as long as they are made in compliance with the conditions specified in the permits issued for them.

There are four landfills located in the watershed. They are as follows:

-Town of Luxemburg Landfill, located in a gravel mining area in the swl/4 swl/4 section 11 of Luxemburg Township. This landfill was created in 1971, is one acre in size, and served about 1500 people. It has been closed.

-Village of Luxemburg Landfill, located in a gravel pit in the sel/4 swl/4 section 11 of Luxemburg Township. The landfill was created in 1969, is 13 acres in size, serves about 1100 people, and has a large remaining capacity.

-Town of Casco Landfill, located in a gravel mining area in the nel/4 swl/4 section 20 of Casco Township. The landfill created in 1969, is one acre in size, and served about 900 people. It is closed.

-Village of Casco Landfill, located in a gravel pit in the swl/4 swl/4 section 29 of Casco Township. The landfill created in 1969, is 2 acres in size, served about 500 people, and has been closed.

All of these landfills were constructed prior to enactment of regulations that controlled the siting and design of landfills in the state. In addition, there was no subsurface hydrogeology studies made of these sites to determine their potential for contaminating the groundwater. Since all are located in areas where leachate movement can be expected to occur, they should all be considered as having a moderate to high potential to contaminate the groundwater. The extent of any such contamination, or whether it is occurring, is not known. For those sites located close to the Kewaunee River (all except the Town of Casco site), it is likely that leachate movement would be towards the Kewaunee River. This would tend to limit the leachate movement in the groundwater, but could result in some release of pollutants to the Kewaunee River.

NUMBER AND COST OF BEST MANAGEMENT PRACTICES

Based on the groundwater and surface water protection needs identified in this plan, the number of best management practices needed in the Kewaunee River Watershed, and their cost, were estimated. The results are shown in Table 16. The estimated quantity of practices is based on meeting all needs identified in management categories I, II, and III for each pollution source. The total cost to meet these needs includes both the landowners' and state cost sharing dollars, and equals approximately 4.5 million dollars. At 100% participation by eligible landowners in the cost-share program, the estimated state cost-share amounts to 2.4 million dollars. This level of participation is not likely, however, since participation in the Wisconsin Nonpoint Source Water Pollution Abatement Program is voluntary. A reasonable estimate of cost-share funds that will actually be needed should consider projected landowner participation levels. It is estimated that 75% of the sources in management categories I and II will be cost-shared, since technical staff will be concentrating their efforts on getting these sources included on cost-share agreements. It is estimated that only 25% of the sources in management category III will be cost-shared.

Although these sources are eligible, staff will not be concentrating their efforts on bringing them under cost-share agreement. At this projected level of participation, the state cost share for this project is estimated to be 1.5 million dollars.

Table 16

Quantity and Costs of Best Management Practices for Protection of Surface and Groundwater of the Kewaunee River Watershed - Both Counties[1]

Best Management Practice	Estimated Quantity	Average Cost/Unit	Total Cost	Cost-Share Rate	Cost-Share Amount At 100% Level of Participation	Cost Share Amount At Projected Level of Participation
CROPLAND						
Contour Strip Cropping (includes field strips)	7,281 ac	$69/ac	$ 502,390	50%	$251,190	$136,280[2]
Diversions	20,000 ft	$1.15/ft	23,000	70%	16,100	12,100[3]
Terraces	250,637 ft	$1.00/ft	250,637	70%	175,450	98,830[2]
Waterways	365 ac	$1,915/ac	698,975	70%	489,280	367,300[3]
Minimum Tillage	1,759 ac	$20/ac	35,180	50%	17,590	9,280[2]
Grade Stabilization	88 units	$1,175/unit	103,400	70%	72,380	54,290[3]
Critical Area						
Sediment Control	1,863 ac	$85/ac	158,355	70%	110,850	73,190[2]
Sinkhole/Crevice Mgt.	13 units	$1,750/unit	22,750	70%	15,930	12,250[3]
ANIMAL WASTE						
Barnyard Runoff Mgt.	124 units	$4,500/unit	558,000	70%	390,600	214,200[2]
Manure Storage	142 units	$15,000/unit	2,130,000	70% ($6,000 max)	852,000	504,000[2]
STREAMBANK PROTECTION						
Fencing	31,250 ft	.80/ft	25,000	70%	17,500	13,130[3]
Riprap (includes shaping, seed)[4]	-	$13.50/ft	-	70%	-	-
Livestock Crossing	10 units	900/unit	9,000	70%	6,300	5,040[3]
WOODLAND FENCING[4]	-	.80/ft	-	50%	-	-
COSTS			$4,516,690		2,415,170	1,499,890

[1]Refer to section on planning assumptions for more information on how these estimates were determined. This table is to be used to estimate budget needs only; it does not limit the amount of funding that will be available for any one practice. The average cost/unit is used only to project total costs. The average cost used in developing cost-share agreements will depend on the specific practice needs.

[2]The projected level of participation includes 75% of the needs in Management Categories I and II, and 25% of the needs in Category III.

[3]The projected level of participation is 75% of the total need.

[4]Although a small amount is anticipated, no estimate of need has been made.

The following information and assumptions were used in developing Table 16.

Estimates for Cropland BMP Needs and Costs

Combinations of best management practices needed to reduce soil loss to 3 T/A/yr were estimated for cropland in each of the five soil loss categories (3-5 T/A/yr; 5-7 T/A/yr; 7-10 T/A/yr; 10-15 T/A/yr; over 15 T/A/yr). Table 17 shows the assumptions that were used in developing the estimate of the types and quantities of practices needed on cropland.

In addition, the following assumptions were used in estimating the quantity and costs of practices needed.

Contour Strip Cropping

* 60% of these will be field strips.
* 75% of all strips will need tiling with an average application of 75 feet of tile/acre.
* The average unit cost of $70/ac is a weighted average of strips with and without tiles.

Terraces

* 60% of all terraces will need to be tiled.
* The average unit cost of $1.00/ft is a weighted average of terraces with and without tiles.

Diversions

* 75% of all diversions will need to be tiled.
* The average unit cost is a weighted average of waterways with and without tile, and also assumes 1 rock crossing per acre of waterway.

Grade Stabilization

* The estimated quantity includes 33 toe walls and rock chutes, 50 small (maximum dike height of 3 feet) dry basins and 5 wet basins.
* The average unit cost is a weighted average of these three types of grade stabilization structures.

Critical Area Stabilization

Erosion Control

* Critical soil erosion acres include those to be put into trees or into permanent grass cover.
* The average unit cost for areas of soil erosion is a weighted average based on the proportion of the total area needing trees vs. hay and the relative cost of each.
* 23% of the acres needing practices will be put into trees and 77% will be planted to permanent grass.

Sinkhole/Crevice Management

* The average unit cost assumes that 50% of the situations will have alternate gravity outlets and may need more expensive structural practices, and that 50% of the situations may not have alternate gravity outlets and would use less expensive measures.
* The estimated quantity does not include barnyard runoff control or manure storage. These are included under Animal Waste in Table 16.

Estimates for Barnyard Runoff Management BMP Needs and Costs

* The estimated total need of 124 barnyard runoff control systems includes 31 for protection of groundwater, 87 for protection of surface water, and 6 for the protection of both.
* If a barnyard was targeted for reasons of both surface water and groundwater protection, it was given the higher of the two management category priorities.

Estimates for Manure Storage Needs and Costs

* A preliminary estimate of 153 manure storage units was made, including 29 for the protection of groundwater, 104 for the protection of surface water, and 23 for the protection of both. The total need shown in Table 16 assumes that only 10% of the manure storage units expected due solely to inclusion in Management Category II for groundwater will be found necessary. This class includes 13 units, and the need is reduced to 2 units.

Table 17

Percent of Cropland Acres in Each Soil Erosion Category Needing Best Management Practices to Reduce Soil Loss to 3 T/A/yr.[1,2]

	Soil Erosion Categories									
	3-5 T/A/yr		5-7 T/A/yr		7-10 T/A/yr		10-15 T/A/yr		Over 15 T/A/yr	
	KEW	BN	KEW	BN	KEW	BN	KEW	BN	KEW	BN
Best Management Practices										
Contour Strips or Field Strips	62%	40%	64%	35%	43%	57%	36%		23%	
One Terrace/Acre	21%	20%	8%	65%	19%	42%	7%			
Two Terraces/Acre	2%		5%		14%		29%		23%	
Conservation Tillage	10%	20%	13%	65%	10%	42%	10%		16%	
Critical Area Stabilization Using Grasses	5%		8%		33%		43%	50%	46%	50%
Using Trees					19%		7%		23%	
Conservation Cropping System	19%	40%	21%		15%		14%			

[1]KEW = Kewaunee County
BN = Brown County

[2]Because more than one practice may be needed on any particular land parcel, the percentages in each erosion control category do not total 100%.

PART II: IMPLEMENTATION STRATEGY

INTRODUCTION

This Implementation Plan identifies:

1. the tasks necessary to implement the recommendations in the Management Plan;

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

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

4. the type and amount of staff needed.

The general procedure used for achieving the water quality objectives identified in the Management Plan is through the voluntary installation of corrective land management practices to control the critical nonpoint sources. Cost-share funds are provided to contract with landowners to cover a percentage of the costs of installing the practices. In addition, funds are made available to the implementing agencies to cover part of the work effort required to carry out their responsibilities.

AGENCIES INVOLVED

DESIGNATED MANAGEMENT AGENCIES

Designated Management Agencies (DMAs) are those local units of government identified in the areawide water quality plans as having responsibility for soil and water conservation, including implementation of best management practices to improve water quality. For unincorporated areas, the Brown and Kewaunee County Boards will serve jointly as DMAs, being represented by their respective Land Conservation Committees. The City of Kewaunee and the Villages of Luxemburg and Casco are the identified DMAs for nonpoint source responsibilities within their respective incorporated limits. Together these units of government are able to provide project cost-share funding to landowners, and install practices on public lands.

The Kewaunee County Land Conservation Committee, acting for the Kewaunee County Board, was selected as the Lead Designated Management Agency (LDMA) for the Kewaunee River Watershed Project. The LDMA is responsible for coordinating activities among all other DMAs in the watershed. The LDMA is also contractually and financially responsible to the State of Wisconsin for overall management of the project, and responsible for coordinating activities of all the agencies involved. The LDMA responsibilities are set forth in the Nonpoint Source Grant Agreement that the LDMA will enter into with the State of Wisconsin. The Grant Agreement also specifies the amount of money the state agrees to grant to the project.

DMA responsibilities in the Wisconsin Nonpoint Source Water Pollution Abatement Program are identified in Wisconsin Administrative Rules (NR 120.06). In summary, DMA's must:

1. Assist with the development of the priority watershed plan and approve the watershed plan;

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

3. Carry out education and information programs about nonpoint source pollution and land management needs;

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

5. Certify installation, operation, and maintenance of best management practices;

6. Coordinate and control cost-sharing monies with local contributions;

7. Report to DNR on project progress and recommended project modifications;

8. Screen applications for variances to established cost-sharing rates;

9. Determine priority for assistance among grant applications.

10. Determine average practice costs to be used in developing cost-share agreements; and

11. Determine labor and equipment rates to be used in crediting landowners for use of their own time and equipment to install practices.

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

COOPERATING AGENCIES

In addition to the designated management agencies, the Kewaunee River Watershed Project will receive assistance from the other agencies listed below.

1. Soil Conservation Service (SCS) (U.S.D.A.) - This agency works through the local Land Conservation Committee for Kewaunee and Brown Counties. The SCS provides technical assistance for installing conservation practices. County SCS personnel will work with other project personnel to provide inventories of conservation needs, estimated costs of best management practices, planning, designing, layout, supervision, and certification of practice installations.

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

3. Agricultural Stabilization and Conservation Services (ASCS) - Under contract to the Kewaunee County Land Conservation Committee, the Kewaunee and Brown County offices of ASCS (U.S.D.A.) will provide assistance for

fiscal management of the Kewaunee River Watershed project. In addition, cost-sharing provided by the ongoing ACP program (Agricultural Conservation Program) will be coordinated with the Nonpoint Source Program in the Kewaunee River Watershed.

4. Department of Natural Resources - The Department has overall administrative responsibility for the Wisconsin Nonpoint Source Water Pollution Abatement Program of which the Kewaunee River Priority Watershed is part. The DNR is responsible for allocation of funds to the project, for water quality surveys and for evaluation of the watershed plan and project.

IMPLEMENTATION APPROACH

BEST MANAGEMENT PRACTICES

Those land management practices which will effectively control the water pollutants from nonpoint sources are called Best Management Practices (BMPs). The practices eligible for the Kewaunee River Watershed Project for cost-sharing under the Nonpoint Source Program are listed in Table 18. The cost-sharing rates which were determined by the LCC range from 50% to 70% and fall within the maximum state cost-share rates established for the Nonpoint Source Program in Administrative Rule NR 120.

TABLE 18
BMPs and Maximum Cost-Share Rates

Practice	Maximum Project Cost-Sharing Rate
Field Strip Cropping	$10/acre[1,2]
Contour Strip Cropping	$12/acre[1,2]
Diversions (with and without tile)	70%
Terraces (with and without tile)	70%
Waterways (with and without tile)	70%
Minimum Tillage (except no-till)	$ 8/acre
Grade Stabilization	70%[3]
Critical Area Stabilization	70%[4]
Barnyard Runoff Management	70%
Manure Storage Facilities	70% ($6,000 max.)
Shoreline Protection	70%[5]
Livestock Exclusions from Woodlots	50%
Street Cleaning	50%

[1]Obstruction removal will be cost-shared at 50% up to a maximum of $40/acre.

[2]Tiling in strips is cost-shared at 50%.

[3]Includes erosion control structures.

[4]Includes planting of permanent grasses and trees to stabilize eroding cropland and roadsides. Also includes practices (other than barnyard runoff control and manure storage) designed to reduce the groundwater contamination potential.

[5]Includes fencing, rip-rap, shaping and seeding, livestock and machinery crossings, and cattle watering access.

The BMPs included in Table 18 are those practices which will help meet the water quality objectives set for the watershed. The specifications used for these practices must meet the Soil Conservation Service requirements concerning technical design. It is possible some practices may be recommended that are not included on the BMP list. Administrative Rule NR 120.10(4)(b) and (c) provides for substitute practices under conditions which are set on a case by case basis.

Appendix A describes the practices and cost-share procedure in further detail.

COST-SHARING FOR BEST MANAGEMENT PRACTICES

Cost-share funding is available to landowners for a percentage of the cost it takes to install eligible best management practices on their land (See Table 18). Once this priority watershed plan has been approved, and the Nonpoint Source Grant Agreement signed, landowners will have three years to sign up for cost-share monies.

To obtain cost-share monies, a landowner must enter into a contract with Brown or Kewaunee County. This contract is called a cost-share agreement, and is a legal document which the county assumes responsibility for enforcing.

The cost-share agreement (see Appendix B for example) includes the number and types of practices that are needed, the estimated installation dates, estimated practice costs, cost-share percentage rates, and the estimated cost-share reimbursement amount. The agreements also include practices which are needed to meet water quality objectives but are not cost-sharable under the Nonpoint Source Program. An example would be development of a conservation cropping system.

Practice costs will be based on the average and customary rates in effect for the project area. For purposes of calculating practice costs, the Brown and Kewaunee County LCC's will determine labor rates for landowners who use their own labor for practice installation. In addition, equipment rates allowed for landowners who use their own equipment will be based on the hourly rates reported by the Wisconsin Agricultural Reporting Service.

Once the cost-share agreement is signed, the landowner has five years to install the practices. Each practice installed must be maintained by the landowner for a period of time specified in the contract. These maintenance periods are established in the administrative rules for the program (NR 120).

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

1. Only BMPs necessary to improve or protect water quality are eligible. Critical nonpoint sources needing control are those in Management Categories I, II or III, as defined for each source in this watershed management plan.

2. A landowner must agree to include best management practices for all critical nonpoint sources on his property. If the landowner does not agree to include all necessary practices, the local designated management

agency may not sign the cost-share agreement and cost-sharing for that landowner will not be made available. In this watershed, sources in Management Categories I and II are eligible for cost-sharing and must be included in the cost-share agreement.

3. Rural and urban areas are eligible.

4. Townships and counties will be eligible to receive cost-sharing to stabilize cuts along existing roads only. This assistance will be available provided that the grant recipient agrees to seed and mulch road cuts along all newly created roadsides.

5. Cost-sharing is limited to areas of the state with approved areawide water quality management plans. Such a plan has been completed for the area of which the Kewaunee River Watershed is a part.

6. Cost-sharing is limited to priority management areas of priority watersheds.

Cost-sharing is not available for practices which:

1. are normally and routinely used in growing crops;

2. are normally and customarily used in cleaning of streets and roads (increased street cleaning is eligible if it benefits water quality);

3. have drainage of land as the primary objective;

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

It is possible some practices may be "custom" designed and do not fit the established definition for a particular practice. The Nonpoint Source Program will provide for substitute management practices after review and approval by the DNR and DMA to make a determination on eligibility for cost-sharing and assign a maximum cost-sharing rate. Design specifications will be recommended by the SCS Technical Guide Work Group.

IMPLEMENTATION SCHEDULE

The most important scheduling problem involves assuring that the critical nonpoint sources of pollution are included on cost-share agreements within the three year landowner sign-up period. In order to achieve this, the DMA's must concentrate their efforts on priority landowners, since many of them may need to be contacted several times before they agree to enter into a cost-share agreement.

All landowners that have a pollution source in Management Categories I, II, or III are eligible for cost-sharing on the applicable BMP. However, only those landowners with at least one pollution source in either Management Category I or II will be actively solicited for involvement in the program. All of these landowners will be contacted at least once during the first year. A portion will be selected for contacting a second time during the first year. At the end of the second year, all of these landowners will have been contacted at least twice. The third year will be used to contact those critical landowners who have not yet entered into cost-share agreements.

For each round of contacts, priority will be placed on landowners in the Scarboro Creek, Lower Kewaunee, and Casco Creek subwatersheds. In addition, priority will be given to contacting landowners having pollution sources in Management Category I.

Information and education activities will be closely coordinated with the landowner contact schedule. The purpose of this coordination is to maximize the number of critical landowners who sign cost-share agreement. This will require that the content and scheduling of I & E activities during the first two years of the project be developed to meet the needs of the landowner contact schedule. Additional information concerning the I & E program for this watershed project follows.

INFORMATION AND EDUCATION PROGRAM

One objective of the information and education program is to create an awareness and understanding of the Kewaunee River Watershed Project, and to generate interest and support among landowners. Most importantly, the intent of this program is to develop and distribute sufficient information to allow the landowner to evaluate and make intelligent decisions regarding his/her involvement and participation in this cost-sharing program.

An information and education program will be conducted over the life of the project, which will provide the necessary understanding as well as provide a structure for cooperation between agencies, groups and individuals involved in the project.

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

Major responsibility for implementing the information and education program rests with UW-Extension, with the assistance of personnel from LCD, SCS, ASCS, DNR and other agencies, under the guidance of the Lead Designated Management Agency.

The information and education program of the Kewaunee River Watershed will focus on the following five objectives:

1. To provide information to landowners and farm operators about the problems in the Kewaunee River Watershed and:

    a. The Kewaunee River Watershed Project, and their role in its implementation;

    b. Best management practices that will reduce or eliminate problems;

    c. Financial aids available;

d. Technical assistance available.

2. To create public awareness of the Kewaunee River Watershed Project and the benefits derived by all the citizens of the area as a result of the implementation of the Project and best management practices in the priority management areas.

3. To provide information to public officials, financial lenders, and farm organization leaders to develop an awareness of their role in the water quality improvement of the Kewaunee River Watershed.

4. To conduct tours, demonstrations and research which will lead to greater understanding and participation in the implementation of best management practices in the P.M.A. by landowners and farm operators.

5. To create understanding and cooperation between the participating agencies and organizations to facilitate coordination of all activities in the development and implementation of the Kewaunee River Watershed Project.

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

Implementation of these education and information activities will be directed toward specific target audiences. These will be:

1. General public

2. Landowners and farm operators having pollution sources in Management Categories I and II

3. DMA's and agency personnel

4. Township and Village Leaders, Agribusinesses, Financial Institutions, Farm Organizations

Implementation methods to be used with each target audience to meet the goals of the information and education program have been identified and are as follows:

1. General Public

Method		Frequency
a.	Public Information Meetings	1-2/year
b.	Watershed Newsletter	2-4/year
c.	Newspaper Articles	Monthly
d.	Radio and TV Programs	3-4/year
e.	Articles - Homemakers, 4-H, DHIA Newsletters	3-4/year
f.	Watershed Signs	
g.	School and Organization Presentations	4/year

2. Landowners and Operators

Method	Frequency
a. Watershed Newsletter	2-4/year
b. Direct Mail	As Needed
c. Neighborhood Group Meetings	4/year
d. Individual Contacts	As Needed
e. Field Days - Tours - Demonstrations	2/year
f. Research Plot - Tillage Methods	1/year

3. DMA's and Agency Personnel

Method	Frequency
a. DMA Committee Meetings	6/year
b. Newsletter (Watershed	
c. Direct Mail	
d. Interpersonal Contact	
e. Tours	1-2/year

4. Township and Village Leaders, Agribusinesses, Financial Institutions, Farm Organizations

Method	Frequency
a. Watershed Newsletter	
b. Watershed Meetings	
c. Town and Village Meetings	4/year
d. Watershed Presentations	2/year

The following table details the annual information and education program goal as well as the total effort.

KEWAUNEE RIVER WATERSHED
INFORMATION AND EDUCATION GOALS

PRODUCT	1984	1985	1986	1987	1988	1989	1990	Total	Responsibility
Newsletter	4	4	4	2	2	2	2	20	UWEX & LCD
Brochure	1							1	UWEX & LCD
News Releases	6	6	6	3	3	3	3	30	UWEX & LCD
Radio	3	3	3	1	1	1	1	13	UWEX & LCD
T.V.	2	2	2	1	1	1	1	10	UWEX & LCD
Watershed Meetings	2	1	1	1				5	UWEX & LCD
Small Group Meetings	8	8	8					24	LCD, SCS
BMP Demos and Tours	2	2	2		1		1	8	UWEX, LCD
Workshops	2	2	2					6	SCS, UWEX, LCD
School Group Meetings	2	2	2					6	UWEX, LCD
Meetings with other Organizations	2	2	2					6	UWEX, LCD
Slide Program	1							1	UWEX, LCD

PROJECT ADMINISTRATION

LEAD DMA RESPONSIBILITIES

As the Lead DMA, Kewaunee County will be responsible for the day-to-day operations of the project and coordination of project activities with other programs.

The Lead DMA is responsible for developing a complete set of project records that meet the requirements of NR 120. These records pertain to both general program management and to specific cost-share agreement and work program records for each landowner. Records pertaining to general program management include such things as: correspondence, contracts and subcontracts, all financial transactions, project status and progress evaluation, the status of landowner contacts and I & E activities, and a set of cost-share agreements. Records pertaining to landowners under cost-share agreement include such things as: the cost-share agreement along with any amendments, the landowner tracking form, the conservation plan, practice design and certification information, progress reports, bills, proofs of payment, and other records of financial transactions.

Financial records for overall project management and evaluation will be kept by the Kewaunee County office of ASCS. Financial records kept with each landowner's cost-share agreement file will be kept by the Brown County and Kewaunee County ASCS offices for their respective landowners. (The financial management program for this project is presented in more detail in the section, "Administration Procedures".) Portions of the landowner's cost-share agreement files related to technical assistance needs and program evaluation will be kept in the Brown and Kewaunee County LCD offices for their respective landowners. In addition, copies of the cost-share agreements, practice certification forms, and progress reports from cost-share files in Brown County will be sent to the Kewaunee County LCD.

The Lead DMA is also responsible for developing a work map for the project which allows an evaluation of the program at any point in the project. It will include BMP needs, those pollution sources which are under cost share agreements, and those BMP's which have been installed.

PROJECT MANAGER RESPONSIBILITIES

The project manager will serve as the liaison between the state, federal, and local agencies involved in the project. The Kewaunee County Conservationist will act as the project manager. Major responsibilities include: monitoring and supervising contracts between the Lead DMA and other agencies, coordinating technical assistance with information and education activities, evaluating project progress and making sure that technical assistance priorities are maintained as specified in the plan. In addition, the project manager is responsible for submitting to the Department of Natural Resources, requests for local assistance aids and for cost-share account reimbursements.

ADMINISTRATIVE PROCEDURE

Under project management, the majority of the activities involve handling the different steps of cost-share agreement development, landowner reimbursement, and maintaining a status review of project expenditures and balances related to the cost-sharing budget.

Landowner sign-ups will be handled by the technical staff available to the Brown County and Kewaunee County LCD. Estimated costs for all practices will be based on an average cost system that is reviewed and revised annually. Each county will additionally be responsible for the design, layout, installation and certification of BMP's in their respective counties.

The Nonpoint Source Program is designed to reimburse the landowner after the practice has been installed and certified by the technician. There will be one watershed checking account and landowners in both counties will be reimbursed through the Kewaunee County ASCS office.

Reimbursement of the watershed project by DNR for payment of landowners will occur as needed. Initially an "up front" amount of funding will be made available to the project to establish the watershed checking account. As landowners are reimbursed for completed practices and the balance is drawn down, the project manager will forward the appropriate documents to DNR who will in turn reimburse the project. The necessary documentation includes: a Cost-Share Calculation and Practice Certification Form (Form #3200-53) for each landowner being reimbursed, and a Request for Advance or Reimbursement Form (Form #3400-70). Examples of these forms are included in Appendix B. The Nonpoint Source Grant Agreement covers the cost-share funds available to the watershed project and will be amended to cover increased encumberances as additional landowners sign cost-share agreements.

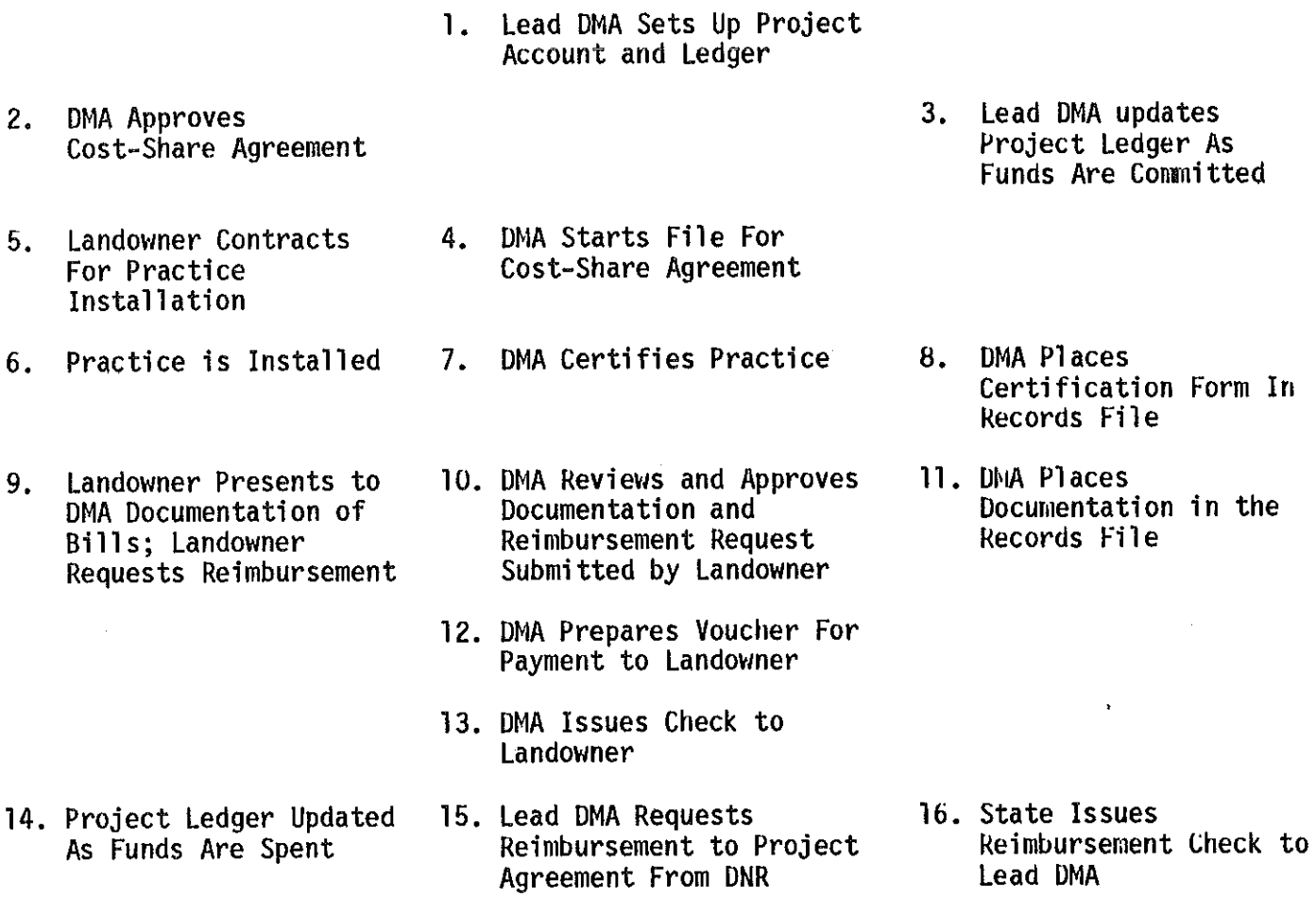
The responsibilities and procedures for setting up and managing the project account, and for making cost-share reimbursements to landowners are set forth in Table 19. The flow chart presented in Figure 7 corresponds to this table.

The Lead DMA will contract with both the Brown and Kewaunee County ASCS offices to obtain services specified in Table 19.

The contracts will be reviewed on an annual basis by all three agencies. The executive director for each county ASCS office will serve as contract agency for ASCS. The ASCS office and lead DMA will provide sufficient time annually to meet audit responsibilities. Each ASCS office will submit to the lead DMA a monthly financial progress report and an annual report. Each county's ASCS shall be reimbursed by the Kewaunee County Land Conservation Committee for administrative services performed in the implementation of the watershed plan.

In addition, cost sharing provided by the ongoing Agricultural Conservation Program (ACP) will be coordinated with the project in the Kewaunee River Watershed.

Figure 7. Fiscal Management Flow Chart



This flow chart assumes that the cost-share agreement has already been developed by Brown or Kewaunee County.

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Table 19
Fiscal Management Procedure for the Kewaunee River Watershed

1. Kewaunee County will contract with the Kewaunee County Office of ASCS to set up and keep a project ledger. This project ledger and recordkeeping system must meet the minimum requirements of NR 120.06 and conditions of the Nonpoint Source Grant Agreement. Kewaunee County will sign the Nonpoint Source Grant Agreement with DNR (form 3400-67). Kewaunee County will set up the project account with an advance sum of money which will be requested on form 3200-54.

2. Each county's LCC chairman will approve their own cost-share agreements. Brown County will report their approved agreements to Kewaunee ASCS within one week after approval. Both Brown and Kewaunee County ASCS offices will set up financial management files.

3. Kewaunee ASCS will update the project ledger as contracts are approved and notify landowners of said approvals. Upon update of project ledger, Brown County ASCS may notify their landowners of approvals.

4. Each respective DMA will be required to keep a file for each of their cost-share agreements. This file must contain materials sufficient to comply with NR 120.06(5)(c).

5. The landowner will be responsible for hiring a contractor to install a practice, or may install the practice with his own equipment.

6. Once a practice is installed LCC or SCS staff will field check the work and sign check notes that the practice meets specifications.

7. The County Conservationist or D.C. in Brown County will certify (sign form 3200-53) each practice as it is completed. In Kewaunee County the project manager or the D.C. will certify each practice.

8. The certification form is then returned to ASCS and becomes part of the file.

9. The landowner then presents documentation of cost of materials and labor and requests reimbursement from the respective ASCS offices.

10. After ASCS compiles documentation each LCC reviews and approves the request for reimbursement.

11. This approval and documentation then becomes part of the participant's file.

12. Upon approval ASCS will prepare a voucher for the amount approved. Brown County ASCS will prepare their voucher and send to Kewaunee ASCS before a project check is issued.

13. A project check will be issued by Kewaunee ASCS and signed by Kewaunee LCC chairman. If the landowner has paid his bill for the work contracted, or has served as his own contractor, a single party check may be issued. If

the landowner has merely submitted an unpaid bill for work done by another contractor, a two-party check, bearing the names of both the landowner and the contractor, will be issued.

14. The project ledger is then updated to track funds committed and spent. If a practice payment is $500.00 or more than the estimated cost, the LCC must justify to DNR in writing so that funds spent do not exceed the funds committed, as it would deplete the amount of up front monies in the account. Justification shall be made as soon as it is known, but in no case after the check is made to the landowner.

15. The Kewaunee LCC will request reimbursement (form 3400-70) from DNR as the project account is drawn down. The request will include a copy of form 3200-53 covering all practices reimbursed. Also, include justification for variances of $500.00 along with the amended cost share agreement.

16. After 3 to 4 weeks lag time the DNR will issue a state check to the Kewaunee LCC to reimburse the project account.

17. Amendments to cost share agreements will be made on form 3400-68A and should follow appropriate steps as laid out in the foregoing procedure. Amendments must include the signature of the landowner and approval of the DMA. If the amendment changes by at least $500.00 the cost of the total agreement or an individual practice, DNR approval is also required.

Workload Estimates

The workload for this project includes activities in four major areas. These are: technical assistance, financial management, project management, and information/education. Table 20 summarizes the project workload for each activity except information and education. Although I & E activities have been identified, the estimated workload, in hours, has not been estimated.

The estimated hours presented in Table 20 are based on the projected level of landowner participation. The total projected workload is 35,610 hours. Kewaunee County would have 88% of this total, or 31,180 hours. Brown County would have the remainder, or 4,430 hours.

Most of these hours (86% or 31,000 hours) are for technical assistance activities. These include: landowner contacts; cost-share agreement development; conservation planning; practice design, installation, and certification; cost-share agreement review; and BMP maintenance checks.

Project management activities are expected to be split with 90% of the work resting with the project manager and 10% contributed by Brown County. The total project management hours are expected to be 3,500 hours.

The DMAs, with SCS, will have the majority of the project management and technical assistance responsibilities.

The financial management activities are expected to take approximately 1,400 hours to complete. The number of hours necessary to complete the fiscal management tasks will be dependent on the number of landowners who sign cost-share agreements. As an estimate, if 217 landowners sign cost-share agreements, approximately 1,410 hours of fiscal management time will be needed spread over the eight year project life, most likely peaking in the third, fourth and fifth years of the project. This estimate is based on .5 hour for the development of the paperwork for each cost-share agreement, and three reimbursement requests per cost-share agreement at two hours each. Nine hundred and forty hours of effort would be required by the Kewaunee County ASCS office and 470 hours by the Brown County ASCS office.

For information and education, the activities and subsequent hours are greatest during the first three years of the project and taper off towards the later years. UWEX will be responsible for the majority of the educational activities, hours and costs.

Table 20
Estimated Technical Assistance Hours at Projected Level of Landowner Participation[1]

Activity	Total Watershed Needs		County Need[2]	Rate (hrs/unit)	County Hours	Total Watershed Hours
Landowner Contacts[3]	263	K	180	6 hr/ea	1,080	1,580
		B	83		500	
Pre-contact Office Inventory Review	263	K	180	.25 hr/ea	50	70
		B	83		20	
Cost-Share Agreement Development	217	K	145	2 hr/ea	290	440
		B	72		150	
Conservation Planning[4]	7,200 ac	K	6,480 ac	.4 hr/ac	2,590	2,880
		B	720 ac		290	
Project Management		K			3,150	3,500
		B			350	
SUBTOTAL		K			7,160	8,470
		B			1,310	
Practice Design and Installation[5]						
Contour Strips (Including Field Strips)	3,950 ac	K	3,661 ac	.75 hr/ac	2,746	2,963
		B	289 ac		217	
Diversions	15,000 ft	K	15,000 ft	.02 hr/ft	300	300
		B				
Terraces	141,182 ft	K	126,684 ft	.03 hr/ft	3,800	4,235
		B	14,498 ft		435	
Waterways	274 ac	K	263 ac	29 hr/ac	7,627	7,946
		B	11 ac		319	
Minimum Tillage	928 ac	K	705 ac	.1 hr/ac	71	93
		B	223 ac		22	
Grade Stabilization	66	K	64	18 hr/ea	1,152	1,188
		B	2		36	
Critical Area Stabilization						
Sediment Control	1,230 ac	K	1,192 ac	.1 hr/ea	119	123
		B	38 ac		4	
Sinkhole/Crevice Mgmt.	10 ac	K	10	48 hr/ea	480	480
		B				

Activity	Total Watershed Needs		County Need[2]	Rate # hrs/unit	County Hours	Total Watershed Hours
Barnyard Runoff	68	K	52	35 hr/ea	1,820	2,380
		B	16		560	
Manure Storage	84	K	71	60 hr/ea	4,260	5,040
		B	13		780	
Streambank Fencing	23,438 ft	K	19,500 ft	.01 hr/ft	195	234
		B	3,938 ft		39	
Livestock Crossing	8	K	6	12 hr/ea	72	96
		B	2		24	
Subtotal of Practice Design and Installation		K			22,640	25,080
		B			2,440	
Financial Management	217 Contracts	K	145	6.5 hr/ea	940	1,410
		B	72		470	
Cost Share Agreement Review with Landowner	217 Contracts	K	145	1 hr/ea	145	217
		B	72		72	
BMP Maintenance Check	217 Contracts	K	145	2 hr/ea	290	430
		B	72		140	
TOTAL HOURS		K			31,180	35,610
		B			4,430	

[1]Participation Level for each practice is calculated to be 75% of the Category I and II sources, and 25% of the Category III sources. This table is to be used to estimate workloads for the project only, and will not limit the actual workload that develops during project implementation.

[2]K = Kewaunee County; B = Brown County

[3]Assumes 3 contacts per landowner @ 2 hr/contact.

[4]Watershed needs include only those acres losing over 3 T/A/YR for landowners in Management Categories I-III for cropland.

[5]Rates (hr/unit) include both design and installation. Where the rates for any one practice vary, such as for grade stabilization, sinkhole-crevice management, or for strips and diversions (available with and without tile), a weighted average rate was developed.

At this time, both the Brown and Kewaunee County LCC have staff that can satisfy some of the project workload. The Kewaunee County LCC has about 3,450 staff hours each year that are flexible for use in various programs. It is not reasonable to assume that all of this effort would be put into the Kewaunee River Watershed, since other portions of the county need attention as well. It is expected, however, that a minimum of 1,690 hours will be made available for work in the watershed. This minimum level of project activity is called the "county base level" and takes into account several factors. These include 1) the proportion of the county that occurs in the watershed, 2) the number of "flexible" staff hours (SCS and County), and a redirection of some additional staff time into the watershed to acknowledge that the area is a priority to the county. Work done by the county above this base level will be supported with grants from the Wisconsin Fund Program.

For Brown County, the available staff time equals 4,700 hours annually, but because the proportion of the county in the watershed is so small, the "base level" is only 338 hours. Brown County will also be reimbursed for work done above this base level of activity.

The county base level is reviewed, and if necessary, adjusted annually to reflect current conditions.

SCHEDULING TECHNICAL ASSISTANCE

In order to assess the need for additional staff to complete the watershed project, the total workload was scheduled out over an eight year period. Table 21 shows the schedule. (This table does not include I & E activities or fiscal management activities, since staffing in these areas comes from UW-Extension and ASCS, respectively.) Figures 8 and 9 show this same information for Brown and Kewaunee Counties.

The figures show that at different times during the project there will be a need for staff with different abilities. In the first three years, the major portion of the work is with landowner contacts and planning practices. After that period, design, installation and certification of the practices make up the major portion of the effort.

Table 21

Scheduling Technical Assistance Hours Over 8 Year Project Life - Projected Participation Level[1]

Activity[2]	Total Project Hours (K)	Total Project Hours (B)	Project Year 1 (K)	Project Year 1 (B)	Project Year 2 (K)	Project Year 2 (B)	Project Year 3 (K)	Project Year 3 (B)	Project Year 4 (K)	Project Year 4 (B)	Project Year 5 (K)	Project Year 5 (B)	Project Year 6 (K)	Project Year 6 (B)	Project Year 7 (K)	Project Year 7 (B)	Project Year 8 (K)	Project Year 8 (B)
Land Owner Contact	1,080	500	500	230	350	160	230	110	-	-	-	-	-	-	-	-	-	-
	1,580 hours		730 hours		510 hours		340 hours											
Pre-contact Office Inventory	50	20	50	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	70 hours		70 hours															
Conservation Planning	2,590	290	863	97	863	97	863	97	-	-	-	-	-	-	-	-	-	-
	2,880 hours		960 hours		960 hours		960 hours											
Cost Share Agreement Dev.	290	150	97	50	97	50	96	50	-	-	-	-	-	-	-	-	-	-
	440 hours		147 hours		147 hours		147 hours											
Design & Installation	22,640	2,440	527	200	2,282	300	2,597	400	4,215	750	4,545	500	4,040	100	3,655	100	775	100
	25,080 hours		727 hours		2,582 hours		2,997 hours		4,965 hours		4,945 hours		4,140 hours		3,755 hours		875 hours	
Cost-share Agreement Review; BMP Maintenance Check	440	210	-	-	25	20	50	30	125	50	125	50	50	40	30	10	30	10
	650 hours				45 hours		80 hours		175 hours		175 hours		90 hours		40 hours		40 hours	
Project Management	3,150	350	550	60	550	60	550	60	550	60	400	50	300	30	125	15	125	15
	3,500 hours		610 hours		610 hours		610 hours		610 hours		450 hours		330 hours		140 hours		140 hours	
TOTAL	30,240	3,960	2,587	657	4,167	687	4,386	747	4,890	860	5,050	600	4,390	170	3,810	125	930	125
	34,200 hours		3,244 hours		4,854 hours		5,133 hours		5,750 hours		5,650 hours		4,560 hours		3,935 hours		1,055 hours	

[1]The projected level of participation includes 75% of the landowners with category I or II management needs, and 25% of the landowners having category III management needs.

[2]Information/Education and Financial Management activities are not included since they are being treated as out-of-pocket expenses.

Figure 8. Distribution of Estimated Technical Assistance and Project Management Hours at the Expected Level of Landowner Participation over an Eight Year Project Period — Brown County

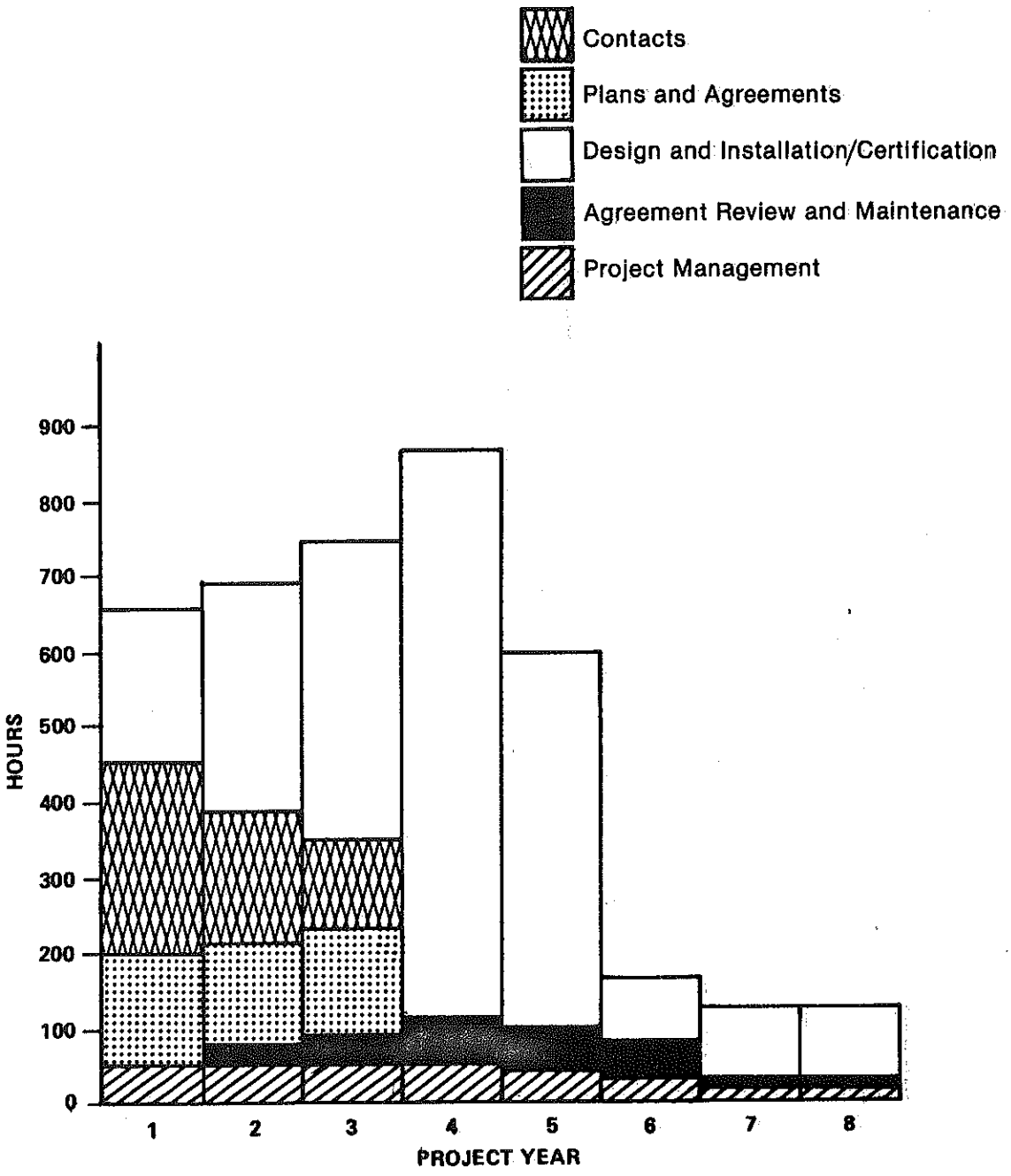
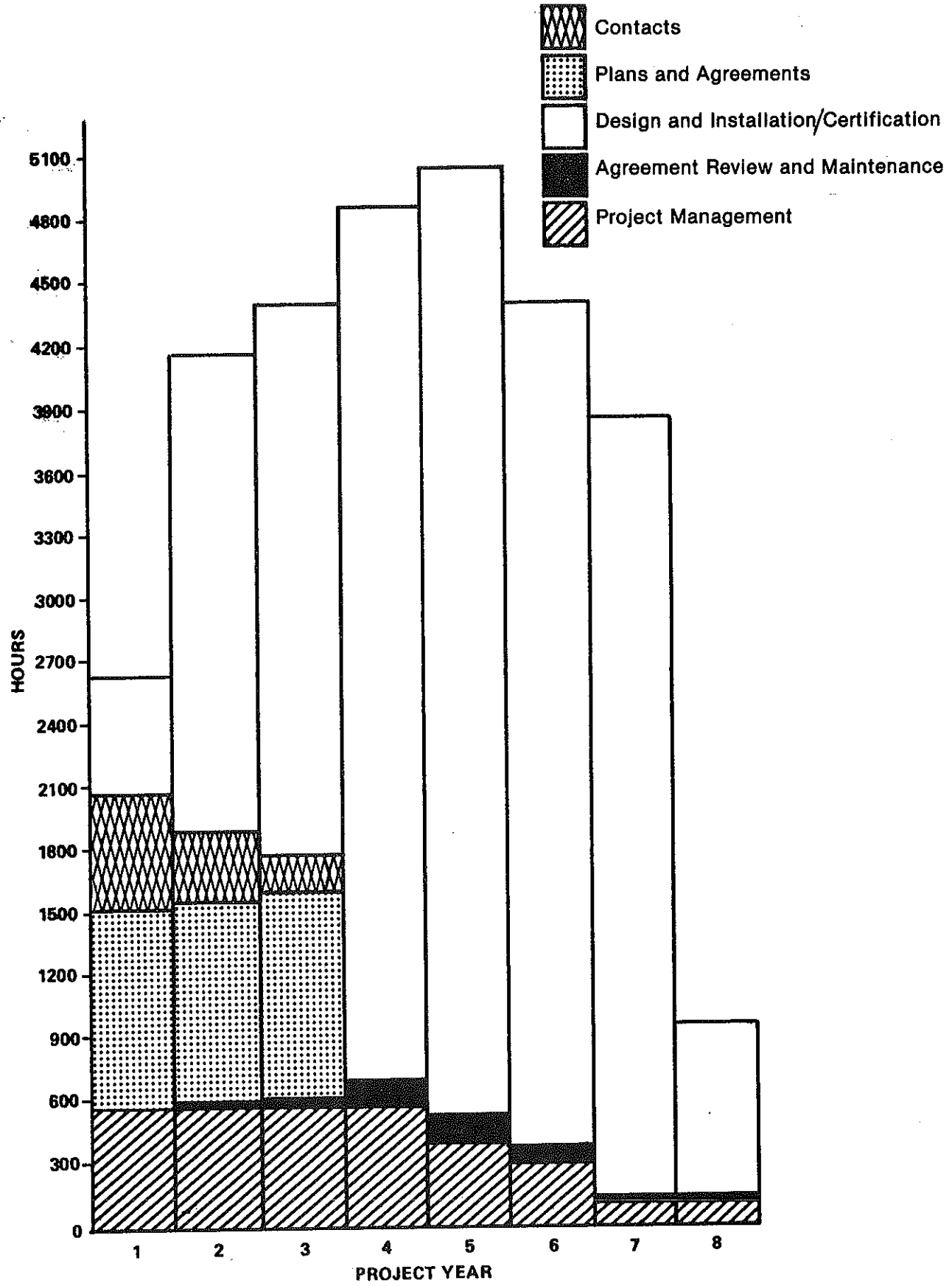


Figure 9. Distribution of Estimated Technical Assistance and Project Management Hours at the Expected Level of Landowner Participation over an Eight Year Project Period — Kewaunee County



Tables 22 and 23 show these annual estimated workloads for each county in relation to the counties' "available staff levels" and county base levels. At the projected level of landowner participation,

Table 22 shows that Kewaunee County will need to work above its base level in order to complete the project. The workload above the base level is projected to be significant equaling from .5 to 1.9 employee equivalents per year. The estimated workload also exceeds the "available staff time" by up to 1 employe equivalent per year. This indicates that Kewaunee County will likely need to shift some of its available staff time into the watershed so that it is working above its base level, and possibly hire an additional staff person for work in the watershed as the workload develops.

Table 23 shows that Brown County will also need to work above its base level but to a much lesser degree (about the equivalent of .2 employes per year). Most likely, this additional work can be handled either through using existing staff or through a cooperative arrangement with Kewaunee County.

Table 22
ANTICIPATED NEED FOR ADDITIONAL STAFF IN KEWAUNEE COUNTY TO COMPLETE THE WORKLOAD FOR THE KEWAUNEE RIVER PRIORITY WATERSHED PROJECT

	Hours By Project Year							
	1	2	3	4	5	6	7	8
County Workload (A)	2587	4167	4386	4890	5050	4390	3810	930
County Base Level (B)	1690	1690	1690	1690	1690	1690	1690	1690
Available County Staff (C)	3450	3450	3450	3450	3450	3450	3450	3450
Workload in Excess of County Base Level (A-B)	897	2477	2696	3200	3360	2700	2120	0
FTE Equivalent[1]	.5	1.4	1.5	1.8	1.9	1.5	1.2	0
Workload in Excess of Available County Staff (A-C)	0	717	936	1400	1600	940	360	0
FTE Equivalent	0	.4	.5	.8	.9	.5	.2	0

[1] 1 FTE is equivalent to 1800 hours annually. FTE standards for "Full Time Employe".

Table 23
ANTICIPATED NEED FOR ADDITIONAL STAFF IN BROWN COUNTY TO COMPLETE THE WORKLOAD FOR THE KEWAUNEE RIVER PRIORITY WATERSHED PROJECT

	Hours By Project Year							
	1	2	3	4	5	6	7	8
County Workload (A)	657	687	747	860	600	170	125	125
County Base Level (B)	338	338	338	338	338	338	338	338
Available County Staff (C)	4700	4700	4700	4700	4700	4700	4700	4700
Workload in Excess of County Base Level (A-B)	319	349	409	322	262	0	0	0
FTE Equivalent[1]	.2	.2	.2	.2	.1	0	0	0
Workload in Excess of Available County Staff (A-C)	0	0	0	0	0	0	0	0
FTE Equivalent	0	0	0	0	0	0	0	0

[1] 1 FTE is equivalent to 1800 hours annually. FTE standards for "Full Time Employe".

PROGRESS EVALUATION

Project progress will be evaluated and reported quarterly. Annually, more detailed evaluations will be conducted by DNR and the LCC's.

PLAN REVIEW

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

This watershed plan was written with the best information available at the time of its preparation. Situations and conditions may change during the implementation of this plan which may require changes in this document. The plan may be revised at any time upon agreement by both the DMA's and the Department of Natural Resources.

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APPENDIX A

DESCRIPTION OF BEST MANAGEMENT PRACTICES

Cost-sharing for Best Management Practices

I. Introduction

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

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

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

II. Cost-share rates

The Department of Natural Resources [redacted] is required to identify a maximum cost-sharing rate for each best management practice. The maximum cost-sharing rate identified in this booklet represents a ceiling. Local designated management agencies may use any rate at or below the ceiling.

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

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

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

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

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

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

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

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

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

Table 1.

		Effectiveness	Capital Cost	Private On-site Benefit	Relationship to Customary Operating Practices	Maximum State Cost-sharing
C1	Contour Cropping	High	Low	Moderate	Moderate	50%***
C2	Strip Cropping	High	Low	Moderate	Moderate	50%***
C3	Diversions	High	Moderate	Moderate	Low	70%
C4	Terraces	High	Moderate	Moderate	Low	70%
C5	Waterways	High	Moderate	Moderate	Moderate	70%
C6	Minimum Tillage	High	Low	Moderate	High	50%***
M1	Critical Area Stabilization	High	High	Low	Low	70%*
M2	Grade Stabilization Structure	High	High	Low	Low	70%*
M3	Shoreline Protection	High	High	Low	Low	70%*
M4	Settling Basins	High	High	Low	Low	70%*
L1	Barnyard Runoff Management	High	Moderate	Moderate	Low	70%
L2	Manure Storage Facilities	High	High	Moderate	Moderate	70%**
L3	Livestock Exclusion From Woodlots	High	Low	Low	Moderate	50%
U1	Leaf Collection	High	Low	Low	High	50%
U2	Street Sweeping	Moderate	Low	Low	High	50%
U3	Infiltration System	Moderate to High	Moderate	Low	Low	70%

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

* May be increased to 80% according to the conditions in section II
** A dollar ceiling of $6,000 is set for priority watershed projects

*** A flat rate per acre equal to the cost-share rate applied to an average installation may be used

III. General Policies

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

2. Rural and urban areas are eligible.

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

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

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

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

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

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

   a. are normally and routinely used in growing crops

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

   c. have drainage of land as the primary objective

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

   *This does not include construction of best management practices.

IV. Best Management Practices Eligible for Cost-Sharing

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

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

C1 Contour Cropping

Maximum cost-share rate 50%
or flat rate per acre $6.00

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

Conditions:

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

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

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

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

   b) A winter cover crop must be established; or

   c) Protective tillage operations must be performed.

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

Specifications: SCS technical guide specifications 330 and 344

9/79

C2 Strip cropping

Maximum cost-share rate 50%
or flat rate per acre $12.00

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

Conditions:

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

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

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

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

   b) A winter cover crop must be established; or

   c) Protective tillage operation must be performed.

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

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

9/79

C3 Diversions Maximum cost-share rate 70%

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

Conditions:

1. An adequate outlet must exist.
2. Cost-sharing is authorized for:
   a) Diversions, ditches, dikes or subsurface drains. Cost-sharing for subsurface drains is limited to areas on sloping land where the internal water seeps to the surface and causes the land or cover to lose its stability.
   b) Installation of structures such as pipe, underground outlets, or other outlets, if needed, for proper functioning to a ditch or dike, for more even flow, or to protect outlets from erosion.
   c) Necessary leveling and filling to permit installation of an effective system.
   d) Removing obstructions necessary to permit establishment of the practice.
3. Cost-sharing is not authorized for ditches or dikes designed to impound water for later use, or which will be a part of a regular irrigation system.
4. The system must be maintained for a minimum of 15 years following the year of installation.

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

9/79

C4 Terrace Systems Maximum cost-share rate 70%

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

Conditions:

1. Cost-sharing is authorized for:
   a) Terraces and the necessary leveling and filling to permit installation of an effective system.
   b) Removal of obstructions necessary to permit installation of an effective system.
   c) Materials and installation of underground pipe outlets and other mechanical outlets.
   d) Converting the present system to a new system only if the present system is not serving its intended conservation purpose. Cost-sharing will not be authorized if the sole purpose of the conversion is to accommodate changes in cropping patterns or equipment used by the farmer.
2. A protective outlet or waterway is required.
3. The system shall be maintained for a minimum of 20 years following the year of installation.

Specifications: SCS Technical Guide specifications 412, 600 and 606

9/79

C5 Waterways

Maximum cost-share rate 70%

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

Conditions:

1. Cost-sharing is authorized for site preparation, grading, shaping, filling, and establishing permanent vegetative cover. Cost-sharing is also authorized for subsurface drains necessary for proper functioning of the waterway.
2. The cover may consist of sod-forming grasses, legumes, mixtures of grasses and legumes or other types of vegetative cover that will provide the needed protection from erosion.
3. Close-sown small grains, annuals or mulching may be used for temporary protection if followed by eligible permanent vegetative cover established by seeding or natural revegetation.
4. The practice shall be maintained for a minimum of 10 years following the year of installation.

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

9/79

C6 Minimum tillage system (Conservation tillage)

Maximum cost-share rate 50%
or flat rate per acre $8.00

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

Conditions:

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

Specifications: SCS Technical Guide specification ~~478~~ 329

9/79

L1 Barnyard Runoff Management

Maximum cost-share rate 70%

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

Conditions:

1. Cost-sharing is authorized for:

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

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

   c) Permanent fencing.

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

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

9/79

L2 Manure Storage Facilities

Maximum cost-share rate 70% up to a maximum of $6,000.00

Definition: A structure for temporary storage of manure.

Conditions:

1. Cost-sharing is authorized for:

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

2. Cost-sharing is not authorized for:

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

   b. Portable pumps and other portable equipment;

   c. Buildings or modifications to buildings;

   d. Equipment for spreading or incorporating manure; and

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

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

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

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

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

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

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

Specifications: SCS Technical Guide specifications 313, 425 and 359

9/79

L3 Livestock Exclusion from Woodlots* Maximum cost-share rate 50%

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

Conditions:

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

Specifications: SCS Technical Guide specifications 382, 472.

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

9/79

M1 Critical Area Stabilization Maximum cost-share rate 70%

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

1. Cost-sharing is authorized for:

   a) Permanent fencing to protect the site.

   b) Planting trees, shrubs, perennial grass cover.

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

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

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

9/79

M2 Grade Stabilization Structures Maximum cost-share rate 70%

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

Conditions:

1. Cost-sharing is authorized for:

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

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

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

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

9/79

M3 Shoreline Protection (Streambank Protection) Maximum cost-share rate 70%

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

Conditions:

1. Cost-sharing is authorized:
   a) For permanent fencing to protect banks from damage by domestic livestock.
   b) For planting trees, shrubs, perennial grass cover as filter strips or buffer zones along banks.
   c) To limit livestock access to water.
   d) To install livestock and machinery crossings that will minimize disturbance of the stream channel and banks.
   e) For placement of riprap and other materials on the bank when other practices are not practical.
   f) For shaping and smoothing banks prior to the installation of protective structures or plantings.
2. Livestock must be excluded from the sloped and planted area.
3. The practice shall be maintained for a minimum of 10 years following the calendar year of installation.

Specifications: SCS Technical guide specifications 326, 382, 580 and 342

9/79

M4 Settling Basin Maximum cost-share rate 70%

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

Conditions:

1. Cost-sharing is authorized:
   a) For detention or retention structures, such as erosion control dams (excluding water storage type dams), desilting reservoirs, sediment basins, debris basins, or similar structures.
   b) For channel linings, chutes, drop spillways, and pipe drops that dispose of excess water.
   c) For fencing and vegetative cover (including mulching needed to protect the structure) and for leveling and filling to permit the installation of the structure.
2. Cost-sharing is not authorized for structures with a primary purpose of flood control or creation of a permanent pool.
3. The structure must be maintained for a minimum of 25 years following the year of installation.

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

9/79

U1 Leaf collection

Maximum cost-share rate 50%

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

Conditions:

1. Cost-sharing is authorized for equipment (or prorated portion of time that equipment is used) or manpower required to increase the frequency and/or efficiency of vegetative matter collection for a one-year period.
2. Cost-sharing for this practice will not be approved for a municipality more than once.
3. The practice must be maintained for a minimum of 5 years after the initial year.

9/79

U2 Street sweeping

Maximum cost-share rate 50%

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

Conditions:

1. Cost-sharing is authorized for equipment (or prorated portion of time that equipment is used) and manpower required to increase street sweeping efficiency or frequency to more than once every two weeks during the period of April 1 to November 1 for a one-year period.
2. Cost-sharing for this practice will not be approved for a municipality more than once.
3. The practice must be maintained for a minimum of 5 years after the initial year.

9/79

U3 Infiltration systems

Maximum cost-share rate 70%

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

Conditions:

1. Cost-sharing is authorized for:
   a) excavation, grading and shaping;
   b) construction materials and
   c) installation of materials
2. Cost-sharing is not authorized for the portion of the total costs normally associated with conventional systems (i.e. costs associated with conventional paving of parking lots or roadways is not considered as an eligible cost).
3. The practice must be maintained for a minimum of 10 years after the year of installation.

9/79

V. Substitute Practices

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

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

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

VI. Best Management Practices not Eligible for Cost-sharing

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

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

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

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

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

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

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

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

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

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

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

S-1 Special or substitute practice - Conservation tillage on croplands planted in row crops year after year. (A separate practice from C-6, Minimum Tillage.)

(a) Description: Tillage and/or planting practices which leave roughened surfaces and substantial amounts of crop residue on the soil surface after crops are planted. Croplands planted in row crops year after year are defined as fields where corn, soybeans or other crops grown in rows are normally grown on that specific field at least four out of five years. The installation period of the practice is considered to be three years. Chisel systems ridge or till-plant systems and disking systems are included under the definition of conservation tillage. "No-till" systems can be used only if conditions which limit runoff of nutrients and pesticides are included. Specific conditions for use of "no-till" systems will be identified in the appropriate Priority Watershed Plan.

(b) Conditions

1. Cost-sharing shall be based on the custom rate for the tillage and planting operations as well as any increased costs needed to establish the practice. The maximum installation costs are identified below.

2. Cost-sharing shall not be authorized where a satisfactory tillage system is currently used, [redacted] or another suitable practice may be installed at a lower cost. Separate and additional cost-sharing for contour cropping is not authorized.

3. The practice must be operational and certified the third year of the installation period. Payments for the first and second years may only be made if the appropriate system is used and appropriate levels of surface cover are achieved. Appropriate systems are defined in section (c).

   For example, if the appropriate system is used and the appropriate level of surface cover and other requirements are achieved the first year, the cost-sharing payment will be made. If requirements are not achieved in the first year, cost-sharing payment will not be made that year. Then if the requirements are achieved in the second year, payments for the first and second year will be made, etc.

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

5. The designated management agency with the advice of UW-Extension, may approve the use of a moldboard plow or other tillage or cultivation implement not normally part of the minimum tillage system once during the maintenance period, if required to alleviate insect, weed, or disease problems. (This applies to the dormant season, it is not intended as a restriction on the use of cultivation equipment during the growing season.) The above mentioned implements may be used only upon written approval by the designated management agency.

6. Any conservation tillage method used must conform to the following conditions:

   1) Insecticides (except for needed mid-season insecticides) and phosphorus fertilizers must be applied through injection, in row applied, or incorporated in some manner in order to prevent runoff. They may not be surface applied with no form of incorporation.

   2) Manure spreading is not allowed without some form of incorporation.

   3) If a surface crust forms, which retards water infiltration, the crust must be broken up.

(c) Cost-sharing applies to the systems using one primary tillage pass in the fall or spring and one or two passes with a light or secondary tillage equipment prior to planting. The tillage and planting should be on the contour or across slope if it is not practical to till and plant on the contour. Regardless of what conservation tillage method is used, at least 30 percent surface cover should be remaining after planting during a normal year.

Examples of eligible systems are as follows:

1. Chisel plowing in the fall or spring with one or two uses of a secondary tillage implement (light disk, cultivator) before planting. The plowing and planting must be on contour or across slope.

2. Ridge or till-plant systems on the contour or across slope.

3. Disking in the fall of spring with a light disk before planting on the contour or across slope.

4. "No-till" systems with specific conditions for use are identified in a Priority Watershed Plan.

(d) Rates

Year of Installation Period	Installation Cost per Acre	Cost-Share %	Cost-share Rate Per Acre
1	$30	70	$21
2	$30	50	$15
3	$30	30	$ 9
Total	$90	150	$45

(Practice C-6 Minimum Tillage applies for minimum tillage systems using additional passes of tillage equipment prior to planting or minimum tillage used with crop rotations.)

APPENDIX B

FORMS USED IN A WATERSHED PROJECT

Nonpoint Source Grant Agreement (Form 3400-67)

This form is used to convey cost-sharing money for the installation of practices from the Department to the Lead Designated Management Agency. It is in effect for the duration of the project. The amount of the grant increases as the amount of money encumbered increases. The grant is signed by the Department of Natural Resources and the Lead Designated Management Agency.

Local Assistance Agreement

The Local Assistance Agreement is signed by the Department and the Lead DMA. This agreement outlines what the reimbursement will be to the project for the additional staff needs. It defines the work which needs to be done by the county to implement the project and what the reimbursement for that work will be. The agreement is usually for one year and is renegotiated each year.

Request for Advance or Reimbursement (Form 3200-54)

The county uses this to request their initial "advance" money for cost-sharing funds or to reimburse their cost-sharing account when they have paid landowners for the installation of practices. When used for reimbursment purposes the form must be accompanied by a contractor's itemized invoice, evidence of payment by the landowner, and a copy of the Practice Certification Form (see below).

Landowner Tracking Sheet (No Form Number)

This form has many uses. It is filled out before a landowner contact is made. It indicates the conditions of an individual's land according to the inventory. After a contact it should show any changes in the land from the inventory data. It is also used to justify any changes in a landowner's eligibility status. Finally, if the landowner signs a cost-share agreement it indicates the changes in nonpoint source conditions due to the agreed upon best management practices.

Cost-Share Agreement (Form 3400-68)

This form is signed by the county and the landowner. It outlines the needed practices, the locations of the practices, the estimated total cost, cost-share rate, and cost-share amount; the scheduled year of installation, and the practice maintenance period. The form also describes the responsibilities of both the landowner and the designed management agency. This is a binding contract betwen the two parties.

Cost-Share Agreement Amendment (Form 3400-68A)

This form is used whenever there is a need to change a cost-share agreement. Examples of changes needing an amendment are deletion or addition of a practice, and a change in the cost of a practice by more than $500.00. This form must be signed by the landowner and the DMA before the change becomes effective.

Cost-Share Calculation and Practice Certification (Form 3200-53)

There are two functions served by this form. It is filled out by the county and sent to the Department when requesting reimbursement for cost-share funds. The first part of the form is simply the calculation for the amount of cost-share money the landowner received and is being requested for reimbursement. The second part is the county's certification that the practices on the form meet the required specifications. This replaces the ACP 247 certification form.

State of Wisconsin
Department of Natural Resources

NONPOINT SOURCE GRANT AGREEMENT
Section 144.25, Wis. Stats.
Form 3400-67 Rev. 5-82

Wisconsin Nonpoint Source Water Pollution Abatement Program

☐ Priority Watershed Project

☐ Local Priority Project

PART I. Purpose

To set out the conditions and restrictions under which the Wisconsin Department of Natural Resources (Department) will reimburse

_____,

lead designated management agency (DMA), for funds used for the cost-sharing of best management practices (BMP) to control nonpoint sources of water pollution through the _____

_____ project.

PART II. Grant Administration Data

1. Designated Management Agency/Recipient

2. Authorized Representative

Title

3. Street or Route

City, State, Zip Code

4. Telephone Number (Include Area Code)

5. Grant Number

6. Department District

7. Maximum Grant Amount

8. Eligible Period for Entering Into Cost-Sharing Agreements

9. Installation Period

_____ Years from the signing of the cost-sharing agreement

10. Grant Period

From _____ Through _____

11. Eligible Costs

Eligible costs are those costs incurred for the installation of the BMPs listed on line 12 of part II on the sites listed on line 13 of part II. Costs for BMPs whose installation is started before the signing of a cost sharing agreement between the landowner or user and the DMA are not eligible costs. Costs for BMPs which do not meet the specifications and conditions of sec. NR 120.13, Wis. Admin. Code, are not eligible costs.

12. **Eligible Best Management Practices**

13. **Eligible Sites**

PART III. Conditions

The Department and the DMA, in mutual consideration of the provisions of this document, do hereby agree as follows:

1. This agreement is subject to the provisions of Section 144.25, Wis. Stats.
2. This agreement is subject to the provisions of Chapter NR 120, Wis. Admin. Code.
3. The Department shall reimburse the DMA for a percentage of each eligible cost incurred by the DMA during the grant period listed on line 10 of part II. The amount of each eligible cost to be reimbursed shall be determined in accordance with sec. NR 120.14, Wis. Admin. Code. The total amount reimbursed by the Department shall not exceed the maximum grant amount listed on line 7 of part II. The DMA shall provide the Department with itemized payment requests on forms to be provided by the Department.
4. All amendments to this agreement shall be executed in writing and be mutually agreed upon between the Department and DMA.
5. The DMA shall use the cost-sharing agreement form provided by the Department for all contracts reimbursable through this agreement.
6. The DMA shall document that all best management practices for which reimbursement is requested under this agreement meet the technical specifications and design criteria identified in Section NR 120.10(4), Wis. Admin. Code, and any other conditions set out in this agreement.
7. Quarterly during the grant period, the DMA shall submit a progress report to the Department including the following:
   A. The number of cost-sharing agreements signed during that quarter;
   B. The number of eligible grant recipients who have indicated an interest in entering into a cost-sharing agreement during that quarter, but have not done so;
   C. The amount of funds included in cost-sharing agreements during that quarter;
   D. The number or units of each best management practice included in cost-sharing agreements during that quarter;
   E. The number or units of each best management practice installed during that quarter; and
   F. Other measurements of participation or accomplishment agreed upon by the DMA and the Department.
8. DMA accountability.
   A. Financial management. The DMA is responsible for maintaining a financial management system which shall adequately provide for:
      (1) Accurate, current and complete disclosure of the financial results of each cost-sharing agreement awarded in accordance with generally accepted accounting principles and practices, consistently applied, regardless of the source of funds.
      (2) Records which identify adequately the source and application of funds for grant-supported activities. These records shall contain information pertaining to grant awards and authorizations, obligations, unobligated balances, assets, liabilities, outlays and income.
      (3) Effective control over and accountability for all project funds, property, and other assets.
      (4) Comparison of actual with budgeted amounts for each grant.
      (5) Procedures for determining the eligibility and allocability of costs in accordance with the provisions of Sections NR 120.10 and NR 120.12, Wis. Admin. Code.
      (6) Accounting records which are supported by source documentation.
      (7) Audits to be made by the DMA or at its direction to determine, at a minimum, the fiscal integrity of financial transactions and reports, and the compliance with the terms of the grant agreement. The DMA shall schedule such audits with reasonable frequency, usually annually, but not less frequently than once every 2 years, considering the nature, size and complexity of the activity.
      (8) A systematic method to assure timely and appropriate resolution of audit findings and recommendations.
   B. Records. The following record and audit policies are applicable to this grant and to all cost-sharing agreements awards under this grant.
      (1) The DMA shall maintain books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly:
         (A) The amount, receipt, and disposition by the DMA of all assistance received for the project, including both state assistance and any matching share or cost-sharing; and
         (B) The total costs of the project, including all direct and indirect costs of whatever nature incurred for the performance of the project for which this grant has been awarded. In addition, contractors of DMAs, including contractors for professional services, shall also maintain books, documents, papers, and records which are pertinent to this grant award. The foregoing constitute "records" for the purposes of this section.

(2) The DMA's records and the records of its contractors, including professional services contracts, shall be subject at all reasonable times to inspection, copying, and audit by the Department.

(3) The DMA and contractors of DMAs shall preserve and make their records available to the Department:

(A) Until expiration of 3 years from the date of final settlement, or

(B) For such longer periods, if required by applicable statute or lawful requirement; or

(C) If a grant is terminated completely or partially, the records relating to the work terminated shall be preserved and made available for a period of 3 years from the date of any resulting final termination settlement.

(4) Records which relate to appeals, disputes, litigation on the settlement of claims arising out of the performance of the project for which a grant was awarded, or costs and expenses of the project to which exception has been taken by the Department or any of its duly authorized representatives, shall be retained until any appeals, litigation, claims or exceptions have been finally resolved.

C. Audit.

(1) Preaward or interim audits may be performed on grant applications and awards.

(2) A final audit shall be conducted after the submission of the final payment request. The time of the final audit will be determined by the Department and may be prior or subsequent to final settlement. Any payment made prior to the final audit is subject to adjustment based on the audit. DMAs and subcontractors of DMAs shall preserve and make their records available pursuant to condition 8B of part III of this agreement.

9. This agreement will remain in effect beyond the grant period described in part II, line 10 through the maintenance period for all best management practices cost-shared. During the grant period, either the DMA or the Department may on thirty (30) days written notice, unilaterally and without cause, shorten the grant period of this agreement without liability, except that: (1) the Department shall reimburse the DMA for all eligible costs incurred against cost-sharing agreements signed before the final date of the amended grant period, (2) the DMA annually shall report to the Department as described in condition 7 of part III of this agreement, (3) the DMA shall be accountable to the Department as described in condition 8 of part III of this agreement, and (4) the DMA shall enforce all provisions of all cost-sharing agreements in effect as of the final date of the grant period.

10. In connection with the performance of work under this agreement, the DMA agrees not to discriminate against any employe or applicant for employment because of age, race, religion, color, handicap, sex, physical condition, developmental disability as defined in Section 51.01(5), Wis. Stats., or national origin. This provision shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The DMA agrees to post in a conspicuous place available for employes and applicants for employment, notices to be provided by the Department setting forth the provisions of this clause.

11. Disputes regarding quality and quantity may be settled by arbitration in accordance with Chapter 298, Wis. Stats., if the party alleging such a dispute notifies the other party in writing thereof within ten (10) days after the notifying party became aware of, or reasonably could have become aware of, such dispute.

State of Wisconsin
Department of Natural Resources

By _____

Date Signed _____

Authorized Representative of Lead
Designated Management Agency

By _____

Date Signed _____

GLOSSARY 0016 (P)

LOCAL ASSISTANCE AGREEMENT FOR
_____ PRIORITY WATERSHED PROJECT

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
_____ COUNTY

This agreement is entered into by and between the Wisconsin Department of Natural Resources (hereinafter referred to as the Department) and _____ County acting as the lead designated management agency under section NR 120.02(8), Wisconsin Administrative Code (hereinafter referred to as the County).

I. PURPOSE OF THIS AGREEMENT

The purpose of this agreement is to identify the circumstances under which the Department will reimburse the County for completing tasks, over and above a base level, necessary to implement the _____ Priority Watershed Plan in accordance with the detailed program for implementation developed as part of that plan. Only tasks over and above the base level, consistent with this agreement, are reimbursed by the Department.

II. PROJECT LIAISONS

For Department: John G. Konrad, Chief
Nonpoint Source Section
Bureau of Water Resource Management
Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921

For County: _____
_____
_____
_____

III. DURATION OF AGREEMENT: _____

IV. MAXIMUM REIMBURSEMENT AMOUNT: $ _____

V. GUARANTEED MINIMUM REIMBURSEMENT AMOUNT: $ _____

VI. CONDITIONS:

A. The general conditions for conduct of local assistance activities are those appearing in sections NR 120.50 through NR 120.53 of the Wisconsin Administrative Code.

B. Tasks completed prior to _____, are not eligible for reimbursement under this contract.

C. The project base level is determined to be _____ hours for the duration of this agreement using the procedure identified in Section NR 120.52(3)(a), Wisconsin Administrative Code based on professional staff levels of the Land Conservation Committee and the Soil Conservation Service.

D. The accelerated task hours are all hours associated with eligible tasks greater than the project base level of hours.

E. All subcontracts shall be submitted to the Department for review prior to signing of the subcontract.

F. Landowner or land user contacts under technical assistance are covered under this agreement only when the lands are within the priority management area identified in the priority watershed plan and are anticipated to have significant nonpoint sources.

G. Conservation plan development is covered under this agreement as follows:

1. For the "most critical" landowners,, as defined in Section VII, conservation planning is eligible for reimbursement independent of a signed cost-share agreement.

AND

2. For all other landowners, conservation planning is eligible for reimbursement only when an agreement is reached with the landowner or land user to install all the necessary best management practices.

H. Design, installation and certification of best management practices is covered under this agreement only for landowners and practices identified as eligible in the _____ Priority Watershed Plan providing:

1. The practices are included in a cost-share agreement (DNR Form 3400-68 or 3400-68A)

OR

2. A written agreement is reached between the County and the landowner or land user to install and maintain the best management practices necessary to control all the critical nonpoint sources on the landowner's/land user's property in accordance with the conditions in NR 120 and the _____ Priority Watershed Plan. This does not include practices designed and installed under the federal ACP program.

VII. SCOPE

This agreement covers the tasks listed in Tables 1, 2, 3, and 4 provided they are carried out within the priority management area identified in the _____ Priority Watershed Plan and meet the intent of that plan.

For purposes of this agreement, "most critical" landowner is defined in the _____ Priority Watershed Plan to be:

Table 1. Technical Assistance Tasks and Hours Per Task

TASK	AGREED UPON EFFORT PER TASK
1. Contacts	(See Section VIII, Line A.1)
2. Precontact Review of Landowner Information	" "
3. Cost-Share Agreement Development	" "
4. Conservation Plan Development for Landowners Other than the "Most Critical" Landowners	" "
5. Conservation Plan Revisions	" "
6. Conservation Plan Development for the "Most Critical" Landowners	
7. Design of Best Management Practices	
Contour Cropping	_____ hr/acre
Contour Strips	_____ hr/acre
Diversions	_____ hr/foot
Terraces	_____ hr/foot
Waterways	_____ hr/acre
Minimum Tillage	_____ hr/acre
Critical Area Stabilization	_____ hr/acre
Grade Stabilization Structures	_____ hr/structure
Shoreline Fencing	_____ hr/foot
Shoreline Shaping/Seeding	_____ hr/foot
Shoreline Rip-Rap	_____ hr/foot
Stream Crossing	_____ hr/crossing
Barnyard Runoff Control	_____ hr/site
Manure Storage Facility	_____ hr/facility
Livestock Exclusion from Woodlots	_____
Other (specify)	_____
8. Installation & Certification of Best Management Practices	
Contour Cropping	_____ hr/acre
Contour Strip Cropping	_____ hr/acre
Diversions	_____ hr/foot
Terraces	_____ hr/foot
Waterways	_____ hr/acre
Minimum Tillage	_____ hr/acre
Critical Area Stabilization	_____ hr/structure
Grade Stabilization Structures	_____ hr/structure
Shoreline Fencing	_____ hr/foot
Shoreline Shaping/Seeding	_____ hr/foot

	Shoreline Rip-rap	_____ hr/foot
	Stream Crossing	_____ hr/crossing
	Barnyard Runoff Control	_____ hr/site
	Manure Storage Facility	_____ hr/facility
	Livestock Exclusion from Woodlots	
9.	Review of Cost Share Agreement	_____ hr/farm or municipality
10.	Best Management Practice Maintenance Review	_____ hr/farm or municipality

Table 2. Fiscal Management Tasks

TASK	AGREED UPON HOURS PER TASK
Development of cost-sharing agreement file and update of project ledgers	0.5 hour per cost-share agreement
Handling of requests for reimbursement for installed best management practices	2.0 hours per request[1]

(1) A single request shall include all best management practices installed under a cost-share agreement concurrently.

Table 3. Project Management Tasks

TASK	AGREED UPON HOURS PER TASK
Coordination of activities between counties; activities with Department; technical assistance tasks; fiscal management tasks; and educational tasks.	_____

Table 4. Education Tasks

TASK	AGREED UPON NUMBER	ESTIMATED DIRECT COSTS
Newsletters	_____	_____

VIII. REIMBURSEMENT

A. The Department agrees to reimburse the County for completed, eligible tasks for accelerated task hours as follows:

1. For technical assistance, the eligible tasks and agreed upon effort per task are identified in Table 1.

a. For tasks 1 through 5, Table 1, Section VII, reimbursement shall be based on actual hours for these tasks up to _____ hours.

b. For task 6, Table 1, Section VII, reimbursement shall be based on the actual hours for this task up to _____ hours.

2. For fiscal management, the eligible tasks and agreed upon hours per task are identified in Table 2.

3. For project management, the eligible tasks are identified in Table 3. The actual hours incurred in carrying out these tasks up to _____ hours will be eligible for reimbursement plus a maximum of $_____ for costs associated with attending an annual meeting with the Department.

4. For educational activities, the eligible tasks are identified in Table 4. The actual direct costs for printing, postage, contractual editing and layout associated with these tasks up to $_____ and for actual hours incurred by LCC or SCS staff in carrying out these tasks up to _____ hours.

B. The reimbursement rate for accelerated task hours shall be $12.50 per hour.

C. The guaranteed minimum reimbursement in Section V of this agreement will be made to the County even if the total accelerated task hours actually expended by the County under the agreement is less than _____ hours provided:

1. That _____ hours have been spent on tasks 1) through 5) of Table 1, Section VII, and

2. That a minimum of _____ conservation plans for "most critical" landowners [task 6), Table 1, Section VII] have been developed, and

3. That the county has provided _____ additional full time equivalent staff years for the period covered by this agreement through either direct hiring or contracting.

D. Reimbursement shall be requested quarterly within 15 days of the end of the quarter on forms provided by the Department. The quarterly project base level shall be _____ hours. Any quarterly base level not met in a quarter shall be carried over to the next quarter.

IX. MODIFICATIONS OF THE AGREEMENT

A. The Department and County agree that any amendments to this contract shall not be effective unless agreed to by the parties in writing.

B. Either the County or the Department may, on thirty (30) days written notice, unilaterally and without cause, terminate this contract without liability, except that the County shall be paid for services actually rendered by it up to and including the termination date and it shall provide to the Department a report summarizing work products to the date of termination.

X. NONDISCRIMINATION

A. In connection with the performance of work under this contract, the County agrees not to discriminate against any employe or applicant for employment because of age, race, religion, color, handicap, sex, physical condition, developmental disability as defined in Section 51.01(5), Wisconsin Statutes, sexual orientation, or national origin. This provision shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Except with respect to sexual orientation, the county further agrees to take affirmative action to ensure equal employment opportunities. The county agrees to post in conspicuous places, available for employes and applicants for employment, notices to be provided by the county setting forth the provisions of the nondiscrimination clause.

B. A written affirmative action plan is required as a condition for the successful performance of the contract. Excluded from this requirement are contractors whose annual work forces amount to less than ten employes. The affirmative action plan shall be submitted to the Department within fifteen (15) working days after the award of the contract.

XI. HOLD HARMLESS CLAUSE

"HOLD-HARMLESS: The Contractor agrees to save, keep harmless, defend and indemnify the State of Wisconsin, Department of Natural Resources and all its officers, employees and agents, against any and all liability claims, costs of whatever kind and nature, for injury to or death of any person or persons, and for loss or damage to any property (state or other) occurring in connection with or in any way incident to or arising out of the occupancy, use, service, operation or performance of work in connection with this contract or omissions or contractor's employees, agents or representatives."

XII. INDEPENDENT CONTRACTOR

The County is an Independent Contractor for all purposes including Worker's Compensation, and not an employe or agent of the Department.

XIII. AUDIT, ACCESS TO RECORD

The County shall, for a period of three (3) years after completion and acceptance of the project by the Department, maintain books, records, documents and other evidence directly pertinent to performance on grant work under this contract in accordance with generally accepted accounting principles and practices. The County shall also maintain the financial information and data used in the preparation or support of the cost submission in effect on the date of execution of this contract and a copy of the cost summary submitted to the Department. The Department, or any of its duly-authorized representatives, shall have access to such books, records, documents, and other evidence for the purpose of inspection, audit and copying. The County shall provide proper facilities for such access and inspection.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

_____ Date

_____ C. D. Besadny, Secretary

_____ Date

_____ Chair
County Board

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

REQUEST FOR ADVANCE OR REIMBURSEMENT
WISCONSIN FUND - NONPOINT SOURCE PROGRAM

SECTION 144.25, WIS. STATS.
FORM 3200-54 5-83

Complete Items 1 through 8 and 13 for all payment requests. See instructions on reverse side for completing Items 9 through 12. Send one copy of this form to:

Wisconsin Department of Natural Resources
Bureau of Finance, Audit Section
Box 7921
Madison, Wisconsin 53707

1. GRANTEE/DMA	2. COUNTY	3. GRANT NO.	4. PAY. REQ. NO.
5. MAIL CHECK TO:	6. PERIOD COVERED BY THIS REPORT (MO-DAY-YR): FROM TO		
	7. TYPE OF PROJECT ☐ PRIORITY WATERSHED ☐ LOCAL PRIORITY	8. TYPE OF REQUEST ☐ ADVANCE ☐ PARTIAL ☐ FINAL	

	AMOUNT	LEAVE BLANK DNR USE ONLY
9. Request for Advance Payment		
a. Initial State Grant Amount		
b. Advance Payment Requested (Maximum 10% of Above)		
10. Summary of Payment Requests		
a. Reimbursement Requested This Claim (From Form 4400-47)		
b. Total Prior Pay Requests (Including Advance)		
c. Total All Payment Requests to Date		
11. Computation of Maximum Partial Payment		
a. Total Cumulative Grant to Date		
b. Enter 95% of Above Total		
12. Computation of Net Payment Due		
a. Enter 95% of Total Cumulative Grant (Line 11b. Above)		
b. Less: Total Prior Payment Requests (Line 10b. Above)		
c. Net Payment Due (Line 12a. Minus Line 12b.)		
	Amount Allowed This Claim	

13. CERTIFICATION:

I certify that to the best of my knowledge and belief the billed costs of expenditures are based on actual payments of record and are in accordance with the terms of the project agreement and the reimbursement represents the grant share due which has not been previously requested.

Auditor Initials _____

Date _____

Bur. Finance Initials _____

Date _____

SIGNATURE OF AUTHORIZED REPRESENTATIVE	DATE SIGNED
TYPED OR PRINTED NAME AND TITLE	TELEPHONE NO. (INCLUDE AREA CODE & EXTENSIONS)

INSTRUCTIONS

Item 9 - Complete for Advance Payment Request Only

9a Enter the amount of grant shown on the original agreement.
9b Advance requested may not exceed 10% of original grant amount.

Item 10 - Complete for Partial and Final Payment Requests. (See required attachments below.)

10a Enter total amount from worksheet (Form 4400-47) attached to this pay request.
10b Enter total amount of all previous payment requests, including the advance.
10c Sum of 10a and 10b.

Item 11 - Complete for Partial Payment Requests Only

11a Enter the sum of the original grant amount and any amendment increases.
11b Enter 95% of the above amount, which represents the maximum that shall be paid on a grant prior to final accounting and audit. (Compare this amount with Item 10c before completing Item 12.)

Item 12 - Complete for Partial Payment Requests Only when the amount shown on line 10c above exceeds the amount shown on line 11b.

12a & b Self-explanatory.
12c The net result when subtracting line 12b from line 12a is the maximum amount which may be paid with this pay request.

REQUIRED ATTACHMENTS

Attach the following documentation with each Partial and Final Payment Request:

1. One copy of reimbursement claim worksheet (Form 4400-47) listing individual payments on cost share agreements.

2. Photocopy of cost share agreements (Form 3400-68) for each payee listed in this report. (If not previously submitted.)

3. Photocopy of form showing approval of final cost share amount by the DMA for each practice listed in this report.

LANDOWNER TRACKING SHEET

_____ WATERSHED PROJECT

Landowner: _____

Property Description: T_____ N, R _____, Sect.: _____

Other Identifiers: _____ County: _____

Cost Share Agreement No.: _____

Contact Record	Date	Contacted By	Response
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Comments: _____

_____

Inventory Summary, Update, and BMP Status

Nonpoint Source	Inventory	Update	BMP Status
Animal Lot Runoff Animal Units Model Results Ranking			
Streambank Erosion Feet Severity			
Cropland Erosion acres at t/ac acres at acres at acres above			
Other Nonpoint Sources			

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT PROGRAM COST-SHARE AGREEMENT

SECTION 144.25, WIS. STATS.
FORM 3400-68 REV. 8-82

Cost-Share Agreement Number	Total Est. Grant Amount $
Name of Grant Recipient	Telephone Number
Street or Route	
City, State, Zip Code	
Legal Description of Property	
Name of Landowner (if other than Grant Recipient)	Telephone Number
Street or Route	
City, State, Zip Code	
Installation Period From	To

Name of Designated Mgt. Agency	Telephone Number
Street or Route	
City, State, Zip Code	

SECTION 1. AGREEMENT PROVISIONS

1. The grant recipient agrees:
   A. To install the best management practice(s) listed in section 2 consistent with the specifications listed in section 3 during the installation period identified above.
   B. To operate and maintain each best management practice for the life span identified in section 2.
   C. To certify, on forms provided by the designated management agency, best management practices installed under this agreement are being maintained.
   D. To repay the full amount of the cost-share payments made and forfeit all rights to future cost-share payments if:
      (1) Any best management practice is rendered ineffective during its life span due to improper maintenance, operation or neglect;
      (2) The applicable conditions identified in section 3 are not met; or
      (3) The grant recipient adopts any land use or practice which defeats the purposes of the best management practices.
   E. To retain responsibility for this agreement if a change in ownership occurs unless the new owner assumes, in writing, the operation and maintenance of the best management practices and other provisions of this agreement pertaining to the grant recipient.
   F. Not to discriminate against contractors because of age, race, religion, color, handicap, sex, physical condition, developmental disability, or national origin, in the performance of responsibilities under this agreement.
2. The designated management agency agrees:
   A. To provide technical assistance for best management practices identified in section 2.
   B. To make cost-share payment after receipt of a payment request and evidence of completion status.
3. Satisfactory evidence of completion status will consist of a technical performance report signed by a technician assigned by the designated management agency.
4. The total state cost-share payment for each practice identified in section 2 shall be based on the cost-share rate for the practice as applied to the eligible costs actually incurred, as substantiated to the designated management agency. If the total cost-share payment for a practice identified in section 2 exceeds the estimated grant amount for that practice, payment of the overrun will be made only if there are funds available.
5. The agreement may be amended, by mutual agreement, during the installation period as long as the changes will provide equal or greater pollution control.

SECTION 2. BEST MANAGEMENT PRACTICES, COSTS, INSTALLATION SCHEDULE, LIFE SPANS

This section contains all best management practices, both those eligible for cost-sharing and those not eligible, needed to control significant nonpoint sources in eligible areas owned or operated by the grant recipient.

1. Cost-shared best management practices

Location (Field Number)	Practice Code	Practice Title	Quantity	Units	Estimated Total Cost	Cost-Share Rate	Estimated Cost-Share Amount	Cost-Sharing From Other Programs *	Year of Instal-lation	Practice Life-span
				Total		Total		*Identify program		

2. Noncost-shared best management practices

Location (Field Number)	Practice Code	Practice Title	Quantity	Units	Year of Installation	Practice Life-span

SECTION 3. BEST MANAGEMENT PRACTICE CONDITIONS

Attached are the conditions for each best management practice listed in section 2.

Grant Recipient or Authorized Representative's Signature	Date Signed	Authorized Representative of Des. Mgt. Agency - Signature	Date Signed
Title		Title	

State of Wisconsin
Department of Natural Resources

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT
PROGRAM COST-SHARE AGREEMENT AMENDMENT
Section 144.25, Wis. Stats.
Form 3400-68A 4-83

Cost-Share Agreement Number	Amendment Number
Name of Grant Recipient	
Name of Designated Mgt. Agency	
New Total Est. Grant Amount $	

1. Cost-shared best management practices ADDED

Location (Field Number)	Practice Code	Practice Title	Quantity	Units	Estimated Total Cost	Cost-Share Rate	Estimated Cost-Share Amount	Cost-Sharing From Other Programs*	Year of Installation	Practice Life-span
				New Total		New Total		*Identify program		

2. Cost-shared best management practices DELETED

Location (Field Number)	Practice Code	Practice Title	Quantity	Units	Estimated Total Cost	Cost-Share Rate	Estimated Cost-Share Amount	Cost-Sharing From Other Programs*	Year of Installation	Practice Life-span
				New Total		New Total		*Identify program		

-B20-

3. Cost-shared best management practices CHANGED

Location (Field Number)	Practice Code	Practice Title	Updated Quantity	Units	Updated Estimated Total Cost	Cost-Share Rate	Updated Estimated Cost-Share Amount	Cost-Sharing From Other Programs*	Year of Installation	Practice Life-span
				Change (+/−)		Change (+/−)		*Identify program		

Grant Recipient or Authorized Representative's Signature	Date Signed	Authorized Representative of Des. Mgt. Agency — Signature	Date Signed
Title		Title	

State of Wisconsin
Department of Natural Resources
Box 7921
Madison, Wisconsin 53707

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT PROGRAM — COST SHARE CALCULATION AND PRACTICE CERTIFICATION FORM
Section 144.25, Wis. Stats.
Form 3200-53 9-82

_____ Priority Watershed Project: _____ County

Agreement Number	Name and Address
Telephone Number (Include Area Code)	

COST SHARE CALCULATION

Practice Code	Practice Name	Units Installed	*	Total Cost of Practice	Cost Share %	Cost Share For Practice
				$		$
					TOTAL	$

*Place 0 if there are more of this type of practice on this agreement to install.
Place 1 if these units complete the installation of this practice for this agreement.

Amount Paid	Check Number	Check Date YY – MM – DD

PRACTICE CERTIFICATION

I certify the above practice or practices and practice units have been installed in accordance with the appropriate standards and specifications.

Signature	Title	Date Signed