Runoff Management Plan & Pollution Reduction Incentive Program for the South Fork of the Hay River Priority Watershed

The Wisconsin Runoff Management Program

Plan Approved LWCB meeting date, 1997

This Plan Was Cooperatively Prepared By:

Wisconsin Department of Natural Resources
Wisconsin Department of Agriculture, Trade and Consumer Protection,
Dunn County Land Conservation Department,
St. Croix County Land Conservation Department,
Polk County Land Conservation Department and
Barron County Land Conservation Department
South Fork of the Hay River Priority Watershed Citizens Advisory Committee

Publication # to be assigned by editor

Published [Month] 1997

For copies of this document please contact:

Department of Natural Resources
Bureau of Watershed Management
P.O. Box 7921
Madison, WI 53707

The Department of Natural Resources acknowledges the Environmental Protection Agency's Region V Office for their involvement in the partial funding of this activity through Section 319 of the Clean Water Act.

Watershed Plan Credits

Principal Authors

Bridget Waite Appleberry, DNR Runoff Management Section
Lynne Hess, DATCP Soil & Water Management Section
Michael Kinney, Dunn County Land Conservation Department

Contributing Authors

Kyle Kulow, St. Croix County Land Conservation Department
Michael Smith, Dunn County Land Conservation Department
Candace Glaus, Dunn County Land Conservation Department
Steve Olson, Dunn County Land Conservation Department
Alan Carlson, Dunn County Land Conservation Department
Diane Stuart, St. Croix County Land Conservation Department
Ken Schreiber, DNR Bureau of Watershed Management
Ron Struss, University of Wisconsin Extension

Additional Contributors

James Forster, Dunn County Land Conservation Department
Charles Christenson, St. Croix County Land Conservation Department
Dale Hanson, Barron County Land Conservation Department
Cheryl Bursik, Polk County Land Conservation Department
Ken Baun, DNR Runoff Management Section
Nancy Borth, DNR Bureau of Watershed Management
Nicholas Zymonas, DNR Groundwater Management Section
Dan Simonson, DNR Bureau of Watershed Management
Marty Engel, DNR Bureau of Fisheries Management
Jim Holzer, DNR Bureau of Fisheries Management
Buzz Sorge, DNR Bureau of Watershed Management
Dale Gagner, USDA Natural Resources Conservation Service
Donald Siler, USDA Natural Resources Conservation Service
Cindy Hoffland, DNR Bureau of Community Assistance
Christina Cowles, DNR Bureau of Watershed Management

South Fork of the Hay River Citizens Advisory Committee

Franklin Retz (co-chair)
Doug Hill (co-chair)
JoAnn Utphall
Mark Falteisek
William Drinkman
James Carnitz
Alan Carlson
William Shepard

Editor

Christina Cowles, DNR Bureau of Watershed Management

Graphics/Maps

Janel Pike, Bureau of Groundwater and Drinking Water (maps), DNR
Robert Queen, Bureau of Communication and Education (cover photograph), DNR

George letter - Dunn

George letter - St. Croix

George letter - Polk

George letter- Barron

Resolution - Dunn

Resolution - St. Croix

Resolution - Polk

TABLE OF CONTENTS

Page

Watershed Plan Organization Information . . . . . Inside Front Cover
Watershed Plan Credits iii

TABLE OF CONTENTS xiii
List of Tables xvii
List of Maps xvii

CHAPTER ONE
Purpose and Location Description 1
Wisconsin Nonpoint Source Water Pollution Abatement Program 1
Location and Community Information 2
Civil Divisions 2
Population Size and Distribution 2

CHAPTER TWO
Watershed Conditions and Objectives 5
Physical Setting 5
Climate and Precipitation 5
Topography 5
Geology 6
Soils 6
Water Resource Conditions and Goals 8
Water Use Classifications 8
Surface Water and Recreational Resources 9
Streams 10
Lakes 11
Wetlands 15
Groundwater Resources 17
Regional Aquifers 17
Direction of Groundwater Flow 17
Groundwater Quality 18
Water Supplies 19
Potential Groundwater Quality Problems 20
Water Quality Goals and Objectives 22
Overall Watershed Objectives 22
Subwatershed Discussions 25
Upper South Fork Subwatershed (US) 27
Connors Creek Subwatershed (CC) 29
Middle South Fork Subwatershed (MS) 31
Bolen Creek Subwatershed (BC) 35
Johns Creek Subwatershed (JC) 37
Sandy Creek Subwatershed (SC) 41
Upper Tiffany Subwatershed (UT) 43

Page

Lower Tiffany Subwatershed (LT) 45
Beaver Creek Subwatershed (BC) 49
Lower South Fork Subwatershed (LS) 53

CHAPTER THREE
Rural Inventory Results,
Runoff Pollutants, and
Participation Criteria 55
Nonpoint Source (Runoff) Pollutant Reduction Goals 55
Pollutant Reduction Goals and Project Objectives for Nonpoint Sources 55
Management Categories 57
Rural Nonpoint Pollution Sources and Management Strategy 58
Upland Sediment 60
Gully Erosion 64
Streambank Erosion 64
Eligibility for Wetland Restoration and Easements 68
Wetland Restoration 68
Land Easements 69
Ordinances 70
Manure Storage Ordinance 70
Construction Site Erosion 71
Stormwater Management Ordinances 71
Other Pollution Sources 72
Industrial Point Sources of Pollution 72
Sewage Treatment Systems 72
Municipal Waste Water Treatment Plants 72
Private Sewage Systems 72
Land Application of Municipal and Industrial Wastes 73
Solid Waste Disposal Sites 73
Petroleum Storage: Leaking Underground Storage Tank (LUST) Sites 73
Other Contaminated Sites 73
Mining 74

CHAPTER FOUR
Implementation Definitions,
Schedule & Budget 75
Introduction 75
Pollution Reduction Incentive Program 75
Program Outline and Time Frame 76
Program Requirements and Payments 77
Nutrient Management Plans and Soil Conservation Farm Plans 77
Barnyard Runoff 79
Stream Corridor Management 81
Upland Woodland Management 82
Best Management Practices 83
BMPs Eligible For Cost-Sharing And Their Rates 83
Description of BMPs 83
Interim Best Management Practices 86
Practices, Sources and Activities Not Cost-Shared 86

Page

Cost-Share Agreement Administration 88
Cost Containment 89
Cost Containment Procedures 89
Implementation Schedule 90
Landowner Contact Schedule 90
Sediment Delivery Inventory Completion Schedule 90
Urban Implementation Program 90
Core Elements of the Urban Management Program 90
Segmented Elements of the Urban Management Program 91
Urban Roles and Responsibilities 92
Cost-Share Budget 94
Costs of Installing Rural BMPs 94
Easement and Land Acquisition Costs 94
Budget and Staffing Needs 98
Project Cost 98
Grant Disbursement and Project Management Schedule 100

CHAPTER FIVE
Integrated Resource Management 101
Introduction 101
Fisheries and Wildlife Management 101
Wetland Restoration 102
Groundwater Management 103
Private Sewage System Maintenance and Rehabilitation 104
Riparian Zones 104
Stewardship 104
Forestry Programs 105
Coordinating Regulations, Permits, and Zoning 107
Environmental Quality Incentive Program (EQIP) 107
Coordination With State and Federal Conservation Compliance Programs 107
Archaeological Sites: Coordination with State Historic Preservation Laws 108
Endangered and Threatened Resources 109
Rare Species 110
Natural Areas 111

CHAPTER SIX
Information and Education Activities 113
Introduction 113
Project Educational Goals and Objectives 113
Activities for Reaching Educational Objectives 115
Information and Education Strategy Evaluation 117
Annual Information and Education Activity Plans 117
January 1, 1997 - December 31, 1998 117

CHAPTER SEVEN
Project Evaluation 127
Pilot Review 127
Final Evaluation 127
Administrative Review 128

Page

Accomplishment Reporting 128
Financial Expenditures 129
Time Spent On Project Activities 129
Nonpoint Source Pollutant Load Reduction 130
Cropland Sources 130
Streambank Sources 130
Barnyard Runoff 131
Urban Areas 131
Water Resource Evaluation Monitoring 131
Whole Stream Monitoring Sites 131
Signs of Success 132

APPENDIX A
Program Purpose and Legal Status A-135
Wisconsin Nonpoint Source Water Pollution Abatement Program A-135
Legal Status of the Nonpoint Source Control Plan A-136
Amendments to the Plan A-137
Project Planning and Implementation Phases A-137
Planning Phase A-137
Implementation Phase A-138

APPENDIX B
Water Resources Appraisal Monitoring Methods B-139

APPENDIX C
Interim Best Management Practices C-141
Vegetated Riparian Buffer C-141
Definition C-141
Purpose C-141
Eligibility C-141
Cost Sharing Authorization C-143
No Cost Sharing Authorization C-143
Sediment and Phosphorus Load Reduction Credit C-144

APPENDIX D
Glossary D-145

BIBLIOGRAPHY D-161

Page

List of Tables

Table 1-1. Land Uses in the South Fork of the Hay River Watershed 3
Table 1-1. Areal Extent of Urban Land Uses for Subwatersheds of the South Fork of the Hay River Watershed: 4
Table 2-1. Surface Water Resource Conditions, Problems, and Nonpoint Sources of Pollution of Each Subwatershed in the South Fork of the Hay River Watershed 13
Table 2-2. Wetland Inventory Summary: South Fork of the Hay River Watershed 16
Table 3-1. Sediment Reduction Objective 56
Table 3-2. Phosphorus Reduction Objectives 56
Table 3-3. Barnyard Pollution Reduction ESTIMATES Summary 59
Table 3-4. Summary of Upland Sediment Loading By Land Use: South Fork of the Hay River Watershed Project (75% inventory shown) 62
Table 3-5. Upland Sediments 63
Table 3-6. Eligibility Criteria for Gully Erosion 64
Table 3-7. Streambank Inventory Results: South Fork of the Hay River Watershed Streambank Erosion and Degraded Habitat 66
Table 3-8. Streambank Erosion 67
Table 4-1. State Cost-Share Rates for Eligible Best Management Practices Separate from Practices 86
Table 4-2 Estimated BMPs Needed to Meet Water Quality Goals in Dunn, St. Croix, Polk, and Barron Counties. 95
Table 4-3. Estimated PRIP Budget over 8 Years 97
Table 4-3a. Estimated PRIP Budget over 4 Years 97
Table 4-4. Estimated Dunn and St. Croix County Staff Needs for 4 Years of Project Implementation 99
Table 4-5. State Share of Total Project Costs for 4 Years 100
Table 6-1. 1997 Activity Plan 119
Table 6-2. 1998 Activity Plan 123

Page

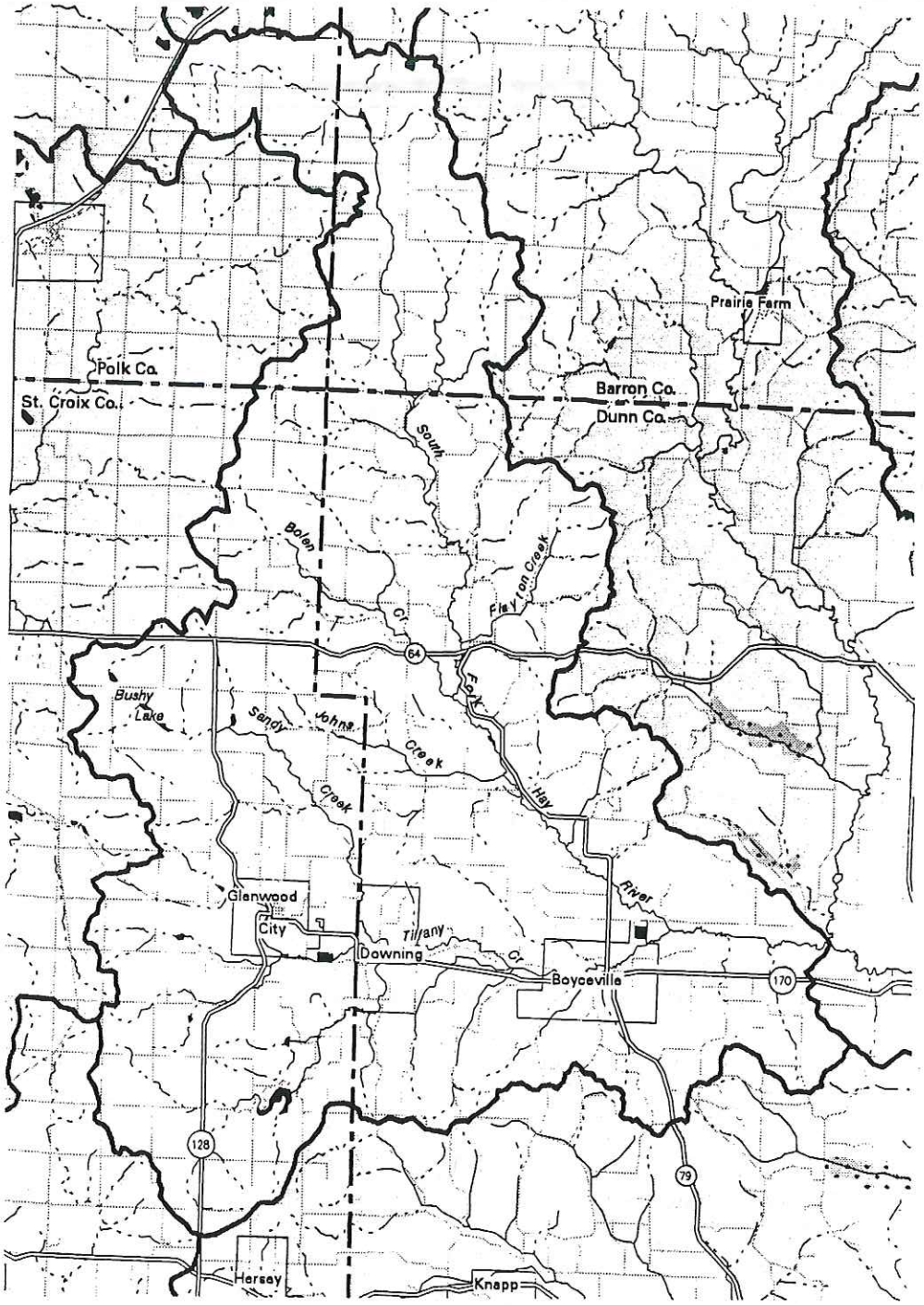
List of Maps

Map 1-1	South Fork of the Hay River Watershed	xx
Map 2-1.	South Fork of the Hay River Watershed Subwatersheds	24
Map 2-2	Upper South Fork Subwatershed	26
Map 2-3.	Connors Creek Subwatershed	28
Map 2-4.	Middle South Fork Subwatershed	32
Map 2-5.	Bolen Creek Subwatershed	34
Map 2-6.	Johns Creek Subwatershed	36
Map 2-7.	Sandy Creek Subwatershed	40
Map 2-8.	Upper Tiffany Subwatershed	42
Map 2-9.	Lower Tiffany Subwatershed	46
Map 2-10.	Beaver Creek Subwatershed	48
Map 2-11.	Lower South Fork Subwatershed	52

List of Acronyms

BARNY	Barnyard nutrient analysis model
BIM-GEO	DNR Bureau of Information Management-Geographical Unit
BMP	Best Management Practice
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CAC	Citizen Advisory Committee
CRP	Cropland Reserve Program (federal)
CSA	Cost-share agreement
DATCP	Wisconsin Department of Agriculture, Trade, and Consumer Protection
DILHR	Wisconsin Department of Industry, Labor, and Human Relations
DNR	Wisconsin Department of Natural Resources
EPA	United States Environmental Protection Agency
EQIP	Environmental Quality Incentives Program (formerly ACP)
ERC	Environmental Resources Center (UW-Extension, UW-Madison Campus)
FFA	Future Farmers of America
FOCS	Field Offices Computing System (federal, state, county agencies share)
FPP	Wisconsin Farmland Protection Program
FSA	Food Security Act (federal)
FSA	Farm Services Agency (U.S. Department of Agriculture)
GW	Groundwater
I&E	Information and education
LCC	Land Conservation Committee
LCD	Land Conservation Department
LWCB	Land and Water Conservation Board (state)
NPM	Nutrient and Pest Management
NRCS	Natural Resource Conservation Service (U.S. Dept. of Agriculture)
SHS	Wisconsin State Historical Society
SIP	Stewardship Incentive Program
SOS	Signs of Success monitoring program
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UWEX	University of Wisconsin-Extension
VOC	Volatile Organic Compounds
WGNHS	Wisconsin Geological and Natural History Survey
WINHUSLE	Sediment transfer model based on the Universal Soil Loss Equation
WPDES	Wisconsin Pollutant Discharge Elimination System (permit system)
WRP	Wetland Reserve Program (federal)
WUWN	Wisconsin Unique Well Number assigned to well sample sites
WWTP	Wastewater treatment plant

Map 1–1 South Fork Hay River Priority Watershed



Study Area

LEGEND

- Watershed Boundary
- Major Highway
- Local Roads
- Perennial Stream
- Intermittent Stream
- County Boundary
- Wetland
- Open Water
- Municipal Area

0 2 4 6 Miles

0 2 4 6 8 10 Kilometers

Scale 1:222,183

Wisconsin Department
of Natural Resources
Watershed Management
September 1997

CHAPTER ONE
Purpose and Location Description

Wisconsin Nonpoint Source Water Pollution Abatement Program

The state Legislature created the Wisconsin Nonpoint Source Water Pollution Abatement Program in 1978. The goal of the program is to improve and protect the water quality of streams, lakes, wetlands, and groundwater by reducing pollutants from urban and rural nonpoint sources. The 191-square-mile South Fork of the Hay River Watershed, located in Dunn, St. Croix, Barron and Polk counties, was designated a "priority watershed" in 1993 and began planning in 1994.

With special legislation within the 1997-99 state budget bill, the South Fork of the Hay River Watershed project was granted a 4-year "pilot" in order to try a locally-sponsored initiative called the Pollution Reduction Incentive Program within the context of the priority watershed program. This incentive program differs slightly from a more conventional priority watershed approach in how pollution reduction practices are cost-shared and what types of practices are permitted. The specific practices and landowner incentive payment structure are detailed in Chapter 4 of this plan. If after an evaluation in the winter of 2000-2001, the DNR and project team agree to continue the project through its 8-year time frame (for which this plan was developed), DNR representatives will lobby the Legislature to act in the 2001-2003 state budget bill for continuing of this "pilot" for a period to be mutually agreed upon. More information on evaluation is provided in Chapter 7.

The Citizen Advisory Committee (CAC) for the South Fork Hay River Priority Watershed has been active in the approval and approach in this plan. Understanding their roles as stewards of their local resources, a representative number of farmers, along with teachers, a banker, a lake association member, a crop consultant and LCD staff, have steered the development of an incentive concept to their project.

This plan has been developed with the belief that through neighbor-to-neighbor education and a fair and equitable incentives where every landowner is eligible to participate, a majority of the farming landowners will adopt the necessary conservation practices required to achieve the water quality objectives established for this watershed (see Chapter Three for the specific pollution reduction objectives). The hope is that this broad-based "incentive" approach will be more successful than some more conventional approaches in watershed projects where only those landowners with pollution problems are eligible to participate and cost-sharing is

allocated for specific types of management practices. As a part of the South Fork of the Hay River Priority Watershed approach, the CAC developed the following mission statement:

> We, the citizens of this watershed, as a community, will improve and maintain the water quality of our lakes, streams, wetlands and groundwater in an efficient and effective manner.

The primary objective of this project is to reduce nonpoint source pollution loads and to enhance and protect the water quality of the streams, groundwater and lakes within the South Fork of the Hay River Watershed. At the same time, an objective is to reduce the nonpoint source pollution loads flowing out of the South Fork of the Hay system into the main stem of the Hay River and eventually to Tainter Lake. The South Fork of the Hay River is part of the larger Lower Chippewa River Basin.

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

Location and Community Information

The South Fork of the Hay River Watershed is a 191-square-mile drainage basin located predominantly in agricultural and wooded land about 20 miles northwest of the city of Menomonie.

Civil Divisions

The South Fork of the Hay River Watershed lies within Dunn, St. Croix, Barron and Polk Counties. Incorporated areas in the watershed include the city of Glenwood City and the villages of Boyceville and Downing. Public land within the watershed includes the Bolen Creek Fishery area, Chimney Rock Fishery Area, and Glen Lake County Park. There is some federally owned parcels in the northern portions of the watershed. See map 1-1 for the map of civil divisions.

Population Size and Distribution

The South Fork of the Hay River Watershed population is estimated to be about 6,000 persons. Most of the watershed population lives in rural unincorporated areas. Population trends in the watershed show an overall stable trend, with population projected to steadily increase through the year 2015 with new home constructions near Glenwood City and Boyceville.

Farming is of vital importance to this area's economy as agriculture comprises more than 50 percent of the overall land use in the South Fork of the Hay River watershed (Table 1-1).

While the number of farms in the watershed has decreased steadily over the past two decades, the average farm size has increased slightly to an average of 252 acres.

Table 1-1. Land Uses in the South Fork of the Hay River Watershed: 122,240 Acres

Land Uses	Acres (approximate)	Percent (rounded off)
Agricultural	73,193	60%
Cropland	57,501	47%
Pasture	7,777	6%
Farmstead	2,992	3%
Grazed woodlot	4,923	4%
Recreation	1,025	.8%
Natural Area, Wetlands	8,555	7%
Woodland	36,084	30%
Developed and Industrial	3,167	2%
Mined	190	.2%

[1] These are estimates based on WINHUSLE inventory data (extrapolated from a 74% inventory). The wetland estimates are of actual wetland acres, not cropped wet fields.

Source: Dunn and St. Croix County LCDs

Table 1-1. Areal Extent of Urban Land Uses for Subwatersheds of the South Fork of the Hay River Watershed:

Subwatershed	Municipality	Land Use in Acres						
		Residential - Low Density	Comm	Ind	Strees and Hwys	Inst	Urban Open Space	Total Acres
Upper South Fork	-	-	-	-	48	-	-	48
Connors Creek	Reeve	16	2	-	39	1	3	61
Middle South Fork	Connorsville	36	6	12	80	2	85	221
Bolen Creek	-	-	-	-	53	-	-	53
Johns Creek	-	-	-	-	88	-	-	88
Sandy Creek	-	-	-	-	77	-	-	77
Upper Tiffany Creek	Glenwood	254	67	26	46	61	221	1,350
	Downing	11	4	1	108	-	7	155
Beaver Creek	Downing	33	2	-	85	1	2	163
Lower Tiffany Creek	Boyceville	183	18	8	127	74	111	951
Lower South Fork	-	-	-	-	53	-	-	53
	Totals	533	99	47	804	139	429	3220

Source: DNR and Dunn and st. Croix County LCD

CHAPTER TWO
Watershed Conditions and Objectives

This chapter discusses the physical characteristics, existing conditions, objectives and management categories for the water resources in the South Fork of the Hay River Priority Watershed. Information is presented for each subwatershed and by pollution source.

Physical Setting

Climate and Precipitation

The frequency, duration and amount of precipitation influences surface and groundwater quality and quantity, soil moisture content, runoff characteristics, and the physical condition of waterways. The South Fork of the Hay River Watershed lies in the continental zone which is characterized by winters which are long and relatively cold and snowy and summers which are mostly warm with periods of hot humid conditions. Mean annual precipitation for the region is about 33 inches of rain and melted snow; the majority falls in the form of thunderstorms during the growing season (May-September). Most runoff occurs in February, March and April when the land surface is frozen and soil moisture is highest.

Topography

The relief in the region is largely controlled by glacial features. The present topography of the South Fork of the Hay River Watershed was also influenced by previous periods of erosional and depositional activity. The western third of the watershed, which is located in St. Croix County, and some areas of northwest Dunn County and southwest Barron County are noted for their steep hills and high gradients. These high gradients lead the federal government to install numerous earthen dams in the 1960s in the area around Glenwood City for flood control purposes. The areas described above also mark the headwaters of most of the streams in the watershed.

Moving downstream, the area east of Glenwood City quickly flattens out to a relatively wide outwash plain which is home to Tiffany Creek, the largest tributary to the South Fork of the Hay River. The steep hills in the northern part of the watershed become more gentle as the river flows southeast. About 3 miles from the confluence of Tiffany Creek and the South Fork of the Hay River, the landscape becomes even more gentle and dominates the landscape for the rest of the watershed.

Geology

The significant differences in elevation from the western groundwater divide of the South Fork of the Hay River in St. Croix and Polk counties to its outlet at the North Fork Hay River in Dunn County allow for a wide variety of bedrock formations to be present within the watershed. This change in grade also follows the exposure of these formations as they dip southeastward. All of the formations are from either the Ordovician or Cambrian period, ranging in age from 430 to 570 million years.

The oldest exposed formation in the watershed is the Eau Claire formation which overlies the Mount Simon formation. Both are sandstones with the Eau Claire formation being light brown and fine grained with fossils present. The next formation, Wonewoc, is a well-cemented sandstone and thus can be noted as cliffs in various parts of Dunn County. Above the Wonewoc is the Tunnel City group which is defined by five formations. The Lone Rock formation dominates, but all are characterized by features such as cross-bedding, small bands of glauconitic siltstone, and skolithos caused by borrowing marine worms. next is the St. Lawrence formation which is a fine grained silty dolomite with trilobite fossils present. Above this is the last Cambrian deposit, the Jordan formation. It is a light-colored, medium-bedded sandstone with about 20 feet at the top of sandy dolomite. This marks the transition into the dolomites of the Prairie du Chien group, the first of the Ordovician deposits. As mentioned, the Prairie du Chien is a dolomite which also contains smaller units of sandstone and siltstone. It tends to be gray to brown in color and thick-bedded. This latter feature makes it the dominant group in St. Croix County.

Overlain on all of the bedrock formations in the South Fork of the Hay River is glacial till. Located on the eastern edge of the River Falls lobe of the most recent glacial period, the till varies widely in depth and composition. Material can range from a relatively heavy clay to a poorly sorted mix of rocks and gravel. Above the till is a layer of post-glacial loess which varies in thickness from about 6 inches on hilltops to about 2 feet on the leeward side of hills and valley floors.

Soils

Three soil associations tend to dominate the landscape of the South Fork of the Hay River Watershed. The southern and eastern portions of the watershed, particularly along the South Fork of the Hay River and Tiffany Creek, have a Plainfield-Plainbo association. This topography is nearly level to sloping and consists of excessively drained soils that have a loamy sand or sandy subsoil underlain by sandstone on the uplands. This association contains about 38 percent Plainfield soils, 33 percent Plainbo soils and 29 percent Morocco, Gotham, Hubbard, Newton, Markey and Houghton soils.

Plainfield soils have a surface layer of very dark grayish brown, loamy sand about 7 inches thick. the subsoil is dark brown, loamy sand in the upper part and dark yellowish brown, loamy sand in the lower part. The underlying material is dark yellowish brown sand and yellowish brown, fine sand that extends to a depth of at least 60 inches. Plainbo soils are

similar to Plainfield soils but are underlain by sandstone at a depth of 20 to 40 inches. Some of this association is cultivated, but much of it is wooded or in grasses. Low available water capacity, low natural fertility, and the hazard of soil blowing are the main limitations of the soils in this association. Plainbo soil is suitable for crops. Some areas are irrigated and planted to corn. Soybeans and alfalfa are other common crops. Large acreages have been planted to Norway and White Pine.

A second association found throughout much of the Dunn County portion of the watershed is the Urne Elk Mound association which consists of moderately steep to very steep, well drained soils that have a loam and very fine, sandy loam subsoil underlain by sandstone on uplands. Both Urne and Elk Mound soils formed in the mantle of loamy residuum over sandstone. The residuum ranges from less than 20 inches to 36 inches in thickness. Urne soils have a surface layer of very dark brown loam and very fine sandy loam. They are underlain by weakly cemented sandstone at a depth of about 22 inches.

Elk Mound soils have a surface layer, about 7 inches thick, of very dark grayish brown loam and a subsoil of dark yellowish brown loam. They are underlain by sandstone at a depth of about 14 inches. Much of this association is used for pasture or weedland. Maintaining fertility of the soils and good stands of pasture plants are the main concerns in pastured areas. Protection from grazing is needed in most of the wooded areas.

The landscape of the north and west portions of the watershed is one of broad upland ridges that are dissected by shallow drainageways and depressions. This part of the watershed consists of the Otterholt-Almena association soils. They are gently sloping, well drained and somewhat poorly drained, having a silt loam subsoil underlain by glacial till on uplands. These soils transition to the Santiago-Otterholt-Arland and Santiago-Jewett-Magnor association in St. Croix County to the west and to the Magnor-Freeon association in the north.

Otterholt soils are well drained. They formed in a deep layer of windblown silt over glacial till. the surface layer is very dark, grayish brown silt loam about 7 inches thick, and the subsurface layer is about 6 inches of dark grayish brown, silt loam. The subsoil is dark brown silt loam about 23 inches thick.

Almena soils are similar to Otterholt soils, but they are somewhat poorly drained and do not warm up as early in the spring. The surface layer is 8 inches of very dark grayish brown, silt loam, and the subsurface layer is dark grayish brown silt loam mottled with dark yellowish brown.

Most of the association is cultivated and is suited to all crops commonly grown in the area. Uncultivated areas are used for pasture or woodland. Controlling erosion and maintaining soil fertility are the main concerns of management. A seasonal high water table is concern in the areas of Almena soils.

Water Resource Conditions and Goals

This section describes the general conditions of the surface and groundwater resources in the South Fork of the Hay River Watershed. It describes the classifications used for Wisconsin's waters, then describes the surface water and recreational resources in the watershed. Descriptions of subwatersheds are also included and several tables provide summaries of the watershed's resources. Table 2-1 in the next section also serves as a useful summary of the surface water resources in each subwatershed. Groundwater resources and quality is also discussed.

Water Use Classifications

Surface water quality standards and criteria are expressions of the conditions considered necessary to support biological and recreational uses. Water quality standards for recreational and biological uses are contained in Chapters NR 102, NR 104, and NR 105 Wisconsin Administrative Code.

In addition to these standards, other criteria were used to assess the suitability of surface waters for recreational and biological uses. Data characterizing stream size and accessibility were used to help determine the suitability and types of recreation a stream is capable of supporting. Information on current recreational use of surface waters (provided by users at public access points and discussions with local officials) is also used to assess suitability of surface waters for recreation. Use classifications and supporting water quality standards used in evaluating water resource conditions are discussed below.

Biological Stream Use

Wisconsin streams are classified according to the biological uses desired for each stream. These classifications are listed for each stream in the water quality management plans developed for each basin.in the subwatershed discussions. Stream classification determines allowable pollutant loads to the system. Resources are classified as one of the following:

> **COLD = Coldwater Communities** include surface waters capable of supporting a community of coldwater fish and other aquatic life or serving as a spawning area for coldwater fish species.
> **WWSF = Warmwater Sport Fish Communities** include surface waters capable of supporting a community of warmwater sport fish and/or serving as a spawning area for warmwater sport fish.
> **WWFF = Warmwater Forage Fish Communities** include surface waters capable of supporting an abundant diverse community of forage fish and other aquatic life.
> **LFF = Limited Forage Fish Communities**

Trout streams carry a separate designation found in "Wisconsin Trout Streams" (DNR Publication number. 6-3600(80)) and Outstanding/Exceptional Resource Waters, Wisconsin Administrative Code NR 102.20 and NR 102.11. Trout classes are:

Class I trout streams are high quality, and populations are sustained by natural reproduction.
Class II trout streams have some natural reproduction but may need stocking to maintain a desirable fishery.
Class III trout streams have no natural reproduction and require annual stocking of legal-size fish to provide sport fishing.

Table 2-1 summarizes the water resource classification and conditions for the South Fork of the Hay River Watershed.

Recreational Stream Use

Recreational stream use classifications are described by a level of human body contact determined to be safe and reasonable. The system applies to all surface waters including those categorized as intermediate or marginal under the above referenced biological use classification system. Three designations are used under the recreational stream classification system. These designations are full body contact, partial body contact, and non-contact.

Full Body Contact. These waters are used for human recreation where immersion of the head is expected and occurs often. Recreation activities classified as full body contact include swimming, waterskiing, sailboarding and other similar activities.

Partial Body Contact. These waters are used for human recreation where immersion of the head is not frequent and contact is most often incidental or accidental. Recreational activities classified as partial body contact include boating, canoeing, fishing and wading.

Non-contact. These waters should not be used for human recreation. This category is used infrequently when extenuating circumstances such as high concentrations of in-place pollutants, an uncontrollable pollution source, or other conditions dictate that contact with the water would be an unnecessary health risk.

Surface Water and Recreational Resources

For the purposes of this project, the South Fork of the Hay River Watershed is subdivided into 10 individual subwatersheds. Each subwatershed conveys surface water to the South Fork of the Hay River. Major tributaries, associated streams, wetlands, the reservoir and subwatershed divides are shown in Map 2-1. See table 2-1 for the general conditions of major water resources in the South Fork of the Hay River Watershed.

Subwatersheds in the South Fork of the Hay River Watershed

Upper South Fork	(USF)
Connors Creek	(COC)
Middle South Fork	(MSF)
Bolen Creek	(BOC)
Johns Creek	(JOC)
Sandy Creek	(SDC)
Upper Tiffany Creek	(UTC)
Lower Tiffany	(LTC)
Beaver Creek	(BVC)
Lower South Fork	(LSF)

Streams

Streams are the predominant surface water features in the watershed. Perennial streams, which have a combined length of about 135 miles, maintain at least a small continuous flow throughout most of the year. The South Fork of the Hay River is the longest perennial stream in the watershed. Other primary streams in the watershed are: Tiffany Creek, Johns Creek, Bolen Creek, Flayton Creek, Beaver Creek, Sandy Creek and Connors Creek.

The South Fork of the Hay River (South Fork) originates at the outlet of Long Lake in Barron County and flows southeast about 43 miles to the Hay River in Dunn County. The Hay River eventually drains to Tainter Lake, a 1,692-acre impoundment formed by the Hay and Red Cedar River watersheds. Tainter Lake receives excessive nutrient loading from its drainage area, is highly eutrophic and experiences nuisance algae blooms throughout the growing season.

Numerous perennial streams in the watershed support coldwater fish communities. The South Fork of the Hay River watershed has 8 Class I and 25 Class II trout streams and one stream reach that supports a warmwater forage fishery. Fish surveys conducted at 107 sites in the watershed in 1994 found brook and brown trout, 7 warmwater game and 25 minnow and forage fish species. Brook trout dominate the coldwater fishery in this watershed. White sucker, brook stickleback, pearl dace, creek chub and fathead minnow were the most common forage species.

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

organisms. Filling-in of pools reduces the amount of available cover for juvenile and adult fish.

Other water resource problems in the watershed include flashy stream flows, ditching and the presence of beaver dams. Land use activities that reduce infiltration result in flashy stream flows during runoff events and loss of groundwater discharge during low flow conditions. Ditching reduces the variability of stream morphometry, impacting the amount of available fish habitat. Stream ditching can also aggravate flooding downstream by increasing peak runoff rates. Beaver dams are common in the watershed and may cause an increase in water temperatures and restrict fish migration. Flooding caused by beaver dams can damage riparian vegetation and result in bank erosion when the dam washes out.

Organic loading (in the form of animal waste) affects water quality by reducing stream dissolved oxygen conditions which stresses fish and other aquatic life. Based on appraisal findings, oxygen conditions are generally good in the watershed streams, however, some streams show evidence of organic pollution. The primary source of this organic loading is likely livestock waste from barnyards, feedlots and field spread manure. Animal waste may also be a source of un-ionized ammonia which is toxic to aquatic organisms.

Several of the watershed streams have summer water temperatures that are above optimal for coldwater fish species. Elevated water temperatures may result from a number of factors including lack of stream shading, reduced base flow and a relatively shallow, wide stream morphometry. The elimination of streambank vegetation reduces shading and increases solar radiation which may increase stream temperatures. Streambank erosion and resulting sedimentation of the stream bottom may result in wider, shallower streams which could indirectly cause increased water temperatures. Impoundments (built by humans or beaver) on streams or spring areas may increase downstream water temperatures. The cumulative effect of these impacts may decrease the suitability of a stream to support a coldwater fishery.

Lakes

The South Fork watershed has several small lakes including Glen Lake, Bushy Lake, Little Bushy Lake, Bass and Long lakes. Glen Lake is an 84-acre drainage lake with a maximum depth of 38 feet. The lake has a public access boat landing, swimming beach and a warmwater sport fishery. The remaining lakes in the watershed are shallow, have a limited warmwater fishery and lack public access.

Tainter Lake

Outside of the South Fork of the Hay River Watershed boundaries, Tainter Lake is a highly eutrophic impoundment formed by the confluence of the Red Cedar and Hay Rivers in Dunn County. The lake receives excessive phosphorus loading from its relatively large (1,680 square miles) drainage area. An earlier study found that Tainter Lake received about 696,642 pounds of phosphorus during the year of monitoring (Schreiber, 1992). Approximately 94 percent of the annual phosphorus load was from nonpoint source pollution and the remainder from point

sources. The South Fork of the Hay River, a tributary of the Hay River, represents about 11 percent of the drainage area to Tainter Lake.

Earlier modelling efforts estimated that a relatively high level of phosphorus control (70-80 percent) would be needed to measurably improve water quality conditions in Tainter Lake. Recent revisions and calibration of the BATHTUB model (Walker, 1995) suggest the lake would be more responsive to phosphorus load reductions than earlier predicted. The revised model predicts that a 50 percent reduction in the annual phosphorus load would result in a corresponding 50-percent reduction in lake mean chlorophyll-a concentrations. A significant decrease in mean chlorophyll a concentrations would also result in a significant decrease in the duration and intensity of algae blooms, and improved water clarity.

Table 2-1. Surface Water Resource Conditions, Problems, and Nonpoint Sources of Pollution of Each Subwatershed in the South Fork of the Hay River Watershed

Subwatershed	Stream Name	Length (miles)	Biological Use		Observed or Potential Sources of Pollution[7]
			Current Use/Miles	Potential Use/Miles	
Upper South Fork	South Fork of the Hay River	3	Intermittent	Same	BDAM, FLOW
Connors Creek	Connors Creek	5	Cold I	Same	PSB, SB/SED, HAB
	South Fork Hay River	4	Cold I / 3 Intermittent / 1	Same	BDAM, SB/SED, HAB, DCH, BDAM/HAB
Middle South Fork	South Fork Hay River	11.6	Cold II / 7.3 Cold I / 4.3	Same	PSB, SB/SED, HAB
	Flayton Creek	5	Cold II	Same	BDAM, PSB, DCH/SED, HAB
	Carver Creek (Cr. 16-16)	2.3	Cold II	Same	BDAM, PSB, DCH/SED, HAB
	Torgerson Creek	3	Cold II	Cold I	FL, PSB/FLOW, HAB
	Cr. 27-9	1	Cold II	Same	CL/SED, HAB
	Cr. 23-11	1	Cold II	Same	SB, PSB/SED, HAB
	Cr. 22-6 (Shoe Creek)	2.8	Cold II	Same	SB/SED, HAB
Bolen Creek	Bolen Creek	9	Cold II	Cold I	BDAM, PSB, SB/SED, HAB
	Little Bolen Creek	2	Cold II	Cold I	PSB, BY, SB/SED, HAB
Johns Creek	Johns Creek	6	Cold II	Same	DCH, CL, SB, BDAM, PSB/ SED, HAB
	South Fork Hay River	10.8	Cold II	Same	PSB, SB/ HAB, SED
	Cr. 14-10	3	Cold II	Same	SB, CL, DCH/ SED, HAB
	Cr. 11-14	1.8	Cold II	Same	DCH, PSB, SB/ SED, HAB
	Cr. 8-7	1	Cold II	Same	DCH, SB/SED, HAB
Sandy Creek	Sandy Creek	12	Cold II / 6.8 mi. Cold I / 5.2 mi.	Cold I Cold I	PSB, DCH, SB, DCH/ HAB, SED PSB/ HAB
	Cr. 12-11	2.2	Cold II	Cold I	SB, PSB/ SED
Upper Tiffany	Tiffany Creek	8.4	Cold I / 5.4 mi. Cold II / 3 mi.	Same Cold I - Cold II/1	CL, PSB, SB, URB/ SED, HAB DCH, SB/ SED, HAB DCH, URB/ SED, HAB
	South Fork Tiffany Cr.	3	Cold I	Same	BDAM, PSB/ HAB, SED
	Blue Creek (Ryan Cr.)	3	Cold I	Same	BDAM, DCH/ HAB, SED
	Cr. 25-11	2	Cold II	Same	DCH, URB/ SED, HAB
Lower Tiffany	Tiffany Creek	9.6	Cold II	Same	PSB, FL, SB/ SED, HAB
	Cr. 35-2	3	Cold II	Same	PSB, DCH/HAB, SED

			Biological Use		
	Cr. 34-6a	Length	Cold II	Cold I	[illegible]
Subwatershed	Stream Name	(miles)			Pollution[7]
Beaver Creek	Beaver Creek	9.1	Cold II / 5.2 mi. Cold I / 2.9 mi. WWFF / 1 mi.	Same Same Same	DCH, PSB, SB/ SED, HAB SB, CL, PSB/ FLOW, HAB, DO SB, CL, PSB/ FLOW, HAB, DO
	Cr. 6-5	2	Cold II	Same	BDAM/ SED, HAB
	Cr. 1-10	1	Cold II	Same	BDAM, PSB, SB/HAB, SED
Lower South Fork	South Fork Hay River	4.7	Cold II	Same	DCH, FL, PSB, SB/HAB, SED

LEGEND:

[1] **Fish and Other Aquatic Life Uses** - this column indicates the current biological use and classification supported by the stream.
COLD - coldwater communities
WWSF - warmwater sport fish communities
WWFF - warmwater forage fish communities
LFF - limited forage fishery (intermediate surface waters)

[2] **Chemistry** - this category indicates water chemistry monitoring values exceeding acceptable levels (except dissolved oxygen)
DP - Dissolved Phosphorus
TP - Total Phosphorus
SS - Suspended Solids
AMM - Ammonia
BOD - Biochemical Oxygen Demand
DO - Dissolved Oxygen (less than state standard of 5 mg/l)
TEMP - Temperature

[3] **Problems/Limiting Factors**
HAB - Habitat (lack of sufficient habitat)
SED - Sedimentation
TEMP - Temperature (warm)
DO - Dissolved oxygen problems
FLO - Limited stream flow
PL - Aquatic plants/algae (abundant)
NUT - Nutrient enrichment
TURB - Turbidity
CH - Channelization (ditching)
BD - Beaver dams
STRAT- Summer stratification
DEPTH- Stream depth and little overhead cover
FLD - Flooding streambanks

[4] **Observed or Potential Pollution Sources**
CL - Cropland erosion
SB - Streambank erosion
PSB - Streambank pasturing
BY - Barnyard or exercise lot runoff
PSM - Point source, municipal treatment plant discharge
PSI - Point source, industrial discharge
PAS - Public access site
WSM - Winter spread manure

Wetlands

Wetlands are valuable natural resources. They provide wildlife habitat, fish spawning and rearing areas, recreation, storage of runoff and flood flows and removal of pollutants. Wetlands in the watershed are mainly in the South Fork of the Hay River floodplain. There are also extensive wetland areas along the riparian corridor of Tiffany Creek. Floodplain wetlands support furbearers and waterfowl populations and may provide seasonal habitat for sport fish.

A wetland and wildlife habitat inventory was done to identify existing and modified or converted wetlands for the purpose of protection from degradation or potential restoration. The focus of the inventory was on wetlands that are presently, or have been in the past, degraded through drainage, grazing, cropping, or other activities causing water storage loss, and build up of sediments. Information was collected on 1,018 wetlands (14,867 acres), with an average of 14.6 acres per site. Information was gathered from Natural Resource Conservation Service maps, air photos, the DNR wetland inventory maps, and drive-by surveys. Guidelines for wetland restoration, which will be a component of this project, are outlined at the end of this chapter. See table 2-1 for Wetland Inventory Summary.

Table 2-2. Wetland Inventory Summary: South Fork of the Hay River Watershed

	Prior Converted		Grazed Wetland		Excavated Wetland		Farmed in Dry Years		Degraded Wetland		Abandoned Farmland Wetland			
	number of		number of		number of		number of		number of		number of			
Subwatershed	sites	acres	sites	acres	sites	acres	sites	acres	sites	acres	sites	acres	Total Sites	Total Acres
Upper South Fork	37	689	2	12	12	24	2	18	166	332	1	6	220	1,091
Connors Creek	31	681	0	0	11	22	0	0	33	66	1	9	76	778
Middle South Fork	52	1,254	8	520	8	16	0	0	54	108	2	48	124	1,946
Bolen Creek	37	753	6	272	0	0	0	0	13	26	0	0	56	1,051
Johns Creek	44	1,277	8	1,041	4	8	1	14	68	136	4	161	129	2,637
Sandy Creek	40	962	4	162	7	14	0	0	53	106	0	0	104	1,244
Upper Tiffany Creek	30	846	2	34	9	18	1	5	29	58	0	0	71	961
Beaver Creek	22	890	4	321	18	36	0	0	21	42	0	0	66	1,303
Lower Tiffany Creek	49	1,102	14	1,137	3	6	1	7	46	92	2	44	116	2,390
Lower South Fork	26	693	6	506	3	6	3	184	15	30	1	19	43	1,422
Totals	368	9,147	54	4,005	75	150	8	228	498	996	11	287	1,005	14,823

Groundwater Resources

Regional Aquifers

Groundwater is the primary source of drinking water in the Priority Watershed. Groundwater is stored underground in pore spaces and cracks within the soil and rock layers. Unconsolidated material and rock layers which will yield groundwater in usable quantities are called aquifers. Aquifers receive and store water and also discharge groundwater to lakes, streams, wetlands, and wells. Since 1936, Wisconsin law has required well drillers to document well construction and rock and soil layers encountered during well installation. The following report includes information from driller construction reports, geologic logs, and United States Geological Survey (USGS) and Wisconsin Geological and Natural History Survey (WGNHS) publications.

Groundwater in the watershed is found at the land surface to more than 50 feet below the surface. Artesian conditions occur where groundwater is confined by a low permeability layer such as clay lens. Most drinking water wells in the watershed tap groundwater at depths of 50 to 350 feet. The principal aquifers of the South Fork Hay River watershed are the sand-and-gravel and bedrock aquifers. The deeper Precambrian basement complex typically serves as a sump for increasing well storage capacity.

The sand-and-gravel aquifer consists of lenses of saturated sand and gravel deposits in the unconsolidated materials overlying bedrock. Glacial deposits in this watershed range from 0 to over 100 feet thick and include ground moraine, outwash, and end moraine overlain by up to two feet of post-glacial loess. The sand-and-gravel aquifer yields small to large quantities of water to wells depending on the thickness and composition of surficial deposits. The lower reaches of the watershed generally provide the greatest yields from the sand-and-gravel aquifer.

The bedrock aquifer consists of various Cambrian sandstone formations and, in the far western part of the watershed, the Prairie du Chien group. Although the various Cambrian and Ordovician rocks have distinct lithologies and permeability, all units are hydraulically interconnected and generally considered a single aquifer.. The thickness of this aquifer varies from 0 feet (at granite outcrops) to several hundred feet. The Prairie du Chien group consists primarily of dolomite and yields small quantities of water, while the Cambrian sandstone yields moderate to large quantities of water.

Direction of Groundwater Flow

Groundwater in the watershed flows in shallow, local systems as well as a deeper, regional system. Shallow groundwater flow roughly follows the topography of the land surface and flows "downhill" or down-gradient toward stream valleys, wetlands, and lakes. On a regional scale, groundwater flows generally southward and southeastward toward the Chippewa River Valley.

Groundwater Quality

Groundwater in the South Fork of the Hay River Priority Watershed is generally of good quality, although in some areas high levels of dissolved solids and hardness and moderately high levels of nitrate present concerns. The quality of groundwater resources, however, may decline as a result of human activities. Nearly anything that can be spilled or spread on the ground has the potential to leach or seep through the ground and into groundwater.

The physical setting of an area and the nature of the contaminant determine how easily groundwater becomes polluted if inadequate waste management or improper land uses occur. Physical setting includes a location's soil type, characteristics of the subsurface unconsolidated material, depth to bedrock, depth to groundwater, topography, and hydrologic characteristics. Proximity to the land surface and relatively high permeability of subsurface materials increase the susceptibility of the sand-and-gravel aquifer in this watershed. Potential point sources of groundwater contamination may include spills, leaking underground storage tanks, pesticide contamination sites, old landfills, and improperly abandoned wells. Potential nonpoint sources include fertilizers and pesticides, sludge and septage spreading, livestock waste spreading, irrigation, and road salt.

High nitrate levels in groundwater in parts of Wisconsin have been linked to agricultural practices, septage spreading, and faulty septic systems. Extensive agricultural activity within the watershed is a potential concern for nitrate contamination. Consumption of water with high nitrate levels is discouraged for pregnant women and infants, and excessive nitrates may adversely affect livestock, trout populations, and other ecosystem components as well. As part of the Water Quality Appraisal (Schreiber, 1996), (#) private well samples were collected and analyzed for nitrate (NO_3) + nitrite (NO_2). Samples analyzed for nitrate (NO_3) + nitrite (NO_2) showed concentrations ranging from not detected to 43 parts per million or milligrams per liter (mg/L). The groundwater enforcement standard (ES) for nitrate is 10 mg/L. The state preventive action limit (PAL) is 2 mg/L.

Enforcement Standard (ES) Health Advisory Level: The concentration of a substance at which a facility regulated by DILHR, DATCP, DOT or DNR must take action to reduce the concentration of the substance in groundwater.
Preventive Action Limit (PAL): A lower concentration of a contaminant than the Enforcement Standard. The PAL serves to inform DNR of potential groundwater contamination problems, establish the level at which efforts to control the contamination should begin, a provide a basis for design codes and management criteria.

Out of 203 samples taken, 26 samples (13 percent) exceeded 10 mg/L, and 111 (55 percent) of the samples exceeded 2 mg/L. Results indicate a pattern of groundwater contamination that can be linked to broad sources of nitrate, such as septic systems, earthen manure storage, cropland and barnyards. These results may or may not represent the overall groundwater quality of the watershed.

Pesticides have contaminated groundwater in parts of Wisconsin, and the WDNR Groundwater Retrieval Network lists a small number of pesticide detections in past samples from this watershed. Pesticide testing, however, was not a component of the Water Quality Appraisal. No atrazine prohibition areas currently exist within the watershed. Due to the extent of agricultural land use in this watershed and the coarseness of subsurface deposits, pesticide levels in groundwater should be carefully monitored.

No samples were collected for coliform bacteria or hazardous substances such as volatile organic compounds (VOCs). The WDNR Groundwater Retrieval Network lists detections of coliform bacteria and also of VOCs in samples taken from the watershed in the past. Coliform bacteria can be a drinking water problem where septic systems, land spreading of manure, or barnyards are located upgradient (generally uphill) from a private well. Bacteria may enter the drinking water supply along the well casing of improperly constructed wells, through a cracked casing, through improperly capped wells, or through fracture flow in bedrock. Generally, wells with bacteria can be rehabilitated.

Volatile organic compounds, common examples include gasoline products such as benzene, may enter a well from nearby leaking underground gasoline or other fuel storage tanks, spills, and landfills. Once these compounds are in the groundwater they are difficult to clean up. In general, the contaminated wells have to be abandoned and a new well drilled.

Water Supplies

Private and public groundwater systems provide water supplies for domestic, agricultural, and industrial uses. High capacity wells tap the bedrock aquifer, while domestic and farm wells tap the upper part of the bedrock except in areas where the sand and gravel aquifer is sufficient. Downward percolation within the watershed and groundwater inflow from the west recharge the watershed's aquifers. Municipal water supply systems in Boyceville and Glenwood City serve the watershed's residents. The municipal system wells tap the bedrock sandstone at depths ranging from 160 to 545 feet.

In addition to private and municipal community water supply systems, watershed residents may also rely on other-than-municipal community systems and transient or non-transient non-community systems. Other-than-municipal community systems serve year-round residents, have at least 15 service connections or serve at least 25 people for 60 or more days per year, and are not owned by a municipality. Non-community systems do not serve year round residents. A non-community system that serves the same 25 people for 6 or more months per year is considered non-transient, otherwise the system is classified as a transient system.

Since April 1992, the DNR has required a wellhead protection plan be developed for any new municipal well. The plan must include an inventory of existing potential contamination sources within a half-mile radius of the well, plus an assessment of existing potential sources within the well's recharge area. The plan also identifies the groundwater flow direction, the recharge area and zone of influence for the well, a wellhead protection area, public education and water conservation programs, a contingency plan, and a management plan. The DNR has delineated

a fixed radius for every public well from well construction and pumping data. Establishing wellhead protection plans is recommended for all public water supply systems.

Potential Groundwater Quality Problems

Previously identified potential groundwater problems in the South Fork of the Hay River Watershed are provided below. These sites may not currently be causing groundwater pollution, but are the types of problems which have caused groundwater contamination elsewhere. This information is periodically updated and may change.

This watershed contains no Superfund sites.

Table 2-3.

The WDNR Publication SW-504-95(REV), *The Wisconsin Remedial Response Site Evaluation Report* (October 1995), lists EPA Superfund sites, which may cause or threaten to cause environmental pollution, leaking underground storage tank (LUST) sites, and reported hazardous substance spill sites. This publication lists the following sites in the South Fork of the Hay River Watershed or within 2 miles of the boundary:

High and medium priority LUST sites:

Town/City	Town	Range	Sect.	Q	QQ		Town/City	Town	Range	Sect.	Q	QQ
Boyceville	30	14	35	NE	NE		Downing	30	14	30	SE	SW
Boyceville	29	14	14	NE	NW		Downing	31	14	33	NE	NE
Boyceville	30	14	35	NE	NW		Clayton	33	15	27	SE	NE
Boyceville	30	14	10	NW	SW		Clayton	33	15	27	SE	NW

The WDNR publication SW-108-93, *Registry of Waste Disposal Sites in Wisconsin* lists the following waste disposal sites in the watershed:

Town/City	Town	Range	Sect.	Q	QQ		Town/City	Town	Range	Sect.	Q	QQ
Glenwood	30	15	27				New Haven	31	14	6	SE	NW
Glenwood	20	15	12	NE	NE		New Haven	31	14	25	NW	SE
Glenwood City	30	15	25	SW	SW		Tiffany	30	14	25	NW	SE
Springfield	29	15	16	SW	NW		Tiffany	30	14	6	NE	NW
Boyceville	30	14	36	SW	SE		Hay River	31	14	6	SE	NE
Boyceville	30	14	36	SE	SW		Vance Creek	32	14	17	SW	NW

WDNR data from August 1996 lists the following spill sites in the watershed where soil or groundwater contamination occurred:

Town/City	Town	Range	Sect.	Q	QQ		Town/City	Town	Range	Sect.	Q	QQ
Glenwood City	30	15	26	SW	NW		Clayton	33	15	24	SE	SW

Every public water supply facility (including municipal, other-than-municipal, and non-transient systems) must complete a WDNR Public Water Supply Contaminant Use Inventory (Form 3300-215). This form documents the type and number of all potential contaminant sources within 1,200 feet of each well in the system.

Improperly abandoned wells present a significant threat to groundwater quality. Wells provide an open conduit that allows pollutants to reach drinking water aquifers directly, bypassing the ground's natural filtering process. Information on the proper procedures for abandonment will be provided to landowners with improperly abandoned wells.

Water Quality Goals and Objectives

The DNR staff with assistance from the Dunn and St. Croix County Land Conservation staff, the South Fork of the Hay River Watershed Citizens Advisory Committee and DATCP developed water quality goals and project objectives. Objectives for each subwatershed are included in the next section. Details can be found in the South Fork of the Hay River Priority Watershed Surface Water Resource Appraisal Report (Schreiber, 1996) available through DNR's West-Central Region Office.

Following are the goals for water resources:

- **Protection:** Protection refers to maintaining the present biological and recreational uses supported by a stream or the reservoir. For example, if a stream supports a healthy cold water fishery and is used for full-body contact recreational activities, the goal seeks to maintain those uses.

- **Enhancement**: Enhancement is used to describe improvements in water quality and habitat, without a change in the designated biological use category. (e.g. to improve habitat conditions in a Class I trout stream sufficiently to increase natural reproduction and growth rates). This term is reserved for waterbodies that are currently meeting their potential biological use.

- **Improvement:** Improvement refers to improvements in water quality and habitat sufficient to upgrade the biological use category. (e.g. to improve conditions sufficiently to support trout reproduction where none occurred previously, resulting in a change in trout stream classification - from Class II to Class I).

The water quality conditions needed to support the goals for streams and lakes are the basis for determining the type and level of nonpoint source control to be implemented under the priority watershed project.

Pollutant reduction goals are indicated in relative terms as high, medium or low depending on level of control needed to achieve the identified water resource objective. Final numerical values for the loading reduction goals are identified in Chapter 3.

Overall Watershed Objectives

The following water resource management objectives are recommended for the entire South Fork of the Hay River Priority Watershed:

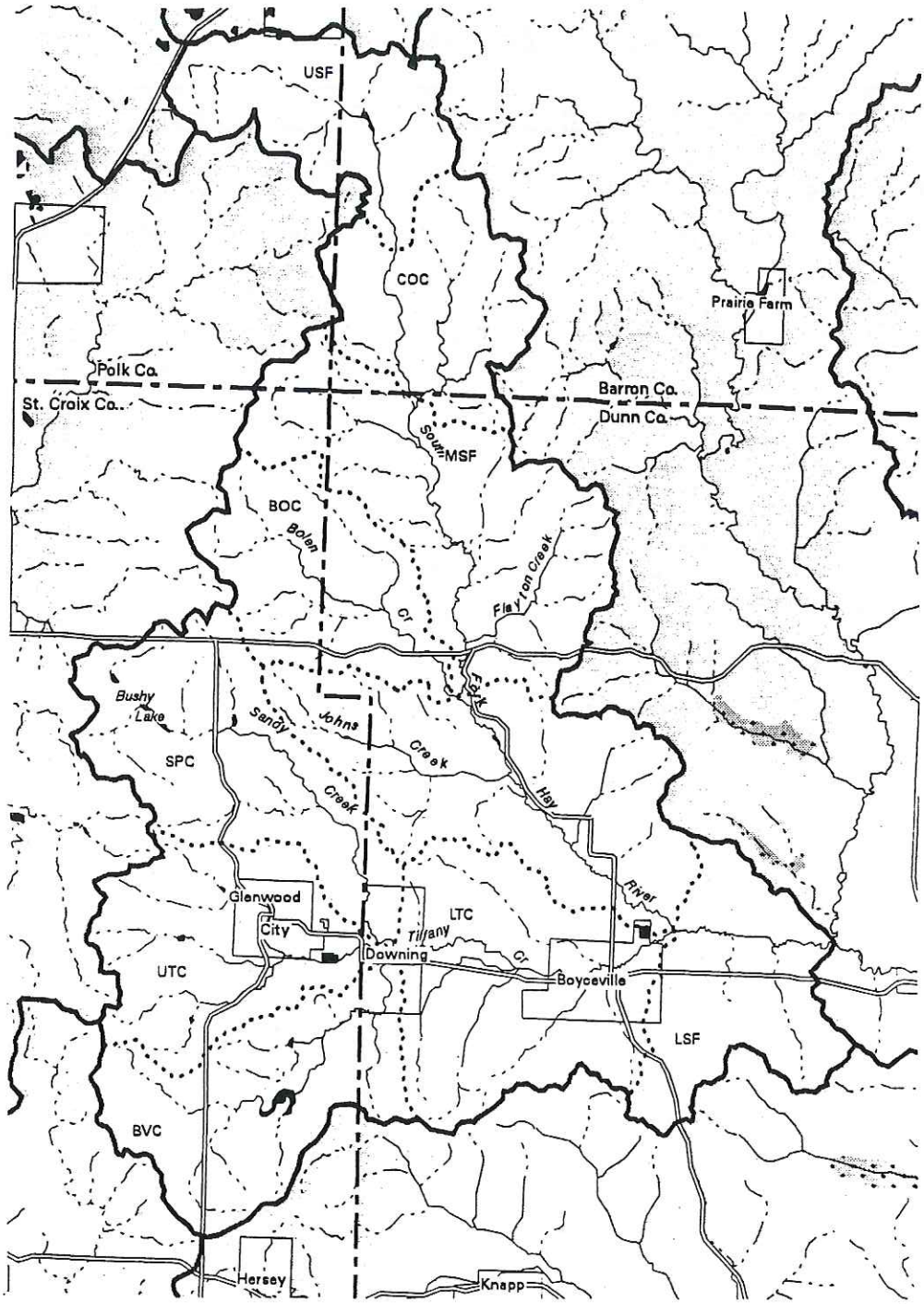
1. Improve habitat conditions sufficiently in watershed streams to improve the size structure of the trout population and increase carryover of adult fish. This objective applies to all streams, including those that are currently meeting their highest designated biological use (ie. Class I trout streams).

2. Reduce P loading to Tainter Lake and Lake Menomin by decreasing phosphorus loading from animal waste by 50 percent from the entire watershed.

Streams in the South Fork of the Hay River watershed are generally in good condition and support a viable, naturally-reproducing brook trout fishery. Macroinvertebrate sampling found HBI values primarily in the "good" to "very good" water quality range, suggesting minimal impacts from organic loading. However, all of the streams would benefit from nonpoint source management, and could be improved to support a higher quality, more sustainable coldwater fishery.

The following subwatershed narratives provide a brief description of water resource appraisal findings and project management objectives for each perennial waterbody. The narratives also provide relative sediment loading reduction goals for each subwatershed. See Appendix B for monitoring methods used for these determinations.

Map 2–1 Subwatersheds of the South Fork Hay River Priority Watershed



Study Area

Subwatershed Codes and Names

SPC= Sandy Creek
BOC= Bolen Creek
MSF= Middle South Fork Hay River
COC= Connors Creek
USF= Upper South Fork Hay River
BVC= Beaver Creek
LTC= Lower Tiffany Creek
LSF= Lower South Fork Hay River
UTC= Upper Tiffany Creek
JOC= Johns Creek

0 2 4 6 Miles

0 2 4 6 8 10 Kilometers

Scale 1:222,183

LEGEND

- Watershed Boundary
- Subwatershed Boundary
- Major Highway
- Local Roads
- Perennial Stream
- Intermittent Stream
- County Boundary
- Wetland
- Open Water
- Municipal Area

Wisconsin Department of Natural Resources
Watershed Management
October 1997

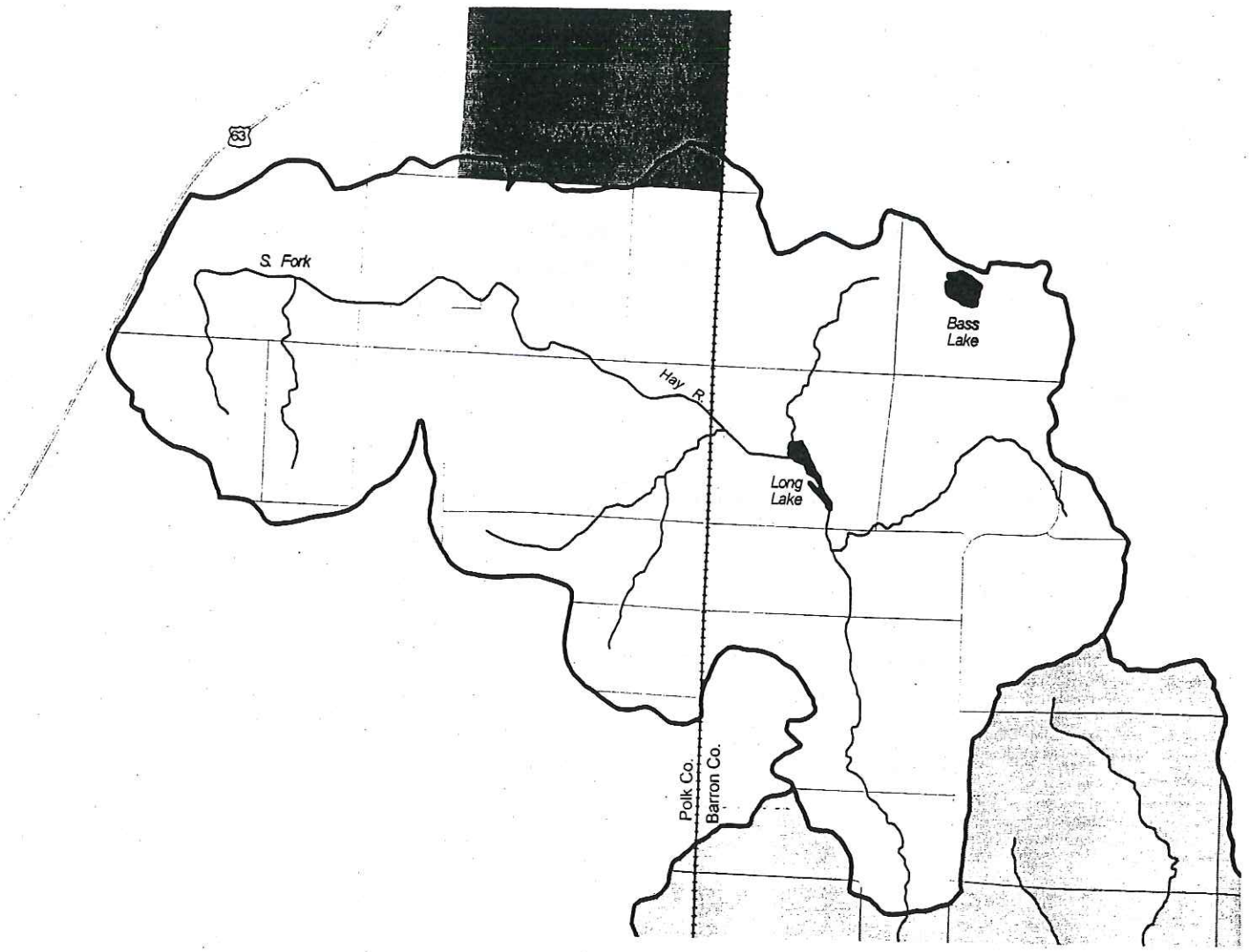
Subwatershed Discussions

This section describes the physical and water quality conditions for each subwatershed in the South Fork of the Hay River Watershed project. Discussions for each subwatershed are broken into four parts: a general description, water quality conditions, the nonpoint source pollutants impairing the subwatershed, and objectives for the subwatershed. Table 2-1 summarizes the subwatershed conditions.

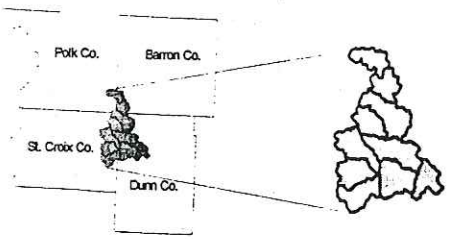
Subwatersheds in the South Fork of the Hay River Watershed

Upper South Fork	(USF)
Connors Creek	(COC)
Middle South Fork	(MSF)
Bolen Creek	(BOC)
Johns Creek	(JOC)
Sandy Creek	(SDC)
Upper Tiffany Creek	(UTC)
Lower Tiffany	(LTC)
Beaver Creek	(BVC)
Lower South Fork	(LSF)

Map 2-2 Upper South Fork Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.5 1 1.5 Miles

Mapscale 1:56,557

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Upper South Fork Subwatershed (US)

Description

The Upper South Fork subwatershed is 13.6 square miles and includes the headwaters of the South Fork of the Hay River. The South Fork of the Hay River originates at the outlet of Long Lake in Barron County, a shallow 6-acre lake with no appreciable sport fishery and no public access.

Water Quality Conditions

The river is classified as intermittent throughout this subwatershed and has little potential as a coldwater fishery. A habitat assessment conducted in the river above Long Lake had a rating of "good." However, most of the South Fork in this subwatershed is severely limited by beaver dams, sedimentation, ditching and lack of permanent flow.

Nonpoint Source Pollutants

- The Upper South Fork Subwatershed contains 18 animal lots which contribute 603 pounds of phosphorus annually. This represents an estimated 8 percent of the barnyard phosphorus load for the entire watershed.

- The upland sediment delivery in the Upper South Fork Subwatershed is 1,508 tons, annually, or 10 percent of the entire watershed load. Cropland is the major source in this subwatershed, contributing 83 ercent of the load.

- Streambanks from the Upper South Fork Subwatershed contribute 1 percent of the streambank sediment delivered to the entire watershed.

Water Resource Objectives

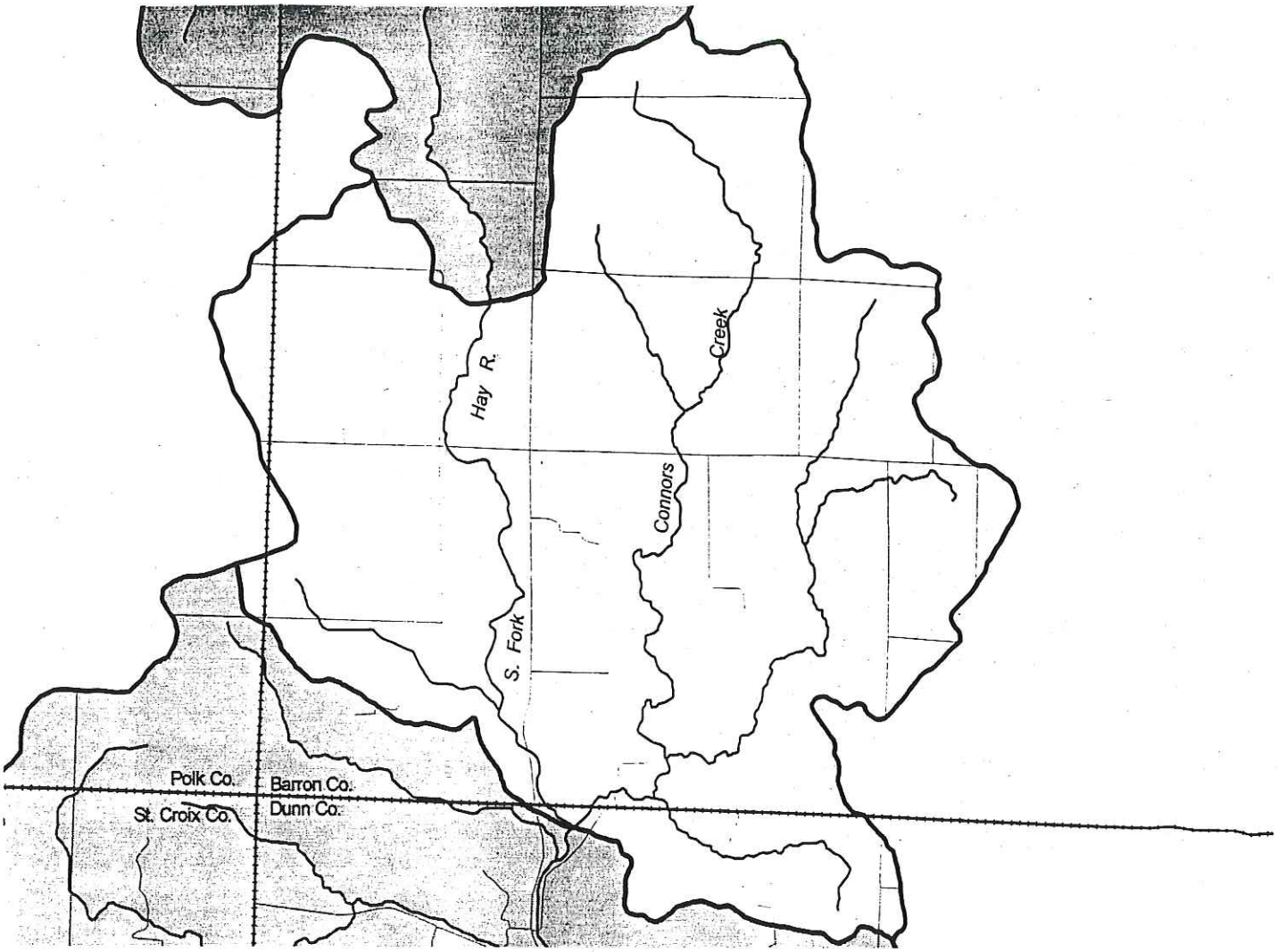
The following are recommended for the water resources of the Upper South Fork Subwatershed:

1. Enhance water quality conditions in the South Fork of the Hay River.

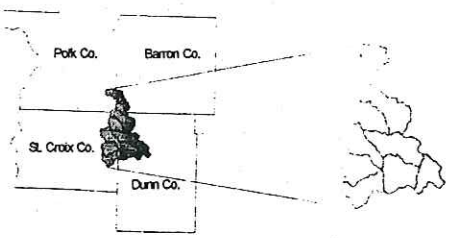
2. Improve water quality in the South Fork of the Hay River with a **medium** level of sediment control.

3. A higher level of protection will be given to the watershed surrounding Bass and Long Lakes. Sediment and manure runoff control are crucial to stop the rapid degradation of these sensitive waters.

Map 2-3 Connors Creek Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.5 1 1.5 Miles

Mapscale 1:56,557

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Connors Creek Subwatershed (CC)

Description

The Connors Creek subwatershed is 13.8 square miles and has two perennial streams; Connors Creek and a portion of the South Fork of the Hay River.

Water Quality Conditions

Connors Creek is a 5-mile tributary of the South Fork of the Hay River and supports a Class I trout fishery. The fish habitat rating was "fair" to "good" and the Index of Biotic Integrity (IBI) was "excellent." The stream has high brook trout densities and good natural reproduction. The stream HBI was "very good" indicating minimal organic loading.

Trout populations have greatly improved in Connors Creek since a 1972 fish survey. Streambank pasturing and erosion is greatly reduced in the upper reach since the earlier survey. However, pasturing and streambank erosion are still a problem in the lower reach.

The South Fork of the Hay River is 4 miles in length in this subwatershed, the upper one mile (above the Village of Reeve) has intermittent flow and the lower 3 miles are a Class I brook trout fishery. The fish habitat rating was "good" and the IBI was "excellent" at the Barron-Dunn county line. The stream has moderate brook trout densities and good reproduction in the reach with permanent flow. The HBI was "fair," with the poorest rating in the watershed at CTH A. The relatively poor macroinvertebrate rating may be a result of periodic organic loading from the extensive wetland area above the sample site.

Trout populations in this reach of the South Fork are greatly improved from earlier fish surveys conducted in 1958 and 1964. Streambank pasturing and erosion are much reduced from the earlier surveys. The stream is primarily limited by flooding, beaver dams and lack of suitable cover.

Nonpoint Source Pollutants

- The Connors Creek Subwatershed contains 11 animal lots which contribute 409 pounds of phosphorus annually. This represents an estimated 6 percent of the barnyard phosphorus load for the entire watershed.

- The upland sediment delivery is the highest in the Connors Creek Subwatershed, when compared with other subwatersheds, contributing 3,428 tons annually, or 22 percent, of the entire watershed load. Cropland is the major source in this subwatershed, contributing 93 percent of the load.

- A very small amount of the sediment delivered from streambanks in the watershed comes from the Connors Creek Subwatershed.

Water Resource Objectives

The following are recommended for the water resources of the Connors Creek Subwatershed:

1. Enhance the Class I trout fisheries in Connors Creek and South Fork of the Hay River.

2. Improve habitat and water quality conditions in the subwatershed streams with a **medium** level of sediment control.

Middle South Fork Subwatershed (MS)

Description

The Middle South Fork subwatershed is 25.2 square miles and has seven perennial streams including: South Fork of the Hay River, Flayton Creek, Carver Creek, Torgerson Creek and unnamed streams 27-9, 23-11 and 22-6.

Water Quality Conditions

The South Fork of the Hay River flows 11.6 miles in this subwatershed and is a Class I trout fishery in the upper 4.3 miles, and a Class II trout fishery in the lower 7.3 miles. The fish habitat rating was "fair" to "good" and the IBI was "excellent" in the upper reaches and "good" in the lower reaches. The stream had moderate brook trout densities and good natural reproduction in the upper six stations. Fingerling brook trout are stocked annually throughout much of this portion of the South Fork. The stream is primarily impacted by streambank erosion and sedimentation in the lower reaches.

Flayton Creek is a 5-mile tributary of the South Fork of the Hay River and is managed as a Class II trout fishery. The fish habitat rating was "fair" in the downstream station and "good" in the upper three stations. The stream IBI was "excellent" at three stations and "poor" at station 2, which had no trout. The stream had low trout densities and some natural brook trout reproduction. The stream is impacted by beaver dams, streambank pasturing, ditching and sedimentation.

Creek 27-9 is a 1-mile tributary of Flayton Creek and is managed as a Class II trout fishery. The fish habitat rating was "good" and the IBI was "excellent," but the rating may not be appropriate since fewer than 25 fish were collected.

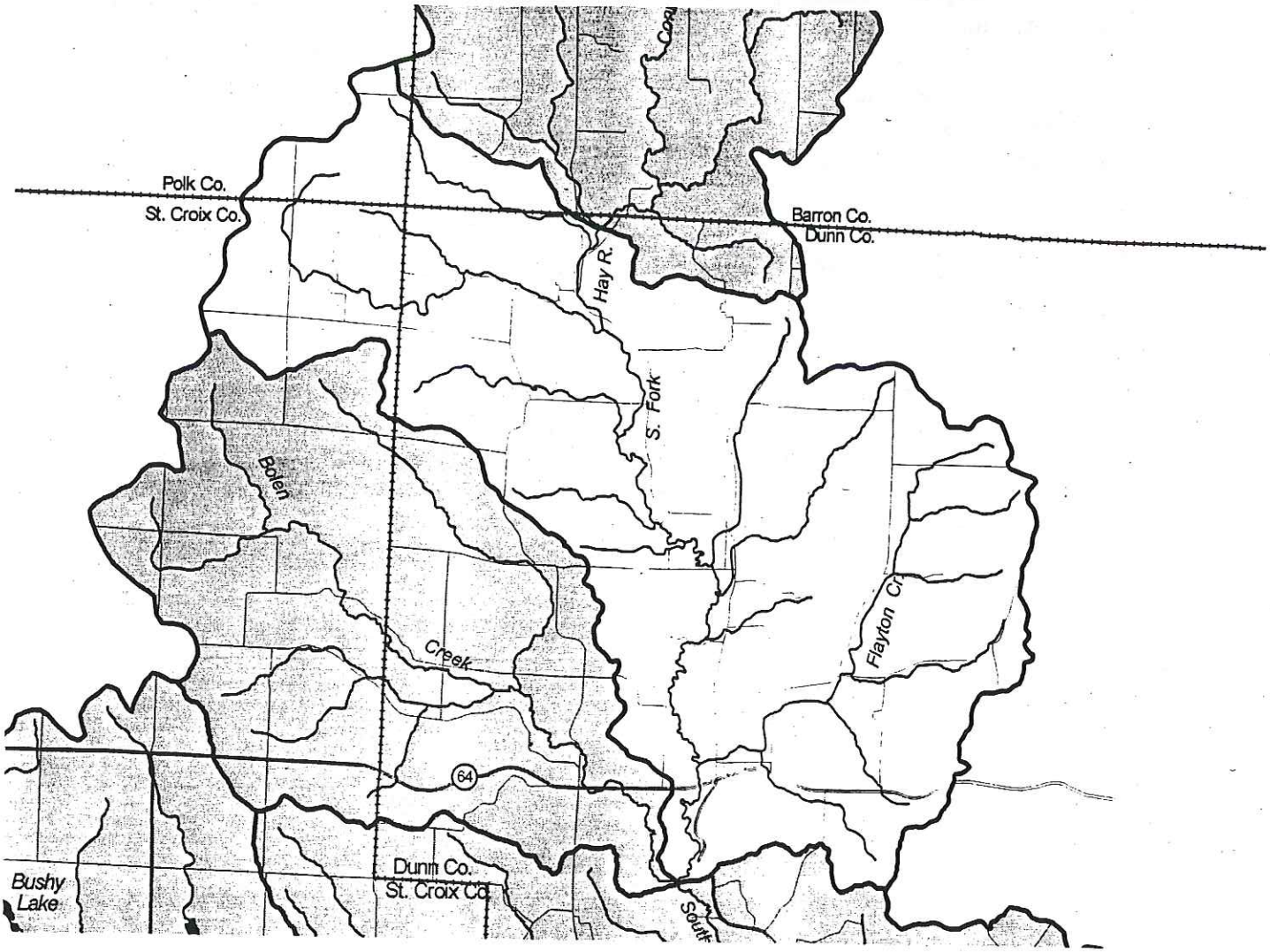
Carver Creek is a 2.3-mile tributary of the South Fork of the Hay River and is managed as a Class II trout fishery. The fish habitat rating was "fair" to "good," and IBI was "fair" to "excellent." Brook trout densities were generally low with limited natural reproduction. The stream is impacted by beaver dams, ditching and grazing of streambanks.

Torgerson Creek is a 3-mile tributary of the South Fork of the Hay River and is managed as a Class II trout fishery. The fish habitat rating was "fair" to "good" and the IBI was "excellent." The stream had moderate brook trout densities and some natural reproduction. The stream has a high gradient and is impacted by flashy streamflow conditions.

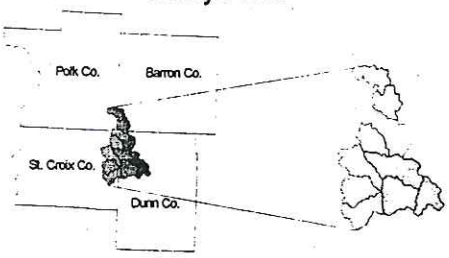
Creek 22-6 is a 2.8-mile tributary of the South Fork of the Hay River and is managed as a Class II trout fishery. The fish habitat rating was "fair" and the coldwater IBI was "poor," since no trout were found. The lack of trout in this stream may be a result of beaver activity.

Creek 23-11 is a 1-mile tributary of Flayton Creek and is managed as Class II trout fishery. The fish habitat rating was "fair" and the IBI was "excellent," but the rating may not be appropriate since fewer than 25 fish were captured.

Map 2- 4 Middle South Fork Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.8 1.6 2.4 Miles

Mapscale 1:88,370

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Nonpoint Source Pollutants

- The Middle South Fork Subwatershed contains 33 animal lots which contribute 1,066 pounds of phosphorus annually. This represents an estimated 15 percent of the barnyard phosphorus load for the entire watershed.

- The upland sediment delivery in the Middle South Fork Subwatershed is 1,109 tons, annually, or 7 percent of the entire watershed load. Cropland is the major source in this subwatershed, contributing 83 percent of the load.

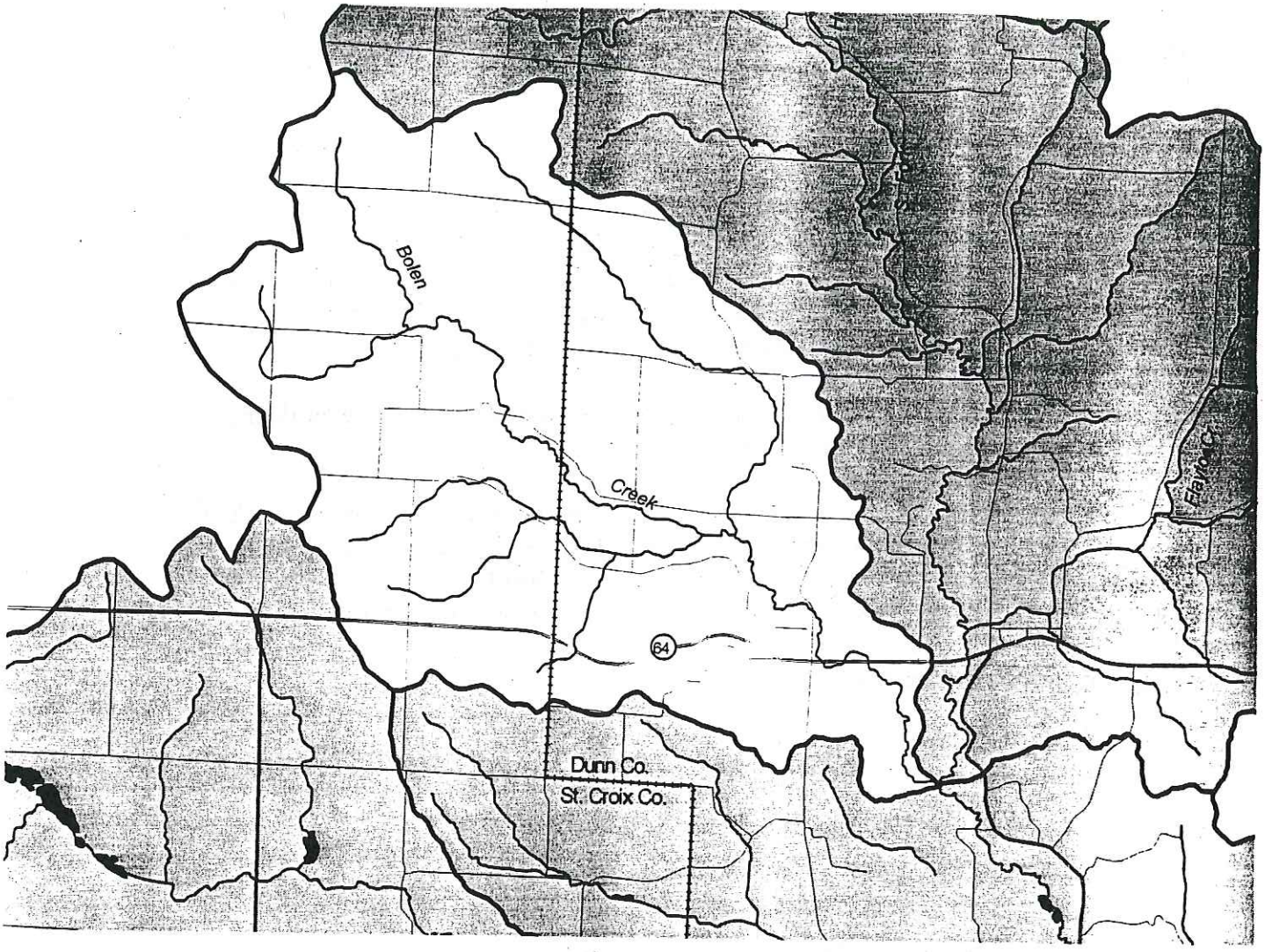
- Six percent of the sediment delivered from streambanks in the watershed comes from the Middle South Fork Subwatershed.

Water Resource Objectives

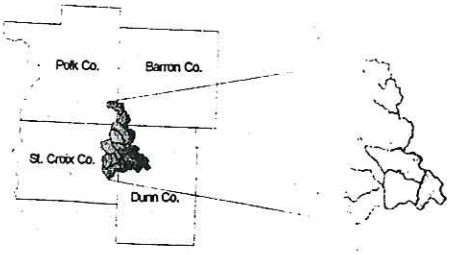
The following are recommended for the Middle South Fork of the Hay River Subwatershed:

1. Improve Torgerson Creek to a Class I trout fishery.
2. Enhance habitat and water quality conditions in the remaining subwatershed streams.
3. Improve habitat and water quality conditions in subwatershed streams with a **high** level of sediment control.

Map 2-5 Bolen Creek Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.6 1.2 1.8 Miles

Mapscale 1:68,663

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Bolen Creek Subwatershed (BC)

Description

The Bolen Creek Subwatershed is 14.8 square miles and has two perennial streams; Bolen Creek and Little Bolen Creek.

Water Quality Conditions

Bolen Creek is a 9-mile tributary of the South Fork of the Hay River and is managed as a Class II trout fishery. The stream fish habitat rating was "fair" to "good" and the IBI was "excellent" at all sites. The stream had moderate brook trout densities and good natural reproduction at all stations. The lower stream reach is annually stocked with holdover brook trout. The HBI was "very good" indicating little organic loading.

The stream is impacted by streambank pasturing, streambank erosion, beaver dams, sedimentation and a shifting sand substrate.

Little Bolen Creek is a 2-mile tributary of Bolen Creek and is managed as a Class II trout fishery. The fish habitat rating was "fair" and the IBI was "fair" at the upstream site and "excellent" in the downstream reach. The upstream site had low brook trout densities and was impacted by streambank erosion, and the downstream site was impacted by barnyard runoff.

Nonpoint Source Pollutants

- The Bolen Creek Subwatershed contains 16 animal lots which contribute 713 pounds of phosphorus annually. This represents an estimated 10 percent of the phosphorus load from barnyards for the entire watershed.

- The upland sediment delivery in the Bolen Creek Subwatershed is 1,043 tons, annually, or 7 percent of the entire watershed load. Cropland is the major source in this subwatershed, contributing 92 percent of the load.

- Streambanks in the Bolen Creek Subwatershed contribute 3 percent of the sediment delivered in the entire watershed.

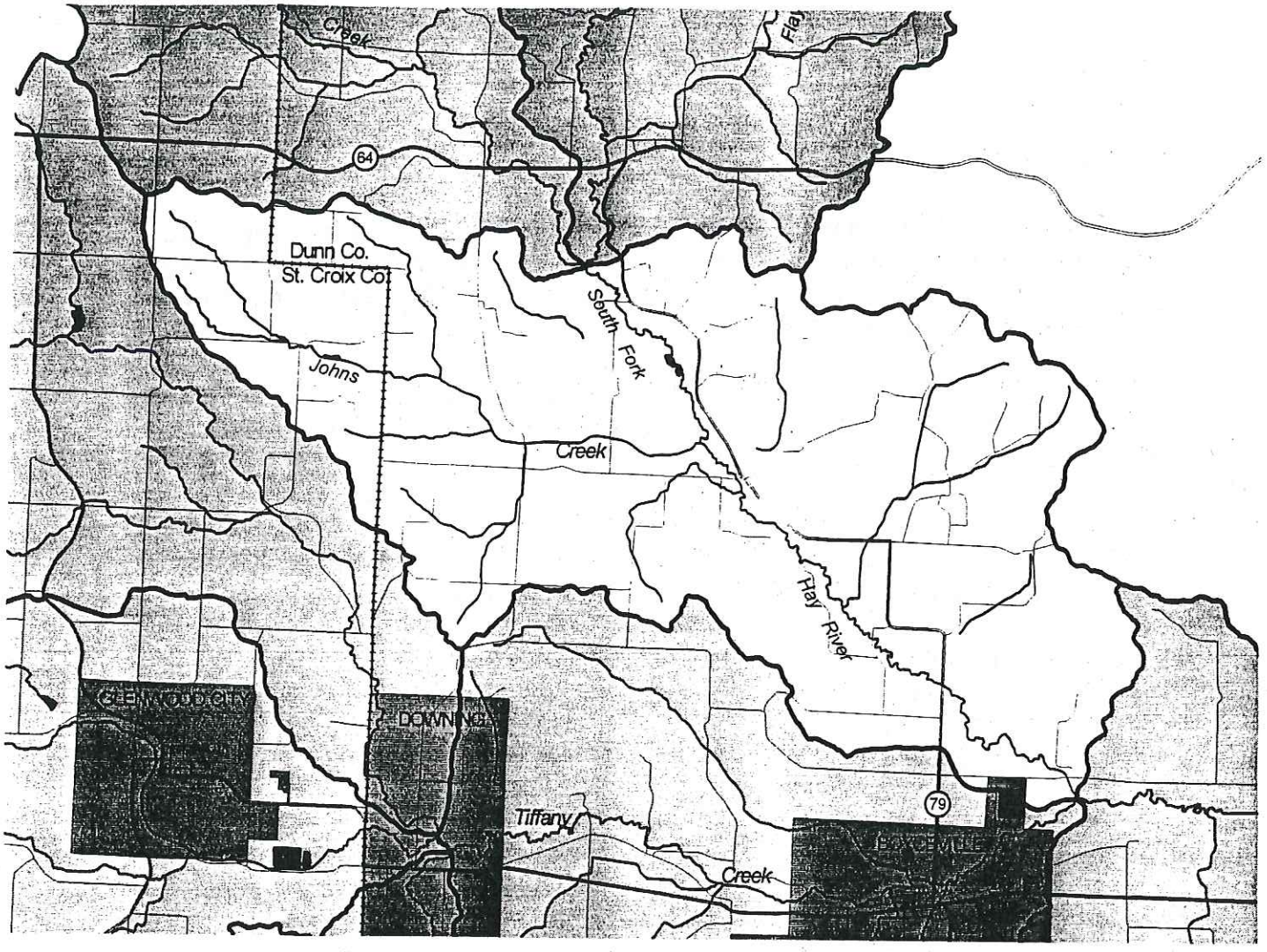
Water Resource Objectives

The following are recommended for the Bolen Creek Subwatershed:

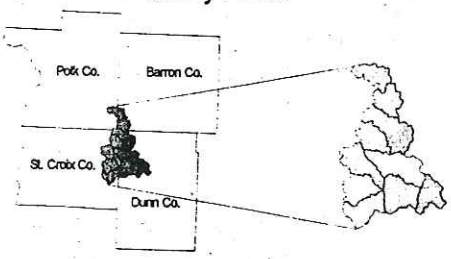
1. Improve Bolen and Little Bolen Creeks to a Class I brook trout fishery.

2. Improve habitat and water quality conditions in Bolen and Little Bolen Creeks with a **high** level of sediment control.

Map 2- 6 Johns Creek Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.8 1.6 2.4 Miles

Mapscale 1:85,828

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Johns Creek Subwatershed (JC)

Description

The Johns Creek Subwatershed is 24.9 square miles and has five perennial streams including; a portion of South Fork of the Hay River, Johns Creek and unnamed streams 14-10, 11-14 and 8-7.

Water Quality Conditions

Johns Creek is a 6-mile tributary of the South Fork of the Hay River and is managed as a Class II trout fishery. The fish habitat rating was "fair" and IBI was "excellent" at all sites. The HBI was "good" indicating minimal organic loading. The stream had low brook trout densities, but good natural reproduction.

The stream is impacted by upland runoff and streambank erosion, beaver dams, and ditching. The creek has cold water temperatures, however, ditching has resulted in poor stream structure and limited fish habitat.

Creek 8-7 is a 1-mile tributary of Johns Creek and is managed as a Class II trout fishery. The fish habitat rating was "fair" and the IBI was "excellent." The stream is primarily a road ditch, with lack of fish cover and habitat as the primary limiting factors.

The South Fork of the Hay River flows 10.8 miles in this subwatershed and is managed as a Class II brook and brown trout fishery. The fish habitat ratings were "fair" to "good" and IBI values were "good" to "excellent." The fish surveys found low densities of brook and brown trout. The river is stocked annually with holdover brown trout in this reach. The stream HBI was "very good" at STH 79 indicating minimal organic loading.

Creek 14-10 is a 3-mile tributary of the South Fork of the Hay River and is managed as a Class II trout fishery. The fish habitat rating was "good" and the IBI was "poor" at the downstream site and "excellent" at the upstream site. No trout were found at the downstream site and some natural brook trout reproduction was evident at the upstream site. The lower station is ditched and has a muck bottom that is unsuitable for trout.

Creek 11-14 is a 1.8-mile tributary of Creek 14-10 and is managed as a Class II trout fishery. The stream fish habitat rating was "fair" and the IBI was "excellent." The streambanks were severely grazed by cattle.

Nonpoint Source Pollutants

- The Johns Creek Subwatershed contains 33 animal lots which contribute 921 pounds of phosphorus annually. This represents an estimated 13 percent of the barnyard phosphorus load for the entire watershed.

- The upland sediment delivery in the Johns Creek Subwatershed is 1,687 tons annually, or 11 percent of the entire watershed load. Cropland is the major source in this subwatershed, contributing 92 percent of the load.

- The highest contributor of streambank sediment of all the subwatersheds, the Johns Creek Subwatershed contributes roughly 35 percent of the sediment delivered from streambanks in the watershed.

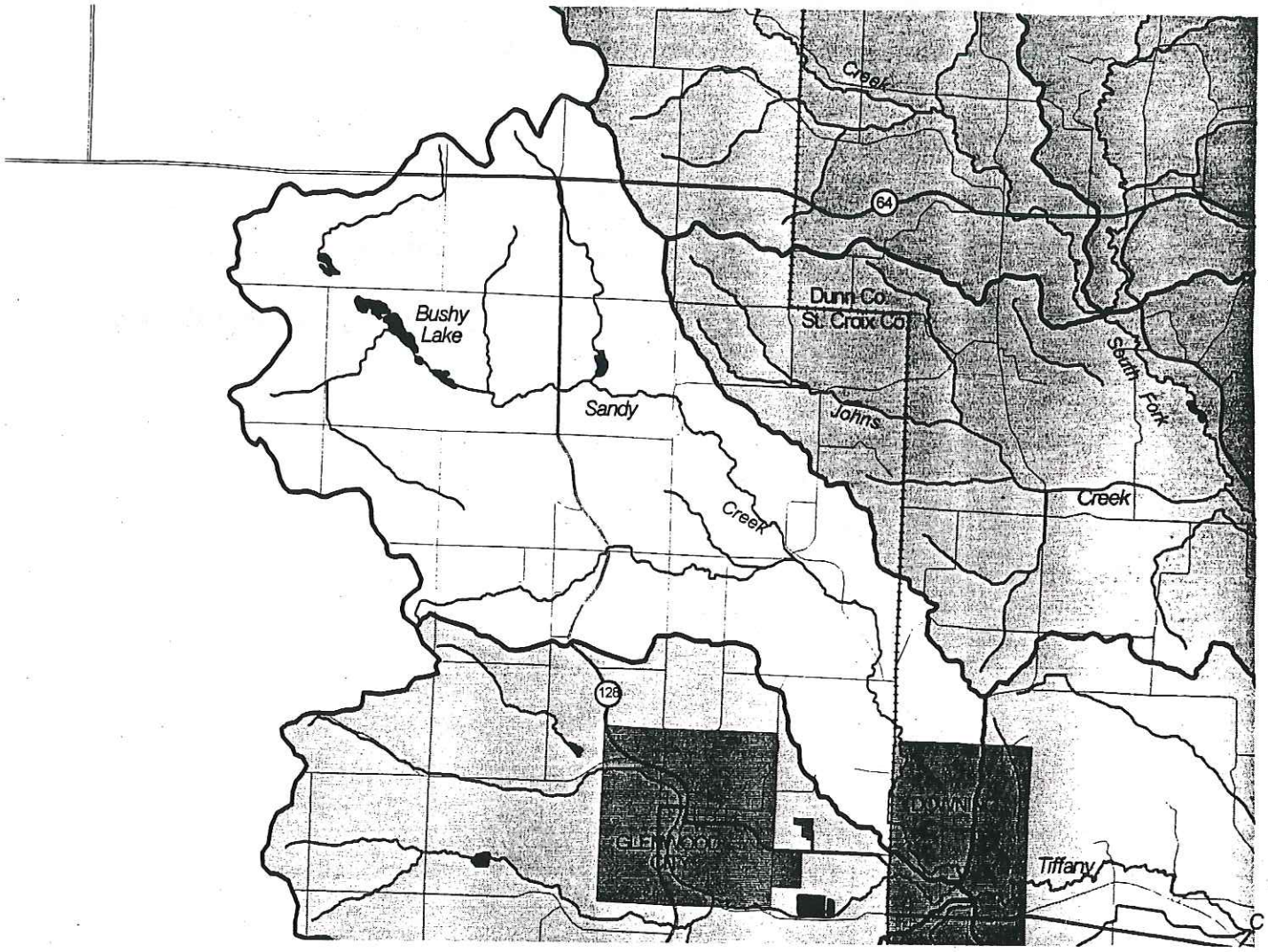
Water Resource Objectives

The following are recommended for the Johns Creek Subwatershed:

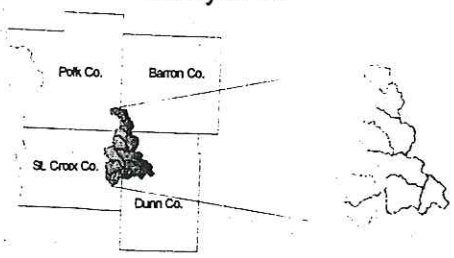
1. Enhance the Class II trout fisheries in all perennial streams in this subwatershed.

2. Improve habitat and water quality conditions in the subwatershed streams with a **high** level of sediment control.

Map 2-7 Sandy Creek Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.8 1.6 2.4 Miles

Mapscale 1:56,557

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Sandy Creek Subwatershed (SC)

Description

The Sandy Creek Subwatershed is 19.5 square miles and has two perennial streams; Sandy Creek and Creek 12-1.

Water Quality Conditions

Sandy Creek is a 12-mile tributary of Tiffany Creek and is managed as a Class I trout fishery in the upper 5.2 miles, and as a Class II fishery in the lower 6.8 miles. The stream fish habitat rating was "good" to "excellent" in the upper portion and "fair" to "good" in the lower portion. The stream IBI was "good" to "excellent," and the HBI was "good." Sandy Creek had moderate brook trout densities and good natural reproduction in the upper reaches. The lower reaches had increasing amounts of shifting sand and reduced trout densities.

Water resource problems include bank erosion, especially in wooded areas, streambank pasturing, ditching and sedimentation.

Creek 12-11 is a 2.2-mile tributary of Sandy Creek and is managed as a Class II trout fishery. The fish habitat rating was "excellent" and IBI was "excellent." Sedimentation and streambank erosion due to pasturing was noted during the habitat survey.

Nonpoint Source Pollutants

- The Sandy Creek Subwatershed represents the largest contributor of barnyard phosphorus of any subwatershed in the project area and represents an estimated 18 percent of the barnyard phosphorus load for the entire watershed. The Sandy Creek Subwatershed contains 18 animal lots which contribute 1,321 pounds of phosphorus annually.

- The upland sediment delivery in the Sandy Creek Subwatershed is 1,485 tons, annually, or 10 percent of the entire watershed load. Cropland is the major source in this subwatershed, contributing 87 percent of the load.

- One percent of the sediment delivered from streambanks in the watershed comes from streambanks in the Sandy Creek Subwatershed.

Water Resource Objectives

The following are recommended for the Sandy Creek Subwatershed:

1. Improve the Class II portion of Sandy Creek to a Class I trout fishery.
2. Improve Creek 12-11 to a Class I trout fishery.
3. Improve habitat and water quality conditions in the subwatershed streams with a **high** level of sediment control. The Bushy Lakes will receive a higher level of control.

Upper Tiffany Subwatershed (UT)

Description

The Upper Tiffany Subwatershed is 16.8 square miles and is located in the southwest portion of the watershed. This subwatershed includes 4 perennial streams: Tiffany Creek, South Tiffany Creek, Blue Creek and Creek 25-11.

Water Quality Conditions

Tiffany Creek flows 8.4 miles in this reach and is managed as a Class II trout fishery in the lower 3 miles, and Class I trout fishery in the upper 5.4 miles. The stream has good natural brook trout reproduction in its headwaters area, and is relatively deep and narrow in this subwatershed. The fish habitat rating was "good" to "excellent," and the IBI was "excellent." The HBI rating was "good," suggesting minimal organic loading.

This reach of Tiffany Creek has moderate brook trout densities, generally increasing moving upstream. The stream is occasionally impacted by urban runoff and fertilizer spills in Glenwood City. Other water resource problems include streambank erosion and ditching.

Creek 25-11 is a 2-mile tributary of Tiffany Creek and is managed as a Class II brook trout fishery. The fish habitat ratings were "fair" and IBI values were "poor" in the downstream station, and "good" in the upstream stations. The downstream station had no trout and was heavily impacted by silt deposition, ditching and possible urban runoff from Glenwood City.

South Tiffany Creek is a 3-mile tributary of Tiffany Creek and is managed as a Class I brook trout fishery. The fish habitat ratings were "fair" to "good," IBI values are "good" to "excellent" and the HBI was "good." This stream has high densities of brook trout with abundant natural reproduction in the headwater area. Water resource problems include beaver dams, streambank pasturing and sedimentation of the stream bottom.

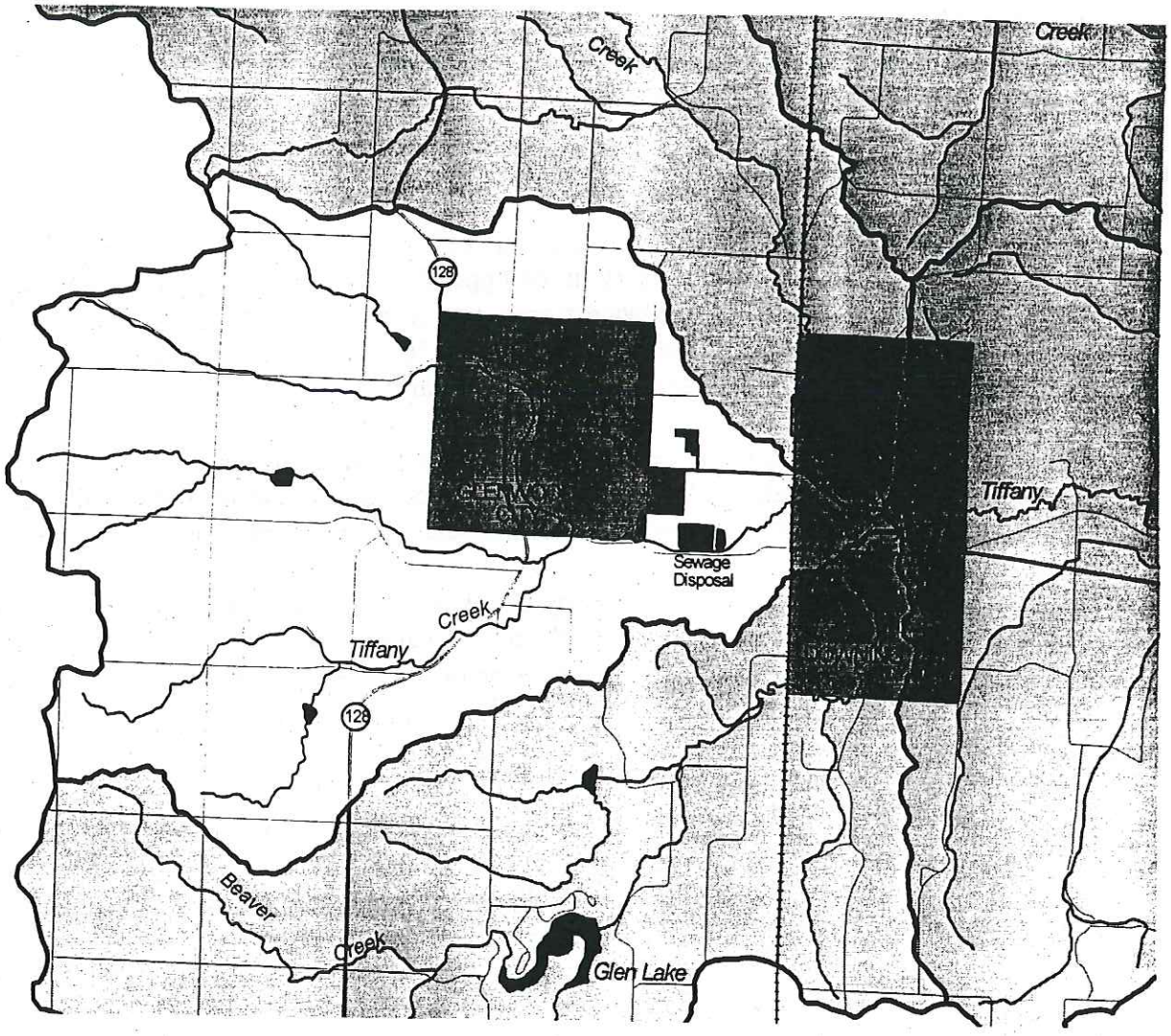
Blue Creek is a 3-mile tributary of South Fork Tiffany Creek and is managed as a Class I brook trout fishery. The fish habitat ratings were "good" to "excellent" and IBI values were "excellent." The stream has relatively high brook trout densities with abundant natural reproduction in the headwaters area. Water resource concerns include beaver dams and ditching in the upper reaches.

Nonpoint Source Pollutants

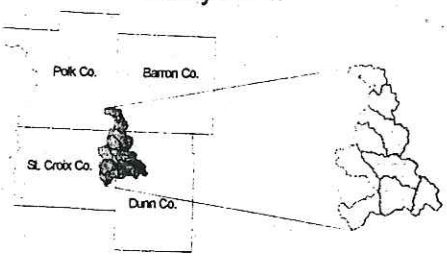
- The Upper Tiffany Subwatershed contains 18 animal lots which contribute 752 pounds of phosphorus annually. This represents an estimated 10 percent of the barnyard phosphorus load for the entire watershed.

- The upland sediment delivery in the Upper Tiffany Subwatershed is 1,267 tons, annually, or 8 percent of the entire watershed load. Cropland is the major source in this subwatershed, contributing 89 percent of the load.

Map 2-8 Upper Tiffany Creek Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.6 1.2 1.8 Miles

Mapscale 1:73,795

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

- Two percent of the sediment delivered from streambanks in the watershed comes from the Upper Tiffany Subwatershed.

Water Resource Objectives

The following are recommended for the Upper Tiffany Creek Subwatershed:

1. Improve 2 miles of Class II trout fishery in Tiffany Creek to a Class I fishery.

2. Enhance water quality and habitat conditions in all other streams in the subwatershed.

3. Improve water quality and habitat conditions of the subwatershed streams with a **high** level of sediment control.

Lower Tiffany Subwatershed (LT)

Description

The Lower Tiffany Subwatershed is 21.4 square miles and is located in the south central portion of the watershed. The subwatershed has three perennial streams; Tiffany Creek, Creek 35-2 and Creek 35-6a.

Water Quality Conditions

Tiffany Creek flows for 9.6 miles in this subwatershed and is managed as a Class II brook trout fishery. Fish habitat generally improves moving upstream, with a habitat rating of "fair" in the lower three stations and "good" in the upper three stations in the subwatershed. The IBI was "fair" to "poor" in the lower stations, and "good" in the upper stations. The stream had moderate brook trout densities with no trout reproduction in the lower three stations and limited reproduction in the upper reaches. The HBI was "good" in this reach, indicating minimal organic loading.

The lower reaches of this stream have a shifting sand substrate and elevated water temperatures. The stream is also impacted by extensive bank erosion, streambank pasturing, flooding and overall lack of suitable fish habitat.

Creek 35-2 - is a 3-mile tributary of Tiffany Creek and is managed as a Class II trout fishery. The lower end of this stream flows through the village of Boyceville. The fish habitat rating was "fair" and the IBI was "excellent." However, the stream had low brook trout densities. Water resource problems include streambank pasturing and ditching.

Creek 34-6a - is a 3-mile tributary of Tiffany Creek and is managed as a Class II trout fishery. The fish habitat rating was "fair" to "good" and IBI was "excellent." However, brook trout densities were low. The stream has potential to become a Class I trout fishery with adequate sediment control.

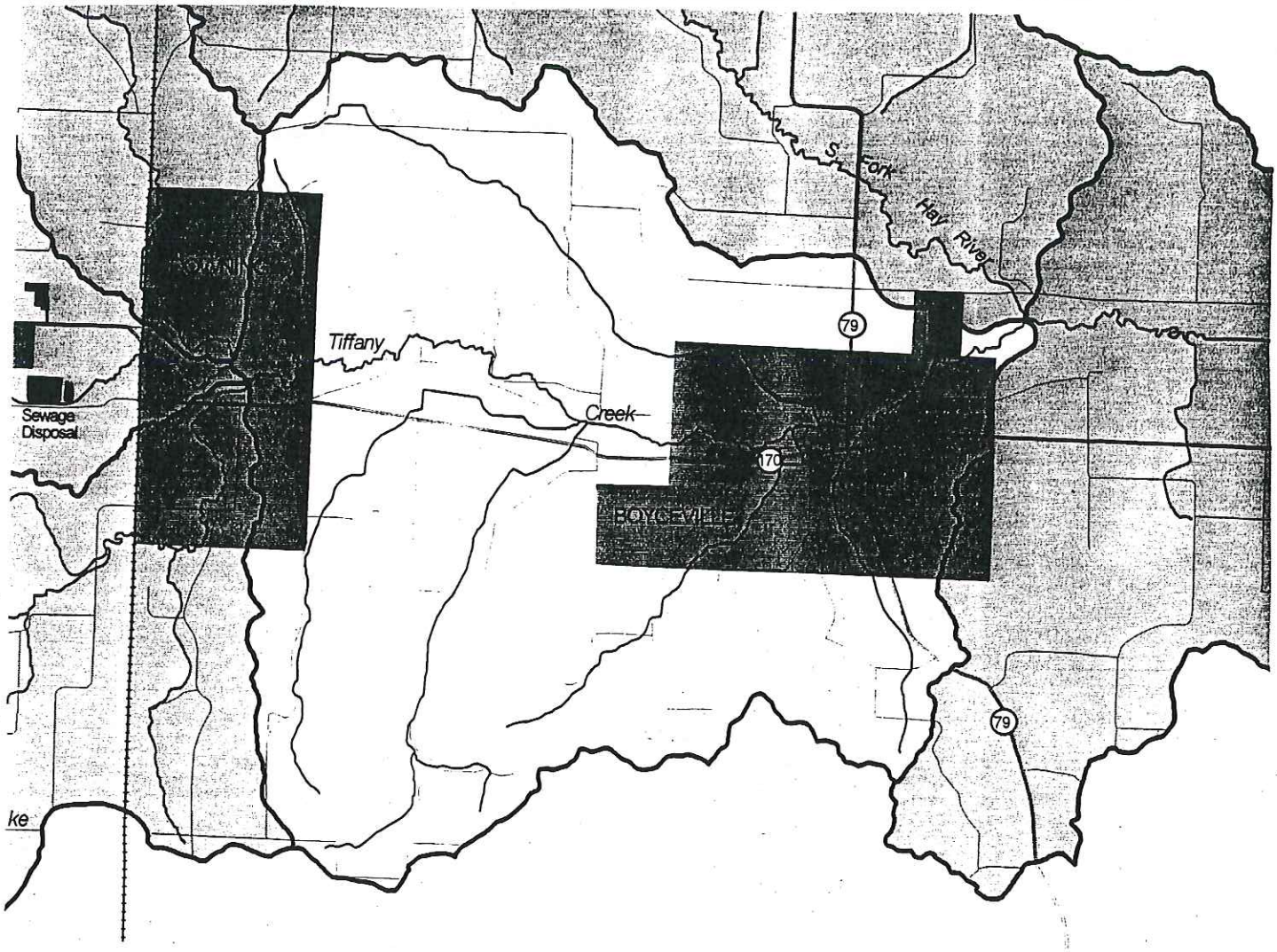
Nonpoint Source Pollutants

- The Lower Tiffany Creek Subwatershed contains 23 animal lots which combined contribute 202 pounds of phosphorus annually. The least amount of any one subwatershed in the project, this represents an estimated 3 percent of the phosphorus for the entire watershed.

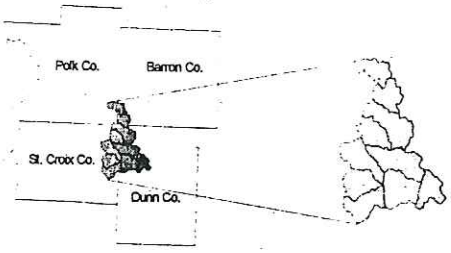
- The upland sediment delivery in the Lower Tiffany Subwatershed is 1,676 tons, annually, or 11 percent of the entire watershed load. Cropland is the major source in this subwatershed, contributing 92 percent of the load.

- A high amount, roughly 32 percent, of the sediment delivered from streambanks in the watershed comes from the Lower Tiffany Subwatershed.

Map 2-9 Lower Tiffany Creek Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.6 1.2 1.8 Miles

Mapscale 1:56,557

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Water Resource Objectives

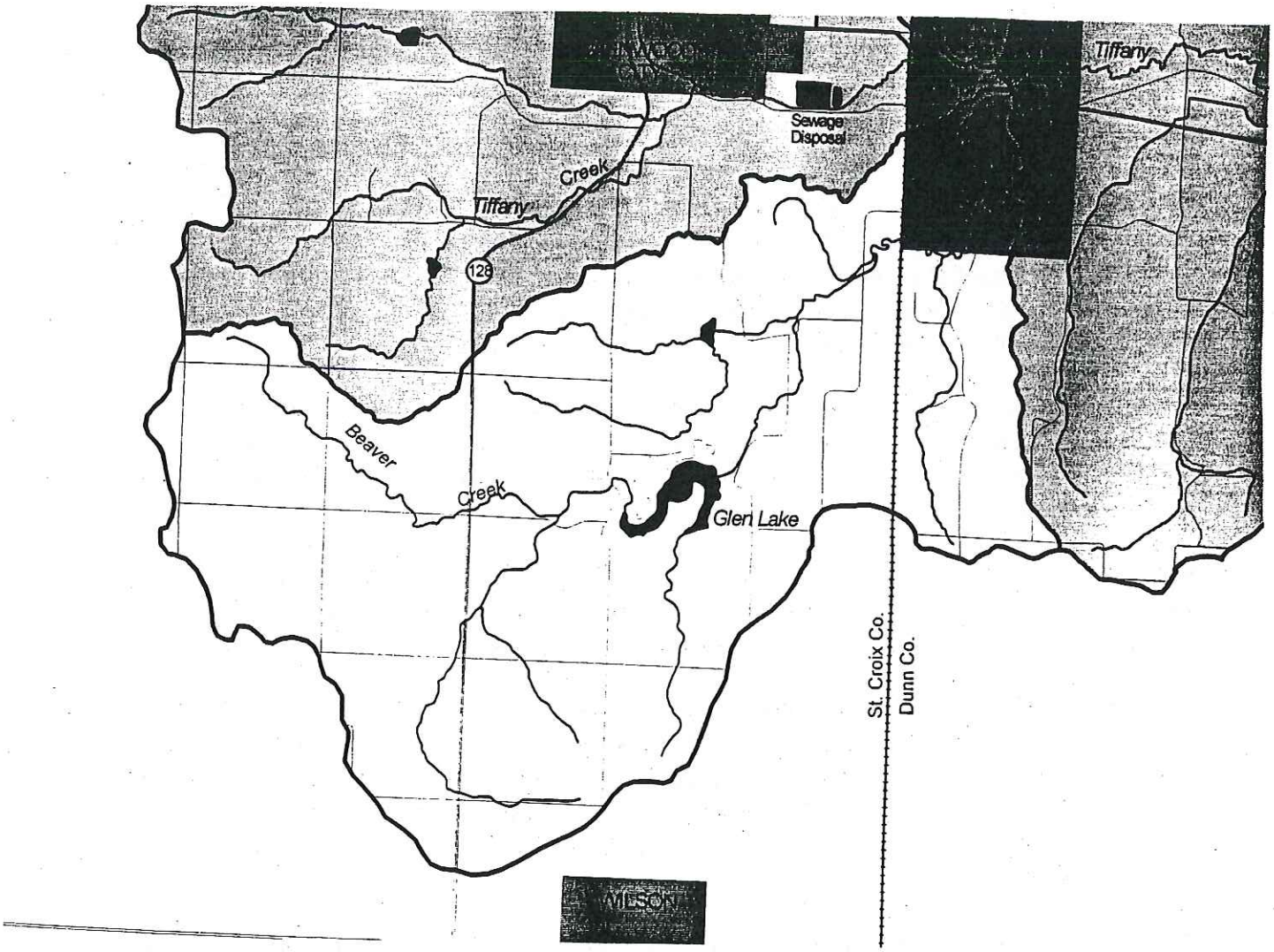
The following are recommended for the Lower Tiffany Subwatershed:

1. Enhance the Class II trout fishery in lower Tiffany Creek and Creek 35-2.

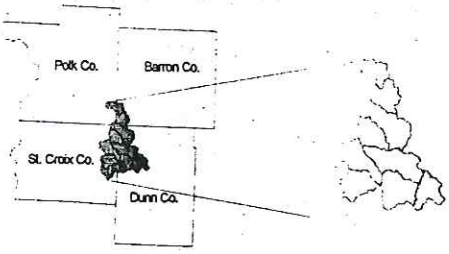
2. Improve Creek 34-6a from Class II to a Class I trout fishery.

3. Improve water quality and habitat conditions in the subwatershed streams with a **high** level of sediment control.

Map 2-10 Beaver Creek Subwatershed



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.6 1.2 1.8 Miles

Mapscale 1:56,557

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Beaver Creek Subwatershed (BC)

Description

The Beaver Creek Subwatershed is 17.6 square miles and includes 3 perennial streams; Beaver Creek, Creek 6-5 and Creek 1-10.

Water Quality Conditions

Beaver Creek is a 9.1-mile tributary of Tiffany Creek and is managed as a warmwater forage stream in the headwaters area above Glen Lake and as a coldwater trout fishery below the lake outlet. Above Glen Lake, the stream has highly flashy streamflow, elevated water temperatures and occasional dissolved oxygen depletion. The stream below Glen Lake has 2.9 miles of Class I brook trout fishery and the remainder is a Class II trout fishery.

Fish habitat ratings in Beaver Creek ranged from "fair" above Glen Lake, to "fair" to "excellent" below the lake. The IBI ranged from "poor" above the lake, to "excellent" below the lake. Fish surveys found high brook trout densities and good natural reproduction in the reach below the dam.

Water resource problems in Beaver Creek include organic, sediment and phosphorus loading and high runoff rates from the watershed above Glen Lake. Below the dam, the stream is impacted by excessive streambank grazing and erosion, ditching and sedimentation.

Glen Lake is an 84 acre impoundment of Beaver Creek and is managed as a warmwater sport fishery primarily consisting of largemouth bass and panfish. In addition, about 500 brood stock surplus brook trout are stocked each fall to provide a winter fishery (Engel and Paukert, 1995). The Glen Lake dam has a bottom discharge which provides some of the coolest summer stream water temperatures recorded in the watershed (maximum water temperature was 55° F during the survey).

Glen Lake is significantly impacted by sediment and nutrient loading from its watershed. The Trophic Status Index (TSI) indicates the lake is eutrophic, with relatively high phosphorus and chlorophyll a levels during the growing season. Lake profile measurements found the lake thermally stratified during summer, resulting in anoxic (devoid of oxygen) conditions below 5 meters. A macrophyte survey found excessive sedimentation and shallow water depths in a bay receiving water from Beaver Creek (Borman and Konkel, 1995).

Bacteriological sampling of the Glen Lake beach found fecal coliform and fecal streptococcus levels well below the state water quality standard of 400 colonies/100 ml. for body contact recreational use.

Creek 6-5 is a 2 mile tributary of Beaver Creek and is managed as a Class II trout fishery. The fish habitat rating was "good" and the IBI was "good." Water resource problems include beaver dams and sedimentation.

Creek 1-10 is a one mile tributary of Beaver Creek with a Class II trout fishery. The fish habitat rating was "good" and IBI was "excellent."

Nonpoint Source Pollutants

- The Beaver Creek Subwatershed contains 15 animal lots which contribute 923 pounds of phosphorus annually. This represents an estimated 13 percent of the barnyard phosphorus load for the entire watershed.

- The upland sediment delivery in the Beaver Creek Subwatershed is 1,336 tons, annually, or 9 percent of the entire watershed load. Cropland is the major source in this subwatershed, contributing 87 percent of the load.

- One percent of the sediment delivered from streambanks in the watershed comes from the Beaver Creek Subwatershed.

Water Resource Objectives

The following are recommended for the Beaver Creek Subwatershed:

1. Improve the Class II portion of Beaver Creek to a Class I trout fishery.

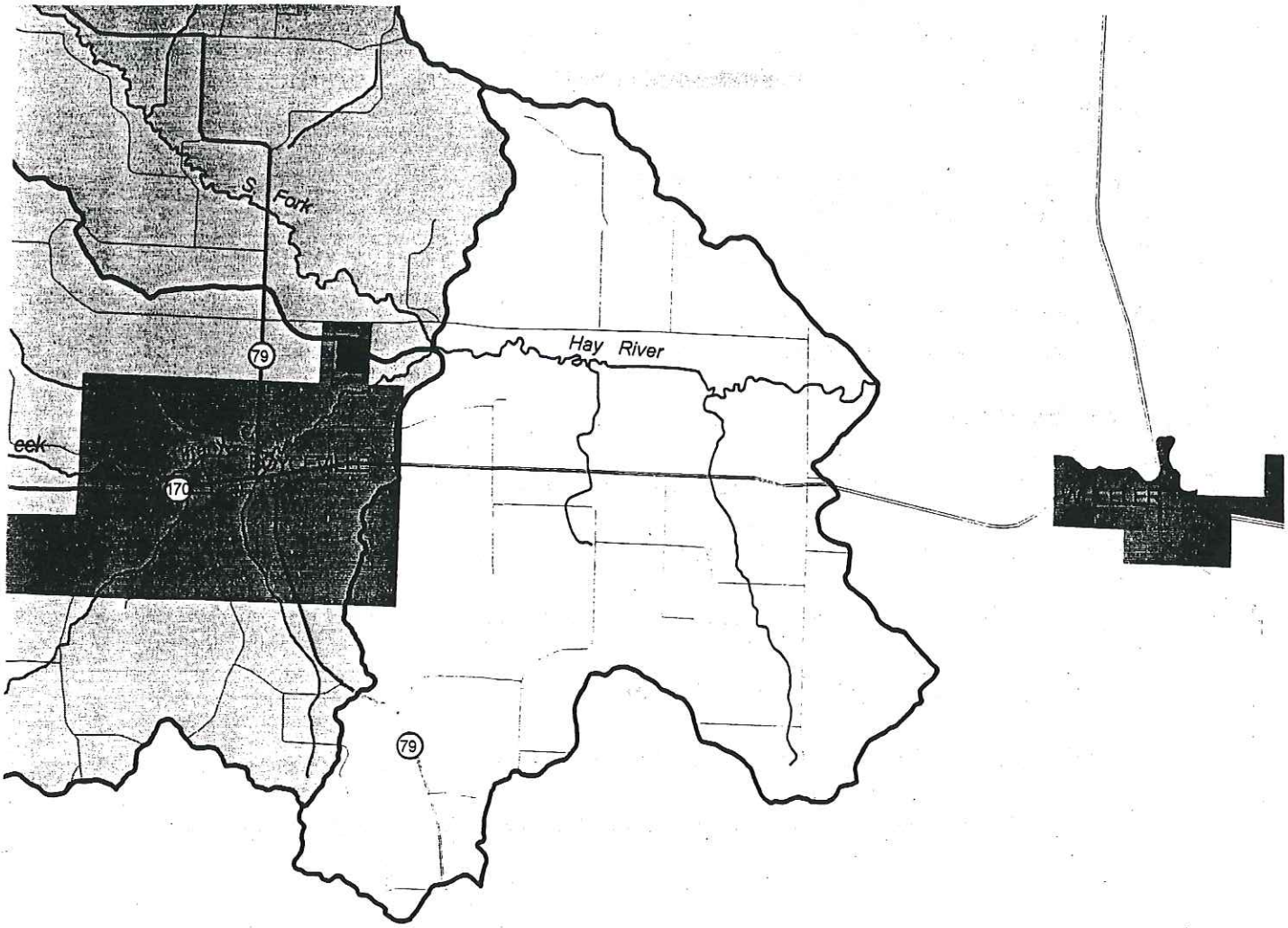
2. Enhance the warmwater forage fishery in Beaver Creek above Glen Lake.

3. Enhance the Class II trout fishery in Creeks 6-5 and 1-10.

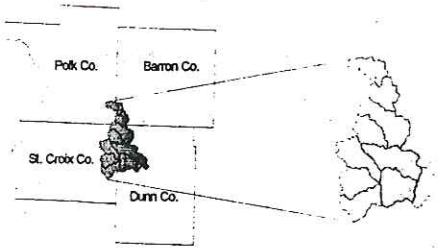
4. Significantly reduce sediment and nutrient loading to Glen Lake.

5. Improve habitat and water quality of the subwatershed water resources with a **high** level of sediment control.

Map 2-11 Lower South Fork Hay River



Study Area



Legend

- County Boundary
- Local Roads
- Major Roads
- Streams
- Open Water
- Municipal Area
- Subwatershed Boundary

N
W E
S

0 0.6 1.2 1.8 Miles

Mapscale 1:71,791

Wisconsin Department
of Natural Resources
Water Division GIS Lab
October 1997

Lower South Fork Subwatershed (LS)

Description

The Lower South Fork subwatershed is 14.1 square miles and is located in the southeast portion of the watershed. The South Fork of the Hay River is the only perennial stream in the subwatershed and flows 4.7 miles to the Hay River in this reach.

Water Quality Conditions

The South Fork of the Hay River transitions from a marginal Class II coldwater fishery in the upper reach to a warmwater sport fishery in the lower reach of this subwatershed. The stream is relatively wide and shallow, and has a shifting sand substrate and sluggish flow. The South Fork has minimal fish cover and no natural trout reproduction in this reach. The trout fishery is supplemented with annual stocking of holdover brown trout.

The fish habitat ratings were "fair" and IBIs were "good" at all sites. The stream is primarily impacted by sedimentation and elevated water temperatures.

Nonpoint Source Pollutants

- The Lower South Fork Subwatershed contains 9 animal lots which contribute 283 pounds of phosphorus annually. This represents an estimated 4 percent of the phosphorus for the entire watershed.

- The upland sediment delivery in the Lower South Fork Subwatershed is 778 tons annually, or 5 percent of the entire watershed load which is the smallest amount of any one subwatershed in the project area. Cropland is the major source in this subwatershed, contributing 93 percent of the load.

- About 19 percent of the sediment delivered from streambanks in the watershed comes from the Lower South Fork Subwatershed.

Water Resource Objectives

The following are recommended for the water resources of the Lower South Fork Subwatershed:

1. Enhance the Class II trout fishery in the lower South Fork of the Hay River.

2. Improve habitat and water quality conditions in the subwatershed with a **medium** level of sediment control.

CHAPTER THREE
Rural Inventory Results, Runoff Pollutants, and Participation Criteria

Nonpoint Source (Runoff) Pollutant Reduction Goals

This section describes the nonpoint source inventories, objectives, and cost-share eligibility criteria for each pollutant source. These sources include barnyard runoff and sediment from upland, gully, and streambank erosion. Cost-share funds for installing pollution control measures, known as best management practices (BMPs), will be targeted at sites which contribute the greatest amounts of pollutants. This section is organized in the following parts.

- Pollutant Reduction Goals and Project Objectives for Nonpoint Sources
- Management Categories
- Rural Nonpoint Pollution Sources and Management Strategy

Pollutant Reduction Goals and Project Objectives for Nonpoint Sources

Goals for water quality in the South Fork of the Hay River watershed were identified in Chapter 2 as protection, enhancement, and restoration of water resources. These goals will be achieved through project objectives for sediment, phosphorus, and groundwater. The project team determined that the water resources would best benefit from an overall sediment reduction of 40 percent which the project will strive to achieve. However, recognizing the historical difficulty in reaching such high reduction goals, especially for cropland sediment, over the relatively short time frame of a watershed project, an overall sediment reduction *objective* was set at 30 percent. It is expected that a 25- to 30-percent reduction is possible through a high participation of the identified landowners given the fiscal and time limitations of applying BMPs under the present program structure. The water resources *goal* of a 40 percent sediment reduction will be established for the watershed community to continue to work for during the project and long after it has ended.

The following is a summary of pollution reductions to be targeted for the entire watershed.

Sediment Objectives: Reduce overall sediment delivered by 30 percent. To meet this objective, the following is needed:

- 30-percent reduction in sediment reaching streams from agricultural uplands in all subwatersheds.

- 20-percent reduction in streambank sediment delivered to all streams and a 10 percent overall repair of stream habitat in all subwatersheds.

Phosphorus Objective: Reduce overall phosphorus load by 40 percent. To meet this objective, the following is needed:

- 50-percent reduction in P from barnyards in all subwatersheds.
- A reduction in P from land-spread manure, especially in winterspreading on non-appropriate cropland acres.
- 30-percent reduction in sediment reaching streams from agricultural uplands.

In addition, this plan calls for restoration of as many degraded or prior converted wetlands as possible.

Tables 3-1 and 3-2 summarize the sediment and phosphorus reduction goals for the South Fork of the Hay River Priority Watershed Project.

Table 3-1. Sediment Reduction Objective

Source	Sediment Load Delivered (tons)	Percent of Total Load	Planned Percent Reduction	Planned Reduction Load (tons)
Uplands (extrapolated)	15,317	84%	30%	4,595
Streambanks	2,799	16%	20%	495
Totals	18,116	100%	29%	5,090

Table 3-2. Phosphorus Reduction Objectives

Nonpoint Source	Inventoried Phosphorus Load (lbs)	Percent of Total	Planned Percent Reduction	Planned Phosphorus Reduction (lbs)
Uplands	15,279*	63%	30%	4,584
Barnyards	7,192	30%	50%	3,596
Streambanks	1,733	7%	20%	346
Total	24,204	100%	≈ 40%	8,526

* This number is based on phosphorus estimates from the WINHUSLE computer model for uplands. It represents only the amount of phosphorus that leaves (flows out) of the entire watershed annually and NOT how much is deposited in the streams as it is bound up in the sediment. The ratio of pounds of phosphorus to tons of sediment being delivered is approximately 7:1.

* This number is based on phosphorus estimates from the WINHUSLE computer model for uplands. It represents only the amount of phosphorus that leaves (flows out) of the entire watershed annually and NOT how much is deposited in the streams as it is bound up in the sediment. The ratio of pounds of phosphorus to tons of sediment being delivered is approximately 7:1.

Management Categories

Management categories help prioritize nonpoint sources for participation in the incentive program; they are based on the amount of pollution generated by a source.

It is important to note that all landowners within the South Fork of the Hay River Watershed area are, in fact, eligible to participate in the watershed program no matter which management category identifies their particular site or source. There may be some areas where specific practices would not be eligible for incentive payments, and they are detailed in Chapter 4. In order to participate in any part of the incentive program or watershed project, a landower is required to participate in the Nutrient Management and Soil Conservation Plan portion.

Management category criteria are expressed in terms of tons of sediment delivered to surface waters from eroding uplands and streambanks and pounds of phosphorus delivered to surface water from barnyards or elsewhere.

The LCDs will assist landowners in applying BMPs. Practices range from alterations in farm management (such as changes in manure-spreading and crop rotations) to engineered structures (such as diversions, sediment basins, and manure storage facilities), and are tailored to specific landowner situations. See Chapter 4 for a complete list of BMPs.

Critical Management Category

Nonpoint sources described as critical source areas contribute a significant amount of the pollutants impacting surface waters and are eligible for funding and technical assistance through the priority watershed project. Controlling these sources of pollution is essential for meeting the water quality objectives of the project since they contribute the highest amount per site compared to the other sites.

Eligible Management Category

Nonpoint sources of pollution in this category contribute less significantly, per site, to water quality degradation. Still, remediation of these sites are also important for meeting the water quality objectives. These sites are eligible for technical and funding assistance as well.

Ineligible Management Category

Sites where funding assistance or incentives do not apply through the priority watershed project would be considered ineligible. Other DNR programs, such as wildlife and fisheries management, may assist county project staff to control these sources as part of the implementation of the integrated resource management plan for this watershed. Other local, state, or federal programs may also be applicable to these sites. A landowner is also

considered ineligible if he or she refuses to participate in the Nutrient Management and Soil Conservation Plan portion of the watershed project.

Rural Nonpoint Pollution Sources and Management Strategy

Barnyard Runoff

Runoff carrying a variety of pollutants from barnyards and other confined livestock areas is a source of pollutants in the streams of the South Fork of the Hay River Watershed. A total of 194 barnyards are the source of 7,192 pounds of phosphorus per year (Table 3-2). Approximately 20 barnyards were not included in this inventory. With the concurrence from the landowner, these barnyards will be inventoried during the first 2 years of the implementation phase of the project. Preliminary staff estimates indicate that none of these are among the highest sites.

The objective for barnyard runoff control is to reduce phosphorus loading to streams by 50 percent. Barnyard sites contributing a phosphorus load equal to or greater than 150 pounds annually are designated as the highest sources. There are 12 barnyard sites in the highest category in the entire watershed.

Incentive payments will be tied to the amount of phosphorus reduction a particular management practice will acheive (using the BARNY model estimates). The higher the predicted phosphorus runoff reduction for a particular management practice installation, the higher the dollar-per-pound amount a landowner will be eligible to receive. The incentive payment structure is outlined in Chapter 4.

Barnyard sites that contribute less than 149 pounds of phosphorus annually will also be considered as eligible for incentive payment. Again, the lowest cost solution is recommended where significant reductions can be made. In addition to focusing on improving the highest barnyard sources, project staff will focus their efforts on the 69 yards that individually contribute between 20 and 149 pounds. Their participation in the watershed project is important if the phosphorus reduction objective is to be met.

About 113 barnyards are in a category of barnyards that contribute less than 20 pounds each of phosphorus runoff. Again, landowners of these barnyard sites are eligible for the incentive payment based on pounds of phosphorus reduced.

Table 3-3. Barnyard Pollution Reduction ESTIMATES Summary

(Phosphorus Reduction Goal: 3,600 lbs. = 50%)

Category Criteria (lbs of P)	Number of barnyards	Pounds reduced (100% participation and maximum P reduction per site)	Percent Reduction of Total Load	Percent Reduction of Goal (100% part.)	Percent Reduction of Goal (75% part.)
Highest Barnyard Sources ≥ 150 lbs.	12	2,357	33%	60%	60%
Medium Barnyard Sources 90 - 149 lbs.	20	1,788	25%	45%	34%
Low Barnyard Sources 20-89 lbs.	49	1,190	17%	30%	23%
Minimal Barnyard Sources Below 20 lbs.	113	-	25%	-	-
TOTAL	194	5,335	100%	135%	117%

Landowners receiving incentive payments for barnyard runoff are required to prepare a nutrient management plan for their operation. A soil conservation plan is necessary for development of a nutrient management plan.

Internally Drained Barnyards

Internally drained barnyards drain to surface depressions rather than directly to surface waters. The key to groundwater protection is prevention of groundwater contamination. Prevention is the best public policy because it is more cost-effective than remediation after groundwater has been contaminated. Proper barnyard management, including nutrient management, is important for groundwater protection.

Three internally drained yards were identified in the watershed. Eligibility for internally drained animal lots is based on a site by site analysis conducted by the LCD to determine likelihood of groundwater contamination.

Nutrient and Pest Management

All cropland in the South Fork of the Hay River Watershed will be eligible for incentive payments for development of a nutrient management plan. A pest management plan may also be developed at the landowner's discresion. Approximately 280 farms with 57,000 acres are eligible. The watershed goal is to have NM plans on 70 percent of these acres, with an objective of 50 percent over eight years of implementation.

Manure spreading runoff and management of nutrients are addressed through Natural Resource Conservation Service (NRCS) Nutrient Management Standard 590. Pest management is addressed through NRCS Pest Management Standard 595. Nutrient and pest management plans may be developed by private consultants or by the landowner with the requirment that it is reviewed and signed by LCD staff. LCD staff will prepare soil conservation plans and materials for the nutrient and pest management plans.

Nutrient and pest management activities will result in pollutant load reductions. For this reason, fertilizer application rates must be tracked and reported. Professional services contracts developed for nutrient and pest management consulting must include a provision for reporting the required information to the LCD. Since one of the watershed project goals is that for all landowners to be able to easily interpret nutrient management plans, a more user-friendly plan will be developed by project staff in consultation with the UW-Extension to accompany the Standard 590 form. This will also facilitate another project goal which is to encourage farmers to develop their own nutrient management plans.

Manure Storage

Cost-share eligibility for manure storage practices will be based on the development of a preliminary Nutrient Management Plan, developed in accordance with NRCS Standard 590. An operation is required to address the water quality impact if the nutrient management plan demonstrates that manure can not be feasibly managed during periods of snow-covered, frozen and saturated conditions without the installation of storage practices. The nutrient management plan must also demonstrate that proper utilization of the manure can be achieved following adoption of the intended storage practice.

The eligibility for storage facilities will be based on the least-cost system, through the development of a nutrient management (Std. 590) plan. These options may include, but are not limited to: properly sited, unconfined manure stacks (in accordance with Std. 312); the construction of a short term storage facility (capacity for 30 to 100 days manure production in accordance with Std. 313); the construction of a long term storage facility (capacity for up to 210 days production in accordance with Std. 313 or 425); the rental of additional lands; or haul or broker manure to a neighboring farm that can use the manure in accordance with a nutrient management plan. The latter two BMPs are interim practices for the Branch River Priority Watershed and will be available to this project.

Landowners receiving cost-sharing funds for manure storage are required to develop a nutrient management plan for those acres that will receive manure applications resulting from this practice.

Upland Sediment

Intensive agricultural practices have caused considerable amounts of eroded soil to reach streams, ponds, and wetlands in the South Fork of the Hay River Watershed. Upland erosion is the major source of sediments to the streams of the watershed. As mentioned previously, the project team determined that while reducing sediment by 40 percent was desired for the improvement of the water resources, a more realistically achievable overall sediment reduction *objective* was set at 30 percent. It is expected that a 25- to 30-percent reduction is possible

through a high participation of the identified landowners given the fiscal and time limitations of applying BMPs under the present program structure. The water resources *goal* of a 40 percent sediment reduction will be established for the watershed community to continue to work for during the project and long after it has ended.

Upland sediment sources were evaluated through subarea sampling and extrapolated for the entire 117,695 watershed acres. The subarea sampled represents approximatley 75 percent of the total land area in the watershed. The results of this inventory are summarized in the first two columns of table 3-5. Inventoried upland sediment sources reveal an estimated 9,806 tons of soil per year are delivered to wetlands or streams in the watershed from croplands. An additional 1,147 tons/year are delivered from grassland, pastures and woodlots. Table 3-4 summarizes upland sediment loading (75 percent) by land use for all subwatersheds. Extrapolated data indicate that uplands are the source of 84 percent of the sediment delivered to surface waters. The remaining 16 percent of the estimated sediment delivered to the watershed comes from streambank sources.

A 30-percent reduction in sediment from eroding fields is targeted for agricultural lands. The inventory results show that 90 percent of the upland sediment is derived from cropland.

To be classified as the highest sediment sources, fields must be contributing sediment at a rate greater than the highest sediment yield rate for that subwatershed. These rates range from 0.6 tons/acre/year of sediment in Sandy Creek, to 2.1 tons/acre/year of sediment in Upper South Fork (Table 3-5). The highest sources will cover an estimated 1,905 acres of cropland and will reduce the annual cropland sediment load by 1,149 tons, 25 percent of the sediment reduction objective. The average sediment delivery rate for all cropland in the watershed is 0.23 tons/ acre/year.

An additional 3,446 tons of sediment per year will be targeted to meet the 30 percent reduction objective. In an effort to reach this objective, as well as move on to the 40 percent sediment reduction goal, all other fields delivering sediment will be eligible for sediment reduction through the Nutrient Management and Soil Conservation Plans and associated incentive payments (see Chapter 4).

Table 3-4. Summary of Upland Sediment Loading By Land Use: South Fork of the Hay River Watershed Project (75% inventory shown)

Subwatershed		Cropland	Farmstead	Pasture	Woodland	Natural Areas	Wetland	Grazed Woodlot	Totals
UPPER SOUTH FORK	Acres	1513	107	338	543	[illegible]	[illegible]	[illegible]	[illegible]
	Sediment	480	80	14	2	0	0	5	581
CONNERS CREEK	Acres	2594	102	355	942	[illegible]	[illegible]	13	[illegible]
	Sediment	1564	63	21	3	0	0	31	1682
MIDDLE SOUTH FORK	Acres	4277	278	811	5631	807	83	[illegible]	[illegible]
	Sediment	814	65	80	14	4	0	9	986
BOLEN CREEK	Acres	3336	154	392	2347	386	159	515	[illegible]
	Sediment	762	44	19	6	2	0	3	836
JOHNS CREEK	Acres	6793	276	762	5159	774	233	503	14500
	Sediment	1457	66	29	17	9	0	5	1583
SANDY CREEK	Acres	5650	343	1146	2417	78	365	436	10435
	Sediment	1148	114	44	5	0	0	3	1314
UPPER TIFFANY CREEK	Acres	2828	157	460	1197	13	68	197	4921
	Sediment	541	47	18	3	0	0	1	610
BEAVER CREEK	Acres	4191	257	993	3012	117	494	237	9301
	Sediment	949	94	33	19	0	0	2	1097
LOWER TIFFANY CREEK	Acres	8523	318	446	2839	980	274	111	11491
	Sediment	1313	80	25	10	2	0	1	1431
LOWER SOUTH FORK	Acres	4846	222	252	2652	841	98	0	8912
	Sediment	778	32	15	6	2	0	0	833
Totals	Acres	42,551	2214	5755	26,702	[illegible]	[illegible]	[illegible]	87,396
	Sediment	9806	685	298	85	19	0	60	10,953

Notes: Sediment is reported in tons/year.
Data is based on a 75% inventory and not extrapolated to the entire watershed.

Table 3-5. Upland Sediments

Subwatershed	Inventory Results					Objective: 30% Reduction in sediment delivered - 4,595 tons							
						Highest Sediment Sources				Eligible Acres			
	Total Acres	Total Cropland Acres	Total tons/yr Sediment delivered from uplands (extrapo-lated)	% contri-buted	Tons needed for 30% reduction	# Acres	Target - Tons Reduced	Highest Sediment Delivery Rate	% of Goal Reduced	# Crop Acres	Target - Tons Reduced	Delivery Rate needed for 30% reduction	% of Goal Reduced
Upper South Fork	8,864	4,460	1,508	10	452	102	113	1.7	2	4,358		.60	7
Connors Creek	8,758	4,879	3,428	22	1,026	147	257	2.1	6	4,732		.57	17
Middle South Fork	16,138	5,357	1,109	7	333	260	83	1.1	2	5,097		.35	6
Bolen Creek	9,688	4,435	1,043	7	313	178	79	.8	2	4,257		.33	5
Johns Creek	16,432	7,698	1,687	11	506	295	127	1.0	3	7,403		.36	8
Sandy Creek	12,375	6,700	1,485	10	446	123	111	.6	2	6,577		.29	7
Upper Tiffany Creek	10,889	4,841	1,267	8	380	68	95	1.0	2	4,773		.27	6
Beaver Creek	11,449	5,159	1,336	9	401	272	100	.7	2	4,687		.37	7
Lower Tiffany Creek	14,185	7,627	1,676	11	503	323	126	.9	3	7,304		.37	8
Lower South Fork	8,917	4,851	778	5	233	137	58	.9	1	4,714		.25	4
Total	117,695	56,007	15,317	100	4,595	1,905	1,149	avg. 1.0	25%	54,102	3,446	avg. .38	75%

Gully Erosion

Gully erosion has not been identified as a significant problem in this watershed; therefore, a field inventory of gully erosion was not done.

Soil erosion that occurs from gully activity on cropland will be controlled primarily through the installation of grassed waterways. In some cases, other Best Management Practices may be used in an effort to reduce peakflow and increase infiltration. High residue management and the installation of structural practices may be utilized as alternatives.

If an on-site evaluation of an active gully leads the watershed staff to the conclusion that the installation of structural practices would not be cost effective, that site will be deemed as ineligible for those specific practices. All active gullies will be eligible for critical area stabilization and seeding.

Table 3-6. Eligibility Criteria for Gully Erosion

Management Category	Description	Target Reduction Level
Eligible	Actively Eroding Gullies	40% of Sediment Load from all eroding Gullies
Not Eligible	Inactive Gullies	N/A

Streambank Erosion

Streambank erosion contributes 16 percent of the total sediment to surface waters in the South Fork of the Hay River Watershed. Approximately 247 miles of streambank were evaluated. Significant erosion has occurred and aquatic habitat and water quality were degraded along approximately 51 miles of streambank. An estimated 2,478 tons of sediment are eroding into streams annually. Further review of streambank erosion on the effects of aquatic habitat requires additional attention be given to this sediment source. In particular, sources which are high in sand disturb the sensitive aquatic habitat the most. Silt and clay tend to stay in suspension longer and contribute to problems farther downstream where the flow of the water is slower. The watershed staff and NRCS engineers will be reviewing various methods of controlling these sources of sediment which vary from traditional rip-rap. See table 3-7 for streambank inventory results.

The highest sources for streambanks are those identified as *severe* erosional sites with a sediment delivery rate of greater than 75 tons/site/year. Three sites which meet this criteria have been identified. County staff will evaluate site accessibility and feasibility for remediation on these areas. As a minimum, severe eroding sites which are culturally induced, i.e., cattle access, cropping, etc. will be required to develop a plan or adopt practices to minimize these effects. If a site is a naturally occurring erosional site, landowners will be encouraged to adopt an appropriate BMP. Additional cost-sharing from other programs or organizations will be sought out if the county staff makes the determination that it is cost effective to use public funds. If previously unidentified severe sites are found during the implementation of the project, the same criteria will be used.

Eligible streambanks are those identified as *moderate and slight* erosional sites with a sediment delivery rate of greater than 7 tons/site/year and between 2 and 7 tons/site/year respectively. Moderate sites greater than 7 tons/site/year are eligible for rock rip-rap, bio-bank stabilization, and shaping and seeding. Sites eroding between two and seven tons/site/year are eligible for shaping and seeding or bio-bank stabilization.

Livestock Access

Livestock have access to approximately 21 percent of the total streambank length in the South Fork of the Hay River Watershed. Since there are no trampled sites that have greater than 75 tons/site/year erosion, no critical source areas have been identified from trampled streambanks. However, BMPs will be encouraged on all trampled streambanks, especially when other BMPs are being implemented.

Table 3-7. Streambank Inventory Results: South Fork of the Hay River Watershed Streambank Erosion and Degraded Habitat

Subwatershed	Inventoried Streambank Length (feet)	Eroded Sites (feet)	Trampled Sites (feet)	Slumped Sites (feet)	Cattle Access (feet)	Total Sediment Loss Tons/Year	% Bank Degraded From E,T,S	% of Total Bank Erosion in Watershed	Subshed Rank for Bank Erosion	Subshed Rank for Cattle Access
Upper South Fork	116,500	5760	36,148	0	33,100	26	35	1	9	4
Conners Creek	90,100	0	20,700	0	36,350	0	23	0	10	3
Middle South Fork	277,000	42,556	18,973	4803	47,880	147	24	6	4	2
Bolen Creek	88,000	12,947	8520	2350	18,920	70	27	3	5	6
Johns Creek	152,000	37,299	2645	480	24,620	869	27	35	1	5
Sandy Creek	88,000	8945	1075	90	2500	37	11	1	7	10
Upper Tiffany Creek	106,000	9010	980	40	66,000	53	9	2	6	1
Beaver Creek	144,000	5215	3720	685	12,260	34	15	1	8	8
Lower Tiffany Creek	164,000	25,115	8700	1720	17,820	764	22	32	2	7
Lower South Fork	80,000	6970	810	2110	11,880	476	13	19	3	9
Totals	1,305,600	153,817	102,271	12,278	271,330	2476	100%	100%		

Source: Dunn, St. Croix, Barron and Polk County LCDs

64

Table 3-8. Streambank Erosion

Subwatershed	Inventory Results			Goal and Eligibility criteria					
	Inventoried stream length (ft)	Total Sediment Loss - Tons per year	Percent of total contributed	Category I - severe erosion rate > 75 t/yr/site		Category II - moderate erosion rate >7 t/yr/site (eligible)		Category - III slight erosion rate <7 and >2 t/yr/site (eligible)	
				Sites	Total feet	Sites	Total feet	Sites	Total feet
Upper South Fork	116,500	26	1	0.00	0.00	0.00	0.00	0.00	0.00
Conners Creek	90,100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Middle South Fork	277,000	147	6	0.00	0.00	1	125	25	2,000
Bolen Creek	88,000	70	3	0.00	0.00	0.00	0.00	9	468
Johns Creek	152,000	869	35	2	5,250	24	2,400	41	3,075
Sandy Creek	88,000	37	1	0.00	0.00	1	70	3	180
Upper Tiffany Creek	106,000	53	2	0.00	0.00	0.00	0-	0.00	0.00
Beaver Creek	144,000	34	1	0.00	0.00	0.00	0-	6	240
Lower Tiffany Creek	164,000	764	32	1	225	31	3,100	70	4,900
Lower South Fork	80,000	476	19	0.00	0.00	19	1,900	39	3,510
Total	1,305,600	2476	100	3	5475	76	7595	193	14373

Eligibility for Wetland Restoration and Easements

Wetland Restoration

The targeted goal is to restore as many of the degraded or prior converted wetland sites inventoried as possible. All inventoried wetlands are eligible for restoration if the sites meet the criteria listed below.

Wetland restoration is considered a best management practice for the purpose of increasing groundwater recharge, flood control, and control of nonpoint sources of pollution. Wetland restoration includes: the plugging or breaking up of existing tile drainage systems, the plugging of open channel drainage systems, other methods of restoring the pre-development water levels of an altered wetland, and the fencing of wetlands to exclude livestock. Secondary benefits of wetland restoration may be enhancement of fish and wildlife habitat.

Wetland restoration is an available option to address any of the following:

1. Cultivated hydric soils with tile or open channel drainage systems discharging to a stream or tributary.

   Wetland restoration will reduce the amount of nutrients and pesticides draining from the altered wetland to a water resource by establishing permanent vegetation and altering the drainage system.

2. Pastured wetlands riparian to streams or tributaries.

   Eliminating livestock grazing within wetlands will reduce the organic and sediment loading to the wetland and adjacent water resource and reduce the direct damage to the wetland from the livestock. Livestock exclusion by fencing will control the pollutants and restore the wetland.

3. Prior converted wetlands down slope or up slope from fields identified as significant upland sediment sources.

   Restoration of wetlands in these situations may do two things: 1) create a wetland filter which reduces the pollutants from an up slope field(s) to a water resource; or 2) reduce the volume and velocity of water flowing from an up-slope wetland to a down-slope critical field. The following two eligibility conditions must be met in order for wetland restoration to be cost-shared:

   - All upland fields draining to the wetland must be controlled to a soil loss rate that is less than or equal to 'T'.

   - In the South Fork of the Hay River subwatersheds, converted wetland restorations will be considered over lower cost practices to control nonpoint source pollutants. The coldwater streams of these subwatersheds are high priority water resources.

Land Easements

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

- Shoreline Buffers: vegetative areas which minimize nonpoint source impacts and other direct impacts to streams;

- Critical Area Stabilization: stabilization efforts needed on sites that erode at an excessive rate or have high sediment delivery rates to surface water;

- Wetland Restoration: areas where wetlands are intentionally restored or enhanced in order to improve their ecological values, such as natural filters and infiltration of surface water.

Easements may also be considered for protecting municipal well heads if it can be established that vegetative cover will correct an existing groundwater quality threat.

Although easements are not considered a best management practice, they can help achieve desired levels of nonpoint source pollution control in specific conditions. Easements are used to support best management practices, enhance landowner cooperation and more accurately compensate landowners for loss or altered usage of property. The benefits of using easements in conjunction with a management practice are: 1) riparian easements can provide fish and wildlife habitat along with the pollutant reduction function; 2) easements are generally perpetual, so the protection is longer term than a management practice by itself; and 3) an easement may allow for limited public access (depending on the situation). However, the primary justification of an easement must be for water quality improvement.

Easements should be considered in the following situations:

1. To exclude livestock from grazed wetlands or along eroding stream banks within the watershed. Easements are strongly recommended whenever:

    - there is any grazing of wetlands.
    - livestock density is so great that areas of un-vegetated soil are within 60 feet of streams or intermittent streams.
    - More than 100 feet of streambank are severely trampled and eroding and length is equal to Critical site criteria for streambank habitat.
    - channel erosion is exacerbated by livestock grazing such that un-vegetated stream banks are two feet or more in height.

2. When elimination of row cropping and the establishment of permanent vegetative cover will stabilize a critical area. Easements are strongly recommended whenever:

    - Row cropping is occurring within 60 feet or less of streams or intermittent streams.

3. To support eligible wetland restorations. Easements are strongly recommended whenever:

   - The eligible wetland restoration is greater than 1 acres in size.

4. When a barnyard or animal feedlot is located within the flood plain and: a) a permanent easement is the least-cost alternative to provide adequate pollution reduction or b) a permanent easement provides a greater level of pollution reduction than on-site engineering options at a price that is cost-effective when compared to the level of pollution reduction and the price of the available engineering options. Easements are strongly recommended whenever:

   - Engineering options would require intensive management in order to continue to provide adequate pollution reduction.
   - Surrounding land use is largely agricultural and it is anticipated that it will remain so for two decades or more.

Ordinances

Manure Storage Ordinance

Surface and groundwater resources are at risk of contamination when animal waste storage facilities are improperly located, designed, or constructed. Manure overflows and storage facility failures are a serious threat to public health and safety, as well as, serious environmental degradation. Counties adopt animal waste storage ordinances to prevent groundwater and surface water pollution by assuring the proper location, design, construction, and management of installed facilities. An ordinance must meet the guidelines adopted by DATCP. These standards are based on USDA-Natural Resources Conservation Service Standards and Specifications.

To assure the protection of surface and groundwater from animal waste storage facilities throughout the watershed, the adoption of an animal waste storage ordinance in Dunn County is necessary within the first two years following approval of the South Fork of the Hay River Watershed plan. As required by state statutes, Dunn County would have to repay to the state all Nonpoint Source Grant agreement funds should an approved ordinance not be adopted.

St. Croix, Polk, and Barron Counties all have Animal Waste Storage ordinances. Dunn County is presently in the process of writing an animal waste storage ordinance.

Construction Site Erosion

A number of local governments recognize that the cost of *preventing* damage from erosion and sedimentation is often less than the cost of *correcting* damage from erosion. Also, many believe that the cost of preventing erosion damage should be borne by those benefiting from the development rather than by taxpayers paying to remove sediment from ditches, culverts, streets, harbors, lakes, and streams. These local governments are developing or amending subdivision ordinances, zoning ordinances, and other local ordinances to include runoff and erosion control requirements for developing land areas.

Chapter 236 of the Wisconsin Statutes gives cities, villages, towns, and counties authority to control erosion from developing subdivisions and smaller land divisions. This chapter establishes the minimum standards and procedures for land division in Wisconsin. The chapter enables local governments that have an established planning agency to adopt subdivision ordinances that are more restrictive than the state standards. Several of these government units have included runoff and erosion control provisions in their ordinances. These ordinances typically require a developer to submit a detailed plan specifying control measure for minimizing erosion and runoff during and after development. Typically, before a final plat is filed the person who reviewed the erosion and runoff control plan visits the development site and certifies that the measures have been installed in accordance with the plan.

The DNR suggests that the Wisconsin Construction Site Erosion Best Management Handbook (DNR Publication WR-222-93) be used as a reference for any development that occurs in the South Fork of the Hay River Priority Watershed Project.

Boyceville and Glenwood City are encouraged to adopt construction site erosion control ordinances.

Stormwater Management Ordinances

The South Fork of the Hay River Watershed does not anticipate needing stormwater management ordinances in Boyceville and Glenwood City to reach water quality objectives. However, it is recognized that increasing amounts of impervious surfaces affect water quality. Therefore, stormwater BMPs will be eligible for cost sharing with DNR and LCD approval.

Other Pollution Sources

Many pollution sources contributing to surface water quality degradation in the watershed are typically not addressed by the priority watershed project. Control of these pollution sources occurs through other state and county regulatory programs, as described below.

Industrial Point Sources of Pollution

Discharges of wastewater from permitted municipal and industrial sources are important considerations for improving and protecting surface water resources. Chapter 147, Wis. Stats., requires any person discharging pollutants into the waters of the state to obtain a Wisconsin Discharge Elimination System (WPDES) Permit issued by the DNR.

Sewage Treatment Systems

Municipal Waste Water Treatment Plants

The villages of Boyceville and Glenwood City have municipal wastewater treatment plants that discharge to surface water. The village of Boyceville discharges to the South Fork of the Hay River. Treatment of wastewater is through an aerated lagoon. The system was updated in 1991.

The village of Glenwood City discharges to a natural wetland tributary of Tiffany Creek and to groundwater of the Lower Chippewa Drainage Basin in St. Croix County. Treatment of the wastewater is through an aerated pond followed by an artificial wetland. The system was constructed in 1982 and has had no significant modifications since that time. The treatment system serves both Glenwood City and Downing, with a combined population of 1,200.

Private Sewage Systems

Septic systems consist of a septic tank and a soil absorption field. Septic systems fail due to soil type, location of system, poor design or maintenance such as tanks which go un-emptied. Pollutants from septic system discharges are nitrates, bacteria, viruses and hazardous materials from household products. Generally, in the South Fork of the Hay River Watershed, the majority of soils are suitable for conventional septic tank soil absorption systems. Land-spreading of septic system waste during the winter months can also create surface water quality problems.

Counties have been using the Wisconsin Fund since 1981. The Wisconsin Fund is a Private Sewage System Replacement Grant Program offering financial assistance designed to help eligible homeowners and small business operators offset the costs of replacing a failing septic system. The program is administered by the Dunn, St. Croix, Polk, and Barron Counties' Zoning Departments. The grant program applies to principle residences and small businesses built prior to July 1, 1978, and is subject to income and size restrictions. Seasonal homes are not eligible for participation in this program. Interested individuals should contact their county zoning department for more information.

Land Application of Municipal and Industrial Wastes

Sludge is an organic, non-sterile, by-product of treated wastewater, composed mostly of water (up to 99 percent). The re-use of sludge through land application is considered a beneficial recycling of nutrients and a valuable soil conditioner. Use of sludge in this manner is also considered to be the most cost-effective means for the treatment facility to dispose of the material.

Land application of municipal and industrial sludge is regulated under NR 204 and NR 214 respectively which require a WPDES permit, site criteria, minimum distances from wells, application rates to ensure that environmental and public health concerns such as proper soil types, depth to groundwater, distance from surface water, and the type of crop to be grown on sludge amended fields are taken into consideration when the DNR approves agricultural fields for sludge application.

Municipal
There are several sites in the South Fork of the Hay River Watershed that spread municipal sludge. They are primarily in the Boyceville area.

Industrial
There are several sites in the watershed that spread industrial sludge. Industrial sludge is primarily food processing waste. Again, these are primarily in the Boyceville area.

Solid Waste Disposal Sites

Landfill

There are several closed disposal sites within the watershed. See table 2-3 for their locations.

There are no active landfill sites in the South Fork of the Hay River Priority Watershed.

Petroleum Storage: Leaking Underground Storage Tank (LUST) Sites

The Wisconsin Remedial Response Site Evaluation Report (DNR publication number SW-144-91) lists the sites identified through the LUST program. These sites are listed on table 2-3.

Other Contaminated Sites

The Wisconsin Remedial Response Site Evaluation Report also has the Inventory of Sites or Facilities Which May Cause or Threaten to Cause Environmental Pollution and the Spills Program List which includes sites or facilities identified under the Hazardous Substance Spill Law. See table 2-3 for list of spill sites.

Mining

There is no known metallic mining in the South Fork of the Hay River Watershed. There is some mining of sand and gravel in the South Fork of the Hay River Watershed, but there are no mining ordinances on the books in any of the four counties.

CHAPTER FOUR
Implementation Definitions, Schedule & Budget

Introduction

This chapter identifies the means for implementing the management actions for runoff pollution control described in the previous chapter. The success of this priority watershed project depends on the aggressive implementation of these nonpoint source pollution control strategies. This chapter identifies:

- The Pollution Reduction Incentive Program (PRIP);
- Other cost-sharing and cost-share agreement procedures;
- The best management practices (BMPs) needed to control nonpoint sources of pollution as described in the previous chapter;
- The cost containment policies;
- Schedules for implementing the PRIP, including the critical source notification schedule;
- The estimated project **budget** for cost-sharing, staffing, and other support.

Pollution Reduction Incentive Program

The Pollution Reduction Incentive Program (PRIP) was developed with the understanding that through neighbor-to-neighbor education, and a fair and equitable incentive, a majority of the farming landowners will adopt the necessary conservation practices required to achieve the water quality objects established for this watershed.

In cooperation with the project team, the Citizen Advisory Committee (CAC) for the South Fork Hay River Priority Watershed has been active in the development and approval of this plan, and in particular the incentive concept. The CAC is composed of a representative number of farmers, along with a Vo Ag instructor, a banker, a lake association member, and LCD staff. The CAC will continue their oversight of the project throughout its implementation phase.

Program Outline and Time Frame

The Pollution Reduction Incentive Program is broken down into two major areas. Part 1 is composed of the bulk of the activities planned and deals with four of the major pollution source areas. Part 2 covers the "other" practices eligible to cost-sharing, especially the more capital intensive BMPs such as manure storage.

Part 1

The framework of the program covers five areas:

1. Nutrient Management Plans and Soil Conservation Farm Plans
2. Barnyard Runoff Control
3. Stream Corridor Management
4. Upland Woodland Management

Part 2

Best management practices (BMPs) which are not related to the above four areas and/or are capital intensive will only be eligible for cost-sharing if they meet both the criteria set forth in the watershed plan and the approval of a project staff-CAC panel to determine cost-effectiveness for public expenditures.

Signup for the Nutrient Management Plan and Soil Conservation Plan component of the program will be limited to the first five years the program is available. All other BMPs will be available for the entire length of the program.

Time Frame

The PRIP was developed to require eight full years of implementation in order to achieve community pollution reduction objectives. However, due to the "pilot" nature of this program, it will be limited to three and one-half years of implementation (through June 30, 2001) unless it is extended through further action by the Legislature once it's underway. Therefore, a "mid-way" participation goal will be set in order for the project team, the DNR and CAC to evaluate the effectiveness of the PRIP and to determine whether to attempt extending it for it's full 8-year course. Program length will not exceed eight years of implementation. For more information regarding the evaluation and possible extension of the "pilot," refer to Chapter 7 of this plan. Due to the 'pilot' nature of this project, the CAC and watershed staff may need to further clarify specific points during the implemenation phase of the project.

Program Requirements and Payments

The following includes a description of the four components of Part 1 of the PRIP: Nutrient Management and Soil Conservation Farm Plans; Barnyard Runoff Control; Stream Corridor Management; and Upland Woodland Management.

Nutrient Management Plans and Soil Conservation Farm Plans

Inventory results show that sediment and nutrient management are the primary concerns for improvement of water quality within the South Fork of the Hay River Priority Watershed. Such problems dictate that Nutrient Management Plans and Soil Conservation Farm Plans become the guidepost for program participation. Therefore, both plans will be considered a single component of this program and will be **required** for participation or receiving payments or cost-sharing in any area of the project.

Description

Nutrient Management and Soil Conservation Farm Plans (NM-SC-FP) eligibility applies to all cropland acres. Watershed staff will use FSA crop acres to determine which acres are cropland. All non-cropland must also be addressed in the plan: e.g., pastures, woodland, idle land, and farmstead.

The types of practices encouraged may include reduced tillage or "no-till" (high residue management), changing crop rotations, contour strip cropping, cropland protection cover, rotational grazing, grassed waterways, nutrient management, and streambank/shoreline buffers. Any combination of practices may be used to achieve the desired sediment delivery rate, with one incentive payment allowable per acre per year (**not** per practice; see section on Incentive Payments in the following pages). Participation will be sought through voluntary means.

The components of the Nutrient Management and Soil Conservation Farm Plan include the following four requirements.

1. For a landowner to qualify for an incentive payment for an NM-SC-FP, all copland acres must have practices that maintain soil loss at or below the annual tolerable soil loss level, "T," at a minimum.

II. The nutrient management aspect of the NM-SC-FP must address all forms of on-farm nutrient sources as well as commercial fertilizer. NRCS 590 recommendations will be the guide for developing these plans. All fields must be soil tested every four years. A manure spreading plan will be developed by December 1 of each year. Land Conservation Departments (LCD) will assist landowners with manure spreader calibrations.

III. All streams must have a minimum vegetative buffer of 25 feet along each side.

IV. All waterways, ditches, channels, etc. must have a vegetative cover.

For evaluating pollution reduction, credit for reducing sediment delivery will be provided for streambank buffers and grassed waterways at a rate of 46 percent for streambank buffers and 10 percent for waterways. Buffer widths will be calculated using the Brown County buffer rating sheet. Credit for reducing sediment from cropland using other conservation practices will be provided using the WINHUSLE computer model where applicable.

One of the goals in developing Nutrient Management and Soil Conservation Farm Plans is to encourage farmers to learn how to write their own plans. LCDs will provide training along with necessary instructional material. Computer training for those desiring to purchase nutrient management software will also be available through the LCD staff. Private consultants and fertilizer dealers may also continue to assist landowners in developing these plans. In these situations, the farmer should still demonstrate a working knowledge of the nutrient management plan. A similar working knowledge will also be required of soil conservation plans written by LCD employees.

Incentive Payment

Note: The following explanation assumes the continuation of this "pilot" for four and one-half years beyond the current allowable time frame. If there is legislation to continue the pilot, all the time frames explained below will stand. However, if the end date of the South Fork of the Hay River Priority Watershed project remains June 30, 2001, the program should be followed as written through the fourth year when all payments or cost sharing will be ceased, thus ending the project and payment schedule roughly half-way. County LCD project staff should be clear to inform landowners of this currently limited payment schedule. For example, if a landowner signs up in the first year to receive an incentive payment for eight years, he would instead only receive a maximum of four years of payments if the "pilot" project is not acted on to continue.

The incentive payment for the combined Nutrient Management and Soil Conservation Farm Plan will be $6 per crop acre for non-HEL fields and $8 for HEL fields. Payments will be made for up to a maximum of eight years for those who sign up the first year. Payments each year will be made after an annual certification of compliance of these practices and all other BMPs which the landowner has installed as a part of the incentive program. Second year participants will receive payments for a maximum seven years. Third year participants will receive a maximum six years of payments, etc. Landowners, however, will not be able to sign up after the sixth year so as to ensure there would be at least three years of Nutrient Management and Soil Conservation Plans in practice on any given farm.

Those acres enrolled in CRP will not be eligible for incentive payments. Those acres in Farmland Preservation will be eligible for payments. Farmland that is contiguous will be eligible for incentive payments while cropland that is completely outside the watershed will not be eligible. The operator of rented land will receive the incentive payment as this person is

responsible for the conservation and nutrient management practices. Landowners who utilize funding from other government programs will not receive incentive payments for the same practice. Landowners can use these programs for practices which incentive payments are not designed to cover.

Non-compliance of any BMP will result in no incentive payment for all BMPs for that year. County LCD staff will determine compliance.

Early signup incentive: To encourage a high amount of pollution reduction early in the program, a higher incentive rate will be offered for those participants who sign up within the first two years, 1998 or 1999. Landowners must sign up prior to each respective crop year. Incentive rates would be $1 higher per crop acre (so, a total of $7 on non-HEL or $9 on HEL fields) for those landowners who sign up during the first year of the program for the entire eight years. Similarly, if landowners sign up during the second year, $.50 more per crop acre would be paid for seven years.

Community participation bonus: An additional incentive payment of $.50 per acre will be paid to all participating landowners once 50 percent of the cropland available for participation in the watershed is signed up. This additional incentive payment will be increased to $1 per acre once the participation level reaches 75 percent of available cropland. Payments will be made for remaining years of the program and not for past years of individual participation.

CAC Appeal Board

All matters of appeal regarding program requirements, payment amounts, etc. will be reviewed and receive determination by an established three-member subcommittee of the CAC. The subcommittee or the landowner may invite a consultant to advise them on matters of a technical nature. Further appeals can be made to the landowner's respective county Land Conservation Committee and Board of Supervisors.

Barnyard Runoff

Nutrient and soil runoff from barnyards is recognized as a significant contributor to water quality degradation. As detailed in Chapter Three, the inventory results using the BARNY computer model show varying amounts of phosphorus delivery to the streams across the watershed: from 0 to more than 250 pounds of phosphorus per year.

Description

A variety of barnyard runoff control practices will be examined on a site-by-site basis to determine the best possible mechanism for acheiving control. Using the BARNY computer model, LCD project staff will provide technical support and advice regarding the types of control practices necessary to achieve various amounts of phosphorus reduction. The types of practices the landowners may choose from include: full barnyard runoff control systems using

concrete; lower-tech, lower cost, clean water diversions to redirect the runoff; roof gutters; etc.

To encourage the highest amount of reduction at every site, incentive payments will be based on a formula of pounds reduced as per a percentage of the initial total amount per site, regardless of the final cost to the landowner of the particular practice. This is not cost-sharing per practice; rather it is cost-sharing per amount of phosphorus reduced. To receive any payment a landowner must be reducing his phosphorus load by at least 20 percent. Reduction or elimination in herd size may qualify as a phosphorus load reduction. Barnyards will be reinventoried at the time each landowner signs up. This inventory will be used as the base for determining the amount of reduction for incentive payment purposes.

The watershed reduction goal for barnyard runoff is 50 percent over the life of the project. A community goal of achieving 25-percent of this goal within 36 months has been established.

Landowners who desire to participate in the barnyard runoff management aspect of the program must first implement nutrient management and soil conservation farm plans.

The importance of reducing barnyard runoff is such that it will require the participation of those landowners with barnyards loading more than 150 pounds of phosphorus annually if they desire to participate in any other aspect of the incentive program. At a minimum, the participant must reduce the barnyard discharge at these critical source areas to less than 150 pounds per year using the BARNY model estimates. Installation of landowner-determined BMPs for reducing barnyard runoff will be done within 36 months after implementation begins. If the reduction goal or the time frame is not met, incentive payments for other program areas will be discontinued until that landowner is back in compliance.

For all landowners with BARNY model values below 150 pounds of phosphorus, barnyard runoff management is not a required management practice for participation in the incentive program, but it will be encouraged.

Design Standards

Landowners will be encouraged to use NRCS standards. However, they will also have the flexibility to modify BMPs as desired to meet pollution reduction goals for each site. Hence, some practices installed may not meet NRCS standards. However, these practices must be reviewed and approved by the LCD technical staff, who are ultimately liable for any non-standard design. Appeals will be reviewed and receive approval/disapproval from the five-member CAC panel. This panel or the landowner may invite an agricultural engineer to assist with the review of technical design requirements. Further appeals can be made to the landowner's respective county Land Conservation Committee and Board of Supervisors.

Incentive Payments

Landowners will receive a one-time payment in three parts over three years (34 percent the first year after completion of the practice, and 33 percent the next two years) unless the capital expenditure exceeds the initial 34 percent. If this is the case, the landowner will receive a payment up to but not to exceed the full incentive payment based on the cost of the practice installed. This payment is based on the percent reduction of phosphorus estimated using the BARNY model for the BMP they choose. That percentage will be tied to a fixed rate which will then multiplied by the number of pounds reduced to calculate the payment. Rates per pound of phosphorus reduced will vary from $10 per pound for a minimum 20-percent reduction, to $70 per pound for 100-percent phosphorus load reduction. This payment is a one-time payment after the practice is installed.

The following payment schedule applies to all landowners:

20% reduction receives $10/lb
30% reduction receives $20/lb
40% reduction receives $30/lb
50% reduction receives $40/lb
60% reduction receives $45/lb
70% reduction receives $50/lb
80% reduction receives $55/lb
90% reduction receives $60/lb
100% reduction receives $70/lb

EXAMPLE A: BARNY = 50 lbs.
Farmer A reduces runoff to 10 lbs. with a clean water diversion
40 lbs = 80% reduction
Mr. A receives $55 x 40 lbs = $2,200

EXAMPLE B: BARNY = 200 lbs.
Farmer B reduces runoff to 50 lbs. with a concrete pad and roof gutters
150 lbs = 75% reduction
Mr. B receives $50 x 150 lbs = $7,500

Stream Corridor Management

Description

Landowners eligible for this incentive payment must have a stream corridor which is located on their property and used as a grazing area at the time of the watershed inventory. If they meet these criteria, the landowner must develop and implement a stream corridor management plan prior to receiving payment. For the purpose of this program, "stream corridor" is defined as those acres adjacent to a stream flowing through and are used for grazing. Fencing,

buffer strips, rotational grazing, and other BMPs may be a part of the corridor management plan. Any continued grazing within the corridor must not result in an over-grazed situation.

Stream corridor management is not required for participation in the incentive program (PRIP). However, landowners who desire to participate in the stream corridor management aspect of the program must first implement a nutrient management and soil conservation farm plan (NM-SC-FP).

Incentive Payment

Note: Again, the following explanation assumes the continuation of this "pilot" for four and one-half years beyond the current allowable time frame. If there is legislation to continue the pilot, all the time frames explained below will stand. However, if the end date of the South Fork of the Hay River Priority Watershed project remains June 30, 2001, the program should be followed as written through the year four when all payments or cost sharing will be ceased, thus ending the project and payment schedule roughly half-way. County LCD project staff should be clear to inform landowners of this currently limited payment schedule. For example, if a landowner signs up in the first year to receive an incentive payment for the full five years for stream corridor management, he would instead only receive a maximum of four years of payments if the "pilot" project is not acted on to continue.

Incentive payments for stream corridor management will be based on a formula of acres of stream corridor grazed and under management, and the number of feet of linear stream running through the property. Payment is only for those acres presently grazed and under a management plan. The incentive payment will consist of $2 per acre of grazed stream corridor and $.25 per linear foot of streambank to include both sides of the stream. The $2 per acre will be paid each year for up to eight years (pending legislative action to extend "pilot"; otherwise, limited to four years); while the $.25 per linear foot will be paid only the first year to help offset the costs of BMPs installed. This combined payment will ensure equity for those individuals who may have more linear feet of stream per acre and thus demand more BMPs, i.e., fencing, crossings, water systems, etc.

Upland Woodland Management

Description

Upland woodland management pertains to those acres of upland woodland which are used as pasture at the time of the watershed inventory. Upland woodland possesses a higher value as a forest crop than pasture, and forest litter vegetation greatly reduces rill and gully erosion while increasing infiltration for base flow of local streams. Those acres of upland woodlands placed in the program will be restricted from grazing.

Incentive Payment

Incentive payment for upland woodland management will be $2 per acre for a maximum of eight years (pending legislative action to extend "pilot"; otherwise, limited to four years).

Best Management Practices

BMPs Eligible For Cost-Sharing And Their Rates

Best management practices control nonpoint sources of pollution and are identified in NR 120. Design and installation of all cost-shared BMPs must meet the conditions listed in NR 120. Generally these practices use standard specifications included in the NRCS Field Office Technical Guide. In some cases additional specifications may apply. The applicable specifications for each BMP can be found in NR 120.14.

If the installation of BMPs destroys significant wildlife habitat, NR 120 requires that habitat will be recreated to replace the habitat lost. The DNR District Private Lands Wildlife Specialist or a designee will assist the LCD in determining the significance of wildlife habitat and the methods used to recreate the habitat. Every effort shall be made during the planning, design, and installation of BMPs to prevent or minimize the loss of existing wildlife habitat. Wildlife habitat restoration components of the practice are cost-shared at 70 percent.

The practices eligible for cost sharing and cost-share rates for each BMP are listed in Table 4-1. Financial assistance provided in other areas of the Pollution Reduction Incentive Program are designed to offset the traditional monies distributed through the BMPs not listed. All cost-shared BMPs require a 10-year maintenance agreement.

Description of BMPs

Following is a brief description of the most commonly used BMPs. More detailed descriptions can be found in NR 120.14. **Note:** Not all of the following are eligible for separate cost-sharing. Some will be considered together, and landowers may receive one payment for performing several practices. Refer to the Pollution Reduction Incentive Program details for information on specific cost-sharing and/or incentive payment structure for each source (e.g. cropland, barnyard, streambank, woodlot, etc.).

Contour Farming. The farming of sloped land so that all operations from seed bed preparation to harvest are done on the contour.

Contour and Field Strip cropping. Growing alternating strips of row crops and grasses or legumes on the contour.

High Residue Management. A system which leaves at least 30 percent of the ground covered with crop residue after crops are planted.

Cropland Protection Cover (Green Manure). Cropland protection cover are close-growing grasses, legumes or small grain grown for seasonal soil erosion protection and soil improvement.

Nutrient Management. The management and crediting of nutrients from all sources, including legumes, manure, and soil reserves for the application of manure and commercial fertilizers. Management includes the rate, method and timing of the application of all sources of nutrients to minimize the amount of nutrients entering surface and groundwater. This practice includes manure nutrient testing, routine soil testing, and residual nitrogen soil testing.

Pesticide Management. The management of the handling, disposal and application of pesticides including the rate, method and timing of application to minimize the amount of pesticides entering surface and groundwater. This practice includes integrated pest management scouting and planning.

Pesticide Handling Spill Control Basins. Structures designed to contain accidental spills or overflows from pesticide mixing, loading and unloading operations for the purposes of groundwater and surface water protection.

Intensive Grazing Management (Rotational Grazing). Intensive grazing management is the division of pastures into multiple cells that receive a short but intensive grazing period followed by a period of recovery of the vegetative cover. Rotational grazing systems can correct existing pasturing practices that result in degradation and should replace the practice of summer dry-lots when this practice results in water quality degradation.

Critical Area Stabilization. The planting of suitable vegetation on nonpoint source sites and other treatment necessary to stabilize eroding lands.

Grade Stabilization Structure. A structure used to reduce the grade in a channel to protect the channel from erosion or to prevent the formation or advance of gullies.

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

Shoreline and Streambank Stabilization. The stabilization and protection of stream and lake banks against erosion and the protection of fish habitat and water quality from livestock access.

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

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

Barnyard Runoff Management. Structural measures to redirect surface runoff around the barnyard, and collect, convey or temporarily store runoff from the barnyard.

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

Roofs for Barnyard Runoff Management. A roof and supporting structure constructed specifically to prevent rain and snow from contacting manure.

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

Manure Storage Facility Abandonment. Manure storage system abandonment is the proper abandonment of leaking and improperly sited manure storage systems, including: a system with bottom at or below groundwater level; a system whose pit fills with groundwater; a system whose pit leads into the bedrock; a system which has documented reports of discharging manure into surface or groundwater due to structural failure; and a system where there is evidence of structural failure. The practice includes proper removal and disposal of wastes, liner materials, and saturated soil as well as shaping, filling, and seeding of the area.

Field Diversions. Structures installed to divert water from areas where it is ein excess to sites where it can be used or transported safely.

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

Milking Center Waste Control Systems. A milking center waste control system is a piece of equipment, practice or combination of practices installed in a milking center for purposes of reducing the quantity or pollution potential of the wastes.

Livestock Exclusion from Woodlots. The exclusion of livestock from woodlots to protect the woodlots from grazing by fencing or other means.

Cattle Mounds. Cattle mounds are earthen mounds used in conjunction with feeding and dry lot operations and are intended to provide a dry and stable surface area for cattle.

Structural Urban Best Management Practices. These practices are source area measures, transport systems and end-of-pipe measures designed to control storm water runoff rates, volumes and discharge quality. These practices will reduce the amount of pollutants carried in runoff and flows destructive to stream habitat. These measures include such practices as infiltration trenches, porous pavement, oil water separators, sediment chambers, sand filtration units, grassed swales, infiltration basins and detention/retention basins.

Easements. Easements are legally binding restrictions on land titles. Easements are purchased to provide permanent vegetative cover.

Table 4-1. State Cost-Share Rates for Eligible Best Management Practices Separate from Practices Associated with the PRIP

BEST MANAGEMENT PRACTICE	STATE COST-SHARE RATE
Pesticide Handling Spill Control Basins	70%
Manure Storage Facilities	70% and 50% [1]
Manure Storage Facility Abandonment	70%
Wetland Restoration	70%[2]
Structural Urban BMPs	70% [3]
Well Abandonment	70%
Grassed Waterways	70%
Critical Area Stabilization	70%[2]
Grade Stabilization Structures	70%
Shoreline and Streambank Stabilization	70%[2]
Land Acquisition	50%[4]
Milking Center Waste Control	70%

[1] Manure storage is cost-shared at 70% for the first $20,000 of cost and at 50% for the remaining cost, not to exceed $35,000.
[2] Easements may be entered into with landowners identified in the watershed plan in conjunction with these BMPs. See Chapter Two for an explanation of where easements may apply.
[3] The maximum cost-share rate for land acquisition, storm sewer rerouting, and removal of structures necessary to install structural urban BMPs is 50%.
[4] Cost sharing is available to acquire land for the construction of an urban structural practice or to acquire land which is contributing or will contribute nonpoint source pollution.

Interim Best Management Practices

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

Practices, Sources and Activities Not Cost-Shared

Practices not cost-shared, but which shall be included on the cost-share agreement if necessary to control the nonpoint sources, are listed below (as listed in NR 120.17):

The following practices, sources, or activities are not eligible for cost-share assistance unless they are part of the PRIP in the previous section:

- Best Management practice installation, operation, or maintenance started prior to the signing of the cost-share agreement.

- Activities covered by the WPDES permit program including those identified in chs. NR 200 to 299 (except as provided in sub. (1) (g)).

- Livestock operations which have applied and are eligible for a WPDES permit, have been issued a WPDES permit, have greater than 1,000 animal units, or have greater than 1,000 animal units and have been issued a notice of discharge under ch. NR 243. Other sources on the farm, such as sediment delivered from cropland and streambanks may be eligible for cost-sharing for practices.

- Activities required as part of, or as a condition of, a license for a solid waste management plan.

- Activities funded through state or federal grants for wastewater treatment plants.

- Active mining operations.

- Pollutant control measures needed during building and utility construction, and storm water management practices for new development.

- Pollutant control measures needed during construction of highways and bridges.

- The planting, growing, and harvesting of trees associated with silviculture, except as necessary for site stabilization.

- Small scale on-site human domestic waste facility construction.

- Dredging of harbors, lakes, rivers, and ditches.

- Dams, pipes, conveyance systems, and detention basins intended solely for flood control.

- Operation and maintenance of cost shared practices.

- Practices normally and routinely used in growing crops.

- Practices whose purpose is to accelerate or increase the drainage of land, except where drainage is required as a component of a best management practice.

- Practices to control spills from commercial bulk storage of pesticides, fertilizers, petroleum and similar materials required by chs. ATCP 32 and 33 or other administrative rules.

- Practices needed to control sources, which were adequately managed for the specific land use at the time of cost share agreement signing.
- Practices to be fully funded through other programs.
- Practices previously installed and necessary to support cost shared practices.
- Changes in crop rotation.
- Minimum levels of street sweeping and leaf collection.
- Changes in location of unconfined manure stacks involving no capital cost.
- Nonstationary manure spreading equipment.
- Practices needed for land use changes during the cost share agreement period.
- Other practices which the department determines are not necessary to achieve the objectives of the watershed project.

Cost-Share Agreement Administration

Money for PRIP and cost-share agreements will be distributed to landowners by the LCD from a Nonpoint Source grant provided by the DNR. The LCD receives additional grant money to support its staff and other administrative responsibilities. Cost-share agreements are binding contracts between landowners and the LCD. To qualify for cost-sharing funds, landowners must meet eligibility criteria defined above and in the previous chapter.

Cost-share agreement sign-up begins following formal approval of the watershed plan. The project is scheduled to end June 30, 2001. All cost-shared practices must be installed at that time. Agreements may be amended throughout the life of the project.

Practices included on cost-share agreements must be installed within the schedule agreed to on the cost-share agreement. Practices must be maintained by the owner for a minimum of 10 years from the date of installing the final practice listed within the cost-share agreement. County LCD staff are responsible for enforcing compliance of cost-share agreements. The LCD staff will monitor practices installed through the watershed project in conjunction with other state and federal conservation compliance programs. Practices should be monitored every two years or more frequently as necessary. Monitoring will insure that BMPs installed through the program are maintained in accordance with the operation and maintenance plan for the practice. Proper operation and maintenance of practices provides cost effective management of pollution sources.

Local, state, or federal permits may be needed prior to installation of some BMPs. Areas in which a permit is generally required include zoned wetlands and the shoreline areas of lakes and streams. These permits are needed whether the activity is a part of the watershed project

or not. The cost-share recipient is responsible for acquiring the needed permits prior to installation of practices.

Cost Containment

Cost Containment Procedures

Chapter NR 120 requires that cost containment procedures be identified in this plan to control the costs of installing BMPs. The cost containment procedure to be used by Dunn, St. Croix, Barron and Polk Counties is described below. The bidding procedure and average cost and flat rate lists can be obtained from the county LCD.

Average Costs: Based on past information, the Land Conservation Department determines an average cost per unit of materials and labor for the installation of a Best Management Practices (BMPs) which may not be exceeded.

Range of Costs: Based on past cost information, the Land Conservation Department establishes a cost range for the installation of best management practice. Eligible costs may not exceed the maximum cost of the range.

Bidding: The Land Conservation Department requires the landowner or land operator to request bids from contractors for the installation of best management practice. The cost share payment shall be calculated based on the lowest reasonable bid received in accordance with the LCD bidding policy.

Flat Rates: Flat rates are only used as a part of the PRIP. These rates are described earlier in this chapter.

Maximum Cost share Limit: The Land Conservation Department or the department established a maximum cost share rate limit not to exceed the rates specified in s. NR 120.18 for installation of a best management practice.

Wisconsin Conservation Corps: The Land Conservation Department uses the Wisconsin Conservation corps to install best management practices for landowners and land operators.

Other cost containment procedures: If the Land Conservation Department determines another cost containment procedure would be more effective than the cost containment procedures described in this subsection, it shall include the alternative in the detailed program for implementation portion of the watershed plan.

Payments for "in kind" contributions will be based on the county's guidelines. Cost share recipients who wish to install a BMP using their own labor, material and equipment must submit a bid plus one bid from a qualified contractor for the practice installation.

Cost-share payments will be based on actual installation costs. If actual installation costs exceed the amount of cost-sharing determined by cost estimates, then the amount paid the grantee shall be documented in writing explaining the unusual circumstances and attached to the cost share agreement or amendment and attached to the request for reimbursement submitted to the DNR by the Land Conservation Department.

Implementation Schedule

Landowner Contact Schedule

- During the first twelve months of the implementation period, all landowners with sites defined as a "critical resource area" will be visited by one of the county LCD staff to review their sources of nonpoint pollution and what practices would be appropriate for installation. "Eligible resource areas" will, as a minimum, receive correspondence from the county LCD explaining the project and how they can become involved.

- County LCD staff will continue to make contacts with eligible landowners until the landowners have made a definite decision regarding participation in the program.

- County staff will contact all eligible landowners not signing cost-share agreements by personal visit, phone or letter prior to the end of the third year of the cost-share signup period to encourage participation.

Sediment Delivery Inventory Completion Schedule

- Approximately 26 percent of the watershed remains to be inventoried as of plan approval. The remainder of this inventory will be completed by December 1999.
- As part of the annual inventory work, LCD staff expect to identify fields that are among the highest contributors. The LCD staff will verify all sites identified each year and note these in a report to DNR.

Urban Implementation Program

The following discussion provides guidance on how the urban nonpoint source control program will be implemented. It presents the "core" activities that provide a base for the urban program. In addition, more complex, "segmented" activities are presented. Eligibility for financial assistance is also described in this section.

Core Elements of the Urban Management Program

The "core" elements of the urban program are basic measures that can be implemented without further study. Adoption of these measures by a participating municipality is the first step in the implementation process. This show of commitment is required in order to receive

financial assistance through the watershed program. It is required only where the municipality receives funds for its own use, such as where the municipality installs, owns, and operates a management practice. It does not apply to those instances where the municipality acts as a grantor, passing cost-share funds through to private landowners. Individual landowners within the municipality may receive funds before the municipality has agreed to conduct the core program.

Core program elements for the villages of Boyceville and Glenwood City may include:

- Develop, adopt, and enforce a construction erosion control ordinance. The ordinance should cover clearing, grading, and excavation conducted prior to the issuance of a building permit. The village must also commit to enforcing the erosion control provision of the Uniform Dwelling Code.

- Carry out a regular street sweeping program sweeping village streets at least twice each year in the spring and fall, including fall leaf collection.

- Assist the Dunn, St. Croix, Polk, and Barron County Land Conservation Departments with the implementation of an information and education program for urban pollution prevention practices by handing out educational materials and assisting in the coordination of local events.

- Establish and enforce maintenance requirements for village-owned vegetated riparian buffers.

Segmented Elements of the Urban Management Program

The "segmented" elements of the urban nonpoint source program include those requiring further study prior to implementation. Recommendations from chapter 2 that are not included in the core element description are considered segmented elements. Examples include construction of a wet detention pond to capture runoff from the Industrial Park, erosion control or infiltration devices at storm sewer outlets, and the development of a storm water plan and ordinance. Detailed engineering studies will be required for some of these practices.

The villages of Boyceville and Glenwood City may implement the segmented activities any time after expressing commitment to implement all of the core activities listed above. Cost sharing will be available throughout the eight year implementation period of the project.

Segmented program activities recommended for the villages of Boyceville and Glenwood City include:

- Conduct detailed engineering studies to determine the best means to implement recommended structural practices, except on minor retention and detention projects.

- Design and install structural urban best management practices.

- Develop a storm water management plan. Map the storm sewer system in preparation for this plan. Ensure the primary focus of this plan is to provide filtration and groundwater recharge for local cold water fisheries and municipal drinking supply.

- Develop a storm water management ordinance. Adopt and enforce the ordinance.

- Develop a wellhead protection program.

- Implement accelerated street sweeping as described in Appendix A.

- Establish and maintain vegetative buffers on privately owned land along the stream and riparian wetlands.

- Continue development of long range land use plans with water quality concerns in mind.

All townships in the watershed are also eligible for cost-share funds to implement the urban recommendations. The development of construction site erosion control provisions as outlined within the recommendations section of this plan will be considered a core activity for the towns. With commitment to develop an erosion control ordinance, the townships are also eligible for funding for storm water management ordinance development. This commitment must occur within three years of plan approval in order to be eligible for funds.

Urban Roles and Responsibilities

Local Units of Government

Each municipality wishing to participate in the South Fork of the Hay River Priority Watershed Project will need to:

- Commit to the implementation of the core activities.

- Develop a schedule for implementation of activities within twelve months following commitment to participate in the program. This schedule will outline implementation of core and segmented activities for each municipality. The schedule may be revised during the implementation period.

- Prepare and submit annual work plans, annual reports, and attend annual review meetings.

- Enter into cost share agreements for eligible best management practices. Cost share agreements between landowners and the village are expected to be minimal. For practices installed and maintained by private individuals, the cost share agreement is between the landowner and the local unit of government.

Department of Natural Resources

The DNR is assigned the overall administrative responsibility for the priority watershed program by statute. This includes providing financial support for local staff and installation of management practices, assisting local units of government to integrate wildlife and fish management concerns into selection and design of BMPs, and conducting project evaluation activities. The Department will also provide assistance in development of ordinances and other project implementation activities, review designs for urban BMPs, and approve storm water management plans.

Dunn, St. Croix, Polk, and Barron County Land Conservation Departments

The LCD will be responsible for the following activities in the urban area:

- Assist municipalities in the development of construction site erosion control and storm water management ordinances.
- Develop and implement the recommended information and educational program outlined in Chapter 6 of this plan.
- Provide assistance in the development of grant applications, cost share agreements, project schedules, and progress tracking.

Landowners and Land Operators

In some situations, private landowners will install BMPs on their property. As such, they can be important participants in the urban implementation strategy. Eligible landowners can participate in the project by signing cost-share agreements with local units of government.

Cost-Share Budget

Costs of Installing Rural BMPs

The quantity and type of management practices that are required to meet the water quality objectives of this project are listed in table 4-2. The capital cost of installing the BMPs are listed for a 100 percent landowner participation rate. Units of measurement and cost per unit for the various BMPs are also included.

The capital cost of installing the Best Management Practices is approximately $4,182,985, assuming 100 percent participation of targeted landowners. At 75 percent participation, the capitol cost is $3,491,562.

- State funds necessary to cost-share this level of control would be approximately $2,481,720.

- The local share provided by landowners and other cost-share recipients would be approximately $1,009,842.

Easement and Land Acquisition Costs

Chapter Three identifies where nonpoint source program funds can be used to purchase easements and land. The estimated cost of purchasing easements and land is shown in Table 4-2. At 75-percent participation, the estimated purchase price of easements on eligible lands would be $ 100,000 and $ 100,000 for land acquisition. Easements are funded at 100 percent and will be purchased by Wisconsin Nonpoint source program. Land acquisition is funded at 50 percent and will be purchased by the four participating counties, in full or in cooperation with nonprofit organizations. DNR does not purchase land through this program.

Table 4-2 Estimated BMPs Needed to Meet Water Quality Goals in Dunn, St. Croix, Polk, and Barron Counties.

BMP	number		cost/ unit ($)	total cost	seventy-five percent participation			
					state share	local share	hrs/ unit	total hours
Upland Control								
Change in Crop Rotation	16263	ac	NA	0	0	(1)	.1	1,220
Contour Cropping		ac	0	0	0	(1)	.3	0
Contour Strip Cropping	5164	ac	0	0	0	(1)	.5	1,937
High Residue Management (2)	12127	ac	0	0	0	(1)	.1	910
Cropland Protection Cover (2) (Green Manure)	525	ac	0	0	0	(1)	.04	16
Intensive Grazing Management (Rotational Grazing)	20	ea	0	0	0	0	15	225
Critical Area Stabilization	50	ac	800	40,000	21,000	9,000	.5	19
Grass Waterways	150	ac	3,000	450,000	236,250	101,250	22	2,475
Grade Stabilization	40	ea	4,000	160,000	84,000	36,000	50	1,500
Agricultural Sediment Basin	5	ea	10,000	50,000	26,250	11,250	90	338
Shoreline Buffers	50	ac	0	0	0	0	2	75
Nutrient Management (2)	18810	ac	7	1,053,360	790,020	237,006	.1	1,411
Spill Control Basin	2	ea	10,000	20,000	10,500	4,500	40	60
Wetland Restoration	60	ea	2,000	120,000	63,000	27,000	34	1,530
Livestock Exclusion, Woods	450	ac	10	4,500	4,500	1,688	.01	3
Upland subtotal				**1,897,860**	**1,235,520**	**427,689**		**11,719**

BMP	number		cost/ unit ($)	total cost	seventy-five percent participation			
					state share	local share	hrs/ unit	total hours
Barnyard Runoff Control and Manure Storage								
Barnyard System (concrete, filter)	32	ea	0	0	0	0	95	2,280
Roof Gutters	98	ea	0	0	0	0	2	147
Clean Water Diversion/Crossing	77	ea	0	0	0	0	21	1,213
Roofs	4	ea	0	0	0	0	0	0
Barnyard Relocation	6	ea	0	0	0	0	100	450
Barnyard Incentive Payments	5335	lb	40	213,400	160,050	48,015	.1	400
Manure Storage Facility (3)	21	ea	40,000	840,000	378,000	252,000	100	1,575
Manure Storage Facility Abandonment	20	ea	10,000	200,000	105,000	45,000	20	300
Cattle Mounds	2	ea	0	0	0	0	15	23
Milking Center Waste Control	10	ea	7,000	70,000	36,750	15,750	20	150
Barnyard subtotal				**1,323,400**	**679,800**	**360,765**		**6,538**
Streambank Erosion Control								
Shape and Seeding	3000	ft	10	30,000	15,750	6,750	.1	225
Stream Corridor Management	34,725	ft	1	34,725	34,725	7,813	.06	1,563
Rock Riprap	11200	ft	35	392,000	205,800	88,200	.2	1,680
Bio-Bank Stabilization	1000	ft	25	25,000	13,125	5,625	.5	375
Crossing	40	ea	2,000	80,000	42,000	18,000	18	540
Remote Watering Systems	30	ea	0	0	0	0	15	338
Streambank subtotal				**561,725**	**311,400**	**126,388**		**4,721**
Miscellaneous								
Well Abandonment	200	ea	500	100,000	52,500	22,500	20	3,000
Subtotal				**3,882,985**	**2,279,220**	**937,342**		
Land Acquisitions	50	ac	2000	100,000	50,000	50,000	8	300
Easements	100	ac	1,000	100,000	100,000	0	8	600
Total				**4,182,985**	**2,481,720**	**1,009,842**		**26,878**

Source: Wisconsin DNR, DATCP, and Dunn, St. Croix, Barron and Polk County

Table 4-3. Estimated PRIP Budget over 8 Years

Incentive Plan	Estimated Cost
Nutrient Management and Soil Conservation Farm Plans	790,020
Barnyard Runoff	160,050
Stream Corridor Management	34,700
Upland Woodland Management	4,500
Total	989,270

Table 4-3a. Estimated PRIP Budget over 4 Years

Incentive Plan	Estimated Cost
Total	494,635

Budget and Staffing Needs

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

Staff Needs and Costs

Table 4-4 lists the total estimated staff needed to implement the project assuming a 75-percent level of participation by eligible landowners. Approximately 77,337 staff hours are required over 8 years to implement this plan. This includes 14,928 staff hours to carry out the information and education program.

Currently, four positions are being funded on the South Fork Hay River Priority Watershed. The LCD and agencies will determine the need for additional staff based on an annual workload analysis.

The estimated cost for 5.2 staff members to cover the estimated 77,337 hours is $1,801,280. These costs will be paid by the state through the Local Assistance Grant Agreement.

Project Cost

The total state funding required to meet the rural nonpoint source pollution control needs at 75 percent level of landowner participation is presented in table 4-5. The estimated cost to the state is $2,642,855. The estimated cost to landowners and others is $504,921 for a total project cost of $3,147,776. This figure includes the capital cost of practices, staff support, and easement costs as presented above.

This cost estimate is based on projections developed by agency planners and local staff. Historically, the actual expenditures for projects are less than the estimated costs. The factors affecting expenditures for this watershed project might include: the participation rate; the amount of cost sharing that is actually expended; the number of staff working on the project; and the amount of support costs.

Table 4-4. Estimated Dunn and St. Croix County Staff Needs for 4 Years of Project Implementation

Activity	Dunn County Staff Hours	St. Croix County Staff Hours	Total Staff Hours
Project and Financial Management			3,600
Information and Education Program			7,600
Inventory and Planning*			10,000
Practice Design and Installation			
Upland Sediment Control			5,000
Barnyard Runoff Control and Manure Storage			2,500
Streambank Erosion Control			2,500
Easements, Land Aquisition, and Misc.			2,000
Monitoring BMP Operation and Maintenance			3,000
Training			2,500
Leave			3,600
Total hours:			42,300
Hours per year:			10,575
Estimated Staff Required per year			5

Source: DNR, DATCP, Manitowoc and Sheboygan County

* Inventory and Planning includes: Inventory, Landowner Contacts, Conservation Planning and Plan Revisions, Cost-Share Agreement Development and Amendment, and Progress Tracking.

Table 4-5. State Share of Total Project Costs for 4 Years

Item	Costs
Cost-Share Funds: Practices	1,240,860
Cost-Share Funds: Easements	100,000
PRIP	494,635
Local Assistance to Support 4.0 Staff	692,800
Information and Education Direct	43,000
Other Direct (travel, supplies, etc.)	66,560
Engineering Assistance	5,000
Total	2,642,855

Source: DNR, DATCP, and Dunn, St. Croix, Polk, & Barron County Land Conservation Departments

Grant Disbursement and Project Management Schedule

Implementation of this Priority Watershed project shall begin upon both approval of this plan and receipt of the Nonpoint Source grant. The plan must be approved by the DNR, the Dunn, Polk, Barron, & St. Croix County Boards, and the Wisconsin Land and Water Conservation Board.

The project implementation period is four years. During this time, cost-share agreements with eligible landowners may be signed. Practices listed on any cost-sharing agreement must be installed before the end of the implementation phase. The implementation phase of this project is scheduled to conclude in June 30, 2001.

The initial Nonpoint Source grant will cover the cost of practices over the first four year implementation phase. The amount of the Nonpoint Source grant is calculated at 75 percent participation by eligible landowners; see Table 4-2 for a detailed explanation. This grant may be amended due to changes needed for time of performance, funding levels, or scope of work.

Local Assistance grants will be disbursed annually to Dunn and St. Croix Counties to cover the costs of personnel, operating expenses, and equipment. The DNR will evaluate an annual workload analysis and grant application submitted by both Dunn and St. Croix County.

CHAPTER FIVE
Integrated Resource Management

Introduction

The purpose of this chapter is to identify existing state, federal and local resource management programs which provide benefits for water quality or fish and wildlife resources in the South Fork of the Hay River Watershed. Watershed staff will work to coordinate the efforts of these programs to provide the best possible management of land and water resources in the watershed. This comprehensive approach will facilitate consideration of the various goals and objectives for all the programs in which the landowner participates. Each of these activities is described below.

Fisheries and Wildlife Management

Watershed best management practices (BMPs), such as streambank protection, shoreline buffer strips and easements, should be implemented in a manner that preserves and enhances the management goal of providing a quality fishery in the South Fork of the Hay River Watershed. Specifically, all streambank protection BMPs should be installed using large diameter-sized rock below the water line. Rock riprap should be installed and sized so that the placement and size of rock will positively benefit fish habitat. Vegetative shoreline erosion control using emergent aquatic vegetation for habitat enhancement should be used where applicable. Wildlife habitat components should also be incorporated into vegetative buffer strips along streams or in upland areas.

Shoreline erosion control measures will be installed in a manner beneficial to fisheries and wildlife habitat. DNR Fish and Wildlife Management personnel in Eau Claire and Baldwin will be asked for input in the design of streambank and shoreline protection BMPs to maximize benefits to the fish and wildlife communities. In cooperation with counties, DNR staff will also review placement of agricultural sediment basins, provide technical assistance when the installation of BMPs will require the removal of obstructions or other wildlife habitat by proposing measures to minimize impact on wildlife habitat, and assist in resolving questions concerning effects of agricultural nonpoint source BMPs on wetlands.

Additional information can be obtained from the fisheries managers at DNR offices in Baldwin, Cumberland or Eau Claire:

Marty Engel	Thomas Beard	Jim Holzer
DNR	DNR	DNR
990 Hillcrest, Suite 104	1341 2nd Ave. (PO Box 397)	2004 Highland Ave.
Baldwin, WI 54002	Cumberland, WI 54829	Eau Claire, WI 54701
715/684-2914	715/822-3590	715/839-3765

Wetland Restoration

Watershed staff will use NRCS wetland inventory maps and site visits to identify potential sites for wetland restoration projects. The general guidelines for wetland restoration, easement acquisition and shoreline buffers to protect existing wetlands should be followed. Each time a wetland restoration or easement purchase is possible, the county staff will consult with DNR wildlife management, fish management and watershed management personnel, and the NRCS area engineer to determine the best design and use for the particular site. Shoreline buffer easements may be acquired adjacent to these wetlands to offer better protection from sedimentation and other nonpoint source pollution.

Wetland restoration programs exist through the watershed project, NRCS Wetland Reserve Program, NRCS Conservation Reserve Program (CRP), U.S. Fish & Wildlife Service and DNR Wildlife Management programs. U.S. Army Corps of Engineers staff may also need to be contacted for assistance on the project. For additional information on wetland restorations in the South Fork of the Hay River Priority Watershed, contact any of the following agencies:

St. Croix County LCD 1060 10th Ave. (PO Box 85) Baldwin, WI 54002 715/684-2894	Dunn County LCD 390 Red Cedar St. Menomonie, WI 54751 715/232-1496	U.S. Fish & Wildlife
USDA-NRCS (St. Croix Co.) (same address as LCD) 715/684-2894	USDA-NRCS (Dunn Co.) (same address as LCD) 715/232-1132	

DNR offices (addresses listed in previous section -- ask for Wildlife Manager)

Groundwater Management

Wells provide a direct conduit for pollutants to reach groundwater resources. Preventing well contamination and sealing abandoned wells are important steps for protecting these resources. If not properly sealed, abandoned wells can directly channel contaminated surface water or shallow groundwater into deeper drinking water aquifers, bypassing the normal purifying action that takes place as surface water slowly percolates downward. Abandoned wells are a significant threat to groundwater quality in the South Fork of the Hay River Watershed.

Dunn or St. Croix County LCD staffs will encourage all landowners to properly seal abandoned wells. Information on the proper abandonment procedures will be provided to landowners when abandoned wells are located.

Well Abandonment

The DNR provides cost-share assistance to South Fork of the Hay River Priority Watershed farm operators to properly seal abandoned wells to protect groundwater resources. Design assistance for well abandonment is available from local well drillers, the local county NRCS office or the Dunn or St. Croix County LCD offices.

Wisconsin Well Compensation Grants

Wisconsin's Well Compensation grant program provides financial assistance to replace or treat private wells contaminated with heavy metals, pesticides, solvents or gasoline. Wells must exceed state or federal drinking water standards. Replacement of wells contaminated with bacteria or nitrate are not eligible for cost-sharing, with the exception of livestock wells contaminated with more than 40 ppm of nitrate. DNR district water supply personnel should be consulted for more information concerning income limits and other eligibility requirements.

Eligible landowners will be encouraged to apply for well replacement funds through the Wisconsin Well Compensation Grant Program.

Fuel Storage Tanks

Leaking fuel storage tanks can be a source of contamination for both groundwater and surface water. Description of programs funding removal and remediation of leaking underground storage tanks (LUSTs) can be found through:

DNR - West Central Region
404 S. Barstow St. (PO Box 4001)
Eau Claire, WI 54702
715/839-3700

Private Sewage System Maintenance and Rehabilitation

Poorly sited or improperly functioning private sewage systems have the potential to contaminate groundwater and surface waters in the South Fork of the Hay River Watershed. Pollutants from sewage system discharge includes bacteria, viruses, household chemicals, nitrates and phosphorus. Many sewage systems located in riparian areas are outdated and installed in soils which do not adequately filter pollutants due to the poor filtering ability of the soil and/or a high water table. Failing sewage systems in riparian areas are a special concern since pollutants can enter the surface waters with minimal filtering. Sewage system failure is often due to poor maintenance, primarily a failure to pump septic tanks on a regular basis.

Wisconsin Fund

The Private Sewage System Replacement and Rehabilitation Grant Program (Wisconsin Fund) provides financial incentives to protect and improve groundwater quality in Wisconsin. The Wisconsin Fund provides funds to update private sewage systems installed before 1978. To be eligible the septic system must have been inspected by the Dunn, St. Croix, Barron or Polk County Sanitarian and determined to be failing by discharging waste to the groundwater or surface water. Only permanent residences qualify, and there are income restrictions. Applications for Wisconsin Fund are made through the local county zoning department (see addresses and telephone numbers under the "Coordinating Regulations, Permits and Zoning" section on the following pages.

Riparian Zones

Cattle access to streams and lakes has not been identified as a serious problem in the watershed. Any sites impacted by cattle access that are identified during the implementation phase of the project should be protected with BMPs. Sensitive riparian areas can be acquired through easements so they receive lasting protection.

Dunn and St. Croix County staff will promote protecting riparian areas where possible.

Stewardship

The Stewardship program enables purchasing land or easements to protect sensitive environmental areas. The streambank protection program under stewardship is another important means of protecting water quality. Under this program, the DNR could obtain an easement on both sides of streams in the watershed (generally 66 feet wide on each side). If needed, the DNR will financially support fencing the stream to protect it from livestock

access. There are [?get from Tracey Teodecki] watershed streams currently eligible for stewardship protection.

Forestry Programs

Private forest lands, which account for over 26,000 [get from counties] acres within the South Fork of the Hay River Watershed, contribute to the quality of water resources and fish and wildlife resources in the watershed. Financial assistance is available for forest management and soil and water resource protection through the Stewardship Incentive Program (SIP), the Managed Forest Law Program (MFL) and other forest stewardship programs. Additional information can be found in DNR publication FR-093-95, *Wisconsin Forestry Best Management Practices For Water Quality*, developed by DNR Bureau of Forestry. For more information on forestry programs, contact the DNR forester nearest you:

Kathryn Nelson DNR 990 Hillcrest, Suite 104 Baldwin, WI 54002 (715) 684-2914	Jay Jordan DNR Hwy. 29 & Brickyard Rd. Route 6 (PO Box 1) Menomonie, WI 54751 715/232-1516
Richard Livingston DNR, Ranger Station 117 S. Riverside Dr. Cornell, WI 54732 715/239-6355	Phillip Anderson DNR 1341 2nd Ave. (PO Box 397) Cumberland, WI 54829 715/822-3590

Stewardship Incentive Program

The Stewardship Incentive Program (SIP) was developed to stimulate enhanced management of forest lands by cost-sharing approved management practices. SIP provides cost share funding of up to 75 percent for practices that provide soil and water protection. The SIP program applies to nonindustrial private forest land of 10 acres or more on forested or forest related (i.e., prairie, wetlands) lands. Practices that are cost-shared by SIP include: development of a landowner forest stewardship plan; site preparation and tree planting; timber stand improvement; windbreak and hedgerow establishment; soil and water protection and improvement; riparian and wetland protection and improvement; fisheries habitat enhancement; wildlife habitat enhancement; and forest recreation enhancement.

Managed Forest Law

The goal of the Managed Forest Law (MFL) program is to encourage long-term sound forest management. MFL is a tax incentive program for industrial and nonindustrial private woodland owners who manage their woodlands for forest products while also managing for water quality protection, wildlife habitat and public recreation. In return for following an approved management plan, property taxes are set at a lower rate than normal. At a later time when the landowner receives an income from a timber harvest, some of the deferred tax is collected in the form of a yield tax. Management plans are based on the landowners' objectives. These plans may address harvesting, planting, thinning, release and soil erosion on a mandatory basis while addressing other practices such as wildlife and aesthetic activities on a voluntary basis.

Other Stewardship Programs

Some other forest stewardship programs available to watershed landowners include the Forest Improvement Program (FIP) and the federal Environmental Quality Incentive Program (EQIP). These programs provide funding for the establishment of timber stands.

Coordinating Regulations, Permits, and Zoning

Local, state and federal regulations regarding surface water and wetland protection must be considered whenever BMPs are installed. Best management practices that address streambank or shoreline erosion such as riprap or vegetative shoreline stabilization will require permits from the DNR. Any BMP which effects wetland form or function may require permits from the DNR, St. Croix, Dunn, Barron or Polk County Zoning office and the U.S. Army Corps of Engineers.

The St. Croix or Dunn County LCD staff will work with the DNR Water Regulation and Zoning staff, the St. Croix, Dunn, Polk or Barron County Zoning Department and the U.S. Army Corps of Engineers to assure that necessary permits are received prior to the installation of streambank or shoreline stabilization practices.

Landowners will be referred to the appropriate regulators prior to construction projects for proper permits. For more information on water regulations, contact:

Dunn County Zoning and Land Use Planning Dept.
(get addresses from county LCD staff)

St. Croix County Zoning Dept.

USDA-NRCS
(see above section

U.S. Army Corps of Engineers
(get address from county LCD staff)

Environmental Quality Incentive Program (EQIP)

The EQIP was established in the 1996 federal Farm Bill to provide a single, voluntary conservation program for farmers. Priority watershed projects in the Wisconsin Runoff Management Program will have the opportunity to submit priority area proposals for federal funding through Local Work Groups (LWG). This opportunity will allow projects to leverage the local, state and federal dollars to enhance the state efforts where water quality and other environmental objectives can be acheived. Dunn and St. Croix County watershed staff will work with these LWGs and NRCS when possible to solicit requests for funding through EQIP for projects in the watershed.

Coordination With State and Federal Conservation Compliance Programs

The South Fork of the Hay River Watershed project will be coordinated with the conservation compliance features of the Wisconsin Farmland Preservation Program (FPP) administered by

DATCP, and the Federal Food Security Act (FSA) administered by the Natural Resource Conservation Service. DATCP will assist the LCD and the NRCS offices to identify landowners within the watershed that are subject to the compliance provisions of FPP and FSA. Conservation Farm Plans were to have been completed for all landowners in FSA by December 31, 1989. There are 71[get from counties] FPP plans and 135[get from counties] FSA plans within the watershed project.

Implementing and amending these conservation plans will be necessary during the implementation phase of the watershed project. Watershed project staff will inform FPP and NRCS staff of changes in plans resulting from management decisions and the installation of needed BMPs for nonpoint source pollution abatement.

Staff will also want to work cooperatively with other agency programs, such as NRCS's Wetland Reserve Program, Conservation Reserve Program (CRP), the Environmental Quality Incentives Program (EQIP), the Grazing Lands Conservation Initiative, the Forestry Incentive Program (FIP) and the Wildlife Habitat Incentive Program (WHIP) as they have funds to help achieve complementary goals to those of the priority watershed. Additional information can be obtained from NRCS. (715) 524-8520

Archaeological Sites: Coordination with State Historic Preservation Laws

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

There are several known archaeological sites within the South Fork of the Hay River Watershed. A list of all the registered cemeteries in the watershed may be obtained through the State Historical Society. Wisconsin state law makes it illegal to knowingly disturb a burial. Landowners themselves may have information on some sites that have not been reported.

These areas will need special consideration when structural best management practices are being considered. Settling basins, manure storage structures, and streambank or shoreline shaping and riprapping are likely practices that may impact archaeological sites. As discussed above, state and federal laws require preservation of archaeological resources within the framework of the state watershed program.

Before finalizing any watershed agreement with the landowner, project staff will review the maps showing known archaeological and historic sites. Also, staff will review the list of practices of concern listed below. If a known site occurs in the vicinity of a proposed BMP of concern, this does not necessarily mean the BMP needs to be moved or altered. In some cases, the specific location of the BMP will not actually be near enough to the location of the known site to warrant further review. Project staff should consult with the DNR West Central Region watershed coordinator to arrange an informal visit to the area by a cultural resource professional (either DNR employee or otherwise). This first visit would consist of a "pre-review" to ensure that the *specific* location of the proposed BMP will not disturb the known archaeologic or historic site. In some cases, a representative from the U.S. Natural Resources Conservation Service (NRCS) may conduct the review. Instructions and cultural resource site review documentation forms are available in the Implementation Handbook.

If it is too difficult to determine through a pre-review, or if it appears that the known site would indeed be disturbed, contact the DNR's archeological site liaison, Victoria Dirst, to set up a formal Archaeological or Historic Site Review of the area. Any costs incurred as part of a site review *will not be passed on to the landowner*. The DNR's Nonpoint Source Pollution Abatement (Runoff Management) Program will pick up the costs of professional historic and archaeological site reviews.

Practices of concern

Archaeological Sites
- Field Diversions
- Terraces
- Grade Stabilization Structures
- Agricultural Sediment Basins
- Streambank and Shoreline Stabilization
- Structural Urban Practices
- Wetland Restoration
- Sediment Retention, Erosion or Water Control Structures
- Grass Waterways
- Critical Area Stabilization

Historic Buildings
- Barnyard Runoff Management Systems
- Animal Lot Relocation
- Manure Storage Facilities
- Roofs for Barnyard
- Roofs for Manure Storage Facilities

Practices - No Concern Needed for Historic Cultural Sites
- Contour Farming
- Contour Strip-cropping
- Field Strip-cropping
- Reduced Tillage
- No-till Systems
- Permanent Vegetative Cover
- Cropland Protective Cover
- Livestock Exclusion from Woodlots
- Shoreline Buffers
- Pesticide Management
- Nutrient Management

Endangered and Threatened Resources

Information on threatened and endangered resources was obtained from the Bureau of Endangered Resources of the DNR. Endangered resources include rare species and natural communities. It should be noted that comprehensive endangered resource surveys have not been completed for the entire South Fork of the Hay River Priority Watershed. The lack of additional occurrence records does not preclude the possibility that other endangered resources are present in the watershed. In addition, the Bureau's endangered resource files are continuously updated from ongoing field work. There may be other records of rare species and natural communities which are in the process of being added to the database and so are not listed in this document.

Rare Species

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

Wisconsin Endangered Species

An endangered species is one whose continued existence as a viable component of this state's wild animals or wild plants is determined by the DNR to be in jeopardy on the basis of scientific evidence. Wisconsin endangered species known to be within the watershed include:

[This should come from the Bureau of Endangered REsources when you give them the town/range/section info for the watershed. Karen Rahmeier can help with this. The contact in ER is John Pohlman.]

Charadrius melodus, piping plover (bird)
Podiceps grisegena, red-necked grebe (bird)

Wisconsin Threatened Species

A threatened species is one which, if not protected, has a strong probability or becoming endangered. Wisconsin threatened species within the watershed are:

Moxostoma valenciennesi, greater redhorse (fish)
Buteo lineatus, red-shouldered hawk
Alasmidonta viridis, slippershell mussel
Lepomis megalotis, longear sunfish
Clemmys insculpta, wood turtle

Wisconsin Special Concern Species

A special concern species is one for which some problem of abundance or distribution is suspected in Wisconsin, but not yet proven. The purpose of this category is to focus attention on certain species **before** they become endangered or threatened. Wisconsin special concern species within the watershed are:

Poanes massasoit, mulberry wing (butterfly)
Poanes viator, broad-winged skipper (butterfly)
Euphyes dion, Dion skipper (butterfly)
Medeola virginiana, Indian cucumber root (plant)
Ophioglossum vulgatum var pseudopodum, adder's tongue (plant)

Natural Areas

Natural areas are sites that contain high quality examples of natural communities. The following natural areas have been identified in the South Fork of the Hay River Priority Watershed. The natural communities found at each area are also listed.

Northern Mesic Forest: In Shawano County, at an area used as a sugar bush, this old, second-growth woodlot is dominated by sugar maple-beech and hemlock. The understory is open and appears undisturbed by grazing.

Spring Pond and *Shallow, Hard, Seepage Lake:* Pensaukee Lakes, in Shawano County, contains this rare natural community. The most eastern of the three lake basins at the headwaters of the Pensaukee River contains a clear, hardwater spring lake with chara and coontail dominating the tract. The lake is bordered by white cedar and tamarack swamp. The outlet is clogged with water willow. The only upland portion of the shoreline has been cleared.

Northern Sedge Meadow and *Floodplain Forest*: Charles Pond, in Oconto County, is a wetland complex on Green Bay and is subject to the influences of water level fluctuations. The hardwood swamp forest on lacustrine deposits is one of the few of its kind. The bay-mouth bar lake, extensive shallow marsh, and shrub zones vary in extent according to the level of Green Bay.

If specific location or other information is needed about these species or natural communities, contact the Bureau of Endangered Resources, DNR. Note that the specific location of endangered resources is sensitive information. Exact locations **should not** be released or reproduced in any publicly disseminated documents.

CHAPTER SIX
Information and Education Activities

Introduction

Priority watershed projects use financial cost-sharing, technical assistance, and educational programming as ways to assist watershed residents in overcoming barriers to better land use management. These three methods need to be used together with each other if projects are to succeed.

Educational programming provides watershed residents with an awareness of water quality problems and solutions, and the knowledge and skills required to successfully adopt best management practices. Educational programming also provides watershed residents with motivation to take on new ventures and make investments of time and money to protect water resources.

This strategy is based on educational goals, objectives, and activities. It was developed by project staff and citizen advisory committee members. Project staff and advisory committee members will develop Annual Information and Education Activity Plans designed to meet the educational goals and objectives outlined below.

Project Educational Goals and Objectives

Goal 1: Increase understanding of watersheds and nonpoint source pollution by those who live and work in the South Fork of the Hay River Watershed.

Educational objectives:

a. Watershed residents, especially youth, will understand what a watershed is and the connection between land use and water quality.

Goal 2: Increase appreciation of the water resources found in the South Fork of the Hay River Watershed by those who live and work in the watershed.

Educational objectives:

a. Watershed residents will come to appreciate how quality water resources can lead to an improved quality of life.

Goal 3: Reduce the amount of sediment being delivered to the South Fork of the Hay River and its tributaries.

Educational objectives:

a. Watershed residents will know the sources of sediment in the watershed and understand the harmful impacts that sedimentation has on streams and lakes.

b. Crop producers will understand and be able to apply with assistance such practices as conservation tillage, long rotations, gully control, vegetated buffer strips, upland dams, vegetated buffer strips, and wetland restoration.

c. Livestock producers will understand and be able to apply with assistance grazing systems, livestock stream crossings, and remote watering stations.

d. Landowners with streams will understand and be able to apply with assistance such streambank protection and enhancement practices as bio-engineered and rock rip-rap bank protection.

e. Landowners who rent out land will understand and be able to communicate to their renters the types of conservation practices required for water quality protection.

f. Contractors, builders, and home buyers will understand and be able to apply with assistance construction site erosion control practices.

g. Town and county government will understand and be able to apply with assistance construction site erosion control on their road building and repair projects.

Goal 4: Reduce the amount of phosphorous being delivered to Tainter Lake.

Educational objectives:

a. Watershed residents will understand the role of phosphorous to production agriculture, know the sources of phosphorous runoff in the watershed, and understand the harmful impacts that high phosphorous runoff has on lakes and Mississippi River backwaters.

b. Crop and livestock producers will be able to develop and apply their own nutrient management plans that avoid over-application of manure and commercially purchased phosphorous to cropland.

c. Livestock producers with manure runoff problems will understand and be able to apply with assistance such manure management practices as barnyard runoff control systems.

d. Homeowners and municipalities will understand and be able to apply with assistance such phosphorous runoff control practices as good lawn management and keeping leaves and grass clippings off of streets and other paved areas.

Goal 5: Restore and enhance critical wildlife habitats such as stream corridors and wetlands.

Educational objectives:

a. Watershed residents will understand what makes for a healthy. Fishery potential for the watershed's streams will be understood.

b. Watershed residents will understand the varied and valuable wildlife habitats provided in riparian and wetland areas - the area where water meets land.

c. Landowners with streams will understand and be able to apply with assistance such practices as stream buffer areas, limited livestock access, vegetative plantings, wildlife plantings, fish structures, bird houses, and the sale of easements.

d. Landowners with wetlands will understand and be able to apply with assistance wetland enhancement and restoration practices.

Activities for Reaching Educational Objectives

The following is a listing of the types of educational activities that will be used to reach the educational goals and objectives outlined above. Annual Information and Education Activity Plans will be developed that indicate which of the below activities are being planned for the coming year.

One-on-one contacts:

Contacts to potential participants by staff and advisory committee members.
Provide individual consultation on agricultural best management practices.
Provide individual consultation on construction site best management practices.
Contacts to town and county highway departments on erosion control practices.
Up-dates to ag business, yard care, construction, and financial communities.
Up-dates to county board and town board members.
Up-dates to county land conservation and extension committees.
Up-dates to county planning and zoning staff and board of adjustment members.

Group training:

c. Livestock producers with manure runoff problems will understand and be able to apply with assistance such manure management practices as barnyard runoff control systems.

d. Homeowners and municipalities will understand and be able to apply with assistance such phosphorous runoff control practices as good lawn management and keeping leaves and grass clippings off of streets and other paved areas.

Goal 5: Restore and enhance critical wildlife habitats such as stream corridors and wetlands.

Educational objectives:

a. Watershed residents will understand what makes for a healthy. Fishery potential for the watershed's streams will be understood.

b. Watershed residents will understand the varied and valuable wildlife habitats provided in riparian and wetland areas - the area where water meets land.

c. Landowners with streams will understand and be able to apply with assistance such practices as stream buffer areas, limited livestock access, vegetative plantings, wildlife plantings, fish structures, bird houses, and the sale of easements.

d. Landowners with wetlands will understand and be able to apply with assistance wetland enhancement and restoration practices.

Activities for Reaching Educational Objectives

The following is a listing of the types of educational activities that will be used to reach the educational goals and objectives outlined above. Annual Information and Education Activity Plans will be developed that indicate which of the below activities are being planned for the coming year.

One-on-one contacts:

Contacts to potential participants by staff and advisory committee members.
Provide individual consultation on agricultural best management practices.
Provide individual consultation on construction site best management practices.
Contacts to town and county highway departments on erosion control practices.
Up-dates to ag business, yard care, construction, and financial communities.
Up-dates to county board and town board members.
Up-dates to county land conservation and extension committees.
Up-dates to county planning and zoning staff and board of adjustment members.

Group training:

Workshops on cropland erosion control practices.
Workshops on construction site erosion control.
Project WET workshops for elementary and secondary level teachers.
Technical school nutrient management short-course for crop producers.

Demonstrations:

Farm demonstrations of erosion control and nutrient management practices.
Construction site demonstrations of erosion control practices.
Wetland interpretive site with walkway and signs.

Presentations:

Present at County and Town Board meetings.
Present at Planning and Zoning Committee and Board of Adjustment meetings.
Present at lake association meetings.
Present at farm business and association meetings.
Present at outdoor/sports/environmental group meetings.
Present to students in classroom and at field days.

Events:

Participate in annual lake fair.
Organize "neighborhood" project property owner meetings.
Display at county and community Fairs.
Annual "Clean the Hay" river clean-up.
Early spring "Fishing Clinic" family event.
Citizen Advisory Committee meetings held at project sites.

Youth involvement:

Annual stream monitoring project for high school classes.
Essay and poster contests on conservation theme.

Targeted media:

Direct mail and watershed project newsletter.
Include articles in lake association newsletters.
Distribution of urban homeowner best management practice information packets.
Technical fact sheets on BMPs.
Distribute model "Rented Land Conservation Agreement."
Develop table top 3-D model of watershed area.
Develop and display "watershed quilt."
Distribute watershed placemats
Storm drain stenciling projects.

Mass media:

Use of local and regional press and radio.
Use of agricultural press.
Erect project area boundary signs.

Information and Education Strategy Evaluation

Evaluation of educational activities can be difficult, but should be done in some form whenever possible. This strategy is based on educational goals and objectives, and it is important to know whether these measures are being met.

Planned evaluation methods are:

1. Assessment of awareness and understanding of the key messages being delivered will be made. Assessments will be done at the beginning of year 1, at the end of year 3, and at the end of year 8. Telephone survey will be the assessment method used.

2. Tracking of reasons for project interest and best management practice implementation. Project participants will be asked what factors made them decide to investigate the project, or to implement a given best management practice. Simple tracking sheets kept in participant files will used to collect this information.

3. Follow-up evaluations will be made of information and education activities. The most common form of this will be evaluation sheets distributed to participants at the end of information and education events.

Annual Information and Education Activity Plans

Annually, project staff and Citizen Advisory Committee members will review last year's information and education activities, re-evaluate information and educational needs, and prepare an Annual Information and Education Activity Plan for the coming year to two years. Annual Information and Education Activity Plans will indicate the "what, when, who, and how much" for planned activities.

Activity implementation will be supervised by the Project Manager. The manager will assure that activities listed in the annual plan are carried out by those who they are assigned to.

January 1, 1997 - December 31, 1998

Information and Education (I&E) activities are designed around the following information and educational goals:

1. Increase understanding of watersheds and nonpoint source pollution by those who live and work in the South Fork of the Hay River Watershed.
2. Increase appreciation of the water resources found in the South Fork of the Hay Watershed.

3. Reduce the amount of sediment being delivered to the South Fork of the Hay River and its tributaries.
4. Reduce the amount of phosphorous being delivered to Tainter Lake.
5. Restore and enhance critical wildlife habitats such as stream corridors and wetlands.

Table 6-1. 1997 Activity Plan

Activity	Schedule	Ed. Goals	Assignments	Materials & Costs
ONE-TO-ONE CONTACTS				
One-to-one contacts with landowners Direct contacts by project staff and Citizen Advisory Committee members to landowners who are eligible for project participation.	On-going	All	Dunn County LCD St. Croix County LCD Citizen Advisory Board	Handouts: $50
One-to-one contacts with engineers, contractors, and town and county highway departments Direct contacts by project staff to area engineers, contractors and road crews to discuss stormwater and construction site erosion control BMP's.	On-going	1, 3, 4 and 5	Dunn County LCD St. Croix County LCD	Handouts: $15
One-to one contacts with community leaders Direct contacts by project staff and Citizen Advisory Committee members to local government, business, education, religious, and media leaders to keep them updated on project purpose and progress.	On-going	1 and 2	Barron County LCD Dunn County LCD Polk County LCD St. Croix County LCD Citizen Advisory Board	Handouts: $15
GROUP TRAINING				
Neighborhood group meetings Three summer meetings that will showcase BMP's and take landowners stream side.	June July Aug.	All	Dunn County LCD St. Croix County LCD	Refreshments: $125 Handouts: $25
Information to those renting out farm land Present at annual Boyceville meeting on farm programs. Develop model "Conservation on Rented Land" agreement form.	Sept.	1, 3, 4 and 5	Area UWEX	Handouts: $15
Collaboration with Dunn County Grazers Project will work with grazing groups to assist landowners in adopting grazing BMPs.	On-going	3, 4 and 5	Dunn County LCD	N/C

Activity	Schedule	Ed. Goals	Assignments	Materials & Costs
DEMONSTRATIONS				
Low cost BMP demonstrations - Installation Stream buffer strip Diversion Prairie establishment	May - Sept.	2, 3 and 5	Dunn County LCD St. Croix County LCD	N/C (Paid by cost-sharing agreements)
BMP demonstrations - Showcasing Showcase established BMP demonstrations via on-site meetings, press releases, and newsletter.	Sept. - Oct.	2, 3 and 5	Dunn County LCD St. Croix County LCD County & Area UWEX	Publicity: $25 Handouts: $50
PRESENTATIONS				
Presentation to community groups Targeted groups are town and county boards and committees, farm groups, sports and outdoor organizations, etc. Slide show will be developed.	On-Going	All	Dunn County LCD St. Croix County LCD Area UWEX	Slide show: $150
EVENTS				
"Clean the Hay Day" Annual river clean-up involving watershed high school classes.	May	1, 2 and 5	Dunn County LCD WAV Program	Publicity: $25 Materials: $50
County and community fairs Develop project display for use at summer county and community fairs.	July - Aug.	All	Dunn County LCD St. Croix LCD Area UWEX	Display materials: $200
Dunn County Lake Fair Participate with a display and activities at this annual event.	June	All	Dunn County LCD Dunn County UWEX Area UWEX	Materials: $50
YOUTH INVOLVEMENT				

Activity	Schedule	Ed. Goals	Assignments	Materials & Costs
Stream ecology field days Annual event with Boyceville, Clayton, and Glenwood City schools. Students monitor stream health by looking at water chemistry, aquatic insects, and stream habitat.	May	1, 2 and 5	Dunn County LCD Area and State UWEX WAV Program	Supplies: $150
Construct watershed model Develop a table-top 3D model of watershed area as a student project. Will use as display item once constructed.	Nov.	1 and 2	Dunn County LCD Area UWEX	Materials: $50
Community service / career day option Make opportunity available to high school students to perform community service projects, or to experience careers in soil and water conservation.	On-going	All	Barron County LCD Dunn County LCD St. Croix County LCD County UWEX (4-H)	N/C
TARGETED MEDIA				
Project placemats Distribute project placemats developed by UWEX to project area schools, lodges, and cafes.	May	1 and 2	Dunn County LCD St. Croix County LCD State UWEX	N/C (Covered by state funds)
Newsletter Mailed three times annually.	March Sept. Jan.	All	Dunn County LCD Area and State UWEX	Postage: $1,017 (3 X 1,500 X 22.6¢ each) Film and processing: $200
MASS MEDIA				
News releases Issued when newsworthy items occur. Target of 6 per year.	On-going	All	Dunn County LCD St. Croix County LCD	N/C
Boundary signs Erect project area boundary signs six main roads.	Aug.	1	Dunn County LCD St. Croix LCD	Signs: $1,800

Activity	Schedule	Ed. Goals	Assignments	Materials & Costs
Participant signs Signs to be placed on homestead of project participants. Bought first year and distributed throughout project life. (50 signs @ $4 each)	On-going	1	Dunn County LCD St. Croix County LCD	Signs: $200
EVALUATION				
Telephone survey A telephone survey will be conducted to determine the level of awareness and understanding of watersheds, nonpoint source water pollution, and project operation. Potential watershed participants will be targeted.	Sept.	1 and 2	Dunn County LCD Area UWEX	Survey cost: $400
TOTALS				**$ 4,612**

Programs: CVTC = Chippewa Valley Technical College, DNR = Department of Natural Resources, LCD = Land Conservation Department, NPM = Nutrient and Pesticide Management Program, UWEX = UW - Extension, WAV = Water Action Volunteers Program

Table 6-2. 1998 Activity Plan

Activity	Schedule	Ed. Goals	Assignments	Materials & Costs
ONE-TO-ONE CONTACTS				
One-to-one contacts with landowners Direct contacts by project staff and Citizen Advisory Committee members to landowners who are eligible for project participation.	On-going	All	Dunn County LCD St. Croix County LCD Citizen Advisory Board	Handouts: $50
One-to-one contacts with engineers, contractors, and town and county highway departments. Direct contacts by project staff to area engineers, contractors and road crews to discuss stormwater and construction site erosion control BMP's.	On-going	1, 3, 4 and 5	Dunn County LCD St. Croix County LCD	Handouts: $15
One-to one contacts with community leaders Direct contacts by project staff and Citizen Advisory Committee members to local government, business, education, religious, and media leaders to keep them updated on project purpose and progress.	On-going	1 and 2	Barron County LCD Dunn County LCD Polk County LCD St. Croix County LCD Citizen Advisory Board	Handouts: $15
GROUP TRAINING				
Nutrient management short-course Required Chippewa Valley Technical College course for project participants installing manure management BMP's. Participants will learn how to develop and implement their own Nutrient Management Plans.	Jan.	4	CVTC - Menomonie NPM Program Dunn County LCD St. Croix County LCD County UWEX	Tuition for 30: $900
Neighborhood group meetings Three summer meetings that will showcase BMP's and take landowners stream side.	June July Aug.	All	Dunn County LCD St. Croix County LCD	Refreshments: $125 Handouts: $25
Information to those renting out farm land Present at annual Boyceville meeting on farm programs.	Sept.	1, 3, 4 and 5	Area UWEX	Handouts: $15

Activity	Schedule	Ed. Goals	Assignments	Materials & Costs
Collaboration with Dunn County Grazers Project will work with grazing groups to assist landowners in adopting grazing BMPs.	On-going	3, 4 and 5	Dunn County LCD	N/C
DEMONSTRATIONS				
BMP demonstrations - Showcasing Showcase established BMP demonstrations via on-site meetings, press releases, and newsletter.	June	2, 3 and 5	Dunn County LCD County & Area UWEX	Publicity: $25 Handouts: $50
Wetland interpretive center Provide the public the opportunity to experience a wetland by installing informational signs, walkway, and canoe launch.	May	2 and 5	Dunn County LCD DNR	$1,500 ($5,000 in donations will be sought to augment this amount)
PRESENTATIONS				
Presentation to interest groups Targeted groups are town and county boards and committees, farm groups, sports and outdoor organizations, etc. Slide show will be developed.	On-Going	All	Dunn County LCD St. Croix County LCD Area UWEX	Slide show up-date: $25
EVENTS				
"Clean the Hay Day" Annual river clean-up involving watershed high school classes.	May	1, 2 & 5	Dunn County LCD WAV Program	Publicity: $25 Materials: $50
Dunn County Lake Fair Participate with a display and activities at this annual event.	June	All	Dunn County LCD Dunn County UWEX Area UWEX	Materials: $50
Pre-season fishing clinic Indoor, pre-season event to teach fishing skills and water quality awareness. Family event. Use the "Fishing for Fun and Learning" 4-H program.	March	1,2 &5	Dunn County LCD County UWEX (4-H) Area UWEX	N/C (Covered by registrations)

Activity	Schedule	Ed. Goals	Assignments	Materials & Costs
County and community fairs Update and use project display for use at summer county and community fairs.	July - Aug.	All	Dunn County LCD St. Croix LCD Area UWEX	Display up-date: $50
YOUTH INVOLVEMENT				
Student creativity contest Contest in which students can compete in several categories of activities, such as essays, posters, drama, and speeches. Prizes will be donated.	March	All	Dunn County LCD St. Croix LCD County UWEX (4-H)	Publicity: $25
Stream ecology field days Annual event with Boyceville, Clayton, and Glenwood City schools. Students monitor stream health by looking at water chemistry, aquatic insects, and stream habitat.	May	1,2 and 5	Dunn County LCD Area and State UWEX WAV Program	Supplies: $150
Urban BMP fact sheet distribution Using youth volunteers, distribute urban BMP fact sheets to town households.	May	1, 3 and 4	Dunn County LCD St. Croix Co. LCD County UWEX (4-H)	Handouts: $50
Storm drain stenciling Goal of stenciling all stormwater inlets in project with message "Dump No Waste - Drains to River." Youth volunteers will be used.	On-going	1, 3 and 4	Dunn County LCD St. Croix Co. LCD WAV Program	Stencils and paint: $150
Community service / career day option Make opportunity available to high school students to perform community service projects, or to experience careers in soil and water conservation.	On-going	All	Barron County LCD Dunn County LCD St. Croix County LCD County 4-H Programs	N/C
TARGETED MEDIA				

Activity	Schedule	Ed. Goals	Assignments	Materials & Costs
Watershed quilt Develop a quilt of the watershed area by having each subwatershed and community contribute sections. Will be displayed in public areas.	January	1	Area UWEX	Fabric: $150
Rural BMP fact sheet development One per practice fact sheets that outlines purpose, function, design, and costs. Distributed to landowners interested in BMP installation.	November	3 and 4	Dunn County LCD Area and State UWEX	Handouts: $50
Project placemats Distribute project placemats developed by UWEX to project area schools, lodges, and cafes.	May 1997	1 and 2	Dunn County LCD St. Croix County LCD State UWEX	Costs: $0 (Covered by state funds)
Newsletter Mailed three times annually.	March Sept. Jan.	All	Dunn County LCD Area and State UWEX	Postage: $1,017 (3 X 1,500 X 22.6¢ each) Photo supplies: $200
MASS MEDIA				
News releases Issued when newsworthy items occur. Target of 6 per year.	On-going	All	Dunn County LCD St. Croix County LCD	N/C
TOTALS				**$ 4,662**

Programs: CVTC = Chippewa Valley Technical College, DNR = Department of Natural Resources, LCD = Land Conservation Department, NPM = Nutrient and Pesticide Management Program, UWEX = UW - Extension, WAV = Water Action Volunteers Program

CHAPTER SEVEN
Project Evaluation

This chapter briefly summarizes the plan for monitoring the progress and evaluating the effectiveness of the South Fork of the Hay River Priority Watershed Project. The evaluation strategy includes these components:

- Pilot Review
- Administrative review
- Pollution reduction evaluation
- Watershed Resource Evaluation Monitoring

Pilot Review

An administrative evaluation will be conducted prior to the fourth year of the "pilot" program to determine the usefulness of attempting to extend the pilot through its originally intended full timeline, through December 2005. This evaluation will be conducted jointly by DNR and Dunn and St. Croix County LCDs and will consist of a mutually agreeable set of criteria to evaluate the mid-term success of the pilot. Components would include number of landowners participating, dollars expended and pollutant load reduction estimates. These and other components would be evaluated for progress based on how well the pilot was expected to perform and how effective it would be if it were extended. The DNR will then report to the Legislature in winter 2000-2001 on the status of the pilot and the desire to seek further action to extend the project.

Final Evaluation

Information on the next two components will be collected by the Dunn and St. Croix County LCD and reported on a regular basis to the DNR and the DATCP. The project team will meet early in the year throughout the implementation phase to review and evaluate the accomplishments of the preceding year. Additional information on the numbers and types of practices on cost-share agreements, funds encumbered on cost-share agreements, and funds expended will be provided by the DNR's Bureau of Community Finance. The Watershed Resource Evaluation Monitoring follows guidance established by DNR's Bureau of Watershed Management to select and monitor specific sites in the watershed to monitor resource quality changes.

A **final report** will be prepared for the South Fork of the Hay River Priority Watershed Project within 18 months of the end of the project or the Nonpoint Source Grant period. This report will include information on landowner participation, project management, grant management, technical assistance, and any Signs of Success sites completed within the watershed among other topics. It is developed to evaluate progress, provide documentation on attainment of water quality and pollutant load reduction objectives, evaluate BMP effectiveness, and provide recommendations on key areas needing improvement in the NPS program. The county LCDs may be asked to prepare the final report with assistance from the DNR and DATCP.

Administrative Review

The administrative review, will focus on the progress of the county LCDs and other units of government in implementing the project. The project will be evaluated with respect to accomplishments, financial expenditures, and staff time spent on project activities.

Accomplishment Reporting

The county LCDs will provide the following data to the DNR and the DATCP annually:

- Planned and completed BMPs
- Planned and completed conservation systems
- Major information and education activities undertaken

Accomplishment data are used in summaries in the "Annual Accomplishment Report" for the watershed program prepared by the county LCDs, and are also discussed at watershed review meetings held annually for projects in implementation. Additional evaluation data provided by the county LCDs for the annual watershed review include:

- Pollutant load reductions (described later in this chapter)
- Status of grants and related financial activities
- Evaluation of landowner participation
- Status of project administration including data management, staff training, and BMP monitoring
- Status of nutrient management planning, and easement acquisition and development
- Effectiveness of construction site erosion control activities
- Status of stormwater management activities for new development controlled by the local units of government.

Likewise, participating local units of government implementing the urban nonpoint source management program meet periodically with DNR staff to review progress. The DNR and

local units of government will jointly evaluate the urban implementation program. Requested information of urban governmental units will include:

- Information and education activities
- Implementation of urban "housekeeping" program activities
- Storm water management ordinance provisions adopted
- Stormwater mangement planning activities

Details of the reporting requirements are contained in DNR publication WR-223-94, which is reviewed every two years by DATCP and DNR and revised as necessary.

The Field Offices Computing System (FOCS) is a computer data management system that has been developed by the U.S. Natural Resources Conservation Service (NRCS). NRCS, DNR and DATCP use FOCS to meet the accomplishment reporting requirements of all three agencies. The county LCDs can use FOCS to collect data for administrative accomplishments, and can provide the information to the DNR and the DATCP for program evaluation.

Financial Expenditures

The county LCDs and other participating units of government will provide the following financial data to DNR and the DATCP annually or more frequently depending on the needs of DNR grant managers:

- Number of landowner reimbursement payments made for the installation of best management practices (BMPs), and the amount of money paid
- Staff travel expenditures
- Information and education expenditures
- Expenditures for equipment, materials, and supplies
- Expenditures for professional services and staff support costs
- Total project expenditures for the county staff
- Amount of money paid for installation of BMPs, and money encumbered in cost-share agreements

The county LCDs and other participating units of government will also provide the DNR with the following financial data on or before April 15 of each year.

- Staff training expenditures
- Interest money earned and expended
- Total budget and expenditures on the project

Time Spent On Project Activities

The county LCDs and other participating governmental units with Local Assistance Grants will provide time summaries to both departments for the following activities on an annual basis:

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

Annual evaluation activities will be used to make decisions about projects with regard to funding and time periods of grants. NR 120.28 includes the various actions available to DNR for making project adjustments that are needed to correct deficiencies.

Nonpoint Source Pollutant Load Reduction

The purpose of the next evaluation component, pollutant load reduction, is to estimate reductions in nonpoint source pollutants as a result of installing BMPs. Key sources were identified for estimating changes in pollutant loads that reach surface waters in the South Fork of the Hay River Watershed. Data collected for evaluation include sediment load reduction from uplands; phosphorus load reductions from barnyards; reduced sediment loads from work on streambanks and gullies; reduced winter spreading of manure; and streambank (habitat) protection. Chapters Two and Three of this plan describes target pollutant reductions for each of the subwatersheds.

Cropland Sources

County LCDs can use the WINHUSLE computer model to estimate sediment reductions due to changes in cropping practices. The county LCDs will use FOCS to provide data for the WINHUSLE model on an annual basis, as described earlier in this chapter. These reports can also be developed for each cost-share agreement and used to document eligibility and changes to sediment delivery. Alternative methods for documenting eligibility and pollutant load reductions must be approved by DNR.

Streambank Sources

County LCDs staff will report reductions in streambank sediment erosion from planned BMPs. The FOCS system is capable of tracking these reductions and would provide the advantage of tracking the reductions continually.

Barnyard Runoff

County LCDs will use the BARNY model to estimate phosphorus reductions due to the installation of barnyard control practices. The LCDs can report the information to the DNR through FOCS. In the event that FOCS is not used, a replacement system will be used for project tracking.

Urban Areas

Municipal entities in the project that receive grants will be required to report annual progress on the activities funded under the grant. These reports can be written narratives or summaries of activities.

Water Resource Evaluation Monitoring

Limited funds and the intensive staffing needed to properly evaluate water quality changes prohibits monitoring each watershed individually. Instead, two types of evaluation monitoring are being conducted on a state-wide basis: Whole Stream Monitoring and Signs of Success. The goal of the evaluation monitoring activities is to determine the progress the DNR's Runoff Management Program is making towards improving the quality of Wisconsin's water resources. Evaluation monitoring activities were developed to answer five questions about the water resource objectives and the pollution reduction goals:

1. Do the levels and types of BMPs recommended in the watershed plans achieve the water resource objectives?
2. Do the types and levels of BMPs recommended in the watershed plans achieve the pollutant reduction goals?
3. Does any level of practice installation below 100 percent achieve the water resource objectives or the pollutant reduction goals?
4. Do we need to adjust the pollutant load reduction goals to achieve the water resource objectives?
5. Can we use simple environmental indicators in many of the watershed projects to provide some early evidence that the practices might achieve the water resource objectives and pollutant reduction goals?

A team of experts from state and federal agencies, and the University of Wisconsin was formed to develop and direct the evaluation monitoring activities at the Whole Stream Monitoring and Signs of Success sites.

Whole Stream Monitoring Sites

Criteria were developed to select and monitor 12 streams around the state. The stream sites represent the five major types of fishery found in agricultural and urban parts of priority watersheds, and they also represent three of the five ecoregions in the state. The five fishery types are: high gradient cold water sport fishery, high gradient warm water sport fishery, high gradient warm water forage fishery, low gradient warm water forage fishery, and low gradient cold water sport fishery. A storm sewer outfall is also being monitored. The three ecoregion types represented are the Southeastern Wisconsin till plains, the Driftless area, and the North Central Hardwood Forest.

All but one of the stream sites drains a small area (about 10 square miles or less). The schedule involves two years of monitoring before any BMPs are installed, five years of monitoring during the practice installation phase, two years of monitoring during the response period, and two years of monitoring during the post-practice installation phase, for a total of 11 years of monitoring.

State-of-the-art chemical and physical monitoring is being done at all the stream sites. State-of-the-art biological monitoring will be done at eight of the 12 streams. Results of the monitoring will be used to determine how well the BMPs allowable through the program achieve the pollution reduction goals and objectives. Improving the fish community is the most important water resource objective for all the streams.

A total of about $8,360,000 is needed for the stream monitoring, if the work is carried out over a period of 11 years. The success of the evaluation monitoring activities depends on the installation of all the BMPs at the Whole Stream Monitoring Sites.

Signs of Success

Signs of Success (SOS) is a less expensive, less intense, short-term monitoring designed to provide some early evidence that better land management does make a difference. One site is being sought for each watershed project. Signs of Success will focus on one practice such as barnyard runoff controls, manure storage, or streambank fencing that is expected to have an early effect on the adjacent stream.

Monitoring will take place over a two-year period--the year before and the year after a practice is installed. Positive improvements are expected at those sites where implementation has occurred. Habitat sampling and photographs will be used to indicate the benefit of the practice. Limited chemical monitoring, macroinvertebrate, and fish sampling will be done at some sites.

The results of the Signs of Success monitoring will be featured in educational materials such as watershed newsletters and newspapers and the statewide newsletter "Fields and Streets."

SOS sites for South Fork of the Hay River Watershed are still being identified and will be established shortly after the implementation stage begins. County LCDs staff will be asked to help identify potential SOS sites during implementation of the project.

APPENDIX A
Program Purpose and Legal Status

Wisconsin Nonpoint Source Water Pollution Abatement Program

The state Legislature created the Wisconsin Nonpoint Source Water Pollution Abatement Program in 1978. The goal of the Program is to improve and protect the water quality of streams, lakes, wetlands, and groundwater by reducing pollutants from urban and rural nonpoint sources. The 191-square-mile South Fork of the Hay River Watershed, located in Dunn, St. Croix, Barron and Polk counties, was designated a "priority watershed" in 1993 and began planning in 1994. The primary objective of this project is to reduce nonpoint source pollution loads and to enhance and protect the water quality of the streams, groundwater and lakes within the South Fork of the Hay River Watershed. At the same time, an objective is to reduce the nonpoint source pollution loads flowing out of the South Fork of the Hay system into the main stem of the Hay River and eventually to Tainter Lake. The South Fork of the Hay River is part of the larger Lower Chippewa River Basin.

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

The following is an overview of the Nonpoint Source (NPS) Priority Watershed program.

- The DNR administers the program in cooperation with DATCP. Wisconsin is divided into 333 discrete hydrologic units called watersheds. These watersheds are assessed for water quality concerns as part of a comprehensive basin planning program. Watersheds with a high degree of water quality impairment from nonpoint sources of pollution become eligible for consideration as a priority watershed project. Currently, there are 150 large-scale equivalent watersheds (one large-scale could be equal to 2 small scale or 2 lake projects) eligible for "priority" designation. A total of 22 watersheds (large and small-scale) are completed, and 64 are underway in either the planning or implementation phase. Designation as a priority watershed project enables special financial support to local governments and private landowners in the watershed to reduce nonpoint source pollution.

- A priority watershed project is guided by a plan such as this one, prepared cooperatively by the DNR, DATCP and local units of government, with

assistance and comments from a local citizen's advisory committee. Project staff evaluate the conditions of surface water and groundwater, and inventory the types of land use and nonpoint sources of pollution throughout the watershed. The priority watershed plan assesses nonpoint and other sources of water pollution and identifies best management practices (BMPs) needed to control pollutants to meet specific water resource objectives. The plan guides implementation of these practices in an effort to improve water quality.

- Upon approval by state and local authorities, local units of government implement the plan. In this case, the plan will be implemented by the counties' Land Conservation Department staff. Water quality improvement is achieved through voluntary implementation of nonpoint source controls (BMPs) and the adoption of ordinances. Landowners, land renters, counties, cities, villages, towns, sanitary districts, lake districts, and regional planning commissions are eligible to participate.

- Technical assistance is provided to aid in the design of BMPs. State level cost-share assistance is available to help offset the cost of installing these practices. Eligible landowners and local units of government are contacted by the local staff to determine their interest in installing the BMPs identified in the plan. Signed cost-share agreements list the practices, costs, cost-share amounts and a schedule to install management practices. Municipal governments are also assisted in developing and installing BMPs to reduce urban pollutants.

- Informational and educational activities are developed to encourage participation and change behavior to be positive for water resources.

- The DNR and DATCP review the progress of the counties and other implementing units of government, and provide assistance throughout the ten-year project. The DNR monitors improvements in water quality resulting from control of nonpoint sources in the watershed.

Legal Status of the Nonpoint Source Control Plan

The South Fork of the Hay River Priority Watershed Plan was prepared under the authority of the Wisconsin Nonpoint Source Water Pollution Abatement Program described in Section 281 of the Wisconsin Statutes and Chapter NR 120 of the Wisconsin Administrative Code. It was prepared through the cooperative efforts of the DNR, DATCP, the Land Conservation Departments (LCDs) for Dunn and St. Croix counties, NRCS, and the South Fork of the Hay River Watershed Citizens Advisory Committee.

This watershed plan is the basis for the DNR to enter into cost-share and local assistance grants with agencies responsible for project implementation and will be used as a guide to

implement measures to achieve desired water quality conditions. If a discrepancy occurs between this plan and the statutes or the administrative rules, or if statutes or rules change during implementation, the statutes and rules will supersede the plan. This watershed plan does not in any way preclude the use by local, state or federal governments of normal regulatory procedures developed to protect the environment. All local, state and federal permit procedures must be followed. In addition, this plan does not preclude the DNR from using its authority under chapters 283 and 281 of the state statutes to regulate significant nonpoint pollution sources in the project area.

This priority watershed plan was approved by DNR following approvals by the state Land and Water Conservation Board, the County Boards of Dunn, St. Croix, Barron and Polk counties, and the South Fork of the Hay River Citizens Advisory Committee.

Amendments to the Plan

This plan is subject to the amendment process under NR 120.08(4) for substantive changes. The Department of Natural Resources will make the determination with the local sponsors if a proposed change will require a formal plan amendment.

The Nonpoint Source Control Plan and the Stormwater Discharge Permit Program

Wisconsin's Pollution Discharge Elimination System (WPDES) Storm Water Permit Program is administered by DNR's Bureau of Wastewater Management under Chapter 147 of the Wisconsin Statutes. This program is separate from the Runoff Management program and applies to certain classes of dischargers statewide as identified in NR 216. In cases where the programs do overlap, implementation grants may only apply to activities identified in the watershed plan. Practices to control construction site erosion and storm water runoff from new development are not eligible for cost sharing. In industrial areas, cost sharing is available as specified in NR 120.17 — only in the non-industrial parts of facilities where a problem has also been identified in the priority watershed plan.

Project Planning and Implementation Phases

Planning Phase

The planning phase of the South Fork of the Hay River project began in 1994. The following information gathering and evaluation activities were completed during this stage:

- Determine the conditions and uses of groundwater, streams, and lakes.
- Inventory types of land uses and severity of nonpoint sources affecting groundwater, streams and lakes.

- Evaluate the types and severity of other factors which may be affecting water quality. Examples include discharges from municipal wastewater treatment plants and natural or endemic stream conditions. (This has been completed through the continual integrated resource management planning efforts in the Lower Chippewa River Basin.)

- Determine nonpoint source controls and other measures necessary to improve and/or protect water quality.

- Prepare and gain approval of a program for local implementation of the project so that plan recommendations would be carried out.

Implementation Phase

The implementation phase of the South Fork of the Hay River Priority Watershed Project began following review of the draft priority watershed plan, a public hearing, and approval by the South Fork of the Hay River Watershed Citizens Advisory Committee, DNR, LWCB, and the Board of Supervisors for Dunn, St. Croix, Barron and Polk counties. Public review during plan development occurred primarily through the efforts of the South Fork of the Hay River Citizen Advisory Committee and the Land Conservation Committees from St. Croix and Dunn counties.

During the implementation phase:

- DNR enters into local assistance agreements with local units of government that have implementation responsibilities identified in the plan. These agreements provide funds necessary to maintain the resources and staff required for plan implementation.

- In the rural portions of the watershed, the Dunn and St. Croix County LCDs contacted eligible landowners to determine their interest in installing best management practices identified in the plan.

  In the urban portions of the watershed, the DNR or its designee contacts local units of government to discuss in detail the required actions for implementing the plan recommendations.

- In rural areas, the landowner signs a cost-share agreement with the county outlining the practices, costs, cost-share amounts and a schedule for installation of management practices. Practices are scheduled for installation after an agreement is signed. Practices must be maintained for at least 10 years. Easements must be for a period of at least 20 years, and are usually perpetual.

  In urban areas, similar processes are used. In some cases, the local units of government and the DNR sign agreements for urban practices. In other cases the agreements will be between local units of government and their private landowners.

APPENDIX B
Water Resources Appraisal Monitoring Methods

Monitoring activities for the water resource appraisal were initiated in March 1994 and completed in October 1994. Following is a summary of methods used to collect information for the appraisal.

Macroinvertebrates

Aquatic macroinvertebrates were collected at 12 sites in the watershed, generally near stream mouths, during Spring 1994 (Fig. 2). Samples were collected with a D-frame net using methods outlined in Hilsenhoff (1977 and 1982). The samples were preserved in 70% ethanol and sent to UW-Stevens Point for sorting and identification. Results were reported using the Hilsenhoff Biotic Index (HBI) which indicates water quality condition based on the macroinvertebrates as an indicator of the relative measure of organic loading to a stream. The HBI rating system ranges from 0 (excellent) to 10 (very poor).

Fish Surveys

Electrofishing surveys were conducted during summer 1994 at 107 sites on 25 streams in the watershed (Fig. 2). Surveys were conducted at approximately one site per mile of permanent stream (approximately 20% of the total stream miles). Single-run electrofishing surveys were conducted on a 900 ft. reach at each site to inventory the sport fishery. Within the reach, all fish species were identified and counted on a 300 ft. portion of the total reach to determine the stream Index of Biotic Integrity (IBI) (Lyons, et. al. 1994). The IBI provides a relative measure of the streams' ability to support and maintain a balanced and healthy fish community. The IBI indicates fish assemblages for assessing biotic integrity and environmental health in warmwater streams based on fish habitat and communities present.
The IBI rating ranges from 0 (very poor) to 100 (excellent).

Fish were collected using either an AbP-3 backpack shocker or a 230 volt D.C. generator-type stream shocker, depending on stream size. All fish collected were identified to species and counted, and all trout were measured to the nearest 0.1 inch.

Habitat Assessment

Habitat assessments were conducted at each fish survey site on stream reach lengths that were 35 times the MSW (Mean Stream Width) according to methods outlined in Simonson et al.

(1994). The assessments included measurement of streamflow, width, depth, substrate composition and streambank characteristics. A fish habitat rating was determined for each site according to Simonson, et al. (1994). A habitat rating indicates the relative quality and quantity of aquatic life habitat in the stream.

Temperature and Dissolved Oxygen

Maximum/minimum thermometers were placed in streams at each of the fish survey sites to measure temperature extremes during summer conditions. The thermometers were deployed for one week at each site during the fish surveys. In addition, RYAN TempMentor recording thermometers were placed in streams at six sites in the watershed. The recording thermometers measured and recorded stream temperatures on a 30-minute interval between June and September 1994.

Hourly stream dissolved oxygen and temperature was monitored during 4-12 day periods at 4 sites during July - August 1994. Streams were monitored using a YSI D.O. and temperature meter connected to a LICOR datalogger.

Lake Surveys

Water quality monitoring and a macrophyte survey was conducted on Glen Lake during 1994. Lake water quality monitoring followed the DNR lake trend monitoring protocol as outlined in Appendix A. The macrophyte survey was conducted during peak biomass in August 1994, using the Jenssen and Lound (1962) line-intercept rake sampling method.

Bi-weekly bacteriological samples were collected from the Glen Lake swimming beach by county park staff from June through September 1994. Samples were shipped with ice to the State Laboratory of Hygiene (SLOH) for fecal coliform and fecal streptococcus analysis.

APPENDIX C
Interim Best Management Practices

Interim best management practices (BMPs) are created to meet the specific and individual needs identified during the planning process of a priority watershed project and will be used on a trial basis. The practice will be evaluated for its effectiveness before consideration as a standard BMP. A procedure for interim BMP approval is detailed within the "Implementation Handbook" from the Runoff Management Program, DNR.

Vegetated Riparian Buffer

Definition

Riparian buffers are permanently vegetated (not cropped) areas immediately adjacent to intermittent or perennial streams that are designed and constructed to function as a filter to delay, absorb, or purify contaminated runoff before it enters watershed streams and lakes.

Purpose

The predominant sources of nonpoint source (runoff) pollutants in the South Fork of the Hay River Watershed originate on croplands in the forms of excess phosphorus, nitrogen and sediment. Establishing vegetated buffer strips will provide significant protection to the water resource and increase the likelihood of achieving the water resource objectives identified in this plan.

This practice is primarily an informational and educational tool to promote water quality awareness, with the intent of providing watershed participants with a feasible management option that will reduce nonpoint source pollutant runoff to surface waters.

All watershed participants will also be eligible for an NPS corridor easement acquisition where the establishment of a vegetated riparian buffers is determined necessary to meet water resource objectives.

Eligibility

1. To be eligible for an annual payment, the establishment of a 35-foot-wide buffer strip will be required as a minimum, although a 66-foot-wide buffer is preferred. This buffer

width will be further defined on a case-by-case basis, using the formula developed and revised for the Branch River Watershed project, pending DNR approval.

- All perennial and intermittent streams delineated on the USGS 7.5-minute quadrangle maps are eligible for the vegetated riparian buffer establishment. Approval from the DNR West Central Regional (or Lower Chippewa River Basin) watershed coordinator will be required to establish eligibility for streams not delineated on a USGS map.

- The measurable width of a buffer begins at the centerline of an intermittent stream, and the edge of bank of a perennial stream (ordinary high-water mark).

- Vegetated buffer widths may be extended to cover floodplain areas to meet nonpoint source program objectives. Approval from the DNR West Central Regional (or Lower Chippewa River Basin) watershed coordinator will be required for proposed buffer areas that exceed 66 feet wide.

2. At a minimum, buffers must be maintained in permanent hay land or an NRCS-approved perennial grass mixture for 10 years from the installation date of the final practice listed on the cost-share agreement.

   - Dunn and St. Croix County LCD staff may pursue establishing a county buffer ordinance which could require longer maintenance times beyond the operation and maintenance period requirements of the priority watershed plan.

3. The mowing and removal of grasses that were established through the nonpoint source program for the specific intent of providing a vegetated buffer will be allowed between July 15 and September 1 of each year to maintain grasses.

   - Permanent hay land established at the expense of the landowner may be harvested for forage prior to September 1 of each year during the growing season.

   - Soil disturbance within the established buffer area during the reseeding shall be held to a minimum. When soil disturbance becomes necessary due to streambank or gully repair, the appropriate action(s) shall be taken to limit the disturbance and protect all exposed areas.

4. Wildlife and environmental consideration must be given when designing this practice.

5. A cost-share agreement must be signed by the landowner and the granting agency.

6. Cost-share eligibility for establishment of vegetated riparian buffers is dependent on the cost effectiveness and ability to produce a sheet flow (laminar) condition throughout the width of the buffer.

7. Before a landowner is to receive an annual payment, the sediment delivery rate of fields immediately adjacent to the proposed vegetated riparian buffer shall be planned down to the tolerable soil loss ("T").

8. Installation of the vegetated riparian buffer must be verified by county staff before the initial payment to the landowner can be made.

9. Buffer strip boundaries shall be delineated in an identifiable manner. Acceptable methods would be fencing or sign placement every 100 feet, or other DNR approved methods.

10. As a minimum, a status review of established buffers shall be conducted by the county LCD staff every 3 years. If a riparian buffer is rendered ineffective due to circumstances beyond the cost-share recipients control during the grant period, the local unit of government may amend the cost-share agreement to make the necessary repairs.

    While conducting a status review of a riparian buffer, the county LCD staff shall inspect for the following conditions:

    - encroachment within the delineated boundary.
    - the presence of rills or gullies.
    - sparse vegetative cover or the presence of invasive species.
    - buffer degradation due to cattle or machinery access.

11. Outstanding flat-rate payments for the vegetated riparian buffer practice will be taken into account during the easement appraisal process for those landowners interested selling a NPS corridor easement.

Cost Sharing Authorization

Cost sharing is authorized for the following rates, conditions and practices associated with establishing riparian vegetated buffer strips.

1. At a rate of 70 percent for the grading and shaping of the buffer area to eliminate concentrated flow.

2. At a rate of 70 percent for permanent fencing or boundary delineation.

3. At a rate of 70 percent for the planting of trees or an NRCS-approved perennial grass mixture.

4. At a flat rate of $100/acre/year for a maximum of 5 years for buffers planted to an NRCS-approved perennial grass mixture that does not contain reed canary grass.

No Cost Sharing Authorization

Cost sharing is NOT authorized for the following situations.

1. Areas with pre-established vegetated buffers that meet the requirements listed under condition number 1 under "Eligibility."

2. The establishment of buffer areas for, or in conjunction with, another program such as the federal Conservation Reserve Program (CRP) or "set-aside" acreage.

3. The establishment of vegetated buffers in areas in which the landowner or operator will allow livestock access.

4. Sites where there is no direct benefit to protecting the surface water resources.

Sediment and Phosphorus Load Reduction Credit

Establishment of vegetative riparian buffers that comply with the conditions mentioned here can be credited at a sediment and phosphorus removal rate agreeable to DNR. Due to varying soils and site conditions, the established and agreed upon removal credits and conditions will only apply in the South Fork of the Hay River Watershed project.

Cropland within 300 feet of a vegetated riparian buffer that has a slope greater than 10 percent is not eligible for a sediment and phosphorus reduction credit.

Sediment and phosphorus removal credits for vegetative riparian buffer strips of 35 to 66 feet wide is limited to drainage areas of 1,750 feet or less, measured perpendicular to the buffer.

APPENDIX D
Glossary

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

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

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

AMMONIA:
A form of nitrogen (NH_3) found in human and manures. Ammonia can be toxic to aquatic life.

ANAEROBIC:
Without oxygen.

AREA OF CONCERN:
Areas of the Great Lakes identified by the International Joint Commission (IJC) as having serious water pollution problems. There are no areas of concern designated in the Pensaukee River Watershed as of this publication.

AREAWIDE WATER QUALITY MANAGEMENT PLANS (BASIN PLANS):
A plan to document water quality conditions in a drainage basin and make recommendations to protect and improve basin water quality. Each basin in Wisconsin must have a plan prepared for it, according to section 208 of the Clean Water Act.

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

AVAILABILITY:

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

BACTERIA:

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

BARNY:

The Wisconsin Barnyard runoff model, a computer model used to assess the water quality impacts of barnyards or feedlots. It was developed by DNR with assistance from NRCS and DATCP.

BASIN PLAN:

See "Areawide Water Quality Management Plan."

BENTHIC ORGANISMS (BENTHOS):

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

BEST MANAGEMENT PRACTICE (BMP):

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

BIOACCUMULATION:

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

BIOASSAY STUDY:

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

BIOCHEMICAL OXYGEN DEMAND (BOD):

A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. BOD_5 is the biochemical oxygen demand measured in a five day test. The greater the degree of pollution, the higher the BOD_5.

BIODEGRADABLE:

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

BIOTA:
All living organisms that exist in an area.

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

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

CARCINOGENIC:
A chemical capable of causing cancer.

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

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

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

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

CLEAN WATER ACT:
See "Public Law 92-500."

COMBINED SEWERS:
A wastewater collection system that carries both sanitary sewage and stormwater runoff. During dry weather, combined sewers carry only wastewater to the treatment plant. During heavy rainfall, the sewer becomes swollen with stormwater. Because the treatment plant

cannot process the excess flow, untreated sewage is discharged to the plant's receiving waters, i.e., combined sewer outflow.

CONFINED DISPOSAL FACILITY (CDF):
A structure built to contain and dispose of dredged material.

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

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

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

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

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

COST-EFFECTIVE:
A level of treatment or management with the greatest incremental benefit for the money spent.

CRITERIA:
See water quality standard criteria.

CRITICAL SITE:
A major source of polluted runoff in a watershed project for which best management practices are available but not currently being used. The watershed plan contains the description and the means of identifying critical sites for different pollution sources. Critical sites are so important to the overall success of the priority watershed project that the state has been given authority to require site owners to install and/or use BMPs at identified critical sites.

DIOXIN (2,3,7,8-tetrachlorodibenso-p-dioxin):
A chlorinated organic chemical which is highly toxic.

DISINFECTION:

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

DISSOLVED OXYGEN (DO):

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

DISTRICTS:

DNR field offices, now called "regions" with the DNR's recent reorganization. There are five DNR administrative regions in the state (see inside back cover for map). The Pensaukee River Watershed area is located entirely in the DNR's Northeast Region.

DREDGING:

Removal of sediment from the bottom of water bodies.

ECOSYSTEM:

The interacting system of biological community and its nonliving surrounding.

EFFLUENT:

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

EFFLUENT LIMITS:

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

EMISSION:

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

ENVIRONMENTAL PROTECTION AGENCY (USEPA):

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

ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP):

Formerly ACP, EQIP is a federal cost-sharing program to help landowners install measures to conserve soil and water resources. EQIP is administered by the USDA-NRCS through county committees.

ENVIRONMENTAL REPAIR FUND:

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

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

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

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

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

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

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

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

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

GREEN STRIPS:
See buffer strip.

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

HABITAT:

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

HEAVY METALS:

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

HERBICIDE:

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

INFLUENT:

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

IN-PLACE POLLUTION:

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

ISOROPYLBIPHENYL:

A chemical compound used as a substitute for PCB.

LANDFILL:

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

LEACHATE:

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

LOAD:

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

MACROPHYTE:

A rooted aquatic plant.

MASS:

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

MASS BALANCE:

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

MESOTROPHIC:

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

MILLIGRAMS PER LITER (mg/1):

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

MITIGATION:

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

MIXING ZONE:

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

NONPOINT SOURCE POLLUTION (NPS):

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

OLIGOTROPHIC:

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

OUTFALL:

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

PATHOGEN:

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

PELAGIC:
Referring to open water portion of a lake.

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

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

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

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

PLANKTON:
Tiny plants and animals that live in water.

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

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

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

POLYCHLORINATED ORGANIC COMPOUNDS:
A group of toxic chemicals which contain several chlorine atoms.

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

PRIORITY POLLUTANT:

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

PRIORITY WATERSHED:

A drainage area roughly between 100,000 and 200,000 acres selected to receive state money to help pay the cost of controlling nonpoint source pollution. Because money is limited, only watersheds where problems are critical, control is practical, and cooperation is likely are selected for funding.

PRODUCTIVITY:

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

PUBLIC LAW 92-500 (CLEAN WATER ACT):

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

PUBLIC PARTICIPATION:

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

PUBLICLY OWNED TREATMENT WORKS (POTW):

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

RECYCLING:

The process that transforms waste materials into new products.

REGIONS:

DNR field offices. There are five DNR administrative regions in the state (see inside back cover for map). The Pensaukee River Watershed area is located entirely in the DNR's Northeast Region. DNR regions were formerly called "districts" before 1997.

REMEDIAL ACTION PLAN (RAP):

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

REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RF/FS):

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

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 (RCRA):
This federal law amends the Solid Waste Disposal Act of 1965 and expands on the Resource Recovery Act of 1970 to provide a program that regulates hazardous wastes, to eliminate open dumping and to promote solid waste management programs.

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

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

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

RULE:
Refers to Wisconsin administrative rules. See Wisconsin Administrative Code.

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

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

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

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

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

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

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

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

STANDARDS:
See water quality standards.

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

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

SUSPENDED SOLIDS (SS):
Small particles of solid pollutants suspended in water.

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

TERTIARY TREATMENT:
See advanced wastewater treatment.

TOP-DOWN MANAGEMENT:
A management theory that uses biomanipulation, specifically the stocking of predator species of fish to improve water quality.

TOTAL MAXIMUM DAILY LOADS:
The maximum amount of a pollutant that can be discharged into a stream without causing a violation of water quality standards.

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

TOXIC SUBSTANCE:
A chemical or mixture of chemicals which, through sufficient exposure, or ingestion, inhalation of assimilation by an organism, either directly from the environment or indirectly by ingestion through the food chain, will, on the basis of available information

cause death, disease, behavioral or immunologic abnormalities, cancer, genetic mutations, or development of physiological malfunctions, including malfunctions in reproduction or physical deformations, in organisms or their offspring.

TOXICANT:
See toxic substance.

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

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

TREATMENT PLANT:
See wastewater treatment plant.

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

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

UNIFORM DWELLING CODE:
A statewide building code for communities larger than 2500 residents specifying requirements for electrical, heating, ventilation, fire, structural, plumbing, construction site erosion, and other construction related practices.

UNIVERSITY OF WISCONSIN-EXTENSION (UWEX):
A special outreach, education branch of the state university system.

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

VOLATILE:
Any substance that evaporates at a low temperature.

WASTELOAD ALLOCATION:

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

WASTEWATER:

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

WASTE:

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

WASTEWATER TREATMENT PLANT:

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

WATER QUALITY AGREEMENT:

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

WATER QUALITY LIMITED SEGMENT:

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

WATER QUALITY CRITERIA:

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

WATER QUALITY STANDARDS:

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

WATER QUALITY STANDARD VARIANCE:

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

WATERSHED:

The land area that drains into a lake or river.

WETLANDS:

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

WINHUSLE:

A computer model for evaluating sediment delivery to suface waters from agricultural lands. It was developed by DNR with assistance from NRCS.

WISCONSIN ADMINISTRATIVE CODE:

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

WISCONSIN FUND:

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

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

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

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

WISCONSIN NONPOINT SOURCE WATER POLLUTION ABATEMENT GRANT PROGRAM:

A state cost-share program established by the state Legislature in 1978 to help pay the costs of controlling nonpoint source pollution. Also known as the nonpoint source element of the Wisconsin Fund or the Priority Watershed Program. It may also be referred to under its new name (as of DNR reorganization, effective January 1997), called the Runoff Management Practices program.

WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES):

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