Nonpoint Source Control Plan for the Arrowhead River, Rat River and Daggets Creek Priority Watershed Project



Arrowhead River

PROJECT SUMMARY

This Plan was prepared under the provisions of the Wisconsin Nonpoint Source Water Pollution Abatement Program by the Wisconsin Department of Natural Resources, the Department of Agriculture, Trade and Consumer Protection, and the Land Conservation Departments of Outagamie and Winnebago counties.

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The Wisconsin Nonpoint Source Water Pollution Abatement Program

July 1993

This Plan Was Cooperatively Prepared By:

The Wisconsin Department of Natural Resources and The Department of Agriculture, Trade and Consumer Protection

In cooperation with:

The Arrowhead River, Rat River & Daggets Creek Watershed Citizens Advisory Committee
Outagamie County Land Conservation Department
Winnebago County Land and Water Conservation Department

Publication PUBL-WR-330-93

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The Wisconsin 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 Water Quality Act.

Watershed Plan Acknowledgements

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SUMMARY

Introduction

This priority watershed project plan assesses the nonpoint sources of pollution in the Arrowhead River, Rat River and Daggets Creek watershed and guides the implementation of nonpoint source control measures. These control measures are needed to meet water resource objectives for the three river systems which are all tributary to Lakes Poygan, Winneconne, and Butte des Morts. Nonpoint sources of pollutants most commonly found in this watershed include:

- sediment from eroding croplands and gullies
- polluted runoff from barnyards and feedlots
- sediment from eroding streambanks and shorelines
- nutrients and pesticides from cropland runoff

The purpose of this project is to reduce the amount of pollutants from nonpoint sources that reach surface water and groundwater within the Arrowhead River, Rat River & Daggets Creek Priority Watershed Project area. This watershed is one of eleven watersheds identified in the Lower Green Bay Remedial Action Plan as contributing significant amounts of pollutants from nonpoint sources to the waters of the Winnebago system, the Fox River, and Lower Green Bay. Similarly, the Winnebago Comprehensive Management Plan identified this watershed area as a major contributor of nonpoint source pollutants. This watershed plan will allow the recommendations and needs identified in these two other documents to be implemented.

The DNR selected the Arrowhead River, Rat River and Daggets Creek watershed as a priority watershed project through the Wisconsin Nonpoint Source Water Pollution Abatement Program in the fall of 1990. It joined over 50 similar watershed projects statewide in which nonpoint source control measures are being planned and implemented. The plan was prepared by the Wisconsin Department of Natural Resources (DNR), the Department of Agriculture, Trade, and Consumer Protection (DATCP), the Outagamie County Land Conservation Department (LCD), and the Winnebago County Land and Water Conservation Department (LWCD), with assistance from the University of Wisconsin-Extension and the USDA Soil Conservation Service (SCS).

The project is administered on the state level by the DNR and DATCP. The Outagamie County LCD and Winnebago County LWCD administer and implement the project locally

with assistance from the UW-Extension and the SCS. Participation in the program by landowners is voluntary. However, all participants must follow the requirements of the program's administrative rules (NR 120) and the Nonpoint Source Control Plan (summarized by this document).

General Watershed Characteristics

The Arrowhead River, Rat River and Daggets Creek Watershed covers approximately 131 square miles or 84,200 acres in Winnebago and Outagamie counties. The watershed project is bounded on the north by Bear Creek and Black Otter Lake watersheds, to the east by Mud Creek and Neenah Slough watersheds, and to the west by the Wolf River.

The east half of the Village of Winneconne is the only incorporated community in the watershed. Allenville, Butte des Morts, Dale, Larsen, Medina, and Winchester are the unincorporated communities within the watershed. Public lands within the watershed include the 4042 acre Rat River State Wildlife Area and a portion of the Wolf River State Wildlife Area.

The watershed is nearly level or gently sloping with land use being primarily agricultural as shown in table S-1. Dairy farming is the predominant land use at the present time. Cash grain farming is increasing in the watershed with corn and soybeans being the principal crops. Potential construction site erosion from rural residential development is becoming an area of increasing concern for water quality.

Table S-1. Land Use in the Arrowhead River, Rat River and Daggets Creek Watershed				
Land Use	Acres	Percent		
Cropland	43,030	51%		
Developed Land	5,686	7%		
Grassland	7,122	8%		
Woodlot	11,184	13%		
Wetland	17,142	20%		
Watershed Totals	84,164	100%		

Water Quality and Water Resource Objectives

This watershed is divided into seven smaller drainage areas, called subwatersheds. They are the: Lower Rat River, Dale Swamp, Upper Rat River, Arrowhead River, Winneconne-Poygan (direct drainage to the lakes), Butte des Morts (direct drainage to the lake), and Daggets Creek.

All of the watershed's streams were assessed for their current recreational and biological uses and their potential recreational and biological uses if nonpoint source pollutants were controlled. Groundwater conditions present in the watershed were assessed through a private well sampling program that tested wells for nitrate and atrazine (triazine screening) concentrations.

Nitrate contamination above the state enforcement standard of 10 milligrams per liter (mg/l) occurred in 36 (18%) of the 191 wells tested within the watershed. Only four (2%) of the 176 samples analyzed for atrazine exceeded the state standard of 3.0 micrograms per liter (ug/l). These results are very similar to the average results within other recently tested priority watershed projects in the state.

Common water resource problems in the watershed include sedimentation of the tributaries and sediment loading to the lakes, channelization, excessive filamentous algae and periphyton growth from nutrient loading, limited habitat, low dissolved oxygen levels, high bacteriological levels, low stream flows during dry weather, and streambank and shoreline erosion. There is also concern for water quality problems caused by urban nonpoint sources from extensive shoreline development.

The lower stream reaches near the mouths of the Arrowhead River, the Rat River, and Daggets Creek are classified as warm water sport fish (WWSF). A small portion of the watershed is classified as warm water forage fish (WWFF); however, large portions of the streams and tributaries are limited forage fish or limited aquatic life. Habitat ratings for most of the watershed ranged from fair to poor with only an occasional good rating. The Hilsenhoff Biotic Index (HBI) ratings, which provide a relative measure of organic loading to streams based on the number and type of macro-invertebrates present, were poor for all stream stretches except one. Sedimentation and nutrient enrichment were identified as problems in all streams.

Water resource objectives for the watershed include increasing aquatic life by improving overall habitat conditions, protecting and enhancing wildlife by improving wetland and grassland habitat, controlling lake shoreline erosion, and reducing developed area nonpoint source loadings.

Sources of Pollution

The Outagamie County LCD and the Winnebago County LWCD collected data on agricultural lands, barnyards, gullies, shorelines and streambanks in the watershed. These data were used to estimate the pollutant potentials from these sources. The results of the inventories of these nonpoint sources are summarized below.

Barnyard Runoff Inventory Results:

- 156 barnyards were assessed.
- 25 barnyards contribute 51% of the organic pollutants.
- 13 barnyards show substantial potential to adversely impact groundwater.

Manure Management Inventory Results:

- Improper manure management accounts for 42% of the phosphorus loading.
- Landowners without suitable acreage for winter spreading 180 days of manure production are considered a water quality risk.
- An estimated 29 landowners with herd sizes greater than 30 animal units have insufficient acreage for winter spreading manure based on a nutrient management plan.

Streambank and Shoreline Erosion Inventory Results:

- 15.271 feet of eroded, trampled, or slumped banks.
- 5,515 feet (36%) of degraded banks are lake shoreline sites
- 267 tons of sediment annually from degraded banks.

Upland Sediment Inventory Results:

- 19,257 tons of sediment are delivered to streams annually (84% from cropland).
- 16,198 acres contribute 62% of the sediment.
- Nearly 20% of sediment is from the Arrowhead River Subwatershed.

Gully Erosion Estimates:

- Gullies are estimated to contribute 6,584 tons or 25% of all sediment delivered to surface waters in the project area.
- 2,909 tons or 11% of all sediment is from gullies in the Arrowhead River Subwatershed.

Pollutant Reduction Goals

To improve water quality in the Arrowhead River, Rat River and Daggets Creek watershed, this plan calls for:

- 50% reduction in phosphorus loadings from barnyards and improperly spread manure.
- 50% reduction in the total sediment from all sources reaching surface waters.
- 75% reduction in streambank sediment from adjacent agricultural lands in the watershed.
- 75% reduction in sediment from shoreline erosion.
- 75% reduction in sediment from gully erosion.

Management Actions and Cost-share Eligibility

The watershed plan establishes criteria to define which nonpoint sources are eligible for cost sharing through the project. Cost-share funds for installing pollutant control measures will be targeted only at those sources which meet these conditions.

These conditions are established because the majority of pollutants that reach surface waters come from less than one-half of the farm operators in the watershed. All landowners eligible to receive cost-share funds will be contacted by the Outagamie County Land Conservation Department and Winnebago County Land and Water Conservation Department during project implementation. All critical sources of nonpoint pollutants must be controlled if a landowner wishes to participate in any aspect of the program.

The following is a brief description of critical nonpoint pollutant source conditions that will be eligible for cost sharing through the project. These conditions are further explained in chapter four of the full watershed plan. Practices eligible to control the identified nonpoint sources are listed on table S-4.

Upland Runoff

All lands with sediment delivery rates greater than or equal to 0.41 t/ac/yr (according to the WIN model) will be eligible for cost sharing and must be brought down to a delivery rate of 0.2 t/ac/yr. Fields meeting this condition must be controlled for a landowner to participate in the program.

Lands with sediment delivery rates less than 0.41 t/ac/yr, but greater than 0.20 t/ac/yr are eligible for cost sharing. Controls on fields meeting this condition are optional for a participating landowner.

Barnyard Runoff

Barnyards with phosphorus loading values of 50 pounds or greater annually (according to BARNY model) are required to control the barnyard runoff to a value of 15 pounds or less to participate in the program. Barnyards with phosphorus loading values less than 50 pounds annually, but greater than or equal to 30 pounds are eligible for cost sharing to control the barnyard runoff. Where a barnyard is ineligible for priority watershed cost-share funds every effort will be made to provide assistance through other programs such as ACP.

Manure Spreading

SCS 590 Appendix B criteria will be used to determine the need for, and appropriateness of short term stacking or manure storage needs. A landowners rotation and herd size will be used to determine available suitable acres for spreading and the amount of manure produced. If the landowner does not have enough suitable acreage to safely spread a 180 day quantity of manure at the rate of 100 pounds of phosphorus per acre, the landowner will be eligible for manure storage cost-share assistance. If the landowner is short by 10 or more suitable acres for safely spreading 180 days of manure, storage will be required for a landowner to participate in the program. All other landowners who are lacking suitable acreage based on criteria outlined in the plan will be considered eligible for cost-share assistance.

Streambanks and Shorelines

All participating landowners throughout the watershed project will be required to control 75% of the sediment loading from shorelines and sites adjacent to agricultural lands. All other shoreline and streambank sites will be eligible for cost-share assistance.

Land acquisition in the form of easements will be promoted along the perennial main channels of the Arrowhead River, Rat River, and Daggets Creek. Other streambank or shoreline area may be eligible for easements if cost-effective and criteria described in the watershed plan are applicable.

Fencing or limited term grazing will be required as a management practice throughout the watershed project where eroded, trampled, or slumped streambanks are used for grazing.

Gully Erosion Control

All participating landowners will be required to control at least 75% of the sediment generated from the gullies on their property. All remaining gullies will be eligible for cost-share assistance.

Nutrient and Pesticide Management

All landowners eligible to receive assistance through this plan for the control of nonpoint pollution from either barnyard runoff, winter spread manure, or eroding croplands or uplands will also be eligible for assistance to develop SCS 590 and 595 nutrient and pest management plans.

Funds Needed for Cost Sharing, Staffing, and Educational Activities

Grants will be awarded to Outagamie and Winnebago counties by the DNR for cost sharing, staff support, and educational activities. Table S-2 shows estimates of the financial assistance needed to implement nonpoint source controls in the Arrowhead River, Rat River and Daggets Creek watershed, assuming a 75% participation rate of landowners.

Table S-2. Estimated Financial Assistance Needed to Implement Nonpoint Source Controls

Item Costs (State Share)		te Share)
	Outagamie County	Winnebago County
Cost-share Funds: Practices	\$466,268	\$1,095,688
Cost-share Funds: Easements	\$300	\$900
Local Assistance Staff Support*	\$419,204	\$659,472
Information/Education Direct	\$23,475	\$23,475
Other Direct (travel, supplies, etc.)	\$37,000	\$75,000
Total:	\$946,247	\$1,854,535

^{*} Salary + Indirect = \$35,000/year

Project Implementation Procedures

The following is an outline of the steps in carrying out this plan:

- 1. "A Nonpoint Source Control Plan for the Arrowhead River, Rat River and Daggets Creek Priority Watershed" is formally approved by the Outagamie and Winnebago County Boards, the Dept. of Agriculture, Trade, and Consumer Protection, and the Dept. of Natural Resources.
- 2. DNR awards two grants to each of the counties in the watershed:
 - a. Local Assistance Grant Agreement Amendment: This provides funds to the county to hire the staff and support needed to carry out the plan.
 - b. Nonpoint Source Grant Agreement: This provides funds for the county to pay landowners cost sharing for the proper installation of approved Best Management Practices (BMPs).
- 3. County project staff contact eligible landowners (as identified in the plan) to explain the program and encourage the signing of a Cost-share Agreement. Landowners may enter into Cost-share Agreements with the county only during the first 3 years of the project. The Cost-share Agreement defines the types and amounts of BMPs needed, the estimated costs, the cost-share amount, the schedule for installation, and the landowner's responsibilities for maintaining the BMPs.
- 4. Upon entering into a Cost-share Agreement, the county schedules practice installation (no more than 5 years after signing of agreement), designs the BMPs, and insures that the BMPs are installed in compliance with the approved designs.
- 5. After paying for the BMPs, the landowner submits proof of payment to the county project staff and the landowner is reimbursed the cost-share amount.

Information and Education

An information and education program will be conducted throughout the project period with the Outagamie and Winnebago county project staff having overall responsibility for the program. University of Wisconsin-Extension in the county will also have major responsibilities for assistance. This program will be most intensive during the first three years of the project, and activities will taper off during the rest of the project. The activities will include Best Management Practice demonstrations, tours, newsletters, and public meetings.

Project Evaluation and Monitoring

The evaluation strategy for the project involves the collection, analysis, and reporting of information so that progress may be tracked in three areas:

- 1. Administrative This includes the progress in providing technical and financial assistance to eligible landowners, and carrying out education activities identified in the plan. Progress in this area will be tracked by the county project staff and reported to the DNR and DATCP quarterly.
- 2. **Pollutant Reduction Levels** Reductions in nonpoint source pollutant loadings resulting from changes in land use practices will be calculated by the county project staff and reported to DNR and DATCP through the use of computer tracking sheets generated at the time of Cost-share Agreement development.
- 3. Water Resources Changes in water quality, habitat, and water resource characteristics may be monitored by the DNR during implementation and at the end of the project period in association with updates to the Wolf River Water Quality Management Plan.

Table S-3. Practices Using a Flat Rate for State Cost-Share Funding				
Best Management Practice	Flat Rate			
Contour Farming	\$6.00/ac.			
Strip Cropping	\$12.00/ac.			
Field Strip Cropping	\$10.00/ac.			
Reduced Tillage	\$15.00/ac.			
Reduced Tillage	\$45.00/ac.			

- 1. Reduced tillage systems for short crop rotations, and establishment of forages and small grains (includes no-till methods). One year only.
- 2. Reduced tillage systems for continuous row cropping over three years.

Table S-4. Eligible Management Practices & State Cost-Share Rates				
Best Management Practice	State Cost-share Rate			
Contour Farming	50% 1, 2			
Contour Strip Cropping	50% 1, 2			
Field Diversions and Terraces	70%			
Grassed Waterways	70%			
Reduced Tillage (No-till)	50% 1,2			
Critical Area Stabilization ⁶	70% ³			
Grade Stabilization Structures ⁶	70%			
Agricultural Sediment Basins	70%			
Shoreline and Streambank Stabilization ⁶	70% 1			
Shoreline Buffers ⁶	70% ³			
Wetland Restoration ⁶	70%			
Barnyard Runoff Management	70%			
Animal Lot Relocation ⁶	70%			
Manure Storage Facilities	70% 5			
Livestock Exclusion from Woodlots	50% 1			
Wetland Restoration	70% 3			
Nutrient and Pesticide Management	50% 4			

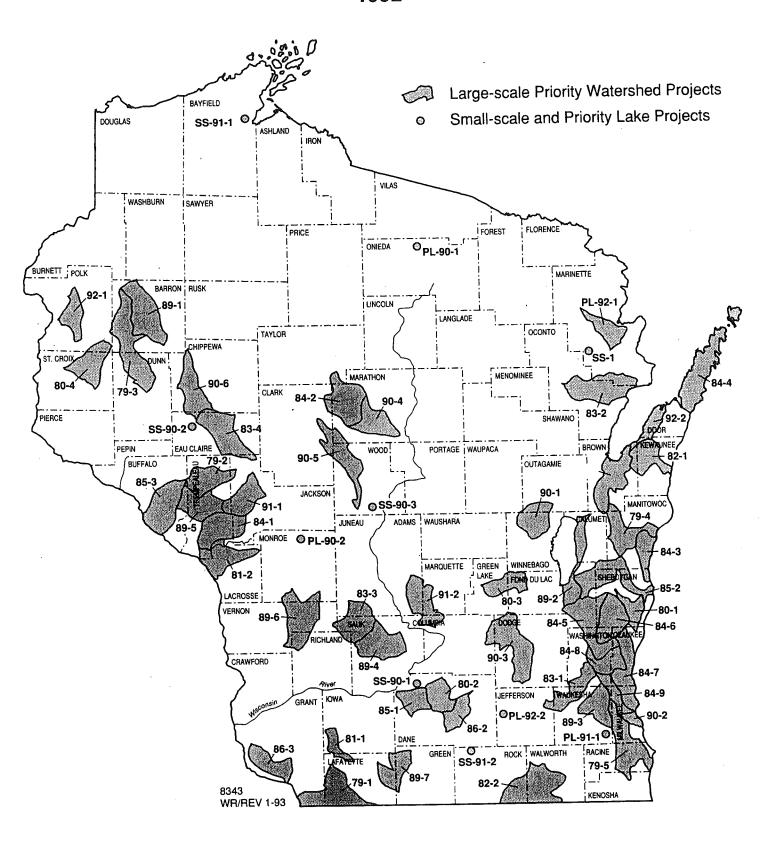
- 1. Flat rates for these BMPs can be found in table four (below)
- 2. Wildlife habitat restoration components of this practice are cost-shared at 70%
- 3. Easements may be entered into with landowners identified in the watershed plan in chapter four with these BMPs. See chapter four for where easements apply.
- 4. Spill control basins have a state cost-share rate of 70%
- 5. Maximum cost-share is \$20,000 including no more than \$5,000 for manure transfer equipment
- 6. State share can be raised to 80% if County provides 10% cost sharing

PRIORITY WATERSHED PROJECTS IN WISCONSIN 1992

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

^{*} Project completed

Priority Watershed Projects in Wisconsin 1992



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