A Nonpoint Source Control Plan for the East and West Branches of the Milwaukee River Priority Watershed Project

MILWAUKEE RIVER
Priority Watersheds Program

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 **Dodge, Fond du Lac, Ozaukee, Sheboygan**, and **Washington County Land Conservation Departments**.

WATERSHED PLAN ORGANIZATION INFORMATION

Natural Resources Board

Thomas Lawin, Chair
Stanton Helland, Vice Chair
Donald O'Melia, Secretary
Richard Hemp
Collins Ferris
Helen Jacobs
Will Lee

Dodge County Land Conservation Committee

Earl Weiss, ASC Mamber
Russell Madigan, Chair
Delwyn Biel
Elmore Elser
Don Fabisch
John Mason

Fond du Lac County Land Conservation Committee

Leonard Rosenbaum, Chair
Henry Hayes
Charles Hub
Ray Puddy
Mary Schuster
Ben Seffes, ASC Member

Ozaukee County Land Conservation Committee

Roland Kison, Chair
Iris Cance
Rose Hass Leider
Ella Opitz
James Speiden
Lawrence Albinger, ASC Member

Sheboygan County Land Conservation Committee

William Hand, Chair
Elmer Grahl
Elmer Gumm
William Jens
Raymond Karsteadt
Herbert Dickman, ASC Member

Washington County Land Conservation Committee

Reuben Schmahl, Chair
Frank Falter
John Kohl
Daniel Stoffel
Paul Tuchscherer
Allen Peil, ASC Member

Wisconsin Department of Natural Resources (WDNR)

C. D. Besadny, Secretary
Lyman Wible, Administrator, Division for Environmental Quality
Bruce Baker, Director, Bureau of Water Resources Management
Michael Llewelyn, Chief, Nonpoint Source & Land Management Section

Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP)

Howard Richards, Secretary
Nicholas Neher, Administrator, Div. Agricultural Resource Management
Jim Johnson, Director, Bureau of Land and Water Resources
Dave Jelinski, Chief, Soil and Water Resource Management Section

A NONPOINT SOURCE CONTROL PLAN FOR THE EAST AND WEST BRANCHES OF THE MILWAUKEE RIVER PRIORITY WATERSHEDS PROJECT

The Wisconsin Nonpoint Source Water Pollution Abatement Program

February, 1989

Plan Prepared Cooperatively By:

Wisconsin Department of Natural Resources
Wisconsin Department of Agriculture, Trade and Consumer Protection
East and West Branch Milwaukee River Watershed Subcommittee
and the Counties of:
Dodge, Fond du Lac, Ozaukee, Sheboygan, and Washington

Publication WR-255-90

For copies of this document please contact:

Wisconsin Department of Natural Resources
Bureau of Water Resources Management
Nonpoint Source and Land Management Section
P.O. Box 7291
Madison, Wisconsin 53707

WATERSHED PLAN CREDITS

Author

John Pfender, Nonpoint Source & Land Management Section, WDNR

Contributing Author

Gary Korb, University of Wisconsin Extension

Editors

David Whitteberry, Nonpoint Source & Land Management Section, WDNR
Cindy Lukas, Nonpoint Source & Land Management Section, WDNR

Graphics/Maps

Jim McEvoy, WDNR
Southeastern Wisconsin Regional Planning Commission

Contributors

East and West Branch Milwaukee River Watershed Advisory Subcommittee
Southeastern Wisconsin Regional Planning Commission
Mark Bethke, Dodge County Land Conservation Department
Patty Cook, Fond du Lac County Land Conservation Department
Andy Holschbach, Ozaukee County Land Conservation Department
Chris Ertman, Sheboygan County Land Conservation Department
Doris Thiele, Washington County Land Conservation Department
Steve Mace, Southeast District, WDNR
Ken Baun, Nonpoint Source and Land Management Section, WDNR
Roger Bannerman, Nonpoint Source and Land Management Section, WDNR

Word Processing

Word Processing Staff, WDNR

MILWAUKEE RIVER BASIN ADVISORY COMMITTEE

Reuben Schmahl (Rural Co-Chair), Chair, Washington County Board of Supervisors

Norbert Hynek (Urban Co-Chair), Mayor, City of Glendale

Bruce Baker, Director, Bureau of Water Resource Management, WDNR

Kurt W. Bauer, Executive Director, Southeastern Wisconsin Regional Planning Commission

Daniel Cupertino, Jr., Chair, Milwaukee County Land Conservation Committee

John Erickson, City Engineer, City of Milwaukee

Margaret Farrow, State Senator, 33rd District

Sharon L. Gayan, Milwaukee River Program Coordinator, WDNR

Norman Huth, Member, Milwaukee County Conservation Alliance

Gary Jackson, Water Quality Education Specialist, Environmental Resource Center, University of Wisconsin Extension

James Johnson, Director, Land and Water Resources Bureau, WDATCP

Roland Kison, Chair, Ozaukee County Land Conservation Committee

Harold Lindemann, Executive Committee, Sheboygan County Board

Theodore Manning, Area Conservationist, Department of Agriculture, Soil and Conservation

Gary Gagnon, Milwaukee Metropolitan Sewerage District

Michael Miller, Mayor, City of West Bend

Lloyd Owens, Administrative Committee, Waukesha County Board

Donald Roensch, City Administrator/Engineer, City of Mequon

Leonard Rosenbaum, Chair, Fond du Lac County Land Conservation Committee

Hilbert Schuenemann, Park and Planning Commission, Washington County

Gerald Schwerm, Director, Department of Public Works and Development, Milwaukee County

Glen Stoddard, Executive Secretary, Wisconsin Land Conservation Association

Brigid Sullivan, Director, Milwaukee County Parks, Recreations, and Culture Department

MILWAUKEE RIVER
EAST-WEST BRANCH WATERSHED COMMITTEE

Henry Hayes: (Chair), Fond du Lac County Land Conservation Committee

Bernice Popelka: (Vice-Chair), Kettle Moraine Audubon Society

Frank Falter: (Member at Large), Washington County Land Conservation Committee

James Hovland: Fond du Lac County University of Wisconsin Extension

Carolyn Johnson: City of West Bend

Gary Kurer: Ozaukee County Land Conservation Department

Mike Lettow: Agricultural Representative, Washington County

Perry Lindquist: Washington County Land Conservation Department

Karen Magnuson: Department of Agriculture, Trade and Consumer Protection

Theodore Manning: U.S. Soil Conservation Service

Lynn Mathias: Fond du Lac County Land Conservation Department

Patrick Miles: Sheboygan County Land Conservation Department

Wayne Rollin: Fond du Lac County Planning Department

Leonard Rosenbaum: Fond du Lac County Land Conservation Committee

Daniel Schmidt: Village of Kewaskum

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

BOX 7921
MADISON, WISCONSIN 53707

May 17, 1989

File Ref: 2600

Mr. Harvey Radtke
County Board Chair
Dodge County Courthouse
Juneau, WI 53039

Dear Mr. Radtke:

It is my pleasure to approve A Nonpoint Source Control Plan for the East and West Branches of the Milwaukee River Priority Watershed. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. This plan has been approved by Washington, Fond du Lac, Dodge, Sheboygan, and Ozaukee Counties, as well as by the Wisconsin Department of Agriculture, Trade, and Consumer Protection. My approval of the watershed plan completes the plan approval process as set forth in Wisconsin Statutes and allows the granting of funds through the Nonpoint Source Water Pollution Abatement Program necessary to support the project.

I am also approving this plan as an amendment to the areawide water quality management plan for the Upper Milwaukee River Basin, and will request that the Southeastern Wisconsin Regional Planning Commission recommend the priority watershed plan as an amendment to the areawide water quality management plan for southeastern Wisconsin.

The start of this watershed project is an exciting milestone in this next phase our efforts to improve the water quality throughout the Milwaukee River Basin. A successful program will be a sound investment in our own future as well as that of our children and succeeding generations. I look forward in working together with you to realize the environmental gains that this cooperative effort can bring.

Sincerely,

C. D. Besadny
Secretary

cc Mr. Norbert Hynek, Co-chair, Milwaukee River Basin Advisory Committee
Mr. Henry Hayes, Chair, East-West Watershed Advisory Subcommittee
Rep. Margaret Farrow, Chair, I&E Advisory Subcommittee
Mr. Kurt Bauer, SEWRPC
Mr. James Johnson, DATCP
Ms. Gloria McCutcheon, DNR - SED
Mr. James Huntoon, DNR - SD
Mr. Michael Miller, Mayor, City of West Bend
Mr. Paul Blumer, President, Village of Kewaskum
Mr. Milton Wilkens, President, Village of Newburg
Mr. Phillip Ketter, President, Village of Campbellsport

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

BOX 7921
MADISON, WISCONSIN 53707

File Ref: 2600

May 17, 1989

Mr. Wilbert Halbach, County Board Chair
City-County Government Center
160 S. Macy Street
Fond du Lac, WI 54093

Dear Mr. Halbach:

It is my pleasure to approve A Nonpoint Source Control Plan for the East and West Branches of the Milwaukee River Priority Watershed. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. This plan has been approved by Washington, Fond du Lac, Dodge, Sheboygan, and Ozaukee Counties, as well as by the Wisconsin Department of Agriculture, Trade, and Consumer Protection. My approval of the watershed plan completes the plan approval process as set forth in Wisconsin Statutes and allows the granting of funds through the Nonpoint Source Water Pollution Abatement Program necessary to support the project.

I am also approving this plan as an amendment to the areawide water quality management plan for the Upper Milwaukee River Basin, and will request that the Southeastern Wisconsin Regional Planning Commission recommend the priority watershed plan as an amendment to the areawide water quality management plan for southeastern Wisconsin.

The start of this watershed project is an exciting milestone in this next phase our efforts to improve the water quality throughout the Milwaukee River Basin. A successful program will be a sound investment in our own future as well as that of our children and succeeding generations. I look forward in working together with you to realize the environmental gains that this cooperative effort can bring.

Sincerely,

C. D. Besadny
Secretary

cc Mr. Norbert Hynek, Co-chair, Milwaukee River Basin Advisory Committee
Mr. Henry Hayes, Chair, East-West Watershed Advisory Subcommittee
Rep. Margaret Farrow, Chair, I&E Advisory Subcommittee
Mr. Kurt Bauer, SEWRPC
Mr. James Johnson, DATCP
Ms. Gloria McCutcheon, DNR - SED
Mr. James Huntoon, DNR - SD
Mr. Michael Miller, Mayor, City of West Bend
Mr. Paul Blumer, President, Village of Kewaskum
Mr. Milton Wilkens, President, Village of Newburg
Mr. Phillip Ketter, President, Village of Campbellsport

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Carroll D. Besadny
Secretary
BOX 7921
MADISON, WISCONSIN 53707

May 17, 1989

File Ref: 2600

Mr. James Swan, County Board Chair
Ozaukee County Courthouse
121 W. Main Street
Port Washington, WI 53074-0994

Dear Mr. Swan:

It is my pleasure to approve A Nonpoint Source Control Plan for the East and West Branches of the Milwaukee River Priority Watershed. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. This plan has been approved by Washington, Fond du Lac, Dodge, Sheboygan, and Ozaukee Counties, as well as by the Wisconsin Department of Agriculture, Trade, and Consumer Protection. My approval of the watershed plan completes the plan approval process as set forth in Wisconsin Statutes and allows the granting of funds through the Nonpoint Source Water Pollution Abatement Program necessary to support the project.

I am also approving this plan as an amendment to the areawide water quality management plan for the Upper Milwaukee River Basin, and will request that the Southeastern Wisconsin Regional Planning Commission recommend the priority watershed plan as an amendment to the areawide water quality management plan for southeastern Wisconsin.

The start of this watershed project is an exciting milestone in this next phase our efforts to improve the water quality throughout the Milwaukee River Basin. A successful program will be a sound investment in our own future as well as that of our children and succeeding generations. I look forward in working together with you to realize the environmental gains that this cooperative effort can bring.

Sincerely,

C. D. Besadny
Secretary

cc Mr. Norbert Hynek, Co-chair, Milwaukee River Basin Advisory Committee
Mr. Henry Hayes, Chair, East-West Watershed Advisory Subcommittee
Rep. Margaret Farrow, Chair, I&E Advisory Subcommittee
Mr. Kurt Bauer, SEWRPC
Mr. James Johnson, DATCP
Ms. Gloria McCutcheon, DNR - SED
Mr. James Huntoon, DNR - SD
Mr. Michael Miller, Mayor, City of West Bend
Mr. Paul Blumer, President, Village of Kewaskum
Mr. Milton Wilkens, President, Village of Newburg
Mr. Phillip Ketter, President, Village of Campbellsport

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

BOX 7921
MADISON, WISCONSIN 53707

May 17, 1989

File Ref: 2600

Mr. James Gilligan, County Board Chair
Sheboygan County Courthouse
615 N. Sixth Street
Sheboygan, WI 53081

Dear Mr. Gilligan:

It is my pleasure to approve A Nonpoint Source Control Plan for the East and West Branches of the Milwaukee River Priority Watershed. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. This plan has been approved by Washington, Fond du Lac, Dodge, Sheboygan, and Ozaukee Counties, as well as by the Wisconsin Department of Agriculture, Trade, and Consumer Protection. My approval of the watershed plan completes the plan approval process as set forth in Wisconsin Statutes and allows the granting of funds through the Nonpoint Source Water Pollution Abatement Program necessary to support the project.

I am also approving this plan as an amendment to the areawide water quality management plan for the Upper Milwaukee River Basin, and will request that the Southeastern Wisconsin Regional Planning Commission recommend the priority watershed plan as an amendment to the areawide water quality management plan for southeastern Wisconsin.

The start of this watershed project is an exciting milestone in this next phase our efforts to improve the water quality throughout the Milwaukee River Basin. A successful program will be a sound investment in our own future as well as that of our children and succeeding generations. I look forward in working together with you to realize the environmental gains that this cooperative effort can bring.

Sincerely,

C. D. Besadny
Secretary

cc Mr. Norbert Hynek, Co-chair, Milwaukee River Basin Advisory Committee
Mr. Henry Hayes, Chair, East-West Watershed Advisory Subcommittee
Rep. Margaret Farrow, Chair, I&E Advisory Subcommittee
Mr. Kurt Bauer, SEWRPC
Mr. James Johnson, DATCP
Ms. Gloria McCutcheon, DNR - SED
Mr. James Huntoon, DNR - SD
Mr. Michael Miller, Mayor, City of West Bend
Mr. Paul Blumer, President, Village of Kewaskum
Mr. Milton Wilkens, President, Village of Newburg
Mr. Phillip Ketter, President, Village of Campbellsport

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Carroll D. Besadny
Secretary
BOX 7921
MADISON, WISCONSIN 53707

May 17, 1989

File Ref: 2600

Mr. Reuben Schmahl, County Board Chair
Washington County Courthouse
432 E. Washington Street
West Bend, WI 53095-7986

Dear Mr. Schmahl:

It is my pleasure to approve A Nonpoint Source Control Plan for the East and West Branches of the Milwaukee River Priority Watershed. This plan meets the intent and conditions of s. 144.25, Wisconsin Statutes, and Chapter NR 120, Wisconsin Administrative Code. This plan has been approved by Washington, Fond du Lac, Dodge, Sheboygan, and Ozaukee Counties, as well as by the Wisconsin Department of Agriculture, Trade, and Consumer Protection. My approval of the watershed plan completes the plan approval process as set forth in Wisconsin Statutes and allows the granting of funds through the Nonpoint Source Water Pollution Abatement Program necessary to support the project.

I am also approving this plan as an amendment to the areawide water quality management plan for the Upper Milwaukee River Basin, and will request that the Southeastern Wisconsin Regional Planning Commission recommend the priority watershed plan as an amendment to the areawide water quality management plan for southeastern Wisconsin.

The start of this watershed project is an exciting milestone in this next phase our efforts to improve the water quality throughout the Milwaukee River Basin. A successful program will be a sound investment in our own future as well as that of our children and succeeding generations. I look forward in working together with you to realize the environmental gains that this cooperative effort can bring.

Sincerely,

C. D. Besadny
Secretary

cc Mr. Norbert Hynek, Co-chair, Milwaukee River Basin Advisory Committee
Mr. Henry Hayes, Chair, East-West Watershed Advisory Subcommittee
Rep. Margaret Farrow, Chair, I&E Advisory Subcommittee
Mr. Kurt Bauer, SEWRPC
Mr. James Johnson, DATCP
Ms. Gloria McCutcheon, DNR - SED
Mr. James Huntoon, DNR - SD
Mr. Michael Miller, Mayor, City of West Bend
Mr. Paul Blumer, President, Village of Kewaskum
Mr. Milton Wilkens, President, Village of Newburg
Mr. Phillip Ketter, President, Village of Campbellsport

State of Wisconsin
Department of Agriculture, Trade & Consumer Protection

801 West Badger Road
P.O. Box 8911
Madison, WI 53708

Howard C. Richards
Secretary

April 12, 1989

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

Dear Mr. Baker:

We have received a copy of the Nonpoint Source Control Plan for the East and West Branches of The Milwaukee River Priority Watershed along with your letter of transmittal.

Although DATCP was involved only during the later stages of the planning process for the East and West Branches, a thorough review of the document by members of my staff was accomplished due to the cooperative spirit of DNR and the Fond du Lac, Washington, Sheboygan and Dodge County Land Conservation Departments. There have been a great deal of public and agency comments on this plan. We believe this indicates a great interest in improving water quality within the project area, and bodes well for the success of the project.

We believe that the public and agency comments have been, for the most part, satisfactorily addressed at this time. We note, however, that an analysis of the need for manure storage ordinances was not done for this watershed plan. We understand that new watershed plans, beginning with the Yahara-Monona, East River and Lower Grant will include such an analysis and a determination of the need for an ordinance.

We understand that future amendments to the plan are possible, upon agreement of the local governing unit, DNR and DATCP.

Please accept this letter as the Department's approval of the East and West Branches of The Milwaukee River Priority Watershed Plan. We look forward to assisting DNR and Fond du Lac,

Washington, Sheboygan and Dodge Counties in the protection and enhancement of this unique water resource through implementation of the watershed plan. If I or any members of my staff can be of any further assistance please let me know.

Sincerely,

James A. Johnson, Director
Land & Water Resources Bureau
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
(608) 267-9788

JAJ:SH:pmd
cc: Nicholas Neher
Dave Jelinski

LCD
DODGE COUNTY LAND CONSERVATION DEPARTMENT
COURTHOUSE, JUNEAU, WI 53039
Phone: 414-386-4411 Ext. 423

LAND CONSERVATION COMMITTEE
RUSSELL MADIGAN DON FABISCH JOHN MASON ELMORE ELSER DELWYN BIEL EARL WEISS

The Dodge County Land Conservation Committee has approved the Non-Point Source Pollution Control Plan for the East-West Branch of the Milwaukee River Priority Watershed Program.

The Dodge County Land Conservation Committee agrees to cooperate and participate in the implementation of this plan to the extent practicable.

This is respectfully submitted this 26th day of April, 1989.

Russell Madigan
Elmore Elser
Earl Weiss

RESOLUTION NO. 195-88

RESOLUTION ADOPTING THE MILWAUKEE RIVER
EAST-WEST BRANCH NONPOINT SOURCE
PRIORITY WATERSHED PLAN

WHEREAS, the East and West Branches of the Milwaukee River Watershed was designated by State Legislature as a "priority watershed" in 1984 under the Wisconsin Nonpoint Source Water Pollution Abatement Program, and

WHEREAS, the County Land Conservation Department in cooperation with the Wisconsin Department of Natural Resources conducted a detailed inventory of the land use within the watershed in 1986 and 1987, and

WHEREAS, this inventory resulted in the development of a detailed nonpoint source control plan for the watershed, and

WHEREAS, a number of public information meetings have been conducted throughout the watershed, and an official public hearing was conducted on February 23, 1989, and

WHEREAS, pertinent public comments have been incorporated into the plan, and

WHEREAS, each county within the watershed wishing to receive cost-sharing grants for landowners in the watershed must first adopt the East-West Watershed plan.

NOW, THEREFORE, BE IT RESOLVED by the Fond du Lac County Board of Supervisors that the Milwaukee River East-West Branch Nonpoint Source Priority Watershed Plan be adopted and that implementation of the plan begin as soon as possible.

Dated March 21, 1989

LAND CONSERVATION COMMITTEE

FISCAL NOTE: Costs to the county for implementation of this watershed plan are reimbursed 100% by the state.

APPROVED BY:

M. Anita Anderegg
COUNTY EXECUTIVE

APPROVED BY:

Thomas L. Storm
CORPORATION COUNSEL

RESOLUTION NO. 89-1

MILWAUKEE RIVER EAST AND WEST BRANCHES
PRIORITY WATERSHED PLAN

WHEREAS, the Ozaukee County Board of Supervisors through Resolution No. 85-20 expressed its support of the designation of the Milwaukee River Basin as a Priority Watersheds project; and

WHEREAS, the East and West Branch is one of five watersheds in Ozaukee County which are included in the Milwaukee River Basin; and

WHEREAS, the inventory and planning phases of the project have been completed under the direction of the Ozaukee County Land Conservation Committee in cooperation with the Wisconsin Department of Natural Resources; and

WHEREAS, a priority watershed plan has been prepared which assesses the existing water quality and watershed conditions, identifies the management practices and actions necessary to improve or protect the water quality of the watershed, outlines the tasks required and the agency responsible for each, and establishes the time frame and cost estimates for the project; and

WHEREAS, a draft of the plan has been available for review and comments were accepted at a public hearing held February 23, 1989; and

WHEREAS, the implementation of this plan will provide both technical assistance and cost share monies to eligible landowners within the priority watershed for the installation of conservation practices designed to reduce the sources of non point pollution and protect or improve the quality of Ozaukee County's water resources;

NOW, THEREFORE, BE IT RESOLVED, that the Ozaukee County Board of Supervisors does hereby approve the "Non Point Source Control Plan for the East and West Branches of the Milwaukee River Priority Watershed"; and that the Land Conservation Committee be given the authority and responsibility to act in behalf of Ozaukee County to administer this Priority Watershed Project as outlined in the plan.

Dated at Port Washington, Wisconsin, this 18th day of April, 1989.

Roland Kison

Roland F. Kison

~~Ella B. Opitz~~

James N. Speiden

Rose Hass Leider

Rose Hass Leider

Iris R. Cance

LAND CONSERVATION COMMITTEE

SHEBOYGAN COUNTY

(414) 459-3148 LAND CONSERVATION DEPARTMENT 650 FOREST AVE.
SHEBOYGAN FALLS, WI 53085

April 7, 1989

Carroll D. Besadny, Secretary
Wisconsin Department of Natural Resources
Box 7921
Madison, WI 53707

Dear Mr. Besadny;

The Sheboygan County Land Conservation Committee has reviewed and approved the East-West Branch of the Milwaukee River Watershed Plan via a motion which was made and approved on April 7, 1989. The Sheboygan County Land Conservation Committee and Department staff will cooperate fully on the implementation of the Watershed Plan.

Sincerely;

William O. Hand, Chairman
Sheboygan County Land Conservation Committee

Elmer Gunm, Vice-Chairman

Raymond Karsteadt, Secretary

William Jens, Member

Elmer Grahl, Member

Herbert Dickman, ASCS Member Representative

RESOLUTION NO. 7-89-90

Approval of Nonpoint Source Control Plan for the East/West Branch of the Milwaukee River Priority Watershed

WHEREAS, the Milwaukee River Watershed has been selected by the State Legislature and the Department of Natural Resources for priority funding to control nonpoint sources of water pollution; and

WHEREAS, the Land Conservation Committee (LCC) is responsible for implementation of control strategies in the unincorporated areas, which would include providing technical assistance and administering cost sharing agreements with rural landowners through the Land Conservation Department; and

WHEREAS, the Department of Natural Resources has prepared a final draft of the Nonpoint Source Control Plan for the East/West Branch of the Milwaukee River Watershed which must be approved by the County Board before cost sharing dollars can be made available to local landowners; and

WHEREAS, the Land Conservation Committee has reviewed the final draft of the East/West Branch plan and recommends approval of the plan by the Board;

NOW, THEREFORE, BE IT RESOLVED by the Washington County Board of Supervisors that they hereby approve the Nonpoint Source Control Plan for the East/West Branch of the Milwaukee River Priority Watershed;

BE IT FURTHER RESOLVED that the Land Conservation Committee is hereby authorized to enter into a Nonpoint Source Grant Agreement with the DNR for the purpose of administering cost sharing dollars to rural landowners with the understanding that there be no direct costs to the County;

BE IT FURTHER RESOLVED that Washington County reserves the right to request future amendments to the watershed plan in order to incorporate new cost sharing opportunities for landowners, to facilitate needed changes in technical standards and specification, to extend sign-up periods, or to include other changes currently proposed in the draft Administrative Rules NR-120.

DATED this 9th day of May, 1989.

APPROVED:

_____

Corporation Counsel

Dated_____

Considered_____

Adopted_____

Ayes____ Noes____ Absent____

Voice Vote_____

Introduced by members of the LAND CONSERVATION COMMITTEE as filed with the County Clerk.

_____

Reuben J. Schmahl, Chairperson

_____

Frank Falter

_____

John Kohl

_____

Daniel Stoffel

_____

Paul Tuchscherer

(No Fiscal Effect)

TABLE OF CONTENTS

WATERSHED PLAN ORGANIZATION INFORMATION . . . . . Inside Front Cover

WATERSHED PLAN CREDITS i

RESOLUTIONS AND LETTERS OF APPROVAL v

LIST OF APPENDICES xxx

LIST OF MAPS xxx

LIST OF FIGURES xxxi

LIST OF TABLES xxxii

SUMMARY 1

CHAPTER I. PLAN PURPOSE AND LEGAL STATUS 13
- INTRODUCTION 13
  - Nonpoint Source Control Program 13
- PROJECT PLANNING AND IMPLEMENTATION 14
- LEGAL STATUS 15
- RELATIONSHIP OF THE NONPOINT SOURCE PLAN TO THE INTEGRATED RESOURCE MANAGEMENT PLAN 15
  - Organization and Use of This Priority Watershed Plan 16

PART ONE
THE WATERSHED ASSESSMENT

CHAPTER II. GENERAL WATERSHED CHARACTERISTICS 21
- INTRODUCTION 21
- CULTURAL FEATURES 21
  - Civil Divisions 21
  - Population Size and Distribution 21
  - Land Uses 22
  - Municipal and Industrial Point Sources of Water Pollution 22
  - Sanitary Sewer Service 22
  - Water Supply Service 25
- NATURAL RESOURCE FEATURES 25
  - Climate 25
  - Topography 25
  - Surface Water Resources 26
  - Ground Water Resources 30
  - Environmental Corridors 31
  - Natural Area Sites 31
  - Endangered Species 32

CHAPTER III. WATER RESOURCE CONDITIONS, NONPOINT SOURCES, AND WATER RESOURCES OBJECTIVES 33
INTRODUCTION 33
WATERSHED OVERVIEW 33
Surface Water Conditions 33
Groundwater Conditions 35
Nonpoint Sources of Pollution 36
Water Resources Objectives 41
SUBWATERSHED CONDITIONS FOR THE EAST REGION 42
Watercress Creek Subwatershed 44
Low Delivery Subwatershed 47
Long Lake Subwatershed 48
Parnell Esker Subwatershed 51
Mauthe Lake Subwatershed 54
Crooked Lake Subwatershed 57
Forest Lake Subwatershed 62
SUBWATERSHED CONDITIONS FOR THE WEST AND UPPER MAINSTEM REGION 63
Headwaters Subwatershed 64
Lake Bernice Subwatershed 67
Wayne Marsh Subwatershed 70
Greenway Road Subwatershed 73
Ice Age Subwatershed 75
Eden Subwatershed 77
Kettle Moraine Subwatershed 80
McCullough Marsh Subwatershed 83
Auburn Creek Subwatershed 86
Campbellsport Subwatershed 89
Unnamed Tributary Subwatershed 98
SUBWATERSHED CONDITIONS FOR THE LOWER MAINSTEM REGION 100
Kewaskum Subwatershed 101
Smith Lake Subwatershed 110
West Bend Subwatershed 112
Silver Creek Subwatershed 134
Quaas Creek Subwatershed 141
Daly Lake Subwatershed 145
Green Lake Subwatershed 149

CHAPTER IV. NONPOINT SOURCE CONTROL NEEDS 151
INTRODUCTION 151
POLLUTANT LOAD REDUCTION GOALS 152
Subwatershed Pollution Reduction Goals 152
Watershed Pollutant Reduction Goals 155
RURAL POLLUTION CONTROL GOALS AND DECISION CRITERIA 155
Barnyard Runoff 156
Manure Spreading Runoff 158
Upland Erosion 159
Streambank Degradation 160
Rural Pollution Source Control Summary 161
RURAL POLLUTION CONTROL PRACTICES 162
Upland Erosion Control Practices 162
Animal Waste Management 163
Streambank Protection 164
Pesticide and Fertilizer Management 164

URBAN POLLUTION CONTROL GOALS AND DECISION CRITERIA 165
Umbrella Urban Program 165
Recommended Program for the Village of Kewaskum 179
Recommended Program For the Village of Campbellsport 183
Recommended Program For the Village of Newburg 185

PART TWO
DETAILED PROGRAM FOR IMPLEMENTATION

CHAPTER V. DETAILED PROGRAM FOR IMPLEMENTATION 191
INTRODUCTION 191
PARTICIPANTS AND THEIR ROLES 191
Landowners and Land Operators 191
Local Units of Government 192
Cooperating Agencies 193
Department of Natural Resources 194
PROJECT SCHEDULE 195
COST SHARE ASSISTANCE ADMINISTRATION 195
Eligible Pollution Sources 195
Eligible Best Management Practices 196
Wetland Restoration Eligibility 198
Cost Share Agreements 201
Fiscal Management Procedures 205
Cost Containment Provisions 207
LOCAL ASSISTANCE FUNDS ADMINISTRATION 208
BUDGET AND STAFFING NEEDS 211
Rural Implementation 211
Urban Implementation 214
Villages of Kewaskum, Campbellsport, and Newburg 216

CHAPTER VI. INFORMATION AND EDUCATION PROGRAM 219
PURPOSE AND PERSPECTIVES 219
Key Audience Groups 220
Types of Activities 221
Levels of Activities 221
Educational Project Workload and Lead County Concept 222
Program Evolution and Educational Plan Updates 223

PART THREE
EVALUATION PLAN

CHAPTER VII. PROJECT EVALUATION AND MONITORING 227
PROJECT EVALUATION 227
Evaluating Local Implementation 227
Evaluating Changes in Land Management 228
Evaluating Changes in Water Resources 229

BIBLIOGRAPHY 287

WISCONSIN DEPARTMENT OF NATURAL RESOURCES MISSION STATEMENT . . . . . Back Cover

LIST OF APPENDICES

Appendix A. State of Wisconsin Water Quality Standards for Streams and Lakes in the East-West Branch Milwaukee River Watersheds 233

Appendix B. Nonpoint Source Pollution Control Guidelines for Infiltration Devices in Urban Areas 235

Appendix C. Alternative Best Management Practices, Design Criteria, Standards, and Specifications for the East-West Branch Milwaukee River Watersheds 239

Appendix D. Milwaukee River Program Basinwide Educational Goals 249

Appendix E. Planning Methods 251

Appendix F. Description of Watershed-Specific Materials and Events 267

Appendix G. Tables 285

LIST OF MAPS

Map 1. Milwaukee River Priority Watersheds 23

Map 2. Milwaukee River East-West Branch Watershed 27

Map 3. Existing land use in the Campbellsport Study Area: 1985 91

Map 4. Existing and planned urban areas in the Campbellsport Study Area 95

Map 5. Existing land use in the Kewaskum Study Area: 1985 103

Map 6. Existing and planned urban areas in the Kewaskum Study Area 107

Map 7. West Bend Study Area 117

Map 8. Existing land use in the West Bend Study Area: 1985 119

Map 9. Historic urban development in the West Bend Study Area 123

Map 10. Existing and planned urban areas in the West Bend Study Area 125

Map 11. Existing land use in the Newburg Study Area: 1985 129

Map 12. Existing and planned urban areas in the Newburg Study Area 131

LIST OF FIGURES

Figure 1. Hydrologic flow diagram for the East and West Branches Milwaukee River Watershed 43

LIST OF TABLES

Table A-1. Buffer Area to Source Area Ratio . . . . . Appendix C

Table A-2. Flow Length of Buffer to Source Area . . . . . Appendix C

Table A-3. East-West Branch Watershed Educational Plan . . . . . Appendix F

Table 1. The relative importance of the East and West Branches Milwaukee River Watershed as a source of pollutants to the Milwaukee River System G-1

Table 2. Relative significance of major nonpoint source types in the East and West Branches Milwaukee River Watershed G-2

Table 3. Agricultural land use distribution, in acres, for three regions in the East and West Branches Milwaukee River Watershed G-3

Table 4. Soil loss and sediment delivery from upland sheet and rill erosion in three major regions of the East and West Branches Milwaukee River Watershed G-4

Table 5. Extent of internal drainage in the three main regions of the East and West Branches Milwaukee River Watershed G-5

Table 6. Streambank degradation in the East and West Branches Milwaukee River Watershed G-6

Table 7. Destination of barnyard runoff in three major regions of the East and West Branches Milwaukee River Watershed G-7

Table 8. Potential for pollution from winterspreading animal waste in the East and West Branches Milwaukee River Watershed G-8

Table 9. Agricultural land use distribution, in acres, for subwatersheds of the East Region, East and West Branches Milwaukee River Watershed G-9

Table 10. Rural nonpoint source summary for the Watercress Creek Subwatershed G-10

Table 11. Rural nonpoint source summary for the Low Delivery Subwatershed G-11

Table 12. Rural nonpoint source summary for the Long Lake Subwatershed G-12

Table 13. Rural nonpoint source summary for the Parnell Creek Subwatershed G-13

Table 14. Rural nonpoint source summary for the Mauthe Lake Subwatershed G-14

Table 15. Rural nonpoint source summary for the Crooked Lake Subwatershed G-15

Table 16. Agricultural land use distribution, in acres, for subwatersheds of the West and Upper Mainstem Region, East and West Branches Milwaukee River Watershed G-16

Table 17. Rural nonpoint source summary for the Headwaters Subwatershed G-17

Table 18. Rural nonpoint source summary for the Lake Bernice Subwatershed G-18

Table 19. Rural nonpoint source summary for the Wayne Marsh Subwatershed G-19

Table 20. Rural nonpoint source summary for the Greenway Road Subwatershed G-20

Table 21. Rural nonpoint source summary for the Ice Age Subwatershed G-21

Table 22. Rural nonpoint source summary for the Eden Township Subwatershed G-22

Table 23. Rural nonpoint source summary for the Kettle Moraine Subwatershed G-23

Table 24. Rural nonpoint source summary for the McCullough Marsh Subwatershed G-24

Table 25. Rural nonpoint source summary for the Auburn Creek Subwatershed G-25

Table 26. Rural nonpoint source summary for the Campbellsport Subwatershed G-26

Table 27. Estimated year 1985 urban nonpoint pollutant loadings by land use for the Campbellsport Study Area G-27

Table 28. Estimated year 2000 urban nonpoint pollutant loadings by land use for the Campbellsport Study Area G-28

Table 29. Rural nonpoint source summary for the Un-named Tributary Subwatershed G-29

Table 30. Agricultural land use distribution, in acres, for subwatersheds of the Lower Mainstem Region, East and West Watershed G-30

Table 31. Rural nonpoint source summary for the Kewaskum Subwatershed G-31

Table 32. Estimated year 1985 urban nonpoint pollutant loadings by land use for the Kewaskum Study Area G-32

Table 33. Estimated year 2000 urban nonpoint pollutant loadings by land use for the Kewaskum Study Area G-33

Table 34. Rural nonpoint source summary for the Smith Lake Subwatershed G-34

Table 35. Rural nonpoint source summary for the West Bend Subwatershed G-35

Table 36. Annual urban nonpoint pollutant loadings from the city of West Bend G-36

Table 37. Relative importance of urban sub-basins in the city of West Bend, West Bend Subwatershed, based on water and pollutant loadings G-37

Table 38. Relative importance of different land uses in the city of West Bend, West Bend Subwatershed, based on water and pollutant loadings G-38

Table 39. The percent of critical land uses contained within high priority urban sub-basins for the city of West Bend: West Bend Subwatershed G-39

Table 40. Amount of lead loading from critical land uses in three critical urban sub-basins located in the city of West Bend: West Bend Subwatershed G-40

Table 41. Estimated annual urban lead loading by land use for the year 2000 for the city of West Bend: West Bend Subwatershed G-41

Table 42. Estimated year 1985 urban nonpoint pollutant loadings by land use for the Newburg Study Area G-42

Table 43. Estimated year 2000 urban nonpoint pollutant loadings by land use for the Newburg Study Area G-43

Table 44. Rural nonpoint source summary for the Silver Creek Subwatershed G-44

Table 45. Relative importance of urban sub-basins in the city of West Bend, Silver Creek Subwatershed, based on water and pollutant loadings G-45

Table 46. Relative importance of different land uses in the city of West Bend, Silver Creek Subwatershed,based on water and pollutant loadings G-46

Table 47. The percent of critical land uses contained within high priority urban sub-basins for the city of West Bend: Silver Creek Subwatershed G-47

Table 48. Amount of lead loading from critical land uses in five critical urban sub-basins located in the city of West Bend: Silver Creek Subwatershed . . G-48

Table 49. Estimated annual urban lead loading by land use for the year 2000 for the city of West Bend: Silver Creek Subwatershed G-49

Table 50. Rural nonpoint source summary for the Quaas Creek Subwatershed G-50

Table 51. Relative importance of urban sub-basins in the city of West Bend, Quaas Creek Subwatershed, based on water and pollutant loadings G-51

Table 52. Relative importance of different land uses in the city of West Bend, Quaas Creek Subwatershed, based on lead loadings G-52

Table 53. The percent of critical land uses contained within high priority urban sub-basins for the city of West Bend: Quaas Creek Subwatershed G-53

Table 54. Amount of lead loading from critical land uses in three critical urban sub-basins located in the city of West Bend: Quaas Creek Subwatershed . . . G-54

Table 55. Estimated annual urban lead loading by land use for the year 2000 for the city of West Bend: Quaas Creek Subwatershed G-55

Table 56. Rural nonpoint source summary for the Daly Lake Subwatershed G-56

Table 57. Rural nonpoint source summary for the Green Lake Subwatershed G-57

Table 58. Sediment and phosphorus reduction goals for the East and West Watershed G-58

Table 59. Management decision criteria for pollution sources in the East and West Branches Milwaukee River Watershed G-59

Table 60. Preliminary site characteristics used to indicate low groundwater contamination potential from concentrated animal waste sources G-60

Table 61. Agricultural nonpoint pollution sources planned for control in the East and West Branches Milwaukee River Watershed, by Region G-61

Table 62. Agricultural nonpoint pollution sources planned for control in the East Region, East and West Branches Milwaukee River Watershed G-62

Table 63 Agricultural nonpoint pollution sources planned for control in the West and Upper Mainstem Region, East and West Branches Milwaukee River Watershed G-63

Table 64. Agricultural nonpoint pollution sources planned for control in the Lower Mainstem Region, East and West Branches Milwaukee River Watershed G-64

Table 65. Estimated best management practice needs for controlling rural nonpoint pollution sources in the East and West Branches Milwaukee River Watershed G-65

Table 66. Effectiveness of urban nonpoint source controls for reducing pollutant loadings in existing urban areas in the city of West Bend: Silver Creek Subwatershed G-66

Table 67. Effectiveness of urban nonpoint source controls for reducing pollutant loadings in planned urban areas in the city of West Bend: Silver Creek Subwatershed G-67

Table 68. Effectiveness of alternative urban nonpoint source control programs in achieving pollutant reduction goals for future land uses in the city of West Bend: Silver Creek Subwatershed G-68

Table 69. Effectiveness of urban nonpoint source controls for reducing pollutant loadings in existing urban areas in the city of West Bend: Quaas Creek Subwatershed G-69

Table 70. Effectiveness of urban nonpoint source controls for reducing pollutant loadings in planned urban areas in the city of West Bend: Quaas Creek Subwatershed G-70

Table 71. Effectiveness of alternative urban nonpoint source control programs in achieving pollutant reduction goals for future land uses in the city of West Bend: Quaas Creek Subwatershed G-71

Table 72. Effectiveness of urban nonpoint source controls for reducing pollutant loadings in existing urban areas in the city of West Bend: West Bend Subwatershed G-72

Table 73. Effectiveness of urban nonpoint source controls for reducing pollutant loadings in planned urban areas in the city of West Bend: West Bend Subwatershed G-73

Table 74. Effectiveness of alternative urban nonpoint source control programs in achieving pollutant reduction goals for future land uses in the city of West Bend: West Bend Subwatershed G-74

Table 75. Effectiveness of alternative urban nonpoint source control programs in achieving pollutant reduction goals for future land uses in the village of Kewaskum Study Area G-75

Table 76. Effectiveness of alternative urban nonpoint source control programs in achieving pollutant reduction goals for future land uses in the village of Campbellsport Study Area G-76

Table 77. Effectiveness of alternative urban nonpoint source control programs in achieving pollutant reduction goals for future land uses in the village of Newburg Study Area G-77

Table 78. Eligible best management practices and cost share rates for the East and West Branches Milwaukee River Watershed G-78

Table 79. Cost share budget needs for rural management practices in the East and West Branches Milwaukee River Watershed G-79

Table 80. Cost share budget for rural best management practices in the Washington County portion of the East and West Branches Milwaukee River Watershed G-80

Table 81. Cost share budget for rural best management practices in the Fond du Lac and Dodge County portions of the East and West Branches Milwaukee River Watershed G-81

Table 82. Cost share budget for rural best management practices in the Ozaukee County portion of the East and West Branches Milwaukee River Watershed G-82

Table 83. Cost share budget for rural best management practices in the Sheboygan County portion of the East and West Branches Milwaukee River Watershed G-83

Table 84. Estimated technical assistance needs for rural implementation in the East and West Branches Milwaukee River Watershed G-84

Table 85. Cost of alternative urban nonpoint source control program for existing, planned and future land uses in the city of West Bend: Silver Creek Subwatershed G-85

Table 86. Cost of alternative urban nonpoint source control program for existing, planned and future land uses in the city of West Bend: Quaas Creek Subwatershed G-86

Table 87. Cost of alternative urban nonpoint source control program for existing, planned and future land uses in the city of West Bend: West Bend Subwatershed G-87

Table 88. State and local costs associated with implementing nonpoint source controls in existing urban areas of the West Bend Study Area G-88

Table 89. Cost of alternative urban nonpoint source control program for existing, planned and future land uses in the village of Kewaskum Study Area G-89

Table 90. Cost of alternative urban nonpoint source control program for existing, planned and future land uses in the village of Campbellsport Study Area G-90

Table 91. Cost of alternative urban nonpoint source control program for existing, planned and future land uses in the village of Newburg Study Area G-91

Table 92. State and local costs associated with implementing nonpoint source controls in existing urban areas of the Kewaskum, Campbellsport, and Newburg Study Areas G-92

Table 93. Sites selected for evaluation monitoring in the East and West Branches Milwaukee River Watershed G-93

SUMMARY

INTRODUCTION

The East-West Watershed is one of five drainage areas in the Milwaukee River Basin, which also includes the North Branch, Menomonee, Cedar Creek, and the Milwaukee River South watersheds (Map 1). The East-West Watershed was designated as a "priority watershed" in 1984 under the Wisconsin Nonpoint Source Water Pollution Abatement Program (Nonpoint Source Control Program). It joins 31 other major drainage areas in the State which together total more than 3 million acres (see map, back cover). Here the clean-up of nonpoint source pollution is needed to protect and improve water resources.

The watershed lies in portions of five counties--Dodge, Fond du Lac, Ozaukee, Sheboygan, and Washington (Map 2). Approximately 50 percent lies in Fond du Lac County, with another 35 percent located in Washington County. Incorporated areas include the city of West Bend and the villages of Newburg, Kewaskum, and Campbellsport. All or portions of 19 townships are also included in the watershed.

In 1985, the population in the East-West Watershed was estimated at 43,000 persons. Trends suggest that the population will increase between 35 percent and 70 percent over the next 20 years. The increasing population will foster urban development and increase the resulting potential for nonpoint source pollution.

Rural land uses cover approximately 90 percent of the watershed. Of this, agricultural and related open space lands make up about two-thirds. Wetlands and surface water together cover one-sixth of the rural area, and woodlands most of the remaining one-sixth. Residential, commercial, and industrial land uses are concentrated in the four municipalities.

WATER QUALITY

The undulating, irregular topography in the East-West Watershed has resulted in about 265 miles of streams (Map 2). There are about 183 miles of perennial streams in the watershed. Perennial streams are those which maintain at least a small continuous flow most of the year. Approximately 159 miles (87 percent) of these streams are in their natural condition, while 24 miles (13 percent) are dammed or channelized. The longest perennial streams are listed with Map 1.

The intermittent streams have a combined length of approximately 80 miles. Intermittent streams generally maintain continuous flow only when runoff and groundwater discharge is highest. They form the headwaters of many perennial

streams in the watershed. They are relatively short, narrow, shallow, and drain small areas, thus making them very susceptible to nonpoint source pollution. More than 29 miles (36 percent) are channelized with 51 miles (64 percent) retaining their natural condition.

Forty-one named lakes, with a combined surface area of about 1,900 acres, are located in the watershed. This is about half the lakes contained in the entire Milwaukee River Basin. The major lakes, most having glacial origins, are listed with Map 1.

Fourteen named lakes are classified as impoundments. Most are located along the three main branches of the Milwaukee River. Many are no longer serving their original function and offer limited recreational opportunities because of shallowness and water quality problems. They also prohibit upstream migration of game fish, favor less desirable fish species, such as carp, and restrict navigation.

Wetlands provide wildlife habitat, fish spawning and rearing, recreation, detention of runoff and flood flows, and removal of pollutants. Wetlands are particularly important in this watershed because of their prevalence, location, high quality, and diversity. Here they constitute almost half of the wetlands in the entire Milwaukee River Basin.

Recurring water quality problems in rural areas include loss of aquatic habitat, excessive aquatic plant growth, low dissolved oxygen, and high bacteria levels. Pollutants that originate, at least in part, from rural nonpoint sources include sediment, nutrients, and fecal material. In urban areas, the list of problems and pollutants also includes contaminated sediments and chronic toxicity from heavy metals in surface waters, and destabilization of stream hydrology.

RURAL NONPOINT POLLUTION SOURCES

Rural nonpoint pollution sources in the East-West Watershed include barnyards, winter spread manure, cropland erosion and streambank erosion.

Upland Erosion: Soil loss per year is 157,000 tons in the watershed. However, internally drained lands are abundant, and the network of wetlands which filter out sediment is extensive. Therefore, relatively little of the eroded soil, is delivered to lakes and streams. Consequently, the portion of the total soil erosion that actually reaches surface waters is four percent or 6,300 tons per year for the entire watershed.

Streambank Degradation: Streambank degradation includes eroding streambanks that produce sediment, and areas where livestock cause habitat destruction through trampling of the streambed and streambank vegetation.

There are few seriously degraded streambanks in the watershed. Seventy-six sites were identified, producing about 420 tons of sediment per year. The streambank erosion problem occurs primarily along Quaas Creek and along the

Milwaukee River within and immediately downstream of the city of West Bend. One cause of streambank erosion in these areas is the increase in stream flows following changes in land uses.

Livestock access is an important factor along 56 percent of the degraded streambank. This causes increased channel width and decreased depth, destruction and streamside vegetation, higher water temperatures, destruction of habitat for aquatic life eaten by fish, and the direct pollution of the stream with manure.

Barnyard Runoff: There are a total 267 barnyards in the watershed. Only 158 of these (59 percent) are linked by channels to lakes and streams or their associated wetlands. These barnyards represent just over half of the barnyard runoff pollution potential. Most of this potential is caused by a small percentage of barnyards. For example the 15 barnyards having the highest surface water pollution potential account for 50 percent of the problem, and the worst 34 barnyards account for 75 percent of the problem.

Non-streamside "pocket" wetlands and shallow soils less than 24 inches deep over bedrock or groundwater together receive runoff from 39 barnyards (15 percent of total). These have low to moderate pollution potential, with relatively few posing a severe problem.

Finally, 70 barnyards (26 percent of total), have runoff that is internally drained to deep mineral soils. These make up 34 percent of the barnyard pollution potential and do not generally pose a nonpoint source pollution hazard.

Winter-Spread Manure: There are 233 livestock operations in the watershed, producing an estimated 162,000 tons of manure during late fall through mid-spring. Manure runoff from steeply sloping lands or lands near waterways is an environmental concern. It is estimated that 70 livestock operations (30 percent) do not have sufficient environmentally safe acres to avoid improper winter spreading. Thus, an estimated 1,530 acres of critical lands are winter spread with manure each year.

URBAN NONPOINT POLLUTION SOURCES

The urban lands in the watershed are concentrated primarily in and adjacent to the city of West Bend and the villages of Newburg, Kewaskum, and Campbellsport.

The West Bend area alone includes 75 percent of the urban lands and contributes about 75 percent of the urban pollutant load. Within this area, the lands draining directly to the Milwaukee River (West Bend Subwatershed) have the highest per acre pollutant loading, and the urban lands within the Quaas Creek Subwatershed have the lowest per acre pollutant loading. The urban lands within the Silver Creek Subwatershed have intermediate characteristics.

Extensive urban development is projected for the West Bend area (Map 10). Growth is expected to be 87 percent, and the pollution potential of post-development stormwater runoff could increase 109 percent if not controlled. The largest increase in pollutant loading, due to substantial urban development, would occur in the Quaas Creek Subwatershed.

The Kewaskum area includes 11 percent of the urban lands and produces 11 percent of the urban pollutant load. Projected future growth will increase this urban area by 128 percent (Map 12). If urban runoff is not controlled, the urban pollutant load will increase 150 percent.

The Newburg area includes seven percent of the urban lands and produces four percent of the urban pollutant load. Projected future growth will increase 135 percent in this urban area (Map 12). If urban runoff is not controlled, the urban pollutant load will increase nearly 10 times due to substantial development.

The Campbellsport area includes six percent of the urban lands and produces six percent of the urban pollutant load. Projected future growth will increase 60 percent in this urban area (Map 4). If urban runoff is not controlled, the urban pollutant load will increase 30 percent.

In addition to pollution potential from runoff in newly developed areas, there is also a tremendous pollution potential from construction erosion. This potential occurs in the four urban areas, as well as in unincorporated portions of the watershed.

POLLUTION REDUCTION GOALS

Extensive water quality and aquatic habitat investigations indicated that significant reductions are needed in several key pollutants to achieve the watershed project's objectives.

Two factors were considered in setting pollutant load reduction goals for the watershed project: 1) reducing pollution to improve and protect water resources within the watershed; and 2) sufficiently reducing pollution to improve surface waters outside the watershed including the Lower Milwaukee River and Milwaukee Harbor Estuary.

Sediment and Phosphorus: It was necessary to set high goals for sediment and phosphorus reduction in the East-West Watershed. In most of the East-West's subwatersheds the goal for sediment and total phosphorus reduction was set at about 50%. The achievement of these goals will ensure the protection of the East-West Watershed's surface waters and will significantly contribute to the cleanup efforts in the Milwaukee Harbor Estuary and the Milwaukee River Basin, which lie downstream.

Bacteria and Pathogens: Extensive bacteriological testing was conducted to determine if surface waters complied with the bacteria standards established

by Wisconsin Law for recreational uses. The instream goal is to achieve compliance.

The control strategy for nutrients will also effectively address the animal waste sources which have the highest potential for contributing bacteria.

There is a need for better identification of problem storm sewer discharges in the urban areas to see how practices recommended for control of sediment, toxins, and flow will affect bacteria reaching streams.

Urban Stormwater Pollutants: Three streams in the watershed are considered to be heavily influenced by urban runoff. These include Silver Creek, Engmann Creek, and portions of the Milwaukee River Main Stem (Map 10). Kewaskum Creek may also fall into this category. For these streams, the primary goal is to achieve 40 to 60 percent urban pollutant reduction in most cases by the year 2000. A secondary goal to maintain 1985 urban pollutant loads was established to prevent further degradation in streams.

The remaining urban streams including the West Branch in Campbellsport, the Milwaukee River Main Stem in Kewaskum and Newburg, and Quaas Creek in the city of West Bend, do not appear to be heavily impacted by urban stormwater pollutants. For these surface waters, the goal is to prevent urban pollutant loads from exceeding 1985 levels.

Flow Levels and Urban Stream Protection: Streams in the watershed that are expected to experience the greatest changes because of urbanization include Silver, Engmann, Washington, Quaas, and Kewaskum. Urbanization can lead to significant increases in runoff volumes and peak discharges, and decreases in stream base flows.

Increases in runoff volumes and peak discharges following urbanization tend to destabilize the streambed and streambank until a new equilibrium is reached. This results in greater scour and erosion. The goal for these streams is to maintain post-development runoff at existing levels for the mean (average) annual flood.

Stream base flows suitable for sustaining fish and aquatic life can be critical. Water temperatures must also be kept at levels that allow for survival and reproduction. Urbanization can lead to inadequate base flow volumes and water temperatures too high to support certain fish species.

MANAGEMENT ACTIONS

Management actions are described in terms of best management practices (BMPs). These are management measures or engineered structures needed to control nonpoint sources to the levels described above. State level funding is available to offset the expense of installing these practices and managing the local nonpoint source control program recommended in this plan.

Financial assistance is available for a variety of activities. In urban areas, state funds help support: 1) equipment expenses for accelerated street sweeping; 2) design and installation funds for stormwater control structures; 3) detailed engineering studies and stormwater plans for carrying out planning recommendations; 4) local staff for enforcement of local ordinances controlling construction site and stormwater runoff, and the implementation of street sweeping programs; and 5) information and education programs.

In rural areas, state funds provide assistance for: 1) installing best management practices; 2) providing local government staff support to contact landowners and implement management practices; and 3) information and education programs.

Participation in watershed projects is voluntary. Projects are implemented by local units of government, such as cities, villages, and counties. The Department of Natural Resources and the Department of Agriculture, Trade and Consumer Protection review the progress of the project. The Department of Natural Resources monitors improvements in water quality resulting from the control of the nonpoint sources.

The following is an overview of both urban and rural management actions needed to meet water quality goals in the East-West Watershed.

RURAL MANAGEMENT PROGRAM

The rural strategy targets reducing an estimated 50 percent of the watershed's total sediment load. Approximately five percent of this control will come from streambank protection, and 45 percent from the control of sediment from uplands.

The rural strategy also targets reducing an estimated 45 percent of the watershed's total phosphorus load. Approximately 25 percent of this control will come from upland practices, five percent from manure management, and 15 percent from barnyard runoff controls.

Sources of agricultural nonpoint pollution targeted for control include 63 barnyards, 14,609 acres of eroding uplands, 23,405 feet of degraded streambanks at 76 sites, 1,237 critical areas estimated to be inappropriately spread with manure each winter, and 20 barnyards that may be impacting pocket wetlands or groundwater, thus requiring further investigation.

A combination of contour cropping, contour strip cropping, reduced tillage, critical area stabilization, and crop rotation changes will reduce sediment delivery to surface waters from a large portion of the 14,609 critical cropland acres. Changes in crop rotation area a low-cost to no-cost alternative that can play a major role in meeting reduction targets. In fact this practice by itself, could meet the need on 43 percent of all critical fields. Agricultural sediment basins, vegetative filter strips and wetland restoration were identified as additional management practices that could be effective in reducing sediment from these areas.

Barnyard runoff management will include traditional runoff control systems that incorporate clear water diversions, sediment basins, filter walls, and filter strips. In addition, there may be a need to control runoff by using roofs over certain barnyards to prevent rain and snow from contacting manure. Finally, there is a potential need to relocate high-priority barnyards from sensitive floodplain areas.

Streambank fencing, shaping and seeding, and rip-rap are some of the traditional practices needed, as well as cattle and machinery crossings, on 23,405 feet of degraded streambank. Other more innovative practices that will help achieve better fish habitat while decreasing streambank erosion include livestock watering pumps and erosion controls that incorporate fish habitat structures.

URBAN MANAGEMENT PROGRAM

The urban management program has three major elements: construction erosion control; existing urban area control; and planned urban area control.

Extensive controls of construction site erosion throughout the incorporated and unincorporated portions of the watershed are important because of the potentially catastrophic impacts on water resources.

The project seeks to minimize the flow volume and pollutant loading impacts of new development on water resources. Specifically, the goals are to reduce or prevent increases in pollutant loads, prevent increases in peak discharges so that streambed and streambank erosion will not be increased, and maintain stream base flows and temperatures. Control of urban runoff from new development will be used in conjunction with control of runoff from existing areas.

In order to cost-effectively improve and protect urban streams, the program targets controls in areas that produce pollutants at the highest rates. For example, stormwater control practices will be installed in critical areas, and good "housekeeping" practices will be fostered to keep harmful materials out of the stormsewer system.

Principal urban management practices considered for controlling stormwater pollutants in the watershed include wet detention basins, infiltration devices, and accelerated street sweeping. These practices vary in effectiveness for controlling urban pollutants, reducing peak runoff discharges, and maintaining the infiltration of precipitation needed to support stream baseflows. Streambank stabilization will be used site specifically as needed.

Basic Elements of the Urban Management Program: The basic elements of the urban nonpoint source control program applicable to local governments include measures that can be implemented without further study. Adopting a community specific core program of basic activities is the first step in the

implementation process. Communities should work within the first three years of the project to start the core program.

The basic program elements are:

1) Develop, adopt and enforce a construction erosion control ordinance consistent with the "model" developed jointly by the Wisconsin League of Municipalities and the Department of Natural Resources. Construction erosion control practices should be consistent with the standards and specifications in the "Wisconsin Construction Site Best Management Practice Handbook".

2) Develop and implement a community specific program of urban "housekeeping" practices which reduce urban nonpoint source pollution. This may include a combination of information and education efforts, adoption of ordinances regulating pet wastes or changes in the timing and scheduling of leaf collection.

3) Implement an information and education program containing the elements and goals of the urban information and education strategy.

Advanced Elements of the Urban Management Program: More advanced elements of the urban nonpoint source program include those requiring site specific investigations prior to implementation.

The more advanced program elements are:

1. Adopt and enforce a comprehensive stormwater management ordinance.

2. Develop, as needed, management plans for planned urban development to identify the type and locations of structural urban best management practices.

3. Conduct detailed engineering studies to determine the best means to implement community specific nonpoint source control measures for existing urban areas, such as detention ponds, infiltration devices and accelerated street sweeping.

4. Design and install structural urban best management practices for existing urban areas with complete detailed engineering studies.

PROJECT PARTICIPANTS AND THEIR ROLES

Landowners and Land Operators: The owners and operators of both public and private lands are key groups, because they will implement voluntary best management practices. Rural landowners who have critical nonpoint pollution sources will work with their local Land Conservation Departments.

In urban areas, the general public will be encouraged by local municipalities through information and education programs. Owners and operators of established urban lands--such as existing parking lots, street surfaces, and

large rooftops--will work with their respective municipalities. Where the municipality owns or operates the land, it will work in a parallel fashion directly with the Department.

Land developers and builders will work directly with the appropriate municipal or county authorities.

Local Units of Government: Washington, Fond du Lac, Ozaukee, Sheboygan, and Dodge counties, working through their respective Land Conservation Departments, are the major management agencies for rural portions of the project. They will:

1. Contact high-priority landowners, develop conservation plans, and enter into cost share agreements.

2. Design practices, certify their installation, and reimburse landowners for construction costs.

3. Track changes in the land management inventory, pollutant load reductions from landowner involvement, and progress in completing the technical workload.

4. Enter into agreements with the Department to make cost share funds available to landowners and to support the staff needed to carry out watershed project responsibilities.

5. Work with the Department and towns within the watershed to identify construction erosion control needs for unincorporated areas.

6. Where appropriate, administer and enforce ordinances in unincorporated areas.

7. Cooperate through Land Conservation Department staff working with the UW-Extension in conducting information and education program activities.

The city of West Bend and the villages of Kewaskum, Newburg, and Campbellsport are the principal management agencies for urban portions of the project. Each will:

1. Contact owners or operators of critical urban lands where retrofitted practices to control nonpoint source pollution are eligible for cost sharing.

2. Where necessary, conduct further studies to determine which identified practices are feasible at specific locations.

3. Develop cost share agreements with the Department and private landowners to cover portions of cost for design and installation of practices.

4. Modify, or adopt and administer, construction erosion control ordinances.

5. Develop and implement stormwater management plans or ordinances to protect water resources from new development impacts.

6. Work with the UW-Extension to conduct urban educational activities.

Cooperating Agencies: The primary cooperating agencies that will assist in implementation include the U.S. Soil Conservation Service (SCS), the UW-Extension, and the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP).

Wisconsin Department of Natural Resources: The Department will:

1. Provide funding support for cost share agreements that counties and municipalities develop with landowners under their jurisdictions.

2. Enter into cost share agreements directly with units of government for control of pollution sources on lands that governments own or operate.

3. Provide technical assistance funding to local governments to support a wide range of activities.

4. Fund staff or establish professional services contracts to carry out most of the responsibilities identified for local units of government.

5. Fund staff and other expenses needed to carry out the information and education program.

6. Assist county staff with site reviews where wetland or groundwater impacts are suspected and with the integrating wildlife and fish management concerns into certain management practices.

7. Assist counties, cities, and villages in identifying any changes needed in their construction erosion control programs.

8. Assist municipalities in identifying additional actions needed to implement recommendations for control or urban runoff from existing and developing areas.

9. Conduct water resource monitoring and evaluation activities.

10. Provide administrative support for annual work planning and revisions of local assistance funding agreements.

INFORMATION AND EDUCATION

The primary purpose of the information and education program is to enhance implementation of watershed plan objectives. The educational plan includes recommendations for both general and specifically targeted activities. It is likely that the first years of educational activity within the watershed will

be among the most ambitious. However, it is also likely that the educational plan will be augmented through an annual updating process.

The key audience groups contained in the educational plan include the following: agricultural and environmental organizations, business and industrial associations, civic and service groups, politicians, the general public, landowners, and the local media.

The educational plan reflects a collective decision to informally practice a "lead county concept". Fond du Lac and Washington Counties should serve as co-leaders for the multi-county educational activities in the East-West Watershed because most of the watershed is contained in these counties. For the other Milwaukee River watersheds, the educational roles will be reversed. In all cases, however, participating landowners will work directly with their respective county or municipality.

The information and education program includes:

1) A media campaign to inform the public about nonpoint source pollution and what they can do to reduce it.

2) More intensive educational activities, such as meetings, workshops, tours, and demonstration projects for landowners and local government officials who must adopt new pollution control techniques.

3) Water quality newsletters for farmers, local government officials, community groups, and concerned citizens to inform them about watershed activities, implementation processes, and pollution control methods.

4) Educational activities and service projects for youth targeting water resource issues and the development of a conservation ethic.

BUDGET AND STAFFING NEEDS

Rural Budget Needs: The total cost of meeting the identified rural pollution reduction objectives is approximately $3.67 million. State funds necessary to cost share this level of control would be about $2.37 million, and the local share provided by landowners would total about $1.3 million. If the voluntary level of participation is lower than recommended, then the funds needed for cost sharing at both levels would also be lower.

Rural Staffing Needs: The total technical assistance workloads that develop for the county Land Conservation Departments over the 8-year project will vary depending on the level of landowner cooperation. The total estimated technical assistance workload for the rural portion of the project is anticipated to be between 33,000 hours and 54,000 hours, based on participation levels of 50 and 100 percent, respectively. This is equivalent to a full-time staff equivalent of 18 to 30 staff-years of effort, and will require salary and fringe benefits of $460,000 to $756,000 over 8 years.

Urban Budget Needs: All costs associated with practices for planned urban development must be borne locally, since these costs are not eligible through the Nonpoint Source Control Program. However, the State covers 70 percent of the capital cost of infiltration and detention and 50 percent of the cost of accelerated street sweeping in existing urban areas, while 30 to 50 percent of these capital costs and all maintenance costs must be borne locally.

Cost estimates for feasibility studies, stormwater management planning, or practice design and certification have not been made at this time although they are important components of implementing stormwater management programs. Costs associated with any needed changes in construction erosion control programs have also not been estimated. The Nonpoint Source Control Program will cover a portion of the cost associated with these activities. Most costs would be incurred in the West Bend area. The estimated costs include the construction and maintenance of detention and infiltration devices and for accelerated street sweeping programs. The total cost of urban controls in the watershed is estimated at $9.5 million.

PROJECT EVALUATION

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

Local Implementation: This information includes evaluating accomplishments of the workplan goals. It will be used jointly by local project managers, Department support staff, and staff from other participating agencies to identify adjustments needed in project implementation.

Changes in Land Management: This information will be used to track progress toward pollutant reduction goals, and serve in part as an indicator of project success.

Changes in Water Resources: This information is used to determine if the water resource objectives are being met. In conjunction with changes in pollutant loading, it will serve as an indicator of project success.

CHAPTER I

PLAN PURPOSE AND LEGAL STATUS

INTRODUCTION

The East and West Branches of the Milwaukee River Watershed (East-West Watershed) is one of five drainage areas in the Milwaukee River Basin which was designated as a "priority watershed" in 1984 under the Wisconsin Nonpoint Source Water Pollution Abatement Program (Nonpoint Source Control Program). It joins 31 other major drainage areas in the state, which together encompass more than three million acres, in which the cleanup of nonpoint sources of pollution is needed to protect and improve water resources.

NONPOINT SOURCE CONTROL PROGRAM

The Nonpoint Source Control Program (Program) was created in 1978 by the State Legislature. Its primary goal is to improve and protect surface and groundwater quality by reducing pollution caused by nonpoint sources. The following is a brief overview of the Program.

1. The Program achieves water quality improvement through:

    a. Voluntary implementation of accepted land management practices, including the adoption of ordinances, in order to control urban and rural nonpoint sources determined to be impacting water quality.

    b. The conduct of Information and Education Programs to illustrate the sources and impacts of nonpoint pollution, alternative control measures, and their effectiveness.

2. The Program is administered at the state level by the Department of Natural Resources (Department), with cooperation from the Department of Agriculture, Trade, and Consumer Protection (DATCP).

3. A priority watershed project is implemented locally by cities, counties, villages, and other units of

government. Implementation is guided by this priority watershed plan.

4. Landowners, land renters, counties, cities, villages, towns, sanitary districts, lake districts, and other state agencies are eligible to participate in the Program. Participation is encouraged by state level cost share assistance to help offset the cost of installing recommended land management practices.

PROJECT PLANNING AND IMPLEMENTATION

The East-West Branch Priority Watershed Project (East-West Watershed) is being carried out in two phases--planning and implementation.
The planning phase was initiated in 1985. Principal planning activities included:

a. Appraisal of the conditions and uses of the surface water resources.

b. Assessment of the types and severity of nonpoint pollution sources.

c. Assessment of the types and severity of other human-induced factors and natural conditions affecting water quality. Examples include point sources of pollution and natural stream conditions.

d. Determination of the management levels necessary to achieve desired water quality conditions.

e. Identification of the implementation measures necessary to attain the identified management levels.

f. Preparation and approval of a priority watershed plan documenting the above referenced evaluations, management levels, implementation procedures, and costs.

These planning activities were conducted jointly by the Department of Natural Resources (Department), the Department of Agriculture, Trade, and Consumer Protection (DATCP), county Land Conservation Departments (LCD), and the University of Wisconsin Cooperative Extension Service (UW-Extension). Principal support was provided by the Southeastern Wisconsin Regional Planning Commission (SEWRPC), the United States Department of Agriculture-Soil Conservation Service (SCS), and a watershed advisory group representing elected officials, citizens, and resource management professionals from urban and rural portions of the watershed.

Implementation is the second phase of the project, and begins following approval of this plan by the Department, the DATCP, and the Boards of Supervisors for counties within the project area. Subsequently, the Department enters into local assistance agreements with the counties and other units of government identified as having implementation responsibility. These agreements provide the units of government with the funds necessary to maintain the resources and staff necessary for the eight year plan implementation period.

Plan implementation is achieved primarily by entering into cost share agreements with eligible landowners and operators for installation of land management practices. During an initial three year period, eligible landowners will be contacted to determine their interest in voluntary installation of land management practices identified in the plan. The cost share agreement signed by the landowner and the county or other implementing body, outlines the practices, costs, cost share amounts, and a schedule for installation. The practices are scheduled for installation up to five years from the date of signing the cost share agreement.

LEGAL STATUS

The East-West Watershed Plan was prepared under the authority of the Wisconsin Nonpoint Source Water Pollution Abatement Program described in Section 144.25 of the Wisconsin Statutes and Chapter NR 120, Wisconsin Administrative Code. This plan is the basis for cost share and local assistance grants through the nonpoint source pollution abatement program and as such is used as a guide to implement the measures to achieve the desired water quality conditions. In the event that a discrepancy occurs between this plan and the statutes or the administrative rules, or if the statutes or rules are changed during implementation, the statutes and rules will supersede the plan

Following approval by the Department, the DATCP, and the counties involved with the project, this plan becomes an element of the two water quality management plans formerly prepared by the Department and the Southeastern Wisconsin Regional Planning Commission for this area (SEWRPC, 1979a; WDNR, 1980).

RELATIONSHIP OF THE NONPOINT SOURCE PLAN TO THE INTEGRATED RESOURCE MANAGEMENT PLAN

This watershed is one of five drainage areas in the Milwaukee River Basin. The Milwaukee River Basin, 833 square miles in size, drains to Lake Michigan in the city of Milwaukee and occupies portions of seven counties--Dodge, Fond du Lac, Milwaukee, Ozaukee, Sheboygan, Washington, and Waukesha. It contains over 430 miles of streams and 21 major lakes with a combined surface area of 3,400 acres. The Milwaukee River Basin is home to more than one million

people--20 percent of the state's population--making it the most extensively urbanized major drainage area in Wisconsin.

The Department took the initiative provided by the comprehensive clean up of nonpoint source pollution to design and implement a new approach to natural resource management in the Milwaukee River Basin. This innovative approach is termed "integrated resource management." It uses the nonpoint source program as the foundation for coordinating other Departmental environmental protection (solid waste, wastewater, water regulation and zoning, water resources management, water supply) and resource management (fisheries, forest management, parks and recreation, and wildlife and endangered resources management) efforts.

This coordinated approach is documented in a seven volume report entitled Milwaukee River Basin Integrated Resource Management Plan (WDNR, 1988a) It was prepared by the Department with the cooperation of an advisory committee and six subcommittees, whose membership includes representatives of local, state, and federal units and agencies of government. The plan establishes comprehensive goals and management strategies for the Department's environmental protection and resource management programs. It also serves as a vehicle to coordinate these Departmental activities with similar efforts of local, state, and federal units and agencies of government.

Importantly, this integrated resource management plan is incorporated herein by reference. Consequently, this nonpoint source pollution control plan meets the requirements of Section 144.25 of the Wisconsin Statutes. This statute requires the Department to develop "an integrated resource management strategy to protect or enhance fish and wildlife habitat, aesthetics, and other natural resources" for priority watersheds.

Organization and Use of This Priority Watershed Plan

The remainder of this watershed plan is divided into six chapters.

CHAPTER II, "General Watershed Characteristics," presents general characteristics of the East-West Watershed, and is meant to provide the reader with an overview of the cultural and natural resource features pertinent to planning for nonpoint source pollution control within the project area.

CHAPTER III, "Water Quality Conditions, Nonpoint Sources, and Water Resource Objectives," presents the findings of the water resource appraisals and the land management inventories, and identifies water resources objectives for the Nonpoint Source Control Program. Information in this chapter is presented at three levels. First, general information is presented about water quality and nonpoint sources for the watershed as a whole. Secondly, information is arranged by major regions of the watershed that parallel those discussed in the integrated resource management plan for the East-West Watershed (WDNR, 1988b). Finally, more

detailed information is presented on a subwatershed basis that includes water quality information, data on nonpoint source pollution, and a statement the project objectives for water resources in each subwatershed.

CHAPTER IV, "Nonpoint Source Control Needs," identifies the level of urban and rural nonpoint source control needed to meet the project objectives, identifies decision criteria for determining when specific pollution sources need to be controlled, and identifies the level of land management needed in rural and urban areas.

CHAPTER V, "Detailed Program for Implementation," presents details of the implementation program that local units of government will use in conducting this project. This chapter presents guidance concerning project administration and financial management, lays out an Information and Education Program strategy, identifies the local assistance and cost sharing budget for each unit of government, and identifies the procedures to be used for tracking and evaluating the project.

CHAPTER VI, "Information and Education Program," contains the Information and Education Program strategy that will be used during the eight year project period.

CHAPTER VII, "Project Evaluation and Monitoring," presents the evaluation and monitoring techniques used to determine the condition of surface and groundwater resources and the nonpoint sources impacting them.

PART ONE
THE WATERSHED ASSESSMENT

CHAPTER II - GENERAL WATERSHED CHARACTERISTICS

CHAPTER III - WATER QUALITY CONDITIONS, NONPOINT SOURCES, AND WATER RESOURCE OBJECTIVES

CHAPTER IV - NONPOINT SOURCE CONTROL NEEDS

CHAPTER II
GENERAL WATERSHED CHARACTERISTICS

INTRODUCTION

The East-West Watershed is a 265 square mile, L-shaped surface water drainage area. It is the largest--occupying about 32 percent--of the five watersheds in the Milwaukee River Basin. Map 1 shows the location of the East-West Watershed within the Milwaukee River Basin.

The following is a description of the watershed's cultural and natural resource features pertinent to planning for the nonpoint source implementation program. Additional descriptive information is contained in the Milwaukee River East-West Branch Watershed Integrated Resource Management Plan:2000 (WDNR, 1988b).

CULTURAL FEATURES

Civil Divisions

The watershed lies in portions of five counties--Dodge, Fond du Lac, Ozaukee, Sheboygan, and Washington. Approximately 50 percent of the watershed lies in Fond du Lac County, with most of the remainder--35 percent--located in Washington County. The incorporated areas include the city of West Bend and the villages of Campbellsport, Kewaskum, and Newburg. The watershed also encompasses all or portions of 19 townships.

Population Size and Distribution

The 1985 watershed population was estimated to be 43,000 persons. The majority, approximately 33,600 persons, or 78 percent, reside in Washington County. Approximately 25,100 persons, or 58 percent, live in the city of West Bend and the villages of Campbellsport, Kewaskum, and Newburg. The remaining 17,900 persons, or 42 percent, reside outside the incorporated areas primarily in subdivisions, isolated small enclaves of residential development, or on farmsteads.

Regional and watershed specific trends suggest that the population will increase by between 35 and 70 percent over about the next 20 years, resulting in a population of between 58,000 and 73,000 persons by the year 2010. The increasing population and anticipated decrease in household size will increase the amount of urban development and its attendant nonpoint source pollution potential.

Land Uses

Rural land uses comprise approximately 90 percent, of the drainage area. The predominant rural land uses are agricultural and other related open land uses, which cover about two-thirds of the rural area. Wetlands and surface water together cover about one-sixth of the rural area, with woodlands comprising the remaining land use.

Transportation and utility facilities are the predominant urban land uses, and are generally distributed uniformly throughout the watershed. Residential, commercial, and industrial land uses are concentrated in the city of West Bend and the villages of Campbellsport, Kewaskum, and Newburg.

Municipal and Industrial Point Sources of Water Pollution

A consequence of urban development and economic growth is the generation of municipal (domestic, commercial, and industrial) and industrial wastewater. Discharge to surface water and groundwater systems is regulated by the Department. Detailed information on point sources of pollution is presented in the integrated resource management plan for this watershed (WDNR, 1988b).

Municipal wastewater treatment plants in the city of West Bend, and the villages of Kewaskum and Newburg discharge treated wastewater to the Main Stem of the Milwaukee River. The municipal facility located in the village of Campbellsport, which presently discharges effluent to the groundwater through a soil absorption system, is presently undergoing modifications and will begin discharging to the Main Stem of the Milwaukee River in 1989.

Two additional small wastewater treatment facilities are located in the northern portion of the watershed. They are the Kettle Moraine Correctional Institution and the Long Lake Recreational Facility, both of which discharge effluent to the groundwater through soil absorption systems.

Eight industrial wastewater discharges are located in the watershed. They all discharge to the Milwaukee River through either storm sewers or effluent pipes. The discharges are comprised primarily of non-contact cooling water.

Sanitary Sewer Service

Sanitary sewer service is limited to areas in and immediately adjacent to the city of West Bend, and the villages of Campbellsport, Newburg, and Kewaskum. The existing service area for these is approximately eight square miles in areal extent, or about three percent of the watershed. Approximately 26,300 persons, or about 62 percent of the population receive service. Wastewater generated by the remainder of the 16,700 watershed residents is disposed of by private onsite systems.