



US Army Corps
of Engineers
St. Paul District

UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM

DEFINITE PROJECT REPORT/
ENVIRONMENTAL ASSESSMENT (SP-12)

SPRING LAKE PENINSULA
HABITAT REHABILITATION
AND ENHANCEMENT PROJECT

POOL 5
UPPER MISSISSIPPI RIVER
BUFFALO COUNTY, WISCONSIN

AUGUST 1991

EXECUTIVE SUMMARY

Spring Lake is a 302-acre backwater area located on the Wisconsin side of the Mississippi River in lower pool 5. The site lies within the Upper Mississippi River Wildlife and Fish Refuge. The lake is triangular in shape, bounded by the Wisconsin shoreline, the dam 5 dike, and a series of islands and a peninsula that partially separates it from the river. The lake was previously a quiet, protected area with much diversity, making it a valuable area for fish and wildlife. However, a natural peninsula protecting Spring Lake has been breached, allowing flow and sediments into the lake that reduces the habitat quality for centrarchids, especially during the winter.

The ultimate goal of the project is to improve winter and summer centrarchid habitat in Spring Lake. Specific project objectives to accomplish this goal include decreasing winter flow velocities while maintaining acceptable dissolved oxygen levels and water temperatures. It is also desirable to create additional deep water fish habitat.

The plan formulation process considered several alternatives for addressing the project objectives including closing the breach in the peninsula, restoring and creating barrier islands, and dredging. During the planning process it was determined that closing the breach was a minimum requirement to address project objectives and would be a component of any plan. Construction of two barrier islands was also found to be incrementally beneficial and could provide significant habitat benefits, but because of public and agency priorities and current budget constraints, only the closing of the breach was selected for implementation at this time. The Spring Lake islands project has been scheduled in the program for further study.

The selected plan includes closing the breach in the peninsula at the upper end of Spring Lake with a 550-foot-long closure constructed of a combination of pervious fill and fine material. Rock riprap would be used to stabilize the 1 vertical on 3 horizontal slope on the upstream side. The top width would be 20 feet at 5 feet above normal pool with a 1 on 10 to 1 on 40 slope on the downstream side. The pervious fill for the closure would be obtained by mechanically dredging from a slough in the backwater and the fine material from the downstream side of the structure within Spring Lake. Total direct construction cost of the selected plan is estimated to be \$194,000. Indirect costs for engineering and design work and construction supervision and administration bring the total project cost to \$283,000. During the general design phase of this project, \$74,000 was expended. Average annual operation and maintenance costs of the project are estimated to be \$1,000 and would be the responsibility of the U.S. Fish and Wildlife Service, in cooperation with the non-Federal sponsor, the Wisconsin Department of Natural Resources.

The selected plan would reduce the sediment load into Spring Lake and protect future loss of about 50 acres of centrarchid habitat. The habitat would be enhanced by the elimination of cold water flows into the area during the winter. The rock riprap would improve the value of the area for lithophilic fish species and the dredging would provide additional deep water habitat and improve dissolved oxygen levels for centrarchids. Plans to monitor the project for performance evaluation purposes were designed to measure the attainment of project objectives. The monitoring parameters include measurement of flow in the upper end of Spring Lake, diel dissolved oxygen levels during summer and winter, and winter water temperatures. The estimated average annual cost of evaluation over the 50-year project life is \$460.

The District Engineer has reviewed the proposed project accomplishments in relation to its cost and has determined that implementation of the selected plan is a justified expenditure of Federal funds. Therefore, approval by the Secretary of the Army for construction of the Spring Lake breach closure is recommended by the St. Paul District Engineer at a 100-percent Federal construction cost estimated to be \$283,000. The District Engineer further recommends that funds be allocated to begin preparation of plans and specifications for the project.

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ST. PAUL DISTRICT, CORPS OF ENGINEERS
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ST. PAUL, MINNESOTA 55101-1479
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TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
INTRODUCTION	DPR-1
AUTHORITY	DPR-1
PROJECT SELECTION PROCESS	DPR-2
PARTICIPANTS AND COORDINATION	DPR-3
PROJECT LOCATION AND PURPOSE	DPR-4
FISH AND WILDLIFE MANAGEMENT GOALS IN THE PROJECT AREA	DPR-5
U.S. Fish and Wildlife Service	DPR-5
Wisconsin Department of Natural Resources	DPR-5
Corps of Engineers	DPR-6
EXISTING CONDITIONS	DPR-6
PHYSICAL SETTING	DPR-6
GEOMORPHOLOGY	DPR-6
WATER RESOURCES	DPR-7
GEOLOGY AND SOILS	DPR-9
Geology	DPR-9
Soils	DPR-9
Sediment Transport and Substrate Type	DPR-9
Sediment Quality	DPR-10
NATURAL RESOURCES	DPR-11
Habitat Types and Distribution	DPR-11
Fish and Wildlife	DPR-11
Threatened and Endangered Species	DPR-12
Vegetation	DPR-12
Water Quality	DPR-13
CULTURAL RESOURCES	DPR-14
RECREATION/AESTHETIC RESOURCES	DPR-14
SOCIOECONOMIC RESOURCES	DPR-14
Population	DPR-15
FUTURE WITHOUT PROJECT CONDITIONS	DPR-15
HISTORICALLY DOCUMENTED CHANGES IN HABITAT	DPR-15
FACTORS INFLUENCING HABITAT CHANGE	DPR-15
ESTIMATED FUTURE HABITAT TYPES AND DISTRIBUTION	DPR-16
Geomorphology	DPR-16
Hydrology	DPR-16
Sediment Transport	DPR-16
Water Quality	DPR-16
Vegetation	DPR-16
Future Habitat Types and Distribution	DPR-17

<u>SUBJECT</u>	<u>PAGE</u>
PROBLEM IDENTIFICATION	DPR-17
EXISTING HABITAT DEFICIENCIES	DPR-17
ESTIMATED FUTURE HABITAT DEFICIENCIES	DPR-17
PLANNING OPPORTUNITIES	DPR-18
PLANNING CONSTRAINTS	DPR-18
HYDROLOGIC	DPR-18
ENGINEERING	DPR-19
ECOLOGICAL	DPR-19
RECREATION	DPR-19
LEGAL	DPR-19
ECONOMIC	DPR-19
PROJECT OBJECTIVES	DPR-20
Fisheries Habitat Improvement Objectives	DPR-20
Wildlife Habitat Improvement Objectives	DPR-21
PLAN FORMULATION	DPR-22
ALTERNATIVES CONSIDERED	DPR-22
No Action	DPR-23
Breach Closure	DPR-23
Barrier Islands	DPR-23
ALTERNATIVE EVALUATION	DPR-24
No Action	DPR-24
Alternative A	DPR-24
Alternative B	DPR-25
Alternative C	DPR-26
Alternative D	DPR-26
Alternative E	DPR-26
Alternative Summary	DPR-26
SELECTED PLAN OF ACTION	DPR-30
Sources of Fill Material	DPR-30
Construction Methods	DPR-30
Project Support	DPR-31
Project Accomplishments	DPR-31
Real Estate Requirements	DPR-31
ENVIRONMENTAL ASSESSMENT	DPR-31
RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS	DPR-31
NATURAL RESOURCES EFFECTS	DPR-33
Terrestrial Habitat	DPR-33
Aquatic Habitat	DPR-33
Water Quality	DPR-33
Fish and Wildlife	DPR-33
Endangered Species	DPR-34
Air Quality	DPR-34
SOCIOECONOMIC FACTORS	DPR-34
Noise Pollution	DPR-34
Recreation and Aesthetic Values	DPR-34
CULTURAL RESOURCES	DPR-34
COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS	DPR-35
PROJECT REQUIREMENTS	DPR-35
OPERATION AND MAINTENANCE	DPR-35
COST ESTIMATE	DPR-36
PERFORMANCE EVALUATION	DPR-37

SUBJECTPAGE

PROJECT IMPLEMENTATION	DPR-38
DIVISION OF PLAN RESPONSIBILITIES	DPR-38
COST APPORTIONMENT	DPR-39
Construction	DPR-39
Operation and Maintenance	DPR-39
STEPS PRIOR TO PROJECT CONSTRUCTION	DPR-39
RECOMMENDATIONS	DPR-40
LITERATURE CITED	DPR-41

List of Tables

DPR-1. Area of Habitat Types in Spring Lake	DPR-11
DPR-2. Project Goals, Objectives, and Alternative Enhancement Features	DPR-22
DPR-3. Summary of Habitat Benefits and Costs	DPR-27
DPR-4. Incremental Analysis of Alternatives	DPR-29
DPR-5. Impact Assessment Matrix	DPR-32
DPR-6. Cost Estimate for the Selected Plan	DPR-36
DPR-7. Monitoring and Performance Evaluation Matrix	DPR-37
DPR-8. Pre- and Post-construction Measurements	DPR-38

List of Attachments

1. Plates (15)
2. Finding of No Significant Impact
3. Section 404(b)(1) Evaluation
4. Letters of Intent
5. Coordination
6. Draft Memorandum of Agreement for Operation and Maintenance
7. Distribution List
8. Detailed Cost Estimate

SPRING LAKE PENINSULA
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INTRODUCTION

AUTHORITY

The authority for this report is provided by Section 1103 of the Water Resources Development Act of 1986 (Public Law 99-662). The proposed project would be funded and constructed under this authorization. Section 1103 is summarized as follows:

Section 1103. UPPER MISSISSIPPI RIVER PLAN

(a)(1) This section may be cited as the Upper Mississippi River Management Act of 1986.

(2) To ensure the coordinated development and enhancement of the Upper Mississippi River system, it is hereby declared to be the intent of the Congress to recognize that system as a nationally significant ecosystem and a nationally significant commercial navigation system....The system shall be administered and regulated in recognition of its several purposes.

(e)(1) The Secretary, in consultation with the Secretary of the Interior and the states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin, is authorized to undertake, as identified in the Master Plan -

(A) a program for the planning, construction, and evaluation of measures for fish and wildlife habitat rehabilitation and enhancement....

A design memorandum (or implementation document) did not exist at the time of the enactment of Section 1103. Therefore, the North Central Division, U.S. Army Corps of Engineers, completed a "General Plan" for implementation of the Upper Mississippi River System Environmental Management Program (UMRS-EMP) in January 1986. The U.S. Fish and Wildlife Service (USFWS), Region 3, and the five affected States (Illinois, Iowa, Minnesota, Missouri, and Wisconsin) participated through the Upper Mississippi River Basin Association. Programmatic updates of the General Plan for budget planning and policy development are accomplished through Annual Addendums.

Coordination with the States and the USFWS during the preparation of the General Plan and Annual Addendums led to an examination of the Comprehensive Master Plan for the Management of the Upper Mississippi River System. The Master Plan, completed by the Upper Mississippi River Basin Commission in 1981, was the basis of the recommendations enacted into law in Section 1103. The Master Plan report and the General Plan identified examples of potential habitat rehabilitation and enhancement techniques. Consideration of the Federal interest and Federal policies has resulted in the conclusions below:

Project Eligibility Criteria -

a. (First Annual Addendum). The Master Plan report...and the authorizing legislation do not pose explicit constraints on the kinds of projects to be implemented under the UMRS-EMP. For habitat projects, the main eligibility criterion should be that a direct relationship should exist between the project and the central problem as defined by the Master Plan; i.e., the sedimentation of backwaters and side channels of the Upper Mississippi River System (UMRS). Other criteria include geographic proximity to the river (for erosion control), other agency missions, and whether the condition is the result of deferred maintenance....

b. (Second Annual Addendum).

(1) The types of projects that are definitely within the realm of Corps of Engineers implementation authorities include the following:

- backwater dredging
- dike and levee construction
- island construction
- bank stabilization
- side channel openings/closures
- wing and closing dam modifications
- aeration and water control systems
- waterfowl nesting cover (as a complement to one of the other project types)
- acquisition of wildlife lands (for wetland restoration and protection) Note: By letter of 5 February 1988, the Office of the Chief of Engineers directed that such projects not be pursued.

(2) A number of innovative structural and nonstructural solutions that address human-induced impacts, particularly those related to navigation traffic and operation and maintenance of the navigation system, could result in significant long-term protection of UMRS habitat. Therefore, proposed projects which include such measures will not be categorically excluded from consideration, but the policy and technical feasibility of each of these measures will be investigated on a case-by-case basis and the measures will be recommended only after consideration of system-wide effects.

PROJECT SELECTION PROCESS

Projects are nominated for inclusion in the District's habitat program by the respective State natural resource agency and the U.S. Fish and Wildlife Service based on agency management objectives. To assist the District in the selection process, the States and USFWS agreed to utilize the expertise of the Fish and Wildlife Work Group (FWWG) of the River Resources Forum (RRF) to consider critical habitat needs along the Mississippi River and prioritize nominated projects on a biological basis. The FWWG consists of biologists responsible for managing the river for their respective agency.

In phase one, the individual projects proposed by the various Federal and State agencies were ranked according to the prioritized resource problems that the individual projects addressed and other ranking factors. The resource problems identified and prioritized in a pool included backwater sedimentation, water quality, erosion, lack of important habitat, and lack of habitat protection. The other ranking factors considered included anticipated

fisheries benefits, wildlife benefits, habitat diversity, ease of implementation, potential for innovative or experimental techniques to be used, project longevity, maintenance, and socioeconomic benefits. The second phase of the evaluation involved the development of a prioritized list of the top 20 projects within the St. Paul District based on the numerical ranking from phase one and other factors. The ranking was forwarded to the RRF for consideration of the broader policy perspectives of the agencies involved. The RRF submitted the coordinated ranking to the District and each agency officially notified the District of its views on the ranking. The District then formulated and submitted a program consistent with the overall program guidance as described in the UMRS-EMP General Plan, Annual Addenda, and additional guidance provided by the North Central Division, Corps of Engineers.

Projects consequently have been screened by biologists closely acquainted with the river. Resource needs and deficiencies have been considered on a pool-by-pool basis to ensure that regional needs are being met and that the best expertise available is being used to optimize the habitat benefits created at the most suitable locations. Through this process the Spring Lake Peninsula project was recommended and supported as capable of providing substantial habitat benefits. In the FWG initial 1987 evaluation process, the Spring Lake project scored the highest of all projects evaluated and was ranked number one on the list recommended for implementation.

PARTICIPANTS AND COORDINATION

Participants in the planning process included the U.S. Fish and Wildlife Service (Upper Mississippi River Wildlife and Fish Refuge and Region 3 Office), the Wisconsin and Minnesota Departments of Natural Resources, and the St. Paul District, U.S. Army Corps of Engineers (COE). The U.S. Fish and Wildlife Service (USFWS) was a cooperating agency throughout the process as required by regulations developed by the Council on Environmental Quality for the implementation of the National Environmental Policy Act (40 CFR 1500-1508). The following study team members visited Spring Lake in August 1989 to discuss problems and objectives:

Don Powell	Project Manager	Corps of Engineers
Daniel Wilcox	Fisheries Biologist	Corps of Engineers
Mark Rodney	Hydraulic Engineer	Corps of Engineers
Winston Riedesel	Civil Engineer	Corps of Engineers
Al Kean	Geotechnical Engineer	Corps of Engineers
Loren Nishek	Design Engineer	Corps of Engineers
Ronald Benjamin	Fisheries Manager	Wisconsin DNR
Robert Moody	EMP Coordinator	Wisconsin DNR
Keith Beseke	EMP Coordinator	USFWS
Tim Julison	Wildlife Biologist	USFWS
Gary Grunwald	Fisheries Biologist	Minnesota DNR

A Problem Appraisal Report was prepared after the site visit and initial meeting to:

- * Document the extent of the project area.
- * Describe existing and probable future conditions within Spring Lake.
- * Identify resource management goals for the project area.
- * Identify planning constraints and opportunities.
- * Identify habitat objectives for the project area.
- * Describe alternative plans for Spring Lake habitat rehabilitation and enhancement.
- * Identify information needed to select an alternative and design the project.

Correspondence was also initiated between the agencies to coordinate the project at various stages of development. A public meeting with about 60 people in attendance was held on June 5, 1990, in Buffalo City, Wisconsin, to discuss the study and project alternatives. A preliminary draft of this report was sent to the U.S. Fish and Wildlife Service and the States of Wisconsin and Minnesota for review and comment. The comments that were received and the results of meetings with the agencies and individuals were used to select and develop a plan. Written comments are included in attachment 5. The draft Definite Project Report/Environmental Assessment and/or public notice was sent to the agencies and interests listed in attachment 7. A second public meeting was held on June 19, 1991, at Buffalo City to describe the proposed plan and obtain comments. A memo for the record and list of attendees is included in attachment 5. Comments received from the Wisconsin Department of Natural Resources are also included in attachment 5. The report was revised to address these comments. This final report includes the environmental assessment, Finding of No Significant Impact, and modifications based on public and agency comments.

PROJECT LOCATION AND PURPOSE

Spring Lake is a 302-acre backwater area located on the Wisconsin side of the Upper Mississippi River (UMR) in lower pool 5, approximately 1 mile downstream of Buffalo, Wisconsin (see Plates 1 and 2). The Spring Lake project area is triangular in shape, bounded by Belvidere Slough on the west, the Wisconsin shore on the east, and the dam 5 dike on the south. The project area includes the area east of the chain of islands separating Spring Lake from Belvidere Slough, including the islands and the peninsula at the upstream end of Spring Lake. The study area includes about 14 acres of terrestrial floodplain habitat, 100 acres of vegetated aquatic habitat, and 188 acres of open water. The project area is owned by the Corps of Engineers and cooperatively managed and administered by the USFWS as part of the Upper Mississippi River Wildlife and Fish Refuge. The area was originally acquired for the development and operation of the navigation system.

The purpose or goal of the project is to restore and maintain centrarchid fisheries and enhance aquatic plant bed development in Spring Lake for fish and wildlife.

FISH AND WILDLIFE MANAGEMENT GOALS IN THE PROJECT AREA

The USFWS, WDNR, and COE have direct management responsibilities for the Spring Lake area. The following describes the resource management goals of each agency for the project area.

U.S. Fish and Wildlife Service - Fish and wildlife management goals for the area are defined in the Upper Mississippi River Wildlife and Fish Refuge Master Plan (USFWS 1988). The management goals listed in the Master Plan that most directly apply to the study area include:

- * Reduce the adverse impacts of sedimentation and turbidity entering the river system.
- * Eliminate or reduce adverse impacts of water quality degradation.
- * Preserve unique and/or representative ecotypes.
- * Restore species that are in critical condition and achieve the national population or distribution objectives.
- * Maintain or improve habitat of migrating waterfowl using the UMR.
- * Maintain or increase the populations and distribution of colonial nesting birds.
- * Increase production of historically nesting waterfowl.
- * Contribute to the achievement of the national population and distribution objectives identified in the North American Waterfowl Management Plan and flyway management plans.
- * Maintain and enhance, in cooperation with the States, the habitat of fish and other aquatic life on the UMR.
- * Maintain or increase the species diversity and abundance of wildlife.
- * Maintain and enhance habitat used by threatened and endangered species.
- * Carry out endangered species recovery plans.
- * Maintain furbearer populations at levels compatible with fisheries and waterfowl management and other management objectives to provide a resource for recreation.
- * Provide outdoor recreation opportunities.

Wisconsin Department of Natural Resources - The WDNR manages the fishery in the Spring Lake area in cooperation with the USFWS. WDNR conservation officers regulate hunting, fishing, and recreational boating on the Wisconsin portion of the Mississippi River. The WDNR manages water quality and regulates activities that affect waters of the State. WDNR management goals for the Spring Lake area include:

- * Improve water quality.
- * Improve fish and wildlife habitat conditions.
- * Improve fishing opportunity.
- * Improve small game hunting opportunity.
- * Improve furbearer trapping opportunity.
- * Maintain access for recreational boating.
- * Limit redistribution of in-place pollutants.
- * Avoid increases in flood stages.

Corps of Engineers - The St. Paul District, Corps of Engineers has responsibility for operation and maintenance of the 9-foot channel navigation system. The COE also has management responsibilities for project land. COE management goals for the Spring Lake area include:

- * Reduce dredging requirements in lower pool 5.
- * Maximize beneficial use of dredged material.
- * Minimize cost of channel maintenance.
- * Improve fish and wildlife habitat and water quality conditions.
- * Provide for public use.
- * Maintain access for recreational boating.
- * Maintain lock and dam 5 dike and culvert.

These management objectives, together with additional input from State and Federal agency natural resource managers, were used to guide the development of specific project objectives. These objectives are presented in a subsequent section of this report. However, this project forms only one part of a much larger cooperative natural resource management effort on the river.

EXISTING CONDITIONS

PHYSICAL SETTING

Spring Lake is part of the Upper Mississippi River system and was created by lock and dam 5. The lake is located about 1 mile below the center of Buffalo City, Wisconsin. The river valley in this area is about 3 miles wide from bluff to bluff with a mile-wide low terrace on the Wisconsin side. A natural peninsula extends from the Wisconsin shore at the upper end of Spring Lake, and a series of barrier islands forms the west side of the upper half of the lake. The peninsula has been breached by past floods and allows flow into the upper end of the lake. The west side of the lower half of the lake is open to Belvidere Slough and the open pool 5. The Wisconsin shoreline forms the east boundary of the lake and the lock and dam 5 dike forms the lower boundary.

GEOMORPHOLOGY

The Spring Lake area was once part of an extensive floodplain complex consisting of secondary and tertiary channels, floodplain forest, abandoned channel lakes, marsh, and meadow. The area was bordered by Belvidere Slough and the main channel of the Mississippi River on the west and high ground along the face of a glacial-era floodplain terrace on the east. This large floodplain area extended 8 miles downstream to Fountain City, Wisconsin. Construction of lock and dam 5 divided the upstream end of the floodplain area with a dike that ties the lock and dam to high ground on the Wisconsin side. The floodplain area downstream of the dike is Fountain City Bay. The triangular area upstream of the dike, lying between the lower end of Belvidere Slough and the Wisconsin shore, is the Spring Lake project area. A natural peninsula on the upstream side of the lake formerly protected Spring Lake from high river flows. However, this peninsula has been breached by spring floods, allowing flow into the upper end of Spring Lake even at normal pool levels.

When lock and dam 5 was constructed, the floodplain complex was inundated in the Spring Lake area, raising the normal water surface by about 4 feet (COE 1970). The Spring Lake area consisted of an oxbow along the Wisconsin shore, tertiary channels, and floodplain ridge-and-swale features formed by lateral movement of channels. Four nearly parallel lines of natural river levee islands were formed along the eastern side of the downstream end of Belvidere Slough as it moved westward. The floodplain topographic features were still emergent islands following inundation (see Plate 3). The lock and dam 5 dike ties into the Wisconsin shore on a former delta of Waumandee Creek. The stream now discharges on the downstream side of the dike into Fountain City Bay.

Increased water surface elevations, and decreased current velocities through Spring Lake, changed the configuration of the riverbed since impoundment. Higher water levels resulted in erosion of the levee islands on the west side of Belvidere Slough, exposing the islands on the west side of Spring Lake to greater wind fetch and wave action. These islands were reduced over time by wave action and flood events. Plates 4, 5, 6, and 7 illustrate the significant decline in the number, areal extent, and shoreline length of islands in the project area since 1939. Wave action and flood events leveled the topographic relief of the area, reduced the height, number, and areal extent of islands, and filled in deeper areas. An influx of sand filled the floodplain channels and formed a delta in the upper end of Spring Lake. Vertical accretion of fine grained materials further filled in the areas, and deposited a veneer of silt over most of Spring Lake.

The bottom configuration of Spring Lake has not been recently surveyed. The average depth of Spring Lake is approximately 4 feet (Lucchesi and Benjamin, 1988). Deeper areas occur along the Wisconsin shore and along the dike. The channels leading into Spring Lake from Belvidere Slough are generally about 4 feet deep. Much of Spring Lake is quite shallow where islands formerly existed. The lake is 1 to 3 feet deep in the stump fields and aquatic plant beds. Plate 8 is a bathymetric map of the area prepared from soundings taken in 1979 (Fremling et al. 1979).

WATER RESOURCES

Like the rest of the Upper Mississippi River, the project area experiences annual high water, generally between March and July. The primary source of floodwaters is spring snowmelt combined with the increased precipitation that usually occurs during these months. The major tributaries in pool 5 are the Zumbro and Whitewater Rivers that enter from the Minnesota side of the Mississippi River in the Weaver Bottoms complex. These tributaries have little or no impact on the Spring Lake area because the Mississippi River channel and barrier islands separate the flows from the Spring Lake area.

Water surface elevation in the project area is controlled by river discharge and operation of lock and dam 5. Water surface in Spring Lake closely follows water surface elevation in the main channel. Wind causes short-term changes in water surface elevation in the Spring Lake area. Because the project area is close to the dam, water level fluctuations are dampened by dam operation. Project pool elevation is 660.0 feet MSL (Mean Sea Level - 1912) (COE 1970) at river mile 748.5. During most of the year, pool elevation is held 0.5 foot lower at the dam (UMR mile 738.1), at elevation 659.5. In the Spring Lake project area, which is located between river miles 740.5 and 742.1, water surface elevation is usually between 660.0 and 661.0, over a wide range of river discharge. Spring high water has been as much as 10 feet higher than normal pool elevation in the Spring Lake area.

Mississippi River discharge through the Spring Lake area is similar to the discharge gaged at Winona, Minnesota (Plate 9). The watershed upstream of Winona is 59,200 square miles. Average annual runoff from the watershed is 6.42 inches, producing an average annual discharge of 27,980 cfs (Gunard et al. 1988). River discharge is usually greatest during spring runoff. Heavy rain can cause significant increases in discharge. Winter river discharge is normally about 10,000 cfs. There are no streams tributary to the project area. Since the project area is only about 1.3 miles long, normally only a few tenths of a foot of head differential exists between the upstream and downstream ends.

Flow through Spring Lake is from Belvidere Slough, entering through several channels between islands at the upper end. A breach in the peninsula extending downstream from the Wisconsin shore at the upper end of the project area is gradually allowing more flow through. Water exits the project area along a wide shallow connection with the main channel at the lower end, through the borrow trench along the dike. Culverts in the dam 5 dike release about 300 cfs from the lower end of Spring Lake into Fountain City Bay. These culverts were installed to improve water quality in the Fountain City Bay backwater area. Release of water through the culverts induces an increased flow rate into the lower end of Spring Lake, most pronounced during low flow periods. Wind-induced water movement in the lower end of pool 5 can be significant, and there may be considerable exchange of water between the Spring Lake area and the main channel during strong wind events. Conditions dampening wave action are the remaining islands and shallow areas along the west side, and extensive stands of emergent and submergent macrophytes during the growing season.

Current velocities are usually low throughout Spring Lake. Velocities measured under the ice were generally less than 0.1 ft/sec (Lucchesi and Benjamin, 1988). Velocities are highest along the channel side of the islands that form the west boundary of the project area and in the channels flowing from Belvidere Slough. Areas with low current velocity during non-flood conditions exist downstream of the remaining islands and at the upstream end of the project area. Vegetation stands also provide protection from current during the growing season.

GEOLOGY AND SOILS

Geology - The most significant geologic event explaining the nature of the Mississippi River in the vicinity of the project area occurred at the end of the Pleistocene glaciation approximately 10,000 years ago. During the retreat of the glaciers, tremendous volumes of glacial meltwater, primarily from the Red River Valley's Glacial Lake Agassiz, eroded the preglacial Minnesota and Mississippi River valleys. As meltwaters diminished, the deeply eroded river valleys aggraded substantially to about the present levels. Since post-glacial times, a braided stream environment has dominated this reach of the Mississippi River, due to the river's low gradient and oversupply of sediment from its tributaries. Prior to impoundment of pool 5 in 1938, the broad floodplain of the river was characterized by this braided stream system that consisted of swampy depressions, sloughs, natural levees, islands, and shallow lakes. Since impoundment, a relatively thin veneer of silts, clays, or sands has been deposited over most of the river bottom within the pool.

Soils - Borings were obtained in the project impact area in June 1991 for purposes of future design. Analysis of the borings has not been completed to date. Results will be available for preparation of more detailed plans. However, site visits, cursory bottom sediment sampling, and discussions with professionals familiar with the area indicate that the lake portions of the area generally have about a 3-foot layer of fine sediments overlying sand. An area at the upper end of Spring Lake may have a thin layer of sand as a result of a breach in the peninsula. The river channel portions have a sandy bottom with traces of gravel.

Sediment Transport and Substrate Type - Suspended solids concentration in the Spring Lake area varies seasonally and with river discharge (see Plate 10). The average concentration of suspended solids in the main channel of the river at Winona is 24 mg/l (Tornes 1986). The average annual suspended sediment yield at Winona is estimated to be about 300,000 tons. Bedload inflow to pool 5 from the Mississippi and Zumbro Rivers averages 486,000 tons per year. Bedload outflow through lock and dam 5 is 230,000 tons per year. An average of 168,000 tons per year has historically been dredged from pool 5. Since the estimates were made, modifications to the river around Weaver Bottoms have improved sediment transport competency of the navigation channel to some extent. Bedload transport through lock and dam 5 is probably now in the range of 200,000 to 300,000 tons per year.

Belvidere Slough is the primary source of water for the upper Spring Lake area, and transports a considerable amount of sand. The Spring Lake area is removed from the channel of Belvidere Slough by a line of natural river levee islands and submerged ridges which serve to route most sand carried by Belvidere Slough downstream to the west of Spring Lake. An extensive sand flat has developed at the downstream end of Belvidere Slough. There appears to be some influx of sand into the upper end of Spring Lake. Vertical accretion of fine sediment occurs throughout most of Spring Lake. Probing with a steel rod indicated about 3 feet of fine sediment overlying most of Spring Lake.

A detailed analysis of riverbed elevation changes in the Spring Lake area cannot be made because of a lack of accurate and complete hydrographic surveys over time. It does not appear that there has been excessive influx of sediment into the area. The changes in area of islands and in bottom configuration appear to be primarily due to wave erosion and redistribution of material during floods. Ice forms over the entire Spring Lake area during most winters, reaching a thickness of up to 2 feet. Wind-driven ice can also erode the shoreline and islands.

A survey of substrate type in the Spring Lake area was conducted in the winter of 1986-1987 by the COE as part of the Weaver Bottoms rehabilitation project. Approximately nine locations within Spring Lake were sampled, and substrate material was analyzed for particle size composition and organic matter content. A substrate type map of the Spring Lake area has not been prepared. Additional sampling would be required to prepare a useful substrate type map. Most of the area has silt substrate with organic sediments probably occurring in the older macrophyte beds. There is a sand flat in the upper end of Spring Lake where the incurrent channels have created a delta. Because much of Spring Lake was bottomland forest before inundation, stumps and woody debris are common in the shallower areas. The lock and dam 5 dike is armored with rock riprap.

Sediment Quality - There is much historical data on main channel sediment in pool 5, with the most recent information collected in 1989. A limited amount of surficial backwater sediment quality data is available for pool 5, but no depth stratified data are available. No pesticides were detected in any of the samples collected either in the main channel or in backwaters. PCB's were not detected above 50 ug/kg in any of the samples. Four backwater samples collected in pool 5, as part of the USFWS 1985 survey, were also analyzed for polynuclear aromatic hydrocarbons (PAH) and the results indicate very little problem with PAH contamination. The metals analyses indicate main channel sediments are relatively uncontaminated. There were some relatively high mercury values recorded in 1974 for the main channel. However, recent surveys of both the main channel and the backwaters have recorded substantially lower values of mercury. In addition to the limited backwater metals data collected by the various agencies, other metal studies have been conducted for the Weaver Bottoms area of pool 5. None of the mean values reported by the investigators exceeded the mean values plus 2 standard deviations calculated for the agencies' backwater data. However, as indicated by the maximum values reported by these investigators, at least some samples for copper, chromium, and nickel exceeded these values. Data are not available for the immediate Spring Lake project area, but the values are probably similar to the data referred to above. However, additional sampling, especially depth stratified sampling, would be necessary if fine material is dredged within this area for use as closure fill, topsoil, and/or to create deepwater fish habitat. The summary information above has been compiled and is included in the Section 404(b)(1) evaluation (attachment 3).

NATURAL RESOURCES

Habitat Types and Distribution - Habitat within Spring Lake can be classified into terrestrial and aquatic and further characterized by vegetation. Aerial photographs of Spring Lake taken in 1939, 1964, 1977, and 1989 were interpreted. Boundaries of discernible habitat types were digitized and entered into a computer geographic information system. Acreages of different habitat types in Spring Lake determined from the historical aerial photos are listed in table DPR-1.

TABLE DPR-1
Area of Habitat Types in Spring Lake

<u>Habitat Type</u>	<u>1939</u>	<u>Area (acres)</u> <u>1964</u>	<u>1977</u>	<u>1989</u>
Terrestrial	121.3	71.5	15.4	13.8
Aquatic				
Vegetated			246.0	100.3
Open Water			<u>40.6</u>	<u>187.9</u>
Total Aquatic	<u>180.7</u>	<u>230.5</u>	<u>286.6</u>	<u>288.2</u>
Total	302.0	302.0	302.0	302.0

There are a total of 302 acres within the project area. Of this total, only about 14 acres of land remain. The land area consists of the peninsula extending from the Wisconsin shore at the upper end, and the remaining islands. The eastern sides of the islands have gradual slopes with emergent aquatic vegetation. There were approximately 100 acres of aquatic plant beds in 1989. The dominant emergent plant is arrowhead. Wild celery and coontail are the most abundant submergent aquatic plants in the project area. Most of the shallow aquatic habitat in the project area has submergent aquatic plants. Deep aquatic habitat (greater than 4 feet) occurs along the Wisconsin shore. Acreage determinations of water depths cannot be made at this time. Interspersion of shallow open water, submergent and emergent aquatic plant beds has not been quantified; however, it appears good. About 12,265 lineal feet of island shoreline remains. Deep aquatic areas exist close to vegetated aquatic habitat.

Fish and Wildlife - Thirty-six species of fish were sampled in Spring Lake during 1987-1988 (Lucchesi and Benjamin 1988). Centrarchids were the most abundant fish sampled, comprising over 50 percent of the total catch. The proportion of centrarchids to total fish in Spring Lake samples is similar to those from other reputed centrarchid angling areas (Talbot 1981; Engel 1988). Centrarchid populations are stable, with both juvenile and adult fish abundant (Lucchesi and Benjamin 1988). The upper end of Spring Lake serves as a nursery area for juvenile centrarchids, as evidenced by many juvenile black crappie and bluegill sampled among the aquatic vegetation beds (Lucchesi and Benjamin 1988). The maintenance of this area is a management concern because these backwater nursery areas are important in supplying stock for large surrounding areas (Talbot 1982).

Fremling et al. (1976) identified 98 species of birds in the vicinity of Spring Lake, 36 of which were represented by 5 or fewer sightings. Common waterfowl species include the mallard, coot, blue-winged teal, and wood ducks. The heaviest use of the area is during fall migration when large numbers of mallards, canvasbacks, coot, tundra swans, Canada geese, and widgeon occur. The spotted sandpiper is the most common shorebird in the area. Other common species include the great blue heron, mourning dove, tree swallow, robin, grackle, and the red-winged blackbird.

There have been 40 species of mammals reported to occur in the project area by Fremling et al. (1973). Fremling et al. (1976) observed 15 species of mammals in Weaver Bottoms, with the white-footed mouse, short-tail shrew, and muskrat being the most abundant. Little information exists on the status of amphibians and reptiles, but some of the species observed include the leopard frog; American toad; spring peepers; painted, snapping, soft-shell, and snapping turtles; and the water snake.

Threatened and Endangered Species - Two mussel species are federally listed as endangered on the Upper Mississippi River: the Higgins' eye pearly mussel (*Lampsilis higginsii*) and the fat pocketbook mussel (*Proptera capax*). These endangered species have not been recorded in pool 5 during any of the recent surveys (Fuller 1978; Fuller 1980; and Thiel 1981). Nielsen et al. (1978) sampled only six mussel taxa at various side channel sites of Weaver Bottoms along the main channel of the Mississippi River. No specimens of the two listed endangered species were found. Therefore, the proposed project is unlikely to have any significant impact on the two listed mussel species. Two other federally protected species, the threatened bald eagle (*Haliaeetus leucocephalus*) and the endangered peregrine falcon (*Falco peregrinus*), could occur in the project area. Very little upland area would be disturbed, and the disturbance from construction activities is likely to be relatively minor. Therefore, it is unlikely that any significant impact would occur on the two species or on their required habitat.

No other federally-listed endangered or threatened species or any species proposed to be listed are in the project area or are likely to be affected by the project.

Vegetation - The species composition and distribution of vegetation in the Weaver Bottoms-Belvidere Slough areas of pool 5 have been extensively documented (Fremling et al. 1976; Fremling et al. 1979; Nielsen et al. 1978; Olson and Meyer 1976; Lucchesi and Benjamin unpublished). The emergent vegetation beds in the Lost Island-Belvidere Slough area are evenly distributed throughout, although Spring Lake had a higher coverage than the other areas surveyed (Nielsen et al. 1978). Emergent species found in Spring Lake during this study were water lily, arrowhead, narrow-leaf arrowhead, burreed, cattail, and lotus. A total of 15 species of submergent aquatic plants were also identified within Spring Lake in this study including coontail, wild celery, river pondweed, curly-leaf pondweed, waterweed, and water stargrass. The Wisconsin side of lower pool 5 is characterized by a wide, even distribution of submergent beds, with most of them located within Spring Lake. The Minnesota side is characterized by much larger beds located mainly in the northern and western areas (Nielsen et al. 1978). Important emergent species in the area are arrowhead, water lily, narrow-leaf arrowhead, and burreed. Important submergent species in the area are coontail, wild celery, river pondweed, water stargrass, curly-leaf pondweed, and waterweed.

The terrestrial floodplain areas in the study area support silver maple, green ash, cottonwood, and black willow. Reed canary grass is common in open canopy areas. Few trees remain on the small islands due to erosion and wind-fall.

Water Quality - Water temperature in the main channel correlates with air temperature (see Plate 11). Maximum water temperature occurs in mid-summer, and remains close to 0°C during the winter. In the Spring Lake project area during the summer, water in the shallow areas attains a slightly higher temperature than the main channel, cools faster in the evening, and results in greater swings in diel temperature than occur in other flowing areas of the river. The water is warmer in the shallow areas due to suspended solids, the dark bottom, and smaller volume. The shallow areas cool faster than deeper areas because of the smaller volume of water.

During winter, areas within Spring Lake that are protected from current tend to be warmed by the river bottom, and perhaps from influx of groundwater, to temperatures up to several degrees warmer than the near-freezing water in the flowing channels. Winter water temperatures under the ice are quite stable, but increases in discharge can serve to cool water in backwater areas as water exchange rates increase.

Dissolved oxygen in Spring Lake is normally above the 5 mg/l concentration necessary to sustain most forms of aquatic life. During the growing season, oxygen concentration is strongly influenced by algal and aquatic plant activity. Oxygen concentrations can exceed 15 mg/l within aquatic plant beds in the afternoon and fall to 6 mg/l at night. These diel swings in dissolved oxygen also occur in open water areas due to phytoplankton activity, but tend to be less dramatic than in aquatic plant beds (see Dahlgren 1988 for examples from Weaver Bottoms).

Phytoplankton in the Mississippi River follows a seasonal progression of species composition typical of north-temperate eutrophic water bodies, a strong spring diatom bloom giving way to blue-green algae blooms dominated by *Aphanizomenon*. Plant nutrient concentrations during the open water season normally exceed levels that allow nuisance blooms of algae to develop. Inorganic nitrogen and available phosphorus concentrations occasionally fall below limiting concentrations during intense algal blooms. Physical conditions of light penetration, mixing, filtering by aquatic plant beds, wind, flow path, and dilution have a great effect on phytoplankton concentrations at any point in the river.

The photic zone depth in Spring Lake is controlled primarily by the amount of suspended mineral and organic material in the water column. Photic zone depth (depth with greater than 1 percent of photosynthetically-active radiation incident at the surface) averaged 3.2 feet or less during July and August sampling periods in 1986, 1988, and 1989 in Weaver Bottoms, pool 5 (John Sullivan, Wisconsin DNR, La Crosse. Personal communication, 1990). The aquatic plant beds in the upper end of Spring Lake may serve to filter some of the suspended material and algae from the inflowing water during the growing season. Wind-induced water movements into the lower end of Spring Lake could periodically decrease water clarity and photic zone depth. Chlorophyll *a* attenuates a considerable amount of light in the water column in dense algae blooms. In Spring Lake, phytoplankton, duckweed mats, non-algal suspended solids, and epiphyton all create shaded conditions that limit growth of aquatic macrophytes.

CULTURAL RESOURCES

In accordance with the National Historic Preservation Act of 1966, as amended, the National Register of Historic Places has been consulted. As of 1 October 1990, there are no National Register sites in the project area. There are nine recorded prehistoric sites within a mile of the island group and eleven significant historic sites or structures. The island group appears to be an original land surface which has remained relatively undisturbed.

In August 1990, an archaeologist with the St. Paul District conducted a Phase I Cultural Resources survey of all land areas that would potentially be affected by possible project construction. The boat landing area and three additional islands were examined and tested for cultural resources. No resources were discovered, and on the basis of a records search and field reconnaissance, no further cultural resources are expected.

RECREATION/AESTHETIC RESOURCES

A boat landing at the lower end of Spring Lake near the tie-back of the dam 5 dike provides direct access to the lake. The landing is maintained by the Wisconsin Department of Natural Resources. Spring Lake receives light fishing use during the open water season. Spring Lake historically supported a popular winter fishery, but success has recently declined due to increased water flows through the area. Most summer angling in the area takes place on the downstream side of the dam 5 dike at the culverts. A boat landing located on the peninsula at the north end of Spring Lake is maintained by the city of Buffalo, Wisconsin. Access to Spring Lake can be gained a short distance downstream via a historic small channel through the remaining barrier islands.

The St. Paul District, with assistance from Region 3 of the U.S. Fish and Wildlife Service and various regional, State, and local agencies that have an interest in the river, developed a land use allocation plan for the Upper Mississippi River. The purpose of the plan is to balance and enhance public recreational use and fish and wildlife management while maintaining the river navigation system. This plan shows a narrow strip of land located along the east shore of Spring Lake and the barrier island complex that are allocated for wildlife management, the levee along the lower part of the lake for navigation project operations, and a small area at the upstream end of the dam 5 dike for low-density recreation (Lower Spring Lake Landing).

SOCIOECONOMIC RESOURCES

The project area is located in a rural area of west-central Wisconsin, just downstream of Buffalo, Wisconsin, in Buffalo County. The upper half of the eastern shore of Spring Lake is lined with year-round residences. At the upper portion of this area, these residences (about 25) are separated from the lake by a blacktop road. There are about 20 residences between the roadway and the shore at the lower portion of the lake. The Lower Spring Lake boat landing is at the end of the road and the residential development along the lake. The remainder of the Spring Lake shoreline is owned by the Corps of Engineers for project operations (dam 5 dike) or managed for wildlife by the U.S. Fish and Wildlife Service.

Population - The nearest town, Buffalo City, has a population of 894 (1980 census). The city of Cochrane (population 512) is located about 1 mile inland. Other major towns within 10 miles of the project area are Alma (population 876) and Fountain City (population 963). The major city of Winona, Minnesota, with a population of over 25,000, is only about 20 miles away.

FUTURE WITHOUT PROJECT CONDITIONS

HISTORICALLY DOCUMENTED CHANGES IN HABITAT

Although portions of the project area are important for many species of fish and wildlife, declines in habitat values have been noted in recent years. The documented loss of barrier islands and especially the breach in the peninsula have changed flow conditions and wave action in Spring Lake. A reduction in the fisheries output and aquatic plant bed areas has been observed. Although quantitative data on declines in use by waterfowl and other wildlife are not available, resource managers in the area feel that Spring Lake has a much greater potential for habitat use than currently exists. This reasoning is based on the fact that the area was more heavily used by fish and wildlife in the past.

FACTORS INFLUENCING HABITAT CHANGE

The factors potentially affecting habitat quality in Spring Lake are numerous, complex, and interrelated, but the dominant influence results from flood events, flow conditions, and wind generated waves. It is believed that changes in the aquatic plant beds can be largely attributed to sedimentation and turbidity, and possibly a combination of other factors. Years of sedimentation produce soft, unstable substrates which make it difficult for aquatic plants to gain or retain a foothold. Aquatic plants that initiate growth are thus easily uprooted by wave action. Sedimentation also causes changes in depths, producing a more uniform bottom which leads to decreased plant species diversity. Wind-induced waves and the feeding activity of rough fish can also resuspend sediment and increase turbidity. Restriction of light penetration is the greatest impact of turbid waters. Light transmission to the lake bottom is essential for the growth of submergent aquatic plants, especially early in the growing season. High turbidity indirectly affects fish and wildlife by depressing the growth of aquatic vegetation and directly affects fish community diversity by favoring rough fish over sport fish. It affects sport fish through diminished sight feeding ability, depression of planktonic food resources, and loss of shelter. An example of how changes in suspended sediment can affect vegetative growth is demonstrated by pool 8 data that showed a two-fold increase in ambient suspended sediment concentrations (increase from 20 mg/l to 40 mg/l) would decrease the 1-percent photic depth from 133 cm to 105 cm (a 27-percent decrease) (C.E. Korschgen, unpublished. Northern Prairie Wildlife Research Center, U.S. Fish and Wildlife Service, La Crosse, Wisconsin, Field Station).

The turbidity observed in Spring Lake may be the result of several factors, including resuspension of fine substrates by wind-induced turbulence, the importation of suspended solids via the breach in the peninsula, the growth of planktonic algae, and feeding activities of rough fish.

Flow through the breach in the peninsula allows cooler water and produces higher current velocities in the upper end of Spring Lake during the winter months, reducing the desired habitat for centrarchids and the associated winter fishery of the lake.

ESTIMATED FUTURE HABITAT TYPES AND DISTRIBUTION

Habitat changes in the Spring Lake area can be expected to occur over the next 50 years that would result in a decrease in habitat value for fish and wildlife. Historic trends in geomorphology of the area can be expected to continue, resulting in significant physical changes to the area. The existing breach in the peninsula will continue to enlarge and scour deeper. These physical changes would affect sediment transport, water quality, vegetation, and centrarchid habitat.

Geomorphology - Plates 4, 5, 6, and 7 illustrate the loss of islands that has occurred in the project area since 1939. Wave action and flood events will continue to erode the islands that remain, further flattening the topographic relief of the area. The deep aquatic areas can be expected to gradually fill in. Wave action will level the bottom, eroding the high spots and filling in the deep areas. The area with islands and beds of emergent aquatic plants will become a large shallow flat.

Hydrology - Lacking any unforeseen change in dam operation, the water level regime in the Spring Lake area will remain the same. The flow pattern through the project area will probably change, however, as the peninsula at the upstream end of the project area enlarges and barrier islands are eroded down. Flow through Spring Lake can be expected to increase. Current velocities through the area will increase somewhat.

Sediment Transport - Suspended sediment will continue to be carried through the breach in the peninsula at a greater rate as the breach becomes larger. As the barrier islands on the west side of Spring Lake erode, the area will become subject to increased wave energy. Wave action will resuspend bottom material and wind-induced currents will redistribute the material to a much greater extent than presently occurs. Increased flow into the area through the upper end may allow a greater influx of bed load, resulting in an expansion of the delta where the inflowing channels meet the backwater area.

Water Quality - Spring Lake water quality will become dominated by water inflow as the exchange rate through the area increases. Suspended solids concentration will increase due to the greater influence of inflowing water and increased resuspension of bottom sediment by wave action. Winter water temperature in Spring Lake will decrease because of increased flows.

Vegetation - Floodplain forest vegetation will decline as island erosion continues. As the islands on the west side of Spring Lake erode, the aquatic vegetation now protected by the islands will be subjected to increased wave action. Aquatic plant beds will become increasingly limited by light penetration and can be expected to decrease over time.

Future Habitat Types and Distribution - Future habitat conditions in Spring Lake will be characterized by increased shallow open water areas with higher flows and reduced island and aquatic plant bed areas. The area of desirable centrarchid habitat will be reduced as current velocities increase, depths decrease, and winter water temperature decreases. Habitat variability will be gradually reduced as the topographic relief declines, winter water temperature declines, and shallow open water area predominates.

PROBLEM IDENTIFICATION

EXISTING HABITAT DEFICIENCIES

Existing habitat conditions in Spring Lake are deficient in meeting management goals. Winter water quality in Spring Lake greatly limits suitable habitat for centrarchids. Additional bluegill and largemouth bass winter habitat is needed. Current velocity greater than 0.1 meter/second and water temperatures less than 4°C limit wintering habitat for centrarchids (Sheehan, et al. 1990). Except for the limited centrarchid wintering habitat available in Spring Lake, existing habitat conditions in the project area are fairly good. However, the lack of rock, gravel, and riffle habitat in the flowing channels limits a number of fish species.

Wildlife habitat includes the open water areas, submergent vegetation, emergent vegetation, and the islands. The primary wildlife habitat deficiency is the increasing lack of aquatic vegetation due to wave action.

ESTIMATED FUTURE HABITAT DEFICIENCIES

The expected increased water exchange rates through Spring Lake will exacerbate the deficiency of suitable winter habitat for centrarchids. Water flows through the area are expected to increase and will continue to degrade centrarchid winter habitat. Although wave action and flow through Spring Lake currently is not a critical problem, increases in the future will increase suspended solids concentration and further limit light penetration. The reduced photic zone will further limit growth of aquatic plants. Sedimentation of Spring Lake will continue and accelerate as the breach in the peninsula enlarges.

Future fish habitat conditions will include areas with high flows deficient in aquatic vegetation and its interspersions with open water. The increase in suspended solids occurring from more flow and wave action will decrease fish habitat during the open water season.

The loss of wildlife habitat will continue due to increased water flow and wave action, and reduced light penetration caused by the resuspension of fine sediment. Wave action will have a greater effect on vegetation because of shallower depths. The decreases in aquatic vegetation, water:land interspersions, light penetration, and water depth diversity will cause a similar decrease in the fish and wildlife use of the area. The land to water ratio and aquatic vegetation acreage will need to be increased for wildlife habitat.

PLANNING OPPORTUNITIES

The principal purpose of plan formulation is to develop a plan that provides the best use, or combination of uses, of water and land resources to meet the project objectives. The plan formulation process must also consider the identified planning constraints.

Planning opportunities are physical conditions, plans by others, and available resources considered in formulating alternative plans to address the management objectives for the project area. Characteristics of the study area are considered during the design of alternative plans to address the objectives. Whenever possible, existing physical conditions and material availability will be used to conserve non-renewable resources and in the design of project features.

For example, the following factors could provide opportunities for designing a more efficient project to better meet the objectives. An abundance of sand material near Spring Lake is potentially available for constructing habitat improvement features. Maintenance dredging of the Mississippi River channel in the vicinity could provide a source of coarse material for construction of stable structures. Summerfield Island dredge cut and Lost Island placement site are possible sources of coarse material obtained from channel maintenance projects. Suitable material may also be located within Spring Lake or Belvidere Slough, but additional investigation would be needed. Topsoil to stabilize a structure could likely be obtained from Spring Lake to provide deeper areas for improved fish habitat. Material dredged from the lake could also be used beneficially to improve farmland in the vicinity.

PLANNING CONSTRAINTS

A plan for habitat improvements at Spring Lake must be compatible with a number of constraints.

HYDROLOGIC

1. The structures must be designed with consideration of the hydrologic regime and water regulation of pool 5. Any structures should be designed to withstand forces of water currents and wave action associated with conditions up to a 50-year recurrence interval flood event.

2. Structures must not induce increased flood elevations of more than 0.1 foot during a 100-year recurrence interval flood event.

3. Interference with current pool operating procedures must be kept to a minimum.

ENGINEERING

1. Any dredged material must be placed at an approved placement site or used beneficially.
2. Construction access must be available.
3. Project features must be designed for a minimum 50-year life.
4. Construction materials are limited to the physical characteristics of pool 5 dredged material or at existing placement sites.
5. Construction equipment must be available that can handle the borrow or construction material.
6. Operation and maintenance requirements must be relatively low.

ECOLOGICAL

1. Construction should be conducted to minimize redistribution of existing unconsolidated fine sediments and contaminants.
2. Plans for improvement should maximize the areal extent and quality of aquatic vegetation.
3. Any modifications to Spring Lake should not result in long-term water quality degradation in Spring Lake or the Mississippi River.
4. Fish passage between Spring Lake and the main pool should be maintained.

RECREATION

1. Existing recreational access must be maintained.
2. Boat access to the main channel must be maintained.

LEGAL

1. The plan must comply with all Federal and State laws and regulations.
2. Project features must be constructed on lands owned by the Federal Government or the local sponsor or long-term easements must be acquired for construction on private property.

ECONOMIC

1. The cost of project features must be reasonable when compared to the habitat improvements estimated.

PROJECT OBJECTIVES

The ultimate goal of the project is to improve winter and summer centrarchid habitat in Spring Lake. This could be accomplished by reducing winter flows through the area. A secondary project goal would be to improve water quality. This could be accomplished by reducing wave induced erosion and resuspension of bottom sediments. For purposes of design and future evaluation, specific project objectives were developed. Specific goals are required for an engineered solution to the habitat problems. Current guidance on project evaluation indicates the prime focus should be on measurable chemical and physical parameters, with limited monitoring of biological features (i.e., vegetation studies only). Therefore, the stated project objectives were narrowly defined to reflect the aspects of the project that could be designed for future monitoring and evaluation. Meeting these objectives will not be the only end products resulting from construction of a project. Positive effects should also be experienced in other aspects and outside the project area. Discussions of specific project objectives for the 50-year future period follow.

Fisheries Habitat Improvement Objectives - Spring Lake presently supports a popular fishery that is dominated by bluegill and largemouth bass. Walleye, yellow perch, channel catfish, crappie, and smallmouth bass are also caught in the area. A management goal for the Spring Lake area is to maintain a year-round centrarchid-based fishery. The target species for management are bluegill and largemouth bass. Spawning habitat requirements for both species are sand or coarse bottom substrate close to aquatic plant beds, in 3 to 10 feet of water with little detectable current.

No estimates of standing stock of fish in Spring Lake are available. Average standing stock of bluegill in backwater lakes, sloughs, and side channels of UMR pools is 18.9 lb/acre (Pitlow 1987). Standing stock of largemouth bass from the same set of samples averaged 4.9 lb/acre. Standing stock of bluegill and bass in Spring Lake may be somewhat higher than these figures, because of the protected backwater character of the area. Implicit in the management goal is maintaining sufficiently high standing stock of these species.

Summer foraging and resting habitats for both target species are areas within or close to aquatic plant bed cover. Some water flow may be needed during late summer to raise dissolved oxygen levels. Emergent vegetation adjacent to islands provides valuable nursery habitat for a variety of fish species (Schueller 1989). An increase in shoreline length of islands could improve nursery habitat for fish.

Young-of-the-year bluegill require shallow water with aquatic macrophytes with no current velocity. Young-of-year largemouth bass often share the same habitat, but also make use of areas with less vegetation cover and with low current velocity.

Winter habitat for bluegill and largemouth bass may be the most critical for both species in the Spring Lake area. Both species require water generally greater than 3 feet deep with available cover, undetectable current velocity, and dissolved oxygen concentrations of 5 mg/l or greater. Optimum winter water temperature is 4°C, since this is the warmest water under ice conditions.

Aquatic habitat improvement objectives to meet fisheries management goals are:

- * Decrease water flows from entering Spring Lake.
- * Increase the extent of water greater than 3 feet deep sheltered from river current in proximity to macrophyte beds, and with adequate dissolved oxygen (>5 mg/l) for centrarchid habitat.
- * Maintain or increase the areal extent, interspersions, density, and species composition of macrophyte beds.
- * Increase the island shoreline length.
- * Maintain an interspersions of flowing channel habitat.
- * Provide rock and gravel in flowing channels for lithophilic species.
- * Decrease suspended solids concentrations.

Wildlife Habitat Improvement Objectives - The major use of open water areas for waterfowl (mainly divers) is for fall feeding and loafing, but smaller secluded areas serve as pair ponds for breeding waterfowl. Emergent vegetation areas provide nesting and brood rearing habitat for waterfowl; feeding areas for mink, muskrat, and beaver; nesting and feeding areas for songbirds; and feeding areas for wading birds, such as great blue herons. Islands with dense vegetative cover provide nesting areas for puddle ducks and other ground nesting birds; cover for small mammals, reptiles, and amphibians; and denning sites for mink. The habitat quality of Spring Lake has declined in recent years. The islands that had functioned as breakwater islands have eroded. The loss of these islands has increased wave action and turbidity in Spring Lake. Aquatic vegetation losses result from plants being uprooted by wave action and a decrease in the photic zone. Open water areas lacking in aquatic vegetation have increased in Spring Lake.

The target species for management are nesting and migrating waterfowl, and furbearers. Management for these species would provide habitat to a variety of wildlife. Habitat improvement objectives to meet wildlife management goals are:

- * Maintain or increase the areal extent, interspersions, density, and species composition of macrophyte beds.
- * Increase the length of shoreline and area of islands.
- * Decrease suspended solids concentrations.

Based on design factors that affect project area habitats and future project performance assessment, the specific project objectives described above are summarized in table DPR-2.

TABLE DPR-2
Project Goals, Objectives, and Alternative Enhancement Features

GOAL	PROJECT OBJECTIVE	POTENTIAL ENHANCEMENT ALTERNATIVE	UNIT OF MEASURE	ENHANCEMENT Existing	POTENTIAL Future (2041)	POTENTIAL With Project
Improve winter & summer centrarchid habitat*	Decrease winter flow velocities	Breach closure	ft/sec	0.09	>0.09	0
	Maintain dissolved oxygen levels >5 mg/l	Opening in closure	mg/l	>5	>5	>5
	Create additional area 3-10 feet deep	Dredging	acres	90	<90	144
	Increase area of aquatic plants	Closure structure	%	35	<35	50
	Maintain winter water temp. above 4°C	Dredging & closure	°C	<4	<4	≥4

* Optimum habitat includes sand or coarse bottom substrate, 15-30% aquatic plant bed coverage, water depths of 3 to 10 feet in at least 50% of the area, flow velocity <0.3 ft/sec (summer)/0 ft/sec (winter), dissolved oxygen levels >5 mg/l, suspended solids concentrations <50 ppm (summer), and water temperature 27°C (summer)/≥4°C (winter).

PLAN FORMULATION

The principal purpose of plan formulation is to develop a plan that would provide the best use, or combination of uses, of water and land resources to meet the project objectives. Much discussion between the project proponents and designers centered around achieving the desired project objectives with the lowest first costs and minimal maintenance requirements.

ALTERNATIVES CONSIDERED

Three initial alternative designs were developed for the rehabilitation of Spring Lake, including the no action alternative, repairing the breach in the peninsula at the upper end of the lake, and restoring the outermost barrier islands along the west side of the lake in conjunction with the breach repair. The alternative to restore and/or create islands included variations in the number and extent of islands. The initial alternatives are described below and are shown on Plate 12. A summary of the habitat benefits estimated for each of the alternative plans is shown in table DPR-3.

No Action

With this alternative, no project that would influence Spring Lake would be implemented using Federal funds. Water flows would increase at the head of the lake as erosion continued to increase the size of the breach. Specific details of future conditions with no action have been described in previous sections and they will not be repeated in this section. In particular, refer to the "Estimated Future Habitat Types and Distribution" section.

Breach Closure

Alternative A - The breach in the peninsula that allows flows to enter the upstream end of Spring Lake would be repaired by placing a partial closure in the breach. Material for the closure would be dredged from Spring Lake or in the vicinity of Belvidere Slough. The side slopes and top would be stabilized with rock riprap or vegetation. A notch would be included in the closure to permit minimal flow of fresh water to the upper portion of Spring Lake during the summer. Winter centrarchid habitat in the upper end would be enhanced by this option.

Barrier Islands

Several island alternatives were considered as a means to enhance habitat in Spring Lake by reducing the effects of being exposed to greater pool 5. The extent of barrier islands was considered with regard to the habitat benefits anticipated. The islands would be designed using coastal engineering technology to optimally reduce wind fetch and wave action within the lake, thereby reducing wind-induced resuspension of sediment. Island design would resemble a series of riverine islands, with peninsulas and shallow embayments that would allow development of wetland habitat. To the extent possible, material to construct the island(s) would be dredged from the area of Spring Lake to maximize fish habitat benefits. A single barrier island lacking inflow structures is not desirable because it would eliminate fish passage and boating access, as well as reducing flows. Some of the islands could be built to 5 feet or more and top-dressed with fines to allow for rapid vegetative growth. Other islands could be built lower and left in a non-vegetated condition to provide shorebird habitat. Top width of the islands would be about 50 feet. Geotechnical analyses would be necessary to determine foundation conditions, final island design and alignment, construction material availability, and suitable island construction techniques. It was recognized early in the plan formulation process that the breach closure was a critical element of any plan to improve habitat at Spring Lake. Therefore, each of the barrier island alternatives includes the breach closure (Alternative A). The location of each barrier island is shown on Plate 12. A description of each barrier island alternative follows.

Alternative B - One barrier island, about 2,000 feet long, would be constructed along the west side at the upper end of Spring Lake (Island 1 on Plate 12). The new island would tie into the existing barrier islands. About 50,000 cubic yards of material would be needed to build the island. Island construction along the west side of Spring Lake is desirable for water quality and habitat improvement purposes. Water quality would be improved because of the reduced wind and wave action behind the island. Waterfowl habitat would be improved by providing island nesting cover, and the improved water quality would permit aquatic plant beds to flourish.

Alternative C - This plan would include one barrier island, 2,000 feet long, located along the lower end of Spring Lake (Island 3 on Plate 12). It is estimated that about 50,000 cubic yards of material would be needed to construct the island. As a minimum, rock riprap would be used on the upper end of the island to prevent erosion. Fewer existing barrier islands remain at the lower end, so this plan would have a greater effect than alternative B on enhancing the aquatic plant community. An opening would remain at the lower end along the dam 5 dike for fish and boat access.

Alternative D - This plan would include two barrier islands, each about 2,000 feet long (Islands 2 and 3 on Plate 12). Both islands would be located in the lower portion of Spring Lake where there are few existing barrier islands. The lower island (3) would be similar to alternative C and the upper island (2) would further shield Spring Lake from the effects of greater pool 5. About 100,000 cubic yards of material would be needed to construct the islands. Fish and boating access would be provided by the opening between the islands and at the lower end.

Alternative E - This plan would include three barrier islands, each about 2,000 feet long, located along the entire west side of Spring Lake (Islands 1, 2, and 3 on Plate 12). This plan would almost entirely sequester the lake from pool 5 during normal flow conditions. Fish and boat access and flow into and out of Spring Lake would be maintained by leaving openings between the islands. About 150,000 cubic yards of material would be needed to construct the islands.

ALTERNATIVE EVALUATION

No Action - Water flows would increase at the head of Spring Lake as erosion would continue to increase the size of the breach. Winter centrarchid habitat would continue to be marginal, at best. Waterfowl habitat would continue to decline due to the loss of island and aquatic vegetation acreage. No project objectives would be met if this plan was selected. This plan would be considered only if no feasible action alternative could be found.

Alternative A - Repair of the breach in the peninsula by constructing a closure structure would decrease flows into the upper portion of Spring Lake and provide desirable centrarchid habitat conditions to about 50 acres of the lake. The closure would provide conditions to meet the project objectives of decreasing winter flow into the upper end of Spring Lake, increasing aquatic plant coverage by protecting the area from wave action, and maintaining winter water temperature greater than 4°C by preventing flow from the cooler main channel and slough area. Placing a notch in the closure structure would satisfy the project objective of maintaining dissolved oxygen concentrations greater than 5 mg/l by permitting fresh water flow, if necessary, during the summer low flow conditions. The project objective of providing additional deepwater habitat would be satisfied if suitable material can be found within Spring Lake for construction of the closure structure.

Based on a habitat evaluation analysis for the bluegill species, the alternative would provide an annual increase of 14.0 habitat units (HU). This was computed using Habitat Evaluation Procedures (HEP). A similar analysis for the mallard species, using Wildlife Habitat Assessment Guidelines (WHAG), showed that the alternative did not produce significant waterfowl benefits (0.5 HU). The first cost of alternative A was estimated to be \$248,700 for the purpose of alternative evaluation and selection. The operation and maintenance cost was estimated to be \$1,000 annually. This alternative plan was fully endorsed at the public meeting and was rated first priority by those in attendance. This also constitutes the project that was originally envisioned by the field biologists when nominated for inclusion in the Environmental Management Program and selected for funding. The estimated project cost for the initial budgetary request was based on this alternative.

Initially, a 20-foot-wide open notch was proposed to be placed in the western end of the closure to permit flow into the upper end of Spring Lake so that summer dissolved oxygen levels could be maintained. The bottom of this notch was set at elevation 659 to limit the quantity of flow and to allow the opening to freeze shut during the winter, thereby eliminating flow into the area. It was also proposed to dredge a 50-foot-wide channel from the notch in the closure to deeper water in Spring Lake. The channel was 8 feet deep and about 500 feet long with side slopes of 1 vertical on 4 horizontal. The purpose of the channel was to provide fish access to the upper end of the lake where the habitat is desirable, provide deepwater fish habitat, and divert the cooler water flowing through the notch prior to freeze-up away from the prime centrarchid habitat. However, after additional hydraulic analysis and discussion with river experts, it was decided that the proposed channel would not function to divert cooler water flowing through the notch because of the cooler water being slightly less dense than the warmer water in the lake and that fish could access the rest of the lake via existing deeper areas along and close to the Wisconsin shoreline. Additional deepwater habitat could be better provided by dredging a more desirable location in the upper end of the lake for closure structure material, if material can be found that is suitable for construction. Also, it was questionable whether the notch would actually freeze shut because of the higher flow velocity as observed at other river locations. Since it was thought to be desirable to provide flow into the area for aeration purposes only during the summer (and then only if dissolved oxygen conditions warrant), it was decided to replace the original notch design with a small stoplog structure located in the closure in the vicinity of the extreme upper end of Spring Lake. The stoplog structure was a simple sheetpile design with a 5-foot-wide opening that could be closed with stoplogs most of the year. The stoplogs would be removed during the low flow summer periods if it was determined that dissolved oxygen levels in the upper end of Spring Lake were falling below 5 mg/l. This provided a positive means of controlling flows into the lake.

Various closure cross-sections were formulated to provide a stable structure, maximize the use of fine material from the backwater, and reduce the use of rock riprap for slope stabilization.

Alternative B - Constructing one barrier island 2,000 feet long (Island 1) would affect about 115 acres at the upper end of Spring Lake. The habitat evaluation analysis indicated an annual increase of 32.2 HU for bluegill and 1.1 HU for mallard. A preliminary estimate of the first cost for building the 2,000-foot-long island was approximately \$600,000. Adding the cost of alternative A to the island cost brings the total cost estimate of alternative B to \$848,700. Annual operation and maintenance was estimated to be \$3,000.

Alternative C - This alternative (Island 3) would affect a larger area (130 acres) and provide a higher habitat suitability index (HSI) than alternative B because of its location. Therefore, the habitat evaluation analysis resulted in greater annual increases in habitat units (36.4 HU for bluegill and 18.2 HU for mallard). The construction cost would be the same as alternative B (\$848,700) as would operation and maintenance costs (\$3,000).

Alternative D - Constructing two islands (2 and 3) would affect about 257 acres of Spring Lake. The habitat evaluation analysis indicated annual increases in habitat units of 72.0 for bluegill and 36.0 for mallard. The cost of the second island would be nearly identical to the first, so the total construction cost was estimated to be \$1,448,700. Operation and maintenance costs were estimated to be \$4,500.

Alternative E - Constructing three islands would practically sequester Spring Lake from the rest of the pool, affecting all 302 acres of the lake. The habitat evaluation analysis indicated annual increases in habitat units of 84.6 for bluegill and 42.3 for mallard. Total construction cost was estimated to be \$2,048,700 and operation and maintenance to be \$6,000.

Alternative Summary - A summary of the habitat benefits and costs for each alternative is shown in table DPR-3. Habitat units were computed for two species (bluegill and mallard) because these are the species that would most be affected by the alternatives. The annual habitat unit increases for each species were not added together because double counting would result. The increase in habitat units for each species is shown independently for easier analysis of the overall alternative benefits. The annual cost of the habitat units gained for each alternative and species is also shown. The costs shown were estimated early in the formulation of the project and do not reflect final costs after further development of the selected alternative described later in this report. These initial cost estimates were used for the preliminary evaluation and comparison of alternatives.

The summary table shows the primary habitat benefits afforded by each alternative. The breach closure provides significant fish (bluegill) habitat benefits, but very little direct waterfowl (mallard) habitat benefits. The island alternatives (especially at the lower end of Spring Lake) provide both significant fish habitat benefits and waterfowl habitat benefits at a reasonable cost per habitat unit gained.

TABLE DPR-3
SUMMARY OF HABITAT BENEFITS AND COSTS

ALTERNATIVE 11	HSI 12	Acres		HU's 13	Ave Annual Habitat Unit Increase	Initial Investment 14	Estimated Cost/Year 15	Estimated Ave Annual O&M Cost	Ave Annual Cost/HU
	Bluegill Mallard	Affected by Project	Unaffected by Project	Bluegill Mallard					
No Action (Future Without Project)	0.62 0.12	0	302	187.2 36.2	0.0 0.0	\$0	\$0	\$0	\$0 \$0
A (Breach Closure at Upper End of Spring Lake)	0.90 0.13	50	252	201.2 36.7	14.0 0.5	\$248,700	\$22,391	\$1,000	\$1,671 \$46,782
B (Alternative A + Island Construction Along Upper end of Spring Lake)	0.90 0.13	115	187	219.4 37.4	32.2 1.1	\$848,700	\$76,410	\$3,000	\$2,466 \$69,053
C (Alternative A + Island Construction Along Lower end of Spring Lake)	0.90 0.26	130	172	223.6 54.4	36.4 18.2	\$848,700	\$76,410	\$3,000	\$2,182 \$4,363
D (Alternative A + Construction of 2 Islands in Lower End of Spring Lake)	0.90 0.26	257	45	259.2 72.2	72.0 36.0	\$1,448,700	\$130,430	\$4,500	\$1,875 \$3,750
E (Alternative A + Construction of 3 Islands Along Entire West Side of Spring Lake)	0.90 0.26	302	0	271.8 78.5	84.6 42.3	\$2,048,700	\$184,449	\$6,000	\$2,252 \$4,504

Footnotes:

- 1) All of the alternatives considered, if implemented, should continue to provide the habitat benefits throughout their 50-year project life.
- 2) Habitat Suitability Index (HSI) value for bluegill was derived by HEP. HSI value for mallard was derived by WHAG (values are shaded for clarity).
- 3) Habitat Units (HU) reported are average annual habitat units and are the sums of the product of unaffected acreage and the no-action alternative HSI value and the product of affected acres and that alternative's HSI value.
- 4) Initial investment is the estimated first cost of construction of the alternative. Costs are preliminary and used for the initial comparison of alternatives.
- 5) Estimated cost/year is the annualized first cost of construction based on a 50-year economic life and an 8-7/8 percent discount rate.

An incremental analysis of alternatives was also performed to better indicate which of the barrier island alternatives appears most economically feasible. This analysis is shown by table DPR-4. The breach closure was used as a basis for the project alternatives because closing the breach at the upper end of the lake was a minimum requirement to improve habitat conditions in the lake. The results indicate that alternative C (Island 3) is economically preferred over alternative B (Island 1). This appears reasonable because there are more existing barrier islands at the upper end of the lake. However, the analysis shows that alternative D (the breach closure and Islands 2 and 3) is preferred over the other barrier island alternatives. This alternative, along with existing barrier islands, would shield Spring Lake from greater pool 5 most effectively. It was shown to be incrementally beneficial and could provide significant habitat benefits. Further study and refinement of island design could lower the estimated construction cost, and a number of fish and wildlife habitat improvements could be implemented. Possible habitat improvement features include: providing coarse spawning substrate; using vegetative plantings and management on the islands to provide a variety of successional stages; planting tubers of wild celery and arrowhead in deepwater areas presently devoid of vegetation; planting emergent species, such as wild rice and bulrush in the shallow embayments of the constructed islands; and providing artificial nesting structures for waterfowl. However, field data and study funds were not sufficient to adequately complete the evaluation and assessment of this alternative, and the closing of the breach is of the highest, immediate priority. Therefore, it was decided to pursue development of the breach closure only at this time, since it provides significant habitat benefits when compared to the construction cost, it has a high local priority, and funds have been scheduled for implementing the project in a short time-frame.

Although the construction of barrier islands is not being pursued at this time because of agency priorities and budget constraints, it should be pursued in the future. A fact sheet was prepared for the "Spring Lake Islands, Wisconsin" habitat project and it was coordinated with the participating natural resource agencies (see attachment 5). The project is included in the 6th Annual Addendum and scheduled for general design funds in the fiscal year 1993 proposed program.

There is insufficient sediment quality information to adequately evaluate some of the alternatives or project features for contaminants, so a final contaminants determination cannot be made. A tier II evaluation, including collection of bulk chemical sediment data, may be required depending on the final alternative selected for additional evaluation. If additional testing is required, a sampling strategy would be developed and coordinated with the appropriate personnel in the various agencies prior to any sample collection.

TABLE DPR-4
Incremental Analysis of Alternatives

Alternative Increment	Average Annual Cost	Ave Annual Incremental Cost	Species \1	Average Annual Habitat Unit Gain			Average Annual Incremental Cost/ Habitat Unit Gain
				Alt	Total	Incremental	
No Action	\$0	\$23,391	Bluegill	No	0.0		
A (Closure)(Base)	\$23,391			A	14.0	14.0	\$1,671
			Mallard	No	0.0		
				A	0.5	0.5	\$46,782
A	\$23,391	\$56,019	Bluegill	A	14.0		
B (Island 1)	\$79,410			B	32.2	18.2	\$3,078
			Mallard	A	0.5		
				B	1.1	0.6	\$93,365
A	\$23,391	\$56,019	Bluegill	A	14.0		
C (Island 3)	\$79,410			C	36.4	22.4	\$2,501
			Mallard	A	0.5		
				C	18.2	17.7	\$3,165
A	\$23,391	\$111,539	Bluegill	A	14.0		
D (Islands 2&3)	\$134,930			D	72.0	58.0	\$1,923
			Mallard	A	0.5		
				D	36.0	35.5	\$3,142
A	\$23,391	\$167,058	Bluegill	A	14.0		
E (Islands 1,2,&3)	\$190,449			E	84.6	70.6	\$2,366
			Mallard	A	0.5		
				E	42.3	41.8	\$3,997
Analysis by Island Increment Only							
A	\$23,391	\$56,019	Bluegill	A	14.0		
C (Island 3)	\$79,410			C	36.4	22.4	\$2,501
			Mallard	A	0.5		
				C	18.2	17.7	\$3,165
C	\$79,410	\$55,520	Bluegill	C	36.4		
D (+Island 2)	\$134,930			D	72.0	35.6	\$1,560
			Mallard	C	18.2		
				D	36.0	17.8	\$3,119
D	\$134,930	\$55,519	Bluegill	D	72.0		
E (+Island 1)	\$190,449			E	84.6	12.6	\$4,406
			Mallard	D	36.0		
				E	42.3	6.3	\$8,813

Footnote:

- 1) Habitat Suitability Index (HSI) value for bluegill was derived by HEP.
HSI value for mallard was derived by WHAG (shaded for clarity).

SELECTED PLAN OF ACTION

The alternative that best satisfies the immediate agency and public goals, habitat improvement objectives, and planning opportunities and constraints is alternative A. This alternative is shown on Plate 13. It is imperative to repair the breach in the peninsula under the scheduled program funds before additional degradation of the upper end of Spring Lake occurs. Features of the plan include a 550-foot closure of the breach in the peninsula at the upper end of Spring Lake. The closure would be constructed of a combination of pervious fill (sand) and fine material with 18 inches of riprap on geotextile fabric to stabilize the Belvidere Slough side slope. The top width would be 20 feet with a 1 vertical on 3 horizontal side slope on the Belvidere Slough side and a 1 vertical on 10 horizontal slope on the upper part of the Spring Lake side and a 1 vertical on 40 horizontal slope on the lower part. The top elevation (665 msl) would be 5 feet above normal pool elevation. This elevation was chosen so that, in a flood, the existing adjacent islands and peninsula would overtop first. A typical cross-section of the closure design is shown on Plate 14.

After additional analysis and discussions with project participants, it was agreed to entirely eliminate the notch opening and flow control structure because it is very unlikely that dissolved oxygen levels in the lake will be a problem. Prior to the breach forming in the peninsula, there is no evidence or record that low dissolved oxygen conditions existed in the upper end of the lake. In fact, the area was a prime centrarchid fishery. Therefore, the selected plan does not include placing an opening in the closure.

The combination of pervious fill (sand) and fine material to construct the closure is intended to maximize the potential use of material from Spring Lake and, thereby, provide additional deepwater habitat benefits for fish. Dredging about 4 feet of material from adjacent to the closure or a selected area of upper Spring Lake for closure material would create about an acre of additional deepwater habitat for fish. The exact area and depth would be determined during the next phase of design and will depend on the results of soil borings in the lake.

Sources of Fill Material - Material to construct the breach closure could be dredged from five possible sources: the upper end of Spring Lake; Belvidere Slough; Summerfield Island dredge cut; Lost Island disposal site; or Lost Island Lake. These sites are shown on Plate 15. Spring Lake is the preferred source of construction material for the closure because the dredging would provide additional deepwater fish habitat. However, it is not expected that suitable sand would be available in Spring Lake, so Belvidere Slough is the expected source. An approved on-land source of material could also be used to construct the sand base and core of the closure. Initial analysis of soil borings obtained in 1991 in the project area indicates that pervious construction material is available in Belvidere Slough and not in Spring Lake. Additional field visits will be needed for final design to determine the quantity and character of material both in Belvidere Slough and Spring Lake.

Construction Methods - On-site fill material would be mechanically dredged from Belvidere Slough and/or Spring Lake. It is likely that sand would be dredged from Belvidere Slough and barged to the closure site. Fine material would be dredged from the Spring Lake side of the closure directly in-place. Rock riprap could be barged or trucked to the project site from local quarries and placed directly in-place to minimize handling costs.

Project Support - The participants in the planning process provided written and verbal suggestions that were considered fully during plan development and selection. Their written comments and letters of support are included in attachments 4 and 5. At a public meeting on June 5, 1990, the attendees strongly endorsed efforts to repair the breach as quickly as possible and encouraged the pursuit of further barrier island construction in the future to enhance habitat in Spring Lake. Based on specific written comments on the draft DPR received from the Wisconsin DNR by letter dated June 28, 1991, changes were made to the report as requested.

Project Accomplishments - The proposed project has been designed to meet the project objectives shown in table DPR-2.

Real Estate Requirements - No land needs to be acquired for the proposed project since the project would be located on land owned by the Corps of Engineers and managed by the U.S. Fish and Wildlife Service. Appropriate agreements would be made with the U.S. Fish and Wildlife Service for the construction and operation and maintenance of the project.

ENVIRONMENTAL ASSESSMENT

An environmental assessment has been conducted for the proposed action, and a discussion of the impacts on habitat conditions follows. Impacts of the project are summarized by category in the impact assessment matrix (table DPR-5). In accordance with Corps of Engineers regulations (33 CFR 323.4(a)(2)), a Section 404(b)(1) evaluation was prepared (see attachment 3). Application was made to the State of Wisconsin regarding water quality certification under Section 401 of the Clean Water Act. Water quality certification was obtained from the Wisconsin DNR by letter dated August 12, 1991 (see attachment 5). The Finding of No Significant Impact (attachment 2) was signed after the public review period elapsed and the water quality certification was obtained.

RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS

The proposed project fully complies with applicable environmental statutes and Executive Orders for the current stage of planning. Among the more pertinent are the National Environmental Policy Act, the Fish and Wildlife Coordination Act, the Clean Water Act, the National Historic Preservation Act, the National Wildlife Refuge System Administration Act, Executive Order 11990 (Protection of Wetlands), and Executive Order 11988 (Floodplain Management).

TABLE DPR-5.

IMPACT ASSESSMENT MATRIX

NAME OF PARAMETER	MAGNITUDE OF PROBABLE IMPACT						
	← INCREASING BENEFICIAL IMPACT			NO APPRECIABLE EFFECT	INCREASING → ADVERSE IMPACT		
	SIGNIFICANT	SUBSTANTIAL	MINOR		MINOR	SUBSTANTIAL	SIGNIFICANT
A. SOCIAL EFFECTS							
1. Noise Levels				X			
2. Aesthetic Values				X			
3. Recreational Opportunities		X					
4. Transportation				X			
5. Public Health and Safety				X			
6. Community Cohesion (Sense of Unity)				X			
7. Community Growth & Development				X			
8. Business and Home Relocations				X			
9. Existing/Potential Land Use				X			
10. Controversy				X			
B. ECONOMIC EFFECTS							
1. Property Values				X			
2. Tax Revenues				X			
3. Public Facilities and Services				X			
4. Regional Growth				X			
5. Employment				X			
6. Business Activity				X			
7. Farmland/Food Supply				X			
8. Commercial Navigation				X			
9. Flooding Effects				X			
10. Energy Needs and Resources				X			
C. NATURAL RESOURCE EFFECTS							
1. Air Quality				X			
2. Terrestrial Habitat			X				
3. Wetlands		X					
4. Aquatic Habitat		X					
5. Habitat Diversity and Interspersion		X					
6. Biological Productivity		X					
7. Surface Water Quality		X					
8. Water Supply				X			
9. Groundwater				X			
10. Soils				X			
11. Threatened or Endangered Species				X			
D. CULTURAL RESOURCES							
1. Historic Architectural Values				X			
2. Pre-Hist & Historic Archeological Values				X			

NATURAL RESOURCES EFFECTS

Terrestrial Habitat - Approximately 2,000 square feet of shrub carr/herbaceous vegetation would be covered by fill during the construction phase. The closure structure is designed to be 5 feet above normal pool elevation and would cover about 1.4 acres. Of this total, 12,500 square feet would be quarry run riprap on the upstream side of the structure at a 1 vertical on 3 horizontal slope. The remainder of the area would be level or at a gradual slope and would be vegetated. There would be about 1.2 acres gained in terrestrial habitat by the construction of the closure structure.

Aquatic Habitat - Approximately 1.2 acres of aquatic habitat (mostly unvegetated sand flat) would be lost by the construction of the closure structure and associated riprap placement. The rock riprap would provide a more diverse substrate in the project area. The Spring Lake side of the structure would provide a vegetated shallow area that would serve as important fish spawning and waterfowl habitat.

Water Quality - Detailed effects of the project on water quality are described in the attached Section 404(b)(1) Evaluation (attachment 3). Potential construction related negative effects on water quality would be from the construction of the closure structure, including open-water placement of dredged material from the upper end of Spring Lake. The pervious dredged material to be used as a base for the closure structure and the rock fill would reduce impacts on water quality. Local turbidity plumes would be generated from the construction of the structure, but releases of contaminants should be minimal due to the relatively uncontaminated material. Excavation and placement of material would be done mechanically. The long-term impact on water quality is expected to be positive because of the lower flow velocities.

Fish and Wildlife - The project is designed to benefit fish and wildlife habitat, and the benefits associated with the project have been discussed previously in this report. Therefore, this discussion will only briefly summarize the anticipated benefits and discuss the unavoidable trade-offs. The closure structure would reduce the sediment load into Spring Lake and protect future loss of about 50 acres of prime centrarchid habitat. One of the primary benefits would be the enhancement of winter centrarchid habitat in Spring Lake by eliminating cold water flows into the area. Protecting the closure structure with rock riprap would provide a coarse substrate to improve the value of the area for lithophilic fish species, such as smallmouth bass. Rock substrate is at least 10 times as productive for macroinvertebrates, including crayfish (an important food source for smallmouth bass), as the sand substrate it would be replacing. The construction of the closure structure and dredging in Spring Lake would at least temporarily disturb fish use of the area. Dredging would convert shallow wetlands, predominantly submerged aquatic plants, to deepwater wetlands. This would have both positive and negative effects, depending on the species. It would have a positive benefit to the centrarchid fisheries in the lake. However, it would have a negative effect on certain wildlife species that use shallow water wetlands. Use of the area by fish may be reduced during construction activities, especially in the areas of elevated suspended sediment. No toxic effects are expected on fish or other aquatic organisms. Overall, fish spawning, nursery, and wintering habitat values would be improved by the project. Some burrowing mammals and reptiles could be killed or displaced by construction activities. Overall, the impacts should not be substantial because of the relatively small area of habitat that would be affected by construction. The long-term impacts are expected to be positive.

Endangered Species - The proposed project would not have substantial impacts on threatened or endangered species. The absence of Higgins' eye pearly mussels from recent surveys in and adjacent to the project area would indicate that the project should not have any significant impact on this species. Bald eagles use the area, mainly for wintering and during migrations. The immediate project area does not provide the kind of habitat preferred by peregrine falcons, and no impacts are expected. The U.S. Fish and Wildlife Service supports this determination of no significant impacts (see attachment 5, Coordination).

Air Quality - The proposed actions would have minor negative effects on air quality. Exhaust emissions from construction equipment would degrade air quality slightly for short periods. This temporary change in air quality could disturb people using adjacent areas of the river, but the overall effect on people, vegetation, and wildlife would be negligible.

SOCIOECONOMIC FACTORS

The proposed project would have minimal or no impacts on the following Section 122 (1970 Rivers and Harbors Act) socioeconomic categories: transportation, public health and safety, community cohesion, community growth and development, business or home relocations, land use, property values, tax revenues, regional growth, employment, business activity, food supply, navigation, flooding effects, or energy resources.

Noise Pollution - The immediate vicinity around the project area would be temporarily disrupted by construction activities. Some disturbance may occur from noise and human activity, although these impacts are temporary, and adverse impacts to the general public would be short-term and insignificant.

Recreation and Aesthetic Values - The presence of construction equipment would have a temporary negative effect on aesthetic values in the project area. Use of the Upper Spring Lake boat landing could be limited during construction of the project because construction equipment may use the area for access.

CULTURAL RESOURCES

In accordance with the National Historic Preservation Act of 1966, as amended, the National Register of Historic Places has been consulted. As of October 1, 1990, there are no sites on or determined eligible for the Register in the immediate project area. There are nine recorded prehistoric sites within a mile of the island group and eleven significant historic sites or structures. The island group appears to be an original land surface which has remained relatively undisturbed. No resources were discovered in a recent survey, and on the basis of a records search and field reconnaissance, no further cultural resources are expected.

COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

An environmental review of the proposed action indicates that the proposed project would not result in substantial effects on the environment. Therefore, an environmental impact statement will not be prepared as described in the Finding of No Significant Impact (attachment 2). For the current stage of planning, the proposed project complies with all applicable Federal environmental laws, executive orders (E.O.) and policies, and State and local laws and policies, including the Clean Air Act, as amended; the Endangered Species Act of 1973, as amended; the Land and Water Conservation Fund Act of 1965, as amended; the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969, as amended; the Fish and Wildlife Coordination Act of 1958, as amended; E.O. 11988-Floodplain Management; E.O. 11990-Protection of Wetlands; and the Farmland Protection Policy Act of 1981.

PROJECT REQUIREMENTS

OPERATION AND MAINTENANCE

After construction of the project, annual operation and maintenance (O&M) of the project would be the responsibility of the U.S. Fish and Wildlife Service (USFWS). Generally, it is anticipated that O&M requirements would include annual inspection and periodic riprap replacement at areas where erosion takes place. No maintenance of the deepwater area provided by borrowing of fine material for the closure would be required because of the shelter provided by the closure. An O&M manual detailing the specific requirements of the project would be prepared by the Corps during the plans and specifications phase. Development of the manual would be coordinated with the USFWS and Wisconsin Department of Natural Resources. Over the 50-year project life, the estimated average annual O&M cost of the project is shown below.

Inspection and report writing/evaluations	\$ 400
Riprap replacement (average 12 CY/year @ \$50/CY)	600
TOTAL ANNUAL O&M COST	\$1,000

COST ESTIMATE

A cost estimate for the project is shown in table DPR-6. This cost estimate differs from the estimate shown earlier in this report because more detailed design and analyses were used to develop it. Extensions are rounded to the nearest \$100 and column totals to the nearest \$1,000. A detailed cost estimate with narrative report is included as attachment 8.

TABLE DPR-6
Cost Estimate for the Selected Plan

Item	Quantity	Unit Price	Amount	Contingencies		
				Amount	(%)	Reasons
CLOSURE						
Mobilization and demobilization	1 JOB	\$10,000	\$10,000	\$25,000	250	1,2,3,6
Pervious Fill	8,611 CY	7.00	60,300	30,000	50	1,3
Fill, Fines	2,778 CY	7.00	19,400	9,700	50	1,3
Geotextile	1,333 SY	3.00	4,000	2,000	50	1,3
Riprap (18")	741 CY	30.00	22,200	11,100	50	1,3
SUBTOTAL DIRECT CONSTRUCTION COSTS			116,000	78,000	67	
ENGINEERING AND DESIGN	1 JOB	65,000	65,000	7,000	11	4
SUPERVISION & INSPECTION	1 JOB	11,000	<u>10,000</u>	<u>7,000</u>	70	5
SUB-TOTALS			191,000	92,000		
TOTAL CONSTRUCTION COST				\$283,000		

Reasons for contingencies: (1) Quantity unknowns (based on available information)
(2) Unit price unknowns
(3) Unknown site conditions
(4) Undefined requirements
(5) 9% of estimated construction cost, including contingencies
(6) Includes 3,000 CY dredging for access

NOTE: General design (planning) allocations have totaled \$74,000 and include \$22,000 of the E&D costs. Annualized first costs (based upon a 50-year economic life and an 8-7/8% discount rate) would amount to \$25,500. With the addition of annual operation and maintenance costs, the total average annual costs are estimated to be \$26,500. Performance evaluation costs are shown in table DPR-8.

	Aug 91	Feb 92	%	25%
Const.	194	212	9.2	265
Labor	67	77	16%	
Surk	96	96		
	<u>357</u>	<u>385</u>		

Est. = 197

PERFORMANCE EVALUATION

The principal types, purposes, and responsibilities of project monitoring and evaluation are shown in table DPR-7. Post-construction plans to monitor the project for performance evaluation purposes were designed to directly measure the degree of attainment of project objectives. For each objective, an appropriate monitoring parameter was chosen. The parameter to be measured for each objective is shown in table DPR-8. Monitoring activities would be closely coordinated with any similar efforts by the Long Term Resource Monitoring program component and could be modified in the future based on field observations.

TABLE DPR-7
UMRS-EMP Monitoring and Performance Evaluation Matrix

Type of Activity	Purpose	Responsible Agency	Implementing Agency	Funding Source	Remarks
Sedimentation Problem Analysis	System-wide problem definition [to PA(S)9]*. Evaluate planning assumptions.	USFWS	USFWS (EMTC)	LTRM	Lead into pre-project monitoring; define desired conditions for plan formulation.
Pre-project Monitoring	Identify and define problems at specific sites.	Sponsor	Sponsor	Sponsor	Should attempt to begin defining baseline.
Baseline Monitoring	Establish baselines for performance evaluation.	Corps	Field stations or sponsors thru Cooperative Agreements, or Corps.**	LTRM ****	Should be over several years to reconcile perturbations.
Data Collection for Design	1. Identify project objectives. 2. Design of project. 3. Develop Performance Evaluation Plan.	Corps	Corps	HREP	After fact sheet. Data may aid in defining baseline.
Construction Monitoring	Assure permit conditions met.	Corps	Corps	HREP	
Performance Evaluation Monitoring	Determine success of projects.	Corps	Field stations or sponsors thru Cooperative Agreements, sponsor thru O&M***, or Corps.**	LTRM ****	After construction.
Analysis of Biological Responses to Projects	1. Determine critical impact levels, cause-effect relationships, and long-term losses of significant habitat.	USFWS	USFWS (EMTC)	LTRM	Biological Response Study tasks beyond scope of Performance Evaluation, Problem Analysis, and Trend Analysis.
	2. Demonstrate success or response of biota.	Corps	Corps/USFWS (EMTC)/Others	LTRM ****	

*Refers to Sedimentation Problem Analysis Tasks, pages 35-36, LTRM Operating Plan

**Choice depends on logistics. When done by the States under a Cooperative Agreement, the role of the EMTC will be to:
(1) advise and assist in assuring QA/QC consistency, (2) review and comment on reasonableness of cost estimates, and
(3) be the financial manager. If a private firm or state is funded by contract, coordination with the EMTC is required to assure QA/QC consistency.

***Some limited reporting of information for some projects (e.g., waterfowl management areas) could be furnished by on-site personnel as part of O&M.

****Requires a transfer of allocations from the Habitat Project account to the LTRM account.

TABLE DPR-8
Pre- and Post-construction Measurements

Goal	Project Objective	Enhancement Feature	Unit of Measure	Measurement Plan	Monitoring Interval	Projected Cost per Effort	Field Observations
Improve winter & summer centrarchid habitat	Decrease winter flow velocities	Breach closure	ft/sec	Measure winter flow velocity 3 times/yr in upper Spring Lake.	Once pre- and 1 and 3 year post-construction	\$2,000	Presence of fish during summer and winter
	Maintain summer dissolved oxygen levels >5 mg/l	Opening in closure	mg/l	Measure diel DO levels during July-August for 6 consecutive days	Twice pre- and 1 and 3 year post-construction	\$2,000	
	Maintain winter DO >5 mg/l and water temp above 4 deg. C	Dredging and closure	mg/l and deg. C	Measure DO and temperature every 2 weeks during safe ice cover conditions	Once pre- and 1 and 3 year post-construction	\$3,000	

Average annual monitoring cost over the 50-year project life = \$460

PROJECT IMPLEMENTATION

DIVISION OF PLAN RESPONSIBILITIES

The responsibilities for plan implementation and construction fall to the Corps of Engineers as the lead Federal agency. Operation and maintenance (included minor repair and replacement) of the completed project would be the responsibility of the U.S. Fish and Wildlife Service. Should rehabilitation of the project which exceeds the annual maintenance requirements be needed (as a result of a specific storm or flood event) the Federal share will be a responsibility of the Corps. Project performance evaluation and major rehabilitation would be the responsibility of the Corps of Engineers. Some project performance monitoring (field observations) would be accomplished by the Wisconsin Department of Natural Resources during normal management efforts in the area. This will be more specifically coordinated and defined in the future O&M manual.

COST APPORTIONMENT

Construction - All project construction activities would be conducted on lands managed as part of the Upper Mississippi River National Wildlife and Fish Refuge. Therefore, in accordance with Section 906(e)(3) of Public Law 99-662, the first costs for construction of the project would be 100-percent Federal and would be borne by the Corps of Engineers.

Operation and Maintenance - After construction of the project, annual management operations would be conducted by the U.S. Fish and Wildlife Service. A draft Memorandum of Agreement for operation and maintenance is included as attachment 6. The U.S. Fish and Wildlife Service would assure that non-Federal operation and maintenance responsibilities are in conformance with Section 906(e) of the Water Resources Development Act of 1986. The non-Federal sponsor is the Wisconsin Department of Natural Resources. Specific operation and maintenance features would be defined in a project O&M manual which would be prepared by the Corps and coordinated with the involved agencies during the plans and specifications phase.

Rehabilitation - Rehabilitation of the project cannot be accurately estimated. The U.S. Army Corps of Engineers will be responsible for 75 percent of the cost of rehabilitation work that is mutually agreed upon and determined necessary for the project or functional portion. The non-Federal sponsor is responsible for the remaining 25 percent of rehabilitation cost, in accordance with Section 906(e) of the Water Resources Development Act of 1986.

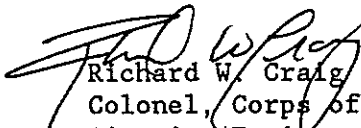
STEPS PRIOR TO PROJECT CONSTRUCTION

After submittal of the final report to higher authority, funds for plans and specifications can be provided by the Office of the Chief of Engineers (OCE), prior to approval of the project by the Assistant Secretary of the Army (Civil Works). As described in this report, this work would include soundings and surveys at the closure site, borrow site material testing, cultural resource survey, detailed design of the closure structure, preparation of plans and specifications and an O&M manual, and coordination of project design with the sponsor and local interests.

The current schedule is to begin preparing plans and specifications in fiscal year 1992. A construction contract would be advertised by the competitive bid process and awarded in fiscal year 1992. The work would be completed in fiscal year 1993.

RECOMMENDATIONS

I have weighed the accomplishments to be obtained from construction of this habitat improvement project against its cost and have considered the alternatives, impacts, and scope of the proposed project. In my judgment, the proposed project is a justified expenditure of Federal funds. I recommend that the Secretary of the Army approve this repair of a breach in the peninsula at Spring Lake in Buffalo County, Wisconsin, for habitat rehabilitation and enhancement. The total estimated construction cost of the project is \$283,000, which amount would be a 100-percent Federal cost according to Section 906(e)(3) of Public Law 99-662. I further recommend that funds be allocated to begin preparation of plans and specifications for the Spring Lake Peninsula habitat project.


Richard W. Craig
Colonel, Corps of Engineers
District Engineer

Attachments:

1. Plates:

- 1 - Location Map
 - 2 - Project Area Map
 - 3 - Aerial Photo of Spring Lake
 - 4 - Spring Lake Island Composition in 1939
 - 5 - Spring Lake Island Composition in 1964
 - 6 - Spring Lake Island Composition in 1977
 - 7 - Spring Lake Island Composition in 1989
 - 8 - Spring Lake Bathymetry
 - 9 - Miss River Discharge at Winona
 - 10 - Miss River Suspended Solids Conc at Winona
 - 11 - Miss River Water Temperature at Winona
 - 12 - Project Alternatives
 - 13 - Selected Plan
 - 14 - Typical Closure Cross-Section
 - 15 - Dredged Material Borrow Sites
2. Finding of No Significant Impact
 3. Section 404(b)(1) Evaluation
 4. Letters of Intent
 5. Coordination
 6. Draft MOA for O&M
 7. Distribution List
 8. Detailed Cost Estimate

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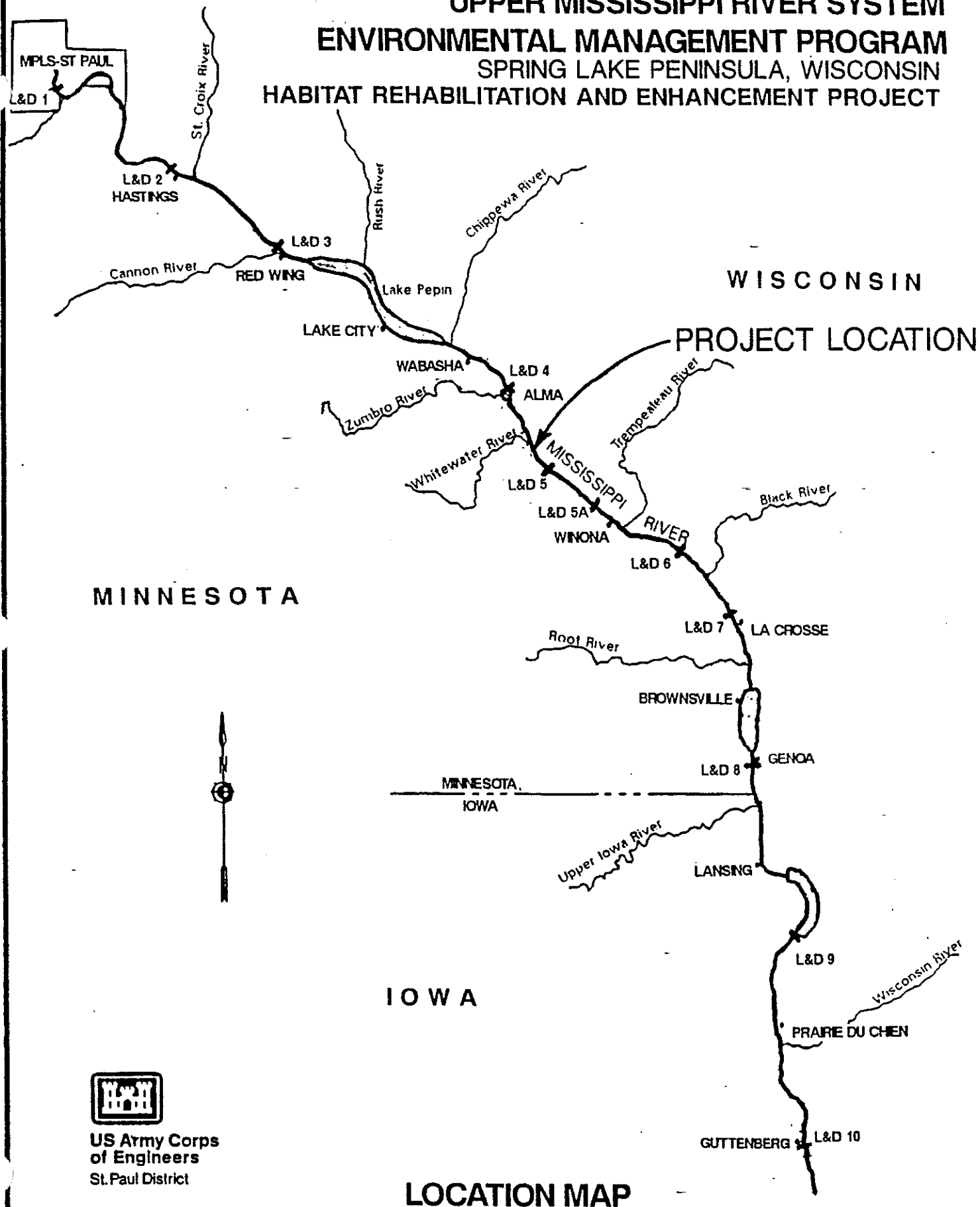
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Attachment 1

Plates

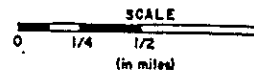
UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM
SPRING LAKE PENINSULA, WISCONSIN
HABITAT REHABILITATION AND ENHANCEMENT PROJECT



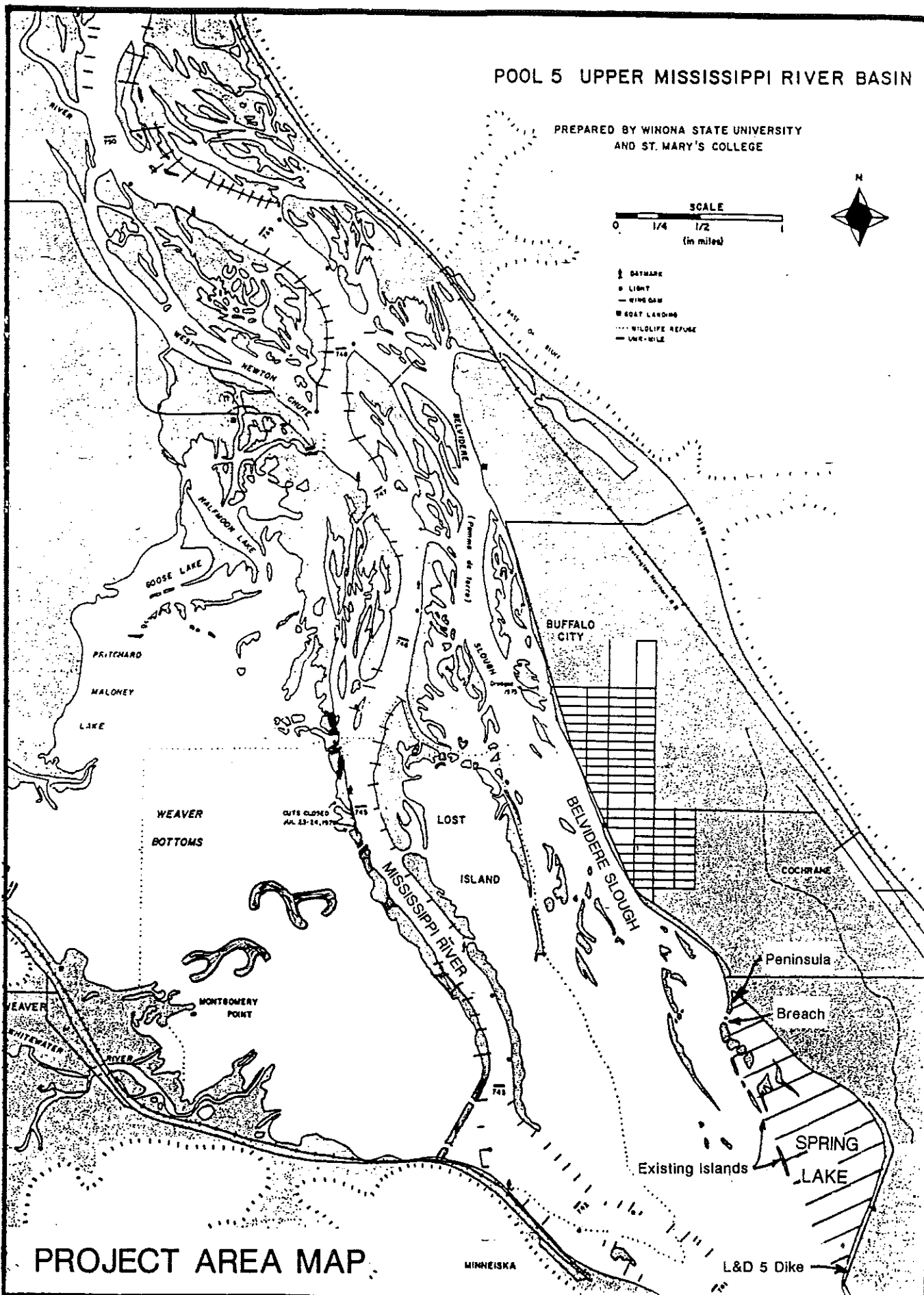
LOCATION MAP

POOL 5 UPPER MISSISSIPPI RIVER BASIN

PREPARED BY WINONA STATE UNIVERSITY
AND ST. MARY'S COLLEGE



- ⬮ BATHARK
- LIGHT
- KING DAM
- ⊞ BOAT LANDING
- ⋯ WILDLIFE REFUGE
- 1/4-MILE



PROJECT AREA MAP

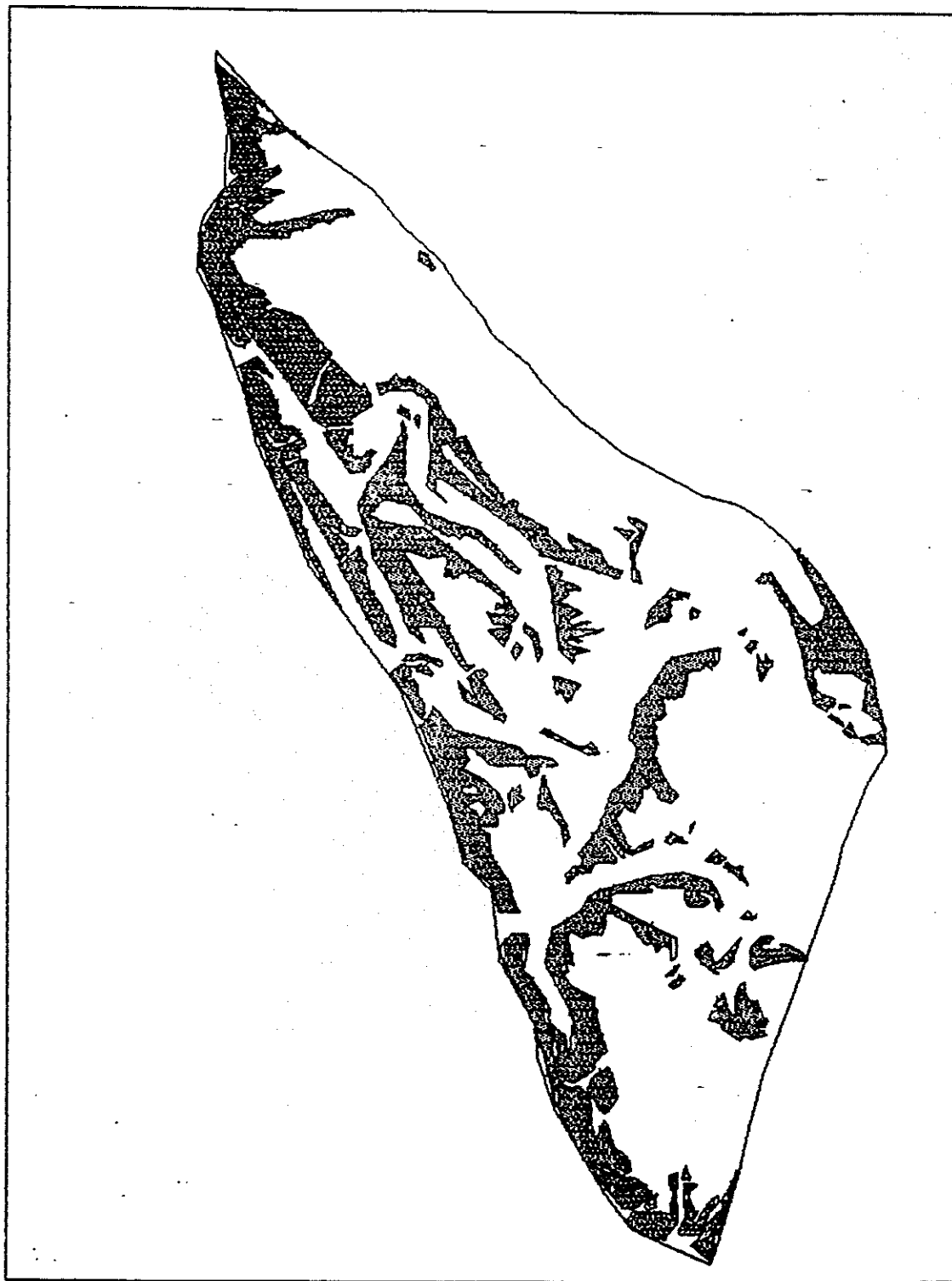


WISCONSIN

SPRING LAKE

Lock & Dam 5 Dike

TITLE: Aerial photo of Springlake Pool 5 (5-1-39) BHM4-16
LOCATION: FOREST MANAGEMENT

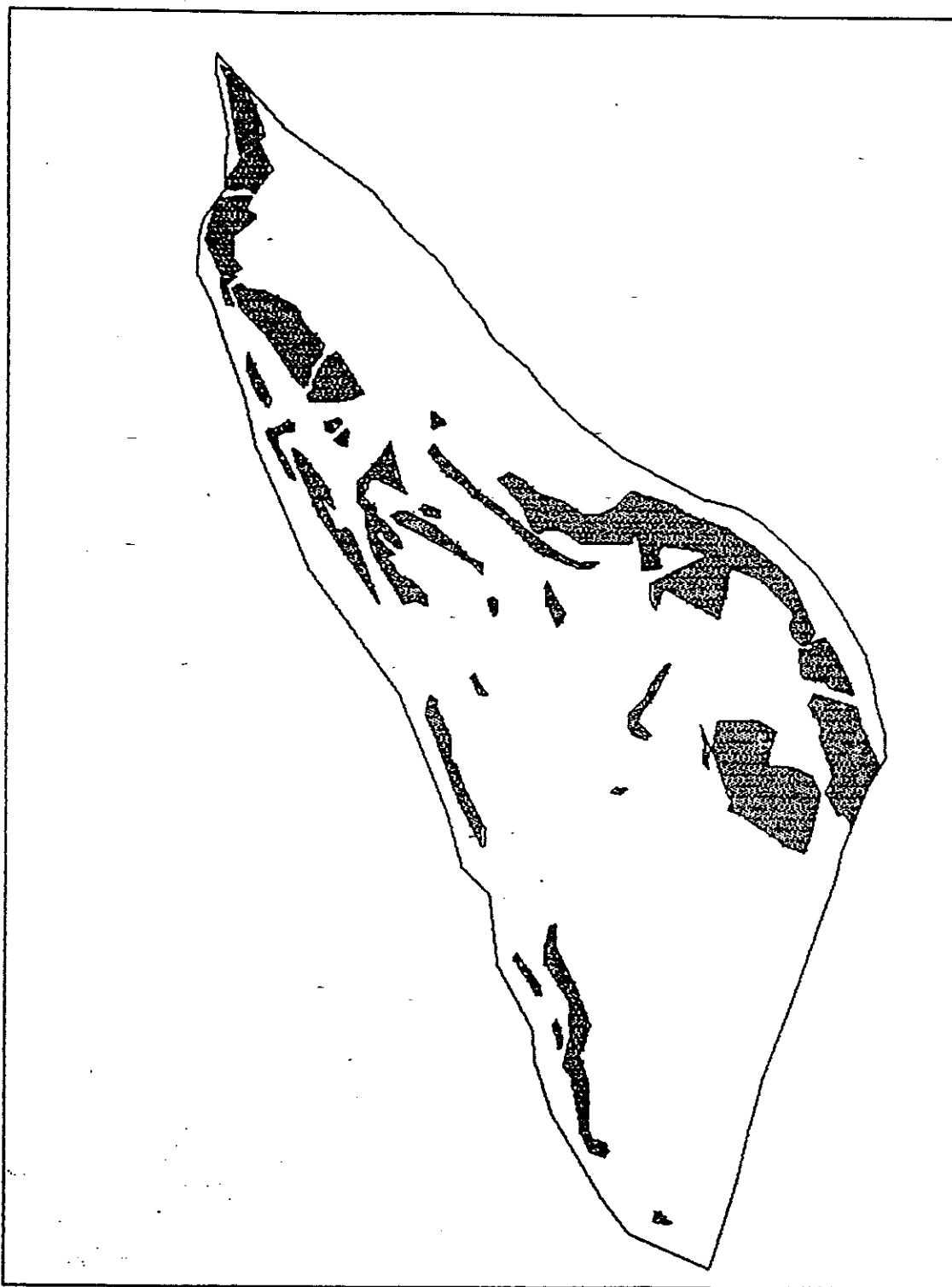


SCALE: 1 : 15000
WINDOW: 591410.00 4896350.00 593580.00 4893400.00

SPRING LAKE ISLAND COMPOSITION IN 1939

PLATE 4

TITLE: Aerial Photo of Springlake Pool 5 (4-10-64) #409A
LOCATION: FOREST MANAGEMENT



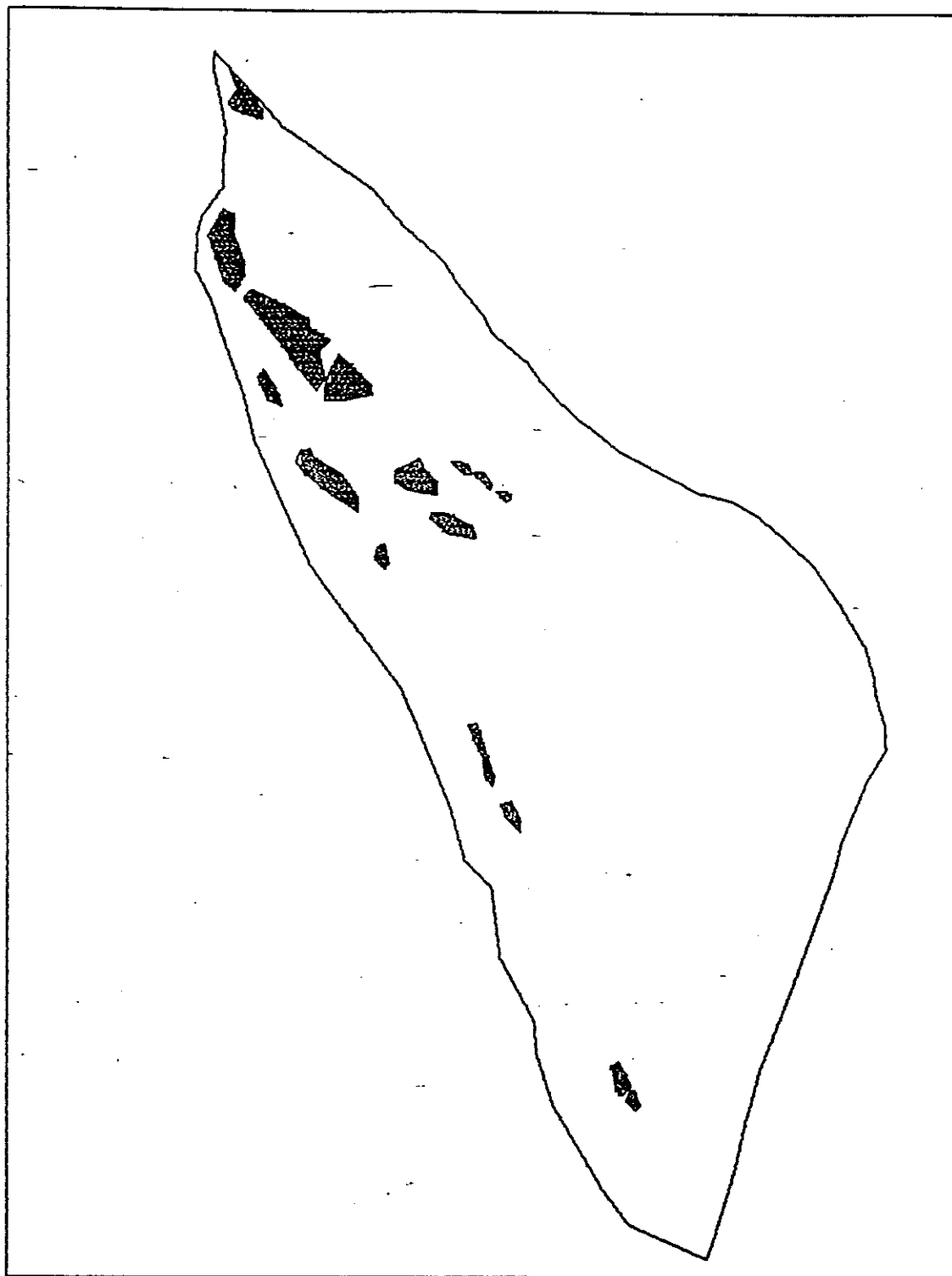
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4893400.00

SPRING LAKE ISLAND COMPOSITION IN 1964

PLATE 5

TITLE: St. Mary's College paper map Springlake 1977
LOCATION: FOREST MANAGEMENT



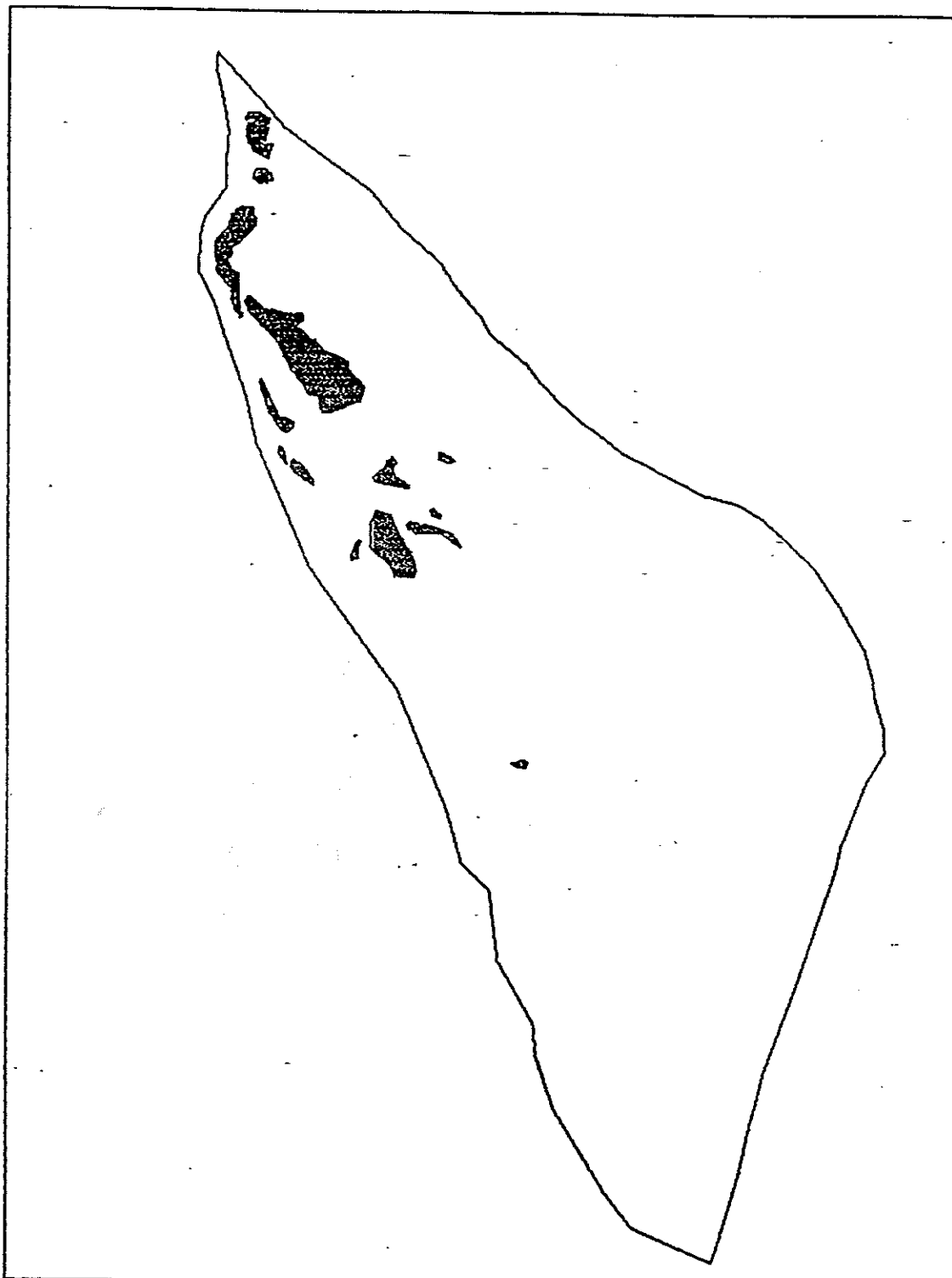
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WINDOW: 591410.00 4896350.00 593580.00
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SPRING LAKE ISLAND COMPOSITION IN 1977

PLATE 6

TITLE: (1989. land)
LOCATION: FOREST MANAGEMENT



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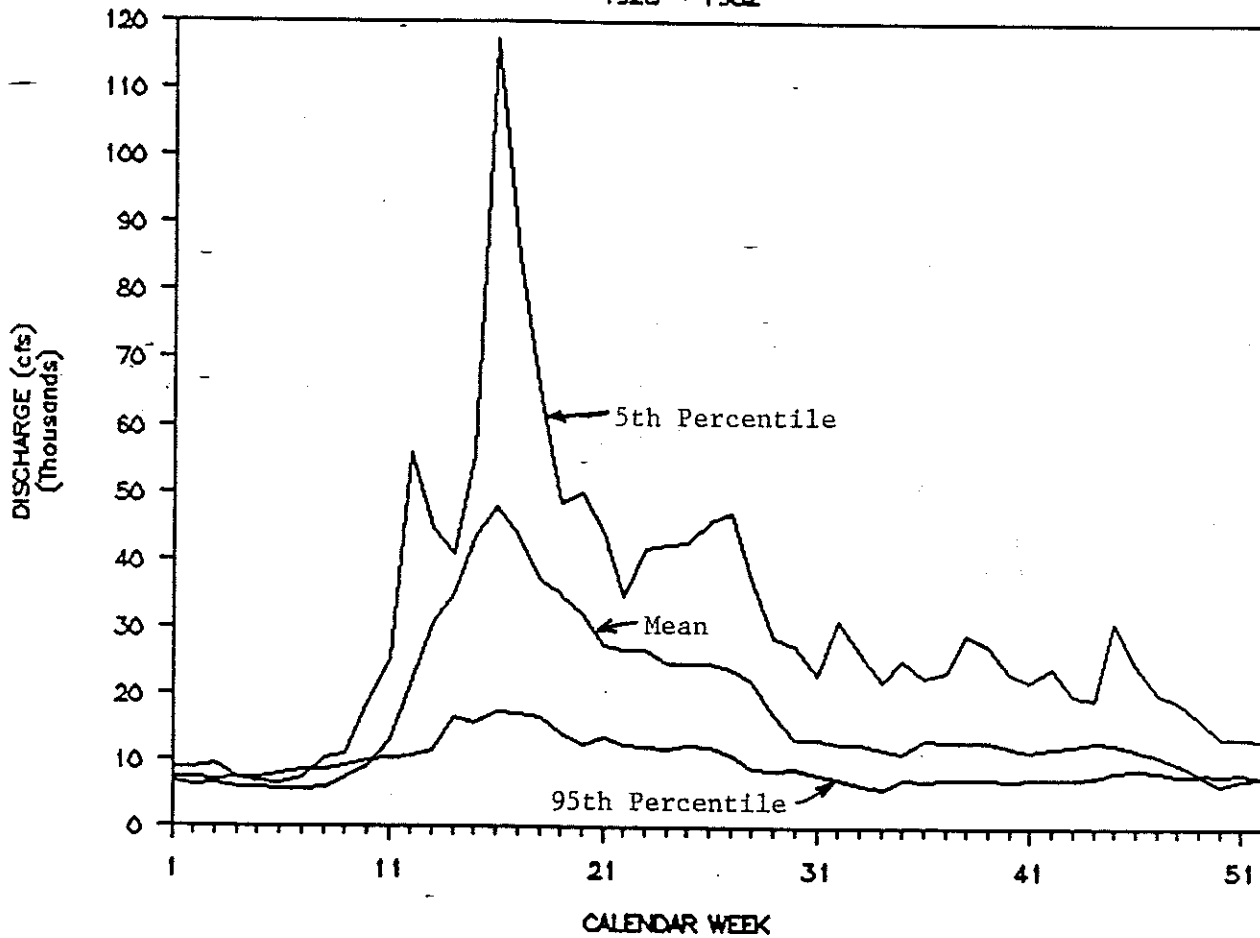
SPRING LAKE ISLAND COMPOSITION IN 1989

PLATE 7



RIVER DISCHARGE AT WINONA

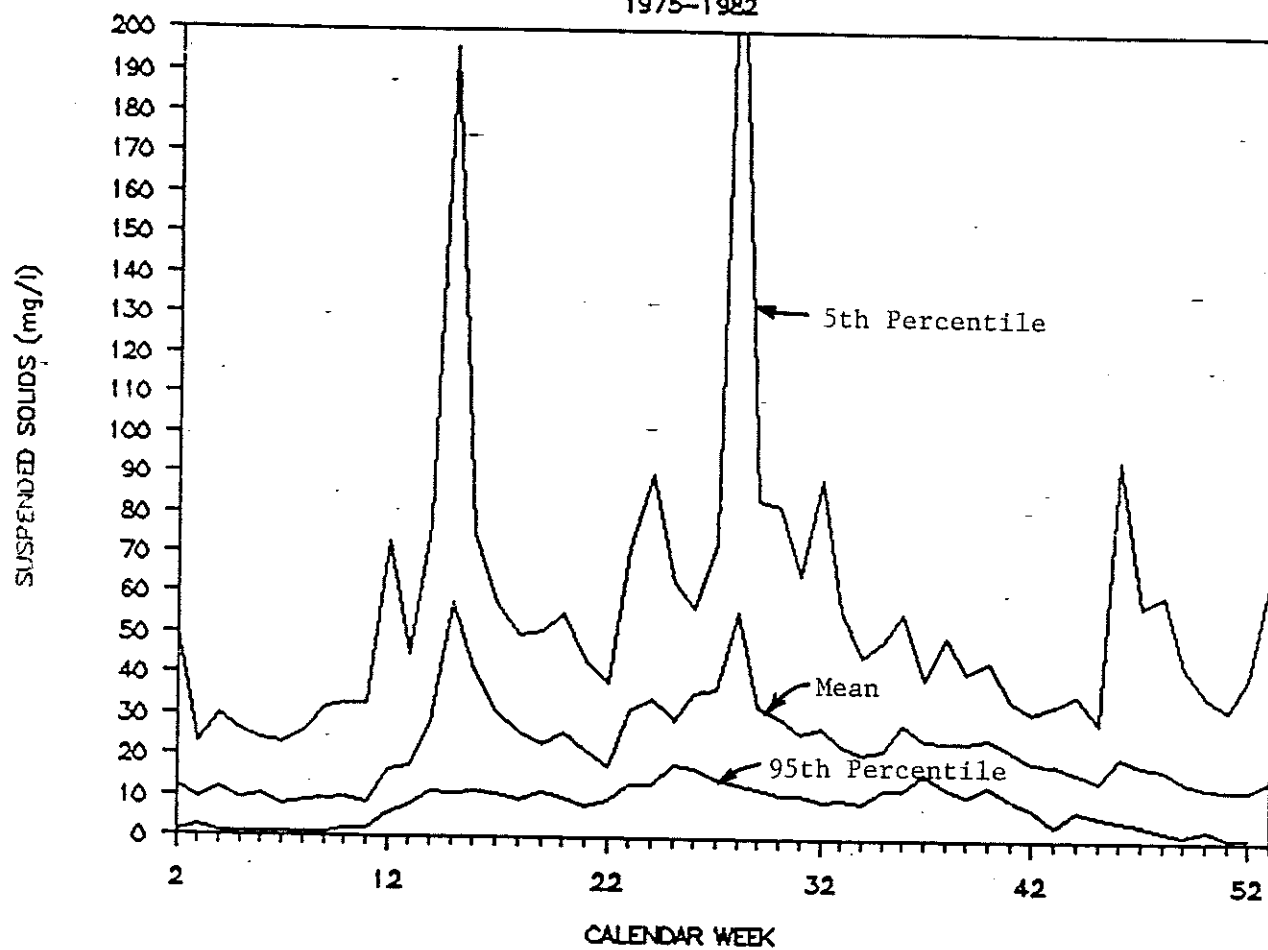
1928 - 1982



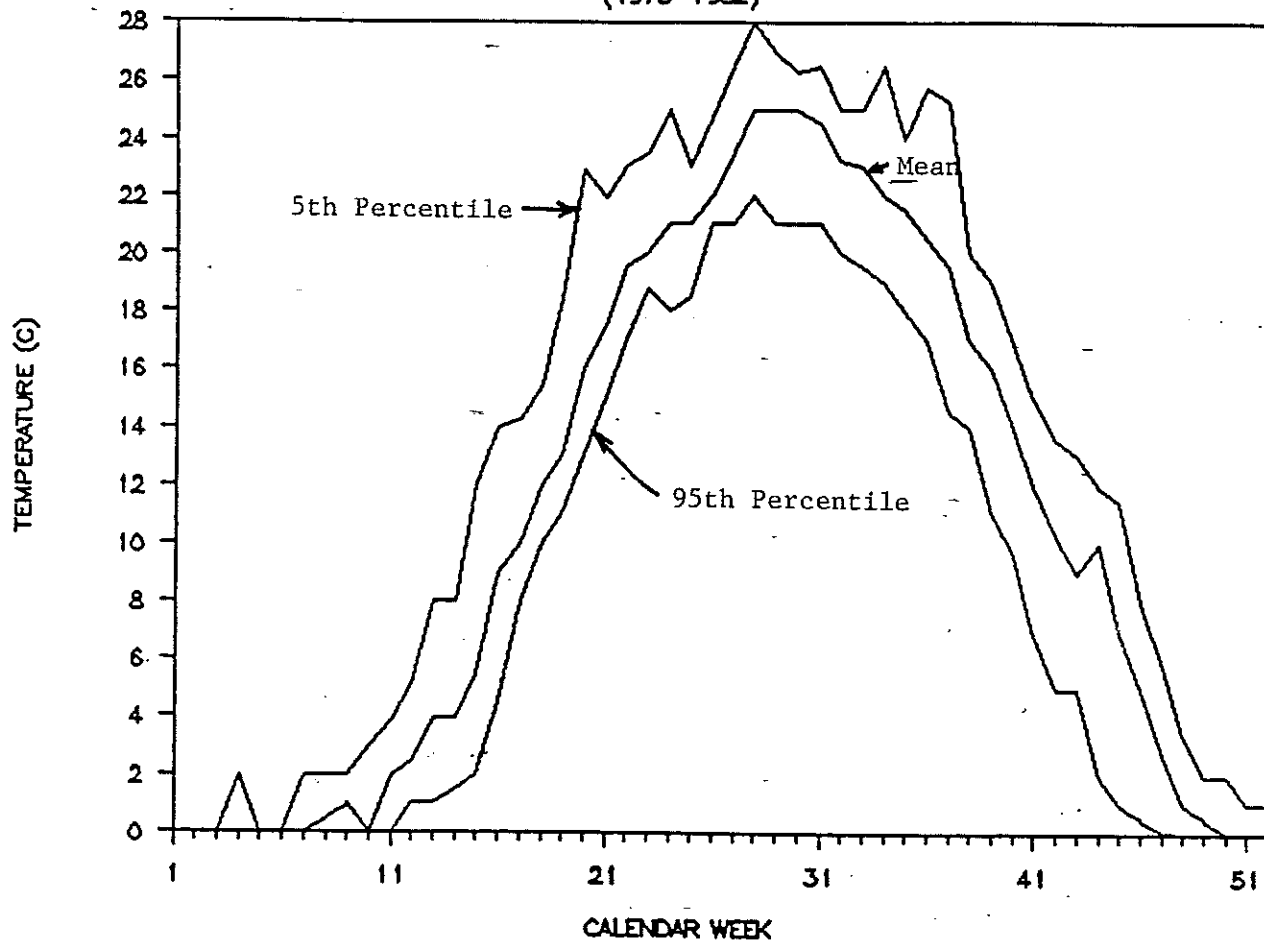
MISSISSIPPI RIVER DISCHARGE AT WINONA, MINNESOTA

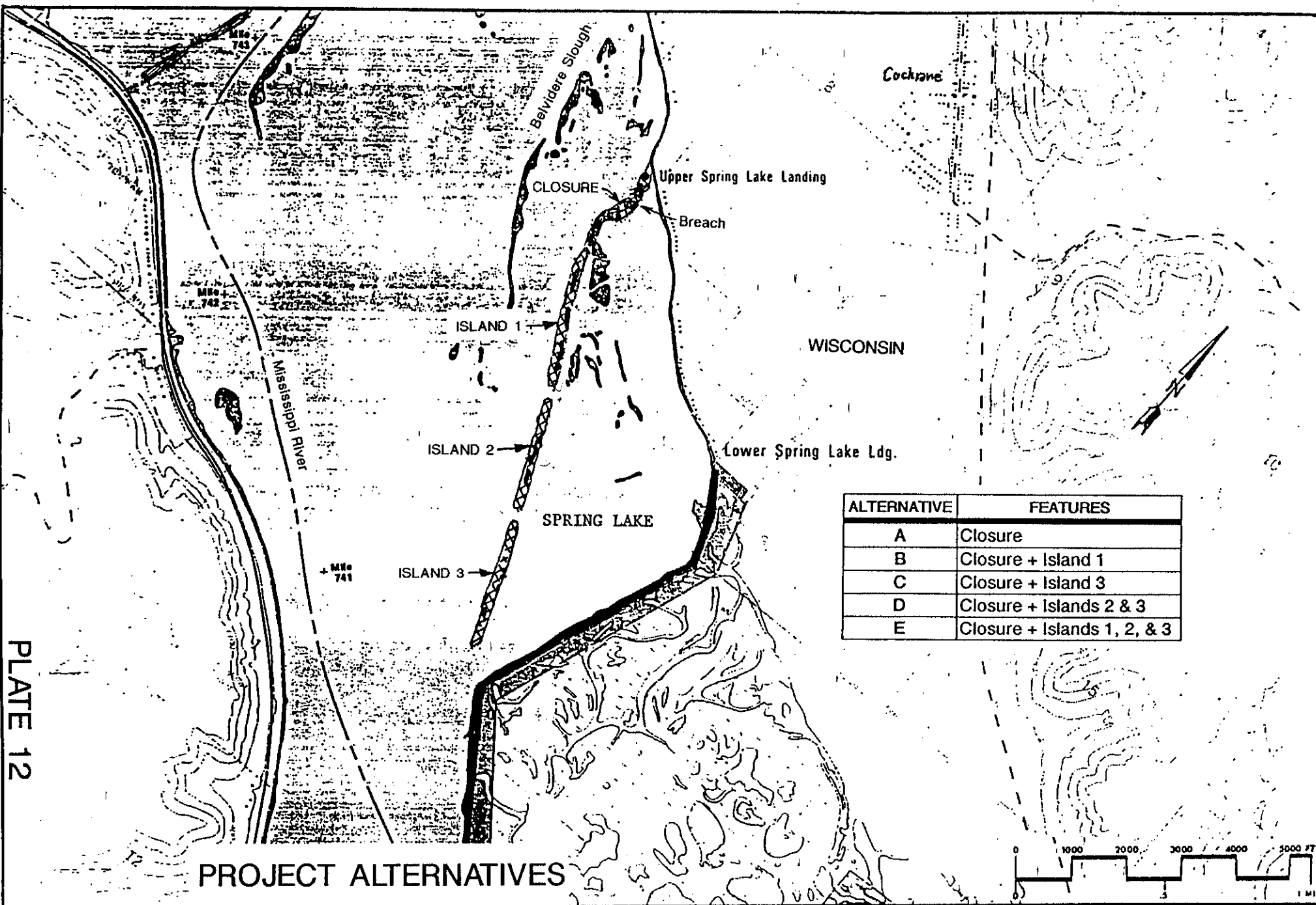
PLATE 9

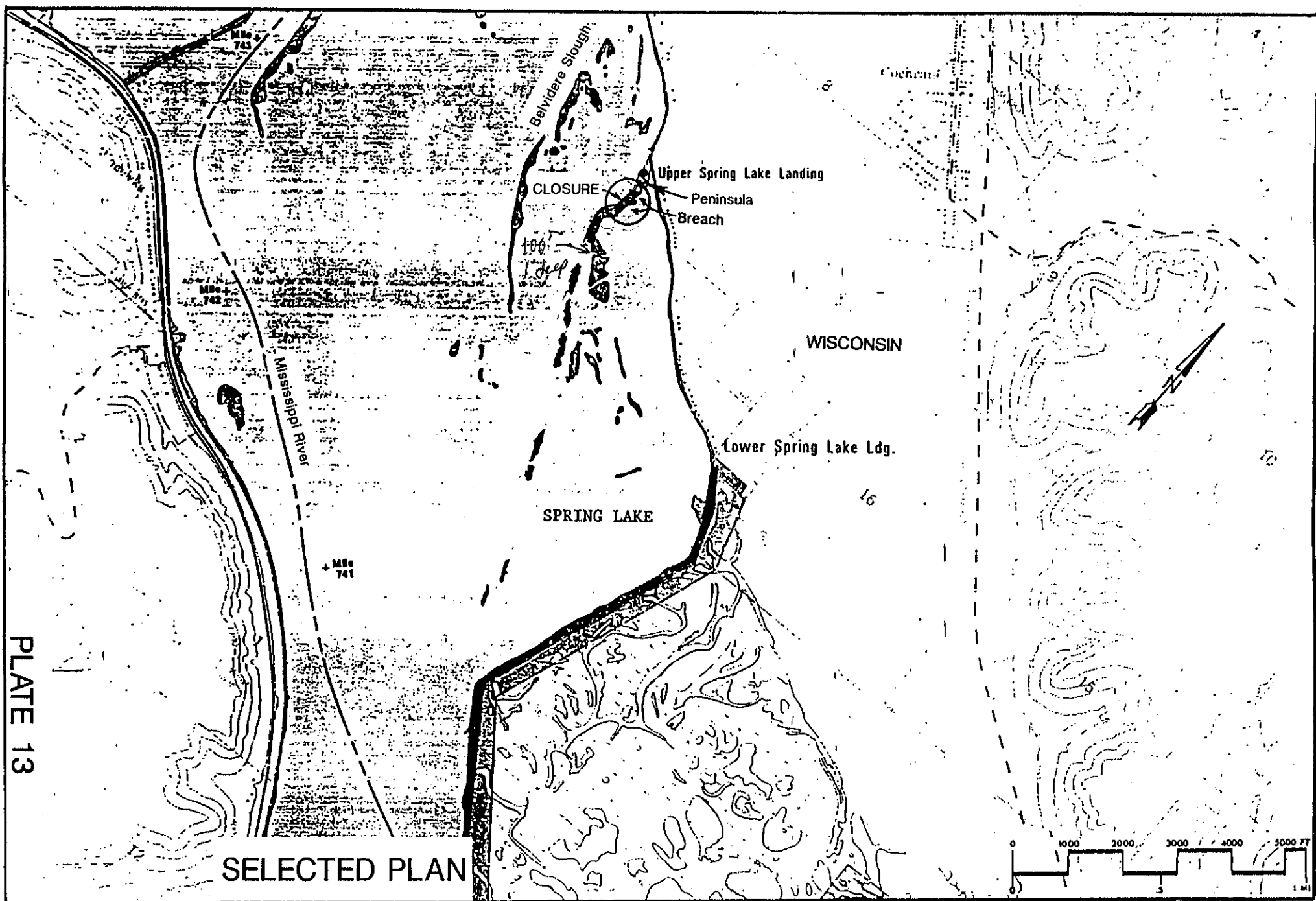
SUSPENDED SOLIDS AT WINONA 1975-1982

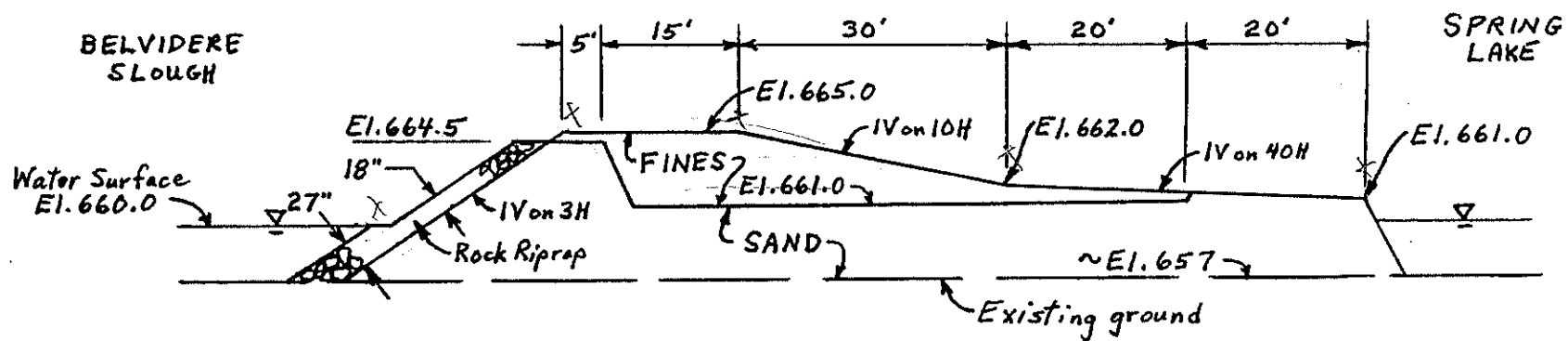


WATER TEMPERATURE AT WINONA (1975-1982)







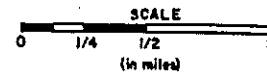


20' HORIZONTAL
10' VERTICAL
SCALES

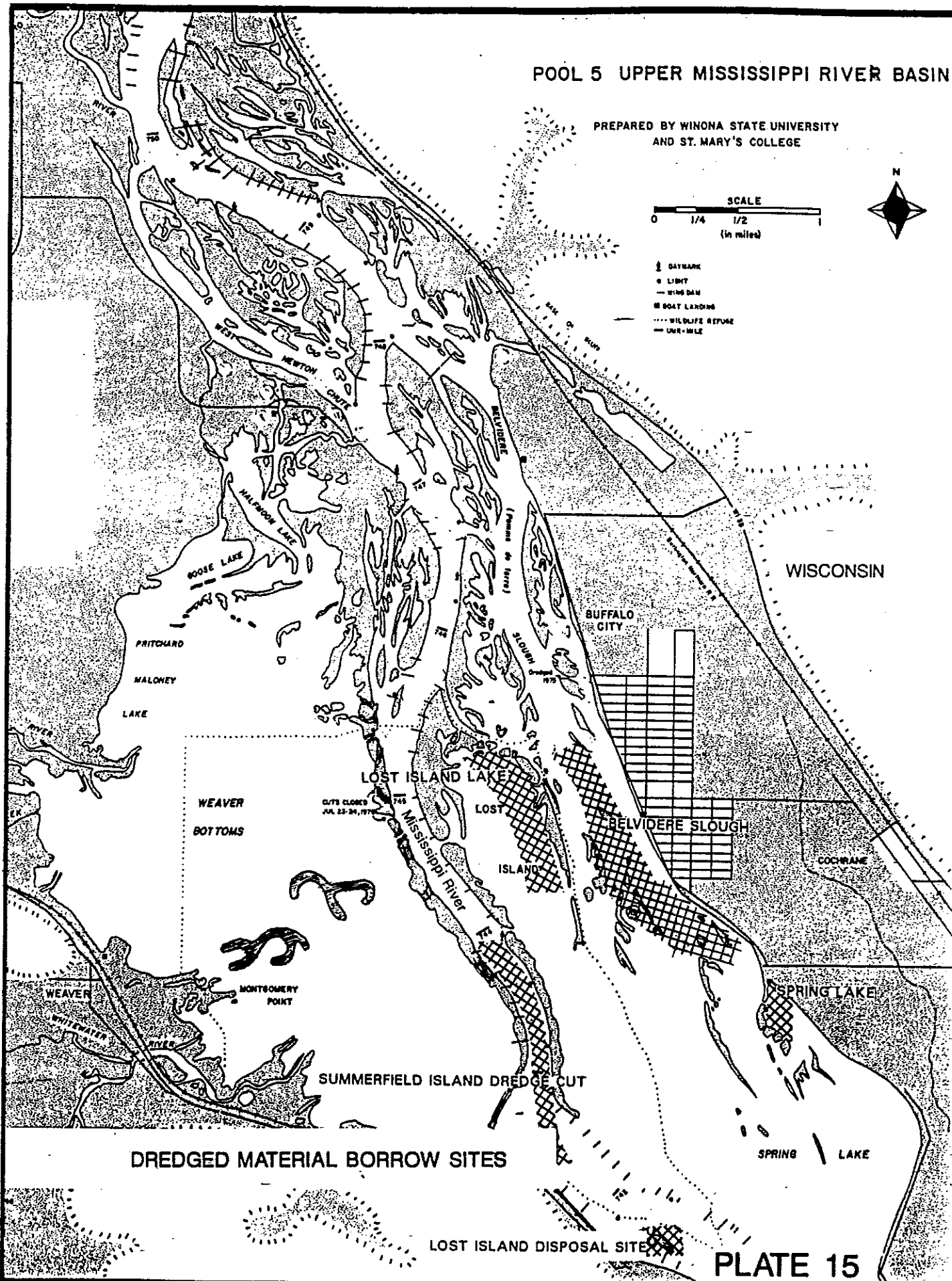
TYPICAL CLOSURE CROSS-SECTION

POOL 5 UPPER MISSISSIPPI RIVER BASIN

PREPARED BY WINONA STATE UNIVERSITY
AND ST. MARY'S COLLEGE



- DAYMARK
- LIGHT
- WING DAM
- BOAT LANDING
- WILDLIFE REFUGE
- UNR-MILE



DREDGED MATERIAL BORROW SITES

LOST ISLAND DISPOSAL SITE

PLATE 15

Attachment 2

Finding of No Significant Impact

Planning Division
Environmental Resources

FINDING OF NO SIGNIFICANT IMPACT

In accordance with the National Environmental Policy Act of 1969, the St. Paul District, Corps of Engineers has assessed the environmental impacts of the following project:

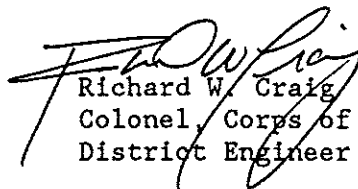
SPRING LAKE PENINSULA
HABITAT REHABILITATION AND ENHANCEMENT PROJECT
POOL 5, UPPER MISSISSIPPI RIVER
BUFFALO COUNTY, WISCONSIN

The purpose of the proposed work is to restore and maintain centrarchid fisheries and enhance aquatic plant bed development for fish and wildlife by constructing a closure structure across a breached area in the upper end of Spring Lake. Spring Lake is a 302-acre backwater area located on the Wisconsin side of the Upper Mississippi River (UMR) in lower pool 5, approximately 1 mile downstream of Buffalo, Wisconsin. The area includes about 14 acres of terrestrial floodplain habitat, 100 acres of vegetated aquatic habitat, and 188 acres of open water.

Spring Lake had been historically protected at the upper end by a peninsula. Due to high water flows during flooding in 1965 and 1969, this peninsula was breached in 2 areas at the head of the lake. Since that time, the breached area has allowed water to flow into the upper end of Spring Lake, resulting in undesirable conditions for the centrarchid fishery, especially during the winter. The total length of the breached area is approximately 350 feet with an average depth of 2 feet. The breach in the peninsula would be repaired by constructing a closure structure across it. Approximately 8,600 cubic yards of pervious material (sand) and 2,800 cubic yards of fine material would be needed to construct the closure structure in the breach. The sand base would be about 120 feet wide, 500 feet long, and would be built to 1 foot above normal pool elevation. Approximately 740 cubic yards of quarry-run rock would be used for protection of the closure. The fine material would be obtained from Spring Lake and would be placed on the sand base to form the interior side of the closure structure with side slopes of 1:10 at the upper part of the structure and 1:40 just above the water surface. The closure top would be 20 feet wide and 5 feet above normal pool elevation. Winter centrarchid habitat in the upper end of Spring Lake would be enhanced by eliminating winter water flows.

Our environmental review indicates that the proposed actions do not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement will not be prepared.

26 Aug 91
Date


Richard W. Craig
Colonel, Corps of Engineers
District Engineer

Attachment 3

Section 404(b)(1) Evaluation

SECTION 404(b)(1) EVALUATION
SPRING LAKE PENINSULA HABITAT REHABILITATION AND ENHANCEMENT PROJECT
ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 5, UPPER MISSISSIPPI RIVER, WISCONSIN

I. Project Description

A. Location - Spring Lake is a 302-acre backwater area located on the Wisconsin side of the Upper Mississippi River (UMR) in lower pool 5, approximately 1 mile downstream of Buffalo, Wisconsin. The Spring Lake project area is triangular in shape, bounded by Belvidere Slough on the west, the Wisconsin shore on the east, and the dam 5 dike on the south. The project area includes the area east of a chain of islands separating Spring Lake from Belvidere Slough, including the islands and the peninsula at the upstream end of Spring Lake. The study area includes about 14 acres of terrestrial floodplain habitat, 100 acres of vegetated aquatic habitat, and 188 acres of open water.

B. General Description - The proposed work involves constructing a closure structure across a breached area of the peninsula at the upper end of Spring Lake in order to restore and maintain centrarchid fisheries and enhance aquatic plant bed development for fish and wildlife. Material for the base of the closure structure would be clean, pervious fill (sand) dredged from Spring Lake or Belvidere Slough or hauled from an upland source. Fine material dredged adjacent to the structure in Spring Lake would be used to construct the interior side of the closure structure. This side would have a gradual side slope and would be vegetated with seed and willows. The proposed project would enhance winter centrarchid habitat by eliminating winter water flows in the upper end of Spring Lake.

C. Authority and Purpose - The proposed project would be funded and constructed under authorization of Section 1103 of the Water Resources Development Act of 1986 (Public Law 99-662). The overall purpose of this project is to rehabilitate, enhance, and maintain diverse riverine habitat for fish and wildlife.

D. General Description of Dredged and Fill Material

1. Physical Characteristics - The material that would be dredged and used for the construction of the base of the closure structure is pervious material (sand) with a low content of silt, clay, and organic material. The base would be constructed to one foot above the normal water level and would be about 120 feet wide and 550 feet long. The interior side of the closure structure would be constructed with fine material obtained from Spring Lake and would be placed on the sand base. The closure would have a top width of 20 feet and be 5 feet above normal pool elevation. The upper slope would be 1 vertical on 10 horizontal and the lower slope 1 vertical on 40 horizontal. About 740 cubic yards (CY) of quarry-run rock would be used for protection of the structure on the Belvidere Slough side.

2. Chemical Characteristics - There is 8,600 CY of pervious fill needed for the base of the closure structure. This material would be clean pervious fill (sand). The 2,800 CY of material dredged from Spring Lake for the Spring Lake side of the structure would consist of fine sand, silt, and clay. It was tested for contaminants because of the high percentage of fines. The material was found not to exceed acceptable contaminant levels.

There is an abundance of information for coarse main channel sediments in pool 5. A limited amount of surficial backwater sediment quality data is available for pool 5, but no depth stratified data are available. Tables 404-1 through 404-5 included at the end of this evaluation report summarize the existing sediment quality in the area. No pesticides were detected in any of the samples collected either in the main channel or in backwaters. PCB's were not detected above 50 ug/kg in any of the samples. The four backwater samples collected in pool 5, as part of the U.S. Fish and Wildlife Service's 1985 survey, were also analyzed for polynuclear aromatic hydrocarbons (PAH) and the results indicate very little problem with PAH contamination (Table 404-3).

The metals data summarized in Table 404-1 indicate that the main channel sediments are relatively uncontaminated. There were some relatively high mercury values recorded in 1974 for the main channel. However, recent surveys of both the main channel and the backwaters have recorded substantially lower values of mercury. In addition to the limited backwater metals data collected by the various agencies, other metal studies have been conducted for the Weaver Bottoms area of pool 5 (Table 404-5). None of the mean values reported by these investigators exceeded the mean values plus 2 standard deviations calculated for the agencies' backwater data. However, as indicated by the maximum values reported by these investigators, at least some samples for copper, chromium, and nickel exceeded these values.

3. Quantity of Fill Material - Approximately 8,600 CY of pervious material (sand) and 2,800 CY of fine material would be needed to construct the closure structure. Approximately 740 CY of quarry-run rock would be used for protection of the structure.

E. Description of Proposed Dredged Material Disposal Site - The disposal area for dredged material is the breached area of the peninsula at the upper end of Spring Lake in pool 5, UMR mile 743. Spring Lake had historically been protected at the upper end by a peninsula. Due to heavy flooding during the floods of 1965 and 1969, this peninsula was breached in 2 areas at the upper end of the lake. Since that time, the breached area has allowed water flows into Spring Lake year-round. The total length of the existing breach is approximately 350 feet with an average depth of 2 feet.

F. Timing and Duration of Dredged Material Disposal and Fill Activities - The project is scheduled for construction in 1992. Various features associated with the project would be constructed throughout the construction season. All project dredging activities would be performed mechanically.

G. Description of Fill and Dredged Material Disposal Methods - The material would be obtained from 2 different sources. The base would be constructed with approximately 8,600 CY of clean sand from the area of Belvidere Slough. The 2,800 CY of fine material used for constructing the interior side of the closure would be obtained from the upper end of Spring Lake adjacent to the closure structure. This material would be dredged mechanically from the closure base or a barge using a dragline. Probable construction equipment would include a crane barge, clam shell dredge, dragline, dozer, and a front-end loader. Rock placement would also be done mechanically.

II. Factual Determinations

A. Physical Substrate Determinations

1. Substrate Elevation and Slope - The existing breach in the peninsula would be raised to 5 feet above normal water surface by the closure structure.

2. Substrate Changes - The project would modify 1.4 acres of the existing substrate to coarse sand on the downstream portion and rock riprap on the upstream side.

3. Dredged/Fill Movement - Fill material movement should be minimal for a number of reasons. The disposal area has an average depth of about 2 feet. With these shallow depths, wavelengths would be shorter so wave erosion of the structure should be minimal. Only the sand and the rock would be exposed to wave action at normal pool elevation. The fine material would be protected from erosion by the sand base. With time, the structure would be vegetated with herbaceous species and willows. The riprap placed on the Belvidere Slough side of the structure should minimize any potential secondary movement of material. The placement site that would be used for the fine material dredged from Spring Lake is a substantially higher elevation than the normal water elevation, making it unlikely that normal water conditions would have a chance to significantly erode the material placed at the site.

B. Water Circulation and Fluctuations

1. General Water Chemistry - The general water chemistry of the project area would not be modified by the proposed disposal activities.

2. Current Patterns and Circulation - The closure structure would reduce water flows in Spring Lake, and eliminate it in the upper end of the lake during winter. Existing current velocities measured on transects across Spring Lake in winter are generally less than 0.1 foot/second.

3. Sedimentation Patterns - The closure structure is designed to reduce the future sediment load and loss of wetland habitats in Spring Lake.

C. Suspended Particulate/Turbidity Determinations

1. Suspended Particulates and Turbidity - Small, localized turbidity plumes would be generated by the construction of some of the project features. Minor turbidity plumes would be generated in Spring Lake from the mechanical placement of sand for a base for the closure structure. The operation of dredging equipment in Belvidere Slough and Spring Lake would also cause a turbidity plume. The plume in Belvidere Slough would dissipate in a relatively short time but the plume in Spring Lake could persist for some time because of the lack of circulation in the area and because the substrate contains a higher amount of fines.

2. Effects on Physical and Chemical Properties of the Water Column

a. Light Penetration - Light penetration could be temporarily suppressed because of the construction activities and of the disturbance of the fine sediments by dredging activities.

b. Dissolved Oxygen - It can be expected that closure of the breach may cause some dissolved oxygen depletion problems in the extreme upper end of Spring Lake during winter and summer conditions because flow from Belvidere Slough will no longer enter the area. Dredging adjacent to the closure for fill material would provide deeper water and help alleviate some of the oxygen depletion problems.

c. Toxic Metals and Organics - The relatively uncontaminated nature of the pervious fill and the efforts made to minimize construction related impacts on water quality should minimize any potential problems with toxic metals or organics.

d. Pathogens - Pathogenic organisms are not likely to be found in the sediments because of the lack any major sewage treatment discharge in the general area.

D. Contaminant Distribution Determinations - No sampling of the pervious fill sediment has been done. It is expected to be relatively clean because of the high quantity of sand. The relatively uncontaminated nature of the material should minimize any potential redistribution of contaminants. The fine material that would be dredged in the upper end of Spring Lake will be analyzed for contaminants. If this material is found to be contaminated, it would not be dredged or used in the construction.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton - Planktonic activity in Spring Lake may be suppressed during construction because of slightly elevated suspended solids levels.

2. Effects on Benthos - The rock substrate that would replace the existing sand substrate would increase habitat diversity for macroinvertebrates. Project activities would cover about one acre of wetland habitat. The intent of the project is to reduce flows and increase aquatic vegetation production, which would benefit invertebrate production.

3. Effects on Fish - Fish use of Spring Lake area during construction may be reduced by all the activities. However, the project features were designed to provide long-term benefits to fish species. The creation of deepwater habitat and the reduction of winter flow would improve water quality and habitat conditions, enhancing the area for centrarchids.

4. Effects on Wildlife - The disposal of the material from backwater dredging offers an opportunity to provide topsoil on the closure structure. These areas would have very limited wildlife values because of the sandy soil and sparse vegetation. By providing topsoil, these areas could be managed for a vegetative community that is rather unique to the Upper Mississippi River Wildlife and Fish Refuge. One of the goals of the project is to prevent future loss of wetlands, which should have a very positive effect on a variety of wildlife species. By reducing sediment influx and water flows, conditions of aquatic vegetation habitat would be improved.

5. Effects on Aquatic Food Web - The dredged material placement activities should not produce any effects on the aquatic food web. Because the project is designed to provide better structure and improve water quality in Spring Lake, it would have a positive effect on the aquatic food web in the area.

6. Effects on Special Aquatic Sites

a. Sanctuaries and Refuges - The project area is part of the Upper Mississippi River National Wildlife and Fish Refuge. The project is listed for implementation in the recently completed Refuge Master Plan and is compatible with the goals and objectives established for the refuge.

b. Wetlands, Mud Flats, and Vegetated Shallows - The fill and material placement would directly affect wetland habitat. Dredging in Spring Lake would convert about 1 acre of shallow wetlands (water depths of 2 to 3 feet with submerged aquatic plant species) to deepwater wetlands with water depths of about 7 feet. One of the project goals is to reduce sediment input into Spring Lake and subsequently prevent the future loss of shallow and deepwater wetlands. Construction of the closure structure would provide better conditions for vegetated shallows.

7. Threatened and Endangered Species - The absence of Higgins' eye pearly mussels from any recent surveys in and adjacent to the project area indicates that the project would have no impact on this species. Bald eagles use the area mainly as a wintering area and during migrations. To ensure that no impacts to this use would occur from the project, no large trees would be removed with the creation of the closure structure.

8. Actions Taken To Minimize Impacts - Efforts would be taken to minimize water quality impacts. Dredging activities would be limited to mechanical methods. The base of the structure would be constructed with sand and the fine material would be protected from erosion by the sand base and core. Vegetative growth would be promoted along the newly constructed shoreline and in the fine material area.

F. Proposed Disposal Site Determinations

1. Mixing Zone - Because of the relatively uncontaminated dredged or fill material, no mixing zone should be required of any contaminants. Small, localized turbidity plumes may be generated by the construction of the project features. The pervious material that would be used in the construction of the project features would minimize any mixing zone, although small, localized turbidity plumes may be generated.

2. Compliance with Applicable Water Quality Standards - The State of Wisconsin's water quality standards are contained in NR 102 and NR 103. Wisconsin (NR 103) indicates that "water quality shall meet the standards and requirements for recreational use and fish and aquatic life." Wisconsin's standard of "unauthorized concentrations of substances are not permitted that alone or in combination with other materials present are toxic to fish and other aquatic organisms" is not likely to be violated by the proposed project. Wisconsin's 80 mg/l guideline for suspended solids should not be exceeded in the turbidity plumes generated. The Wisconsin Department of Natural Resources (WDNR) has received legislative approval to enter into an agreement with the Corps for EMP projects and implementation of GREAT I recommended disposal sites that allows the WDNR to waive State permit and other requirements, including State water quality certification and the prohibition on placement of dredged material below the ordinary high water mark. The existing Memorandum of Agreement between the WDNR and the Corps would have to be amended to cover this project.

3. Potential Effects on Human Use Characteristics

a. Municipal and Private Water Supply - No private or municipal water supplies are located in the immediate project area.

b. Recreational and Commercial Fisheries - The project should have a positive effect on fish and other wildlife habitat, which should result in better fishing and hunting experiences. Because the project is designed to enhance fish habitat, there could be a slight benefit to the commercial fisheries.

c. Water Related Recreation and Aesthetics - The aesthetic quality of the area would be reduced during construction because of the presence and operation of the dredging and other construction equipment. The structure was designed to maintain water depths and current velocity within safe operating conditions for small recreational craft.

d. Cultural Resources - In accordance with the National Historic Preservation Act of 1966, as amended, the National Register of Historic Places has been consulted. As of 1 October 1990, there were no National Register sites in the project area. There are nine recorded prehistoric sites within a mile of the island group and eleven significant historic sites or structures. The island group appears to be an original land surface which has remained relatively undisturbed.

In August 1990, an archaeologist with the St. Paul District conducted a Phase I Cultural Resources survey of all land areas designated to be affected by the proposed closure structure construction. The boat landing area and three additional islands were examined and tested for cultural resources. No cultural resources were discovered, and on the basis of a records search and field reconnaissance, no further survey work is recommended. Therefore, the project would not affect any significant cultural resources.

G. Cumulative and Secondary Effects on the Aquatic Ecosystem - No secondary effects are anticipated with the project because of the measures being implemented to ensure stability of the project features. The project would have a cumulative effect of improving the overall fish and wildlife value of the project area.

III. Findings of Compliance or Noncompliance with Restrictions on Discharge

A. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge that Would Have Less Impact Upon the Aquatic Ecosystem (40 CFR 230.10(a))

1. No Action - The breached area would get larger as more and higher water flows enter the upper end of Spring Lake. With this increased flow would be increased bed and suspended load which would further degrade the aquatic habitat. Centrarchid use of Spring Lake would likely diminish at higher winter water flows.

B. Compliance with Applicable State Water Quality Standards (40 CFR 230.10(b)(1)) - The project would be in compliance with Wisconsin standards stated within the Memorandum of Agreement between the WDNR and the Corps.

C. Compliance with Section 307 of the Clean Water Act (40 CFR 230.10(b)(2)) - The proposed action would not violate any applicable effluent standard or prohibition under Section 307 of the Clean Water Act.

D. Compliance with the Endangered Species Act (40 CFR 230.10(b)(3)) - The project has been coordinated with the U.S. Fish and Wildlife Service, and they concur with the determination that there would be no impacts on endangered species or their habitat.

E. Evaluation of the Extent of Degradation of Waters of the United States (40 CFR 230.10(c))

1. The proposed project would not have any significant adverse effects on human health and welfare.

2. The proposed project would not have any significant adverse effects on life stages of aquatic life or any other wildlife dependent upon aquatic ecosystems.

3. The proposed project would not have any significant adverse effects on aquatic ecosystem diversity, productivity, or stability.

4. The proposed project would not have any significant adverse effects on recreational, aesthetic, cultural, or economic values.

F. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem (40 CFR 230.10(d)) - The project was designed to minimize adverse effects, while reaching the stated goals and objectives.

G. Compliance with the Guidelines for the Discharge of Dredged or Fill Material - Based on this evaluation, I have determined that the proposed action complies with the requirements of these guidelines, with the inclusion of appropriate and practicable conditions to minimize pollution or adverse effects to the aquatic ecosystem.

Date

26 Aug 91

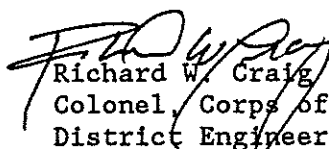

Richard W. Craig
Colonel, Corps of Engineers
District Engineer

Table 404-1

Combined bulk chemical metals data for pool 5.

Combined bulk chemical metals data for pool 9.										METALS (UG/G dry weight unless otherwise specified)																	
Record #	Mile	Location	Year	SYS	Hab. Type	Pool	Sam. Gear	Sam. Depth (cm)	Data Col. Cl.	Ag	Al	As	Ba	Be	Cd	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Se	Ti	Zn	
348	752.5	R-Inland 40-1	1987	1	3	5	1	10	COE			84.10			< 1.50	< 3.7	< 3.2		< 0.800	207.8	< 12.9	8.3					25.4
349	752.5	R-Inland 40-2 -Prec	1987	1	3	5	1	10	COE			< 1.20			< 1.50	< 3.7	2.1		< 0.800	208.0	< 12.9	3.1					23.3
350	752.5	R-Inland 40-2 -Pace	1987	1	3	5	1	10	COE			0.74			< 0.10	5.2	3.2		< 0.020	190	6.7	< 1.0					9.8
351	752.5	R-Inland 40-3 -Prec	1987	1	3	5	1	10	COE			77.70			< 1.50	< 3.7	< 3.2		< 0.800	187.0	< 12.9	3.4					16.7
352	752.5	R-Inland 40-3 -Pace	1987	1	3	5	1	10	COE			0.79			< 0.10	6.0	4.4		< 0.020	130	8.4	< 1.0					10.0
353	752.5	R-Inland 40-4 -Prec	1987	1	3	5	1	10	COE			130.80			< 1.50	< 3.7	< 3.2		< 0.800	116.0	< 12.9	3.3					5.9
354	752.5	R-Inland 40-4 -Pace	1987	1	3	5	1	10	COE			0.92			< 0.10	4.4	3.2		< 0.020	130	6.8	< 1.0					9.5
355	752.5	R-Inland 40-5	1987	1	3	5	1	10	COE			< 1.20			< 1.50	< 3.7	< 3.2		< 0.800	73.9	< 12.9	3.4					10.2
157	752.0		1979	1	1	5	1	10	COE			0.00	20.0		< 10.00	< 10.0	< 10.0	3300	0.000	180	< 10	< 10.0					10.0
707	749.9	R-1st Bwtr. Down Zumbro R	1985	1	3	5	2	10	FWS	< 0.4	11900	< 7.0	148	0.63	< 0.30	20.0	15.0	19300	0.050	688	19.0	15.0	< 4.0	< 10.0	< 20.0		64.2
158	749.0	MULE BEND	1979	1	1	5	1	10	COE			0.00	30.0		< 10.00	< 10.0	< 10.0	2900	0.000	150	< 10	< 10.0					10.0
159	749.0	MULE BEND	1979	1	1	5	1	10	COE			0.00	30.0		< 10.00	< 10.0	< 10.0	3800	0.000	200	< 10	< 10.0					10.0
100	748.2	WEST NEWTON	1980	1	1	5	1	10	COE			0.00	30.0		< 10.00	< 10.0	< 10.0	1800	0.000	180	< 10	< 10.0					6.3
101	747.8	WEST NEWTON	1980	1	1	5	1	10	COE						0.81	28.3	7.4	8930	< 0.010		24	3.8					37.3
102	747.7	WEST NEWTON	1974	1	1	5	1	10	COE			< 0.60			1.00	7.0	7.0		0.900		5	< 10.0					30.0
103	747.7	WEST NEWTON	1975	1	1	5	1	10	COE			0.57			< 0.10	7.7	19.8		0.050			< 0.1					21.1
104	747.3	WEST NEWTON	1980	1	1	5	1	10	COE			0.00	30.0		< 10.00	10.0	< 10.0	1900	0.000	220	< 10	< 10.0					8.2
105	746.3	BELOW WEST NEWTON	1980	1	1	5	1	10	COE			0.00	40.0		< 10.00	< 10.0	< 10.0	2300	0.000	300	< 10	< 10.0					9.9
106	746.0	BELOW WEST NEWTON	1979	1	1	5	1	10	COE			0.00	20.0		< 10.00	< 10.0	< 10.0	2800	0.000	240	< 10	< 10.0					10.0
107	746.0	BELOW WEST NEWTON	1979	1	1	5	1	10	COE			0.00	30.0		< 10.00	< 10.0	< 10.0	2900	0.000	190	< 10	< 10.0					10.0
108	745.3	R-WEAVER BOTTOMS	1984	1	3	5	1	10	COE			13.00			1.10	26.0	13.0	21000			23	17.0					65.0
109	745.2	FISCHER ISLAND	1975	1	1	5	1	10	COE			0.38			< 0.10	5.9	5.7		0.031			< 0.1					19.0
170	745.2	FISCHER ISLAND	1975	1	1	5	1	10	COE			0.45			< 0.10	5.8	5.4		0.029			< 0.1					16.4
171	745.2	FISCHER ISLAND	1975	1	1	5	1	10	COE			0.41			< 0.10	4.9	6.0		0.035			< 0.1					16.2
172	745.2	FISCHER ISLAND	1975	1	1	5	1	10	COE			0.40			< 0.10	5.9	6.6		0.038			< 0.1					24.5
708	745.2	R-Upper Weaver Bottoms	1985	1	3	5	2	10	FWS	< 0.4	9700	< 7.0	154	0.69	0.90	22.0	20.0	19100	0.080	948	24.0	19.0	< 4.0	< 10.0	< 20.0		69.2
173	745.0	FISCHER ISLAND	1974	1	1	5	1	10	COE			10.90			< 1.00	5.0	10.0		0.300		5	< 10.0					13.0
174	745.0	FISCHER ISLAND	1974	1	1	5	1	10	COE			0.90			< 1.00	5.0	8.0		0.200		5	< 10.0					13.0
315	745.0	R-Weaver Bottoms	1987	1	3	5	1	10	COE			4.60				12.0	5.6		0.031	900	11.0	8.5		0.28			31.0
316	745.0	R-Weaver Bottoms	1987	1	3	5	1	10	COE			1.80				12.0	5.6		0.045	420	9.3	9.3		< 0.10			25.0
317	745.0	R-Weaver Bottoms	1987	1	3	5	1	10	COE			8.60			0.13	15.0	6.1		0.026	1000	14.0	14.0		0.12			50.0
175	744.9	FISCHER ISLAND	1980	1	1	5	1	10	COE			0.00	30.0		< 10.00	< 10.0	< 10.0	1500	0.000	190	< 10	< 10.0					7.6
176	744.8	R-WEAVER BOTTOMS	1984	1	3	5	1	10	COE			13.00			1.30	34.0	14.0	38000			25	19.0					79.0
177	744.2	LOWER ZUMBRO	1979	1	1	5	1	10	COE			0.00	30.0		< 10.00	< 10.0	< 10.0	2400	0.000	100	< 10	< 10.0					10.0
178	744.2	LOWER ZUMBRO	1979	1	1	5	1	10	COE			0.00	20.0		< 10.00	< 10.0	< 10.0	2100	0.000	100	< 10	< 10.0					< 10.0
179	743.9	R-WEAVER BOTTOMS	1984	1	3	5	1	10	COE			11.00			2.00	24.0	12.0	18000			20	20.0					48.0
180	743.2	SOMERFIELD ISLAND	1974	1	1	5	1	10	COE			< 0.60			< 0.70	33.0	5.0		0.400		20	< 7.0					13.0
181	743.0	SOMERFIELD ISLAND	1980	1	1	5	1	10	COE						1.43	28.0	4.5	14100	< 0.010		23	0.1					75.4
709	742.8	R-Lower Weaver Bottoms	1985	1	3	5	2	10	FWS	< 0.4	9020	< 7.0	148	0.52	< 0.30	19.0	11.0	21800	0.050	1020	18.0	14.0	< 4.0	< 10.0	< 20.0		61.5
710	742.4	L-Behind Is N&W Spring Lk.	1985	1	3	5	2	10	FWS	< 0.4	10500	< 7.0	139	0.57	< 0.30	29.0	22.0	21800	0.050	825	20.0	21.0	< 4.0	< 10.0	< 20.0		83.2
182	741.8	MOUNT VERNON LIGHT	1978	1	1	5	1	10	COE			0.00	10.0		< 10.00	< 10.0	< 10.0	1800	0.000	170	20	< 10.0					4.0
183	741.8	MOUNT VERNON LIGHT	1978	1	1	5	1	10	COE																		
184	741.8	MOUNT VERNON LIGHT	1978	1	1	5	1	10	COE			0.00	30.0		< 10.00	< 10.0	< 10.0	3200	0.750	270	< 10	< 10.0					< 10.0
185	741.5	MOUNT VERNON LIGHT	1979	1	1	5	1	10	COE			0.00	30.0		< 10.00	< 10.0	< 10.0	3900	0.000	290	< 10	< 10.0					10.0
186	741.5	MOUNT VERNON LIGHT	1979	1	1	5	1	10	COE			0.00	40.0		< 10.00	< 10.0	< 10.0	2800	0.000	200	< 10	< 10.0					10.0

*Values shaded exceed the mean value plus 2 standard deviations for backwaters.

Table 404-2

Combined bulk chemical chlorinated hydrocarbon data for pool 5.

#	Mile	Location	Year	Sys	Hab. Typ	Pool	Sam. Gea	Sam. Depth (cm)	Data Coll. Ctr.	PESTICIDES (ug/kg)										PCB016	PCB254	PCB260	TOTPCB
										A-BHC	B-BHC	G-BHC	CHLORD	PP-DDD	PP-DDE	PP-DDT	DIELDR	ENDRIN	HEPTCH				
348	752.5	R-Island 40-1	1987	1	3	5	1	10	COE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5				< 5
349	752.5	R-Island 40-2 -Prec	1987	1	3	5	1	10	COE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5				< 5
350	752.5	R-Island 40-2 -Pace	1987	1	3	5	1	10	COE														
351	752.5	R-Island 40-3 -Prec	1987	1	3	5	1	10	COE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5				< 5
352	752.5	R-Island 40-3 -Pace	1987	1	3	5	1	10	COE														
353	752.5	R-Island 40-4 -Prec	1987	1	3	5	1	10	COE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5				< 5
354	752.5	R-Island 40-4 -Pace	1987	1	3	5	1	10	COE														
355	752.5	R-Island 40-5	1987	1	3	5	1	10	COE	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5				< 5
157	752.0		1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					< 5
707	749.9	R-1st Bwtr. Down Zumbro	1985	1	3	5	2	10	FWS	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 50
158	749.0	MULE BEND	1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
159	749.0	MULE BEND	1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
160	748.2	WEST NEWTON	1980	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					1
161	747.8	WEST NEWTON	1980	1	1	5	1	10	COE				< 0.40	< 0.2	< 0.2	< 0.4	< 0.2	< 0.2					1
162	747.7	WEST NEWTON	1974	1	1	5	1	10	COE				< 10.00	< 10.00	10.00	< 10.00	< 10.00	< 10.00					
163	747.7	WEST NEWTON	1975	1	1	5	1	10	COE														
164	747.3	WEST NEWTON	1980	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
165	746.3	BELOW WEST NEWTON	1980	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					2
166	746.0	BELOW WEST NEWTON	1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
167	746.0	BELOW WEST NEWTON	1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
168	745.3	R-WEAVER BOTTOMS	1984	1	3	5	1	10	COE				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5					16
169	745.2	FISCHER ISLAND	1975	1	1	5	1	10	COE														
170	745.2	FISCHER ISLAND	1975	1	1	5	1	10	COE														
171	745.2	FISCHER ISLAND	1975	1	1	5	1	10	COE														
172	745.2	FISCHER ISLAND	1975	1	1	5	1	10	COE														
708	745.2	R-Upper Weaver Bottoms	1985	1	3	5	2	10	FWS	< 10	< 10	< 10	< 10	< 10	< 10	10	< 10	< 10	< 10				< 50
173	745.0	FISCHER ISLAND	1974	1	1	5	1	10	COE				< 10.00	< 10.00	< 10.00	< 10.00	< 10.00	< 10.00					
174	745.0	FISCHER ISLAND	1974	1	1	5	1	10	COE				< 10.00	< 10.00	< 10.00	< 10.00	< 10.00	< 10.00					
315	745.0	R-Weaver Bottoms	1987	1	3	5	1	10	COE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				9.7
316	745.0	R-Weaver Bottoms	1987	1	3	5	1	10	COE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				9.3
317	745.0	R-Weaver Bottoms	1987	1	3	5	1	10	COE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1				25
175	744.9	FISCHER ISLAND	1980	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					6
176	744.8	R-WEAVER BOTTOMS	1984	1	3	5	1	10	COE				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5					8
177	744.2	LOWER ZUMBRO	1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
178	744.2	LOWER ZUMBRO	1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
179	743.9	R-WEAVER BOTTOMS	1984	1	3	5	1	10	COE				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5					14
180	743.2	SOMERFIELD ISLAND	1974	1	1	5	1	10	COE				< 10.00	< 10.00	10.00	< 10.00	< 10.00	< 10.00					
181	743.0	SOMERFIELD ISLAND	1980	1	1	5	1	10	COE				< 0.40	< 0.2	< 0.2	< 0.40	< 0.2	< 0.2					< 1
709	742.8	R-Lower Weaver Bottoms	1985	1	3	5	2	10	FWS	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 50
710	742.4	L-Behind Is N&W Spring L	1985	1	3	5	2	10	FWS	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 50
182	741.8	MOUNT VERNON LIGHT	1978	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
183	741.8	MOUNT VERNON LIGHT	1978	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
184	741.8	MOUNT VERNON LIGHT	1978	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					6
185	741.5	MOUNT VERNON LIGHT	1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					0
186	741.5	MOUNT VERNON LIGHT	1979	1	1	5	1	10	COE				0.00	0.0	0.0	0.0	0.0	0.0					3

Table 404-3

Combined bulk chemical polynuclear aromatic hydrocarbons data (ug/kg dry weight) for pool 5.

Record #	Mile	Location	Year	Sys	Hab	Pool	Sam. Depth (cm)	Data Coll. Ctl.	Acena-phthen	Acena-phthyle	Anthra-cene	Benzo (a) Fluor-anthracene	Benzo (b) Fluor-anthrene	Benzo (k) Fluor-anthrene	Benzo (a) Pyrene	Benzo (e) Pyrene	Benzo (g,h,i) Perylene	Bis (2-ethyl .hexyl) phthalate	Chrysene	Di Benzo (a,h) Anthracene	Di-n-Butyl phthalate	Fluor-anthrene	Fluorene	Indeno (1,2,3-C,d) Pyrene	Naptha-lene	Phenan-threne	Pyrene
707	749.9	R-1st Bwtr. Down Zumbro	1985	1	3	5	2	10	FWS			< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
708	745.2	R-Upper Weaver Bottoms	1985	1	3	5	2	10	FWS			< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
709	742.8	R-Lower Weaver Bottoms	1985	1	3	5	2	10	FWS			< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
710	742.4	L-Behind ls N&W Spring L	1985	1	3	5	2	10	FWS			< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Table 404-4

Combined bulk sediment physical and nutrient data for pool 5.

SAMPLE DESCRIPTORS										SETTLABILITY TESTS										PARTICLE SIZE DISTRIBUTION																Nutrients and miscellaneous physical parameters																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
REC #	Site	Location	Year	STS	Hub	Type	Pool	Sens. Gear	Sample Depth (m)	Data Cell CL	SUSPENDED SOLIDS (mg/l)		TURBIDITY (FTU)		HYDROMETER		U. S. STANDARD MESH SIZES														Moisture %	Volatile Solids (mg/kg)	Total Organic Carbon %	Chemical Oxygen Demand (mg/kg)	Ammonia Nitrogen (mg/kg)	Kjeldahl Nitrogen (mg/kg)	Total Phosph. (mg/kg)	Oil & Grease (mg/kg)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
											0 HRS	4 HRS	0 HR	4 HR	0.05 m	0.020 m	270	200	140	100	80	70	60	40	30	25	16	10	8	4									3/8	3/4	3/2	3 in																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
348	752.5	R-Island 40-1	1987	1	3	5	1	10	COE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				

Table 404-5. Miscellaneous backwater metals data for sediments in Weaver Bottoms

Year	Data citation	Collection Gear	Sampling Depth (cm)	Sample Number	Metals data - ug/g dry weight					
					Cd	Cr	Cu	Ni	Pb	Zn
1979	Bailey and Rada in Wiener et al. (1984)	Petite ponar	10	n=15 mean	1.3	27	27	22	13	59
				min	0.7	15	15	11	5	27
				max	2.0	45	45	35	22	93
1978	Anderson (1978)	2 inch corer	15	n=27 mean	0.8	18	21		7	33
				min	0.3	8	11		2	5
				max	1.5	31	37		14	96

Attachment 4
Letters of Intent



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111



JUN 19 1991

FWS/ARW-SS

Colonel Roger L. Baldwin
District Engineer
U.S. Army Engineering District, Saint Paul
1421 U.S. Post Office and Custom House
Saint Paul, Minnesota 55101-1479

Dear Colonel Baldwin:

The U.S. Fish and Wildlife Service (Service) has reviewed the "Definite Project Report/Environmental Assessment (SP-12)" dated May 1991 for the "Spring Lake Habitat Rehabilitation and Enhancement Project." This project, located in Pool 5 of the Upper Mississippi River, is proposed under the Water Resources Development Act of 1986 (Public Law 99-662) as part of the Upper Mississippi River System Environmental Management Program.

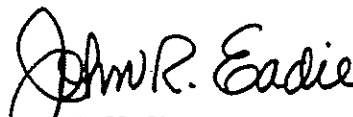
The Spring Lake project has been coordinated with the Service and we approve and support the project as planned and described in the definite project report. The Service agrees with the preferred alternative as described, that of closing the breach in the peninsula at the upper end of Spring Lake without a notch opening or flow control structure. On March 18, 1991, the Refuge Manager, Upper Mississippi River National Wildlife and Fish Refuge (Refuge), found the project compatible with the purposes for which the Refuge was established, as required by the National Wildlife Refuge Administration Act.

The Service will assure operation and maintenance requirements of the project will be accomplished in accordance with Section 906(e) of the Water Resources Development Act of 1986. Anticipated operation and maintenance is described on page DPR-35, estimated to cost \$1,000 per year. In accordance with the policies stated in the Fourth Annual Addendum, the Service will perform the operation and maintenance requirements for this project.

This project being located on Refuge lands, the Service will complete its finding of no significant impact upon learning from you that the public review period produced no substantive changes in the "Definite Project Report/Environmental Assessment."

We look forward to our continued cooperative efforts in developing habitat rehabilitation and enhancement projects under the Environmental Management Program.

Sincerely,


John R. Eadie
Acting Regional Director



State of Wisconsin

DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadny, Secretary
Box 7921
Madison, Wisconsin 53707
TELEFAX NO. 608-267-2750
TDD NO. 608-267-6897

April 3, 1991

IN REPLY REFER TO: 1490

Colonel Roger L. Baldwin
District Engineer
U. S. Army Corps of Engineers, St. Paul District
1421 U. S. Post Office & Custom House
St. Paul, MN 55101-1479

Dear Colonel Baldwin:

The Wisconsin Department of Natural Resources supports construction of the Spring Lake Peninsula Habitat Rehabilitation and Enhancement Project as described in the draft Spring Lake Peninsula Definite Project Report. This project is located on National Wildlife System lands. However, I understand you still require a letter of support from our department.

Upon completion and final acceptance of the project by the Corps of Engineers and the Fish and Wildlife Service, the Wisconsin Department of Natural Resources will cooperate with the Fish and Wildlife Service to assure that operation and maintenance, as described in the Definite Project Report, and any mutually agreed upon rehabilitation, will be accomplished in accordance with Section 906(e) of the Water Resources Development Act of 1986 and the current guidance contained in the Fifth Annual Addendum, May 1990, Attachment 4, Section III, A, 7 (pp. 19-20).

I look forward to seeing the project completed and the benefits it will provide to the Mississippi River System.

Sincerely,

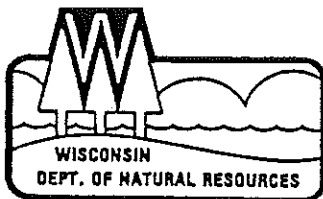
A handwritten signature in dark ink, appearing to read "C. D. Besadny", written over a horizontal line.

C. D. Besadny
Secretary

cc: James Gritman - USFWS
District Director - WD
Terry Moe - La crosse
Doug Fendry - PM/4

Attachment 5

Coordination



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadny
Secretary

State Office Building, Room 104
3550 Mormon Coulee Road
La Crosse, WI 54601
TELEPHONE 608-785-9000
TELEFAX 608-785-9990

August 12, 1991

Mr. Louis Kowalski
Chief, Planning Division
U.S. Army Corps of Engineers, St. Paul District
1421 U.S. Post Office & Custom House
St. Paul, MN 55101-1479

Dear Mr. Kowalski,

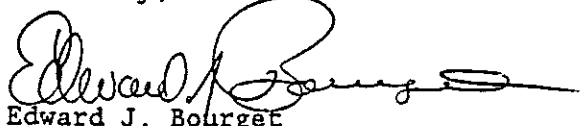
The Department of Natural Resources has examined the application of the Corps of Engineers for Water Quality Certification for the Spring Lake Peninsula Habitat Rehabilitation and Enhancement Project, Pool 5, Mississippi River, Buffalo County, Wisconsin.

The Department is granting Water Quality Certification because there is reasonable assurance that the activity will be conducted in a manner that will not violate the standards enumerated in s. NR 299.05(1).

The certification is granted provided the following conditions are met:

1. Dredging of materials for construction of the closure will be done mechanically, unless a specific carriage water return plan is approved by the Department.
2. At least five working days prior to the beginning of construction, the applicant shall notify the Department of intent to commence the dredging. Please notify Jeff Janvrin at La Crosse, Wisconsin (608) 785-9005.
3. The applicant shall allow the Department reasonable entry and access to the construction site in order to inspect the dredging for compliance with the certification and applicable laws.
4. The project shall be completed as designed and described.

Sincerely,


Edward J. Bourget
District Water Management Supervisor

cc: T. Moe
J. Janvrin
J. Sullivan



United States Department of the Interior

FISH AND WILDLIFE SERVICE
FEDERAL BUILDING, FORT SNELLING
TWIN CITIES, MINNESOTA 55111



IN REPLY REFER TO:

FWS/ARW-SS

AUG 1 1991


Colonel Roger L. Baldwin
District Engineer
U. S. Army Engineering District, Saint Paul
1421 U. S. Post Office and Custom House
Saint Paul, Minnesota 55101-1479

Dear Colonel Baldwin:

Enclosed is the signed Finding of No Significant Impact for the Spring Lake Peninsula Rehabilitation and Enhancement Project. Our Finding is based on your Definite Project Report/Environmental Documentation (SP-12) dated May 1991.

We will sign the Agreement for Operation, Maintenance, and Rehabilitation upon receipt of the final version of that document. We look forward to continued progress on this project.

Sincerely,


Thomas J. Kerze
Acting Regional Director

Enclosure

FINDING OF NO SIGNIFICANT IMPACT

For the reasons presented below and based on an evaluation of the information contained in the supporting references, I have determined that the Spring Lake Peninsula Habitat Rehabilitation and Enhancement Project, part of the Upper Mississippi River System Environmental Management Program, is not a major Federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969. An Environmental Impact Statement will, accordingly, not be prepared.

Reasons

The U.S. Fish and Wildlife Service, as a cooperating Federal agency with the U.S. Army Corps of Engineers, adopts the environmental assessment prepared by the Corps of Engineers for this project. The project involves closing a breach in the peninsula at the upper end of Spring Lake to prevent further degradation of the shallow water fish and wildlife habitat in the lake. Other than short-term effects during construction, this project would have no adverse environmental effects and would help preserve fish and wildlife habitat. The project would have no adverse impacts on endangered or threatened species or their critical habitat nor on significant historical properties, would not result in loss of wetlands, nor lead to floodplain development.

Supporting References

1. Definite Project Report/Environmental Assessment (SP-12)
2. Compatibility Statement


Regional Director 7-7-91
Date

Distribution: AE (Master File)
 EHC/BFA--Washington, DC
 SS
 UMR through WAM1



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

State Office Building, Room 104
3550 Mormon Coulee Road
La Crosse, WI 54601
(608) 785-9000

Carroll D. Besadny
Secretary

June 28, 1991

Mr. Don Powell
Flood Plain Management and Small Projects
Department of the Army
St. Paul District, Corps of Engineers
St. Paul, MN 55101-1479

1600-1-3

Dear Mr. Powell:

We have reviewed the draft Definite Project Report/Environmental Assessment for the Spring Lake Peninsula Habitat Rehabilitation and Enhancement Project dated May 1991. Specific comments we have on this draft are:

DPR-13: Last paragraph. Please provide a reference for photic zone depth.

DPR-15: Third paragraph, last sentence. Please reference the source of this information.

DPR-17: A reference to the 3°C temperature requirement of bluegill and largemouth bass should be provided.

DPR-24: Alternative E. Wouldn't the total amount of material needed be approximately 200,000 cubic yards if all three islands were built?

DPR-38: Pre- and post-construction monitoring. Pre-construction discharge data (flows) should be collected during winter and summer conditions to document existing conditions. Velocity measurements will suffice after the project is completed since there should be no "flow" after the cut is closed.

The window of time for summer diel DO surveys should be expanded to July-August to allow for greater flexibility in sampling during "normal conditions". The sampling period should be extended to at least 6-7 days. At least two pre-construction diel surveys should be conducted rather than one.

404-4: 2. b. We suggest rewriting this section. It can be expected that closure of this cut may cause some oxygen depletion problems in the northern end of Spring Lake during winter and summer conditions since flow from Belvidere Slough will no longer enter through the cut. The deep hole will help alleviate some of the DO problems caused by closing the cut, however, it will not allow the 5 mg/l DO standard to be met more frequently than is now occurring.

404-6: Water Quality Standards. Wisconsin does not have a standard for suspended solids. The 80 mg/l referenced here is only a guideline.

We appreciated the opportunity to review the Spring Lake Peninsula HREP DPR. If you have any questions regarding our comments, please contact me at (608) 785-9005.

Sincerely,



Jeffrey A. Janvrin
Mississippi River Habitat Specialist

cc: Ron Benjamin
Keith Beseke - FWS
Scot Johnson - MDNR

MEMORANDUM FOR RECORD

August 5, 1991

SUBJECT: SPRING LAKE, WI, PUBLIC MEETING

1. A public meeting was held on 19 June 1991 at the Buffalo City Municipal Building. Agency representatives included:

- Peter Fasbender-COE
- Don Powell-COE
- Shannon Scibilia-COE
- Keith Beseke-USFWS
- Tim Julison-USFWS
- Ron Benjamin-WDNR
- Jeff Janvrin-WDNR
- Michelle Marron-WDNR

The purpose of the meeting was to obtain public opinion of the proposed project and to inform the public of project plans. About 25 people attended the meeting. A record of attendance is attached.

The following questions were asked and responded to:

- a> What is the interest rate on annual costs? (8-7/8%)
- b> How many islands will be built? (Initial planning showed 2 islands optimum, but further planning and design could change the number)
- c> Will the lower end of the existing island be built up also? There are three breaches already and it is disappearing fast. (Existing islands would likely be stabilized by future project)
- d> Will there be dredging to deepen the lake and allow easy access to the area by boat? (Dredging of the backwater would take place if suitable material is available. The location of dredging would be based on habitat benefits, but provide access whenever possible)
- e> The way the proposed islands are laid out, will there be boating access from Belvedere Slough and the channel? (The existing natural channel would remain open)
- f> Did the heavier flow from the Weaver Bottoms project cause the breaches? There are comparative flow measurements in Belvedere Slough. (No, hydraulic analysis does not indicate any adverse flow effects)
- g> Where did the islands go? (Backwater and downstream, flatter slopes)
- h> Will the fine silt sink and ooze away? (Would be allowed to dewater)
- i> If the water becomes stagnant can a breach be made to relieve the brackishness? (We would consider a culvert through the closure if this happens, possibly along with the next phase of construction)
- j> Why was Spring Lake so weedy during the summer of 1988? (Low water levels)
- k> Why has the channel changed from it's original "S" shape? (Still appears to be nearly the same as prior to inundation)
- l> What became of the arrowhead plants? (Decline in vegetation along entire river system)
- m> How does U.S. Fish and Wildlife feel about the proposed islands and how it will affect the habitat? (Support, improve as stated)
- n> If proposed Island 1 were not built and the breach increases, birds which used to feed in the area will not be able to sustain themselves and would leave. Would building the islands bring the birds back? (It would provide conditions more desirable to the birds)

3. Overall, the public was very supportive of continuing the proposed project. The main concern was to bring back the fishing and other wildlife habitat to the area. Some feel that earlier action in the Weaver Bottoms area caused the breach in the peninsula by Spring Lake. There is support in the community to continue planning and design of islands for Spring Lake.

attachment

Shannon Scibilia

SHANNON SCIBILIA
Engineer in Training

RECORD OF ATTENDANCE

Meeting - Spring Lake Peninsula, Wisconsin, EMP at Buffalo City

Date - June 19, 1991

This information will be used for the purpose of knowing who attended this meeting.

Please include your address if you wish to be on the project mailing list. Thank you.

NAME (please print)	ADDRESS (optional)	REPRESENTING
Harry Paul	1339 S. River Road Buffalo City	-
Mary Knudsen	520 Lafayette Rd St. Paul MN 55155	MN Pollution Control Agency
Al Kochenderfer	1404 S. River Rd. Buffalo City, MI	SELF
Rich Baures	1303 S. River Rd Cochrane, WI	SELF
Edward Amick	Buffalo City	-
Tim Julison	Upper Miss River USFWS Winona	USFWS
Peggy Morem (Mrs. Curtis)	1408 So. River Rd Buffalo City, Wis.	
Jan Herold	1251 S. River Rd. Buffalo City, Wis.	
Robert E. M. Hall	1251 S River Rd Buffalo City	SELF
JOHN FANDREY	1394 S. RIVER RD BUFFALO CITY	
Brian Bjork	1380 S. River Rd Buffalo	WDMR Wildlife nat.
Martin Reguant	33 W. 2nd St. Buffalo City	Buffalo City

RECORD OF ATTENDANCE

Meeting - Spring Lake Peninsula, Wisconsin, EMP at Buffalo City Date - June 19, 1991

This information will be used for the purpose of knowing who attended this meeting.

Please include your address if you wish to be on the project mailing list. Thank you.

NAME (please print)	ADDRESS (optional)	REPRESENTING
HERB FANDREY	1372 S RIVER RD SPRING LAKE	SELF
JIM WIEGAND	3835A KLONDIKE CT, N BROOKFIELD, WI 53045	
GARY WISSA	S. LAKE RD B. J. L. CT	Self
DAVID FRITCH	S. W. 10000 Buffalo City	Self
D.G. Becker	372 W. 21ST ST.	self
BARRY AUER	1133 So RIVER Rd COCHRANE (Buffalo city)	SELF
CARL HINZ	1151 S RIVER RD BUFFALO CITY	"
A.E. Helmuellex	974 10th ST Buffalo City, WI	BUFFALO CITY
Claude C. Dech	2826 Brook Ct La Crosse, WI 54601	Self.



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

State Office Building, Room 104
3550 Mormon Coulee Road
La Crosse, WI 54601
(608) 785-9000

Carroll D. Besadny
Secretary

April 10, 1991

File Ref: 1600-1-3


Department of the Army
St. Paul District, Corps of Engineers
ATTN: Mr. Don Powell, Planning Division
1421 U.S. Post Office & Custom House
St. Paul, MN 55101-1479

Dear Mr. Powell:

Enclosed for your information are Ed Bourget's comments on the draft Definite Project Report for the Spring Lake Peninsula Habitat Rehabilitation and Enhancement Project.

If you have any questions concerning his comments, please contact me at (608) 785-9005.

Sincerely,


Jeffrey A. Janvrin
Mississippi River Habitat Specialist

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: March 25, 1991

File Ref: 3600-1

To: Jeff Janvrin - LAX

From: Edward J. Bourget - WD

RECEIVED
MAR 27 1991
DNR La Crosse Area

Subject: Permits Needed for the Long Lake and Spring Lake Peninsula Habitat Rehabilitation and Enhancement Projects (HREP)

The Long Lake project consists of dredging a channel from the Mississippi River (side channel) to Long Lake and placing a reinforced concrete pipe structure in the newly constructed channel. Placement of a rock liner and riprap at the upstream and downstream ends of the culvert structure is also proposed.

I assume that this project will be approved through the forum process and added to the MOU. If that is the case, Wis. Stats. 30.202 exempt this project from state permits.

I would, however, like to be assured that the deposition of the spoils in the floodway of the Mississippi River will not increase flooding. The way to accomplish this is to insist that the maintenance road not be constructed any higher than one foot above the surrounding land and that all other spoils be transported to the site mentioned in the report.

The Spring Lake project consists of the construction of a closing structure, with a notch, to repair a breach in the existing peninsula. The closing structure would consist of previous fill and fine material with 18 inches of riprap on filter cloth to stabilize the Belvidere Slough side slope and the top of the structure.

Again, if this project is approved as a project through the forum, and the site is included in the MOU, Wis. Stats. 30.202 exempt this project from obtaining state permits.

My only additional comment would be to protect both sides of the new closing structure with riprap to prevent erosion especially during flooding events.

WZ/EB097.sz



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Upper Mississippi River Refuge Complex
51 East 4th Street
Winona, Minnesota 55987

IN REPLY REFER TO:

April 9, 1991

Mr. Don Powell
Project Manager
St. Paul District, Corps of Engineers
1125 U.S. Post Office & Custom House
180 E. Kellogg Blvd.
St. Paul, Minnesota 55101-1479

Dear Mr. Powell:

Enclosed is a signed compatibility determination for the selected alternative discussed in the draft Definite Project Report with Integrated Environmental Assessment (SP-12) for the Spring Lake Peninsula Habitat Rehabilitation and Enhancement Project.

If you have any questions please contact Keith Beseke, Environmental Management Program Coordinator at 507/452-4232.

Sincerely,

Richard F. Berry
Complex Manager

Enclosure

cc: Winona District
Chuck Gibbons, RO-SS

UPPER MISSISSIPPI RIVER NATIONAL
WILDLIFE AND FISH REFUGE
Established 1924

Compatibility Study
SPRING LAKE PENINSULA

Establishment Authority:

Public Law No. 268, 68th Congress, The Upper Mississippi River Wildlife and Fish Refuge Act.

Purpose for Which Established:

"The refuge shall be established and maintained (a) as a refuge and breeding place for migratory birds included in the terms of the convention between the United States and Great Britain for the protection of migratory birds, concluded August 16, 1916, and (b) to such extent as the Secretary of Agriculture may, by regulations, prescribe, as a refuge and breeding place for other wild birds, game animals, fur-bearing animals, and for the conservation of wild flowers and aquatic plants, and (c) to such extent as the Secretary of Commerce may, by regulations, prescribe a refuge and breeding place for fish and other aquatic animal life."

Description of Proposed Use:

The proposal is a Habitat Rehabilitation and Enhancement project authorized by the Water Resource Development Act of 1986 (Pub. L. 99-662). The proposed project will be constructed in Spring Lake, a 302-acre backwater area located on the Wisconsin side of the Upper Mississippi River (UMR) in lower Pool 5, approximately 1 mile downstream of Buffalo, Wisconsin. The Spring Lake project area is triangular in shape, bounded by Belvidere Slough on the west, the Wisconsin shore on the east, and the dam 5 dike on the south. The project area includes the area east of the chain of islands separating Spring Lake from Belvidere Slough, including the islands and the peninsula at the upstream end of Spring Lake.

The purpose or goal of the project is to restore and maintain centrarchid fisheries and enhance aquatic plant bed development in Spring Lake for fish and wildlife. Spring Lake presently supports a popular fishery that is dominated by bluegill and largemouth bass. Walleye, yellow perch, channel catfish, crappie, and smallmouth bass are also caught in the area. A management goal for the Spring Lake area is to maintain a year-round centrarchid-based fishery. The target species for management are bluegill and largemouth bass. Spawning habitat requirements for both species are sand or coarse bottom substrate close to aquatic plant beds, in 3-10 feet of water with little detectable current.

No estimates of standing stock of fish in Spring Lake are available. Average standing stock of bluegill in backwater lakes, sloughs, and side channels of UMR pools is 18.9 lb/acre (Pitlow 1987). Standing stock of largemouth bass

from the same set of samples averaged 4.9 lb/acre. Standing stock of bluegill and bass in Spring Lake may be somewhat higher than these figures, because of the protected backwater character of the area. Implicit in the management goal is maintaining sufficiently high standing stock of these species.

Summer foraging and resting habitat for both target species are areas within or close to aquatic plant bed cover. Emergent vegetation adjacent to islands provides valuable nursery habitat for a variety of fish species (Schueller 1989). An increase in shoreline length of islands could improve nursery habitat for fish.

Young-of-the-year bluegill require shallow water with aquatic macrophytes with low current velocity. Young-of-year largemouth bass often share the same habitat, but also make use of areas with less vegetation cover and with low current velocity.

Winter habitat for bluegill and largemouth bass may be the most critical for both species in the Spring Lake area. Both species require water generally greater than three feet deep with available cover, water temperature above 3°C, undetectable current velocity, and dissolved oxygen concentrations of 5 mg/l or greater.

Aquatic habitat improvement objectives to meet fisheries management goals are:

- * Decrease water flow from entering Spring Lake.
- * Increase the extent of water greater than 3 feet deep sheltered from river current in proximity to macrophyte beds, and with adequate dissolved oxygen (>5 mg/l) for centrarchid habitat.
- * Maintain or increase the areal extent, interspersions, density, and species composition of macrophyte beds.
- * Increase the island shoreline length.
- * Maintain an interspersions of flowing channel habitat.
- * Provide rock and gravel in flowing channels for lithophilic species.
- * Decrease suspended solids concentration.

To meet these objectives, a major flow entering Spring Lake would be closed off by repairing a breach in the peninsula. Features of the plan include about a 550-foot closure of the breach in the peninsula at the upper end of Spring Lake. The closure would be constructed of a combination of pervious fill and fine material with about 18 inches of riprap on filter cloth to stabilize the Belvidere Slough side slope and top of the structure. The top width would be approximately 20 feet with 1 vertical on 3 horizontal side slope on the Belvidere Slough side and 1 vertical on 10 horizontal on the Spring Lake side. The top elevation (665 msl) would be 5 feet above normal pool elevation. This elevation was chosen so that, in a flood, the existing adjacent islands and peninsula would overtop first. If suitable, the material (pervious fill (sand) and fine material) to construct the project will come from Spring Lake and, thereby, provide additional deep water fish habitat benefits.

More details of the project, including maps and engineering drawings, are contained in the draft report entitled, "Upper Mississippi River System Environmental Management Program Definite Project Report With Integrated Environmental Assessment (SP-12) Spring Lake Peninsula Habitat Rehabilitation and Enhancement, Pool 5, Upper Mississippi River, Buffalo County, Wisconsin," prepared by the St. Paul District, Corps of Engineers.

Anticipated Impacts on Refuge Purposes:

As a result of the project fish populations should increase which will be a direct benefit toward maintaining and accomplishing refuge purposes. The above-mentioned report contains additional information on the project's impacts.

Justification:

The proposed project works toward the accomplishment of the stated objectives of the refuge.

Determination:

The proposed project is compatible with purposes for which the refuge was established.

Determined by:

James R. Lunn
Project Leader

3/18/91

Date

Richard F. Berry
Complex Manager

3/18/91

Date

Reviewed by:

Ed Crozier
WAM 1

3/26/91

Date

Concurred by:

McCluskey
Regional Director

3/28/91

Date



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Upper Mississippi River Refuge Complex
51 East 4th Street
Winona, Minnesota 55987

IN REPLY REFER TO:

March 6, 1991

Mr. Don Powell
St. Paul District, Corps of Engineers
1135 U.S. Post Office & Custom House
180 E. Kellogg Boulevard
St. Paul, Minnesota 55101

Dear Mr. Powell:

This provides U.S. Fish and Wildlife Service (Service) comments on the preliminary draft Definite Project Report and Environmental Documentation (SP-12) for the Spring Lake Peninsula Habitat Rehabilitation and Enhancement Project. This project will benefit the fishery resources of the Upper Mississippi River National Wildlife and Fish Refuge (Refuge).

The project is being built on federal lands managed as part of the Refuge, therefore, a Refuge compatibility determination and Refuge approval is required before the project can be constructed. A compatibility determination for the selected alternative discussed in this draft report has been forwarded to our Regional Office. When signed it will be sent to your office. Approval of the project will be formally provided by the Regional Director after completion of the final Definite Project Report (DPR).

The final draft DPR must include a copy of the draft Memorandum of Agreement for the operation, maintenance, and rehabilitation. In accordance with the Fifth Annual Addendum the Service will cover operation and maintenance costs as discussed in this report. The Regional Director's letter on the final draft DPR will include the certification of support for operation and maintenance.

The Service does not support the concept of placing a notch with a small stoplog structure in the peninsula closure. The Service has no evidence of a problem which would support this design change. If problems do occur after completion of Phase I of this project we can re-evaluate this issue during our Phase II design.

Past geotechnical analysis has demonstrated that it is very unlikely that back water material will be suitable to construct islands. The Service is concerned that statements in this report are overly optimistic and will mislead the public.

The Service agrees with Wisconsin Department of Natural Resources that we should consider the integrity of the existing islands as part of this phase of the Spring Lake Project.

Our January 23, 1991, letter to Mr. Robert F. Whiting provided Service comments on a contaminants sampling strategy for the Spring Lake project which was based on rudimentary project design information. At that time, neither the location nor required depth of dredging for the source of fine fill material for the proposed closure structure had been identified. Further, no information was available concerning the history of sediment deposition in the area. We thus recommended that the Corps of Engineers (Corps) obtain a minimum of three sediment core samples at randomly selected sites and that each core be taken to a depth one foot beyond the anticipated dredged depth and split for analysis in accordance with existing District procedures for conducting sediment evaluations for such projects.

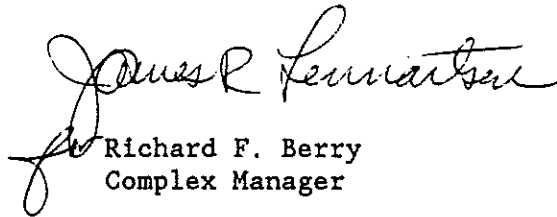
The present draft DPR indicates that a one-acre area within upper Spring Lake would be mechanically dredged four feet to provide deeper fish habitat and serves as a source of fine sediments for the closure structure. Noting the lack of contaminant data for other than surficial sediments in Pool 5, the DPR (page 10) states that depth-stratified sediment sampling and analysis would be necessary if fine sediments were to be dredged for any of several project purposes. Both alternative project designs involve dredging an area in upper Spring Lake, seemingly triggered such sampling and analyses. However, the 404(b)(1) evaluation seems to contradict the Corps' position stated above by suggesting that sufficient relevant Pool 5 sediment chemistry data are available to conclude that the proposed project will have few or no adverse impacts to aquatic resources. We cannot agree with that conclusion. The surficial sediment quality data referenced in the DPR cannot be assumed to represent contaminant conditions in deeper sediments. Absent information indicating that upper Spring Lake sediments will be removed to a depth clearly comprised of pre-impoundment riverine or upland soils, we still recommend the three stratified samples discussed above.

Based on information contained in the review document and the nature of the proposed project, its location, and the habitat requirements of the federally threatened Bald eagle (Haliaeetus leucocephalus), endangered Peregrine falcon (Falco peregrinus), and endangered Higgins' eye pearly mussel (Lampsilis higginsii), we support your determination that the proposed project will not affect federally listed threatened or endangered species. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should this project be modified or new information indicates that listed species may be affected, consultation with the Service's Twin Cities Field Office should be reinitiated.

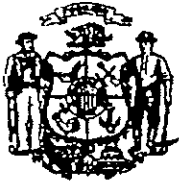
These comments are provided under the authority of and in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973, as amended, and the Service's Mitigation Policy, and are consistent with the intent of the National Environmental Policy Act of 1969.

This report illustrates the cooperation evident between the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service. Except for the above concerns the Service is very supportive of this project, which by design will enhance the fishery resources of the Upper Mississippi River System.

Sincerely,


Richard F. Berry
Complex Manager

cc: Winona District
Winona FAO
SPFO
LTRM
WDNR--Alma
WDNR--La Crosse
R.O.--SS



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

State Office Building, Room 104
3550 Mormon Coulee Road
La Crosse, WI 54601
(608) 785-9000

Carroll D. Besadny
Secretary

February 22, 1991

Mr. Don Powell
Flood Plain Management and Small Projects
Department of the Army
St. Paul District, Corps of Engineers
1421 U. S. Post Office & Custom House
St. Paul, MN 55101-1479

1600-1-3

Dear Mr. Powell:

We have reviewed the preliminary draft of the Definite Project Report (DPR) and Environmental Documentation for the Spring Lake Peninsula EMP habitat project. It is unfortunate that the barrier islands can not be constructed at this time, but we strongly support construction of the islands as a second phase to this HREP. Specific comments we have on the DPR are:

- DPR-3: John Wetzel did not attend this meeting. Please remove his name from the list of attendees.
- DPR-13: Last Paragraph: More appropriate light extinction data is available from Weaver Bottoms area.
- DPR-21: Reference to the 3°C temperature requirement of bluegill and largemouth bass should be provided.
- DPR-26: Table DPR-3. The estimated costs/year are difficult to understand. Using Alternative A as an example, the total cost of the project could be incorrectly interpreted as being \$22,391 x 50 = \$1,119,550. This section needs to be explained further.
- DPR-27: We would like to propose a third option/design for the closure similar to the typical design on Plate 14. This option would incorporate more fines. However, it would require more rip-rap (than Option 2) which will increase costs, but provide more structure for fish habitat (See Attachment A).
- DPR-28: This is an appropriate use of HEP to decide which alternative is best. Unfortunately, Table DPR-4 is rather difficult to understand.
- DPR-39: There are several references cited in the text that are not included in the Literature Cited.

Plate 2: This map should be updated to include the work that has been done in the Weaver Bottoms area.

Plate 14 & 15: Pool elevation is incorrect.

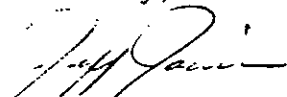
Plate 16: Same comment as PLATE 2.

404 b (1): Previous interagency review of this project has indicated sediment sampling is necessary. Please contact John Sullivan regarding an acceptable sediment sampling strategy. He estimates that at least 2 core samples should be collected from the project area.

General Comments: We have some concerns about the integrity of the existing islands once the closure is completed. Will the flow of Belvadere Slough be redirected in such a way that a breach may form elsewhere along the peninsula or possibly cause accelerated erosion of the remaining islands? Given the present rate of island deterioration in the Spring Lake area, it may be timely for us to consider protection of the islands that still exist as part of this phase of the Spring Lake HREP.

Overall, this DPR is well written and complete. We appreciated the opportunity to review it and look forward to the completion of the project, including the barrier islands, in the future. If you have any questions or need further information, please contact me at (608) 785-9005.

Sincerely,

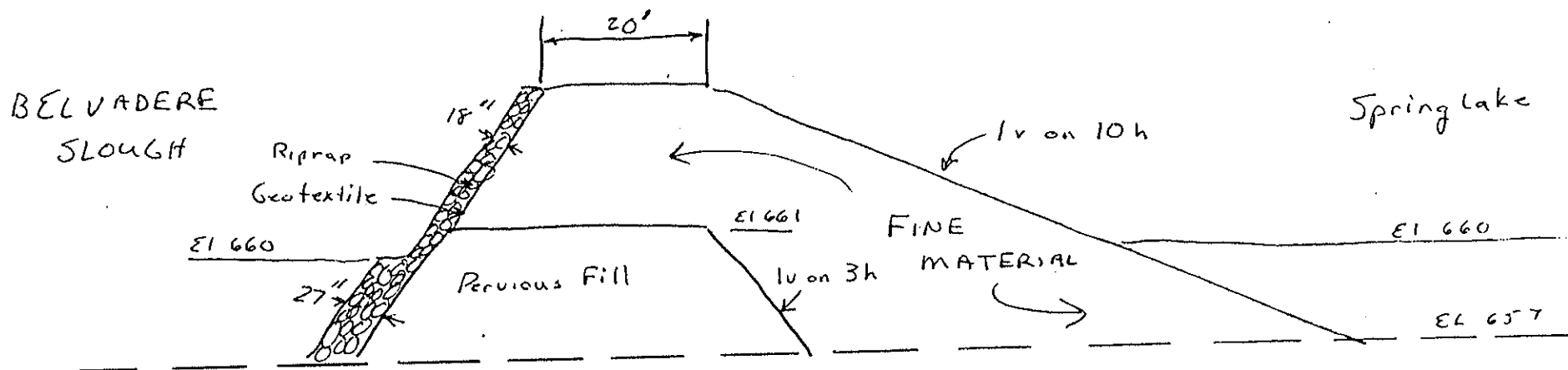


Jeffrey A. Janvrin
Mississippi River Habitat Specialist

Encs.

JAJ:ak

cc: Terry Moe - WDNR
Ron Benjamin - WDNR
Keith Beseke - FWS
Scot Johnson - MDNR



OPTION 3 CLOSURE CROSS-SECTION

Enclosure A.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
FEDERAL BUILDING, FORT SNELLING
TWIN CITIES, MINNESOTA 55111



IN REPLY REFER TO:

FWS/ARW-SS

OCT 10 1990

Colonel Roger L. Baldwin
District Engineer
U. S. Army Engineering District, Saint Paul
1421 U. S. Post Office and Custom House
Saint Paul, Minnesota 55101-1479

Dear Colonel Baldwin:

Thank you for providing us with a copy of the final report "A Phase I Cultural Resources Investigation: Field Reconnaissance [sic] and Testing of Islands in Spring Lake, Pool 5, Near Buffalo City, Buffalo County, Wisconsin" by Randy Withrow (August 10, 1990: Saint Paul; 14 pages). The investigation of islands in the W/2, Section 17, T.20N., R.12W., produced no evidence of archeological materials on these severely eroded island remnants. We note the islands are part of the cooperative agreement lands, owned in fee title by the U.S. Army Corps of Engineers and managed by the U.S. Fish and Wildlife Service within the Upper Mississippi River National Wildlife and Fish Refuge.

Sincerely,

Thomas J. Kerne
Acting Regional Director



United States Department of the Interior

NATIONAL PARK SERVICE

ROCKY MOUNTAIN REGIONAL OFFICE

12795 W. Alameda Parkway

P.O. Box 25287

Denver, Colorado 80225-0287



IN REPLY REFER TO:

H2415 (RMR-PR)

SEP 5 1990

Mr. Robert J. Whiting
Chief, Environmental Resources Branch
Planning Division
Attention: Mr. David Berwick
Chief, Cultural Resources Section
Department of the Army
St. Paul District, Corps of Engineers
1421 U.S. Post Office and Custom House
St. Paul Minnesota 55101-1479

Dear Mr. Whiting:

In response to your request of August 16, 1990, we have reviewed the brief report entitled "A Phase I Cultural Resources Investigation: Field Reconnaissance and Testing of Island in Spring Lake, Pool 5, Near Buffalo City, Buffalo County, Wisconsin."

We are pleased to note the thorough treatment accorded this small-scale survey. Conduct of field operations and background information are clearly presented. Results are well documented and support the investigator's recommendations.

Thank you for allowing us to review this report; we trust that our comments prove useful.

Sincerely,

J.J. Hoffman, Chief
Interagency Archeological Services
Division of Cultural Resources



THE STATE HISTORICAL SOCIETY OF WISCONSIN

H. Nicholas Muller III, Director

816 State Street
Madison, Wisconsin 53706
608/262-3266

September 14, 1990

Mr. Robert J. Whiting
Chief, Environmental Resources Branch
Department of the Army
St. Paul District, Corps of Engineers
1421 U.S. Post Office & Custom House
St. Paul, Minnesota 55101-1479

SHSW: 90-0162

RE: Fish Habitat Protection Measures for Spring Lake

Dear Mr. Whiting:

We have reviewed the archeological report entitled, "A Phase I Cultural Resources Investigation: Field Reconnaissance and Testing of Islands in Spring Lake, Pool 5, Near Buffalo City, Buffalo County, Wisconsin," by Mr. Randall Withrow. The survey procedures utilized were sufficiently thorough to justify the conclusion that there are no archaeological resources eligible for inclusion on the National Register of Historic Places within the areas surveyed.

It is always possible that deeply buried archeological sites may be discovered during construction. If such finds are made, please report them directly to me at 608/262-2970. Should human remains be discovered during construction, you must contact our office immediately for compliance with S.157.70, Wis. Stats., which provides for the protection of burial sites.

Should you have any questions, please contact me directly.

Sincerely,

Jennifer L. Kolb
Archaeologist, Compliance Section
DIVISION OF HISTORIC PRESERVATION

JLK (3342N)

cc: Dave Berwick



THE STATE HISTORICAL SOCIETY OF WISCONSIN

H. Nicholas Muller III, Director

816 State Street
Madison, Wisconsin 53706
608/262-3266

March 26, 1990

Mr. Robert J. Whiting
Department of the Army
St. Paul District, Corps of Engineers
1421 U.S. Post Office & Custom House
St. Paul, Minnesota 55101-1479

IN REPLY PLEASE REFER TO:
SHSW: #90-0162

RE: Fish Habitat Protection Measures for Spring Lake

Dear Mr. Whiting:

We have reviewed the above-referenced project as required for compliance with Section 106 of the National Historic Preservation Act and 36 CFR Part 800:- Protection of Historic Properties, the regulations of the Advisory Council on Historic Preservation governing the Section 106 review process.

There are no structures listed in the National Register of Historic Places located within the area of the proposed undertaking. Furthermore, we are not aware of any structures that may be eligible for the National Register in this area.

There are no KNOWN archeological sites in the project area, but the area has never been surveyed for such resources. The islands that formed the high ground of the former floodplain have good potential for archeological discovery. We recommend, therefore, that the remnants of the original islands in the former floodplain be surveyed by a qualified archeologist to locate and evaluate the significance of any archeological sites that may be present. When the survey has been completed, two copies of the archeologist's report should be forwarded to our office for our review and comments.

This report should be accompanied by a copy of our letter requesting the survey, which contains identifying information that is essential in order to unite the report with our previous project records. In the event a copy of our letter is omitted, we will, at our discretion, return the report to the sender with a request for the necessary identifying information.

- 2 -

We remind you that 36 CFR 800.4 includes the requirement that you seek information, as appropriate to the undertaking, from Indian tribes, local governments, public and private organizations and other parties likely to have knowledge of or concerns with historic properties in the project area.

If there are any questions concerning this matter, please contact Gretchen Block of my staff at (608) 262-2732.

Sincerely,



Richard W. Dexter
Chief, Compliance Section
DIVISION OF HISTORIC PRESERVATION

RWD:1kr -

1732N/1733N

1733B

Office of Clerk

CITY OF BUFFALO

Post Office Address

Cochrane, Wis. 54622

June 14, 1990

U. S. Corps of Engineers
1421 USPO & Custom House
St. Paul, MN 55101-9808
ATTN: Mr. Don Powell

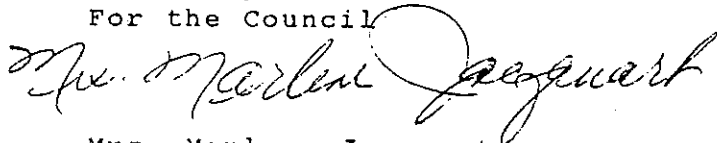
Dear Mr. Powell,

RE: your meeting held in the City of Buffalo on June 5,
1990.

The Common Council of the City of Buffalo would like to give their support to the Spring Lake project. We are all in total agreement that it would be very helpful to the area and is something that is needed in the Spring Lake area and in the City of Buffalo.

If there is any way that we can be of help or if you need any information that this office can give you, please feel free to call or contact us.

Sincerely,
For the Council



Mrs. Marlene Jacquart
City Clerk/Treasurer
CITY OF BUFFALO

June 11, 1990

Dr. & Mrs. Curtis Moem
R.R. 1, Box 401-A
Cochrane, Wisconsin, 54622

Col. Baldwin
U.S. Corps of Engineers
1421 USPO & Custom House
St. Paul, Minnesota
55101-9808

Dear Col. Baldwin:

Last Tuesday Don Powell of your office came to Buffalo City, Wisconsin, with representatives from the Department of Natural Resources and the Fish and Wild Life to present a very informative presentation on the St. Paul District Habitat Program. We thank you for the Corps part in organizing that interesting evening. Having an opportunity to learn about our river and question the experts is a rare opportunity.

We were particularly interested in your experts comments on the effects of the Weaver Bottoms project on our side of the Mississippi. As a matter-of-fact, the residents of this area have long known Spring Lake was filling in. However, since the Weaver Bottoms Project was started we have watched with apprehension the ever-more rapid silting-in that came with the heavier flow to the Wisconsin side of the river at Buffalo City.

We are wondering if the Corps could manage some kind of an emergency effort for the temporary re-establishment of the peninsula. Perhaps this winter when the ice is thick, drive trucks on the ice and dump rock in the openings. If we have to wait till 1993 for the Spring Lake project to wend its way through the Upper Mississippi River System Environmental Management planning process there may not be a back-water here to develop into a protected area for fish and wild life.

We realize it is not the Corps of Engineers job to provide habitats for fish and wildlife but we also realize the thousands of people who use this area for recreation are as important as keeping the river open for barge traffic.

In making this request to fill in the breaches temporarily with Corps money we are not in any way denigrating the E.M.P.'s potential solutions to our backwater's problems; on the contrary, we fully support their objectives, but we feel something should be done immediately about the peninsula and the

re-establishment of the otter islands that protect our shores from erosion.

Our family has resided on Spring Lake since 1957, and in that time we have watched the river change dramatically with the increase in barge traffic and the recreational boating. Please help us to maintain our river for both the commercial and recreational interests.

Most sincerely,

Peggy & Curtis Morem

Mr. & Mrs. Curtis Morem

Copy: Alan Robbins-Fenger, Director, Minnesota-Wisconsin Boundary Area Commission
 Steve Gunderson, Member of Congress, Third Congressional District, Wisconsin
 Barbara Gronemus, Wisconsin State Assembly Representative, 91st District
 Rod Ivers, State Senator
 Buffalo City Council
 Keith Beseke, Upper Mississippi River NWR

Inc: Copy of 1988 letter to Alan Robbins-Fenger

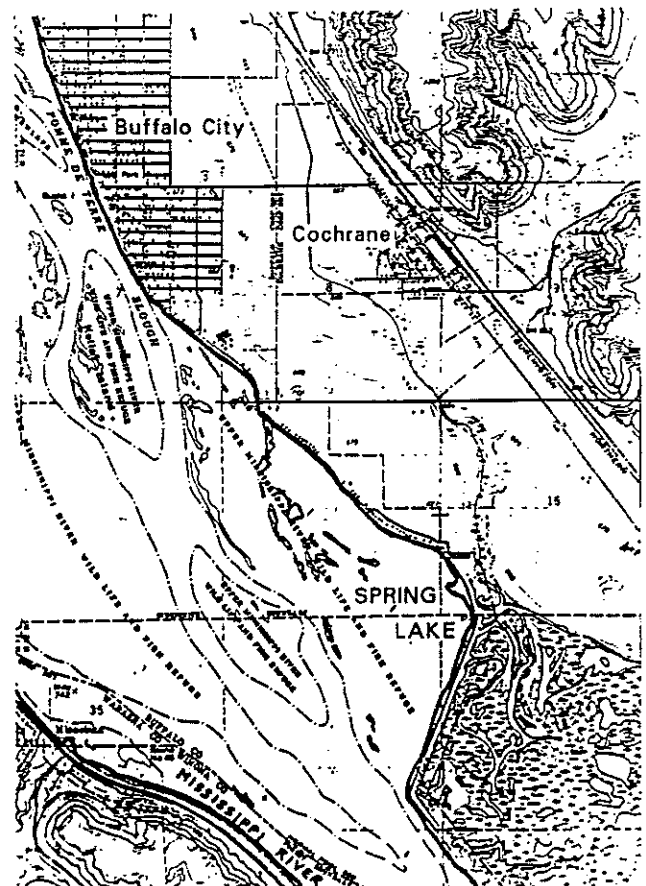
May 15, 1990

SPRING LAKE, WISCONSIN
HABITAT REHABILITATION AND ENHANCEMENT PROJECT
UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM (EMP)

A public meeting to discuss habitat improvements at Spring Lake, Wisconsin is scheduled for Tuesday, June 5, 1990, at 7:00 pm in the City Hall (8th and Humboldt) at Buffalo City, Wisconsin. This will be an opportunity to learn about the "EMP" and be involved in the planning for a habitat rehabilitation and enhancement project at Spring Lake. You will be able to ask questions and provide your input. Representatives from the Corps of Engineers, Wisconsin Department of Natural Resources, and -U.S. Fish and Wildlife Service will be present.

The Spring Lake habitat project is part of the Upper Mississippi River System - Environmental Management Program. The "EMP" was established by Congress in 1986 to protect the resources of the Upper Mississippi River and guide future river management. It includes the development of many habitat rehabilitation and enhancement projects on the Mississippi River from the Twin Cities in Minnesota to Cairo, Illinois. The purpose of the Spring Lake project would be to improve fish and wildlife habitat quality by providing conditions in the lake that are conducive to panfish activity and aquatic plant growth.

We encourage you to attend the meeting on June 5th and tell others who might be interested in providing input or hearing about possible plans affecting Spring Lake. If you are unable to attend the meeting, feel free to send your comments to the District Engineer, St. Paul District, Corps of Engineers, 1421 USPO and Custom House, St. Paul, Minnesota 55101-9808, ATTN: CENCS-PD-PF, or contact Mr. Don Powell at 612-220-0402. **IMPORTANT!** If you would like to receive future information about the project, please notify Mr. Powell at the above address, by telephone, or at the meeting. Otherwise, your name and address will be removed from the mailing list.



6 JUNE 1990

MEMORANDUM FOR SPRING LAKE EMP PLANNING TEAM

SUBJECT: SPRING LAKE EMP PUBLIC MEETING AT BUFFULO, WISCONSIN 5 JUNE 1990.

1. Will this project turn into another Weaver Bottoms where the island construction was done with minimal effort?
2. Can a closure structure be constructed at the head of Spring Lake as an emergency measure considering the rate of habitat being lost?
3. Can something be built to break up the wind fetch on Spring Lake?
4. How much money is available for this EMP project, where does it come from, how is it allocated, and how much will each phase of the project cost?
5. If a closure structure is built at the upper end, there has to be some flows maintained through there, otherwise the vegetation will decay and cause aesthetic problems as it had in the past.
6. If islands are constructed as part of this project, will boat access be maintained between Spring Lake and the main channel?
7. If Spring Lake is going to be dredged, how deep will it go and how will this material be used for the island construction (topping vs. fill)?
8. Can anything be done about the significant decline in fish and wildlife habitat in the lower end of Spring Lake?
9. If it is found that the Weaver Bottoms project is negatively affecting Spring Lake, can anything be done in Weaver Bottoms that would rectify this?
10. Is it possible to start these EMP projects upstream where the problems start, and then continue downstream?
11. Is it true that the Corps of Engineers will rectify any problems that the Weaver Bottoms project created?

Pete
Note taker

RECORD OF ATTENDANCE

Meeting - Spring Lake, Wisconsin, EMP at Buffalo City

Date - June 5, 1990

This information will be used for the purpose of knowing who attended this meeting.

Please include your address if you wish to be on the project mailing list. Thank you.

NAME (please print)	ADDRESS (optional)	REPRESENTING
LIETH ALVIN	COCHRAN W	YES
WES HERBST	BUFFALO CITY	SELF
GWEN HERBST	" "	SELF
Gordon Jensen	Cochrane	Self
Marceda Jensen	BUFFALO CITY	Self
Al Lorenz	5903 BERNARD CHICAGO -	SELF
ALVINA LORENZ	" "	"
Peggy Monahan (Mrs Curlier)	RR1 Box 401-A Cochrane, Wis Spring Lake Rd	
Roy Thatcher	Rt 1 Box 44 Cochrane - W. (BC)	"
Robt. E. Miller	Rt 1 Box 430 Cochrane WI 54622	"
CLIFFORD BURMEISTER	R. 1 BOX 210 COCHRANE WI.	"
JOHN MATSON	R1 Box 384 COCHRANE WI 54622	"
Marlene Jacobsen	Rt #1 Box 137 Buffalo City WI 54622	City of Buffalo

RECORD OF ATTENDANCE

Meeting – Spring Lake, Wisconsin, EMP at Buffalo City

Date - June 5, 1990

This information will be used for the purpose of knowing who attended this meeting.

Please include your address if you wish to be on the project mailing list. Thank you.

NAME (please print)	ADDRESS (optional)	REPRESENTING
Rudy Zeller	236 N. Main St Cochrane W.	Rudy Red Owl
Herbert Zeller	Cochrane W.	Self
George Klotzke	Cochrane W.	CofE
DAN SACQUART	BUFFALO CITY	SELF
Harry Fout	RI Cochrane	"
Bob Green	Buffalo City	"
Walter H. H. H.	Buffalo City	"
Jack Walz	" "	"
Herb Fandrey	" "	"
Mal O. Heneid	" "	"
David D. Fitch	" "	"
STEVEN BURMEISTER	BOX 294 COCHRANE W.	SELF

RECORD OF ATTENDANCE

Meeting - Spring Lake, Wisconsin, EMP at Buffalo City

Date - June 5, 1990

This information will be used for the purpose of knowing who attended this meeting.

Please include your address if you wish to be on the project mailing list. Thank you.

NAME (please print)	ADDRESS (optional)	REPRESENTING
Donna Matson	Rt 1 Box 384 Cochrane WI	Self
Rich Zures	Rt 1 Box 428 Cochrane, WI's	
Virgil Stinchy	Cochrane	
John Wilson	Rt 1 Cochrane	
Dave Brandon	Buffalo City	
Gregg Stano	Buffalo City	
CLAUDE C & Coleen DECK	2826 BROOK CT LACROSSE, WI 54601	SELF -
Brian Björke	Spring Lake	
Jim Wiegand	3835 A KLONDIKE CT. BROOKFIELD, WI 53005	Self
Dick Leeth	Buffalo City	
Tom Leeth	Buffalo City	
Ed. Helmuelle	Rt 1 COCHRANE, WI 54622 - BUFFALO CITY	

RECORD OF ATTENDANCE

Meeting - Spring Lake, Wisconsin, EMP at Buffalo City

Date - June 5, 1990

This information will be used for the purpose of knowing who attended this meeting.

Please include your address if you wish to be on the project mailing list. Thank you.

NAME (please print)	ADDRESS (optional)	REPRESENTING
BARRY AUER	Box 382 COCHRANE, WIS	SELF
Jerry Lee	La Crescent	COE
DAVE BAKER	Box 380	SELF
Mr & Mrs. Cook King	RT#1 Box 585 54622 Cochrane, Wis.	
Gilbert Halmeron	RT Cochrane	Self
Edward W. Squires	RR#1 Box 99 Cochrane Wis.	Self
Ellen W. Kocher	RR#1 BOX 401 COCHRANE, WI.	SELF
Edward Amundson	Buffalo City	SELF
Walter Bank	Buffalo City	SELF
Gary Nitsch	" "	Self
Lois Leiby	Buffalo City	
Ralph Leiby	Buffalo City	

UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM
FACT SHEET

SPRING LAKE ISLANDS
POOL 5, UPPER MISSISSIPPI RIVER, WISCONSIN

LOCATION: Spring Lake is a 300-acre backwater area located on the Wisconsin side of the Mississippi River in pool 5, approximately 1 mile below Buffalo City, Wisconsin. The site lies within the Upper Mississippi River Wildlife and Fish Refuge.

RESOURCE PROBLEM: Natural islands along the west side of Spring Lake have eroded and many have disappeared since the creation of pool 5. Previously, these islands protected Spring Lake from the direct effects of the main Mississippi River channel area and served to reduce wind fetch and the associated wave action. This is degrading the shallow water fish and wildlife habitat in the lake because of higher turbidity levels and undesirable conditions for the establishment of aquatic plant beds. The fish and wildlife habitat in Spring Lake has been of high quality because of the diversity present and the physically protected nature of the area. Quiet, protected areas are most valuable for fish and wildlife such as largemouth bass, bluegill, wading birds, muskrat, and dabbling ducks. Aquatic plant beds provide a valuable food source for fish and migrating birds.

PROPOSED PROJECT: The proposed project would rebuild or create barrier islands along the west side of Spring Lake to prevent further degradation of the fish and wildlife habitat in the lake. It is proposed to build the islands with material dredged from the vicinity of the main channel. Dredging volume is expected to be about 110,000 cubic yards, depending on the number and configuration of the islands. The project would require no future maintenance dredging.

PROJECT OUTPUTS: The project would stop the continued degradation of about 200 acres of valuable backwater fish and wildlife habitat by permitting Spring Lake to be maintained as a protected, shallow backwater wetland with the proper conditions for high productivity of both fish and wildlife. More than two-thirds of the lake would be directly affected by the project. If suitable material can be dredged from Spring Lake for island fill, it would also create deeper areas to provide additional fish habitat.

FINANCIAL DATA: Costs for general design are estimated at \$100,000 and construction costs are estimated at \$1,800,000. Annual costs for OM&R are estimated at \$3,500. Because the project would be located on lands of the National Fish and Wildlife Refuge System and "managed as a national wildlife refuge" within the meaning of Section 906(e) of the 1986 Water Resources Development Act, general design and construction costs would be 100-percent Federal. Costs for OMRR would be 75-percent Federal/25-percent non-Federal. The non-Federal sponsor would be the Wisconsin Department of Natural Resources.

Attachment 6

Draft Memorandum of Agreement
for
Operation and Maintenance

DRAFT
MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES FISH AND WILDLIFE SERVICE
AND
THE DEPARTMENT OF THE ARMY
FOR
ENHANCING FISH AND WILDLIFE RESOURCES
OF THE
UPPER MISSISSIPPI RIVER SYSTEM
AT THE
SPRING LAKE PENINSULA
BUFFALO COUNTY, WISCONSIN

I. PURPOSE

The purpose of this Memorandum of Agreement (MOA) is to establish the relationships, arrangements, and general procedures under which the U.S. Fish and Wildlife Service (FWS) and the Department of the Army (DOA) will operate in constructing, operating, maintaining, repairing, and rehabilitating the Spring Lake Peninsula separable element of the Upper Mississippi River System - Environmental Management Program (UMRS-EMP). All project lands are owned by the United States and are managed by the FWS as part of the Upper Mississippi River Wildlife and Fish Refuge.

II. BACKGROUND

Section 1103 of the Water Resources Development Act of 1986, Public Law 99-662, authorizes construction of measures for the purpose of enhancing fish and wildlife resources in the Upper Mississippi River System. Under conditions of Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662, all construction costs of those fish and wildlife features for the Spring Lake project are 100 percent Federal, and all operation, maintenance, repair, and rehabilitation costs are to be cost shared 75 percent Federal and 25 percent non-Federal.

III. GENERAL SCOPE

The Spring Lake peninsula project provides for the construction of a closure with stoplog structure to prevent flow into the upper end of Spring Lake through a breached portion of the peninsula. This would restore and maintain centrarchid fisheries and enhance aquatic plant bed development in Spring Lake for fish and wildlife.

IV. RESPONSIBILITIES

A. DOA is responsible for:

1. Construction: Construction of the Project consists of closing a breach in the Spring Lake peninsula with an earth structure and placing a stoplog structure in the closure.

2. Major Rehabilitation: Any mutually agreed, upon rehabilitation of the project that exceeds the annual operation and maintenance requirements identified in the Definite Project Report and that is needed as a result of specific storm or flood events.

3. Construction Management: Subject to and using funds appropriated by the Congress of the United States, DOA will construct the Spring Lake Peninsula project as described in the Definite Project Report/Environmental Assessment, Spring Lake Peninsula, Habitat Rehabilitation and Enhancement Project, dated xxxx 1991, applying those procedures usually followed or applied in Federal projects, pursuant to Federal laws, regulations, and policies. The FWS will be afforded the opportunity to review and comment on all modifications and change orders prior to the issuance to the contractor of a Notice to Proceed. If DOA encounters potential delays related to construction of the Project, DOA will promptly notify FWS of such delays.

4. Maintenance of Records: DOA will keep books, records, documents, and other evidence pertaining to costs and expenses incurred in connection with construction of the Project to the extent and in such detail as will properly reflect total costs. DOA shall maintain such books, records, documents, and other evidence for a minimum of three years after completion of construction of the Project and resolution of all relevant claims arising therefrom, and shall make available at its offices, at reasonable times, such books, records, documents, and other evidence for inspection and audit by authorized representatives of the FWS.

B. FWS is responsible for:

1. Operation, Maintenance, and Repair: Upon completion of construction as determined by the District Engineer, St. Paul, the FWS shall accept the Project and shall operate, maintain, and repair the Project as defined in the Definite Project Report/Environmental Assessment entitled "Spring Lake Peninsula, Habitat Rehabilitation and Enhancement Project," dated xxxx 1991, in accordance with Section 906(e) of the Water Resources Development Act, Public Law 99-662.

2. Non-Federal Responsibilities: In accordance with Section 906(e) of the Water Resources Development Act, Public Law 99-662, the FWS shall obtain 25 percent of all costs associated with the operation, maintenance, and repair of the Project from the Wisconsin Department of Natural Resources.

V. MODIFICATION AND TERMINATION

This MOA may be modified or terminated at any time by mutual agreement of the parties. Any such modification or termination must be in writing. Unless otherwise modified or terminated, this MOA shall remain in effect for a period of no more than 50 years after initiation of construction of the Project.

VI. REPRESENTATIVES

The following individuals or their designated representatives shall have authority to act under this MOA for their respective parties:

FWS: Regional Director

U.S. Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

DOA: District Engineer

U.S. Army Engineer District, St. Paul
1421 U.S. Post Office and Custom House
St. Paul, Minnesota 55101-9808

VII. EFFECTIVE DATE OF MOA

This MOA shall become effective when signed by the appropriate representatives of both parties.

THE DEPARTMENT OF THE ARMY

THE U.S. FISH AND WILDLIFE SERVICE

BY:

(signature)

ROGER L. BALDWIN
Colonel, Corps of Engineers
St. Paul District

BY:

(signature)

JAMES C. GRITMAN
Regional Director
U.S. Fish and Wildlife Service

Date _____

Date _____

Attachment 7
Distribution List

The Draft Definite Project Report/Environmental Assessment and/or Public Notice will be sent to the following agencies and interests:

Congressional

Sen. Paul Wellstone (St. Paul)*	Sen. Robert W. Kasten, Jr (Madison)*
Sen. Dave Durenberger (Mpls)*	Sen. Herbert Kohl (Madison)*
Rep. Tim Penny (Rochester)*	Rep. Steve Gunderson (Black Riv Falls)*

Federal

Department of Transportation (Chicago)*
Environmental Protection Agency (Chicago)
U.S. Coast Guard (St. Louis)*
U.S. Fish and Wildlife Service (La Crosse - Delaney*; St. Paul - Lewis*; Winona - Berry*, Beseke, Lennartson*; Twin Cities - Gritman*, Gibbons, Dobrovolny)
U.S. Geological Survey (St. Paul; Madison)*
National Park Service (Omaha)*
Soil Conservation Service (Madison, St. Paul)*
Advisory Council on Historic Preservation (Wash DC)*
Office of Environmental Compliance - DOE (Wash DC)*
Office of Environmental Project Review - DOI (Wash DC)*
Corps of Engineers (LMS - Hawickhorst; LMV - Arnold; NCD - Havrilla; NCR - Skalak; OCE - Howell*; NCS - Fountain City - Krumholz; LaCrescent - Otto*; L&D 4*; L&D 5*; St. Paul - Anderson, Beauvais*, Cin, Fasbender, Geisen*, Hendrickson*, Kean, Krumholz*, Osterby, Powell, Riedesel, Rodney, Schommer; Winona - Peterson*)

State of Wisconsin

Department of Administration (Madison)*
Department of Natural Resources (Madison - Besadny*; La Crosse - Benjamin, Janvrin, Moe; Alma - Marron; Eau Claire - Bourget)
Department of Transportation (La Crosse)*
State Historic Preservation Officer (Madison)
State Archeologist (Madison)

State of Iowa

Department of Natural Resources (Des Moines - Anderson)

State of Minnesota

Department of Natural Resources (Frontenac - Johnson; Lake City - Grunwald*; Rochester - Heather, Shepperd*; St. Paul - Alexander*, Norris*)
Pollution Control Agency
Department of Administration*
Department of Transportation*
Department of Agriculture*
Department of Health & Human Services*
State Historic Preservation Officer
Department of Energy, Economics, and Development*
State Archeologist
State Planning Agency*
Water and Soil Resources Board*

*Public Notice Only

Local

Buffalo City Clerk/Treas
Buffalo City Council*
Bank of Buffalo*
Buffalo Co Cnsrvationist*
Buffalo County Clerk*
Rich's Barber Shop*
Nick's Riverside Resort*
Riverside Sport Shop*
ZJ's Bar*

Cochrane Village*
Cochrane-Fntn Cty Rcrdr
Winona Daily News*
Alma Public Library*
Cochrane Post Office*
Hillside Fish House*
Fountain City Post Off*
Steve's Construction*

Alma Fishing Float*
Buck's Log Cabin Bait*
Buffalo City Bait*
5th Avenue Bar*
Fountain City Clerk*
Judy's Bar*
Alma Post Office*
Village Gasthaus*

Other Interests

Upper Miss Riv Cons Com (Rock Isl)
Izaak Walton Lg (Mpls, Red Wing)*
National Audubon Society (Mpls)*
Miss Riv Reg Plan Comm (La Crosse)*
Ducks Unlimited (Mpls)*

Sierra Club (Madison, Mpls)*
Mn/Wisc Bound Area Commission (Hudson)
Upper Miss River Basin Assoc (St. Paul)*
Goodhue-Pierce Arch Soc (Hagar City)*
Nature Conservancy (Mpls)*

Individuals

Curtis Morem
Ardine Steckling
Virgil Adank*
Clifton Adler, Jr*
Myles Auer*
James Averbeck*
Gene Baker*
Warren Barth*
W.L. Beckendorf*
Clarence Becker*
Gordon Jensen*
Roy Thatcher
Clifford Burmeister
Rudy Zeller
Kermit Keller
Dan Jacquart
Harvey Paul
Bob Lovas
Sandra Piechowski
Jack Walz
Willis Fernholz*
Herb Fandrey
Milford Herreid
David Fritsch
Steven Burmeister
Rich Baures
Virgil Stinocher
Gregg Stangl
Claude Deck
Jim Wiegand
Dick Lietha
Ed Helmueller

Carl Hinz
Gilbert Halverson
Edward Annuik
Ralph Leahy
Willard Blank
David Brandon
Wes Herbst
Allen Kochenderfer
Alvin Lieth
Alfred Lorenz
John Matson
Robert E. Miller
Gary Nissalke
Edward Squires
John Weber
Allen Bollinger*
Craig Buchholz*
Roger Burmeister*
Larry Comero*
Jack Deneff*
Randy Dienger*
Steven Duellman*
Gerald Earney*
Steven Engler*
Monte Fernholz*
David Fettling*
Dick Graettinger*
Welton Herold*
John Hilt*
Peter F. Hund, Jr*
Steve Johnson*
Neil Keller*

Duane Loewenhagen*
Randy Maier*
Doug McFarlin*
Bill Meyer*
John Moss*
Randy Oesau*
Dave Olson*
William Powell*
Aaron Reuter*
Peter Rothering*
Ken Salwey*
Dennis Schmidtknecht*
Arnold Schultz*
Myron Schwauke*
Kevin Solem*
Michael Valentine*
Randy Wiecezorek*
Brian Bjorke*
E.M. Appel*
Richard Hansen*
John Tweedy*
Henry Stankiewicz*
Leslie Christianson*
Kirsten Almo*
Barry Auer
Dave Becker
William H. Krause*
Tom Krumholz*
George Kletzke*
Marceda Jensen*
M. Pinehurst*
John Fandrey*

*Public Notice Only

Attachment 8

Detailed Cost Estimate

NARRATIVE REPORT FOR

COST ESTIMATE

SPRING LAKE PENINSULA, DEFINITE PROJECT REPORT

POOL 5, UPPER MISSISSIPPI RIVER, BUFFALO COUNTY, WISCONSIN

1. DESCRIPTION OF PROJECT. This project is for construction of a partial closure to reduce flow from the main channel into Spring Lake. Borrow is available at Belvidere Slough, Summerfield Island dredge cut, Lost Island disposal site and Lost Island Lake. All these sites are less than 2 miles from the closure. The site is accessible by land. The closure is sand covered with geotextile and then silts for vegetation growth and riprap on the river side.

2. CONSTRUCTION METHODS. A barge mounted clamshell with two material barges and one push boat can accomplish the work. At normal pool the draft is approximately 4 feet at the closure. Material can be dredged, hauled by barge and placed with a second clamshell working from land. Limestone for riprap is abundant in the area. Riprap can be trucked to the construction site and placed with front end loaders and clam shell. Organic soils will be dredged with the clamshell from the river bottom adjacent to the closure, sidecast, left to drain and then shaped with a small dozer. The typical cross section shown on plate 14 may have to be varied to facilitate construction. It may not be practical to operate equipment on thick silts.

3. UNIT COST ANALYSIS. Estimated unit costs have been derived based on labor, equipment and material costs.

4. PLANNING, ENGINEERING, DESIGN AND CONSTRUCTION MANAGEMENT COSTS. Amounts shown are based on estimates of time and materials. Estimates for the cost of this work have been done by, or have been reviewed by, the appropriate Section or Branch Chiefs.

5. CONTINGENCY ANALYSIS.

a. Mobilization and Demobilization. The contingency includes \$20,000 for dredging for access. Additional contingency is for unknowns and additional time that may be required.

b. Riprap and Fill. The contingency is for quantity variations. The unit price for riprap is considered adequate because of the potential for placement from land. The unit price for fill is considered adequate because of the large number of borrow areas available and also the potential for placement from land.

c. Geotextile and Fines. The contingency is for quantity variations and establishment of vegetation. The unit prices are considered adequate.

DEFINITE PROJECT REPORT ESTIMATE

ACCOUNT CODE	ITEM	UNIT	QUANTITY	UNIT PRICE	AMOUNT	CONTINGENCIES		REASON
						AMOUNT	PERCENT	
=====								
11.-.-.-	LEVEES AND FLOODWALLS							
11.1.-.-	CLOSURE							
11.0.A.-	MOBILIZATION AND DEMOBILIZATION	JOB	1	10,000.00	10,000	25,000	250%	1,2,3,6
11.0.1.B	PERVIOUS FILL	CY	8,611	7.00	60,300	30,000	50%	1,3
11.0.1.B	FILL, FINES	CY	2,778	7.00	19,400	9,700	50%	1,3
11.0.1.B	GEOTEXTILE	SY	1,333	3.00	4,000	2,000	50%	1,3
11.0.1.B	RIPRAP, 18"	CY	741	30.00	22,200	11,100	50%	1,3
30.-.-.-	ENGINEERING AND DESIGN	JOB	1	65,000	65,000	7,000	11%	4
31.-.-.-	CONSTRUCTION ADMINISTRATION	JOB	1	10,000	10,000	7,000	70%	5

SUBTOTAL CONSTRUCTION COSTS					191,000			
SUBTOTAL CONTINGENCIES					48.2%	92,000		

TOTAL					283,000			
					=====			

REASONS FOR CONTINGENCIES

-
1. Quantity Unknowns
 2. Unit Price Unknowns
 3. Unknown Site Conditions
 4. Undefined Requirements
 5. 9% Of Total Contingencies for Construction
 6. Includes 3,000 Cy Dredging For Access

NOTES

-
1. Extensions are rounded to the nearest \$100,
column totals to the nearest \$1,000