US Army Corps
of Engineers
St. Paul District

UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM

DEFINITE PROJECT REPORT/
ENVIRONMENTAL ASSESSMENT (SP-11)

COLD SPRINGS

HABITAT REHABILITATION AND ENHANCEMENT PROJECT

POOL 9
UPPER MISSISSIPPI RIVER
CRAWFORD COUNTY, WISCONSIN

MAY 1991

EXECUTIVE SUMMARY

The Cold Springs area affords valuable habitat for fish, birds, and other wildlife. The backwater provides spawning and rearing habitat for bluegill, crappie, bass, and gizzard shad. Fish species such as walleye, sauger, and northern pike also use the backwater, especially for refuge during periods of high water on the Mississippi River. Animals in the area include beaver, muskrat, white-tailed deer, and other small mammals. Wood ducks and mallards nest in the area, and it is used by shore birds and migrating waterfowl.

Construction of what is now the Burlington Northern Railroad causeway in the late 19th century created the semi-isolated Cold Springs backwater. Cold Springs is fed by Kettle Creek inflows through a highway bridge and is connected to the Mississippi River through a railroad bridge. The backwater is characterized by little or no flow velocity; hence, sediment carried by creek and river water tends to settle out, forming natural levees along the creek inlet and accumulating in deeper areas as well. The creation of Pool 9 in the late 1930s increased the water level, but serious erosion in upland watersheds due to poor farming, grazing, and logging practices caused major sedimentation. Improved land use practices since the late 1960s greatly reduced erosion and related sedimentation to the extent that the study leading to this report concluded that further reductions in sedimentation were neither crucial nor cost effective. Consideration was also given to deepening the backwater to reverse the effects of past sedimentation. However, the winter habitat suitability model for bluegill, the target fish species, showed that depths are close to optimal at present; therefore, deepening would not be cost-effective.

A peninsula bordering the north side of the Kettle Creek inlet divides the Cold Springs backwater area into north and south lobes. This peninsula is the site of a public boat landing and parking area. The creek channel has been dredged to improve boat access from the landing to the river through the railroad bridge.

Studies show that the primary habitat deficiency is low dissolved oxygen (DO) levels in the winter. Low DO results in temporary migrations of fish from the backwater and fish kills. Forced movement from preferred habitat may also affect fish mortality due to higher predation and/or changes in available food. A related problem is restricted fish movement through shallows on both sides of the boat channel; ice buildup can obstruct fish access from deeper areas of the north and south lobes into the boat channel and river, trapping fish in areas with insufficient DO.

The plan formulation process considered measures to improve DO (e.g., artesian wells and aerators) and to provide fish with access to areas with sufficient DO. The recommended plan consists of two measures: (1) a structure to divert oxygenated inflow from Kettle Creek into the south lobe during the winter and (2) a channel to allow fish movement between the backwater's lobes and the boat channel.

The diversion structure would consist of a weir across the creek channel just downstream of the Highway 35 bridge and wing walls to tie

the structure into the highway embankment. The structure would consist of steel sheetpile driven into the soil and protected by rock fill placed in a trapezoidal cross section.

The top of the weir would be at Pool 9's normal level except for a notch to allow fish into and out of Kettle Creek. In the winter, this notch would be stoplogged and a slot in the south wing wall would be opened to divert creek water into the south lobe via a ditch. This slot would be stoplogged the rest of the year to prevent large creek flows from carrying sediment into the south lobe.

The fish access channel, trapezoidal in cross section, 4 feet deep and 24 feet wide, would be dredged from the north lobe, across the boat channel, and into the south lobe. Material dredged for the fish access channel and diversion ditch would be placed on the north peninsula.

The cost of the recommended plan (including construction, engineering and design, and construction supervision and administration) is $344,000, to be borne by the Corps of Engineers. Operation and maintenance costs are estimated to average $900 annually 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 recommended plan would be expected to increase the DO level in a minimum of 50 percent of the south lobe (i.e., over 25 percent of the entire backwater) to at least 5 milligrams/liter and insure that fish throughout the backwater have access to areas with adequate DO.

To evaluate project performance, the DO would be monitored semi-weekly over the winter the first, third, and fifth years, and fish access channel depths would be measured the fifth and tenth years.

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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 discussed in detail in the main body of this report would be funded and constructed under this authorization. This report includes an integrated environmental assessment, Section 404(b)(1) evaluation, and Finding of No Significant Impact.

Section 1103 of the Water Resources Development Act of 1986 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.

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 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 which 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 recommended only after consideration of system-wide effects.

PARTICIPANTS AND COORDINATION

Participants in project planning included the Upper Mississippi River Wildlife and Fish Refuge and the Region 3 Office of the U.S. Fish and Wildlife Service, the Wisconsin and Iowa Departments of Natural Resources, and the St. Paul District, Corps of Engineers. The U.S. Fish and Wildlife Service was a cooperating agency throughout the process as defined by the Council on Environmental Quality Regulations for implementing the National Environmental Policy Act (40 CFR 1500-1508). Meetings of the study participants were held at the project site and other locations to discuss project objectives and designs. During various stages

of project development, coordination was supplemented by correspondence between the agencies.

PROJECT LOCATION

Cold Springs is located in Crawford County, Wisconsin, on the east side of the Upper Mississippi River in Pool 9, approximately 5 miles above Lock and Dam 9. The nearest communities are Ferryville and Lynxville, Wisconsin, about 6 miles north and 2 miles south, respectively. The closest major metropolitan area is La Crosse, Wisconsin, about 40 miles north (figure 1). The Cold Springs backwater is located within the Upper Mississippi Wildlife and Fish Refuge and is managed as a national wildlife refuge.

PROJECT PURPOSE

The overall purpose of this project is rehabilitation, enhancement, and maintenance of aquatic habitat for fish occupying the backwater for overwintering, retreat from summer heat, and refuge during periods of high water in the Mississippi River.

Several years of monitoring (discussed further in the EXISTING HABITAT CONDITIONS section) shows dissolved oxygen (DO) falls to critical levels for fish survival during the winter. The low DO levels force fish to migrate from the Cold Springs backwater and have resulted in documented fish kills. Forced movement may also affect predation and food availability.

The Cold Springs backwater has experienced significant sediment buildup since Pool 9 was created. This has decreased the deep-water habitat required by fish that are overwintering or escaping summer heat.

Project features were considered with the purpose of improving DO conditions, correcting existing problems due to past sediment buildup, and avoiding potential sedimentation drawbacks. The resulting array of

viable alternatives was screened to identify the most cost-effective, acceptable combination of measures in sufficient detail to proceed to plans and specifications and eventual implementation.

GENERAL PROJECT SELECTION PROCESS

ELIGIBILITY CRITERIA

Under the EMP authority, the following procedures were followed in selecting this project for inclusion and eventual study.

Projects are nominated for inclusion in the District's habitat program by the respective State natural resource agency or the USFWS 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 Channel Maintenance Forum (CMF) 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 agencies. Meetings were held on a regular basis to evaluate and rank the nominated projects according to the biological benefits that they could provide in relation to the habitat needs of the river system. The ranking was forwarded to the CMF for consideration of the broader policy perspectives of the agencies involved. The CMF 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 which is consistent with the overall program guidance as described in the UMRS-EMP General Plan and Annual Addendums and supplemental management guidance provided by the North Central Division.

PROJECT SELECTION

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 Cold Springs project was recommended and supported as capable of providing significant habitat benefits.

ASSESSMENT OF EXISTING RESOURCES

PHYSICAL SETTING

Pool 9 is part of the Upper Mississippi River system which was created by the construction of Lock and Dam 9. The pool is about 31 miles long, extending from river mile (RM) 648 to just above RM 679. Cold Springs is a 35-acre backwater located in the lower part of Pool 9, about 5 miles above the lock and dam.

Cold Springs is bounded on the west by the Burlington Northern Railroad causeway and on the north, east, and south by the Wisconsin State Highway 35 embankment (figure 2). The backwater is connected to the Mississippi River via an opening through a 3-pier railroad bridge approximately 90 feet long.

Spring-fed Kettle Creek provides a base flow estimated at 2 to 3 cubic feet per second (cfs). The creek enters the backwater through the Highway 35 embankment via a highway bridge approximately 110 feet long. The creek's watershed covers 5.4 square miles, with 32 percent in agricultural use and the remainder heavily wooded.

Cold Springs is divided into two lobes by a peninsula which extends along the north side of the creek from the highway bridge into the backwater (figures 3 and 4). The south lobe encompasses about 19 acres, the north lobe about 16 acres. A public boat landing is located on the peninsula. The Kettle Creek channel running west along the peninsula to the railroad bridge has been dredged to provide boat access to both lobes of the backwater and the Mississippi River.

WATER RESOURCES

Prior to construction of the Chicago, Burlington & Quincy Rail Road (now the Burlington Northern Railroad) causeway in the late 19th century, the Cold Springs area was situated on an outside bend of Winneshiek Slough, a major channel of the braided Mississippi River. The railroad embankment created a semi-isolated backwater area fed by Kettle Creek and Cold Spring Hollow (an intermittent stream), and by periodic inflows through the railroad bridge when the Mississippi River flooded. This backwater was characterized by little or no flow velocity; hence, sediment introduced by creek and river inflows tended to settle out relatively quickly, slowly filling the backwater and forming natural levees along the creek outlet from the Highway 35 bridge to the railroad bridge.

Prior to creation of Pool 9 in 1939, the U.S. Bureau of Sport Fisheries and Wildlife had fish rearing ponds in the Cold Springs backwater (figure 5). Pool 9 breached the levees containing the fish ponds when the water level increased from about elevation 612.7 to 620.0 (1912 MSL). At that same time, the Kettle Creek and Cold Spring Hollow watersheds were suffering from poor farming, grazing, and logging practices, which resulted in nearly denuded streambanks, serious gullying, and major sediment loads being carried into the backwater. A 1954 aerial photo (figure 6) shows considerable gullying despite improvements in upland treatment; hence, heavy sediment loads persisted during that period. This photo also shows that the creek delta diverted flows and concomitant sediment loads into the north lobe, which resulted in its present-day shallow depths compared to the south lobe (figures 7 and 8). When the boat landing was constructed on the north peninsula, a boat channel was dredged from the landing through the railroad bridge by sidecasting the material onto the north peninsula, producing the existing features illustrated on figures 3, 7, and 8.

Kettle Creek is fed by surface runoff, groundwater seepage in its bed, and numerous springs along the bluffs bordering its channel. Wintertime measurements show creek DO levels of 10 milligrams per liter (mg/l).

Sporadic measurements suggest that, during low-flow periods (representative of what might be expected in the winter when backwater DO is a problem), creek flow typically is in the 2 to 3 cfs range and might drop close to 1 cfs.

GEOLOGY AND SOIL/SUBSTRATE

Geology - Cold Springs is about 5 river miles north (upstream) of Lock and Dam 9, near Lynxville, Wisconsin. This region, known as the western upland physiographic province of Wisconsin, is dominated by two major topographic features. Bluffs along the river comprise the uplands of the province. These bluffs rise 400 to 500 feet above the present river level and are dissected by numerous, well-formed stream drainages. The second major topographic feature is the Mississippi River gorge itself.

Although the Mississippi River Valley existed as long as 180 million years ago, the major geologic event which created the gorge we see today occurred at the end of the Pleistocene glaciation, about 10,000 years ago. Tremendous volumes of glacial meltwater from glacial Lake Agassiz scoured and deepened the valley. As the meltwaters diminished, the deeply eroded valley filled with up to 150 feet of river sands, gravels, clays, and silts. The large supply of sediment from stream tributaries, coupled with a diminished water supply, led to the development of a braided stream environment characterized by numerous channels, swampy depressions, natural levees, islands, and shallow lakes. Completion of Lock and Dam 9 in 1939 flooded the area and obscured the braided stream characteristics. Since impoundment, a veneer of silts, sands, and clays has been deposited over most of the present river bottom.

The bluffs along Wisconsin Highway 35 consist of the Cambrian-period Jordan Sandstone, which lies beneath the ridge-topping, Ordovician-period limestones of the Prairie du Chien formation.

Bedrock beneath the river sediments consists of Cambrian-period sandstones of the Dresbach formation. The Mount Simon Sandstone member of this formation is the major water-producing aquifer in this part of the State, and flowing artesian wells drilled into it may be observed along Highway 35.

Soil/Substrate - The composition of the upper soil strata within the project area was substantially influenced by construction of what is now the Burlington Northern Railroad embankment in the late 19th century. As noted previously, prior to construction of this embankment, the project area was on an outside bend of Winneshiek Slough, a major channel. The depth and flow velocity in this channel are expected to have resulted in relatively coarse-grained bottom sediments (i.e., predominantly sand). After the railroad embankment was constructed, the project area became a protected backwater where fine alluvium (predominantly silts and clays) from Kettle Creek and Cold Spring Hollow could be deposited without being carried away by the flow of Winneshiek Slough. As a result, a delta with low natural levees formed at the creek outlet downstream from Wisconsin State Highway 35. This delta was well established by the 1930s when Lock and Dam 9 was constructed and Pool 9 was created, as shown on the flowage surveys for Pool 9 (figure 5). Aerial photos of the project area from the 1930s through the 1950s indicate that farming practices within the Kettle Creek and Cold Spring Hollow watersheds contributed to significant upland erosion and subsequent delta growth during this period. Later photos and hydrographic surveys indicate that improved agricultural practices from the late 1960s on greatly reduced upland erosion and the related sedimentation rate and delta growth.

Six soil borings were obtained within the project area in May 1990. The locations of these borings are shown on figure 9 and the boring logs are shown on figure 10. These borings reflect the presence of predominantly fine sediments within the upper soil strata in the project area. It should be noted that the uppermost strata at boring 90-6M include material that was dredged from the outlet of Kettle Creek and Cold Spring Hollow in the 1970s when the channel was straightened and deepened and a

boat landing constructed on the northern peninsula. The silts and clays encountered in borings 90-1M and 90-2M indicate that channel excavation in this area would necessitate mechanical dredging or containment of hydraulically-dredged material.

VEGETATION

The plant community in the Cold Springs backwater is typical of Upper Mississippi River habitats, consisting of floodplain forests and backwater sloughs. Riparian areas vary from wooded to shrubby. Common trees and plants include river birch, cottonwood, green ash, basswood, sandbar willow, false indigo, button bush, wild grape, jewelweed, poison ivy, purple loosestrife, and a variety of additional species.

Aquatic plants occupy much of the backwater, with dense communities of emergent and submerged species occupying areas with water depths of 4 feet or less. Common emergent species include lotus, water plantain, broad-leaved arrowhead, cattails, and purple loosestrife. Submerged and floating leaved plant species include coontail, big duckweed, wild celery, water shield, and white and yellow water lilies.

HABITAT TYPES AND DISTRIBUTION

Areas, water depths, and aquatic vegetation coverage (emergent, floating leaved, and near-surface) of the north and south lobes were determined by digitization of aerial photos of the area taken September 10, 1989, U.S. Geological Survey maps, and Wisconsin Department of Natural Resources (WDNR) bathymetric data (table 1 and figures 11 and 12).

FISH AND WILDLIFE

With the exception of winter DO concentrations, the Cold Springs backwater provides excellent habitat for a number of fish and wildlife species. The backwater provides spawning, rearing, and good overall habitat for fish species such as bluegill, crappie, bass, and gizzard shad.

Table 1
COLD SPRINGS BACKWATER AREA, DEPTH, AND VEGETATION

AREA:

North lobe	16.01 acres
South lobe	19.03 acres
Total	35.04 acres

WATER DEPTH:

	Greater than 4 feet	Less than 4 feet	Total
North lobe	5.00 acres	11.00 acres	16.00 acres
South lobe	11.26 acres	7.79 acres	19.05 acres
Total	16.26 acres	18.79 acres	35.05 acres

VEGETATION:

	Submerged	Emergent	Total
North lobe	4.95 acres	2.15 acres	7.10 acres
South lobe	2.65 acres	1.51 acres	4.16 acres
Total	7.60 acres	3.66 acres	11.26 acres

Note: Inconsistencies due to round-off errors.

It is also used by walleye, sauger, northern pike, and various other species, especially for refuge during periods of high water.

Kettle Creek supports limited numbers of small bluegill, creek chubs, brook sticklebacks, and white suckers.

Animals using the area include such species as beaver, muskrat, raccoon, white-tailed deer, squirrels, and other small mammals.

Wood ducks and mallards are known to nest in the area, and it is used by a variety of species of migrating waterfowl. A wide variety of shore birds also use the area.

THREATENED AND ENDANGERED SPECIES

The Cold Springs backwater is located within the historical range of the bald eagle (Haliaeetus leucocephalus), the peregrine falcon (Falco peregrinus), the osprey (Pandion haliaetus), and the Higgins' eye pearly

mussel (Lampsilis higginsi). The peregrine falcon and Higgins' eye pearly mussel are Federally- and State of Wisconsin-listed endangered species. The bald eagle is a Federally- and State-listed threatened species, and the osprey is listed by the State of Wisconsin as threatened.

No nesting sites for the bald eagle, peregrine falcon, or osprey are known to exist in the immediate vicinity of the Cold Springs backwater. However, these species may be sighted in the area during migration and may use adjacent areas for roosting.

The Higgins' eye pearly mussel, although known to be present in Pool 9, is not known to occur in the Cold Springs backwater. The silty substrate and lack of flows in the project area do not provide suitable habitat for this species.

CULTURAL RESOURCES

In accordance with the National Historic Preservation Act of 1966, as amended, the National Register of Historic Places has been consulted. Pool 9 is rich in cultural resources, with over 80 historic and 90 prehistoric recorded sites. The pool has never been systematically surveyed, so the actual numbers are probably much higher. There are seven recorded burial mound groups within 1/2 mile of the project area, all located in upland areas. There are no historic or prehistoric sites on or determined to be eligible for the National Register in the proposed project area.

SOCIOECONOMIC RESOURCES

The project location is a rural river-fringe area approximately midway between the towns of Lynxville and Ferryville, Wisconsin.

RECREATIONAL RESOURCES

Cold Springs landing is a popular recreation site for anglers, boaters, hunters, and snowmobilers. Area residents and visitors from out

of State use the area year-round for boat fishing, bank fishing, ice fishing, and other activities. The protected backwater and good bank access to the fishery make the site particularly valuable for non-boating anglers. The parking area is frequently filled to capacity (approximately 20 car/trailer spaces) during peak fishing and hunting season weekends. Although winter flows from the creek and springs make ice conditions at the site fairly changeable, the area is popular for snowmobiling and ice fishing. Open water generally persists in the boat channel from the landing almost to the railroad bridge.

PROJECT OBJECTIVES

INSTITUTIONAL FISH AND WILDLIFE MANAGEMENT GOALS FOR THE PROJECT AREA

Fish and wildlife management goals and objectives for the project area fall under those more broadly defined for the Upper Mississippi River Wildlife and Fish Refuge as a whole (Upper Mississippi River National Wildlife and Fish Refuge Environmental Impact Statement/Master Plan, 1988, U.S. Fish and Wildlife Service, Department of the Interior, North Central Regional Office, St. Paul, Minnesota). The management objective that most directly applies to the project area is:

Fisheries and Aquatic Resources

+ Maintain and enhance, in cooperation with the States, the habitat of fish and other aquatic life on the Upper Mississippi River.

Because the project area is within the Upper Mississippi River Wildlife and Fish Refuge, this management objective, together with additional input from State and Federal agency natural resource managers, was used to guide development of specific project objectives (presented in a subsequent section of this report).

PROBLEM IDENTIFICATION

Existing Habitat Conditions

Cold Springs habitat deficiencies include inadequate wintertime DO, loss of deep-water habitat, and, possibly, excessive aquatic vegetation.

Dissolved Oxygen - Low DO levels during winter months result in temporary migrations of fish from the Cold Springs backwater and documented fish kills. Forced movement of the fish from their preferred habitat may also affect fish mortality due to higher predation and/or a change in available food.

Suspected causes of low DO include the ice cover that prevents air/water oxygen transfer, the oxygen demand of bacteria and fungi decomposing dead vegetation and other organic matter, plant respiration, and the decrease in water volume due to sedimentation.

Monitoring during 1977, 1978, 1979, 1987, and 1988 by the WDNR shows that DO in the north lobe may reach critical levels of less than 1 mg/l as early as February 1 and remain critically low into March. DO levels in the south lobe reach levels well below 5 mg/l, the minimum desirable concentration; however, due to greater water depths and thermal stratification, it is believed that surface DO levels in the south lobe remain above those encountered in the north lobe.

DO in the boat channel remains relatively high because of the oxygenated inflow from Kettle Creek. However, wintertime mixing of this oxygenated water with the DO-deficient waters in Cold Springs is minimal because the relatively warm creek water tends to stratify and shunt directly out between the north and south peninsulas to the railroad bridge.

Fish die-offs, particularly involving gizzard shad, have been noted at Cold Springs, especially in the boat channel, during the winter months. The reason for these die-offs has not been fully determined. Kettle Creek

water entering the boat channel has adequate levels of DO and, in the winter, is warmer than the water in the backwater. Gizzard shad, which are temperature-sensitive and, at Cold Springs, near the northern limits of their range, may be attracted to the boat channel due to the warmer water and/or the high DO. The die-offs may be occurring because of thermal stress, overcrowding of fish in the boat channel with resultant shock, oxygen depletion, or some other unknown cause.

Sedimentation - Since the construction of the Burlington Northern Railroad causeway and creation of the locks and dams, the Cold Springs backwater has experienced significant sediment accumulation. Comparison of the Lock and Dam 9 flowage survey of 1937 (figure 5) and data collected by the WDNR in 1987 (figures 7 and 8) indicates that some areas have accumulated over 5 feet of sediment.

Although agricultural practices in the Cold Springs watershed currently are among the best in Wisconsin, information provided by the Soil Conservation Service (SCS) indicates that soil erosion due to agricultural practices in use prior to the mid-1960s could have contributed significantly to sedimentation of the backwater. Based on this information, it is estimated that sedimentation rates between the late 1930s and the 1960s could have been well over 1 inch per year.

Sedimentation in the backwater is currently estimated at between 0.15 and 0.30 inch per year and is attributed to a number of sources, including up to 0.1 inch per year from the Kettle Creek watershed. Plant and animal detritus also could be contributing significantly to sediment buildup. Other sources, although considered relatively insignificant, include fluctuation of the level of Pool 9 and wind setup across Pool 9, both of which cause sediment-laden Mississippi River water to enter the backwater. Another source is concurrent opposing flows through the railroad bridge caused by Kettle Creek water exiting the backwater through the boat channel via surface flow in the winter (when creek inflow is warmer than the ambient backwater) and via bottom flow in the summer (when

creek inflow is colder than the backwater) and being replaced by sediment-laden river water.

With the decrease in water depths due to sedimentation, a large portion of the backwater has become shallow enough to receive sufficient light penetration to support an abundant plant community.

The winter habitat suitability model for bluegill (Palesh and Anderson, 1990) requires 50 percent of the area to be 4+ feet deep for an optimal rating. Because 46 percent of the Cold Springs backwater is 4+ feet deep (59 percent of the south lobe and 31 percent of the north lobe), the suitability rating is very high, and depths are not a limiting factor.

Although USFWS Habitat Suitability Index (HSI) models do not use water depth as a criterion, DO and temperature are used and quite often are dependent on water depths. However, deepening the Cold Springs backwater by itself would probably not correct wintertime DO deficiencies. Summer water temperatures are acceptable; winter water temperatures are slightly below optimum. However, deepening likely would not affect winter temperatures to the extent that significant impacts on habitat suitability would result.

Vegetation - The density of the aquatic plant community in the Cold Springs backwater has increased due to nutrient-rich sediment and decreased water depths which allow light penetration to the bottom. Over 30 percent of the backwater now supports aquatic vegetation. Vegetation is used by fish for resting and cover. The USFWS HSI models for bluegill, black crappie, and northern pike indicate that current amounts of vegetation provide near ideal conditions for these species. However, this same vegetation might exacerbate wintertime DO problems.

Estimated Future Habitat Conditions

Without any project, it is anticipated that conditions in the Cold Springs backwater would remain basically the same as at present. Minor

amounts of sediment buildup, estimated at between 0.15 and 0.30 inch per year, would increase the area occupied by aquatic plants.

Inadequate levels of DO during the winter months would continue to be experienced, forcing fish to migrate from the backwater into the river and, perhaps, contributing to continued periodic die-offs.

PROJECT GOALS AND OBJECTIVES

The general goal was to improve the habitat for centrarchid fish species, while maintaining the value of the habitat for other indigenous species. At meetings between participating Federal and State agencies, the consensus was that DO sags during the winter were the limiting factor for habitat suitability. Subsequently, the project objective was specified as providing wintertime DO concentrations of at least 5 mg/l to a minimum of 25 percent of the 35-acre backwater area and ensuring that fish throughout the backwater have access to the area(s) with adequate DO.

Early in the planning process, consideration also was given to increasing the amount of deep-water habitat (areas over 8 feet in depth) in order to reduce the aquatic plant community and augment the volume of water, both to help the winter DO situation to some extent; however, as discussed below in PLANNING CONSTRAINTS, deepening was later dropped from the list of critical objectives. Similarly, reducing the rate of sedimentation was dropped, although impacts from sedimentation were given full consideration while framing alternatives.

ALTERNATIVES

PLANNING CONSTRAINTS

The Upper Mississippi River Land Use Allocation Plan prepared by the St. Paul District, Corps of Engineers, shows that the Cold Springs study area is owned and managed by the U.S. Fish and Wildlife Service. The Cold Springs backwater is part of the Upper Mississippi River Wildlife and Fish

Refuge, and the proposed project is consistent with the goals of the Refuge Master Plan.

There were several implicit and explicit criteria and constraints involved in the development and evaluation of alternatives for the Cold Springs project:

- Measures must retain public water access at Cold Springs and access from the Cold Springs backwater to the Mississippi River.

- Project design must take into consideration the rights-of-way of the Burlington Northern Railroad and Wisconsin State Highway 35. The Cold Springs EMP project will be coordinated with both the Burlington Northern Railroad and Wisconsin Department of Transportation (WDOT) to ensure that any project features that might possibly affect the railroad causeway or highway would be thoroughly scrutinized. At present, the only known plans are for the highway embankment to be reconstructed and the bridge over Kettle Creek replaced in 1992. Although the bridge will be widened and the embankment widened and its side slopes flattened during the highway project, the proposed work would not be incompatible with an EMP project in the Cold Springs backwater.

Once wintertime DO enhancement was identified as the primary focus, study participants weighed advantages and disadvantages of various ways of meeting the project objective of providing wintertime DO concentrations of at least 5 mg/l to a minimum of 25 percent of the 35-acre backwater area and ensuring that fish throughout the backwater have access to the area(s) with adequate DO.

The deepening option faced serious constraints: First, the existing deep-water habitat (46 percent 4 feet or more) is close to the 50-percent given a maximum rating in the winter habitat suitability model for bluegill developed by Palesh and Anderson; thus, there is no critical need for deepening. Furthermore, any dredging would have to avoid creating conditions that would encourage rough fish to overwinter in the project

area or prevent target fish from escaping during periods in which DO might fall below acceptable levels. Also, the USFWS stated that it would not conduct maintenance dredging. In addition, dredged material would likely be unsuitable for construction purposes and have to be placed in a permanent disposal site for which few acceptable candidates were identified.

Measures addressing the sedimentation problem were considered early in the study process. However, the current sedimentation rate is greatly reduced from the excessive rates which appear to have occurred prior to the mid-1960s. Therefore, it was concluded that there was no urgent need to significantly decrease the sedimentation rate further and no cost-effective means of doing so.

ALTERNATIVES IDENTIFIED

No single measure was identified that could fulfill the project objective of providing at least 5 mg/l to a minimum of 25 percent of the backwater and ensuring that fish throughout the backwater would have access to the area(s) with sufficient DO. Therefore, attention was given to formulating an alternative capable of meeting the project objective by combining a measure that could improve winter DO levels with a measure that could ensure fish access to the area(s) with adequate DO.

Several DO-enhancing measures and one access measure were identified. In addition, the no-action alternative was considered. Measures considered were:

- No action
- Culvert through railroad embankment
- Dredge backwater
- Capture springs, and pipe water to north lobe
- Tap Kettle Creek, and pipe water to north lobe
- Artesian wells
- Aerate the south lobe
- Aerate the north lobe

- Dredge fish access channel between north and south lobes
- Seasonally divert Kettle Creek into south lobe

ALTERNATIVES ELIMINATED FROM DETAILED EVALUATION

With the exception of the no-action alternative, criteria in evaluating a measure were technical feasibility, cost, and environmental factors. Technical feasibility considerations included practicability and the measure's capability of at least partially satisfying the project objective such that, in combination with a complementary measure, an alternative could be formulated that would fully meet the project objective. Cost considerations included initial costs and operation and maintenance costs (O&M) relative to projected gains in habitat value. Environmental factors included impacts on indigenous species and groundwater.

Based on the above criteria, the measures listed below were eliminated from detailed consideration early in the evaluation process:

Culvert through railroad embankment

This alternative would consist of a culvert through the Burlington Northern Railroad's causeway near the north end of the north lobe. Oxygenated river water would enter the north lobe through the culvert, mix with DO-deficient north lobe water, and exit through the railroad bridge.

This alternative was dropped because it would not, by itself, fulfill the project objective and because of practicability questions: The small head differentials between the north end of the north lobe and the railroad bridge made its functionality suspect; the portion protruding into the river would be subject to damage from ice floes and subject to blockage from debris; the introduction of turbid river water into the backwater might increase sedimentation; and introduced currents could have a negative impact on the species the project is intended to help.

Dredge backwater

This measure is based on the assumption that a greater volume of water would increase the supply of DO. This alternative was dropped from consideration, however, because the additional DO would not be sufficient to be effective and, thus, would not fulfill the project objective.

Capture springs, and pipe water to north lobe

This alternative would capture springs feeding into Kettle Creek and use a network of buried pipes to convey the captured flow through the Highway 35 bridge opening and into the north lobe. This alternative addresses the DO needs of the north lobe alone because, under extreme low-flow conditions, Kettle Creek lacks enough flow to allow spring capture sufficient for the DO needs of both lobes, much less to also provide continued flow in the creek channel downstream of the capture reach at the same time.

This alternative was dropped from consideration because: Site visits showed these springs individually produce very small flows; in excess of 50 individual springs might be required to supply the requisite total flow. The practicability of such a pipe network was questioned. Also, these springs are an integral part of the base flow of the creek. Removal of the volume required to oxygenate the north lobe would leave less than 1/2 cfs in the creek under low-flow conditions. This reduction could have a detrimental effect on the ecosystem of the creek downstream of the spring capture reach. Also, the reduced flow reaching the backwater would reduce the DO transfer that takes place at the boat channel-south lobe interface, exacerbating the south lobe's DO problems unless a complementary DO-enhancing measure was provided for the south lobe.

Tap Kettle Creek, and pipe water to north lobe

This measure would consist of a low-head dam approximately 1/2 mile upstream from the creek's confluence with Pool 9 (the elevation of the

site would provide the head to convey water through a pipeline to the north lobe), a perforated pipe buried in filter material in the creek bed, and a pipeline to carry the captured flow to the north lobe.

This alternative was dropped for many of the same reasons as were cause to reject the spring capture measure: Creek flow downstream of the low-head dam under low-flow conditions would be reduced to a point where the effect on the downstream ecosystem could be detrimental. The reduced creek flow also could exacerbate the south lobe's DO problems unless a complementary DO-enhancing measure was provided for the south lobe. Furthermore, there are questions whether the creek would silt in behind the low-head dam and whether the buried PVC pipe would avoid clogging for the project's 50-year life; if not, accumulated sediment would have to be dredged out and the filter material replaced or the pipe replaced.

Artesian wells

This alternative would involve drilling a number of wells in either or both lobes to oxygenate part of the Cold Springs backwater. Artesian pressure was assumed adequate to elevate well outflow a sufficient distance above the normal backwater level to aerate the outflow to 10 mg/l as it falls back into the pool, perhaps over baffles. The wells could be valved to shut off flow during summer months to avoid impacts on summer habitat suitability and to reduce groundwater depletion.

This alternative was dropped from consideration because of concerns regarding groundwater depletion and questions regarding performance (e.g., actual output would be uncertain until the wells were drilled, output might be reduced by well interference, and high iron content from the wells can result in a precipitate that can smother fish eggs).

ALTERNATIVES CONSIDERED IN DETAIL

The measures listed below were given more detailed consideration as described in the following EVALUATION OF ALTERNATIVES section:

- No action
- Dredge fish access channel between north and south lobes
- Aerate the south lobe
- Aerate the north lobe
- Seasonally divert Kettle Creek into south lobe

EVALUATION OF ALTERNATIVES

NO ACTION

With the no-action alternative, no project would be implemented using Federal funds. Future conditions with no action were described earlier in the ESTIMATED FUTURE HABITAT CONDITIONS section of this report. Essentially, inadequate DO would continue to occur during winter months, forcing fish to migrate from the backwater into the river and, perhaps, contributing to continued periodic fish kills. The no-action alternative would not fulfill the project objective.

ACTION ALTERNATIVES

Dredge fish access channel between north and south lobes

The north and south lobes contain deep areas semi-isolated from the boat channel, each other, and the Mississippi River by shallow depths off the tips of the north and south peninsulas (figure 8). A 4-foot-deep, 1,100-foot-long channel (figures 13 and 14) would provide ingress and egress for fish to and from both lobes to areas with sufficient DO. (An access channel would be particularly important if some complementary measure adopted to increase DO in either lobe should break down; large numbers of fish drawn into the area by the higher DO might be trapped and die from DO depletion without an escape route.)

It is anticipated that the estimated 1,300 cubic yards of dredging would be done mechanically with disposal on the north peninsula (excluding

the boat landing and parking area). The disposal capacity of the north peninsula would be increased by bulldozing or draglining a shallow depression and placing the excavated material around the perimeter of the peninsula to assist in confining the dredged material.

Vegetation on the north peninsula consists primarily of purple loosestrife, which has little value as wildlife cover or food; thus, its loss is not considered significant. Furthermore, provision would be made to revegetate the disposal site with more desirable species.

This measure would satisfy the fish access portion of the project objective but would not fulfill the DO enhancement portion and, therefore, is not a stand-alone alternative. However, this measure was retained for consideration in combination with complementary DO-enhancement measures to make composite alternatives that could completely fulfill the project objective of providing at least 5 mg/l DO to a minimum of 25 percent of the backwater and ensuring that fish throughout the backwater would have access to the area(s) with sufficient DO.

Aerate the south lobe

This measure would involve installation of a 3-horsepower (hp) single-phase electric motor powering a rotary blower feeding relatively low-pressure air into three 1 1/2-inch polyethylene lines fanning out into the south lobe (figure 15). Each line would have two 1/2-inch orifices, one at the end and one 250 feet from the end, and check valves to prevent inflow of water when the aerators were shut off. The electric motor and rotary blower would be placed in a pre-fabricated building on the north peninsula adjacent to the boat landing parking lot for access, elevated on pilings above expected flood levels, and surrounded by a 7-foot, barbed wire-topped fence to prevent vandalism (figure 16). Power would be supplied from Crawford Electric.

The aerator system would likely prevent freezing of areas in the south lobe, with the open water promoting oxygen transfer to the water.

By operating this system during the winter months, DO in the south lobe would be expected to remain at acceptable levels (i.e., 5 mg/l in at least 50 percent of the south lobe) all winter.

The open water is also likely to lower water temperatures compared to the insulating effects of snow-covered ice. This drop in water temperature could adversely affect suitability of the area for target fish species.

Although recreational users in this area are likely to be accustomed to changing ice conditions, the aerator system would add several areas of open water and thin ice. These areas would have to be barricaded or fenced in compliance with Wisconsin statutes.

This measure would satisfy the DO-enhancement portion of the project objective but would not fulfill the fish access portion. Combined with the fish access channel measure described above, this measure would make up a composite alternative that could completely fulfill the project objective of providing wintertime DO concentrations of at least 5 mg/l to a minimum of 25 percent of the 35-acre backwater area and ensuring that fish throughout the backwater have access to the area(s) with adequate DO. However, safety issues and O&M responsibilities were considered unacceptable by the USFWS and WDNR; therefore, this measure was dropped from further consideration.

Aerate the north lobe

The components of this measure (figures 16 and 17) and reasons for its elimination from further consideration are essentially identical to those of the "Aerate the south lobe" measure described above.

Seasonally divert Kettle Creek into south lobe

This measure would involve construction of a weir-type structure across Kettle Creek tying back into the Highway 35 embankment (figures 18-

21). The weir would divert essentially all creek flow during the winter (typically 2 to 3 cfs) into the south lobe via a 3-foot-deep, 300-foot-long channel. The rest of the year, the diversion would be stoplogged so that creek flows would overtop the weir and flow out the boat channel as at present. The weir would have an opening (stoplogged in the winter) to allow fish access to and from the creek.

This measure would require an estimated 1,600 cy of dredging. This dredged material would be placed on the north peninsula in the same manner as that proposed for the "Dredge fish access channel between north and south lobes" measure discussed earlier.

Diverting the warm creek water into the south lobe in the winter would relocate the area of open water and thin ice from the boat channel to the diversion channel and south lobe. This likely would result in the boat channel icing over earlier and, thus, affect wintertime boat access and bank fishing from the north peninsula. The WDNR has determined that fencing would not be required around the relocated open water; however, the State would request signs informing site visitors of possible changes in ice conditions.

The weir would raise stages upstream of the Highway 35 bridge less than 1 foot even during a major creek flood. The WDNR has advised the Corps of Engineers that, because stage increases under normal flow conditions would fall within existing Federal flowage easements (figure 22), additional easements would not be required.

This measure would not fulfill the project objective alone but, combined with the fish access channel measure described above, would make up an alternative that could fulfill the project objective of providing wintertime DO concentrations of at least 5 mg/l to a minimum of 25 percent of the 35-acre backwater area and ensuring that fish throughout the backwater have access to the area(s) with adequate DO. Because this measure would relocate but not increase the amount of open water and thin ice from the warm creek inflow, safety concerns associated with this measure are

remediable and acceptable. Based on a preliminary assessment, the USFWS did not express reservations regarding O&M with this alternative. Therefore, this composite alternative was proposed for implementation.

SUMMARY COMPARISON OF ALTERNATIVES

The following summarizes the evaluations of individual measures:

No action: Eliminated because it failed to meet the project objective even partially.

Culvert through railroad embankment: Eliminated because it would not meet the project objective and because practicability questions made feasibility doubtful.

Dredge backwater: Eliminated because it would not fulfill the project objective even partially.

Capture springs, and pipe water to north lobe: Eliminated because of practicability questions and detrimental impacts to the creek ecosystem downstream of the captured springs.

Tap Kettle Creek, and pipe water to north lobe: Eliminated because of practicability questions and detrimental impacts to the creek ecosystem downstream of the diversion.

Artesian wells: Eliminated because of questions regarding performance and concerns about groundwater depletion and possible smothering of fish eggs.

Dredge fish access channel between north and south lobes: This measure is not a stand-alone alternative because it would not fulfill the project objective alone. However, this measure was retained because it could be combined with complementary DO-enhancement measures to make up alternatives that would fulfill the project objective.

Aerate the south lobe: This measure would not fulfill the project objective alone but, combined with the fish access channel measure, would make up an alternative that could fulfill the project objective. However, safety issues and O&M responsibilities were unacceptable to the USFWS and WDNR; therefore, this measure was eliminated.

Aerate the north lobe: This measure would not fulfill the project objective alone but, combined with the fish access channel measure, would make up an alternative that could fulfill the project objective. However, safety issues and O&M responsibilities were unacceptable to the USFWS and WDNR; therefore, this measure was eliminated.

Seasonally divert Kettle Creek into south lobe: This measure would not fulfill the project objective alone but, combined with the fish access channel measure, would make up an alternative that could fulfill the project objective. Because a preliminary assessment showed that safety issues and O&M responsibilities would be within acceptable limits, this measure was retained for further consideration.

SELECTED PLAN WITH DETAILED DESCRIPTION/ DESIGN AND CONSTRUCTION CONSIDERATIONS

The only alternative that meets the fish access and DO-enhancement elements of the project objective and is acceptable to all participating agencies combines two measures, dredging a fish access channel into both lobes and seasonally diverting Kettle Creek into the south lobe.

Dredge fish access channel between north and south lobes

The north and south lobes contain deep areas semi-isolated from the boat channel, each other, and the Mississippi River by shallow depths off the tips of the north and south peninsulas (figure 7). In the winter, depending on ice thickness, either or both lobes could be completely cut

off. This measure would provide ingress and egress for fish to and from both lobes to areas with sufficient DO.

The proposed channel (figures 13 and 14) would be excavated to a depth of 4 feet below normal pool, with approximately 1 vertical (V) on 3 horizontal (H) side slopes and a bottom width of about 24 feet (in order to provide a width of 30 feet at a 3-foot depth for portable barge access). This channel would require excavation of 0 to 2 1/2 feet of material over approximately a 1,100-foot length, totaling an estimated 1,300 cubic yards of dredging. It is anticipated that dredging would be done mechanically in a two-step process, first loading onto a portable barge, then off-loading onto the north peninsula. Most likely, the contractor would excavate to the above dimensions and allow material along the sides to slump to its angle of repose, eventually ending up with a slightly decreased cross section that would be more than adequate for unimpaired fish movement.

The north peninsula (excluding the boat landing and parking area) would be prepared for dredged material disposal by bulldozing or dragging a shallow depression and placing the excavated material around the perimeter of the depression to assist in confining the dredged material. If future, more detailed survey data collected for the plans and specifications phase of the Cold Springs project show additional disposal capacity would be needed for the proposed dredging, an appropriate quantity of existing material could be excavated from the north peninsula. If the material has suitable engineering properties, it could be used for fill at the site of a proposed parking lot for a handicapped-accessible, shore fishing facility planned for construction in 1992 at the south end of the south lobe in conjunction with Highway 35 reconstruction and bridge replacement (figure 13).

Vegetation on the north peninsula consists primarily of purple loosestrife, which has little value as wildlife cover or food; thus, its loss is not considered significant. Furthermore, provision would be made to revegetate the disposal site with more desirable species.

A variation of the fish access channel measure considered during the planning process would add a 100-foot by 200-foot by 4-foot deep "hole" just west of the south peninsula. The purposes of the "hole" would be (1) to increase mixing of creek and south lobe waters and (2) to serve as a trap for sediment from Kettle Creek to prevent the south lobe from being choked off from the boat channel and to increase the lifetime of the fish access channel.

The "hole" could improve water exchange between the boat channel and south lobe during the spring, summer, and fall when creek flow would be directed down the boat channel as at present. However, there is no oxygen deficiency in the south lobe during those seasons. And, in the winter, when the proposed project would divert creek flow into the DO-deficient south lobe, the "hole" might "short-circuit" creek water back into the boat channel, which would reduce mixing and diminish the effectiveness of the diversion.

The "hole" would open up a shallow area where depths are less than 1 foot in places and would, to some unknown extent, intercept creek-borne sediment that otherwise could settle in the fish access channel. However, based on the current estimated sedimentation rate, the additional dredging would not be needed to ensure a 50-year project life for the fish access channel.

About 1,500 cubic yards of additional dredging would be needed which, combined with the approximately 2,600 cubic yards generated by construction of the fish access channel and diversion structure, would exceed the limited dredged material disposal capacity of the north peninsula and, thus, require development of new off-site disposal areas at considerable cost.

Because the "hole" would net few, if any, habitat benefits but would add substantial costs, it was not incrementally justifiable and was dropped from further consideration.

Seasonally divert Kettle Creek into south lobe

Diversion of Kettle Creek would require construction of a weir-type structure across the mouth of Kettle Creek between the north and south peninsulas, with wing walls tying back into the Highway 35 embankment (figures 18 and 19).

The structure would be interlocking sheetpile driven into the soil and stabilized with rock fill. The rock fill would be trapezoidal in cross section, with a 5-foot top width and side slopes of 1 V on 2 H on the upstream side and 1 V on 3 H on the downstream side (figure 20). The central weir of the structure would be at the normal Pool 9 level (620.0) to divert the typical wintertime creek flow of 2 to 3 cfs of 10 mg/l DO water into the south lobe, elevating an estimated 50 percent of the lobe's volume of water to 5 mg/l DO.

The north and south wing walls would have the same general cross section as the central weir, but with top elevations of 624.5 and 623.5, respectively, to keep flooding of the north and south peninsulas similar in frequency and severity to that at present (figure 19).

During the spring, summer, and fall, fish movement into and from the creek would be provided by a 2-foot-deep by 3-foot-wide "notch" in the central weir. In the winter, stoplogs would be removed from an opening in the south wing wall and installed in the "notch" to divert creek flow into a diversion channel carrying the oxygenated creek water into the south lobe. Wintertime fish movement to and from the creek would be via this diversion channel.

The opening in the south wing wall would be stoplogged in the spring, summer, and fall to prevent creek flow into the south lobe when there is a greater risk of thunderstorms and their resulting large discharges and sediment loads in Kettle Creek.

The diversion channel would be approximately 3 feet deep (bottom elevation 617.0) and 300 feet long. It would be constructed with equipment mounted on portable barges. Dredging would proceed from the south lobe, requiring barge access from the boat channel into the south lobe. This barge access route would become part of the fish access channel between the north and south lobes; therefore, an estimated 300 cy for the barge access route could be deducted from the 1,300 cy estimate for the fish access channel and charged against the Kettle Creek diversion feature. In addition, another 1,300 cy dredging would be needed for the diversion channel and weir construction. Thus, the proposed project would generate a total of about 2,600 cy dredging, 1,600 cy for the diversion feature and 1,000 cy for the fish access feature. All dredged material would be placed on the north peninsula as discussed earlier for the fish access channel.

Larger creek discharges would overtop the weir and flow down the boat channel and out through the railroad bridge as at present. To minimize scour downstream of the weir, a rock fill toe would extend 5 feet downstream from the base of the central weir at the current bed elevation of approximately 617.0, and a 1 V on 3 H extension of this toe would be embedded 3 feet below the present creekbed (figure 20). In addition, rock fill protection would be provided for the banks of both the north and south peninsulas for a distance of 16 feet downstream from the base of the central weir (figures 19 and 21).

It is expected that turbulence in larger runoff events would keep creek sediment in suspension and carry the sediment over the weir and out the boat channel, alleviating the need for a sediment trap or periodic dredging upstream of the weir. The rock fill of the diversion structure and toe and bank protection would provide about 1,250 sf of more stable and diverse bottom habitat than currently exists in the boat channel.

Analyses of flood discharges and stages in the vicinity of the Highway 35 bridge (conducted by a consultant to the WDOT) were supplemented by weir analyses by the Corps of Engineers to determine the effects

of the proposed structure on upstream water surface elevations. The effect of the weir on stages upstream of the Highway 35 bridge would range from zero during low Kettle Creek flows to less than 1 foot even with a 100-year creek runoff event, estimated at 2,300 cubic feet per second. The results below show that, with a 100-year creek flood, the weir would increase stages upstream of the Highway 35 bridge by 0.9 foot when Pool 9 is at a low (normal) level and 0.6 foot with a coincident 5-year flood on the Mississippi River. Properties subject to these minor stage increases include the Highway 35 embankment and bridge approaches and land adjacent to the creek just upstream of the highway bridge.

	Condition on the Mississippi River:	
Water surface elevation ...	Normal pool	5-year flood
of Mississippi River (1912 MSL)	619.5	625.2
upstream of railroad bridge	621.3	625.3
upstream of diversion structure	625.3	625.8
upstream of Highway 35 bridge ...		
with diversion structure in place	625.4	625.1
without diversion structure	624.5	625.5
Difference	+0.9	+0.6

The WDNR has advised the Corps of Engineers that, because stage increases under normal flow conditions would fall within existing Federal flowage easements (figure 22), no additional easements would be required. However, a permit would be required for the diversion structure under Wisconsin Statute 30.12, which covers placement of structures in navigable waters, and a "permit" would be acquired from the WDOT to tie the wing walls into the highway embankment.

Diversion of the warm creek inflows would relocate the area of open water and thin ice from the boat channel to the diversion channel and south lobe but would not be expected to significantly change the size of the area. Therefore, this measure does not introduce a new danger to site visitors; indeed, recreational users in this area are likely to be accustomed to changing ice conditions. The WDNR has advised the Corps of Engi-

neers that Wisconsin statutes would not require fencing in this situation; however, the State would request that the USFWS place signs at access points to inform site visitors of possible changes in ice conditions.

Diverting the warm creek water into the south lobe would likely result in the boat channel icing over earlier in the winter. Wintertime bank fishing in the boat channel from the north peninsula would also be affected by freeze-up of the channel once diversion takes place. The WDNR has advised the Corps that the schedule for the creek diversion would consider the needs of bank fishermen and boaters but would be driven by biological and chemical (DO) needs in the south lobe.

Habitat evaluation

The USFWS's Habitat Evaluation Procedure (HEP) was used to quantify the habitat benefits of the two measures making up the selected alternative. HEP uses a Habitat Suitability Index (HSI) to rate habitat quality on a scale from 0 to 1 (1 being optimum). The HSI is multiplied by the number of acres of available habitat to obtain Average Annual Habitat Units (AAHUs). One AAHU is defined as one acre of optimum habitat. By comparing existing AAHUs to the number of AAHUs expected after the proposed action, outputs of proposed action(s) can be quantified.

Two centrarchid species models (bluegill and crappie) were reviewed in an initial evaluation of HSI values. These models indicated that the Cold Springs backwater provides suitable habitat for the species. However, the USFWS models do not contain variables allowing for consideration of winter habitat conditions. Therefore, a modified model for bluegill developed by Palesh and Anderson, 1990, was also used. Since habitat requirements for both selected species are similar, it was decided to use the modified bluegill model to represent conditions in the area.

Based on available information, the following assumptions were used in the HEP evaluation:

1. Due to the configuration of the backwater, the north and south lobes can be treated separately in determining habitat suitability.

2. Water depths in the area proposed for fish access channel dredging range from 1-1/2 to 4 feet at normal pool elevations. It is assumed that under certain conditions (e.g., with ice cover), the shallower depths could prevent fish from migrating to areas with sufficient DO during the winter months.

3. From a physical standpoint, not considering DO sags, habitat conditions in the Cold Springs backwater are satisfactory, with overall HSI values of 0.82 for the north lobe and 0.84 for the south lobe.

4. DO depletion is the primary limiting factor in the backwater area. Using the modified bluegill model which takes winter conditions into consideration, HSI values for the backwater were calculated to be 0.10 for both the north and south lobes.

5. Construction of a diversion structure directing Kettle Creek inflows into the south lobe would have to be completed before appreciable benefits would be realized from a fish access channel between the deep areas of the north and south lobes. Therefore, the incremental cost for the diversion structure includes the cost of dredging an equipment access route (which eventually would be converted into part of the fish access channel) from the boat channel into the south lobe. This decreases the incremental cost for the fish access channel.

Based on the above assumptions, an analysis compared benefits (in terms of AAHUs) which would be realized, associated first and annualized costs for construction, annual costs for operation and maintenance, and overall annual cost per AAHU for both measures of the selected alternative (see Appendix A for detailed cost breakdowns). Results of this analysis are shown in table 2 and on figure 23.

Table 2
INCREMENTAL ANALYSIS

	EXISTING		PROJECT INCREMENT			
			DIVERSION		DREDGE ACCESS	
	North	South	North	South	North	South
Composite HSI	0.10	0.10	0.10	0.90	0.29	0.90
Habitat Units (North lobe = HSI * 16) (South lobe = HSI * 19)	1.60	1.90	1.60	17.04	4.57	17.04
Average Annual Habitat Unit (AAHU) Increase	N/A	N/A	0.00	15.14	2.97	0.00
AAHU Increase (Total backwater)		N/A		15.14		2.97
Estimated Initial Cost		N/A		$311,000		$33,000
Estimated Cost/Year (Interest & Amortization)		N/A		$27,600		$2,900
Estimated O&M/Year		N/A		$900		$0
Total Average Annual Cost		N/A		$28,500		$2,900
Estimated Cost/Year/AAHU		N/A		$1,880		$980

Note: Interest and amortization are based upon a 50-year life and an 8-3/4 percent discount rate.

The AAHUs gained and incremental costs per AAHU for both measures of the selected alternative are:

Kettle Creek diversion:	15.14 AAHUs	@	$1,880 per AAHU
Fish access channel:	2.97 AAHUs	@	$980 per AAHU

ENVIRONMENTAL EFFECTS

RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS

An environmental assessment was conducted for the selected alternative; a discussion of the impacts follows. As specified by Section 122 of the 1970 Rivers and Harbors Act, the categories of impacts listed in the environmental impacts matrix (table 3) were reviewed and considered in arriving at the final determination. In accordance with Corps of Engineers regulations (33 CFR 323.4(a)(2)), a Section 404(b)(1) evaluation was prepared (Appendix B). Water quality certification under Section 401 of the Clean Water Act was granted by the State of Wisconsin by letter dated December 14, 1990 (Appendix C, Section C-2). The Finding of No Significant Impact (FONSI), which immediately follows the RECOMMENDATIONS section of this report, was signed after the public review period elapsed, issues were resolved, and the water quality certification was obtained.

The proposed action would comply with all applicable Federal environmental laws, executive orders, and policies, and State and local laws and policies including the Clean Air Act, as amended; the Clean Water Act of 1977 (with acquisition of the water quality certification); 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; Executive Order 11988 - Floodplain Management; and Executive Order 11990 - Protection of Wetlands.

Table 3

ENVIRONMENTAL 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 EFFECTS							
1. Historic Architectural Values				X			
2. Prehist & Historic Archeological Values				X			

NATURAL RESOURCE EFFECTS

Kettle Creek provides an estimated base inflow in the winter of 2 to 3 cfs to the Cold Springs backwater. However, mixing of this oxygenated water with that of the backwater is minimal. Due to the configuration of the backwater and boat channel, the relatively warm creek water tends to stratify and shunt directly out through the railroad bridge. The proposed project would improve fish habitat in the Cold Springs backwater by diverting the oxygenated water of Kettle Creek into the south lobe of the backwater during the winter. This would promote mixing and provide at least 50 percent of the south lobe (and over 25 percent of the entire backwater) with DO concentrations greater than 5 mg/l during the winter. A dredged access channel between deepwater areas of the north and south lobes would insure that fish throughout the backwater have access to the high DO areas.

Diversion of Kettle Creek inflows into the south lobe during the winter would change flow and ice conditions in the backwater. The boat channel, which currently remains ice-free for a majority of the winter, would freeze over earlier. In contrast, the diverted creek water would keep a portion of the south lobe ice-free. The warmer creek water mixing with that of the backwater should raise temperatures in the backwater slightly, which would increase the area's suitability for centrarchid and other fish species.

The proposed project would result in some short-term disturbances from construction activities. Clearing and preparation of the dredged material disposal site would eliminate the vegetation on the north peninsula. However, this area is heavily vegetated with purple loosestrife (Lythrum salicaria), a species of very little value to wildlife, and the impacts of construction should, therefore, be only minimal. After the dredged material consolidated sufficiently, the area would be planted with native plants and grasses, providing an area more suitable to wildlife than under current conditions.

Construction of the diversion structure and toe and bank protection would cover and eliminate approximately 1,100 sf of benthic habitat. However, the loosely consolidated silt substrate that currently exists provides habitat only minimally suited for benthic organisms. The diversion structure and toe and bank protection would provide approximately 1,250 sf of rock fill substrate which would provide a much more stable and diverse habitat than currently exists.

Any benthic organisms in the areas proposed for placement of the diversion structure and dredging would be eliminated, but would be expected to quickly recolonize these areas once construction was complete. Mobile species would temporarily migrate from the immediate project area during construction.

Construction activities would temporarily suppress use of the area by birds and other wildlife.

The proposed project would not have any long-term detrimental effects on wildlife, birds, fish, aquatic macrophytes, benthic organisms, plankton, or nekton in the project area.

WATER QUALITY EFFECTS

The following summarizes the effects of the proposed project on water quality. A more detailed discussion can be found in the Section 404(b)(1) evaluation in Appendix B.

There would be short-term adverse effects on water quality due to construction activities, but the long-term effects would be beneficial. Dredging of the diversion and access channels, dredged material placement, and construction of the diversion structure would all cause short-term, localized increases in turbidity and suspended solids. Conditions would quickly return to normal when construction activities cease.

Core samples from several areas of the backwater have been analyzed. Bulk chemical analysis indicates that contaminants of concern are comparable to other fine backwater sediments of the Upper Mississippi River. Concentrations of the parameters tested were fairly evenly distributed between the bottom and top layers of the core samples taken. In the sample collected in the area of the proposed fish access channel, copper concentrations were detected at levels between 60 and 66 milligrams per kilogram (mg/kg), higher than normal for Upper Mississippi River backwater sediments. Pesticides and PCBs were not present in detectable concentrations.

Because dredging would be done mechanically and relatively low levels of metals and organics have been detected in the sediment, the potential for significant bioaccumulation as a result of dredging is low.

THREATENED AND ENDANGERED SPECIES EFFECTS

A biological assessment of the proposed project was completed to determine the potential effects on the following species: Higgins' eye pearly mussel (Lampsilis higginsi), peregrine falcon (Falco peregrinus), bald eagle (Haliaeetus leucocephalus), and osprey (Pandion haliaetus). The peregrine falcon and Higgins' eye pearly mussel are Federally- and State-listed endangered species. The bald eagle is a Federally- and State-listed threatened species. The osprey is listed by the State of Wisconsin as threatened. Individuals of these species would not be affected by the proposed project.

No nesting sites for the peregrine falcon, bald eagle, or osprey are known to exist in the immediate vicinity of the Cold Springs backwater. However, the peregrine falcon, bald eagle, and osprey may be sighted in the area during migration and may use adjacent areas for roosting.

The Higgins' eye pearly mussel, although known to be present in Pool 9 of the Upper Mississippi River, is not known to occur in the backwater.

The silty substrate and lack of flows in the project area do not provide suitable habitat for this species.

The proposed project has been coordinated with the USFWS which concurs with the determination that the proposed project would not affect Federally-listed endangered or threatened species.

CULTURAL RESOURCE EFFECTS

All project-related activities would take place within the confines of the backwater area and would have no impact on cultural resources. The mound groups are all in upland areas and would not be affected by the placement of dredged material in the proposed lowland areas.

SOCIOECONOMIC EFFECTS

The proposed project would have no appreciable effects on social or economic parameters.

RECREATIONAL EFFECTS

Diverting the winter flow of Kettle Creek into the south lobe of the backwater would benefit recreation as a by-product of improving the fish and wildlife habitat at Cold Springs. New flow patterns would change the locations of open water and bank-fishing areas during the winter, however. The diverted creek flow would cause the boat channel (which provides an open water fishing area under current conditions) to freeze over earlier. The diverted flow would create a new open water area in the south lobe of the backwater. Anglers using the site are accustomed to variability in ice conditions, so changes in open water locations are not expected to discourage recreational use or to increase safety concerns to an unacceptable degree. The WDNR has advised the Corps of Engineers that fencing around the open water would not be required; however, the State would request that the USFWS place signs at access points to inform site visitors of possible changes in ice conditions.

During project construction, recreation in the area could be disrupted. Negative impacts caused by the temporary inconvenience or loss of the recreation resource would be offset by the long-term improvements for habitat and recreation.

The proposed project would have minor negative impacts on the aesthetics of the area. The rock fill-covered weir, diversion channel, and the disposal area on the north peninsula would appear more structured than existing conditions at the site. Weathering and eventual plant growth on the rock fill would lessen the visual impact of the structure over time. The disposal area would be planted with native plants and grasses suitable for the site.

SUMMARY OF PLAN ACCOMPLISHMENTS

The proposed project would effectively fulfill the project objective of providing wintertime DO concentrations of at least 5 mg/l to a minimum of 25 percent of the 35-acre backwater area and ensuring that fish throughout the backwater have access to the area(s) with adequate DO. The projected measurable accomplishments of the proposed project are shown in table 4.

OPERATION, MAINTENANCE, AND REHABILITATION

Upon completion of construction, the USFWS would accept responsibility for O&M of the Cold Springs project in accordance with Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662. An operation and maintenance manual detailing requirements would be prepared by the Corps in coordination with the USFWS and WDNR during the plans and specifications phase.

Rehabilitation costs would be the responsibility of the Corps of Engineers. Rehabilitation is considered reconstructive work that signifi-

Table 4
PROJECT GOALS, OBJECTIVES, AND ENHANCEMENT FEATURES

Objective	Project Accomplishment	Potential Enhancement Feature	Units	Enhancement Potential		
				Existing	Future Without	Future With
Provide winter minimum of 5 mg/l DO to 25%+ of backwater	Provides at least 5 mg/l DO to over 25% of backwater (50% of south lobe) during winter	Diversion of Kettle Creek flows into south lobe during winter	mg/l	Winter DO under 5 mg/l throughout backwater	Winter DO under 5 mg/l throughout backwater	Provides at least 5 mg/l DO to over 25% of backwater (50% of south lobe) during winter
Ensure that fish throughout backwater have access to areas with adequate DO	Ensures that fish throughout backwater have access to oxygenated area of south lobe	Dredged access channels between deepwater areas of north and south lobes	Water depth	Depths under 2 ft between north and south lobes and river	Depths under 2 ft between north and south lobes and river	Ensures that fish throughout backwater have access to oxygenated area of south lobe

cantly exceeds the annual operation and maintenance requirements identified in this Definite Project Report and which would result from major storm or flood events.

O&M activities are briefly described below. The estimated average annual O&M costs for this project are shown in table 5.

Table 5
ESTIMATE OF ANNUAL OPERATION AND MAINTENANCE COSTS

Item	Unit	Quantity	Unit price	Amount
Setting stoplogs	job	2	$180[a]	$360
Riprap replacement	cy	10	$50	$500
				$860
				say $900

[a] (1 man-day/job x 8 hr/man-day x $10/hr x 2 (OH rate)) + (80 miles/job x $0.25/mile) = $180/job

OPERATION

1. Seasonally changing stoplogs between the "winter setting" and the "spring/summer/fall setting."

a. With the winter setting, stoplogs would be removed from the diversion slot in the south wing wall and inserted into the fish notch in the middle of the weir (figure 19). This would divert most creek inflows into the south lobe via the diversion ditch. A suggested winter-setting date of about mid-December could vary from year to year.

b. With the spring/summer/fall setting, stoplogs would be removed from the fish notch and inserted into the diversion slot. This would prevent direct creek flow into the south lobe under normal flows and allow fish movement through the weir between the backwater and creek. A proposed spring/summer/fall-setting date of about mid-March is approxi-

mate; the date should be late enough to avoid a late winter DO drop dangerous to the fish, but early enough to avoid a major spring rainfall which could result in inadvertently diverting a large creek discharge and sediment load into the south lobe.

2. Signs must be posted at access points to improve recreational user awareness of the project-related changes in and the variability of ice conditions.

MAINTENANCE

1. Minor amounts of settling and breakup of the rock fill protecting the weir sheetpile are normal and would require occasional replacement. Replacement rock fill may be hauled by truck and placed by equipment stationed on the Highway 35 bridge or the public boat landing parking area.

2. Based on statements from the USFWS, maintenance dredging of the diversion and fish access channels would not be performed during the 50-year project life. The channel would continue to perform its function even if sedimentation occurred at the current estimated rate of 0.15 to 0.3 inch per year (which would reduce channel depths by 7 1/2 to 15 inches over 50 years).

PROJECT PERFORMANCE EVALUATION

A monitoring plan for project evaluation purposes (table 6) was developed to directly measure the degree of attainment of the two-part project objective; i.e., (1) providing wintertime DO concentrations of at least 5 mg/l to a minimum of 25 percent of the backwater area and (2) ensuring that fish throughout the backwater have access to the area(s) with adequate DO.

Table 6

RECOMMENDED ALTERNATIVE AND EVALUATION PLAN

Objective	Recommended Project Feature	Enhancement Potential	Unit of Measure	Monitoring Plan	Monitoring Interval	Projected Cost per Effort
Provide winter minimum of 5 mg/l DO to 25%+ of backwater	Diversion of Kettle Creek flows into south lobe during winter	Provides at least 5 mg/l DO to over 25% of backwater (50% of south lobe) during winter	mg/l	Monitor DO semi-weekly at selected sites from ice-up to ice-out	First, third, and fifth years	$3,000
Ensure that fish throughout backwater have access to areas with adequate DO	Dredged access channels between deepwater areas of north and south lobes	Ensures that fish throughout backwater have access to oxygenated area of south lobe	Water depth	Measure water depths in fish access channel	Fifth and tenth years	$2,000

COST ESTIMATE

Table 7 shows the costs of the recommended plan. (Appendix A presents detailed construction and contingency estimates by account code.) Contingencies are included for uncertainties in work items, quantities, and unit costs. First cost subtotals and totals are rounded to the nearest $1,000.

Table 7

ESTIMATED FIRST AND ANNUAL COSTS

FIRST COSTS:

Item	Unit	Quantity	Unit cost	First cost
Mobilization & demobilization	job	1	$35,000	$35,000
Rock fill	cy	800	30	24,000
Sheetpile	sf	2,700	19	51,300
Stoplogs	job	1	2,000	2,000
Mechanical dredging, site preparation, excavation, disposal	cy	2,620	13	34,100
Seeding	ac	0.75	3,000	2,300
Engineering & design	job	1	102,700	102,700
Construction administration	job	1	12,800	12,800
Subtotal				$264,000
Contingencies				80,000
Total first cost				$344,000

ANNUAL COSTS:

O&M (Installation and removal of stoplogs, maintenance of rock fill)	900

The construction activities and habitat improvements would be conducted within the Upper Mississippi River Wildlife and Fish Refuge on lands managed as a national wildlife refuge. Therefore, in accordance with Section 906(e)(3) of the Water Resources Development Act of 1986, first costs for construction would be 100-percent Federal and would be borne by the Corps of Engineers.

REAL ESTATE REQUIREMENTS

With one exception, construction features of the proposed project would be located on land owned by the USFWS and managed as part of the Upper Mississippi River National Wildlife and Fish Refuge. The exception would be the wing walls tying the diversion structure back into the Highway 35 embankment for which a permit would be acquired from the WDOT.

The effect of the weir on stages upstream of the Highway 35 bridge would range from zero during low Kettle Creek flows to less than 1 foot with a 100-year flow. Properties subject to minor stage increases include the Highway 35 embankment and bridge approaches and land adjacent to Kettle Creek just upstream of the highway bridge. Because stage increases under normal flow conditions would fall within existing Federal flowage easements (figure 22), the WDNR has advised the Corps of Engineers that no additional easements would be required.

SCHEDULE FOR DESIGN AND CONSTRUCTION

The schedule of project completion steps follows:

Requirement	Schedule
Submit final Definite Project Report to North Central Division, US Army Corps of Engineers and participating agencies	Mar 1991
Submit final Definite Project Report to Headquarters, US Army Corps of Engineers	Apr 1991
Obtain plans and specifications funds	May 1991
Obtain construction approval by Assistant Secretary of the Army (Civil Works)	Sep 1991
Completion of plans and specifications	Nov 1991
Advertise for bids	Dec 1991
Contract award	Jan 1992
Complete construction	Sep 1992

IMPLEMENTATION RESPONSIBILITIES

The Memorandum of Agreement (included in Appendix C, Section C-1) formally establishes the relationships between the Department of the Army, represented by the Corps of Engineers, and the USFWS in constructing, operating, and maintaining the proposed Cold Springs project.

The Corps of Engineers, St. Paul District, is responsible for project management and coordination with participating and interested governmental bodies and other publics. Project management includes procuring project funds, preparing the Definite Project Report and meeting National Environmental Policy Act (NEPA) requirements, preparing plans and specifications, advertising and awarding the construction contract, and conducting contract supervision and inspection. The Federal Share of major rehabilitation (e.g., as a result of a specific storm or flood event) that exceeds anticipated, normal annual maintenance requirements would be the responsibility of the Corps of Engineers.

The USFWS ensures that project features are compatible with the objectives and management strategies of the Upper Mississippi River National Wildlife and Fish Refuge and that the project is operated and maintained as described earlier in the OPERATION, MAINTENANCE, AND REHABILITATION section of this report.

The WDNR provides technical data and advisory assistance during all phases of project development and acts as the non-Federal sponsor.

COORDINATION, PUBLIC VIEWS, AND COMMENTS

The proposed project has been coordinated with the Wisconsin and Iowa DNRs, WDOT, the USFWS, the Wisconsin State Historic Preservation Office, the Wisconsin State Archaeologist, and the National Park Service.

Appendix C, Section C-1, includes letters of intent from the USFWS and WDNR and the Memorandum of Agreement which outlines the respective

areas of project responsibility for the Corps of Engineers and USFWS (discussed in more detail in the IMPLEMENTATION RESPONSIBILITIES section of this report).

Appendix C, Sections C-2 and C-3, present letters received from agencies and individuals in response to the draft report. Appendix C, Section C-4, contains materials related to the public hearing held December 18, 1990. Appendix C, Section C-5, lists Congressional interests; Federal, State, and local agencies; special interest groups; individual citizens; and others who received a copy of the draft Definite Project Report/Environmental Assessment and/or the Public Notice.

CONCLUSIONS

The Cold Springs habitat rehabilitation and enhancement project presents an opportunity to improve a fish habitat which, at present, suffers wintertime DO deficiencies which stress resident fish and force them to emigrate to areas with adequate DO or cause them to perish if ice conditions and existing areas of shallow water prevent escape.

Numerous measures aimed at correcting the DO problem and ensuring fish access to areas with sufficient DO were considered. The recommended project consists of two components: The first, diversion of wintertime Kettle Creek flows into the south lobe of the backwater, deals directly with DO shortages. The second, providing a fish access channel between deep areas of the north and south lobes, guarantees freedom of movement for fish from areas with inadequate DO to areas with sufficient DO.

The habitat enhancement which would be gained by the Upper Mississippi River System from implementation of the recommended project justifies expenditure of public funds for preparation of plans and specifications and construction.

RECOMMENDATIONS

I have weighed the accomplishments to be obtained from this habitat improvement project against its cost and have considered the alternatives, impacts, and scope of the proposed project. A weir-type structure and diversion channel will be constructed near the mouth of Kettle Creek to correct the existing wintertime DO deficiency, and a fish access channel will be dredged between the north and south lobes of the Cold Springs backwater. In my judgment, the cost of the proposed project to enhance the fish habitat is a justified expenditure of Federal funds. I recommend that higher authority approve construction of the habitat rehabilitation and enhancement features of the Cold Springs, Wisconsin, project at a total estimated construction cost of $344,000, which amount would be a 100-percent Federal cost according to Section 906(e)(3) of the 1986 Water Resource Development Act.

Roger L. Baldwin
Colonel, Corps of Engineers
District Engineer

Environmental Resources Branch
Planning Division

FINDING OF NO SIGNIFICANT IMPACT

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

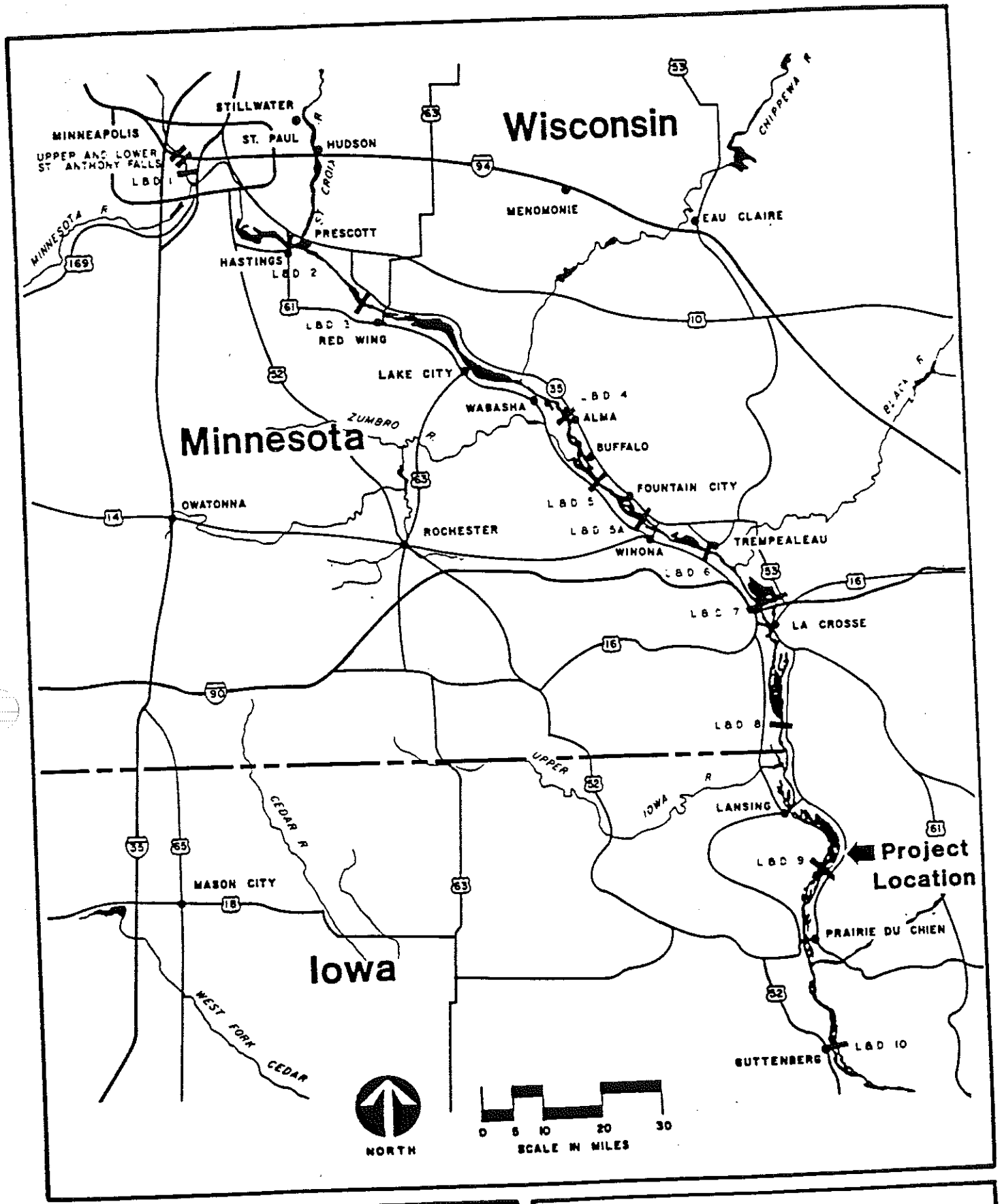
COLD SPRINGS REHABILITATION
POOL 9, UPPER MISSISSIPPI RIVER
CRAWFORD COUNTY, WISCONSIN

The intent of the proposed project is to improve fish habitat in the Cold Springs backwater by reducing periods of low dissolved oxygen levels during the winter months and providing access for fish between areas of deep water in the backwater. This Finding of No Significant Impact is based on the following factors: The proposed project would have only minor and short-term impacts on wildlife resources; the proposed project would have beneficial impacts on the fisheries resources; the proposed project would have no impact on the cultural environment; the proposed project would have minor and short-term impacts on the social environment; the project would have only minor and short-term impacts on the aesthetic/ recreation environment; and continued coordination will be maintained with appropriate State and Federal agencies.

The environmental review process indicates that the proposed action does not constitute a major Federal action significantly affecting the quality of the environment. Therefore, an environmental impact statement will not be prepared.

11 Apr 91
Date

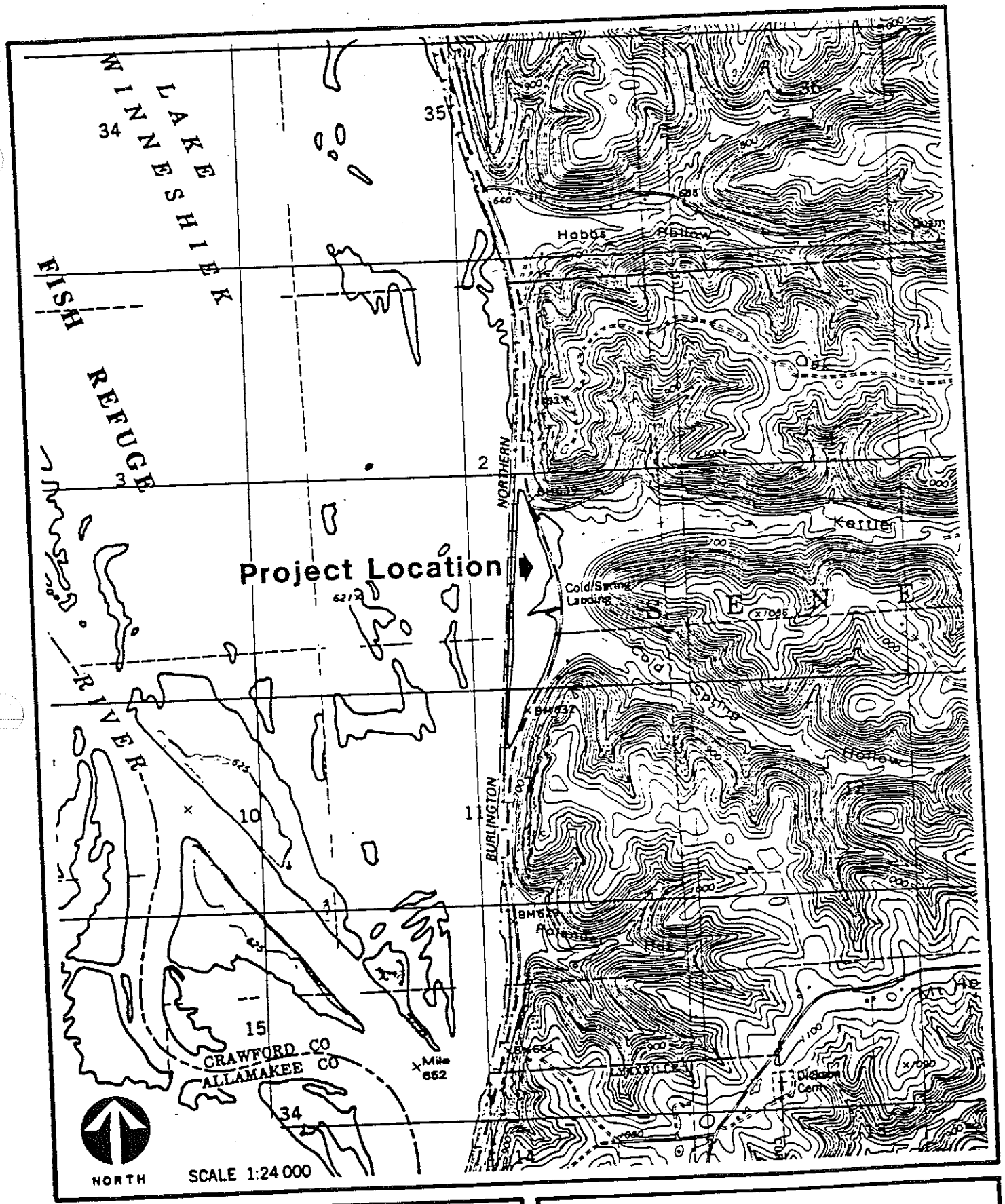
Roger L. Baldwin
Colonel, Corps of Engineers
District Engineer



Upper Mississippi River System
Environmental Management Program

General Area Map
Cold Springs
Pool 9 Mile 654

Figure 1

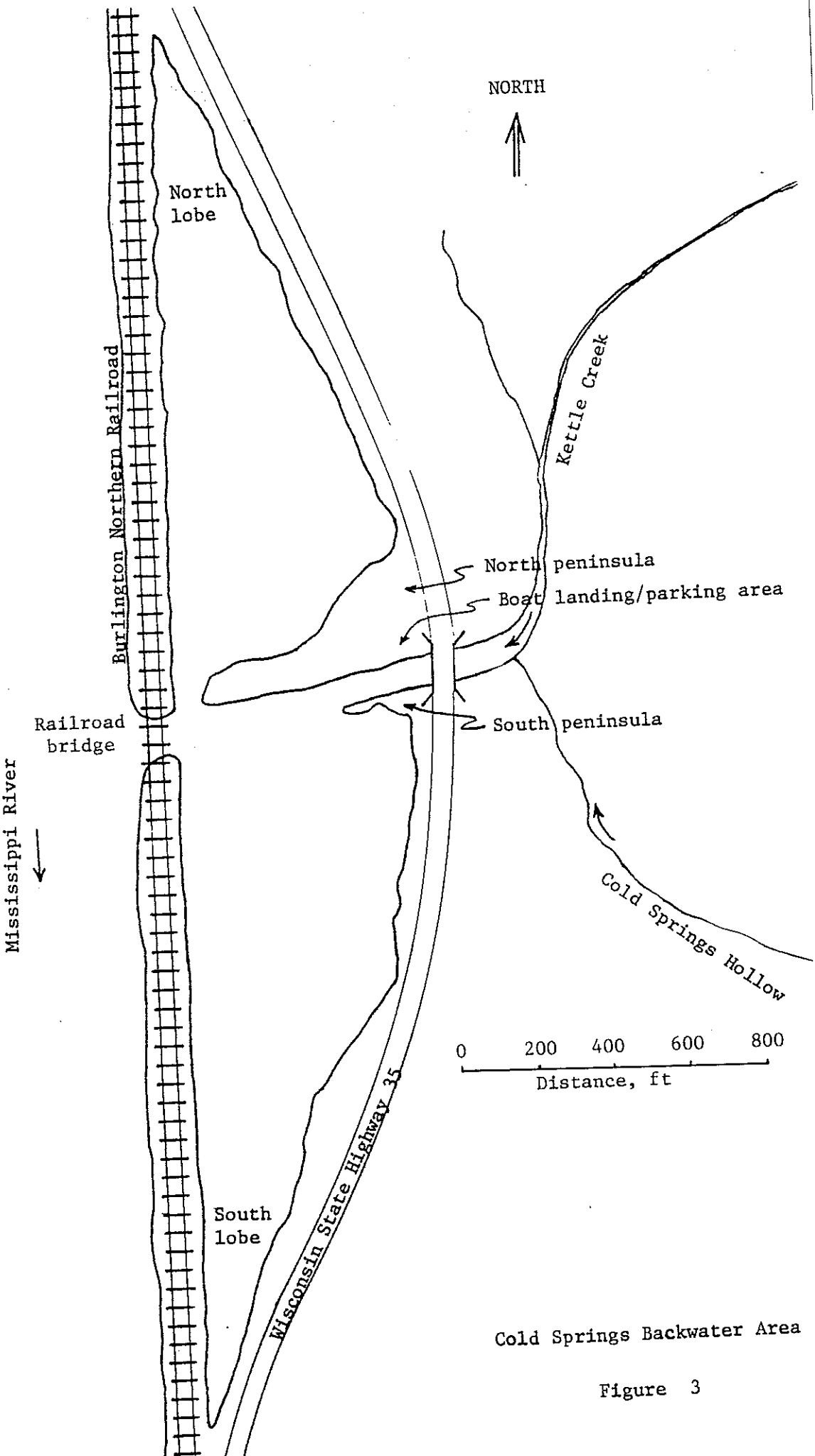


Upper Mississippi River System
Environmental Management Program

Project Area Map

Cold Springs
Pool 9 Mile 654

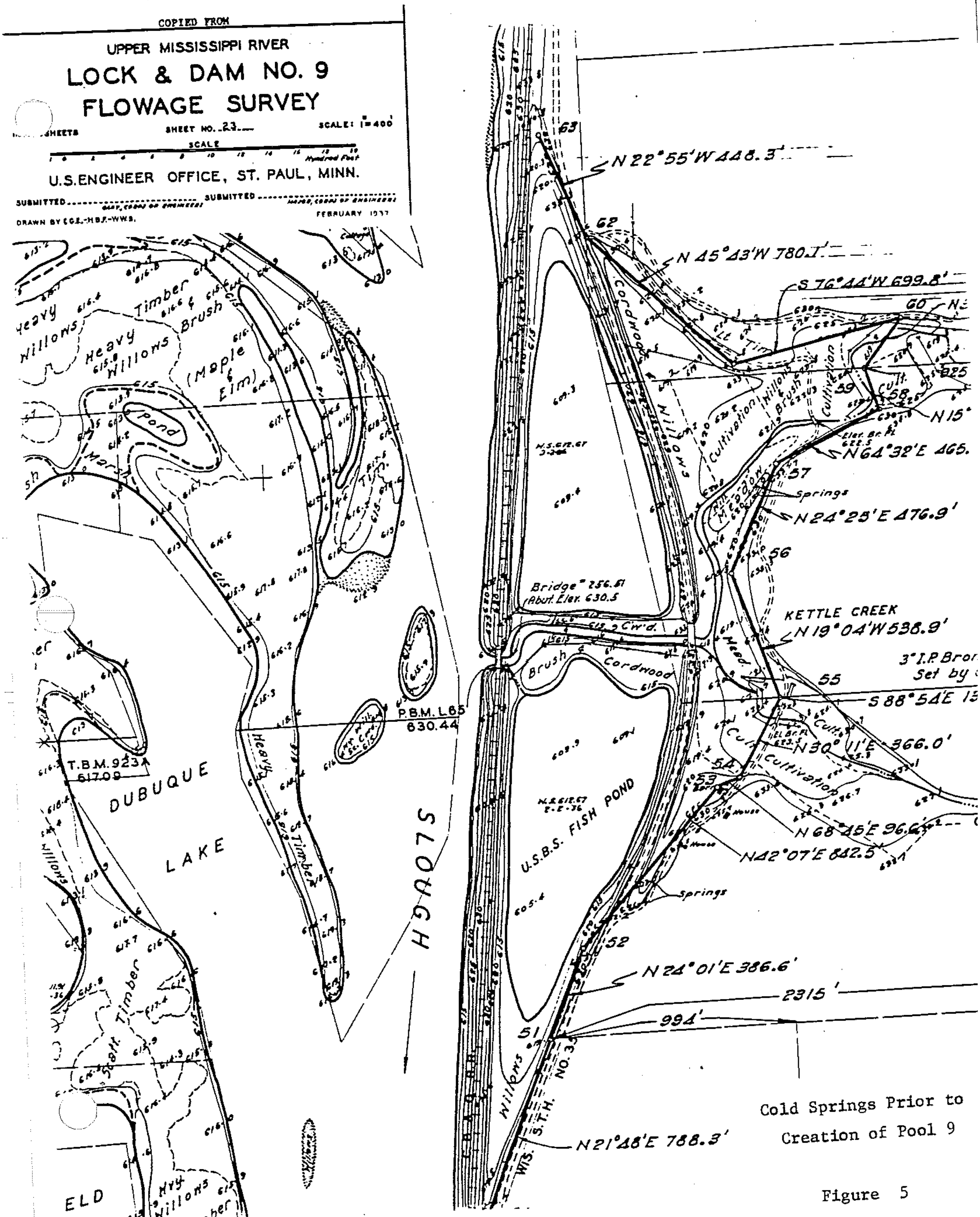
Figure 2



Cold Springs Backwater Area

Figure 3

Figure 4 Photograph of Cold Springs Backwate

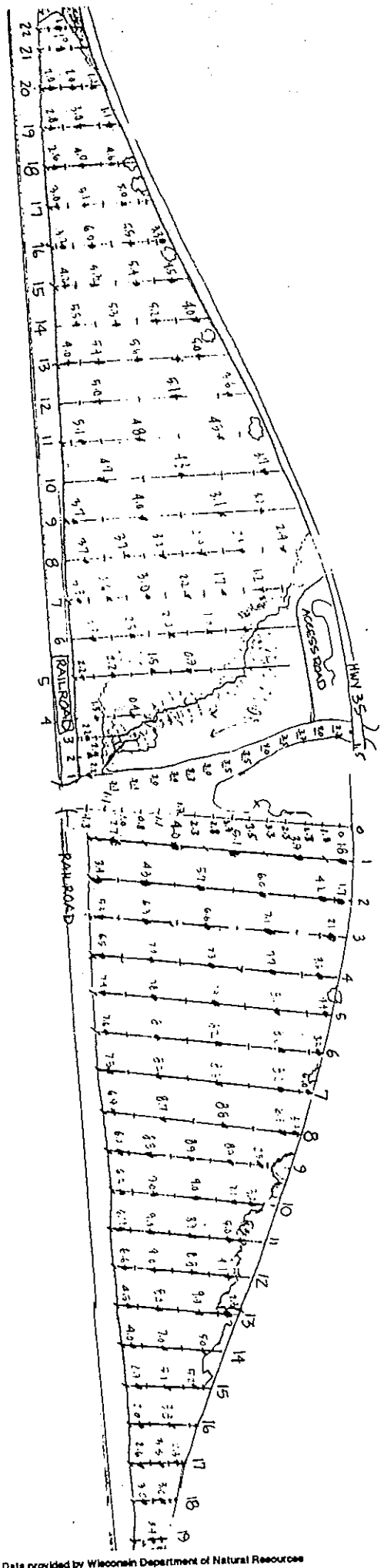


Cold Springs Prior to Creation of Pool 9

Figure 5

Aerial Photograph -
November 7, 1954

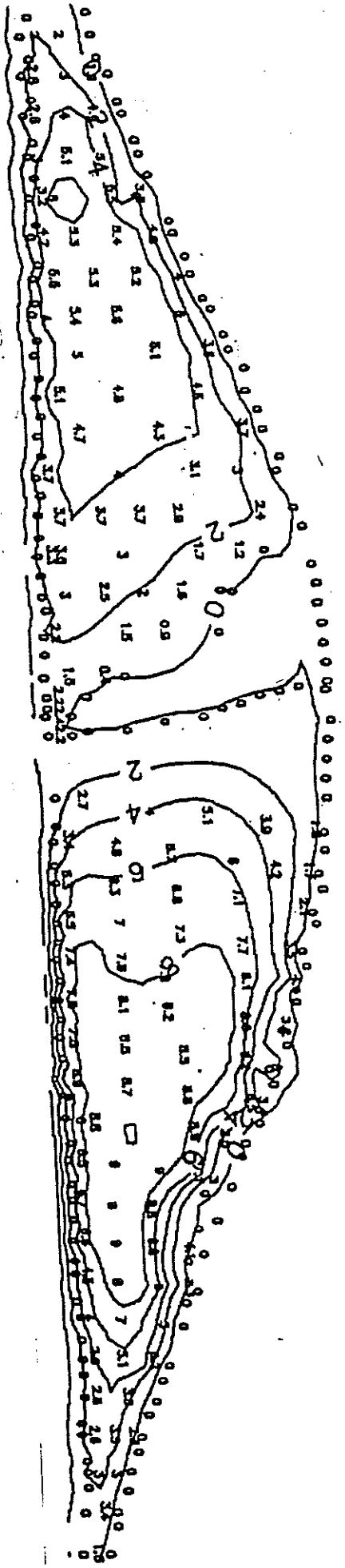
Figure 6



Cold Springs Depths - January 1987

Figure 7

Data provided by Wisconsin Department of Natural Resources

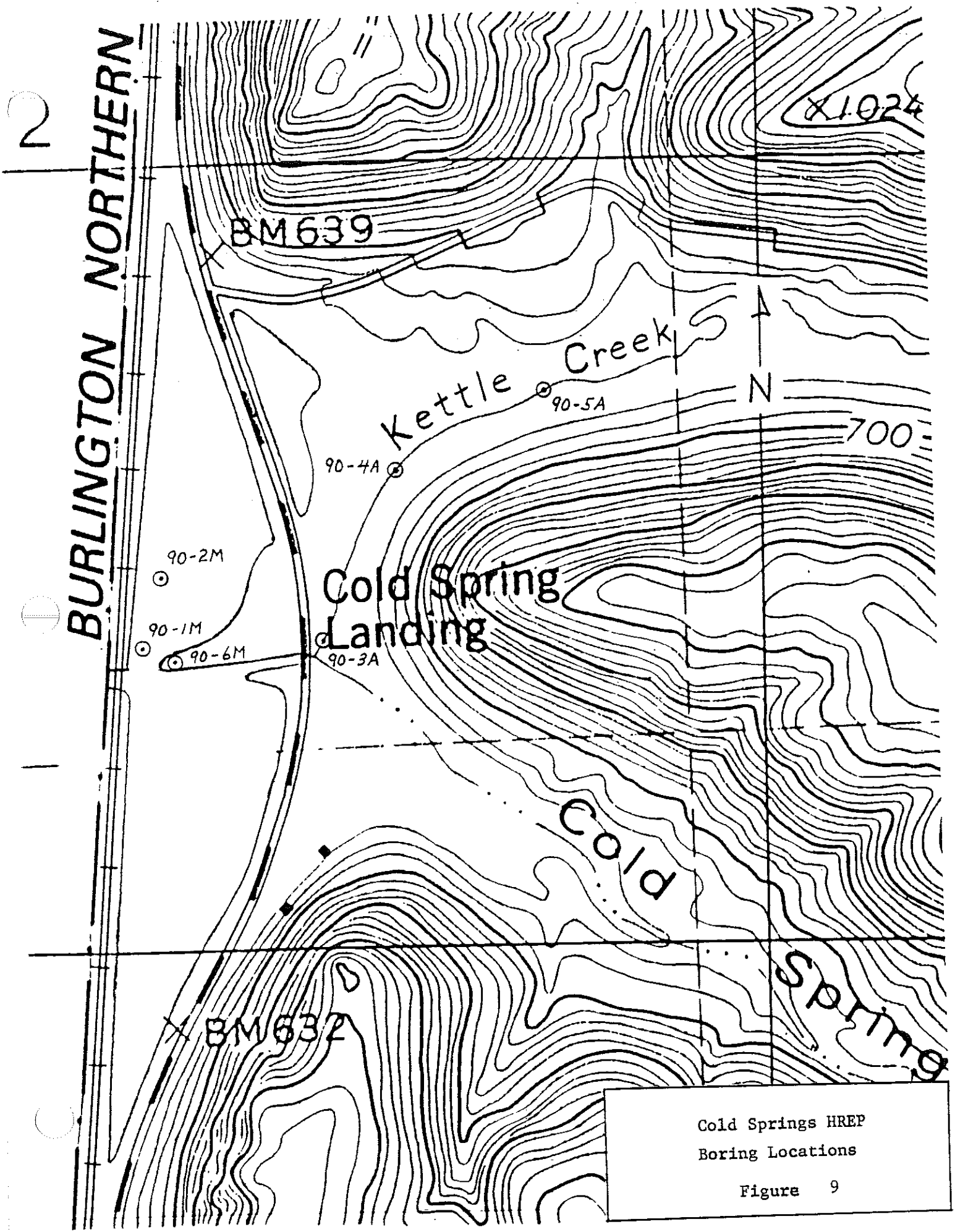


NORTH

Data provided by Wisconsin Department of Natural Resources

Cold Springs Bathymetry - January 198

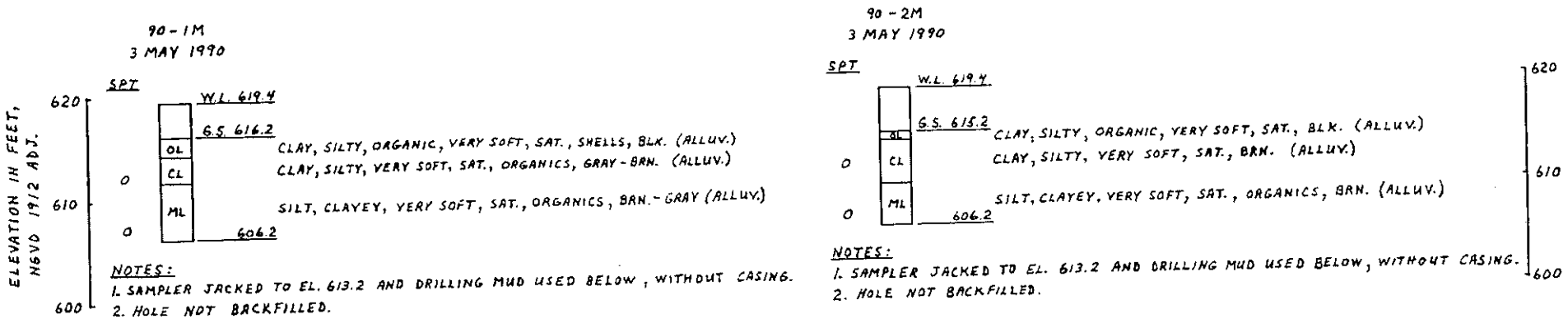
Figure 8



Cold Springs HREP

Boring Locations

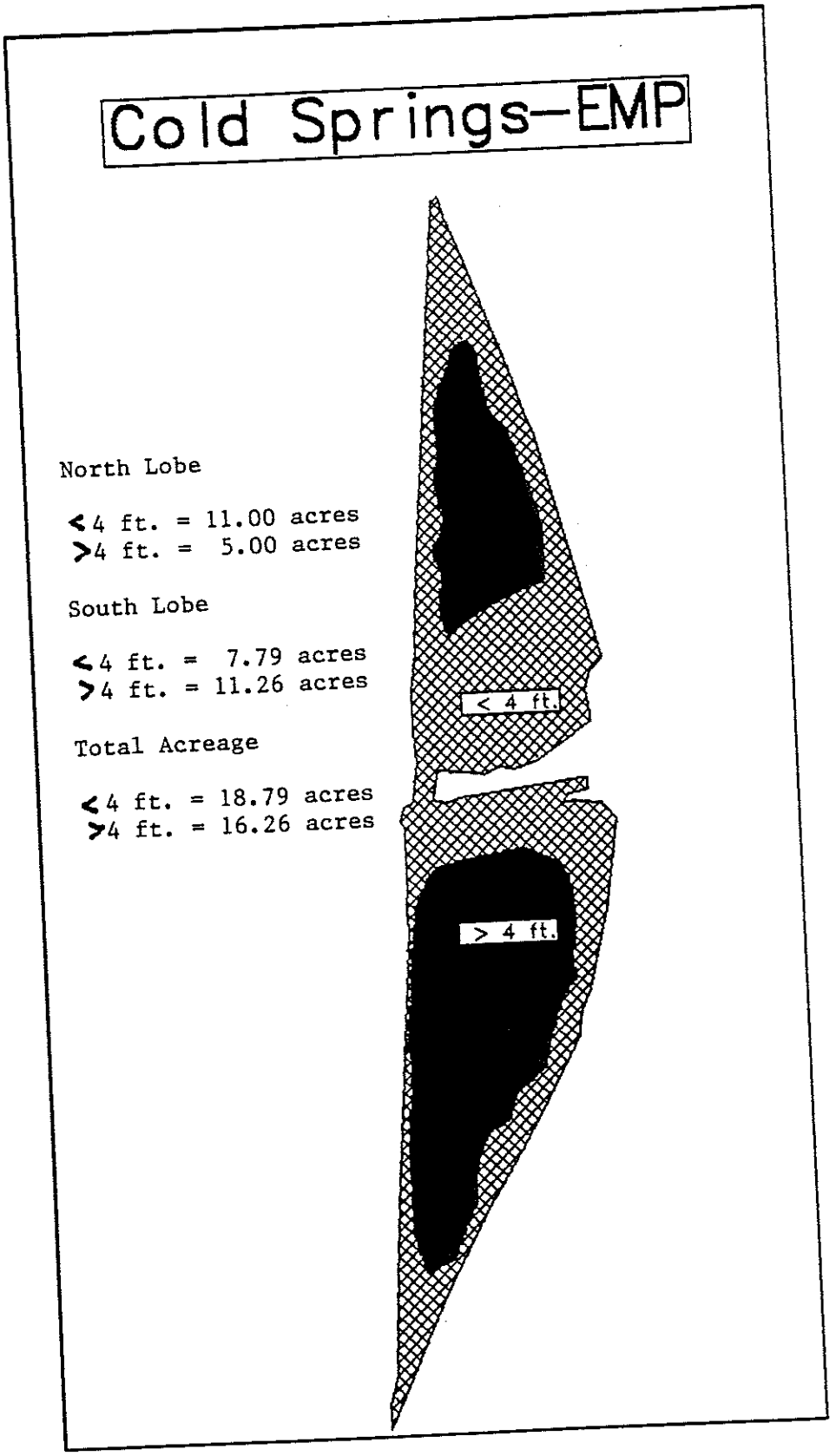
Figure 9



Cold Springs HREI
Boring Logs

Figure 10

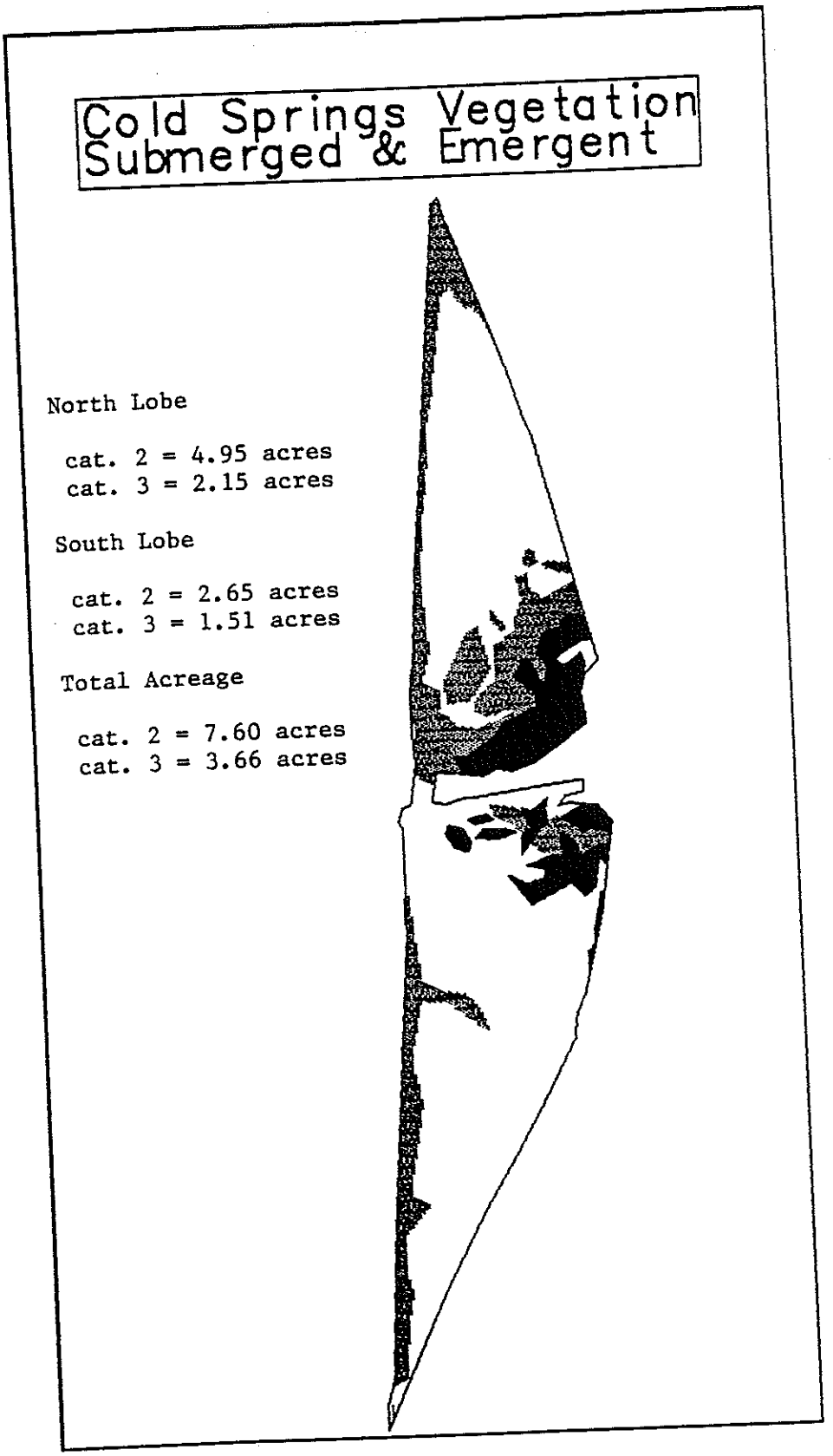
TITLE: Cold Springs-EMP
LOCATION: Pool 9 - Mississippi River



Cold Springs Depths

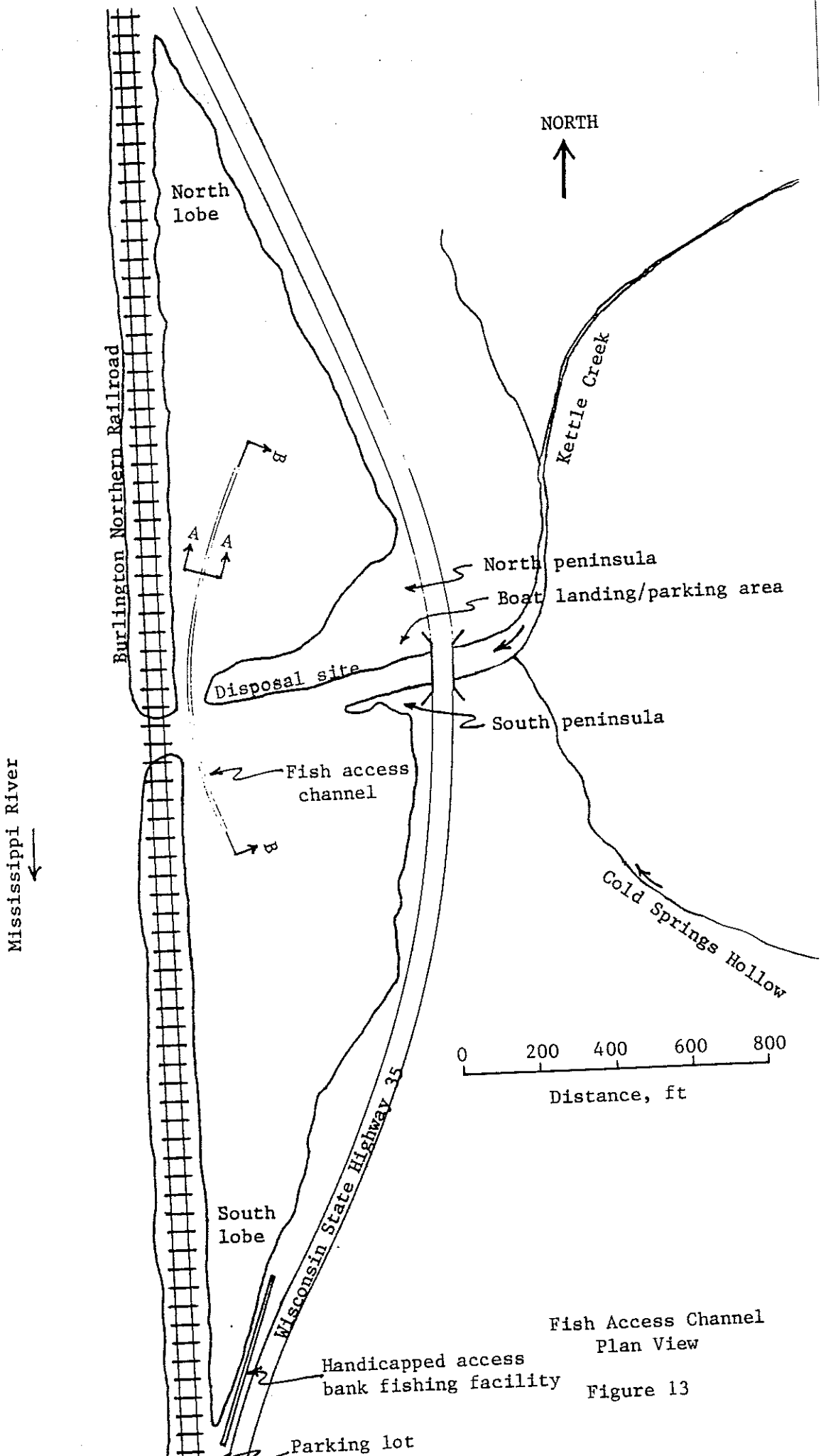
Figure 11

TITLE: Cold Springs
LOCATION: Pool 9 - Mississippi River



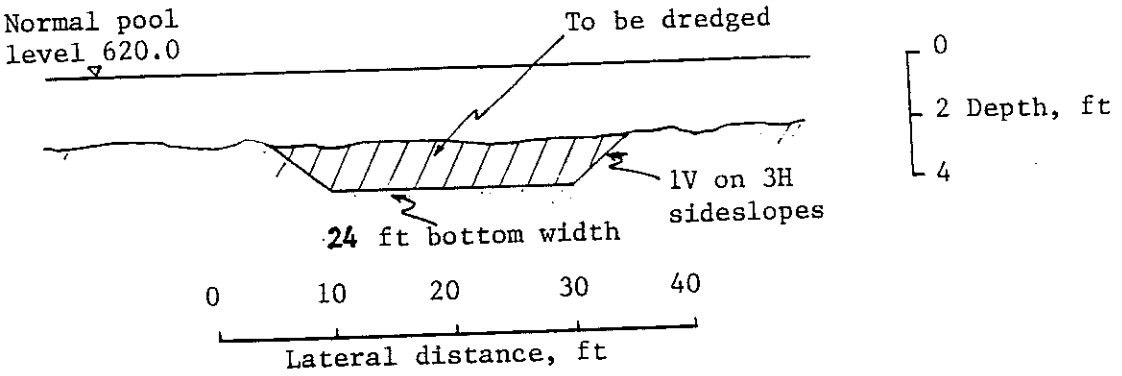
2 Submerged Vegetation
3 Emergent Vegetation

Cold Springs Vegetation
Figure 12

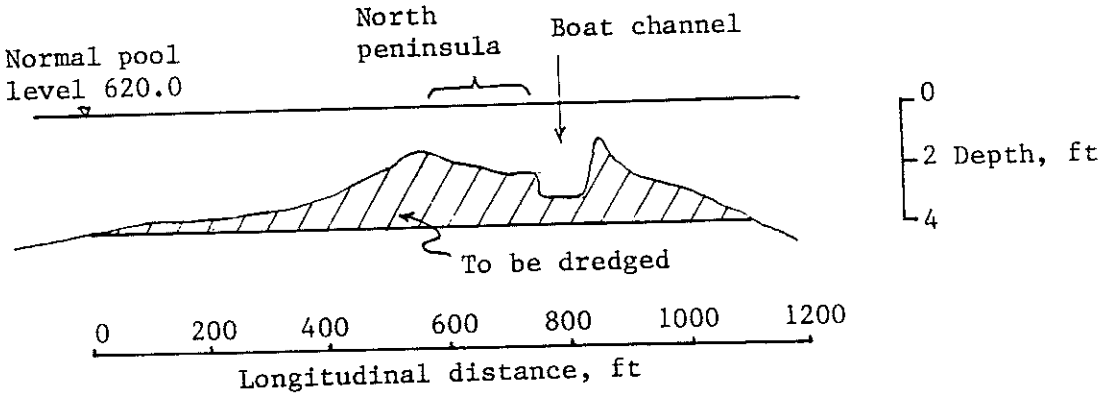


Fish Access Channel
Plan View

Figure 13



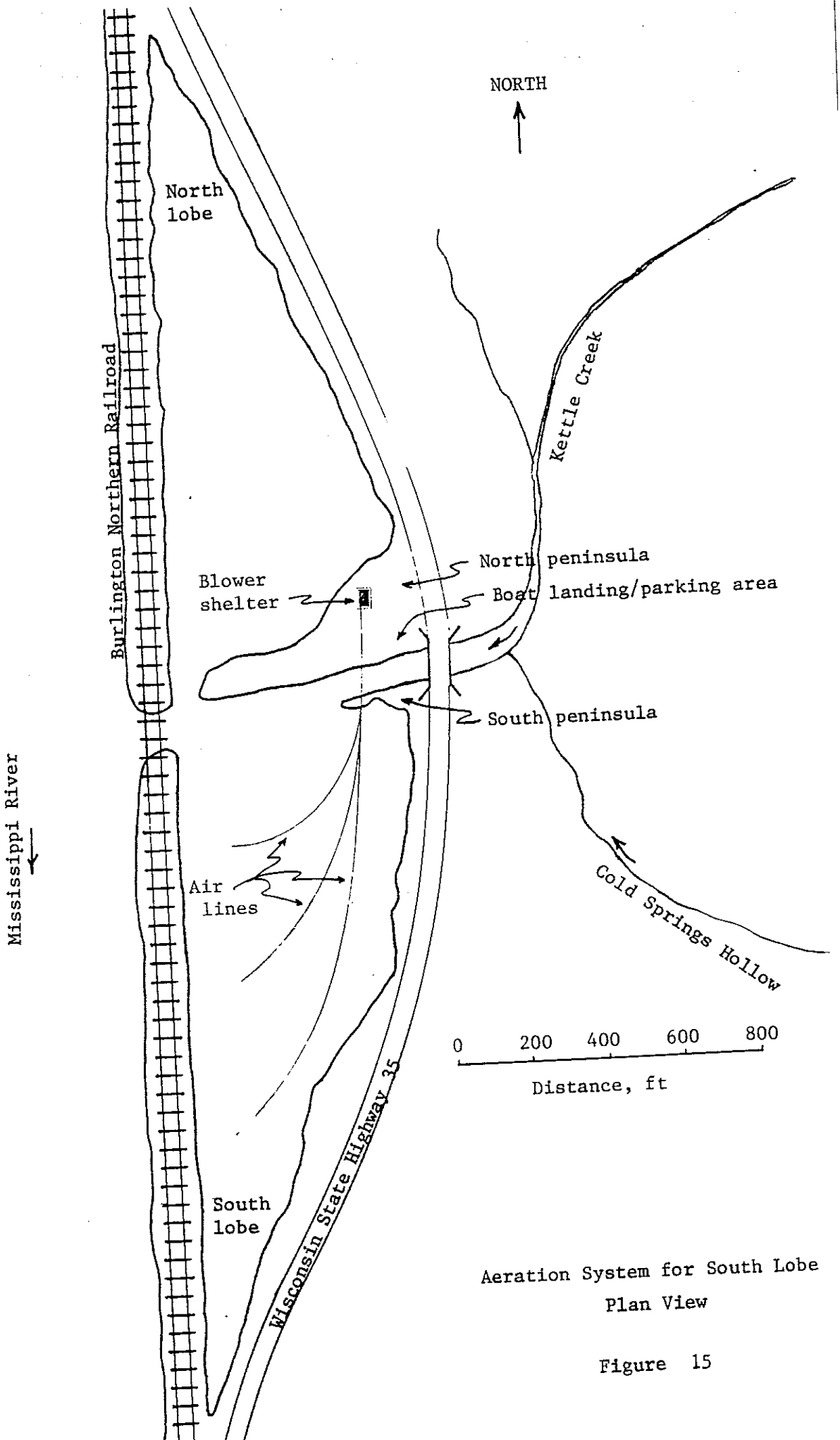
CROSS SECTION A-A



CROSS SECTION B-B

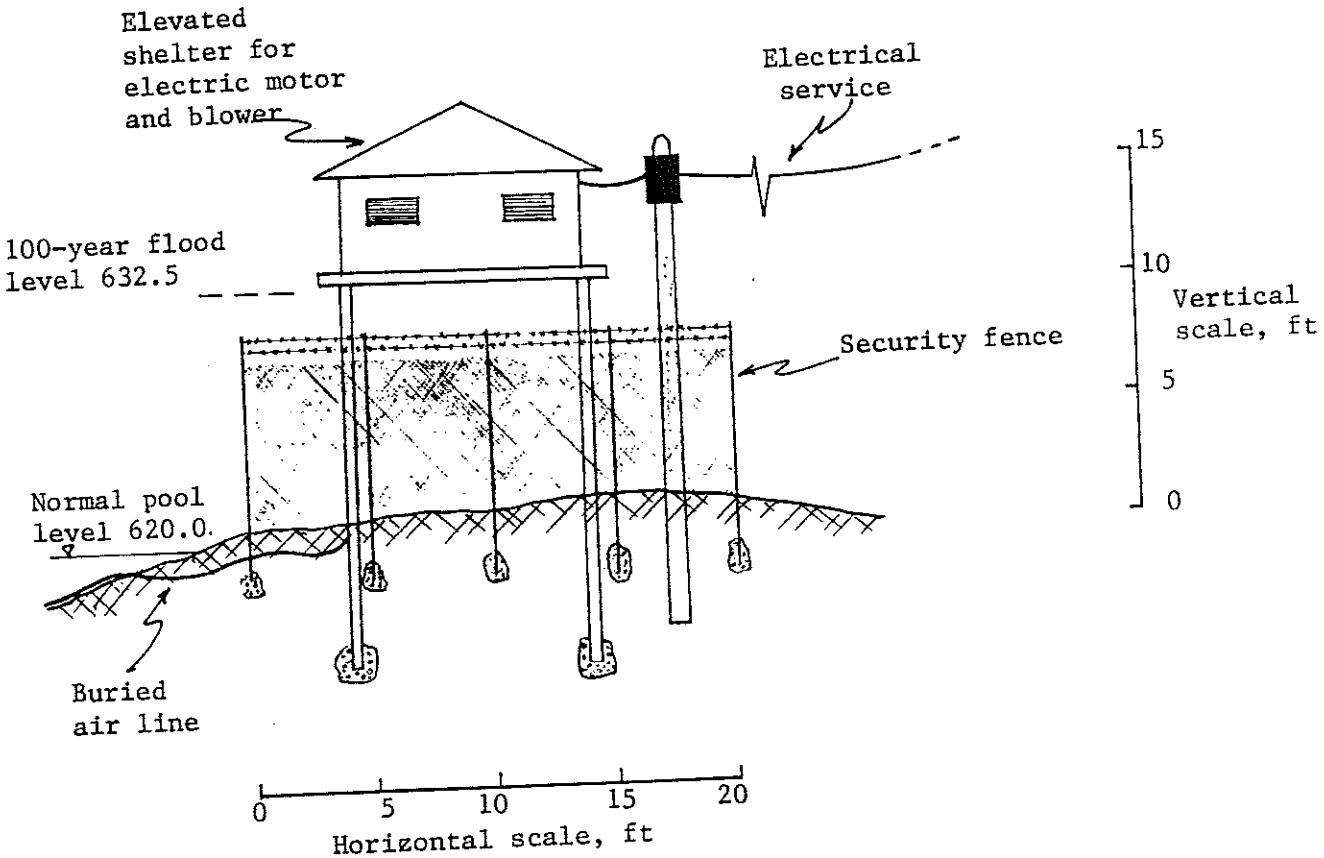
Fish Access Channel
Cross-sectional Views

Figure 14



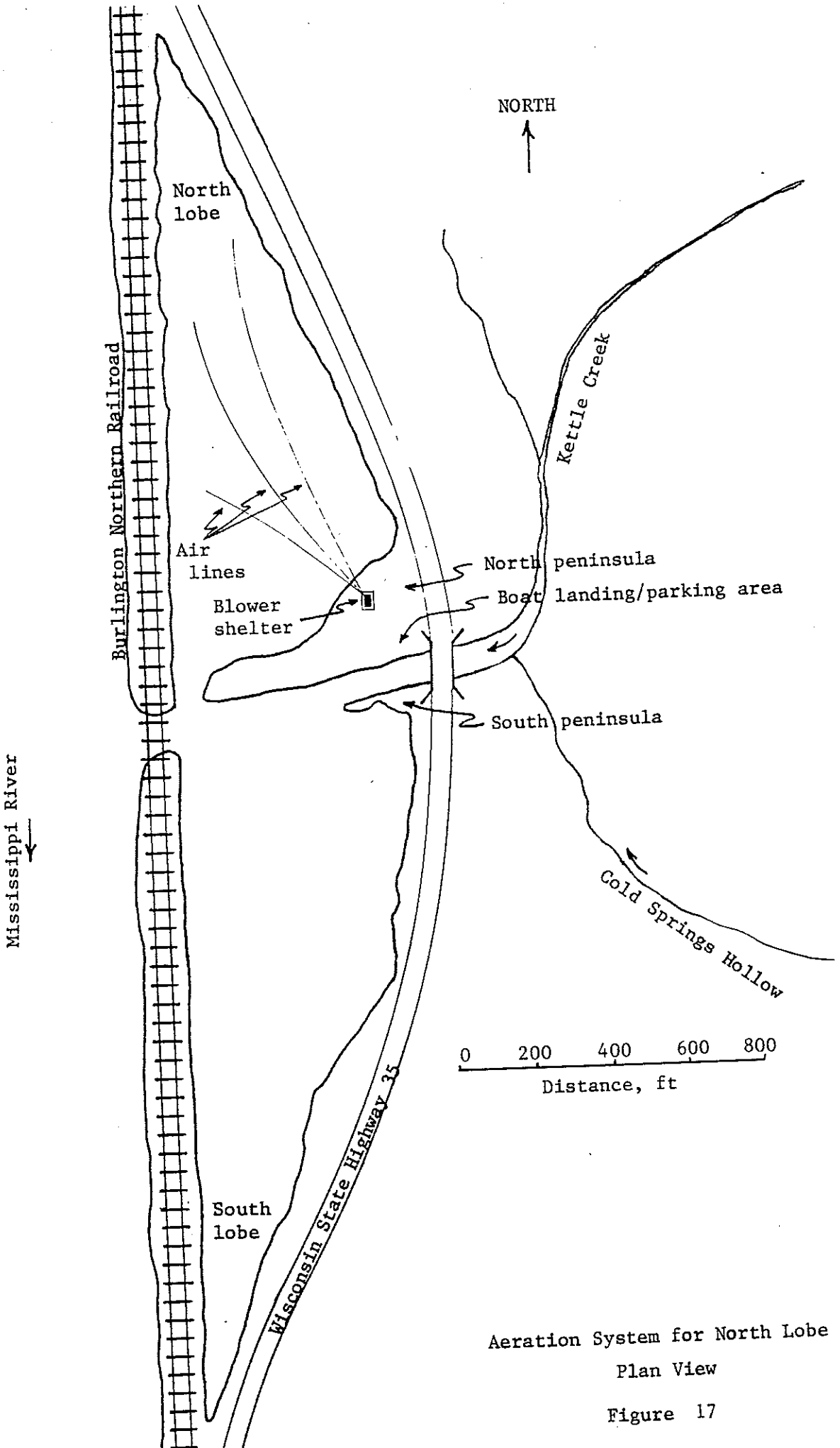
Aeration System for South Lobe
Plan View

Figure 15



Aeration System for Either or Both Lobes

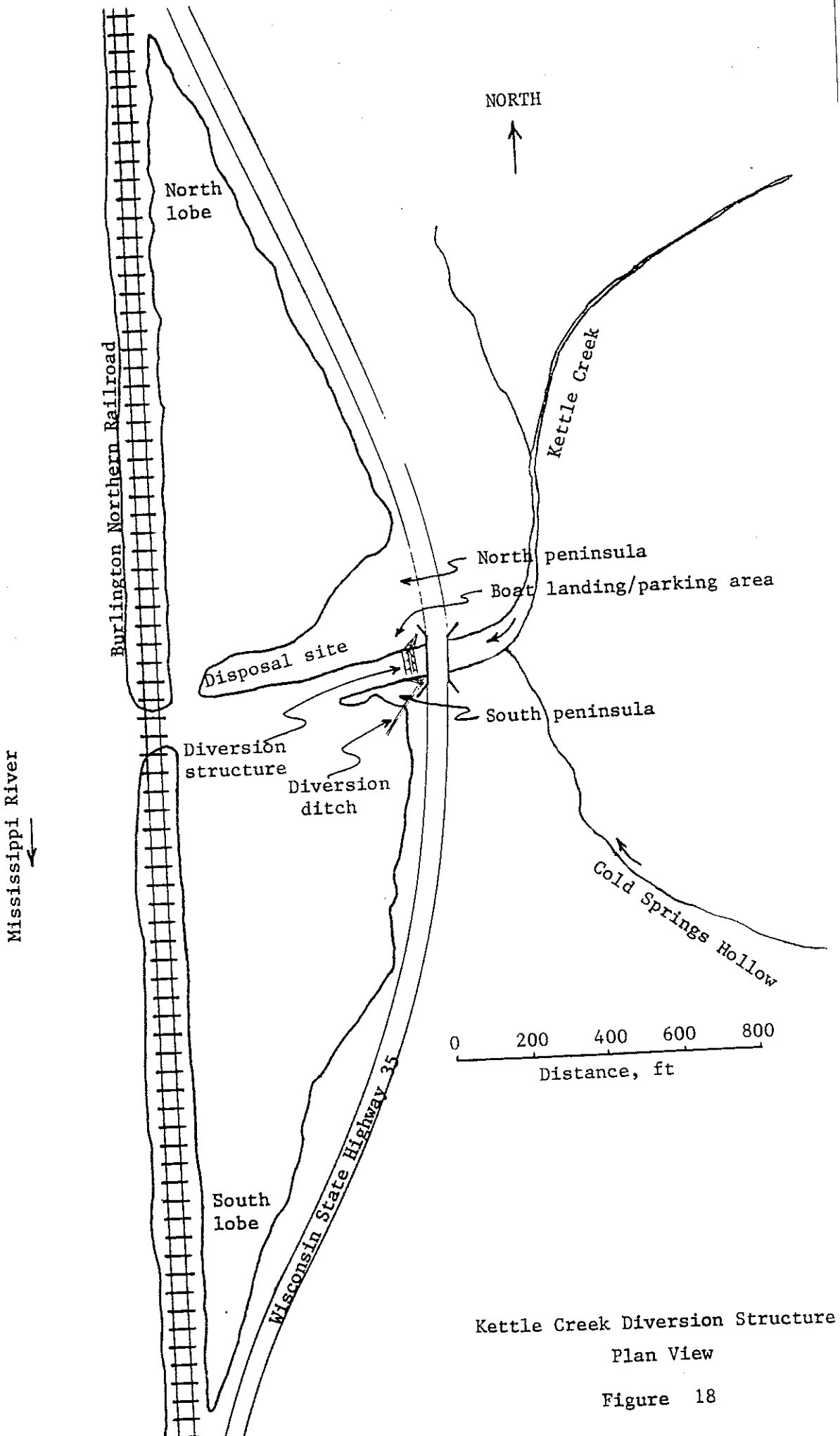
Figure 16



Aeration System for North Lobe

Plan View

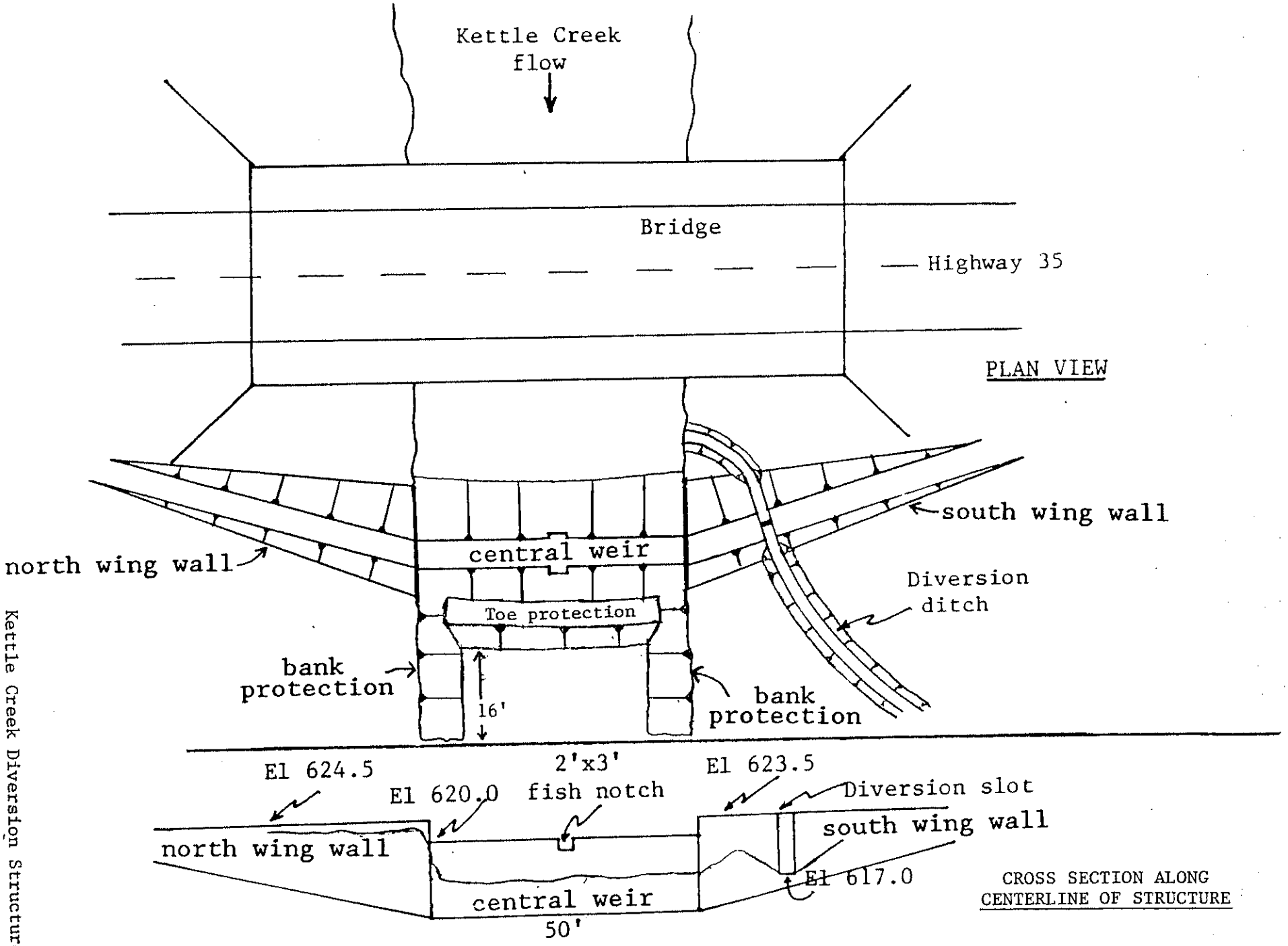
Figure 17



Kettle Creek Diversion Structure

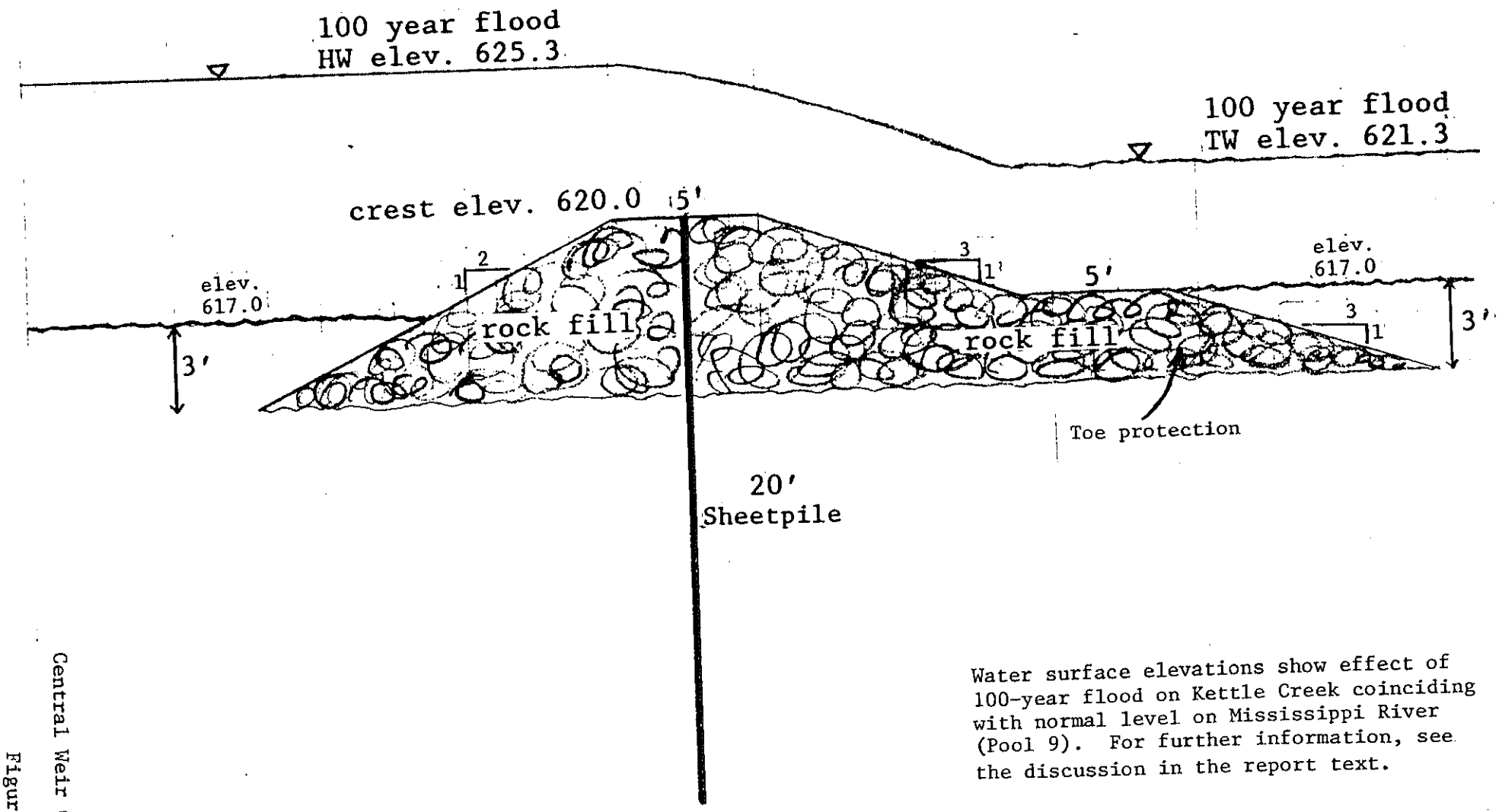
Plan View

Figure 18



Kettle Creek Diversion Structure
Plan View and Cross Section

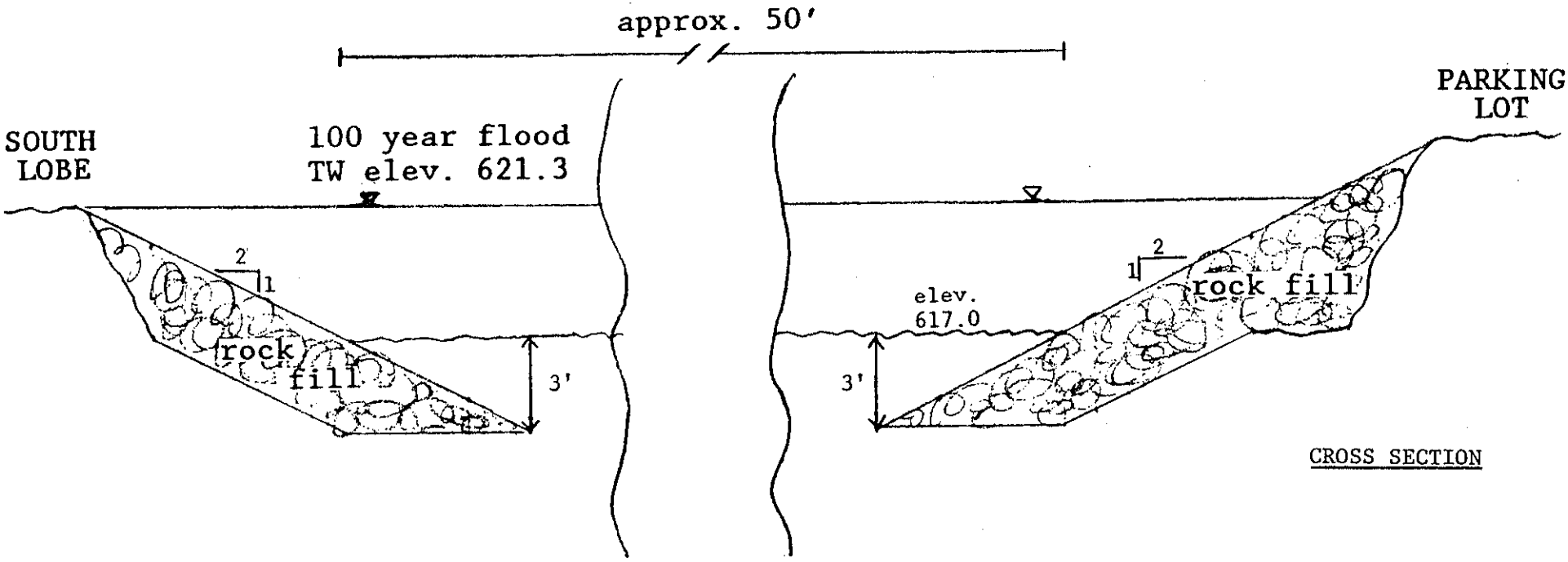
Figure 19



Water surface elevations show effect of 100-year flood on Kettle Creek coinciding with normal level on Mississippi River (Pool 9). For further information, see the discussion in the report text.

Figure 20

Central Weir Cross Section

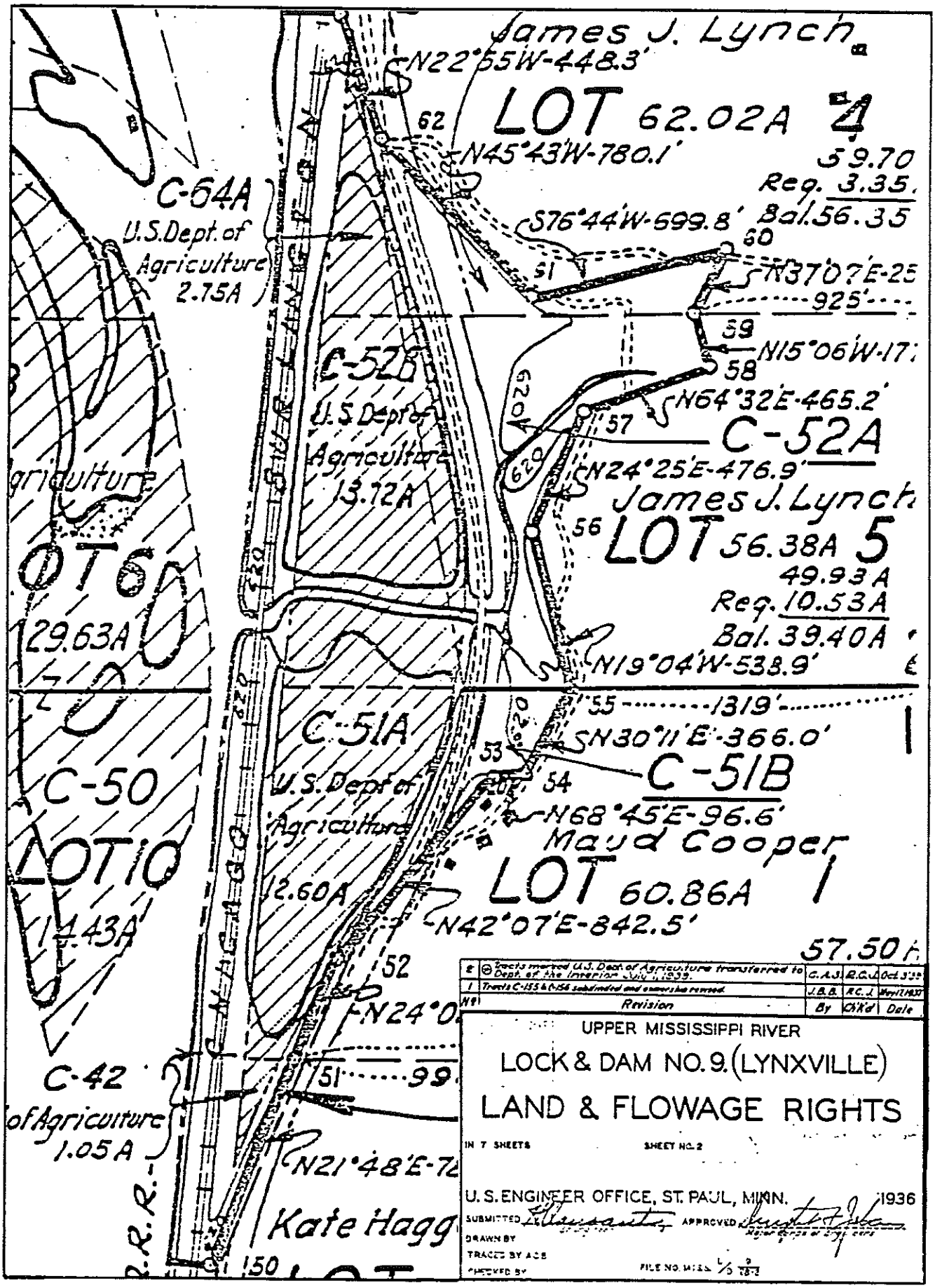


scale: 1"=5'

Water surface elevation shows effect of 100-year flood on Kettle Creek coinciding with normal level on Mississippi River (Pool 9). For further information, see the discussion in the report text.

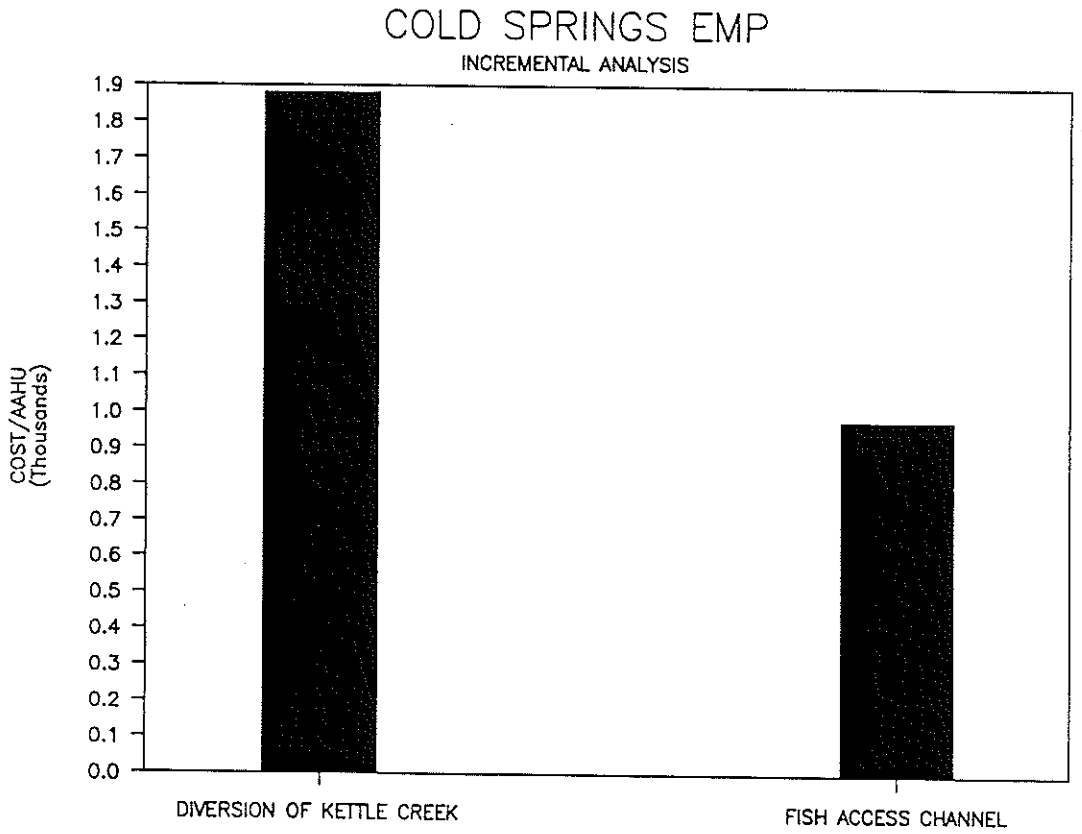
Bank Protection Downstream of Central Weir

Figure 21



Existing Federal Lands and Flowage Easements in the Cold Springs area

Figure 22



Cold Springs Incremental Analysis

Figure 23

APPENDIX A

COST ESTIMATES

COST ESTIMATES

Construction costs for the recommended alternative are discussed and shown on the following pages. Contingencies are included for uncertainties in work items, quantities, and unit costs. Total first costs are rounded to the nearest $1,000.

Operation and maintenance costs are discussed in the OPERATION, MAINTENANCE, AND REHABILITATION section of the Definite Project Report. Cost estimates for monitoring project performance are discussed in the PROJECT PERFORMANCE EVALUATION section and shown in table 6 of the report.

NARRATIVE REPORT

FOR

COLD SPRINGS EMP, DEFINITE PROJECT REPORT

POOL 9, UPPER MISSISSIPPI RIVER, CRAWFORD COUNTY WISCONSIN

COST ESTIMATE

1. Description of Project. The project consists of mechanically dredging a fish access channel and a diversion channel. The fish access channel will be 4 feet deep and the diversion channel will be 3 foot deep.

2. Construction Methods. Access for marine plant is not available. The dredging can be done from sectional barges mobilized specifically for this work. Three or 4 sectional barges with a small (2 cubic yard) hydraulic excavator can dredge both channels. Production will be about 200 cubic yards per day. Disposal is on shore at the site. Sheetpile and rockfill can be placed separately with land based equipment. Dewatering is not necessary.

3. Unit Cost Analysis. Unit costs have been derived based on labor and equipment production and material costs.

4. Planning, Engineering, Design and Construction Management Cost. Amounts shown are based on estimates of actual time and materials required.

5. Contingency Analysis. The contingencies shown include 15 percent for unit cost and scope of work unknowns. All additional contingencies are for potential quantity variations.

COLD SPRINGS EMP FEASIBILITY REPORT 4/01/91(KAB)

ACCOUNT CODE	ITEM	UNIT	QUANTITY	UNIT PRICE	AMOUNT	CONTINGENCIES AMOUNT	CONTINGENCIES PERCENT	REASON
12.-.-.-	DREDGING							
12.0.1.-	MOBILIZATION, DEMOB. & SITE PREPARATION	JOB	1	35,000	35,000	5,300	15	1,2,3
12.0.4.-	MECHANICAL DREDGING							
12.0.4.B	EXCAVATION, KETTLE CREEK DIVERSION	CY	1,600	13.00	20,800	10,400	50	1,2,3
12.0.4.B	EXCAVATION, FISH ACCESS CHANNEL	CY	1,020	13.00	13,300	8,600	65	1,2,3
12.0.4.B	SEEDING DISPOSAL AREA	ACRE	0.75	3,000	2,300	1,000	45	1,2,3
15.-.-.-	CONTROL AND DIVERSION STRUCTURES							
15.0.D.-	EARTHWORK FOR STRUCTURES							
15.0.D.B	ROCKFILL	CY	800	30.00	24,000	7,200	30	1,2,3
15.0.E.-	FOUNDATION WORK							
15.0.E.B	PILING, SHEET STEEL	SF	2,700	19.00	51,300	15,400	30	1,2,3
15.0.4.-	GATES AND STOPLOGS							
15.0.4.E	STOPLOGS	JOB	1	2,000	2,000	1,600	80	1,2,3
30.-.-.-	ENGINEERING AND DESIGN	JOB	1	102,700	102,700	30,800	30	1,2,3
31.-.-.-	CONSTRUCTION MANAGEMENT	JOB	1	12,800	12,800	0	0	4

SUBTOTAL CONSTRUCTION COSTS		264,000	
SUBTOTAL CONTINGENCIES	30.3%		80,000
TOTAL			$344,000

REASONS FOR CONTINGENCIES:

1. QUANTITY UNKNOWNS
2. UNANTICIPATED ITEMS OF WORK
3. UNIT PRICE UNKNOWNS
4. N/A

NOTES:

A. EXTENSIONS ARE ROUNDED TO THE NEAREST $100.
B. TOTALS ARE ROUNDED TO THE NEAREST $1000.

APPENDIX B

SECTION 404(b)(1) EVALUATION

SECTION 404(b)(1) EVALUATION
COLD SPRINGS
POOL 9, UPPER MISSISSIPPI RIVER
CRAWFORD COUNTY, WISCONSIN

I. PROJECT DESCRIPTION

A. Location and Background

Cold Springs is a 35-acre backwater area located on the Wisconsin side of the Upper Mississippi River in Pool 9 at the mouth of Kettle Creek, approximately 5 miles above Lock and Dam 9, at river mile 653. It is bounded on the west by the Burlington Northern Railroad causeway and on the east by Wisconsin State Highway 35 (figures 1 and 2). The site lies within the Upper Mississippi River National Wildlife and Fish Refuge.

The Cold Springs backwater is connected to the Mississippi River via an opening through a 3-pier railroad bridge approximately 90 feet long.

A peninsula, which extends over three-fourths of the distance across the backwater along the north side of Kettle Creek, divides Cold Springs into two distinct lobes. The south lobe encompasses about 19 acres, the north lobe about 16. A public boat landing is located on the north peninsula, with a dredged channel running west along the peninsula to the railroad bridge providing boat access to both lobes of the backwater and the Mississippi River. A second (south) peninsula paralleling the south side of Kettle Creek extends about one-fourth of the distance across the backwater.

The Kettle Creek watershed encompasses approximately 5.4 square miles, 32 percent of which is in agricultural use with the remainder heavily wooded. Kettle Creek, a spring-fed creek, provides an estimated base inflow of about 2 to 3 cubic feet per second (cfs) of fresh water to the backwater. However, wintertime mixing of the creek water with the water in Cold Springs is minimal because, with the configuration of the backwater, the relatively warm creek water tends to stratify and shunt directly out through the railroad bridge.

The Cold Springs backwater has experienced significant sediment buildup since Pool 9 was created by the locks and dams, with some areas having accumulated over 5 feet of sediment. This accumulation of sediment has resulted in a loss of deepwater habitat with a resultant increase in the amount of aquatic vegetation and periods of low dissolved oxygen (DO) during the winter months. Low DO levels result in temporary migrations of fish from the area and documented fish kills. Forced movement of fish from their preferred habitat may also have an effect on mortality due to higher predation and changes in available food supplies.

In addition, sedimentation has resulted in shallow water depths between the deepwater areas of both lobes of the backwater and the Mississippi River. These shallow depths may be blocked during periods of heavy ice

cover and prevent fish from reaching areas with sufficient concentrations of DO.

The overall purpose of the proposed project is to provide areas with adequate concentrations of DO during the winter months and insure that fish throughout the backwater have access to these areas.

B. General Description

The proposed plan consists of (1) diverting Kettle Creek inflows into the south lobe of the backwater during the winter months to promote mixing of the oxygenated creek water with that of the backwater and (2) dredging an access channel between the deepwater areas of the two lobes of the backwater to provide fish with access to areas with sufficient DO concentrations.

Diversion of Kettle Creek inflows would involve construction of a weir-type structure across the mouth of Kettle Creek between the north and south peninsulas, with wing walls tying back into the Highway 35 embankment (figures 3-6). The structure would be constructed of interlocking sheetpile driven into the soil, stabilized with rock fill.

The central weir of the structure would be at the normal Pool 9 level (620.0 feet mean sea level (MSL)) to block all creek inflow under typical low-flow winter conditions. In the winter, stoplogs would be removed from an opening in the south wing wall to divert creek flow into a shallow channel approximately 300 feet long which would carry the oxygenated creek water into the south lobe. This opening would be stoplogged to prevent creek flow into the south lobe during the spring, summer, and fall when there is a higher likelihood of larger Kettle Creek runoff events carrying greater sediment loads. High creek discharges would overtop the weir and flow down the boat channel and out through the railroad bridge as at present. To minimize scour downstream of the weir, a rock fill toe would extend 5 feet downstream from the base of the weir at the current bed elevation of approximately 617.0, and a 1 vertical on 3 horizontal extension of this toe would be embedded 3 feet below the present creekbed (figure 5). In addition, rock fill protection would be provided for both banks for a distance of 16 feet downstream from the base of the central weir (figures 4 and 6).

It is expected that turbulence in larger runoff events would keep creek sediment in suspension and carry the sediment over the weir and out the boat channel, alleviating the need for a sediment trap or periodic dredging of the pool behind the weir.

The diversion structure's central weir would have an opening 2 feet deep by 3 feet wide to allow fish ingress to and egress from the creek. This opening would be stoplogged in the winter to divert all creek flow into the south lobe (except when the level of Pool 9 is above 620.0 MSL or creek flows are unusually high and overtop the weir, in which case, the creek inflow would be split between the diversion channel and the boat

channel). During the remainder of the year, the stoplogs would be removed from this opening.

The diversion structure's wing walls would be designed to retain the existing frequency of overtopping and flooding of the north and south peninsulas from high creek flows.

An access channel with a depth of 4 feet and an approximate bottom width of 24 feet would be dredged between the deepwater areas of the north and south lobe of the backwater (figures 7 and 8), allowing fish access to areas of the backwater and the Mississippi River having adequate DO levels during the winter months.

This evaluation addresses the impacts resulting from the placement of fill material in waters of the United States in compliance with Section 404 of the Clean Water Act. The proposed fill activities would consist of the placement of approximately 2,600 cubic yards (cy) of dredged material on the north peninsula and construction of a weir-type diversion structure across Kettle Creek.

C. Authority and Purpose

Section 1103 of the Water Resources Development Act of 1986 (Public Law 99-662) provides authorization and appropriations for an environmental management program for the Upper Mississippi River System that includes fish and wildlife habitat rehabilitation and enhancement. A diversion structure would be constructed and an access channel dredged between the deeper portions of the backwater under this authority.

The purpose of the proposed project is to provide wintertime DO concentrations of at least 5 mg/l to a minimum of 25 percent of the backwater area and ensure that fish throughout the backwater have access to areas with sufficient DO concentrations.

D. General Description of Dredged or Fill Material

1. General Characteristics of Material

The weir across Kettle Creek and wing walls tying into the Highway 35 embankment would be constructed of steel sheetpile with rock fill protection and with wood, aluminum, or concrete stoplogs. The weir would have a 5-foot top width and side slopes of 1 vertical on 2 horizontal on its upstream face and 1 vertical on 3 horizontal on its downstream face (figure 5).

Material dredged during construction of the proposed access channel, the diversion channel, and weir would consist primarily of silt and silty-sand. The material would contain a high percentage of fines. Sediment samples taken from the area of dredging for the proposed access channel indicate that the dredged material would be 99 percent finer than 0.149 mm.

2. Quality of Material

A sediment core was collected by the Corps of Engineers (COE) from the area proposed for access channel dredging during June 1990 (figure 9). The core exceeded the proposed dredging depth by approximately 1 foot, was divided into two sections, top and bottom, and analyzed for bulk chemistry. Table 1 summarizes the results of this analysis. Concentrations of parameters tested were found to be fairly evenly distributed between the top and bottom layers of the core sample, with contaminants of concern comparable to fine backwater sediments of the Upper Mississippi River. No pesticides or PCBs were present in detectable concentrations. Copper was detected at levels between 60 and 66 milligrams per kilogram (mg/kg), higher than normal for Upper Mississippi River backwater sediments. The results of this analysis are comparable to those of a sample collected in the center of the north lobe of the backwater in August 1987 (table 3).

Sediment component and grain size distribution for the sample collected during June 1990 is summarized in table 2. The sediment is composed primarily of silt (over 70%), with some clay and sand. The material is very fine, with 90.4 percent of the upper layer and 80.9 percent of the lower layer finer than 0.053 mm.

The Wisconsin Department of Natural Resources (WDNR) collected a core sample from the center of the south lobe of the backwater during February 1987 (figure 10). Bulk sediment data from this sample are summarized in table 4. The arsenic levels reported for this sample are somewhat higher than those of the COE sample, which may be due to different sampling locations. The WDNR sample also shows ammonia levels substantially higher than the COE data. These differences may be due to different extraction methods.

Sediment analysis indicates that serious water quality problems would not be anticipated with the proposed dredging.

3. Quantity of Material

Construction of the weir and wing walls would require approximately 2,700 square feet (sf) of steel sheetpile, 800 cy of rock fill, and a sufficient number of wood, aluminum, or concrete stoplogs to block an area about 3 feet wide by 7-1/2 feet high. Approximately 1,300 cy of material would be dredged in construction of the diversion channel into the south lobe and the weir and downstream toe and bank protection.

Construction of the access channel between the deepwater areas of the backwater would require the dredging of an additional 1,300 cy of material.

4. Source of Material

Rock fill would be obtained from existing pits and quarries in the vicinity of the proposed project. Sheetpile and stoplogs would be commercially produced items.

Dredging would be done by mechanical equipment mounted on portable barges assembled and launched from the public boat landing. The diversion channel would be dredged from the south lobe through the south peninsula. This would require an equipment access route from the boat channel into the south lobe through the shallows bordering the south side of the boat channel. This equipment access route would become part of the fish access channel described below. The initial 240 feet of diversion channel would have a depth of 3 feet below normal pool, a bottom width of 30 feet (to accommodate the barges hauling equipment and dredged material), and 1 vertical on 3 horizontal side slopes. The remaining 60 feet would not require barge access and, therefore, would have a bottom width of 3 feet.

Approximately 100 cy of dredging would be needed at the weir site to key the weir, toe protection, and bank protection into the channel bottom and sides.

The fish channel between deepwater areas of the north and south lobes would be approximately 4 feet deep at normal pool, with a 24-foot bottom width and 1 vertical on 3 horizontal side slopes. This channel would be located on the west side of the backwater (figure 7).

All excavated and dredged material would be placed on the north peninsula (figures 3 and 7).

E. Description of the Proposed Discharge Sites

1. Location

The diversion structure would be located between the boat landing on the north peninsula and the Highway 35 bridge (figure 3). The weir would be placed in the boat channel, and the wing walls would tie into the highway embankment. The 3-foot-deep diversion channel would be dredged across the south peninsula and into the south lobe to a point where existing depths reach 3 feet below normal pool (approximately elevation 617.0).

The fish access channel would follow the shortest path between areas of the two lobes where existing depths are 4 feet below normal pool (approximately elevation 616.0). This path (figure 7) would generally run from the deep water in the north lobe southward through the shallows between the railroad causeway and north peninsula, across the boat channel, and through the shallows adjacent to the railroad causeway separating the boat channel and south lobe.

Dredged material would be placed on the north peninsula (figures 3 and 7). To provide the required capacity, the peninsula would be hollowed out, with the excavated material used to create a berm around the peninsula's

edge or, if still more disposal volume is needed, used as fill at a site south of the south lobe where the Wisconsin Department of Transportation has proposed a parking lot to serve a bank-fishing facility.

2. Size

The diversion structure and downstream toe and bank protection would span the approximately 50-foot-wide boat channel and cover approximately 1,100 sf of channel bottom and sides. Each wing wall would be approximately 50 feet in length and cover a surface area of approximately 800 sf.

The diversion channel would be about 300 feet in length, including about 100 feet through the south peninsula. Approximately 8,000 sf of benthic habitat would be affected by construction of the channel.

Approximately 3/4 acre on the north peninsula would be required for disposal of dredged material. This would occupy the entire peninsula from the public water access to its western end (figures 3 and 7). This portion of the peninsula is approximately 500 feet in length with a width varying from less than 50 feet to over 80 feet.

3. Type of Site

The diversion structure would span a dredged boat channel. The wing walls would be located on the north and south peninsulas. The north peninsula contains a parking area and boat launch and is highly disturbed. The area of the south lobe affected by construction of the diversion structure is composed of silty sand and supports primarily purple loosestrife and willows.

The dredged material disposal site would be located on the north peninsula. This peninsula was formed primarily by deposition of sediments from the Kettle Creek watershed and has been used in the past for disposal of material dredged for boat channel maintenance.

4. Types of Habitat

The boat channel across which the diversion structure would be constructed is approximately 50 feet wide and 3 feet deep, has a substrate composed primarily of loose silt, and supports few aquatic macrophytes. Kettle Creek introduces between 2 and 3 cfs into the channel under normal conditions. Because of the large cross-sectional area of the boat channel, flow velocities are very low. The boat channel provides habitat only minimally suited for aquatic organisms.

The proposed dredged material disposal site on the north peninsula is heavily vegetated with purple loosestrife, along with limited amounts of other species, including jewelweed and sandbar willow.

Purple loosestrife (Lythrum salicaria) is an exotic plant species of European origin. The plant has no natural enemies and is extremely

aggressive, crowding out other vegetation. Purple loosestrife has very little value for either food or shelter for wildlife.

F. Description of Disposal Method

The diversion structure would be constructed using mechanical equipment located on either peninsula and/or a barge in the boat channel.

Material from the diversion channel and the access channel would be dredged mechanically, loaded onto barges, and off-loaded mechanically into the disposal area. Equipment used for the dredging would work from barges.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations

1. Substrate Elevation and Slope

The depth of the boat channel across which the diversion structure would be constructed is approximately 3 feet at normal pool elevation. The wing walls would be constructed on the north and south peninsulas at elevations varying from approximately 3-1/2 to 4-1/2 feet above normal pool levels (0 to 3-1/2 feet above the ground surface). The diversion structure would have a 5-foot top width and a 1 vertical on 2 horizontal side slope on its upstream face and 1 vertical on 3 horizontal side slope on its downstream face.

The proposed dredged material disposal site is composed of silty sand, sandy silt, and silt. Current elevations vary from approximately 1-1/2 to 3 feet above normal pool elevation. A berm approximately 3 feet high would be constructed around the perimeter of the site, using material currently on the site, to provide the required capacity and help confine the dredged material. The berm would have approximately 1 vertical on 2.5 horizontal side slopes and a 2- to 3-foot top width.

2. Sediment Type

Tables 2 and 4 include results of analyses of material typical of that which would be dredged for the proposed project. The dredged materials would contain high percentages of silt (typically 65 to 75 percent) and lesser amounts of sand and clay.

3. Dredged/Fill Material Movement

Materials required for construction of the diversion structure consist of steel sheetpile and rock fill. No movement of these materials would be expected once the project is in place.

Dredged material would consist primarily of silt with a high percentage of fines. Therefore, an increase in turbidity and suspended solids could be expected in the area during construction. Conditions would be expected

to quickly return to normal after construction activities ceased. Because dredging would be done mechanically, introduction of dredged material into the backwater during placement in the disposal site should be minimal.

The berm surrounding the dredged material disposal site would have a top elevation approximately 5 feet above normal pool elevation, and the proposed project calls for seeding the disposal area with native plants and grasses once the dredged material has sufficiently consolidated. However, until a plant community has been established, should water levels exceed the height of the berm, some dredged material could be resuspended in the water column. Some of these suspended particulates could be carried into the Mississippi River by flows from Kettle Creek.

4. Physical Effects on Benthos

The substrate in the vicinity of the proposed weir is composed primarily of loose silt and provides habitat only minimally suited for benthic organisms. Once construction is complete, the area would quickly recolonize. Construction of the diversion structure and downstream toe and bank protection would disturb approximately 3,600 sf of benthic habitat. The rock fill would cover about 1,100 sf of channel bottom and sides and provide approximately 1,250 sf of substrate more stable and diversified than that which currently exists.

The dredged material disposal site is a seasonally flooded peninsula. Dredged material placement at this site would not affect benthic organisms.

5. Actions Taken to Minimize Impacts

Construction would take place during periods of normal to low water levels, with dredging done mechanically. Because the placement of materials would be done mechanically and have only minimal impacts, no special actions to minimize adverse impacts would be taken.

B. Water Circulation, Fluctuation, and Salinity Determination

1. Water

a. Salinity

Not applicable.

b. Water Chemistry

No significant impacts on water chemistry are anticipated.

c. Clarity

Some short-term decreases in water clarity would be anticipated from dredging and fill activities. No long-term effects are anticipated.

d. Color

The proposed fill activities should have no effect on water color.

e. Odor

The proposed fill activities should have no effect on water odor.

f. Taste

The proposed fill activities should have no effect on water taste.

g. Dissolved Oxygen Levels

Monitoring done during 1977, 1978, 1979, 1987, and 1988 by the WDNR shows that DO levels in the north lobe of the Cold Springs backwater may reach critical levels of less than 1 mg/l as early as February 1 and remain critically low into March. DO levels in the south lobe also reach levels well below 5 mg/l, the minimum acceptable concentration for the target fish species; however, due to greater water depths and thermal stratification, it is believed that DO levels in the surface waters of the south lobe remain above those encountered in the north lobe.

Diversion of Kettle Creek inflows into the south lobe of the backwater during the winter months would insure that a minimum of 50 percent of the south lobe maintained DO levels of greater than 5 mg/l, an appreciable improvement over current conditions. Winter DO levels in the boat channel adjacent to the control structure would be expected to be significantly lower than under current conditions. However, this area is of little value to fish, and the benefits gained by oxygenating a greater volume of the backwater more than offset the loss of DO in the boat channel.

Dredging and dredged material placement should have no appreciable effect on DO levels.

h. Nutrients

The proposed fill activities should have little or no effect on nutrient levels in the water.

i. Eutrophication

The proposed fill activities should have no effect on the level or rate of eutrophication of the water.

j. Temperature

Inflows of relatively warm Kettle Creek water currently keep the boat channel ice free during a majority of the winter. It is anticipated that, with the construction of a diversion structure and channel, the area of open water would change, with the boat channel freezing and a portion of the south lobe remaining ice free. Introduction of the relatively warm

creek water into the south lobe during the winter would also be expected to raise water temperatures of the south lobe slightly. However, the magnitude of the change on the overall backwater should be insignificant.

2. Current Patterns and Circulation

a. Current Patterns and Flow

Under current conditions, Kettle Creek inflows enter the boat channel and follow it until exiting the backwater through the railroad bridge. Due to differences in water temperature, the creek water and that of the boat channel tend to stratify, with the Kettle Creek inflows being shunted directly out of the backwater through the railroad bridge.

The proposed project would change current patterns and flow during the winter by diverting Kettle Creek inflows into the south lobe of the backwater. In the winter, stoplogs would be removed from an opening in the south wing wall to divert creek flow into a 3-foot-deep diversion channel approximately 300 feet long carrying the flow into the south lobe. This opening would be stoplogged to prevent creek flow into the south lobe during the remainder of the year. The central weir would have an opening 2 feet deep by 3 feet wide which would be stoplogged during the winter to divert creek flow. The rest of the year, the stoplogs would be removed, allowing creek flows into the boat channel and giving fish ingress to and egress from the creek. High creek discharges would overtop the weir and flow down the boat channel as at present.

b. Velocity

With the proposed project, water movement through the boat channel during the winter would be eliminated (except when Pool 9 is above normal level or when Kettle Creek flows were greater than normal). However, during the remainder of the year a 2-foot-deep by 3-foot-wide notch in the weir would be opened, allowing creek inflows to enter the boat channel. With the notch open, water velocity would be the same as under current conditions, except in the immediate vicinity of the control structure. During the winter months, Kettle Creek inflow would be directed via a diversion channel into the south lobe of the backwater, changing flows and water velocities in this area. However, with flows of only 2 to 3 cfs, the change from current velocities would be negligible.

c. Stratification

The proposed fill activities would have no appreciable effect on overall stratification conditions. However, during the winter months, Kettle Creek inflows would be diverted into the south lobe of the backwater. It is expected that the warmer creek water will tend to stratify, staying at the surface until it cools sufficiently, sinks, and mixes with the water in the backwater.

d. Hydrologic Regime

The proposed project would not affect the hydrologic regime.

3. Normal Water Level Fluctuations

The proposed fill activities would have no effect on normal water level fluctuations downstream of the control structure. The weir and wing walls would be designed so that flooding of the north and south peninsulas would be the same as under current conditions. Under normal conditions on the Mississippi River and Kettle Creek, the weir would have no perceptible effect on stages. However, during major Kettle Creek runoff events, stages upstream of the control structure would increase slightly; analyses show that with the proposed project in place, a 100-year Kettle Creek flood would be less than 1 foot higher upstream of the Highway 35 bridge.

4. Salinity Gradient

Not applicable.

5. Actions Taken to Minimize Impacts

Placement of fill material would be done by mechanical means during periods of normal to low water.

C. Suspended Particulate/Turbidity Determination

Construction of the diversion structure would cause temporary increases in turbidity in areas adjacent to the construction activities. Channel flows would tend to direct any turbidity plumes down the boat channel and out through the railroad bridge. These increases, however, would be temporary and conditions would quickly return to normal after construction was completed.

Dredging and the placement of dredged material in the proposed disposal site would cause temporary increases in turbidity and suspended solids near the areas of these activities. Dredging would be done mechanically to keep particulate suspension and turbidity to a minimum.

1. Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site

Although temporary increases in suspended particulates and turbidity would occur during project construction, conditions would quickly return to normal after construction.

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

No effects are expected on light penetration, toxic metals, organisms, pathogens, or aesthetics of the water column after the project is in place.

Diversion of Kettle Creek inflows into the south lobe of the backwater during the winter would promote mixing of the oxygenated creek water with that of the south lobe. It is anticipated that a minimum of 50 percent of the south lobe would maintain DO levels in excess of 5 mg/l with the proposed project, a substantial improvement over current conditions.

3. Effects on Biota

Biota in the vicinity of the diversion structure would be eliminated or disturbed during project construction. However, the area would quickly be recolonized. The rock fill would provide a more stable and diverse substrate than currently exists.

Construction of the dredged material disposal area on the north peninsula would eliminate the biota in that area. However, the major plant species in the area is purple loosestrife, a plant with very little value as food or habitat for birds or other wildlife. Consequently, its loss is not considered significant. Once the dredged material had sufficiently consolidated, the area would be planted with native plants and grasses.

4. Actions Taken to Minimize Impacts

No special actions are anticipated.

D. Contaminant Determinations

An analysis of the material proposed for removal from the backwater by dredging has been completed. The results of bulk chemical analysis indicate that contaminants of concern are comparable to those of other backwater sediments of the Upper Mississippi River. No pesticides or PCBs were present at detectable levels in the samples tested. Construction of the diversion structure, dredging, and placement of dredged materials should not result in the relocation or increase of contaminants in the aquatic system.

E. Aquatic Ecosystem and Organism Determination

1. Effects on Plankton

During construction, increases in turbidity and suspended solids would have a localized suppressing effect on phytoplankton productivity. However, these local effects are not considered significant. The plankton populations would recover quickly once construction activities ceased.

2. Effects on Benthos

Approximately 1,100 sf of existing benthic habitat would be covered during construction of the diversion structure. Any existing benthic organisms in this area would be eliminated. However, the rock fill of the diversion structure and toe and bank protection would provide approximately 1,250

sf of more stable and diversified habitat that would be quickly colonized upon project completion.

The proposed dredged material disposal site is located in an area that is several feet above normal pool elevation. Use of this site would not affect any benthic communities.

3. Effects on Nekton

No effects on nekton are expected.

4. Effects on Aquatic Food Web

Providing the Cold Springs backwater with adequate DO levels during the winter months is expected to increase the total productivity of the area. There would, however, be a temporary disruption to the aquatic biota during construction.

5. Effects on Special Aquatic Sites

No special aquatic sites are located in the project area.

6. Threatened and Endangered Species

No known Federally- or State-listed threatened or endangered species would be affected by the project.

7. Other Wildlife

Construction of the proposed diversion structure is not anticipated to result in a significant change in the area's limited use by other wildlife.

The area proposed for placement of dredged material is densely vegetated primarily with purple loosestrife, a plant with very little value as food or shelter for wildlife. Consequently, the peninsula is little used by birds and other wildlife. The use of this area for dredged material disposal would not result in a significant loss of habitat. In fact, planting of more desirable species could enhance its use by wildlife.

8. Actions Taken to Minimize Impacts

No special actions are required.

F. Proposed Disposal Site Determinations

1. Mixing Zone Determination

Not applicable - The material would not be dispersed.

2. Determination of Compliance with Applicable Water Quality Standards

The proposed diversion structure would be constructed of steel sheetpile and rock fill. Rock fill would be obtained from approved existing pits and quarries in the area. Since this area does not have a history of contamination problems, applicable water quality standards should not be violated.

The dredged material disposal area would be constructed through shaping of the material at the site. Because no new material would be required and because construction would be done during periods of normal to low water, no contaminants should be introduced into the aquatic ecosystem.

Dredging would be done mechanically with dredged material placed in barges, moved to the disposal site, and mechanically unloaded. Temporary increases in turbidity and suspended solids are anticipated during handling of dredged materials. However, mechanical handling and the relatively clean material should insure against the introduction of contaminants into the aquatic ecosystem. Unless a flood event overtops the containment area before vegetation can be established, no significant movement of dredged material is expected after placement in the site.

3. Potential Effects on Human Use Characteristics

Because of the present and projected human use characteristics, the existing physical conditions, and the proposed construction methods, this proposed action would have no significant effects on human use characteristics.

G. Determinations of Cumulative Effects on the Aquatic Ecosystem

Implementation of the proposed action would cause no significant impact on the aquatic ecosystem.

H. Determination of Secondary Effects on the Aquatic Ecosystem

No significant secondary effects on the aquatic ecosystem would be expected from the proposed action.

III. FINDING OF COMPLIANCE WITH RESTRICTIONS ON DISCHARGE

1. No significant adaptations of the guidelines were made relative to this evaluation.

2. The proposed fill activity would comply with the Section 404(b)(1) guidelines of the Clean Water Act. The placement of fill is required to provide the desired benefits. Other alternatives would not provide the desired results.

3. The proposed fill activity would comply with all State water quality standards. The disposal operation would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4. Use of the selected disposal sites would not harm any endangered species or their critical habitat.

5. The proposed fill activities would not result in significant adverse effects on human health and welfare, including municipal and private water supplies and recreation and commercial fishing. It would not adversely affect plankton, fish, shellfish, wildlife, or special aquatic sites. Aquatic life and other wildlife would not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity, and stability and on recreational, aesthetic, and economic values would not occur. The diversion of Kettle Creek inflows into the south lobe would insure that the backwater would maintain adequate concentrations of DO, providing suitable habitat for aquatic organisms on a year-round basis. Dredging of a channel between deepwater areas of the backwater would insure that fish have access to areas with adequate DO on a year-round basis.

6. To minimize the potential for adverse impacts, construction would be done during periods of normal or low water levels. Since the proposed action would result in few adverse effects, no additional measures to minimize impacts would be required.

7. On the basis of this evaluation, I specify that the proposed disposal site complies with the requirements of the guidelines for discharge of fill material.

11 Apr 91
Date

Roger L. Baldwin
Colonel, Corps of Engineers
District Engineer

TABLE 1
Cold Springs Sediment Sample Analysis

Sample Collected by: COE
Sample Date: June 20, 1990
Analyzed by: Twin City Testing between June 21 and July 30, 1990

Parameter, mg/kg	Top Layer	Bottom Layer	LDL
Arsenic	3.7	3.4	0.16
Cadmium	2.4	1.8	0.5
Chromium	16	11	0.5
Copper	66	60	0.5
Lead	9.5	13	5.0
Mercury	0.025	0.033	0.02
Manganese	550	640	0.5
Nickel	13	10	0.5
Selenium	ND	ND	0.33
Zinc	67	50	0.5
Ammonia	5.8	5.0	0.10
Cyanide	ND	ND	0.2
Moisture, %	32.20	23.76	0.1
Total Organic Carbon, %	2.18	1.56	0.0001
Total Solids, %	67.80	76.24	0.01
Volatile Solids, %	4.01	2.84	0.01

Pesticide/PCB Results

Parameter (ug/kg)			
A-BHC	ND	ND	1.0
B-BHC	ND	ND	1.0
D-BHC	ND	ND	1.0
Chlordane	ND	ND	1.0
4,4'DDD	ND	ND	1.0
4,4'DDE	ND	ND	1.0
4,4'DDT	ND	ND	1.0
Dieldrin	ND	ND	1.0
Endrin	ND	ND	1.0
Heptachlor	ND	ND	1.0
Lindane (G-BHC)	ND	ND	1.0
PCB 1016	ND	ND	1.0
PCB 1221	ND	ND	5.0
PCB 1232	ND	ND	5.0
PCB 1242	ND	ND	5.0
PCB 1248	ND	ND	5.0
PCB 1254	ND	ND	5.0
PCB 1260	ND	ND	5.0

mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram

LDL = lower detection limit

TABLE 2
Cold Springs Sediment Sample Analysis
Grain Size Distribution Data

Sample Collected by: COE
Sample Date: June 20, 1990
Analyzed by: Twin City Testing between June 21 and July 30, 1990

Sieve	Size, mm	Percent Finer Top Layer	Size, mm	Percent Finer Bottom Layer
Mechanical Analysis Data				
#10	2.000	100.0	2.000	100.0
#40	0.420	99.7	0.420	99.7
#100	0.149	99.0	0.149	94.2
#200	0.074	94.6	0.074	85.8
#270	0.053	90.4	0.053	80.9
Hydrometer Analysis Data				
	0.0274	61.7	0.0289	52.8
	0.0189	47.1	0.0198	38.3
	0.0117	34.0	0.0121	26.6
	0.0085	28.2	0.0087	22.3
	0.0061	23.8	0.0063	17.9
	0.0013	15.8	0.0013	12.1
+ 3 inch, %		0.0		0.0
Gravel, %		0.0		0.0
Sand, %		5.4		14.2
Silt, %		72.9		70.3
Clay, %		21.7		15.5

TABLE 3
Cold Springs Sediment Sample Analysis

Sample Collected by: Corps of Engineers
Sample Date: August 20, 1987
Analyzed by: Precision Analytics, Inc.

Parameter (ug/kg)	
Metals	
Arsenic	< 0.0011
Cadmium	< 0.615
Chromium	20.213
Copper	18.243
Lead	9.828
Mercury	< 0.0003
Nickel	54.545
Selenium	18.630
Zinc	87.500
Manganese	840.385
Chlorinated Hydrocarbons	
Aldrin	< 5.0
BHC	< 5.0
Chlordane	< 5.0
DDD	< 5.0
DDE	< 5.0
DDT	< 5.0
Dieldrin	< 5.0
Endrin	< 5.0
Endosulfan I & II	< 5.0
Heptachlor	< 5.0
Heptachlor Epoxide	< 5.0
Lindane	< 5.0
Methoxychlor	< 5.0
PCB	< 5.0
Chlor. Phenoxy Acid Herbicides	
2,4-D	< 5.0
2,4,5-T	< 5.0
Silvex	< 5.0
Total Available Cyanide	< 5.0
Ammonia Nitrogen	2.43
Total Solids, %	90.10
Volatile Solids, %	2.90
Total Organic Carbon, %	4.61
Percent Moisture (wet basis)	9.90

Note: The < designation indicates parameter was not detected at that minimum detection limit.

TABLE 4
Cold Springs Sediment Sample Analysis

Sample Date: February 3, 1987
Collected by: Wisconsin DNR
Inorganic and Organic Analysis by:
Wisconsin State Laboratory of Hygiene, Madison, WI
Particle Size analysis by:
University of Wisconsin - Extension Soil and Forage Analysis Lab
Marshfield, WI

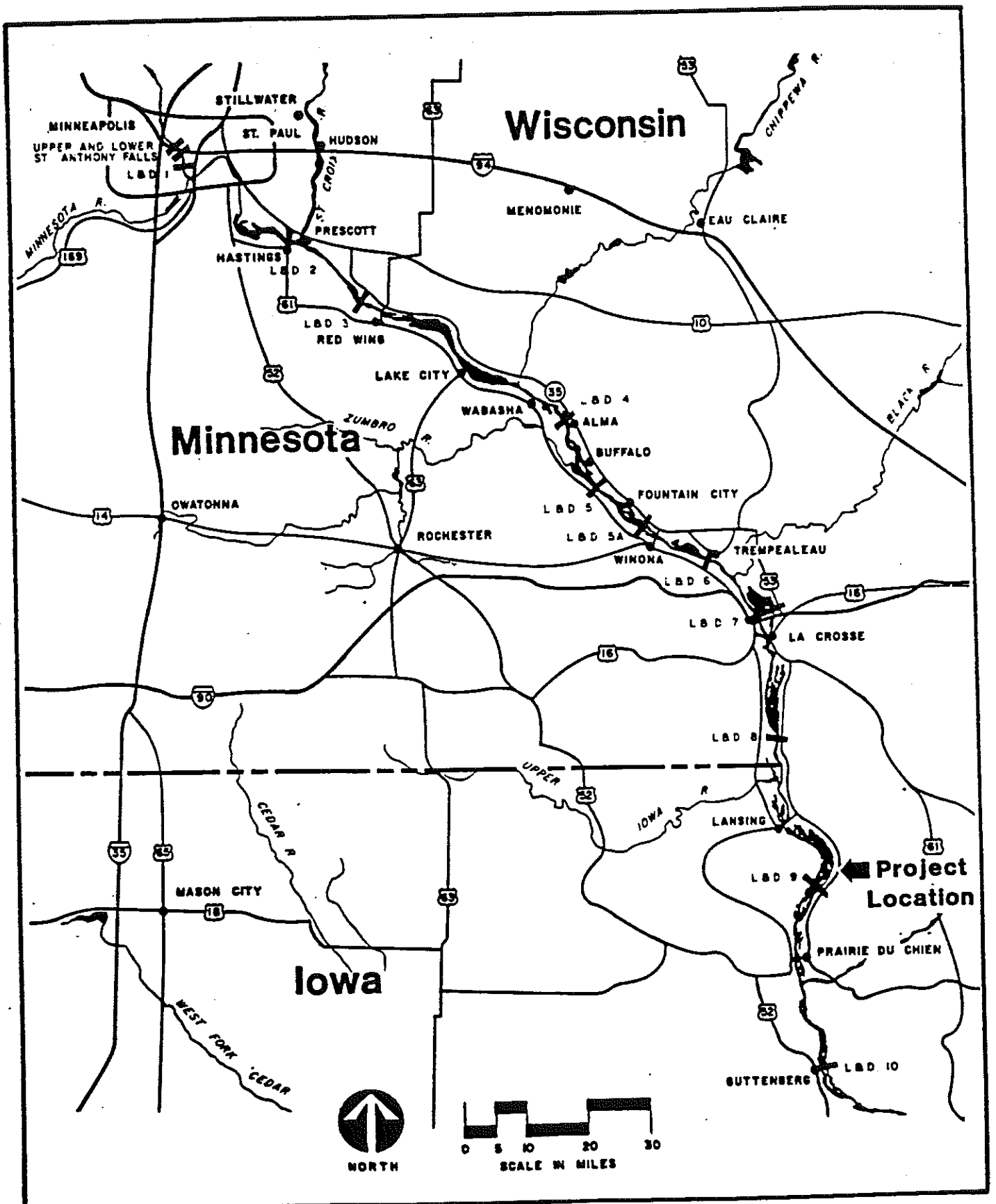
Parameter	Core Strata* 0-1.5 ft	1.5-3.0 ft	3.0-5.0 ft
Arsenic ug/g	9.6	9.9	2.1
Cadmium ug/g	< 1	< 1	< 1
Copper ug/g	23	25	9
Nickel ug/g	33	30	14
Lead ug/g	14	15	< 5
Zinc ug/g	120	100	21
Manganese ug/g	890	990	250
Total Organic Carbon %	2.1	ND	0.6
Total Volatile Solids %	5.6	4.1	1.4
NH3 - N ug/g	220	180	22
Sand %	3	12	82
Silt %	67	69	15
Clay %	30	19	3
Total PCBs ug/g	< 0.05	< 0.05	< 0.05
p,p DDE ug/g	< 0.01	< 0.01	< 0.01
cis-Chlordane ug/g	< 0.01	< 0.01	< 0.01
trans-Chlordane ug/g	< 0.01	< 0.01	< 0.01
cis-Nonachlor ug/g	< 0.01	< 0.01	< 0.01
trans-Nonachlor ug/g	< 0.01	< 0.01	< 0.01
Heptachlor Epoxide ug/g	< 0.01	< 0.01	< 0.01
Dieldrin ug/g	< 0.01	< 0.01	< 0.01
2,4,5-T ug/g	< 0.01	< 0.01	< 0.01
2,4,5-TP ug/g	< 0.01	< 0.01	< 0.01
2,4-D ug/g	< 0.01	< 0.01	< 0.01

Results expressed as dry weight.

* Represents net sample collected from core and does not reflect compaction or extrusion influences.

ND = No data

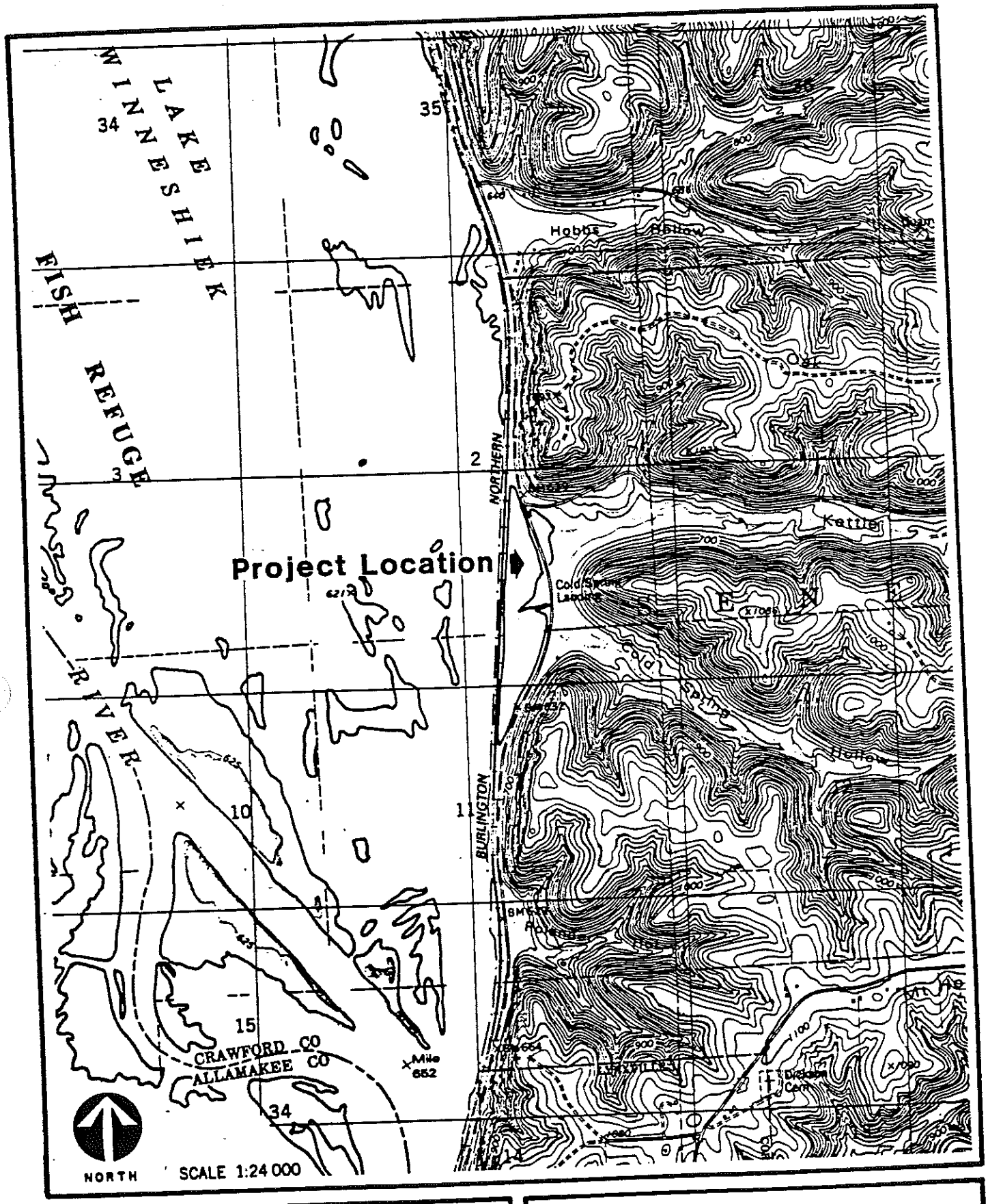
Other: Broken shell noted in the core sample at 3.2 and 5 feet. Compaction estimate of silt-clay materials was 62 percent.



Upper Mississippi River System
Environmental Management Program

General Area Map
Cold Springs
Pool 9 Mile 654

Figure 1

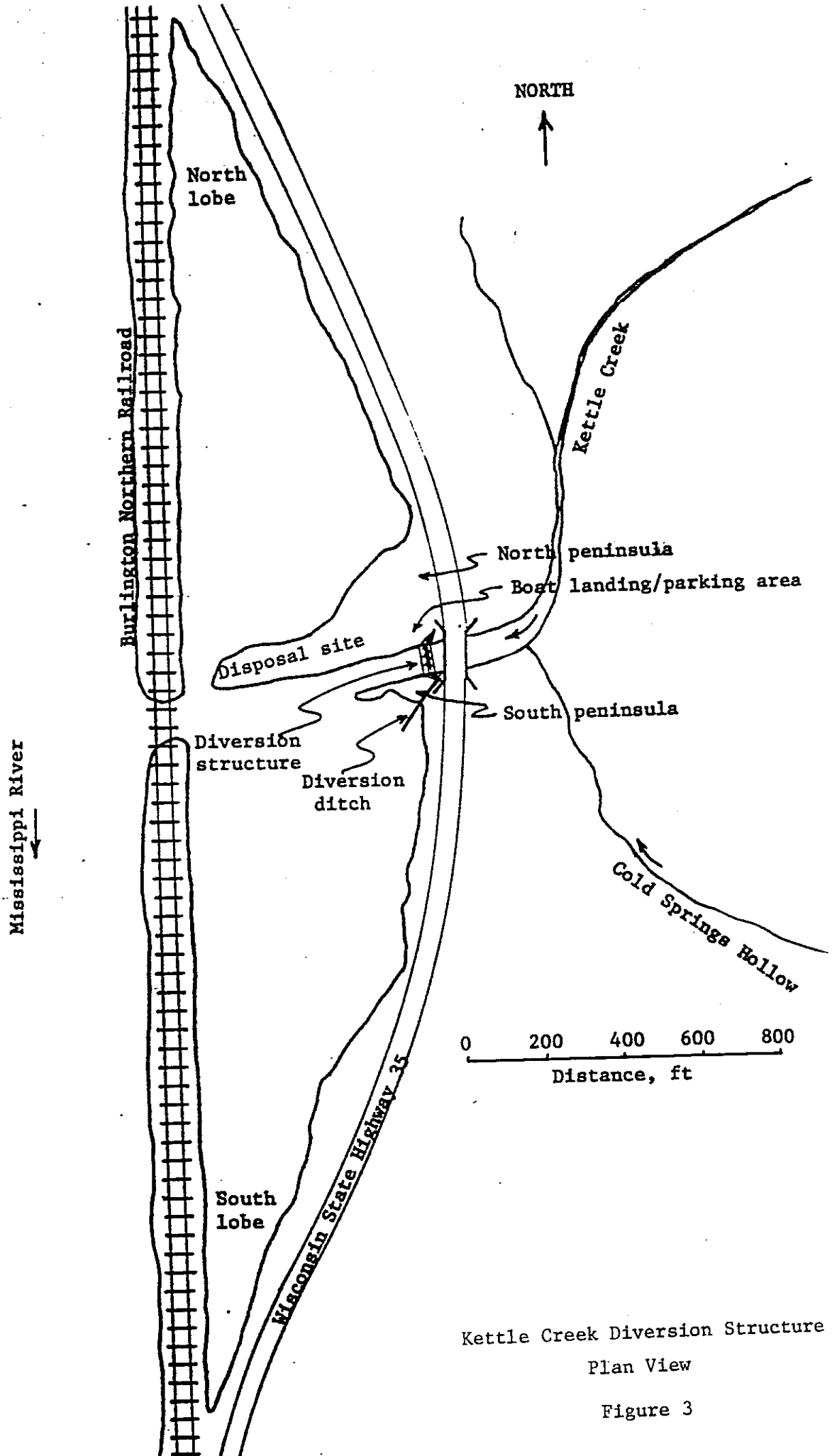


Upper Mississippi River System
Environmental Management Program

Project Area Map

Cold Springs
Pool 9 Mile 654

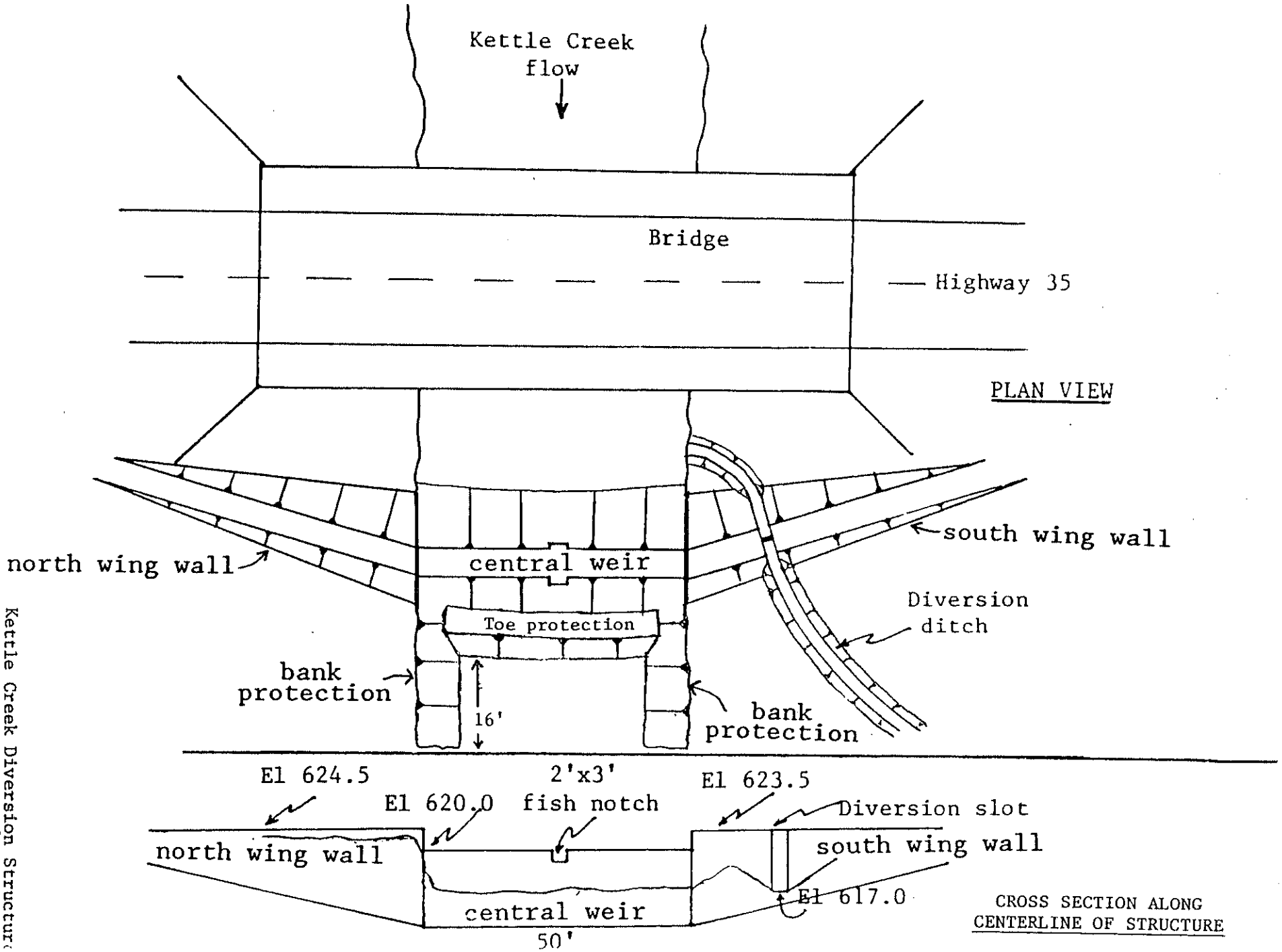
Figure 2



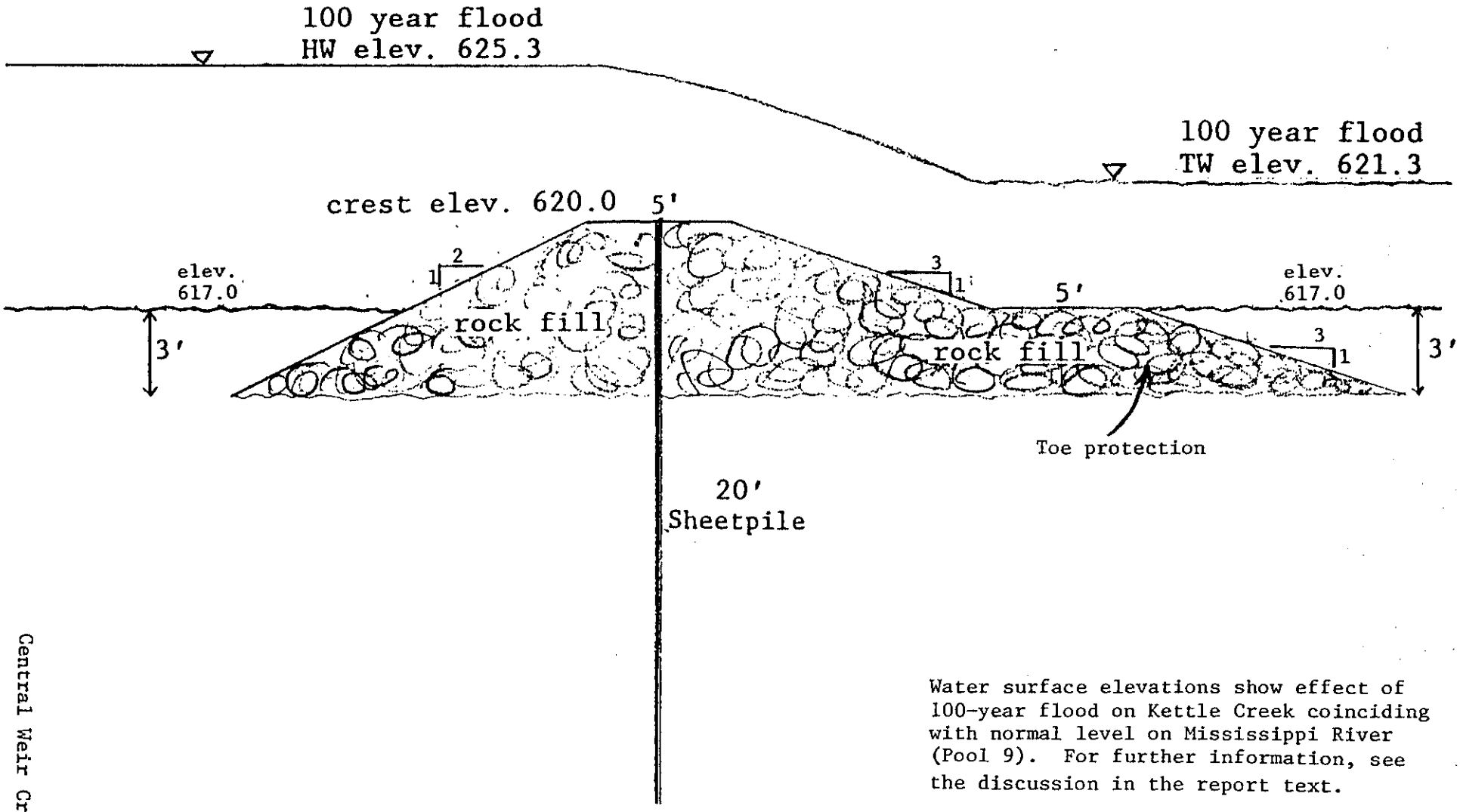
Kettle Creek Diversion Structure

Plan View

Figure 3



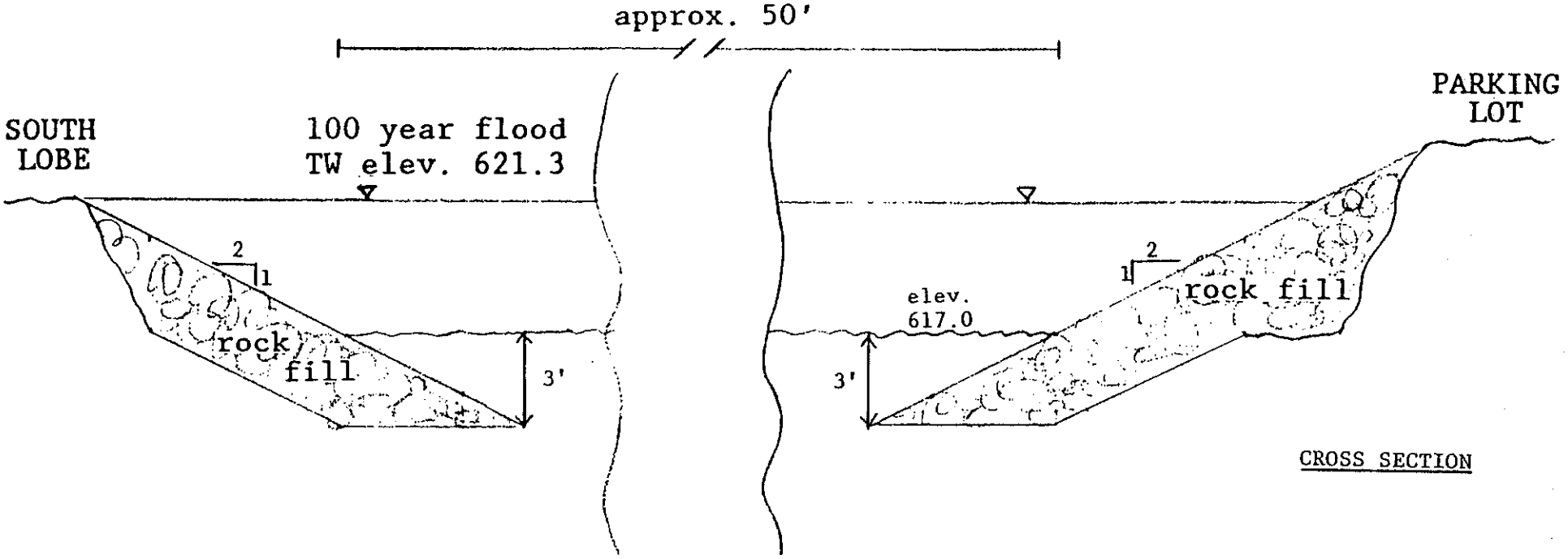
Kettle Creek Diversion Structur
Plan View and Cross Section



Water surface elevations show effect of 100-year flood on Kettle Creek coinciding with normal level on Mississippi River (Pool 9). For further information, see the discussion in the report text.

scale: 1"=5'

Figure 5 Central Weir Cross Section

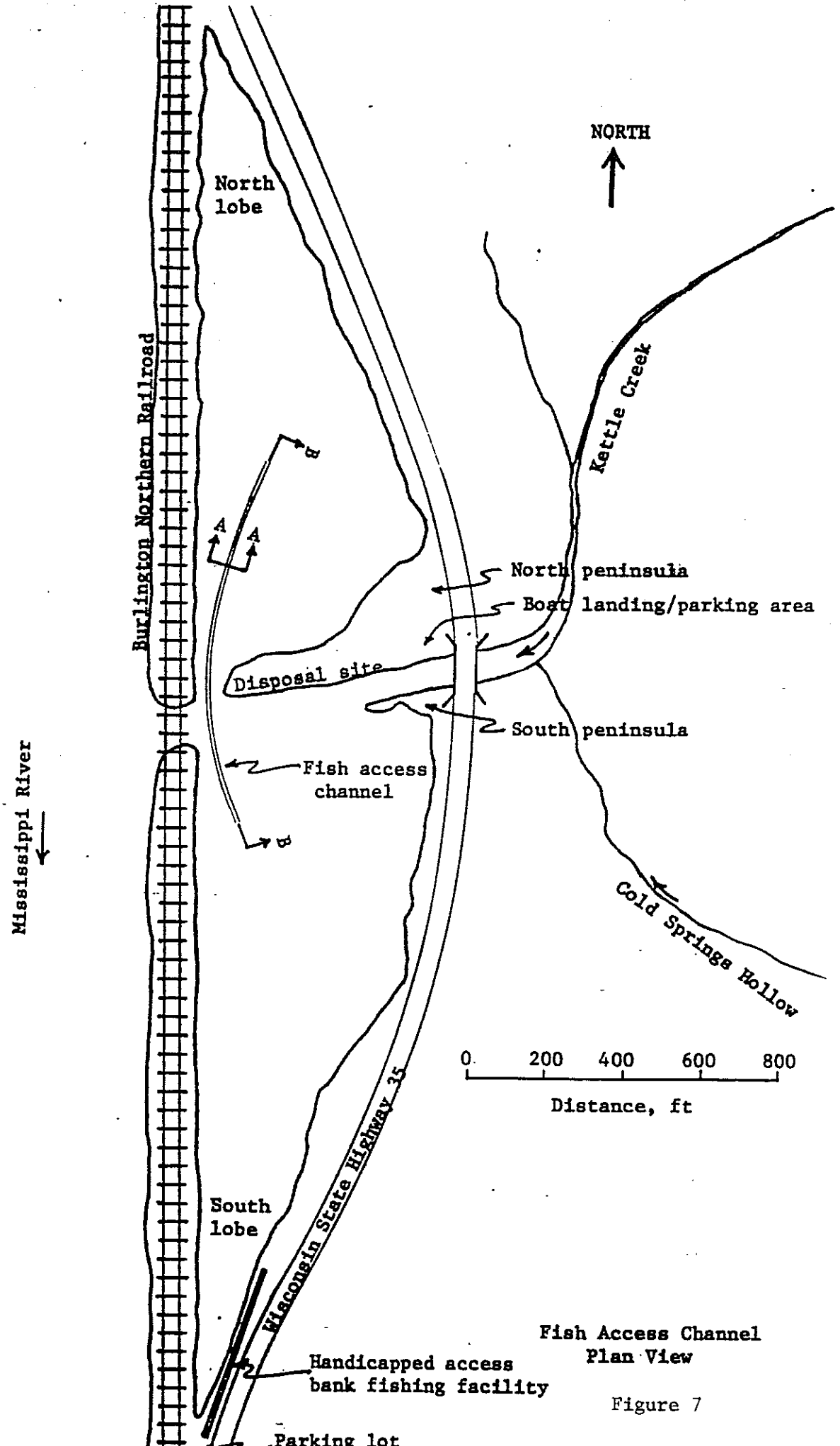


scale: 1"=5'

Water surface elevation shows effect of 100-year flood on Kettle Creek coinciding with normal level on Mississippi River (Pool 9). For further information, see the discussion in the report text.

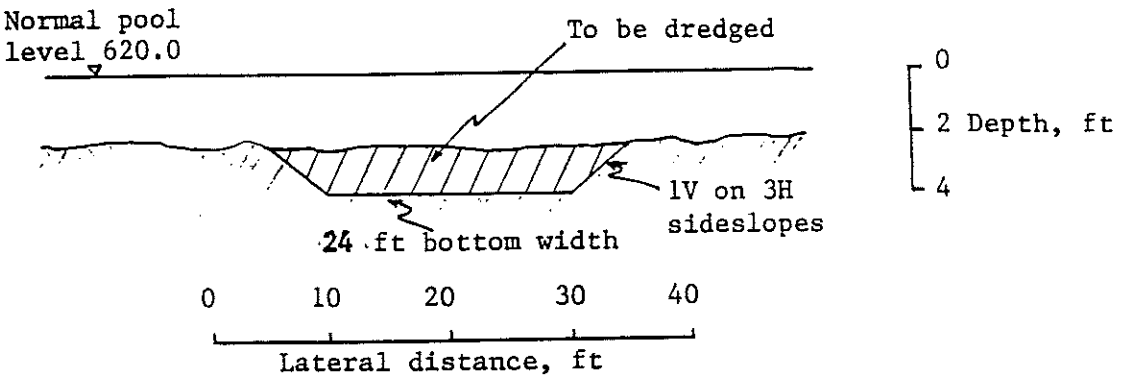
Figure 6

Bank Protection Downstream of Central Weir

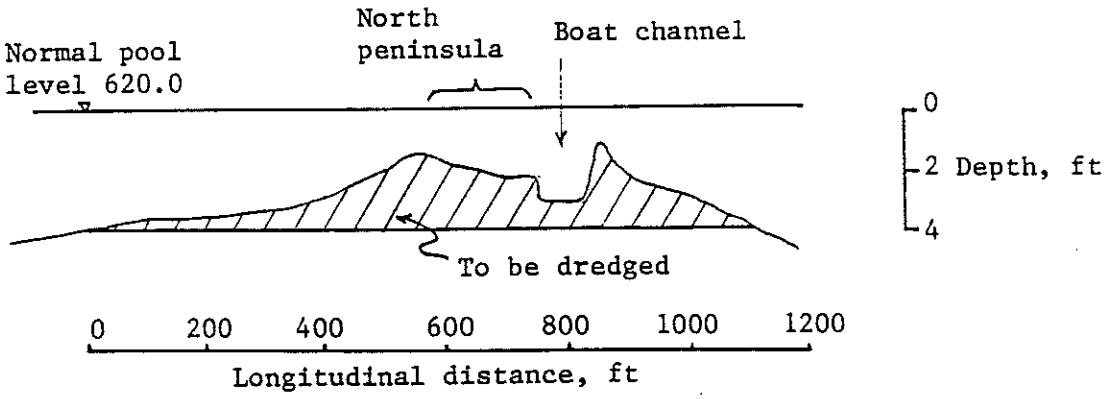


Fish Access Channel
Plan View

Figure 7



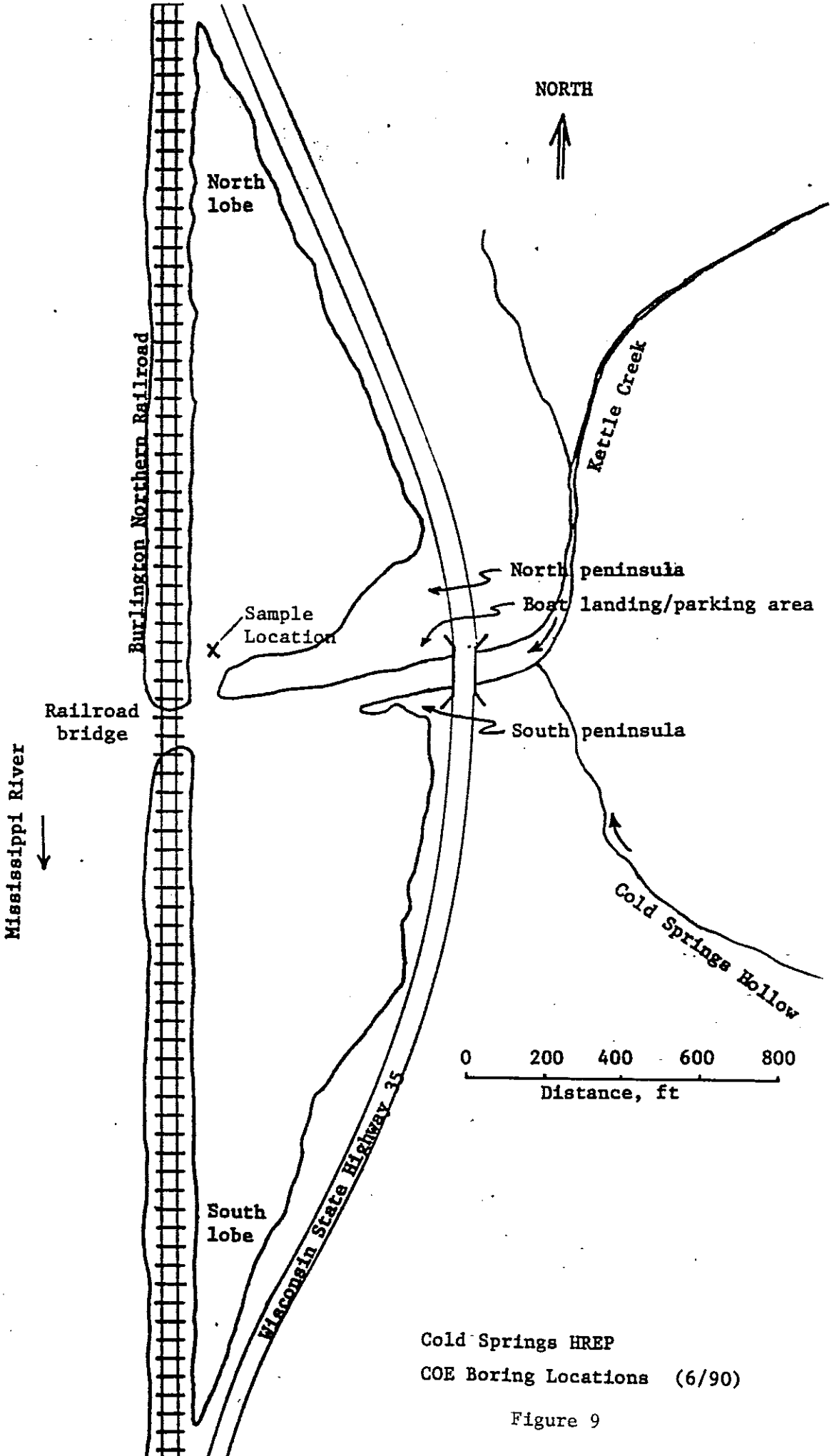
CROSS SECTION A-A



CROSS SECTION B-B

Fish Access Channel
Cross-sectional Views

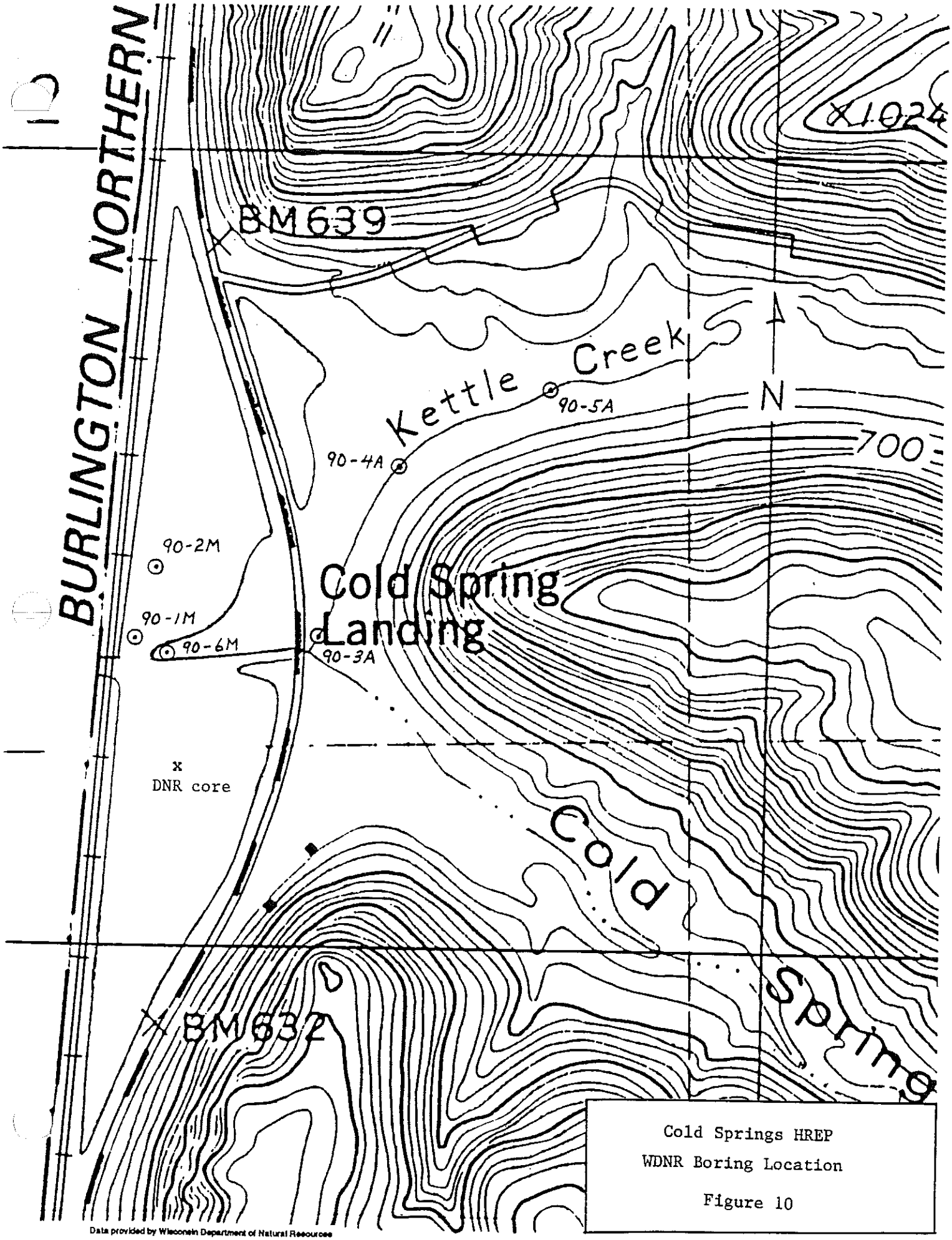
Figure 8



Cold Springs HREP

COE Boring Locations (6/90)

Figure 9



Cold Springs HREP

WDNR Boring Location

Figure 10

APPENDIX C

COORDINATION

TABLE OF CONTENTS

C-1

LETTERS OF INTENT AND MEMORANDUM OF AGREEMENT

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

IN REPLY REFER TO: 1490

April 3, 1991

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 Baldin:

The Wisconsin Department of Natural Resources supports construction of the Cold Spring Habitat Rehabilitation and Enhancement Project as described in the draft Cold Spring 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,

C D Besadny

C. D. Besadny
Secretary

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

APR 15 1991

United States Department of the Interior

FISH AND WILDLIFE SERVICE

FEDERAL BUILDING, FORT SNELLING
TWIN CITIES, MINNESOTA 55111

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

FWS/ARW-SS

JAN 10 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:

The U.S. Fish and Wildlife Service (Service) has reviewed the Definite Project Report-Environmental Assessment (SP-11) dated November 1990 for the Cold Springs Habitat Rehabilitation and Enhancement Project. This project, located in Pool 9 of the 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 Cold Springs project has been coordinated with the Service and we approve the project as planned and described in the Definite Project Report. The Service agrees with the preferred alternative described in the Environmental Assessment, dredging a fish access channel between the north and south lobes and diverting Kettle Creek with a weir and diversion channel into the south lobe. On November 5, 1990, the Refuge Manager, Upper Mississippi River National Wildlife and Fish 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's comments of January 9, 1990, on the problem analysis reports and comments of October 18, 1990, on the draft Definite Project Report, should be included in the final version of the Definite Project Report.

The Service will assure that operation and maintenance requirements of the project will be accomplished in accordance with Section 906(e) of the Water Resources Development Act of 1986. In accordance with the policies stated in the Fourth Annual Addendum, the Service will perform the operation and maintenance requirements for this project: setting stoplogs, and limited riprap replacement. Monitoring by the Service is not anticipated under this project.

The project is located on refuge lands, and 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,

Marvin E. Moriarty
Acting Regional Director

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

COLD SPRINGS

CRAWFORD 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 (USFWS) and the Department of the Army (DOA) will operate in constructing, operating, maintaining, repairing, and rehabilitating the Cold Springs separable element of the Upper Mississippi River System - Environmental Management Program (UMRS-EMP).

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. The project area is located on lands managed as a national wildlife refuge. Therefore, 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 Cold Springs 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 Cold Springs project provides for: (1) constructing a diversion weir and channel to direct Kettle Creek flows into the south lobe of the backwater during the winter to correct a dissolved oxygen deficiency and (2) dredging a fish access channel between the north and south lobes to allow fish to travel from an area of potentially inadequate dissolved oxygen to areas with sufficient dissolved oxygen.

IV. RESPONSIBILITIES

A. The DOA is responsible for:

1. Construction: Construction of the project consists of (a) constructing a diversion weir at the mouth of Kettle Creek and a channel from the weir into the south lobe of the backwater and (b) dredging a fish access channel connecting deep areas of the north and south lobes.

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 Cold Springs project as described in the Definite Project Report/Environmental Assessment, Cold Springs, Habitat Rehabilitation and Enhancement Project, dated March 1991, applying those procedures usually followed or applied in Federal projects, pursuant to Federal laws, regulations, and policies. The USFWS 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 the USFWS 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 USFWS.

B. The USFWS is responsible for:

1. Operation, maintenance, and repair: Upon completion of construction as determined by the District Engineer, St. Paul, the USFWS shall accept the project and shall operate, maintain, and repair the project as defined in the Definite Project Report/Environmental Assessment, Cold Springs, Habitat Rehabilitation and Enhancement Project, dated March 1991, in accordance with Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662.

2. Non-Federal responsibilities: In accordance with Section 906(e) of the Water Resources Development Act of 1986, Public Law 99-662, the USFWS 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:

USFWS: 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

BY: _____

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

DATE: _____

THE U.S. FISH AND WILDLIFE SERVICE

BY: _____

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

DATE: _____

CORRESPONDENCE REGARDING:

(1) PROPOSED COLD SPRINGS HABITAT IMPROVEMENT PROJECT

AND

(2) DRAFT DEFINITE PROJECT REPORT/ENVIRONMENTAL ASSESSMENT

The following correspondence was generated by agency coordination regarding the proposed Cold Springs project. The letters reflect agency viewpoints both pre- and post-Draft Definite Project Report/Environmental Assessment (issued in November 1990).

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES
Western District Headquarters
1300 West Clairemont Avenue
Call Box 4001
Eau Claire, WI 54702-4001

Carroll D. Besadny
Secretary

December 14, 1990

File Ref: 3500

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

Dear Col. Kowalski:

The Wisconsin Department of Natural Resources has examined the application of the Corps of Engineers for water quality certification for the Pool 9 HREP Project (Cold Spring), Mississippi River, Crawford County. This project involves the dredging of fish access channels into the north and south lobe of a backwater area and constructing a weir-type structure on the bed of Kettle Creek in order to divert water into the south lobe of the backwater area. The overall goal of the project is to divert water higher in dissolved oxygen into the backwater lobes in order to enhance and maintain the existing fisheries and aquatic habitat.

The Department is granting water quality certification because there is a reasonable assurance that the activity will be conducted in a manner that will not violate the standards enumerated in NR 299.05(1), Wisconsin Administrative Code.

The certification is granted provided the following conditions are met:

1. The Wisconsin DNR requests weekly monitoring of total suspended solids, ammonia nitrogen, pH, dissolved oxygen and water temperature during periods of dredging. Sampling should be conducted at two locations: the middle of the north and south lobes.

2. At least five working days prior to the beginning of the discharge, the applicant shall notify the Department of its intent to commence dredging. Please notify John Sullivan at La Crosse, WI (608) 785-9995.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

ST. PAUL FIELD OFFICE (ES)
50 Park Square Court
400 Sibley Street
St. Paul, Minnesota 55101

IN REPLY REFER TO:

SPFO

May 4, 1990

Mr. Robert Whiting
Environmental Resources Branch
U.S. Army Corps of Engineers
1135 U.S. Post Office and Custom House
St. Paul, Minnesota 55101-1479

Dear Mr. Whiting:

This is in response to your April 18, 1990 letter concerning potential impacts on federally endangered or threatened species from the proposed Cold Spring Project located in Pool 9 of the Upper Mississippi River. The project is proposed for implementation under the Environmental Management Program.

Based on information contained in your above referenced letter and the nature of the proposed project, its location, and the habitat requirements of the federally threatened bald eagle (Haliaeetus leucocephalus), endangered Higgins' eye pearly mussel (Lampsilis higginsi) and peregrine falcon (Falco peregrinus), we support your determination that the proposed project will not affect federally listed endangered or threatened 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 listed species may be affected, consultation with this office should be reinitiated.

These comments have been prepared under authority of and in accordance with provisions of the Endangered Species Act of 1973, as amended.

Sincerely,

for James L. Smith
Assistant Field Supervisor

cc: WI Dept. of Natural Resources, Madison
WI Dept. of Natural Resources, LaCrosse

THE STATE HISTORICAL SOCIETY OF WISCONSIN

H. Nicholas Muller III, Director

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

April 9, 1990

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

IN REPLY PLEASE REFER TO:
SHSW: #90-0078

RE: Enhance Fish Habitat at Cold Springs Landing Area

Dear Mr. Whiting:

Thank you for your correspondence of January 16, 1990, in which you described a proposed fish habitat enhancement activities at the Cold Springs Landing area. We apologize for the late date of our response.

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.

As you acknowledged in your letter, a number of mound groups are located in the project vicinity. It is likely that as-yet-undiscovered archeological sites are present also. We recommend, therefore, that all upland disposal sites, if any, be surveyed by a qualified archeologist to locate or relocate archeological sites that are present. When the survey has been completed, please provide two copies of the archeologist's report for our review and comment.

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

Sincerely,

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

RWD:lks/2718N
cc: Dave Berwick
2718N

United States Department of the Interior

IN REPLY REFER TO:

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

November 20, 1990

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

Dear Mr. Raster:

Enclosed is a signed compatibility determination for the alternatives A and D discussed in the draft Definite Project Report with Integrated Environmental Assessment (SP-11) for the Cold Springs 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: McGregor District
Chuck Gibbons, RO-SS

THE STATE HISTORICAL SOCIETY OF WISCONSIN

H. Nicholas Muller III, Director

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

December 13, 1990

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

SHSW 90-0078
Enhance Fish Habitat at Cold Springs Landing Area

Dear Colonel Baldwin:

Thank you for providing for our review a copy of the document entitled, "Draft Definite Project Report/Environmental Assessment (SP-11) Cold Springs Habitat Rehabilitation and Enhancement Project, Pool 9, Upper Mississippi River, Crawford County, Wisconsin."

Because project activities in the selected alternative will take place entirely within wetland areas, we agree with your conclusion that the project will not affect cultural resources.

If you have any questions, please contact Gretchen Block at 608-262-2732.

Sincerely,

Richard W. Dexter
Chief, Compliance Section

cc: Dave Berwick

RWD:JKP:jkp
3472N

Advisory Council On Historic Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

DEC 26 1990

Roger L. Baldwin, Colonel
District Engineer
St. Paul District, Corps of Engineers
Department of the Army
1421 U.S. Post Office & Custom House
St. Paul, Minnesota 55101-9808

RE: Draft Environmental Assessment
Cold Springs Rehabilitation
Pool 9, Upper Mississippi River, Wisconsin

Dear Colonel Baldwin:

On November 29, 1990, the Council received the referenced report for our review and comment.

We have completed our review and note a discrepancy in the Corps' and the SHPO's determinations. While the Corps has decided that there are no historic properties within the project area, the Wisconsin State Historic Preservation Office (SHPO) has requested an archaeological survey of any upland disposal areas because of the close proximity of the mound groups. Please inform us of your intentions regarding this matter.

If you have any questions, please contact Valerie DeCarlo at (202) 786-0505. Thank you for your cooperation.

Sincerely,

John E. Klima
Director, Eastern Office
of Project Review

January 28, 1991

Environmental Resources Branch
Planning Division

Valerie DeCarlo
Advisory Council on Historic Preservation
The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

Dear Ms. DeCarlo:

Enclosed please find a copy of your letter of December 26, 1990 concerning the Cold Springs Rehabilitation Project (Wisconsin) and a copy of a December 13, 1990 letter to our office from the Wisconsin SHPO reviewing the Environmental Assessment for the same project.

The Wisconsin SHPO had requested a survey of all upland areas that might have been affected by the Cold Spring Rehabilitation in response to our initial coordination letter. By the time the assessment was released, it had been decided that no upland areas would be utilized and the SHPO responded accordingly in its review of that document.

We apologize for any confusion this has caused in your office. We hope this clarifies the situation to your satisfaction.

Sincerely,

Robert J. Whiting
Chief, Environmental Resources Branch
Planning Division

UPPER MISSISSIPPI RIVER NATIONAL
WILDLIFE AND FISH REFUGE
Established 1924

Compatibility Study
COLD SPRINGS REHABILITATION

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 Cold Springs, a 35-acre backwater area located on the Wisconsin side of the Upper Mississippi River in Pool 9 and on the Upper Mississippi River National Wildlife and Fish Refuge. The Cold Springs backwater is connected to the Mississippi River via an approximately 40-foot-wide railroad bridge opening.

Kettle Creek, a spring-fed creek, provides an estimated base inflow of about 2 to 3 cubic feet per second (cfs) of fresh water to the Cold Springs backwater. The Kettle Creek watershed encompasses 5.4 square miles, 32 percent of which is in agricultural use with the remainder heavily wooded.

A peninsula, which extends over three-fourths of the distance across the backwater along the north side of Kettle Creek, divides Cold Springs into two distinct lobes. The southern lobe encompasses about 19 acres, the north lobe about 16. A public boat landing is located on the peninsula, and a dredged channel running west along the peninsula to the railroad bridge provides boat access to both lobes of the backwater and the Mississippi River.

The Cold Springs backwater has experienced significant sediment buildup since Pool 9 was created by the locks and dams, with some areas having accumulated over five feet of sediments. The subsequent loss of deep-water habitat has resulted in increased amounts of aquatic vegetation and, more important, periods of low dissolved oxygen (DO) levels during the winter months. Low DO levels are believed to be responsible for documented fish kills in the area

and are believed to result in temporary migrations of fish from the area. Forced movement of fish from their preferred habitat may have an effect on mortality due to higher predation and changes in available food supplies.

The overall purpose of the proposed project is to provide adequate levels of DO during the winter months and provide an access route for fish between areas with adequate DO within the backwater. This will be accomplished by dredging a fish access channel between the deep water area and an existing boat channel, and diverting Kettle Creek flows into the south lobe during the winter by constructing a weir and diversion ditch.

Complete 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-11) Cold Spring Habitat Rehabilitation and Enhancement, Pool 9, Upper Mississippi River, Crawford 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 detailed 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: _____ Project Leader — 11/5/90 Date

Richard J. Berry — Complex Manager — 11/5/90 Date

Reviewed by: _____ WAM 1 — 11/13/90 Date

Concurred by: _____ Regional Director — 11/15/90 Date

Acting

United States Department of the Interior

OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL AFFAIRS
230 S. DEARBORN, SUITE 3422
CHICAGO, ILLINOIS 60604

TAKE PRIDE IN AMERICA

ER 90/1041

January 3, 1991

Colonel Roger L. Baldwin
District Engineer
U.S. Army Engineer District
St. Paul District
1421 U.S. Post Office and Custom House
180 East Kellogg Blvd.
St. Paul, Minnesota 55101-1479

Dear Colonel Baldwin:

The Department of the Interior (Department) has reviewed the Draft Definite Project Report/Environmental Assessment for Cold Springs, Crawford County, Wisconsin Habitat Rehabilitation and Enhancement Project. The Department has no objections to the proposed project.

We appreciate the opportunity to provide comment.

Sincerely,

Sheila Minor Huff

Sheila Minor Huff
Regional Environmental Officer

COMMENTS AND RESPONSES REGARDING

DRAFT DEFINITE PROJECT REPORT/ENVIRONMENTAL ASSESSMENT

The following correspondence regarding the Draft Definite Project Report/Environmental Assessment issued in November 1990 includes from two to eight specific issues per letter. Following the set of letters is a set of responses numbered to correspond to numbers placed in the right margin next to each letter's issues.

1/17/91

Pam.

Letters like this make enemies but it isn't always possible to avoid it. If I had known that this project was in the works a year or two ago I would have put my 2¢ in at that time.

There are always beaver in Kettle creek by the Hwy 35 bridge. They have even gone by me when I was out wading in the north lobe fishing bluegills. It is likely that they will want to add to the diversion structure (if it is built) because it would be a natural place for them to want to work. This will cause continuous maintenance problems.

Also, if the structure is built there will be a tendency for people to remove the stop logs because fisherman will want the current to flow as it now does since it is a handy place to fish.

I can't imagine that diverting Kettle creek would add significantly to the O2 levels because it will only affect

lobe. It really isn't a problem (in my opinion) if the south lobe gets very low in oxygen because fish are able to move into the Kettle Creek channel when this happens. If the north-south channel is dug this will assure that fish have access to this area. (4

It appears to me that this proposa was not well thought out.

Roger Kerr

5388 Hwy MS
Boscobel, WI 53805

January 17, 1991

Mr. Robert Whiting
Chief, environmental Resources
St. Paul District, COE
1421 U.S. Post Office
St. Paul, MN 55101

Dear Mr. Whiting:

This letter is in regard to the proposed Cold Spring habitat enhancement and rehabilitation project in Pool 9 by Lynxville in Crawford County, Wisconsin.

I am a fish manager for the Wisconsin Department of Natural Resources and an avid bluegill angler. I have spent hundreds of hours in the fall and winter fishing in the Cold Spring area thus I have some knowledge of the existing situation. Winter (open water) angling for bluegills in the existing Kettle Creek channel west of the Highway 35 bridge (and often directly under the bridge) is without equal in southwest Wisconsin. On mild winter days it is not uncommon to find 10 to 20 anglers using this resource. Will this fishery be destroyed by the proposed diversion structure? It appears to me that it will because there doesn't appear to be any provision to create comparable bank fishing along the new channel. The south bank of the north peninsula provides convenient access to the open water area created by Kettle Creek and this is where people fish. Bluegills and various other fish move into this area by the thousands (probably from both the north and south lobes) during winter months. In my opinion the proposed diversion plan will merely move these fish from the existing channel to the new channel which won't have good bank access.

I believe, however, that the proposed channel dredging project between the north and south lobes would serve a useful purpose. The north lobe is on the verge of being completely cut off from the south lobe and if this happened it would destroy the existing fishery in the north lobe. Most of the fall fishing that I do is in the north lobe because this is where I have had my best success. Fish move into this area in the fall (at least this is what appears to happen) as part of their migration to wintering areas. The channel would assure that fish would have direct access to the oxygen rich area in the Kettle Creek channel.

In summary, the diversion structure and diversion ditch is a bad proposal; the channel dredging project is a good proposal.

I should add that I am writing this letter as a private citizen. I was not requested by my employer to review this project and I only learned about it two days ago.

Sincerely,

R. A. Kerr

Roger A. Kerr

Robert J. Whiting
Chief, Environmental Resources
St. Paul District, COE
1421 U.S. POST OFFICE
St. Paul, MN 55101
January 10, 1991

RE: Improving Fish Habitat--Cold Springs

Dear Mr. Whiting,

I have had the opportunity to review the proposal for enhancing fish habitat at Cold Springs. As an adjacent landowner and recreator on the Cold Springs waters I appreciate the opportunity to publically respond to the proposals.

Overall,considering the public use and overwintering potential offered by the Springs, I feel the project is too minimal. Furthermore, proposals for dredge spoil disposal is optimistic, at best.

Given even the moderate sedimentation rate of between .15 and .33 inches per year as we approach the second half of the projected 50 year plan the majority of the Springs area will not support fish. To maximize fish habitat substantially more dredging should be authorized while the dredge is in place. My recommendation is to dredge all areas to a depth of four feet. To do less is to encourage schooling of large numbers of fish in the proposed new dredge area and along the aeration channel. I have witnessed large die-offs of shad and bluegill in the present boat access as a result of such winter overcrowding.

A more agressive dredging policy will not only expand the areas actually useable by fish--both winter and summer--but will prevent such potential die-offs. Further, it will ensure that the projected maximum 50-year use will provide <u>quality</u> habitat throughout its duration. Should such increased water depth encourage greater populations of rough fish, the area is ideal for contract agreements with local commercial fishermen to remove them.

We are concerned, considering dredging activities which have occurred in the Springs in the past, for your dredge spoil disposal plan. First, previous dredge spoil sloughed into the present boat access very shortly after it was placed. We feel some bank stabilization--whether rip-rap or sheet piling--be included not only on the disposal site, but along the aeration channel as well. Without these measures the dredge muck will quickly end up back in the water. This process is aggravated by occassional local flooding from Kettle and Cold Spring hollow, as well as flooding of the Mississippi proper. It is not uncommon for the proposed spoil site to be under several feet of water.

RICHARD WELSH

Office 608-375-5567 | 602 West Bluff, Apt. 12 Boscobel, WI 53805 | Home 608-375-2675

Biologically I also question the premise on which an aeration channel for the South lobe is predicated. Since Kettle Creek essentially begins on out property we are aware of its sporadic and unpredictable flow. The seven primary springs which create the majority flow are frequently inactive. We would ask you to seriously reconsider--despite the cited potential problems--including the artesian enhancement of waterflows upstream from the actual project areas. This, coupled with spring-head redevelopment and some minimum retainage of upstream water should be included in your planning. We would welcome any opportunity to discuss this in detail, should you so desire, and work cooperatively with you on such a component of the Cold Springs project. (11

While I realize that this project is a fish habitat improvement plan, I encourage you for the sake of conserving funds to include enhanced access to the fishing--either unilaterally or in cooperation with another Bureau or Agency. Toward that end I suggest creating flat/retained walkway areas on both sides of the proposed aeration area. In addition to providing access to the fish, it creates an area to place additional dredge spoil. (1.

Furthermore, since according to your own assessment, the present boat access channel deprived of fresh inflow will freeze over earlier in the winter. What is currently a marginal launch channel now, will be unuseable with the weir in place. It is likely it will further degrade because of the dumping of suspended sediment immediately below the structure. We suggest mitigating such eventualities by redredging the existing boat access channel as a part of the project. (1

An alternative would be to more agressively dredge the proposed diversion channel, stabilize its banks, and use the new channel as a boat channel. This would allow longer boats such as pontoons and easier ingress and exit from the grossly inadequate area. In addition, these channels <u>are</u> important habitat areas for Cold Springs. They should not be neglected in a habitat improvement project. (1

We appreciate the opportunity to provide input into this important project. We hope you seriously consider our suggestions and include them in the project.

Thank you.

Richard Welsh

and

Larry Welsh

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Wisconsin Department of Natural Resources
State Office Building
3550 Mormon Coulee Road
LaCrosse, WI 54601

Carroll D. Besadny
Secretary

December 14, 1990

Colonel Roger Baldwin, District Engineer
St. Paul District
Corps of Engineers
1421 U.S. Post Office and Custom House
St. Paul, MN 55101-9808
ATTN: CENCS-PD-FS

Dear Col. Baldwin,

We support the general concept of the Cold Springs Habitat Rehabilitation and Enhancement Project as defined in the draft Definite Project Report/Environmental Assessment. We are providing you with the following specific comments on the report. In addition, we have corresponded with Tom Raster on detailed minor changes and suggestions for the public meeting.

You have correctly noted on Page 25 that under the aeration option Wisconsin would require the open water area to be barricaded or fenced. However, with the preferred alternative of dredging fish access channels and creek diversion, we do not feel that this is necessary. Instead, we will be asking the FWS to put up educational signs at access points to inform the users of changes that have occurred at the project site and the resulting differences in ice conditions. This has worked successfully on the Lake Onalaska and Bertom-McCartney HREP's. Please make the appropriate changes on Pages 26, 32, 41, 43, 44, and elsewhere to reflect this. (1

Page 30. - There is no contingency for placement of fine material at an upland site, should the north peninsula material not be suitable for WDOT's parking lot fill. Are you waiting until the plans and specs stage? We feel that the hollowing out of the site is necessary in order to maximize the capacity of the site. (1
This material should be placed above the ordinary high water mark of the stream and steps should be taken to insure that none of the material sloughs into the surrounding waterway.

No mention was made of our concept to extend the life of the project and to improve water exchange by dredging an area west of the south peninsula from the center of the boat channel south to intercept with the 4 foot contour of the south lobe. This (1
suggestion was presented to the COE in letters dated October 18, 1990, and October 24, 1990.

Page 30. - This project does not meet the criteria for exemption from state permits because it is not directly related to channel maintenance dredging. The weir structure is considered a structure according to the statutory definitions. This structure must be authorized in accordance with Wis. Stats. 30.12 prior to construction. The Corps, who we assume are the riparian owners of the adjacent property, will have to make proper application for this permit. The riparian land owner, according to statute, is the only one who can apply for a structure permit. A public notice will be required for the weir structure as part of the statute requirements. (18)

Page 44. - We will consider the needs of bank fishermen and people desiring boat access, but the over-riding factor is the chemical (DO) need of the south lobe. Our timing will be driven by biological needs. Omit the first 3 lines of Page 44. (19

Figures. - When we provide graphic or tabular on a habitat project, we are doing so to transfer information, usually on short notice. In most cases, this material will not be camera ready for a report. We realize that preparing the graphics and tables for publication may take you more time, but the end result will be a more professional report. For example, Figures 7 and 8 in the DPR and Fig. 8 in the 404 are not readable or report quality. We would appreciate acknowledgement of the WDNR on the figure for our data collection. (20

We hope these comments are helpful. If you have any questions concerning our comments, please contact me, Jeff Janvrin, at the above address or call (608) 785-9005. We would appreciate your feedback on the comments we provided. Thanks for the opportunity to provide input on the Cold Springs DPR.

Sincerely,

Jeff Janvrin
Mississippi River Habitat Specialist

cc: Keith Beseke, FWS
Gary Ackerman, Iowa DNR
John Sullivan, WDNR
Pam Thiel, WDNR
John Lyons, FWS
Mark Endris, WDNR
Tom Raster, COE
Edward Bourget, WDNR

Wisconsin Department of Transportation

TRANSPORTATION DISTRICT 5
3550 Mormon Coulee Road
P.O. Box 337
La Crosse, WI 54602-0337

January 10, 1991

Mr. Tom Raster
Corps of Engineers, St. Paul District
1421 U.S. Post Office & Custom House
St. Paul, Minneosta 55101 - 1479

Subject: I.D. 5161-03-00
Lynxville - DeSoto
S.T.H. 35, Crawford County
Cold Springs Habitat Rehabilitation and
Enhancement Project

This letter is in response to your request at the public information meeting held on December 18, 1990 concerning the project's effect on S.T.H. 35.

Our major concerns with the C.O.E. Cold Springs Enhancement Project are the increase in backwater caused by the proposed weir, the high water elevation and water velocity through the highway bridge. You stated that the Corps would be running an HEC II on Kettle Creek to determine the backwater elevation for the highway structure. (21

The Wisconsin Department of Transportation will cooperate in the disposing of the approximate 3,000 C.Y. of excavation from the Cold Spring Project, provided the material is usable for highway construction, and the construction sequences between the two projects can be scheduled to coincide. (22

We hope to work with you for a satisfactory conclusion of both our projects.

Sincerely,

Lorenz A. Bischel, P.E.
District Design Supervisor

GND:cw

DT10R

1. The diversion structure would be located adjacent to the heavily-used public boat ramp and parking lot. It is likely that the large amount of vehicular, boat, and shore fishing traffic will deter beaver activity.

2. The stoplogs would be locked in position to guarantee that resource management personnel retain control of operation. Public meetings could be held to gather and distribute information regarding project operation to maximize public support and cooperation.

3. Under current conditions during the winter, the relatively warm, highly oxygenated Kettle Creek inflow tends to stratify on the colder, denser water in the boat channel and shunt directly out of the backwater through the railroad bridge. Consequently, creek water is not mixing with and oxygenating the water in the backwater. Kettle Creek inflows diverted into the south lobe would initially form a surface layer of relatively warm creek water on top of the colder water in the south lobe. As the creek water spread and cooled and density differences diminished, the creek water would sink and mix with the lobe water. Equally important, the warm surface layer would tend to prevent ice formation, with the open water resulting in additional oxygenation of south lobe waters. The amount of open water and mixing and the extent of the south lobe affected would depend on many factors, including creek flow, wind, and temperature.

4. Under current conditions, both lobes of the Cold Springs backwater experience unacceptably low dissolved oxygen (DO) in the winter. Consequently, fish in these areas are forced out of their preferred habitat into areas with sufficient DO. Although the boat channel has acceptable DO, it lacks room for all the fish in the backwater, which forces some to move into the river. Crowding of fish in the boat channel has detrimental effects. Fish die-offs, particularly gizzard shad, are relatively common and may be caused by overcrowding with resultant stress, oxygen depletion, thermal stress, or some other unknown factor. Forced movement of fish from their preferred backwater habitat can increase fish mortality due to higher predation and/or a change in food availability.

The wintertime diversion of Kettle Creek inflows into the south lobe would provide a substantial area of preferred habitat with suitable DO. Dredging a fish access channel between the two lobes would ensure unimpaired fish movement throughout the backwater.

5. The proposed diversion structure would improve the fish habitat as reflected by the additional habitat units that would be generated (Table 2 in the Definite Project Report/Environmental Assessment). Bank fishing along the south shore of the north peninsula is dependent on the presence of open water in the boat channel. At normal pool, the diversion structure would divert all creek flow during periods of minimal creek flow; under these conditions, the boat channel would tend to ice over earlier than at present. However, greater than normal pool elevations or creek flows could overtop the weir and a portion of the warm creek water maintain open water in the boat channel for shore fishing opportunities. Bank fishing would be available to some extent from the south peninsula and the east bank of the south lobe. The present congregation of thousands of fish in the boat channel might be contributing to stress-related fish dieoffs; the proposed diversion is likely to reduce overcrowding.

6. The fish access channel would improve movement to and from both lobes and the boat channel. At present, the boat channel, with its relatively sterile bottom and nearly uniform depth of 3 to 4 feet, offers little to the fish except an oxygen-rich environment. The south lobe, if oxygenated as proposed, would provide a more complete habitat, including more room, refuge from predators, and a range of depths.

7. A 1989 assessment of the sedimentation rate attributed 0.1 inch per year to Kettle Creek, 0.02 inch per year each to pool 9 fluctuations and wind set-up, and relatively insignificant amounts to other sources. The total, with allowances for error, is estimated at 0.15 to 0.3 inch per year. A recent analysis indicates that, at the end of 50 years, over 40 percent of the Cold Springs backwater will be greater than 4 feet deep. This percentage compares favorably to the present figure of 46 percent over 4 feet deep, which is very

close to the 50 percent considered optimal by biologists using the winter habitat suitability model for the target fish species.

8. Because the portion of the backwater over 4 feet deep is relatively close to the 50 percent figure considered optimal, dredging all areas to a depth of 4 feet would not improve habitat value substantially. On the other hand, such dredging would increase costs greatly, largely because no cost-effective areas for disposal of even moderate amounts of dredged material have been identified. Such dredging would sacrifice shallow wetland areas vital to muskrats, wading birds, amphibians, and other creatures and would be counter to the Federal policy against a net loss of wetlands.

9. The dredging suggested in the letter would increase the opportunity for fish movement and would delay but not solve wintertime DO deficiencies, the critical factor. Consequently, because fish school in areas with sufficient DO, we could expect continued wintertime overcrowding and die-offs in the boat channel, probably to about the same extent as at present. The proposed project would greatly increase the portion of the backwater with adequate DO, which should reduce both the crowding in the boat channel and the frequency and severity of the die-offs.

10. Disposal would take place in a shallow depression on the north peninsula (excluding the boat landing and parking area). Construction equipment would prepare this depression by moving material from the interior of the peninsula to the perimeter to form a berm that would assist in confining the dredged material. The Definite Project Report/Environmental Assessment notes that, if detailed survey data show that additional disposal capacity is needed, the necessary quantity of existing material could be excavated from the peninsula and, if this material has suitable engineering properties, used for fill at a proposed parking lot for a shore fishing facility at the south end of the south lobe. The peninsula would be revegetated with native plants and grasses after disposal of the dredged material, which should help reduce erosion.

11. Minimum creek flows recorded by the Wisconsin Department of Natural Resources are adequate to provide the desired aeration benefits for the south lobe. Therefore, development of artesian wells to supplement creek flows is not needed and, in fact, has several potential drawbacks, including considerable cost, uncertain output until wells are drilled, possible well interference which might further reduce output, and iron precipitate which might pose problems in and around spawning areas. Springhead capture was dismissed as impracticable and unacceptable because reduced flows would adversely affect the ecosystem downstream of the collection point.

12. The proposed fish access channel between the north and south lobes will greatly improve boat access to both areas from the boat channel. However, any such recreational improvements are incidental to this habitat improvement project. Walkways bordering both sides of the diversion ditch fall outside the scope of the project. Therefore, a cooperating agency would have to provide funding, and the U.S. Fish and Wildlife Service would have to agree to accept responsibility for operation and maintenance and liability.

13. The boat channel is not expected to experience a significant change in sedimentation. Turbulence generated when large Kettle Creek flows overtop the diversion weir could increase sediment movement downstream of the weir. Channel improvement for boat access is beyond the scope of this habitat improvement project. Information provided by the Wisconsin Department of Natural Resources suggests that the boat channel was redredged in late 1983 or 1984 by the U.S. Fish and Wildlife Service.

14. Use of the diversion ditch for boat access is not practicable because that would require its remaining open during the spring, summer, and fall when large rainfall events generate a lot of sediment-laden runoff from the Kettle Creek and Cold Spring Hollow watersheds. As proposed, the diversion would operate only during the winter when such runoff events are extremely rare. At present, the boat channel does not provide good habitat. The substrate is noncompacted silts, not an ideal material for many species. This channel is heavily used by boats, which resuspend bottom sediments and create forceful, sporadic, inconsistent currents. The proposed project would

improve habitat value somewhat by providing a more stable substrate at the weir and stilling basin.

15. Noted. The final report will be revised accordingly.

16. Disposal would take place in a shallow depression on the north peninsula (excluding the boat landing and parking area). Construction equipment would prepare this depression by moving material from the interior of the peninsula to the perimeter to form a berm that would assist in confining the dredged material. The Definite Project Report/Environmental Assessment notes that, if detailed survey data show that additional disposal capacity is needed, the necessary quantity of existing material could be excavated from the peninsula and, if this material has suitable engineering properties, used for fill at a proposed parking lot for a shore fishing facility at the south end of the south lobe. These detailed survey data were to be obtained in conjunction with development of plans and specifications. The peninsula would be revegetated with native plants and grasses after disposal of the dredged material which should help reduce erosion.

17. The final report will include a brief assessment of dredging a 100-foot by 200-foot area 4 feet deep just west of the south peninsula as a possible addition to the "Dredge fish access channel between north and south lobes" alternative. This option is not included in the final proposal for several reasons:

(a) The suggested dredging would improve water exchange between the boat channel and south lobe during the spring, summer, and fall when creek flow would be directed down the boat channel as at present. However, there is no oxygen deficiency in the south lobe during those seasons. In the winter when highly oxygenated Kettle Creek water would be diverted into the south lobe, the suggested dredging might cause "short-circuiting" of creek water back into the boat channel, which would reduce mixing of the creek water and oxygen-deficient south lobe water and greatly reduce the effectiveness of the diversion. Therefore, habitat benefits attributable to the suggested dredging are insignificant.

(b) Based on the current estimated sedimentation rate, we do not feel that the suggested dredging is necessary to ensure a 50-year project life.

(c) There is a very limited dredged material disposal capacity. Quantities beyond those in the proposed project would incur prohibitive costs. Because the habitat benefits are insignificant, the suggested dredging is not incrementally justifiable.

18. Noted. The final report will be revised accordingly.

19. Noted. The final report will be revised accordingly.

20. Noted.

21. Analyses show that backwater effects from the proposed diversion weir would reduce flow velocities through the Highway 35 bridge. The worst-case scenarios studied by Strand Associates, Inc., show 9.8 feet per second (fps) and 10.1 fps through the existing and proposed bridges, respectively, with a 100-year Kettle Creek runoff event and pool 9 at normal level. The backwater from the weir would increase flow area through the bridge opening and cut velocities by over 50 percent, to approximately 4.3 fps. Water surface elevations upstream of the bridge would increase less than 1 foot even during major runoff events from the Kettle Creek watershed. The greatest effect would occur when pool 9 is at normal pool and the blockage effect of the weir is maximized; high pool levels would submerge the weir and reduce its effect on creek outflows.

22. Material on the north peninsula may be excavated to provide additional disposal capacity. Analyses will be done on that material to determine its gradation, etc. in order to judge its suitability for construction purposes, e.g., highway or parking lot fill. The Corps of Engineers will coordinate with the Department of Transportation to determine if projects can be sequenced.

PUBLIC MEETING MATERIALS

The following public meeting materials include the public meeting notice, public meeting handout, and memorandum for record.

November 13, 1990

PUBLIC MEETING NOTICE

COLD SPRINGS
HABITAT REHABILITATION AND ENHANCEMENT PROJECT
UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM

A public meeting to discuss the proposed Cold Springs project is scheduled for Tuesday, December 18, 1990, at 7:00 pm in the DeSoto High School Commons Room, DeSoto, Wisconsin. This will be an opportunity to learn about the Environmental Management Program (EMP) and the proposed project at Cold Springs. 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 Cold Springs project is part of the Upper Mississippi River System - Environmental Management Program. The long-term program 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, Minnesota, to Cairo, Illinois. The Cold Springs backwater is located on the Upper Mississippi National Wildlife and River Fish Refuge, about 6 miles south of Ferryville, Wisconsin, and 2 miles north of Lynxville, Wisconsin. The habitat project being considered for Cold Springs would consist of a diversion structure in Kettle Creek just downstream of the Highway 35 bridge and a fish access channel between the north and south lobes of the backwater.

We encourage you to attend the meeting and tell others who might be interested in learning about the Cold Springs habitat project. If you are not able 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-FS, or contact Tom Raster at 612-220-0238. If you would like to receive a copy of the draft report, please send your request to the above address.

COLD SPRINGS
HABITAT REHABILITATION AND ENHANCEMENT PROJECT
ENVIRONMENTAL MANAGEMENT PROGRAM

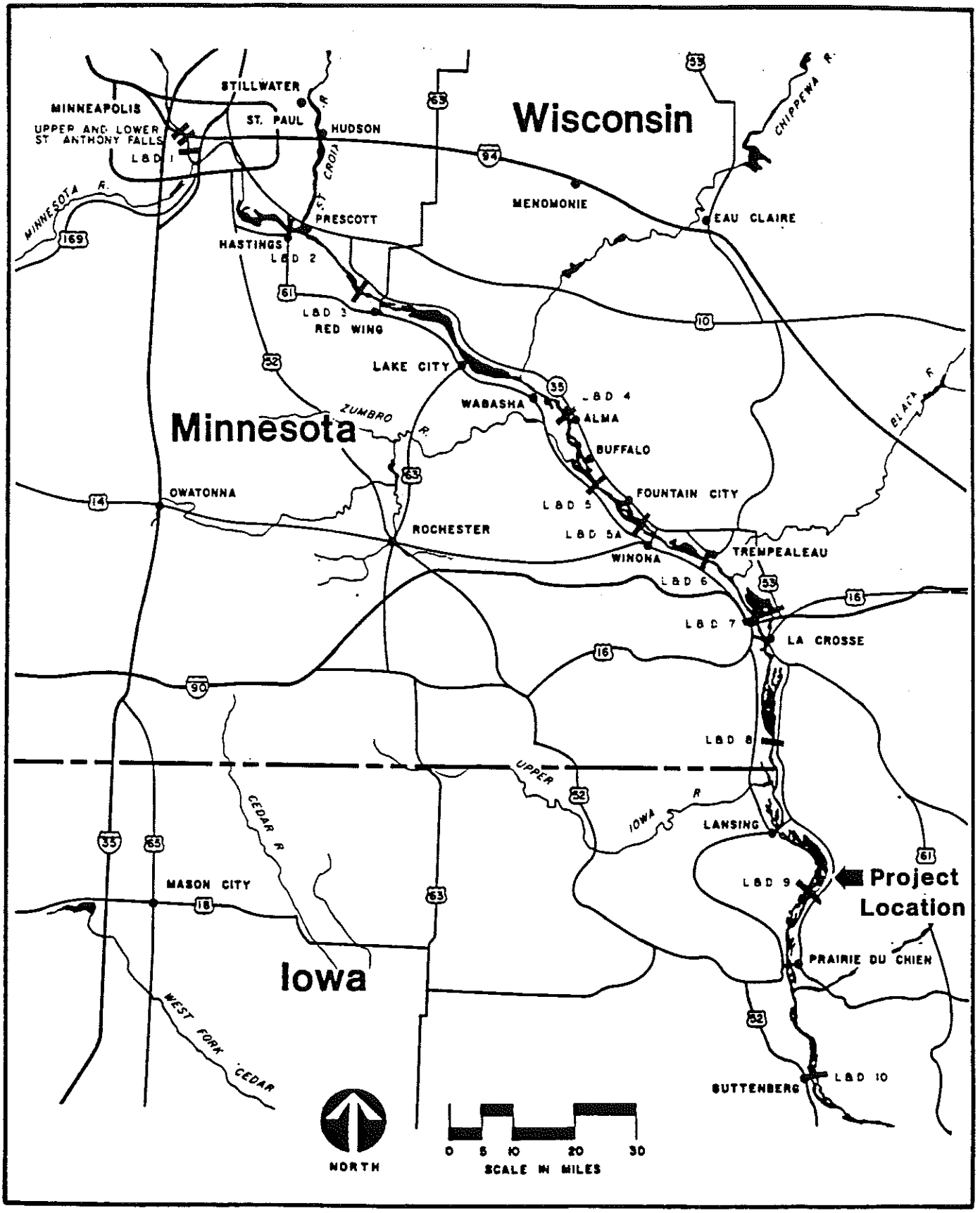
BACKGROUND:

- Cold Springs is located in Crawford County, Wisconsin, on the east side of the Mississippi River about 5 miles north of Lock and Dam 9. Cold Springs is located on the Upper Mississippi River National Wildlife and Fish Refuge about 6 miles south of Ferryville, Wisconsin, and 2 miles north of Lynxville, Wisconsin. Cold Springs is a backwater area bounded on its landward side by the Highway 35 embankment and on the Mississippi River side by the Burlington Northern Railroad causeway with a railroad bridge connecting the backwater with the river. Kettle Creek enters the backwater through a bridge through the Highway 35 embankment. The creek channel has been deepened to the railroad bridge to provide recreational boater access. A public boat landing and parking lot is located on the peninsula bordering the north side of the boat channel.

- The Cold Springs study is being conducted through the Upper Mississippi River System - Environmental Management Program (EMP). This long-term program was established by Congress in 1986 to protect the resources of the Upper Mississippi River and to guide future river management. It includes development of habitat rehabilitation and enhancement projects on the Mississippi River from the Twin Cities, Minnesota, to Cairo, Illinois. The Cold Springs project, which would be implemented for the improvement of fish and wildlife habitat, is a cooperative effort between the Corps of Engineers, the U.S. Fish and Wildlife Service, and the Wisconsin Department of Natural Resources.

HABITAT PROBLEMS:

- Based on soundings and aerial photography from as far back as the 1930s, it appears that considerable sedimentation has occurred due in large part to poor land management practices through the mid-1960s in the Kettle Hollow and Cold Springs Hollow watersheds that drain into the Cold Springs via Kettle Creek. The sedimentation and dredged material from the boat channel have built the peninsula on the north side of the channel to the point where the backwater is essentially divided into two lobes. The sedimentation has also built a smaller peninsula and shallows on the south side of the channel. Measurements by the Wisconsin Department of Natural Resources show low dissolved oxygen in the winter, which stresses fish and forces them to emigrate to the river. A related problem is presented by areas of shallow water which may prevent the fish from escaping to areas with sufficient dissolved oxygen.



Upper Mississippi River System
Environmental Management Program

General Area Map
Cold Springs
Pool 9 Mile 654

POTENTIAL SOLUTION:

- The objective of the Cold Springs project is to increase the winter dissolved oxygen in at least 25 percent of the backwater and to ensure that the fish have access to areas with sufficient dissolved oxygen. A number of alternatives for solving the dissolved oxygen problem were evaluated, including diverting river water into the backwater; artesian wells; piping upland springwater into the backwater; and windmill-, solar-, or electrically-powered aerators. Presently, it appears that the recommended plan will be to divert wintertime Kettle Creek flows into the south lobe and to dredge channels for fish movement through the shallows that nearly isolate the north and south lobes.

- To divert the creek, a sheetpile weir protected by riprap would be placed across the creek just downstream of the Highway 35 bridge and a diversion channel cut across the south peninsula into the south lobe. The diversion would operate only during the winter. The rest of the year, the diversion would be closed and the creek would pass over the weir and/or through an opening in the weir down the creek channel just like at present.

- To ensure that fish have access to the area with enhanced dissolved oxygen, a 4-foot-deep channel would be dredged through shallow areas between the north and south lobes.

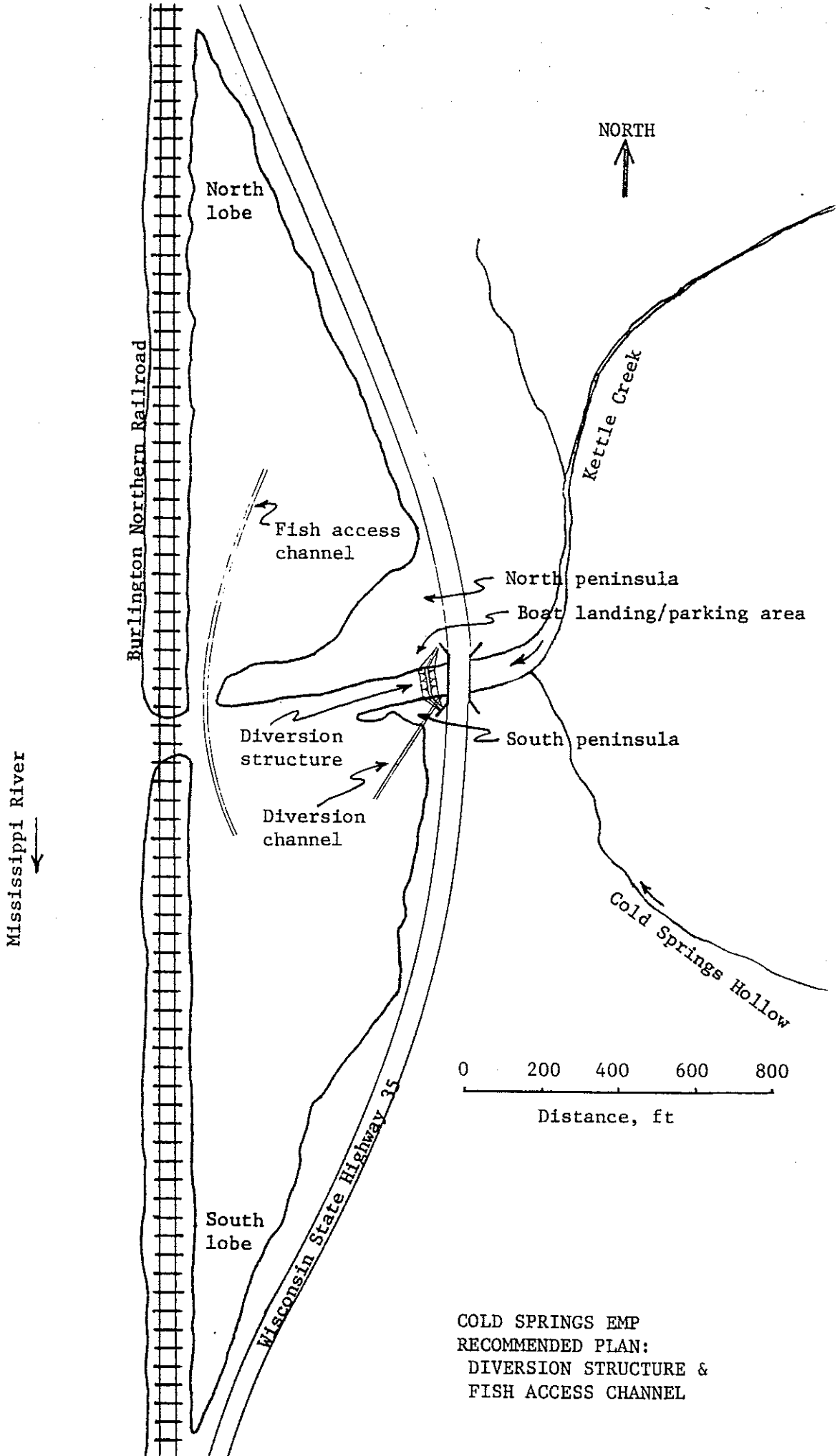
- It should be noted that the sedimentation rate has decreased to such an extent because of improved land management practices over the last 25 years that additional measures to reduce sedimentation even further were considered unlikely to be cost-effective.

SCHEDULE:

Public Review of Report:	December 1990
Plans & Specifications:	Summer 1991
Construction:	Winter-Summer 1992

ESTIMATED COST: $265,000

OPERATION & MAINTENANCE: Because the proposed project would be located on the Upper Mississippi River National Wildlife and Fish Refuge, operation and maintenance would be provided by the U.S. Fish and Wildlife Service.



COLD SPRINGS EMP
RECOMMENDED PLAN:
DIVERSION STRUCTURE &
FISH ACCESS CHANNEL

RECORD OF ATTENDANCE

Meeting COLD SPRINGS Date 12/18/90

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
Randy Urich	Corps of Engineers Mississippi River Project Office 300 So. First St. La Crescent, MN 55947	←
G. R. Sandry	Vernon County Board	
William Howe	Wis Conservation Corps Crawford	
Gordon Peckham	790 S. Beaumont Prairie du Chien	
Cathy Onsager	W3764 Wolter Rd West Salem WI 54669	Sen. B. Rude
John Riehl	R/Box 266 Ferryville WI 54628	
John Brunet	POB ox 426 Prairie du Chien	
Randy Robertson	R#2, Box 213 FERRYVILLE WIS	
Jim R. Rike	10 NR Decorah.	
Leonard Olson	Gays Mills W.	
Tom Olson	Gays Mills W	
Scott Yess	51 W. 4th ST Winona, Mn.	USFWS Winona FAO

RECORD OF ATTENDANCE

Meeting _____ Date _____

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
John R. Lyons	P.O. Box 460 McGregor, IA 52157	USFWS
Tony Batya	" "	USFWS
Pam Thiel		WDNR
		WDNR
Eric Gehl	Rt. 1 Box 308 DeSoto, WI 54624	I would like a copy of the final report.
Gary Ahlquist	IA DNR	
Mark Endris	3550 Mormon Coulee Rd La Crosse	WDNR
Bruce Luebke	P.O. Box 460 McGregor, IA 52157	USFWS
LORENZ BISCHEL	DOT LA CROSSE	

Floodplain Management
and Small Projects Branch

19 December 1990

Environmental Resources Branch

Memorandum for Record: Cold Springs EMP Project - Public Meeting

1. On 18 December 1990, subject meeting was held in DeSoto, Wisconsin, to provide the public (agencies, special interest groups, media, individuals, etc.) with an update on the Cold Springs study's results and to get reactions to the draft Definite Project Report's recommendation to divert Kettle Creek into the south lobe during the winter and to dredge a fish access channel between the north and south lobes. About 30 people attended; the attendance list is attached but is incomplete because some people did not sign it.

2. The meeting included a slide program on the overall Environmental Management Program, a presentation focused on the habitat problems in the Cold Springs backwater and measures that were considered for solving those problems, and an open discussion period. This memorandum will address comments and suggestions presented by audience members during the open discussion.

3. The overall reaction was one of general approval of the recommended plan's objectives and measures for their achievement; but some audience members expressed a desire to expand the scope of the project, in particular, to deepen portions of the backwater (including, if necessary, disposal of dredged material in shallow areas of the north lobe).

4. One specific proposal was profered and is examined below in some detail:

a. The proposal, presented by Mr. William Howe (editor of the Courier Press, Prairie du Chien's newspaper, and spokesman for the Wisconsin Conservation Congress), called for enlarging the recommended fish access channel (from a width of 20' to 30', a depth of 4' to 8', and a length of about 1100' to 1500') and dredging 60'x90'x12'-deep "holes" at both ends of the fish access channel.

b. A debate about the need for deepening ensued:

i. Pro: Mr. Howe asserted that deepening would provide more diversity and more deep-water habitat. He stated that more room is needed for fish, particularly during spring runoff, when fish gather in the backwater to escape turbidity in the river. Also, rough fish which might be attracted by deep areas would be beneficial because their movement helps water circulation in the backwater.

ii. Con: 46% of Cold Springs is over 4 feet deep, which is very close to the 50% considered optimal by biologists using the winter habitat suitability model for the target fish species (bluegill and northern). Thus, the proposed deepening would not produce a significant improvement in habitat, but would increase costs substantially. Mr. Keith Beseke, U.S. Fish and Wildlife Service, noted that costs are a major consideration in determining whether a project gets approval or not. After the meeting, Mr. Howe and representatives of the Wisconsin Department of Natural Resources (WDNR) and

Corps discussed why few additional habitat units (which are used to quantify a project's benefits) could be credited to the proposed "holes" and fish access channel enlargement. Briefly stated, the draft report's proposed dimensions for the fish access channel are based on dredging equipment access needs and are already generous if fish access is the criterion. Further enlargement, such as proposed by Mr. Howe, would have to be justified with an incremental analysis, which would show an excessively high cost per habitat unit gained.

c. An overriding consideration for any deepening proposal for the Cold Springs area is disposal of dredged material. Mr. Howe estimated that his proposal would generate 8,000 to 9,000 cubic yards (cy) of dredged material compared to 3,000 cy for the recommended plan (less than half of which would come from the fish access channel). However, post-meeting calculations show that his proposal would produce at least 14,000 cy (mostly for the larger access channel) assuming the "holes" would be located in the deepest areas of the north and south lobes (presently 6 and 9 feet deep, respectively).

d. Disposal is a major problem. The draft report recommends bulldozing material from the interior of the north peninsula into a low berm around the peninsula's perimeter to increase its disposal capacity and to prevent dredged material from running off into the north lobe or boat channel. Even so, the estimated disposal capacity would only be about 2,000 - 3,000 cy. A limited amount of additional capacity could be provided by excavating material from the interior of the peninsula and transporting it elsewhere. (The draft report suggests its use in constructing a parking lot proposed by the Wisconsin Department of Transportation for the south end of the south lobe. The peninsula's material would have to be tested to ensure its suitability as parking lot base material.)

e. Dredging quantities in excess of those generated by the draft report's plan would require very costly disposal arrangements because there are almost no alternative disposal sites in the vicinity. A GREAT site about 1 mile south of Cold Springs was deemed undesirable by biologists because its use would destroy valuable bottomland forest to gain additional, less critical deep-water habitat. Mr. Howe suggested disposal on the Olson property which borders Kettle Creek; however, it is unlikely that acceptable and cost-effective upland sites could be found: The State Historical Society has specifically cautioned about Indian mounds and as-yet-undiscovered archeological sites which would require archeological surveys. Furthermore, upland sites would be extremely costly; the slope of sites in the vicinity of Cold Springs would require confinement dikes and would cut into the capacity of any given size storage site, perhaps resulting in a "rice paddy"-type design.

f. The draft report's unit cost for dredging is $13 per cubic yard plus contingencies of 65 percent, but unit costs undoubtedly would be much higher if quantities exceeded the draft report's 3,000 cy and extra costs for extra handling, long haul distances, and/or disposal site preparation were incurred. No attempt was made to estimate how high those costs might reach; however, if we use the draft report's $13 per cubic yard x 1.65 (reflecting contingencies) x over 12,000 additional cubic yards, we see that Mr. Howe's proposal would add over $250,000 to the project (doubling the current cost estimate) but would produce few additional habitat units (as discussed in paragraph b.ii. above).

5. Members of the general public at the meeting spoke out in favor of disposal in the north lobe - either in the north end where, it was stated, natural processes are already filling in open-water areas, or in the shallows along the north edge of the north peninsula. Mr. Beseke noted that Federal policy against a net loss of wetlands (as expressed in a number of documents discouraging wetland use, including Executive Order 11990 and Section 404 of the 1977 Clean Water Act, as amended, and President Bush's policy of wetland preservation) would prevent consideration of disposal in those areas. In follow-up post-meeting discussions, WDNR and Corps biologists commented that project goals include helping the fishery, but not degrading the habitat for other species; the shallows are vital to muskrats, wading birds, amphibians, and other critters and should not be sacrificed as some suggested.

6. Mr. Leonard Olson, one of the co-owners of the Olson property along Kettle Creek, noted that the draft report's recommended diversion weir would block fishing boat traffic from moving upstream. (At least two individuals in the audience confirmed that they did boat fish in that area.) He also commented that the weir would prevent access to a marina that might be built in conjunction with a motel that might be built at some indefinite point in the future. As shown in the draft report, he is correct; a short reach (approximately 100') of Kettle Creek would no longer be accessible by boat, although it would continue to be fishable from the Highway 35 bridge or from shore. (If there was a realistic chance that a motel/marina complex might be built in the foreseeable future, the recommended 2'x3' fish opening in the weir could be redesigned during the plans and specifications stage to accommodate fishing craft.) It was noted that the weir would need permits before being constructed, and the permit review process would allow opportunities for comments from individuals opposed to the proposal.

7. Mr. Randy Robinson, Ferryville, asked whether the weir would act as a sediment trap. Mr. Tom Raster of the Corps noted that the weir would extend only about 3 to 4' above the boat channel bottom, and that it was expected that major runoff events in the Kettle Creek watershed would generate enough flow and turbulence to put sediment into suspension and carry it over the weir and down the boat channel out the railroad bridge into the river as happens at the present time.

8. Mr. Robinson also asked if the boat channel would be deepened as part of the recommended project. Mr. Raster said that the project was for habitat, not recreational, improvement and that any recreational benefits would be incidental. The recommended diversion ditch and fish access channel would be dredged by barge-mounted equipment; the boat channel would be deepened only if the draft of the dredging equipment would require it for access.

9. Mr. Gerald Sandry, Vernon County Board, asked why the recommendation was diversion into the south lobe instead of the north lobe, which is in poorer condition. Mr. Tim Peterson of the Corps commented that the north lobe's dissolved oxygen (DO) becomes deficient earlier than that of the larger, deeper south lobe, and the north lobe's fish move to the south lobe or the river. The recommended diversion would keep the south lobe's DO at satisfactory levels through the winter, and the fish access channel would allow the fish in the north lobe unimpeded movement to the south lobe. The recommended plan maximizes habitat benefits for the costs.

10. Mr. Sandry also asked if a pedestrian bridge could be built from the western tip of the north peninsula to the railroad embankment to provide easier access to fishermen. It was noted that, for liability reasons, the railroad likely does not approve of people trespassing onto its property. Furthermore, as stated earlier, this project is for habitat improvement, not recreational improvement.

11. Mr. John Diehl, Ferryville, asked how the recommended project would affect the gizzard shad die-offs that regularly occur at Cold Springs in the winter. Mr. Peterson noted that the gizzard shad are attracted to the warmer water of spring-fed Kettle Creek and collect in the thousands. Although the exact reason for the die-offs is not known, it probably is due to crowding, stress, shock, temperature, or some other factor. The recommended diversion would diffuse and mix the warmer creek water with the colder south lobe water. Consequently, the water exiting to the river would be much cooler than at present and should attract fewer gizzard shad. In addition, concentrations of warm water would be eliminated, and the gizzard shad would crowd less. The likely net result would be a decrease in the number and/or magnitude of die-offs.

12. As noted in paragraph 3, the overall reaction at this public meeting was favorable to the concept recommended in the draft report. The vast majority of suggestions made by those in attendance are not practicable (for instance, disposal in wetlands); the few that could not be answered satisfactorily at this time (e.g., cutting off boat access upstream of the diversion weir) will be addressed during the plans and specifications and permit application stages.

THOMAS E. RASTER
Floodplain Management
and Small Project Branch
Planning Division

TIMOTHY W. PETERSON
Environmental Resources Branch
Planning Division

Attachment: Attendance list

C-5

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AND/OR

PUBLIC NOTICE

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Federal

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Environmental Protection Agency ✓
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Department of Health & Social Services
State Archaeologist
State Historic Preservation Officer
Department of Natural Resources
Department of Transportation
Bureau of Water Reg. & Zoning

State of Minnesota

Department of Natural Resources

State of Iowa

Department of Natural Resources

County

Crawford County Board of Commissioners
Crawford County Engineer

Local Interests

~~Environmental Management Technical Center,~~ City of Prairie du Chien, WI
Ferryville, WI
Mr. James Volk, Ferryville Village President *
Lynxville, WI
Lansing, IA
McGregor Public Library
La Crosse Tribune
Prairie du Chien Courier Press
KNEI Radio, Waukon, IA
WPRE Radio *
DeSoto Post Office *
Ferryville Post Office *
Harpers Ferry Post Office *
Waukon Newspapers
North Iowa Times *
Allamakee Journal and Lansing Mirror *
Falling Rock Bar and Bait Shop *
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Lansing Marina *
Lansing Public Library *
Courier Press
Vernon County Broadcaster-Censor *
Mr. Jack Blask
Mr. Donald Cooper
Mr. Gene D. Cooper
Mr. John Diehl *
Mr. Jerry Finney *
Mr. Martin Kirchhof, DeSoto High School *
Mr. Gus Kerndt *
Mr. Eugene Loeffler
Mr. Raymond McKelatti
Ms. Minnie Olson
Mr. Leonard Olson *
Mr. Thomas Olson *
Mr. Glen Palmer
Mr. Paul Porvaznik *
Mr. Brian Rude *
Mr. Richard Welsh
Mr. & Mrs. Lawrence W. Henkel

Other Interests

Minnesota-Wisconsin Boundary Area Commission
Mississippi River Planning Commission
Upper Mississippi River Basin Association
Upper Mississippi River Conservation Commission
Burlington Northern Railroad
Corps of Engineers, St. Paul District, Environmental Resources Branch
Corps of Engineers, St. Paul District, Planning Division
Corps of Engineers, St. Paul District, Construction Operations Division
~~Corps of Engineers, Vicksburg District~~, Planning Division
Corps of Engineers, St. Louis District, Planning Division
Corps of Engineers, Rock Island District, Planning Division
Corps of Engineers, North Central Division, Planning Division
Corps of Engineers, HQUSACE, Planning Division
Natural Fish Research Lab
Sierra Club
Izaak Walton League
Audubon Society
Ducks Unlimited
~~Mr. Jerry Rasmussen, Environmental Mgmt. Tech. Ctr.~~

* Public Notice Only