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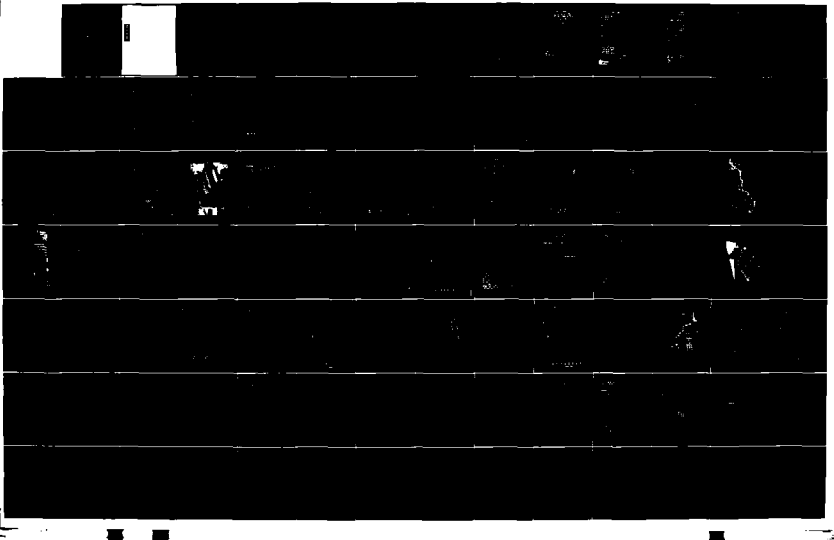

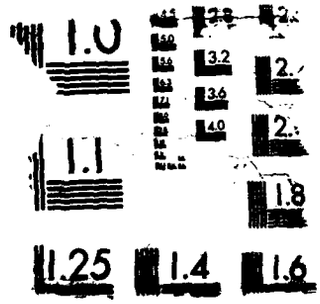
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FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

MAJOR REHABILITATION EFFORT
MISSISSIPPI RIVER LOCKS AND DAMS 2-22
ILLINOIS WATERWAY FROM LA GRANGE TO LOCKPORT LOCKS AND DAMS
IOWA, ILLINOIS, MISSOURI, MINNESOTA, AND WISCONSIN

The lead agency responsible for this effort is the U.S. Army Corps of Engineers, Rock Island District, Rock Island, Illinois.

ABSTRACT:

A programmatic Environmental Impact Statement (EIS) was prepared to assess the environmental impacts to the Upper Mississippi River System (UMRS) from the major rehabilitation effort. The majority of the rehabilitation work has consisted of repair and replacement items. However, certain measures were identified as having the potential to increase navigation traffic and possibly cause cumulative impacts to the UMRS.

A traffic analysis was conducted to determine whether operation of the measures would be likely to increase commercial navigation on the UMRS. The traffic analysis concluded that during the navigation season a very small increase in system traffic may occur with the proposed measures in place. This small increase is within the normal variability of any navigation season and would not result in system-wide (cumulative) impacts to the UMRS that are measurable over the existing condition.

Although projected traffic increases are minor, concern has been expressed that traffic increases may be concentrated at the end of the navigation season, due to the installation of high-volume bubbler systems. End-season traffic is highly variable and unpredictable, with no typical time period or volume of traffic associated with it. Ice conditions in the river channel are the controlling factor. Industry representatives have indicated that bubbler systems would not induce further traffic, but only assist in the orderly withdrawal of tows. The installation of high-volume bubbler systems would not promote a higher level of end-season traffic. (SDW)

The U.S. Fish and Wildlife Service concluded that although the rehab action is not likely to jeopardize the continued existence of Lampsilis higginsi, it is likely to cause Incidental Take of the species. Criteria established for the St. Louis District's Second Lock at Lock and Dam 26(R) project at Alton, Illinois, also will apply to the rehab action, and no additional measures are required at this time.

Site-specific impacts to the natural environment were analyzed in the EIS. No significant, adverse site-specific impacts were identified from construction of the proposed measures.

Funding for construction of the guidewall extensions and the guardwall is not anticipated prior to 1991 due to current budgetary constraints. Presently, preliminary engineering data for these measures are insufficient to evaluate the site-specific impacts concerning possible dredging and material disposal. As funding becomes available in the future, a Design Report will be prepared which will include an additional NEPA document to address impacts. For the remaining measures, all anticipated site-specific impacts are addressed in this EIS.

Please send any comments you may have on this statement to the following address within 30 days:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

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SUMMARY

MAJOR CONCLUSIONS AND FINDINGS

S.1 Major rehabilitation of the locks and dams on the UMRS is critical to maintaining the safety and design capability of the navigation structures. The majority of the rehabilitation work has consisted of repair and replacement items. However, certain measures were identified as having the potential to increase navigation traffic and possibly cause cumulative impacts to the UMRS:

* Submersible Tainter Gate, Peoria and LaGrange Locks and Dams, Illinois Waterway
* Guardwall at Lock and Dam 22, Saverton, Missouri
* Vertical Lift Gate at Lock and Dam 20, Canton, Missouri
* High-Volume Bubbler Systems at Locks and Dams 2 Through 22, Mississippi River
* Modification to Lock Chamber Outlet Structure at Lock and Dam 15, Rock Island, Illinois
* Upper Guidewall Extensions, Locks and Dams 12 Through 22; Lower Guidewall Extensions at Locks and Dams 21 and 22, Mississippi River

An EIS was prepared for the proposed action due to the concern expressed by agencies and other groups as to the type and level of environmental impacts.

S.2 The Rock Island District conducted a traffic analysis to ascertain whether operation of the proposed measures would be likely to increase commercial navigation, which would lead to system-wide (cumulative) impacts on the UMRS. The traffic analysis concluded that during the navigation season and by the year 2040, a 1.3 percent increase in system traffic, or about 2.1 million tons, would occur with the proposed measures in place, versus without the proposed measures. This traffic increase translates into an average increase of about one tow per week on the Illinois Waterway, and about two tows per week on the Mississippi River. It would be difficult to measure this small increment of traffic from the environmental impact viewpoint. Also, this small increase in traffic is within the normal variability of any navigation season. The District has concluded that this increase in system traffic during the navigation season caused by the proposed measures would not result in system-wide or cumulative impacts to the UMRS that are measurable over the existing condition.

S.3 Although projected traffic increases are minor, concern has been expressed that traffic increases may be concentrated at the end of the navigation season due to the installation of high-volume bubbler systems. Based upon input provided by Louis Berger and Associates, the traffic analysis

identified the potential for an additional 10 to 20 lockages at the end of the navigation season due to the installation of high-volume bubbler systems at Locks 2 through 22. Evaluation of this potential traffic increase indicates that end-season traffic is highly variable and unpredictable, with no typical time period or volume of traffic associated with it. Ice conditions in the river channel are the controlling factor, and bubbler systems at the lock gates have no effect on ice conditions in the river away from the immediate lock gate area. Also, end-season navigation requires risk-taking for both carriers and shippers. Industry representatives have indicated to the District that bubbler systems would not induce further traffic, but only assist in the orderly withdrawal of tows. Evaluation of end-season traffic confirms that most tows are downbound, to avoid being iced in. Another limiting factor is increased lockage time associated with this period, as locks are not able to accommodate an additional five lockages per day. Therefore, the installation of high-volume bubbler systems at UMR locks will not promote a higher level of end-season traffic. Bubbler systems would improve end-season navigation only be expediting the withdrawal of tows from the UMR.

S.4 Concerning Section 7(c) of the Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service issued a Biological Opinion and concluded that the rehab action is not likely to jeopardize the continued existence of Lampsilis higginsi. However, they also concluded that the rehabilitation action is likely to cause Incidental Take of the species. Criteria were established that set the level of Incidental Take for the Second Lock at the Lock and Dam 26(R) project located in Alton, Illinois (St. Louis District). The U.S. Fish and Wildlife Service is not requiring additional measures due to the rehabilitation action. However, should any Level of Take criteria be reached, the Service will consult with mussel experts and the Corps to determine whether or not additional action should be taken. Such action may include implementation of additional measures to minimize harm to the species, and/or reinitiation of endangered species consultation.

S.5 Site-specific impacts to the natural environment were also analyzed in the EIS. No significant, adverse site-specific impacts were identified from construction of the proposed measures.

S.6 Funding for construction of the guidewall extensions at Locks 12 through 22, and the guardwall at Lock 22, is not anticipated prior to 1991 due to current budgetary constraints. Presently, preliminary engineering data concerning these measures are insufficient to evaluate the site-specific impacts concerning possible dredging and material disposal. Guidewalls were included in the EIS to assure assessment of all potential systemic effects in the traffic analysis. As funding becomes available in the future, the District will initiate a Design Report which will include an additional NEPA document (EA) to address site-specific impacts. Only minor impacts are anticipated, since relatively small quantities of material are expected to be removed and require disposal. Also, disposal sites would be located on Government land in areas that avoid impacts to fish and wildlife resources, wherever possible. Design information was available for the vertical lift gate in the auxiliary lock at Lock and Dam 20; high-volume bubbler systems at

Locks and Dams 2 through 22; and modification of the outlet at Lock and Dam 15. All anticipated site-specific impacts of these measures are addressed in this EIS. Impacts from the submersible tainter gate at Peoria and LaGrange Locks and Dams were described in an Environmental Assessment prepared for each site, dated March 1986. After public and agency review, the Finding of No Significant Impact was signed on June 10, 1986, for each project.

AREAS OF CONTROVERSY

S.7 During scoping and subsequent coordination of this EIS, comments were received concerning the perceived need to combine the impact analysis for the major rehabilitation measures and the Second Lock at Lock and Dam 26(R) project at Alton, Illinois, being analyzed by the St. Louis District. These commentors felt that these actions were related and reasonably foreseeable, which requires analysis in one EIS. The Rock Island and St. Louis Districts disagree and maintain that the actions are independent, under separate jurisdiction, and under separate authorization.

S.8 Also during coordination of this EIS, comments were received on the need to revise the traffic projections found in the UMRBC Comprehensive Master Plan. The traffic patterns on the UMRS have generally followed the Master Plan projections until 1984. In 1985 and 1986, the value of the U.S. dollar and foreign competition reduced demand for U.S. grain, resulting in a drastic reduction in farm exports. In addition, these years were the low points in the general Midwest economy. In 1987, traffic increased significantly, up almost 30 percent from the previous year. This put the tonnage back near the Master Plan projections. Historically, traffic has increased at about a 4 percent annual rate over the long term, with considerable variations from year to year. Therefore, on a long-term basis, the Master Plan projections are the best available.

UNRESOLVED ISSUES

S.9 Comments have been received by both the Rock Island and St. Louis Districts on the perceived need to combine the impact analysis for the rehabilitation measures and the Second Lock at Lock and Dam 26(R) project into one EIS. The Districts disagree and maintain that the actions are independent, under separate jurisdiction, and under separate authorization. The proposed work would be necessary even if there never was a second lock proposed at Lock and Dam 26(R). One does not autcmatically trigger the other, rely upon the other to proceed, nor depend upon the other for its justification.

RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS

S.10 See Table EIS-1 which lists statutes, plans, and regulations that may be applicable, and whether or not their requirements were met.

TABLE EIS-1

Relationship to Environmental Protection Statutes and Other Environmental Requirements

STATUTE OR REQUIREMENT	CONSTRUCT MEASURES	NONSTRUCTURAL MEASURES
FEDERAL STATUTES		
Archaeological and Historic Preservation Act (as amended)	Full	Full
Clean Air Act (as amended)	Full	Full
Clean Water Act (as amended)	Full	Full
Coastal Zone Management Act (as amended)	N/A	N/A
Endangered Species Act (as amended)	Full	Full
Estuary Protection Act	N/A	N/A
Federal Water Project Recreation Act (as amended)	Full	Full
Fish and Wildlife Coordination Act (as amended)	Full	Full
Land and Water Conservation Fund Act (as amended)	Full	Full
Marine Protection, Research and Sanctuaries Act	N/A	N/A
National Historic Preservation Act (as amended)	Full	Full
National Environmental Policy Act (as amended)	Full	Full
River and Harbor Act	Full	Full
Watershed Protection and Flood Prevention Act	N/A	N/A
Wild and Scenic Rivers Act (as amended)	N/A	N/A
Farmland Policy Protection Act	Full	Full
EXECUTIVE ORDERS AND MEMORANDA		
Floodplain Management (E.O. 11988)	Full	Full
Protection of Wetlands (E.O. 11990)	Full	Full
Analysis of Prime & Unique Farmlands	Full	Full
LAND-USE PLANS		
REQUIRED FEDERAL ENTITLEMENTS		
Section 404 Permit (Clean Water Act)	Full	Full

COMPLIANCE CATEGORIES:

a. Full Compliance. Having met all requirements of the statute, E.O., or other environmental requirement for the current stage of planning (either pre or postauthorization).

b. Partial Compliance. Not having met some of the requirements that normally are met in the current stage of planning.

c. Noncompliance. Violation of a requirement of the statute, E.O., or other environmental requirement.

d. Not Applicable. No requirements for the statute, E.O., or other environmental requirement for the current stage of planning.

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SECTION 1 - NEED FOR AND OBJECTIVES OF ACTION

STUDY AUTHORITY

1.1 Construction, operation, and maintenance of the locks and dams on the Mississippi River and Illinois Waterway were authorized by the River and Harbor Act of 1930.

1.2 An Environmental Impact Statement was prepared for Operation and Maintenance of the 9-Foot Channel, Upper Mississippi River, Head of Navigation to Guttenberg, Iowa, and filed with the Council on Environmental Quality in August 1974.

1.3 An Environmental Impact Statement was prepared for Operation and Maintenance of the 9-Foot Channel, Upper Mississippi River, Pools 11 Through 22, and filed with the Council on Environmental Quality in January 1975.

1.4 An Environmental Impact Statement was prepared for Operation and Maintenance of a 9-Foot Channel in the Illinois Waterway, From the Junction of the Calumet-Sag Channel and the Chicago Sanitary and Ship Canal to the LaGrange Lock and Dam, and filed with the Council on Environmental Quality in December 1975.

1.5 In 1978, the Inland Waterways Authorization Act (Public Law 95-502) was signed into law. Section 101 of the Act directed the Upper Mississippi River Basin Commission to prepare a Comprehensive Master Plan for the Management of the Upper Mississippi River System, which includes the Illinois Waterway, in cooperation with appropriate Federal, State, and local officials.

1.6 Public Law 99-662 (November 17, 1986) enacted the Upper Mississippi River Management Act of 1986, which states [Sec. 1103(a)(2)]:

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

1.7 Congress also approved the Master Plan "as a guide for future water policy on the Upper Mississippi River system. Such approval shall not constitute authorization of any recommendation contained in the Master Plan" [Sec. 1103(c)(1)].

PUBLIC CONCERNS

1.8 The following concerns have been identified by Federal and State agencies, other groups, and the public during the scoping process for this document. These concerns are addressed in this EIS.

* Combine the second lock at Lock and Dam 26 and the rehabilitation work into one EIS.

* Increased traffic would further accelerate degradation of the Illinois River.

* Bubbler systems will create additional navigation in the late fall/ early spring.

* Guidewall extensions are new construction, and not rehabilitation.

* EIS must include assessment of improvements in navigation capacity - processing efficiency and throughput.

* Cumulative impacts from hydropower should be discussed in the EIS.

* Need to anticipate improvements as well as work that degrades the UMRS in the future to the year 2040.

* The impact of navigation is more acute on the Illinois River. Any increase is critical to the ecosystem or discouraging to boaters and sportsmen.

* Traffic projections should be revised so capacity and incremental changes are accurate. Traffic levels have not followed the Master Plan and should be revised.

* Address the alternative of using helper boats instead of the high cost/high impact guidewall extension concept.

* The guidewall extension at Lock and Dam 20 would impact upon North Riverfront Park.

* The rehabilitation elements are similar to the year-round navigation study.

* The EIS should address <u>all</u> measures that may lead to increased navigation use of the UMRS. These measures could include structural as well as nonstructural measures.

* Assumptions used in this EIS should be consistent with the assumptions used in development of the EIS for the Second Lock at Lock and Dam 26 (R).

* Formulation and evaluation of alternative plans should be based on the most likely conditions expected to exist in the future with and without the plan. While this is an ambitious undertaking, it is required if the objective is to predict the future condition of the UMRS in the year 2040.

* The EIS should address all tributaries expected to receive commercial navigation use.

PLANNING OBJECTIVES

1.9 The planning objectives of this study are as follows:

. To determine whether the addition of certain measures to the existing lock and dam structures would create an increase in navigation traffic on the UMRS.

. To determine the environmental impacts resulting from construction of the measures, including any cumulative impacts to the UMRS if navigation traffic is found to increase.

. To determine ways to avoid, minimize, or offset any significant adverse environmental impacts that are identified.

SECTION 2 - ALTERNATIVES

PLANS ELIMINATED FROM FURTHER STUDY IN THE EIS

2.1 Site-specific Environmental Assessments with Section 404(b)(1) Evaluations, if required, have been prepared for those in-kind repair and replacement items that did not have the potential to increase navigation traffic and cause cumulative environmental impacts, as recommended by Federal/State agencies and other groups. Provided below is a summary of those items addressed in the site-specific Environmental Assessments. These documents are on file and available at the St. Paul and Rock Island District offices. For the remaining lock and dam sites on the Upper Mississippi River (Locks and Dams 11 through 16), Environmental Assessments will be prepared and coordinated for similar in-kind repair and replacement items as described here, when funding becomes available.

2.2 Lockport Lock, Major Rehabilitation, Design Memorandum No. 1, General Design Memorandum With Environmental Assessment for Lockport Lock and Brandon Road Lock and Dam (Rock Island District, May 1982). The Environmental Assessment analyzed the environmental impacts of the following rehabilitation items for both sites: resurfacing and stabilizing the lock walls, guidewalls, and other areas where masonry has deteriorated; repairing or replacing mechanical equipment, including lock gates, tow haulage equipment, the fire protection system, and the electrical system; reinforcing and stabilizing 12 mooring piers; and resurfacing, repairing, or replacing various portions of the access and support structures on the dam. After a 30-day public and agency review of the Environmental Assessment, the Finding of No Significant Impact was signed on March 31, 1983. Rehabilitation of Lockport Lock began in 1983 and was completed in 1987.

2.3 Brandon Road Lock and Dam, Major Rehabilitation, Design Memorandum No. 1, General Design Memorandum (Rock Island District, April 1983). This document contains a copy of the Environmental Assessment identified in Reference 1. Rehabilitation of the Brandon Road Lock and Dam began in 1984 and was completed in 1987.

2.4 Brandon Road Lock and Dam, Major Rehabilitation, Design Memorandum No. 2, Joliet Channel Walls Rehabilitation With Environmental Assessment (Rock Island District, August 1984). The Environmental Assessment analyzed the environmental impacts of repairing damaged concrete; backfilling to insulate and prevent further freeze-thaw damage; and rebuilding manholes. After a 30-day public and agency review, the Finding of No Significant Impact was signed on February 6, 1985. Rehabilitation began in 1985 and was completed in 1988.

2.5 Dresden Island Lock and Dam, Major Rehabilitation, General Design Memorandum (Chicago District, August 1977). Rehabilitation consisted of repairing damaged concrete; repairing miter gates and replacing miter gate operating machinery; repairing tainter gates; replacing service bridge; closing the headgate openings; and repairing the electrical distribution systems. Environmental aspects were covered in the 9-foot channel EIS prepared for the Illinois Waterway. Rehabilitation began in 1978 and was completed in 1982.

2.6 Marseilles Dam Major Rehabilitation, Design Memorandum No. 1, General Design Memorandum With Revised Environmental Assessment (Rock Island District, November 1984, Revised May 1985). The Revised Environmental Assessment analyzed the environmental impacts of the following rehabilitation items: converting tainter gates of the main dam to remote operation including installing a surveillance system; repairing concrete; resurfacing tainter gate piers; converting the ice chute to a concrete spillway and filling the ice chute valve room with concrete; repairing spalled areas on the retaining walls; replacing the top of the left abutment of the footbridge over the south headrace dam; resurfacing the Marseilles canal guidewall; replacing all eight tainter gates of the main dam with submersible tainter gates; removing the walkway bridge over the main dam and replacing it with a walkway and machinery

bridge on the upstream end of the piers; repairing trunnion girder support boxes; repairing the erosion control mat of the north headrace; and adding gravel to the road between the lock and dam. After a 30-day public and agency review of the Environmental Assessment, the Finding of No Significant Impact was signed on July 15, 1985. Rehabilitation began in 1985 and will be completed in 1989.

2.7 Starved Rock Lock and Dam, Major Rehabilitation, General Design Memorandum (Chicago District, August 1977). Rehabilitation consisted of repairing damaged concrete; repairing miter gates and replacing miter gate operating machinery; repairing tainter gates; replacing service bridge; closing the headgate openings; and repairing the electrical distribution systems. Environmental aspects were covered in the 9-foot channel EIS prepared for the Illinois Waterway. Rehabilitation began in 1978 and was completed in 1982.

2.8 Peoria Lock and Dam, Environmental Assessment for Major Rehabilitation (Rock Island District, March 1986). The Environmental Assessment analyzed the environmental impacts of the following rehabilitation items: installing a tainter gate to replace a portion of the wicket dam; sill repair and hurter replacement of the wicket dam; scour protection; repairing the upper guidewall and completing a sheet pile cell; installing a nonpowered traveling kevel (mooring bitt); repairing spalled areas and damaged concrete on the lower guidewall; raising the lower guidewall 4 feet to the same elevation as the lockwall; repairing the bank at the downstream end of the lower guidewall; repairing butterfly valves, as needed; replacing the steel sheet piling wall extending downstream; repairing the earthen dike near the regulating weir; and lock rehabilitation involving mechanical repairs and replacements, top slab resurfacing, lockwall refacing, sand blasting and painting, and repairing wall armor. After a 30-day public and agency review, the Finding of No Significant Impact was signed on June 10, 1986. Rehabilitation began in 1986 and will be completed in 1990.

2.9 LaGrange Lock and Dam, Environmental Assessment for Major Rehabilitation (Rock Island District, March 1986). The Environmental Assessment analyzed the environmental impacts of the following rehabilitation items: installing a tainter gate to replace a portion of the wicket dam; sill repair and hurter replacement of the wicket dam; scour protection; repairing the upper and lower guidewalls and completing a sheet pile cell; installing a nonpowered traveling kevel (mooring bitt) on the upper guidewall; raising the lower guidewall 4 feet to the same elevation as the lockwall; extending the upper guidewall 50 feet; acquiring a spare set of miter gate machinery; resurfacing the upstream face and surface of the regulating weir; repairing butterfly valves, as needed; lock rehabilitation involving mechanical repairs and replacements, top slab resurfacing, lockwall refacing, sand blasting and painting, and repairing wall armor. After a 30-day public and agency review, the Finding of No Significant Impact was signed on June 10, 1986. Rehabilitation began in 1986 and will be completed in 1990.

2.10 Lock and Dam 2, Major Rehabilitation Environmental Assessment (St. Paul District, September 1986). The Environmental Assessment analyzed the site-specific environmental impacts of the following rehabilitation items: restoring lock and dam concrete; installing armor on lockwall joints; replacing machinery; installing television monitoring equipment; installing only the tubing for a new bubbler system and not the compressor for a high volume system (only a low volume bubbler system will be used until this EIS is completed); installing fire protection system; replacing stand-by generator; improving lighting, security, water gaging, and communications systems; installing bulkhead dewatering system; floodproofing lock buildings; replacing control station; reconditioning miter gates and tainter valves; mechanizing tainter gates; replacing tow haulage units; modifying miter gate fenders; improving water and sanitary sewer systems; installing floating mooring bits; upgrading electrical system; modifying service bridge on dam; replacing bulkhead hoist car with crane; reconditioning tainter gates; and modifying earthen embankment. After a 30-day public and agency review, the Finding of No Significant Impact was signed on October 16, 1986. Rehabilitation began in December 1986 and will be completed in 1993.

2.11 Locks and Dams 2 Through 10, Major Rehabilitation, Environmental Assessment (St. Paul District, June 1987). The Environmental Assessment analyzed the site-specific environmental impacts of Locks and Dams 3 through 10, and the cumulative impacts of Locks and Dams 2 through 10, of the following rehabilitation items: restoring lock concrete; installing armor on lockwall joints; replacing machinery for miter gates and tainter valves; installing television monitoring equipment; replacing bubbler systems (low volume only); installing fire protection system; replacing standby generators; improving lighting, security, water gaging and communications systems; installing bulkhead dewatering system; floodproofing lock buildings; replacing or refurbishing buildings; reconditioning miter gates and tainter valves; replacing tow haulage units; modifying miter gate fenders; improving water and sanitary sewer systems; upgrading lock electrical systems; repairing foundations; replacing or refurbishing dam electrical systems; replacing or refurbishing chains for roller and/or tainter gates; refurbishing bulkhead lifting devices; restoring dam concrete; repairing or replacing dam gates; installing heaters for roller and tainter gates; installing motorized hoist car system at dams 2, 4, and 5; and modifying earthen embankments. After a 30-day public and agency review, the Finding of No Significant Impact was signed on August 13, 1987. Rehabilitation began in December 1987 and will be completed in 2000.

2.12 Lock and Dam 20, Major Rehabilitation, General Design Memorandum and Environmental Assessment (Rock Island District, November 1986 and Revised April 1986). The Environmental Assessment analyzed the environmental impacts of the following rehabilitation items: repairing upper guidewall; repairing miter gate bays; replacing deteriorated concrete on lock walls and adding armor; replacing deteriorated concrete on river wall and guard wall; repairing lower guidewall; installing lower approach cell; overhauling and painting

main lock miter gates; removing silt adjacent to emergency lock miter gates; repairing emergency lock miter gates; replacing main lock miter gate machinery; replacing main lock tainter valves and machinery; replacing electrical system; adding additional scour protection; repairing and painting roller and tainter gates; mechanizing the tainter gates; repairing and painting service bridge and extension; and repairing dam piers and sills. After a 30-day public and agency review, the Finding of No Significant Impact was signed on July 11, 1986. Rehabilitation began in 1986 and will be completed in 1991.

2.13 Lock and Dam 21, Major Rehabilitation Environmental Assessment (Rock Island District, February 1987). The Environmental Assessment analyzed the environmental impacts of the following rehabilitation items: replacing deteriorated concrete on lock walls and add armor; constructing a guard cell downstream of the intermediate lock wall; overhauling and painting main lock miter gates; removing silt adjacent to emergency lock miter gates; overhauling and painting emergency lock miter gates; replacing the main lock miter gate machinery; replacing the lock tainter valve machinery; replacing lock electrical equipment; replacing deteriorated concrete on dam piers; replacing windows and roof of dam operating house; cleaning and painting roller gates; replacing lower portion of lifting chains; replacing the dam electrical equipment; painting service bridge; painting emergency bulkheads and replacing seals; scour protection above and below the dam; repairing storage yard tracks; and repairing deterioration on overflow section. After a 30-day public and agency review, the Finding of No Significant Impact was signed on May 27, 1987. Rehabilitation began in 1987 and will be completed in 1990.

2.14 Lock and Dam 22, Major Rehabilitation Environmental Assessment (Rock Island District, February 1987). The Environmental Assessment analyzed the environmental impacts of the following rehabilitation items: replacing deteriorated concrete on lock walls and add armor; repairing approach dike; overhauling and painting main lock miter gates; removing silt adjacent to emergency lock miter gates; repairing emergency lock miter gates; replacing main lock miter gate machinery; replacing lock tainter valve machinery; replacing lock electrical equipment; replacing deteriorated concrete on dam piers; replacing windows and roof of dam operating house; cleaning and painting roller and tainter gates; repairing side seal plates and replacing seals; replacing dam electrical equipment; painting service bridge; painting emergency bulkheads and replacing seals; and repairing concrete of the overflow section. After a 30-day public and agency review, the Finding of No Significant Impact was signed on May 27, 1987. Rehabilitation began in 1987 and will be completed in 1990.

2.15 Locks and Dams 17 and 18, Major Maintenance Environmental Assessment (Rock Island District, July 1988). The Environmental Assessment analyzed the environmental impacts of the following rehabilitation items; replacing deteriorated concrete on lock walls and adding armor; overhauling and painting main lock miter gates; removing silt adjacent to emergency lock miter gates; overhauling and painting emergency lock miter gates; replacing the main lock miter gate machinery; replacing the lock tainter valve machinery; replacing lock electrical equipment; replacing deteriorated concrete on dam piers; replacing windows and roof of dam operating house; cleaning and painting

roller gates; replacing lower portion of lifting chains; and scour protection above and below the dam. After a 30-day public and agency review, the Finding of No Significant Impact was signed on August 17, 1988. Rehabilitation began in 1988 and will be completed in 1992.

2.16 The St. Paul District is currently preparing a design report with draft EIS for construction of a proposed outdraft barrier at Lock and Dam 3. The design report with draft EIS will be distributed for review by the end of 1989.

2.17 The outdraft barrier is a 1,250-foot rock jetty extending upstream from the area between the auxiliary lock and the dam. During high river flows, a strong outdraft sweeps across the upstream approach to Lock 3, which pushes downbound tows crosswise and has carried several tows into the gates of the dam. This poses a serious safety hazard. Presently, a privately operated boat assists tows requesting help to negotiate the cross current during their approach to the lock.

2.18 Although the purpose of the proposed barrier is to prevent accidents, the possibility exists that approach times may be improved. Using historic data, it was estimated that there could be some reduction in approach times for large tows under high flow conditions.

2.19 During 1987 and 1988, low river flows were the rule, and only 6 tows used the assist boat (i.e., would have time savings from the proposed outdraft barrier had it been in place). In 1984 and 1985, river flows were considerably above average. Using those years as a worst case condition, about 28 percent of the traffic would experience an average reduction in total processing time of 9 minutes.

2.20 Time savings this minor for such a small segment of the traffic provide no incentive for the towing industry to view this project as an efficiency measure. Cost savings to industry due to this time savings would be too uncertain due to the dependence upon flows, and too limited since only one site is impacted, to induce more traffic. On a system-wide basis, the cost savings due to this time savings would not be significant. Also, Lock 3 currently has average delays of 32 minutes during the navigation season and a utilization rate of 42 percent, which are not high enough to constrain traffic. It is concluded, therefore, that the proposed barrier dam at Lock and Dam 3 would have no impact on traffic levels.

PLANS CONSIDERED IN DETAIL

WITHOUT CONDITION (NO FEDERAL ACTION)

2.21 In the absence of the proposed measures identified by Federal and State agencies and the public that have the potential to increase navigation traffic and to cause cumulative environmental impacts, rehabilitation of the locks and dams on the Mississippi River and Illinois Waterway consists of the following items: removing and replacing concrete; repairing and replacing mechanical and electrical equipment; replacing or repairing buildings; repairing dam gates; measures for scour protection; and other modification to the locks and dams where agreement has been reached that increases in navigation traffic would not result. In addition, the submersible tainter gates at Peoria and LaGrange Locks and Dams on the Illinois River are under construction, due to the need to assure safety of lock personnel (see paragraphs 2.32 to 2.38 for additional discussion).

2.22 A 600-foot second lock at Lock and Dam 26 (Replacement) at Alton, Illinois, was authorized for construction by Congress in Public Law 99-88 on August 15, 1985. The St. Louis District of the Corps of Engineers prepared a draft Environmental Impact Statement (EIS) for the second lock, which was distributed for public and agency review in September 1986. Due to comments received on the draft EIS, the St. Louis District prepared a supplement to the draft EIS, which was distributed in November 1987 for public and agency review. The final EIS was released for public and agency review in July 1988. The Record of Decision was signed on November 23, 1988.

2.23 In Public Law 99-662 (Water Resources Development Act of 1986), Congress authorized that the following programs be undertaken [Sec. 1103 (e)(1), Upper Mississippi Management Act of 1986]:

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

(B) implementation of a long-term resource monitoring program; and

(C) implementation of a computerized inventory and analysis system.

2.24 Without taking any Federal action, the barge and towing industry may undertake a variety of methods to increase safety and operating efficiency on the UMRS. Many methods would be implemented with existing technology, and others would require advances in current technology. These methods would be implemented as-needed in response to congestion or safety problems encountered on the navigation system. Some of these methods require only changes in operating schedule and policy, while others require large capital investments and greater financial risk. Discussions by the District with shippers, carriers, and other waterway interests resulted in the following general conclusions regarding future navigation on the UMRS:

* The "industry assist program" is the most likely response to near-term waterway congestion

* Industry-provided helper boats are a viable, but expensive, alternative

* Bow boats or bow thrusters are not likely to be put into wide service on the UMRS

* Improved forecasting of river conditions may provide some efficiency gains

* Improved communication, coordination, and scheduling may provide both short-term and long-term productivity gains

2.25 The "industry assist program" is a measure the barge and towing industry has utilized and is likely to implement in the future should conditions warrant. This measure consists of line-haul towboats working together; one line-haul towboat will tie-off its barges and assist other tows transitting a lock or difficult reach of channel. For example, a towboat which is last in the queue for lockage may be given priority lockage in order for it to lock through, secure its barges, and assist other tows in the lockage process. The assisting towboat then extracts the first cut of other double-lockage tows and holds them in place during recoupling. This operation speeds the extraction process and allows the lock chamber to be unobstructed, so another tow can be processed in the same direction. Depending on the level of congestion, lock operating characteristics, and the number of multiple-lockage tows, the operating efficiency of the lock can be dramatically increased using this technique. As the number of activities around the lock increases, however, there may be a resulting decrease in operating safety.

2.26 Industry representatives view the industry assist program as a probable response to future congestion problems. This program is likely to be implemented whenever four or more tows are waiting in each direction to transit a lock. Presently, the industry assist program is used at Lock and Dam 26 whenever three or more tows are waiting to transit the lock in each direction. This program has also been selectively utilized at other points on the UMRS; most recently, during a July 1987 channel closure in Pool 16, and during the rehabilitation work at Lock 20.

2.27 Industry-provided helper boats are another measure by which industry may increase safety and operating efficiency on the UMRS. Helper boats are low-horsepower (hp) towboats (usually less than 1,000 hp) which can be used at lock sites to assist approaching tows, and extract unpowered cuts along the length of the guidewall so that recoupling can occur completely outside the lock chamber. An N-up/N-down policy is required to maximize this effect. Helper boats provide a variety of benefits, including reduced maneuvering and fuel consumption during lock approaches, decreased lockage time, and lower insurance costs. These benefits are best realized at locks experiencing severe outdraft problems. The use of such boats is expensive, however, usually costing $125 to $250 per assist.

2.28 Bowboats are small, low-horsepower, independently operated boats (less than 1,000 hp) which are designed to operate at the bow of the tow to aid in steering and propulsion. Bow thrusters are even smaller, lower-horsepower units, which provide the same basic function as bowboats, but cannot be independently operated and require attachment to a barge. Currently, bowboats are being selectively operated on the Illinois Waterway in line-haul service. The primary benefit of these units is increased tow maneuverability enroute, which is especially important on the narrow, winding channel of the Illinois Waterway. Other benefits include reduced tow downtime during strong winds, reduced fuel consumption through less maneuvering, and enhanced operating safety. Lesser efficiencies include reduced trip time (although these units do not increase underway speed) and minor gains in fuel efficiency. Bowboats can assist at locks with approaches as well as pull and extract unpowered cuts into and from the lock chamber. Primary disadvantages of these units include high capital costs and a reduction in carrying capacity of tows, if bowboats are used to pull unpowered cuts at locks. Lock chamber dimensions on the UMRS (600 feet by 110 feet) limit maximum utilization to 9 jumbo barges (barges are 195 feet long instead of a regular barge of 175 feet long). If a bowboat is used to extract cuts, a barge must be displaced reducing maximum utilization to 8 jumbo barges. The loss of revenue from barge displacement is far greater than efficiency gains during lock operations. As a result, industry representatives state that they have no plans to implement the use of bowboats on the UMRS.

2.29 Improved reliability and forecasting of river conditions represents another method by which the barge and towing industry can increase safety and efficiency. Under this proposal, shippers and barge operators would make use of technological advances in hydrologic forecasting techniques to obtain better forecasts of river stage, velocity, discharge, and channel depth. This would allow operators to decrease operating risks and make better-informed decisions regarding barge loading and routing. A private firm currently provides this service for the Mississippi River below St. Louis, Missouri.

2.30 Many representatives of the barge and towing industry believe that productivity gains also can be achieved through improved cooperation and scheduling of river operations. The barge and towing industry has only recently begun to take advantage of the recent advances in communication and data interchange available to the industry. As more firms take advantage of this technology, productivity gains may be realized.

STRUCTURAL MEASURES

2.31 The following rehabilitation measures have been identified by Federal and State agencies and other groups as having the potential to increase navigation traffic, which may cause cumulative environmental impacts on the Upper Mississippi River System. The specific design information for each of the measures is described in Section 4, starting with paragraph 4.1.

Submersible Tainter Gate, Peoria and LaGrange Locks and Dams, Illinois Waterway

2.32 Twenty-five (25) wickets of the existing wicket dams at Peoria and LaGrange will be replaced by one 84-foot-wide submersible tainter gate and two 8-foot-wide concrete piers. The tainter gates will be located about 75 feet upstream of the wicket dam and adjacent to the riverward lock wall to assist in the passage of ice and to improve the safety and flow regulation at the dam. During floods, the tainter gates will be fully submerged behind a concrete sill with no resultant effect on flood heights.

2.33 A schematic diagram of a wicket is shown on Figure EIS-1. A severe limitation of the wicket dam concerns the passage of ice. Operating the wickets during ice conditions is difficult and hazardous. Under normal loading, the hydraulic pressure increases with depth and holds the bottom of the wickets tight against the sill. However, floating ice exerts a large force at the top of the wickets, causing them to "breach," i.e., pivot at the connection between the prop and the horse. If flows are rising, lowering the breached wickets must be accomplished by either pulling the props out of the hurters from the downstream side or "fishing" underwater for the tops of the wickets and pulling them upstream to dislodge the props. In some instances, the maneuver boat used for this has been forced through openings in the dam by ice pressure.

2.34 In February 1984, several wickets at LaGrange breached under the pressure of the ice, and flows were rising with thawing temperatures. As the crew was lowering wickets from the downstream side of the dam, the maneuver boat and workboat were driven downstream and the maneuver boat got caught on the end of the sill. The water hitting the bow of the maneuver boat rushed over the deck 3 to 5 feet deep, taking with it loose equipment, carrying one man back to the boiler, and stranding another man who had climbed up when he noticed the danger. Fortunately, none of the crew was injured during this incident.

2.35 On the same day, ice was creating problems at the Peoria wicket dam. Flows rose rapidly and heavy ice breached many wickets, making it unsafe to lower wickets from the upstream side. Lowering wickets from the downstream side was also dangerous because lowering the wickets could have released the ice flow. The pool rose, overtopping the upright wickets, and

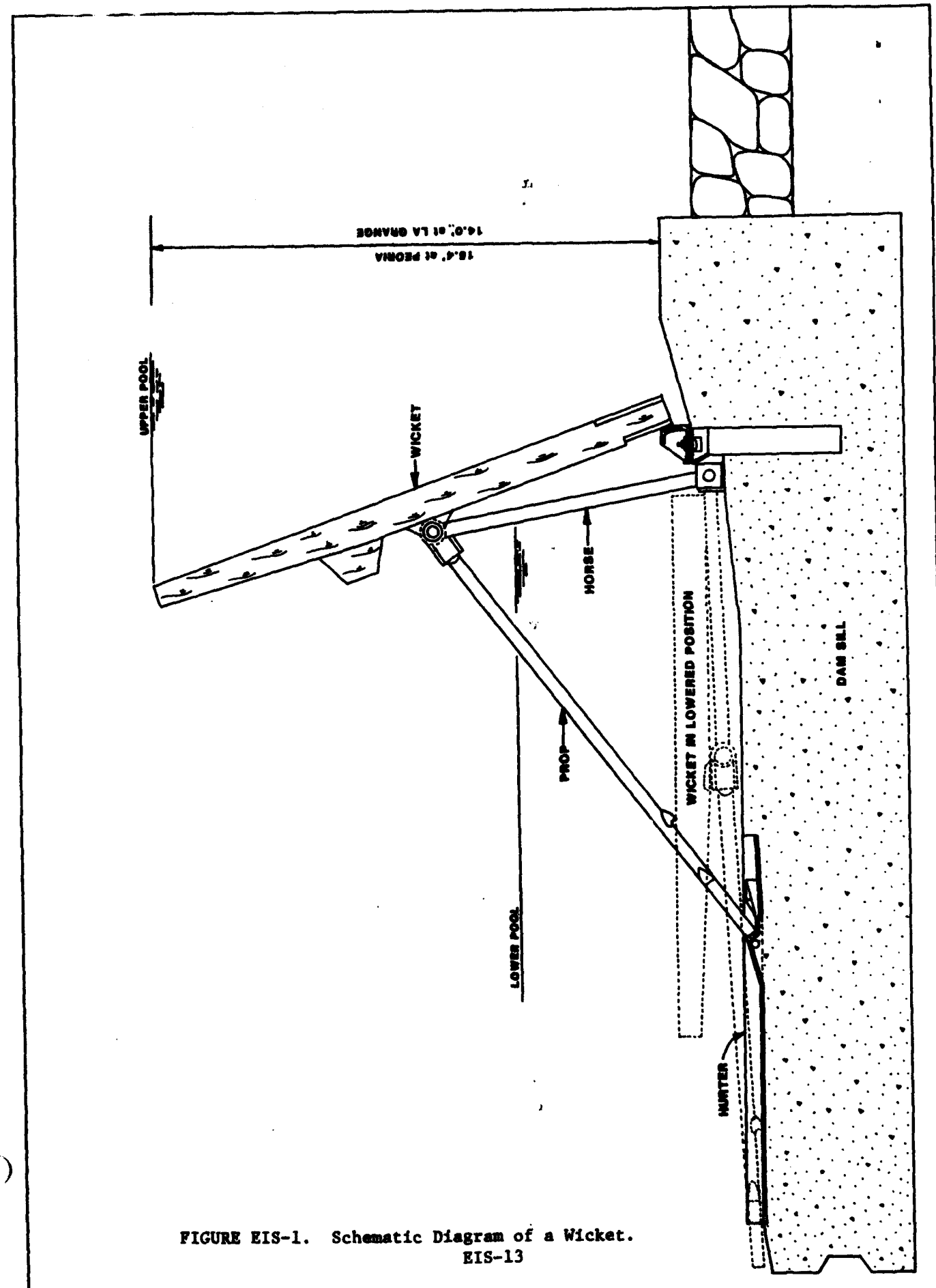


FIGURE EIS-1. Schematic Diagram of a Wicket.

the ice field broke loose. Had the operating crew been caught in this ice field, there is a high probability that there would have been a loss of lives and equipment.

2.36 Another major incident occurred at the Peoria wicket dam several years ago. The wickets had not yet breached, so the crew was lowering wickets from the upstream side. Ice was backed up against the raised wickets and jammed in the flip-top wicket opening. With the flow rising, the main ice field broke loose and increased the ice pressure on the dam. The ice pressure became so great that it rolled and sank the workboat that was positioning the maneuver boat. Fortunately, the crew on the maneuver boat was able to pull the workboat pilot from the sinking boat.

2.37 Performance Monitoring System (PMS) records over the past 10 years were analyzed in the Environmental Assessments (March 1986) to determine whether the operation of the proposed submersible tainter gates would cause an increase in navigation traffic at the Peoria and LaGrange Locks. LaGrange and Peoria have a unique design concerning the operation of the locks for navigation purposes. This navigable pass design allows tows to bypass the lock and pass directly over the lowered wicket dam. The historical records were analyzed to determine how the traffic levels are affected during the open pass condition, which represents the 100 percent efficiency condition. Detailed statistical analysis revealed that there is no correlation or relationship between traffic levels (measured by number of tows or by total tonnage passed) and the existence of open pass condition. Therefore, the District concluded in the Environmental Assessments (March 1986) that this modification to the Peoria or LaGrange Lock and Dam would have no impact on the amount of navigation traffic that utilizes the Illinois Waterway.

2.38 However, the U.S. Fish and Wildlife Service (FWS) indicated that since the statistical analysis did not reflect future increases on waterborne commerce or improved locking efficiency, the potential still existed for increasing navigation traffic (see FWS letter dated April 7, 1986, in Appendix III). However, FWS felt that the safety of lock personnel was an overriding issue and recommended proceeding with construction of the submersible tainter gates, as long as the potential for increased traffic was later evaluated in a programmatic environmental document. Therefore, further analysis of the submersible tainter gates is presented in the traffic analysis (see EIS paragraphs 4.34 to 4.36).

2.39 Guardwall at Lock and Dam 22, Saverton, Missouri. The upper approach to Lock and Dam 22 has a severe outdraft problem, creating the potential for tows and loose barges to be swept away from the lock approach and into the dam. This condition has led to a number of accidents, which have occurred 8 times in the previous 10 years, with damage to both the dam and tows involved. A guardwall extending upstream of the river wall of the auxiliary lock is proposed to act as a barrier to tows and would reduce recurrent damages to the dam's roller and tainter gates. The guardwall would be similar to those constructed during the 1940's at Locks and Dams 11, 14, 16, 20, and 21, and would consist of a series of intermittent sheet-pile cells to allow passage of water. This would reduce, but not eliminate, the outdraft problem.

2.40 Vertical Lift Gate at Lock and Dam 20, Canton, Missouri. The Des Moines River empties into the Mississippi River approximately 18 miles upstream of Lock and Dam 20 and generates extensive ice flows and debris during the late fall and early spring season. Ice and debris collect in the upper approach to the lock, interfering with lock operations and presenting a hazard to navigation. Ice and debris must be removed from the upper approach area by locking it through the chamber or pushing it out of the approach area using a towboat. Such procedures are a safety hazard to lock and towing industry personnel. Ice and debris also hinder normal lock operation and create maintenance problems by damaging miter gates and bending structural members. A vertical lift gate at the lower end of the auxiliary lock is proposed to alleviate this problem. The new gate would minimize safety hazards and maintenance problems by allowing free passage of ice and debris through the upper approach area.

2.41 High-Volume Bubbler Systems at Locks and Dams 2 Through 22 - Mississippi River. Low-volume bubbler systems are already present at many sites on the Upper Mississippi River. These systems consist of low-volume units which are partially effective in reducing ice problems at the locks. As proposed, the new bubbler systems would consist of high volume units which would supply air to diffusers mounted in the miter gate area. This would be more effective in preventing ice accumulation on the gates and clearing gate recesses from floating ice and debris. The systems would reduce the hazard associated with chipping ice from the lock gates and walls and pushing ice and debris away from the gates with long poles. Bubbler systems would also reduce operating stresses on the lock gate and machinery.

2.42 Modification to Lock Chamber Outlet Structure at Lock and Dam 15, Rock Island, Illinois. The existing outlet tunnels from the main lock chamber exit at the lower end of the lock. This creates severe outlet turbulence due to the unique geometry at this site. This turbulence creates a potential for barges to break loose from the lower guidewall during double lockages. The broken tow lines act as uncontrolled whips and present a safety hazard to towboat and lock personnel as well as to lock visitors. Modification of the outlet tunnel is proposed in order to divert the entire riverside discharge into the lower auxiliary lock area.

2.43 Upper Guidewall Extensions, Locks and Dams 12 Through 22; Lower Guidewall Extensions at Locks and Dams 21 and 22, Mississippi River. The upstream approach to the locks, as well as the downstream approaches at Locks and Dams 21 and 22, have periods of strong cross currents that cause alignment and maneuverability problems. These currents have allowed barges to cause structural damage to these facilities. Upper guidewall extensions are proposed to allow tows to maneuver their stern to the guidewall, secure a line to the wall, and safely work the head of the tow to the wall to be properly aligned for entry into the lock chamber. The upper guidewall extension at Lock and Dam 15 consists of only two guide cells. The upper guidewall at Lock 19 would consist of a maximum extension of 800 feet. The upper guidewalls at the other sites would consist of 625-foot extensions. Lock 11 already has a 1,200-foot upper guidewall. The lower guidewall extensions would consist of 625-foot additions and would serve a similar function by reducing safety and operating problems.

NONSTRUCTURAL MEASURES

2.44 Potential nonstructural alternatives were investigated, where possible, for each of the proposed measures. Nonstructural alternatives could not be identified for the ice and debris passage measures: the vertical lift gate at Lock and Dam 20 and the high-volume bubbler systems. Low-volume bubbler systems are already in place at various locks on the UMRS. Bubbler systems and the vertical lift gate would reduce the hazardous practice of manually pushing ice and debris away from the lock gates, and would reduce damage to the operating machinery caused by ice and debris. In addition, the Rock Island District is required to move tows through the locks as they arrive during ice conditions. The Coast Guard does have the authority to limit or stop navigation if conditions warrant.

2.45 The use of federally-provided helper boats has been suggested as a nonstructural alternative for some of the proposed measures. For modification to the outlet at Lock and Dam 15, a helper boat could be used to pull the first downbound cut out of the lock and allow full emptying capability. Construction of the guardwall at Lock and Dam 22 is a safety item proposed to prevent catastrophic damage to the dam facility and towboats, and injury to personnel. The guardwall would not correct for the outdraft problem; therefore, it is conceivable that helper boats could still be needed for severe outdraft problems during high flows. In a similar manner, guidewall extensions would not eliminate the use of all helper boats, but just those used in more routine situations. Helper boats represent a significant capital investment, however, costing approximately $870,000 per year to own and operate. This compares to the average annual cost of $530,000 to $570,000 for a typical guidewall.

2.46 Federally-provided switchboats are another alternative to construction of extended guidewalls. Switchboats are higher horsepower boats which can be used to move strings of barges and reconfigure tows at remote sites from the lock. This alternative requires no change in operating policy and would result in the elimination of unpowered cuts using the lock. Disadvantages to the use of switchboats include high operating and capital costs and a resulting decrease in waterway safety as tows are forced to reconfigure at remote sites.

2.47 Another potential nonstructural alternative that has been suggested is increasing lock staffing. Increased lock staffing will enhance the safety and efficiency of operations on the lock wall. Additional manpower will assure that sufficient staff is available for locking traffic without ... distracted by other duties such as operation of the dam. Increased staffing also may improve the performance of turnback approaches, since lock personnel should be available to aid an approaching tow to tie up to the guidewall while another tow is being serviced. However, increasing lock staffing does not resolve safety problems associated with approach constraints or ice/debris passage. The Rock Island District has no foreseeable plans to add additional staff to the locks.

2.48 Change in lock operating policy (e.g., change of service order of arriving towboats) is another suggested nonstructural alternative. Generally, tows arriving at UMR locks are serviced on a directional first-come/first-serve basis. By changing this service policy, however, many locks would be able to increase throughput capability. One common type of policy is termed N-up/N-down and consists of sequentially servicing several tows in the same direction. This policy is efficient as long as the time it takes to execute a turnback approach is less than that required for an exchange approach. Lockmasters currently have the authority to implement this service policy as necessary. Also, changing lock operating policy would not resolve safety problems associated with approach constraints or ice/debris passage.

SECTION 3 - AFFECTED ENVIRONMENT

DESCRIPTION OF HABITATS OF THE UMRS

3.1 The UMRS, shown on Figure EIS-2, offers a variety of fish and wildlife habitats. The aquatic habitats of the pooled portion of the system are classified into six categories by the Upper Mississippi River Conservation Commission (UMRCC). These categories are shown on Figure EIS-3 and are described below (UMRBC, 1982).

3.2 Main Channel - This includes only the portion of the river through which the large commercial craft can operate. It is defined by combinations of wing dams, river banks, islands, and buoys and other markers. A 9-foot navigation channel with a minimum width of 300 feet is maintained. A current always exists, varying in velocity with water stages. The bottom type is a function of current. The upper section usually has a sand bottom, changing to silt over sand in the lower section. Occasional patches of gravel are present in a few areas. The main channel is subject to scouring action during flood periods and by passage of towboats in the shallower stretches. No rooted aquatic vegetation is present.

3.3 Main Channel Border - This is the zone between the 9-foot channel and the main river bank, islands, or submerged definitions of the old main river channel. It includes all areas in which wing dams occur along the main channel. Buoys often mark the channel edge of this zone. Where the main channel is defined only by the bank, a narrow border still occurs, and often the banks have riprap. Dredged spoil has been placed in some sections of this zone, sometimes covering wing dams. The bottom is mostly sand in the upper sections of the pools and silt in the lower. Little or no rooted aquatic vegetation is present. In this zone, wing dams, rock bank protection, and other man-made structures form excellent fish habitat and provide for some of the better fishing along the river.

3.4 Tailwaters - These include the main channel, main channel border, and the areas immediately below the dams which are turbulent due to the passage of water through the gates of the dams and out of the locks. Since these areas

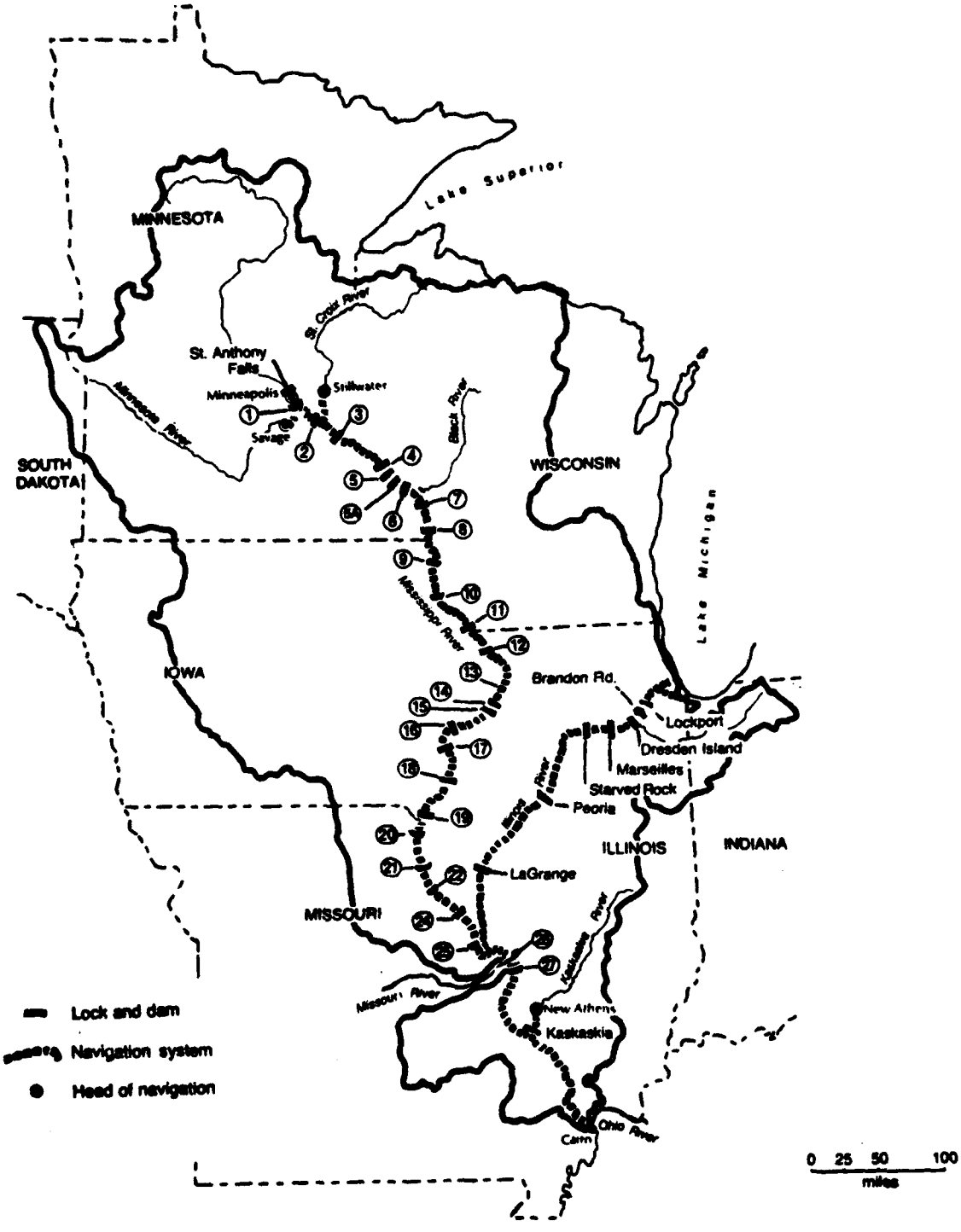


FIGURE EIS-2.
Upper Mississippi River System

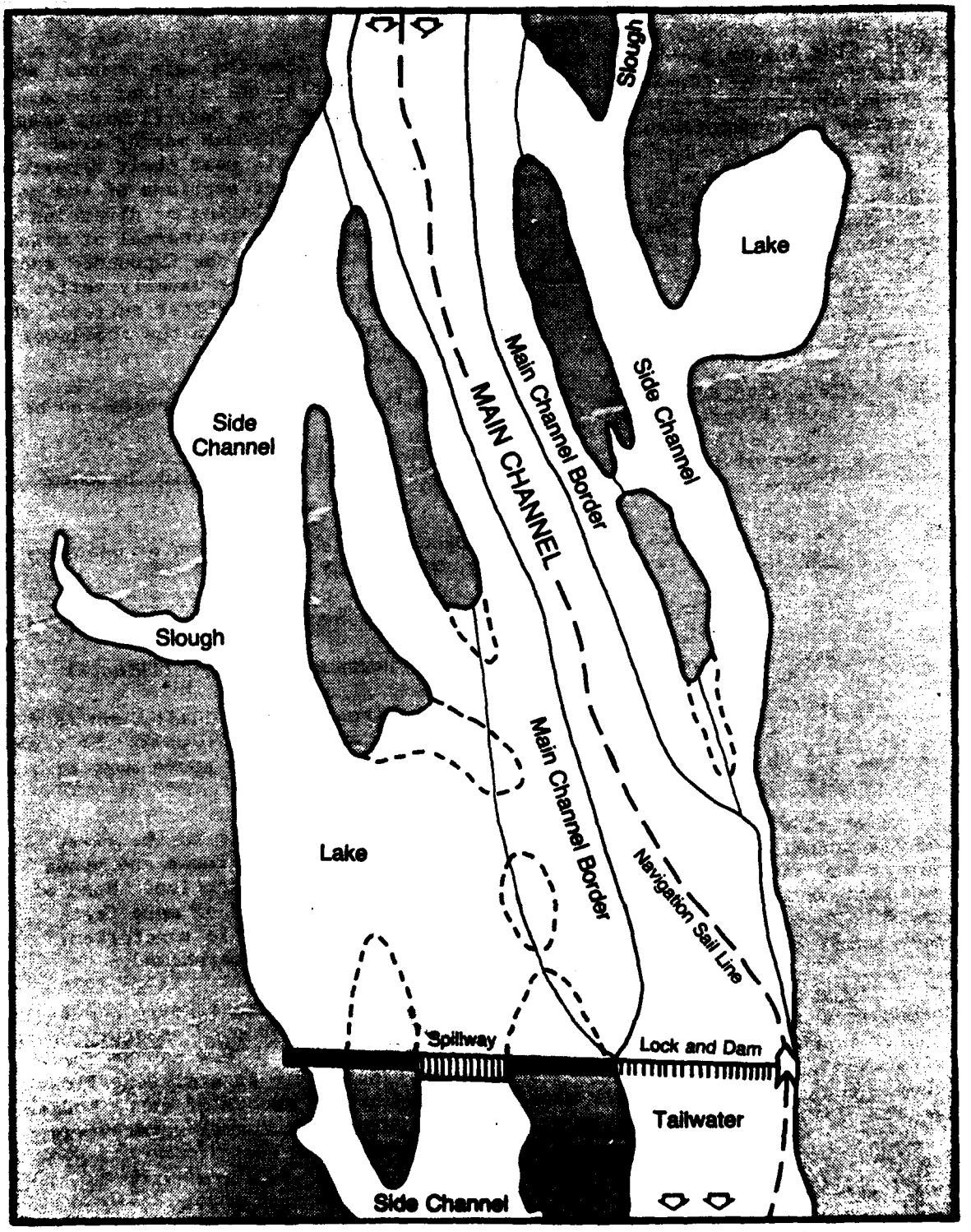


FIGURE EIS-3. Aquatic Habitat Types in the UMRS

From: UMRBC, 1982

change in size according to water stage, an arbitrary lower boundary has been set at a distance of one-half mile below the dams. The bottom is mostly sand. No rooted aquatic vegetation is present.

3.5 Side Channels - These include all departures from the main channel and main channel border, in which there is current during normal river stage. The gradations in this category are widespread, ranging from fast-flowing watercourses with high banks to sluggish streams winding through marshy areas. Undercut or eroded banks are common along side channels near their departure from the main channel. This occurs mainly in the upper sections of the pools where banks are highest and the current is swifter. Closing or diversion dams are usually present where the side channel leaves the main channel or main channel border, and infrequently at other locations. In the impounded section of the river, these are mostly submerged. The bottom type usually varies from sand in the upper reaches to silt in the lower. In the swifter current, there is no rooted aquatic vegetation, but vegetation is common in the shallower areas having silty bottoms and moderate to slight current.

3.6 River Lakes and Ponds - The following types of lakes and ponds can be found in the river bottoms of the UMRS:

- Lakes of formation due to fluviatile dams: (Lake Pepin, between Minnesota and Wisconsin).
- Lakes of mature floodplains: Oxbows or isolated loops of meanders (Spring Lake near Buffalo City, Wisconsin).
- In depressions formed on floodplains: (Sturgeon Lake in Minnesota).
- Between natural levee and swamp: (Chautauqua Lake in Illinois).
- Lakes due to behavior of higher organisms: Dams built by man (Keokuk Lake between Iowa and Illinois. Large open areas, usually not named, off the main channel and main channel borders just above many of the dams).

In river studies, only those lakes having some connection with the river during normal water stages are usually considered. River lakes and ponds may or may not have a light current, depending on their location. Most of the bottoms are mud or silt, often consisting of a layer 2 or more feet thick. These waters may have an abundance of rooted aquatic vegetation, both submergent and emergent. They may be surrounded by marshland.

3.7 Sloughs - This category includes all of the remaining aquatic habitat found in the river. Sloughs often border on the lake or pond category on the one side and on the side channel category on the other. They may be former side channels that have been cut off, or that have only intermittent flows in them. They may be relatively narrow branches or off shoots of other bodies of water. They are characterized by having no current at normal water stage,

3.8 In addition to the six categories of aquatic habitat, there are terrestrial habitat types providing food and cover for semi-aquatic organisms and wildlife. The six major categories of terrestrial habitat are listed below (UMRBC, 1982).

3.9 Marsh (Wetland) Vegetation - This category can be considered the transition zone between open water and terrestrial habitat. Frequently flooded areas of this type support prolific populations of wildlife because of their habitat diversity, available food, and breeding habitat. Many species of birds, amphibians, reptiles, furbearers, and other mammals depend on these areas. Marsh vegetation produce and sustain higher numbers of wildlife than any other land category.

3.10 Sand and Mud - Sand and mud is deposited by floodwaters and dredged material disposal. Accreted silt material usually becomes quickly revegetated; however, most sandy areas are essentially sterile and support minimal growth. This habitat acts as loafing areas for waterbirds and waterfowl.

3.11 Meadow - These lands support mixed stands of grasses, other mixed forbs and broadleaf weeds. Except for overlap occurring near marsh edges and occasional openings in timber that provide good habitat interspersion, these grassy areas are generally not as productive for wildlife compared to forest lands or marshland. They offer moderate loafing cover for deer and nesting cover for certain bird species.

3.12 Forest Lands - Much of the underdeveloped land in the river valley is forest land. Species composition varies from north to south ranging from cypress bottomlands in Missouri to the elm-ash-cottonwood-river birch-silver maple forests found in the middle and upper reaches of the river. Mast producing trees such as hickory, oak, and walnut produce the greatest amount of food for floodplain dwelling wildlife species.

3.13 Agricultural Lands - These lands include open areas which are devoted to annual crops, pastures, fallow ground, and fields that show some sign of recent cultivation. These cultivated areas are located on the driest parts of the floodplain. This habitat type is an important food source for mammals. Many of the small rodent-type species make extensive use of this habitat throughout all phases of their life cycle.

3.14 Urban Land - This category includes areas dominated by industrial or commercial types of structures and those environs which are greatly influenced by industrial development and urbanized areas. Common industries are grain elevator operations, power companies, fertilizer plants, barge docking and loading areas. Very few species depend on developed land for the completion of any life stage. Use is normally transitory, providing resting perches for birds or travel routes for mammals.

3.15 The aquatic habitat and terrestrial habitat acreages for the various reaches of the UMRS are shown in Tables EIS-2 and EIS-3, respectively.

ENVIRONMENTAL SETTING BY STUDY REACH

GENERAL

3.16 For the purposes of analysis in this document, the UMRS has been divided into the following study reaches:

- Upper Mississippi River - Head of Navigation to Pool 10
- Upper Mississippi River - Pool 11 to Pool 19
- Upper Mississippi River - Pool 20 to Pool 26
- Middle Mississippi River - Pool 27 to Cairo, Illinois
- Illinois Waterway - Above Lockport Lock and Dam
- Illinois Waterway - Brandon Road and Dresden Island Pools
- Illinois Waterway - Marseilles and Starved Rock Pools
- Illinois Waterway - Peoria Pool to the Mississippi River
- Minnesota River - Mouth to Mile 21.8
- St. Croix River - Mouth to Mile 24.5
- Black River - Mouth to Mile 1.4
- Kaskaskia River - Mouth to Mile 36.2

3.17 The existing environmental setting for each of the study reaches is described in this section. A general overview is presented, with concentration on the significant resources identified for each study reach. A description of the socio-economic resources for each is provided as well.

3.18 Commodity-specific tonnages transitting the UMRS locks were obtained from the Performance Monitoring System (PMS) and from Waterborne Commerce data. As indicated by Figures EIS-4 and EIS-5, annual commodity flows on the UMR and Illinois Waterway have exhibited upward trends throughout the history of the projects. In this socio-economic profile, recent tonnage trends are presented for each river reach for 1981, peak tonnage year 1983 on the UMR, and 1986.

UPPER MISSISSIPPI RIVER - HEAD OF NAVIGATION TO POOL 10

Natural Resources

3.19 Much of the information presented here has been taken from the UMRBC Master Plan (Technical Report F, Volume II, 1981) and the GREAT I, Fish and Wildlife Appendix (Parts I and II, 1980). Other sources used are as referenced. This reach covers the UMR from the head of navigation at Minneapolis, Minnesota, to Lock and Dam 10 at Guttenberg, Iowa (Upper and Lower St. Anthony Falls and Pools 1 to 10).

TABLE EIS-2

AQUATIC HABITAT ACREAGES
MISSISSIPPI RIVER - ILLINOIS RIVER SYSTEM
AND TRIBUTARIES

Pools	Main Channel	Main Channel Border	Side Channel	Sloughs	River Lakes and Ponds	Tailwaters	Marsh	Total Aquatic
Minnesota River	505.0	----	37.0	74.0	782.0	----	2,738.0	4,216.0
St. Croix River	7,968.0	----	----	----	79.0	----	29.0	8,076.0
Mississippi River								
Pool 1	500.0	----	----	----	----	34.0	----	534.0
Pool 2	1,484.0	1,835.0	128.0	649.0	5,620.0	22.0	786.0	10,524.0
Pool 3	845.0	1,116.0	254.0	1,290.0	2,725.0	72.0	2,911.0	9,213.0
Pool 4	2,243.0	1,545.0	1,241.0	3,938.0	25,260.0	41.0	4,992.0	39,260.0
Pool 5	578.0	1,623.0	1,110.0	3,462.0	2,856.0	77.0	3,854.0	13,560.0
Pool 5A	393.0	651.0	1,099.0	1,844.0	322.0	122.0	2,723.0	7,154.0
Pool 6	696.0	1,637.0	1,004.0	2,568.0	792.0	85.0	4,026.0	10,808.0
Pool 7	477.0	1,535.0	1,288.0	847.0	6,749.0	135.0	4,326.0	15,357.0
Pool 8	1,036.0	2,225.0	3,448.0	4,040.0	5,187.0	92.0	9,236.0	25,264.0
Pool 9	1,622.0	2,500.0	1,636.0	6,064.0	12,297.0	33.0	9,953.0	34,105.0
Pool 10	1,897.0	4,473.0	1,922.0	3,937.0	2,169.0	81.0	4,046.0	18,525.0
Total 1-10	11,771.0	19,140.0	13,130.0	28,639.0	63,977.0	794.0	46,853.0	184,304.0
Pool 11	945.6	3,028.7	1,490.3	1,411.9	11,084.9	66.6	1,976.1	20,004.1
Pool 12	1,109.1	4,281.2	1,729.5	1,676.6	2,034.8	132.3	1,756.6	12,720.1
Pool 13	1,321.2	3,703.3	1,244.3	1,404.7	18,311.0	88.8	3,649.4	29,722.7
Pool 14	1,033.2	3,535.7	1,137.2	1,254.7	2,718.6	80.8	574.9	10,335.1
Pool 15	154.2	1,040.9	348.9	0.0	1,929.1	161.4	14.1	3,648.6
Pool 16	1,218.2	4,712.5	2,801.1	797.9	1,595.4	96.1	804.4	12,025.6
Pool 17	945.5	2,917.1	1,586.9	241.0	1,595.6	129.0	259.9	7,675.0
Pool 18	1,000.0	4,083.4	1,774.3	338.3	4,055.7	83.2	730.1	12,065.0
Pool 19	1,163.6	5,203.6	3,338.5	346.8	17,675.4	124.3	1,664.6	29,516.8
Total 11-19	8,890.6	32,506.4	15,451.0	7,471.9	61,000.5	962.5	11,430.1	137,713.0
Pool 20	1,003.6	4,221.3	1,036.7	35.0	120.5	237.1	46.8	6,701.0
Pool 21	867.9	3,457.8	1,677.8	172.1	869.5	130.2	37.0	7,212.3
Pool 22	963.6	4,180.8	1,111.3	160.6	1,424.9	109.4	31.3	7,981.9
Pool 24	980.0	6,168.0	2,731.0	338.0	279.0	133.0	551.0	11,180.0
Pool 25	1,147.0	7,869.0	4,398.0	1,421.0	781.0	133.0	658.0	16,407.0
Pool 26	1,500.0	10,296.0	3,818.0	664.0	616.0	165.0	974.0	18,033.0
Total 20-26	6,462.1	36,192.9	14,772.8	2,790.7	4,090.9	907.7	2,298.1	67,515.2
Illinois River								
LaGrange Pool	3,911.0	1,883.0	381.0	261.0	23,500.0	39.0	2,673.0	32,648.0
Peoria Pool	5,282.0	15,515.0	546.0	----	15,065.0	71.0	2,482.0	38,961.0
Starved Rock Pool	721.0	1,890.0	368.0	----	171.0	38.0	----	3,188.0
Marseilles Pool	1,162.0	625.0	139.0	21.0	338.0	65.0	10.0	2,360.0
Dresden Island Pool	803.0	1,175.0	92.0	----	943.0	79.0	147.0	3,239.0
Brandon Road Pool	241.0	184.0	----	----	2.0	19.0	9.0	455.0
Totals	12,120.0	21,272.0	1,526.0	282.0	40,019.0	311.0	5,321.0	80,851.0

From: US Army Engineer Division, North Central, 1978

TABLE EIS-3

TERRESTRIAL HABITAT ACREAGES
MISSISSIPPI RIVER - ILLINOIS RIVER SYSTEM
AND TRIBUTARIES

Pools	Forest	Brush	Meadow	Sand	Mud Flat	Agricultural	Residential/ Commercial	Total Terrestrial
Minnesota River	2,007.0	454.0	2,025.0	39.0	----	907.0	1,630.0	7,062.0
St. Croix River	382.0	20.0	11.0	70.0	----	----	535.0	1,018.0
Mississippi River								
Pool 1	27.0	----	----	46.0	----	----	40.0	113.0
Pool 2	3,433.0	212.0	571.0	168.0	----	1,230.0	4,301.0	9,915.0
Pool 3	7,582.0	92.0	203.0	79.0	----	3,381.0	712.0	12,049.0
Pool 4	12,088.0	248.0	261.0	422.0	----	4,103.0	2,448.0	19,570.0
Pool 5	5,957.0	323.0	2,857.0	273.0	----	7,336.0	1,665.0	18,411.0
Pool 5A	4,334.0	3.0	49.0	122.0	----	568.0	290.0	5,366.0
Pool 6	3,340.0	412.0	542.0	140.0	----	388.0	2,488.0	7,310.0
Pool 7	4,279.0	242.0	933.0	126.0	----	577.0	1,248.0	7,405.0
Pool 8	5,816.0	454.0	440.0	286.0	----	601.0	2,450.0	10,047.0
Pool 9	13,589.0	524.0	12.0	176.0	----	1,475.0	1,220.0	16,996.0
Pool 10	9,771.0	924.0	36.0	79.0	----	1,405.0	1,773.0	13,988.0
Total 1-10	70,216.0	3,434.0	5,904.0	1,917.0	----	21,064.0	18,635.0	121,170.0
Pool 11	4,963.0	1,347.3	703.6	129.7	52.1	549.9	887.9	8,333.5
Pool 12	3,396.1	1,379.9	315.7	43.0	0.2	267.0	1,439.6	6,841.5
Pool 13	9,571.6	2,094.9	1,980.5	187.6	25.3	5,485.6	6,926.0	26,271.5
Pool 14	5,561.0	438.4	376.7	49.3	3.1	2,751.4	3,384.7	12,564.6
Pool 15	188.6	32.4	30.9	24.1	0.0	475.4	3,539.8	4,291.2
Pool 16	5,216.2	646.9	363.9	68.3	6.7	2,683.6	2,793.1	11,778.7
Pool 17	5,421.0	804.6	241.1	14.7	15.4	1,103.1	156.7	7,756.6
Pool 18	8,051.4	1,190.9	683.3	157.3	23.6	596.5	502.6	11,205.6
Pool 19	9,410.5	1,834.3	1,397.0	106.3	24.3	20,423.4	2,082.1	35,277.9
Total 11-19	51,779.4	9,769.6	6,092.7	780.3	150.7	34,335.9	21,412.5	124,321.1
Pool 20	2,635.4	391.4	197.0	97.7	2.5	2,823.9	523.5	6,671.4
Pool 21	7,763.7	397.8	104.6	43.1	5.2	1,605.6	462.1	10,382.1
Pool 22	6,653.9	351.1	152.9	31.0	2.0	1,357.6	133.6	8,682.1
Pool 24	6,916.0	----	0.0	127.0	----	1,699.0	675.0	9,417.0
Pool 25	11,911.0	----	0.0	1,053.0	----	8,435.0	971.0	22,370.0
Pool 26	13,005.0	----	0.0	273.0	----	6,497.0	1,847.0	21,622.0
Total 20-26	48,885.0	1,140.3	454.5	1,624.8	9.7	22,418.1	4,612.2	79,144.6
Illinois River								
LaGrange Pool	4,591.0	----	----	----	4,621.0	2.0	59.0	9,273.0
Peoria Pool	4,774.0	----	----	----	2,049.0	1,039.0	257.0	8,119.0
Starved Rock Pool	----	----	----	----	----	----	----	----
Marseilles Pool	9.0	----	----	----	----	490.0	----	499.0
Dresden Island Pool	46.0	----	----	----	----	----	----	46.0
Brandon Road Pool	----	87.0	----	----	----	----	----	87.0
Totals	9,420.0	87.0	----	----	6,670.0	1,531.0	316.0	18,024.0

From: US Army Engineer Division, North Central, 1978

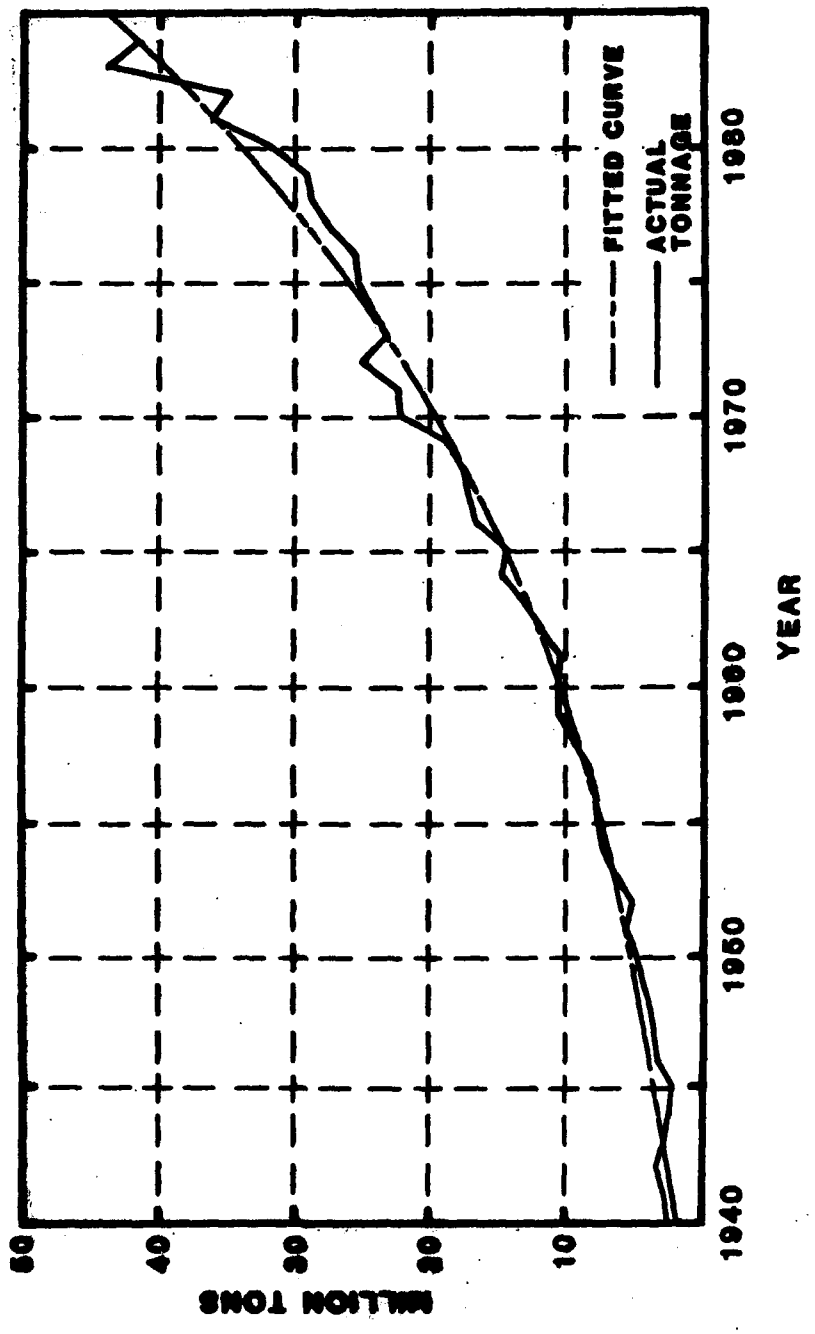


FIGURE EIS-4. Upper Mississippi River Commodity Flows Rock Island District

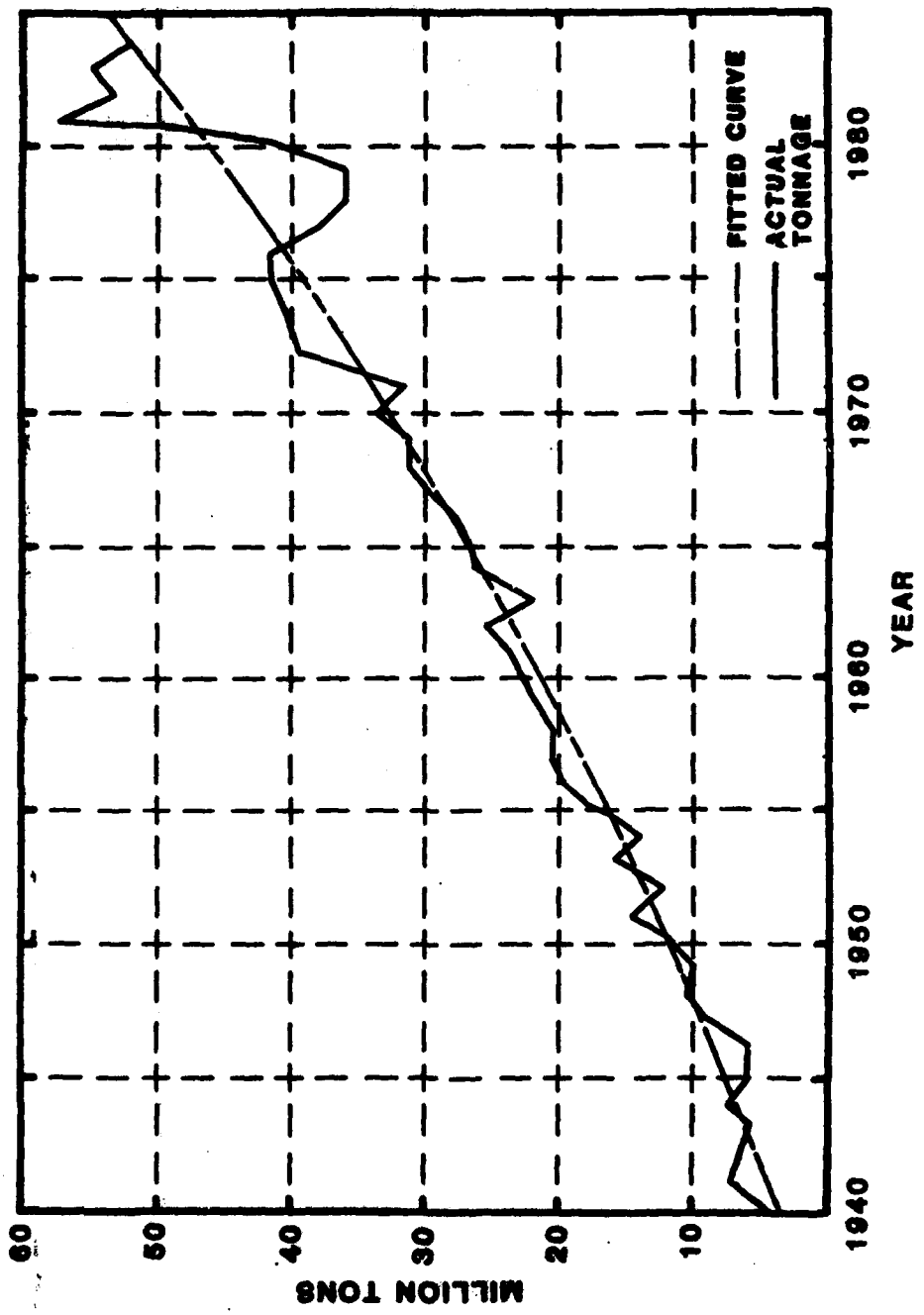


FIGURE EIS-5. Illinois Waterway Commodity Flows
Rock Island District

3.20 At the upper end of this study reach, the UMR flows through the Minneapolis - St. Paul metropolitan area. This section of the river is restricted between steep bluffs with little backwater area. Fish and wildlife habitats and populations are somewhat limited because of urbanization and industrial and commercial development. Just downstream from St. Paul, the UMR widens and develops an extensive system of backwater lakes and sloughs, and rich wetland habitats, until it reaches Lake Pepin at Bay City, Wisconsin. Lake Pepin is between 1 to 2.5 miles wide and about 22 miles long, extending to the delta of the Chippewa River. Lake Pepin is the longest natural lake in the UMRS. The UMR continues to flow downstream through a wide floodplain bordered by high bluffs from Lake Pepin to Guttenberg, Iowa. These backwater areas serve as significant wetland habitat for millions of fish and wildlife.

3.21 In general, the tailwaters of the dams contain valuable fishery habitat, which provides spawning, rearing, and wintering areas for walleye, sauger, yellow perch, catfish, and white bass. The tailwaters also provide important feeding areas for raptors that overwinter in the area, such as bald eagles.

3.22 Fish and wildlife habitat and populations are somewhat limited in Upper and Lower St. Anthony Falls, Pool 1, and Pool 2 because of the urban nature and commercial and industrial development along the shorelines, as well as generally poor water quality. Unlike the upper pools, Pool 3 has a small commercial fishery consisting of carp and mooneye. Also unlike the upper pools, which are generally devoid of mussels, Pool 3 contains a limited, but viable mussel fauna. Birds and mammals would utilize the forested bluff areas and any undisturbed floodplain habitats flanking these pools. However, two large rookeries are located at the downstream tip of Pig's Eye Island (river mile 834.0). The largest rookery lies between a barge fleeting and terminal area, and is used by black-crowned and yellow-crowned night herons and great egrets. About 1,000 feet upstream, another rookery is used by great blue herons.

3.23 Pools 4, 5, 5a, and 6 contain better quality and more abundant fish and wildlife habitat than the upstream pools. The outlet of Lake Pepin (Pool 4) is the northern border of the Upper Mississippi River Wildlife and Fish Refuge (see Figure EIS-6). The refuge was established by Congress in 1924 and is administered by the U.S. FWS. It stretches 284 miles from Wabasha, Minnesota, to Rock Island, Illinois. A final EIS and Master Plan were prepared by the U.S. FWS in July 1987, which describes five alternatives for a 20-year master plan for the refuge.

3.24 The extensive backwater areas around Lake Pepin provide excellent fish feeding and spawning areas, as does Lake Pepin itself. However, Lake Pepin serves as a contaminant sink for chemicals discharged from the Twin Cities metropolitan area, and problems with polychlorinated biphenyls (PCB's) have occurred in recent years. The sport fishery in Pools 4, 5, 5a and 6 is of good quality and diverse, consisting primarily of white bass, sauger, crappie, walleye and bluegill. The commercial fishery consists primarily of carp, buffalo, and catfish.

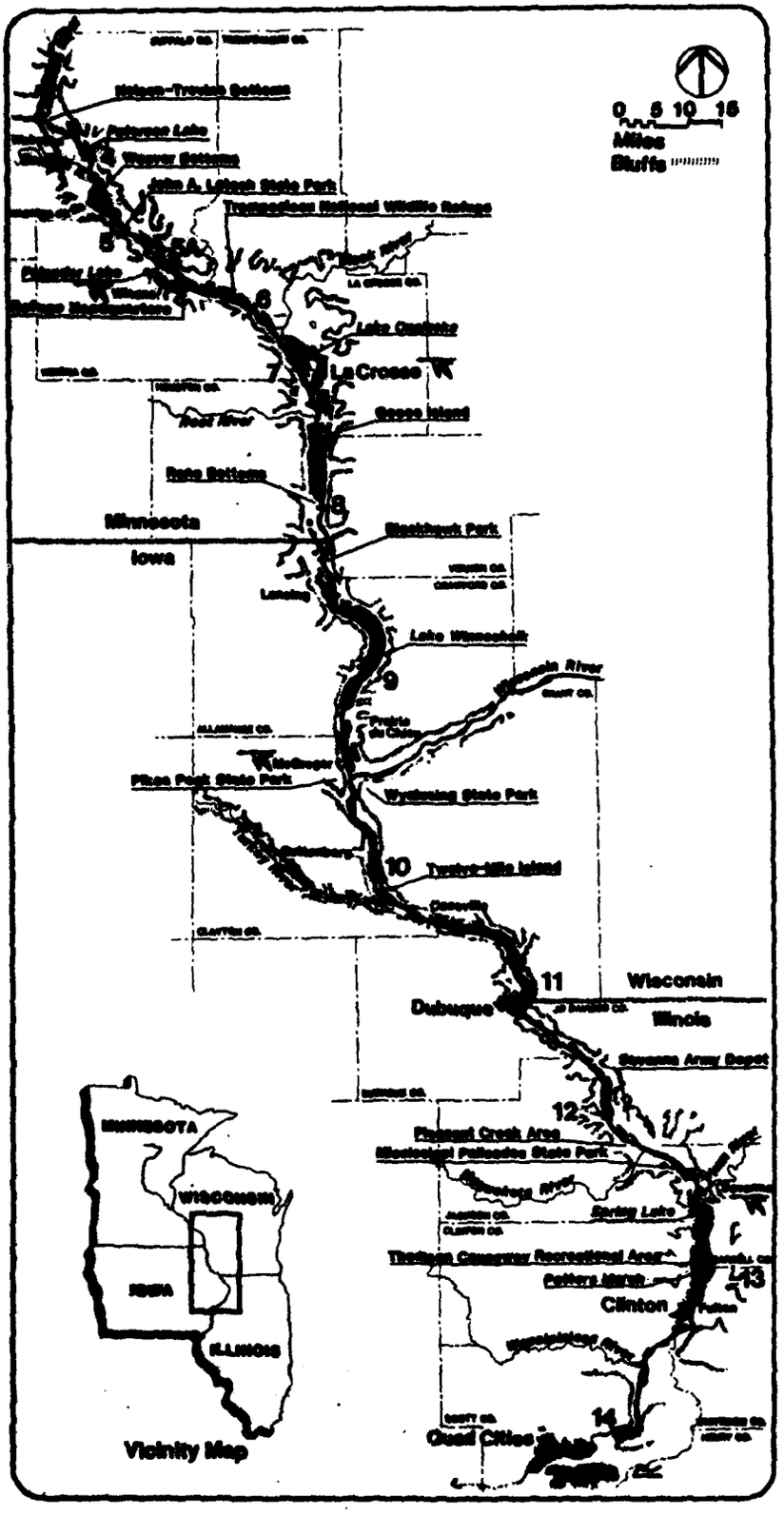


FIGURE EIS-6. Upper Mississippi River National Wildlife and Fish Refuge

3.25 Upper Pool 4 (near Trenton) contains an excellent population of mussels. However, in lower Pool 4, and in Pools 5 and 5a, the mussel community is not as diverse or abundant, due to the sediment load contributed by the Chippewa, Cannon, and Zumbro Rivers. The mussel fauna of Pool 6 returns to a healthy and diverse assemblage, since Pool 6 is less affected by tributary sediment loads. The benthic (bottom-dwelling) invertebrate community for these pools consists primarily of mayflies, caddisflies, chironomids, and fingernail clams.

3.26 The backwater areas of Pools 4, 5, 5a, and 6 provide extensive bird nesting and rearing habitats. Waterfowl heavily utilize these pools during spring and fall migrations for resting and feeding. The bluffs along the Wisconsin Shore of Lake Pepin are being used for a peregrine falcon nesting and rearing program by the U.S. FWS and the University of Minnesota.

3.27 A study of water bird colonies on the UMR revealed that the river reach north of Lock and Dam 10 provided the best nesting and rearing habitat for these species (Thompson and Landin 1978). These data are graphically shown on Figure EIS-7. As the river becomes progressively more confined and controlled going downstream toward Lock and Dam 26, the habitat for water birds declines drastically.

3.28 A wide variety of mammals utilize the habitats available in these pools. Muskrat and beaver are trapped, and fox and raccoon are trapped and hunted along these pools. The Nelson-Trevino bottoms in Pool 4 is one of two areas in this study reach where the massasauga, or swamp rattlesnake, is known to exist. This species is listed as special concern in Minnesota, and as endangered in Wisconsin, Iowa, and Illinois.

3.29 Pools 7 to 10 contain fish and wildlife resources that are similar to that described for Pools 4 to 6. Of additional significance, Lake Onalaska in Pool 7 has an extremely high value for waterfowl because of its abundance of aquatic macrophytes (large plants). Pools 7 to 9 also contain a large diving duck population. Pool 10 is very rich in backwater habitats, which are excellent habitat for fish and wildlife resources.

3.30 Pool 9 is the leading pool in commercial fish harvest in the UMRS, with Pool 8 also being a major source. Species of importance include carp, buffalo, freshwater drum, and catfish.

3.31 Freshwater mussels are valuable to fish and wildlife as food. Mussels are a source of food for freshwater drum, yellow perch and channel catfish, and also serve as substrates for attachment of benthic (bottom-dwelling) organisms, which are also food for fish (GREAT II). Muskrats, raccoon, and other animals often utilize both juvenile and adult mussels (GREAT II).

3.32 A mussel survey of Pools 3 to 11 collected 30 species of mussels, with the most abundant being three ridge, pigtoe, and pimpleback (Thiel 1981). Since 1981, three additional species have been collected, one of which was the rare spectacle case (Cumberlandia monodonta) (Wisconsin Department of Natural

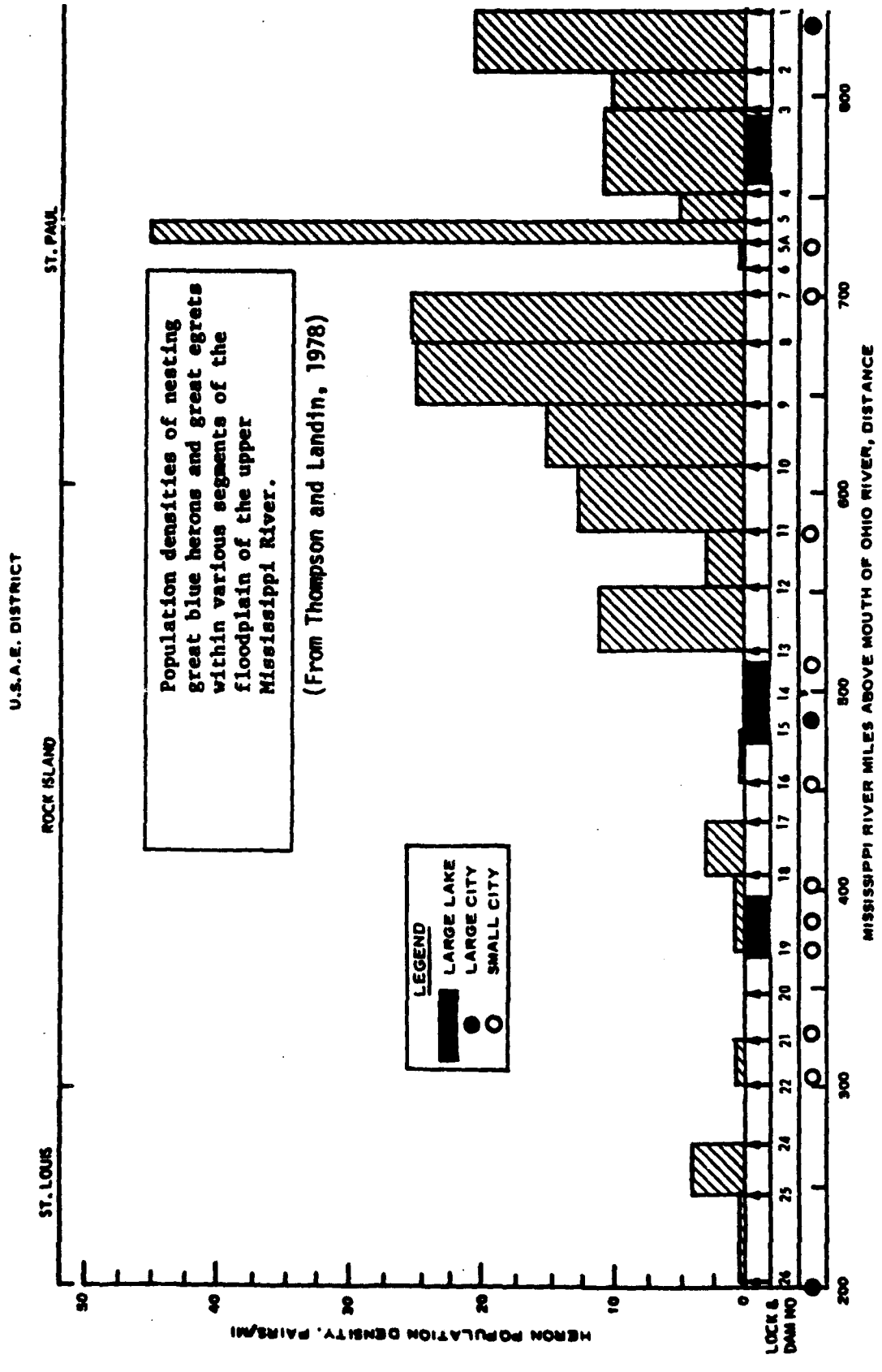


FIGURE EIS-7. Population Densities of Nesting Great Blue Herons and Great Egrets Within Various Segments of the Floodplain of the UMR

Resources, letter dated December 1, 1988). More species and greater numbers of mussels are collected in Pool 10 than in any of the other pools surveyed (Thiel 1981; Duncan and Thiel 1983). The endangered species, the Higgins' eye pearly mussel, has been found in Pools 7, 8, 9, and 10. The Higgins' Eye Recovery Team (1982) identified four essential habitat sites in this reach for this species, which are believed to contain viable reproductive populations:

Whiskey Rock, Wisconsin	Pool 9	river miles 658.4-655.8
Harpers Slough, Wisconsin	Pool 10	river miles 641.4-639.0
Prairie du Chien, Wisconsin	Pool 10	river miles 637.0-633.4
McMillan Island, Wisconsin	Pool 10	river miles 619.1-616.4

3.33 Commercial clamming exists in Pools 4, and 7 through 11. The majority of the harvest occurs in Pools 8 and 9, with the commercially valuable washboard (Megalonaias nervosa) harvested only from Pools 9 and 10 (Heath, et al., 1988). In 1986, the commercial clamming industry transacted about $500,000 in business in Pools 4 through 11 (Heath, et al., 1988).

Socio-Economic Resources

3.34 The UMR reach extending from the head of navigation to Lock and Dam 10 is 239 miles long. A total of 18 counties border the river within this segment: 2 in Iowa, 8 in Minnesota, and 8 in Wisconsin. The 18-county region had approximately 2,609,000 residents in 1985, of which 82 percent were urban (Table EIS-4). Major river communities within this reach include Minneapolis, St. Paul, Hastings, Red Wing, and Winona, Minnesota; and La Crosse and Prairie du Chien, Wisconsin.

3.35 The area's economy is strongly influenced by the Twin Cities (Minneapolis and St. Paul) and La Crosse. Major industries in these cities include computer and machinery manufacturing; canned, frozen, and dairy food processing; and beer processing. Dairy farming comprises the major portion of this region's agricultural activity. Other farm-related activities center on food crop, feed, cattle, hog, and sheep production.

Commercial Navigation

3.36 As can be seen in Figure EIS-8, tonnage transitting the locks increases going downstream from St. Anthony Falls Upper to Lock 10. "Up" and "Low" on Figure EIS-8 refer to St. Anthony Falls Upper and Lower.

3.37 Downbound tonnage has historically, and remains to be, dominated by grain and farm products. Trends in downbound grain traffic tend to explain total traffic through all locks in this reach. Downbound grain tonnage through Lock 10 increased from 12,643 kilotons (ktons) in 1981 to 17,055 ktons

TABLE EIS-4

1985 Population Estimates by River Reach [1]

1. MISSISSIPPI RIVER REACHES

A. HEAD OF NAVIGATION TO POOL 10

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Iowa	Allamakee	14,900	26.4
	Clayton	20,900	----
Minnesota	Dakota	223,100	92.2
	Goodhue	40,300	43.5
	Hennepin	951,400	99.0
	Houston	18,800	35.7
	Ramsey	460,900	99.7
	Wabasha	20,200	20.9
	Washington	127,400	76.7
	Winona	472,300	59.8
Wisconsin	Buffalo	14,300	17.8
	Grant	55,300	31.5
	La Crosse	96,600	74.0
	Pepion	7,500	----
	Pierce	32,100	32.7
	Trempealeau	26,700	----
	Vernon	26,300	14.5
TOTAL		2,609,000	81.5

B. POOL 11 TO POOL 19

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Illinois	Carroll	18,900	24.1
	Hancock	23,900	27.2
	Henderson	9,900	----
	Henry	60,200	51.0
	Jo Daviess	23,700	25.8
	Mercer	20,000	20.1
	Rock Island	160,000	86.0
	Whiteside	67,800	53.7
Iowa	Clayton	20,900	----
	Clinton	56,800	73.6
	Des Moines	44,900	71.2
	Dubuque	91,400	74.4
	Jackson	22,300	28.1
	Lee	42,700	62.8
	Louisa	12,400	----
	Muscatine	43,500	70.9
	Scott	162,900	87.5
Wisconsin	Grant	51,600	31.5
TOTAL		933,800	66.3

TABLE EIS-4 (Cont'd)

C. POOL 20 TO POOL 26

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Illinois	Adams	71,700	59.4
	Calhoun	6,000	-----
	Hancock	23,900	27.2
	Jersey	20,600	36.5
	Madison	240,500	81.8
	Pike	19,800	22.1
Iowa	Lee	42,700	62.8
Missouri	Clark	8,500	-----
	Lewis	11,500	-----
	Lincoln	22,900	11.8
	Marion	29,800	78.5
	Pike	17,400	41.5
	Ralls	8,900	1.9
	St. Charles	152,100	79.0
TOTAL		676,300	67.4

D. POOL 27 TO CONFLUENCE WITH OHIO RIVER

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Illinois	Alexander	12,400	48.4
	Jackson	61,600	58.8
	Madison	240,500	81.8
	Monroe	20,200	44.8
	Randolph	35,800	45.5
	St. Clair	267,900	87.5
	Union	17,900	30.4
Missouri	Cape Girardeau	61,300	71.7
	Jefferson	152,300	43.2
	Mississippi	16,200	56.9
	Perry	17,000	43.8
	Ste. Genevieve	16,000	29.5
	St. Louis (city)	450,300	100.0
	St. Louis (county)	991,800	97.7
	Scott	40,500	58.7
TOTAL		2,401,700	86.5

TABLE EIS-4 (Cont'd)

2. ILLINOIS WATERWAY REACHES

A. ABOVE LOCKPORT LOCK AND DAM

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Illinois	Cook	521,200	99.7
	Dupage	743,200	98.4
	Will	351,100	77.9
TOTAL		1,615,500	94.4

B. BRANDON ROAD AND DRESDEN ISLAND POOLS

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Illinois	Grundy	37,200	38.9
	LaSalle	111,900	62.5
TOTAL		149,100	56.6

C. MARSEILLES AND STARVED ROCK POOLS

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Illinois	Grundy	37,200	38.9
	Will	351,100	77.9
TOTAL		388,300	74.2

TABLE EIS-4 (Cont'd)

D. PEORIA POOL TO THE MISSISSIPPI RIVER

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Illinois	Brown	5,400	----
	Bureau	39,300	33.7
	Calhoun	6,000	----
	Cass	15,500	42.0
	Fulton	45,600	46.9
	Greene	16,800	34.5
	Jersey	20,600	36.5
	LaSalle	111,900	62.5
	Marshall	16,600	18.9
	Mason	19,700	35.9
	Morgan	38,100	63.1
	Peoria	200,600	84.3
	Putnam	6,100	----
	Pike	19,800	22.1
	Schuyler	8,700	40.0
	Scott	6,500	----
	Tazewell	134,500	76.8
	Woodford	35,000	21.0
TOTAL		746,700	61.7

3. KASKASKIA RIVER, MOUTH TO MILE 36.2

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Illinois	Monroe	20,200	44.8
	Randolph	35,800	45.5
	St. Claire	263,900	87.5
TOTAL		323,900	75.7

4. MINNESOTA RIVER - MOUTH TO MILE 21.8

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Minnesota	Dakota	223,100	92.2
	Hennepin	951,400	99.0
	Scott	48,800	65.1
TOTAL		149,100	96.4

TABLE EIS-4 (Cont'd)

5. ST. CROIX RIVER - MOUTH TO MILE 24.5

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Minnesota	Washington	127,400	76.7
Wisconsin	Pierce	32,100	32.7
	St. Croix	46,500	26.0
TOTAL		206,000	58.4

6. BLACK RIVER - MOUTH TO MILE 1.4

State	County	1985 Population Estimate	1985 Percent Urban Population Estimate
Wisconsin	LaCrosse	96,600	74.0

1 References:

a. Bureau of the Census. 1986. "Provisional Estimates of Counties." Prepared for each state.

b. State of Illinois, Bureau of Budget. 1987. "Illinois Population Trends 1980 to 2025."

c. Iowa Development Commission. 1986. "1986 Statistical Profile of Iowa."

d. Minnesota Department of Energy, Planning, and Development. 1983. "Minnesota Population Projections 1980-2010."

e. Missouri State Library, Reference Desk, Jefferson City, MO. Unpublished Source.

f. State of Wisconsin, Demographics Services Center, Madison, WI. Unpublished Source.

UPPER MISSISSIPPI RIVER
HEAD OF NAVIGATION TO L/D 10 (1986)

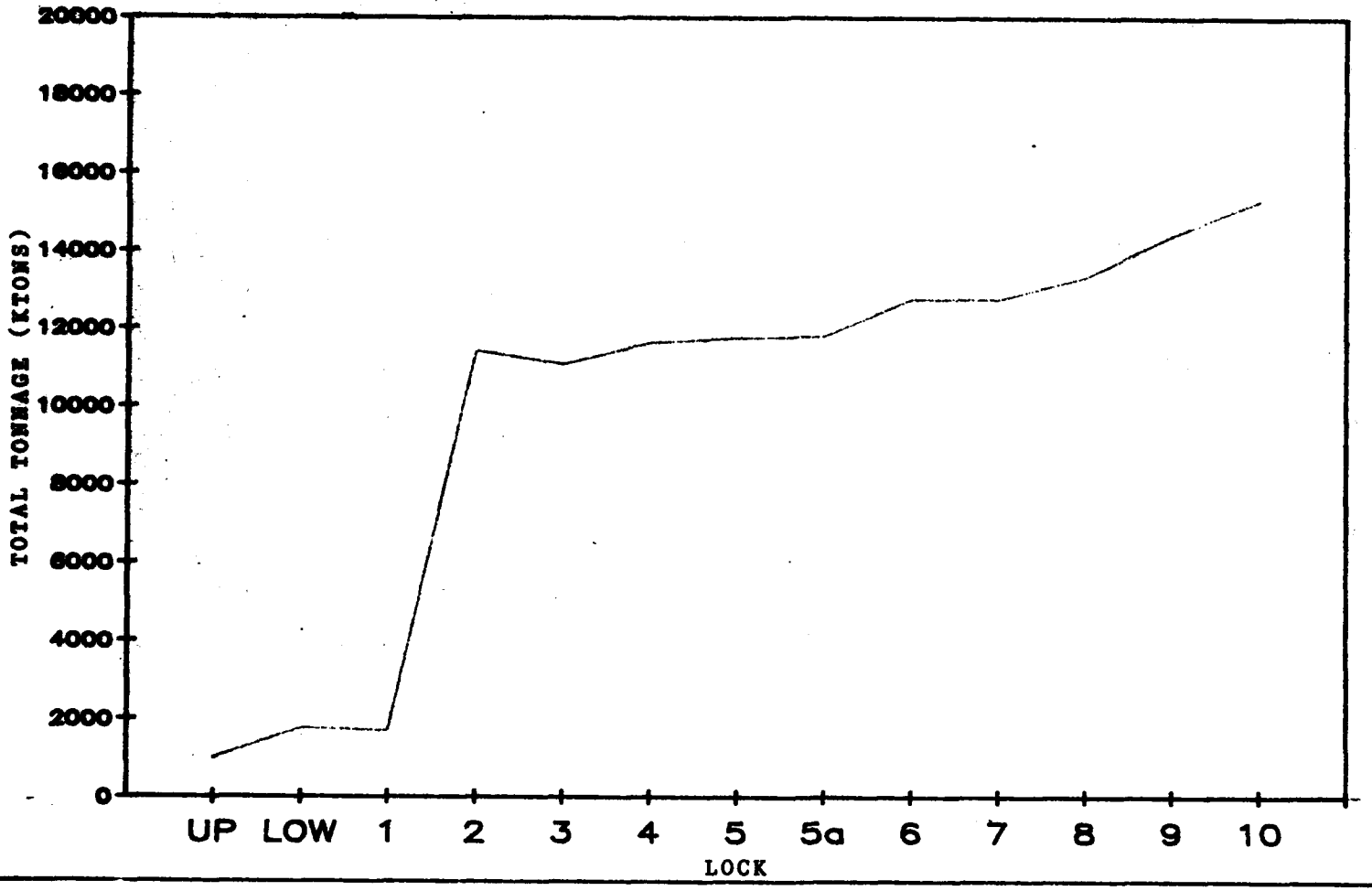


FIGURE EIS-8 Tonnage Transiting Locks, Head of Navigation to L/D 10 (1986)

EIS-37

in 1983 and has fallen to 9,440 ktons in 1986. This trend is typical of other locks in this reach. There is no significant upbound grain traffic, although downbound grain generates many upbound empty jumbo barges.

3.38 In this reach of the Mississippi River, upbound tonnage has declined from 1981 to 1983 and rebounded in 1986 to above 1981 levels. At Lock 10, 1981 upbound tonnage was 5,283 ktons, declining to 4,608 ktons in 1983 and increasing to 5,876 ktons in 1986.

3.39 Other commodities which transit the locks in this reach with significant tonnage include: coal (up and downbound); and upbound fertilizer.

3.40 Upbound coal declined from 1981 to 1983 and rebounded in 1986 to near or above 1981 levels for all locks in this reach. Downbound coal tonnage has declined from 1981 to 1986. At Lock 10, upbound fertilizer tonnage has increased significantly from 567 ktons in 1981, to 958 ktons in 1983, and to 1,357 ktons in 1986.

3.41 Other commodities with less significant tonnage showing steady to significant tonnage increases since 1981 include upbound salt and downbound coke and petroleum products.

UPPER MISSISSIPPI RIVER - POOL 11 TO POOL 19

Natural Resources

3.42 Much of the information presented here has been taken from the UMRBC Master Plan, Technical Reports D and F (1981), and the GREAT II, Fish and Wildlife Management Work Group Appendix (1980). Other sources used are as referenced. This reach covers the UMR from Lock and Dam 10 (river mile 615.1) at Guttenberg, Iowa, to Lock and Dam 19 (river mile 364.2) at Keokuk, Iowa (Pools 11 to 19).

3.43 This reach is different from the previous reach in several respects. Topography changes from a river flanked by high bluffs near Cassville, Wisconsin, to a more rolling landscape near Keokuk, Iowa. Forested areas are less prominent in the lower portion of this reach. There is a high relative distribution of woody vegetation in the floodplain, except for the Quad Cities area in Pool 15. A decline in aquatic vegetation occurs below Pool 14. Non-channel waters and side channels are less extensive and are replaced by main channel border as the dominant water type at the lower end of this reach. This reach can be considered transitional between the upper (above L/D 10) and lower (below L/D 19) pooled river reaches.

3.44 The commercial fishery in this reach consists primarily of carp, buffalo, catfish, and freshwater drum. The principal harvest areas for carp and buffalo occur in Pools 13, 18, and 19, and for catfish and freshwater drum in Pools 18 and 19. This reach is also considered to have a good to excellent sport fishery. Major species sought include bluegill, crappie, sauger,

walleye, channel catfish, white bass, largemouth bass, and freshwater drum. Various fish species congregate in the tailwater habitat of the dams, and these areas attract the greatest fishing pressure. Pool 19 has the largest paddlefish fishery in the UMRS, followed by Pool 13.

3.45 A diversity of species and good populations of freshwater mussels are found in this reach of the UMR. The most common species include the three-ridge, pimpleback, pigtoe, and hickory-nut. The Higgins' eye pearly mussel (Lampsilis higginsi), a federally endangered species, has been found in Pool 11 (river miles 612.2-613.1, 607.5-609.0); Pool 12 (river miles 580.9-581.5); Pool 14 (river miles 510.0-510.2, 508.1, 506.8, 505.0-505.5, 504.0-504.7, 503.2-503.9); Pool 15 (river miles 485.5-486.0); Pool 16 (river miles 480.7-482.0, 482.9, 478.0-478.3, 477.6-478.0, 473.0-474.1, 472.0-473.0); Pool 17 (river miles 449.0-450.0, 445.7, 444.0-445.1, 438.5-438.7); and Pool 19 (river miles 406-410.5). The Higgins' Eye Recovery Team (1982) identified two essential habitat sites in this reach:

Cordova, Illinois	Pool 14	river miles 505.5-503.0
Sylvan Slough, Illinois	Pool 15	river mile 485.5

3.46 Another species of mussel considered as being rare in the UMR has been found in this reach, the spectacle case (Cumberlandia monodonta). This species has been found in Pool 15 (river miles 485.5-485.8, 483.0483.1); Pool 16 (river miles 480.7-482.0, 481.6, 472.0-473.0); Pool 17 (river miles 444.0-445.1); and Pool 19 (river miles 390.0-390.7, 389.0-390.3, 386.5-388.6, 364.5-364.6).

3.47 The pools in this reach are heavily used each year by resident and migratory birds, except for Pool 15 because of its extensive urbanization. Waterfowl heavily utilize the pools during spring and fall migrations for resting and feeding. Pool 19 is especially significant to diving ducks and other waterfowl that obtain food by diving for bulbs, leaves, and small crustaceans. Pool 19 is more than 20 years older than other UMR pools, and its silty bottom supports a rich benthic community, especially fingernail clams.

3.48 As shown on Figure EIS-7, habitat for water birds (herons, egrets) declines from the upper to lower portions of this reach. Great blue heron and/or great egret rookeries are located in Pool 11 (river miles 610.1, 609.7, 609.2, 600.9); Pool 12 (river miles 576.1, 574.8, 569.9, 569.4); Pool 13 (river miles 549.0-556.7 at Savanna Army Depot, 538.3538.6, 535.5); Pool 14 (river miles 514.0-514.8); Pool 16 (river mile 478.1 and includes black-crowned night heron, 476.7); Pool 17 (river mile 451.0); Pool 18 (river mile 433.7); and Pool 19 (river miles 408.3, 397.4, 396.0). In this reach of the UMR, the only nesting area for double-crested cormorants is located in Pool 13, at river miles 534.9, 531.8, and 525.0-527.0.

3.49 A large number of bald eagles winter in this reach of the UMR. Large trees along the shoreline near the locks and dams are of significant importance in providing perching and feeding sites, as bald eagles feed on fish in water kept open by the dams during the winter. In Pool 11, an eagle sanctuary is located at river miles 613.6 to 616.0, and a night roosting area at river

miles 604.0 to 605.0; in Pool 13 eagle nesting and roosting habitat is located in the Savanna Army Depot (river miles 549.0 to 556.7); and in Pool 14 the Oak Valley Eagle Refuge serves as a night roosting area (river miles 493.3 to 495.0). Other roosting areas are found in Pool 15 (river miles 488.0 to 493.0); and Pool 19 (river miles 396.0 to 401.0).

3.50 Wildlife species in this reach depend upon the marsh and shoreline habitats for food and cover. Because of extensive urbanization, wildlife habitat is limited in Pool 15, as compared to the other pools. Mammal species expected to be found in this reach include muskrat, squirrel, raccoon, beaver, rabbit, white-tailed deer, coyote, and fox. Essential habitat for the river otter, a threatened species in Iowa and Illinois, and considered rare in Missouri, is found in Pool 12 (river miles 560.0579.0); Pool 13 (river miles 549.0-560.0, 548.0-540.0, 531.8-537.0, 524.0-529.0); Pool 14 (river miles 518.0-510.0, 506.3-505.5, 494.0-493.0); Pool 15 (river miles 483.0-493.0); Pool 16 (river miles 476.7-483); Pool 18 (river miles 437.0-435.0, 431,0-428.0); and Pool 19 (river miles 406.0405.0). Land and water dwelling reptiles and amphibians also would be abundant in this reach in areas with suitable habitat.

3.51 About 91,720 acres of land and water are managed by State and Federal agencies for fish and wildlife resources in this reach (see Table EIS-5). The Upper Mississippi River Wildlife and Fish Refuge occupies about 62,800 of these acres in Pools 11 to 14 (see Figure EIS-6). As shown on Figure EIS-9, three divisions of the Mark Twain National Wildlife Refuge are located in Pools 17 and 18: Big Timber (1,757 acres), Louisa (2,609 acres), and Keithsburg (1,400 acres) (U.S. FWS 1979).

Socio-Economic Resources

3.52 The UMR reach extending from Lock and Dam 10 to Lock and Dam 19 covers approximately 251 river miles. The area bordering the river within this reach includes 8 Illinois counties, 9 Iowa counties, and 1 Wisconsin county. The combined 1985 population of the 18-county region was estimated at 933,800 (see Table EIS-4). About two-thirds of the region's residents live in urban areas located along the river, including the communities of Dubuque, Clinton, Davenport, Bettendorf, Muscatine, Burlington, Fort Madison, and Keokuk, Iowa; and East Moline, Moline, and Rock Island, Illinois.

3.53 The region's economy has evolved a high degree of economic specialization in agricultural-related industries. The primary economic activities include the raising of feed, seed, and livestock, the producing of machinery to plant and harvest farm products, and the processing of farm products for sale to consumers. Other important activities in the area include the manufacturing of construction equipment and ammunitions and the production of aluminum sheet.

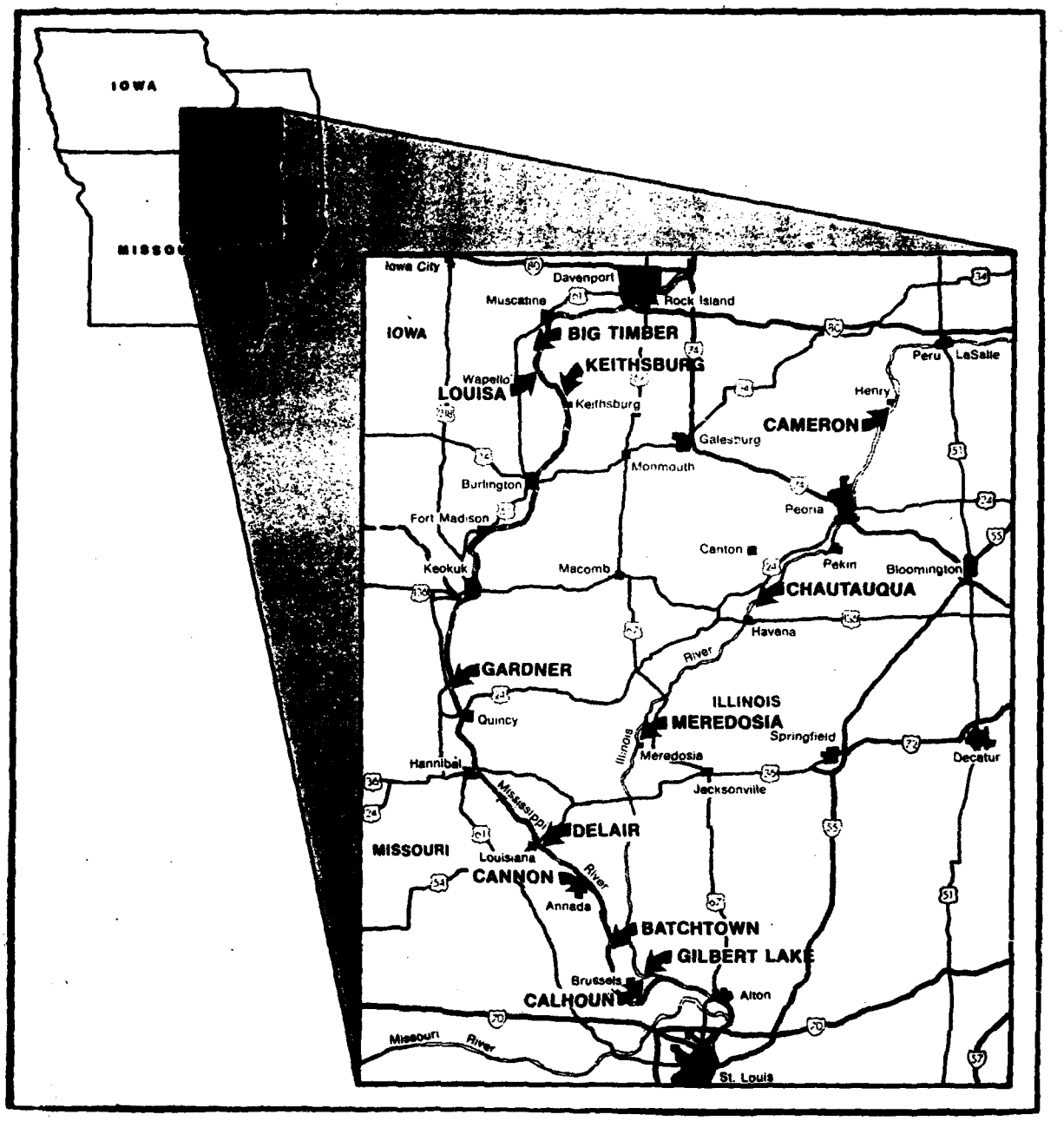
TABLE EIS-5

Approximate Acreage of Land and Water Managed by Federal and State Resource Agencies
UMR Pools 11 to 19

	MANAGEMENT AGENCY						
	U.S. FWS		Iowa		Illinois		
Pool	U.S. FWS Owned	Corps Owned*	State Owned	Corps Owned*	State Owned	Corps Owned*	Total
11	6,800	11,020	-	-	-	-	17,820
12	852	8,373	-	-	-	-	9,225
13	6,888	22,511	2,722	827	-	-	32,948
14	1,079	5,349	722	342	-	-	7,542
15	-	-	-	-	-	-	-
16	-	-	-	1,548	600	4,492	6,640
17	-	4,366	30	2,931	-	1,313	8,640
18	-	1,400		4,314	319	2,872	8,905
19	-	-	-	-	-	-	-
TOTALS	15,619	53,019	3,524	9,962	919	8,677	91,720

* Lands under Cooperative Agreement with U.S. FWS and Corps.

Taken From: GREAT II, Fish and Wildlife Management Appendix, 1980.



From: U.S. Fish and Wildlife Service, 1979

FIGURE EIS-9. The Divisions Composing the Mark Twain National Wildlife Refuge

Commercial Navigation

3.54 As in the previous reach, tonnage transitting the locks in this reach increases going downstream from Lock 11 to Lock 19, as shown in Figure EIS-10. Grain and farm products dominate downbound commodity flows, and trends in downbound grain traffic tend to explain total traffic through all locks in this reach. Downbound grain traffic through Lock 19 increased from 22,344 ktons in 1981 to 25,956 ktons in 1983, and then fell to 14,354 ktons in 1986. It then increased significantly in 1987. There is no significant upbound grain traffic. Upbound tonnage has remained stable at Locks 11 and 12 from 1981 to 1986. Downstream of Lock 12 there have been steady increases in upbound tonnage transitting these locks from 1981 to 1986. At Lock 19, upbound tonnage has increased from 7,549 ktons in 1981, to 7,786 ktons in 1983, and to 8,880 ktons in 1986.

3.55 Other significant commodities which transit the locks in this reach include: coal, petroleum, and a category "other tonnage" which is made up primarily of chemicals and fertilizer.

3.56 Upbound coal transitting Locks 11 through 13 increased markedly from 1981 to 1983 and then dropped off in 1986 but remained above 1981 levels. Downstream of Lock 13 upbound coal has shown steady increases from 1981 to 1986. At Lock 19 upbound coal increased from 2,692 ktons in 1981, to 3,883 ktons in 1983, and to 4,488 ktons in 1986.

3.57 Downbound coal transitting Locks 11-13 shows steady declines from 1981 through 1986. Downstream of Lock 13, downbound coal increased from 1981 to 1983 and then dropped off in 1986 but remained above 1981 levels.

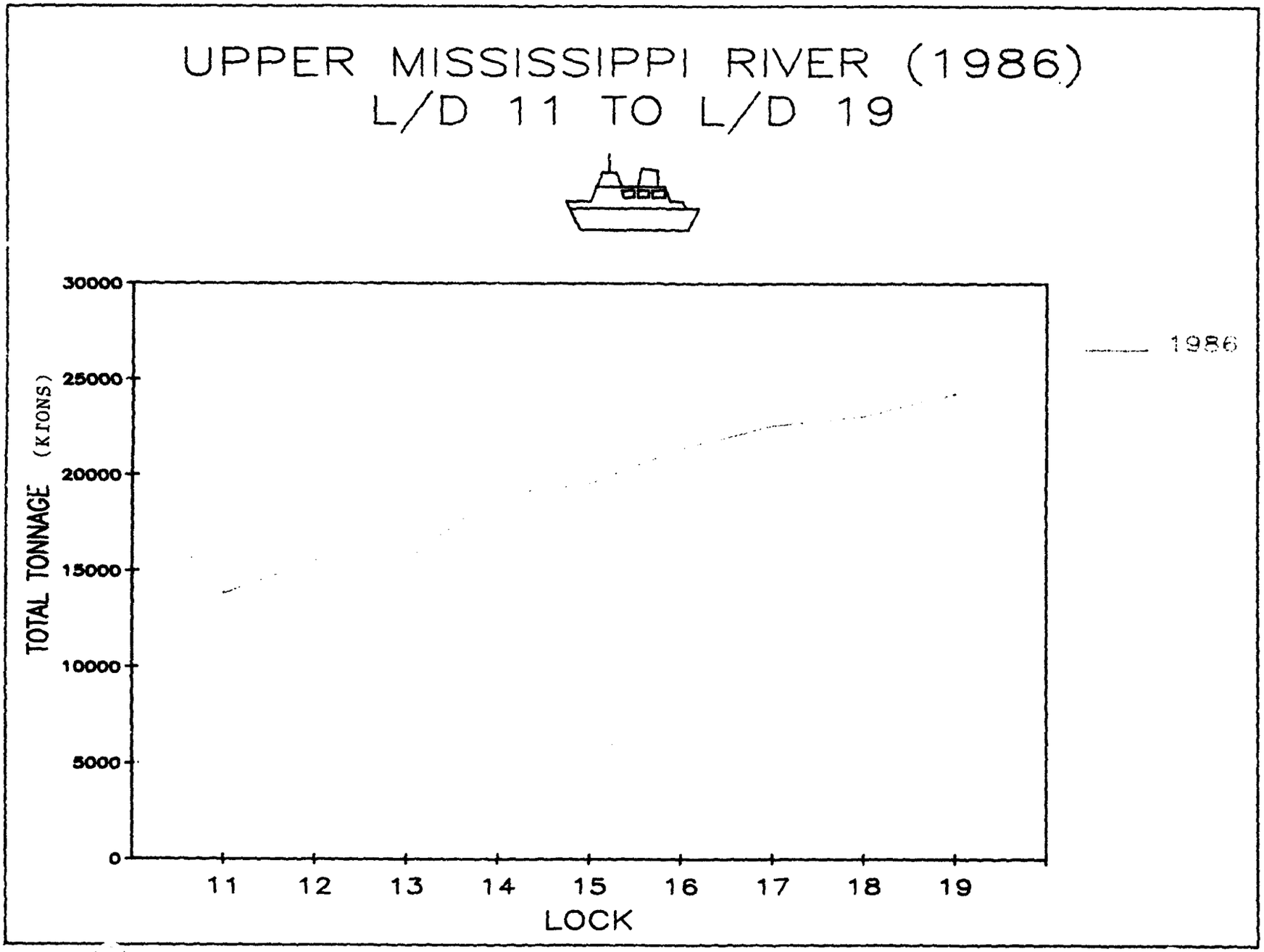
3.58 Up and downbound petroleum tonnage transitting Locks 11-19 shows steady declines from 1981 to 1986. At Lock 19 upbound petroleum declined from 1,486 ktons in 1986, to 696 ktons in 1983, and to 658 ktons in 1986. Downbound petroleum through Lock 19 declined from 674 ktons in 1981, to 423 ktons in 1983, and to 344 ktons in 1986.

3.59 Commodities classified in the "other" category, both up and downbound (primarily upbound fertilizers and salt) have shown significant increases through these locks from 1981 to 1986.

UPPER MISSISSIPPI RIVER POOL 20 TO POOL 26

Natural Resources

3.60 Much of the information presented here has been taken from the UMRBC Master Plan, the Environmental Report (Technical Report D, 1981) and the Long-Term Resource Monitoring Report (Technical Report F, 1981). Other sources



EIS-44 FIGURE EIS-10. Tonnage Transitting Locks, L/D 11 to L/D 19 (1986)

used are as referenced. This reach covers the UMR from Lock and Dam 19 (river mile 364.2) at Keokuk, Iowa, to Lock and Dam 26 (river mile 202.9) at Alton, Illinois (Pools 20-26).

3.61 This reach is characterized by a wide floodplain, altered by agricultural levee construction. This reach contains a smaller area of side channel and backwater habitats, only about 15 percent of the reach, which is a significant reduction from the upper reaches previously described. This reach does contain a more extensive area of main channel border habitats. The ecosystem in this reach has been affected by conversion of floodplain to agricultural use, and by shoreline development, especially in the St. Louis metropolitan area. Less than 10 percent of the total area in this reach is managed by Federal and State agencies for fish and wildlife purposes.

3.62 This reach supports only an average commercial fishing effort, with carp, buffalo, and channel catfish comprising most of the catch. Pool 21 usually has the smallest commercial catch of all the UMR pools. Sport fishing in the reach consists primarily of freshwater drum, channel catfish, bluegill, crappie, white bass, walleye, and sauger. Various fish species congregate in the tailwater habitat of the dams, and these areas attract the greatest fishing pressure. Pool 26 is heavily used by anglers each year.

3.63 Although Pools 20, 21, and 22 have several islands, they lack extensive sloughs and backwater areas, as well as undisturbed terrestrial or bottomland habitat. This results in only moderate use of these pools by migratory waterfowl and other avian species. In Pool 21, the lakes and sloughs of the Quincy Bay area do provide moderate value habitat for ducks, shorebirds, and wading birds. As shown on Figure EIS-7, water bird use of this reach is low. A great blue heron rookery is located on Taylor Island in Pool 20 (river mile 352.0), and on Armstrong Island in Pool 22 (river mile 313.0) (U.S. FWS, 1984).

3.64 Pools 24, 25, and 26 contain better quality habitat for waterfowl use, and Pool 25 is heavily used by migrating dabbling ducks, such as mallard, pintail, gadwall, wigeon, and teal. Great blue heron and great egret rookeries are located on Blackburn Island in Pool 24 (river mile 284.0-285.0); below Lock and Dam 24 (river mile 271.6); below Hamburg, Illinois, in Pool 25 (river mile 253.6); on Hat Island (river mile 238.8); and in Pool 26 at river mile 216.5.

3.65 A large number of bald eagles winter in this reach of the UMR. Much of the area downstream of Montebello State Park in Pool 20 (river miles 360.0 - 365.0) has been purchased for the protection of the bald eagle, and inland is also the Cedar Glen Roost area (U.S. FWS, 1984). This is one of Illinois' largest winter sanctuaries of bald eagles, and has been identified by the Illinois Natural Areas Inventory as being a statewide significant natural area (U.S. FWS, 1984). The Gardner Division of the Mark Twain National Wildlife Refuge in Pool 21 also receives high bald eagle use. Bald eagle roosting, feeding, and perching areas in Pool 22 are located at river miles 318-322, 302-305, and 300-301 (U.S. FWS, 1984). Large concentrations of bald eagles also occur in Pool 25 in the Clarksville Island area, which is possibly the second largest concentration in the UMRS.

3.66 Numerous mussel beds are located in this reach of the UMR. Endangered or rare species located in this reach include the spectacle case (Pool 20, river miles 364.5-364.6), the Higgins' eye pearly mussel (Pool 20, river miles 355.5-355.9), and shells of the fat pocketbook (Pool 22, river miles 309; 299.8-301.1) (U.S. FWS, 1984).

3.67 Wildlife species in this reach depend upon both the bottomland habitats and the bordering upland habitats for food and cover. Depending upon the availability of habitat, mammal species expected to be found in this reach include muskrat, squirrel, raccoon, beaver, rabbit, and white-tailed deer. Land and water dwelling reptiles and amphibians also would be abundant in areas with suitable habitat.

Socio-Economic Resources

3.68 The UMR reach extending from Lock and Dam 19 to Lock and Dam 26 includes portions of Illinois, Iowa, and Missouri. The area bordering the 161 river miles within this reach includes 14 counties: 6 in Illinois, 1 in Iowa, and 7 in Missouri. The combined 1985 population for this 14-county region was estimated at 676,300. Slightly more than 67 percent of this population base was urban (see Table EIS-4). Urban areas within this reach which are adjacent to the river include: Fort Madison and Keokuk, Iowa; Quincy and Alton, Illinois; and Hannibal, Missouri.

3.69 While influenced by the aforementioned communities, this region's economy is dominated by agricultural production. Feed grain and soybean production, in addition to livestock and dairy production, comprise the primary economic activities in the region. Other activities include food processing and chemical, heavy machinery, and broadcast equipment production.

Commercial Navigation

3.70 The information for this reach has been combined with the following reach (L/D 26 to Cairo, Illinois). (See paragraph 3.79.)

MIDDLE MISSISSIPPI RIVER - POOL 27 TO CAIRO, ILLINOIS

Natural Resources

3.71 Much of the information presented here has been taken from the UMRBC Master Plan, the Environmental Report (Technical Report D, 1981) and the Long-Term Resource Monitoring Report (Technical Report F, 1981). Other sources used are as referenced.

3.72 This reach (Middle River) extends from Lock and Dam 26 at Alton, Illinois (river mile 202.9) to the mouth of the Ohio River at Cairo, Illinois (river mile 0.0). This reach contains Dam 27 (river mile 190.3) and Lock 27 on the Chain of Rocks Canal (river mile 185.0). The remaining portion of the nine-foot channel is maintained by closing structures, dikes, and revetments which constrict the flow to the main channel.

3.73 Sloughs and side channels are relatively scarce in this reach. There is a lack of aquatic habitat diversity due to the maintenance of the nine-foot channel, and levee and drainage activities for agriculture reduce the diversity of terrestrial habitat. Water quality is degraded by industrial and municipal discharges, primarily in the St. Louis - East St. Louis metropolitan area. Those water quality parameters that have violated standards include ammonia-nitrogen, copper, iron, mercury, zinc and cadmium. High fecal coliform counts and low dissolved oxygen levels are also common.

3.74 In this reach, 82 species of fish have been recorded. Species recorded from side channels include bluegill, crappie, largemouth bass, white bass, catfish, sauger, and gizzard shad. Some commercial fishing occurs, with buffalo, catfish, and carp most commonly harvested.

3.75 A variety of waterfowl utilize this reach during the spring and fall migrations. Common puddle ducks include mallard, wood duck, teal and pintail, and common diving ducks include scaup, bufflehead, canvasback, and redhead. Numerous bird species also utilize this reach. A rookery consisting of great blue, little blue, and black-crowned night herons is located at river mile 172.0 (Illinois side); a rookery consisting of great blue and black-crowned night herons and great egrets is located at river mile 146.0 (Illinois side); and a black-crowned night heron colony is located at river mile 39.5 (Missouri side). Also, two areas in Illinois near the river serve as roosting and foraging areas for the bald eagle: the Union County Conservation area near river mile 61.0 and the Horseshoe Lake Refuge at river mile 35.0.

3.76 Numerous mammal species would occur in the floodplain areas in this reach. The river bottoms are recognized for their production of furbearers such as muskrats, raccoon, mink, beaver, opossum, coyote, and red and gray fox.

Socio-Economic Resources

3.77 The confluence of the Mississippi and Ohio Rivers serves as the dividing line between the Upper and Lower Mississippi River. The reach extending from Lock and Dam 26 to the confluence point covers 203 river miles. The two-state area bordering the river in this reach contains seven Illinois and seven Missouri counties, along with the independent city of St. Louis, Missouri. The region had an estimated 1985 population of 2,401,700, of which approximately 87 percent was urban (see Table EIS-4). Five major urban areas are adjacent to the river within this reach: East St. Louis, Cahokia, and Chester, Illinois; and St. Louis and Cape Girardeau, Missouri.

3.78 The economic base of the region is primarily agriculture and agriculture-dependent industries (e.g., food and beverage processing). The St. Louis Metropolitan Area serves as the region's economic hub, supporting such industries as auto, aircraft, railroad car and space craft assembly, pet food production, and beer processing.

Commercial Navigation

3.79 Again, the trend of tonnage continues to increase going downstream from Locks 20 to 27, as shown in Figure EIS-11. Trends in downbound grain traffic tend to explain total traffic through locks in this reach. Downbound grain traffic through Lock 27 increased from 44,183 ktons in 1981 to 50,064 ktons in 1983 and then fell to 34,707 ktons in 1986. It then increased substantially in 1987. This trend is typical of locks in this reach. There is no significant upbound grain traffic, although downbound grain generates many upbound empty barges. Upbound tonnage through Locks 20 through 22 has shown steady increases from 1981 to 1986. Downstream of Lock 22 in this reach through Lock 27 upbound tonnage decreased from 1981 to 1983 and increased in 1986 to above 1981 levels. Commodities other than grain which transit the locks in this reach with significant tonnage include: coal (both up and downbound), upbound fertilizer and salt.

3.80 Upbound coal has shown steady increases from 1981 to 1986 at all locks in this reach. Downbound coal has also increased from 1981 to 1986 through Locks 20 to 22. Downstream of Lock 22, trends in upbound coal tonnage vary from lock to lock, at some locks increasing and others decreasing from 1981 to 1986.

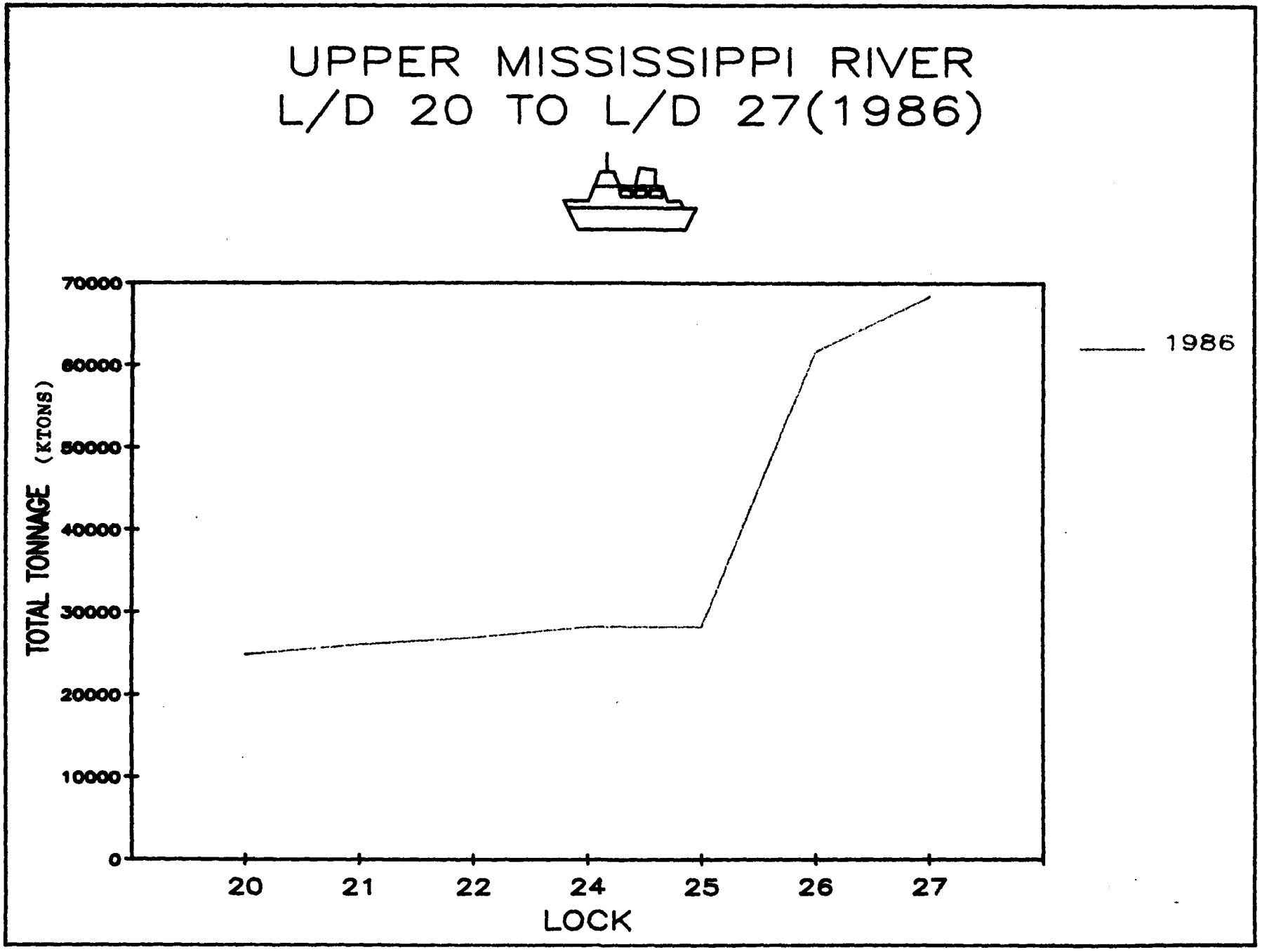
3.81 For Locks 20-27, upbound petroleum declined from 1981 to 1983 and rebounded slightly in 1986 but remained below 1981 levels. Downbound petroleum tonnage has shown a steady decline from 1981 to 1986.

3.82 Upbound fertilizer and salt tonnage have both experienced significant increases from 1981 to 1986. At Lock 27, upbound fertilizer increased from 3,430 ktons in 1981 to 4,493 ktons in 1986. Upbound salt increased from 1,271 ktons in 1981 to 1,848 ktons in 1986.

ILLINOIS WATERWAY - ABOVE LOCKPORT LOCK AND DAM

Natural Resources

3.83 Much of the information presented here has been taken from the UMRBC Master Plan, the Long-Term Resource Monitoring report (Technical Report F, Volume II, 1981). Other sources used are as referenced.



EIS-49 FIGURE EIS-11. Tonnage Transiting Locks L/D 20 to L/D 27 (1986)

3.84 This portion of the Illinois Waterway consists of interconnecting waterways between Lockport Lock and Dam (river mile 291.1) and Lake Michigan, as shown on Figure EIS-12. The waterway in this reach is completely channelized, heavily industrialized, and urbanized, which significantly reduces the quality and quantity of habitat available for fish and wildlife resources. Isolated areas of natural habitat are present, the majority of which is preserved in two natural areas (Lake Calumet and Lemont East Geological Area) and three nature preserves (Cranberry Slough, Cap Sauers, and Black Partridge) in this reach. Other recreational resources are generally limited within this reach.

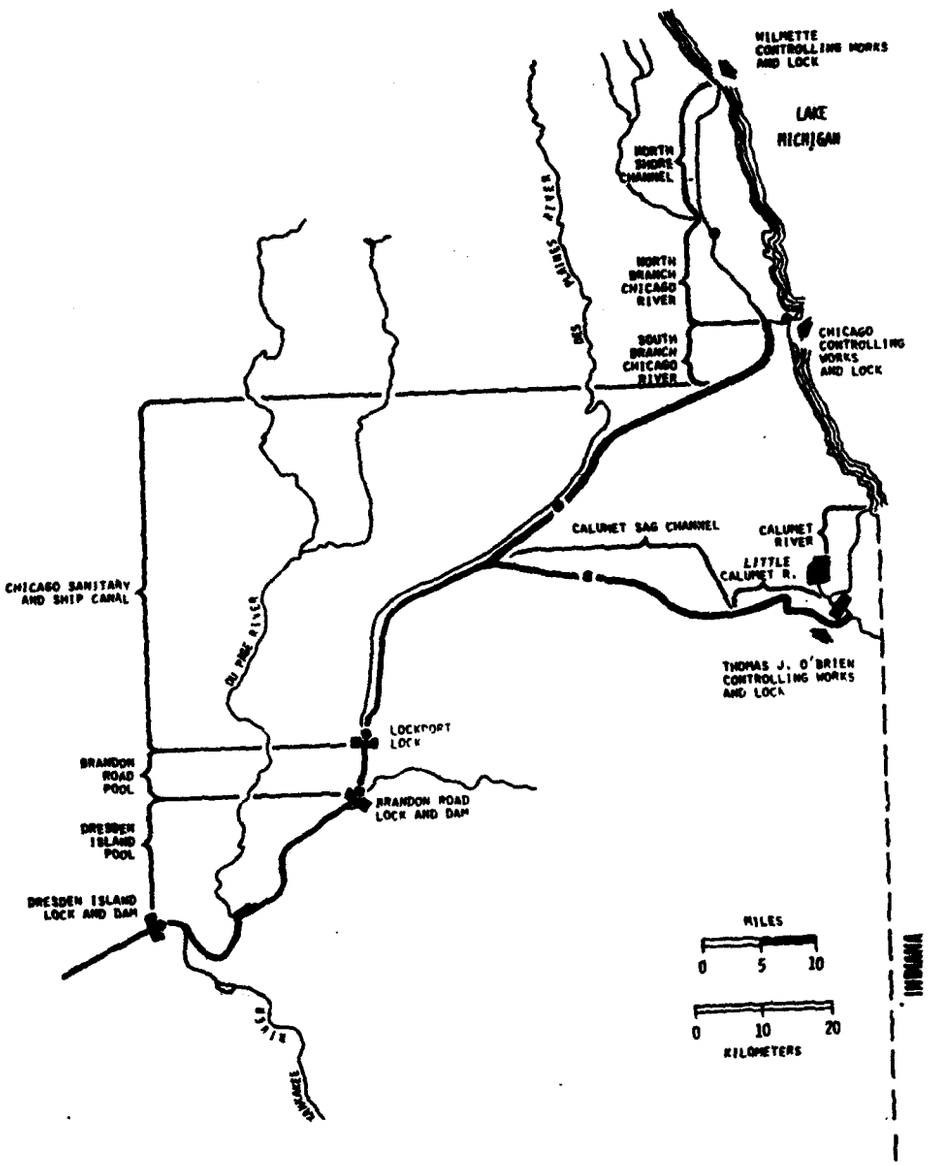
3.85 Poor water quality generally limits the aquatic resources of this reach. Point source discharges, urban runoff, and storm sewer overflows adversely impact the water quality. Fishery resources are dominated by pollution-tolerant species such as carp, carp x goldfish hybrids, goldfish and gizzard shad. Invertebrate fauna is dominated by aquatic earthworms and midge larvae, which are also pollution-tolerant species. However, for portions of the waterways near Lake Michigan serving as an inlet for Lake Michigan water, an improvement in aquatic resources is seen, because of the influence of species from Lake Michigan (Havera, et al., 1980). For example, the Chicago and Calumet Rivers contain a better fishery resource, due to an abundance of Lake Michigan species (Havera, et al., 1980). Lake Calumet is a State natural area, which supports a green heron nesting colony as well as populations of American bittern, great egrets, black terns, yellow-headed blackbirds, and black-crowned night herons, as well as a variety of mammals, reptiles, and amphibians.

3.86 Wildlife resources in this reach are limited to those species that have adapted to the urban environment. One exception is Lake Calumet, located about 2 miles northwest of O'Brien Lock and Dam on the Little Calumet River.

Socio-Economic Resources

3.87 The Illinois Waterway reach extending from Starved Rock Lock and Dam to the Mississippi River covers 231 river miles. This reach includes 18 counties bordering the river and 11 major river communities. Besides the Peoria, Illinois, Metropolitan Area (Peoria, Peoria Heights, Creve Coeur, and East Peoria), important river cities include La Salle, Peru, Spring Valley, Chillicothe, Pekin, Bartonville, and Beardstown. The estimated 1985 population for the region was 746,700; nearly 62 percent of this population resided in urban areas (see Table EIS-4).

3.88 Economic activities in this region are centered around agriculture in rural areas and industry in urban areas. Regional industries produce such products as coated paper and bags, earthmoving equipment, off-highway trucks, labels, bakery products, patio furniture, specialty wire, lawn sprinklers, and communication towers.



From: Havera, et al., 1980

FIGURE EIS-12. Chicago Area Waterways

Commercial Navigation

3.89 As can be seen in Figure EIS-13, tonnage transitting the locks in this reach increases going downstream through O'Brien and Lockport Locks.

3.90 The volume of commercial traffic is much greater at Lockport than at O'Brien Lock, but O'Brien handles a larger volume of recreational lockages. In 1986 at O'Brien Lock, there were 15,010 recreational vessels and only 2,292 commercial towboats. Upbound tonnage exceeds downbound tonnage transitting both of these locks, with coal and petroleum accounting for the largest portion of the upbound traffic at both locks.

3.91 At Lockport, upbound coal decreased from 4,760 ktons in 1981 to 4,032 ktons in 1983 and has rebounded to 4,611 ktons in 1986. Downbound traffic through Lockport is primarily accounted for by petroleum, grain, and iron and steel products. Petroleum and grain account for the largest portions of downbound tonnage transitting Lockport Lock. At Lockport, downbound petroleum increased from 1,666 ktons in 1981 to 2,266 ktons in 1983 and decreased to 1,304 ktons in 1986. Downbound grain increased from 1,169 ktons in 1981 to 1,448 ktons in 1983, then decreased to 1,100 ktons in 1986.

3.92 Significant tonnage in commodities lumped under the category "Other" (both upbound and downbound) also transit all of the locks on the Illinois Waterway. The other category is made up primarily of chemicals and related products, fertilizers, and iron and steel products. This is an indication of the diversity of commodities which transit Illinois Waterway locks.

ILLINOIS WATERWAY - BRANDON ROAD AND DRESDEN ISLAND POOLS

Natural Resources

3.93 Much of the information presented here has been taken from the UMRBC Master Plan, the Long-Term Resource Monitoring Report (Technical Report F, Volume II, 1981). Other sources used are as referenced.

3.94 This reach of the Illinois Waterway (see Figure EIS-12) consists of the Brandon Road pool from Lockport Lock and Dam (river mile 291.1) to Brandon Road Lock and Dam (river mile 286.0), and the Dresden Island pool to Dresden Island Lock and Dam (river mile 271.5).

3.95 The major limiting factor on aquatic resources in this reach has been poor water quality. Dominant fish species include carp, carp x goldfish hybrids, and goldfish in the Brandon Road pool. Additional dominant species in the Dresden Island pool include gizzard shad, green sunfish, emerald shiners, bluntnosed and fathead minnows (Havera, et al., 1980). A few largemouth bass also have been found in the Dresden Island Pool (Havera, et al., 1980). Starrett (1971) found no mussels in this reach of the Illinois Waterway.

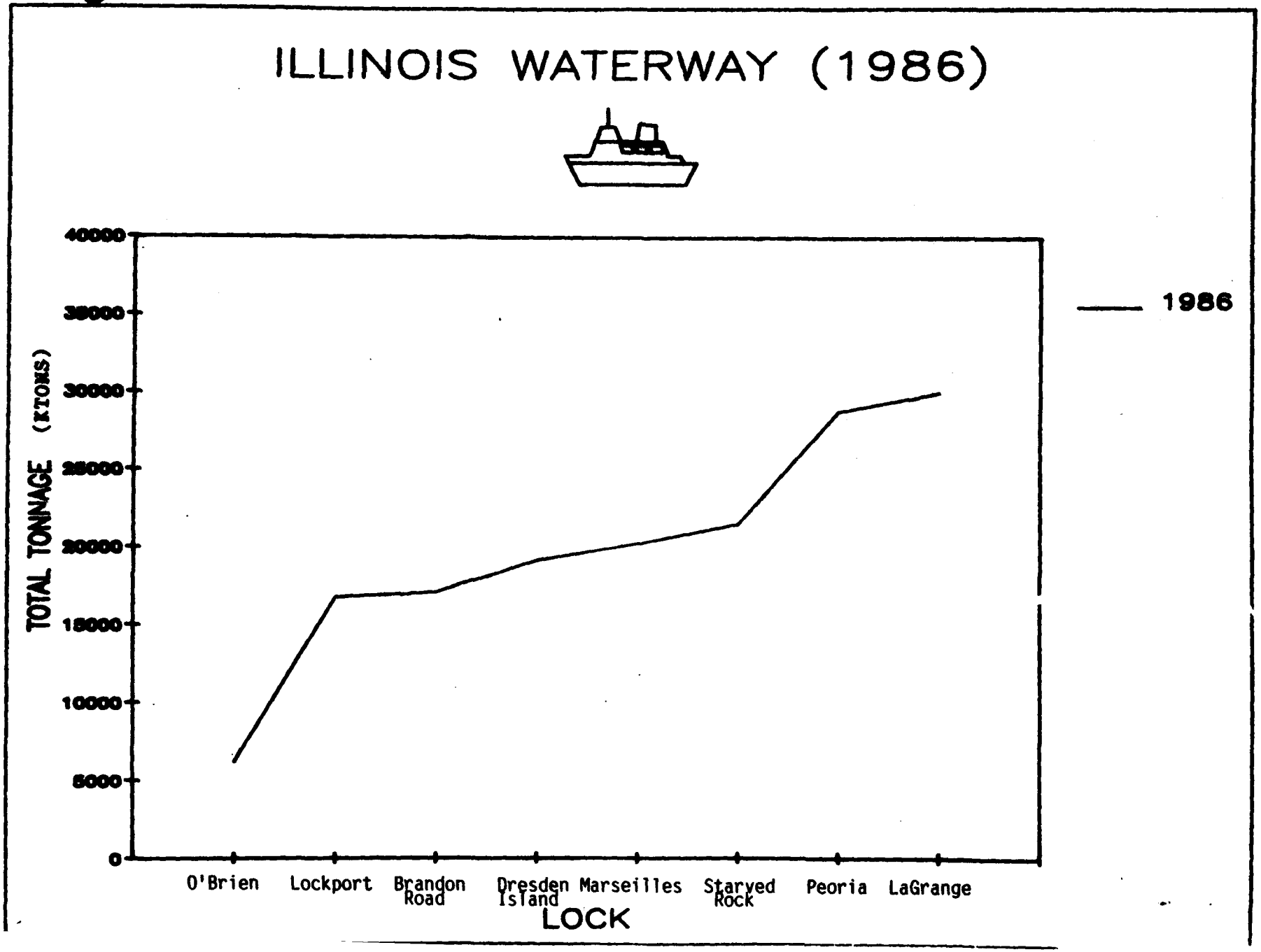


FIGURE EIS-13. Tonnage Transitting Lo
Illinois Waterway (198

3.96 Species diversity and abundance of birds, mammals, reptiles, and amphibians are limited in this reach because of the lack of habitat. The majority of natural habitat in this reach is preserved in the Des Plaines Conservation Area (4,253 acres) and the Channahon Parkway State Park (18 acres) (see Figure EIS-14).

Socio-Economic Resources

3.97 The Illinois Waterway reach extending from Lockport to Dresden Island Lock and Dam covers 20 river miles. Two counties are contained within the reach, with a combined 1985 population estimated at 388,300. Urban residents accounted for 74 percent of the 1985 population (see Table EIS-4). Important communities located on the river in this reach include Joliet and Rockdale.

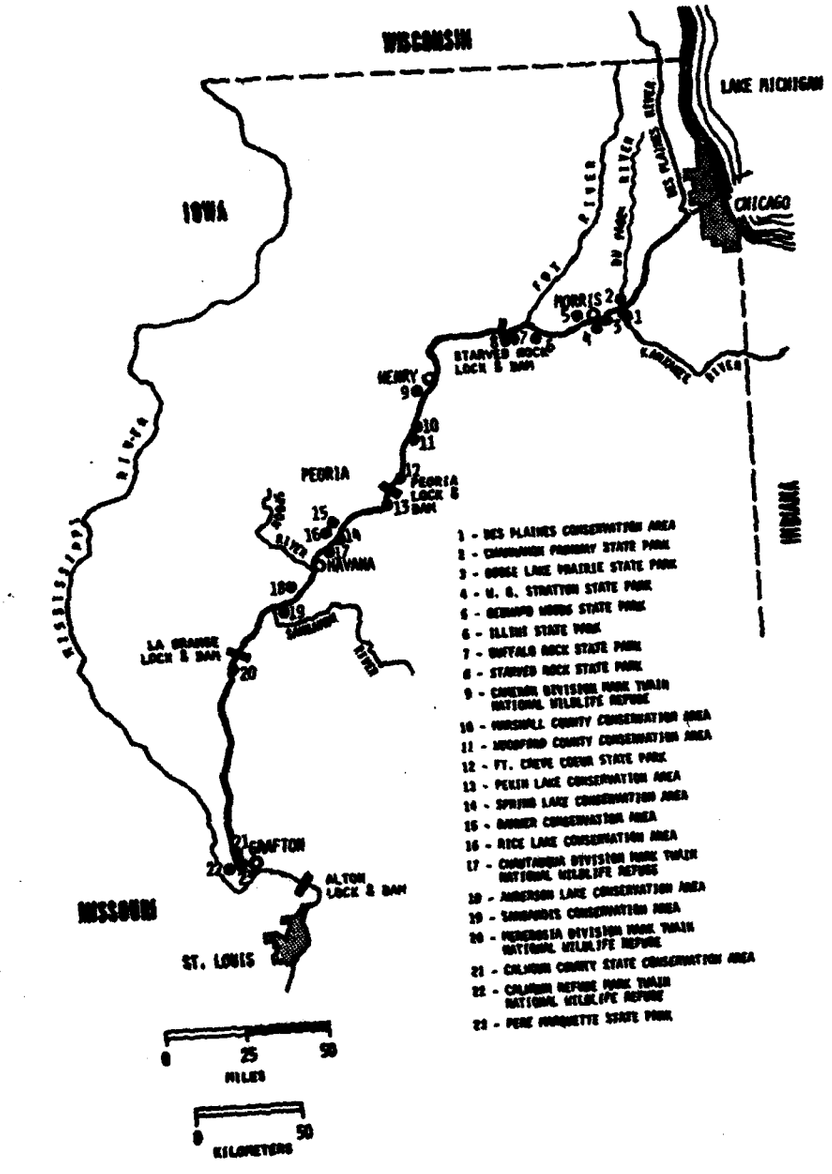
3.98 The economy of this region centers on the production of chemicals, fertilizer, automotive and petroleum products, and propane gas. Other significant industries in the area include manufacturing of wallpaper and explosives.

Commercial Navigation

3.99 As can be seen in Figure EIS-13, tonnage transitting the locks in this reach increases going downstream through Brandon Road and Dresden Island Locks. Upbound tonnage exceeds downbound tonnage by a significant margin through both Brandon Road and Dresden Island Locks. In 1986, upbound tonnage at Dresden Island was 13,064 ktons and downbound tonnage 6,083 ktons. Upbound traffic is dominated by coal and petroleum, while petroleum makes up the largest portion of downbound tonnage.

3.100 Grain tonnage is also a significant portion of total downbound tonnage. At Dresden Island Lock, upbound coal tonnage decreased from 4,702 ktons in 1981 to 4,212 ktons in 1983, then rebounded to 4,775 ktons in 1986.

3.101 At this lock, upbound petroleum decreased from 1,769 ktons in 1981 to 1,550 ktons in 1986. Downbound petroleum increased from 2,823 ktons in 1981 to 3,679 ktons in 1983, then declined to 2,611 ktons in 1986. Downbound grain increased from 1,600 ktons in 1981 to 1,844 ktons in 1983, then declined to 1,393 ktons in 1986.



From: Havera, et al., 1980

FIGURE EIS-14. State Parks and Conservation Areas and Federal Wildlife Areas in the Illinois River Valley

ILLINOIS WATERWAY - MARSEILLES AND STARVED ROCK POOLS

Natural Resources

3.102 Much of the information presented here has been taken from the UMRBC Master Plan, the Long-Term Resource Monitoring report (Technical Report F, Volume II, 1981). Other sources used are as referenced.

3.103 This reach of the Illinois Waterway (see Figure EIS-2) consists of the Marseilles pool from Dresden Island Lock and Dam (river mile 271.5) to the Marseilles Dam (river mile 244.8), and the Starved Rock pool to the Starved Rock Lock and Dam (river mile 231.0). This reach has a relatively fast rate of fall with few backwater areas.

3.104 Aquatic resources once were severely limited in this reach due to poor water quality, but over the last few years water quality has improved and is better than the upstream reaches. The tailwater fishery below the Dresden Island Lock and Dam is composed of carp, emerald shiners, northern pike, channel catfish, sunfish, smallmouth and largemouth bass, and black crappie. Also, the rapids area below the Marseilles Dam is considered to be one of the best fisheries habitat areas on the Upper Illinois Waterway. Fish species present include carp, shad, channel catfish, white bass, sunfish, bluegill, largemouth and smallmouth bass, and buffalo.

3.105 Mussels were once widely distributed in the Illinois River before 1900, and gradually were eliminated by pollution between 1900 and 1930 (Starrett, 1971). No living mussels were collected by Starrett (1971) from the Starved Rock Dam to the confluence of the Des Plaines and Kankakee Rivers. Benthic invertebrates consist of pollution-tolerant species such as aquatic earthworms and midge larvae.

3.106 The lack of backwater habitat limits the wildlife use of this reach. However, the natural terrestrial habitats near the river in this reach are preserved by Goose Lake Prairie (2,537 acres), W. G. Stratton (6 acres), and Gebhard Woods (30 acres) State Parks in the Marseilles pool, and Starved Rock (2,524 acres), Buffalo Rock (43 acres), and Illini (510 acres) State Parks in the Starved Rock pool (see Figure EIS-14, Nos. 3-8). Waterfowl use of this reach is limited, as is use by wading birds such as herons and egrets. A variety of songbird species would use available habitat in this reach during migration and for nesting. Mammals such as muskrat, beaver, raccoon, rabbits, and squirrels also would utilize available habitats.

Socio-Economic Resources

3.107 The Illinois Waterway reach extending from Dresden Island Lock and Dam to Starved Rock Lock and Dam is 41 river miles in length. This reach includes the Illinois counties of La Salle and Grundy, in the central portion of the state. The communities of Ottawa and Morris are the primary urban areas

which border the river within this reach. Fifty-seven (57) percent of the two-county region's 1985 estimate of 149,100 residents was urban (see Table EIS-4).

3.108 The economic base of the 2-county area is supported by industrial and manufacturing activity. Firms in the region produce industrial chemicals, plastics, aluminum coils, plate and sheet, and machinery parts. Agricultural activity supplements the other economic activities in the region.

Commercial Navigation

3.109 Tonnage transitting locks in this reach increases going downstream. At Starved Rock Lock, tonnage declined from 26,351 ktons in 1981 to 21,497 ktons in 1986. Upbound tonnage exceeds downbound tonnage at both locks in this reach. At Starved Rock Lock in 1986, upbound tonnage amounted to 12,729 ktons and downbound tonnage amounted to 8,768 ktons. Upbound tonnage is dominated by coal and petroleum while grain makes up the largest portion of downbound tonnage at Starved Rock. Upbound coal at Starved Rock decreased from 4,927 ktons in 1981 to 4,368 ktons in 1983 and rebounded to 4,832 ktons in 1986. Upbound petroleum declined from 3,326 ktons in 1981 to 1,964 ktons in 1986. Downbound grain tonnage increased from 5,115 ktons in 1981 to 5,487 ktons in 1983 and has declined to 3,824 ktons in 1986.

ILLINOIS WATERWAY - PEORIA POOL TO THE MISSISSIPPI RIVER

Natural Resources

3.110 This reach of the Illinois Waterway (see Figure EIS-2) consists of the Peoria pool from the Starved Rock Lock and Dam (river mile 231.0) to the Peoria Lock and Dam (river mile 157.7); the LaGrange pool from Peoria Lock and Dam to the LaGrange Lock and Dam (river mile 80.2); and the Alton pool from LaGrange Lock and Dam to the confluence with the Mississippi River at Grafton, Illinois (river mile 0.0).

3.111 The Peoria pool is commonly referred to as Peoria Lake, which is the largest and deepest bottomland lake in the Illinois River Valley. Peoria Lake is divided into two segments, Upper and Lower Peoria Lake, by a constricted segment of the Illinois River called "the Narrows," which was formed by an alluvial fan deposited by Ten Mile Creek. As of 1985, Peoria Lake has lost two-thirds of its original 1903 volume due to sedimentation (U.S. Army Corps of Engineers, 1987). The sedimentation rate in Upper Peoria Lake is nearly one and one-half times greater than Lower Peoria Lake; the upper lake has lost about 73 percent of its original 1903 volume, whereas the lower lake has lost about 51 percent (U.S. Army Corps of Engineers, 1987). Upper Peoria Lake now has an average depth of 2 feet, and Lower Peoria Lake an average depth of 5.3 feet. The primary sources of sediment entering Peoria Lake were runoff from the Upper Illinois River watershed, the watersheds of tributary streams

draining into the lake, and from shoreline erosion. This situation is not unique for Peoria Lake; both the LaGrange and Alton pools are experiencing similar sedimentation problems.

3.112 Sedimentation of the backwater areas in this study reach has reduced the amount of aquatic habitat and, coupled with increased turbidity, has degraded the quality of the habitat still available. The growth of marsh and submerged aquatic plants has been severely limited, since the substrate is not firm enough to provide sufficient support for root systems, and photosynthesis potential is very low in turbid water. Aquatic plants not only benefit fish, but are an important food resource to several species of ducks.

3.113 The fish population in the Peoria and LaGrange pools is dominated by carp, gizzard shad, buffalo, carpsucker, sunfish, largemouth bass, freshwater drum, and white and black crappie. The tailwaters of the dams provide important habitat and a sport fishery for white crappie, black crappie, largemouth bass, and white bass. In the Alton pool, fewer carp, buffalo, and carpsuckers are found than in the middle pools, because of the decreased bottomland lake habitats. Fish species recruited from the Mississippi River are more abundant in the LaGrange and Alton pools, and include shortnose gar, goldeye, mooneye, channel and flathead catfish, and bowfin (Havera, et al., 1980).

3.114 The Illinois River has recently provided better fishing for game fish species, which reflects a recovery from more degraded conditions prior to the Federal Water Pollution Control Act Amendments of 1972. Still, the most abundant species are those that feed by a sense of smell and are able to withstand low dissolved oxygen conditions. However, game fish species are able to make population gains during years of high river flow.

3.115 The diversity and abundance of invertebrate fauna in the Peoria and LaGrange pools has been reduced in the last 25 years due to loss of aquatic vegetation and sedimentation. Midge larvae and aquatic worms were the two dominant invertebrates collected in these pools. In the Alton pool, invertebrates include aquatic earthworms, mayflies, midge larvae, caddisflies and fingernail clams.

3.116 Mussel species in this study reach declined between the 1900's to the mid-1960's. This reduction has been attributed to domestic and industrial pollution and from increasing sedimentation. Between 14 to 20 species of mussels occur in this study reach, with the most abundant species being three-ridge, maple-leaf, pimple-back, and floater (Starrett, 1971).

3.117 Waterfowl frequent the Illinois River Valley throughout the year, but are most abundant in the fall and spring. At times, several hundred thousand mallards may overwinter in the valley. The wood duck breeds along the river, and the Illinois Natural History Survey considers the Illinois River Valley one of the most important breeding grounds for this species in the nation (Havera, et al., 1980). As many as 32 species of waterfowl may visit the area, but only 20 are seen regularly. Dabbling ducks are more abundant than diving ducks, a situation that has reversed from historic times due to the loss of the fingernail clam population.

3.118 An acre of water on the Illinois River will be used by over 600 ducks and geese each day during the fall migration. In the spring, the average use per acre of water is less than 300 per day. An average of 16,875,811 waterfowl use days occurred during the winters of 1976-79 composed primarily of mallards. The average duck hunting kill is estimated to be between 50,000-100,000 on the Illinois River (Havera et al., 1980).

3.119 Many birds of interest inhabit or frequent the Illinois River corridor. These include shorebirds, gulls, terns, herons, egrets, cormorants, hawks, owls, kingfishers, woodpeckers, pheasants, and a multitude of songbirds.

3.120 A wide variety of mammals occur in the study area in accordance with habitat availability. Common furbearers would include muskrat, beaver, raccoon, and mink. Aquatic mammals have been adversely affected by the loss of aquatic vegetation and by sedimentation. Bottomland hardwood habitats in the area are important to a variety of small mammals and birds.

3.121 Natural habitats are preserved in this reach by numerous state parks, state conservation areas, and by four divisions of the Mark Twain National Wildlife Refuge (see Figure EIS-14, Nos. 9-23). These areas are used for hunting, fishing, picnicking, hiking, and other outdoor recreation. The wildlife refuges provide valuable resting and feeding places for migrating waterfowl and shorebirds, as well as for other species of birds and wildlife.

Socio-Economic Resources

3.122 The Illinois Waterway reach extending upstream from Lockport Lock and Dam to Lake Michigan is within the Chicago, Illinois Metropolitan Area. Passing through three counties, this reach of the waterway is 42 miles in length. The estimated 1985 population of these counties was 1,615,500. Nearly 95 percent of the 1985 population lived in the city of Chicago or its suburbs, including the river community of Romeoville (see Table EIS-4).

3.123 Industrial and manufacturing development in this reach is specialized into several key areas: production of musical instruments, diesel engines, auto accessories and appliances. Meat processing is another important activity in this area.

Commercial Navigation

3.124 As can be seen in Figure EIS-13, tonnage transitting the locks in this reach generally increases going downstream, although tonnage at LaGrange Lock dipped below tonnage transitting Peoria lock in 1981. Upbound traffic exceeds downbound tonnage at Peoria, but at LaGrange lock downbound tonnage exceeds upbound tonnage. At Peoria in 1986, upbound tonnage amounted to 15,280 ktons and downbound tonnage 13,481 ktons. At LaGrange upbound tonnage was 13,039 ktons in 1986 while downbound tonnage was 16,996 ktons. This is due to large volume of downbound grain transitting LaGrange Lock.

3.125 Upbound tonnage in this reach is dominated by coal and petroleum while downbound tonnage is dominated by grain. In 1986, 8,969 ktons of downbound grain transitted Peoria Lock while 12,431 ktons of downbound grain transitted LaGrange.

MINNESOTA RIVER - MOUTH TO MILE 21.8

Natural Resources

3.126 Much of the information presented here has been taken from the UMRBC Master Plan, the Long-Term Resource Monitoring Report (Technical Report F, Volume II, 1981). Other sources used are as referenced.

3.127 The Minnesota River Valley extends from its head at Brown's Valley, Minnesota, to west of Minneapolis, for a distance of 224 miles. The U.S. Army Corps of Engineers maintains a nine-foot navigation channel from mile 0 to mile 14.7, and a four-foot channel from mile 14.7 to mile 25.6. Private interests maintain a nine-foot channel from mile 14.7 to mile 21.8. Water levels are regulated in part by Lock and Dam 2 at Hastings, and are also influenced by backwater from the Mississippi River. A natural levee exists along the Minnesota River channel in much of the navigable portion, which creates a belt of wetlands and shallow lakes between the bluff and the river. Much of the floodplain in this reach is contained in the Minnesota Valley National Wildlife Refuge, which is managed by the U.S. FWS.

3.128 Sedimentation is a major problem in the Minnesota River basin, and the river is a major suspended sediment contributor to the Mississippi River. This heavy sediment load is primarily due to the high percentage of agricultural land in the basin.

3.129 The lower Minnesota River tends to contain poor fish habitat, primarily due to periodic poor water quality resulting from municipal and industrial effluents and agricultural runoff. The fish community near the mouth is dominated by carp, black crappie, and white bass. Further upstream only 7 percent of the population consisted of game fish, mainly catfish, and the remainder were rough fish species.. No commercial fishing is reported in the Minnesota River. The benthic fauna consists mainly of caddisflies, mayflies, and chironomids. Fuller (1980) reports that mussels are probably extinct in the lower Minnesota River and have been for many years, primarily due to agricultural runoff.

3.130 The most common waterfowl species in this reach include mallard, blue and green-winged teal, ring-necked duck, wood duck, Canada goose, and snow goose. A variety of other species of waterfowl and shorebirds are found, as are many species of songbirds. Waterfowl use the floodplain lakes and marshes for nesting and as migration stopovers. Herons and egrets from the Pig's Eye rookery in Pool 2 of the Mississippi River commonly feed in these areas.

3.131 Mammals found in this reach include white-tailed deer, red fox, jack rabbit, cottontail rabbit, beaver, raccoon, fox squirrel, and pheasant. A variety of reptiles and amphibians would utilize this reach, especially the bottomland marshes and meadows.

3.132 Fort Snelling State Park is located at the confluence of the Minnesota and Mississippi Rivers, and is the most heavily used park in the Minnesota State Park System.

Socio-Economic Resources

3.133 The navigable portion of the Minnesota River extends from mile 25.6 at Shakopee, Minnesota, to the mouth of the river at Minneapolis-St. Paul. This stretch of river passes through three counties and several suburbs of the Twin Cities. The estimated population for this 3-county region was 1,223,300 in 1985. Approximately 96 percent of this population base was urban, residing in the Twin Cities or the surrounding suburban area (see Table EIS-4).

3.134 While the rural sector does produce crops and livestock, the influence of the Minneapolis-St. Paul Metropolitan Area overshadows this activity. Food processing and computer and machinery production dominate the area's economy.

Commercial Navigation

3.135 Twenty-five and six tenths (25.6) miles of the Minnesota River is navigable, although there are no locks on the Minnesota River.

3.136 The existing project, as authorized in 1892, provided for open-channel improvements from Mississippi River to Shakopee (25.6 miles) to obtain a channel with 4 feet of water from the Mississippi River to Shakopee to accommodate vessels of 3-foot draft.

3.137 Modifications authorized by the River and Harbor Act approved July 3, 1958, provide for improvements to the Minnesota River from its mouth at St. Paul to a point 14.7 miles upstream and 0.5 mile above the railroad bridge in the vicinity of Savage, Minnesota. The work includes dredging a channel of 9-foot depth and generally of 100-foot width, one major and two minor cutoffs near the lower end, and flattening sharp bends by providing up to 285-foot widths. These improvements supersede that portion of the existing channel of 4-foot depth from the mouth of the Minnesota River to Savage, Minnesota. The project was completed in August 1968.

3.138 There is at least one fleeting area in operation and one proposed (GREAT I 1980c) and nine barge terminals (GREAT I 1980a). Northern States Power Company's Black Dog Generating Plant at river mile 9.0 receives coal delivered by barge. There are a number of major grain shippers in the Savage area around river mile 13.0.

3.139 Statistics obtained from the Waterborne Commerce Center, WRSC, show outbound shipments as consisting almost entirely of grain. Inbound tonnage is dominated by coal and fertilizers with smaller amounts of non-metallic minerals, asphalt, cement, iron and steel pipe. Total tonnage on the Mississippi River in 1985 amounted to 3,719 ktons, of which 696 ktons were inbound and 3,023 ktons were outbound.

ST. CROIX RIVER - MOUTH TO MILE 24.5

Natural Resources

3.140 Much of the information presented here has been taken from the UMRBC Master Plan, Environmental Report (Technical Report D, 1981) and the Long-Term Resource Monitoring (Technical Report F, Volume II, 1981). Other sources used are as referenced.

3.141 The St. Croix River joins the Mississippi River about 20 miles downstream of the Twin Cities, after flowing from the north through an area of predominantly deciduous forests. The Corps of Engineers maintains a 9-foot navigation channel from mile 24.5 at Stillwater, Minnesota, to the confluence with the Mississippi River at river mile 811.3 at Prescott, Wisconsin. There are no locks and dams on the navigable portion. Water levels are regulated by Lock and Dam 3 at Red Wing, Minnesota. The navigable portion of the St. Croix River is wide and lake-like, and is referred to as Lake St. Croix.

3.142 Water quality in this reach is generally of high quality. Fecal coliform levels have occasionally exceeded standards, probably due to agricultural runoff. Water quality studies have found no violations of standards for dissolved oxygen, nitrogen, turbidity, pH, heavy metals, pesticides, herbicides, and other substances such as PCB's. Sedimentation has not been considered a problem in the St. Croix, except for sediment deposited by the Kinnickinnic River, which must be removed by dredging.

3.143 Lake St. Croix supports a diverse and abundant fishery. Sport species include sauger, walleye, panfish and smallmouth bass, and commercial species include carp, buffalo, catfish, freshwater drum and suckers. The lake sturgeon, a rare species, is a resident of the St. Croix River.

3.144 Population densities of benthic macroinvertebrates in the navigation reach are generally low (less than 5 organisms per square foot), except in the backwaters of the Kinnickinnic River delta, where densities averaged 39 organisms per square foot. The dominant taxa include chironomids and oligochaetes. The mussel fauna in the lower St. Croix River has been in a steady state condition during recent times. New mussel beds have recently been discovered, but the discovery is probably due to increased scientific study as opposed to improved environmental conditions. Well-established beds are at a number of locations on the river. The endangered Higgins' eye pearly mussel has been found in beds near Prescott, Hudson, and St. Croix Falls, Wisconsin. The mussel bed near Hudson, Wisconsin (river miles 16.0-18.0)

contains the northernmost population of the Higgins' eye pearly mussel. This site has been identified by the Higgins' Eye Recovery Team as an essential habitat site. Algal communities are composed mainly of Cyanophyta (blue-greens), Cylorophyta (greens), Crysophyta (goldens and diatoms), and Cryptophyta.

3.145 Many species of waterfowl utilize the St. Croix River during spring and fall migrations. Surface feeding ducks include wigeon, mallard, wood duck, blue and green-winged teal, pintail, gadwall, and shoveller. Diving ducks include lesser scaup, ringneck, goldeneye, canvasback, and redhead. Breeding ducks include wood duck, mallard, and blue-winged teal.

3.146 Marsh and shorebirds occupy the shoreland and lowland habitats along the lower St. Croix, such as woodcock, rails, Wilson's snipe, herons, egrets and gallinules, although many are more likely found in the upper portion of the St. Croix where habitat is more available. Several species of upland birds inhabit the valley, including ruffed grouse, cardinals, tanagers, thrushes, and several types of warblers. Other birds include hawks and other broad-winged species, falcons, ospreys, gulls, and terns. The bald eagle (Haliaeetus leucocephalus), which is considered a federally threatened species in Wisconsin and Minnesota and endangered elsewhere, nests and winters in the St. Croix Valley.

3.147 Common mammals found along the lower St. Croix include white-tailed deer, muskrat, mink, raccoon, fox and skunk. Beaver are occasionally found in tributary streams, and otter and opossum are present but uncommon. Small mammals include shrews, moles, mice, bats, chipmunks and ground squirrels. Numerous reptiles and amphibians are native to the area, including salamanders, toads, frogs, turtles, and snakes.

3.148 The lower 52 miles of the St. Croix River has been designated as part of the National Wildlife and Scenic Rivers System by Congress in 1972. The portion of the St. Croix River included in the nine-foot channel project has been declared a National Scenic Riverway. The St. Croix Islands Wildlife Area at river mile 31.0 is managed by the Wisconsin Department of Natural Resources.

3.149 The lower St. Croix River, especially Lake St. Croix, is one of the most heavily used recreational boating waters in the Midwest. Fishing also dominates the recreational use of the St. Croix. Good water quality makes the St. Croix especially popular for swimming and boating.

Socio-Economic Resources

3.150 The navigable portion of the St. Croix River extends from Stillwater, Minnesota, 24.5 miles south to Prescott, Wisconsin. The three counties bordering the river in this reach (1 in Minnesota and 2 in Wisconsin) had a combined 1985 population estimated at 206,000 as shown in Table EIS-4. (Nearly 59 percent of this population base was urban.) The primary cities

located on the banks of the St. Croix within this reach are Stillwater and Hudson, Minnesota.

3.151 This portion of the St. Croix River is in close proximity to the Twin Cities and its economic base. However, dairy farming and crop and livestock production are of primary importance to this 3-county region.

Commercial Navigation

3.152 Twenty-four and five tenths (24.5) miles of the St. Croix River is navigable, although there are no locks on the St. Croix.

3.153 The project provides for maintenance of a channel 24.5 miles long, 9 feet in depth, and of suitable width from the mouth to Stillwater, and a channel 3 feet deep at mean low water, between Stillwater and Taylors Falls (27.3 miles); in addition, the project provides for improvements of harbor and waterfront at Stillwater, Minnesota.

3.154 The project was completed in 1930. A 9-foot channel from Stillwater to the mouth was automatically established by creation of Pool No. 3 in Mississippi River on August 12, 1938.

3.155 The navigable portion of the river is wide and lake-like, with water depths often approaching 60 feet or more and the width exceeding a mile in places. Steep wooded bluffs rise 200 feet above the shorelines on each side. This segment of the St. Croix, often called Lake St. Croix, is within commuting distance of St. Paul, and has undergone considerable residential development since the 1960's. Cities and towns on the navigable reach include Stillwater and Bayport, Minnesota; North Hudson and Hudson, Wisconsin; Lakeland, St. Croix Beach, and Afton, Minnesota; and Prescott, Wisconsin. The pool is confined within the original banks of Lake St. Croix with very little lowland or floodplain area (GREAT I, 1980a).

3.156 Tributaries on the navigable reach include the Willow River at river mile 18.0 and the Kinnickinnic River at river mile 6.5, both on the Wisconsin side.

3.157 Material dredged from the St. Croix River has been placed on island near Hudson, Wisconsin; on the delta near the mouth of the Kinnickinnic River; at Lake St. Croix Beach, Minnesota; or at the Point Douglas County Park in Minnesota. The material provides sand beaches for the heavy recreation use on the lower St. Croix River. Barge traffic is light and consists almost entirely of coal delivered to the Northern States Power. Statistics obtained from the Waterborne Commerce Statistics Center (WRSC) show tonnage on the St. Croix River to consist almost entirely of inbound coal with lesser amounts of fertilizers. Total tonnage on the St. Croix River in 1985 amounted to 1,194 ktons, all of which was inbound.

BLACK RIVER - MOUTH TO MILE 1.4

Natural Resources

3.158 Much of the information presented here has been taken from the UMRBC Master Plan, the Long-Term Resource Monitoring report (Technical Report F, Volume II, 1981). Other sources used are as referenced.

3.159 Although the Black River now flows directly into Pool 7 of the Upper Mississippi River, the lower 5 miles of the old channel still exists below the Onalaska spillway of Lock and Dam 7 to the point of its original junction with the Mississippi River at La Crosse. The lower 1.4 miles of this old Black River channel is maintained as navigable waters under the 9-foot channel project authorization. It serves principally as a recreational and commercial access for the UMR.

3.160 Little information is available for this reach, but, in general, the biological information for Pool 7 would be applicable to this portion of the Black River. The massasangas, or swamp rattlesnake, a venomous snake of rare occurrence in the UMR, is found in the Black River Delta in Pool 7. Also, the mussel species of the Black River is dominated by the three-ridge (92.8 percent) and pigtoe (7.2 percent), as determined by brailing (Thiel, 1981). Species collected by diving including maple leaf; threehorn, pocketbook, and giant floater (Thiel, 1981). No mussel beds were found to exist in the navigable portion of the Black River.

Socio-Economic Resources

3.161 The Black River reach from its mouth to river mile 1.4 is located at the cities of La Crosse and Onalaska, Wisconsin. This reach is contained in La Crosse County which had a 1985 population estimated at 96,600. Roughly 74 percent of the county's population is urban, residing in the La Crosse Metropolitan Area or smaller outlying communities.

3.162 The county's economy centers around La Crosse industries including beer processing and machine and clothing manufacturing. The more rural area is supported by dairy and livestock farming.

Commercial Navigation

3.163 One and four tenths (1.4) miles of the Black River is navigable. The existing project provides for a channel depth of 9 feet below the normal elevation of Mississippi River Pool No. 8 substantially from bank to bank and extending from the mouth to mile 1.4.

3.164 The dredging of a channel about 300 feet wide which is considered adequate for existing commerce was completed in June 1941. Removal of obstructions at various points outside the dredged area to clear the channel to full project width was considered unnecessary for existing commerce, classified inactive, and deauthorized in August 1977.

3.165 Statistics obtained from the WRSC show tonnage on the Black River to be primarily inbound and to consist mainly of gasoline, distillate fuel oil, asphalt, and nonmetallic minerals, with lesser amounts of chemical fertilizers and coal. Outbound tonnage is dominated by grain with lesser tonnage of woodchips. Total tonnage on the Black River amounted to 274 ktons in 1985, of which 266 ktons were inbound and 8 ktons outbound.

KASKASKIA RIVER - MOUTH TO MILE 36.2

Natural Resources

3.166 Much of the information presented here has been taken from the UMRBC Master Plan, Environmental Report (Technical Report D, 1981) and the Long-Term Resource Monitoring report (Technical Report F, Volume II, 1981). Other sources used are as referenced.

3.167 The Kaskaskia Navigation Project was authorized by the Rivers and Harbors Act of 1962 (Public Law 87-874). This project involved both channelization and canalization of the lower 50.5 miles of the Kaskaskia River to provide a navigation channel 9-feet by 225-feet for barge transport of coal. Project works included construction of a dam and a single 84-foot by 600-foot lock at river mile 0.8. The navigation improvements shortened the length of the lower 50.2 miles of river to 36.2 river miles.

3.168 Water quality parameters that have not met State of Illinois standards include dissolved oxygen, fecal coliforms, copper, boron, mercury, and total iron. The high iron levels are probably due to coal mining in the area, and fecal coliform problems come primarily from agricultural runoff. Low dissolved oxygen levels are probably due to organic waste loading. Throughout most of the year, the Kaskaskia River carries a heavy silt load. Soil erosion due to agricultural activities is the major source of sediment entering the river. Other sources of sediments are due to the erosion of the stream bottom and bank caused by high water levels, increased velocities, and boat traffic.

3.169 About 78 species of fish have been collected from the lower Kaskaskia River. Sport species include largemouth bass, white and black crappie, carp, and channel catfish. Other species include bullheads, sunfish, freshwater drum, carp, and gizzard shad. Only a minor amount of commercial fishing occurs in the lower Kaskaskia.

3.170 A lack of benthic (bottom-dwelling) organisms in the lower river is due largely to the predominance of shifting sand and soft silt bottom materials that do not support a high quality benthic community. Organisms comprising this sparse benthos include midge larvae, mayfly nymphs, worms, and occasionally caddisfly larvae and naiad mussels.

3.171 Waterfowl are common due to the wetland, backwater slough, and oxbow habitat available. Common migratory waterfowl include mallard and blue-wing teal ducks; Canada, blue, and snow geese; and wading birds such as herons and egrets. Many species of nongame birds are present, such as flickers, warblers, finches, sparrows, cardinals, trashers, and towhees.

3.172 Associated with the bottomland areas and especially the forested areas are furbearers such as mink, fox, skunk, raccoon, muskrat, and beaver. Other animals found in this reach include rabbits, squirrels and white-tailed deer. At least 9 species of reptiles and 10 species of amphibians have been located along the lower Kaskaskia River.

3.173 The primary use of this reach since canalization has been for recreation, especially fishing, hunting, pleasure boating, and water skiing. Oxbow areas are used for sport fishing and canoeing.

Socio-Economic Resources

3.174 The Kaskaskia River is maintained for navigation from its confluence with the Mississippi River to Fayetteville, Illinois, at river mile 36.2. This stretch of river passes through three Illinois counties and is bordered by the small communities of Fayetteville and New Athens. The combined 1985 population of this 3-county area was estimated at 323,900. Slightly over three-fourths of the 1985 population resided in urban areas.

3.175 Despite the area's proximity to the St. Louis Metropolitan Area, the majority of the region is supported by agriculture and agricultural-related industries. St. Claire County, which includes portions of the Metro Area, is the most developed portion of the region, featuring food processing and heavy machinery manufacturing.

Commercial Navigation

3.176 Thirty-six and two-tenths (36.2) miles of the Kaskaskia River is navigable. There is one lock on the Kaskaskia; therefore, a record is kept of tonnage through the lock on the Performance Monitoring System (PMS).

3.177 Tonnage on the Kaskaskia has steadily increased from 1981 to 1986. Traffic through Kaskaskia lock is almost exclusively downbound coal with small amounts of upbound stone, sand and gravel, and limestone. Ninety-five (95)

percent of downbound tonnage and 80 percent of total tonnage transitting this lock in 1986 was downbound coal. In 1986, 3,166 ktons of coal transitted Kaskaskia Lock downbound.

3.178 Total tonnage transitting Kaskaskia Lock in 1986 amounted to 611 ktons upbound and 3,347 ktons downbound.

WATER QUALITY

3.179 Much of the information presented here has been taken from the UMRBC Master Plan, Environmental Impact Statement (January 1982). Other sources used are as referenced.

3.180 Surface water quality problems occur in many locations throughout the UMRS. The most serious problems on the Mississippi occur between Minneapolis and Lock and Dam 2, south of Clinton, Iowa, and below the St. Louis Metropolitan area. The Minneapolis-St. Paul and St. Louis regions have problems with excessive amounts of toxic metals, turbidity, and low dissolved oxygen (DO). South of Clinton, Iowa, toxic metals and turbidity values are high and some local problems exist with low DO and high PCBs in fish.

3.181 The entire Illinois River has lower water quality than the Mississippi River main stem. The Chicago area -- including the Chicago River System and the Calumet-Sag System -- has extremely poor water quality. Standards for turbidity, DO, toxic metals, fecal coliforms and biochemical oxygen demand (BOD) are exceeded. Problems with DO, toxic metals and turbidity persist throughout the Illinois River.

3.182 Point sources are single-location sources of material that are capable of polluting the river if not treated. Point sources in the UMRS are many and varied, but are for the most part industrial facilities, power plants and municipal wastewater treatment plants. Some of the largest point sources are wastewater treatment plants in the Minneapolis-St. Paul, St. Louis, and Chicago areas, power plants in several parts of the system, and large steel, oil, and chemical facilities in the St. Louis and Chicago areas.

3.183 Because of the enormous size of the UMRS and the large flow at any given point, point discharges are miniscule by comparison. It is generally accepted that treated point sources of discharge are not the dominant factor influencing the overall water quality of the system, although localized problems may occur. In general, nonpoint pollution is a serious problem in the UMRS and nonpoint pollution inputs are often much greater than point pollution sources.

3.184 The most severe water pollution problems attributed to nonpoint pollution in the UMRS are excessive loadings of suspended solids and sediment and the contamination of sediments by toxic materials. Sediment yields range from 10 to 500 tons/mile^2/yr in the northern portion of the basin to yields

exceeding 6,000 tons/mile^2/yr (0.06 inches/year) in the south. Major sediment sources are cropland, construction sites, streambanks, and localized mining areas.

3.185 Other problems associated with nonpoint pollution of the system include siltation and sediment accumulation in backwaters of the UMRS, increased rates of eutrophication attributed to increased nutrient levels, pesticide and toxic metal inputs, and contamination resulting in general impairment of the major beneficial uses of the river (recreation, fish and wildlife protection, and water supply).

THREATENED AND ENDANGERED SPECIES

FEDERALLY LISTED SPECIES

3.186 As required by Section 7(c) of the Endangered Species Act of 1973, as amended, the Rock Island District requested from the U.S. FWS, Rock Island Field Office, a list of endangered or threatened species which may occur in the study area for the major rehabilitation effort on the Mississippi River Locks and Dams 2 through 22 and the Illinois Waterway from Lockport to LaGrange Locks and Dams. By letters dated March 6 and 18, 1987, the Rock Island Field Office provided the following list of species:

Common Name	Scientific Name	Status
Higgins' Eye Pearly Mussel	Lampsilis higginsi	Endangered
Pink Mucket Pearly Mussel	Lampsilis orbiculata	Endangered
Fat Pocketbook Pearly Mussel	Potamilus capax	Endangered
Iowa Pleistocene Snail	Discus macclintocki	Endangered
Indiana Bat	Myotis sodalis	Endangered
Gray Bat	Myotis grisescens	Endangered
Peregrine Falcon	Falco peregrinus	Endangered
Bald Eagle	Haliaeetus leucocephalus	Endangered (Threatened in Wisconsin and Minnesota)
Interior Least Tern	Sterna antillarum athalassos	Endangered
Northern Monkshood	Acontium noveboracense	Threatened

3.187 The Rock Island Field Office also indicated that critical habitat has been designated for the Indiana bat in La Salle County, Illinois, which includes the Blackball Mine located on Pecumsaugen Creek north of the Illinois River.

3.188 A Biological Assessment was prepared to assess the potential site-specific and cumulative impacts occurring to the list of species. An impact assessment is provided in Section 4, Environmental Effects (see paragraphs 4.67 to 4.70).

STATE-LISTED SPECIES

3.189 A listing of the endangered and threatened species for the UMRS for the States of Minnesota, Wisconsin, Iowa, Illinois, and Missouri is provided in Table EIS-6. The table also lists the habitat preferences for the species and the reach(s) of the UMRS where each species is expected to be located. This list differs substantially from the Federal listing of species which can be attributed to the fact that a given state may lie on the fringes of the natural geographic range of a species. Therefore, a given state may support extremely limited numbers of a species, while the species as a whole may be relatively plentiful on a national or regional basis.

RECREATIONAL USES AND EXPENDITURES

GENERAL

3.190 The UMRS is one of the Nation's largest and most diverse outdoor recreation resources and includes about 1,260 miles of river located in the states of Minnesota, Wisconsin, Iowa, Illinois, and Missouri (UMRCC, 1982). Common UMRS outdoor recreation activities include boating, swimming, water skiing, hiking, picnicking, fishing, camping, canoeing, birding, hunting, and sightseeing. Data shown on Table EIS-8 were taken from a UMRCC publication (1982), and expenditures were updated from December 1981 values to January 1987 values by using a Consumer Price Index Conversion factor of 1.183. Activity day figures listed under "Other Recreation Activity Days" include boating, water skiing, swimming, camping, and picnicking (UMRCC, 1982). The activity day data in Table EIS-7 are based upon a recreationist in any one day recorded as participating in only one primary activity (UMRCC, 1982).

3.191 According to the Upper Mississippi River Basin Association (UMRBA, 1983), increases can be expected in recreation use of the Upper Mississippi River System. In Pools 1-10, recreation use is estimated to increase by nearly 50 percent over the next 50 years; in Pools 11-22, recreation use is estimated to increase 21 percent over the next 50 years; and in Pool 24 to the open river, recreation use is projected to increase 7 percent by the year 2000 (UMRBA, 1983).

3.192 Each year the Corps of Engineers estimates the amount of recreational use that occurs at its recreation sites on the Mississippi and Illinois Rivers. The way these estimates are computed does vary somewhat by District. Visitation estimates for 1985 for the Mississippi River are shown in Table

TABLE EIS-6

STATE ENDANGERED AND THREATENED SPECIES OF THE UMRS

Common Name/ Scientific Name	Habitat	Status1						Reaches2									Habitat3
		FED	MN	WI	IA	IL	MO	A	B	C	D	E	F	G	H	I	Preference
MOLLUSKS																	
Rock Pocketbook Arcidens confragosus	Large rivers, confined to Mississippi River above St. Louis			SC			E		X	X	X	X	X				IB,IC,IA
Higgins' Eye Pearly Mussel Lampsilis higginsi	Deep water areas of large rivers, especially Mississippi River north of Missouri	E	E	E	E	E		X	X	X	X						IB,IC,IA
Pink Mucket Pearly Mussel Lampsilis orbiculata	Large rivers, low to moderately flowing water, lower Mississippi River Basin	E				E							X				ID,IC,IB
Hickory Nut Obovaria olivaria	Large and medium rivers, especially middle Mississippi River						E				X		X				IB,IC,IA
Fat Pocketbook Potamilus capax	Large rivers, especially upper Mississippi River	E	E				E	X	X	X	X	X	X				ID,IC,IB
Wartyback Quadrula nodulata	Large rivers			SC			E		X	X	X	X	X				IB,IC,IA
Iowa Pleistocene Snail Discus macclintocki	Talus slopes	E			E				X	X							IIB
Flat Floater Anodonta suborbiculata	Lentic habitat adjacent to rivers			SC					X								ID
Spectacle Case Cumberlandia monodonta	Rocky areas			SC					X	X		X					IB
Purple Wartyback Cyclonaias tuberculata	Large rivers			SC					X								I
Butterfly Ellipsaria lineolata	Southern rivers with soft substrate			SC					X								IB,IC

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Elephant ear *Elliptio crassidens*	No longer in UMR, host fish can't get past lake Keokuk			SC					X								I
Snuffbox *Epioblasma triquetra*	Usually small streams with gravel substrate			H													I
Ebonyshell *Fusconaia ebena*	A few old individuals found due to loss of host fish			SC					X								IB,IC
Yellow Sandshell and Slough Sandshell *Lampsilis teres*	Sand - silt substrate in large rivers habitats			SC					X								IB,IC,IA
Creek Heelsplitter *Lasmigona compressa*	Sand or gravel substrates in small to medium sized streams. Not found in UMR.			SC													I
Ohio River Pigtoe *Pleurobema cordatum*	Large southern rivers			SC					X								I
Bullhead *Plethobasus cyphus*	Southern rivers			SC					X								I
Winged Mapleleaf *Quadrula fragosa*	Is extinct in UMR			SC													I
Monkeyface *Quadrula metanevra*	Large southern rivers			SC					X								I
Salamander Mussel *Simpsoniasa ambigua*	Large to medium streams, possibly wing dams			H													IB
Buckhorn *Tritogonia verrucosa*	Medium to large sized southern rivers			SC					X								I
MAMMALS																	
River Otter *Lutra canadensis*	Undisturbed rivers, creeks and sloughs, well vegetated shorelines				T		T	X	X	X							IIA

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Bobcat *Lynx rufus*	Heavily wooded areas, along bluffs, in hollows and timbered swamps				E	T			X	X	X	X	X				IIA,IIB
Gray Bat *Myotis grisescens*	Caves for roosting, forage over streams, rivers and lakes					E	E				X	X	X		X		IIA,IIB
Indiana Bat *Myotis sodalis*	Riparian forest	E			E	E	E		X		X	X	X	X	X		IIA
Golden Mouse *Ochrotomys nuttalli*	Flood plains of major streams					T							X				IID
Rice Rat *Oryzomys palustris*	Marshes and wet meadows along waterways of various sizes					T							X				IIC
Plains pocket Mouse *Perognathus flavescens perniger*	Sandy, uncultivated areas				E					X							IIE,IID
FISH																	
Lake Sturgeon *Acipenser fulvescens*	Bottoms of large lakes and rivers at depths from 15-30 ft		SC	SC	E	T	E	X	X	X	X	X					IA,IB,IC,ID
Alabama Shad *Alosa alabamae*	Anadromous, in Mississippi River						E				X	X	X				IB,IA
Skipjack Herring *Alosa chrysochloris*	Open waters of large rivers, large river lakes, swift currents below dams				E				X								I
Crystal Darter *Ammocrypta asprella*	Sand or gravel bottomed areas of large and medium rivers with strong current		SC	E				X									IC,IB
Mud Darter *Etheostoma asprigene*	Sloughs, pools over mud, sand, clay or gravel substrate			SC					X								I

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Western Sand Darter *Ammocrypta clara*	Restricted to sandy substrate in moderate large streams and rivers			SC	T				X	X							IC,IB
Blue Sucker *Cycleptus elongatus*	Channels and pools with moderate currents		SC	T				X									IA,IB,IC
Ozark Minnow *Dionda nubila*	Pools of small to medium sized rivers with gravel			T					X								IC,ID
Grass Pickerel *Esox americanus*	Quiet pools, marshes, sloughs, and swamps				T					X							ID
Bluntnose Darter *Etheostoma chlorosomum*	Sloughs and low gradient streams over mud, clay and detritus		SC	E	E			X	X								ID
Orangethroat Darter *Etheostoma spectabile*	Riffles and pools with sand and gravel bottoms				T					X							IC
Starhead Topminnow *Fundulus notti*	Shallow, low gradient streams with vegetation			E				X									ID
Goldeye *Hiodon alosoides*	Quiet, turbid waters of large rivers and backwaters			E				X									IC,ID
Speckled Chub *Hybopsis aestivalis*	Channels of large, clear to turbid streams, over sand or gravel in moderate current			T				X	X								IC,IB
Sturgeon Chub *Hybopsis solida*	Shallow, fast riffles in large rivers, adapted to turbid water						R						X				IB,IC
Sicklefin Chub *Hybopsis meekihi*	Fast water of large rivers over firm sand or fine gravel						R						X				IB,IC
Gravel Chub *Hybopsis x punctata*	Moderate to large clear rivers and streams over gravel in moderate to swift current		SC	E				X									IB,IC

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Brown Bullhead *Ictalurus nebulosis*	Clear, well-vegetated lakes (backwaters)					R						X					I D
Chestnut Lamprey *Ichtyomyzon castaneus*	Medium and large rivers				T			X	X								ID,IB
Black Buffalo *Ictiobus niger*	Sloughs and main channel, spawns in backwaters in spring. Variety of substrates			T						X							IA,ID
Alligator Gar *Atractosteus spatula*	Turbid, moderately flowing large river					T	R				X		X				ID,IB
Longear Sunfish *Lepomis megalotis*	Quiet pools in clear, hard bottomed low gradient streams			T					X								IC,ID
Pallid Shiner *Notropis amnis*	Large to medium sized clear streams and rivers away from swift current		SC	E					X	X		X					ID
River Redhorse *Moxostoma carinatum*	Strong current over hard, silt-free substrate. Sensitive to turbidity, pollution.			T					X								I
Striped Shiner *Notropis chrysocephalus*	Clear water of fast to moderately flowing streams with gravel, rubble, or sand/gravel			E					X								IC,IB
Pugnose Minnow *Notropis emiliae*	Clear, well vegetated sluggish water with little current		SC	SC			E		X			X	X				ID
Weed Shiner *Notropis texanus*	Waters of slow current, sloughs, pools. Sand, mud substrate.			SC					X								ID,IC
Slender Madtom *Noturus exilis*	Small rivers with moderate to swift current and clear water		SC	E					X								IC,IB
Gilt Darter *Percina evides*	Clear, fast-flowing rivers over gravel or rubble			T					X								IC,IB

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Paddlefish *Polyodon spathula*	Large rivers, pools.			T					X								I
Pallid Sturgeon *Scaphirynchus albus*	Channel of large turbid rivers with moderate current				E		E					X	X	X			IA
Central Mudminnow *Umbra limi*	Well vegetated streams and ponds, restricted to still waters						E					X					ID
BIRDS																	
Cooper's Hawk *Accipiter cooperii*	Open woodlands and timber margins			T	E				X	X	X			X			IIA
American Bittern *Botaurus lentiginosus*	Freshwater marshes and marshy lake shores		SC			E	R					X			X	X	IIC
Red shouldered Hawk *Buteo lineatus*	Bottomland timber		SC	T	E				X	X	X						IIA
Great Egret *Casmerodius albus*	Flood plain forests along large marshes and river backwaters			T		E			X	X	X	X		X		X	IIA
Marsh Hawk *Circus cyaneus*	Marshes and wet meadows			SC	E						X						IIC,ID
Little Blue Heron *Hydrata caerulea**	Freshwater swamps and lagoons, nests in lowland thickets or forests					E	R					X		X			IIA
Snowy Egret *Hydrata thula*	Freshwater swamps and lagoons, nests in lowland thickets or forests					E								X			IIA
Peregrine Falcon *Falco peregrinus*	Nests in cliffs or bluffs along river, esp MN, WI - mostly historical	E	E	E	E			X	X								IIB

* Also *Florida caerulea* (IL)

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Bald Eagle *Haliaeetus leucocephalus*	Nests in river bottom forest north, winters along river south	E	T	T	E	E	E	X	X	X	X	X	X	X	X	X	IIA
Mississippi Kite *Ictina mississippiensis*	Mature, mixed bottomland forest for nesting					E								X			IIA
Black-crowned Night Heron *Nycticorax nycticorax*	Flood plain forests along large marshes and river backwaters			SC		E								X		X	IIA,ID,IIC
Osprey *Pandion haliaetus*	Nests in dead trees along backwaters		SC	E					X								IIA
Double-crested Cormorant *Phalacocorax auritis*	Nests in dead trees along backwaters			SC	E	E			X	X	X						IIA
King Rail *Rallus elegans*	Freshwater marshes and backwaters		SC	SC	E	E						X					IIC
Interior Least Tern *Sterna antillarum athalassas*	Sandy or pebbly beaches, sand bars	E			E	E			X					X			IIE
Forster's Tern *Sterna forsteri*	Marshes, reedy lake and backwater margins		SC	E					X	X							IIC
Common Tern *Sterna hirundo*	Sandy or pebbly beaches, sand bars		SC	E					X	X							IIE
Common Loon *Gavia immer*	Open water			SC					X								IA,ID
Great Blue Heron *Ardea herodias wardi*	Flooded field, sand bars, older stand timber, chutes, sloughs			SC					X								IIA,IC,ID

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Yellow-crowned Night Heron *Nyctanassa violacea*	Older stand timber, flooded fields			SC					X								IIA,IC
American Black Duck *Anas rubripes*	Rivers			SC					X								ID
Yellow Rail *Coturnicops noveboracensis*	Marshes, meadows, grain fields			SC					X								IIC
Wilson's Phalarope *Steganopus tricolor*	Sloughs, ponds			SC					X								IIC
Caspian Tern *Hydroprogne caspia*	Rivers, sloughs, sand bars			SC					X								IA
Black Tern *Chlidonias niger*	Rivers, sloughs, sand bars			SC					X								ID
Acadian Flycatcher *Empidonax virescens*	Bottomland forest			SC					X								IIA,IIB
Bewick's Wren *Thryomanes bewickii*	Around homes, secondary succession			SC					X								IIA,IIB
Eastern Bluebird *Sialia sialis*	Older and younger stands, secondary succession, old fields			SC					X								Misc.
Yellow-throated Vireo *Vireo flavifrons*	Bottomland forest			SC					X								IIA,IIB
Cerulean Warbler *Dendroica cerulea*	Bottomland forest			SC					X								IIA,IIB
Black-and-white Warbler *Mniotilta varia*	Deciduous woods			SC					X								IIA,IIB

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Kentucky Warbler *Oporornis formosus*	Deciduous woods			SC					X								IIA,IIB
AMPHIBIANS AND REPTILES																	
Blanchard's Cricket Frog *Acris crepitans*	Small pebbly streams with well vegetated banks		SC	E					X	X							IIA
Wood Turtle *Clemmys insculpta*	Clear water streams in undisturbed forest		T	T				X	X								IIA
Western Fox Snake *Elaphe vulpina vulpina*	Wooded stream valleys		SC	SC			E		X	X		X	X				IIA
Blandings Turtle *Emydoidea blandingi*	Marshes with floating sedges near sandy uplands		T	T		E		X	X	X	X						IIC
Yellow Mud Turtle *Kinosternon flavescens*	Sandy river bottom areas with permanent sloughs or ponds				E	E	E		X	X	X				X		IIA
Yellowbelly Water Snake *Nerodia erythrogaster*	River bottoms, swamps and marshes				E						X						IIA
Central Newt *Notophthalmus viridescens louisianensis*	Shallow pools in woodland swamps				E					X	X						IIA
Eastern Slender Glass Lizard *Ophisaurus attenuatus*	Bottomland oak savannahs and sand prairies			E	E				X								IIA
Strecker's Chorus Frog *Pseudacris streckeri*	Open sandy areas of river lowland, esp along Illinois River					T										X	IIE
Eastern Massasauga *Sistrurus c. catenatus*	Wooden swamps, wetlands		SC	E	E		E		X	X			X				IIA

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Stinkpot *Sternotherus odoratus*	Rivers, small lakes, permanent ponds				T						X	X					IIC
Ornate Box Turtle *Terrapene ornata*	Bottomland prairies			E	T						X						IID
Eastern Hognose Snake *Heterodon platyrhinos*	Flood plains, forest edge, open woods, clay or sandy cloam			SC					X								IIA
Black Rat Snake *Elaphe Obsolete*	Most woodlands, most habitat, levees			SC					X								IIA
Bullsnake *Pituophis melanoleucus*	Sandy areas near river, cultivated fields			SC					X								IIE
Eastern Milk Snake *Lampropeltis triangulum*	Open fields, wooded areas, city lots			SC					X								IIA
Bullfrog *Rana catesbeiana*	Any permanent water			SC					X								I
Leopard Frog *Rana pipiens*	Near any type of water, secondary succession			SC					X								I
PLANTS**																	
Northern Monkshood *Aconitum noveboracense*	Shaded, moist, sandstone cliffs	E		T*	E*				X	X							IIB
Yellow Giant Hyssop *Agastache nepetoides*	Alluvial woods and thickets			T					X	X							IIA
Purple Milkweed *Asclepias purpurescens*	Dry fields and thickets			E					X	X							IID

* Listed, but no populations reported

** Illinois plants not listed because no impact is anticipated (Lauzon, pers. Comm)

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Aster *Boltonia asteroides*	Alluvial ground bordering sloughs, streams, ditches and ponds						E					X					IID
Prairie Indian Plantain *Cacalia tuberosa*	Lowland woods, ravines			T					X	X							IIA
Water Starwart *Callitriche heterophylla*	Pools and sloughs			SC	T						X						IIC
Crow Spur Sedge *Carex crus-corvi*	Swamps, shaded flood plains		E	E*					X								IIA
Davis' Sedge *Carex davisii*	Mature alluvial forests in major stream valleys		T						X								IIA
Intermediate Sedge *Carex media*	Cold, wooded slopes			E	E				X								IIA
Four-spiked Star Sedge *Carex sterilis*	Lowland fens, requires cold calcareous ground water		T						X								IIC
Rose Turtlehead *Chelone obliqua*	Swampy meadows and margins of springs						R					X					IIC
Erect Day-flower *Commelina erecta*	Flood plain, moist soil			SC	T						X						IID
Tall Corydalis *Corydalis curvisiqua*					T						X						IID
Desmodium illinoense	Bluffs along flood plain		T						X								IIB
False Mermaid *Floerkea prosperpinacoides*	Alluvial woodlands						R					X					IIA

* Listed, but no populations reported

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Fringed Gentian *Gentianopsis crinata*	Moist woods and meadows				T					X							IIA,IID
Round fruited St. Johns Wort *Hypericum sphaerocarpum*	Stream banks			T						X							IID
Winterberry *Ilex verticillata*	Swamps and low ground				E					X							IIC
Midland Quillwort *Isoetes melanopoda*	Moist Prairies and overflowed fields				E					X							IID,IIC
Dwarf Dandelion *Krigia virginica*	Dry, sandy soil				T						X						IID
Kalm's Lobelia *Lobelia kalmii*	Wet banks and meadows				T					X							IIC,IID
Fir Club-moss *Lycopodium porophilum*	Sandstone ledges bordering flood plain	T		SC	E				X								IIB
Fragile Prickly Pear *Opuntia fragilis*	Dry, sandy prairies			T	T						X						IID
Arrow Arum *Peltrandra virginica*	Wet, mucky ground bordering sloughs and oxbow lakes in river bottom				E		R				X	X					IIA
Hair-like Beak-rush *Rhynchospora capillacea*	Lowland fen	T			T				X								IIC
Whorled Nut-rush *Scleria verticillata*	Lowland fens, pine barren species	T		SC					X								IIC
Oval Ladies Tresses *Spiranthes ovalis*	Low or rich moist woodlands				E		R							X	X		IIA

TABLE EIS-6 (Cont'd)

Common Name/ Scientific Name	Habitat	Status1 FED	MN	WI	IA	IL	MO	Reaches2 A	B	C	D	E	F	G	H	I	Habitat3 Preference
Rough-seeded Flame Flower *Talinum rugospermum*	Dry, sandy prairies			SC	E					X							IID
Hairy Meadow Parsnip *Thaspium barbinode*	Bluffs along flood plain			E					X								IIB
Snow Trillium *Trillium nivale*	Forest edge, : along stream and river banks			T					X	X							IIA
Valerian *Valerian edulis*	Calcareous fens and limestone bluffs		T						X								IIB,IIC

1. Status

E - Endangered
R - Rare
T - Threatened
SC - Special Concern
H - Historically found in UMR - not found in recent years

2. Reaches

A. 1, UMR
B. 2-10, UMR
C. 11-13, UMR
D. 14-19, UMR
E. 20-25, UMR
F. 26, UMR
G. Below 26, UMR
H. Upper Illinois River
I. Lower Illinois River

3. Habitat Preference - First entry represents the most preferred habitat. Habit types are:

I. Aquatic

A. Main Channel
B. Main Channel Borders
C. Side Channels and Borders
D. Sloughs and Backwaters

II. Terrestrial

A. Wooded Shores and River Bottom Forest
B. Bluffs and Cliffs
C. Nonforest Wetlands
D. Herbaceous Shores
E. Sandy or Pebbly Beaches

TABLE SOURCE: DRAFT FISH & WILDLIFE COORDINATION ACT REPORT, 1986

FROM: Supplement I, DEIS, Second Lock at L/D 26 (R), Vol. II, St. Louis District

TABLE EIS-7

Annual Recreational Use and Expenditures on the UMRS[1]

River Reach	Sport Fishing Activity Days	Sport Fishing[2] Expenditures $ 14.79/ person/day	Waterfowl Hunting Activity Days	Waterfowl[2] Hunting Expenditures $ 20.12/ person/day	Other Recreation Activity Days	Other[2] Recreation Expenditures $ 17.75/ person/day	Total Recreational Expenditures
Head of Navigation to L/D 10	1,984,800	$ 29,355,192	70,000	$ 1,408,400	6,615,100	$117,418,025	$148,181,617
L/D 10 to L/D 22	4,899,411	72,462,288	205,000	4,124,600	8,905,605	158,074,489	234,661,377
L/D 22 to L/D 26	1,286,000	19,019,940	1,287	25,895	5,912,658	104,949,680	123,995,515
Middle River	226,000	3,342,540	---	---	---	---	3,342,540
Illinois River	2,134,827[3]	31,574,091	35,000	704,200	---	---	32,278,291
Minnesota River	---	---	---	---	---	---	---
St. Croix River	33,166	490,525	---	---	298,483	5,298,073	5,788,598
Black River	---	---	---	---	---	---	---
Kaskaskia River	---	---	---	---	108,540	1,926,585	1,926,585
TOTALS	10,564,204	$156,244,576	311,287	$ 6,263,095	21,840,386	$387,666,852	$550,174,523

Notes:

[1]Taken from UMRCC, 1982. Some river reaches have either limited or no available data. Data blanks are shown as a dashed line. The data in this table have been collected by surveys conducted between 1972 and 1981. While the information is presented in annual figures, it is not intended to be representative of any one specific year.

[2]Expenditures were updated from December, 1981 to January, 1987 using a Consumer Price Index conversion factor of 1.183.

[3]Illinois Department of Conservation update, 1983.

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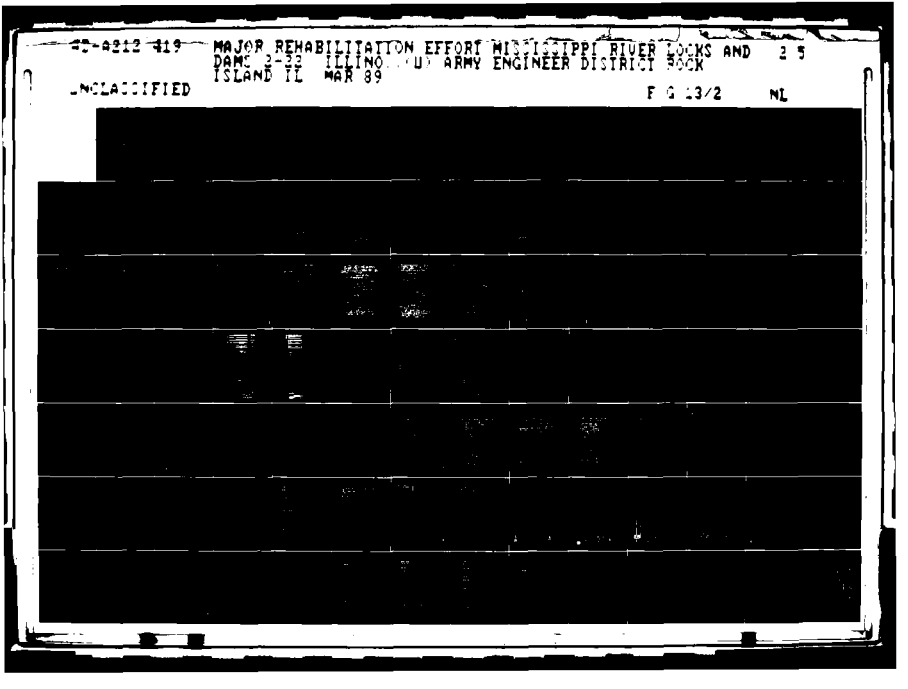

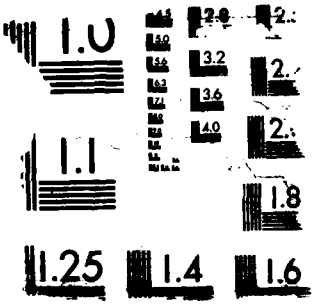
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EIS-8. A recreation day is defined as a visit by one individual to a recreation area for recreation purposes during any reasonable portion or all of a 24-hour period.

3.193 An estimate of the dollar value associated with recreation days also can be computed using the Unit Day Value Method described in Principles and Guidelines (P&G), established by the U.S. Water Resources Council for use by Federal agencies. First, a recreation activity is classified as being general or specialized in nature, and then point ratings are assigned to the activity. A table then converts the point rating to a dollar value per day for the category of general or specialized recreation.

3.194 P&G states that general recreation, "... refers to a recreation day involving primarily those activities that are attractive to the majority of outdoor users and that are attractive and that generally require the development and maintenance of convenient access and adequate facilities ..."

3.195 The general category includes such activities as swimming, camping, hiking, boating, cycling, and general fishing and hunting activities. P&G describes "specialized" as referring to "... a recreation day involving those activities for which opportunities in general area is limited, intensity of use is low, and a high degree of skill, knowledge, and appreciation of this activity by the user may often be involved." Activities such as big game hunting, wilderness pack trips, white water canoeing, and salmon fishing are included in the specialized category.

3.196 P&G dollar values (1987 values per EC 1105-2-177) for general recreation range from $1.75 (0 points) to $5.30 (100 points); for general fishing and hunting from $2.60 (0 points) to $5.30 (100 points); for specialized recreation from $7.10 (0 points) to $21.25 (100 points); and for specialized fishing and hunting from $12.35 (0 points) to $21.25 (100 points). Applying the general recreation dollar value to the Corps recreation estimates, assuming the Mississippi River to be of optimum quality (100 points), would result in a total value of $142,223,380 (26,834,600 x $5.30); if the specialized dollar value is applied, the total value would be $570,235,250 (26,834,600 x $21.25).

SPORT FISHING

3.197 The sport fishing of the UMRS is diverse, owing to the diversity of habitat and associated fish communities found in a pooled river situation. The sport fishery of the UMR includes 14 families, 25 species, and 5 species groups as shown on Table EIS-9. The majority of the fishing activity occurs in the tailwater, main channel border (especially wing dam sites), and backwater habitats of the UMR. Kline and Golden (1979) described harvest trends for the period 1962 to 1973 (U.S. FWS, 1986). Bluegill and crappie were the two most important species harvested; walleye, sauger, and green sunfish increased in importance, while white bass and bullhead decreased (U.S. FWS, 1986). Numbers of bluegill and crappie dropped significantly from 1962 to 1973, while sauger, walleye, freshwater drum, and green sunfish numbers

TABLE EIS-8

UMR Annual Visitation Estimates in Recreation Days [1/] as Reported by the Corps of Engineers, 1985 [2/]

River Segment(s)	Annual Number of Recreation Days
Mississippi River	
Head to L&D 10	8,737,100
L&D 10 to L&D 22	9,373,300
L&D 22 to L&D 26	8,528,200
Open River	196,000 [3/]
Total	26,834,600

1/ A recreation day is defined as a visit by one individual to a recreation development or area for recreation purposes during any reasonable portion or all of a 24-hour period.

2/ Number of recreation days taken from the Corp's Natural Resource Management System for 1985.

3/ Figures from GREAT III (1981)

Adapted From: Supplement I, Draft Environmental Impact Statement, Second Lock at Locks and Dam No. 26(R). St. Louis District, Corps of Engineers. November 1987.

TABLE EIS-9

Species composition of the sport fishery in seven pools of the Upper Mississippi River from creel surveys conducted in (B) 1962-63, (C) 1967-68 and (D) 1972-73. Occurrence in all three surveys is denoted by (A).

Species	Pools 4	5	7	11	13	18	26
Lake sturgeon (Acipenser fulvescens)	B	B					
Shovelnose sturgeon (Scaphirhynchus platorynchus)			D	A	BD		BD
Paddlefish (Polyodon spathula)							D
Gar (Lepisosteus spp.)			C	D	CD		A
Bowfin (Amia calva)	CD		A	D	A		A
American eel (Anguilla rostrata)					B		A
Gizzard shad (Dorosoma cepedianum)				D			BD
Mooneye (Hiodon tergisus)	A	A	C	D	A		C
Northern pike (Esox lucius)	A	A	A	A	A	C	
Carp (Cyprinus carpio)	A	A	A	A	A	A	A
Suckers (Catostomidae)	A	CD	A	CD	A		A
Blue catfish (Ictalurus furcatus)					CD	C	A
Channel catfish (Ictalurus punctatus)	A	A	A	A	A	A	A
Flathead catfish (Pylodictis olivaris)	A	A	A	A	A	A	A
Bullhead (Ictalurus spp.)	A	A	A	A	A	A	A
White bass (Morone chrysops)	A	A	A	A	A	A	A
Yellow bass (Morone mississippiensis)			B	B			BD
Rock bass (Ambloplites rupestris)	A	A	A	CD	CD	D	
Warmouth (Lepomis gulosus)			C		BC		CD
Green sunfish (Lepomis cyanellus)	CD	CD	D		A		A
Orangespotted sunfish (Lepomis humilis)				D	B		
Bluegill (Lepomis macrochirus)	A	A	A	A	A	A	A
Smallmouth bass (Micropterus dolomieui)	A	A	A	A	BD	BC	CD
Largemouth bass (Micropterus salmoides)	A	A	A	A	A	A	A
Crappie (Pomoxis spp.)	A	A	A	A	A	A	A
Other sunfishes (Centrarchidae)	A	CD	A	BC	C	C	C
Yellow perch (Perca flavescens)	A	A	A	BD	A	BD	
Sauger (Stizostedion canadense)	A	A	A	A	A	A	A
Walleye (Stizostedion vitreum vitreum)	A	A	A	A	A	A	A
Freshwater drum (Aplodinotus grunniens)	A	A	A	A	A	A	A

From: Kline and Golden, 1979

increased (U.S. FWS, 1986). According to Kline and Golden, this change may have been influenced by changes in angler attitudes and aquatic habitat; more freshwater drum and green sunfish may have been creeled rather than discarded, and many shallow water areas have been lost because of siltation, which limits potential panfish fishing areas (U.S. FWS, 1986). Also, access to the river increased by 1973, as motorized boats became the standard mode of transportation, which led to increased fishing pressure on walleye and sauger in the tailwaters and wing dam sites (U.S. FWS, 1986).

3.198 The measure of overall catch rate can be used as a general indication of quality of the fishery, and a value over 1.0 fish per hour would indicate excellent fishing, while a value of less than 0.5 would indicate poor fishing (Kline and Golden, 1979). As shown on Table EIS-10, most of the pools provide good to excellent fishing, with the catch rate for Pool 26 being the only one to fall below 0.5 fish per hour. The estimated number of pounds harvested per surface acre of water also was computed to show the significance of sport fishery exploitation for each pool (see Table EIS-10). The general decline in harvest from the northern to the southern pool is probably related to a decrease in the quantity of suitable fish habitat (Kline and Golden, 1979).

3.199 The Illinois River has recently provided better fishing for game fish species, which reflects a recovery from more degraded conditions prior to the Federal Water Pollution Control Act Amendments of 1972. Among the game fish frequently caught by anglers are sauger, walleye, smallmouth bass, crappie, and white bass. In years of normal water conditions, carp, goldfish, bullheads, freshwater drum and gizzard shad are favored for survival, while in years of higher flows, game fish such as white bass, sauger, walleye, smallmouth and largemouth bass, and crappie can make population gains due to an increase in game fish habitat (U.S. FWS, 1986).

3.200 As shown on Table EIS-7, it is estimated that 10,564,204 sport fishing activity days occur annually on the UMRS, generating $156,244,576 in economic activity to the region.

HUNTING

3.201 Mammals hunted along the UMRS include rabbit, fox and gray squirrels, woodchuck, raccoon, red and gray fox, coyote and white-tailed deer, with the majority of the harvest consisting of rabbits and squirrels (U.S. FWS, 1986). The bottomland forests, bluffs, and valleys of the UMRS support good populations of white-tailed deer. Upland game birds also are hunted in the UMRS and include wild turkey, bobwhite quail, ring-necked pheasant, mourning dove, and ruffed grouse. Mourning dove hunting is only permitted in Illinois and Missouri.

TABLE EIS-10

Sport Fishery in the UMR

Catch rate (i.e., catch of all species combined) per angler hour of fishing during three surveys conducted in Pools 4, 5, 7, 11, 13, 18 and 26 of the Upper Mississippi River (Kline and Golden, 1979).

Pool	Period 1962-63	1967-68	1972-73	Average
4	0.754	0.712	0.653	0.706
5	1.132	0.722	0.678	0.844
7	1.275	1.068	1.482	1.275
11	1.115	1.092	1.477	1.228
13	0.600	1.054	0.896	0.850
18	0.840	0.949	0.724	0.838
26	0.730	0.590	0.397	0.452
Average	0.869	0.884	0.901	0.885

Pounds per acre of fish harvested from seven pools of the Upper Mississippi River during 1962-63, 1967-68, and 1972-73 (Kline and Golden, 1979).

Period	Pool 4	5	7	11	13	18	26	Avg.
1962-63	12.82	10.50	13.41	6.00	1.64	7.74	1.92	7.20
1967-68	16.62	11.21	10.74	7.19	4.23	7.12	2.22	8.37
1972-73	13.00	14.63	10.74	12.46	3.34	0.75	3.48	8.24

3.202 The UMR and Illinois River corridors provide migration habitat for 28 waterfowl species, migrating from Alaska, Hudson Bay, the McKenzie River Delta, Baffin Island, and the prairie pothole region of the United States and Canada (U.S. FWS, 1986). As many as 5 million ducks pass through the region each year, and about 75 percent of the total continental canvasback population and 12 percent of the total redhead population use this corridor during the fall migration (U.S. FWS, 1986). During the spring migration, this population increases to almost 36 percent for both populations (U.S. FWS, 1986). Dabbling ducks utilizing the Mississippi Flyway each fall include mallards, wood ducks, pintail, black duck, gadwall, teal and shoveler. Common diving ducks include lesser scaup, ring-necked duck, canvasback, redhead, common goldeneye, and bufflehead. On the UMR, the diving duck population is concen-

trated in Pools 7, 8, 9 where wild celery tubers are the primary food source, and in Pool 19 where fingernail clams are the food source (U.S. FWS, 1986). Geese also migrate through the region and include the Canada, lesser snow, and blue species.

3.203 Waterfowl hunters utilize the sandbars and islands in the UMRS, or conservation areas managed for controlled hunting. As shown on Table EIS-7, the UMRCC (1982) estimated that at least 311,287 waterfowl hunting activity days are spent in the UMRS, which generates about $6,263,095 annually to the region. The UMRCC did not estimate activity days or expenditures for small game, upland bird, and deer hunting in the UMRS. For the UMR reach from Lock and Dam 10 to Lock and Dam 22, the GREAT II Fish and Wildlife Management Work Group Appendix (1980) provided estimates for harvest and hunter days for these activities. These data are shown in Table EIS-11. Applying the expenditure rate of $20.12 used for waterfowl hunting, small game mammal expenditures would be $3,951,367 (196,390 hunter days); upland game bird expenditures would be $213,976 (106,350 hunter days); and deer harvest expenditures would be $603,600 (30,000 hunter days).

OTHER RECREATIONAL ACTIVITIES

3.204 Pleasure boating, water skiing, swimming, and camping account for about 30 percent of total UMR recreation, and similar proportions of activity are expected for other UMRS reaches (U.S. FWS, 1986). Other more passive recreational activities in the UMRS include picnicking, sightseeing, hiking, snowmobiling, photography, bird watching, environmental education, bicycling, and canoeing.

3.205 As shown on Table EIS-7, the UMRCC (1982) estimates that at least 21,840,386 activity days are spent annually pursuing other recreational activities in the UMRS, which generates $387,666,852 in economic activity to the region.

FISH AND WILDLIFE COMMERCIAL USES

COMMERCIAL FISHING

3.206 Commercial fishing on the UMRS has long been practiced and is a major consumptive use of the fisheries resource. Commercial fishing provides a viable food supply and is a profession for numerous residents of the region. Commercial fishing is not known to occur in Upper and Lower St. Anthony Falls and Pools 1 and 2 of the Mississippi River; and in the Black, St. Croix, and Minnesota Rivers. Gear utilized includes setlines, which utilize baited hooks; gill and trammel nets; seines; and traps.

TABLE EIS-11

Hunting in the UMRS

Estimated Small Game Mammal Harvest and Hunter Use Days

State	Rabbit		Squirrel		Woodchuck	
	Harvest	Hunter Days	Harvest	Hunter Days	Harvest	Hunter Days
Iowa	73,423	No Data	27,858	No Data	No Data	No Data
Illinois	86,216	72,810	107,554	91,945	No Data	No Data
Missouri	25,436	16,305	24,587	15,178	171	387
Wisconsin	500	No Data	400	No Data	No Data	No Data
Total	186,000	89,000	160,000	107,000	170	390

Estimated Upland Game Bird Harvest and Hunter Use Days

State	Bobwhite		Mourning Dove		Pheasant		Wild Turkey	
	Harvest	Hunter Days	Harvest	Hunter Days	Harvest	Hunter Days	Harvest	Hunter Days
Iowa	50,478	No Data	No Data	No Data	55,911	No Data	No Data	No Data
Illinois	30,320	39,385	50,711	18,330	15,075	36,058	No Data	No Data
Missouri	14,498	6,992	11,777	4,324	No Data	No Data	78	1,355
Wisconsin	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Total	95,000	46,000	62,000	23,000	71,000	36,000	80	1,350

Deer Harvest and Hunter Use

State	Harvest*	Hunter Days
Iowa	728	14,725
Illinois	1,523	No Data
Missouri	881	14,991
Wisconsin	5	110
Total	3,000	30,000

* This total may include bow hunters and firearms hunters.

3.207 Kline and Golden (1979) analyzed the trends in commercial fishing on the UMR (Pools 3-26; below L/D 26 to Ohio River) for the period 1953 to 1977. As shown in Table EIS-12, four major species dominated the harvest; carp, buffalo, catfish, and freshwater drum. The reported harvest during this period was 278,322,201 pounds, with a yearly average harvest of 11,132,888 pounds. The reported first market value for the period was $31,599,877, with a yearly average of $1,263,995.

3.208 Table EIS-13 shows the commercial fishery data as reported by the UMRCC from 1979 to 1984 (UMRCC, 1986-1981). The average total pounds harvested during this period was 9,135,585 pounds, with an average approximate value of $1,827,045. Also for this period, Pools 8, 9, 10, 13, 18 and 19 were the most productive pools.

3.209 According to the U.S. FWS (1986), the harvest of commercial fish from the Illinois River declined during the period from 1953 to 1977 from 4.15 million pounds in 1953 to 685,000 pounds in 1977. This decline has largely been attributed to pollution and environmental degradation of the Illinois River. Harvest declined further, falling to a low of 305,018 pounds in 1979 (U.S. FWS, 1986). In recent years, the harvest has shown an increasing trend, and reached about 1.4 million pounds in 1984 (U.S. FWS, 1986). Using the UMR economic figures for 1984 ($0.19/pound), the first market value of the Illinois River commercial fishery can be estimated at $266,000.

3.210 The Kaskaskia is the only other major UMR tributary supporting a commercial fishery. Few early records (pre 1950's) of commercial fishing on the Kaskaskia are available; Luce (1933) reported that in 1922 a total of 29,000 pounds of fish were harvested, and Starrett and Parr (1951) reported a total harvest of 27,067 pounds for 1950. The 10-year averages of total harvest for the periods 1951-1970 and 1971-1980 are 29,200 pounds, 35,000 pounds and 36,800 pounds, respectively (Wapora, Inc., 1982). In 1981, a special trammel netting season (December through March) was established in the Kaskaskia Navigation Channel between Fayetteville, Illinois, and the mouth of the river. The reported trammel net catch in 1981 was 33,584 pounds and in 1982 it was 33,405 pounds (U.S. Army Corps of Engineers, 1983). The harvest reached 208,677 pounds by 1984, and using UMR economic figures for 1984 ($0.19/pound), the first market value can be estimated at $39,649.

COMMERCIAL MUSSEL HARVEST

3.211 Commercial harvest of freshwater mussels from the Mississippi River began in the late 1800's when mussel shells were used for button production. By 1902, over 16 million pounds of mussel shells were harvested at a value of $66,110 (Carlander, 1954). In the early 1900's, Danglade (1914) considered the Illinois River to be the most productive mussel stream per mile in the country. By 1911, mussels in certain areas of the Illinois River were beginning to be affected by pollution, siltation, and overharvest (Starrett, 1971). In the mid 1950's, the use of plastics in button manufacturing reduced the interest in mussel fishing on the Mississippi and Illinois Rivers.

TABLE EIS-12

Species Composition of the Commercial Fishery From the UMRS, 1953 to 1977

Species	Reported Harvest (lb)	Yearly Average (lb)	Reported Value	Yearly Average
Carp	130,965,875	5,238,635	$ 6,795,268	$271,811
Buffalo	60,397,170	2,415,887	8,494,648	339,786
Catfish	40,423,305	1,616,932	11,861,618	474,465
Drum	34,340,103	1,373,604	3,122,567	124,903
Paddlefish	2,726,684	109,067	373,573	14,943
Sucker-Redhorse	2,086,248	83,450	103,610	4,144
Bullhead	2,046,237	81,849	332,460	13,298
Carpsucker	2,077,477	83,099	111,732	4,469
Sturgeon	1,206,448	48,258	268,951	10,758
Gar	698,146	27,926	23,395	936
Bowfin	289,531	11,581	8,758	350
Mooneye-Goldeye	249,479	9,979	10,499	420
Northern Pike (none in 1973-77)	165,201	8,260	30,807	1,540
Crappie (none in 1973-77)	131,043	6,552	25,392	1,270
American Eel	31,949	1,278	5,658	226
Grass Carp*	10,645	3,548*	2,281	760*
Other	476,660	19,066	28,660	1,146
Total	278,322,201	11,132,888	$31,599,877	$1,263,995

* First recorded in 1975 (3 years).

From: Kline and Golden, 1979

TABLE EIS-13

Commercial Fishing on the UMR (1979 - 1984) [1]

Reach	1984 Total Pounds	1984 Approx. Value ($) (Average Price Per Pound=$0.20) [2]	1983 Total Pounds	1983 Approx. Value ($) (Average Price Per Pound=$0.19)	1982 Total Pounds	1982 Approx. Value ($) (Average Price Per Pound=$0.19)
Head of Navigation to L/D 10 (Pools 3-10)	3,974,633	794,927	4,145,568	787,658	4,210,487	799,993
L/D 10 to L/D 19 (Pools 11-19)	3,303,759	660,752	3,416,218	649,081	3,326,622	632,058
L/D 19 to L/D 26 (Pools 20-26)	1,297,487	259,497	1,038,037	197,227	812,988	154,468
Below L/D 26 (Middle River)	518,613	103,723	544,914	103,534	236,919	45,015
TOTALS	9,094,492	1,818,898	9,144,737	1,737,500	8,587,016	1,631,533

Reach	1981 Total Pounds	1981 Approx. Value ($) (Average Price Per Pound=$0.21)	1980 Total Pounds	1980 Approx. Value ($) (Average Price Per Pound=$0.214)	1979 Total Pounds	1979 Approx. Value ($) (Average Price Per Pound=$0.195)
Head of Navigation to L/D 10 (Pools 3-10)	4,684,709	983,78°	4,380,406	937,407	4,068,446	793,347
L/D 10 to L/D 19 (Pools 11-19)	3,312,751	695,678	3,601,925	770,812	3,763,090	733,803
L/D 19 to L/D 26 (Pools 20-26)	911,263	191,365	1,084,209	232,021	1,153,543	224,941
Below L/D 26 (Middle River	276,160	57,994	357,050	76,409	393,713	76,774
TOTALS	9,184,883 [3]	1,928,825	9,423,590	2,016,648	9,378,792	1,828,864

1979 - 1984

Reach	Average Total Pounds	Average Approx. Value ($)
Head of Navigation to L/D 10 (Pools 3-10)	4,244,042	849,520
L/D 10 to L/D 19 (Pools 11-19)	3,454,061	690,364
L/D 19 to L/D 26 (Pools 20-26)	1,049,588	209,920
Below L/D 26 (Middle River)	387,895	77,241
TOTALS	9,135,585	1,827,045

NOTES:

1. Data for the Mississippi River were taken from proceedings published for the annual meetings of the Upper Mississippi Conservation Committee, 1986, 1985, 1984, 1983, 1982, and 1981. No commercial fishing is reported from Upper and Lower St. Anthony Falls and Pools 1 and 2. The most current data available are for 1984.

2. This value was computed by UMRCC by averaging the price per pound for each state; then averaging the price per pound for each species of fish.

3. For this year, an additional 233,711 pounds was harvested, but pool numbers were not recorded.

3.212 In the early 1960's, a renewed interest in mussel fishing was stimulated by the demand for shells for the Japanese pearl-culture industry. In the UMRS, washboard and three-ridge are the two most commercially important species, and mapleleaf, pimpleback, and pigtoe are also harvested if of sufficient size (Thiel, 1981; GREAT II, 1980). To be acceptable to the commercial clam buyer, washboards must be 4 inches (10.2 cm) and three-ridges 2.75 inches (7.0 cm) (Thiel, 1981). In Pools 3 through 8 of the UMR, commercial clamming is nearly nonexistent because of the low abundance of commercial mussel species (Thiel, 1981). Commercial harvest of mussels is primarily located in Pools 9, 10, 14, 15, 16, 17 and 19, where both three-ridge and washboard are abundant enough to make commercial harvest profitable (Thiel, 1981; GREAT II, 1980). In 1966, all mussel fishing on the Illinois River was done in the lower 87 miles, and it also resumed in the Peoria area in 1969 (Starrett, 1971).

3.213 UMRS harvest figures are sketchy since the industry is not closely regulated by the states. First market value for mussels in 1984 was $200 per ton, and the value of the 1984 harvest in Illinois was $253,400 and in Wisconsin was $400,000 (U.S. FWS, 1986). The price of shells increased from $200 per ton to a value of $300-$400 per ton in March 1986, which is assumed to have increased demand although harvest data are not available (U.S. FWS, 1986).

FURBEARER HARVEST

3.214 The backwater sloughs and bottomland forests associated with floodplain of the UMRS provide the preferred habitat for furbearers. The raccoon and muskrat are the two most abundant and valuable furbearers, and are extensively trapped throughout the region (U.S. FWS, 1986). Other furbearers of lesser economic importance include fox, opossum, mink, beaver, skunk, weasel, coyote, bobcat and badger (U.S. FWS, 1986). Badger cannot be trapped in Wisconsin.

3.215 UMRCC (1982) estimates for commercial trapping were only available for the UMR reaches from the Head of Navigation to Lock and Dam 22. The first market value was estimated to be $2,112,000 (December 1981 value); updating this value to January 1987 using a consumer price index factor of 1.183, gives a current value of $2,498,496 for commercial trapping.

CULTURAL RESOURCES

3.216 Both the Mississippi and Illinois Rivers have served as important transportation routes, resource procurement areas, and geographical markers since early human populations first came to the Midwest approximately 12,000 years ago. Several thousand prehistoric archeological sites have been recorded during the past 100 years, representing the following major cultural periods:

PaleoIndian	12,000 B.C. to 8,000 B.C.
Early Archaic	8,000 B.C. to 6,000 B.C.
Middle Archaic	6,000 B.C. to 3,000 B.C.
Late Archaic	3,000 B.C. to 1,000 B.C.
Early Woodland	800 B.C. to 400 B.C.
Middle Woodland	400 B.C. to A.D. 400
Late Woodland	A.D. 400 to A.D. 900
Oneota	A.D. 800 to A.D. 1350
Mississippian	A.D. 900 to A.D. 1500

3.217 The above chronology generally applies throughout the Mississippi and Illinois River valleys, although there are significant variations between valleys and along a single valley as one moves north to south. Both the Rock Island and the St. Paul Districts have embarked upon comprehensive archeological and geomorphological surveys required by Sections 106 and 110 of the National Historic Preservation Act (as amended 1980). Thus far, Mississippi River Pools 7 and 10 in the St. Paul District and Pools 11, 12, 16, 17, 18, and 21 in the Rock Island District have been studied. Copies of the technical reports for these investigations are on file at the District offices and have been used to assess impacts associated with the rehabilitation effort. Numerous action-specific, smaller archeological studies also have been utilized for information on cultural resources (i.e., Sections 205, 208, 107, 3, 14, permit, and real estate related projects). Pool surveys have not been done for the Illinois River Valley because the Corps owns very little land and, what is under Federal control is limited to the lock and dam complexes themselves.

3.218 Historic sites also are common, spanning the period of early French exploration (ca. 1680s), through the military frontier, early pioneering, farmsteading, commercial development, and urbanization periods. Historic sites include forts, churches, schools, quarries, farmsteads, mills, potteries, ferry landings, commercial buildings/districts, and cemeteries, just to name a few. Most prominent on the landscape are the locks and dams of the Mississippi River Nine Foot Navigation System and the Illinois Waterway, the foci of the rehabilitation effort.

3.219 Construction for the 9-foot navigation project began in the 1930's and was completed by the early 1940's. Most of the lock and dam complexes are very close to being 50 years old as of 1986. The GREAT II Study, completed in 1980, included a brief overview of the potential significance of the navigation system. Recommendation 5007 (see Appendix A) contained in the Cultural Resources Work Group Appendix (1980:85-89) indicates that "the creation of the navigation system is generally accepted as a major engineering event in American history" and that structures (including equipment) may have individual and collective (District) significance under historical, architectural, and/or engineering criteria. It was recommended that the Corps conduct a historical, architectural, and engineering study to assess the significance of the system as a network important in the transportation, economic, and engineering history of the Nation.

3.220 Substantial information is available on the Mississippi and Illinois Rivers navigation systems. The Rock Island and St. Paul Districts arranged for historical, architectural, and engineering history studies to be conducted of Mississippi River Locks and Dams 3 through 22. Locks and Dams 3 through 10 were described in the report entitled Historical Resources Evaluation, St. Paul District Locks and Dams on the Mississippi River and Two Structures at St. Anthony Falls prepared by Jon Gjerde in September 1983. Locks and Dams 11 through 22 were studied, evaluated, and described by Rathbun Associates in the report entitled Historical-Architectural and Engineering Study, Locks and Dams 11-22, Nine Foot Navigation Project, Mississippi River (December 1985). These reports summarize the social, political, technological, and transportation histories of the navigation system. References are made to Corps records, comprised of original shop drawings, project reports/notes, construction photographs, and motion picture films.

3.221 The River and Harbor Act of July 3, 1930, authorized the construction and maintenance of the Upper Mississippi River Nine Foot Channel Navigation Project. Design work was begun in St. Louis by the Upper Mississippi Valley Division office. Basic blueprint plans were produced and adapted, to fit local site needs, at each lock and dam location. Complete descriptions (with drawings and photographs) are presented in the Gjerde (1983) and Rathbun Associates (1985) reports. The complexes include earthen dams, concrete locks and piers, roller and tainter gates, concrete or brick central control stations, emergency generator buildings, and workshops.

3.222 Old Lock 19, built between 1910 and 1913, includes a dry dock facility and an operator's house. The Lock and Dam 14 complex includes the Old LeClaire Lock and remains of the LeClaire Lateral Canal from the Six Foot Navigation Project of 1922. Locks and Dams 1 and 2 also pre-date the Nine Foot Navigation Project.

3.223 Auxiliary locks are present at Locks and Dams 11, 12, 13, 15, 16, 17, 18, 20, 21, and 22. The Old LeClaire Canal lock served as an auxiliary lock for the Lock and Dam 14 complex, while the 1913 lock now serves as an auxiliary lock for Lock and Dam 19. Several of the lock and dam complexes were built to accommodate hydropower generators.

3.224 Old Lock 19 (1910-1913) and the 1910 Keokuk Power Dam are listed on the National Register of Historic Places for historical, architectural, and technological significance. The State Historic Preservation Officers (SHPO) from Illinois, Iowa, Minnesota, Missouri, and Wisconsin have agreed, along with the Rock Island and St. Paul Districts, that the entire Mississippi River Nine Foot Navigation Project is significant and eligible for listing in the National Register of Historic Places. Significance is based upon the role of the navigation system in the economic history of the Nation, along with New Deal political history and engineering technology aspects (Table EIS-17). Because of this, the SHPO's, the Corps, and the Advisory Council on Historic Preservation (ACHP) have entered into a Memorandum of Agreement (Programmatic Agreement) for the rehabilitation effort (see Appendix IV). Essentially, the Programmatic Agreement states that the Corps will preserve the general overall appearance of lock and dam complexes and treat significant features with

sensitivity during the course of the rehabilitation effort. Furthermore, the Historic American Engineering Record of the National Park Service will be utilized to ensure that Library of Congress quality recording of the system is completed prior to rehabilitation. This work was completed by Rathbun Associates and is on file at the Library of Congress.

GENERAL SYSTEMIC EFFECTS OF NAVIGATION

3.225 Based on the Navigation Effects Study conducted for the Master Plan, it can be concluded that the movement of commercial navigation through the UMRS can have adverse physical and biological effects. A moving towboat and associated barges have a variety of interactions with the hydraulics of the river. Included in these effects are changes in velocity, pressure, direction of flow, and wave generation. The extent of these changes are dependent upon a variety of factors including: channel depth, width, and discharge; and direction of travel, draft, width, speed, and alignment of the tows to the channel. Recreational boats can also generate physical changes when they operate near shore and in side channel and backwater areas. These physical alterations may result in adverse biological effects primarily caused by increased turbidity and suspended sediment levels, degradation of water quality, and increased shoreline erosion. The degree and magnitude of these physical disturbances can be estimated; however, the specific biological impacts are not well understood.

3.226 Increased levels of navigation may increase the magnitude of the physical effects, such as turbidity, the erosion of streambanks, and sediment resuspension. Simons, et al. (1981 and 1988) concluded that resuspended sediments resulting from tow traffic may have little effect on the expected physical life of side channels with both head and mouth connections to the river year-round. These studies did not pertain to disconnected side channels or backwaters. Physical impacts could be greatest in areas that have a narrow channel width, large sinuosity, short distance from the sailing line to the bank, frequent dredging requirements, and high erosion potential. The biological implications of these physical effects include loss of habitat; loss of biological productivity, diversity, and abundance; and disruption of the normal behavior patterns. Specific impacts on some organisms are unknown.

3.227 Increases in navigation capacity on the UMRS may allow the expansion or development of fleeting areas and terminals in the river corridor. New terminal development will likely occur on undeveloped or open lands adjacent to urban areas. These areas normally have greater habitat value than developed lands. Similarly, fleeting areas are usually developed in open water areas. Fleeting development will likely affect aquatic habitat and to a limited extent terrestrial habitat.

3.228 Increases in navigation on the UMRS may increase the potential for hazardous spills. The hazardous materials with the highest bulk movement on the UMRS and, therefore, the highest probability of a spill event, are chemicals and chemical products, fertilizers, and petroleum products. The

volume of material shipped varies from pool to pool. The extent of adverse impacts resulting from a spill would be highly site-specific. The most serious impacts would take place if a hazardous spill occurred near a water intake, a wildlife refuge, sensitive biota (for example, habitat for an endangered species), a swimming area, or a recreational boating area.

SECTION 4 - ENVIRONMENTAL EFFECTS

ALTERNATIVE: STRUCTURAL MEASURES

SITE-SPECIFIC IMPACT ASSESSMENT

Proposed Measures

4.1 Submersible Tainter Gate, Peoria and LaGrange Locks and Dams: Design information and environmental impact assessment for the construction of a submersible tainter gate at Peoria and LaGrange Locks and Dams were described in the Environmental Assessments (EA), dated March 1986, and in an additional coordination letter dated December 1986. The Finding of No Significant Impact (FONSI) for each EA was signed on June 10, 1986. A diagram for the submersible tainter gates is shown on plate 1.

4.2 Vertical Lift Gate, Lock and Dam 20: The vertical lift gate proposed for Lock and Dam 20 would be constructed at the lower end of the auxiliary lock structure, as shown on plate 2. The vertical lift gate would consist of adjacent upper and lower sections of gate, each about 100 feet wide. When submerged, the upper section would lower into a recess behind the lower section. The lower section of gate would remain inoperable, except if access through the auxiliary lock is required. Modifications to the concrete and rock floor of the auxiliary lock would be required to form the gate sill. The construction of the vertical lift gate will require dewatering of the auxiliary lock. To close off the lower end of the auxiliary lock, four sheet pile cells each filled with approximately 675 cubic yards (yd^3) of commercially supplied sand, would be constructed between the riverwall of the dam and the intermediate wall of the main lock. The upper end of the auxiliary lock would be sealed using an existing poiree dam (a prefabricated steel wall-type structure). After the modifications to the lock floor are completed, the sheet pile cells will be removed entirely. The sand would be mechanically removed and disposed of in a 1-acre site located on lock and dam property. It is estimated that the vertical lift gate would be used about 12 times per year, under average ice and debris conditions.

4.3 The components of the vertical lift gate would be constructed on the facility structure itself, which would have negligible effects on natural resources. The aquatic areas in and near the lock structures contain variable current velocities and unsuitable habitat for the establishment of mussel communities. The placement and eventual removal of four temporary sheet pile

cells at the lower end of the auxiliary lock, and dewatering of the auxiliary lock, would cause temporary and minor increases in turbidity and disturbance to the benthos. No permanent loss to aquatic habitat would occur. The 1-acre disposal site is periodically mown and supports little wildlife. This disposal site was previously used and impacts were assessed in the Environmental Assessment for the Lock and Dam 20 Major Rehabilitation Effort (April 1986).

4.4 Minor and short-term impacts to air quality would occur during construction from exhaust emissions and fugitive dust particles. No violations of air quality standards are anticipated. The plans and specifications for this measure (as well as all other proposed measures) would incorporate applicable provisions of the guide specifications (CW-01430, July 1978) on environmental protection to minimize pollution caused by construction of the proposed measures. These provisions include landscape protection, burning procedures, erosion control, dust control, debris disposal, and control of discharges into waterways. Noise levels resulting from the installation and operation of the vertical lift gate would not significantly increase the ambient levels already experienced due to normal lock activities. The immediate lock area does not contain suitable habitat for Federal or State threatened or endangered species. No wetlands would be affected.

4.5 The provision of a vertical lift gate at Lock and Dam 20 would greatly reduce the life, health, and safety risks forced by lock and towing industry personnel. The lift gate would minimize the instances that lock personnel must undertake the dangerous procedure of manually removing ice and debris. The new gate also would result in a reduction in towboats using prop wash to remove ice and debris.

4.6 In conclusion, no significant site-specific impacts are anticipated due to the construction of a vertical lift gate at Lock and Dam 20.

4.7 <u>High-Volume Bubbler Systems, Locks 2 Through 22</u>: Low-volume bubbler systems are presently located at several lock sites on the UMR. These low-volume bubbler systems generate air through diffusers in the bottom of the lock to prevent ice accumulation on the miter gates. The proposed bubbler system would consist of dual capacity, low-volume and high-volume blowers, with piping systems located in the miter gate areas, as shown on plate 3. The high-volume blower would be capable of producing 1,000 cubic feet per minute (cfm) of air at 15 pounds per square inch (psi), while the low-volume blower would produce 175 cfm of air at 15 psi. This dual capacity system would prevent ice accumulation on the miter gates, and also would keep the gate recess clear of floating ice and debris. The piping system for the bubblers would be placed directly on the main lock structure. The upstream and downstream compressors would be placed on top of the lock wall.

4.8 Since the installation of the bubbler systems at Locks 2 through 22 would be limited to the facility structures, there would be negligible effects to natural resources. No impacts would occur to water quality or aquatic habitat. No violations of air quality standards are anticipated. Noise levels would not significantly increase over ambient levels. No suitable

habitat occurs in the main lock areas for Federal or State threatened or endangered species. No terrestrial habitat, including wetlands, would be disturbed.

4.9 Installation of bubbler systems would reduce the life, health, and safety risks faced by lock and towing industry personnel. This improvement in conditions would especially benefit lock personnel. The procedure of manually removing ice and debris is a dangerous one; bubbler systems would greatly reduce the need for manual removal of ice or debris.

4.10 In conclusion, no significant site-specific impacts are anticipated due to installation of the high-volume bubbler systems at Locks 2 through 22.

4.11 Modification to Outlet Structure, Lock and Dam 15: Lock 15 is composed of a main lock and an auxiliary lock that are independently operated. The filling/emptying systems for both locks are composed of culverts which run through the bottom of the lock walls on each side of the lock, with discharge outlets emptying into the lower end of each lock, as shown on plate 4. The culverts located in the intermediate (riverside) lock wall share a common outlet into both the main and auxiliary locks. For example, when the main lock (or auxiliary lock) chamber is emptied, water flows through the culverts in the intermediate wall, and is discharged below the main lock and below the auxiliary lock. The discharge of water from both lockwalls into the lower end of the main lock creates severe turbulence causing a safety hazard during double lockages. The turbulence causes tow lines to break loose from the lower guidewall, which creates a safety hazard for tow and lock personnel, as well as for lock visitors. In order to solve this problem, it is proposed to permanently close the outlet that discharges from the intermediate lockwall below the main lock. This would force all flow from the intermediate wall to permanently discharge into the lower auxiliary lock area. In addition, during double lockages, the landside discharge would be partially closed, allowing the majority of the discharge to exit out of the lower auxiliary outlet. This procedure would reduce turbulence and increase the safety of the lower lock area during double lockages.

4.12 As described for the bubbler systems, modification of the Lock and Dam 15 outlet would be limited to the facility structure itself. Therefore, no significant, adverse impacts would occur to natural, cultural, and socio-economic resources.

4.13 Upper Guidewall Extensions, Locks and Dams 12 Through 22; Lower Guidewall Extensions, Locks and Dams 21 and 22: Upper guidewall extensions, each of about 625 feet in total length, are proposed for construction at Locks 12, 13, 14, 16, 17, 18, 20, 21, and 22. Lower guidewall extensions also of about 625 feet in length are proposed at Locks 21 and 22. These guidewall extensions would consist of a series of 12 sheet pile cells located about 57 feet apart and connected by precast beams and a sheetpile diaphragm, as shown on plate 5. Eleven (11) of the cells would be about 35 feet in diameter; the remaining cell would be about 57 feet in diameter and would serve as an end protection cell. The cells would be founded on H-piles, or directly on rock, depending upon the depth of bedrock at each site. Removal of an unknown quantity of silt by mechanical means also may be required for each extension.

4.14 About 0.3 acre of aquatic habitat would be permanently removed from construction of each guidewall extension (except for Lock 19; see paragraph 4.16). Public use of the launching ramps located near the upper approach of Lock 13, and the lower approach to Locks 21 and 22 would not be affected by the guidewall extensions.

4.15 The upper guidewall extension at Lock 15 consists of two sheet pile cells, each about 30 feet in diameter, located about 600 feet and 1,000 feet above the existing guidewall, as shown on plate 4. A wall-type extension at this site would eliminate access to a backwater area and boat ramp on Arsenal Island. An unknown amount of material may need to be removed in order to construct the cells. About 0.3 acre of aquatic habitat would be removed by the two cells.

4.16 Currently, Lock 19 does not have an upper guidewall. An upper guidewall is proposed for this site, and would consist of a series of sheet pile cells and precast beams as previously described. The exact length and location of the guidewall has not been determined at this time; a model study is being conducted and should be completed in the summer of 1989. As shown on plate 5, the worst-case design would consist of a guidewall with a length of 800 feet located on the landward side of the lock. About 0.6 acre of aquatic habitat would be permanently removed by this guidewall. An unknown quantity of material may need to be removed by mechanical means.

4.17 Funding for construction of the guidewall extensions at Locks 12 through 22 (and the guardwall at Lock 22) is not anticipated prior to 1991 due to current budgetary constraints. Presently, preliminary engineering data for these measures is insufficient to evaluate the site-specific impacts concerning possible dredging and material disposal. Guidewalls were included in this EIS to assure assessment of all potential systemic effects in the traffic analysis. As funding becomes available in the future, the Rock Island District will initiate a Design Report, which will include an additional NEPA document to address site-specific impacts.

4.18 Mussel surveys were conducted for a distance of 2,000 feet upstream of the existing upper guidewall at Locks 12, 15, 16, 17 and 19, for the proposed guidewall extensions (Stanley Consultants 1987). Through coordination with the Rock Island Field Office and State fishery biologists from Iowa, Illinois and Missouri, these sites were selected as having the most potential to contain mussel communities that contained endangered, threatened, or rare species. In general, the surveys revealed that mussel communities were not found 2,000 feet above the upper guidewalls at the locks. Mussel communities were found in a recessed bay area well upstream of the existing guidewall at two sites (Locks 15 and 17). No endangered, threatened, or rare mussel species were found during any of the surveys. Apparently the aquatic areas on and near the lock structures contain unsuitable habitat for the establishment of mussel communities. No impacts are anticipated to mussel species from construction, including any dredging that may be required of the proposed guidewall extensions.

4.19 A minor and temporary increase in turbidity would be expected from construction of each guidewall extension, especially if any dredging would be needed. No violations of State and Federal water quality standards are anticipated. However, Section 404(b)(1) Evaluations will be performed as part of the site-specific studies during the design stage. Section 401(a) water quality certification from the appropriate state(s) also will be obtained, if necessary, at that time. Construction of all the proposed guidewall extensions would result in the permanent loss of 4.5 acres of main channel border habitat. No suitable habitat occurs in the main lock areas for Federal or State threatened or endangered species. Also, no wetlands would be affected.

4.20 Minor and short-term impacts to air quality would occur during construction from exhaust emissions and fugitive dust particles. No violations of air quality standards are anticipated. Noise levels resulting from construction of each guidewall extension would not significantly increase the ambient levels already experienced due to normal lock activities. It would not be necessary to close any of the locks to navigation during construction, although width restrictions may be necessary.

4.21 Extension of the upper and lower guidewalls as proposed would increase the margin of safety for towing industry operations. The guidewall extensions would reduce alignment and maneuverability problems, reducing the likelihood of injury to towing industry personnel during approaches or exits.

4.22 Guardwall at Lock and Dam 22: The guardwall would be constructed in conjunction with the upper guidewall extension at Lock and Dam 22. The guardwall would be about 480 feet long, consisting of about 10 sheet pile cells connected by precast concrete beams, as shown on plate 6. Each cell would be about 30 feet in diameter and would be located about 60 feet apart. Each cell would be founded directly on bedrock and filled with concrete. An unknown amount of silt may need to be removed using mechanical means. About 0.2 acre of aquatic habitat would be permanently removed due to construction of the guardwall.

4.23 Impacts to natural, cultural, and socio-economic resources from construction of the guardwall would be of the same type and magnitude as those described for the guidewall extensions.

CUMULATIVE IMPACT ASSESSMENT

Commercial Traffic Analysis

4.24 The "Comprehensive Master Plan for the Management of the Upper Mississippi River System" (hereafter referred to as the Master Plan study) projected future traffic levels for the UMRS. The Master Plan study stated that increased traffic levels could be accommodated by a variety of structural and nonstructural methods. Some of these methods emphasized Federal action, while others emphasized private sector actions, or a combination of both.

4.25 The traffic analysis conducted for this EIS utilized data and analysis from the Master Plan study as a base resource. Commodity flows are identical to base origin/destination patterns derived for the Master Plan study. These data were obtained through the Waterborne Commerce Statistics Center (WCSC). Future commodity flows were derived by applying commodity growth rates to these base flows. In recent years, commodity flows on the UMRS have deviated from Master Plan study projections for some commodities. These projections, however, still represent reasonable forecasts of long-term waterway activity.

4.26 With the exception of Lock and Dam 25, lock capacities utilized in this analysis were identical to those derived for the Master Plan study. Analysis of actual traffic and operating characteristics associated with Lock 25 indicated that, in this case, the Master Plan source significantly underestimated actual capacity of the lock. Hence, a capacity estimate of 57.3 million tons was used for the lock. This estimate was derived mathematically, incorporating operating and traffic characteristics common to the lock, and is in general agreement with the capacity estimate of 59 to 60 million tons derived for the National Waterways Study.

4.27 Impacts to system capability (traffic) were evaluated using the "CONGEST" or "PERCENT of CAPACITY" model. This same model was utilized during the Master Plan study to derive system traffic levels associated with various possible futures. This model utilizes inputs relating to commodity flow patterns, commodity growth rates, water and rail transportation rates, lock capacities, and lock delay to compute system traffic levels and benefits associated with the input data. All transportation rates and delay costs were updated to 1986 price levels.

4.28 In order to evaluate the potential impacts to navigation resulting from construction of the rehabilitation measures, this traffic analysis focused on the difference in levels of system traffic between the "without-project," or base condition, and the "with-project" condition. The base condition included all existing features of the UMRS plus 1,200- and 600-foot chambers at new Locks and Dam 26. The "with-project" condition included those features in the base condition plus construction of the future major rehabilitation measures. The difference or increment in system traffic between the base and "with-project" conditions represents the level of traffic which may be associated with construction of the measures of the major rehabilitation effort.

4.29 The potential impacts to navigation resulting from construction of the rehab measures were evaluated using a multi-level approach. For each proposed measure the evaluation included:

* Estimation of the impact of site-specific lock capacity resulting from construction of the proposed measure

* Estimation of the level of induced traffic resulting from construction of the proposed measure

* Estimation of the impact on system traffic resulting from construction of the proposed measure

4.30 The first level of analysis evaluated the measures' impacts on site-specific lock capacity. The capacity of a lock is a function of the physical, environmental, and economic factors affecting its performance. Physical factors include the dimensions and sill depth of the lock as well as its operating parameters, such as lock cycle time. These physical factors place a theoretical upper limit on the amount of traffic which a lock can process. Environmental factors include fog, ice, flow, and other natural factors which affect the availability and operation of the lock. Economic or market variables affect lock capacity by controlling the level of demand for the lock. Economic variables may include commodity flows, equipment types, average tow sizes, number of recreational craft, level of empty backhauls, etc. Depending on the characteristics of the lock system and cost of transportation alternatives, at some point below the maximum capacity of a lock, economic forces may make it more profitable for shippers to use some mode other than the waterway.

4.31 Induced traffic consists of near-term traffic which utilizes the system as a direct result of the construction of the feature. This may occur whenever a feature dramatically improves the total efficiency, reliability, or availability of the transport system. Because of characteristically long average linehaul distances and high operating costs associated with the UMRS, induced traffic is most probable with local or shorthaul traffic. In such cases, site-specific increases in efficiency may lead to significant reductions in total trip costs.

4.32 The final level of analysis evaluated the new features' impacts on system capability (traffic). At this level, the site-specific and traffic-inducing characteristics of the various features could be assessed to determine their impact on total system traffic. Since much of the traffic on the system represents long-haul transport of commodities destined or originating outside the system, this analysis emphasized this level of evaluation.

Local Impact Analysis

4.33 Each of the proposed measures was evaluated to determine its potential impact on navigation efficiency and future traffic levels. Site-specific impacts and the potential to induce traffic were evaluated separately for each measure. Following these evaluations, the results were then evaluated at the system level to determine the total system impact which could be associated with the proposed measures of the major rehabilitation effort.

4.34 Submersible Tainter Gates: Construction of submersible tainter gates will improve the flow regulation through Peoria and LaGrange Dams. These gates are also expected to enhance the passage of ice through the dams, which frequently interferes with winter lock operations. A reduction in the level of interference by ice will increase the availability of the lock for commercial navigation, and, thus provide the potential for an increase in lock capacity.

4.35 Analysis of PMS data indicates that ice at Peoria and LaGrange Locks and Dams does increase processing time and reduce chamber availability during the months of December through February. Ice forms and accumulates in many areas of the lock which affects the number, type, and duration of ice stall events. As a result, the severity of ice problems fluctuates widely from year to year. Submersible tainter gates will improve lock performance under ice conditions but will not eliminate the problem. The gates are designed to pass floating ice and can do little to keep ice from forming in and around the lock. Analysis of historic PMS data regarding ice stalls indicates the structures can be expected to eliminate no more than 50 percent of the existing delays at the locks attributed to ice stall. This estimate is based on an analysis of historic data and gives proper consideration to traffic levels and the number, type, and severity of ice stalls which may occur. Using this maximum of 50 percent, the potential increase in winter lock capacity equates to 0.6 percent at LaGrange Lock and Dam and 1.7 percent at Peoria Lock and Dam.

4.36 Although lock capacity may be increased, the potential gains in efficiency realized through construction of submersible tainter gates will not be of sufficient magnitude to induce further traffic on the waterway. Demand for transportation is a function of the demand for the goods transported. Analysis of historic PMS data for the winter months at Peoria and LaGrange Locks indicates there is no statistical correlation between the availability of navigable pass under ice conditions and the number of tows transitting the locks (Pearson's $r = -0.11$). The significance of this finding is that navigable pass conditions at the locks represent 100 percent lock efficiency (the locks are not utilized, hence, zero lockage time). If statistical analysis indicates there is no correlation between 100 percent lock efficiency and the demand for navigation, then it follows that a slight increase in lock efficiency (1 to 2 percent of winter capacity), potentially made possible by the gates, will not increase the demand for navigation.

4.37 Guardwall at Lock and Dam 22: The proposed guardwall at Lock and Dam 22 is a safety feature which will not affect normal operations at the lock. Its purpose is to prevent loose barges or disabled tows from being swept into the dam. This structure will consist of a chain of sheetpile cells which permit flow between them. Construction of the guidewall will result in no measurable change in the outdraft condition of the upper approach. Since this measure will not affect lock processing or approach time, it will not increase lock capacity or induce traffic.

4.38 Vertical Lift Gate at Lock and Dam 20: Under existing conditions, Lock and Dam 20 is not capable of efficiently passing ice and debris. The six submersible tainter gates included in the original design of the dam do not have sufficient depth or width of overflow to accommodate the heavy load of ice and debris contributed by the Des Moines River. As a result, ice and debris tend to accumulate in the upper lock approach area, causing delays to navigation and creating a hazardous working environment for both industry and lock personnel. With construction of the vertical lift gate, problems caused by ice and debris will be reduced, with a resulting increase in safety and lock availability.

4.39 Analysis of PMS data indicates that ice and debris (primarily ice) interfere with lock operations and decrease chamber availability at Lock 20. Ice lockages, towboats, and intensive labor are required to rid the upper lock approach area of ice and debris. The vertical lift gate will not totally eliminate the need for these operations, but can be expected to increase the level of chamber availability. As a maximum, construction of the gate can not be expected to increase the level of seasonal chamber availability at Lock 20 to a level exceeding that of Lock 21 immediately downstream. Lock 21 normally does not experience the level of ice/debris problems as does Lock 20. Therefore, upon comparing the locks for historic seasonal chamber availability resulting from ice or debris stalls, the upper limit of the increase in capacity at Lock 20 is estimated to equal that of Lock 21. This equates to an increase in lock availability of 1.6 percent.

4.40 Shippers located in Pool 20 indicate that an additional 15,000 tons (approximately 11 barges) might transit the lock each year with construction of an efficient system to pass ice. This volume represents traffic which otherwise would move via some other mode of transport. Due to the volume of shipments, environmental constraints, and local market for barge transportation, it is anticipated this traffic would probably be transported into Pool 21 by single or double barges for integration into a larger tow for completion of the movement. As a result, this potential traffic represents approximately five additional lockages through Lock 20 only.

4.41 In addition to the 15,000 tons of new traffic, shippers indicate that an efficient method of passing ice through the lock and dam might enable them to move 150,000 tons annually out of Pool 20 on a demand basis rather than when lock conditions permit. Currently, some shippers in Pool 20 inventory their product in barges or truck it to the Illinois Waterway for trans-shipment when ice conditions do not permit river transport. If lock availability could be increased, all, or a portion of, this traffic could be moved on the UMR as the shipper desired. In effect, these movements do not represent additional traffic to the system, but traffic which would have been released on a demand basis or had originated at a different location on the system. Since all movements would continue to be dispatched in the same season, this traffic would not alter seasonal daily traffic averages.

4.42 Modification to Outlet Structure at Lock and Dam 15: The existing outlet tunnels from the main chamber at Lock 15 discharge at the lower end of the lock immediately downstream of the lower miter gates. Discharge of water from these outlets creates turbulence for barges moored in this area. Loaded barges of the first cut of a downbound double lockage are at great risk. In this situation, there is no towboat to hold the barges to the wall and the discharging water produces a great load on the mooring lines. To reduce this turbulence, the outlet tunnel tainter valves are usually opened only half-way during the chambering of the second cut of a downbound double lockage. As a result, chambering time and overall processing time are increased. The proposed modification of the outlet structure includes relocation of the exit so that water will be discharged away from waiting barges.

4.43 Analysis of 1985 PMS data at Lock and Dam 15 indicates the average difference in chamber spill time for the second cut of loaded downbound double lockages is 2 minutes longer than for a normal spill operation. Modification of the outlet structure is expected to allow the tainter valves to be fully opened on all operations and thus eliminate this difference. This would represent a 0.3 percent increase in lock capacity. Due to the small level of efficiency increase, no induced traffic can be associated with this measure.

4.44 High-Volume Bubbler Systems at Locks and Dams 2-22: Louis Berger & Associates (LBA) in their report for the St. Paul District entitled Assessment of Cumulative Impacts of Major Rehabilitation of L/D 2 Through 10 (1987) state "It is important to emphasize that the new bubbling system has no influence on the length of the navigation season. The beginning and end of the navigation season are determined by the river conditions and not by the lock availability." Although written in a report relating to Locks 2-10, this is a general statement which can be applied to lower locks on the UMR as well. Channel conditions, not conditions at the lock, dictate the length of navigation season on the UMR.

4.45 Installation of high-volume bubbler systems can be expected to alleviate some ice problems commonly encountered at UMR locks at the end of the navigation season. Problems with ice formation and accumulation on miter gates and in gate recesses will be lessened. This may result in an increase in lock availability which operators can utilize to expedite the withdrawal of tows from the UMR. Such an increase in lock availability may also allow an increase in end-season commercial traffic, but many factors such as uncertainty regarding weather and ice conditions and increased operating costs and risk indicate that no such traffic increases would occur.

4.46 In order to evaluate the "worst-case scenario," an evaluation of potential increases in end-season traffic was conducted. This analysis relied on data provided by the LBA report. The LBA report states regarding bubbler systems, "In the more realistic case, the increase in traffic might reach less than 1 percent of the entire navigation season traffic." This level of traffic equates to approximately 10 to 20 additional lockages per year. Their findings were based on the assumption that installation of high-volume bubbler systems in the St. Paul District would allow end-season navigation to reach half the level of late-season navigation. The consultant defined this end-season period to consist of approximately 2 to 5 days at the end of the season and 1 to 2 days at the beginning of the season. As described, these movements represent new or induced traffic on the system. Since these lockages would only occur at the end of the existing season, this would represent more efficient utilization of the navigation season -- not an extension of the season. That is, tows would make greater use of the available time in the existing navigation season.

4.47 Consistent with the results of the LBA report, it can be expected that high-volume bubbler systems installed at UMR Locks 2 through 20 will increase capacity at these locks by 1.0 percent. This increase results from the consultant's expected increase in lock availability for the end-season period. An increase in lock capacity does not imply corresponding increases in commercial traffic, however.

4.48 Locks 21 and 22 in the lower portion of the Rock Island District experience greater late-season activity than other upstream locks. When river conditions allow, bulk commodities are moved out of the pool for downstream destinations. Although highly dependent upon river conditions, it is possible that installation of high-volume bubbler systems at these locks will permit a higher level of local annual activity. Potential increases in lock capacity of 2.0 percent are possible. An increase in lock capacity, however, does not imply corresponding increases in commercial traffic.

4.49 Upper and Lower Guidewall Extensions at Locks 21 and 22: In addition to safety considerations, upper and lower guidewall extensions at Locks 21 and 22 will increase lock efficiency by reducing alignment problems. Improved alignment is expected to reduce average approach and lock processing time. The proposed construction of these guidewalls does not include design and installation of powered travelling kevels, nor are kevels part of the foreseeable future. As a result, efficiency increases expected with these guidewalls are much less than stated in previous reports conducted for the Master Plan effort. Furthermore, the efficiency increases will not be of sufficient magnitude to induce further traffic on the system.

4.50 Increased processing efficiency translates into increased lock capacity. The estimated reduction in average approach time for Lock 22 (per Reconnaissance Report, 5 to 10 minutes for exchange and fly approaches) translates into a 6.0 percent increase in lock capacity. Likewise for Lock 21, the estimated reduction in average approach time for the lock equates to a 2.5 percent increase in lock capacity.

4.51 Upper Guidewall Extensions at Locks 12 Through 20: Upper guidewall extensions at these locks are expected to increase lock capacity by reducing average downbound approach times. These decreases in processing time, however, will not be of sufficient magnitude to induce further traffic. Estimated site-specific increases in lock capacity resulting from construction of the upper guidewalls are presented below:

- Lock 20: 1.0 percent
- Lock 19: 3.0 percent
- Lock 18: 2.0 percent
- Lock 17: 3.0 percent
- Lock 16: 1.0 percent
- Lock 15: 3.0 percent
- Lock 14: 1.0 percent
- Lock 13: 2.0 percent
- Lock 12: 2.0 percent

Induced Traffic

4.52 Induced traffic may occur whenever a proposed measure significantly improves the efficiency, reliability, or availability of the transport system. As an example of induced traffic, consider a producer who is able to ship his

product to customers via a primary delivery system that is operational an average of 28 days per month. During the remaining portion of each month, the delivery system is down for maintenance and repair and is not available for use. As a result, the producer must inventory his product or ship via some other costlier delivery system during this period. If the average operational period of the primary delivery system were to be extended beyond the 28 days per month (e.g., 29 days), the producer would maximize his profit by utilizing the primary delivery system for this additional period of time. As a result, his shipments via the primary delivery system would increase. The LBA report states that such traffic may occur at the end of the navigation season on the UMR due to increased lock availability.

4.53 On the other hand, consider the producer who ships his product via a transport system at a cost ranging from $2.00 to $3.00 per unit. The range in transport costs is a function of market forces affecting the demand for his product and the demand for the transport system. If the average transport cost is decreased by $0.05 per unit, this will probably not result in a measurable increase in sales, as this is well within the range of variability in transport cost. If the average transport cost is reduced by $1.00 per unit, however, these reduced costs may allow the producer to expand his marketing area, increase sales, and, thus, ship more product. This example is supported by industry interviews conducted to determine the impact of bubbler systems in the St. Paul District. Results from these interviews indicated that river traffic might be sensitive to changes in transit time in the magnitude of 2 to 4 hours per lock, but not sensitive to changes in transit time in the magnitude of 1/2 to 1 hour per lock.

4.54 Efficiency gains realized through construction of the proposed measures may also induce short-haul or local traffic at various points on the river systems. Due to their localized operations, sand and gravel operations on the UMR represent the best potential source of such traffic. Demand for sand and gravel, however, is a function of major macro-economic variables - not small changes in the local transportation cost to the distributor. As a result, no increases in short-haul or local traffic were identified to be associated with the measures of the major rehabilitation effort.

System Impact Analysis

4.55 As generated by the system model, construction of the proposed measures associated with the "with-project" condition for the major rehabilitation effort results in a positive increment of traffic. A comparison of projected system traffic under the base and "with-project" conditions is presented in Table EIS-14. Under the "with-project" condition, an additional 2.1 million tons may transit the UMRS by the year 2040.

TABLE EIS-14

Comparison of System Traffic
Without- Vs. With-Project Condition
(million tons)

Year	Without Project	With Project	Increase	
			Tons	Percent
1990	127.2	127.2	0.0	0.0
1995	139.8	141.2	1.4	1.0
2000	147.1	149.4	2.3	1.6
2010	155.3	157.5	2.2	1.4
2020	158.4	160.5	2.1	1.3
2030	160.8	162.9	2.1	1.3
2040	162.5	164.6	2.1	1.3

4.56 Based on historic origin/destination patterns, incremental traffic levels which can be associated with the major rehabilitation effort consist primarily of grain and coal movements on the UMR, and to a lesser extent, grain movements on the lower Illinois Waterway. Grain flows on the UMR comprise the majority of near-term increases in traffic (1995-2020). A portion of these movements may be attributed to the installation of bubbler systems. This traffic will consist of smaller-sized tows moving at the end of the navigation season. New system flows in the outyears (beyond 2020) consist primarily of UMR coal and Illinois Waterway grain.

4.57 Increases in system traffic may be disaggregated into traffic moving during the normal navigation season and traffic moving during the winter or at the end of the navigation season. Table EIS-15 identifies and allocates this traffic over representative locks on the UMRS. For this analysis, the ice-free navigation season is assumed to equal 44 weeks on the UMR and 9 months on the Illinois Waterway. "Ice conditions" represent a 3-month winter period on the Illinois Waterway and a 3- to 5-day period at the end of the navigation season (December) on the UMR.

4.58 On the Illinois Waterway, 180,000 additional tons are expected to move during the winter months in the outyears beyond the year 2010. This equates to approximately 19 tows per winter season or 1 to 2 tows per week (180,000 tons divided by 9,620 tons per tow divided by 12.9 weeks in winter season -- 9,620 tons is average winter tow lading through LaGrange).

4.59 Traffic moving on the UMR can be disaggregated into traffic moving during the normal navigation season (ice-free) and traffic moving at the end of the navigation season. LBA identified the potential increase in end-season activity as consisting of as many as 5 additional lockages per day over a 3- to 5-day period, or a total of 10 to 20 additional lockages per season. This traffic is assumed to move in single-lockage tows of six barges. Hence, total tonnage estimated to move would approximate 170,000 tons per year (20 lockages times 6 barges per tow times 1,400 tons per barge).

TABLE EIS-15

With-Project Increases in Traffic
(as generated by CONGEST model)

Lock	Year 1990 Ice-Free Navigation Season	Ice Conditions*
Brandon Road	No Change	No Change
Peoria	No Change	No Change
L/D 2	No Change	No Change
L/D 13	No Change	No Change
L/D 25	No Change	No Change

Lock	Year 2000 Ice-Free Navigation Season	Ice Conditions*
Brandon Road	No Change	No Change
Peoria	No Change	No Change
L/D 2	1-2 tows/week	10-20 tows/season
L/D 13	2-3 tows/week	10-20 tows/season
L/D 25	approx. 4 tows/week	10-20 tows/season

Lock	Year 2040 Ice-Free Navigation Season	Ice Conditions*
Brandon Road	No Change	No Change
Peoria	No Change	1-2 tows/week
L/D 2	1-2 tows/week	10-20 tows/season
L/D 13	1-2 tows/week	10-20 tows/season
L/D 25	approx. 3 tows/week	10-20 tows/season

*Worst-Case Scenario

4.60 The balance of the additional traffic on the UMR would move during the normal navigation season. This tonnage was converted into number of tows by using an average tow lading of 12.17 ktons per tow (Source: PMS data) and allocating system traffic among locks by their respective shares of system traffic. For this analysis, a 44-week navigation season was utilized for Lock 25. (Year 2000 traffic; 2.3 million tons less 0.17 million tons at end of season = 2.1 million tons. 2.1 million tons divided by 12.17 ktons per tow = 173 tows per year. 173 tows per year divided by 44 weeks in navigation season = approximately 4 tows per week through Lock 25. Since Lock 13 processes only 58 percent of that processed at Lock 25, traffic through Lock 13 totals 2 to 3 tows per week).

Sensitivity Analysis

4.61 Projected increases in system traffic are sensitive to assumptions and base data factored into the analysis. The global economy, transportation demand, industry actions, future tow size, commodity mix, and numerous other variables will affect future traffic levels. For this analysis, system impacts were evaluated utilizing liberal estimates and assumptions regarding site-specific impacts. Some of these assumptions are discussed below. As a result of liberal assumptions, estimates of system traffic most likely overstate any increases in traffic which can be associated with the proposed measures of the major rehabilitation effort.

4.62 Although bubbler systems may permit a higher level of end-season activity at Locks 2 through 22, the exact impact of such systems cannot be predicted, or even measured, with any degree of certainty. While it is possible that some increase in end-season activity may result, it is even more likely that no such increase will occur. In addition to higher operating costs, end-season navigation requires risk-taking for both carriers and shippers. The decision to move a shipment depends upon the perception of risk by the parties involved and their own individual attitudes regarding risk aversion. In interviews with Rock Island District staff, industry representatives stated that bubbler systems will not induce further traffic, but only assist in the orderly withdrawal of tows from the UMR during the late navigation season. There are many reasons for this; among the most important, the uncertainty and risk associated with late season navigation. Carriers fear having their equipment trapped in the frozen river, while shippers fear the same for their cargo. A prime example of this occurred during the fall of 1986. Although the river was open and ice-free until early December, the barge and towing industry, still feeling the effects of a previous winter where they had equipment trapped in the ice, decided they would be out of the Twin Cities prior to Thanksgiving (November 27). Thus, although the river was ice-free for several days after Thanksgiving, end-of-season navigation was virtually nonexistent.

4.63 The risk and uncertainty for both shipper and carrier associated with end-season navigation are good reasons to doubt that any increases in system traffic will actually occur. Another limiting factor is increased lockage time associated with this period. With excessive lockage times of 3 to 4 hours, locks cannot accommodate an additional 5 lockages per day. A small increase in traffic results in a disproportionate increase in lock congestion which time-sensitive, end-season movements cannot tolerate. Recognizing this, industry may be reluctant to incur additional delays for existing traffic by increasing end-season movements.

4.64 Potential increases in lock activity at Locks 21 and 22 resulting from installation of high-volume bubbler systems may not be realized as well. Analysis of average tow size through these locks during the winter months indicates that volume of shipments could be increased by increasing average

tow size rather than increasing lockages or tows. Thus, any increase in volume originating from the pools due to the bubbler systems may be reflected in an increase in average tow size rather than in number of movements.

Conclusions Drawn from Traffic Analysis

4.65 Those measures identified as having the potential to increase commercial traffic on the UMRS may allow a slightly higher level of traffic (up to 1.3 percent) to utilize the system during the navigation season. This small increase in traffic is within the normal variability of any navigation season. It is concluded, therefore, that this small potential increase in system traffic during the navigation season that may be caused by the proposed measures would not result in system-wide (cumulative) impacts to the UMRS that are measurable over the existing condition.

4.66 Although projected traffic increases are minor, concern has been expressed that traffic increases may be concentrated at the end of the navigation season. Based upon input provided by Louis Berger and Associates, the traffic analysis identified the potential for an additional 10 to 20 lockages at the end of the navigation season due to the installation of high-volume bubbler systems at Locks 2 through 22. Evaluation of this potential traffic increase indicates that end-season traffic is highly variable and unpredictable, with no typical time period or volume of traffic associated with it. Ice conditions in the river channel are the controlling factor. Also, end-season navigation requires risk-taking for both carriers and shippers. Industry representatives have indicated to the District that bubbler systems would not induce further traffic, but only assist in the orderly withdrawal of tows. Evaluation of end-season traffic confirms that most tows are downbound, to avoid being iced in. Another limiting factor is increased lockage time associated with this period, as locks are not able to accommodate an additional five lockages per day. Therefore, the installation of high-volume bubbler systems at UMR locks will not promote a higher level of end-season traffic. Bubbler systems would improve end-season navigation only by expediting the withdrawal of tows from the UMR.

Threatened and Endangered Species

Federally Listed Species

4.67 As required by Section 7(c) of the Endangered Species Act of 1973, as amended, a Biological Assessment was prepared to assess the cumulative and site-specific impacts occurring to the list of species provided by the U.S. FWS (see paragraph 3.186 and Appendix IV). The Biological Assessment concluded that no adverse site-specific or cumulative impacts would occur to any of the species listed. The Biological Assessment was sent to the U.S. FWS

on April 15, 1988. By letter dated May 3, 1988, the U.S. FWS concurred with the Biological Assessment for all species, except Lampsilis higginsi, and requested that the Rock Island District initiate formal consultation for this species.

4.68 The U.S. FWS viewed the Second Lock at Lock and Dam 26(R) project being proposed by the St. Louis District as determinant of the baseline level of impact to Lampsilis higginsi from increasing levels of navigation traffic. They concluded that any additional actions proposed by Federal, State, or private parties that may increase traffic, no matter how slight, would be added to this baseline and, consequently, must also affect Lampsilis higginsi. The Rock Island District did not concur with this opinion, but initiated formal consultation by letter dated May 25, 1988.

4.69 The U.S. FWS issued a Biological Opinion dated June 20, 1988 (see Appendix IV). They concluded that the rehab action is not likely to jeopardize the continued existence of Lampsilis higginsi. However, the U.S. FWS also concluded that the rehab action is likely to cause Incidental Take of the species. Criteria were established that set the level of Incidental Take for the Second Lock at Lock and Dam 26(R) project at Alton, Illinois. The U.S. FWS is not requiring additional measures due to the rehab action. However, should any Level of Take criteria be reached, the Service will consult with mussel experts and the Corps to determine whether or not additional action should be taken. Such action may include implementation of additional measures to minimize harm to the species, and/or reinitiation of endangered species consultation. After additional coordination, the Rock Island District has accepted this determination.

State-Listed Species

4.70 Table EIS-6 provides a listing of State threatened and endangered species of the UMRS, by reach and habitat preference. Site-specific impact assessment for each measure (see paragraphs 4.1 to 4.23) concluded that no adverse impacts are anticipated to State-listed threatened or endangered species. Also, since the traffic increase associated with the proposed measures is very small (1.3 percent by the year 2040) and well within the normal variability of any navigation season, this increase would not result in system-wide (cumulative) impacts that are measurable over the existing condition. Therefore, adverse system-wide impacts are not anticipated to State-listed threatened or endangered species.

Socio-Economic Impacts

4.71 This section addresses anticipated socio-economic impacts in a cumulative manner, as the socio-economic impacts associated with each rehabilitation measure would be nearly identical. Safety impacts are addressed in detail in the previous site-specific impacts discussion.

4.72 The cost-effective transportation system provided by the locks and dams on the UMRS has provided stimulus for growth of river communities and the entire Midwest Region. Rehabilitation of this system would provide continued growth opportunities. The rehabilitation activities would have little impact on the surrounding population since no residential, business, or farm relocations would be necessitated and no significant impacts to community cohesion would result. Further, the projects would have little impact on property values or resulting tax revenues.

4.73 Rehabilitation of the structures (public facilities) would help maintain the current efficiency of the UMRS. In addition, these modifications would greatly reduce the life, health, and safety threats of current operation on the UMRS. The rehabilitation measures would reduce the likelihood of injury to lock and towing industry personnel or recreationists.

4.74 During the construction process, an increase in business and industrial activity would be noticed in the vicinity of each project area. A portion of this increase would be attributable to the purchases made for the rehabilitation work. The remaining increase would result from purchases made by construction workers (i.e., meals and lodging). It is anticipated that an average of 100 workers would be employed during the rehab effort, with up to 300 workers employed during the two peak months of construction. Workers would be hired through labor unions in nearby communities. Long-term impacts to business and industrial activity and employment and labor force would be related to community and regional growth.

4.75 Heavy machinery would generate a temporary increase in noise during the construction process at each site. This could impact recreational boaters and persons at nearby recreation areas, as well as residents within the project vicinities. However, project areas are primarily rural in nature, featuring large spans of open fields and low density residential, recreation, and commercial areas. It is therefore unlikely that this noise level increase would significantly affect the surrounding population.

Cultural Resources

4.76 The lock and dam complexes are all approximately 50 years old and in need of repair, rehabilitation, and improvement as part of the Corps' mission to operate safe and efficient transportation systems. Sections 106 and 110 of the National Historic Preservation Act (Public Law 89-665) require that the Federal agencies take into account the effect of their proposed undertakings on properties listed in or eligible (and potentially eligible) for inclusion in the National Register before expending Federal funds for rehabilitation and construction projects. The Act also stipulates that the ACHP be allowed a reasonable opportunity to comment on proposed projects affecting historic properties, supplemented by comments from the appropriate SHPO.

4.77 Numerous maintenance and rehabilitation actions have occurred since all of the complexes became operational in 1939. Some pre-1970 changes are poorly documented, and changes (often cosmetic) often reflected the needs of a series of lockmasters. Numerous other projects have been carried out over the years for which no documentation exists. Hence, the tables EIS-16 through EIS-19 should not be misconstrued as being comprehensive. Clearly, the Mississippi River Navigation System has been envisioned as one of constant change since the mid-19th century. This structural evolution was anticipated and planned for during original project construction. The integrity of the system lies in its continued operation and the normal periodic rehabilitations and improvements rather than in any "as-built" condition.

4.78 Work at locks and dams can be broken down into five major categories: lock rehabilitation, rehabilitation or repairs of the lock gates, rehabilitation of the dam, mechanical repairs or replacement, and electrical repairs or replacement. Reconnaissance reports on major rehabilitation have been completed for Locks and Dams 13, 15, 16, 17, 18, 20, 21, and 22.

4.79 The staff member from the ACHP provided initial comments to Rock Island District in a letter dated June 21, 1985 (see Appendix V). The ACHP position at that time was that either the entire system is eligible or it is not, with the exception of several specifically referenced structures at Lock and Dam 19 which are already listed. Overall, there were no major objections to the major rehabilitation effort even if all the locks and dams were considered eligible. Most rehabilitation actions will not adversely affect those characteristics upon which significance would be based, as long as the attributes of overall configuration and appearance are left intact. Repair of expected and normal wear and "accommodations to modern traffic through minor changes" should not be a problem; however, SHPO/ACHP involvement was required to ensure overall sensitivity of treatment. Significant features would have to be rehabilitated in accordance with the Secretary of the Interior's Standards.

4.80 A meeting was held on June 4, 1985, with staff members from the ACHP; Iowa, Illinois, and Missouri SHPO's; and Rock Island and St. Paul Districts, Corps of Engineers. Participants of this meeting tentatively agreed on an overall treatment for the lock and dam rehabilitation program. The Districts believe that the primary significance of the system lies in its operation and that it continues to function in response to changing needs and requirements of the Corps mission, technological advancements, and modern traffic characteristics. This philosophy is derived from historical trends in Federal management of the UMR dating back to the 19th century. Federal actions for navigation improvement and control reflect an evolutionary pattern of change and, thus, the District feels that the major rehabilitation effort not only carries out inherent anticipated changes but provides the opportunity for a continued program of responsive and innovative improvement. As a result of the June 4, 1985, meeting, and in keeping with this philosophy, the Rock Island District prepared an Overview and Cultural Resource Compliance Report with a Process Memorandum of Agreement for the Major Rehabilitation Program, Mississippi River Locks and Dams 11 through 22, dated March 1986. The St. Paul District prepared a sister document for Locks and Dams 3-10. Between June 1987 and August 1987, a Programmatic Agreement was signed by the Iowa,

Illinois, Missouri, Wisconsin, and Minnesota SHPO offices; the ACHP; and the Rock Island and St. Paul Districts, Corps of Engineers (Appendix V). Execution of the Programmatic Agreement and carrying out its terms satisfies the Corps' Section 106 National Historic Preservation Act responsibilities for the major rehabilitation efforts.

4.81 The fact that the entire system is well preserved through a comprehensive set of documents (Rathbun Associates report; HABS/HAER cards; 21,000 photographs; and some 12,500 contract and shop drawings) ensures that despite changes the original as-built system can be understood and appreciated by the public.

4.82 As Tables EIS-16 through EIS-19 illustrate, major rehabilitation actions can be generally defined as routine repair and maintenance items expected as a result of normal wear and deterioration of aged features. These and the construction actions will not appreciably alter the overall appearance and operation of the navigation system. Many of the actions are necessary to ensure continued safe and efficient operation. Concrete, armor, and painting actions will preserve existing conditions. Window, roof, and door replacements will be treated with sensitivity to preserve the overall appearance of the structures involved. The Secretary of the Interior's Standards (and the ACHP's Preparing Agreement Documents, if applicable) will be used when developing plans and specifications. Electrical/mechanical work will be internal for the most part and not visually obtrusive when external. The major change will be the guidewall extensions of concrete-filled sheet pile cells, but these will not alter the existing walls and the cells could be removed in the future if a return to the original condition is desired. An additional major change will be the replacement of the control stations for Locks and Dams 3 through 10. These actions constitute a significant adverse effect upon the historic character of the National Register Site. In keeping with the Programmatic Memorandum of Agreement, the actions are being coordinated with the appropriate SHPO office, and necessary mitigative measures are being taken. In a letter dated July 22, 1988, the Minnesota State Historic Preservation Office concurred with the St. Paul District plans for the control station replacement at Lock and Dam 3.

4.83 Federal agencies are directed to find ways to avoid impacts if prudent and feasible measures can be found. Likewise, Federal agencies are also required to repair and maintain significant (or potentially significant) historic properties under their jurisdiction. Overall, the major rehabilitation effort has been formulated to achieve both of these mandates. Most of the rehabilitation actions are minor in scope and will have no adverse effect on characteristics which contribute to the significance of the navigation system as a whole or individual structures within it.

4.84 The ACHP defines "effect" as "any condition of the undertaking [which] causes or may cause any change, beneficial or adverse, in the quality of the historical, architectural, archeological, or cultural characteristics that qualify the property to meet the criteria of the National Register (36 CFR part 800.3(a))." Undertakings may affect visual, audible, or atmospheric elements that alter characteristics such as integrity of location, design, feeling, setting, materials, workmanship, or association. Secondary impacts

TABLE EIS-16

Mississippi River Locks and Dams Rehabilitation:
Locks and Dams 3 Through 10

AFFECTED ELEMENTS	LOCK AND DAM 3	LOCK AND DAM 4	LOCK AND DAM 5	LOCKS AND DAM 5A - LOCKS AND DAM 10
Lockwalls, Guidewalls, Walking Surfaces	Concrete is deteriorated due to normal wear, barge scrapes, and freeze-thaw action. Deteriorated concrete would be removed and new concrete and metal armor installed. Recreational mooring bits would be installed. Tow haulage units would be replaced.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Main Lock Miter Gates	Inspect and repair structural members and plates, replace or repair cathodic protection, bearings, fenders and seals and painting the gates. Fender spacing would be increased by removing every other fender. The air bubbler systems on the gates would be replaced with a larger capacity system mounted on the gates, in gate recess area and along the lock floor just upstream of the gates. This will reduce stress on the machinery. Compressors for the bubbler system will be placed on the lock surface at each end.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Main Lock Miter Gate Machinery	The 50-year-old equipment is significantly deteriorated and would be replaced. The new equipment would be placed on top of the lock wall and would stand 7 feet above it to prevent the machinery from being flooded.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Main Lock Tainter Valve Machinery	The 50-year-old tainter valve machinery is badly deteriorated and would be replaced. The new equipment would be placed on top of the lock wall and would stand 4 to 5 feet above it to prevent the machinery from being flooded.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Main Lock Tainter Valves	Structural members and plates would be inspected and repaired; cathodic protection, bearings, and seals would be replaced or repaired, and the valves would be painted.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Lock Electrical System	The current system is 50 years old and replacement parts are unavailable; new components and new wiring would be installed. The transformer would be moved closer to the central control station.	Same as L/D 3	Same as L/D 3	Same as L/D 3

TABLE EIS-16 (Cont'd)

Mississippi River Locks and Dams Rehabilitation:
Locks and Dams 3 Through 10

AFFECTED ELEMENTS	LOCK AND DAM 3	LOCK AND DAM 4	LOCK AND DAM 5	LOCKS AND DAM 5A - LOCKS AND DAM 10
Main Lock	Bulkhead slots would be installed and floating bulkheads would be purchased for lock dewatering.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Emergency/Auxiliary Lock Miter Gates	No plans.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Television Monitoring Equipment	A closed circuit television system would be installed to facilitate remote operation of the lock from the central control station.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Fire Protection System	The locks and dams currently have no dedicated fire protection system; a pump and 4 hose stations would be placed along each of the 2 walls of the lock chamber.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Standby Generators	The existing standby generator has inadequate power (100 kilowatts) for its potential uses, and its use in the present location violates OSHA regulations. It is proposed to install a larger generator (250 kilowatts) in an area which meets all applicable regulations.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Lighting and Security System	The proposed system would reuse the existing high mast lighting and add new lights on the guidewall and gate recesses.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Water Gaging Systems	The existing equipment to measure and record water level, precipitation, temperature, etc., would be replaced with equipment that is connected to the Geostationary Operations Environmental Satellite. This would improve the District's ability to monitor river conditions.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Communications Systems	The existing intrafacility communications system had been installed in stages and combines several different types of equipment. The new system would be a central key operated system with intercom, paging, public address, signaling, and talk back speakers.	Same as L/D 3	Same as L/D 3	Same as L/D 3

TABLE EIS-16 (Cont'd)

Mississippi River Locks and Dams Rehabilitation:
Locks and Dams 3 Through 10

AFFECTED ELEMENTS	LOCK AND DAM 3	LOCK AND DAM 4	LOCK AND DAM 5	LOCKS AND DAM 5A - LOCKS AND DAM 10
Hoist Cars	No plans	The hoist cars used to raise the tainter gates would be replaced and the gates motorized similar to other dams. This is for safety and to reduce the amount of labor needed using the hoist car system.	The hoist cars used to raise the tainter gates would be replaced and the gates motorized similar to other dams. This is for safety and to reduce the amount of labor needed using the hoist car system.	No plans.
Dam Service Bridge	Repair or replace concrete and structural members as needed; paint metal surface as needed.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Cranes	Bulkhead lifting devices on the cranes would be refurbished or modified.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Dam Emergency Bulkheads	No plans.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Scour Protection	Riprap or rock fill would be placed as necessary to prevent undermining of the structure.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Earthen Embankments	The earthen embankments would be raised and/or widened to prevent failure of the structure during a flood.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Sewer and Water System	Replace or repair, as needed, pipes, septic tanks, holding tanks, wells, pumps, and water tanks.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Site Planning	May include road, parking lot, utilities, buildings, and visitor facilities; relocation or repair to enhance access, separate visitor and worker areas, to include fire protection, security, and to optimize land use.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Concrete Overflow Spillways	Repair concrete as needed to original design condition.	Same as L/D 3	Same as L/D 3	Same as L/D 3

From: U.S. Army Engineer District, St. Paul

TABLE EIS-16 (Cont'd)

Mississippi River Locks and Dams Rehabilitation:
Locks and Dams 3 Through 10

AFFECTED ELEMENTS	LOCK AND DAM 3	LOCK AND DAM 4	LOCK AND DAM 5	LOCKS AND DAM 5A - LOCKS AND DAM 10
Buildings	The existing central control building and control stands would be completely replaced or modified. Some of the existing storage and maintenance buildings would be removed. These existing buildings are not energy efficient, are flood prone, currently in need of repair, and poorly located; thus, they would be replaced or made energy efficient and floodproofed. If replaced, the central control building may be located at the upstream or downstream end of the lock.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Outdraft Barrier	An outdraft barrier would be constructed in the channel 1,200 to 1,300 feet long upstream of the lock to reduce navigation hazards. A bridge of some type would be necessary to connect the barrier with the dam.	No plans	No plans	No plans
Dam Structure	Damaged concrete would be repaired or replaced as necessary. Metal surfaces would be cleaned and painted. The electrical system would be refurnished or replaced.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Roller Gates	These would be cleaned and painted on both the inside and outside as necessary. Corroded hoisting chains would be replaced or repaired. New seals would be added, and the gate members and plates would be repaired or replaced as needed. Seal heaters would be installed as needed to reduce ice buildup.	Same as L/D 3	Same as L/D 3	Same as L/D 3
Tainter Gates	These would be cleaned and painted on both the inside and outside as necessary. Corroded hoisting chains would be replaced or repaired. New seals would be added, and the gate members and plates would be repaired or replaced as needed. Seal heaters would be installed as needed to reduce ice buildup.	Same as L/D 3	Same as L/D 3	Same as L/D 3

TABLE EIS-17

Rathbun Associates Study Results

Resource	Const. Date	DA Category	Characteristics of Potential Significance	Condition	Impacts	Preservation Treatments	NRHP Status or Significance
Old Lock 19	1910/13	1	19th century through modern features; unusual lock gates and rare machinery; pneumatic technology	Abandoned but relatively good; guidewalls modified; cofferdam installed	No alteration plans; impacts limited to natural deterioration of an abandoned structure	General Category 1 recommendations; Rathbun Associates report Chapter 5, page 7	Listed
Old Lock 19 Operators House	1910/13	1	Engineering/pneumatic technology; rare machinery	Abandoned but relatively good; deferred maintenance	No alteration plans; impacts limited to natural deterioration of an abandoned structure	General Category 1 recommendations; Rathbun Associates report Chapter 5, page 8	Listed
Old Lock 19 Power House	1910/13	1	400 h.p. water wheel turbine-driven power plant; Ingersoll Rand air compressors; access tunnels; rare machinery; related to Lock 19 features listed on the NRHP	Water damaged; machinery and mechanical systems good	No alteration plans; impacts limited to natural deterioration of an abandoned structure	General Category 1 recommendations; Rathbun Associates report Chapter 5, page 9; stop water leak; lubricate and operate machinery periodically	Listed
Union Electric Keokuk Power Plant	1910/13	1	Second largest hydroelectric station in the world when built; engineering technology; related to Lock 19 Complex	Very good; routine maintenance; active operation; modernized central room; 6 to 15 generators rewound	No alteration plans; impacts limited to natural deterioration of an abandoned structure	General Category 2 recommendations; Rathbun Associates report Chapter 5, page 11	Listed
Dam 19	1910/13	1	Related to Lock 19 complex; privately-owned; regionally unique structure for its time period; built prior to 1930's system	Very good; routine maintenance; active operation; new storage sheds	No alteration plans; impacts limited to natural deterioration of an abandoned structure	General Category 2 recommendations; Rathbun Associates report Chapter 5, page 12	Listed
Lock and Dam 19 Complex	1910/57	1	New (1957) Lock 19, with 9-ft. and 6-ft. project features incorporated; Union Electric Co. Keokuk Power Plant; Des Moines Rapids Canal features; engineering technology; system evolution; rare intact equipment	Overall good w/routine maintenance	No alteration plans; impacts limited to natural deterioration of an abandoned structure	General Category 1 recommendations; except as noted above; preservation and interpretive plans recommended	Listed

TABLE EIS-17 (Cont'd)

Resource	Const. Date	HA Category	Characteristics of Potential Significance	Condition	Impacts	Preservation Treatments	NRHP Status or Significance
Keokuk Dry Dock	19/4	2	Relationship to Old Lock 19 complex; unusual engineering design with rare operating machinery; single-leaf submergible vertical lift gate; only dry dock on river from its period; used by government and private boats	Relatively good for an abandoned structure w/deferred maintenance problems; significantly altered and reduced integrity since 1977 dewatering; arches removed and sheet pile cell added; new concrete added and related buildings removed	No alteration plans; impacts limited to natural deterioration of an abandoned structure	General Category 2 recommendations and damaging vegetation removed; preservation plan and periodic operation of gate mechanism; Rathbun Associates report Chapter 5, page 15	Listed
Des Moines Rapids Canal	1883/89	2	Last remaining structure in Lock 19 area; understanding of navigation improvements	Relatively good condition; riverwall demolished for Keokuk Dry Dock	No alteration plans; impacts limited to natural deterioration of an abandoned structure	General Category 2 recommendations; Rathbun Associates report Chapter 5, page 16	Listed
Lock and Dam 17 Complex	1935/39	2	Lock 17, Dam 17, Central Control Station, emergency generator bldg.*, and new workshop* which best represent the 11 1930's UMR Navigation Project Complexes at MCR; significance as part of group; individual Category 3 structures contribute to significance will the two Category 5* structures detract	Good w/routine repair as part of on-going operations	Rehab plans	General Category 2 recommendations; Rathbun Associates report Chapter 5, page 17	Potentially eligible as part of group
Dam 15	1931/34	3	Engineering technology and function/form of 9-Ft Navigation Project; first designed and constructed of 1930's dams; exclusive use of roller gates w/no earth fill section; hydropower generating	Good and intact; routine maintenance	Possib' further hydropower development and rehab plans w/minor effects	General Category 3 recommendations for ineligible properties; Rathbun Associates report Chapter 5, page 19	Not eligible

TABLE EIS-17 (Cont'd)

Resource	Const. Date	DA Category	Characteristics of Potential Significance	Condition	Impacts	Preservation Treatments	NRHP Status or Significance
Dam 17	1935/39	3	Excellent intact example of most common 1930's dam; engineering technology and form/function of UMR 9-Ft. Navigation Project; best representative example and only one potentially eligible	Very good w/routine maintenance for on-going operations	Rehab plans would not adversely affect property	General Category 3 recommendations for eligible properties; Rathbun Associates report Chapter 5, page 20	Potentially eligible as part of group
Dam 20	1933/36	3	Designed by UMV Division Office - St. Louis (w/15); 38 of 40 tainter gates operated by locomotive hoist cars	Very good w/routine maintenance for on-going operations	Hydropower plans could have adverse effects; rehab plans should not adversely affect property if hoist cars are left in place-albeit gates motorized for safe/efficient operation; hoist cars will not be rehabilitated	General Category 3 recommendations for ineligible properties; Rathbun Associates report Chapter 5, page 22	Not eligible
Lock 14	1935/36	3	Only complex built in the 1930's without an auxiliary lock	Good condition w/routine maintenance for on-going operations; weathered lock walls; spalling at expansion joints and near quoins; intrusive pit covers added; wall extensions	Rehab plans should not adversely affect property	General Category 3 recommendations for ineligible properties; Rathbun Associates report Chapter 5, page 24	Not eligible
Old LeClaire Lock	1922	3	Operating remnant of 6-Ft. Navigation Project; abandoned 1939 but reopened 1969 for recreational traffic; rehab in 1979 and altered for use as a dry dock; evolution of system	Very good condition w/routine maintenance for on-going operations; significantly altered and integrity reduced; machinery replaced	Rehab plans should not adversely affect property	General Category 3 recommendations for ineligible properties; Rathbun Associates report Chapter 5, page 25	Not eligible

TABLE EIS-17 (Cont'd)

Resource	Const. Date	DA Category	Characteristics of Potential Significance	Condition	Impacts	Preservation Treatments	NRHP Status or Significance
Lock 15	1931/34	3	First 1930's lock in NCR built; only one w/auxiliary lock done originally	Good w/routine maintenance; weathered lock walls and spalling near quoins	Proposed plans to permanently install machine pit covers will have adverse effects; other rehab items should not have adverse effect	General Category 3 recommendations for ineligible properties; Rathbun Associates report Chapter 5, page 26	Not eligible
Lock 17	1935/37	3	Excellent intact example of common 1930's lock type; best represents NCR locks and is only one considered eligible	Good condition w/routine maintenance; weathered lock walls and spalling at expansion joints and near quoins; 800-Ft. earthen mooring dike added	Proposed plans to permanently install machine pit covers will have adverse effects; other rehab items should not have adverse effect	General Category 3 recommendations for eligible properties; Rathbun Associates report Chapter 5, page 27, redesign proposed machine pit covers	Potentially eligible as part of group
Central Control Station 17	1935-37	3	Excellent intact example of common 1930's control station; best represents NCR examples and should be considered eligible	Fair condition w/routine maintenance for on-going operations; several cosmetic changes	Rehab plans reworked to satisfy SHPO concerns; no adverse effects anticipated for rehab plans	General Category 3 recommendations for eligible properties; Rathbun Associates report Chapter 5, page 29	Potentially eligible as part of group
Central Control Station 22	1933/35	3	Excellent intact example of common 1930's control station; not individually significant	Fair condition w/routine maintenance for on-going operations; several cosmetic changes	Rehab plans could adversely affect the property unless Secretary's Standards are applied	General Category 3 recommendations for eligible properties; Rathbun Associates report Chapter 5, page 30-32 (see notes below)	Potentially eligible

TABLE EIS-17 (Cont'd)

Resource	Const. Date	DA Category	Characteristics of Potential Significance	Condition	Impacts	Preservation Treatment	HABS Status or Significance
Central Control Station/ Generator Bldg./Lock and Dam Complex 14	1935/35	3	Significant as related to overall 14 Complex; unique 1930's design due to hydropower provisions never utilized	Good condition but abandoned w/deferred maintenance; cosmetic changes	No rehab impacts anticipated	General Category 3 recommendations for ineligible properties; adaptive reuse potential; Rathbun Associates report Chapter 5, page 33	Not eligible
Mississippi River Recreation Office Bldg. 1, Lock and Dam Complex 14	1921	3	Rare example of NCR 6-Ft. Navigation Project structure	Very good condition w/routine maintenance as part of on-going operations	No rehab plans will affect the property	General Category 3 recommendations for ineligible properties; adaptive reuse potential; Rathbun Associates report Chapter 5, page 34	Not eligible
Powerhouse, Lock and Dam 15 Complex	1931/32	3	One of 2 complexes designed for hydropower and only government-designed, built, and operated hydropower facility in NCR	Good condition w/routine maintenance; essentially intact; cosmetic changes	Additional hydropower development by replacement would have adverse effects; no rehab effects	General Category 3 recommendations for ineligible properties; adaptive reuse potential; Rathbun Associates report Chapter 5, page 36	Not eligible
Old Workshop, Lock and Dam 15 Complex	1932	3	Related to overall complex; unique reinforced concrete sunken one-story design	Good condition w/routine maintenance; essentially intact; cosmetic changes	No rehab plans will affect the property	General Category 3 recommendations for ineligible properties; adaptive reuse potential; Rathbun Associates report Chapter 5, page 36	Not eligible
Lock and Dam 14 Complex	1922/39	3	Mixture of category 3-5 features locally unique	Good condition w/routine maintenance; essentially intact; cosmetic changes	No rehab plans will affect the property	General Category 3 recommendations for ineligible properties; adaptive reuse potential; Rathbun Associates report Chapter 5, page 37	Not eligible
Lock and Dam 15 Complex	1931/34	3	Minor importance as the first of a widely used engineering design; several category 5 detrimental structures	Good condition w/routine maintenance; essentially intact; cosmetic changes	No rehab plans will affect the property	General Category 3 recommendations for ineligible properties; adaptive reuse potential; Rathbun Associates report Chapter 5, page 38	Not eligible

TABLE EIS-17 (Cont'd)

Resource	Const. Date	DA Category	Characteristics of Potential Significance	Condition	Impacts	Preservation Treatments	NRHP Status or Significance
Dam 11	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
12	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
13	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
14	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
16	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
18	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
21	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
22	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Lock 11	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
12	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
13	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
16	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
18	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Lock 19	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Lock 20	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
21	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
22	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Control Control Station 11	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Control Control Station 13	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Control Control Station 16	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Control Control Station 18	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Control Control Station 20	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Control Control Station 21	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Control Control Station 22	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Garage, Lock and Dam 12	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Storage Shed, Lock and Dam 14	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Motor Shop Bldg. 2, L/D 14	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Warehouse 3, L/D 14	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Warehouse 4, L/D 14	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Bldg. 5, Misc. River Recreation Shop, L/D 14	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Seawall and Intercepting Sewer, L/D 15	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Garage, L/D 18	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Lock 19 Lockhouse	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Lock 19 Landwall Bldg.	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Lock 19 Riverwall Bldg.	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Visitor Obs Bldg. L/D 19	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Access Bridge, L/D 20	-	4	Property of little or no importance	—	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible

TABLE EIS-17 (Cont'd)

Resource	Const. Date	DA Category	Characteristics of Potential Significance	Condition	Impacts	Preservation Treatments	NRHP Status or Significance
Emergency Gen. Bldg., L/D 22	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Emergency Gen. Bldg., L/D 12	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Emergency Gen. Bldg., L/D 13	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Emergency Gen. Bldg., L/D 16	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Emergency Gen. Bldg., L/D 17	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Emergency Gen. Bldg., L/D 18	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Emergency Gen. Bldg., L/D 20	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Emergency Gen. Bldg., L/D 21	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Emergency Gen. Bldg., L/D 22	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop, L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop, L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop, L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop, L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop, L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop, L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop, L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop, L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Workshop L/D	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Visitor Observ. Bldg., L/D 13	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Visitor Observ. Bldg., L/D 14	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Metal Machine Shop, L/D 14	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
New Main Lock Lockhouse, L/D 14	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impacts	Not eligible
Visitor Center, L/D 14	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impact	Not eligible
Sheet Pile Cell Closure, L/D 19	-	5	Property of little or no importance	---	No Effect/No Adverse Effect	can be modified w/o adverse impacts	Not eligible

TABLE EIS-17 (Cont'd)

Notes: The Rathbun Associates Report states that, for the most part, all lock and dam complexes and individual structures/features within them are remarkably similar. The few unusual or unique characteristics are referenced in the table above where appropriate. As a group, all structures contribute to an understanding of engineering technology and form/function of the UMR 9-ft. Navigation Project.

Preservation Treatments and NRHP Status columns reflect Rathbun Associates report information only.

The Rathbun Associates report emphasizes that most major rehab actions will not adversely affect characteristics which contribute to NRHP significance, particularly if the Secretary of the Interior's Standards are applied.

Specific Rehab Recommendations for L/D 22 Central Control Station:

1. Basement walls and windows
   a) The walls should be left intact or, if necessary, interior rigid insulation could be installed.
   b) The basement windows should be repaired and, if necessary, interior storm windows could be installed.

2. Walls
   a) The cracks in the exterior walls should be repaired with matching mortar.
   b) The interior walls should be left intact or, if necessary, insulation could be applied to the interior walls of all rooms except the machinery room, or all interior walls could be insulated.

3. Windows above grade
   a) The windows should be repaired and made weathertight and, if necessary, operable interior storm windows could be installed.

4. Doors and vestibules
   a) The existing vestibule should be left intact and, if necessary, insulated doors and weather stripping could be installed.
   b) If necessary, an interior vestibule could be installed in the machinery room.

5. Roof and gutter
   a) The roof should be repaired or replaced with matching shingles.
   b) The existing gutters and downspouts should be repaired with copper.
   c) If necessary, the attic floor could have batt insulation installed where possible and provision for attic ventilation should be made.

6. Ceilings
   a) The existing ceilings should be left intact.
   b) Existing drop ceilings could be used to support batt insulation.

7. Mechanical systems
   a) Heating system could be zoned to allow reduced heating in machinery room if desired.
   b) Heating pipes could be insulated.
   c) System efficiency could be improved as needed with new system if necessary.
   d) Radiators could be repaired or replaced.
   e) Ceiling fans could be installed as needed.

8. Electrical system
   a) The electrical system could be repaired, replaced, or added to as needed.

TABLE EIS-18

Cultural Resources
Impact Summary for Major Rehabilitation Actions

Action	Affect to Significant Res.	Affect to Potential NRHP Element	Adverse Effect Criteria	No Adverse Effects	Compliance w/Sec'y Interior's Standards	Beneficial Effects
Lockwalls, Guidewalls Walking Surfaces	Yes	Yes	Potentially 1 and 3 for guidewall extensions	All actions except guidewall extensions	Concrete and armor replacement will essentially match existing conditions; guidewall extension will match those already in place at some locations and will appear clearly different from original lock walls	Except guidewall extension, required upkeep of structures
Main Lock Miter Gates	Yes	Yes	None apply	All actions	Cleaning and painting essentially as existing	Required maintenance
Lock Dewatering System	No	No	None apply	No effect	Straight forward inspection and repair as existing/original	Required maintenance
Emergency/Auxiliary Lock Miter Gates	No	No	None apply	No effect	Straight forward inspection and repair as existing/original	Required maintenance
Main Lock Miter Gates Machinery	Yes	Yes	None apply	New machinery on lockwall will be a minor intrusion	New machinery on top of lock wall will only be about 3 ft. high and visually unobtrusive; replacement parts for 50-yr.-old equipment cannot be obtained	Required maintenance and removal of machinery from flood susceptible pits
Lock Tainter Valve Machinery	Yes	Yes	None apply	New machinery on lockwall will be a minor intrusion	New machinery on top of lock wall will only be about 3 ft. high and visually unobtrusive; replacement parts for 50-yr.-old equipment cannot be obtained	Required maintenance and removal of machinery from flood susceptible pits
Main Lock Outlet	No	No	None apply	No effect	Not required	Required resolution of safety hazard
Lock Electrical Equipment	No	No	None apply	No effect	No required; replacement parts unavailable for 50-yr.-old equipment; unobtrusive alteration	Required maintenance to improve operation
Dam Structure	Yes	one at L/D 15 and L/D 17	None apply	All actions	Repair, no overall appearance or function changes	Required maintenance

TABLE EIS-18 (Cont'd)

Action	Affect to Significant Fea.	Affect to Potential WRSP Element	Adverse Effect Criteria	No Adverse Effects	Compliance w/Sec'y Interior's Standards	Beneficial Effects
Roller Gates	Yes	Yes	None apply	All actions	Cleaning, painting and wiring plans conform	Routine maintenance
Tainter Gates	Yes	Yes	None apply	All actions	Cleaning, painting, wiring, chain work conform	Routine maintenance
Service Bridge	No	No	None apply	No Effect	Full compliance	Routine maintenance
Piezometers	No	No	None apply	No Effect	Full compliance	Routine maintenance
Emergency Bulkheads	No	No	None apply	No Effect	Full compliance	Routine maintenance
Scour Protection	No	No	None apply	No Effect	Full compliance	Routine maintenance
Storage Yard Tracks	No	No	None apply	No Effect	Full compliance	Routine maintenance
Overflow Section	No	No	None apply	No Effect	Full compliance	Routine maintenance
Storage Yard Embankment	No	No	None apply	No Effect	Full compliance	Routine maintenance
Non-Overflow Section	No	No	None apply	No Effect	Full compliance	Routine maintenance
Abutments	No	No	None apply	No Effect	Full compliance	Routine maintenance
Davenport Seawall/ Storm Sewer	No	No	None apply	No Effect	Full compliance	Routine maintenance
Powerhouse Generator	Yes	Yes	Criteria 1 could apply for roofs and windows	All actions	Normal wear repairs; roofs and windows could be designed to comply and preserve appearance, profile, and configuration	Routine maintenance
Maintenance Storage Shed	No	No	None apply	No Effect	Normal wear repairs; roofs and windows could be designed to comply and preserve appearance, profile, and configuration including doors	Routine maintenance
Lock Control Stand Enclosures	Yes	Yes	Criteria 1 and 3 for new enclosures could apply	All actions	New enclosures can be designed to blend in with overall concrete matrix and be an improvement over the existing metal ones	Routine maintenance

TABLE EIS-19

Cultural Resources
Summary of Major Rehabilitation Actions

AFFECTED ELEMENTS	LOCK AND DAM 13	LOCK AND DAM 15	LOCK AND DAM 16	LOCK AND DAM 17	LOCK AND DAM 18	LOCK AND DAM 21	LOCK AND DAM 22
Lockwalls, Guidewalls, Walking Surfaces	Concrete is severely deteriorated due to normal wear, barge scrapes, and freeze thaw action; deteriorated concrete will be removed and new concrete and metal armor installed	Same as 123 with elimination of recessed mooring posts, addition of a bubbler system, and addition of 2 concrete-filled sheet pile cells in line w/upstream guidewall	Same as 13 with addition of bulkhead slots, elimination of recessed mooring posts, addition of a recessed ladder and bubbler system	Same as 13 and 16 with addition of concrete-filled sheet pile cells upstream of intermediate lock wall and a 600-foot upstream guidewall extension of concrete-filled sheet pile cells connected w/precast armored concrete beams; elimination of approach dike except for northern 300 ft.	Same as 13 with installation of dams, bulkhead slots, bubbler system; intermediate wall extension with concrete-filled steel sheet pile guide cells; guidewall extensions of 100 ft. w/anchored sheet pile wall and sand fill on backside	Same as 13 and 16 except that a bubbler system is already in place; a 600-ft. guidewall extension of concrete-filled sheet pile cells will be added.	Same as 13 and 16; outdraft hazards will be reduced by addition of sheet pile guardwall cells, a concrete-filled sheet pile guide cell, and a 600-ft. guidewall extension to upstream/downstream walls of concrete-filled sheet pile cells connected w/precast armored concrete beams
Main Lock Miter Gates	Below waterline leaks at quoin seals and the miter joint, peeled paint, corroded metal, and deteriorated timber will be repaired and rubber fenders applied	same as 13	same as 13	same as 13	same as 13	same as 13	same as 13
Lock Dewatering System					Inspect foundations and repair openings in sheet piling		
Emergency/Auxiliary Lock	Silted in on upstream side, extra lead, peeled paint, and never overhauled; silt removal and overhauling/painting; check corroded metal and spalled concrete replaced	no plans	same as 13	same as 13	same as 13	same as 13	same as 13

TABLE EIS-19 (Cont'd)

AFFECTED ELEMENTS	LOCK AND DAM 13	LOCK AND DAM 15	LOCK AND DAM 16	LOCK AND DAM 17	LOCK AND DAM 18	LOCK AND DAM 21	LOCK AND DAM 22
Main Lock Miter Gate Machinery	Poor condition in pits due to water and silt damage; nearly 50 years old; remove machinery and place new machinery on top of lock wall with interchangeable parts (w/other locks), spare motor added	same as 13 and also for auxiliary lock	same as 13	same as 13	same as 13	same as 13	same as 13
Lock Tainter Valve Machinery	Poor condition in pits due to water and silt damage; worn out units will be replaced w/new machinery on top of lock wall w/interchangeable parts (w/other locks); spare motor added	same as 13	same as 13	same as 13	same as 13	same as 13	same as 13
Main Lock Outlet Tunnel	Existing configuration causes severe flow turbulence; landwall outlet ports would be plugged and flows diverted into a new 12-ft. square concrete tunnel behind the guidewall w/outlet to existing lagoon	no plan	no plan	no plan	no plan	no plan	no plan
Lock Electrical Equipment	Nearly 50 years old; replacement parts unavailable, new equipment installed; rewiring; transformer moved from wall to poles	same as 13	same as 13	same as 13	same as 13	same as 13	same as 13

TABLE EIS-19 (Cont'd)

AFFECTED ELEMENTS	LOCK AND DAM 13	LOCK AND DAM 15	LOCK AND DAM 16	LOCK AND DAM 17	LOCK AND DAM 18	LOCK AND DAM 21	LOCK AND DAM 22
Dam Structure	Cracked pier tops and other horizontal surfaces will be sealed w/latex modified concrete and sloped to drain; metal surfaces will be cleaned and painted	Same as 13 with roller gate pier house roofs repaired and maintenance free windows installed to replace cracked and leaking portions	same as 15	same as 15	same as 13	same as 15	same as 15
Roller Gates	Paint inside and outside metal faces; replace deteriorated wiring and switchgears	Same as 13 with addition of new seals and permanent metal splashboards; new chain or steel cable for gate hoists	Same as 13 and 15 with addition of enclosure to cover brake assembly	same as 13 and 15	Same as 13 and 15 with chain rack replaced by steel cable	same as 18	Same as 13 and 15 with new herring bone gear
Tainter Gates	Clean and paint inside and outside of gates and trunnion bosms; replace corroded lower portions of hoisting chains; replace wiring and switchgears; new seals	no plan	same as 13	same as 13 wo/ electrical or chain replacement	same as 17	same as 17	same as 13 wo/electrical
Service Bridge	Cracked grout around bridge bearing pads will be replaced; new non-skid painted metal deck	Same as 13 with upgrade of lower bulkhead crane	same as 13	same as 13	Same as 13 wo/new deck grating	same as 18	same as 13
Piezometers	no plan	no plan	no plan	unplugging by air or water purging	same as 17	same as 17	same as 17

TABLE EIS-19 (Cont'd)

AFFECTED ELEMENTS	LOCK AND DAM 13	LOCK AND DAM 15	LOCK AND DAM 16	LOCK AND DAM 17	LOCK AND DAM 18	LOCK AND DAM 21	LOCK AND DAM 22
Emergency Bulkheads	Painting and wooden seals replaced w/rubber seals	same as 13	same as 13	same as 13	same as 13	same as 13	same as 13
Scour Protection	Soundings indicate need for riprap capstone on rock fill	no plan	same as 13	same as 13	same as 13	same as 13	no plan
Storage Yard Trucks	Deteriorated ties and clogged ballast will be replaced	no plan	no plan	no plan	same as 13	same as 13	no plan
Overflow Section	Trees and brush will be removed from compacted fill embankment; voids under slush concrete will be filled w/grout and a layer of concrete w/reinforcing mat on top of sheet pile embankment to prevent deterioration	no plan	same as 13	same as 13	same as 13	same as 13	same as 13
Storage Yard Embankment	no plan	no plan	no plan		Expansion joints will be sealed and riprap stone placed on outside edges of sand-filled reinforced concrete abutment	same as 18	no plan

TABLE EIS-19 (Cont'd)

AFFECTED ELEMENTS	LOCK AND DAM 13	LOCK AND DAM 15	LOCK AND DAM 16	LOCK AND DAM 17	LOCK AND DAM 18	LOCK AND DAM 21	LOCK AND DAM 22
Non-Overflow Section	Compacted fill embankment w/some riprap stone will be reinforced by adding soil cement to the 20-ft-wide tops and downstream slopes will be riprapped	no plan	no plan	no plan	no plan	no plan	no plan
Abutments	no plan	no plan	Abutment A on the west side of the gated dam has leaching, settling, cracking, and riprap deterioration problems that will be repaired w/new riprap and concrete	no plan	no plan	no plan	no plan
Davenport Seawall/Storm Sewer	no plan	Remove deteriorated wooden flap gate; replace ladder rungs; repair or replace the roof and windows for the storage shed; derrick stone placed just below sewer outlet	no plan	no plan	no plan	no plan	no plan
Powerhouse Generator	no plan	Renovate antiquated, inefficient, and awkward electric control panel; replace roof and windows; replace trash rack	no plan	no plan	no plan	no plan	no plan

TABLE EIS-19 (Cont'd)

AFFECTED ELEMENTS	LOCK AND DAM 13	LOCK AND DAM 15	LOCK AND DAM 16	LOCK AND DAM 17	LOCK AND DAM 18	LOCK AND DAM 21	LOCK AND DAM 22
Maintenance/Storage Shed	no plan	Deteriorated low building beneath the swing span will have resurfaced roof and new windows/doors (existing are original and in good enough shape to justify rehab)	no plan	no plan	no plan	no plan	no plan
Lock Control Stand Enclosures	no plan	15-yr old glass and aluminum structures are pitted and corroded; these movable temporary structures are unheated; permanent masonry or concrete w/glass structures would be added; 2-ft higher	no plan	no plan	no plan	no plan	no plan

also might occur such as construction of new facilities incongruent with the "as-listed" character of historic properties. This occurrence also could be viewed as a continuation of the natural course of navigation system evolution and in a sense a contribution to overall significance on a broader scale.

4.85 The criteria of adverse effect which must be considered are as follows (36 CFR Part 800.3(b)):

a. Destruction or alteration of all or part of a property.

b. Isolation from or alteration of all or part of the property's surrounding environment.

c. Introduction of visual, audible or atmospheric elements that are out of character with the property or alter its setting.

d. Neglect of a property resulting in its deterioration or destruction.

e. Transfer or sale of a property without adequate conditions or restrictions regarding preservation, maintenance, or use.

4.86 Because of the nature of major rehabilitation plans, Criteria b, d, and e do not apply. Criterion a applies because some minor alterations will occur and Criterion c applies primarily for guidewall extensions. For the most part, rehabilitation actions will be unobtrusive, not visible to the public, and will not affect those characteristics which contribute to National Register significance. Beneficial effects that will accrue include the general upkeep of the system and the extension of its operating life. Safety, national defense, energy efficiency, and economic benefits are not strictly historical but certainly in the public interest as the purpose for project construction. These benefits are those for which the system was constructed in the first place and thus become intangible elements contributing to the overall significance of the system. These elements will be preserved.

4.87 Table EIS-20 summarizes the effects of the major rehabilitation actions described in Table EIS-19 and in the Reconnaissance Reports. A total of 24 generic work items are listed. Of this total, seven potential National Register elements will be affected; however, only three of the seven elements may experience adverse effects based upon current rehabilitation plans. These effects can be eliminated by applying the Secretary of the Interior's Standards and the Programmatic Agreement. Adverse effects which cannot be avoided include the guidewall extension proposal at some locks (including the Lock and Dam 19 Complex) and the removal and replacement of some control stations (including Lock and Dam 3). The guidewall extensions, if built, would be designed to look different from the original lock walls so that observers could clearly discern the original configuration. Likewise, the control station replacements will be designed to be compatible with the historic character of the 9-Foot Channel locks and dams while being clearly discernable from the historic components.

TABLE EIS-20

Cultural Resources
Effects of Major Rehabilitation Actions

Action	Affect to Significant Fea.	Affect to Potential NRHP Element	Adverse Effect Criteria	No Adverse Effects	Compliance w/Sec'y Interior's Standards	Beneficial Effects
Lockwalls, Guidewalls Walking Surfaces	Yes	Yes	Potentially 1 and 3 for guidewall extensions	All actions except guidewall extensions	Concrete and armor replacement will essentially match existing conditions; guidewall extension will match those already in place at some locations and will appear clearly different from original lock walls	Except guidewall extension, required upkeep of structures
Main Lock Miter Gates	Yes	Yes	None apply	All actions	Cleaning and painting essentially as existing	Required maintenance
Lock Dewatering System	No	No	None apply	No effect	Straight forward inspection and repair as existing/original	Required maintenance
Emergency/Auxiliary Lock Miter Gates	No	No	None apply	No effect	Straight forward inspection and repair as existing/original	Required maintenance
Main Lock Miter Gate Machinery	Yes	Yes	None apply	New machinery on lockwall will be a minor intrusion	New machinery on top of lock wall will only be about 3 ft. high and visually unobtrusive; replacement parts for 50-yr.-old equipment cannot be obtained	Required maintenance and removal of machinery from flood susceptible pits
Lock Tainter Valve Machinery	Yes	Yes	None apply	New machinery on lockwall will be a minor intrusion	New machinery on top of lock wall will only be about 3 ft. high and visually unobtrusive; replacement parts for 50-yr.-old equipment cannot be obtained	Required maintenance and removal of machinery from flood susceptible pits
Main Lock Outlet	No	No	None apply	No effect	Not required	Required resolution of safety hazard
Lock Electrical Equipment	No	No	None apply	No effect	No required; replacement parts unavailable for 50-yr.-old equipment; unobtrusive alteration	Required maintenance to improve operation
Dam Structure	Yes	one at L/D 15 and L/D 17	None apply	All actions	Repair, no overall appearance or function changes	Required maintenance

TABLE EIS-20 (Cont'd)

Action	Affect to Significant Fea.	Affect to Potential NRHP Element	Adverse Effect Criteria	No Adverse Effects	Compliance w/Sec'y Interior's Standards	Beneficial Effects
Roller Gates	Yes	Yes	None apply	All actions	Cleaning, painting and wiring plans conform	Routine maintenance
Tainter Gates	Yes	Yes	None apply	All actions	Cleaning, painting and wiring plans conform	Routine maintenance
Service Bridge	No	No	None apply	No Effect	Full compliance	Routine maintenance
Piezometers	No	No	None apply	No Effect	Full compliance	Routine maintenance
Emergency Bulkheads	No	No	None apply	No Effect	Full compliance	Routine maintenance
Scour Protection	No	No	None apply	No Effect	Full compliance	Routine maintenance
Storage Yard Tracks	No	No	None apply	No Effect	Full compliance	Routine maintenance
Overflow Section	No	No	None apply	No Effect	Full compliance	Routine maintenance
Storage Yard Embankment	No	No	None apply	No Effect	Full compliance	Routine maintenance
Non-Overflow Section	No	No	None apply	No Effect	Full compliance	Routine maintenance
Abutments	No	No	None apply	No Effect	Full compliance	Routine maintenance
Davenport Seawall/ Storm Sewer	No	No	None apply	No Effect	Full compliance	Routine maintenance
Powerhouse Generator	Yes	Yes	Criteria 1 could apply for roofs and windows	All actions	Normal wear repairs; roofs and windows could be designed to comply and preserve appearance, profile, and configuration	Routine maintenance
Maintenance Storage Shed	No	No	None apply	No Effect	Normal wear repairs; roofs and windows could be designed to comply and preserve appearance, profile, and configuration	Routine maintenance
Lock Control Stand Enclosures	Yes	Yes	Criteria 1 and 3 for new enclosures could apply	All actions	New enclosures can be designed to blend in with overall concrete matrix and be an improvement over the existing metal ones	Routine maintenance

ALTERNATIVE: WITHOUT CONDITION (NO FEDERAL ACTION)

4.88 Any impacts occurring from this alternative would result from a future condition on the UMRS if the proposed measures were not constructed. In this case, the major foreseeable future activities on the UMRS include the Second Lock at Lock and Dam 26(R) and the Upper Mississippi River Environmental Management Plan (EMP). For the Second Lock, the St. Louis District prepared an EIS to assess the environmental impacts to the UMRS ecosystem due to the projected increase in tow traffic resulting from the project. For the most part, existing data concerning tow impacts is not sufficient to quantitatively assess the effects of traffic-induced impacts. A Plan of Study is being developed by the St. Louis District which will describe studies for quantifying biological impacts of incremental increases in navigation traffic. Federal and State resource agencies, as well as the Rock Island and St. Paul Corps Districts, are working cooperatively with the St. Louis District on the Plan of Study. Implementation of studies identified by the Plan of Study will be dependent on criteria which will indicate that the studies are feasible to perform; can be completed within a reasonable period of time; can be completed for a reasonable cost; will provide information for use for mitigation planning purposes; and have impacts which have a high probability of occurring.

4.89 The EMP is intended to yield net beneficial environmental impacts to the UMRS. Prior to implementation of any EMP project, the Corps District prepares a NEPA document to assess environmental impacts. This document is coordinated and reviewed by State and Federal agencies, other groups, and the public.

4.90 Other general future activities on the UMRS may include routine operation and maintenance activities; activities that may or may not be realized such as the installation of low-head hydropower facilities by non-Federal developers, flood control projects, projects by other Federal agencies such as U.S. FWS (refuge activities) and the U.S. Environmental Protection Agency (water and sewer projects); actions the navigation industry could take to alleviate navigation problems; and other activities that may require a Federal permit, including Section 10 and Section 404 activities regulated by the Corps of Engineers. Only those activities undertaken by Federal agencies, or involving a Federal permit or funding, are subject to environmental impact analysis under the National Environmental Policy Act.

ALTERNATIVE: NONSTRUCTURAL MEASURES

4.91 Any impacts occurring from this alternative would result from the use of federally-provided helper boats and/or switch boats, instead of constructing some of the proposed measures, as described in Section 2 (paragraphs 2.44 to 2.48). In this case, long-term localized impacts in the immediate vicinity of each lock would occur primarily to aquatic resources, since these boats would be used to assist tows in entering and exiting the lock. Since aquatic habitat in the vicinity of the locks is limited in quality, no adverse localized impacts would be anticipated.

4.92 The use of federally-provided helper and/or switch boats, or changes to lock operating policy, would increase the efficiency of operations on the lock wall. Safety problems associated with approach constraints or ice/debris passage would not be resolved, however.

SECTION 5 - LIST OF PREPARERS

The following people were primarily responsible for the information and analysis contained in this EIS:

Name	Discipline/ Expertise	Experience	Role in Preparing EIS
Ms. Karen L. Bahus	Biologist	10 years environmental studies, Rock Island District	Coordination and preparation of EIS; biological impact assessment
Mr. Denny Lundberg	Civil Engineer	10 years civil engineering, Rock Island District	Design information; coordination
Mr. Charles R. Smith	Asst. Chief, Planning Division (Archaeologist)	7 years cultural resources investigations, Rock Island District	Cultural resources impacts
Mr. Kenneth Barr	Archaeologist	3 years cultural resources investigations, Rock Island District	Cultural resources impacts
Mr. Jack Carr	Economist	5 years social and economic investigations Rock Island District	Social and economic resources; commercial navigation resources
Ms. Patricia Risser	Social Science Analyst	4 years economic and social impact analysis, Rock Island District	Social and economic impact assessment
Mr. Richard Beatty	Biologist	10 years environmental studies, St. Paul District	Coordination for St. Paul District
Mr. John Bellen	Civil Engineer	16 years civil engineering, St. Paul and Baltimore Districts	Coordination for St. Paul District

SECTION 6 - PUBLIC INVOLVEMENT AND COORDINATION

6.1 A public information fact sheet was sent to Federal and State agencies, organized groups, and the public on February 17, 1987. This fact sheet described the major rehabilitation effort and the measures being proposed for construction that would be analyzed in this EIS. Out of approximately 550 fact sheets mailed, 26 comment sheets were returned. Those sheets providing specific comments are located in Appendix VI.

6.2 Scoping meetings were held in order for agencies, groups, and the public to provide input concerning the scope and significant issues to be analyzed in this EIS. A scoping meeting was held on March 23, 1987, primarily for Federal and State agencies, in Chicago, Illinois. Five agency representatives attended this meeting. Evening scoping meetings were held on March 30, 1987, in St. Paul, Minnesota; April 6, 1987, in Rock Island, Illinois; and April 8, 1987, in East Peoria, Illinois. Nine (9) organizations attended the St. Paul meeting; 3 organizations attended the Rock Island meeting; and 13 organizations and 2 individuals attended the East Peoria meeting. Transcripts from these meetings are on file at the Rock Island District. Letters received at or after the scoping meetings are located in Appendix VI.

6.3 A summary of the comments received from the scoping meetings and fact sheet is provided below:

* Combine the 2nd Lock at L/D 26 and the rehabilitation work into one EIS (Tri-County Regional Planning Commission; U.S. EPA; U.S. FWS; Izaak Walton League). See Summary paragraph S.9.

* Increased traffic would further accelerate degradation of the Illinois River (Tri-County Regional Planning Commission).

* Bubbler systems will create additional navigation in the late fall/early spring (U.S. FWS, St. Paul). See paragraphs 4.44 to 4.48; paragraphs 4.62 to 4.66, and Summary paragraph S.3.

* Guidewall extensions are new construction, and not rehabilitation (Izaak Walton League).

* EIS must include assessment of improvements in navigation capacity - processing efficiency and throughput (Izaak Walton League). See paragraphs 4.24 to 4.66.

* Cumulative impacts from hydropower should be discussed in the EIS (U.S. EPA). See paragraph 4.90.

* Need to anticipate improvements as well as work that degrades the UMRS in the future to the year 2040 (Wisconsin Department of Natural Resources; U.S. FWS, Rock Island). See paragraphs 2.21 to 2.30, and paragraphs 4.88 to 4.92.

* The impact of navigation is more acute on the Illinois River. Any increase is critical to the ecosystem or discouraging to boaters and sportsmen (Illinois State Water Survey).

* Traffic projections should be revised so capacity and incremental changes are accurate. Traffic levels have not followed the Master Plan and should be revised (Illinois State Water Survey). See Summary paragraph S.8; and paragraphs 4.24 to 4.66.

* Address the alternative of using helper boats instead of the high cost/high impact guidewall extension concept (Area Fisheries Headquarters, Minnesota). See paragraphs 2.44 to 2.48.

* The guidewall extension at L/D 20 would impact upon North Riverfront Park (City of Canton, Missouri). See paragraphs 4.13 to 4.14.

* The rehabilitation elements are similar to the year-round navigation study (Missouri Department of Conservation). See Response to U.S. FWS Recommendations No. 3 and 4.

* The EIS should address all measures that may lead to increased navigation use of the UMRS. These measures could include structural as well as nonstructural measures (Wisconsin Department of Natural Resources). See paragraphs 2.21 to 2.30, and paragraphs 4.88 to 4.92.

* Assumptions used in this EIS should be consistent with the assumptions used in development of the EIS for the 2nd lock at L/D 26 (R) (Wisconsin Department of Natural Resources). See paragraphs 4.24 to 4.28.

* Formulation and evaluation of alternative plans should be based on the most likely conditions expected to exist in the future with and without the plan. While this is an ambitious undertaking, it is required if the objective is to predict the future condition of the UMRS in the year 2040 (Wisconsin Department of Natural Resources). See paragraphs 2.21 to 2.30, and paragraphs 4.88 to 4.92.

* The EIS should address all tributaries expected to receive commercial navigation use (Wisconsin Department of Natural Resources). See Section 3.

6.4 The St. Paul District contracted a traffic analysis with Louis Berger and Associates for Locks and Dams 2 through 10. The contractor presented the study results at a meeting held on April 10, 1987, at the St. Paul District Office. Federal and State agencies, and organized groups, attended this meeting.

6.5 The Rock Island District conducted a traffic analysis to determine whether construction of the rehabilitation measures would be likely to allow an increase commercial navigation. The interim report was provided for review and comment to those Federal and State agencies, and groups, providing input

during the scoping process. Comment letters received are included in Appendix VI. The interim report, with revisions resulting from this review, was incorporated as text into the EIS.

6.6 Concerning the cultural resources aspects, coordination with SHPO staffs from Illinois and Iowa began in 1979 for the hydropower projects under consideration at the time. The completion of the GREAT II study in 1980 elevated the issue of potential architectural-historical significance of locks and dams to the public record and brought the issues involved to the attention of SHPO staffs from Missouri and Wisconsin. Between 1979 and 1983, several letters of objection were received concerning hydropower projects. Basically, the various SHPO staffs were stating that impacts could not be evaluated in the absence of the historical-architectural study suggested in Recommendation 5007 of the GREAT II report. Ordinarily, resources less than 50 years old are not considered for inclusion in the National Register; however, it was felt that the uniqueness of the system and its economic importance justified an evaluation study.

6.7 Hence, in May of 1984 Rathbun Associates was awarded a contract to document the system and to make recommendations concerning National Register eligibility. The Scope of Work for the project was sent to the appropriate SHPO offices for review prior to advertisement for competitive proposals. The draft report was completed and submitted to the Rock Island District in November 1984. External review was initiated in February 1985, with copies provided to the SHPO's for Illinois, Iowa, Missouri, and Wisconsin. A copy also was provided to the ACHP. By separate action, Rathbun Associates staff provided copies to the Keeper of the National Register and Hasbrouck Hunderman Architects for distribution to the St. Paul and St. Louis Districts and the North Central and Lower Mississippi Valley Divisions of the Corps of Engineers.

6.8 Coordination between four SHPO offices and the two Federal agencies was a fairly complex procedure. The process was further complicated by the fact that the Mississippi River Nine-Foot Navigation Project as a whole falls under the jurisdiction of three Corps Districts from two separate Divisions. Hence, two meetings were held at the Rock Island District to discuss the study results, National Register eligibility issues, and possible compliance issues related to the major rehabilitation effort.

6.9 The first meeting was held on October 4, 1984, just prior to submission of the draft report. Rathbun Associates staff made a presentation to Rock Island District staff and SHPO staffs from Iowa and Illinois. Because of problems in obtaining review comments and the complexity of issues involved, a second meeting was held on June 4, 1985. In addition to Corps staff from the Rock Island and St. Paul Districts, SHPO representation included the States of Missouri, Iowa, and Illinois (Wisconsin declined to participate, as did St. Louis District, Corps of Engineers). The transcript of the meeting was distributed immediately after the session for future reference. This transcript is complete except for several minutes where recording problems occurred. The transcript represents staff opinions only. SHPO staffs were to provide formal written comments within 30 days on the technical quality

of the report and also on the content toward eligibility and preservation recommendations.

6.10 Cultural resources overview reports (with a Programmatic Agreement) were prepared to provide for the necessary coordination and project planning for Locks and Dams 3 through 22 pursuant to the National Historic Preservation Act and related guidelines and implementing regulations. These reports are available for review by interested parties. The ACHP has prepared a revised PA for Locks and Dams 3 through 22. The Commanders of the Rock Island and St. Paul Districts have signed the agreement, along with the Chairman of the ACHP. The Programmatic Agreement has been signed by the SHPO's from Illinois, Iowa, Missouri, Minnesota, and Wisconsin as well as the ACHP (see Appendix V).

6.11 In March 1988, the report entitled, Major Rehabilitation Effort, Mississippi River Locks and Dams 11 Through 22 in the Rock Island District: Evaluation of Impacts, was prepared by the District staff (see Appendix IV). This report provided an update on the planned rehabilitation work and was provided to the appropriate SHPO offices for review (letter dated March 10, 1988). Pursuant to paragraph 5 of the Programmatic Agreement, work anticipated but not yet planned at the time of the MOA writing was to be reviewed by the relevant SHPO at the time planning was to begin. This report detailed the proposed rehabilitation work at Locks and Dams 11 to 22 as described in this EIS. Letters were received from the Iowa SHPO (dated May 11, 1988), the Illinois SHPO (dated May 12, 1988), and the Missouri SHPO (dated June 10, 1988), which concurred with the District's findings. The Iowa SHPO did request that final plans and specifications be provided for review and approval, to ensure keeping with the Secretary of the Interior's Standards, prior to initiation of each measure. The District will comply with this request.

6.12 The draft EIS was sent to Federal, State, and local governmental agencies, as well as to private groups and individuals, for review and comment, as specified on the distribution list. Rock Island District responses to all comment letters received are found in Appendix I. The final EIS has also been sent to the addresses as specified on the distribution list. Coordination with interested agencies and individuals will be maintained as the study continues.

6.13 Application has been made to the States of Illinois, Iowa, and Missouri for Certification under Section 401 of the Clean Water Act. Section 401 Certification has been received from the Illinois Environmental Protection Agency (see letter dated December 2, 1988, in Appendix I), from the Missouri Department of Natural Resources (see letter dated January 12, 1989), and from the Iowa Department of Natural Resources (see letter dated February 22, 1989).

6.14 The U.S. Fish and Wildlife Final Coordination Act Report can be found in Appendix III. Coordination efforts between the Rock Island District and the U.S. FWS have been extensive. For ease of review, correspondence between the District and the Service is included in Appendix IV. The final Coordination Act Report contained the following recommendations, and Rock Island District's responses follow.

* U.S. FWS RECOMMENDATION NO. 1:

"The amount and quality of dredged material needs to be identified by lock. Disposal sites should be selected to avoid impacts to fish and wildlife resources. Site selection should be coordinated with this office and the adjacent states in accordance with requirements of Section 404 of the Clean Water Act and the National Environmental Policy Act;"

ROCK ISLAND DISTRICT REPONSE: Engineering data are presently not available in sufficient detail to address dredged or excavated material, and material disposal, for the guidewall extensions at Locks 12-22 and the guardwall at Lock 22. Funding for these measures is not anticipated prior to 1991, and details quantified now are likely to change. Therefore, in the future before implementation of any of these measures, the District will initiate a Design Report which will include a NEPA document to address environmental impacts. Only relatively small quantities of material are expected to be removed and would require disposal. The District will attempt to locate disposal sites on Government land and to avoid impacts to fish and wildlife resources. Should any disposal be needed below the ordinary high water mark, preparation and coordination of a Section 404(b)(1) Evaluation and receipt of Section 401(a) Water Quality Certification will be required. The site selection, Design Report, and NEPA document will be coordinated with your office and the affected states.

* U.S. FWS RECOMMENDATION NO. 2:

"Steps should be taken to protect the mussel beds in the embayments above Lock 15 and Lock 17 from tow propeller impacts, if tow approach and exit paths change after guidewall extensions are constructed. For instance, downbound tows should be asked to wait further upstream and upbound tows should not direct their propellers into the embayment;"

ROCK ISLAND DISTRICT RESPONSE: At Lock 15, a narrow mussel bed was found in the recessed bay area about 1,750 feet above the lockwall. No endangered, threatened, or rare species were collected from this bed. This mussel bed is not within the lock approach or exit area. Construction of two sheetpile cells about 600 and 1,000 feet above the existing guidewall will not change the present pattern of tows entering or exiting the lock. At Lock 17, another very narrow mussel bed was found in a recessed bay area about 1,200 to 2,000 feet above the lock wall. No endangered, threatened, or rare species were collected. The mussel bed is not within the lock approach or exit area, and tows now wait about 1/2 mile upstream of the embayment area. Extending the upper guidewall 600 feet will not change the present pattern of tows entering or exiting the lock. Therefore, additional protection of the mussel beds should not be necessary.

* U.S. FWS RECOMMENDATION NO. 3:

"The effects of the proposed bubbler system be evaluated by conducting a five-year study of changes in end of season and beginning of season tow traffic. Specific details of the study should be coordinated with the teams already established for the St. Louis District Plan of Study."

ROCK ISLAND DISTRICT RESPONSE: As discussed in the Final EIS, there are numerous reasons why the District has concluded that installation of the high-volume bubbler systems will not lead to an extension of the navigation season. However, the District will agree to monitor early- and end-season navigation traffic use at the locks using data from the PMS and OMNI systems, and other published data. The data to be collected will include number of tows and barges by direction, ice conditions, and air and water temperature, and other factors that may influence navigation. The District will need to begin by establishing baseline ranges for traffic and time periods. Then, after installation of the high-volume bubbler systems in Locks 2 through 22 on the UMR, the District will monitor early- and end-season traffic use at representative locks. As a practical matter, however, funding for installation of the high-volume bubbler systems will be requested on a site-by-site basis, and completion of all the systems is not anticipated until the late 1990's. We will coordinate specific details of the monitoring effort, timeframe, baseline interpretations, and monitoring results in the same manner as was done for our traffic analysis, which included Federal and State environmental, transportation, and economic agencies.

* U.S. FWS RECOMMENDATION NO. 4:

"Studies identified in the Year-Round Navigation Study, Peterson (1983), and the Environmental Management Program - Long Term Resource Monitoring Program (Rasmussen and Wlosinski 1988) should be reviewed and incorporated into the study design being developed for the St. Louis District Plan of Study. If significant impacts are identified, the Rock Island and St. Paul Districts should prepare a mitigation plan. In particular, consideration should be given to developing criteria for a closed navigation season; and that,"

ROCK ISLAND DISTRICT RESPONSE: The U.S. FWS and State agencies should pursue incorporating this recommendation into the study design being developed for the St. Louis District Plan of Study. Also, your agency can currently recommend what studies under the Long-Term Resource Monitoring Program are of highest priority for funding. Developing criteria for a closed navigation season also is addressed as an avoid and minimize measure (U.S. FWS No. A-9). As stated in our response to this measure, the Rock Island and St. Paul Districts are willing to extend the current discussions between St. Louis District, Coast Guard, RIAC, and your office to the middle and upper portions of the Mississippi River.

Although projected traffic increases are minor, concern has been expressed that increases in system traffic may not be evenly distributed throughout the navigation season; that is, traffic increases may be concentrated at the end of the navigation season. Based upon input provided by LBA, the traffic analysis identified the potential for an additional 10 to 20 lockages to occur at the end of the navigation season due to the installation of high-volume bubbler systems at Locks 2 through 22. Evaluation of this potential traffic indicates that end-season traffic is highly variable and that bubbler systems are unlikely to promote additional traffic.

Performance Monitoring System (PMS) data indicate that end-season traffic is highly variable and unpredictable. There is no typical time period or volume of traffic which can be associated with end-season navigation. The number of tows and corresponding lockages appears to be a function of prevailing weather conditions. An additional 10 to 20 lockages falls within this normal range of traffic and is not measurable over the existing condition. As an example, December traffic through Lock 18 for the period 1981 to 1987 averaged 98 tows, with a low of 42 and a high of 159 tows. During the last 5 days of the 1983 navigation season, 19 tows requiring 23 lockages transitted Lock 18. All were downbound except for two upbounds which locked through to help others, and one empty upbound returning to its winter base. During the final 5 days of the 1985 navigation season, 13 tows requiring 34 lockages transitted the lock. Ten of these were upbound and were locking through to help others.

End-season navigation requires risk-taking for both carriers and shippers. The decision to move a shipment depends upon the perception of risk by the parties involved and their own individual attitudes regarding risk aversion. In interviews with Rock Island District staff, industry representatives stated that bubbler systems will not induce further traffic, but only assist in the orderly withdrawal of tows from the Upper Mississippi River during the late navigation season. There are many reasons for this; among the most important, the uncertainty and risk associated with late season navigation. Carriers fear having their equipment trapped in the frozen river, while shippers fear the same for their cargo. A prime example of this occurred during the fall of 1986. Although the river was open and ice-free until early December, the barge and towing industry, still feeling the effects of a previous winter where they had equipment trapped in the ice, decided they would be out of the Twin Cities prior to Thanksgiving (November 27). Thus, although the river was ice-free for several days after Thanksgiving, end of season navigation was virtually nonexistent.

The risk and uncertainty for both shipper and carrier associated with end-season navigation are good reasons to doubt that any increases in system traffic will actually occur. Another limiting factor is increased lockage time associated with this period. With excessive lockage times of 3 to 4 hours, locks cannot accommodate an additional 5 lockages per day. Recognizing this, industry may be reluctant to incur additional delays for existing traffic by increasing end-season movements.

The major rehabilitation effort has no relationship to the Year-Round Navigation Study. Major rehabilitation of the locks and dams is critical to maintaining the safety and design capability of the navigation structures. The Year-Round Navigation Study did discuss bubbler systems, one of the features being addressed in the major rehabilitation EIS. The report for the Year-Round Navigation Study (Rock Island District, November 1980) indicated the following for Plan D-Continue the Present Navigation Operational Procedures (No Action Alternative):

> 4-5.022 This alternative would not preclude installation of equipment to improve the lock operation and maintenance which in essence may aid winter navigation: i.e., bubbler systems, etc. The bubbler system has proven to be effective in improving winter lock maintenance and operations and reduces the potential for lock damages. It can be assumed that additional installation of the systems may occur. This equipment is desirable for operation and maintenance of the lock gate damages which can be very costly, and reduce the safety hazard of removing ice from behind the lock gates by hand. The system would also assist in removing debris from the lock gate approaches during other months.

Bubbler systems that are already in place have been effective in reducing the hazardous practice of manually pushing ice and debris away from the lock gates, and reducing damage to the operating machinery caused by ice and debris. In addition, the principal constraint to year-round navigation in the UMR is the amount of ice in the navigation channel. Bubbler systems located in the miter gate area of the locks have not, and will not, affect this constraint.

Because of increased operating costs, and the hazard of tows freezing in, most operators will continue to avoid navigation during ice periods. However, the Corps of Engineers will move tows through the locks if they arrive during ice conditions, typically as a result of an early cold spell. The purpose of the bubblers is to get the tows through the locks with a minimum hazard to life and minimum damage to lock equipment and tows.

The year-round navigation study was terminated in 1981, and no authorization or funding is available for these studies. However, some related studies by the Rock Island District were funded under the GREAT II Implementation Program. The GREAT II Fish and Wildlife Management Work Group recommended studies of winter habitat requirements of fish and wildlife resources of the UMR. When possible, the Rock Island District has funded some of these studies related to winter biology since Fiscal Year 1983, using project operation and maintenance funds appropriated by Congress. References concerning these studies are listed below:

Hubert, W. A., G. E. Darnell, and D. E. Dalk. 1983. Evaluation of wintering benthic macroinvertebrates of pool 13 of the Upper Mississippi River. Wyoming Cooperative Fish and Wildlife Research Unit, Laramie, WY. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 30pp.

Lubinski, K. S. 1984. Winter diving surveys of main channel microhabitats and fish populations in Mississippi River reaches subjected to thalweg disposal. Aquatic Biology Tech. Rpt. 1984(13). IL Natural History Survey. Prepared for Department of the Army, Rock Island District, Corps of Engineers, Rock Island, IL 41pp.

O'Bryan, G. K. 1982. Hydroacoustic equipment: Review and evaluation. Appendix B to a pilot study to evaluate the winter fishery biology of pool 18 of the Upper Mississippi River, summary report. U.S. Fish and Wildlife Service, National Reservoir Research Program, Fayetteville, AK. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 12pp.

Peterson, G. A. 1983. Detailed plan of study for evaluation of winter fishery biology of pool 18 of the Upper Mississippi River. Appendix D to a pilot study to evaluate the winter fishery biology of pool 18 of the Upper Mississippi River, summary report. U.S. Fish and Wildlife Service, Rock Island Field Office, Rock Island, IL. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 6pp.

Peterson, G. A. ed. 1983. A pilot study to evaluate the winter fishery biology of pool 18 of the Upper Mississippi River, summary report. U.S. Fish and Wildlife Service, Rock Island Field Office, Rock Island, IL. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 14pp.

Peterson, G. A. 1982. Winter fishery biology of the Upper Mississippi River: a literature review. Appendix A to pilot study to evaluate the winter fishery biology of pool 18 of the Upper Mississippi River, summary report. U.S. Fish and Wildlife Service, Rock Island Field Office, Rock Island, IL. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 27pp.

Stang, D. L. and J. G. Nickum. 1985. Radio-tracking of catfish and buffalo under winter conditions in pool 13, Upper Mississippi River. Prepared for Fish and Wildlife Interagency Committee and Fish and Wildlife Service, Rock Island, IL and the U.S. Army Corps of Engineers, Rock Island District, Rock Island, IL. 44pp.

Thorne, R. E. and G. L. Thomas. 1983. Evaluation of hydroacoustic techniques for study of fish under winter conditions in Pool 18, Upper Mississippi River. Appendix C to a pilot study to evaluate the winter fishery biology of Pool 18 of the Upper Mississippi River, summary report. University of Washington, School of Fisheries, Seattle, WA. Prepared for U.S. Fish and Wildlife Service, Rock Island Field Office under Contract No. 14-16-0009-83-C12. 66pp.

* U.S. FWS RECOMMENDATION NO. 5:

"Coordination should continue on implementing feasible measures to avoid and minimize impacts. A coordination meeting with the Rock Island District should be held immediately and with the St. Paul District within the next two months."

ROCK ISLAND DISTRICT RESPONSE: Since no significant, adverse impacts have been identified for the proposed rehabilitation measures, mitigation is not proposed in the EIS. However, the avoid and minimize measures have been reviewed by the Rock Island and St. Paul Districts. Some of the measures have been implemented in the past to improve operational and/or maintenance conditions, and to produce positive impacts for the environment, both of which are goals shared by our agencies for the UMRS.

Coordination concerning the avoid and minimize measures is currently on-going between the U.S. FWS, states, Coast Guard, industry, and the St. Louis District for the lower reach of the UMR. The Rock Island and St. Paul Districts will consider these initial discussions and any agreements reached when investigating the measures for the middle and upper UMR.

Rock Island District (NCR) responses to each of the Corps-implementable measures are as follows. If implementation is determined to be feasible and in accordance with Corps authority, the measures would likely be incorporated into our on-going operation and maintenance program. We will arrange a coordination meeting in the very near future.

AVOID AND MINIMIZE MEASURES AS PROVIDED IN THE DRAFT COORDINATION ACT REPORT

* U.S. FWS No. A-6: Designate lock approach waiting areas and provide mooring cells.

U.S. FWS Biological Rationale: Tows waiting for lockage are close to sensitive main channel border habitat. Tows nose into shorelines. Concern is to avoid these impacts.

NCR Response and Implementation Plan: Mooring cells have been constructed at Locks 12 (upper), 13 (upper), and 22 (upper), to improve safety at these sites. NCR will explore the feasibility of implementing this measure at other sites. A recon-level study will begin in FY 89 to review approach problems at Locks 11-22. Potential solutions include mooring cells, protection cells, deadmen, etc., depending upon feasibility. FWS/other agencies will be asked to provide input for the recon (i.e., which sites are of most biological concern). NCR also will coordinate with industry. Costs may be high to construct and/or maintain cells in some cases.

* U.S. FWS No. A-8: Monitor channel depth more frequently.

U.S. FWS Biological Rationale: Efforts by grounded tows to get free cause habitat damage. Also, increased dredging/disposal needs may occur.

NCR Response and Implementation Plan: NCR believes that we currently have the best methodology and equipment for channel monitoring, and have fewer groundings in our reach of the river. NCR recently improved its reconnaissance capability on the UMR. A new, higher speed survey vessel is in use, and state-of-the-art equipment (electronic sounding) is used to monitor the condition of the navigation channel. Any problems are immediately brought to the attention of the Coast Guard, who disseminates the information to the towing industry. Usually, the entire channel is checked every month, and more frequently if a problem is developing. Additional monitoring of the channel would not guarantee that problems would be identified any sooner and that a dredge would be available. NCR is in the process of upgrading our channel monitoring capability on the Illinois Waterway. It is also not very likely that funding for additional equipment and labor would be approved in the near future. NCR believes that current efforts are sufficient, and will not pursue this measure further.

* U.S. FWS No. A-9: Limit and/or close navigation during ice or high water.

U.S. FWS Biological Rationale: Tow operation hazardous during these events; may cause pollution damage. Ice loosened by tows impacts denning species and shoreline habitats. Stuck tows and ice build-up under tows/barges increase physical effects of tow movements. FWS wants navigation season established.

NCR Response and Implementation Plan: High water already causes the closure of locks. The Coast Guard takes the lead in predicting ice conditions and closing the river when hazardous. The Coast Guard usually issues a "controlled zone" or "no navigation zone" when vessel operations would damage property, levees, etc. NCR issues a navigation notice to warn of hazardous navigation conditions. Coordination of ice information currently takes place through meetings with NCR/Coast Guard/River Industry Action Committee (RIAC). These activities will continue.

CRREL has developed for Corps use, as well as for use by others, an ice prediction model which can be used to predict where and when ice will form on the river. This could be used by industry to help schedule traffic around the potential threat of ice.

Establishment of a closed navigation season would need to be based on specific criteria such as ice thickness, water and air temperature, amount of tow equipment, economics (supply and demand), environmental parameters, etc. A standard or set closed season is not considered appropriate, since weather conditions can vary significantly from year to year. Congressional action may be required to modify existing navigation policy that would allow establishment of a closed season. We understand that the St. Louis District has initiated discussions concerning this issue with the Coast Guard, RIAC, and your office. The Rock Island and St. Paul Districts are willing to extend these discussions to the middle and upper portions of the Mississippi River.

* U.S. FWS No. A-11: Enforce maximum 9-foot draft.

U.S. FWS Biological Rationale: The greater the draft of a tow, the greater its physical impacts (drawdown, waves, scouring, sediment deposition, etc.). Unexpected drop in river level may ground overloaded barges.

NCR Response and Implementation Plan: NCR does not encourage or approve of drafts in excess of 9 feet. NCR does not have the authority to enforce a 9-foot draft. The Coast Guard has limited the draft through certain reaches during hazardous conditions, i.e., low water during the 1988 drought. There is no law or regulation stipulating a maximum draft of 9 feet.

* U.S. FWS No. C-3.4.5: Fleeting Regulations.

U.S. FWS Biological Rationale: Develop for environmental protection. Require that fleeting take place at mooring cells or deadmen to avoid tying to trees. Designate "no fleeting zones" to avoid areas of biological concern. Problem fleeting sites are: 683.0-694.0; 572.1-577.5; 550.5-556.7; 546.0-549.0; 520.3-522.5; 507.3-513.5; 468.0-476.0; 443.0-455.3; 426.5-437.2; 390.5-393.5; 369.5-379.5; 357.2-364.5; 324.8-328.5; 320.7-324.8; 301.2-304.0.

NCR Response and Implementation Plan: The Corps does not issue permits for fleeting activities per se. Department of the Army Section 10/404 permits would be required for any fill material or structures placed into the water that are associated with fleeting areas. Also, authorization from our Real Estate office is required for placement of any structures on Corps-administered land. Both of these activities would require compliance with the National Environmental Policy Act of 1969, as amended.

The Rock Island District has been involved in the recent discussions between your agency and industry representatives concerning the need to establish a permitting procedure for fleeting. We are aware that some areas have been identified where more than casual fleeting is underway. We will continue to work with all involved parties concerning this issue.

* U.S. FWS No. C-7: Complete shoreline management plans.

U.S. FWS Biological Rationale: Avoid poorly planned development. Zone categories of public/private uses and define specific management priorities to control uses on Government lands.

NCR Response and Implementation Plan: By Corps policy (36 CFR, Part 327.30) the purpose of the Shoreline Management Plan (SMP) is to permit and regulate the private exclusive use of Corps-administered shoreline (boat docks, storage sheds, etc.) Some areas will be closed to boat dock development. NCR is currently working toward completion of its SMP in FY89. NCS has completed their SMP (1987).

Barge fleeting and other commercial uses are not addressed in either SMP. LMS (1985) prepared a management plan and Final Supplement I, Final Environmental Impact Statement, Operation and Maintenance, Pools 24, 25, and 26, Mississippi and Illinois Rivers. The supplement and management plan were prepared in response to controversial fleeting permit requests.

* U.S. FWS No. D-1: Protect eroding shorelines.

U.S. FWS Biological Rationale: Waves from tows cause erosion, sediment suspension, and habitat damage. Protect banks from erosion and enhance fish and wildlife habitat. Specific reaches of most concern are: 602.5-608.2; 594.0-600.5; 609.5-615.1; 570.0-574.0; 530.5-532.8; 540.0-542.0; 550.5-554.0; 507.3-517.2; 520.3-522.5; 457.2-463.5; 471.0-476.0; 413.5-416.0; 398.8-403.6; 347.0-349.4; 352.0-354.0.

NCR Response and Implementation Plan: NCR authority is limited to the protection of the navigation channel or public facilities. Examples of past actions include bank protection and armoring of the head of islands in conjunction with our on-going wing dam rehab program; bank protection above L/D 21 and below L/D 16 to avoid damage to the shorelines; and many others. Where done, environmental features for fish and wildlife have been incorporated. FWS will provide NCR with maps and locations identifying the sites of most concern. NCR will assess what may be causing the erosion problems at these sites, and those falling within existing authority will be investigated further.

* U.S. FWS No. D-9: Build diversion structures to reduce sedimentation.

U.S. FWS Biological Rationale: Sediment deposition in side channels/ backwaters decreases their value for fish and wildlife resources.

NCR Response and Implementation Plan: NCR is also including Measures D-10 and 11 in this response because of similar purposes. Structures to reduce sedimentation in backwaters is beyond current authority; however, when structures are designed or repaired for navigation channel maintenance, reduction of sedimentation into backwaters and side channels is considered in the design. In the late 1970's, NCR established the Committee to Assess Regulatory Structures (CARS). U.S. FWS attends CARS meetings and provides input concerning fish and wildlife resources. Examples of actions taken by CARS include structures placed at Ackerman's Cut at mile 613.0, and the proposed work at Hurricane Island at mile 599.0. There are over 200 closing dams or structures at the upper ends of the chutes and sloughs which assist in channel maintenance and keep heavy sediments out of the backwaters.

Since the means to review and possibly implement proposals already exists at NCR, FWS/states should develop a list of specific areas of concern to be provided to CARS. Those falling within existing authority will be investigated further.

* U.S. FWS No. D-10,11: Construct barrier islands, reefs, or floating breakwaters.

U.S. FWS Biological Rationale: Reduce wave impacts and sediment input to off-channel areas.

NCR Response and Implementation Plan: See response provided for measure D-9 since it has a similar purpose.

The use of "traditional" reef and breakwater structures may not be practical for river conditions (difficult to maintain in currents and ice conditions). A potential EMP project in Peoria Pool will investigate the feasibility of constructing islands. Costs may be high in some cases, depending upon quality of dredged material and location of island. More input is needed into OSIT and channel maintenance site plans to construct islands from maintenance dredging activities, where cost effective.

* U.S. FWS No. D-13: Modify wing dikes to reduce accretion.

U.S. FWS Biological Rationale: Dikes/training structures have caused sediment accretion in main channel border. Modify by notching, etc., causes scouring of sediments and diversification of aquatic habitat.

NCR Response and Implementation Plan: Modifications of wing dikes is an on-going program at NCR, and modifications and/or redesigns are done annually. While good success has been obtained on the Missouri and Lower Mississippi Rivers with notching of emerged structures, NCR is not convinced that this will work with submerged structures on the UMR. The projects done as demonstrations during GREAT II seemed to be inconclusive, or were failures (Pools 13-22).

FWS/states should provide NCR with a list of priority sites based on biological concerns. NCR will then assess the list of potential sites to determine if any should be investigated further.

* U.S. FWS No. D-14: Realign channel or move sailing line.

U.S. FWS Biological Rationale: In certain locations, tows may cause suspended sediments to be directed into backwaters or main channel borders. Move sailing line away from these habitats to reduce impacts.

NCR Response and Implementation Plan: Moving channel sailing lines usually has a high cost associated with it and increases immediate channel dredging needs. At Quincy, Illinois, the channel was moved to accommodate a new bridge; in over a 9-year period, about 900,000 cubic yards were dredged and 6 wing dams were removed, modified, or replaced. In current dollars, this would amount to about $5 million to relocate 1 mile of channel. Any change in current alignment of channels where hydraulic equilibrium has been reached is likely to cause increased dredging in adjacent areas.

Channel improvements have been done by NCR in the past to reduce hazardous navigation areas, which is the limit of our authority. For example, the Pool 15 Channel Improvement (miles 489-493) reduced the potential for maneuvering problems, groundings, damage to tows/barges, and spills, while incorporating improvements to aquatic habitat and recreation areas.

FWS will provide NCR with further information as to their concerns with the suggested reaches. NCR will investigate further any reaches falling within existing authority.

The St. Paul District has implemented a number of actions that relate to your measures, and will continue doing so under their channel maintenance program in the future. These actions are shown below.

Description	Locations Pool/ River Mile	Date Completed	Comments
Reduce dredging requirement by selectively reducing width and depth of certain reaches of 9-foot channel	UMRS		Reduced NCS dredging requirements by 50% thereby reducing need for disposal areas.
Relocation of navigation markers	UMRS		Has reduced district dredging requirements.
Wingdam modification/ construction for maintaining channel	RM 664	1984	By concentrating flow in main channel reduced sedimentation and dredging requirements.
Sediment trap at mouth of Chippewa River	RM 764	1984 1985 1988	Captured Chippewa River sediment load before it entered UMR; enabled more efficient and environmentally sound dredging and disposal activities.
Wingdam construction L/D 5A	RM 729	1965	Constructed to prevent the outdraft at upstream lock entrance at L/D 5A; provide improved fishery habitat.
Scour protection above and below L/Ds 3-10	UMRS	1984	Placed rock in large scour holes above and below the locks and dams; improved fishery habitat in the process.

Removal of dredged material from historic placement sites to new permanent sites	RM 730.5 RM 762.7 RM 744.7 RM 759.5 RM 745.3 RM 644.5	1984 1985 1986 1987 1987 1987	Dredged material has been removed from historic disposal areas and placed in less damaging locations; this has allowed the continued use of the historic site without expansion into undisturbed areas.
Beneficial use of dredged material	UMRS	1978 to 1988	During the past 10 years, two-thirds of maintenance generated dredged material has been put to numerous beneficial uses and not placed in COE disposal areas. This has prolonged the life of these sites and reduced the need to expand into undisturbed areas.
Vegetative stabilization of disposal areas	RM 744.7 RM 753.4 RM 647.0 RM 849.0 RM 744.0	1982 1984 1984 1986 1988	The banks of existing disposal areas have been stablized by the establishment of vegetation; this has created habitat, along with reducing erosion of the dredged material into the river.
Shoreline protection	RM 646.5 RM 670.0 RM 798.0 RM 731.0	1977 1981 1984 1987	Rock riprap has been placed along the river bank to maintain channel alignment and to prevent erosion; this has prevented sedimentation in backwater areas, reduced dredging needs and provided improved fishery habitat.
Improved dredging equipment	UMRS		Improved techniques and equipment used in maintenance dredging activities has allowed us to use fewer disposal areas by concentrating the disposal at fewer sites, to place the material farther away from the river, and to provide better containment areas.

6.15 The conservation agencies of the States of Minnesota, Wisconsin, Illinois, Iowa, and Missouri provided letters of comment and concurrence on the draft Coordination Act Report. U.S. FWS has indicated that the Final Coordination Act Report recommendations remain substantially the same as presented in their draft report (see letter dated February 1, 1989, in Appendix III). The State letters of comment are reproduced on the following pages, and Rock Island District responses to their comments and recommendations are provided.

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

BOX . 500 LAFAYETTE ROAD • ST. PAUL, MINNESOTA • 55155-40_____

DNR INFORMATION
(612) 296-6157

March 3, 1988

Richard C. Nelson, Field Supervisor
United State Department of Interior
Fish and Wildlife Service
Rock Island Field Office
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Re: Draft Fish and Wildlife Coordination Act Report
For Major Rehabilitation of Locks and Dams 2 through 22
Draft Environmental Impact Statement

Dear Mr. Nelson:

The Minnesota Department of Natural Resources (DNR) has completed a review of the above referenced Draft Fish and Wildlife Coordination Act Report. We concur with the U.S. Fish and Wildlife Service report and with your contention that end-of-season increases in tow traffic resulting from the proposed major lock and dam rehabilitation effort is the main concern from a biological perspective. These increases could be potentially disastrous to fish and wildlife, particularly in the northern reaches of the Upper Mississippi River System. Closing the navigation season in advance of ice conditions is crucial in minimizing potential biological impacts. 1.

In support of this concern, we suggest that the following two variables be added to the 12 variables listed on Page 17 relating to the magnitude of impact resulting from tow movement:

13. Ice cover thickness - impacts increase in direct relationship to ice cover thickness, and 2.

14. Water Temperature - many organisms become sluggish or inactive with falling water temperatures.

Thank you for the opportunity to review and comment on your report. If you have any questions regarding the DNR's comments or require any additional information from the Department, please let me know.

Sincerely,

Joseph N. Alexander
Commissioner

c. Steve Johnson
Jack Skrypek
Laurel Reeves

AN EQUAL OPPORTUNITY EMPLOYER

EIS-162

ROCK ISLAND DISTRICT RESPONSES

1. See response to US FWS Recommendation No. 3.

2. Noted.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Carroll D Besadny
Secretary

BOX 7921
MADISON, WISCONSIN 53707

1650-2

March 4, 1988

Mr. Richard C. Nelson
Field Supervisor
Fish and Wildlife Service
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

Thank you for a copy of your Draft *Fish and Wildlife Coordination Act* Report for the Major Lock and Dam Rehabilitation of Locks 2 through 22 on the Mississippi River. We agree on the need for additional data collection and for identification of mitigation requirements for increases in traffic that may result from the proposed major lock rehabilitation measures at the end of a navigation season.

1.

I would state further that we are concerned about any additional increases in navigation traffic on the Upper Mississippi River System, since there is already concern about the current effects of navigation traffic on the UMRS without any more increases in traffic. Congress has acknowledged that existing conditions on the UMRS are already significantly bad enough to warrant environmental rectification measures (Environmental Management Program, Water Resources Development Act of 1986).

2.

A copy of our comments to the Rock Island District Corps of Engineers during the scoping process for this project has been sent to you separately. We also sent you copies of communications we've recently had with the U. S. Coast Guard regarding reducing the potential for impacts from late season navigation.

3.

Sincerely,

C. D. Besadny
Secretary

CC: James Lissack - WCD
James Buntoon - SD

EIS-163

ROCK ISLAND DISTRICT RESPONSES

1. See response to US FWS Recommendation No. 3.

2. Noted.

3. Noted.

Illinois Department of Conservation
life and land together

LINCOLN TOWER PLAZA • 524 SOUTH SECOND STREET • SPRINGFIELD 62701-1787
CHICAGO OFFICE • ROOM 4-300 • 100 WEST RANDOLPH 60601
MARK FRIEDL, DIRECTOR

March 2, 1988

Mr. Richard C. Nelson
Field Supervisor
Fish and Wildlife Service (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

The Department has reviewed your draft Fish and Wildlife Coordination Act Report for the Major Lock and Dam Rehabilitation of Locks 2 through 22 which you transmitted to us on February 9, 1988.

Generally we concur with the report and its recommendations, however, there are several areas where additional emphasis is warranted:

EIS-164

Spoil and Disposal Sites

The report (page 14), 3rd paragraph discusses potential disposal sites relative to guidewall extentions. It also states, "Due to the relatively small quantities of material expected, it is anticipated that finding a disposal site with little or no environmental impact will not be a problem."

1. It has been our experience in serving as an On-site Inspection Team (OSIT) member on the Mississippi River that OSIT has, at times, great difficulty in finding environmentally sound disposal sites for "relatively small quantities" of spoil material. This is true particularly in areas such as Lock and Dam 15, one of the areas where spoil will be created by the rehab program. The Department recommends that for each rehab site discussed in the report, additional information should be provided on estimated quantities of spoil and potential disposal sites.

Traffic Projections

We note that Table 2 and 3, page 21 generally suggest no to little change in tow traffic on the Illinois River but an increase in tow traffic on the Mississippi River with the rehab program in place.

2. It is unclear, from the report, how the proposed rehab work can effect traffic levels on the Mississippi River without a similar impact to the Illinois River. We recommend additional narrative be provided to clarify this difference.

ROCK ISLAND DISTRICT RESPONSES

1. See response to US FWS Recommendation No. 1.

2. Traffic, commodities, constraints, and proposed measures for the two waterways are considerably different, which is why the traffic analysis shows a difference in traffic levels.

Further, the Department remains concerned with the way the Rock Island Corps reported the increase in barge traffic. The data in your draft is based on tows per week. Based on tows per week (Table 2) the numbers of tows appear to be minimal, ranging from 1 to 4 tows/week during the navigation season. In fact, your report states, "The amount of traffic increase projected by the Rock Island District is within the normal variability of any navigation season." Your report further states "we believe that the projected increase in tow traffic during the navigation season due to this program is too small to measure significant impacts to fish and wildlife resources." An exception to this conclusion may be the impact that occurs at the end of the navigation season when increases up to 20 tows/week could occur (Table 3). Could not a similar increase occur during some other critical seasons, say during spring spawning or during the summer when juvenile fishes are in abundance? Depending on how the projected increases were calculated, it seems that such increases may be possible. If a 20 tow/week increase occurred during prime walleye spawning, would it still have an insignificant impact? Have all these traffic projections considered the timing of the increase in traffic? It remains difficult to comprehend that the projected increase resulting from the major lock and dam rehabilitation will not have significant impacts on the river system. 3.

Relative to avoid and minimize measures discussed in your Conclusions and Recommendations Section of the report, John Brady, St. Louis Corps District, has contacted Department staff concerning a meeting to discuss items in the St. Louis portion of the river. This meeting was scheduled for April 5 but is being changed to another date. 4.

Hopefully, these kinds of meetings and meetings with the Corps concerning their Plan of Study to design and implement a method to quantify the impacts of incremental increases in tow traffic will provide the impetus in providing the needed protection for fish and wildlife resources of the Upper Mississippi River System.

Thank you for the opportunity to comment.

Sincerely,

Mark Frech

Mark Frech
Director

MF:RWL:gb

cc: Iowa DNR (Szcodronski)
Minnesota DNR (Skrypek)
Missouri DNR (Dieffenbach)
Wisconsin DNR (Newman)
USEPA (Bronoski)

EIS-165

3. Review of the traffic analysis contained in the EIS (see paragraphs 4.24 to 4.67) should clarify the points raised in this comment. The traffic analysis is complex, and not easily summarized. Also, there are no reasons why any increases in traffic would vary from existing traffic patterns.

4. The St. Louis District has also involved the Rock Island and St. Paul Districts concerning the avoid and minimize measures, and Plan of Study, for the Second Lock at L/D 26 (R) project. We will continue to work closely with the St. Louis District and the Federal and State agencies involved with the Second Lock project.

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

March 3, 1988

Richard C. Nelson
U.S. Fish and Wildlife Service
1830 Second Avenue, Second Floor
Rock Island, IL 61201

Dear Mr. Nelson:

Iowa Department of Natural Resources staff have reviewed the February 1988 Draft Fish and Wildlife Coordination Act Report for the Major Lock and Dam Rehabilitation of Locks 2 through 22. We concur with the contents and recommendations in the draft report.

We provide the following comments for your information and discretion for inclusion in the report:

1. We agree; it is unfortunate that the Environmental Impact Statements for the major rehabilitation of the locks and dams and the Lock and Dam 26 (Replacement) Second Lock were not combined, or at least distributed together for review. Both actions will result in similar systemic impacts caused by small increases in commercial traffic on the river. Seemingly small, incremental increases will eventually combine to cause significant adverse environmental impacts. 1.

2. Impacts of small increases in commercial traffic are difficult to measure. However, certain river areas will incur impacts. Commitments from the Corps of Engineers and navigation industry are needed now to avoid, and if unavoidable, mitigate for the environmental losses. Such river areas were identified by the impact panels convened for the Lock and Dam 26 (Replacement) Second Lock. 2.

3. We also are concerned about the concentration of increased traffic 5-7 days just before winter freeze-up. Fish are very vulnerable to adverse impacts during this time since their metabolic rate is slow and they cannot respond rapidly to induced stress. Winter den sites of furbearers may be exposed to cold air and physical destruction caused by water drawdowns and turbulence. Remaining waterfowl enroute to their wintering areas will be forced to expend energy as they seek refuge from tow traffic. In fact, all fauna in the vicinity of late season navigation will be susceptible to adverse impacts. 3.

4. Recommendations #1 of the draft report states that "disposal sites for any dredged material should be selected to minimize impacts to fish and wildlife resources." Since the quantities of dredged material should be small, impacts to fish and wildlife can and should be avoided. 4.

WALLACE STATE OFFICE BUILDING / DES MOINES, IOWA 50319 / 515-281-5145

EIS-166

ROCK ISLAND DISTRICT RESPONSES

1. During scoping and subsequent coordination of this EIS, comments were received concerning the perceived need to combine the impact analysis for the major rehabilitation measures and the Second Lock at L/D 26 (R). Commentors felt that these actions were related and reasonably foreseeable, which would require analysis in one EIS. The Rock Island and St. Louis Districts disagree, and maintain that the actions are independent (neither depends upon the other for implementation), are under separate jurisdiction, and are under separate Congressional authorization.

2. Noted. The St. Louis District has also involved the Rock Island and St. Paul Districts concerning the avoid and minimize measures, and Plan of Study, for the Second Lock at L/D 26 (R) project. We will continue to work closely with St. Louis, the Federal and State agencies, and the navigation industry concerning this project.

3. See response to US FWS Recommendation No. 3. The traffic analysis identified that the installation of bubbler systems may allow the potential for an additional 10 to 20 lockages to occur at the end of the navigation season, which is not the same time period as "just before winter freeze-up." The traffic analysis discusses this, and why it is highly unlikely that a higher level of end-season navigation would actually occur (see EIS paragraphs 4.44 to 4.50; 4.55 to 4.57; and 4.62 to 4.65).

4. See response to US FWS Recommendation No. 1. The District will make every attempt to avoid impacts to fish and wildlife resources.

5. We understand that mussel beds are located near locks 15 and 17, but not within the lock approach or exit area. Even though the chances of significant impacts seem remote, the Corps of Engineers should be required, rather than encouraged, to protect the mussel beds from approaching or waiting tows.

5.

Thank you for the opportunity to review the draft Fish and Wildlife Coordination Act Report.

Sincerely,

LARRY J. WILSON
DIRECTOR

5. See response to US FWS Recommendation No. 2.

EIS-167

MISSOURI DEPARTMENT OF CONSERVATION

MAILING ADDRESS:
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Jefferson City, Missouri 65102-0180

STREET LOCATION:
2901 West Truman Boulevard
Jefferson City, Missouri

Telephone: 314/751-4115
JERRY J. PRESLEY, Director

March 7, 1988

Mr. Richard C. Nelson
Field Supervisor
U. S. Fish and Wildlife Service
1830 Second Ave, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

This is in response to your recent letter and attached Draft Fish and Wildlife Report on the Major Lock and Dam Rehabilitation, Mississippi River Pools 2 through 22. With the planned improvements to manage ice, it is very important that we work toward a closed season. Correspondence from Mr. Larry R. Gale to Colonel Neil Smart dated October 21, 1987, indicates the recognition of that need and a possible means for implementation. A copy of that letter is attached. 1.

Specific comments on the draft report are as follows:

Page 9 - #5 and #14. We recommend that a mussel survey be conducted prior to the extension of upper guidewalls at Locks and Dam 20, 21 and 22.

Page 11 - #6. A large mussel bed exists immediately downstream of Lock 22. A mussel survey of this site is also recommended.

Page 17, paragraph 1. Add a #13 to the list...13) Ice cover. 2.

Page 18, paragraph 2. Change—"extended navigation" to extended winter navigation, and add a sentence that discusses the potential impacts from ice and tow movement to aquatic life in deep holes along the main channel.

Page 22. The source of data presented in Figure 11 should be cited on the Figure. Does it show an increase of five to six tows per day? Seems high based on our experience.

I hope these comments are helpful. If you or your staff have questions, please contact William H. Dieffenbach of my staff.

Sincerely,

Dan F. Dickneite

DAN F. DICKNEITE
ENVIRONMENTAL ADMINISTRATOR

EIS-168

ROCK ISLAND DISTRICT RESPONSES

1. See response to US FWS Recommendation No. 3.

2. Noted. The U.S. Fish and Wildlife Service informed us in their letter dated March 16, 1988, that your office has reconsidered, and mussel surveys are not necessary at the guidewall sites. If there is an opportunity to survey these beds in the future, the Rock Island District will do so.

October 21, 1987

Colonel Neil A. Smart
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Re: Planning Division - Rehabilitation of Lock and Dam 2 through 22

Dear Colonel Smart:

1. In response to a September 22, 1987 letter concerning the preparation of an environmental impact statement on the site-specific and cumulative impacts of major rehabilitation at Locks and Dams 2 through 22, we have reviewed available data and previous correspondence.

2. Our major concern is the potential to increase winter and year-round navigation. The discussion on page 18, Item 38 gives no assurance that navigation interests will not attempt to stretch the season and thus increase damage to the Upper Mississippi River ecosystem. Perhaps it is time to evaluate means to provide a reasonable winter closing date for navigation. Analysis of historic degree day temperature record and ice formation data could produce criteria allowing the Corps of Engineers to predict ice formation and thus issue winter closure navigation notices. Such a procedure would alleviate many of our concerns regarding winter navigation.

Specific comments:

1. A search of rare and sensitive species information yielded the following:

3. Fat pocketbook (Potamilus capax) occurs immediately below Lock and Dam 22. This mussel is endangered at the state and federal levels. The record is from 1984. This species was also recorded between Locks and Dams 20 and 19 in 1986.

Hickory-nut (Obovaria olivaria) occurs immediately below Lock and Dam 22. This mussel is endangered in Missouri. The record is from 1984.

ROCK ISLAND DISTRICT RESPONSES

1. Noted.

2. See response to US FWS Recommendation No. 3.

3. We appreciated receiving this information.

Rock pocketbook (Arcidens confragosus) occurs within 1.0 miles downstream of Lock and Dam 22. This mussel is endangered in Missouri. The record is from 1977.

A rookery including Great egret (Casmerodius albus) occurs between Locks and Dams 22 and 21. This bird is watchlisted in Missouri. The record is from 1985.

3. Bald eagle (Haliaeetus leucocephalus) has a known major roost site just below Keokuk, Iowa, on the Illinois side. Areas near Lock and Dam 19 are considered major winter feeding and resting areas. Restrictions on construction activity periods may be necessary during December through February (including further restriction during severe winters). Locks and Dams 21 and 22 are not considered major wintering areas but effort should be made to reduce disturbance of the birds. The bald eagle is endangered at the state and federal levels. The record is from 1985.

Lake sturgeon (Acipenser fulvescens) may occur between Locks and Dams 20 and 19. This fish is endangered in Missouri and is a federal candidate for listing as a threatened or endangered species. Lake sturgeon were recently reported by commercial fishermen below Lock and Dam 22.

Alabama shad (Alosa alabamae) may occur between Locks and Dams 20 and 19. This fish is rare in Missouri. This historic record is from 1944.

EIS-170

4. 2. Page 2 - Item #8. We are somewhat surprised that Red Rock Reservoir has not eliminated "extensive ice floes and debris during the late fall and early spring" from the Des Moines River.

5. 3. Page 5, Item #17. What is the rationale for utilizing lock capacity data for Lock and Dam 25 other than that generated by the Master Plan Study?

6. 4. Page 7, Item #26. What are "exogenous factors"? Would it include weather, grain prices, impact of oil price changes, etc.? Also, does this item mean economic factors would dictate navigation under ice conditions?

7. 5. Page 8, Item #29. Is the 1.6 percent increase in navigation for the vertical lift gates spread equally throughout the year or is a higher percentage of the increase in late fall/early spring?

8. 6. Page 9, Item #35. The increased traffic with bubbler systems in place is reported by Louis Berger & Associates as 1.0 percent for the

4. There are 143 miles of the Des Moines River below the Red Rock Reservoir.

5. Capacity reported in the Master Plan for Lock 25 contained an error in the data. Data was revised after publication of the Master Plan which corrected the error.

6. Exogenous factors do include the items you mention and economic factors would dictate navigation under ice conditions.

7. The increase is expected to be greater during times of high ice or debris floes, usually during the spring.

8. See EIS paragraphs 4.44 to 4.48, and paragraph 4.67. It is expected that the installation of high-volume bubbler systems will only promote the orderly exit of tows at the end of the season.

entire year. Will late fall/early spring increases be higher than 1.0 percent?

9. 7. Page 11, Items #41 and 42. The seemingly small increases raise the question of the economic justification for this activity. .

8. Page 12, Item #46. The statement, "decrease average downbound approach time by 4.0 minutes" is informative. Based upon staff observations, the problem with locking delays relates to the timing or spacing of tow traffic. If tows were evenly spaced, up and down, it appears there would be excess locking capacity well into the foreseeable future.

10.

I believe these somewhat lengthy comments express our concerns. If you or your staff have questions or wish to discuss these comments, please contact William H. Dieffenbach of my staff.

Sincerely,

LARRY R. GALE
DIRECTOR

cc: U. S. Fish and Wildlife Service
Rock Island, Illinois

EIS-171

9. Economic justification is based on reduced maintenance and lock breakdowns.

10. Noted.

INDEX

GLOSSARY

Auxiliary Lock: Also called the emergency lock, and is adjacent to the main lock. It consists of one set of lock gates without operating machinery. Its purpose is to provide a passage for vessels in the event the main lock and/or dam is out of operation.

Benthic: The bottom region of a stream or water body.

Bow Boat: Small, low-horsepower (less than 1000 hp) independently operated boats designed to operate at the bow of the tow to aid in steering and propulsion.

Bow Thrusters: A very small, low-horsepower unit, attached to a barge, which aids in steering and propulsion.

Bulkhead: A structural unit that is used to close off a lock or dam gate in order to dewater the area.

Butterfly Valve: A type of valve used to regulate flow and maintain pool at Peoria and LaGrange Dams on the Illinois Waterway. Butterfly valves are located in the regulating weir, which is at the end of the wicket dam (opposite the lock).

Commodity: An article of trade or commerce. On the UMRS navigation system, commodities include grain, coal, petroleum, and fertilizer.

Double-Lockage: When tows with 9 or more barges are broken apart, with each section passed separately through the lock.

Fluviatile Dam: A barrier that is formed when a stream deposits its load of sediment at the point where it joins another stream, thereby creating a dam.

Geomorphologic: Relating to the form of the earth or its surface features.

Habitat: A specific type of place occupied by an organism, a population, or a community.

Helper Boat: Usually low-horsepower towboats (usually less than 1000 hp) used at lock sites to assist approaching tows, and to extract unpowered cuts along the guidewall so that recoupling of barges can occur completely outside the lock chamber.

Induced Traffic: Consists of near-term traffic which may use the system as a direct result of construction of the proposed measures. It may occur if a measure dramatically improves the total efficiency, reliability, or availability of the transport system.

Invertebrate: An animal without a backbone, such as freshwater mussels and insects.

Lock Capacity: The capacity of a lock is a function of the physical, environmental, and economic factors affecting its performance. Physical factors include the dimensions and sill depth of the lock, as well as its operating parameters such as lock cycle time. Physical factors place a theoretical upper limit on the amount of traffic a lock can process. Environmental factors include fog, ice, flow, and other natural occurrences which affect the availability and operation of a lock. Economic or market variables control the level of demand for a lock. Economic variables include commodity flows, equipment types, average tow sizes, level of empty backhauls, etc.

Macrophyte: Large-bodied aquatic plants; not microscopic.

Miter Gates: The gates located at either end of the lock chamber, which are opened and/or closed to fill and/or empty the chamber.

N-up/N-down: A type of lock operating procedure pertaining to the service order of arriving towboats. It allows several tows moving in one direction to pass through a lock in a shorter period of time. Currently, tows arriving at UMR Locks are usually serviced on a first-come/first-serve basis in order of their arrival.

Outdraft: The river current near a lock and dam that tends to pull traffic away from the lock approach. It occurs both upstream and downstream from locks and dams.

Oligochaetes: A specific type of worm such as earthworms, and many small freshwater worms.

Performance Monitoring System (PMS Records): A National data base that contains information on traffic through individual locks. It includes data on time, tonnage, number of barges, commodities, etc.

Photosynthesis: The conversion of light energy to chemical energy; the production of carbohydrate from carbon dioxide in the presence of chlorophyll, using light energy. It occurs only in the cells of green plants.

Poiree Dam: A prefabricated steel, wall-type structure used to seal an area for dewatering and construction purposes.

Queue: A waiting line of towboats.

Regulating Weir: See Butterfly Valve.

Service Bridge: The structural unit that spans the concrete piers on the dam, and supports the dam gates and operating machinery.

Sinuosity: Having many curves, bends, or turns; winding.

Substrate: The base or material on the bottom.

Switchboat: Higher-horsepower boat used to move strings of barges and reconfigure tows at sites away from the lock.

System Capability (Traffic): A cumulative assessment of the characteristics of the proposed measures identified under lock capacity and induced traffic, to determine their total impact on the UMRS navigation system.

System Efficiency: Refers to the overall operation or performance of the UMRS navigation system.

Tainter Gate: A type of gate in a dam used to maintain pool levels. There are two types of tainter gates; the submersible gate allows water to pass either under or over the gate, whereas a nonsubmersible gate allows water to pass only under the gate.

Traveling Kevel (Mooring Bitt): A cable assembly located on rails running along the length of the guidewall that extracts the first half of a split tow from a lock chamber.

Wing Dam: Structures constructed of rock and brush that are placed along the shoreline of a river, to direct water toward the main channel.

"With-Project" Condition: Includes those features in the "without-project" (base) condition plus construction of all the proposed rehabilitation measures.

"Without-Project" (Base) Condition: Includes all existing features of the UMRS navigation system plus 1,200- and 600-foot chambers at new Locks and Dam 26.

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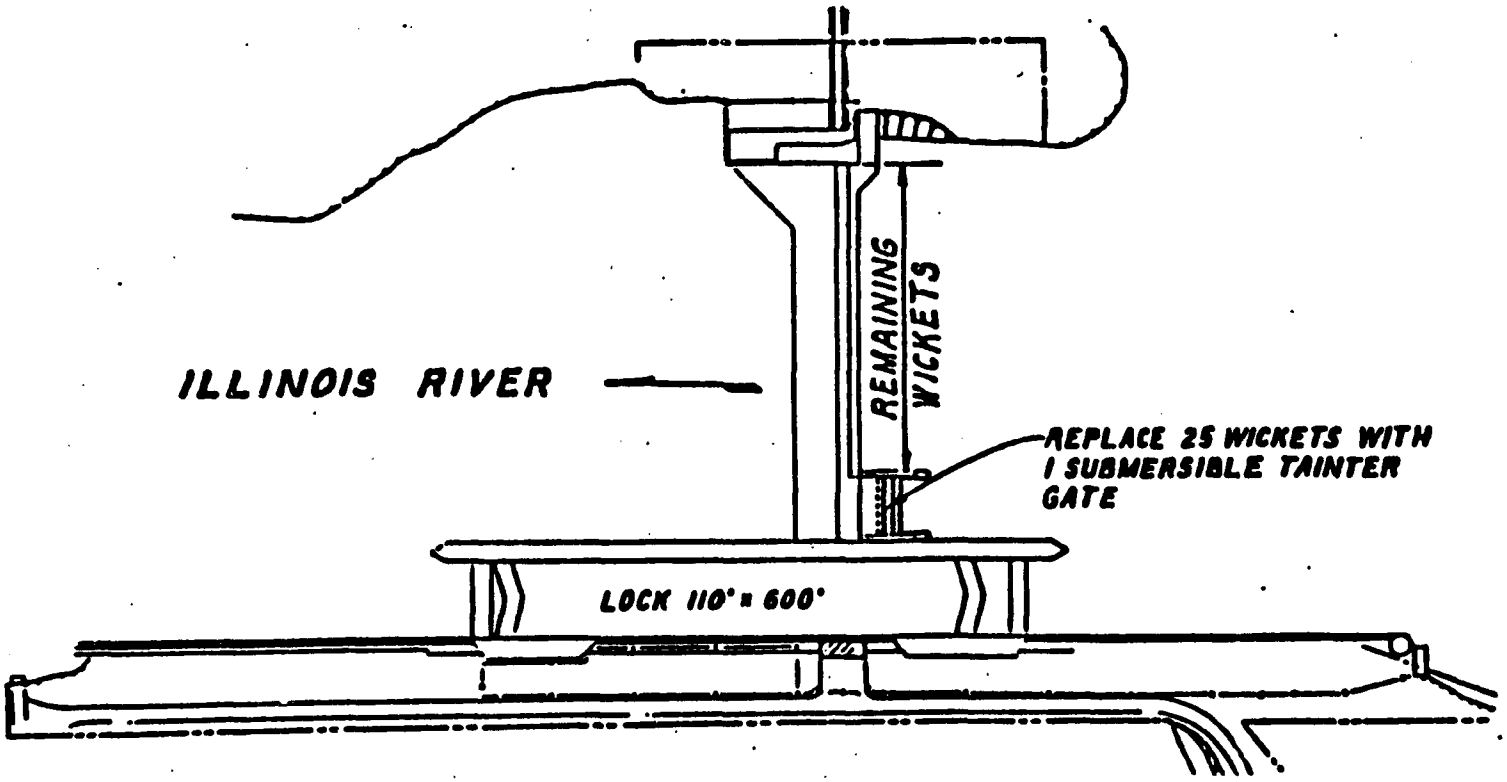

PLATE 1

SUBMERSIBLE TAINTER GATE LOCATION

(PEORIA AND LAGRANGE, ILLINOIS WATERWAY)

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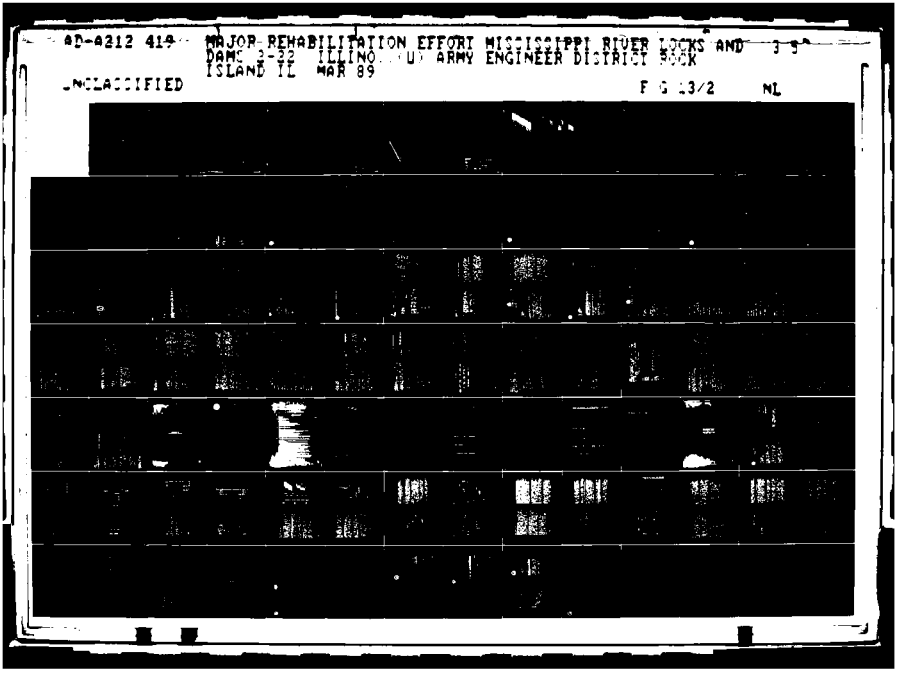

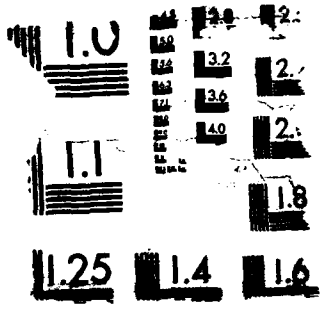
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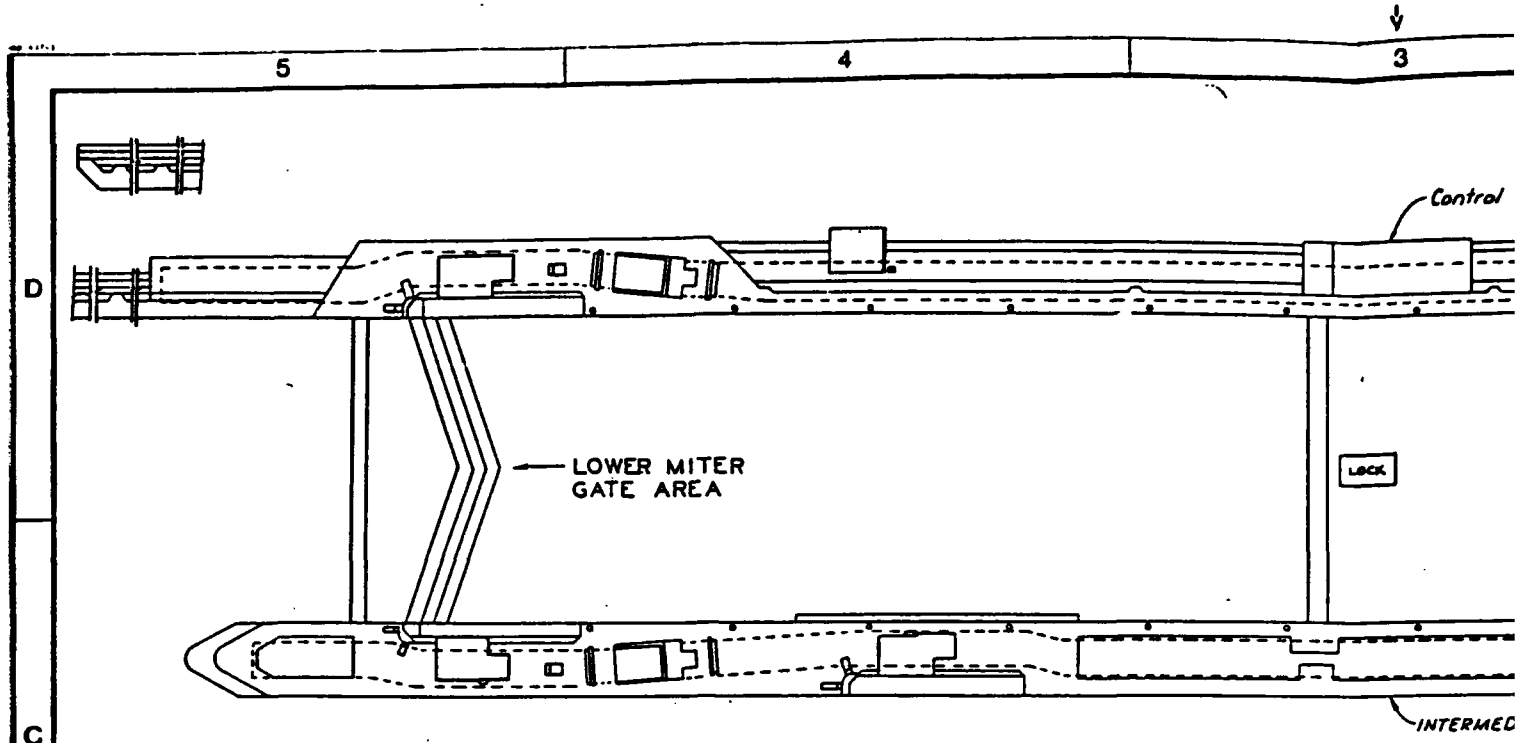

PLAN

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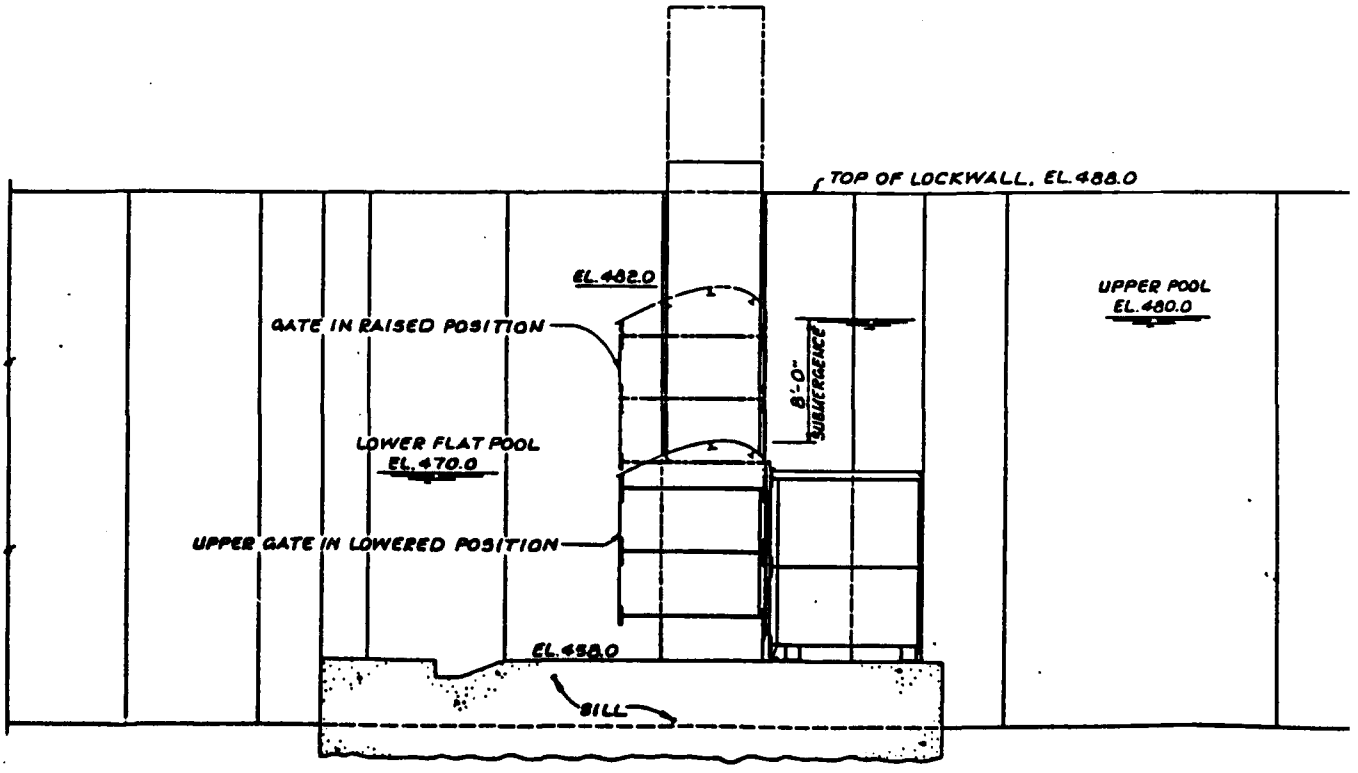

SECTION A-A

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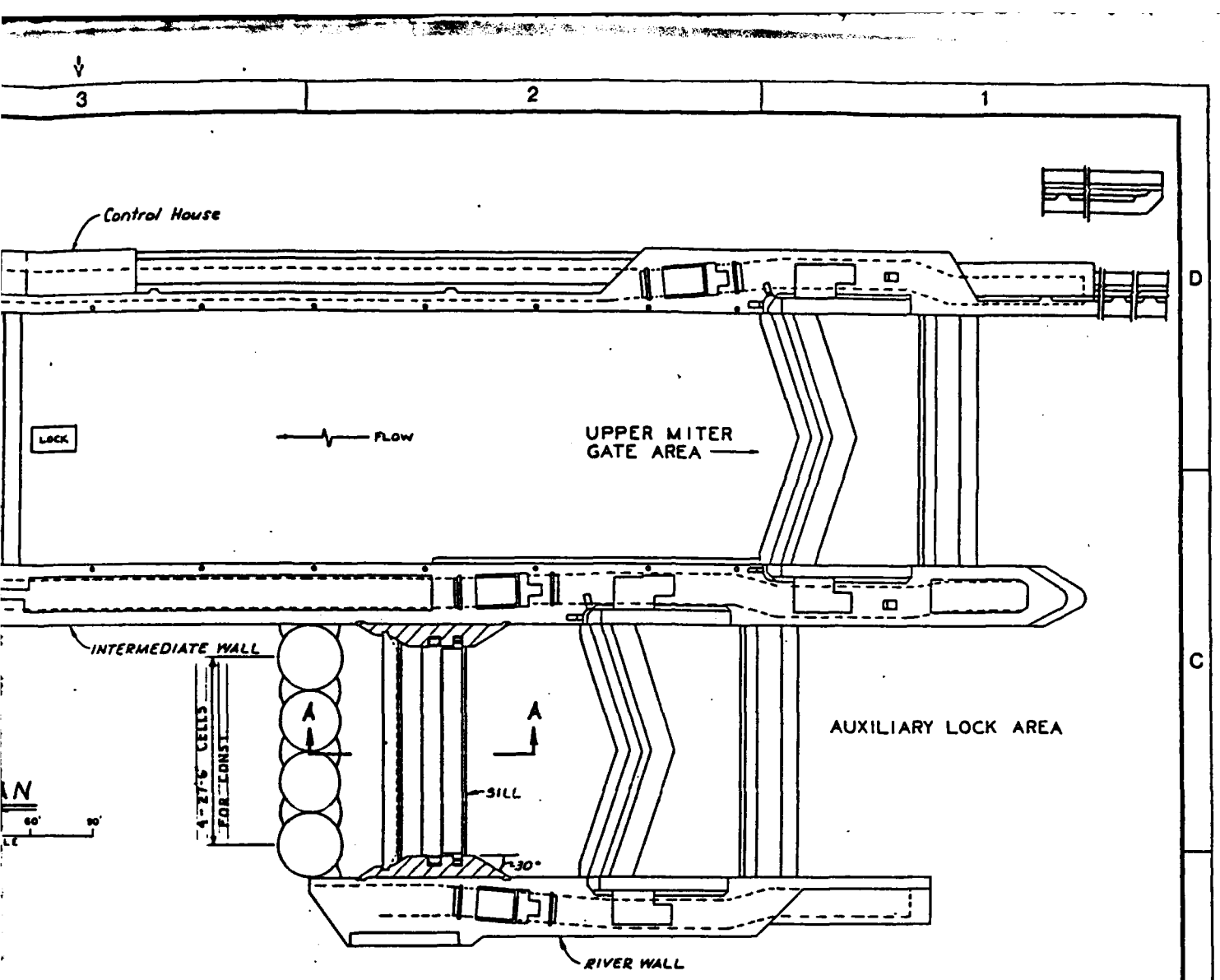


Revisions			
Symbol	Description	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

MISSISSIPPI RIVER
LOCK & DAM NO. 20

VERTICAL LIFT GATE

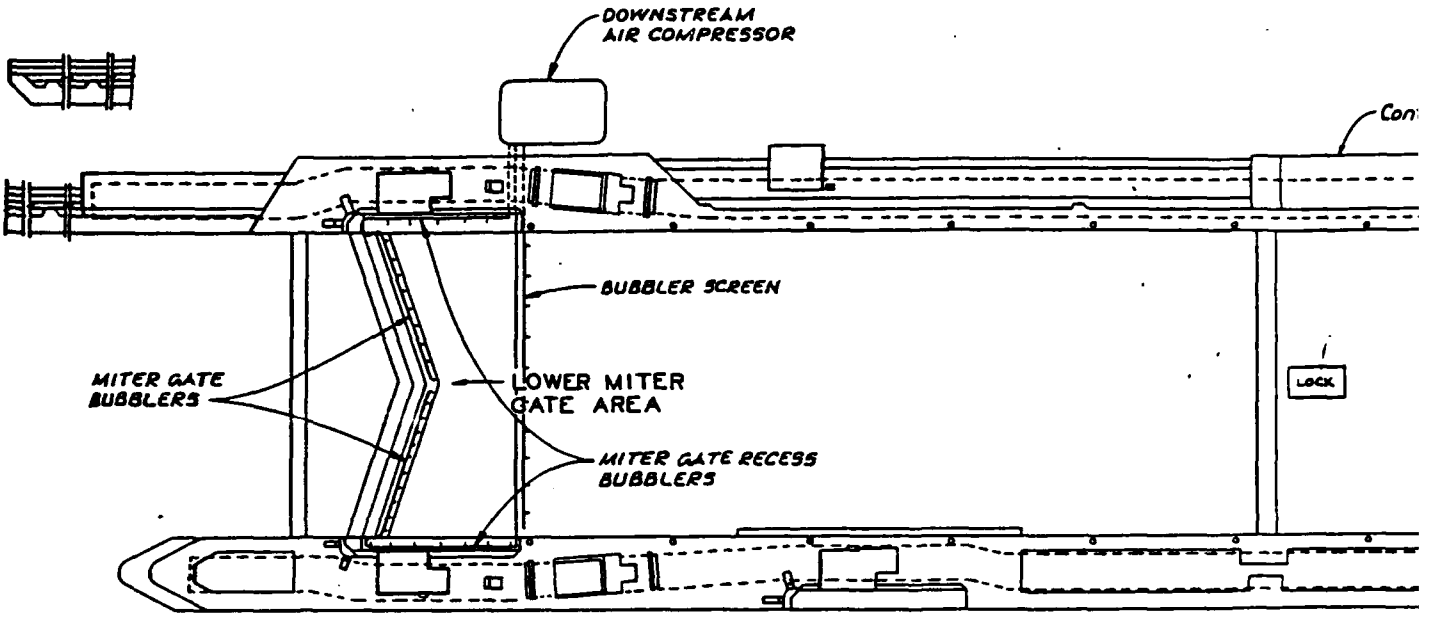
Designed by
Drawn by
Checked by
Traced by
Approved by

Scales: AS SHOWN

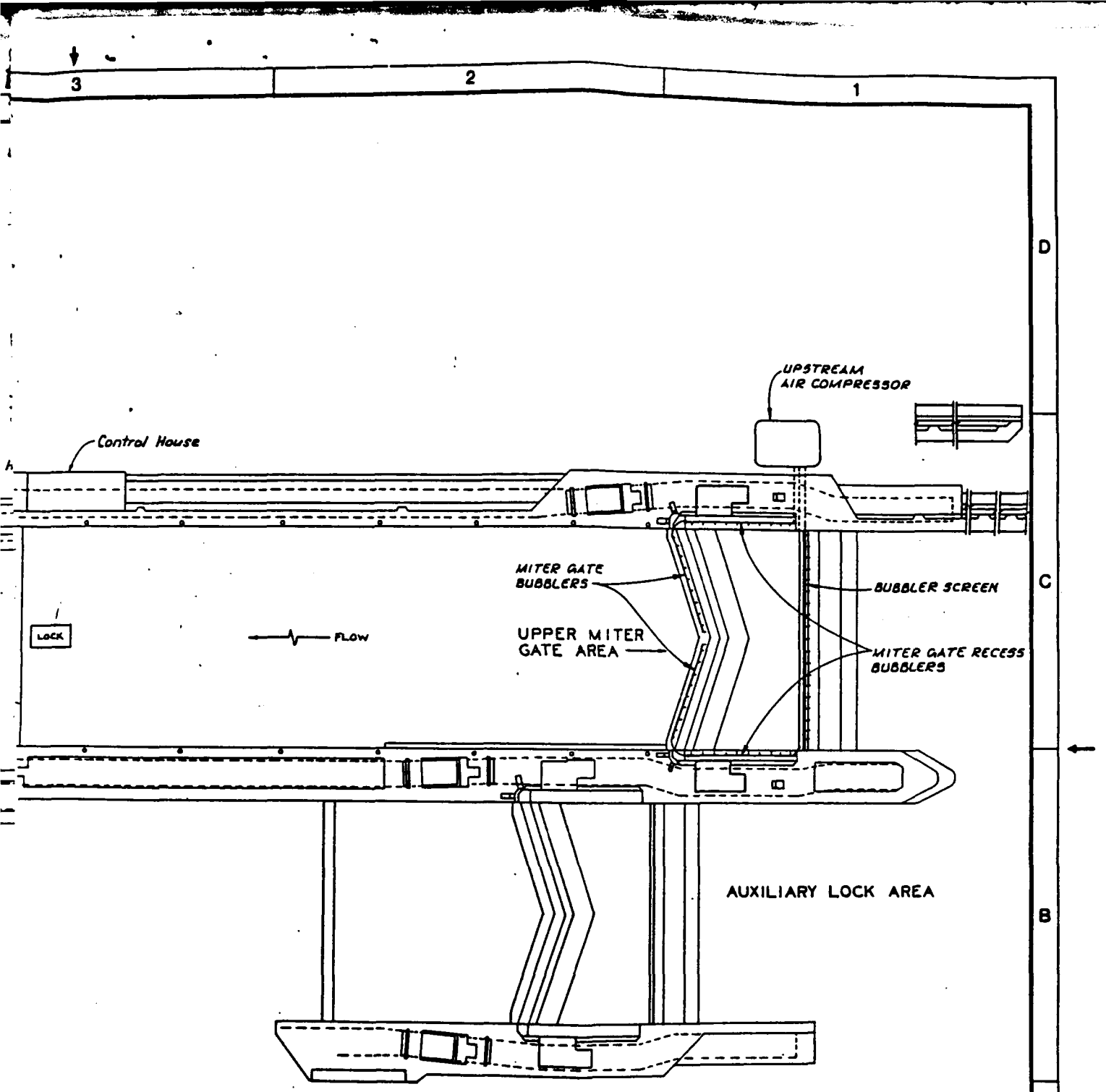
Sheet reference numbers

Sheet _ of _

PLATE 2



SITE PLAN - BUBBLER SYST



ILER SYSTEM LAYOUT

Symbol	Description of Revisions	Date	Approved

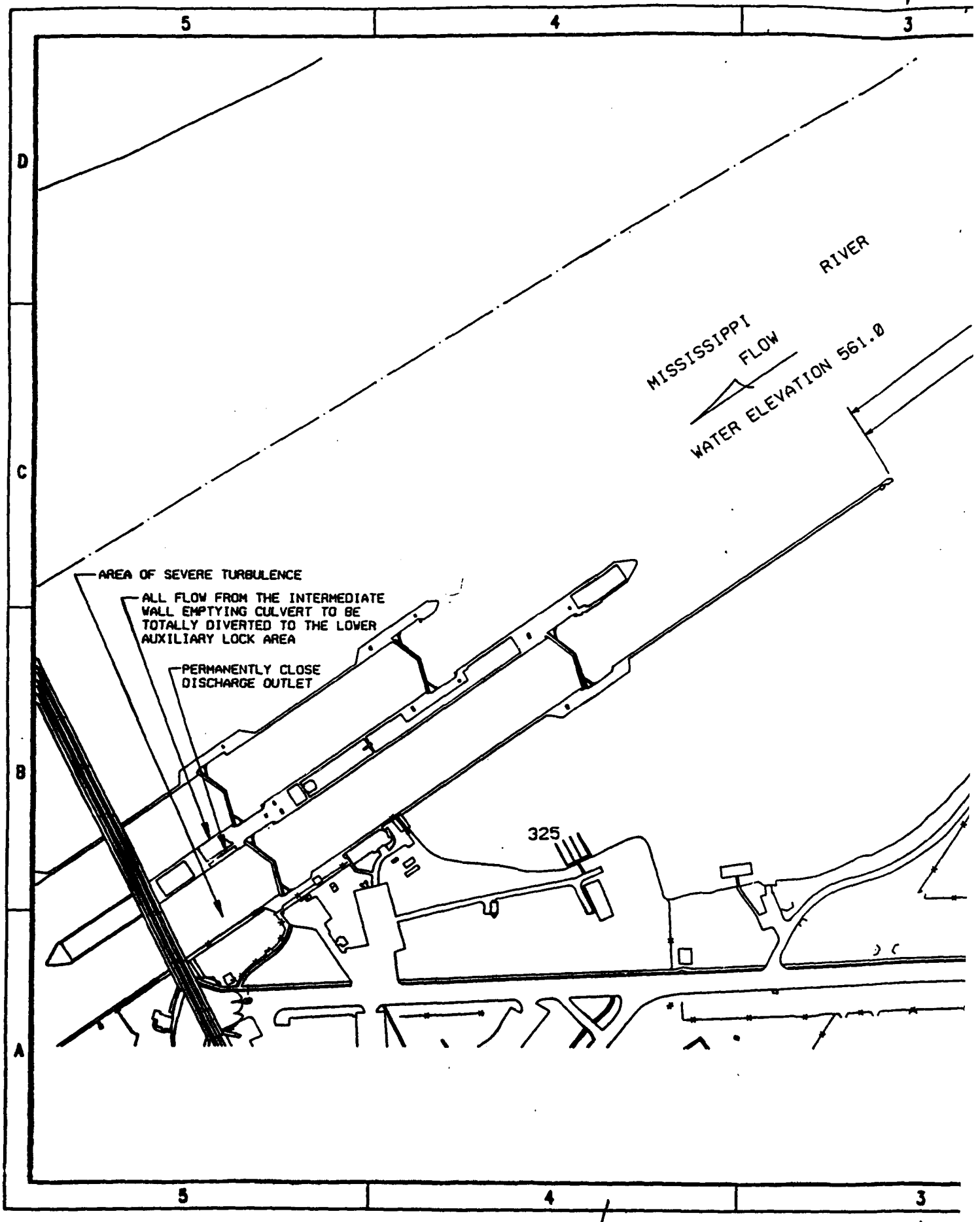
U. S. ARMY ENGINEER DISTRICT, ROCK ISLAND
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

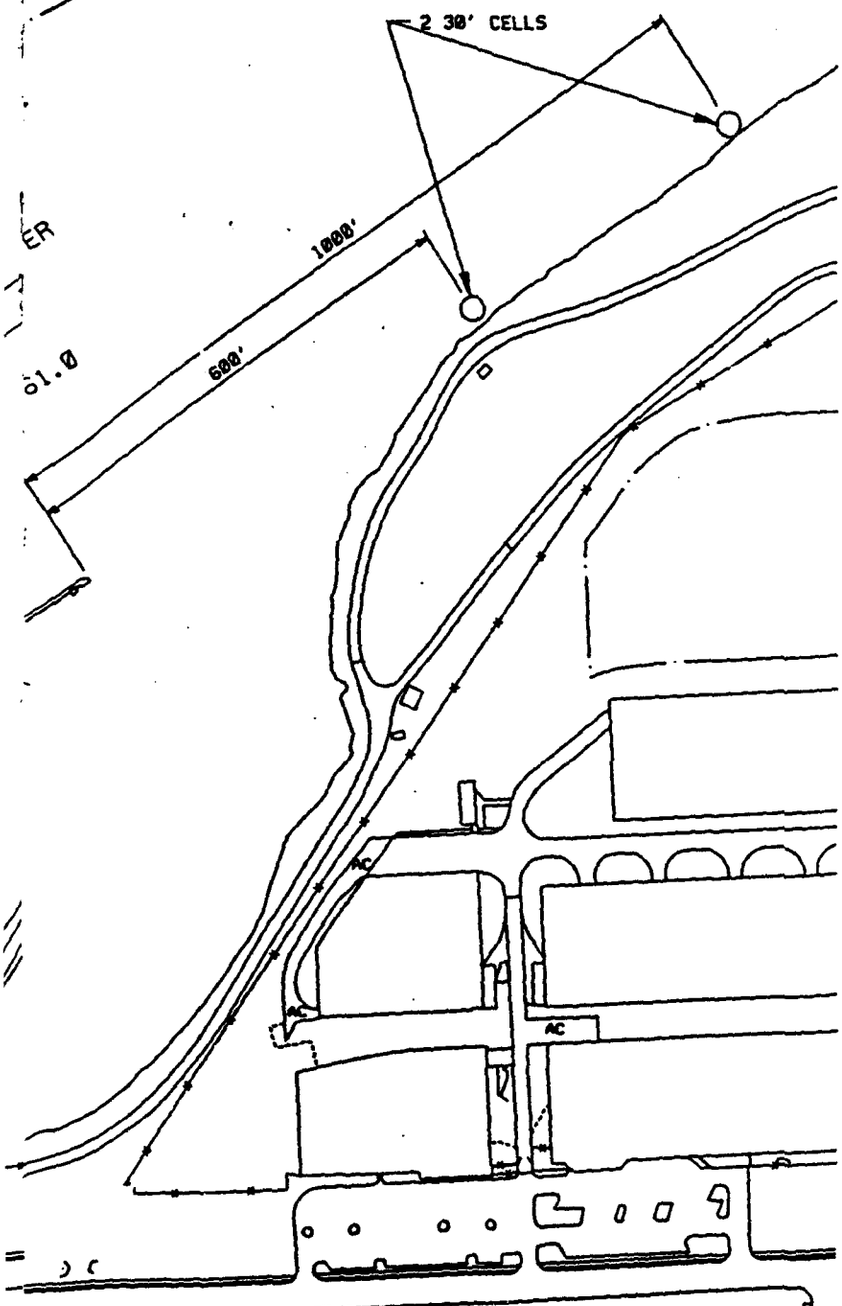
MISSISSIPPI RIVER
LOCKS AND DAMS NO.S 2 TO 22

BUBBLER SYSTEMS

Scale: As Shown

PLATE 3


5
4
3
D
C
B
A
RIVER
MISSISSIPPI
FLOW
WATER ELEVATION 561.Ø
AREA OF SEVERE TURBULENCE
ALL FLOW FROM THE INTERMEDIATE WALL EMPTYING CULVERT TO BE TOTALLY DIVERTED TO THE LOWER AUXILIARY LOCK AREA
PERMANENTLY CLOSE DISCHARGE OUTLET
325



Revisions			
Symbol	Description	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

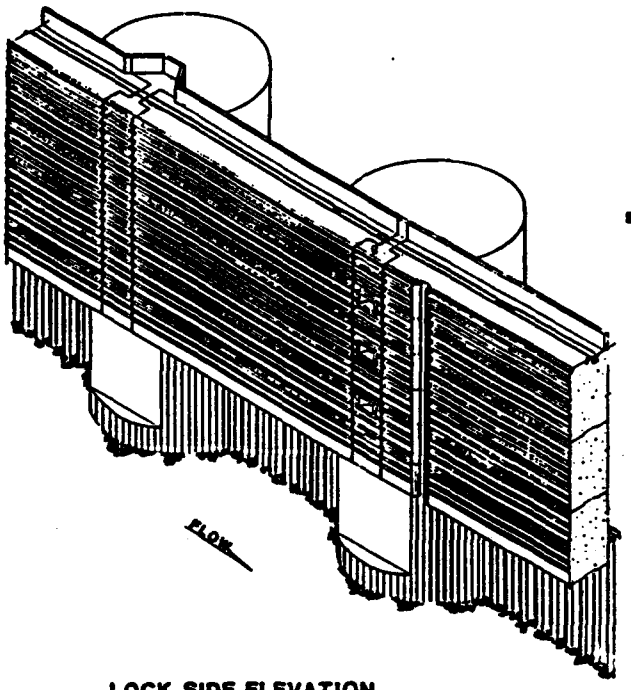
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:

MISSISSIPPI RIVER
LOCK & DAM NO. 15

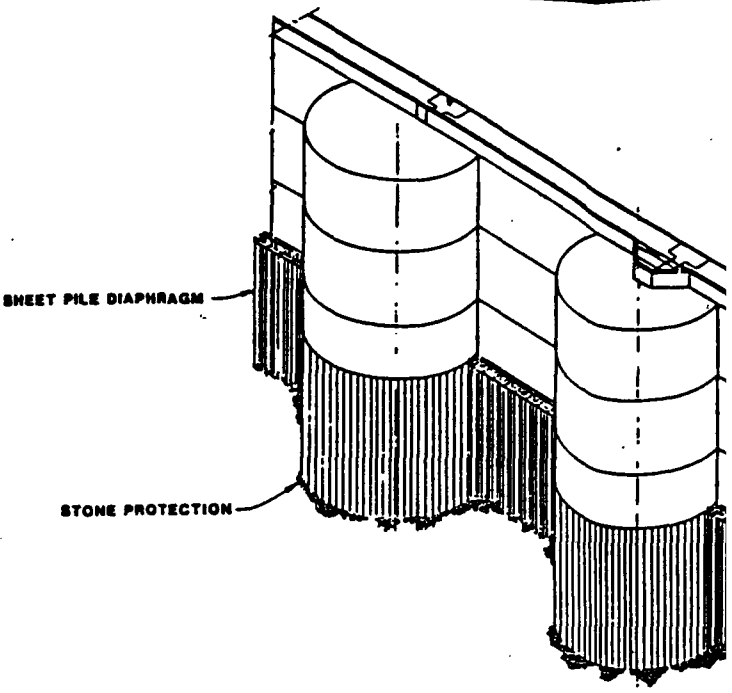
PLAN OF UPPER CELLS AND MODIFICATIONS TO LOWER DISCHARGE OUTLET

Scale:
Date:
Drawing Status:
Sheet Reference Number:
Invitation Number:
Sheet of

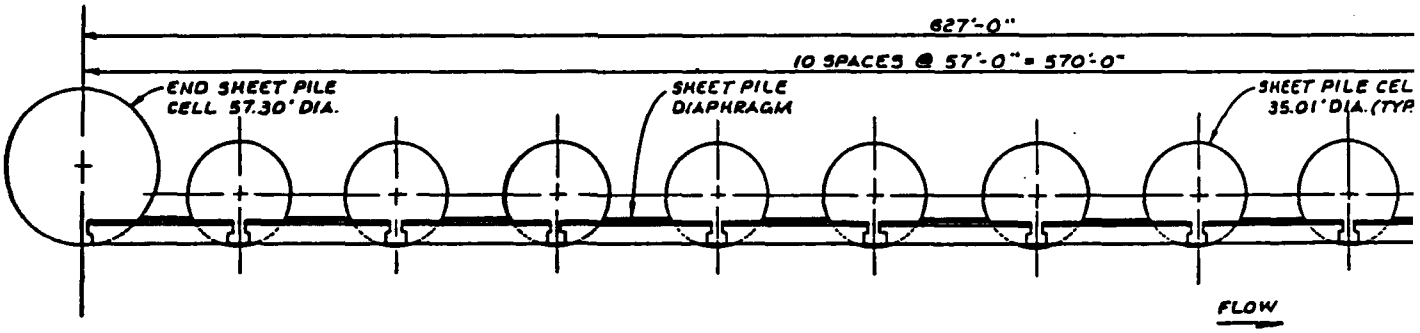
PLATE 4



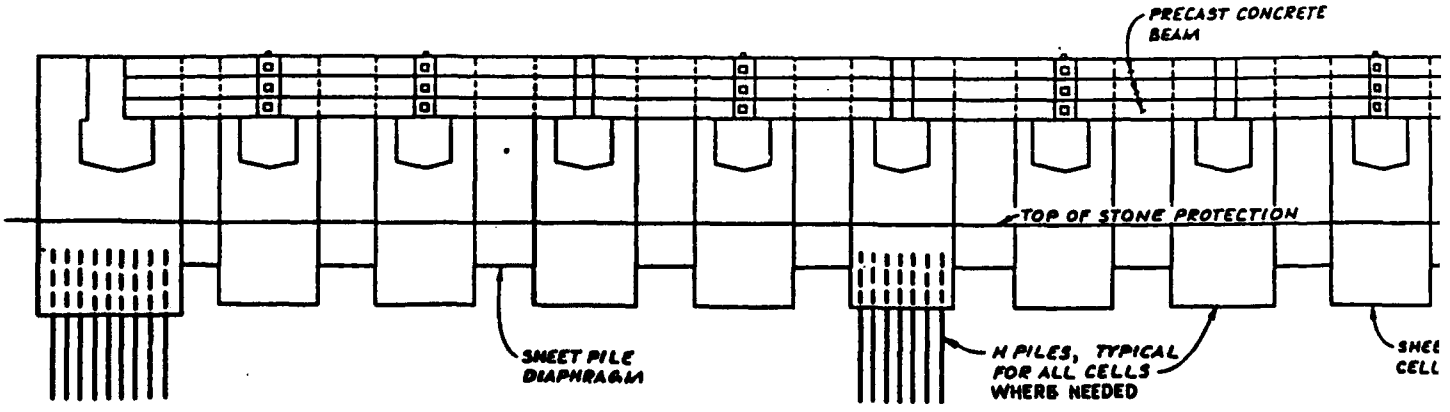
LOCK SIDE ELEVATION



BACK SIDE ELEVATION

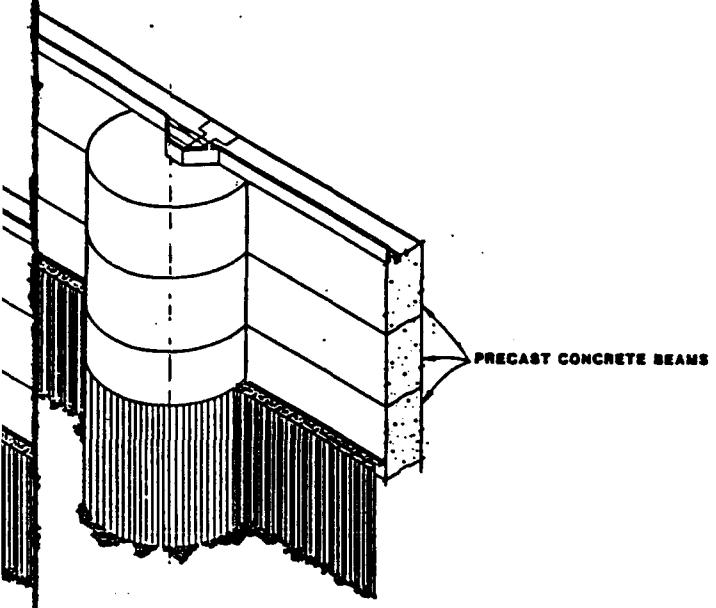


PLAN - UPSTREAM GUIDEWALL

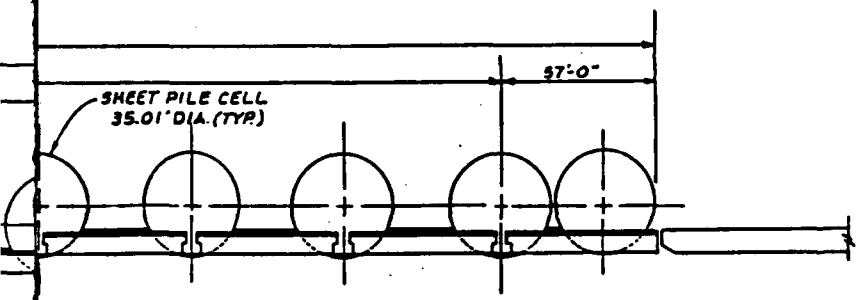


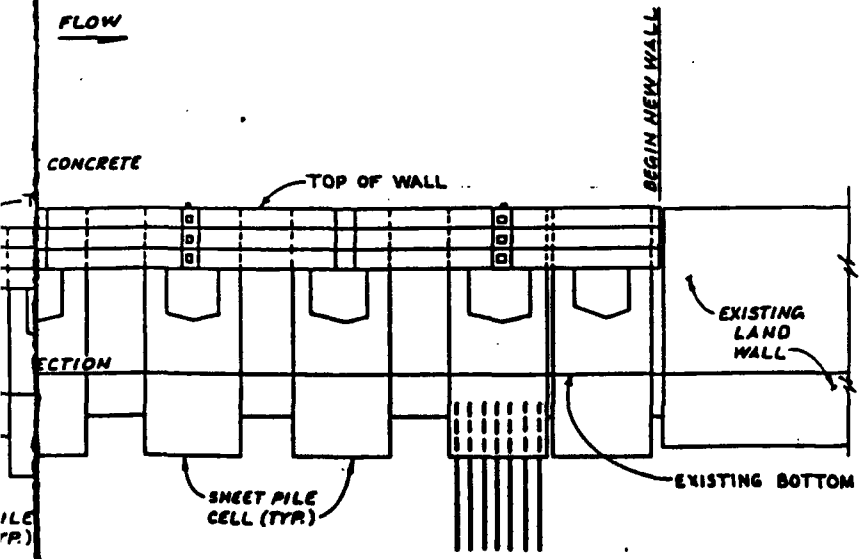
LOCKFACE ELEVATION

	GUIDEWALL	LENGTH	FOUNDATION	TOP OF WALL	GROUND ELEV.	WATER ELEV.
LOCK 12	UPPER	625	PILES	603.00	573.0	592.0
LOCK 13	UPPER	625	PILES	592.00	562.0	583.0
LOCK 14	UPPER	625	ROCK	577.50	551.0	572.0
LOCK 15			ROCK	569.25	540.0	561.0
LOCK 16	UPPER	625	PILES	554.00	525.0	545.0
LOCK 17	UPPER	625	PILES	548.00	515.0	536.0
LOCK 18	UPPER	625	PILES	537.50	505.0	526.0
LOCK 19	UPPER	800	ROCK	525.75	475.0	518.2
LOCK 20	UPPER	625	ROCK	488.00	457.0	480.0
LOCK 21	UPPER LOWER	625 625	PILES PILES	483.50 483.50	447.0 444.0	470.0 459.5
LOCK 22	UPPER LOWER	625 625	ROCK ROCK	471.50 471.50	440.0 436.0	459.5 449.0



ELEVATION





Revisions			
Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

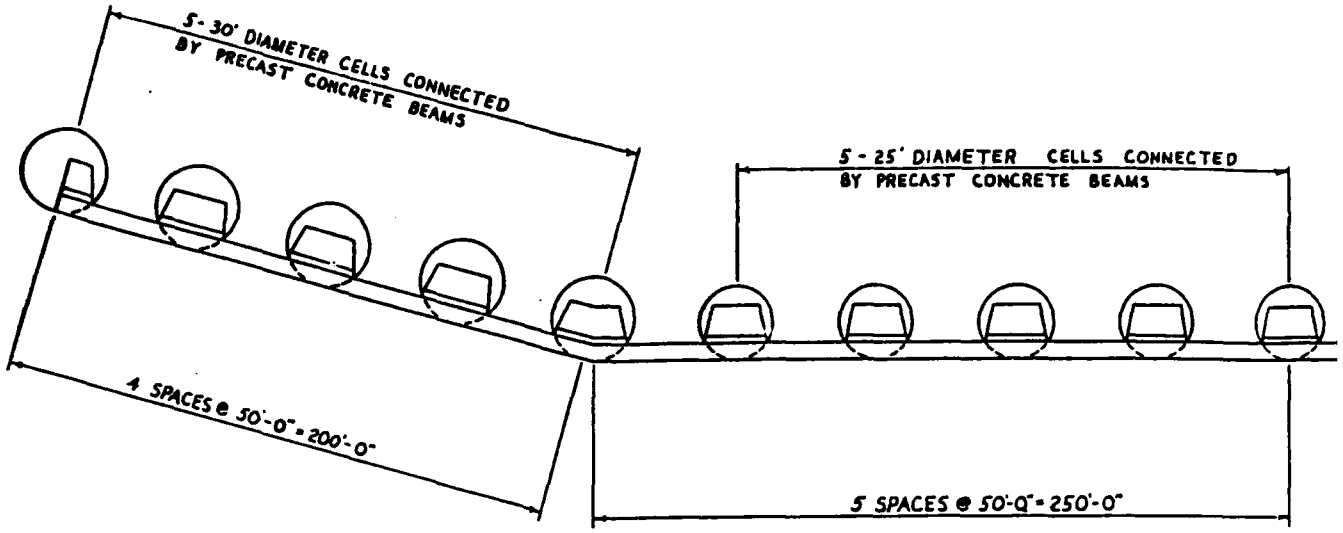
Designed by
Drawn by
Checked by
Reviewed by
Approved by

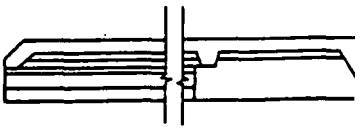
MISSISSIPPI RIVER
LOCKS AND DAMS NO.'S 12 TO 22

TYPICAL GUIDE WALL EXTENSION

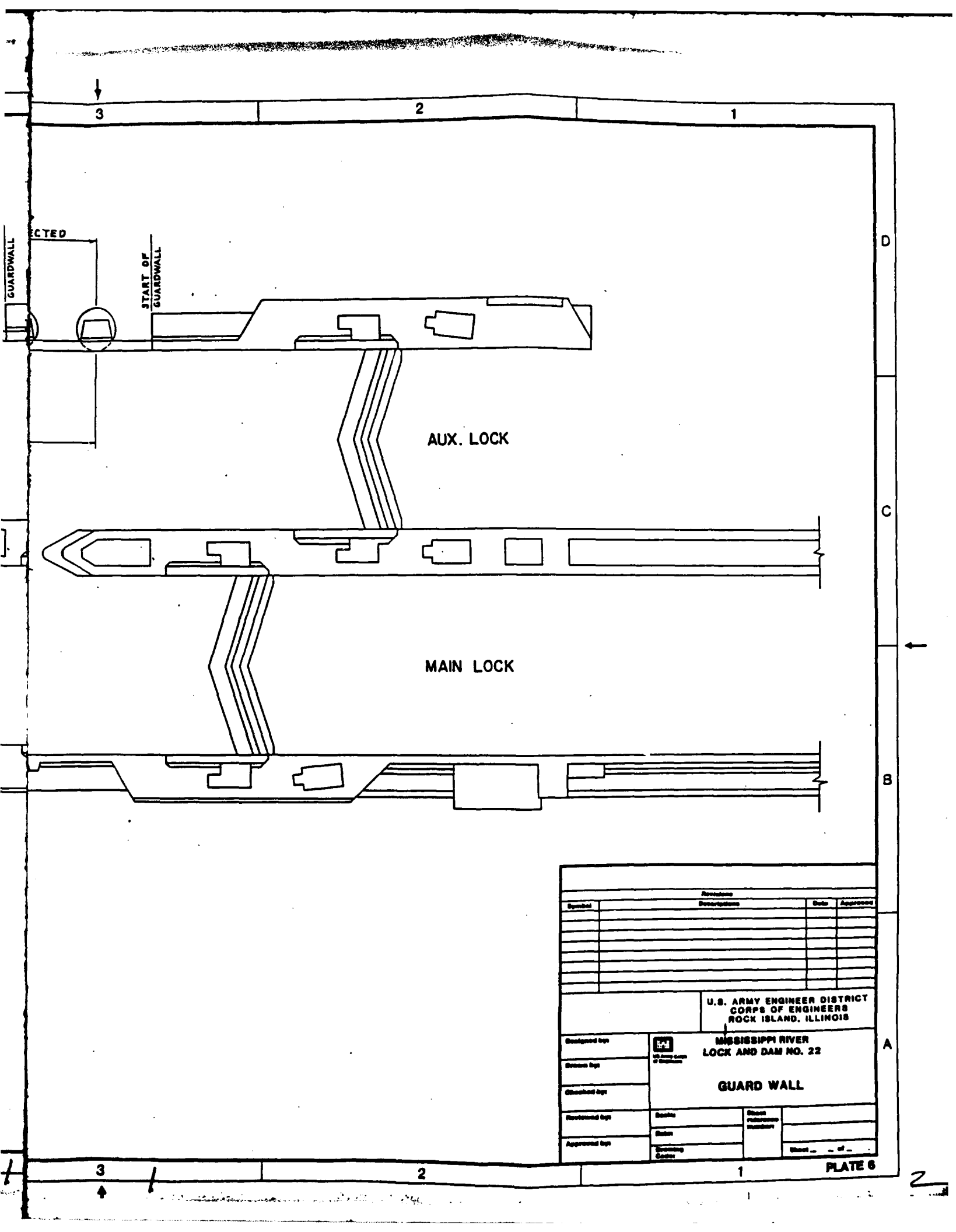
Scale: NO SCALE
Date:
Drawing Order:
Sheet reference numbers:
Sheet _ of _

PLATE 5





GUARDWALL PLAN


3
2
1
D
C
B
A
ECTED
GUARDWALL
START OF GUARDWALL
AUX. LOCK
MAIN LOCK
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS
MISSISSIPPI RIVER
LOCK AND DAM NO. 22
GUARD WALL
PLATE 6

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X

I

COMMENT LETTERS RECEIVED ON THE DRAFT EIS WITH DISTRICT RESPONSES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF:

05 DEC 1988

Dudley M. Hanson
District Engineer
U.S. Army Engineer District, Rock Island
Attn: Planning Division
Clock Tower Building
P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Hanson:

1 In accordance with the National Environmental Policy Act and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (USEPA) has reviewed the Draft Environmental Impact Statement (DEIS) for Major Rehabilitation Effort on the Mississippi River Lock and Dams 2-22.

2 The DEIS proposes the major rehabilitation of the Locks and Dams 2 through 22 on the Upper Mississippi River System (UMRS). The rehabilitation effort would consist of the repair or replacement of deteriorated concrete, worn mechanical and electrical equipment, placing additional rock fill to increase protection against scouring, and the placement of additional components. The purpose of the project is to provide safe operational structures, while improving the Lock and Dams system on the UMRS.

I-1

3 It is proposed that a high bubbler system be installed through out the Lock and Dam System that would prevent ice formation on the equipment. On page EIS-145 paragraph 4, the DEIS states that, "the bubbler system may permit a higher level of end-season activity at Locks 2 through 22, the exact impact of such systems cannot be predicted, or even measured, with any degree of certainty." The possible impacts to the surrounding environment should be evaluated and addressed in a detailed and complete manner. The uncertainty of possible associated impacts does not mean that these issues should not be addressed presently or at a later date. Therefore, we recommend that a study plan, with emphasis on the end-season tows for the first 5 years of operation of the bubbler system, be designed and implemented to provide data to help evaluate and address the possible environmental impacts. The study plan should include evaluation of river bank erosion, petroleum spills, ice damage, and any other occurrences during this period of time. Based on the evaluation of the data, a mitigation plan if necessary could be designed, approved and carried out. This would allow for mitigation measures to be incorporated to minimize the associated negative impacts.

Rock Island District Responses

1. Noted.

2. Noted.

3. There are lock sites in the Rock Island and St. Paul Districts that already have low-volume bubbler systems. Installation of a higher-volume system will improve the ability to keep ice from accumulating on the lock gates, and will also help keep the gate recess clear of floating ice and debris. Manual removal of ice and debris is still necessary with the existing bubblers, and is dangerous to lock personnel. Concerning navigation, ice conditions in the river channel are the controlling factor, and bubbler systems at the lock gates have no effect on ice conditions in the river away from the immediate lock gate area. Bubbler systems located in the miter gate area have not, and will not, affect this constraint. Most operators will continue to avoid navigation during ice periods because of increased operating costs and the hazards that could result from freezing in.

The Rock Island District will agree to monitor early- and end-season navigation traffic use at the locks using data from the PMS and OMNI systems, and other published data. The data to be collected will include number of tows and barges by direction, ice conditions, air and water temperatures, and other factors that may influence navigation. We will need to begin by establishing baseline ranges for traffic and time periods. Then, after installation of the high-volume bubbler systems in Locks 2 through 22, we will monitor early- and end-season traffic use at representative locks. As a practical matter, however, funding for installation of the bubbler systems will be phased in over several years, and completion of all of the systems is not anticipated until the late 1990's. We will coordinate the specific details of the monitoring effort, baseline interpretations, and monitoring results with Federal and state environmental, transportation, and economic agencies.

In Section 404(b)(1) pages 2 and 3, the DEIS states that the description and contaminant classification of fill material as being uncontaminated sand and concrete. The source of the sand and concrete should be included in the description of fill material. In terms of contaminant determination, the DEIS
4 stated that the material to be used for filling sheet pile cells is considered to be clean. Our Agency concurs that the majority of the substrate in the Mississippi River is clean. However, the fill material used in the construction of the cells should be verified to be clean. The background information for the fill material should include source, location, history, and analytical data for evaluation by the appropriate agencies.

On page 4, the DEIS states that filling activities would not affect any wetlands. The construction of the extensions of the guidewalls, would destroy a undetermined amount of wetlands. It is the policy of our Agency that any loss of wetlands be mitigated by replacement in terms of a ratio of 1.5 to 1.
5 The amount of wetlands was not given in the DEIS. To determine the value of the wetlands an analysis of these areas must be provided. As a minimum, the size, type and function of the wetlands must be included in the evaluation of the wetlands. A mitigation plan must be included in the FEIS to replace any wetlands that are lost. We would be willing to review a draft of the mitigation plan prior to the publication of the FEIS.

The DEIS does not address the fate of the fill material after the removal of the temporary cells. The removal or use of the fill material should be
6 included in the FEIS. The background information for the disposal site should include location, history, type of land. Furthermore, the disposal site must not be in a floodplain or wetlands, where the fill material can be reintroduced into the river during flood conditions. The use of the material should be documented by providing a description of the user. The removal of the fill material should be described. The method of removal and transportation to the new site should be addressed.

On page 5, the DEIS did not outline or specify the measures that would be taken to control erosion. The erosion plan must contain provisions to prevent soils and fill material from entering the river, during the construction and operation phase of the project. The measures that will be
7 incorporated into the project and required of the contractors should be provided in the FEIS. Furthermore, the DEIS did not provide any information on what precautions that would be utilized, to prevent fugitive construction material from entering the Mississippi River. The FEIS should contain a description of the plan and methods that would be used to minimize the introduction of fugitive material into the air and water. This is to reduce the negative impacts to the water quality of the Mississippi River.

Rock Island District Responses

4. The fill material will be commercially supplied and is considered to be free of contaminants. This information will be added to the Section 404 Evaluation.

5. Paragraphs 4.13 to 4.16 discuss the proposed guidewall extensions, and provide an estimate for the loss of aquatic habitat. Paragraph 4.19 of the EIS indicates that construction of all the proposed guidewall extensions would result in the permanent loss of 4.5 acres of main channel border habitat. The Rock Island District does not regulate these areas of the river as wetlands. The aquatic habitat in and near the lock sites is not considered to be unique or rare, and is of overall poor quality. These areas are kept scoured by river current and are subject to regular disturbance by tows and recreational craft. Removing a total of 4.5 acres of this habitat is not considered to be a significant loss by the District, and does not require mitigation.

6. Paragraph 4.2 of the EIS indicates that the commercially-supplied sand will be mechanically removed from the temporary cells, and disposed of in a one-acre site located on lock and dam property. Paragraph 4.3 of the EIS indicates that this site consists of periodically mown grasses and weedy species, and was used as a disposal site for sand for the Lock and Dam 20 site-specific rehab work. Material disposed of in this site will not be introduced into the river during floods.

7. Our normal procedures require the use of the guidelines specified in the following document, "Guide Specification, Civil Works Construction for Environmental Protection," CW-1430, July 1978. This document requires the submission of an environmental protection plan by successful contractors, and specifies provisions for the protection of air and water resources (sec 7.4 and 7.5). These provisions include landscape protection, burning procedures, erosion control, dust control, debris disposal, and control of discharges into waterways. District staff reviews the plan submitted by the contractor prior to construction, and Corps inspectors monitor adherence to the plan. This information has been added to the EIS in Section 4, paragraph 4.4.

Based on our review of the information provided and the incorporation of the above comments in the FEIS, our Agency does not have any objections to the proposed rehabilitation of the Locks and Dams 2 through 22, on the Mississippi River. We have rated the project as a "LO". The rating of "LO" indicates our Lack of Objection to the project. This rating will be published in the Federal Register. 8

Thank you for the opportunity to comment on the DEIS for the UMRS. If you have any questions or comments, please contact AL Fenedick of my staff at (312) 886-6872. 9

Sincerely yours,

William D. Franz

William D. Franz, Chief
Environmental Review Branch
Planning and Management Division

Rock Island District Responses

8. Noted.

9. We appreciate your efforts concerning the proposed project and EIS, and will keep your office involved as our plans progress.

To: CMCR (157:ACE2019)
From: DEEDER/FILL (EPA0562) Delivered: Tue 22-Nov-88 9:40 EST Sys 163 (52)
Subject: ATTENTION STEVE VANDERHORN
Mail Id: IPM-163-881122-087040001

5WQA-TUB-8

November 22, 1988

Steve Vanderhorn, Chief
Regulatory Functions Branch
Rock Island District, Corps of Engineers
Department of the Army
Clock Tower Building
Rock Island, Illinois 61201-2004

Dear Mr. Vanderhorn:

1 The U.S. Environmental Protection Agency has received the Public Notice(s) of the proposed project(s) as described on the following list. We are unable to review the project(s) for the impacts on water quality, wetlands, or other water resource concerns. Therefore, no action is contemplated at this time.

2 In the event that information becomes available or an unexpected adverse impact results from any of these activities, we would appreciate the opportunity to review the project(s).

NOTICE NO./NOTICE DATE	APPLICANT	COMMENTS DUE
179990/11-22-88	Mr. Thomas F. Leuthold and Mr. Joel Devriese	12-12-88
174810/11-21-88	IDOT, Division of Water Resources	12-11-88
173220/11-02-88	Mr. James R. Fidler and Mr. John M. Peterson	11-22-88
3 173212/11-04-88	Ottawa Steel and Wire, Inc.	11-24-88
173040/11-04-88	Mr. Gary D. Marti	11-24-88
✓171580-17159Z	Rock Island, U.S. Corps of Engineers	
179022/11-07-88	City of Pekin, Illinois	11-27-88
173492/11-07-88	LaSalle National Bank	11-27-88

If you have any questions concerning this matter, please contact Ms. A. Marie Eeton of my staff, at 312/886-5266.

Sincerely yours,

James D. Giattina, Chief
Planning and Standards Section

cc: Richard Nelson, Fish & Wildlife Service, Rock Island, IL
James Park, Illinois Environmental Protection Agency, Springfield, IL
Robert Schanzle, Illinois Department of Conservation Springfield, IL

I-4

Rock Island District Response

1. Noted.

2. Noted.

3. No. 171580-17159Z pertain to the addendum for the Section 404 Public Notice issued for the proposed measures described in the EIS.

[redacted]

October 27, 1988

[redacted], Chief
Regulatory Functions Branch
Rock Island District, Corps of Engineers
Department of the Army
Clock Tower Building
Rock Island, Illinois 61201-2004

Dear Mr. VanderHorn:

The U.S. Environmental Protection Agency has received the Public Notice(s) of the proposed project(s) as described on the following list. We are unable to review the project(s) for the impacts on water quality, wetlands, or other water resource concerns. Therefore, no action is contemplated at this time. 1

In the event that information becomes available or an unexpected adverse impact results from any of these activities, we would appreciate the opportunity to review the project(s). 2

1-5

NOTICE-NO./NOTICE-DATE	APPLICANT	COMMENTS-DUE
171413/10-07-88	U.S. Army Corps of Engineers	10-07-88
171943/09-26-88	City of Decatur, Illinois	10-16-88
Reg. Permit #19/10-14-88	U.S. Army Corps of Engineers	11-14-88
CENCR-172890/10-17-88	Clarance McGuinty	11-06-88
→CENCR-171580 and 17159Z	U.S. Army Corps of Engineers	11-06-88
CENCR-167750/10-12-88	Mr. Wayne Stewart	11-01-88

3

If you have any questions concerning this matter, please contact Ms. A. Marie Ecton of my staff, at 312/886-5266.

Sincerely yours,

James D. Giattina, Chief
Planning and Standards Section

cc: Richard Nelson, Fish & Wildlife Service, Rock Island, IL
James Park, Illinois Environmental Protection Agency, Springfield, IL

Robert Schanzle, Illinois Department of Conservation
Springfield, IL

Rock Island District Response

1. Noted.

2. Noted.

3. CENCR-171580 and 17159Z pertain to the Section 404 Public Notice issued for the proposed measures covered in the EIS.

United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW

[illegible] DEARBORN, SUITE [illegible]
[illegible] CHICAGO, ILLINOIS [illegible]

ER-88/899

November 22, 1988

Colonel Neil A. Smart
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Building - P. O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

The Department of the Interior has reviewed the Draft Programmatic Environmental Impact Statement for the Major Rehabilitation Effort for
1 Locks and Dams 2-22 on the Mississippi River and the La Grange to Lockport Locks and Dams on the Illinois Waterway. We hereby provide consolidated Departmental comments for your consideration during future project planning phases.

1-6

GENERAL COMMENTS

We commend the Rock Island District (District) for presenting a clear and concise analysis of a very complex issue. This document addresses the many concerns that the Fish and Wildlife Service (Service) has raised over the past three years.

2 We concur with the District's conclusion that the potential increase in tow traffic due to the Major Rehabilitation Program is not likely to result in measurable impacts. We do, however, encourage the District to continue to participate in design of the St. Louis District's proposed plan of study to develop a method to identify the incremental effects of tow traffic increases caused by the new Second Lock at Locks and Dams 26.

SPECIFIC COMMENTS

High Volume Bubbler Systems

3 The only issue which remains unresolved in upper reaches of the River (Locks and Dams 2 through 10) is the installation of high-volume bubbler systems. This issue is discussed on Page EIS-104. We remain concerned

Rock Island District Responses

1. Noted.

2. Noted. We appreciated your input and assistance during development of the traffic analysis and EIS. The Rock Island and St. Paul District staff will continue to participate in development of the Plan of Study.

3. There are lock sites in the Rock Island and St. Paul Districts that already have bubbler systems. Installation of a higher-volume system will improve the ability to keep ice from accumulating on the lock gates, and would also help keep the gate recess clear of floating ice and debris. Ice accumulation is very damaging to the lock structures. Manual removal of ice and debris is still necessary with the existing bubblers, and is dangerous to lock personnel. Concerning navigation, ice conditions in the river channel are the controlling factor, and bubbler systems at the lock gates have no effect on ice conditions in the river away from the immediate lock gate area. Bubbler systems located in the miter gate area have not, and will not, affect this constraint. Finally, most operators will continue to avoid navigation during ice periods because of increased operating costs, and the hazards, as pointed out in your comment, that could result from freezing in.

that operation of the proposed bubbler systems may result in an increase in barge traffic at the end of the navigation season just prior to freeze up. In previous years, barge traffic during this time period has resulted in groundings and subsequent need for maintenance dredging, tows, or individual barges trapped in ice flows, and accidents which
3 resulted in structual damage and cargo spills. We agree that this issue is difficult, if not impossible, to assess since one must quantify both the amount of risk individual towboat operators are willing to take in operating their vessels during this time period under adverse conditions, and the reduction in this risk factor due to operation of the proposed bubbler systems.

To resolve this issue, we offer two alternatives:

4 1. The Corps of Engineers (Corps) initiate discussions with Federal and State agencies and the towing industry with the objective of establishing a defined navigation season; or

5 2. The Corps agree to evaluate the effects of the proposed bubbler system by conducting a five-year study of towboat operation during the later portion of the navigation season. Specific details of the study design to include parameters measured, methods, mitigation, etc. should be coordinated with Federal and State agencies.

1-7

Avoidance and Minimization of Adverse Effects

We continue to be interested in implementation of a program to avoid and minimize any adverse effects of tow movement. The Service's Rock Island
6 Field Office has already met with the St. Louis District to discuss several low cost implementable items. We would like to see this type of dialogue continue with both the Rock Island and St. Paul Districts. We recommend that the conclusions in Section 6.13 be re-evaluated considering the following:

7 A. 6 Deadmen could be a relatively inexpensive alternative to mooring cells. Also, suggested lock approach areas could be designated on the navigation charts and identified in annual local notices to mariners. Both recommendations should be coordinated with field biologists familiar with the designated sites.

8 B. 1 Does the Corps have any authority and/or expertise to conduct research relative to improving tow and barge design?

9 C. 3, 4,5 & 7 We continue to recommend that barge fleeting be addressed in the Rock Island District's shoreline management plan, in a manner similar to the St. Louis District's Pool 26 study. Many fleeting sites are not used for "casual mooring;" they have been in use for years.

Rock Island District Responses

4. The Coast Guard, Rock Island District, and the River Industry Action Committee work together to deal with the seasonal conditions (water and air temperature, degree of ice cover, 5-day forecasts, etc.) encountered at the end of the season. Agreements on restirctions considering all information at the time have been reached as needed.

Concerning a closed season, establishment would need to be based on specific criteria such as ice thickness, water and air temperature, amount of tow movement, economics (supply and demand), environmental parameters, etc. A standard or set closed season is not considered appropriate, since weather conditions can vary significantly from year to year. Congressional action may be required to change present procedures and establish a closed season. We understand that the St. Louis District has initiated discussions concerning this issue with the Coast Guard, RIAC, and the US FWS. The Rock Island and St. Paul Districts are willing to extend these discussions to the middle and upper protions of the Mississippi River.

5. See response to No. 3 concerning bubbler systems. The Rock Island District will agree to monitor early- and end-season navigation traffic use at the locks using data from the PMS and OMNI systems, and other published data. The data to be collected will include number of tows and barges by direction, ice conditions, air and water temperatures, and other factors that may influence navigation. We will need to begin by establishing baseline ranges for traffic and time periods. Then, after installation of the high-volume bubbler systems in Locks 2 through 22, we will monitor early- and end-season traffic use at representative locks. As a practical matter, however, funding for installation of the bubbler systems will be phased in over several years, and completion of all of the systems is not anticipated until the late 1990's. We will coordinate the specific details of the monitoring effort, baseline interpretations, and monitoring results with Federal and state environmental, transportation, and economic agencies.

6. The Rock Island District has been working with the Rock Island Field Office to establish a similiar effort concerning avoid and minimize measures for the UMRS.

7. The District response to this measure has been revised in the EIS to incorporate your suggestions. The Rock Island District will explore the feasibility of implementing this measure.

8. The Corps of Engineers does not have the authority to conduct research relating to tow and barge design.

D. 1 At a minimum, the District should initiate a program to inspect and repair severe erosion areas caused by regulatory structures, tow movement, or dredged material placement sites. Such a program should be coordinated with field biologists. 10

D.10, 11 Preliminary indications are that a small, tire, floating-breakwater in Peoria Pool has been successful in overwintering aquatic plants, reestablishing permanent aquatic vegetation beds, and increasing fish diversity and abundance in an area. We recommend that these and other relatively simple and inexpensive habitat enhancement measures be considered. 11

All of the above are measures that we believe are within existing Corps authority. In addition, the Corps should take a leadership role in this effort by formally requesting other agencies and the industry to implement reasonable, cost effective measures to avoid and minimize adverse impacts to river resources. 12

Land and Water Conservation Fund

I-8 The proposed project could have an impact on the following sites which were provided with Land and Water Conservation Fund assistance:

IOWA

Project Name	Project Number
Riverfront Park, Bellevue	19-00810

WISCONSIN

13

Project Name	Project Numbers
	(Multi-County)
Lower St. Croix Scenic River Acquisition (Wisconsin Department of Natural Resources	55-01201
	Buffalo County
Riecks Lake Park, City of Alma	55-00035
Alma City Bathing Beach	55-00150
Alma Beach Island Development	55-00940
Riecks Lake Park Development/II	55-01213

Rock Island District Responses

9. The District response to this measure has been revised in the FEIS. By Corps policy (36 CFR 327.30), the purpose of a Shoreline Management Plan (SMP) is to permit and regulate the private exclusive use of Corps-administered shoreline. St. Louis District's Pool 26 study was prepared in response to controversial fleeting permit requests.

10. The District response to this measure has been revised in the EIS. Our authority is currently limited to the protection of the navigation channel and public facilities. After providing us with maps and locations identifying those sites of most concern, we will assess what may be causing the erosion problems at these sites, and those falling within our existing authority will be investigated further, per available resources.

11. Noted. The District response to this measure has been revised in the EIS. Again, we will assess your specific areas of concern and those falling within our existing authorities will be investigated further, per available resources.

12. Noted. The Rock Island District has expanded the discussion in the EIS concerning the Avoid and Minimize measures. Some of the measures are not within existing authorities, as described in the expanded discussion.

13. Noted. See the response provided for No. 14.

14. The District has reviewed the list of sites. We do not feel that construction of the proposed measures described in the EIS will have any affect on the listed sites. The states of Iowa and Wisconsin have reviewed the EIS, and had no comments or objections concerning this topic.

15. Both the Rock Island and St. Paul Districts will continue to coordinate our activities with your agency.

WISCONSIN

Project Name	Project Numbers
Crawford County	
Villa Louis Acquisition (State Historical Society)	55-00006
Rush Creek Nature Conservancy Acquisition (Wisconsin Department of Natural Resources)	55-01472
Cottonwood Park Development, DeSoto	55-01618
Grant County	
Nelson Dewey State Park (Wisconsin Department of Natural Resources)	55-00063
LaCrosse County	
Goose Island Park	55-00023
Dam No. 7 Park	55-00024
Upper French Island Park	55-00026
Swarthout Park	55-00104
Goose Island Park	55-00273
Trempealeau County	
Perrot State Park (Wisconsin Department of Natural Resources)	55-00191
Vernon County	
Genoa State Scenic Overlook (Wisconsin Department of Transportation	55-00537

13 I-9

14 The project sponsor should consult with the officials who administer the programs in the States of Iowa and Wisconsin to determine the potential conflicts with Section 6(f)(3) of the Land and Water Conservation Fund Act (Public Law 88-578, as amended). Section 6(f)(3) states: "No property acquired or developed with assistance under this section shall, without the approval of the Secretary (of the Interior), be converted to other than public outdoor recreation uses." The administrator of the Land and Water Conservation Fund program for the State of Iowa is Mr. Larry J. Wilson, Director, Department of Natural Resources, Wallace State Office Building, E. Ninth and Grand Streets, Des Moines, Iowa 50319. The administrator of the Land and Water Conservation Fund program for the State of Wisconsin is Ms. Pauletter Harder, Director, Office of Intergovernmental Programs, Department of Natural Resources, P.O. Box 7921, Madison, Wisconsin 53707.

15 We look forward to continuing coordination with both the Rock Island and St. Paul Districts regarding this rehabilitation program.

Sincerely,

Sheila Minor Huff

Sheila Minor Huff
Regional Environmental Officer

United States Department of the Interior
FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO:
COM: 309/793-5800
FTS: 386-5800

November 29, 1988

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

This is in reference to Public Notice CENCR-171580 and 17159Z dated October 6, 1988, and it's November addendum regarding the major rehabilitation effort at Mississippi River Locks and Dams 2-22 and Illinois River waterway from La Grange to Lockport locks and dams. 1

We have reviewed the Draft Programmatic Environmental Impact Statement for the proposed project and will provide comments through the Department of the Interior consolidated comments. We have no objection to the construction of a vertical lift gate at Lock and Dam 20. 2

It is our understanding that there is insufficient engineering data to evaluate the site-specific impacts regarding the proposed guide wall extensions and the Lock 22 guardwall. Additional 404 (b)(1) evaluations will be completed for these measures as design funding becomes available. We request review of these evaluations when completed. 3

Sincerely,

Richard C. Nelson
Field Supervisor

cc: USEPA (Brown)
ILDOC (Lutz, Bertrand)
IADNR (Szcodronski,Schonoff)
MNDNR (Johnson,Skrypek)
MODNR (Dieffenbach)
WIDNR (Moe,Neuman)

1-10

Rock Island District Responses

1. Noted.

2. Noted.

3. The Rock Island District will coordinate any additional Section 404 (b)(1) Evaluations and NEPA documents with your office, as well as with other Federal and state agencies, groups, and the public.

CONVERSATION RECORD

TIME:

DATE: 12-15-88

TYPE ( )VISIT ( )CONFERENCE (x)TELEPHONE ( )INCOMING ( )OUTGOING

ROUTING

NAME/SYMBOL: INT

NAME OF PERSON CONTACTED: ORGANIZATION: TELEPHONE ( ) -

SUBJECT: Intentions of WI, MO, & IA SHPO to comment on Draft EIS L & D Rehab Mississippi & ILL River

SUMMARY: District Archeologist Ken Barr contacted the following SHPO offices on the indicated dates.

Illinois- 12/9/88 Mr. Emmerson

Wisconsin- 12/9/88 Mr. Dexter

Missouri- 12/15/88 Mr. Weichman

All offices indicated that since they were actively involved in executing PMOA for historic properties in the project areas they would not be commenting on DEIS.

1-11 1

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION: Ken Barr

SIGNATURE: Kenneth Barr

DATE: 12-15-88

ACTION TAKEN

SIGNATURE

TITLE

DATE

50271-101 CONVERSATION RECORD (12-76)

Rock Island District Responses

1. We will continue to coordinate specific plans with the appropriate SHPO office.

STATE OF ILLINOIS
OFFICE OF THE GOVERNOR
SPRINGFIELD 62706

JAMES R THOMPSON
GOVERNOR

SAI# 88-10-07-41

SUBJECT: Programmatic Rehabilitation Effort, Mississippi River Locks & Dams 2-22

1-12

TO: Neil A. Smart
US Army Engineer District, Rock Island
Attn: Planning Division
Clocak Tower Building-P.O. Box 2004
Rock Island, Illinois 61204-2004

1 The Illinois State Clearinghouse has reviewed the reference subject pursuant to the National Environmental Policy Act of 1969. State agencies which are authorized to develop and enforce environmental standards have been given the opportunity to comment on this subject. At this time no comments have been received.

Illinois State Clearinghouse

October 19, 1988

Rock Island District Response

1. Noted

State of Illinois
DEPARTMENT OF AGRICULTURE
Division of Natural Resources
State Fairgrounds, P.O. Box 19281, Springfield, IL 62794-9281, 217/782-6297
Bureau of Farmland Protection Bureau of Soil Conservation

November 2, 1988

Colonel Neil A. Smart
District Engineer
US Army District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Re: Draft Programmatic Environmental Impact Statement
Mississippi River, Locks and Dams 2-22
Illinois Waterway from LaGrange to Lockport
Locks and Dams, September 1988

1-13

Dear Colonel Smart:

1 The Illinois Department of Agriculture has reviewed the Draft Programmatic Environmental Impact Statement for Locks and Dams 2-22 on the Mississippi River and submits the following comments.

2 The Department fully supports the Corps rehabilitation efforts to the Upper Mississippi River System (UMRS). No significant, adverse site-specific impacts have been identified from construction of the proposed measures. Any disposal of excavation materials will be deposited on Corps-owned property or will be transported to wetland areas which will not impact agricultural land.

3 The proposed action should not have a negative effect upon Illinois interests in moving grain downstream. In fact, the improvements should enhance Illinois' abilities to move large quantities of grain when necessary.

4 Final comments shall be submitted upon review of the Final Environmental Impact Statement. Should there be a change in the scope of the project or if there are questions concerning our DEIS comments, please do not hesitate to contact our Department at 217/782-6297.

Sincerely,

Teresa J. Savko
Bureau of Farmland Protection

TJS:mdg

Rock Island District Responses

1. Noted.

2. It is anticipated that most disposal will occur on Corps-owned property near the lock and dam sites. We wil not transport material to wetland areas; non-wetland area would be used.

3. Noted.

4. Noted.

Illinois State Geological Survey

ENR
Illinois Department of Energy and Natural Resources

Natural Resources Building
615 East Peabody Drive
Champaign, IL 61820
217/333-4747

October 25, 1988

Colonel Hall A. Smart
District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building
P.O. Box 2004
Rock Island, Illinois 61204-2004

ATTN: Planning Division

Dear Colonel Smart:

1 The Illinois State Geological Survey appreciates the opportunity to comment on the Draft Programmatic Environmental Impact Statement concerning the major rehabilitation effort on the Upper Mississippi River System.

We suggest that in addition to the points raised in the EIS, the following issues also be considered:

1) What are the estimated amounts and quality of spoils that will be produced by dredging at each site? How will the spoils be disposed of at each
2 site? (We understand that this issue was not addressed in the EIS because specific engineering plans for the improvements do not yet exist; however, guidelines from previous projects could be used to provide estimates.)

2) Will the new structures proposed by this project affect the river flow in such a way as to increase bank erosion, either by diverting the flow
3 closer to the banks, by raising the level of the river, or by causing a change in the paths followed by barge traffic?

3) Any increase in river traffic has the potential to cause an increase in riverbank erosion, increased scour around structures, an increase in suspended sediment, and increased siltation in backwaters. It is
4 important to consider at this stage of the project how these effects could be mitigated if in fact an increase in traffic does occur, despite predictions to the contrary.

Should you or your staff have any questions regarding these comments, please do not hesitate to contact our office.

Sincerely,

David L. Gross
Geologist and Head
Environmental Studies and Assessment Section

DLG:mds

1-14

Rock Island District Responses

1. Noted.

2. As discussed in the EIS (see page EIS-144), we anticipate that only a very small quantity of material may need to be removed for some of the measures. Since construction of the measures will occur within the immediate vicinity of the lock and dam structures, these areas are already kept well scoured by the current. We will attempt to locate disposal sites on Government land located at the lock and dam sites, and to avoid impacts to fish and wildlife resources. A NEPA document will be prepared for future design reports, and cooridnated with Federal and state agencies, and the public.

3. Construction of the proposed measures will not alter river flow and affect bank erosion, river levels, or traffic patterns near the locks.

4. The traffic analysis described in the EIS revealed that only a very small increase in navigation traffic is anticipated by the year 2040 as a result of constructing all of the proposed measures. This will not result in measurable impacts. Since significant, adverse impacts have not been identified, mitigation is not proposed in the EIS.

Illinois Environmental Protection Agency · P. O. Box 19276, Springfield, IL 62794-9276

217/782-0610

Rock Island District Corps of Engineers
Locks and Dams 2-22, LaGrange and Peoria Locks
Log # C - 885-88 [CoE Appl. 171580 and 17159Z #]

December 2, 1988

Mr. James H. Blanchar, P.E.
Chief, Operations Division
Rock Island District
Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Mr. Blanchar:

This Agency received a request on October 4, 1988, from the Rock Island District Corps of Engineers requesting necessary comments for environmental consideration concerning the rehabilitation of various structures at Mississippi River Locks and Dams 2 through 22 and Illinois River Locks and Dams at LaGrange and Peoria, as specified in the Draft Programmatic Environmental Impact Statement of September, 1988.. We offer the following comments. 1

1-15

Based on the information included in this submittal, it is our engineering judgment that the proposed project may be completed without causing water pollution as defined in the Illinois Environmental Protection Act, provided the project is carefully planned and supervised. 2

These comments are directed at the effect on water quality of the construction procedures involved in the above described project and is not an approval of any discharge resulting from the completed facility, nor an approval of the design of the facility. These comments do not supplant any permit responsibilities of the applicant towards this Agency. 3

This Agency hereby issues certification under Section 401 of the Clean Water Act (PL 95-217), subject to the applicant's compliance with the following conditions:

1. The applicant shall not cause:

   a. violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulations;

   b. water pollution as defined and prohibited by the Illinois Environmental Protection Act; and

   c. interference with water use practices near public recreation areas or water supply intakes.

4

Rock Island District Responses

1. Noted.

2. Noted.

3. Noted.

4. Noted. We will comply with conditions #1 to #6. These conditions will be included as conditions to the permit, as well as in the Statement of Findings for the proposed action.

2. The applicant shall provide adequate planning and supervision during the project construction period for implementing construction methods, processes and cleanup procedures necessary to prevent water pollution and control erosion.

3. Any spoil material excavated, dredged or otherwise produced must not be returned to the waterway but must be deposited in a self-contained area in compliance with all State statutes, regulations and permit requirements with no discharge to the waters of the State unless a permit has been issued by this Agency. Any back filling must be done with clean material and placed in a manner to prevent violation of applicable water quality standards.

4. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching. All construction within the waterway shall be conducted during zero or low flow conditions.

4

I-16

5. The applicant shall implement erosion control measures consistent with the "Standards and Specifications for Soil Erosion and Sediment Control" (IEPA/WPC/87-012).

6. This certification becomes effective when the Department of the Army, Corps of Engineers, includes the above conditions #1 through 5 as conditions of the requested permit issued pursuant to Section 404 of PL. 95-217.

5 This certification does not grant immunity from any enforcement action found necessary by this Agency to meet its responsibilities in prevention, abatement, and control of water pollution.

Very truly yours,

Thomas G. McSwiggin

Thomas G. McSwiggin, P.E.
Manager, Permit Section
Division of Water Pollution Control

TGM:BY:lab/3653j, 60-61

cc: IEPA, DWPC, Records Unit
DWPC, Field Operations Section, Region 1, 2, 3 and 5
IDOT, Division of Water Resources, Springfield
USEPA, Region V

Rock Island District Responses

5. Noted.

Illinois Department of Conservation
life and land together

LINCOLN TOWER PLAZA • 524 SOUTH SECOND STREET • SPRINGFIELD 62701-1787
CHICAGO OFFICE • ROOM 4-300 • 100 WEST RANDOLPH 60601
MARK FRECH, DIRECTOR

December 20, 1988

Colonel Neil A. Smart
Rock Island District
Corps of Engineers
Clock Tower Building - P.O. Box 2004
Rock Island, IL 61204-2004

Attn: Karen Bass

I-17

Dear Colonel Smart:

Department staff have been afforded an opportunity to review the draft Programmatic Environmental Impact Statement (PEIS) for the Major Rehabilitation Effort, Mississippi River Locks and Dams 2-22 which you transmitted to us in October, 1988.

1 *Staff did not raise any additional concerns or comments during their review and appear* satisfied with your responses to the U.S. Fish and Wildlife Resources and to Director Frech's letter of March 2, 1988.

Thank you for the opportunity to comment.

Sincerely,

Richard W. Lutz

Richard W. Lutz, Supervisor
Impact Analysis Section
Division of Planning

RWL:gb

cc: USFWS, Rock Island

Rock Island District Responses

1. Noted. We appreciated your efforts on this action, and look forward to continued coordination with your agency.

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

November 10, 1988

Colonel Neil A. Smart
Rock Island Corps of Engineers
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

Iowa Department of Natural Resources staff reviewed the draft Programmatic Environmental Impact Statement (PEIS) for the Major Rehabilitation Effort, Mississippi River Locks and Dams 2-22; Illinois Waterway from La Grange to Lockport Locks and Dams, September 1988. It is well-written and addresses issues as best as can be expected with existing information. Once again it is unfortunate we have such large information gaps that prevent more thorough physical and biological assessments to develop mutually confident conclusions.

1

1-118

We agree that the issue of combining this PEIS with the EIS for the Second Lock at Lock and Dam 26 (Replacement) remains unresolved. Both statements conclude that small increases in navigation traffic capacity will occur as a result of the respective works, although the increased capacity is only minor and insignificant in terms of environmental impacts. Assuming impacts of each project are insignificant, which is an assumption still open for debate due to overall lack of information, the time will come when the cumulative effects of insignificant impacts will be significant. That time may be when the second lock and major rehabilitation projects are complete, or it may be after some future navigation system improvements. Multipurpose management of the Upper Mississippi River System will slowly sway towards commercial navigation dominance if the impacts are continually subdivided and treated separately. Therefore, as stated in the PEIS, we have not convinced you of the need to combine the statements, and you have not convinced us that they should not be combined.

2

We look forward to working with the Corps of Engineers, other interested agencies, and navigation industry on the "avoid and minimize efforts. Cooperation and commitment by all these entities will go a long way towards achieving true multipurpose management of the river system.

3

WALLACE STATE OFFICE BUILDING / DES MOINES, IOWA 50319 / 515 281-5145

Rock Island District Responses

1. Noted.

2. Noted. The Final EIS for the Second Lock at L/D 26 (R) reported a 34 million ton increase (25%) in traffic by the year 2040; the traffic analysis in the rehab EIS showed a 2.1 million ton increase (1.3%) by the year 2040 if all the measures are constructed.

The "without-project" or base condition used in our traffic analysis included all existing features of the UMRS plus 1,200- and 600-foot chambers at new Locks and Dam 26. Also, the rehab EIS does state that combining the two impact statements is an unresolved issue.

3. We concur with your comment and will evaluate the avoid and minimize measures for implementation feasibility in cooperation with Federal and state agencies.

While we understand your logic in why you believe the high-volume bubblers will not cause a rush of end-of-season traffic, it will
4 be interesting to see if industry will operate as projected. If it does not and end-of-season concentrations of traffic result, the issue and impacts must be reconsidered and reevaluated.

5 Thank you for the opportunity to provide these comments on the PEIS for the major rehabilitation efforts on Mississippi River System locks and dams.

Sincerely,

LARRY J. WILSON
DIRECTOR
DEPARTMENT OF NATURAL RESOURCES

LJW:ks

I-19 The Rock Island District will agree to monitor early- and end-season navigation traffic use at the locks using data from the PMS and OMNI systems, and other published data. The data to be collected will include number of tows and barges by direction, ice conditions, air and water temperatures, and other factors that may influence navigation. We will need to begin by establishing baseline ranges for traffic and time periods. Then, after installation of the high-volume bubbler systems in Locks 2 through 22, we will monitor early- and end-season traffic use at representative locks. As a practical matter, however, funding for installation of the bubbler systems will be phased in over several years, and completion of all of the systems is not anticipated until the late 1990's. We will coordinate the specific details of the monitoring effort, baseline interpretations, and monitoring results with Federal and state environmental, transportation, and economic agencies.

5. We appreciated your efforts on this action, and look forward to continued coordination with your agency.

Rock Island District Responses

4. Noted. The District acknowledges your concern that the addition of high-volume bubbler systems will encourage navigation during ice conditions. However, as discussed in the EIS, there are major reasons why this would not occur and why these systems are needed to improve safety. There are lock sites in the Rock Island and St. Paul Districts that already have bubbler systems. Installation of a higher-volume system will improve the ability to keep ice from accumulating on the lock gates, and would also help keep the gate recess clearer of floating ice and debris. Ice accumulation is very damaging to lock structures. Manual removal of ice and debris is still necessary with the existing bubblers, and is dangerous to lock personnel. Concerning navigation, ice conditions in the river channel are the controlling factor, and bubbler systems at the lock gates have no effect on ice conditions in the river away from the immediate lock gate area. Bubbler systems located in the miter gate area have not, and will not, affect this constraint. Finally, most operators will continue to avoid navigation during ice periods because of increased operating costs, and the hazards that could result from freezing in.

The Rock Island District is not denying that the potential exists for adverse environmental impacts from navigation during the winter on the UMR. Our Feasibility Study concerning Year-Round Navigation (1980) clearly stressed the need for further environmental studies on this issue. The District funded some studies related to winter biology under the GREAT II program. More recently, the Long Term Resource Monitoring portion of the UMRS Environmental Management Program has proposed funding for studies concerning winter biology.

State Historical Society of Iowa

The Historical Division of the Department of Cultural Affairs

October 8, 1988

Colonel Neil A. Smart
District Engineer
U.S. District Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, IL 61204-2004

RE: COE - DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT - LOCK AND DAMS #2-22 - MAJOR REHABILITATION EFFORTS.

Dear Col. Smart:

We have reviewed the above mentioned document and concur with the COE that the effects of the proposed rehabilitation projects have been adequately assessed (our letter of May 11, 1988). We look forward to reviewing site-specific impacts. 1

Thank you for consulting with our Bureau during the planning phases of this project.

Sincerely,

Ralph Christian
Review and Compliance Program
Bureau of Historic Preservation

1-20

☐ 402 Iowa Avenue
Iowa City, Iowa 52240
(319) 335-3916

☑ Capitol Complex
Des Moines, Iowa 50319
(515) 281-5111

☐ Montauk
Box 372
Clermont, Iowa 52135
(319) 423-7173

Rock Island District Response

1. Noted. We will continue to coordinate our activities with your office.

Iowa Department of Transportation
800 Lincoln Way, Ames, Iowa 50010 515/239-1646

November 22, 1988

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

RE: Draft Programmatic Environmental Impact Statement - Major Rehabilitation Effort - Mississippi River Locks and Dams 2-22

1-21

1 The Iowa Department of Transportation (DOT) appreciates the opportunity to comment on the Programmatic Environmental Impact Statement on the Upper Mississippi River System. The key question answered was that the incremental increase in navigation traffic induced by the rehabilitation effort was quite small. This small increase leaves the impacts virtually immeasurable. It will be many years before the increase in traffic levels (1.4% by the year 2040) is realized. We agree this small increase is well within the normal variability of any navigation season.

2 The rehabilitations program is not designed to increase navigation capacity, but to restore capacity lost to old and out dated equipment and to make the structures safer and more efficient. This not only benefits commercial navigation, but all users of the river system.

3 Your proposed rehabilitation program will help assure that the river continues to provide benefits to shippers and industry in Iowa. We encourage you to move forward as quickly as possible with rehabilitation improvements being while consistent with necessary environmental safeguards during construction activities. The DOT looks forward to working with you on the rehabilitation program which will help assure the continued operational integrity of the river system.

Sincerely,

Les Holland

Les Holland
Director
Rail and Water Division

LH:js

Rock Island District Responses

1. Noted.

2. Noted.

3. Noted. We will continue to coordinate our activities with your office.

MISSOURI DEPARTMENT OF CONSERVATION

MAILING ADDRESS:
P.O. Box 180
Jefferson City, Missouri 65102-0180

STREET LOCATION:
2901 West Truman Boulevard
Jefferson City, Missouri

Telephone: 314/751-4115
JERRY J. PRESLEY, Director

November 15, 1988

Colonel Neil A. Smart
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Bldg.
Rock Island, Illinois 61201

Attn: Planning Division

Re: Major Rehabilitation Effort
Mississippi River
Locks and Dams 2-22

Dear Colonel Smart:

1-22

Thank you for the opportunity to review the draft Programmatic Environmental Impact Statement concerning Major Rehabilitation of Locks and Dams 2-22. Members of the Department staff reviewed the PEIS and previous correspondence we have had with your staff. The responses to our concerns, while not alleviating them, has helped in our mutual understanding of

1 potential project impacts, especially as related to winter operations. We remain concerned that this major rehabilitation will encourage winter operation and look forward to Rock Island District initiating procedures or guidelines that will curtail winter/ice cover operations before major environmental impacts occur.

Specific comments include:

2 Page 44 - Paragraph 2.62. Add freshwater drum to list of fish species—it was the main species recorded in a creel census at Lock and Dam 22.

3 Paragraph 2.64. Heron and egret rookery exists on Hat Island (R.M. 238.8L).

4 Page 46 - Paragraph 2.75. "Horseshoe Lobe" should be Horseshoe Lake.

5 Page 84 - Paragraph 3.198. The reported decline in sportfish catch rates in 1973 may be more a function of the 1973 flood.

6 Page 91 - Paragraph 3.212. Commercial mussel harvest from pools 26-22 in recent years has been substantial. Harvest estimates data could be provided upon request.

Rock Island District Responses

1. Noted. The District acknowledges your concern that the addition of high-volume bubbler systems will encourage navigation during ice conditions. However, as discussed in the EIS, there are major reasons why this would not occur and why these systems are needed to improve safety. There are lock sites in the Rock Island and St. Paul Districts that already have bubbler systems. Installation of a higher-volume system will improve the ability to keep ice from accumulating on the lock gates, and would also help keep the gate recess clearer of floating ice and debris. Ice accumulation is very damaging to lock structures. Manual removal of ice and debris is still necessary with the existing bubblers, and is dangerous to lock personnel. Concerning navigation, ice conditions in the river channel are the controlling factor, and bubbler systems at the lock gates have no effect on ice conditions in the river away from the immediate lock gate area. Bubbler systems located in the miter gate area have not, and will not, affect this constraint. Finally, most operators will continue to avoid navigation during ice periods because of increased operating costs, and the hazards that could result from freezing in.

The Coast Guard, Rock Island District, and the River Industry Action Committee work together to deal with the seasonal conditions (water and air temperature, degree of ice cover, 5-day forecasts, etc.) encountered at the end of the season. Agreements on restirctions considering all information at the time have been reached as needed.

2. Freshwater drum was added to the list of sport fish species in the EIS.

3. This information was added to the EIS.

4. The correction has been made.

5. Noted.

6. This information has been added to the EIS.

Page 169 - Paragraph 4.48 and 4.58. These paragraphs are the authors' and Corps of Engineers' opinion. Major adverse impacts could occur with RI advised winter navigation. The question that begs a response is how is Rock Island District meeting this challenge. Page 165 - paragraph 3 of Rock Island District's response indicates high level of winter activity with unpredicted impacts. 7

Page 169 - Item A-6. We would support efforts to provide a degree of protection for the Upper Mississippi River through a reasonable set of criteria for closure during winter/ice cover periods. 8

The opportunity to offer these comments is appreciated. Please note that Mr. Larry R. Gale, former director, retired January 1, 1988. 9

Sincerely,

Edwin H. Glaser

EDWIN H. GLASER
ACTING DIRECTOR

cc: U. S. Fish and Wildlife Service
Rock Island, Illinois

1-23

Rock Island District Response

7. The Rock Island District is not denying that the potential exists for adverse environmental impacts from navigation during the winter on the UMR. Our Feasibility Study concerning Year-Round Navigation (1980) clearly stressed the need for further environmental studies on this issue. The District funded some studies related to winter biology under the GREAT II program. More recently, the Long Term Resource Monitoring Portion of the UMRS Environmental Management Program has proposed funding for studies concerning winter biology.

8. Concerning a closed season, establishment would need to be based on specific criteria such as ice thickness, water and air temperature, amount of tow movement, economics (supply and demand), environmental parameters, etc. A standard or set closed season is not considered appropriate, since weather conditions can vary significantly from year to year. Congressional action may be required to change present procedures and establish a closed season. We understand that the St. Louis District has initiated discussions concerning this issue with the Coast Guard, RIAC, and the US FWS. The Rock Island and St. Paul Districts are willing to extend these discussions to the middle and upper protions of the Mississippi River.

9. The District appreciates your interest and will continue to coordinate further activities with your agency.

JOHN ASHCROFT
Governor

FRICK A. BRUNNER
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

OFFICE OF THE DIRECTOR
P.O. Box 176
Jefferson City, Missouri 65102
Telephone: 314-751-4422

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

November 16, 1988

Colonel Neil A. Smart
District Engineer
Rock Island District
Corps of Engineers
P.O. Box 2004
Rock Island, IL 61204-2004

Dear Colonel Smart:

1 The Missouri Department of Natural Resources has reviewed the Draft Programmatic Environmental Impact Statement (EIS) for the proposed major rehabilitation effort, Mississippi River Locks and Dams 2-22.

I-24

In general, we believe the document adequately describes the anticipated environmental impacts of the proposed rehabilitation effort and we concur with the conclusions and findings of the report. We believe the proposed rehabilitation effort to be necessary in maintaining the integrity of these navigation structures and the navigation system as a whole. We are somewhat concerned, however, with the uncertainty expressed with regard to the extent of possible increases in end-season

2 commercial traffic as a result of the installation of high-volume bubbler systems at Locks 2 through 22. While acknowledging the variable nature of end-season traffic, we believe potential impacts to the river environment during ice conditions from possible increases in end-season traffic should be addressed in the analysis.

3 The opportunity to review and comment on this matter is appreciated.

Sincerely,

DEPARTMENT OF NATURAL RESOURCES

Frederick A. Brunner, Ph.D., P.E.
Director

FAB:tlk

Rock Island District Responses

1. Noted.

2. There are lock sites in the Rock Island and St. Paul Districts that already have bubbler systems. Installation of a higher-volume system will improve the ability to keep ice from accumulating on the lock gates, and would also help keep the gate recess clear of floating ice and debris. Ice accumulation is very damaging to the lock structures. Manual removal of ice and debris is still necessary with the existing bubblers, and is dangerous to lock personnel. Concerning navigation, ice conditions in the river channel are the controlling factor, and bubbler systems at the lock gates have no effect on ice conditions in the river away from the immediate lock gate area. Bubbler systems located in the miter gate area have not, and will not, affect this constraint. Finally, most operators will continue to avoid navigation during ice periods because of increased operating costs, and the hazards, as pointed out in your comment, that could result from freezing in.

The Rock Island District is not denying that the potential exists for adverse environmental impacts from navigation during the winter on the UMR. Our Feasibility Study concerning Year-Round Navigation (1980) clearly stressed the need for further environmental studies on this issue. The District funded some studies related to winter biology under the GREAT II program. More recently, the Long Term Resource Monitoring Portion of the UMRS Environmental Management Program has proposed funding for studies concerning winter biology.

The Rock Island District will agree to monitor early- and end-season navigation traffic use at the locks using data from the PMS and CMMI systems, and other published data. The data to be collected will include number of tows and barges by direction, ice conditions, air and water temperatures, and other factors that may influence navigation. We will need to begin by establishing baseline ranges for traffic and time periods. Then, after installation of the high-volume bubbler systems in Locks 2 through 22, we will monitor early- and end-season traffic use at representative locks. As a practical matter, however, funding for installation of the bubbler systems will be phased in over several years, and completion of all of the systems is not anticipated until the late 1990's. We will coordinate the specific details of the monitoring effort, baseline interpretations, and monitoring results with Federal and state environmental, transportation, and economic agencies.

3. We have appreciated your efforts and will continue to coordinate our activities with your agency.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadny
Secretary

BOX 7921
MADISON, WISCONSIN 53707

December 1, 1988

File Ref. 1650-2

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204-2004

Dear Sir:

The Wisconsin Department of Natural Resources has completed review of the Draft Programmatic Environmental Impact Statement - Major Rehabilitation Effort - Mississippi River Locks and Dams 2-22, prepared by the U. S. Army Corps of Engineers. Below are suggestions for additional information you may wish to include in your analysis. We remain concerned with any increases in the navigation capacity or use of the locks on the Upper Mississippi River System (UMRS).

1-26

1

Page S-3, par. S.9. (Relationship to Second Lock at Lock and Dam 26): From a legal standpoint, we agree with the assertion the major lock rehabilitation effort and the second lock project at Lock and Dam 26 are separate projects. However, from a biological standpoint, impacts resulting from these projects will be cumulative and should not be considered independently.

2

Page EIS-28, par. 3.32. (Mussels): Since 1981, when the 30 mussel species were collected through surveys of Pools 3 to 11 (Thiel 1981), 3 additional mussel species have been sampled (Heath, pers. comm.). One of these is a Federal Category 2 species: Cumberlandia monodonta (spectacle case). Recently, the Higgin's eye has been found in Pools 8 (Heath, pers. comm.) and 7 (Miller, 1987).

3

Page EIS-30, par. 3.33. (Commercial Clamming): This paragraph should be deleted and replaced with: "Commercial clamming exists in Pools 4, and 7 through 11. The majority of the harvest occurs in Pools 8 and 9, with the commercially valuable washboard (Megalonaias nervosa)

4

Rock Island District Responses

1. Noted.

2. Noted. The Final EIS for the Second Lock at L/D 26 (R) reported a 34 million ton increase (25%) in traffic by the year 2040; the traffic analysis in the rehab EIS showed a 2.1 million ton increase (1.3%) by the year 2040, if all the measures are constructed. This traffic increase identified for the rehab measures translates into an average increase of about one tow per week on the Illinois Waterway, and about two tows per week on the Mississippi River. This traffic increase is well within the normal variability of any navigation season, and is such a small increment as to not result in measurable impacts.

3. This information has been added to the EIS.

4. Thank you for the updated information. It replaced the existing text in paragraph 3.33.

JOHN ASHCROFT
Governor

FREDERICK A. BRUNNER
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

10.061
171580 and 171582

January 12, 1988

Colonel Hall A. Smart
District Engineer
Rock Island Dist., Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

1-25

1 The Department of Natural Resources, Water Pollution Control Program, has reviewed your request for water quality certification for the proposed rehabilitation effort on the Mississippi River at Lock and Dam numbers 20, 21, and 22, as described in Public Notice numbers CENCR - 171580 and 171582. This office certifies that the proposed activities apparently will not cause the general or numeric criteria to be exceeded nor impair beneficial uses established in Water Quality Standards, 10 CSR 20-7.031.

2 Water Quality Standards must be met during the operation. If compliance with Water Quality Standards is not maintained, the Corps of Engineers will be notified and the certification may be withdrawn.

3 This certification is being issued under Section 401 of Public Law 95-217, the Clean Water Act of 1977.

Sincerely,

MISSOURI CLEAN WATER COMMISSION

Charles A. Stieferman, P.E.
Director of Staff

CAS:lbv

cc: Ms. Karen Bahus, Rock Island Dist., Corps of Engineers
Macon Regional Office

Rock Island District Responses

1. Noted.

2. Noted. The District will comply with this condition.

3. Noted.

harvested only from Pools 9 and 10. In 1986, the commercial clamming industry transacted about $500,000 in business in Pools 4 through 11" (Heath, et al., 1988).

Complete references cited above are:

Miller, Andrew. 1987.
Notes on Winter's Landing. Pool 7, Mississippi River Wingdam Mussel Survey. USACOE, WES, Vicksburg, Mississippi.

Heath, D. J., M. P. Engel, and J. A. Holzer. 1988.
An Assessment of the Commercial Harvest of Freshwater Mussels in the Mississippi River Bordering Wisconsin. Summary Report, Wisconsin Department of Natural Resources.

4

Pages EIS-31 to EIS-38, Table EIS-6: The following changes are needed:

Mollusks

Arcidens confragosus: Habitat: Change "below St. Louis" to "above St. Louis." Reaches: Add C, E.

Obovaria olivaria: Habitat: Add "medium rivers."

Quadrula nodulata: Reaches: Add C, E.

Cumberlandia monodonta: Habitat: Delete existing text and replace with "rocky areas." Reaches: Add C, E.

Ellipsaria lineolata: Habitat Preferences: Add IB, IC.

Fusconaia ebena: Habitat: Delete existing text. Replace with "A few very old individuals found due to loss of host fish." Habitat Preferences: Add IB, IC.

1-27

5

Lampsilis teres: Habitat: Replace "small streams or lake habitats" with "large rivers." Habitat Preferences: IB, IC, IA.

Lasmigona compressa: Reaches: Delete B. This species is not found in the Upper Mississippi River.

Quadrula fragosa: Habitat: Change to "Is extinct in UMR." Reaches: Delete B.

Simpsonaias ambigua: Habitat: Replace existing text with "Large to medium streams." Habitat Preference: IB.

Fish

Additions to Table EIS-6 based on Wisconsin information only:

Ethestoma asericeum (mud darter), WI Status = SC. Reach B (WI). Habitat: Sloughs, pools, over mud, sand, clay or gravel substrate..

Rock Island District Responses

5. Table EIS-6 has been revised per your suggestions.

Ictiobus niger (black buffalo), WI Status = Threatened. Reach B (WI). Habitat: Sloughs, and in main channel. Spawns in Mississippi River backwaters in spring. Variety of substrates.

Notropis texanus (weed shiner), WI Status = SC. Reach B (WI). Habitat: Waters of slow current, sloughs, pools. Sand, mud substrate.

Polyodon spathula (paddlefish), WI Status = SC (will be listed as Threatened). Reach B (WI). Habitat: Large rivers, pools.

Moxostoma carinatum (river redhorse), WI Status = SC (will be listed as Threatened). Reach B (WI). Habitat: Waters with strong current over hard, silt-free substrate. Extremely sensitive to turbidity, pollution.

Alosa chrysochloris (skipjack herring), WI Status = SC (will be listed as Endangered). Reach B (WI). Habitat: Open waters of large rivers, large river lakes, swift currents below dams.

5 The following corrections are needed:

Sangamia megalotis should be corrected to Lepomis megalotis. The WI States of Notropis emiliae should be SC, not W.

Birds

1-28 Interior Least Tern (Sterna antillarum occurs in WI, Reach B. Reported from the LaCrosse (Pool 8) area.

The correct name for the Common Tern is Sterna hirundo.

Plants

Agastache nepetoides (yellow giant hyssop) is Threatened in WI, not Endangered.

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6 Page EIS-94, par. 3.226. (Reference to Simons et al. 1988): We do not agree to the context in which the Simons, et al. (1988) report was cited. The study conclusions apply only to areas of the river where there are no quiet backwaters. It should also be noted that, in a study done for the Master Plan, Simons concluded backwaters were filling in with sediment that was resuspended and laterally transported by wave action resulting from passing tows.

7 Page EIS-102, par. 4.37. (Guardwall at LAD 22): Increased lock capacity will result from the proposed guardwall at LAD 22 because less time will need to be expended on preventing tows from being swept into the dam, and/or retrieving tows that have been swept into the dam.

8 Page EIS-103, par. 4.41. (Impacts of Earlier Shipping at Pool 20): Earlier shipping in Pool 20 due to the proposed vertical lift gate at LAD 20 could impact fish spawning migrations.

Rock Island District Responses

5. Table EIS-6 has been revised per your suggestions.

6. We have added to the FEIS that the conclusions in both Simons' 1981 and 1988 studies pertained only to side channels with both head and mouth connections to the river year-round, and not to more idsconnected side channels or backwaters.

7. Please review Plate 6 which shows the locational relationship of the guardwall to the lock approach. Since the outdraft is not being altered by the guardwall, loose barges or disabled tows will be swept into the guardwall instead of the dam. No less time should be needed to retrieve tows or barges that have been swept into the guardwall instead of the dam.

8. Noted. The wording of EIS paragraph 4.41 has been revised for clarification. We do not mean to imply that an earlier traffic season will occur. Traffic is already moving in the lower pools, and ice conditions can determine whether commodities are moved via barges on the Mississippi River; via truck or rail to the Illinois Waterway; or are delayed for short periods until conditions improve.

Page EIS-105, par. 4.51, (Navigation Capacity Increases): The document states that small increases in lock capacity do not translate into additional barge traffic (e.g. number 4.51, p. EIS 105). The justification given for this opinion is that shippers stated that the benefits of slightly improved capacity were not sufficient to induce more shipping. We disagree with the basis for this opinion for the following reasons.

a. The shippers have a vested interest in the development of the transportation system. The conclusions drawn from the traffic analysis presented in the document rely on the statements made by shippers.

9

b. The emphasis on "induced traffic" misses the point about the overall capacity of the system being increased. The proposed improvements will increase the capacity of locks (e.g. see number 4.50, p. EIS 105). Market conditions will determine when that capacity will be reached. Therefore, the final EIS should address the impacts of increases in the capacity of the locks in addition to the impacts of increased use of the UMRS system due to the proposed major lock improvements.

Page EIS-109, par. 4.63, ("Small" Increases May Not Imply "Small" Impacts): Another problem with the document is the assumption that, if traffic increases are small, impacts will be equally small. We challenge this assumption with the following remarks.

1-29

a. Number 4.63 (p. EIS-109) states "A small increase in traffic results in a disproportionate increase in lock congestion...". Increased congestion implies more tows will be well away from the sailing line, and that additional maneuvering of tows will be required. This translates into an increased potential for environmental impacts.

10

b. An increase in tow size has the potential to result in additional bottom scraping, greater thrust requirements, and more likely tow stranding. All these could result in greater impacts.

c. Small increases in traffic levels could result in very serious environmental impacts if an ecological threshold was crossed. We believe each species has a unique threshold level above which increasing traffic levels will result in conditions detrimental to that species.

Page EIS-110, par. 4.68, (Endangered Species Impacts): We agree with the U. S. Fish and Wildlife position referring to Lampsilis higginsi. The increased navigation use of the UMR expected to result from the Locks and Dams rehabilitation will likely have a direct impact on the rare mussels and fish of the UMR, through increased turbidity and siltation. Increased traffic may also impact the increasing numbers of nesting bald eagles along the UMR during the summers as they forage in the UMR waters. It is imperative that we be extremely cautious when considering and assessing cumulative, system wide navigation impacts as they relate to the future of endangered species in the UMRS.

11

Rock Island District Responses

9. a. Other factors were also used as input to the traffic analysis, not just industry interviews. The projected increases in traffic are sensitive to assumptions and base data factored into the traffic analysis. The global economy, transportation demand, industry actions, future tow size, commodity mix, and other variables affect future traffic needs.

b. The potential impact to navigation resulting from construction of the proposed measures were evaluated in the traffic analysis using a multi-level approach (see page EIS-100-101). Estimation of impacts concerning site-specific lock capacity, level of induced traffic, and level of overall system capability (traffic) was performed and discussed in detail in the EIS. Paragraphs 4.49 to 4.51 describe that increased efficiencies resulting from guidewall extensions will result in minor increases in site-specific lock capacity. However, these efficiency increases are not of sufficient magnitude to induce new traffic on the system. The final level of analysis, the system capability (traffic) component, assessed those site-specific lock capacities and traffic inducing characteristics of the measures to determine the impact on total system traffic. This resulted in a very small increase in traffic (2.1 million tons) being identified by the year 2040 if all the proposed measures were constructed.

10 a. Paragraph 4.63 discusses the risk and uncertainty for shippers and carriers associated with end-season navigation. The point of the discussion is that shippers and carriers of existing end-season movements would not create additional lock congestion by doing anything that may add further end-season movements. The risk and costs associated with standing or stranded end-season movements are too great for most shippers and carriers.

b. It is the overloading of barges that leads to bottom scraping and tow stranding, not additional barges per tow. Greater thrust requirements may be necessary, however, should numerous barges be added to a tow.

c. Noted. UMR Federal and state agencies need to continue working toward a methodology that will assist in quantifying incremental increases in navigation traffic, and resulting environmental impacts.

Page EIS-146, par. 1, (Hazards of Late Season Navigation): It should be noted that in 1984 numerous tows were navigating the UMRS during very bad ice conditions. Several barges were trapped in ice (Pools 7 and 19) for the duration of the winter. 12

Page EIS-149, FWS No. All, (Nine-foot Draft): Enforcing the maximum 9-foot draft would not, in our opinion, be resource intensive. The Corps is already measuring tow drafts at Lock and Dam 2. Additional monitoring equipment could be installed and operated at Locks 1 and 2 without excessive effort. The results of such monitoring would be beneficial when considering the environmental disturbance and costs resulting from overdraft tows attempting to free themselves. Further, we do not agree there is a lack of authority to enforce the maximum 9-foot draft on the UMRS. Congress has designated a navigation channel be maintained to accommodate vessels with a 9.0 foot draft to reduce environmental impacts associated with overdrafting and to reduce the need for channel maintenance dredging. 13

Page EIS-151, (Avoid and Minimize Measures): As indicated on this page, the St. Paul District Corps of Engineers has implemented numerous actions intended to reduce the environmental impacts associated with navigation. We strongly urge the Rock Island and St. Louis Districts to follow suit and implement similar measures. 14

Appendix 5-2: The comments contained in our October 29, 1987 letter to the Rock Island District Engineer are not, in our opinion, adequately addressed in the DEIS. 15

In summary, we believe there is insufficient information to conclude that traffic increases resulting from lock rehabilitation will not result in significant environmental impacts. Since tow impacts can be viewed along a continuum, the question is at what point along the continuum a threshold level will be exceeded and negative impacts begin to manifest themselves. Each species has a unique threshold level above which increasing traffic levels will result in conditions detrimental to that species. It is likely thresholds have already been exceeded for many species under current traffic levels. This problem is further compounded by little understood seasonal effects of navigation on organisms inhabiting the UMRS. Given the extremely difficult nature of trying to assess impacts of increasing traffic levels with existing data, we suggest you do the following: 16

17 1. Improve coordination with the St. Louis District in development and implementation of the Plan of Study to assess the impacts of incremental increases in tow traffic on the UMRS.

18 2. Fund and undertake studies and actions to analyze and minimize the impacts of end of season and early season navigation.

19 3. Implement avoid and minimize measures as recommended in Appendix B, Draft Fish and Wildlife Coordination Act Report for the DEIS - Major Rehabilitation of Locks 2 through 22.

Rock Island District Responses

11. Noted. According to the US FWS, the Endangered Species Act provides a "first-in-time, first-in-right" approach where the authorization of Federal projects may proceed until it is determined that future actions are likely to jeopardize the continued existence of a listed species (US FWS letters dated June 20 and May 3, 1988). Again, the increase in traffic identified for the proposed measures is well within the normal variability of any navigation season, and is such a small increment as to not result in measurable impacts.

12. Noted. The point of the paragraph is that tows have been trapped in ice in the past, and in more recent years most shippers and carriers have been leaving the upper river near the end of November to avoid this situation.

13. The Rock Island District has revised the responses to the avoid and minimize measures in the EIS. The St. Paul District is proposing to place a digital readout transducer at Lock 2 to monitor tow drafts. They anticipate using the transducer only during low flow periods. Lock staff will notify the tow captain if an overdraft is measured. However, the Corps does not have the authority to enforce a 9-foot draft on the UMRS, and has no legal recourse for stopping overloaded tows.

14. Noted. The Rock Island District has also implemented numerous actions intended to reduce impacts to the UMRS; however, these actions did not specifically fit into the specific contexts of the avoid and minimize measures. The District currently has active interagency coordination groups that assist us in determining environmentally acceptable actions (River Resources Coordinating Team; On-Site Inspection Team (for dredged material disposal); Fish and Wildlife Interagency Committee; Committee to Assess Regulatory Structures.

The St. Louis District has an ongoing review of measures to avoid and minimize adverse environmental impacts. This review is being conducted in coordination with the US FWS, US EPA, the states of Missouri and Illinois, the Coast Guard, and the towing industry. Certain measures are already being implemented, and others are likely to be implemented as a result of this review. The review is scheduled for completion in August 1989.

Only through a flexible, multi-tiered approach will we be able to adequately address the issue of navigation-related impacts to the Upper Mississippi River System. And, only through a firm commitment from all concerned parties, including the Corps of Engineers, to better understand this issue, will we be able to ensure wise use and protection of this nationally significant resource. 20

Sincerely,

Kathryn Curtner, Acting Director
Bureau of Environmental Analysis and Review

KC:HN:jh

cc: James Lissack - MD
Jim Hunteen - SD
Ron Nicotera - ER/4
Bob Redos - WQ/6
Bill Franz - EPA
Fish & Wildlife Service - Rock Island

17. The St. Louis District has been coordinating the POS activity with the Rock Island and St. Paul Districts. Both Districts are also involved on the interagency work team (biological and hydraulic subgroups) recently formed for the POS effort.

18. The Rock Island District will agree to monitor early- and end-season navigation traffic use at the locks using data from the PMS and CMMI systems, and other published data. The data to be collected will include number of tows and barges by direction, ice conditions, air and water temperatures, and other factors that may influence navigation. We will need to begin by establishing baseline ranges for traffic and time periods. Then, after installation of the high-volume bubbler systems in Locks 2 through 22, we will monitor early- and end-season traffic use at representative locks. As a practical matter, however, funding for installation of the bubbler systems will be phased in over several years, and completion of all of the systems is not anticipated until the late 1990's. We will coordinate the specific details of the monitoring effort, baseline interpretations, and monitoring results with Federal and state environmental, transportation, and economic agencies.

19. The Rock Island District is assessing the feasibility of implementing some of the avoid and minimize measures. In December, 1988, we had a meeting with US FWS to discuss the measures in more detail. We will also arrange a meeting with all interested Federal and state agencies in the near future.

20. Noted. The Rock Island and St. Paul Districts will continue to coordinate our activities with your office.

Rock Island District Responses

15. The following responses are provided to the general headings of your letter dated October 29, 1987:

Bubbler Systems. See EIS paragraphs 2.41; 4.7 to 4.10; 4.44 to 4.48; 4.62 to 4.64; and p. EIS-150 to 153. There is no discrepancy between the systems proposed by the Rock Island and St. Paul Districts. As discussed in the EIS, there may be a minor increase in the site-specific lock capacities from Locks 2-22. When the bubbler systems, as well as the other proposed measures, are evaluated for overall system effects, a 2.1 million ton increase has been identified.

Navigation Capacity Increases. The EIS describes the concerns of your agency, as well as other agencies concerning increases in traffic and resulting environmental impacts. The EIS also discusses alternatives, including non-structural alternatives industry may be able to undertake (see Section 2).

Increased Navigation Use. See EIS paragraphs 4.29 to 4.32 which describe the multi-level approach used in the traffic analysis. The results of the traffic analysis show that a 2.1 million ton increase in traffic may result by the year 2040 if all the proposed measures are constructed. Many safety benefits will also accrue from protecting Corps structures, as well as our lock personnel, as discussed throughout the EIS.

Locks and Dams 2-10. See EIS paragraphs 2.1 to 2.20 which describe the other rehab work being done by the Rock Island and St. Paul Districts. The site-specific EA's prepared for this work describe why increases to navigation traffic would not occur.

Lock and Dam No. 26 Second Lock. See EIS paragraphs 2.22, 4.28, and 4.88. The "without-project" condition included 1,200 and 600-foot chambers at Lock and Dam 26 (R). Also, the tonnage difference between the two actions results from removal of items found in the Master Plan scenario, which was used in the EIS for the Second Lock, that are not pertinent to the rehab action (i.e., powered kevels, industry measures, etc.).

16. Noted. See previous responses No. 2 and 10c.

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

BOX , 500 LAFAYETTE ROAD • ST. PAUL, MINNESOTA • 55155-40

DNR INFORMATION
(612) 296-6157

November 16, 1988

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Re: Mississippi River Locks and Dams 2-22
Programmatic Environmental Impact Statement

Dear Sir:

1-32

1 The Minnesota Department of Natural Resources (MDNR) has completed a review of the Draft Programmatic Environmental Impact Statement on major rehabilitation efforts proposed for Mississippi River Locks and Dams 2-22. The following comments and concerns are provided for your consideration in preparing the Final Environmental Impact Statement (EIS) on the proposed project.

General Comments

2 The MDNR continues to be concerned about the effects of late and early season navigation on the Upper Mississippi River System (UMRS). The Draft EIS states that the installation of high-volume bubbler systems would bring about the potential for an additional 10-20 lockages at the end of the navigation season. Yet on page S-2, the EIS concludes that there would be no increase in late season navigation. While we understand the risk factors associated with end-season navigation, we find it difficult to believe that the shipping industry would not take advantage of the additional lockage potential brought about by the bubbler systems.

3 We have long maintained that cold-season navigation results in adverse environmental effects. The nature of these impacts are described in Attachment 1 (Appendix B of the Problem Inventory Analysis (PIA) section of the UMRS Environmental Management Program (EMP)). The need to examine this problem was deemed important enough by the PIA work group to be included in the top ten problems to be studied. The effects of cold-season navigation will

Rock Island District Responses

1. Noted.

2. Noted. The District acknowledges your concern that the addition of high-volume bubbler systems will encourage navigation during ice conditions. However, as discussed in the EIS, there are major reasons why this would not occur and why these systems are needed to improve safety. There are lock sites in the Rock Island and St. Paul Districts that already have bubbler systems. Installation of a higher-volume system will improve the ability to keep ice from accumulating on the lock gates, and would also help keep the gate recess clearer of floating ice and debris. Ice accumulation is very damaging to lock structures. Manual removal of ice and debris is still necessary with the existing bubblers, and is dangerous to lock personnel. Concerning navigation, ice conditions in the river channel are the controlling factor, and bubbler systems at the lock gates have no effect on ice conditions in the river away from the immediate lock gate area. Bubbler systems located in the miter gate area have not, and will not, affect this constraint. Finally, most operators will continue to avoid navigation during ice periods because of increased operating costs, and the hazards that could result from freezing in.

The Rock Island District will agree to monitor early- and end-season navigation traffic use at the locks using data from the PMS and OMNI systems, and other published data. The data to be collected will include number of tows and barges by direction, ice conditions, air and water temperatures, and other factors that may influence navigation. We will need to begin by establishing baseline ranges for traffic and time periods. Then, after installation of the high-volume bubbler systems in Locks 2 through 22, we will monitor early- and end-season traffic use at representative locks. As a practical matter, however, funding for installation of the bubbler systems will be phased in over several years, and completion of all of the systems is not anticipated until the late 1990's. We will coordinate the specific details of the monitoring effort, baseline interpretations, and monitoring results with Federal and state environmental, transportation, and economic agencies.

ultimately be examined through the UMRS-EMP Long Term Resource Monitoring Program and other studies such as the Lock and Dam 26 Plan of Study for navigation effects. As results become available, we believe they will substantiate the need for a closed navigation season, as we have recommended.

The Department recommends an integrated approach to facilitate navigation. The Draft EIS comes close to suggesting an integrated plan for dealing with troublesome periods and locations through such measures as the "industry assist program", forecasting of river conditions, and helper boats to assist with navigation problems. It would appear that in many instances, instead of the the structural solutions that are proposed, one or a combination of these measures could be used to effectively deal with problem areas.

4

For example, the Corps has described an outdraft problem under various discharges at the upstream approach to Lock and Dam 5A. It would seem that a combination of forecasting of discharge conditions, communication of these conditions to the industry and alerting assist boats in the Winona Industrial Harbor would be a viable alternative to construction of an expensive guidewall.

5

Specific Comments

Section 2. The MDNR is aware that an outdraft guardwall has been proposed for Lock and Dam 3. We believe this guardwall should have been discussed somewhere in this section, either as a plan eliminated from further study (with supporting rationale) or as one of the structural measures having the potential to increase navigation traffic.

6

Page EIS-10, 2.22. The cost of helper boats is incurred by private industry. The need for assistance does not exist for every lockage. Rather, it is dependent on flow conditions at some lock approaches. Outdraft barrier and guidewall construction at great public expense is highly questionable when there is a private sector solution in operation.

7

Page EIS-10, 2.24. Use of forecasting technology could also be used to ensure the availability of helper boats during conditions which require their use.

8

Page EIS-15, 2.39. A closed season prior to ice-up would eliminate the need for ice handling at the locks.

9

Page EIS-15, 2.40. The $870,000/year cost of a helper boat is misleading. The statement suggests that these helper boats would do nothing but assist tows. For two locations,

10

Rock Island District Responses

3. Noted. The Rock Island District is not denying that the potential exists for adverse environmental impacts from navigation during the winter on the UMR. Our Feasibility Study concerning Year-Round Navigation (1980) clearly stressed the need for further environmental studies on this issue. The District funded some studies related to winter biology under the GREAT II program. More recently, the Long Term Resource Monitoring Portion of the UMRS Environmental Management Program has proposed funding for studies concerning winter biology.

Concerning a closed season, establishment would need to be based on specific criteria such as ice thickness, water and air temperature, amount of tow movement, economics (supply and demand), environmental parameters, etc. A standard or set closed season is not considered appropriate, since weather conditions can vary significantly from year to year. Congressional action may be required to change present procedures and establish a closed season. We understand that the St. Louis District has initiated discussions concerning this issue with the Coast Guard, RIAC, and the US FWS. The Rock Island and St. Paul Districts are willing to extend these discussions to the middle and upper protions of the Mississippi River.

4. Noted. Paragraphs 2.44 to 2.48 discuss the various nonstructural measures investigated. Use of the guidewall extensions and the guardwall would not totally eliminate the need to use helper boats, especially for severe outdraft problems occurring during high flows. Use of other nonstructural measures would not resolve the safety problems associated with approach constraints or ice/debris passage.

5. The St. Paul District has no on-going study for a guidewall at Lock 5A. The Corps has no authority to require the use of an assist boat. Also, use of an assist boat would not prevent uncontrolled barges from damaging a lock and dam.

6. A description of the outdraft barrier proposed at Lock and Dam 3 has been added to Section 2 (see paragraph 2.16). The St. Paul District has assessed the outdraft barrier, and has determined that it will not induce increases to navigation traffic. A project report with a draft EIS is being prepared by St. Paul District, and will be distributed for review by the end of 1989.

7. See response provided to No. 4. Large public expense is also incurred when tows/barges structurally damage the locks and dams. Use of private-sector helper boats can get expensive, costing $125 to $250 per assist, and are only used at selected locations with the worst approach constraints.

at Locks and Dams 3 and 5A, where upstream approach problems exist, helper boats are available at the industrial harbors a short distance downstream from the dams. They currently provide assistance when requested. At locks where assist boats are available, the cost of this alternative should be computed on the basis of the average number of assists required per year times the cost per assist.

11 Page EIS-16, 3.3. We recommend that a discussion of the Main Channel Border should reflect the excellent fish habitat that the border provides as shown in the St. Paul District's Pool 5A Main Channel Border Study. (Anderson et al., 1983).

12 Page EIS-16, 3.4. The description of tailwater habitat also seems to understate its habitat value.

13 Page EIS-26, 3.21. Osprey are not known to overwinter along the UMRS. Their normal wintering range is along the Gulf Coast and Florida.

14 Page EIS-26, 3.22. There are also yellow-crowned night herons at the Pig's Eye rookery.

15 Page EIS-30, 3.32. Higgins' eye mussels have recently b een found in Pool 7, near River Mile 708 (Winters Landing Area). See Miller's unpublished report cited in this letter or contact the St. Paul District, Environmental Resources Branch for additional information.

16 Page EIS-30, 3.33. There has been some commercial clamming in pools 3-8 since 1981, although records are limited. Wisconsin DNR statistics show that approximately 51,000 pounds of clams were harvested in this reach of the river in 1987.

17 Page EIS-61, 3.144. Recent mussel studies in the St. Croix River have shown it to support a higher quality mussel fauna than the EIS suggests. Live elephant ear and ebony shell mussels have recently been collected in the St. Croix near Prescott, Wisconsin and additional Higgins eye locations have been discovered. Please contact Lee Pfannmuller in the MDNR Nongame and Endangered Wildlife Section at (612) 297-2276 for additional information.

18 Page EIS-70, Table EIS-6. See previous comment.

19 Page EIS-86, 3.206. Commercial fishing is not considered to be a valuable fish management tool.

20 Page EIS-94. We recommend that the EIS section entitled General Systemic Effects of Navigation be modified to include a discussion of cold-season navigation impacts.

Rock Island District Responses

8. Noted. As discussed in paragraph 2.24, the barge and towing industry could use forecasting technology to increase the safety and efficiency of their operations.

9. Ice is very damaging to the lock structures and machinery. The need for ice handling may be reduced, but not eliminated, if a closed-season was established.

10. Paragraph 2.44 refers to the costs associated with using federally-provided helper boats, as a nonstructural alternative, for assisting tows during times of approach constraints. Paragraph 2.27 discusses the use and costs associated with using industry-provided helper boats, as part of the without condition, which can cost from $125 to $250 per assist.

11. An expanded discussion has been added to the EIS.

12. More emphasis has been added to the value of tailwater habitat in this paragraph.

13. This has been revised as requested.

14. This information has been added to the EIS.

15. This information has been added to the EIS.

16. Information found in Heath, et al., 1988, was used to revise the text in paragraph 3.33.

17. The St. Paul District has provided additional information for inclusion in the EIS.

18. Noted.

19. This has been removed from the EIS.

20. Since none of the proposed measures will extend of the navigation season beyond existing conditions, a discussion of winter navigation impacts has not been included in this section.

Page EIS-104, 4.45-47. An additional 10-20 lockages at the very end or beginning of the season is of concern to the Department. While this traffic increase may represent more
21 efficient use rather than an extension of the season, the potential damage it may cause is much greater than at any other time of the year.

Page EIS-109, 4.62. The situation cited supports the need
22 for establishing start and end dates for navigation in the upper portion of the Mississippi River.

23 Page EIS-110, 4.66. Please refer to our General Comments.

Page EIS-113, 4.82 and Table EIS-16. From the MDNR's
24 standpoint, scour protection, earthen embankments and outdraft barriers are not "routine repair and maintenance items expected as a result of normal wear and deterioration of aged features".

Page EIS-145. The last five days of two seasons are described to demonstrate the variability in traffic levels
25 from year to year. We would appreciate a clarification of how the last five days of any given year compare to some other five-day period within that year. It is the clustering of traffic at the beginning and the end of the season that is of concern, due to the fact that the aquatic environment may be more susceptible to impacts.

Page EIS-146. Won't the bubbler system reduce or eliminate
26 lockage delays described in the first full paragraph? In the following paragraph (and elsewhere) it is stated that withdrawal of tows will be expedited by the bubbler systems.

Page EIS-149, FWS No. A9. Nothing in the Corps' comments
27 regarding the measures proposed by the U.S. Fish and Wildlife Service suggests that navigation could not be closed during ice conditions. An explanation of why this measure could not be implemented is needed.

Page EIS-149, FWS No. A11. We do not understand how enforcing a maximum 9-foot draft can be resource intensive in terms of equipment and labor. Drafts can be measured with very simple equipment during lockages. We believe that
28 the effect on the shipping industry would be similar to the effect of weigh stations on the trucking industry, which appears to be routinely accepted. Any effects on the industry must of course be weighed against effects to the aquatic environment.

Page EIS-150, FWS No. D9. Maintenance and/or reconstruction
29 of existing side channel closures could, in some cases, also help reduce sedimentation.

Rock Island District Responses

21. See response provided for No. 3.

22. See response provided for No. 2.

23. See responses provided for Nos. 1 to 3.

24. We agree with you, as shown by the next sentence, which reads, "These and the construction actions. . . " The tables are comprehensive for all rehab actions, repair and replacement items as well as new construction items.

25. There is no particular time period or volume of traffic associated with end of season navigation. The number of tows and corresponding lockages are primarily a function of weather conditions and demand for commodities. Congestion occurs at the end of the season because all tows are trying at the same time to go downstream; and if ice starts to form, lock times become slower.

26. Bubbler systems will reduce, but not eliminate delays, thus expediting the withdrawal of existing tows from the UMR.

27. The Coast Guard has the authority to stop navigation during hazardous conditions, including ice. The Corps does not have the authority to stop or close navigation. District responses to the avoid and minimize measures have been revised in the Final EIS.

28. The District has revised the response to this measure in the Final EIS.

29. Noted.

Page EIS-150, FWS No. D 10-11. Why is the cost for
30 construction of barrier islands "extremely high" when dredged material is often available and suitable locations for disposal must be found?

Page EIS-151. Can improved fishery habitat be substantiated
31 in the scour protection areas below Locks and Dams 3-10?

Thank you for the opportunity to comment on the Programmatic Environmental Impact Statement concerning the proposed major rehabilitation of Locks and Dams 2-22. If you have any
32 questions regarding comments from the MDNR or require additional information, please contact Cheryl Heide from my staff at (612) 296-9228.

Sincerely,

Thomas W. Balcom

Thomas W. Balcom, Supervisor
Natural Resources Planning and Review Services

Attachment

1-36

Literature Cited

Anderson, D., D. Wilcox and D. McConville. 1983. Physical and biological investigations of the main channel border habitat of Pool 5A on the Upper Mississippi River in 1980. U.S. Army Cops of Engineers, St. Paul District.

Miller, D. unpubl. rep. Mussel fauna associated with wind dams, Mississippi River Mile 707.8-709.4. Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

c. Jack Skrypek
Ron Lawrenz
Laurel Reeves
Gordon Kimball
Steve Johnson
Robert Welford--U.S. Fish and Wildlife Service

880009-3

Rock Island District Responses

30. Costs would be dependent upon whether suitable material was close to the proposed island location. The response to this measure has been revised in the Final EIS.

31. Substantiation can not be provided as requested.

32. We appreciate your efforts concerning this action, and will continue to coordinate with your office.

Environmental Management Program

WORK OUTLINES FOR ASSESSMENT OF TEN HIGH PRIORITY RESOURCE PROBLEMS

PIA - Appendix B

April 1987

Field studies will entail such things as cage translocation studies at reference sites and impacts sites spanning a range in proximity of navigation impacts.

Products: Technical reports.

Cost: $100,000

Schedule: Years 1-2

Task 4: Develop and evaluate methodologies to determine the behavioral and physiological response of selected fish species to changed hydraulic conditions associated with commercial traffic.

Methods: Field test potential methods, including pop nets, hydroacoustics, telemetry, and others as may be identified. If certain methods are found to be successful, funding will be sought to apply these methods to solve the resource problem.

Products: Technical reports and methods to apply in future studies.

Cost: $75,000

Schedule: Year 1

NOTE: This study element may lead to a 2-3 year study at a cost of at least $500,000.

STUDY PROPOSAL TOTAL COSTS: $925,000 ($325,000, if combined with 3.1)

3.5 COLD-SEASON NAVIGATION IMPACTS

Spring, fall, and winter (cold season) navigation adversely impacts riverine and river-dependent biota.

ASPECTS OF PROBLEM TO BE ADDRESSED

Causal factors of adverse effects of cold-season navigation include vessel-induced water and sediment movements, water temperature, winter distribution of biota, winter physiological condition and behavior of biota, proximity of vessel travel path to important habitat areas, vessel-induced ice action, emergency water control actions, ice buildi on vessel hulls and subsequent grounding, propwash dredging to free grounded vessels, vessel-induced breakup of pan ice, ice jams, and resultant water level fluctuations and increased risk of cargo spills.

Physical effects of vessel passage under ice-free conditions will be determined in PIA work effort 3.3 Task 1.

The physical effects of vessel passage during ice conditions will be investigated and models of these hydraulic effects will be refined. An assessment of the effects of cold-season navigation on fish and macroinvertebrates will be prepared, using information developed by other PIA work efforts and existing literature. Ice jams and vessel grounding incidents will be documented by the RTA team by on-site investigations. The effects of cold-season emergency water control actions will be assessed, using habitat and bathymetric information developed for selected river reaches by the RTA program and existing information on Corps river regulation.

The increased risk of cargo spills during cold-season navigation will not be addressed.

TASKS

Task 1. Refine models of the physical effects of vessel passage developed for PIA work effort 3.3 Task 1 to simulate the physical effects of vessel passage during ice conditions.

Methods: Methods for refining existing models of the physical effects of vessel passage will be as described in PIA work efforts 3.1 Task 1 and 3.3 Task 1. Further refinement of the models to predict the physical effects of vessel passage during ice conditions will be conducted with the aid of limited additional prototype measurements.

Products: Technical report on refinement of models to predict physical effects of vessel passage during ice conditions.

Cost: $100,000

Schedule: Years 1-3

Task 2. Assess the effects of cold-season navigation on benthic macroinvertebrates.

Methods: Using results of Task 1, above, PIA work efforts 3.3 Tasks 2 and 3, and existing literature on the physiological condition and behavior of wintering benthos, reach what conclusions are reasonably possible about the effects of cold-season navigation on benthic macroinvertebrates.

Products: Technical report that describes the effects of cold-season navigation on benthic macroinvertebrates.

Cost: $10,000

Schedule: Year 4 (6 months)

Task 3. Assess the effects of cold-season navigation on fish.

Methods: Using results of Task 1, above, PIA work subsequent to work effort 3.3 Task 4 and PIA work effort 6.2, reach what conclusions are reasonably possible about the effects of cold-season navigation on fish.

Products: Technical report that describes the effects of cold-season navigation on fish.

Cost: $10,000

Schedule: Year 5 (6 months)

Task 4. Document the occurrence and effects of navigation-induced ice jams and grounding incidents.

Methods: Direct observations of these episodic events will be conducted by the RTA team. To the extent possible, the areal extent and habitats affected will be determined.

Products: Incident reports.

Cost: $5,000

Schedule: Years 1-10

As necessary.

Task 5. Assess the effects of cold-season emergency water control actions.

Methods: Using bathymetry and habitat data developed by the RTA program for selected study areas and Corps river regulating information, reach what conclusions are reasonably possible about the effects of cold-season emergency water control actions.

Products: Technical report on the effects of cold-season emergency water control actions.

Cost: $10,000

Schedule: Year 4 (6 months)

Task 6. Identify and evaluate measures to reduce the adverse effects of cold-season navigation.

Methods: Using results of Tasks 1-5, management measures to reduce adverse effects of cold-season navigation will be identified. The degree to which measures identified would be effective in

reducing adverse effects of cold-season navigation will be evaluated.

Products: Technical report identifying alternative measures to reduce the adverse effects of cold-season navigation and an evaluation of their probable effectiveness.

Cost: $10,000

Schedule: Year 5 (6 months)

STUDY PROPOSAL TOTAL COSTS: $190,000

3.7 BARGE FLEETING ADVERSELY AFFECTS HABITAT/BIOTA

Barge fleeting adversely affects riparian and aquatic habitat/biota, but the magnitudes of these impacts are unknown.

ASPECTS OF PROBLEM TO BE ADDRESSED

A fleeting operation consists of the following activities: (1) movement of barges and tows into, within, and out of a fleeting area, (2) physical presence of varying numbers of barges for varying durations of stay, and (3) barge cleaning to prepare empty barges for their new cargo.

The types and quantity of material in fleeted barges are also important considerations for assessing impacts on habitat and biota. Specific causal factors of impacts to be evaluated include: (1) volume of habitat occupied by fleeted barges, (2) cable damage to shoreline trees, (3) location and construction of mooring cells, (4) hull contact with river bottom and bank, (5) changes to river hydraulics caused by moored barges, (6) effect of moored barges on river bed configuration and substrate, (7) light attenuation by moored barges, (8) obstacle to shore access imposed by moored barges, and (9) shear, pressure change, stress, and direct impingement of aquatic biota caused by maneuvering towboats.

TASKS

Task 1: Evaluate impacts of fleeting areas on riparian and aquatic habitat/biota.

Methods: Impact evaluations will be conducted on at least six sites, including two Illinois River sites, and four sites on the Mississippi River to represent various habitats on pooled and open river reaches. These evaluations will involve habitat and biota inventories on the study sites before and after their use for barge fleeting. Specific fleeting areas to be studied will be selected to represent the various valued habitat, such as mussel beds, eagle roost areas, and fish-

The Izaak Walton League of America
INCORPORATED

DEFENDERS OF SOIL, AIR, WOODS, WATERS, AND WILDLIFE

National Office • Suite 1100 • 1701 N. Ft. Myer Dr. • Arlington, Virginia 22209 (703) 528-1818
Upper Mississippi Regional Office • 6601 Auto Club Rd. • Minneapolis, Minnesota 55438 (612) 941-6654

Comments on the Draft Programmatic Environmental Impact Statement, Major Rehabilitation Program, Mississippi River Locks and Dams 2-22, Illinois Waterway from La Grange to Lockport Locks and Dams

Paul W. Hansen
Upper Mississippi Regional Office
Izaak Walton League of America

November 9, 1988

1 "The environmental impact statement shall serve as the means of assessing the environmental impact of proposed agency actions, rather that justifying decisions already made." CEQ Regulations, 40 CFR Section 1502.2(g)

2 The Draft Programmatic Environmental Impact Statement (DEIS) for the Major Rehabilitation Program (MRP) gives every indication of being a document designed to minimize the assessment of potential impacts of this project. The document is biased and is based on faulty assumptions, illogical conclusions, and major inconsistencies. The DEIS is inadequate and is in conflict with a number of requirements of the National Environmental Policy Act (NEPA).

I. A joint EIS should be prepared for the Major Rehabilitation and the Second Lock. The DEIS states that the MRP and the second lock project "are independent, under separate jurisdictions and separate authorization" and should be evaluated separately. NEPA provides no such exemption for these reasons. Furthermore, the Corps denial that a comprehensive program exists does not end the discussion.

> The fact of an agency denial does not end the controversy but rather points to why the controversy exists...At a minimum, the courts must reserve the right to analyze federal actions to determine if, in fact, a comprehensive program, however labeled is under way or proposed. Sierra Club v. Morton, 514 F.2d, 873 (1975).

3 I-41

The proper criteria to determine if a joint EIS should be filed are the CEQ regulations and NEPA case law. 40 CFR Section 1508.25 requires that cumulative actions (those when viewed with other proposed actions have cumulatively significant impacts) or similar actions (those with common timing or geography) be assessed together. Similarly, there is ample case law stating that similar operations, having similar polluting effects in the same areas must be considered together. See National Resources Defense Council v. Callaway, 524 F.2d (1975).

Under these criteria, a joint EIS must be prepared. First, the Second Lock is dependent on the Major Rehabilitation Project to achieve its traffic projections. The FEIS is based on Scenario III modifications from the Master Plan. Scenario III assumes that many of the elements of the Major Rehabilitation Project will have been completed. (Upper Mississippi River Basin Commission, Comprehensive Master Plan for the Management of the Upper Mississippi River System 45-48, 1982).

4

Second, both the second look and the Major Rehabilitation Project have increased navigation capacity as a primary goal. While the second look has been rationalized as a backup for repair or national defense, its economic justification stems from its ability to increase tow traffic. Similarly, the Major Rehabilitation Project has been presented as maintenance and safety measure, yet another purpose for many elements is to decrease lock delay thereby increasing navigational capacity. It is in recognition of these increases in traffic that portions of the Major Rehabilitation Project are undergoing NEPA compliance. Letter from Gen. Pratt to Paul Hansen (July 1, 1986).

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Rock Island District Responses

1. Noted.

2. The DEIS analyzes all the potential site-specific as well as system-wide (cumulative) impacts associated with the construction of the proposed measures. The DEIS relies upon the traffic projections and analysis methods used in the UMR Master Plan. The "without-project" or base condition used in the DEIS and traffic analysis included all existing features of the UMRS, plus 1,200- and 600-foot chambers at new Locks and Dam 26. Scoping meetings and other coordination meetings were undertaken in order to ascertain what impacts were of most concern to agencies and groups. A preliminary version of the traffic analysis was sent to agencies and groups for review and comment. Therefore, we do not agree with your assessment of the DEIS.

3. The two actions are independent, under separate jurisdiction, and under separate authorization. The proposed rehabilitation work would be necessary even if there never was a Second Lock proposed at L/D 26 (R). One action does not automatically trigger the other, rely upon the other to proceed, nor depend upon the other for its justification. In addition, the DEIS does state that this is an unresolved issue.

4. The Second Lock at L/D 26 (R) is not dependent on the proposed rehabilitation measures to achieve its traffic projections. Many other elements not associated with the proposed measures are included in Scenario III of the UMR Master Plan, such as industry-implemented actions. The St. Louis District accepted the traffic projections of Scenario III as a reasonable estimate of future conditions for the Second Lock at L/D 26 (R). The Rock Island District also used the traffic projections in the Master Plan as the basis for our traffic analysis, but excluded all items not pertinent to the proposed rehabilitation measures (i.e., powered kevels, industry measures, etc.).

5. The primary goal of the proposed measures is not increased navigation capacity, or decreasing lock delay times. The primary goal is to maintain the safety and design capability of the navigation structures. There was some concern expressed by agencies and others that construction of all of the proposed measures could incidentally lead to an increase in traffic on a system-wide basis. That is why the Rock Island District conducted the traffic analysis, which concluded that only a very small increase (1.3%) may occur by the year 2040, if all the proposed measures were constructed.

Third, both the second lock and the Major Rehabilitation Project have similar environmental impacts. In both cases, the systemic and site specific impacts at sensitive locations are of greater risk than the site specific impacts at the construction site. 6

For these reasons, the COE-RID erred in not preparing a joint statement. It should be noted that compliance with the Endangered Species Act for this project is being conducted jointly with the Second Lock compliance. Similarly, the economic justification for the two projects was conducted jointly, and the findings of the Plan of Study team for the Second Lock will be used jointly to address the impacts of the MRP. This MRP and Second Lock fulfill the NEPA description of "connected actions" that are "closely related" with "cumulatively significant impacts" and are "similar actions, which when viewed with other reasonably foreseeable or proposed agency actions have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography" (40 CFR 1508.25). 7

The "Scope of Analysis" of this DEIS is in conflict with the requirements of Section 102 (2)(c) of NEPA. The Committee Report (100-502) accompanying S.1792, addresses the intent of Congress regarding this provision of NEPA.

> The Committee reaffirms the basic principle that Congress intended NEPA to be construed broadly. Recent agency disputes concerning the scope of NEPA review indicate the need to restate the intent of section 102(2)(c), particularly with respect to Federal licensing and permitting activities.
>
> "Federal agencies have a responsibility under NEPA to take an expansive, rather than a narrow view of proposed projects and attendant impact. The scope of analysis required by section 102(2)(c) is not limited to the scope of jurisdiction of the regulating agency nor is it limited to the scope of the project purpose as defined by the permit or license applicant.
>
> "To properly assess both environmental impacts and possible alternatives, it is necessary to define the scope of the proposed action broadly. Where it is unlikely that a project would go forward without Federal involvement, agency review must address the project as a whole and not limit consideration to impacts of the Federal part of the project. 8
>
> "Section 102(2)(c)(i) requires Federal agencies to consider all reasonably foreseeable impacts that would flow from a proposed Federal action, regardless of whether those impacts fall strictly within the narrow regulatory jurisdiction of the Federal authority itself. In addition, as the courts have reaffirmed, the types of impacts that are to be assessed include those that are indirect and secondary as well as those that are direct and primary.
>
> "Recognizing that the consideration of alternatives is a crucial component of NEPA, the Committee emphasizes the requirement that Federal agencies consider all reasonable alternatives to a project that may achieve its overall public purposes, construed broadly. Defining the purposes of a project narrowly and thereby limiting the breadth of alternatives to be considered contradicts the intent of section 102(2)(c)."

Rock Island District Responses

6. Noted. Each EIS addressed the site-specific and systemic (cumulative) effects associated with the particular action.

7. See response to No. 3. According to the US FWS, the Endangered Species Act provides a "first-in-time, first-in-right" approach where the authorization of Federal projects may proceed until it is determined that future actions are likely to jeopardize the continued existence of a listed species (US FWS letters dated June 20 and May 3, 1988). In addition, the economic justifications for the two projects were not conducted jointly, and there is no relationship between the two economic justifications. Also, the Plan of Study will identify and recommend for implementation feasible studies to address the question of incremental navigation traffic impacts for the Second Lock at L/D 26 (R).

8. The Rock Island District does not agree with your conclusion that the DEIS is in conflict with NEPA. Various alternatives were discussed in the EIS, and a broad view of the alternatives was taken. For example, the Without Condition also describes a variety of methods the barge and towing industry may take to increase safety and operating efficiency (see p. EIS-9 to 11). Also, all reasonably forseeable activities and impacts are discussed in the EIS (see Section 2 concerning alternatives and p. EIS-143 to 144).

NEPA, NEPA regulations and subsequent case law provide no exemption from the requirement that closely related actions be addressed in one EIS, particularly in cases such as this where actions are linked by timing, geography, similarity of impacts; and especially when the projects are not only both Federal actions, but are Federal actions performed by the same Federal agency.

9

II. The DEIS is based on faulty assumptions regarding increased commercial navigation.

The DEIS concludes that the MRP will cause only "a small increase in traffic" that will result in measurable impacts. By introducing the concept of "induced traffic" and basing the DEIS traffic assessments on this concept, the DEIS avoids or at best obfuscates realistic assessment of environmental impacts of the MRP. Additional navigation capacity made possible by new construction of over 7000 feet of new guidewalls, for instance, may or may not induce traffic; but will certainly allow for decreased lockage time and thereby more lockages per day (more capacity). As previously noted by several MRP Reconnaissance Reports, the Corps report Focus on the Future (St. Paul District, March 1985), and by the Waterways Journal (October 14, 1985), the MRP actions will enable increased navigation capacity. By basing the DEIS on the concept of induced navigation, the Corps ignores new navigation capacity made possible by the MRP, which should be the primary purpose of this DEIS. This results in making this DEIS totally inadequate to its purpose inadequate and in gross conflict with NEPA.

10

L-43

III. The DEIS discussion of high volume bubblers provides an excellent example of the bias of this DEIS toward justifying decisions already made rather that truly assessing the environmental impacts of the action.

The DEIS bases its analysis on opinions of the commercial navigation industry that bubblers "would not induce further traffic, but only assist in the orderly withdrawal of tons" (DEIS 5.3).

11

With all respect, the highly subjective opinion of the commercial navigation industry that high volume bubblers will not increase navigation has no place being presented in the DEIS as scientific fact and no place being used as the primary basis for the conclusion that this action will not enable increased navigation capacity.

The acknowledgment in the DEIS that high volume bubblers can "expedite the withdrawal" of late season navigation, indicates clearly that high volume bubblers aid navigation, increase navigation capacity and provide further incentive towards late and early season attempts at navigation.

The DEIS is contradictory, unscientific and biased in this section. It provides no supporting data, while relying on one subjective opinion and the LBA study conducted for MRP features at Locks and Dams 2-10. At the time, the Izaak Walton League of America (IWLA) agreed not to oppose the MRP

12

actions in the St. Paul District prior to the preparation of an assessment of systemic impacts, we were told that river conditions for Locks and Dams 11-25 were different and that the LBA study for Locks and Dams 2-10 would not be the basis of the systemic assessment. The DEIS is in conflict with that assurance and shows total disregard for the good faith invested by the IWLA at that time.

Rock Island District Responses

9. See response to No. 3.

10. The potential impacts to navigation resulting from construction of the proposed measures were evaluated in the traffic analysis using a multi-level approach (see page EIS-105). The analysis is not solely based upon induced navigation.

Estimation of impacts concerning site-specific lock capacity, level of induced traffic, and level of system traffic was performed and discussed in detail in the DEIS. A preliminary copy of the traffic analysis was also distributed to Federal and state agencies, as well as to you, for review and comment.

11. Numerous factors were considered in evaluating the impacts from bubbler systems, not just industry interviews. The basis for our analysis and conclusions is discussed in detail on pages EIS-109 to 110; EIS-114 to 115; and EIS-150 to 1

Ice conditions in the river channel control navigatior traffic, and bubbler systems at the lock gates have no effect on ice conditions away from the immediate lock gate area.

12. The traffic analysis performed and discussed in the EIS expanded upon the LBA study, which only considered Locks 2-10 in the St. Paul District. The traffic analysis in the EIS evaluated the site-specific as well as systemic effects of high-volume bubbler systems for Lock sites 2 to 22 on the UMR. The St. Paul District has not installed high-volume bubbler systems into Locks 2-10, as agreed upon, and will not do so until the rehab EIS is completed.

The concept of "induced traffic" cannot be the basis for assessing impacts of high volume bubblers. Also the DEIS provides virtually no assessment of the effects of high volume bubblers on early season navigation capacity.

IV. Other Inadequacies are found regarding definition of terms, the socio-economic analysis and in the consideration of alternatives.

NEPA requires that an EIS be clear. There is apparently a good deal of confusion surrounding the definitions of navigation capacity, throughput capacity, system efficiency, induced capacity, system capability and lock capacity. All of these terms appear in the DEIS, however none are defined in the Glossary.

13

NEPA requires that if an economic analysis is performed, it cannot be misleading. It is misleading to equate the benefits of the rehabilitation of existing features with several thousand feet of new guidewalls, when no examples are provided of historical accidents that would have been prevented. This section of the DEIS is also in conflict with claims in the DEIS for the second look that that low frequency, high impact events such as accidents and spills are extremely rare on the Upper Mississippi. Claims is this DEIS that all of Locks and Dams 12-22 all experience cross currents requiring 500 foot guidewall extensions is not supported in the DEIS or by fact.

14

1-44

The DEIS does not adequately consider alternatives whereby new construction improvements and over the existing conditions will not be performed. This would include bubblers will be replaced by bubblers of similar volume and elimination of extensive new guidewalls and other features.

15

Rock Island District Responses

13. Terms used in the EIS include lock capacity; induced traffic; system capability (traffic); and system efficiency. These terms are defined in the text of the traffic analysis (starting on page EIS-104). However, we have added these terms to the Glossary, as requested.

14. An economic analysis for construction of the guidewall extensions at Locks 12-22 is not contained in the EIS. Detailed engineering data, as well as costs, are not available for the guidewall extensions at this time. Guidewalls were included in the EIS to assure assessment of all potential systemic effects in the traffic analysis. As funding becomes available in the future, the District will initiate a Design Report which will contain more specific information concerning the guidewall extensions, and will include an additional NEPA document to assess site-specific environmental impacts. These documents will be coordinated and distributed for review to Federal and state agencies, other groups, and the public.

15. The EIS discusses in detail the Without Condition (No Federal Action) alternative, which does address the types of alternatives suggested.

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
LARRY J. WILSON, DIRECTOR

February 22, 1989

Ms. Karen Bahus
U.S. Army COE
Clock Tower Building - P.O. Box 2004
Rock Island, IL 61204 - 2004

SUBJECT:

Request for state Section 401 certification

Rehabilitation of locks and dams along the Mississippi River (2 - 22)

Water Quality Designation: The Mississippi River is designated as a class A and B(w) river. This waterbody is protected for primary and secondary contact recreational uses, and for fish, wildlife, aquatic, and semiaquatic uses.

1-45

Dear Ms. Bahus:

This department has received and reviewed the request for state certification pursuant to Section 401 of the Clean Water Act. Section 401 certification is the department's concurrence that a project is consistent with Iowa's water quality standards.

This letter certifies subject to the following conditions that the department has determined there is reasonable assurance the proposed activity will be conducted in a manner which will not violate the water quality standards of the state of Iowa.

Conditions:

1. It is the department's position that all mechanically dredged material be disposed of in an upland nonwetland site. Since the disposal sites have not been selected, the department must be notified at least 30 days prior to disposal of any material into a waterbody.

2. Quarry run rock is the preferred material to be used for protection of guide wall extensions. This department discourages the use of broken concrete.

Sincerely,

Kathleen A.
Water Quality Planning Section

Rock Island District Responses

1. Noted.

2. Noted.

3. We will comply with this condition.

4. We will comply with this condition and us quarry run rock.

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF:

CENCR-PD-E

MAJOR REHABILITATION EFFORT
MISSISSIPPI RIVER LOCKS AND DAMS 2-22
ILLINOIS WATERWAY FROM
LAGRANGE TO LOCKPORT LOCKS AND DAMS

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION

MARCH 1989

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Page

MAJOR REHABILITATION EFFORT
MISSISSIPPI RIVER LOCKS AND DAMS 2-22
ILLINOIS WATERWAY FROM
LA GRANGE TO LOCKPORT LOCKS AND DAMS

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION

I - PROJECT DESCRIPTION

GENERAL DESCRIPTION

An Environmental Impact Statement (EIS) is being prepared to assess the site-specific impacts as well as any cumulative impacts to the Upper Mississippi River System from certain measures of the major rehabilitation effort on the Mississippi River and Illinois Waterways. The majority of work has consisted of repair and replacement measures, such as repairing deteriorated concrete, replacing worn mechanical and electrical equipment, placing additional rockfill for increased scour protection, and repairing damaged or worn gate components. Section 404(b)(1) requirements for this repair and replacement work have been satisfied during coordination for the site-specific Environmental Assessments (EA).

However, certain measures of the major rehabilitation effort were identified as having the potential to increase navigation traffic and possibly cause cumulative impacts on the Upper Mississippi River System. These measures are listed below:

- Submersible Tainter Gates at Peoria and LaGrange Locks and Dams
- Guardwall at Lock and Dam 22
- Vertical lift gate at Lock and Dam 20
- Bubbler systems at all Mississippi River sites (L/D 2-22)
- Modification to the outlet structure at Lock and Dam 15
- Upper and lower guidewall extensions at Locks and Dams 21 and 22
- Upper guidewall extensions at Locks and Dams 12-20

The EA's (March 1986) prepared for Peoria and LaGrange Locks and Dams assessed the site-specific impacts associated with construction of a submersible tainter gate at each site. Section 404(b)(1) requirements were satisfied during coordination of these EA's. The Findings of Compliance for each Section 404(b)(1) Evaluation was signed on June 10, 1986.

The aspects of the remaining measures requiring preparation of this Section 404(b)(1) Evaluation include the discharge of fill material associated with:

a. Four temporary sheet-pile cells required for the vertical lift gate construction at L/D 20.

b. The permanent sheet-pile cells associated with the guardwall at L/D 22, and the guidewall extensions at Locks and Dams 12-22. These activities are occurring in waters regulated by the States of Illinois, Iowa, and Missouri.

Presently, preliminary engineering data concerning the guidewall extensions at Locks 12 through 22, and the guardwall at Lock 22, is insufficient to evaluate the site-specific impacts concerning possible dredging and material disposal. As funding becomes available in the future, the District will initiate a Design Report. The Design Report will include an additional Section 404(b)(1) Evaluation report, if necessary, to address any additional aspects that may be subject to Section 404 of the Clean Water Act.

AUTHORITY AND PURPOSE

Construction, operation, and maintenance of the locks and dams on the Mississippi and Illinois Rivers was authorized by the River and Harbor Act of 1930.

GENERAL DESCRIPTION OF FILL MATERIAL

Sand and concrete will be used to fill all sheet pile cells. The sand and concrete will be commercially supplied. This material is considered to be clean and free of organic and other waste products.

DESCRIPTION OF THE PROPOSED DISCHARGE SITE

The proposed discharge sites are near Locks 12-22 on the Upper Mississippi River.

DESCRIPTION OF DISPOSAL METHOD

The material to be used to fill sheet pile cells would be brought to the site by barge. A clamshell bucket or similar means would be used to unload the material and put it in place.

II - FACTUAL DETERMINATION

PHYSICAL SUBSTRATE DETERMINATION

The river bottom near each lock is generally composed of silt, sand, or rock. Loss of benthic species may occur from the filling activities. However, considering the limited number of benthic species in the immediate lock and dam areas, impacts should be minimal. Recolonization and stabilization of the benthic community after filling should occur within one season.

WATER CIRCULATION, FLUCTUATION, AND SALINITY DETERMINATIONS

The only water quality parameter that could be violated by placing and filling sheet pile cells would be the standards for turbidity. However, this condition would be minor and short-term.

The proposed filling activities would not appreciably change the flow regime and would not cause water level fluctuations beyond what currently exist by the natural river.

The proposed project involves a fresh water system. Salinity gradients, therefore, do not apply.

SUSPENDED PARTICULATE/TURBIDITY DETERMINATIONS

The placement and filling of sheet pile cells may produce increases in suspended particulate matter and turbidity. However, these effects would be minor and of a temporary nature.

CONTAMINANT DETERMINATIONS

The material to be used for filling sheet pile cells will be commercially supplied and is considered to be clean and free of organic and other waste products.

AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS

Losses of some nektonic and planktonic organisms during placement and filling of the cells would be expected. The greatest losses would be of drifting organisms which would be unable to move out of the area. Some losses of benthic species also may occur. Recolonization and stabilization of the benthic community after construction should occur within one season.

Minor disruption of the aquatic food chain may occur during construction. However, recolonization of aquatic organisms should occur within one season, and predator species would move back into the area.

Filling activities would not affect any wetlands.

A listing of the Federal and State of Illinois species of fauna and flora identified as threatened or endangered was consulted, and the proposed project should have no adverse impacts upon any of the species listed.

PROPOSED DISPOSAL SITE DETERMINATIONS

Filling activities for the sheet pile cells should not violate water quality standards. No long-term impacts are anticipated.

The proposed projects would have no appreciable negative effects on the human use of the area, and after construction, the proposed projects would not affect the current fishing and boating activities that occur in the areas.

DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM

Material used for the construction of the permanent cells will be placed into the water only once, with no subsequent discharge of material. For the temporary cells, the material will be removed once construction is completed.

DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEM

No secondary effects are anticipated due to the use of sand and concrete to fill sheet pile cells.

III - FINDINGS OF COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

ADAPTATION OF THE SECTION 404(b)(1) GUIDELINES TO THIS EVALUATION

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

EVALUATION OF AVAILABILITY OF PRACTICABLE ALTERNATIVES TO THE PROPOSED DISCHARGE SITES WHICH WOULD HAVE LESS ADVERSE IMPACT ON THE AQUATIC ECOSYSTEM

The actual amount of material to be placed into the water would be minimized to the extent possible.

COMPLIANCE WITH APPLICABLE STATE WATER QUALITY STANDARDS

Compliance with State water quality standards will be achieved by maintaining turbidity and other parameters below State standards. Section 401 Water Quality Certification has been received from the States of Illinois and Missouri. The Certification from Iowa is pending. Circulation of the Environmental Impact Statement and this 404(b)(1) Evaluation would constitute public and agency review. Filling activities should not violate water quality standards of the States of Illinois, Iowa, and Missouri.

COMPLIANCE WITH APPLICABLE TOXIC EFFLUENT STANDARDS OR PROHIBITION UNDER SECTION 307 OF THE CLEAN WATER ACT

It is not anticipated that the project would introduce toxic substances into nearby waters or result in appreciable increases in existing levels of toxic materials. The proposed action will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

COMPLIANCE WITH ENDANGERED SPECIES ACT OF 1973

As discussed previously, no significant impact to federally listed endangered species is anticipated as a result of this project.

COMPLIANCE WITH SPECIFIED PROTECTION MEASURES FOR MARINE SANCTUARIES DESIGNATED BY THE MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT OF 1972

The project is in a fresh water inland river system. No marine sanctuaries are involved.

EVALUATION OF EXTENT OF DEGRADATION OF THE WATER OF THE UNITED STATES

The proposed placement of material to construct sheet pile cells will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life

stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

APPROPRIATE AND PRACTICABLE STEPS TAKEN TO MINIMIZE POTENTIAL ADVERSE IMPACTS OF THE DISCHARGE ON THE AQUATIC ECOSYSTEM

The sand and concrete to be used for filling sheet pile cells is clean material and free of waste.

CONCLUSION

On the basis of the guidelines, the proposed disposal sites for the discharge of fill material for the major rehabilitation measures are specified as complying with the requirements of the guidelines.

_____
Date

_____
Neil A. Smart
Colonel, U.S. Army
District Engineer

APPENDIX III

FINAL FISH AND WILDLIFE
COORDINATION ACT REPORT
BY
U.S. FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

ROCK ISLAND FIELD OFFICE (FS)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO:

COM: 309/793-5800
FTS: 386-5800

February 1, 1989

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

Enclosed is our Final Fish and Wildlife Coordination Act Report for the Major Rehabilitation of Locks and Dams 2 through 22. This report and its recommendations are linked to the Interim Fish and Wildlife Coordination Act Report for the Lock and Dam 26 (Replacement) Second Lock that we provided to the St. Louis District on March 28, 1988, and to our subsequent Memorandum of Agreement with that District.

We continue to find it very difficult to separate these two actions in our evaluation. As we have stated previously, it is our opinion that the Major Rehabilitation Program and the proposed Second Lock are reasonably foreseeable future actions that are closely related with similar impacts and should be evaluated in a single environmental document. Again, we strongly urge you to be a part of our discussions with the St. Louis District as we continue to work with them.

We have incorporated in this report comments that the District made on our draft report and additional concerns raised by the State conservation agencies in the Draft Environmental Impact Statement review process. Our recommendations remain substantially the same as presented in our draft report. Therefore, we have not conducted an additional State review of this final report. By copy of this letter, we are requesting the State conservation agencies to comment directly to you if there are additional unresolved concerns.

In addition, please note that we have not included an appendix identifying potential measures to avoid and minimize the effects of tow traffic. Since coordination is ongoing in this regard, it is not possible to provide a final list of coordinated measures.

We anticipate completing an update of this Appendix late next fall per our verbal agreements with the St. Louis District. We look forward to working with you and the St. Paul District in this regard over the coming months.

If you have any questions, please do not hesitate to contact us.

Sincerely,

[illegible]
Field Supervisor

cc: Director, Illinois Department of Conservation
Director, Iowa Department of Natural Resources
Commissioner, Minnesota Department of Natural Resources
Director, Missouri Department of Conservation
Secretary, Wisconsin Department of Natural Resources
Regional Administrator, U.S. Environmental Protection Agency, Regions 5 and 7

3-1

FINAL

FISH AND WILDLIFE COORDINATION ACT REPORT

FOR

Major Rehabilitation of Locks and Dam 2 through 22

DRAFT ENVIRONMENTAL IMPACT STATEMENT

3-2

U.S. Fish and Wildlife Service
Rock Island Ecological Service Field Office
Rock Island, Illinois

February 1989

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INTRODUCTION

The purpose of this report is to evaluate the potential impacts to fish and wildlife resources of the Upper Mississippi River System (UMRS) that may result from completion of the Major Rehabilitation Program for Lock and Dams 2 through 22. This includes both site specific effects from several construction measures and any cumulative effects that may result from a small increase in tow traffic.

This report summarizes the proposed work and potential impacts to fish and wildlife. It recommends a number of measures to avoid and minimize potential habitat losses and degradation of fish and wildlife resources caused by any increases in navigation on the UMRS. Also recommended are special studies related to potential impacts from cold season navigation.

This report is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); the National Environmental Policy Act of 1969, as amended; and in accordance with the Fish and Wildlife Service (Service) Mitigation Policy. Compliance with the requirements of Section 7 of the Endangered Species Act of 1973, as amended is being handled under separate cover.

This report has been coordinated with the Illinois Department of Conservation, Iowa Department of Natural Resources, Minnesota Department of Natural Resources, Missouri Department of Conservation, and Wisconsin Department of Natural Resources.

This summary report is based on available literature concerning the UMRS and navigation impacts, our draft, supplemental draft, and interim Fish and Wildlife Coordination Act reports for the Second Lock at Lock and Dam 26 (Replacement), and a series of impact panels held in December 1985. The panels were composed of fish and wildlife biologists and researchers most familiar with the UMRS. These experts offered their best professional opinion regarding systemic effects of increased navigation based on their field experiences, knowledge, and available scientific data.

DESCRIPTION OF MAJOR REHABILITATION PROGRAM

The following discussion has been excerpted from information provided by the Corps of Engineers:

Major rehabilitation of the locks and dams on both the Mississippi River and the Illinois Waterway is necessary to maintain the safety of the navigation structures. The majority of work consists of repair and replacement measures, such as repairing deteriorated concrete, replacing worn mechanical and electrical equipment, placing additional rock fill for increase scour protection, and repairing damaged or worn gate components. The major rehabilitation effort began in 1975 and is expected to

continue into the 1990's. National Environmental Policy Act (NEPA) compliance to date for this repair and replacement work has been satisfied by the preparation and public review of site-specific environmental assessments.

During public review and coordination with other agencies for the major rehabilitation effort, certain measures of the scheduled work were identified as having the potential to allow an increase in navigation traffic on the Upper Mississippi River System. Consequently, for the list of measures below, this report will analyze the site-specific impacts and any cumulative impacts to the UMRS navigation traffic increases as a result of these measures:

1) Submersible tainter gates at Peoria and LaGrange Locks and Dams (Illinois Waterway)

2) Vertical lift gate at Lock and Dam 20

3) Bubbler systems at Locks and Dams 2 through 22

4) Modification to outlet structure at Lock and Dam 15

5) Upper and lower guidewall extensions at Locks and Dams 21 and 22

6) Upper guidewall extension at Locks and Dams 11 through 20

7) Guardwall at Lock and Dam 22

A general schematic of a lock and dam showing the locations of the proposed measures is shown on figure 1. A description of these measures is provided below. A summary of the potential for increase in navigation traffic can be found in the next section under the discussion of the future with the project.

1. Submersible Tainter Gate, Peoria and LaGrange Locks and Dams: The purpose of the submersible tainter gates are to pass ice in a manner safer than the existing operation of the wicket dams. Design information and environmental impact assessment for the construction of a submersible tainter gate at Peoria and LaGrange Locks and Dams were described in the Environmental Assessments (EA), dated March, 1986, and in an additional coordination letter dated December, 1986. The Finding of No Significant Impact (FONSI) for each EA was signed on June 10, 1986. A diagram for the submersible tainter gates is shown on figure 2. Construction of these measures was recommended to proceed due to safety concerns. However, the potential for the submersible tainter gates to increase tow traffic is being evaluated here.

2. Vertical Lift Gate, Lock and Dam 20: The vertical lift gate proposed for L/D 20 is to pass ice and debris that accumulate at the dam. This material is primarily from the Des Moines River.

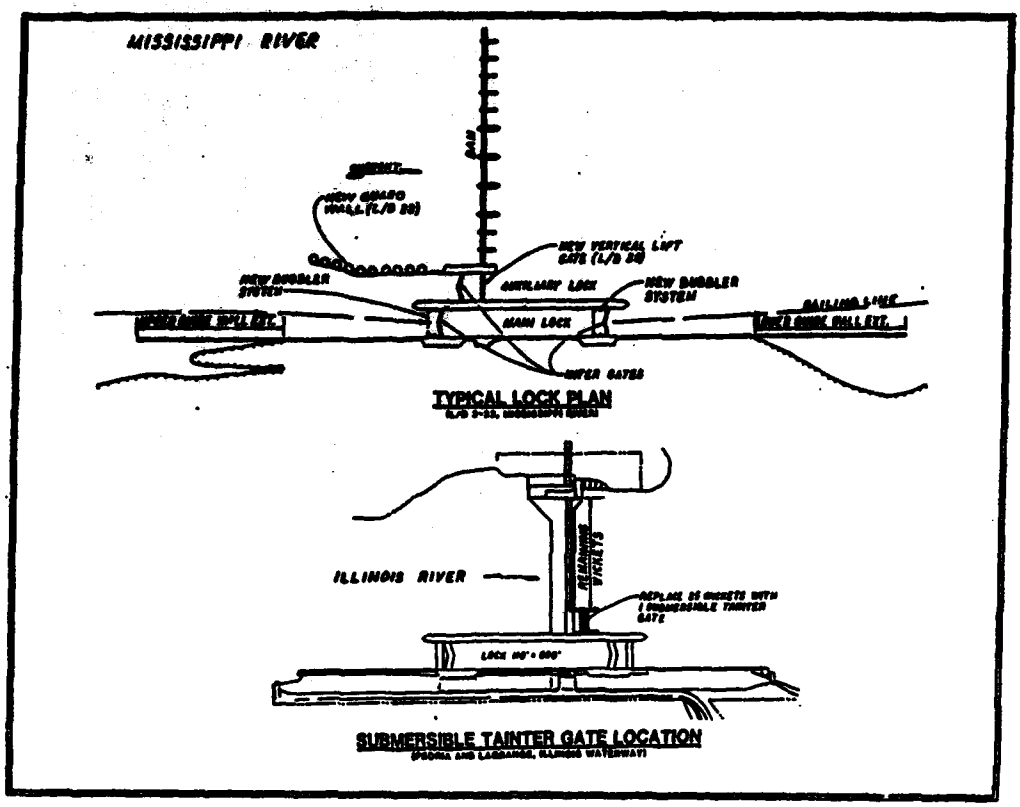

Figure 1. General schematic of locations of proposed measures in Lock and Dam Major Rehabilitation Program.

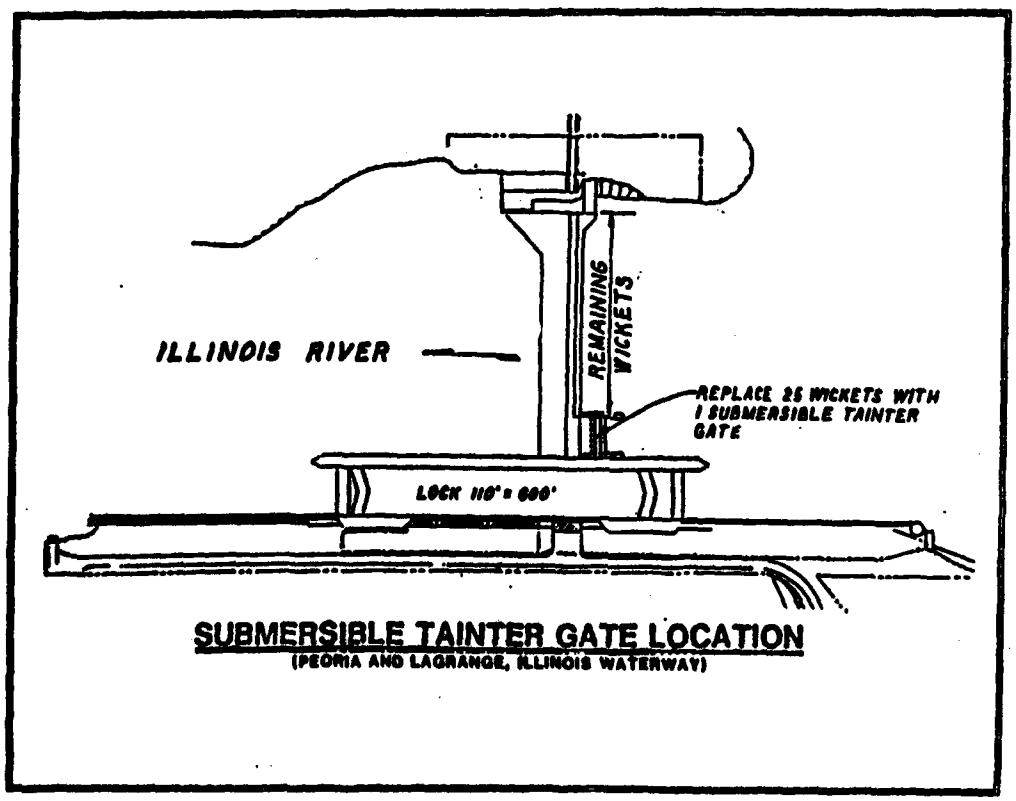

Figure 2. Submersible tainter gate location.

The vertical lift gate would be constructed at the lower end of the auxiliary lock structure, as shown on figure 3. It would consist of adjacent upper and lower sections of gate, each about 100 feet wide. When submerged, the upper section would lower into a recess behind the lower section. The lower section of gate would remain inoperable. Modifications to the concrete and rock floor of the auxiliary lock would be required to form the gate sill.

The construction of the vertical lift gate will require dewatering of the auxiliary lock. To close off the lower end of the auxiliary lock, four sheet pile cells, each filled with approximately 675 yd^3 of commercially supplied sand, would be constructed between the riverwall of the dam and the intermediate wall of the main lock. The upper end of the auxiliary lock would be sealed using an existing poiree dam (a prefabricated steel wall-type structure). After the modifications to the lock floor are completed, the sheet pile cells will be removed entirely. The sand would be mechanically removed and disposed of in a one acre site located on lock and dam property previously used and assessed in the Environmental Assessment for the L/D 20 Major Rehabilitation project. The site is periodically mown. It is estimated that the vertical lift gate would be used about 12 times per year, under average ice and debris conditions.

3. Bubbler Systems, Locks and Dams 2 Through 22: Low volume bubbler systems are presently located at several lock sites on the Upper Mississippi River. These low volume bubbler systems generate air through diffusers in the bottom of the lock to prevent ice accumulation on the miter gates. The proposed bubbler system would consist of dual capacity, low volume and high volume blowers, with piping systems located in the miter gate areas, as shown on Figure 4. The high volume blower would be capable of producing 1000 cubic feet per minute (cfm) of air at 15 pounds per square inch (psi) driven by a 125 horsepower motor, while the low volume blower would produce 175 cfm of air at 15 psi driven by a 25 horsepower motor. This dual capacity system would prevent ice accumulation on the miter gates, and would also keep the gate recess clear of floating ice and debris. The piping system for the bubblers would be placed directly on the main lock structure. The upstream and downstream compressors would be placed on top of the lock wall.

4. Modification to Outlet Structure, Lock and Dam 15: Lock 15 is composed of a main lock and an auxiliary lock that are independently operated. The filling/emptying systems for both locks are composed of culverts which run through the bottom of the lock walls on each side of the lock, with discharge outlets emptying into the lower end of each lock as shown on Figure 5. The culverts located in the intermediate (riverside) lock wall share a common outlet into both the main and auxiliary locks. For example, when the main lock (or auxiliary lock) chamber is emptied, water flows through the culverts in the intermediate wall, and is discharged below the main lock and below the

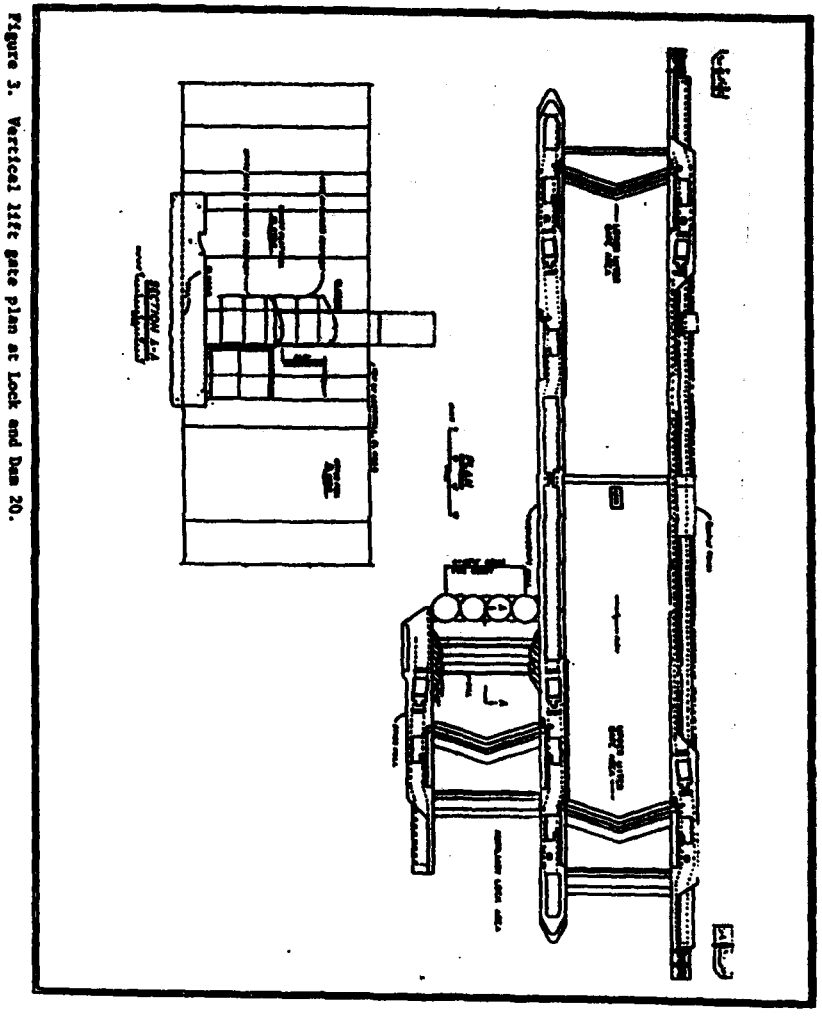

Figure 3. Vertical lift gate plan at Lock and Dam 20.

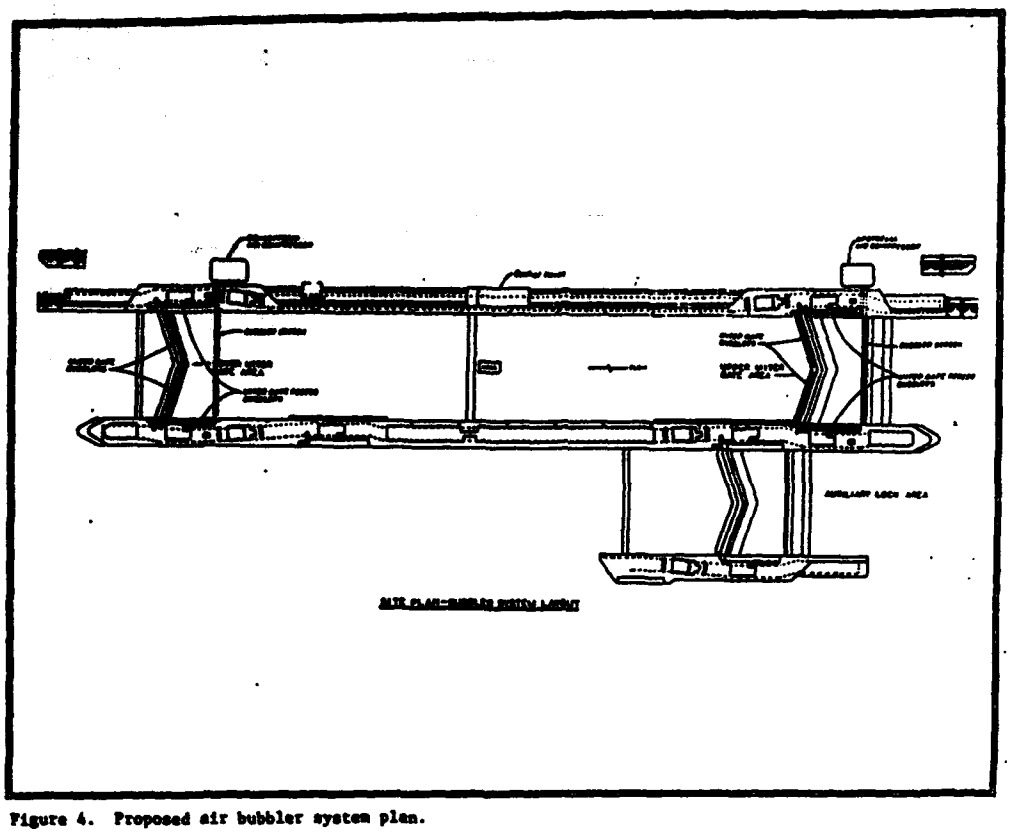

Figure 4. Proposed air bubbler system plan.

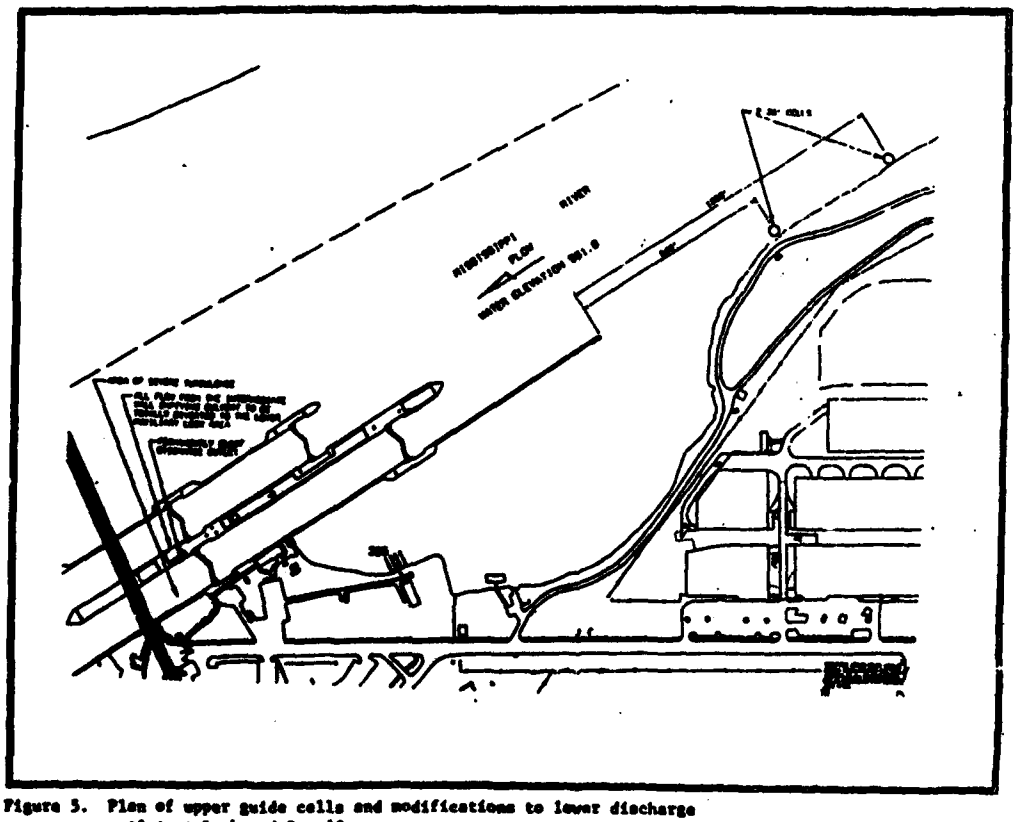

Figure 5. Plan of upper guide cells and modifications to lower discharge outlet at Lock and Dam 15.

auxiliary lock. The discharge of water from both lock walls into the low end of the main lock creates severe turbulence causing a safety hazard during double lockages. The turbulence causes tow lines to break loose from the lower guidewall, which creates a safety hazard for tow and lock personnel, as well as for lock visitors.

In order to solve this problem, it is proposed to permanently close the outlet that discharges from the intermediate lockwall below the main lock. This would force all flow from the intermediate wall to permanently discharge into the auxiliary lock. In addition, during double lockages, the landside discharge would be temporarily closed, allowing all of this flow to be temporarily discharged into the auxiliary lock. This procedure would reduce turbulence in the main lock and increase the safety of the lower lock area during double lockages. The alternative of rerouting the discharge outlet into the adjacent slough is no longer being considered.

5. Upper Guidewall Extensions, Lock and Dams 11 Through 22; Lower Guidewall Extensions, Locks and Dam 21 and 22: Guidewall extensions are proposed to assist tows in aligning with the lock and to reduce lock gate damage. Upper guidewall extensions, each of about 625 feet in total length, are proposed for construction at Locks 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, and 22. These guidewall extensions would consist of a series of 12 sheet pile cells located about 57 feet apart and connected by precast beam and a sheetpile diaphragm, as shown on Figure 6. Eleven of the cells would be about 35 feet in diameter; the remaining cell would be about 87 feet in diameter and would serve as an end protection cell. The cells would be founded on H-piles, or directly on rock, depending upon the depth of bedrock at each site. Removal of an unknown quantity of silt by mechanical means may also be required for each extension. Disposal sites have not been determined.

About 0.3 acres of aquatic habitat would be permanently removed from construction of each guidewall extension. Public use of the launching ramps located near the upper approach of Locks 11 and 13, and the lower approach to Locks 21 and 22 would not be affected by the guidewall extensions. Present tow approach patterns to the locks will not differ once the guidewall extensions are completed.

The upper guidewall extension at Lock 15 consists of two sheet pile cells, each about 30 feet in diameter, located about 600 feet and 1000 feet above the existing guidewall. A wall-type extension at this site would eliminate access to a backwater area and boat ramp on Arsenal Island. An unknown amount of material may need to be removed in order to construct the cells, and a disposal site would need to be identified. About 0.3 acres of aquatic habitat would be removed by the two cells.

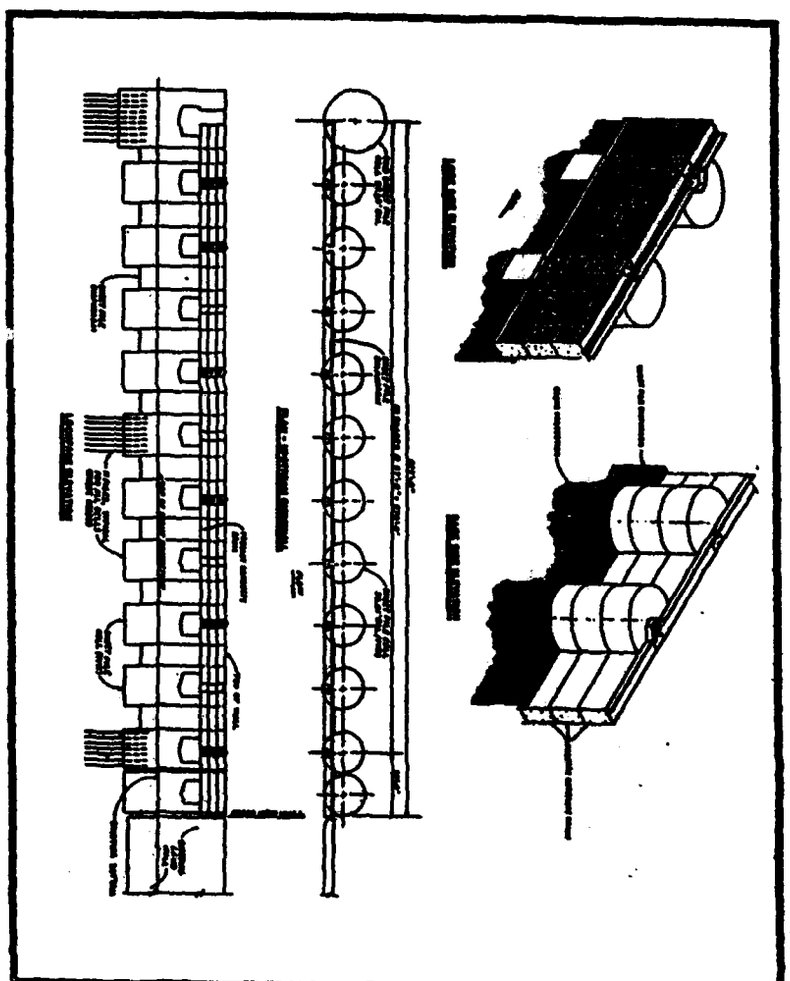

Figure 6. Typical guidewall extension plan.

Currently, Lock 19 does not have an upper guidewall. An upper guidewall is proposed for this site, and would consist of a series of sheet pile cells and precast beams as previously described. The exact length and location of the guidewall has not been determined at this time; a model study is being conducted and should be completed in the summer of 1989. The worst-case design would consist of a guidewall with a length of 800 feet located on the landward side of the lock. About 0.6 acres of aquatic habitat would be permanently removed by this guidewall. An unknown quantity of material may need to be removed by mechanical means. No disposal site has been identified.

6. Guardwall at Lock and Dam 22: The guardwall would also assist in protection of the lock gates. It would be constructed in conjunction with the upper guidewall extension at L/D 22. The guardwall would be about 480 feet long, consisting of about 10 sheet pile cells connected by precast concrete beams, as shown on figure 7. Each cell would be about 30 feet in diameter and would be located about 60 feet apart. Each cell would be founded directly on bedrock, and filled with concrete. An unknown amount of silt may need to be removed using mechanical means, and a disposal site would need to be identified. About 0.2 acres of aquatic habitat would be permanently removed due to construction of the guardwall.

FISH AND WILDLIFE RESOURCES OF THE UMRS

Congress designated the Upper Mississippi River System (UMRS) a nationally significant ecosystem in Public Laws 99-88 and 99-662 (figure 8). These laws mandate that the system be managed to balance navigation and environmental interests. The UMRS is composed of the nearly 1300 commercially navigable miles of the Upper Mississippi River (UMR), Illinois, Kaskaskia, Black, St. Croix, and Minnesota rivers. Bordering states include Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

The heavily forested floodplain and islands and diverse aquatic areas of the UMRS provide valuable fish and wildlife habitat for the benefit of the region and the nation. The Upper Mississippi River mainstem is the focal point for one of four major migration routes, or flyways, for millions of North American birds (over 300 species). In addition, ten Federally listed threatened or endangered animal or plant species are found along the UMRS, as well as over 90 species that are listed by the bordering states as threatened, endangered or of special concern. The UMRS waters are home to over 150 species of fish and 50 species of freshwater mussels. The river corridors provide habitat for many mammals, reptiles and amphibians.

The Service manages for the benefit of fish and wildlife over 80,000 acres of land and 150,000 acres of water on five UMRS National Wildlife Refuges on both the mainstem and tributaries. Additional lands and waters are managed by the State conservation

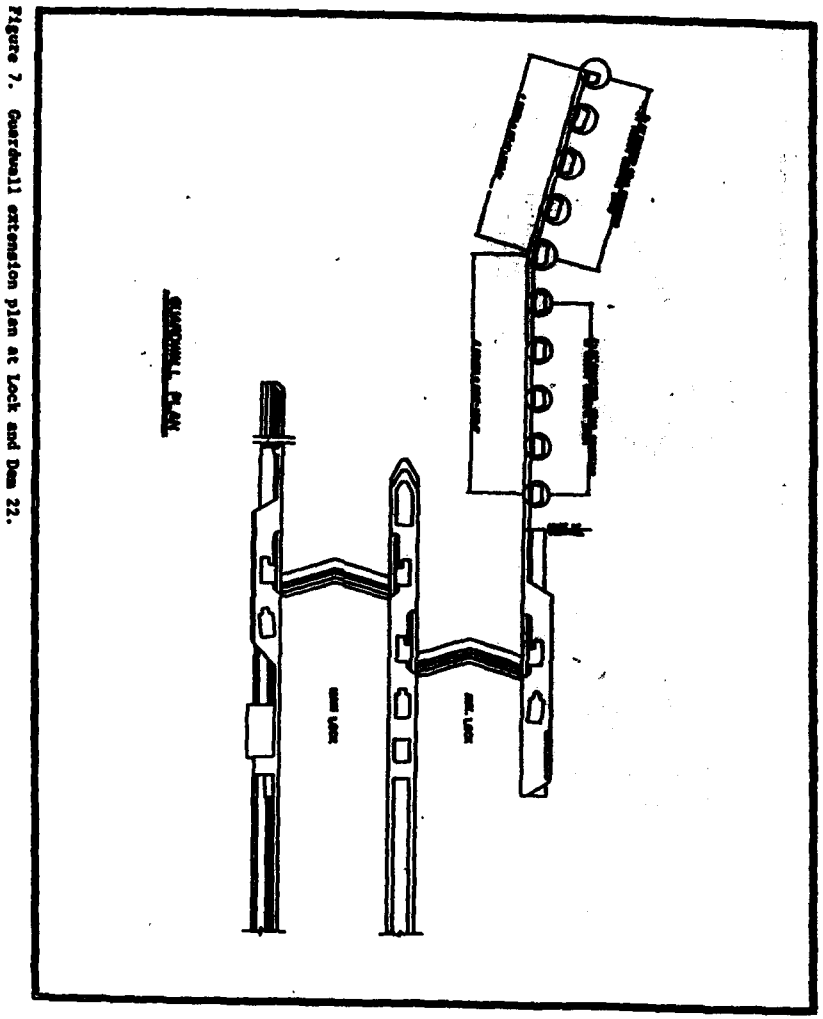

Figure 7. Guardwall extension plan at Lock and Dam 22.

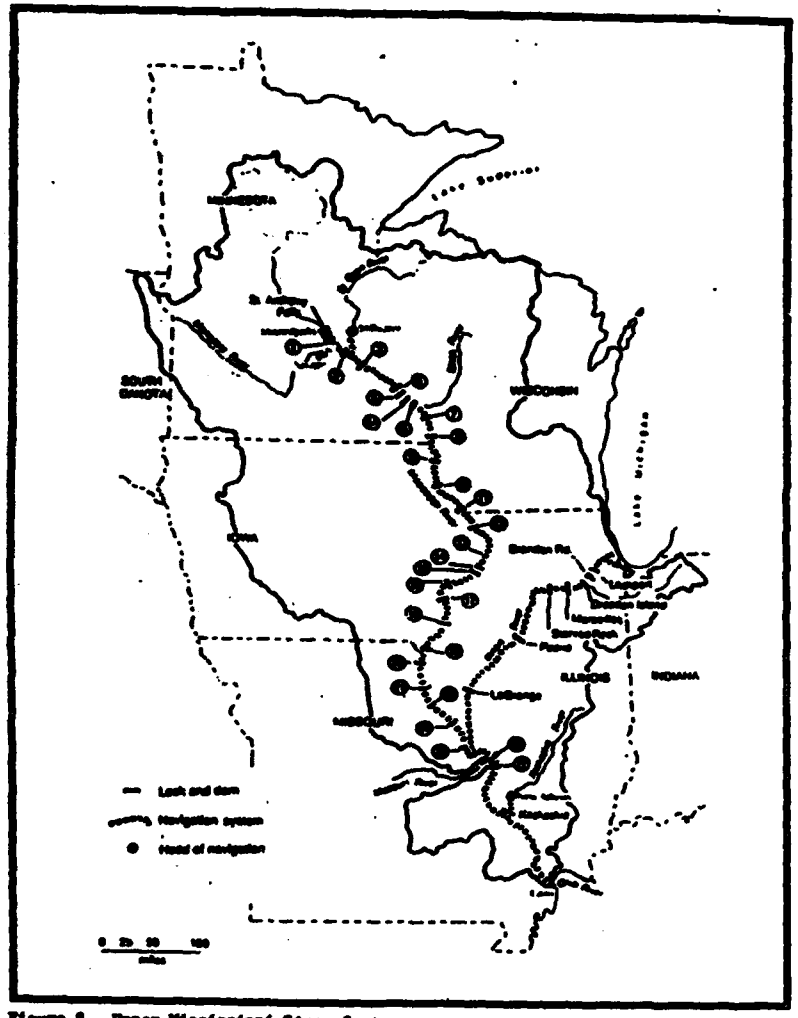

Figure 8. Upper Mississippi River System.

agencies. Finally, the UMRS is an important national recreation and commercial fish and wildlife resource. Expenditures generated by this resource may total well over $1 billion annually, of which approximately 37% is due to sportfishing, 41% pleasure boating and nonconsumptive recreation, 1% waterfowl hunting, and 1% commercial fishing and trapping.

DESCRIPTION OF THE IMPACTS

Construction Items

Onsite impacts that will occur from construction of each of the items described above will generally be minimal and short term. The potential for the guidewall extensions to effect freshwater mussels was evaluated. State fishery biologists recommended that the upper approaches to Locks 12, 13, 16, 17, and 19 be surveyed. (Note: Additional survey work may need to be done at Locks 20, 21, and 22 if additional information becomes available regarding the extent of nearby mussel beds in this area.

The purpose of the surveys were to determine if significant concentrations of mussels exist at the proposed guidewall sites or within 2000 feet upstream (the general approach area of a downbound tow). A diving survey was conducted by Stanley Consultants in August and September 1987 (Stanley Consultants 1987). They only found significant concentrations of mussels near Locks 15 and 17. Both of these mussel beds (figures 9 and 10) are in embayments and are not within the lock approach or exit area. Construction of the proposed guidewalls would not alter the effect of approaching tows on the embankments. Stanley Consultants found scattered individuals at the remaining three sites. No endangered, threatened or rare species were found.

Potential disposal sites for any dredged or excavated material have not been identified. Due to the relatively small quantities of material expected, it is anticipated that finding a disposal site to avoid environmental impact should not be a problem. However, additional coordination in accordance with Section 404 of the Clean Water Act will be required.

Based on this information, the site specific impacts to fish and wildlife should not be significant. No site specific mitigation is required. However, the Corps of Engineers is encouraged to protect the mussel beds identified by Stanley Consultants (1987) from any change in operation of approaching or waiting tows.

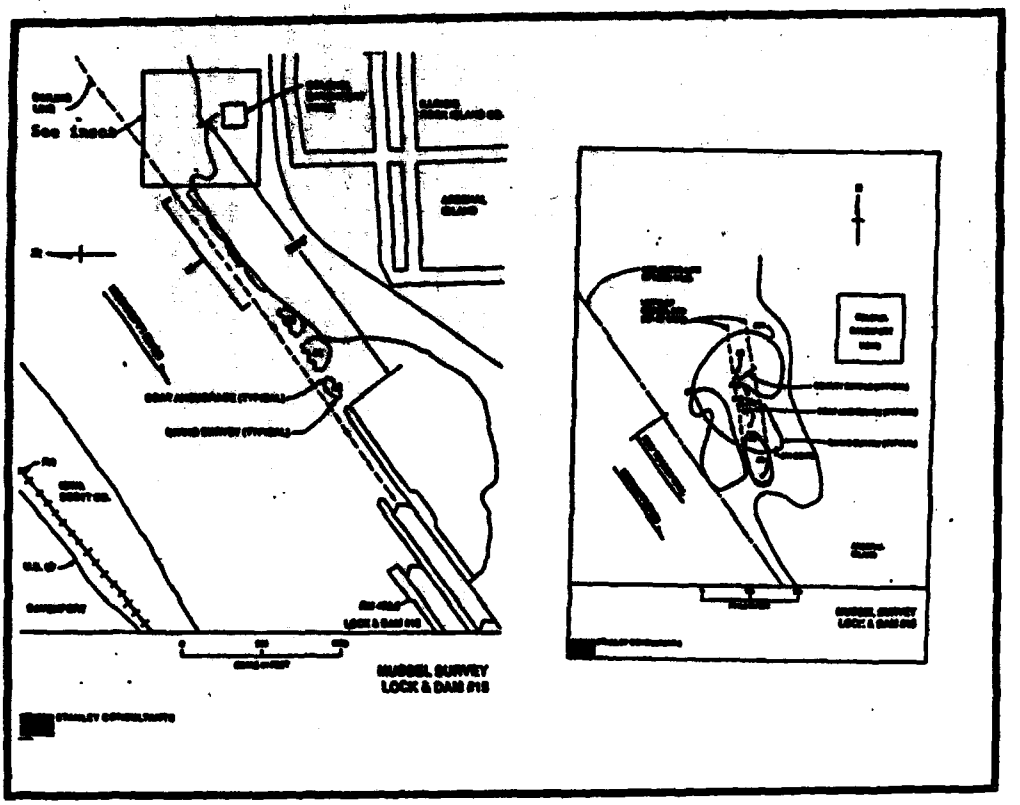

Figure 9. Mussel survey at Lock and Dam 15 (Source: Stanley Consultants 1987).

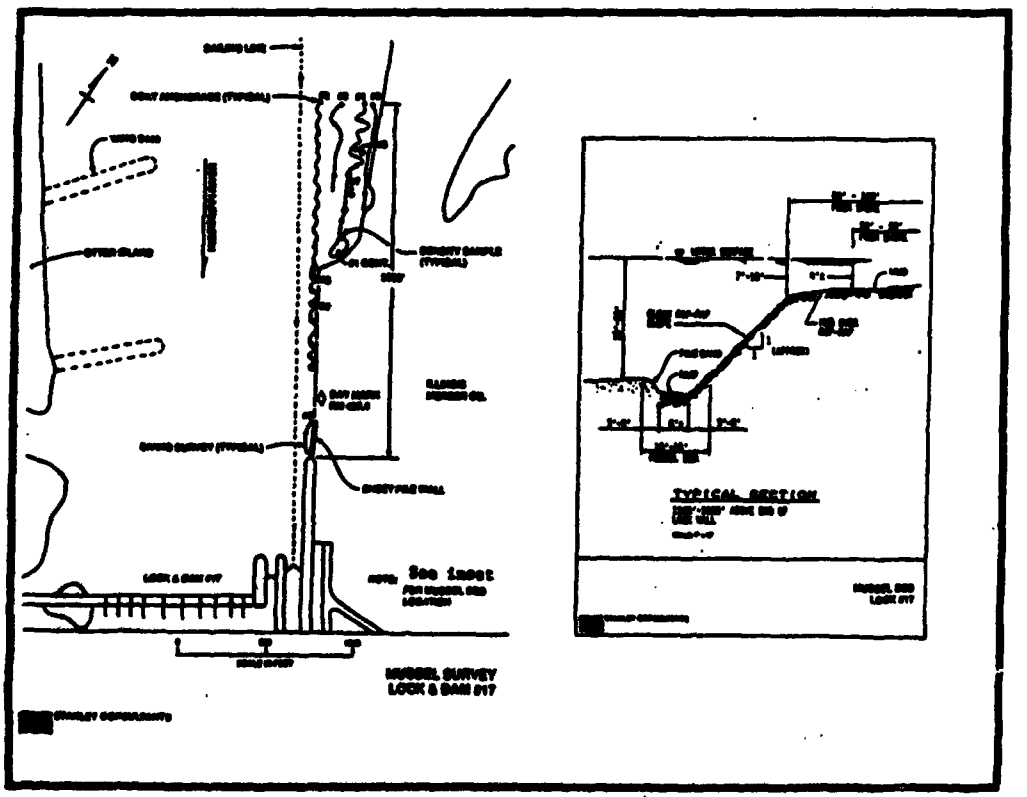

Figure 10. Mussel survey at Lock and Dam 17 (Source: Stanley Consultants 1987).

General Impacts of Tows[1]

Another type of potential impact is systemic (i.e. occurring throughout the UMRS) and cumulative (i.e. incremental effects of all environmental perturbations). Due to the improved operating efficiency of the locks in the Major Rehabilitation Program, an increase in tow traffic may result. Existing levels of tow traffic have had significant systemic and cumulative impacts on UMRS fish and wildlife resources. Future levels of traffic will have varying degrees of additional impact. These impacts relate to the passage of tows through the river environment. Tow movement causes a number of physical alterations, the magnitude of which are dependent on 1) the number of tows per day, 2) size, direction, and speed of each tow, 3) distance between actual sailing line and shoreline, 4) erodibility of banks, 5) sinuosity of channel, 6) channel cross sectional area, 7) tow cross sectional area, 8) depth of channel, 9) size of bottom sediments, 10) flow conditions, 11) habitats impacted, and 12) time of year, 13)ice conditions, and 14)water temperature.

Tow movement may result in a number of physical impacts including drawdown, increased wave energies, changes in water velocities, and increased turbulence depending on the factors listed above. Tow induced drawdown may cause littoral areas of the main channel border and backwaters to be exposed for up to several minutes. Tow waves can be of sufficient height and energy to cause bank erosion. Tow movement may also cause short term increases in water velocities of up to three times ambient for an upbound tow. Flows can actually be reversed by a downbound tow for a short while after passage. In fact, tow propeller inflow ranges from 1000 to 1500 c.f.s. per propeller or 2000 to 4500 c.f.s. per tow depending on number of propellers. By comparison, typical hydropower turbines being considered for installation in UMRS dams may pass 600 to 7000 c.f.s. per turbine depending on head.

Increased prop jet velocities may cause increased suspended sediments and turbidity. Tow movement not only causes significant short term (up to 90 minute) increases in turbidity, but towboats have also increased ambient turbidity. Increased suspended sediment concentrations may result in an increase in suspended sediment volumes entering main channel border areas, side channels, and/or backwaters. The significance of any resulting increase in natural sedimentation rates is still being debated. In addition, the relative tow induced resuspension of contaminated sediments or decrease in dissolved oxygen is unknown at the present time. Other tow induced chemical impacts include significant alterations to the mixing zone at wastewater outfalls.

[1]This discussion is based on information complied in Appendix C to the "Draft Fish and Wildlife Coordination Act Report for the Lock and Dam 26 (Replacement) Second Lock" dated June 1986. References may be found in that report.

The above physical changes could directly impact fish and wildlife populations and degrade fish and wildlife habitat. Terrestrial habitat could be lost due to increased erosion and induced development, although some terrestrial habitat may be gained at the expense of aquatic habitat due to any increases in sedimentation. Aquatic habitat could also be degraded by increased turbidity and erosion. The areal extent of aquatic macrophytes is decreased with reductions in the photic zone, increased wave action, and sedimentation. Benthos could be directly impacted by propeller jet scouring and barge scraping. Laboratory data indicate that increased suspended sediments may reduce benthos respiration and feeding rates. Fish larvae could be killed by tow propellers and their survival may be reduced due to frequent tow-induced drawdown and increased turbidity. Suspended sediment levels and turbulence introduced by tows may also be sufficient to adversely affect adult fish. Birds and furbearers would primarily be affected by aquatic habitat degradation and loss. Hazing due to either tow noise or lights may cause behavior changes in a number of fish and wildlife species. The relative effect on an individual's energy expenditures is unknown. Increasing tow traffic could amplify all of these impacts.

Tow movement in winter may causes ice breakage and movement, which in turn may cause additional shoreline damage and ice jams that can dewater important aquatic habitats, destroying both fish and furbearers. Only very generalized data are available to evaluate possible impacts of extended winter navigation on fish communities. Lubinski et al. (1981) reviewed available literature on this issue. Physical impacts include changes in water quality, increased chemical spills, and ice jams (GREAT II, 1980). Major areas of impact could occur in river bends and sites of ice gorge development (Cawley, 1978). Ecology Consultants (1979) found a lack of appropriate data in their review. Poe et al. (1980) found that frequent vessel passage might cause reduced diversity and density of both invertebrates and fish on the St. Marys River. Liston et al. (1985) felt that winter navigation in the St. Marys River would have a variety of impacts on the fisheries, but could only discuss them in general terms (Table 1).

Concerns have also been raised by UMRS biologists about the potential impact from tow passage in the winter to known concentrations of fish that winter in deep holes adjacent to the navigation channel. In winter diving observations, Lubinski (1984) indicated that "both main channel microhabitats and populations would be susceptible to disturbance from propellor wash that accompanies winter navigation. Fish susceptibility would be dependent on their degree of dormancy and their use of microhabitats close to the navigation channel." He theorized that sturgeon, flathead catfish, and channel catfish could be vulnerable. The general consensus of professional opinion has been that insufficient data exist to adequately evaluate the issue for the Upper Mississippi River System.

Table 1. Impacts of winter navigation on fishes of the St. Marys River as summarized from Liston et al. (1985).

Species	Nature of Impact
Yellow perch	Indirect-turbidity on physiology, reproduction, feeding, etc.; habitat loss.
Northern pike	Block migratory rates due to ice domes and increased turbidity; indirect-vegetation loss due to ice scouring.
Walleye	Disruption of active winter feeding, turbidity
Brown bullhead	Because of sluggish nature in winter may not hold position in turbulence; destruction of emergent vegetation; increase in sediment load little impact.
Bluegill	Turbulence may affect cover; critical to first year survival; direct impacts on constricted areas, increased turbidity.
Emerald shiner	Impacts on main channel border vegetated habitats.

Tow traffic also impacts recreational and commercial users. Indirectly, they are impacted by loss of fish and wildlife habitat. Loss of aquatic habitat translates into reduced sportfishing, commercial fishing, hunting, trapping, and commercial shell fishing opportunities. Habitat losses due to sedimentation may also affect non-consumptive use and reduce available surface waters used by boaters. Direct impacts include disruption of activities as tows pass, reduced accessibility, loss of gear, and reduced fishing and hunting quality.

Additional tow traffic will also result in additional induced activities, such as terminal development, barge fleeting, and the potential for accidents or groundings. All of these can have significant impacts on fish and wildlife and habitat, but without location specific knowledge, these potential impacts are unknown.

Future with and without the Major Rehabilitation Program

In order to determine the impacts of the Major Rehabilitation Program, the most likely levels of traffic through the year 2040, with the program and without, were provided by the Rock Island District. The District has evaluated the Master Plan study and concluded that these projections still represent reasonable forecasts of longterm waterway activity. The base or without condition includes the existing features of the UMRS plus 1200 and 600 foot chambers at new Locks and Dam 26 (Replacement). The "with project" condition includes the base condition and the rehabilitation measures described above. The difference or increment in system traffic between the base and "with-project" conditions represents the level of traffic which can be associated with construction of these features of the major rehabilitation effort.

Projected changes in UMRS tow traffic resulting from the above information are the basis for our analysis of systemwide impacts to fish and wildlife resources. It is important to note that the projections are dependent on such variables as economic conditions, tow size, commodity mix, approach conditions, ice conditions, channel capacity, and the occurrence of open pass conditions at some locks. We cannot overemphasize the fact that changes in these variables could significantly modify the tow projections.

With the Major Rehabilitation Program for Locks and Dams 2 through 22, two types of traffic increases are likely. First is the potential increases in traffic throughout the navigation season. This data was provided by the Rock Island District as likely increases in "tows per week" (table 2). Since the base condition includes the Second Lock at Lock and Dam 26(R), it is our judgment that, the traffic level of Scenario IIIa identified by the St. Louis District is most similar to the base condition. This is because the St. Louis District Final Environmental Impact Statement for the Second Lock has stated that traffic levels

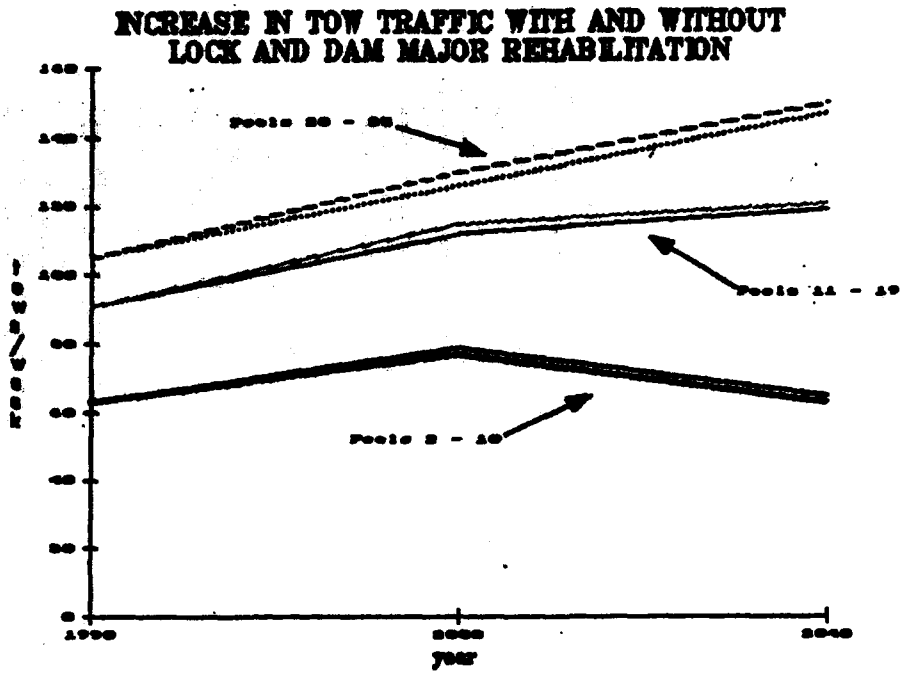

Figure 11. Increase in tow traffic without (Scenario IIIa) and with Lock and Dam Rehabilitation Program. See Table 2 for increment.

Table 2. Increase in tons per week throughout the navigation season with the Lock and Dam Major Rehabilitation Program.

LOCK	YEAR 1990		YEAR 2040	
	No Change	No Change		No Change
Brandon Road	•	•		•
Peoria	• • • • •	1-2 tons/wk		1-2 tons/wk
Lock 2		2-3 tons/wk		1-2 tons/wk
Lock 13		4 tons/wk		3 tons/wk
Lock 25				

Table 3. Increase in number of tows during last 3 to 5 days of navigation season (just prior to freeze-up).

LOCK	YEAR 1990		YEAR 2040	
	No Change	No Change		No Change
Brandon Road	•	•		1-2 tows
Peoria	• • • • •	10-20 tows		10-20 tows
Lock 2		10-20 tows		10-20 tows
Lock 13		10-20 tows		10-20 tows
Lock 25				

approximating those of Master Plan Scenario III "are expected to be generated by economic activities with or without a Second Lock. Therefore, we believe that the future without the Major Rehabilitation Program should include both the referred to economic activity and the Second Lock.

With the Major Rehabilitation Program in place, a traffic level similar to figure 11 might be expected. This is a simple addition of Table 2 plus Scenario IIIa expressed in tows per week. Approximately 1 to 4 additional tows per week are projected for the Upper Mississippi River. No measurable change is predicted for the Illinois River. This is primarily because the potential gains in efficiency realized through the submersible tainter gates will not be of sufficient magnitude to increase traffic on the Illinois (Corps of Engineers 1987).

The impact to fish and wildlife resources from this small increment in tow traffic is unknown, as the data base for determining impacts to fish and wildlife is incomplete. Much of the missing information is relevant to understanding the incremental impacts of increased navigation on the river environment. This has required us to base this assessment on available data and our best scientific judgment. We acknowledge the numerous shortcomings of our analysis. We are currently coordinating with the St. Louis District to develop a plan of study to obtain the necessary information to quantify the incremental impacts of tow passage.

The impacts of an additional 1 to 4 tows per week have not been measured, and the potential significance is unknown either on a system-basis or site specific. Based on our current understanding of potential impacts, we believe that the projected increase in tow traffic during the navigation season due to this program is too small to measure significant impacts to fish and wildlife resources. The amount of traffic increase projected by the Rock Island District appears to be within the normal variability of any navigation season.

An exception to this conclusion may be the potential to increase the number of tows on the system at the end of the navigation season. This data is expressed in "tows per season" but it is likely that this number (table 3) will occur primarily in the last 2-5 days of the season just before freeze up or the first 1 or 2 days at the beginning of the season (Berger 1987). This type of impact may be significant. As stated previously, the general consensus of professional opinion has been that insufficient data exist to quantify impacts that may occur from tow traffic in the winter months. Potential adverse impacts include direct and indirect impacts to wintering fish and benthos, increased suspended sediments, and ice jams that may dewater important aquatic habitat.

A similar conclusion was reached in the Rock Island District's Year Round Navigation Study. The 1981 reports of the Chief of Engineers and the Board of Engineers for Rivers and Harbors on the Year-Round Navigation Study recommended that the evaluation of year round navigation be terminated and that environmental study efforts be initiated. The call for studies was to provide baseline data to determine the impacts and acceptability of current operational procedures and for use in future decisions on management of the Upper Mississippi River navigation system. In addition, they also noted that a closed navigation season may be environmentally beneficial. They recognized that considerable environmental studies are needed to substantiate the need for a closed season and the establishment of criteria on which to base such an action.

Table 4 summarizes the necessary studies identified by the Year-Round Navigation Feasibility Report (U.S. Army Corps of Engineers 1980). With several exceptions, the Corps has not sponsored any work toward completion of these study objectives. The exceptions are the "Pilot Study to Evaluate the Winter Fishery Biology of Pool 18 of the Upper Mississippi River" (Peterson 1983 and its appendicies), "Winter Diving Surveys of Main Channel Microhabitats and Fish Populations in Mississippi River Reaches Subjected to Thalweg Disposal" (Lubinski 1984), "Radiotracking of Catfish and Buffalo in Pool 13, Upper Mississippi River" (Stang and Nickum 1985), and "Evaluation of Wintering Macroinvertebrates of Pool 13 of the Upper Mississippi River" (Hubert et al. 1983). This work was funded by the Rock Island District under its GREAT II implementation program.

The objective of the pilot study was to evaluate methods to collect baseline winter fishery data. Based on a limited field test, the study concluded that hydroacoustic gear could be an effective tool. The final task of the study was to identify a future plan of study to evaluate the winter fishery biology of pool 18. Although a detailed plan of study was provided in the report, no progress has been made to undertake this work. The winter diving and radiotracking work were undertaken in association with the evaluation of thalweg disposal of dredged material. Neither study was designed specifically to evaluate winter biology, but the research did result in additional information on winter habitats and fisheries use. The benthos survey provided insight into significant correlations of taxa and substrate size. However, the study concludes that "in order to further interpret the winter study, it is recommended that additional assessment be done at the same locations in Pool 13 over the entire year." A comprehensive study of winter biology has yet to be funded.

Table 4. Proposed environmental studies to evaluate winter conditions for the Upper Mississippi River[1]

Study	Minimum Length of Study (Yrs.)	Estimated Minimum Cost[2] ($000)
1. Bank dooming species, aquatic and shoreline plants.	3	175
2. Water Quality	3	250
3. Winter Fish Movement	3	350
4. Wintering Wildlife (Birds and Mammals); Cross-Channel Mammal Movement	2	50
5. Recreation and Recreation Safety	2	40
6. Tailwater Fisheries	3	90
Study Management	3-5	45
Total Estimated Cost		$1,000

[1]From U.S. Army Corps of Engineers, Rock Island District (1980)

[2]1979 dollars (Indexed to 1988 dollars = $1,710,000)

Table 5 summarizes the navigation effects studies related to cold season navigation that are identified in the Environmental Management Program Long Term Resource Monitoring Program (Rasmussen and Wlosinski 1988). These tasks are dependent on completion of a number of other tasks. To date appropriations for the program have been insufficient to initiate work on the requisite tasks.

CONCLUSIONS AND RECOMMENDATIONS

We view tow impacts as a continuum. The point where impacts become significant either at a site or system-wide like along th continuum. However, the location of significance expressed in tows per day or tows per week is unknown. Accurately assessing the significance of any impacts due to increased tow traffic on the UMRS ecosystem with existing data is nearly an insurmountabl task. Even though some impacts are readily evident, much discussion and controversy has been generated over the relative quantitative and qualitative effects that tow induced impacts will have on the river ecosystem. This has been demonstrated by the discussions on general impacts in this report, our Second Lock reports, and the comments the District has received to date on this project.

Several methods to quantify impacts are currently being reviewed by the St. Louis District. We understand that the objective is to develop and implement a plan of study that will identify a method to quantify the biological impacts of discrete increments of tow traffic. We support this work and will be working cooperatively with the St. Louis District on this plan.

In a qualitative sense, we have concluded that the increase in late season navigation that may result from the Lock and Dam Major Rehabilitation Program, may significantly affect wintering fish and benthic populations of the UMRS. However, we believe that for the remainder of the navigation season the projected average seasonal increases in tow traffic are too small to measure significant impacts to UMRS biological resources.

Our draft report outlined a number of measures that could be employed to avoid and minimize tow traffic impacts. The measure relate to 1) operation of the navigation channel and locks that can be implemented by the U.S. Army Corps of Engineers and the U.S. Coast Guard, 2) measures related to tow operation, 3) measures related to induced development by the commercial navigation industry, 4) measures to rectify impacts. Appendix B to our draft report described each measure, its rationale, and the likelihood of it being implemented. Since coordination is ongoing regarding potential implementation of these measures, it is not possible to provide a final version of the appendix at this time. We anticipate being able to complete a final report next fall which will be forwarded to both you and the St. Louis District.

Table 5. Proposed work of Long Term Resource Monitoring Program related to cold season navigation effects. (Rasmussen and Wlosinski 1988).[a/]

Task	Description	Estimated Cost ($000)
PA(NE)8	Assess the effects of cold-season navigation on benthic macroinvertebrates in pools 8, 13, 19, 26, the Open River or La Grange Pool.	14
PA(NE)9	Assess the effects of cold-season navigation on fish in pools 8, 13, 19, 26, the Open River or the La Grange Pool.	14
PA(NE)10	Assess the effects of cold-season emergency water control actions on fish and wildlife resources in pools 8, 13, 19, 26, the Open River or La Grange Pool.	14
PA(NE)11	Identify and evaluate measures to reduce the adverse effects of cold-season navigation on fish and wildlife resources	14

[a/]Assumes completion of most of Navigation Effects Tasks 1 through 7 (estimated cost: $2,242,000).

The avoid and minimize concept focuses on our first priority in the formulation of mitigation measures. The effectiveness of the concept is obviously dependent on Federal, State and industry partnership for management of this multi-purpose resource. Additional assessment needs to be made of potential compensation measures if it is found through further data collection that compensation is required.

Our recommendations address data gaps and steps to implement a mitigation plan if necessary. Coordination of these recommendations with the St. Louis District is imperative. We recommend that:

1. The amount and quality of dredged material needs to be identified by lock when construction funding becomes available. Disposal sites should be selected to avoid impacts to fish and wildlife resources. Site selection should be coordinated with this office and the adjacent States in accordance with requirements of Section 404 of the Clean Water Act and the National Environmental Policy Act;

2. Steps should be taken to protect the mussel beds in the embayments above Lock 15 and Lock 17 from tow propeller impacts, if tow approach and exit paths change after guidewall extensions are constructed. For instance, downbound tows should be asked to wait further upstream and upbound tows should not direct their propellers into the embayment;

3. The effects of the proposed bubbler system be evaluated by conducting a five-year study of changes in end of season and beginning of season tow traffic. Specific details of the study should be coordinated with the teams already established for the St. Louis District Plan of Study.

4. Studies identified in the Year-Round Navigation Study, Peterson (1983), and the Environmental Management Program - Long Term Resource Monitoring Program (Rasmussen and Wlosinski 1988) should be reviewed and incorporated into the study design being developed for the St. Louis District Plan of Study. If significant impacts are identified, the Rock Island and St. Paul districts should prepare a mitigation plan. In particular, consideration should be given to developing criteria for a closed navigation season; and that,

5. Coordination should continue on implementing feasible measures to avoid and minimize impacts. A coordination meeting with the Rock Island District should be held immediately and with the St. Paul District within the next two months.

We believe the above recommendations provide a flexible solution to a very difficult problem. However, a strong commitment from the Corps of Engineers will be necessary to bring these recommendations to fruition. Without such a commitment, significant impacts caused by any increases in navigation traffic will not have been adequately evaluated and appropriately mitigated. Balanced use of this nationally significant multipurpose resources will not be achieved.

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APPENDIX IV

COORDINATION WITH THE U.S. FISH AND WILDLIFE SERVICE, INCLUDING ENDANGERED SPECIES

United States Department of the Interior

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

IN REPLY REFER TO:
FWS/AE-SE

LOG NO. 3-88-F-IL-2-RIFO

JUN 2 0 1988

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building
P.O. Box 2004
Rock Island, Illinois 61201-2004

Dear Colonel Smart:

This responds to your May 25, 1988, request for consultation under the Endangered Species Act of 1973 (Act), as amended, on the proposed Major Rehabilitation Effort (MRE), Mississippi River Locks and Dams 2-22, and Illinois Waterway from LaGrange to Lockport Locks and Dams. We received your request on May 27, 1988, which is, therefore, the initiation date of consultation. This represents the Biological Opinion of the U.S. Fish and Wildlife Service (Service) in accordance with Section 7 of the Act. An administrative record of this consultation is on file in this office.

4-1

Chronology

May 29, 1986 - Letter from Rock Island Field Office to Rock Island Corps District concurring with the Corps' conclusion that the MRE at Peoria and LaGrange Locks and Dams on the Illinois Waterway will have no effect on any federally listed threatened or endangered species.

February 13, 1987 - Letter from Rock Island Corps District requesting a list of threatened and endangered species that may occur in the MRE project area.

March 6, 1987 - Letter from Rock Island Field Office to Rock Island Corps District listing threatened, endangered, and proposed species in the MRE project area.

March 18, 1987 - Letter from Rock Island Field Office to Rock Island Corps District correcting certain errors made in the Service's March 6th letter.

April 15, 1988 - Letter from Rock Island Corps District to Rock Island Field Office transmitting Corps' Biological Assessment for the MRE.

May 3, 1988 - Letter from Rock Island Field Office to Rock Island Corps District responding to the Corps' Biological Assessment. The Service declines to concur with the Corps' conclusion that the MRE project will have no effect on Lampsilis higginsi and recommends that formal consultation be initiated.

May 6, 1988 - Rock Island Field Office meets with the Rock Island Corps District to discuss the implications of the Service's nonconcurrence with the Corps' Biological Assessment.

May 25, 1988 - Rock Island Corps District initiates formal consultation.

May 27, 1988 - Formal consultation begins (date request received).

Background Information

This Opinion incorporates by reference the Service's Biological Opinion on the proposed Second Lock at Lock and Dam 26 (Replacement), Alton, Illinois, dated November 20, 1987, the Incidental Take Statement and Conservation Recommendations which compose Attachments A and B, respectively, of that Opinion, and a Memorandu for Record dated February 24, 1988, which records certain changes to the Incidental Take Statement that were agreed upon by the Corps and Service.

In your Biological Assessment, you concluded that the MRE would have no effect on any federally listed threatened or endangered species. The Service concurred with your conclusion for all species except L. higginsi.

Federal agencies have a legal requirement to consider the cumulative impacts of other projects and impacts when determining whether their proposed action complies with Section 7(a) of the Act. However, the consideration of cumulative impacts is not a procedural requirement as with NEPA; rather, it is a substantive requirement designed to prevent the loss of endangered species regardless of cost.

Furthermore, since all other future federal actions will themselves be subject to the restraints of Section 7 of the Act at some later date, the impact of those actions should be addressed sequentially rather than collectively. Each action must be capable at some point or individually satisfying the standards of Section 7. Thus, Section 7 provides a "first-in-time, first-in-right" process whereby authorization of federal projects may proceed until it is determined that further actions are likely to jeopardize the continued existence of a listed species or adversely modify its critical habitat.

In determining the scope of the project under review, both the proposed activity itself and any "connected" activity must be included. Connected activities are those which are related to (interrelated) or dependent upon (interdependent) the proposed project. Thus, the Rock Island District correctly conducted a traffic analysis to ascertain whether the operation of the proposed measures would be likely to increase commercial navigation, which would lead to systemic (cumulative) impacts on the Upper Mississippi River System (UMRS). You concluded that, by the year 2040, a 1.4 per cent increase in system traffic would occur with the proposed measures in place.

In determining the environmental baseline, the federal agency should consider the past and present impacts of all projects and human activities in the area, regardless of whether they are federal, state, or private in nature. All these activities are contributing influences which mold the present environmental status quo of the project area. Furthermore, the federal agency should consider, as part of the environmental baseline, the anticipated impacts of all proposed federal projects in the affected area which have previously been the subject of Section 7 consultation and received a favorable Biological Opinion. This is consistent with the "first-in-time, first-in-right" approach, since a project receiving a favorable Biological Opinion is in effect allocated the right to consume a certain portion of the remaining natural resources of the area.

It is in this regard, we believe, that the Rock Island District failed to consider the effects of the Second Lock at Lock and Dam 26 (Replacement). In our Biological Opinion for that project, we concluded that an increase in navigation traffic (interrelated with the second lock) would affect L. higginsi to some degree, although it would not jeopardize its continued existence. Logically, therefore, since the MRE will also result in an increase in navigation traffic, albeit small, it too will affect the species to some degree.

The question may be asked how we are to know whether the adverse effects of navigation traffic on L. higginsi are due to tows that result from the Second Lock, the MRE, or are the result of a natural increase in traffic that may have taken place regardless of the two actions. In fact, this determination is impossible to make and the impacts are inseparable. It would have been better, from an endangered species standpoint, to have considered the impacts of both the Second Lock and the MRE as a single project or to have considered the impacts of the MRE before the Second Lock. The Service, as well as others, continually made this point during the planning and environmental documentation for the Second Lock. The question is moot, however, because any measures that may be taken in the future to minimize harm to the species will address all tow traffic regardless of its origin.

4-2

Biological Opinion

Cumulative and indirect impacts due to an increase in navigation traffic have been identified by Carmody et al (1986) including erosion, turbidity, sedimentation, an increased likelihood of accidental spills of toxic materials, a general decrease in water quality, and the need for support facilities. These actions will affect L. higginsi to some degree.

Since the project increase in navigation traffic due to the MRE is small (1.4 per cent by the year 2040), the impacts may be virtually unmeasurable. Furthermore, it may be many years before the increase in traffic levels due to the MRE are realized. In the meantime, any number of events could occur, including the gradual decline of the species due to natural causes, the catastrophic extirpation of the entire population, an increase in the population, or simply the accumulation of additional data that might change the status of the species.

Considering the uncertainty of future events, it is my Biological Opinion that the action is not likely to jeopardize the continued existence of L. higginsi. However, the action is likely to cause the Incidental Take of the species.

Criteria have been established that set the level of Incidental Take of L. higginsi in the form of changes in the structure of the mussel community (Attachment A of our Biological Opinion for the Second Lock at Lock and Dam 26 is incorporated here by reference). Measures which must be taken to minimize the Incidental Take of the species were also specified. Those measures include (1) a monitoring program to track the status of the species and of the mussel community in general, (2) a study of the nature and extent of impacts on mussels due to navigation traffic, and (3) a feasibility study of measures that could be taken at some future time to further minimize harm to the species.

We see no reason to require additional measures for the Incidental Take due to the MRE. The measures established for the Second Lock project can also apply to the MRE. As with the Second Lock project, should any of the Level of Take criteria be reached at any of the study sites, the Service will consult with known mussel experts and the Corps to determine whether or not additional action should be taken. Such action may include implementation of additional measures to minimize harm to the species and/or reinitiation of endangered species consultation.

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 the project be modified or new information indicate that endangered species may be affected, consultation should be reinitiated.

Sincerely,

John Popowski

John Popowski
Acting Regional Director

cc: Ecological Services Field Office, Fish and Wildlife Service, Rock Island, IL
" " " " " " " " Marion, IL
" " " " " " " " St. Paul, MN
Dr. Leslie Holland Bartels, National Fisheries Research Center, FWS, LaCrosse, WI
Corps of Engineers, North Central Division, Chicago, IL
Corps of Engineers, St. Paul District, St. Paul, MN
Dr. Andrew Miller, Waterways Experiment Station, Vicksburg, MS
Jennifer Brown, Region V, Environmental Protection Agency, Chicago, IL
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Colonel Neil A. Smart 5

Susan Lauson, endangered species coordinator, DOC, Springfield, IL
Daryl Howell, " " " DNR, Des Moines, IA
Carrol Henderson, " " " DNR, St. Paul, MN
Michael Sweet, " " " DOC, Jefferson City, MO
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Bernie Schonhoff, DNR, Fairport, IA
Alan Buchanan, DOC, Columbia, MO
Leroy Koch/Gordon Parabee, DOC, Palmyra, MO
Pamela Thiel, DNR, La Crosse, WI
Kevin Cummings, Illinois Natural History Survey, Urbana, IL
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Dr. Edward Cawley, Loras College, Dubuque, IA
Marian Havlik, Prairie du Chien, WI

4-3

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

May 25, 1988

Planning Division

Mr. Richard C. Nelson
Field Supervisor
U.S. Fish and Wildlife Service
Rock Island Field Office
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

We are responding to your letter dated May 3, 1988, concerning our Biological Assessment for the Major Rehabilitation Effort, Mississippi River Locks and Dams 2-22, Illinois Waterway from LaGrange to Lockport Locks and Dams. Your letter indicated concurrence with our Biological Assessment for all species except Lampsilis higginsi. Also, your letter recommends that the Rock Island District intitate formal consultation with your agency pursuant to Section 7 of the Endangered Species Act, as amended, for Lampsilis higginsi.

We would like to reiterate that our traffic analysis indicated that by the year 2040, a 1.4 percent increase in system traffic (about 2.2 million tons, or an average increase of about two tows per week on the Mississippi River) would occur with all the proposed measures in place. The District has concluded that this very small increase in traffic is well within the normal variability of any navigation season, and that this increase will not result in system-wide or cumulative impacts that are measurable over the existing condition. Therefore, the measures being considered for construction by the Rock Island District will not increase the capacity of the Upper Mississippi River Navigation System.

As discussed in our Biological Assessment, we still believe that construction and operation of our proposed measures will not adversely affect Lampsilis higginsi. However, we wish to proceed with processing under Section 7 of the Endangered Species Act, and therefore request the initiation of formal consultation for Lampsilis higginsi.

Any questions or requests for additional information should be directed to Ms. Karen Bahus of our Environmental Analysis Branch at 309-788-6361, Ext. 158.

Sincerely,

ORIGINAL SIGNED BY
Dudley M. Hanson, P.E.
Chief, Planning Division

Copies Furnished:

Commander, North Central Division
ATTN: CENCD-PD-ER (Eitel)

Commander
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ATTN: CENCS-ED-M (Bailen)
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210 Tucker Boulevard North
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Vicksburg, Mississippi 39180-0080

4-4

United States Department of the Interior
FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201
IN REPLY REFER TO:
COM: 309/793-5800
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May 3, 1988

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CE

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61201-2004

Dear Colonel Smart:

This responds to Mr. Dudley M. Hanson's letter dated April 15, 1988, transmitting your agency's Biological Assessment for the Major Rehabilitation Effort, Mississippi River Locks and Dams 2-22, Illinois Waterway from LaGrange to Lockport Locks and Dams. The Assessment concluded that the Major Rehabilitation Effort would have no effect on any federally listed threatened or endangered species in the study area.

We concur with your assessment for all species except Lampsilis higginsi. In our Biological Opinion for the Second Lock project at Locks and Dam 26, Alton, Illinois, the Service concluded that the impacts associated with an increase in tow traffic on the Upper Mississippi River would affect L. higginsi but would not jeopardize its continued existence. However, in the Incidental Take Statement that accompanied the Biological Opinion, certain criteria were established that set the upper limit of the incidental take. If these criteria are surpassed, formal consultation would be reinitiated and corrective measures would be taken. The Incidental Take Statement also required a mussel monitoring program that would keep track of the status of several mussel communities and the impacts of commercial navigation on the beds.

The Major Rehabilitation Effort must be considered as a having effects cumulative to those of the Second Lock Project. The Biological Assessment states that the Major Rehabilitation Effort will result in a 1.4% increase in systemwide tow traffic by the year 2040. While this increase may be insignificant by itself, and the impacts resulting from it may be immeasureable, it nevertheless contributes to the overall affect that L. higginsi will experience due to increases in tow traffic as a result of both the Second Lock and the Major Rehabilitation Effort. The Endangered Species Act provides a "first in time, first in right" process for Federal projects whereby the authorization of Federal

projects may proceed until it is determined that further actions are likely to jeopardize the continued existence of a listed species. The Second Lock project has, in effect, been allocated the right to consume a certain portion of the remaining natural resources of the study area. We must insure that the Major Rehabilitation Effort will not push the species over the brink of jeopardy.

Therefore, since the project may affect an endangered species, we recommend that you initiate formal consultation with the Fish and Wildlife Service as, soon as possible, pursuant to Section 7 of the Endangered Species Act, as amended.

Sincerely,

Richard C. Nelson
Field Supervisor

cc: USFWS Region 3, Twin Cities, MN (Engel)
USFWS Marion, IL
USFWS St. Paul, MN
USCoE North Central Division, Chicago, IL
USCoE St. Paul District, MN
USEPA Region IV, Kansas City, MO (Bronowski)
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Illinois Endangered Species Coordinator (Lauson)
Minnesota Endangered Species Coordinator (Henderson)
Iowa Endangered Species Coordinator (Howell)
Wisconsin Endangered Species Coordinator (Nicotera)
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Kevin Cummings, INHS, Urbana, IL
Dan Sallee, ILDOC, Aledo, IL
Bernie Schonhoff, IADNR, Fairport, IA
Tom Boland, IADNR, Bellevue, IA

DEPARTM
ROCK ISLAND DIST
CLOCK TOWER
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REPLY TO ATTENTION OF:

Planning Division (11-2-240a)

Mr. Richard C. Nelson
Field Supervisor
U.S. Fish and Wildlife Service
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

In accordance with Section 7(c) of Species Act of 1973, as amended, the I has completed the enclosed Biological Major Rehabilitation Effort, Mississi Dams 2-22, Illinois Waterway From Lo Locks and Dams.

The Biological Assessment analyzes site-specific impacts, as well as any to the Upper Mississippi River System of certain measures of the major rehat The Biological Assessment concludes th impacts are anticipated to the federal threatened species which may occur in

Should you have any questions conc Biological Assessment, please call Ms. Environmental Analysis Branch at 309/7 We look forward to your reply.

Sincerely,

ORIGINAL SIGNE

Dudley M. Mans
Chief, Plannin

Enclosure

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

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BIOLOGICAL ASSESSMENT

MAJOR REHABILITATION EFFORT
MISSISSIPPI RIVER LOCKS AND DAMS 2-22
ILLINOIS WATERWAY FROM
LA GRANGE TO LOCKPORT LOCKS AND DAMS

APRIL 1988

BIOLOGICAL ASSESSMENT

MAJOR REHABILITATION EFFORT
MISSISSIPPI RIVER LOCKS AND DAMS 2-22
ILLINOIS WATERWAY FROM
LA GRANGE TO LOCKPORT LOCKS AND DAMS

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BIOLOGICAL ASSESSMENT

MAJOR REHABILITATION EFFORT
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LA GRANGE TO LOCKPORT LOCKS AND DAMS

INTRODUCTION

As required by Section 7(c) of the Endangered Species Act of 1973, as amended, the Rock Island District requested from the U.S. Fish and Wildlife Service, Rock Island Field Office, a list of endangered or threatened species which may occur in the study area for the major rehabilitation effort on the Mississippi River Locks and Dams 2-22 and the Illinois Waterway from Lockport to LaGrange Locks and Dams. By letters dated March 6 and March 18, 1987 (attached), the Rock Island Field Office provided the following list of species:

Common Name	Scientific Name	Status
Higgins' Eye Pearly Mussel	Lampsilis higginsi	Endangered
Pink Mucket Pearly Mussel	Lampsilis orbiculata	Endangered
Fat Pocketbook Pearly Mussel	Potamilus capax	Endangered
Iowa Pleistocene Snail	Discus macclintocki	Endangered
Indiana Bat	Myotis sodalis	Endangered
Gray Bat	Myotis grisescens	Endangered
Peregrine Falcon	Falco peregrinus	Endangered
Bald Eagle	Haliaeetus leucocephalus	Endangered (Threatened in Wisconsin and Minnesota)
Interior Least Tern	Sterna antillarum athalassos	Endangered
Northern Monkshood	Aconitum noveboracense	Threatened

The Rock Island Field Office also indicated that critical habitat has been designated for the Indiana bat in LaSalle County, Illinois, which includes the Blackball Mine located on Pecumsaugen Creek north of the Illinois River.

BACKGROUND INFORMATION

An Environmental Impact Statement (EIS) is being prepared to assess the site-specific impacts as well as any cumulative impacts to the Upper Mississippi River System from certain measures of the major rehabilitation effort on the Mississippi River and Illinois Waterway. Major rehabilitation of the locks and dams is critical to maintaining the safety and design capability of the navigation structures. The majority of work has consisted of repair and replacement measures, such as repairing deteriorated concrete, replacing worn mechanical and electrical equipment, placing additional rockfill for increased scour protection, and repairing damaged or worn gate components. Section 7 requirements for this repair and replacement work have been satisfied during coordination with the U.S. Fish and Wildlife Service for the site-specific Environmental Assessments (EA).

However, certain measures of the major rehabilitation effort were identified as having the potential to increase navigation traffic and possibly cause cumulative impacts on the Upper Mississippi River System. These measures are listed below:

- Submersible tainter gates at Peoria and LaGrange Locks and Dams
- Guardwall at Lock and Dam 22
- Vertical lift gate at Lock and Dam 20
- Bubbler systems at all Mississippi River sites (L/D 2-22)
- Modification to the outlet structure at Lock and Dam 15
- Upper and lower guidewall extensions at Locks and Dams 21 and 22
- Upper guidewall extensions at Locks and Dams 12-20

The EA's (March 1986) prepared for Peoria and LaGrange Locks and Dams assessed the site-specific impacts associated with construction of a submersible tainter gate at each site. By letter dated May 29, 1986, the Rock Island Field Office indicated that the proposed work covered in the EA's would not affect any threatened or endangered species.

Funding for construction of the guidewall extensions at Locks 12 through 22 and the guardwall at Lock 22 is not anticipated prior to 1991 due to current budgetary constraints. Presently, preliminary engineering data concerning these measures are insufficient to evaluate the site-specific impacts concerning possible dredging and material disposal. As funding becomes available in the future, the Rock Island District will initiate a Design Report, which will include an additional NEPA document to address site-specific impacts. For the remaining measures, all anticipated site-specific impacts are addressed.

A description of the measures is provided below.

1. Submersible Tainter Gate at Peoria and LaGrange Locks and Dams, Illinois Waterway. A portion of the wicket dams at both Peoria and LaGrange will be removed and replaced with a single 84-foot submersible tainter gate that will improve the safety and flow regulation of each dam. The wickets are manually operated; it becomes very difficult and hazardous under ice conditions to raise and lower them. This is a serious threat to the safety of the lock personnel. Plate 1 shows the location of the submersible tainter gate.

2. Vertical Lift Gate at Lock and Dam 20, Canton, Missouri. The Des Moines River empties into the Mississippi River approximately 18 miles upstream of Lock and Dam 20 and generates extensive ice floes and debris during the late fall and early spring season. Ice and debris collect in the upper approach to the lock, interfering with lock operations and presenting a hazard to navigation. Ice and debris must be removed from the upper approach area by locking it through the chamber or pushing it out of the approach area using a towboat. Such procedures are a safety hazard to lock and towing industry personnel. Ice and debris also hinder normal lock operation and create maintenance problems by damaging miter gates and bending structural members. A vertical lift gate at the upper end of the auxiliary lock is proposed to alleviate this problem. The new gate would minimize safety hazards and maintenance problems by allowing free passage of ice and debris through the upper approach area.

The vertical lift gate would be constructed at the lower end of the auxiliary lock structure, as shown on plate 2. The vertical lift gate would consist of adjacent upper and lower sections of gate, each about 100 feet wide. When submerged, the upper section would lower into a recess behind the lower section. The lower section of gate would remain inoperable, except if access through the auxiliary lock is required. Modifications to the concrete and rock floor of the auxiliary lock would be required to form the gate sill.

The construction of the vertical lift gate will require dewatering of the auxiliary lock. To close off the lower end of the auxiliary lock, four sheet pile cells, each filled with approximately 675 cubic yards of commercially supplied sand, would be constructed between the riverwall of the dam and the intermediate wall of the main lock. The upper end of the auxiliary lock would be sealed using an existing poiree dam (a prefabricated steel wall-type structure). After the modifications to the lock floor are completed, the sheet pile cells would be removed entirely. The sand would be mechanically removed and disposed of in a 1-acre site located on lock and dam property previously used and assessed in the EA for the Lock and Dam 20 Major Rehabilitation effort (April, 1986). It is estimated that the vertical lift gate would be used about 12 times per year, under average ice and debris conditions.

3. Bubbler Systems at Locks and Dams 2 through 22, Mississippi River. Bubbler systems are already present at many sites on the Upper Mississippi River. These systems consist of low-volume units which are partially effective in reducing ice problems at the locks. As proposed, the new bubbler systems would consist of high volume units which would supply air to diffusers mounted in the miter gate area. This would be more effective in preventing ice accumulation on the gates and clearing gate recesses from floating ice and debris. The systems would reduce the hazard associated with chipping ice from the lock gates and walls and pushing ice and debris away from the gates with long poles. Bubbler systems also would reduce operating stresses on the lock gate and machinery.

The proposed bubbler system would consist of dual capacity, low volume and high volume blowers, with piping systems located in the miter gate areas, as shown on plate 3. The high volume blower would be capable of producing 1,000 cubic feet per minute (cfm) of air at 15 pounds per square inch (psi), while the low volume blower would produce 175 cfm of air at 15 psi. The piping system for the bubblers would be placed directly on the main lock structure. The upstream and downstream compressors would be placed on top of the lock wall.

4. Modification to Lock Chamber Outlet Structure at Lock and Dam 15, Rock Island, Illinois. Lock 15 is composed of a main lock and an auxiliary lock that are independently operated. The filling/emptying systems for both locks are composed of culverts which run through the bottom of the lock walls on each side of the lock, with discharge outlets emptying into the lower end of each lock, as shown on plate 4. The culverts located in the intermediate (riverside) lock wall share a common outlet into both the main and auxiliary locks. For example, when the main lock (or auxiliary lock) chamber is emptied, water flows through the culverts in the intermediate wall, and is discharged below the main lock and below the auxiliary lock. The discharge of water from both lockwalls into the lower end of the main lock creates severe turbulence, causing a safety hazard during double lockages. The turbulence causes tow lines to break loose from the lower guidewall, which creates a safety hazard for tow and lock personnel, as well as for lock visitors.

In order to solve this problem, it is proposed to permanently close the outlet that discharges from the intermediate lockwall below the main lock. This would force all flow from the intermediate wall to permanently discharge into the lower auxiliary lock area. In addition, during double lockages, the landside discharge would be partially closed, allowing the majority of the discharge to exit out of the lower auxiliary outlet. This procedure would reduce turbulence and increase the safety of the lower lock area during double lockages.

5. Upper Guidewall Extensions, Locks and Dams 12 through 22; Lower Guidewall Extensions at Locks and Dams 21 and 22. The upstream approach to the locks, as well as the downstream approaches at Locks and Dams 21 and 22, have periods of strong cross currents that cause alignment and maneuverability problems. These currents have been the cause of structural damage to these facilities. Upper guidewall extensions are proposed to allow tows to maneuver their stern to the guidewall, secure a line to the wall, and safely work the head of the tow to the wall to be properly aligned for entry into the lock chamber.

Upper guidewall extensions, each of about 625 feet in total length, are proposed for construction at Locks 12, 13, 14, 16, 17, 18, 20, 21, and 22. Lower guidewall extensions, also of about 625 feet in length, are proposed at Locks 21 and 22. These guidewall extensions would consist of a series of 12 sheet pile cells located about 57 feet apart and connected by precast beams and a sheetpile diaphragm, as shown on plate 5. Eleven (11) of the cells would be about 35 feet in diameter; the remaining cell would be about

57 feet in diameter and would serve as an end protection cell. The cells would be founded on H-piles, or directly on rock, depending upon the depth of bedrock at each site. Removal of an unknown quantity of silt by mechanical means may also be required for each extension.

The upper guidewall extension at Lock 15 consists of two sheet pile cells, each about 30 feet in diameter, located about 600 feet and 1,000 feet above the existing guidewall, as shown on plate 4. A wall-type extension at this site would eliminate access to a backwater area and boat ramp on Arsenal Island. An unknown amount of material may need to be removed in order to construct the cells.

Currently, Lock 19 does not have an upper guidewall. An upper guidewall is proposed for this site, and would consist of a series of sheet pile cells and precast beams as previously described. The exact length and location of the guidewall has not been determined at this time; a model study is being conducted and should be completed in the summer of 1989. As shown on plate 5, the worst-case design would consist of a guidewall with a length of 800 feet located on the landward side of the lock. An unknown quantity of material may need to be removed by mechanical means.

6. Guardwall at Lock and Dam 22, Savanna, Missouri. The upper approach to Lock and Dam 22 has a severe outdraft problem, creating the potential for tows and loose barges to be swept away from the lock approach and into the dam. This condition has led to a number of accidents with damage to both the dam and tows involved. A guardwall extending upstream of the river wall of the auxiliary lock is proposed to act as a barrier to tows and would reduce recurrent damages to the dam's roller and tainter gates. The guardwall would be similar to those constructed during the 1940's at Locks and Dams 11, 14, 16, 20, and 21.

The guardwall must be constructed in conjunction with the upper guidewall extension at Lock and Dam 22. The guardwall would be about 480 feet long, consisting of about 10 sheet pile cells connected by precast concrete beams, as shown on plate 6. Each cell would be about 30 feet in diameter, located about 60 feet apart, founded directly on bedrock, and filled with concrete. An unknown amount of silt may need to be removed using mechanical means.

TRAFFIC ANALYSIS

The Rock Island District conducted a traffic analysis to ascertain whether operation of the proposed measures would be likely to increase commercial navigation, which would lead to system-wide (cumulative) impacts on the Upper Mississippi River System (UMRS). The traffic analysis concluded that during the navigation season and by the year 2040, a 1.4 percent increase in system traffic, or about 2.2 million tons, would occur with the proposed measures in place. This traffic increase translates into an average increase of about one tow per week on the Illinois Waterway, and about two tows per week on the Mississippi River. This increase in system

traffic is quite small as related to Master Plan projected total system traffic. It would be difficult to measure this small increment of traffic from the environmental impact viewpoint. Also, this small increase in traffic is within the normal variability of any navigation season. The District has concluded that this increase in system traffic during the navigation season caused by the proposed measures would not result in system-wide or cumulative impacts to the UMRS that are measurable over the existing condition.

Although projected traffic increases are minor, concern has been expressed that traffic increases may be concentrated at the end of the navigation season. Based upon input provided by Louis Berger and Associates, the traffic analysis identified the potential for an additional 10 to 20 lockages at the end of the navigation season due to the installation of high-volume bubbler systems at Locks 2 through 22. Evaluation of this potential traffic increase indicates that end-season traffic is highly variable and unpredictable, with no typical time period or volume of traffic associated with it. Ice conditions in the river channel are the controlling factor. Also, end-season navigation requires risk-taking for both carriers and shippers. Industry representatives have indicated to the District that bubbler systems would not induce further traffic, but only assist in the orderly withdrawal of tows. Another limiting factor is increased lockage time associated with this period, and locks are not able to accommodate an additional five lockages per day. Therefore, the installation of high-volume bubbler systems at UMR locks will not promote a higher level of end-season traffic. Bubbler systems would improve end-season navigation only by expediting the withdrawal of tows from the UMR.

IMPACTS TO FEDERALLY ENDANGERED OR THREATENED SPECIES

HIGGINS' EYE PEARLY MUSSEL (Lampsilis higginsi)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the Higgins' eye pearly mussel is listed for the Mississippi River downstream of the Twin Cities to Lock and Dam 20, as well as for the St. Croix and lower Wisconsin Rivers. Historically, the Higgins' eye has been recorded from the Mississippi River at Louisiana, Missouri (river mile 283) to Prescott, Wisconsin (river mile 811), as well as from at least 10 major tributaries such as the Illinois, Sangamon, and Kankakee Rivers in Illinois; the Iowa, Cedar, and Wapsipinicon Rivers in Iowa; and the St. Croix, Wisconsin, and Black Rivers in Wisconsin (Havlik 1980). The Higgins' eye was formerly widely distributed on the Illinois River before 1900, but gradually was eliminated by pollution and siltation by 1930 (Starrett 1971). By 1980, the distribution of the Higgins' eye pearly mussel had been reduced on the Mississippi River from near Brownsville, Minnesota (river mile 689) to near New Boston,

Illinois (river mile 437), and with small populations in the St. Croix and Wisconsin Rivers (Havlik 1980). Recently, the Higgins' eye has been found in mussel beds in Pools 17, 18, and 19, which has extended its southern range to river mile 407 (Cawley 1984). Also, Higgins' eye has been found in Pool 17.

The Higgins' eye is found in medium to large rivers with a variety of substrates ranging from mud to sand and gravel (Ecological Analysts 1981; Nelson and Freitag, 1980). It has been suggested that a continuous river current is the single most important environmental factor influencing the occurrence of the species (Ecological Analysts 1981; Nelson and Freitag 1980). The reproductive cycle of the Higgins' eye is similar to that of most unionids. Two fish species have been implicated as the hosts for the Higgins' eye, the sauger (Stizostedion canadense) and the freshwater drum (Aplodinotus grunniens), both of which are common in the Upper Mississippi River.

The Higgins' Eye Recovery Team (1982) identified seven essential habitat sites for the species, which are believed to contain viable reproductive populations. These sites are:

Site	Pool	River Mile
Hudson, Wisconsin	St. Croix River	17.6 - 16.2
Whiskey Rock, Wisconsin	UMR Pool 9	658.4 - 655.8
Harpe~s Slough, Iowa	UMR Pool 10	641.4 - 639.0
Prairie du Chien, Wisconsin	UMR Pool 10	637.0 - 633.4
McMillan Island, Wisconsin	UMR Pool 10	619.1 - 616.4
Cordova, Illinois	UMR Pool 14	505.5 - 503.0
Sylvan Slough, Illinois	UMR Pool 15	485.5

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Although the literature indicates that the Higgins' eye was widespread in the Upper Mississippi River and in some of its major tributaries, it was never locally abundant (Higgins' Eye Recovery Team 1982). Reasons for decline of the species include commercial harvesting, channel dredging, increased turbidity and subsequent sedimentation, and industrial and agricultural effluents. However, it is unlikely that a single factor is responsible for the decline, but rather a combination of factors (Higgins' Eye Recovery Team 1982).

Since modification of the outlet at Lock and Dam 15 and installation of the bubbler systems at Locks 2 through 22 would be limited to the lock structures, no impacts are anticipated that would adversely affect aquatic resources. The components of the vertical lift gate also would be constructed on the facility structure itself, and would have negligible effect on aquatic resources.

Mussel surveys were conducted by divers for a distance of 2,000 feet upstream of the existing upper guidewall at Locks 12, 15, 16, 17, and 19, for the proposed guidewall extensions (Stanley Consultants 1987). Through

from Iowa, Illinois, and Missouri, these sites were selected as having the most potential to contain mussel communities that contained endangered, threatened, or rare species. In general, the surveys revealed that mussel communities were not found 2,000 feet above the upper guidewalls at the locks. Mussel communities were found in a recessed bay area upstream of the existing guidewall at two sites (Locks 15 and 17). No endangered, threatened, or rare mussel species were found during any of the surveys. The aquatic areas on and near the lock structures appear to contain unsuitable habitat for the establishment of mussel communities. No impacts are anticipated to mussel species from construction, including any dredging that may be required, of the proposed guidewall extensions and guardwall. In addition, the placement of four temporary sheet pile cells and dewatering of the auxiliary lock associated with the construction of the vertical lift gate at Lock and Dam 20 should not adversely affect mussel species. Disposal sites, where required, would occur on land.

With respect to potential increases in navigation traffic on the UMRS, impacts to endangered mussel species may result from increases in erosion, turbidity, and sedimentation; increases in accidental spills on toxic materials; a general decrease in water quality; the need for additional secondary development, such as fleeting areas and barge terminals; or direct impacts such as abrasion or crushing of mussels. However, the increase in system traffic identified for the proposed measures is very minor and should not result in adverse impacts to endangered mussel species.

In conclusion, no adverse impacts to the Higgins' eye pearly mussel are anticipated from construction and operation of the proposed measures.

PINK MUCKET PEARLY MUSSEL (Lampsilis orbiculata)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the pink mucket pearly mussel is listed in Illinois for the Ohio River, and in Missouri for the Sac, Osage, Meramec, Black, Gasconade, Little Black, St. Francis, and Big Rivers.

Historical records indicate that the pink mucket pearly mussel is strictly an Ohioan or Interior Basin species, found mainly in the Tennessee, Cumberland, and Ohio River drainages, with occasional records from the Mississippi and Illinois Rivers (U.S. Fish and Wildlife Service 1985a). This species has never been collected in large numbers from any one site or drainage, and has usually been considered rare (U.S. Fish and Wildlife Service 1985a). Currently, the greatest concentrations of the pink mucket pearly mussel are reported from the Tennessee, Cumberland, Osage, and Meramec Rivers (U.S. Fish and Wildlife Service 1985a). It is presently known from 16 different rivers, none of which are included in the UMRS. Also, surveys of the mussel fauna of the UMRS in recent years have not recovered specimens of this species (Fuller 1978; Thiel 1981; Cawley 1981; Ecological Analysts 1981; Duncan and Thiel 1983; Starrett 1971).

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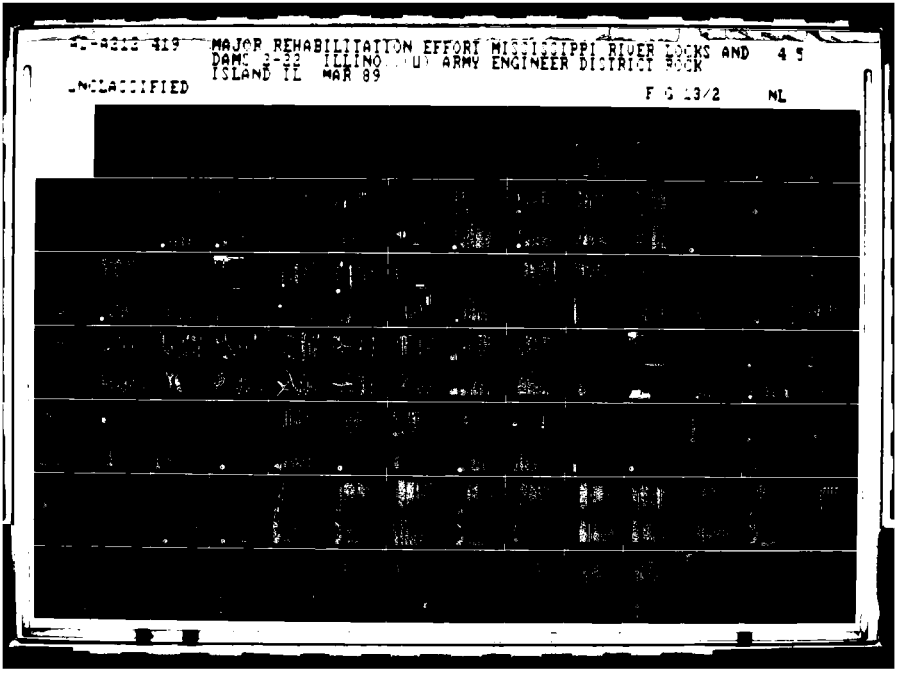

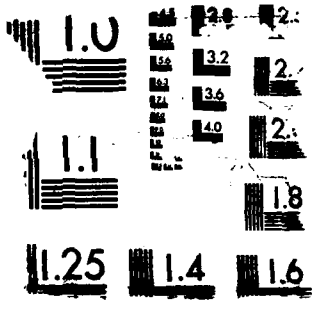
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The pink mucket pearly mussel is found in medium to large rivers with a variety of substrates from silt, rubble, gravel, and sand, and in moderate to fast-flowing water at depths from 0.5 to 8.0 meters (U.S. Fish and Wildlife Service 1985a). Buchanan (1980) reports that the pink mucket pearly mussel is most commonly found in a gravel and cobble substrate, and has been collected in standing to moderately flowing water at depths from 1 inch to 5 feet.

The life history of this species is unknown, but it is probably similar to that of most naiades, and specific fish hosts are unknown (U.S. Fish and Wildlife Service 1985a). Reasons for decline of this species include impoundment of rivers, siltation, and pollution (U.S. Fish and Wildlife Service 1985a).

Since the pink mucket pearly mussel apparently is no longer found in the UMRS, the proposed measures would have no adverse impact upon this species.

FAT POCKETBOOK PEARLY MUSSEL (Proptera capax)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the fat pocketbook pearly mussel is listed in Illinois for the Mississippi River (Pike and Hancock Counties) and for the Wabash River; in Iowa for the Mississippi River (Des Moines County) and for the Iowa River; and in Missouri for the Mississippi River (Clark, Lewis, Marion, Pike, and Ralls Counties). Most fat pocketbook records appear to be from three areas: the Upper Mississippi River above St. Louis, Missouri; the Wabash River in Indiana; and the St. Francis River in Arkansas (U.S. Fish and Wildlife Service 1985b). A few historic records are found from the Illinois River, although Starrett (1971) did not find this mussel during his survey. Starrett also indicated that this species probably disappeared from the upper Illinois River by 1900 and from the lower Illinois before 1920.

Recent records of the fat pocketbook mussel are few; the St. Francis River population is currently the only verified population of this species remaining (U.S. Fish and Wildlife Service 1985b). In recent years, surveys of the mussel fauna of the Upper Mississippi River have not recovered living specimens of the fat pocketbook mussel (U.S. Fish and Wildlife Service 1985b; Fuller 1978; Duncan and Thiel 1983). This may suggest that this species has been extirpated from the Upper Mississippi River. Relic shells are occasionally reported (Ecological Analysts 1981; Fogge and Schneider 1980; Freitag 1978; Perry 1979). The Missouri Department of Conservation (1986) recently reported that seven valves were collected from the Mississippi River from river miles 354.5 to 287.0 which may indicate that live specimens of the fat pocketbook are in the Mississippi River.

Parmalee (1967) indicates that the fat pocketbook has been found on both sand and mud substrates, in flowing water, and at depths of only a few inches to 8 feet or more. The fat pocketbook also has been found in sand, mud, and fine gravel substrates in the St. Francis River (U.S. Fish and

Wildlife Service 1985b). Museum records indicate that the fat pocketbook is a large river species which requires flowing water and a stable substrate (U.S. Fish and Wildlife Service 1985b). The life cycle of the fat pocketbook is unknown but is assumed to be similar to other species of Unionidae (U.S. Fish and Wildlife Service 1985b). The fish host of the fat pocketbook is unknown (U.S. Fish and Wildlife Service 1985b). Reasons for decline of the species have been attributed to channelization and impoundment of rivers, siltation, and pollution (U.S. Fish and Wildlife Service 1985b).

The impact analysis described for the Higgins' eye pearly mussel would also apply to the fat pocketbook pearly mussel. Therefore, no adverse impacts are anticipated to the fat pocketbook pearly mussel from construction and operation of the proposed measures.

IOWA PLEISTOCENE SNAIL (Discus macclintocki)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the Iowa pleistocene snail is listed for Illinois in Jo Daviess County and in Iowa for Clinton, Fayette, Jackson, Clayton, and Dubuque Counties. The Iowa pleistocene snail is a glacial relict, and there are 18 existing sites located in Clayton County (Dry Mill, Bear, and Buck Creeks); Dubuque County (Pine and Hewett Creeks) in Iowa; and in Jo Daviess County (Younkers Bluff) in Illinois (U.S. Fish and Wildlife Service 1984). At present, the only suitable habitat for the Iowa pleistocene snail is on larger algific (cold-producing) talus (shattered-stone) slopes with very specific temperature and moisture requirements (U.S. Fish and Wildlife Service 1984). Other factors limiting the distribution of the Iowa pleistocene snail include a rich but loose soil cover for forage; strongly calcareous soil; protection from the sun; and limited diet requirements (U.S. Fish and Wildlife Service 1984).

Reasons for decline of the species include cyclic climatic change; human disturbance such as slope clearing, pasturing, human traffic, and road building; natural calamities such as rockfalls; predation by shrews and cychrine beetles; weather-related factors; and use of herbicides and pesticides (U.S. Fish and Wildlife Service 1984).

Construction of the proposed measures would occur in the floodplain of the Mississippi River and Illinois Waterway, and would not affect the algific talus habitat, found on the bluffs of the river valleys, that is required by the Iowa pleistocene snail. Disposal sites, where required, could be selected to avoid impacting algific talus habitat. In addition, impacts generally associated with increasing navigation traffic on the UMRS would not relate to the life requirements or habitat of the Iowa pleistocene snail. Therefore, no adverse impacts to the Iowa pleistocene snail are anticipated from construction and operation of the proposed measures.

INDIANA BAT (Myotis sodalis)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the Indiana bat is listed for Illinois as statewide in distribution, with critical habitat being the Blackball Mine, located on Pecumsaugen Creek north of the Illinois River, in LaSalle County; for Iowa in Dubuque and Louisa Counties bordering the Mississippi River; and for Missouri in Jefferson, Lewis, and Marion Counties that border the Mississippi River.

In Illinois, one definite winter colony of the Indiana bat hibernates in the abandoned Blackball Mine in LaSalle County, and a winter colony may still inhabit the Blue Pool Cave in Madison County (Illinois Department of Conservation 1981). Summer breeding populations have been documented at McKee Creek in northeastern Pike County; Galum Creek in Perry County; Fishhook Creek in Pike County; in Union County; in McDonough County; in Bond County; and in Pulaski County (Illinois Department of Conservation 1981; Gardner et al., 1986). Juvenile and reproductively active adult female Indiana bats have been captured in Adams, Bond, Jackson, Johnson, Perry, Pike, Pulaski, Schuyler, Scott, Union, Wabash, and Edwards Counties in Illinois (Gardner et al., 1986). Additional records are of migrating individuals or adult males from Adams, Christian, Cook, Hardin, McDonough, Morgan, and Sangamon Counties (Gardner et al., 1986).

In Iowa, the first records of the Indiana bat were in Dubuque, Jasper, Louisa, and Marion Counties (Bowles 1981). During a 2-year study in 1980-1981, 61 Indiana bats were located in Appanoose, Decatur, Lucas, Marion, Madison, and Van Buren Counties (Bowles 1981). While no maternity colonies were located, the capture of pregnant or lactating females and volant (flying) juveniles provide evidence of the presence of maternity colonies (Bowles 1981). While Iowa has no sizable overwintering population of Indiana bats, the southern half of the State is a major part of the summer range of the species, especially for females that hibernate in central Missouri (Bowles 1981).

The Indiana bat occurs throughout much of southern and eastern Missouri, and about two-thirds of the total population hibernates in only a few caves and one abandoned mine in Missouri (Schwartz and Schwartz 1981).

Indiana bats hibernate from October through April in large, dense clusters in caves and mines, choosing cooler ones with stable temperatures and rather high humidity (Barbour and Davis 1969; Schwartz and Schwartz 1981). Stable low temperatures allow the bats to maintain a low rate of metabolism and conserve fat reserves until spring. Spring and summer habitat consists of mature trees in riparian and floodplain areas of small to medium-sized streams, which are critical for reproduction and foraging (Humphrey, et al., 1977; Illinois Department of Conservation 1981; Schwartz and Schwartz 1981). Females give birth to a single young in late June or early July, which are reared in small maternity colonies under the loose bark of trees (Humphrey, et al., 1977; Schwartz and Schwartz 1981).

Decline in the population of the Indiana bat is due to natural hazards such as flooding and collapse of caves; human disturbance such as vandalism; stream clearing and channelization; and pesticide poisoning (Illinois Department of Conservation 1981; Humphrey et al., 1977; Gardner et al., 1986).

No caves would be impacted by construction of the proposed measures, so no winter habitat would be lost or disturbed. Also, no trees would be removed at any of the construction sites that could serve as foraging or maternity roost habitat. Construction activities would take place primarily during daylight hours, and Indiana bats forage aerially at night. Disposal sites, where required, could be selected to avoid impacting roosting or winter habitats. In addition, preferred riparian habitat of small to medium streams used by this species for reproduction and foraging would not be affected by navigation-induced impacts on the UMRS. Therefore, adverse impacts to the Indiana bat are not anticipated from construction and operation of the proposed measures.

GRAY BAT (Myotis grisescens)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the gray bat is listed for the following counties bordering the Upper Mississippi River System: for Illinois in Adams, Madison, and Pike Counties; and for Missouri in Jefferson, Lincoln, Pike, and Ralls Counties.

In Illinois, the gray bat is a seasonal migrant from March through October and is not known to winter in Illinois (Illinois Department of Conservation 1981). Cave Spring Cave in Hardin County supports the only permanent maternity colony in Illinois (Illinois Department of Conservation 1981). In Pike and Adams Counties, gray bats use several caves during the spring and fall as assembly areas and transient roosts while migrating to and from their winter caves in southern Missouri (Illinois Department of Conservation 1981). In Missouri, the gray bat lives in the Ozark Highland where caves occur, and the population was estimated (in 1980) at 515,000 (Schwartz and Schwartz 1981). The range of the gray bat is probably related to the type of caverns, commonly associated with limestone formations, that are preferred by this species (Schwartz and Schwartz 1981).

Gray bats roost, raise their young, and hibernate primarily in caves (Illinois Department of Conservation 1981; U.S. Fish and Wildlife Service 1982; Barbour and Davis 1969; Tuttle 1979). Gray bat roosts in west-central Illinois are in remote, spacious, and high-roofed caves (Illinois Department of Conservation 1981). Caves used for nursery colonies have large openings that may make flying easier if adults need to carry young (Schwartz and Schwartz 1981). Caves used during the winter usually have a vertical opening or shaft which may reduce predation and human entrance, and may also create lower temperatures (Schwartz and Schwartz 1981).

Gray bats forage almost exclusively over rivers, streams, and lakes, with adjacent riparian habitat, and rarely more than 2 km and usually less than 1 km from their caves (Illinois Department of Conservation 1981; Tuttle 1979; Laval et al., 1977).

Breeding takes place in the fall, and probably winter and spring (Schwartz and Schwartz 1981). During June a female produces a single young, and the young are raised in large maternity colonies by forming great masses clustered on the ceiling of the cave (Barbour and Davis 1969; Schwartz and Schwartz 1981).

In fall, females are first to migrate to winter caves, followed by yearlings, and later adult males (Schwartz and Schwartz 1981). It has been suggested that gray bats travel in flocks between summer and winter caves (Barbour and Davis 1969). Gray bats hibernate by hanging from cave walls and ceilings in large masses (Schwartz and Schwartz 1981; Barbour and Davis 1969).

Decline in the population of gray bats has been linked to increased human disturbance, natural catastrophes (flooding, collapse of caves), vandalism to colonies, use of pesticides, and impoundment of waterways (Illinois Department of Conservation 1981; Schwartz and Schwartz 1981; Tuttle 1979; U.S. Fish and Wildlife Service 1982).

Since no caves would be impacted by construction of the proposed measures, there would be no effect on winter hibernacula, summer caves, or nursery caves used by the gray bat. Also, no riparian habitat would be cleared in conjunction with construction of the proposed measures, which precludes impacts to potential summer foraging habitat. Disposal sites, where required, could be selected to avoid impacting potential summer foraging habitat and caves. In addition, navigation-related impacts would not affect the preferred habitats of this species. Therefore, adverse impacts to the gray bat are not anticipated from construction and operation of the proposed measures.

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PEREGRINE FALCON (Falco peregrinus)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the peregrine falcon is listed for Iowa in Allamakee, Black Hawk, Johnson and Linn Counties (no active breeding sites, but spring and fall migrants seen regularly); for Minnesota in Wabasha and Winona Counties (breeding) and Chicago, Cook, Goodhue, Hennepin, Houston, Lake, Pine, Ramsey, St. Louis, and Washington Counties (potential breeding); and for Wisconsin in Buffalo and Sauk Counties (breeding) and Adams, Columbia, Crawford, Dane, Door, Grant, Iowa, Juneau, La Crosse, Pepin, Pierce, Polk, Richland, St. Croix, Trempealeau, and Vernon Counties (potential breeding).

There are two subspecies of the peregrine falcon, the American peregrine (Falco peregrinus anatum) and the Arctic peregrine (F. p. tundrius). The Arctic peregrine nests north of the tree line in Alaska and Canada and passes through the Upper Mississippi River on its migration to the gulf coast (Great I 1980; Wisconsin Department of Natural Resources 1980). In Illinois, the American peregrine falcon once nested locally throughout the State and the last known nesting occurred in Jackson County in 1951 (Illinois Department of Conservation 1981). It now occurs in Illinois as an occasional migrant along Lake Michigan, with some regularity, and as a rare migrant elsewhere (Illinois Department of Conservation 1981). In Iowa, the American peregrine falcon formerly nested in the palisades along the Cedar River in Linn and Johnson Counties and along the Mississippi River in Allamakee, Clayton, and Dubuque Counties (Dinsmore et al., 1984). It is now considered to be a rare migrant and extirpated summer resident, migrating through the state from early March to late May, and from early September to mid-October (Dinsmore, et al., 1984). In Missouri, the American peregrine formerly nested primarily on bluffs along major rivers, and is now only rarely sighted during migration in the spring and fall (Missouri Department of Conservation 1984). In Wisconsin and Minnesota, American peregrines previously nested and reared young along the bluffs of the Mississippi River from Lake Pepin southward, but no breeding birds have been observed in this range for several decades (GREAT I 1980). However, scientists have made several attempts at reestablishing breeding peregrines along the Mississippi River. A number of peregrines have been hacked (raised and released) in the Mississippi River floodplain at Weaver Dunes and adults are beginning to breed again at traditional eyries along the river in Wisconsin and Minnesota (Wisconsin Department of Natural Resources 1986). They are now nesting at several locations along the Mississippi River above Winona, Minnesota.

For the UMRS, suitable habitat for breeding sites for the peregrine falcon occur along the bluffs of the Mississippi River and Illinois Waterway, and along other major rivers (Illinois Department of Conservation 1981; Wisconsin Department of Natural Resources 1980; Missouri Department of Conservation 1984). Peregrines feed more regularly in marshes, lakes, and along shores than over woodlands, and feed almost entirely on birds from ducks to warblers (Wisconsin Department of Natural Resources 1980 and 1986). This species has declined primarily from use of chlorinated hydrocarbon pesticides (Wisconsin Department of Natural Resources 1980).

The peregrine falcon is primarily a migrant in the UMRS, and nesting habitat would occur on the bluffs of the major rivers. Disposal sites, where required, would not be located in habitat preferred by the peregrine falcon. In addition, navigation-related impacts would not relate to the habitat requirements of this species. Therefore, adverse impacts to this species are not anticipated from construction and operation of the proposed measures.

BALD EAGLE (Haliaeetus leucocephalus)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the distribution of the bald eagle occurs for the counties that border the UMRS. The bald eagle formerly bred throughout most of North America, but is now restricted to Alaska, parts of northern and eastern Canada, the Gulf coast, Florida, and the northern United States. For the UMRS, known occupied breeding areas occur primarily in Minnesota (190 areas) and Wisconsin (188 areas), and are mainly confined to the northern inland lake areas (Northern States Bald Eagle Recovery Team 1983; Wisconsin Department of Natural Resources 1988). A few occupied breeding areas also occur in Illinois in Jo Daviess, Williamson, and Alexander Counties, and in Iowa in Allamakee County (Northern States Bald Eagle Recovery Team 1983; Illinois Department of Conservation 1981; Dinsmore et al., 1984). In Missouri, nesting occurred in 1982 and 1983 on Truman Lake and Mingo National Wildlife Refuge, and the State has been involved in a hacking program (raising and releasing eagles) since 1981 to attempt to reestablish nesting in southeast Missouri (Wilson 1984; Missouri Department of Conservation 1984).

The bald eagle is a common migrant and winter resident along the UMRS from November through March. An abundant and readily available food supply in conjunction with suitable roosting and perching sites are the primary characteristics of winter habitat. The lock and dam system on the Upper Mississippi River and Illinois Waterway create areas of open water in the winter, which provide bald eagles with a dependable source of food (fish). Riparian habitat along the rivers provide roosting and perching sites. Roost sites are located in wooded areas that are protected by the wind, adverse weather, and human disturbance.

Nesting populations of bald eagles have been reduced due to loss of habitat, mortality from shooting and trapping, and toxic effects of organochlorine insecticides.

Since no large trees would be removed by construction of the proposed measures, no impacts to existing or potential roosting and perching sites are anticipated. Disposal sites, where required, would be selected to avoid impacting trees suitable as roosting and perching sites. Also, construction of the guidewall extensions, vertical lift gate, and guardwall would cause temporary increases in noise levels around the locks that could disturb eagle use. However, since concrete would not be placed into water with temperatures below 50 degrees F, construction of these measures would not occur during the winter months, thereby precluding disturbance impacts to wintering bald eagles. In addition, adverse impacts to bald eagles are not anticipated from the very minor increase in traffic due to the proposed measures and because eagles utilize the UMRS during the winter when navigation-related impacts are minimal. Therefore, adverse impacts to the bald eagle are not anticipated from construction and operation of the proposed measures.

INTERIOR LEAST TERN (Sterna antillarum athalassos)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the interior least tern is listed for Illinois in Alexander, Gallatin, Hardin, Madison, Massac, Pope, Pulaski, and Wabash Counties; for Iowa in Lyon, Plymouth, Pottawattamie, and Sioux Counties; and in Missouri in Mississippi, New Madrid, and Pemiscot Counties. The least tern formerly ranged in summer along the Mississippi River as far north as Dubuque, Iowa (Thompson and Landin 1978). Currently, along the Mississippi River, terns are concentrated at a few sites from Osceola, Arkansas, to Cairo, Illinois (U.S. Fish and Wildlife Service 1985c).

In Iowa, least terns formerly nested on sandbars along major rivers, especially the Missouri River and the Des Moines River, and at many locations in central and eastern Iowa (Dinsmore et al., 1984; U.S. Fish and Wildlife Service 1985c). The least tern is now primarily a rare migrant, appearing in late May or early June and leaving in late August (Dinsmore et al., 1984).

In Illinois, the least tern is an uncommon local migrant and summer resident in the southern counties; a rare summer resident in the central counties; and a rare migrant and post breeding wanderer in the rest of the State (Illinois Department of Conservation 1981). Recent nesting colonies are located along the Ohio River in Gallatin and Pope Counties, and the Mississippi River in Madison County (Illinois Department of Conservation 1981). In Missouri, the least tern formerly nested along the Missouri and Mississippi Rivers (Missouri Department of Conservation 1984).

The least tern nests in shallow depressions on sand and pebble beaches along coasts, and on sandbars in large rivers (Illinois Department of Conservation 1981). Their breeding biology centers around three ecological factors: the presence of bare or nearly bare alluvial sandbars; favorable water levels during the nesting season; and availability of food (U.S. Fish and Wildlife Service 1985c). Least terns feed on small fish such as minnows. Breeding colonies are usually small, up to 20 nests, although colonies of 75 nests have been reported along the Mississippi River (U.S. Fish and Wildlife Service 1985c).

Since no sandbars would be impacted by construction of any of the proposed measures, no impacts to nesting habitat of the least tern are anticipated. Disposal sites, where required, could be selected to avoid potential nesting habitat of the least tern. In addition, navigation-related impacts would not affect the preferred habitat of this species. Tow-induced impacts from any nominal increases in navigation are unlikely to have any effect on sandbar formation or stability. Therefore, no adverse impacts to the least tern are anticipated from construction and operation of the proposed measures.

NORTHERN WILD MONKSHOOD (Aconitum noveboracense)

According to the U.S. Fish and Wildlife Service's revised "Region 3, Section 7 Species List" (April 30, 1987), the northern monkshood is listed for Iowa in Allamakee, Clayton, Delaware, Dubuque, Fayette, and Jackson Counties; and for Wisconsin in Grant, Monroe, Richland, Sauk, and Vernon Counties.

The current range of the northern monkshood is restricted to 20 extant sites in three regions: in and adjacent to the unglaciated (Wisconsinan Epoch) portion of Iowa and Wisconsin; the northeastern Ohio glaciated area; and the Catskill Mountains of New York, also a glaciated area (U.S. Fish and Wildlife Service 1983). Five populations are found in southwestern Wisconsin, with the largest population found in Vernon County along the Upper Kickapoo River (Wisconsin Department of Natural Resources, no date).

The typical habitat for the northern monkshood is shaded to partially shaded cliffs and talus (shattered-stone) slopes, although in New York it also occurs in seepage springs at high elevation headwaters and in stream-side crevices downstream (U.S. Fish and Wildlife Service 1983; Wisconsin Department of Natural Resources, no date). In northeastern Iowa, the northern monkshood is found exclusively on early Ordovician dolomite, while in southwestern Wisconsin, it is mainly found on Cambrian sandstone (U.S. Fish and Wildlife Service 1983). The common feature of its habitat preference is a cold year-round soil temperature in the range of 11 degrees to 18 degrees C (51.8 degrees to 64.4 degrees F), due to groundwater or subterranean air seepage (U.S. Fish and Wildlife Service 1983; Wisconsin Department of Natural Resources, no date).

Threats to the existence of the northern monkshood population include reservoir construction, road construction, and maintenance activities; power line construction and maintenance; logging and quarrying operations; grazing; and foot trail development (U.S. Fish and Wildlife Service 1983).

Construction of the proposed measures would occur in floodplain areas of the Upper Mississippi River, and would not affect the shaded, talus habitat found on the bluffs of river valleys required by the northern monkshood. Disposal sites, where required, could be selected to avoid shaded, talus habitats. In addition, potential impacts generally associated with increasing navigation traffic on the UMRS would not relate to the life requirements or habitat of this species. Therefore, adverse impacts to the northern monkshood are not anticipated from construction and operation of the proposed measures.

CONCLUSIONS

The Biological Assessment analyzed the anticipated site-specific impacts, as well as any cumulative impacts, to the Upper Mississippi River System from construction and operation of certain measures of the major rehabilitation effort. No adverse impacts are anticipated to the federally endangered or threatened species which may occur in the study area.

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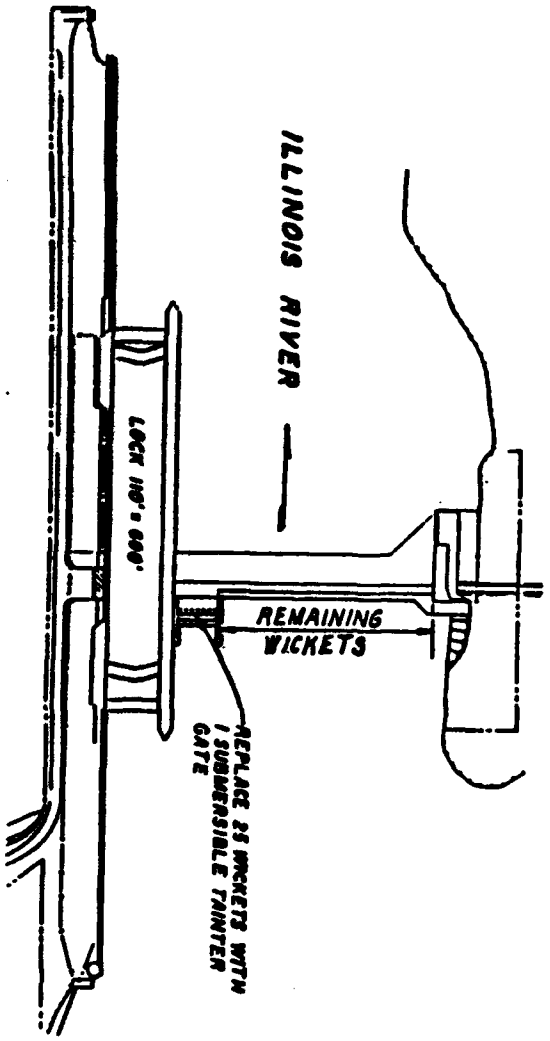

SUBMERSIBLE TAINTER GATE LOCATION
(PEORIA AND LAGRANGE, ILLINOIS WATERWAY)

PLATE 1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO:
COM: 309-793-5800
FTS: 386-5800

May 29, 1986

Colonel William C. Burns, Jr.
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Burns:

This is in reference to the Environmental Assessments dated April 25, 1986 for the proposed major rehabilitation for the La Grange Lock and Dam (RM 80.2), Cass County, Illinois and the Peoria Lock and Dam (RM 157.7), Peoria County, Illinois on the Illinois River. Also, this responds to Public Notices NCROD-S-070-0X6-1-13935Z and 13936Z dated April 29, 1986.

We have reviewed both documents and found that our concerns have been adequately incorporated. Therefore, we have no objection to the Finding of No Significant Impact or issuance of a Section 404 permit. We also concur with your conclusion that the proposed work will not affect any threatened or endangered species. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should this project be modified or new information indicate endangered species may be affected, consultation should be initiated.

We are pleased to note the incorporation of 3-4 feet diameter derrick stone in the scour protection provisions. If the WES recommendations vary on the size or extent of scour protection, additional coordination with this office will be required. In addition, we would like to be notified of the schedule to close the locks to navigation and when the coffer dams are pumped dry. If possible, we would like to view the river bottom inside the coffer dams before it is disturbed by construction activities.

We would like to take this opportunity to reemphasize our April 7, 1986 letter concerning a programmatic environmental document to evaluate the impacts of increased navigation traffic on the Upper Mississippi River System that may result from the Major Rehabilitation Program (MRP) or future actions at the locks and dams. This document is absolutely essential to determine if significant cumulative impacts may result from these actions. As discussed in our April 7 letter, your "future without" alternative should be the conditions of the locks and dams in April 1986. Therefore, the submersible tainter gates, minor guidewall extensions, and other construction proposed for both La Grange and Peoria Locks and Dams will be evaluated in the "future with" project alternative. In this way, if any increases in navigation traffic result from the MRP, they will be addressed in the programmatic

document. We suggest that you insure that your existing database will adequately accomplish this objective. We will be happy to provide you assistance in scoping this programmatic document.

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

Sincerely,

Richard C. Nelson
Field Supervisor

cc: ILDOC (Lutz, Bertrand)
USEPA (Brennan)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO:
COM: 309-793-5800
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March 6, 1987

Mr. Dudley M. Hanson
U.S. Army Corps of Engineers
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Hanson:

This responds to your February 13, 1987, request for a list of endangered or threatened species which may occur in or adjacent to the Upper Mississippi River between Locks and Dams 2 and 22 and the Illinois Waterway between Lockport, Illinois and the confluence with the Mississippi River.

The following species are listed:

Common Name	Scientific Name	Status	Habitat
Higgins' Eye Pearly Mussel	Lampsilis higginsi	E	Deepwater areas of large rivers.
Pink Mucket Pearly Mussel	L. orbiculata	E	Large rivers
Fat Pocketbook	Potamilus capax	E	Large rivers
Iowa Pleistocene Snail	Discus macclintocki	E	Talus slopes
Indiana Bat	Myotis sodalis	E	Riparian forest
Gray Bat	M. grisescens	E	Caves, streams, rivers and lakes
Peregrine Falcon	Falco peregrinus	E	Nests on cliffs and bluffs, migrates along large rivers.
Bald Eagle	Haliaeetus leucocephalus	E/T*	Nests & winters along large rivers.
Interior Least Tern	Sterna antillarum	E	Sandy & pebbly beaches, sand bars

Common Name	Scientific Name	Status	Habitat
Northern Monkshood	Aconitum noveboracense	E	Talus slopes

* Threatened in Illinois and Wisconsin;
Endangered elsewhere

In addition to these, you should also consider two species proposed for listing as endangered:

Common Name	Scientific Name	Range	Habitat
Spectacle Case	Cumberlandia monodonta	Pools 10, 15-17, 19	Rocky areas, wing dams
Salamander Mussel	Simpsoniconcha ambigua	Pool 10 (possibly extirpated	Lives in colonies beneath rocks

Critical Habitat has been designated for the Indiana bat in LaSalle County, Illinois. It includes the Blackball Mine located on Pecumsaugen Creek north of the Illinois River.

In accordance with Section 7(c) of the Endangered Species Act of 1973, as amended, the Federal agency responsible for actions authorized, funded, or carried out in furtherance of a construction project that signficantly affects the quality of the human environment, is required to prepare a Biological Assessment. The purpose of the assessment is to identify listed or proposed species likely to be adversely affected by the action and to assist the Federal agency in making a decision as to whether consultation should be initiated. The Biological Assessment is to be completed within 180 days of initiation and before contracts are entered into or construction begun.

We suggest you refer to the Biological Assessment that was prepared by the St. Louis Corps District for the Second Lock project (Appendix B of the draft Environmental Impact Statement). It concluded that an increase in tow traffic due to a second lock may affect only the bald eagle and Lampsilis higginsi. Since we anticipate that the impacts due to the Major Rehabilitation project may be similar to those caused by the Second Lock project, you may be able to draw heavily from that Assessment.

When preparing a Biological Assessment, the following steps should be taken:

1. Conduct an on-site inspection of the area affected by the proposed activity or program, which may include a detailed survey of the area to determine if species are present and whether suitable habitat exists for either expanding the existing population or potential reintroduction of populations.

2. Interview recognized experts on the species at issue, including those within the Fish and Wildlife Service, State conservation departments, universities and others who may have data not yet found in scientific literature.

3. Review literature and other scientific data to determine the species' distribution, habitat needs and other biological requirements.

4. Review and analyze the effects of the proposal on the species, in terms of individuals and populations, including consideration of the cumulative effects of the proposal on the species and its habitat.

5. Analyze alternative actions that may provide conservation measures.

We have enclosed is a list of the Major Responsibilities Required of Federal Agencies under the Endangered Species Act of 1973, as Amended.

Sincerely,

Charles P. Davis
Assistant Field Supervisor

Attachments

cc: Region 3/SE (Engel)
SLD (Dutt)

United States Department of the Interior
FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
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March 18, 1987

Mr. Dudley M. Hanson
U.S. Corps of Engineers
Rock Island District
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Hanson:

This is in further reference to your February 13, 1987 request for a list of threatened and endangered species which may occur in or adjacent to the Upper Mississippi River between Locks and Dams 2 and 22 and the Illinois Waterway between Lockport, Illinois and the confluence with the Mississippi River. In our March 6th response to your request, we made several errors of fact:

1. The northern monkshood (Aconitum noveboracense) is threatened, not endangered.

2. The bald eagle (Haliaeetus leucocephalus) is threatened in Wisconsin and Minnesota but endangered elsewhere.

3. The spectacle case (Cumberlandia monodonta) and salamander mussel (Simpsoniconcha ambigua) are candidate species, not proposed. These need not be addressed in your Biological Assessment.

4. Indiana bat (Myotis sodalis) habitat includes caves and mines in winter and small stream corridors in summer.

If you have any questions, do not hesitate to contact me or Gerry Bade of my staff.

Sincerely,

Richard C. Nelson
Field Supervisor

cc: Region 3/SE (Engel)
SLD (Dutt)

4-21

United States Department of the Interior
FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
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January 29, 1988

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

This is in reference to Mr. Dudley Hansson's letter of December 8, 1987, that provided additional information on the traffic analysis completed for the Lock and Dam Major Rehabilitation Program. His letter responded to questions we raised about the analysis.

The letter adequately responds to our questions. No additional information concerning the traffic analysis is necessary to complete our Fish and Wildlife Coordination Act Report for the project. We anticipate submitting our report in early March.

Thank you for your efforts in this regard.

Sincerely,

for Richard C. Nelson
Field Supervisor

cc: USEPA (Jennifer Brown)

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

December 8, 1987

Planning Division

Mr. Richard C. Nelson
Field Supervisor
U.S. Fish and Wildlife Service
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

This response is in reference to your letter dated October 21, 1987, and our meeting with Ms. Gail Carmody of your staff on November 6, 1987, concerning your questions on the interim report describing the results of the traffic analysis for the Major Rehabilitation Environmental Impact Statement. Responses to your questions, as numbered in your letter, are provided below:

4-22

1. This traffic analysis utilized a capacity estimate for Lock 25 of 57.3 million tons. This estimate was derived mathematically using operating and traffic characteristics common to the lock and is in general agreement with the capacity estimate of 59 to 60 million tons derived for the National Waterways Study. The Master Plan Technical Report A (Navigation and Transportation) identified capacity of Lock 25 under a future tow size scenario to be 47.5 million tons, which is less than the Master Plan estimate under the existing tow size scenario. Analysis of actual traffic and operating characteristics associated with Lock 25 indicated that, in this case, the Master Plan source significantly underestimated actual capacity of the lock.

2. Both the CONGEST and General Equilibrium (GEM) models utilize the same basic input data. The models then use different algorithms or procedures to compute system traffic levels and benefits associated with the input data. Differences in base system traffic levels generated by the two models may range from 0 to 10 percent. However, the emphasis of this analysis was to estimate the increment of traffic associated with the rehabilitation features. Since both models start from a similar base, they would generate increments of system traffic quite comparable to one another.

3. Each feature was evaluated individually to determine its potential to induce traffic and its impact upon site-specific lock capacity. The results from these individual analyses were then entered into the system model to determine the total system impact which would be collectively associated with the features.

4. The 50-percent maximum reduction in total delay hours does represent an average estimate over a range of different ice stall events. Ice forms and accumulates in many areas of the lock and the number and duration of ice stall events will be affected by the type, location, and severity of ice. Submersible tainter gates will improve lock performance under ice conditions but will not eradicate the problem. The gates are designed to pass floating ice and can do little to keep ice from forming in and around the lock. Based on this range of effectiveness for the submersible gates, 50-percent was thought to be the upper limit of delay reduction possible at the locks. This estimate is based on historic data regarding ice stall delays and gives consideration to traffic levels and the number, type, and severity of ice stalls which may occur.

5. Since no point or internal estimates were derived, confidence limits are not appropriate. However, testing the null hypothesis that no significant positive relationship exists between the variables VOLUME OF TRAFFIC and AMOUNT OF NAVIGABLE PASS yields a Z-statistic that is significant at the 0.95 level of confidence.

The correlation coefficient between the variables AMOUNT OF NAVIGABLE PASS and VOLUME OF TRAFFIC is actually negative (-0.11) indicating that a negative relationship exists between the variables (i.e., the greater the level of navigable pass, the less the demand for navigation). This negative relationship is not statistically significant, however.

6. Regarding the vertical lift gate, the base comparison of late-season lock availability between Locks 20 and 21 was conducted without the influence of the bubbler systems. PMS data regarding ice stalls and delays for the two locks were analyzed to evaluate this feature's impacts upon lock capacity and induced traffic. Following this analysis, the results were entered into the system model to be evaluated collectively with the other features including the bubbler systems.

7. Based on industry interviews, 5 to 11 additional lockages may occur through Lock 20. Barges would be moved out of Pool 20 into Pool 21 where they would be integrated with other downbound movements originating in that pool. Thus, the increase in number of lockages applies only to Lock 20.

8. No. This traffic represents movements which will be diverted at a later date (a few days to a few weeks) or moved to the Illinois Waterway (IWW) for immediate transshipment. Movements on the IWW can be expected to be integrated into existing tows, thereby not increasing the number of tows. As a result, all movements will be made in the same season and will not alter daily traffic averages by season.

9. Yes, and this is the reason for proposing this feature. Currently, with unattended barges moored to the lower guidewall, tainter valves on the landside are *not opened until the chamber has been at least 50-percent* emptied (via partial opening of the riverside outlets). Opening of the landside valves one-half way prior to this point of the chamber spilling operation is considered too hazardous for normal operating practices.

10. The 2-percent increase in lock capacity is included to reflect the higher level of *end-season* activity in this pool over upstream pools. There is no reason to expect an increase of 3- to 5-percent as suggested in the year-round navigation study. The data obtained for the year-round study was based on Upper Mississippi River (UMR) regional data which was not specific to pools 21 and 22. In addition, the study indicates that as much as 4.7 percent of grain could be diverted. Since grain comprises only a percentage (albeit large) of the total commodity flows through the lower pools, the total *percentage increase* in commodity flows would be less than 4.7 percent. Most importantly, potential diversions of grain traffic to the river were based on the assumption that additional features beyond bubbler systems would be installed. These additional features included lockgate and wall coatings, heaters for valve machinery, more aids to navigation, icebreakers, *rock excavation, lockgate skin plates, additional lock* personnel, increased O&M for movable bridges, and extra maintenance crew and plant. No such items are included in the major rehabilitation effort.

11. The installation of powered travelling kevels is not part of the foreseeable future.

12. The annual increases in system are quite small, requiring allocation of small numbers of tows among river segments. The procedure is further complicated by small traffic increases which lie within the confidence levels of the models. The following analysis identifies and allocates system traffic increases among critical seasons and locks.

COMPARISON OF SYSTEM TRAFFIC
WITHOUT- VS. WITH-PROJECT CONDITION
(million tons)

YEAR	W/O PROJECT	W/PROJECT	DIFFERENCE
1990	127.2	125.2	0.0
2000	147.1	149.4	2.3
2040	162.5	164.6	2.1

Increases in system traffic may be disaggregated into traffic moving during the normal navigation season and traffic moving at the end of the navigation season on the UMR or under ice conditions on the IWW.

WITH-PROJECT INCREASES IN TRAFFIC

YEAR 1990

LOCK	ICE-FREE NAVIGATION SEASON	ICE CONDITIONS
Brandon road	NO CHANGE	NO CHANGE
Peoria	NO CHANGE	NO CHANGE
L/D 2	NO CHANGE	NO CHANGE
L/D 12	NO CHANGE	NO CHANGE
L/D 25	NO CHANGE	NO CHANGE

YEAR 2000

LOCK	ICE-FREE NAVIGATION SEASON	ICE CONDITIONS
Brandon Road	NO CHANGE	NO CHANGE
Peoria	NO CHANGE	NO CHANGE
L/D 2	1-2 tows/week	10-20 tows/season
L/D 13	2-3 tows/week	10-20 tows/season
L/D 25	approx. 4 tows/week	10-20 tows/season

YEAR 2040

LOCK	ICE-FREE NAVIGATION SEASON	ICE CONDITIONS
Brandon Road	NO CHANGE	NO CHANGE
Peoria	NO CHANGE	1-2 tows/week
L/D 2	1-2 tows/week	10-20 tows/season
L/D 13	1-2 tows/week	10-20 tows/season
L/D 25	approx. 3 tows/week	10-20 tows/season

In a report for the St. Paul District, Louis Berger and Associates, Inc. identified the potential for an increased level of activity at the end of the navigation season on the UMR due to installation of high-volume bubbler systems. According to the report, this potential may consist of as many as 5 additional lockages per day over a 3- to 5-day period for a total of 10 to 20 additional lockages per season. Since these lockages would only occur at the end of the existing season, this would represent more efficient utilization of the navigation season and not an extension of the season. That is, tows would make greater use of the available time in the existing navigation season. This traffic is assumed to move in single-lockage tows of six barges. Hence, total tonnage estimated to move would approximate 170,000 tons per year (20 lockages times 6 barges per tow times 1,400 tons per barge). The balance of the increase in system traffic would move during the normal navigation season. This tonnage may be converted into number of tows by using an average tow lading of 12.16 ktons per tow (Source: PMS data) and allocating system traffic among locks by their respective shares of system traffic. For this analysis, a 44-week navigation season was utilized for Lock 25. (Year 2000 traffic: 2.3 million tons less 0.17 million tons at end of season = 2.1 million tons; 2.1 million tons divided by 12.17 ktons per tow = 173 tows per year; 173 tows per year divided by 44 weeks in navigation season = approximately 4 tows per week through Lock 25.) Since Lock 13 processes only 58 percent of that processed at Lock 25, traffic through Lock 13 totals 2 to 3 tows per week.

On the Illinois Waterway, 180,000 additional tons are expected to move in the out years beyond the year 2010. This would approximate 19 tows per winter season or 1 to 2 tows per week during the winter months (180,000 tons divided by 9,620 tons per tow, which is the winter average tow lading at LaGrange, divided by 12.9 weeks in the winter season).

4-24

The risk and uncertainty for both shipper and carrier associated with end-season navigation are good reasons to doubt that any increases in system traffic will actually occur. Another limiting factor, however, is the increased lockage time associated with end-season navigation. With excessive lockage times of 3 to 4 hours, locks cannot accommodate an additional 5 lockages per day. A higher level of end-season traffic on the system will dramatically increase lock congestion, resulting in long queues at UMR locks which time-sensitive, end-season movements cannot tolerate. Recognizing this fact, industry may be reluctant to incur additional delays for existing traffic by increasing end-of-season movements.

13. This comment was answered by response to comment 12.

14. Average lockage time at Lock 18 is approximately 80 minutes. The average reduction in processing time made possible by an extension of the upper guidewall (4 minutes) applies primarily to downbound double lockages which comprise approximately 40 percent of total lockages. Thus, 4 minutes X 0.5 downbound lockages X 0.8 double lockages = 1.6 minutes; 1.6 minutes + 80 minutes X 100 = 2.0 percent.

I hope that our responses resolve the concerns expressed by your questions. We look forward to receiving your formal comments on the traffic analysis as soon as possible.

Sincerely,

Dudley M. Hanson, P.E.
Chief, Planning Division

Copies Furnished:

Ms. Jennifer Brown
Environmental Review Branch
U.S. Environmental Protection
Agency
230 S. Dearborn Street
Chicago, Illinois 60604

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO:
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January 28, 1987

Colonel Daniel M. Wilson
District Engineer
U.S. Army Engineer District
St. Louis
210 Tucker Blvd. North
St. Louis, Missouri 63101

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61201

Dear Colonel Smart:

This is in reference to Mr. Dudley Hansen's letter of December 30, 1986 regarding the baseline condition for the lock and dam major rehabilitation program (MRP). Mr. Hansen's letter states that the Second Lock at Lock and Dam 26(R) will be included in the future without condition for the Rock Island District's MRP cumulative evaluation. On the other hand, as stated in our August 26, 1986 letter to Col. Smart, the St. Louis District includes the MRP in the future without condition for the Second Lock environmental impact statement.

We agree that MRP and Second Lock NEPA documents should address increments in navigation traffic; however, we do not fully understand how the St. Louis and Rock Island Districts are assigning these increments. As discussed in previous correspondence, the Fish and Wildlife Service disagrees that the Second Lock and the MRP are totally independent actions and projects. In this regard, we have recommended that a single EIS be completed for these two actions in accordance with the NEPA regulations (40 CFR 1502.4(a)).

In order that this issue might be resolved or at least better understood, we recommend that you provide a joint response explaining how the two actions relate to each other and how the incremental increases in tow traffic till 2040 will be assigned. A graph relating the juxtaposition of the actions would be useful.

In preparing your response, consideration should be given to determining the sequence of these actions for purposes of Section 7 consultation under the Endangered Species Act. Although, it is more appropriate to require collective consideration of reasonably foreseeable future Federal activities for purposes of NEPA, the substantive nature of Section 7 suggests that a project-by-project sequential review of federal actions to be a more appropriate approach for endangered species consultation. Therefore, we will be using a "first-in-time, first-in-right" process to determine if these future Federal actions may jeopardize the continue existence of a listed species.

Your response by February 10, 1987 would be appreciated to assist the Higgin's Eye expert panel that is being convened to assist in our formal consultation for the Second Lock. If you have any questions, do not hesitate to call me.

Sincerely,

Richard C. Nelson
Field Supervisor

cc: ILDOC (Lutz)
IADNR (Szcodronski)
MNDNR (Wald)
MODOC (Dieffenbach)
WIDNR (Newman)
USEPA (Kring, Brennan)

4-25

United States Department of the Interior

IN REPLY REFER TO:

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61204

COM: 309-793-5800
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October 21, 1987

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building
P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

This is in reference to the interim report describing the results of the traffic analysis for the Major Rehabilitation of Locks and Dams 2 through 22. We have reviewed the report and have several questions:

1. Page 5, #17: What lock capacity is used for Lock and Dam 25? Why is it different?

2. Page 6, #22: Would the results of this analysis be any different if the General Equilibrium model were used?

3. Page 6, #24: This paragraph infers that each feature was evaluated individually. Were the features also addressed collectively?

4. Page 7, #25: What is the basis for the assumption that the submersible tainters "cannot be expected to eliminate greater than 50 percent of existing delays at locks attributed to ice stalls"? Shouldn't the potential increase be expressed as a range to account for varying conditions?

5. Page 7, #26: What are the confidence limits of the statistical analysis? What is the correlation coefficient?

6. Page 8, #28: Was the level of chamber availability at Lock 21 been determined with or without the high volume bubbler system?

7. Page 8, #30: Does the additional 11 barges translate to 5-11 additional lockages during the winter?

8. Page 8, #31: Will enhanced shipment of these 150,000 tons alter the per day average of tow traffic by season?

9. Page 9, #32: Are there still safety concerns when the outlet tunnel tainter valves are only opened half-way?

4-26

10. Page 10, #37: What is the basis for estimating the 2% increase? Could there be a change in shipping volumes similar to that noted for Pool 20 in #31? The District's Year-Round Navigation Study Final Feasibility Report (Attachment 1 to Appendix D) suggests a range of 3.31%-4.71% of the yearly grain shipment is now transferred to another mode but may be shipped by barge if winter conditions permitted.

11. Page 10, #39: Will powered travelling kevels likely be installed during the period of analysis?

12. Page 11, #42: Are these results the cumulative data for all the features in place? Is it possible to present this analysis in tows per day by lock and by month or season? Such data is necessary to evaluate environmental impacts.

13. Page 12, #43: How many barges are necessary for 9,000 tons? Are the average traffic increases based on all 12 months or just for the months the bubblers are in operation?

14. Page 12, #45: Is the average lock processing time for Lock 18 two hundred minutes?

I recommend that a biologist from this office meet with your staff to discuss the above questions. We can complete our formal comments on this report following such a meeting.

Sincerely,

Richard C. Nelson
Field Supervisor

cc: IA DNR (Szeodronski, Schonhoff)
IL DOC (Lutz, Salle)
MN DNR (Wald, Johnson)
MO DOC (Dieffenbach, Stucky)
WI DNR (Neuman, Kennedy)
EPA (Bronoski, Brown)
RID (Bahus, Younker)
SPFO
MISO

March 17, 1967

Planning Division

Mr. Richard C. Nelson
Field Supervisor
U.S. Fish and Wildlife Service
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

This is in response to your letter of January 28, 1967, regarding the baseline condition for the Environmental Impact Statement being prepared to address the potential for cumulative impacts from certain measures of the major rehabilitation effort. This response has been coordinated with the St. Paul and St. Louis Districts, and the North Central and Lower Mississippi Valley Divisions.

I want to reaffirm the Corps' position that the Major Rehabilitation effort and the Second Lock projects are independent actions, under separate authorization and separate jurisdiction. Each action is independently justified and each will take place totally independent of the other.

Since these are separate actions, the projected future with and without conditions will be different. The enclosed graph (Enclosure 1) displays the with and without conditions for the Second Lock at Locks and Dam 26. For the Major Rehabilitation effort, the with and without conditions are displayed graphically on Enclosure 2.

Both actions are based on the traffic projections in the Master Plan. The Second Lock study attributes 12 million tons to a future without condition (year 2040) consisting of a combination of federal and industry actions, and 34 million tons to a future with the Second Lock. This results in a total change from baseline conditions (year 1990) of 46 million tons. The Major Rehabilitation effort will include in its future

4-27

without condition the traffic attributable to the Second Lock and that portion of the traffic attributable to the other Federal actions identified in the Master Plan, and industry actions.

It should be noted that the Master Plan determined that the non-lock component (12 million tons) of the total traffic increase could be achieved through either Federal actions or industry actions. The measures being considered for the rehabilitation effort are not the same as those analyzed in any of the Master Plan scenarios. For example, powered traveling levels are not proposed as part of the Major Rehabilitation effort. A tentative listing of those rehabilitation measures that have been identified by your agency as having the potential to increase traffic and to cause cumulative impacts is provided by Enclosure 3. We have not yet determined which, if any, of these proposed rehabilitation measures would induce increases in traffic.

You may be assured that when data on traffic with the rehabilitation measures are developed, we will share it with you.

Sincerely,

ORIGINAL SIGNED BY

Dudley H. Hanson, P.E.
Chief, Planning Division

Enclosures

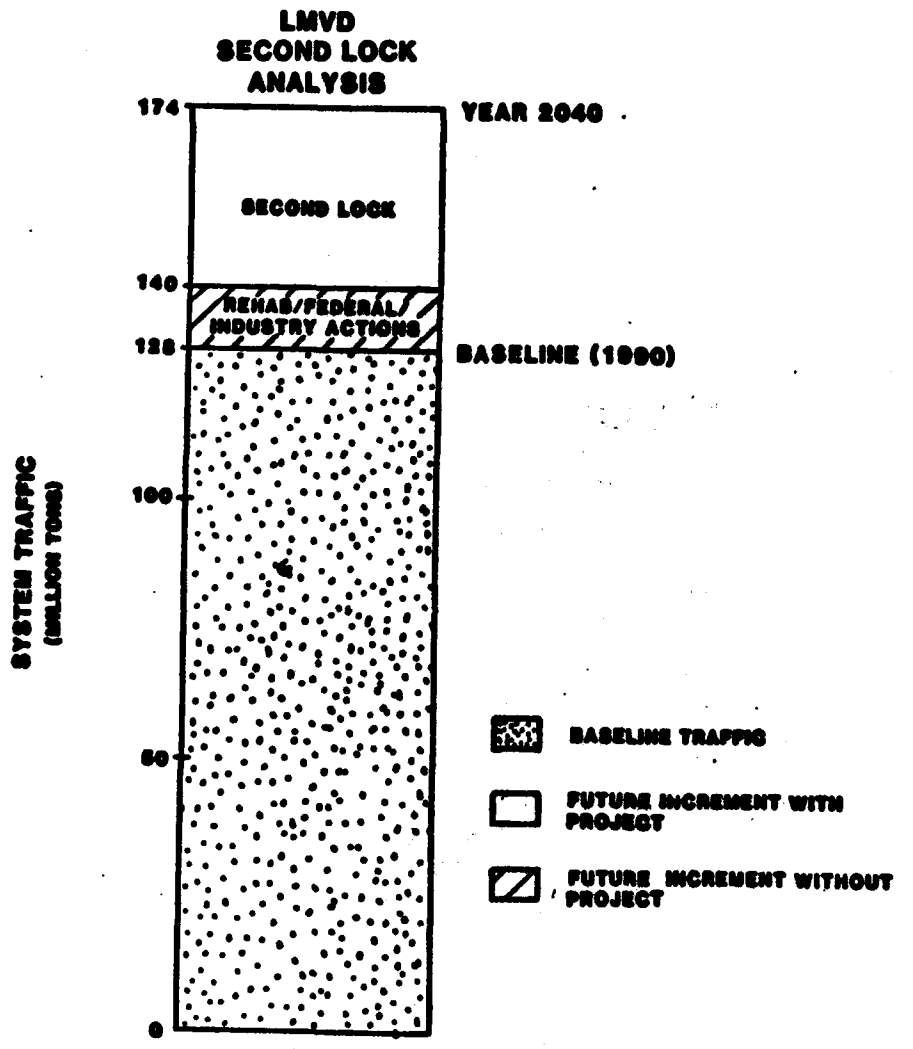
Copies Furnished:

Commander, North Central Division
ATTN: NCDPD-ER (D. Kitel)

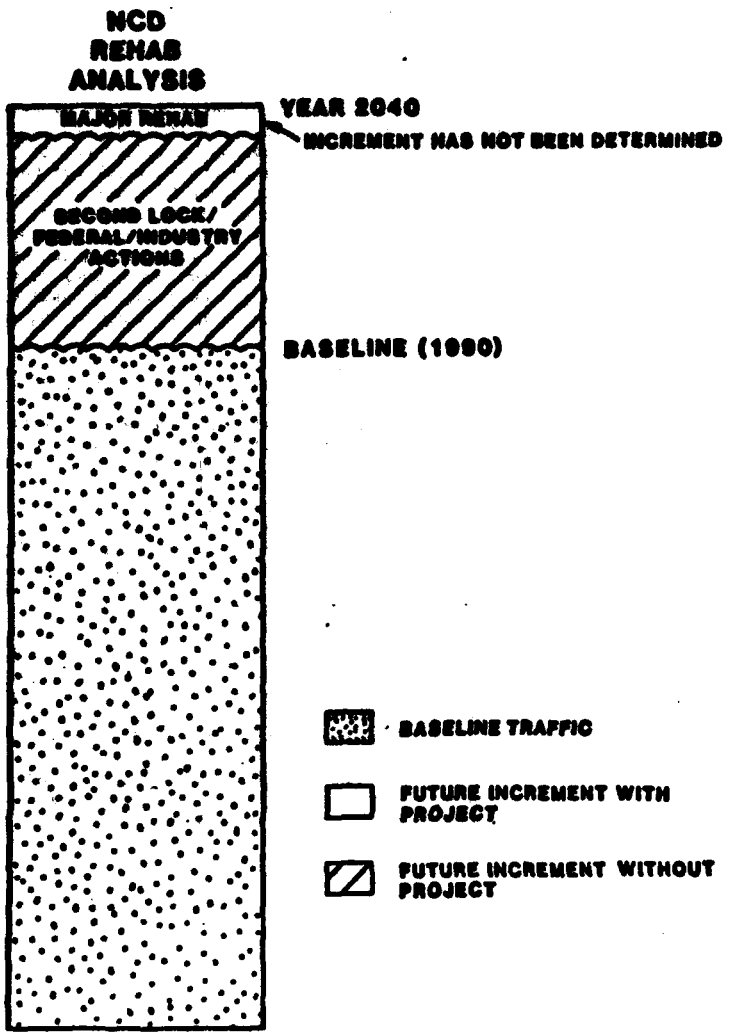
Commander
U.S. Army Engineer District, St. Paul
ATTN: NCSED-H (J. Bellen)
1135 USPO & Custom House
St. Paul, Minnesota 55101-1479

Commander
U.S. Army Engineer District, St. Louis
ATTN: LMSPD-A (O. Dutt)
210 Tucker Boulevard N.
St. Louis, Missouri 63101-1986

Commander
U.S. Army Engineer Division,
Lower Mississippi Valley
ATTN: LMVPD-R (G. Buglewicz)
P.O. Box 80
Vicksburg, Mississippi 39180-0080



Enclosure 1



SYSTEM TRAFFIC
AND GOALS

4-29

TENTATIVE REHABILITATION MEASURES

* Submersible tainter gate at Peoria and LaGrange Locks and Dams on the Illinois Waterway.
* Guardwall at Lock and Dam 22.
* Vertical lift gate at Lock and Dam 20.
* Bubbler systems at all sites.
* Modification to the outlet structure at Lock and Dam 15.
* Construction of two cells above Lock and Dam 15.
* Upper and lower guidewall extensions at Lock and Dams 21 and 22.
* Upper guidewall extensions at Locks and Dams 11 through 20.

Enclosure 2

Enclosure 3

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

In reply refer to:
COM: (309) 793-5800
FTS: 386-5800

April 7, 1986

Colonel William C. Burns Jr.
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Burns:

This is in response to Mr. Hansen's letters of March 5, 1986, and March 27, 1986, concerning the potential increases in navigation traffic from the District's Lock and Dam Major Rehabilitation Program (MRP).

The March 5th letter summarized our previous meetings and provided more detailed information on the effect on navigation traffic of traveling (non-motorized) kevels; minor modifications of guidewalls at LaGrange, Peoria and Lock 20; the Pool 15 rock cut; and Pool 12 mooring cell. Based on this information, we concur that these measures appear to have no effect on increasing navigation.

The March 5th letter also described the District's intent to prepare a programmatic environmental assessment to evaluate the potential cumulative impacts of increased navigation traffic due to the MRP on the Upper Mississippi River System (UMRS). We applaud this decision and look forward to our continuing coordination on this issue. We hope that you will immediately begin development of the assessment so that future improvements to the locks and dams are not needlessly delayed. In this regard, we recommend that the District identify the baseline conditions that will be used in determining the potential increase in navigation on the UMRS from any proposed program for new construction. We suggest that this baseline should be the physical conditions and navigation capacity that exists today (April 7, 1986).

In discussions subsequent to the March 27th letter, we have recommended that our offices "agree to disagree" on the issue of whether or not the submersible tainter gates at Peoria and LaGrange will allow an increase in navigation traffic. We do not believe the statistical analyses completed by the District adequately reflect future increases in waterborne commerce or the improved locking efficiency afforded by installation of the submersible tainter gates at both locks and dams. However, the safety of lock personnel is an overriding issue, and the gates should be built without delay. Therefore, we recommend that the District proceed with construction of the gates, recognizing that they may increase navigation traffic. This potential measure should be evaluated in the programmatic environmental assessment.

The submersible tainter gates may be viewed as an individually minor action, but may be collectively significant when considered with other measures proposed in the MRP. If you adopt our proposed baseline, any increases in navigation traffic allowed by the gates will be adequately assessed.

We appreciate the continued cooperation our staffs have had on these issues. If you have any questions, please contact Gail Carmody or myself.

Sincerely,

Richard C. Nelson
Field Supervisor

cc: ICC w/incoming
IL DOC w/incoming
MO DOC w/incoming
WI DNR w/incoming
EPA (Chicago & KC) w/incoming

4-30

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO:
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FTS: 386-5800

August 26, 1986

Colonel William C. Burns Jr.
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Burns:

General Pratt's letter of July 1, 1986, to Paul Hansen of the Izaak Walton League has come to our attention. This letter addresses the Corps' environmental documentation for the Lock and Dam Major Rehabilitation Program.

We are concerned with the apparent position in this letter that the Second Lock at Lock and Dam 26 will be the baseline condition for the major rehabilitation work in the North Central Division. This is not our understanding of the agreement we have with the Rock Island District nor is it consistent with the direction we have received from the St. Louis District.

The Rock Island Field Office's recent approval of the environmental assessment for La Grange and Peoria Locks rehabilitation was based on an understanding that the baseline conditions for the cumulative assessment would be the physical conditions that existed on April 7, 1986. In addition, St. Louis District has instructed us to evaluate two alternative plans for the Second Lock: "with" the lock and "without" the lock. The District has stated that the "without" alternative "assumes the 1200-foot lock is in place and that the lock and dam improvements, being constructed under the rehabilitation program..... are also in place" (see Col. Wilson's letter of October 17, 1985 enclosed).

These inconsistencies in baseline conditions need to be resolved before scoping of the Major Rehabilitation Program cumulative assessment can begin. I strongly recommend that baseline conditions be those that existed on April 7, 1986. Your expeditious reply would be appreciated.

Sincerely,

Richard C. Nelson
Field Supervisor

Enclosure

4-31

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 TUCKER BOULEVARD, NORTH
ST. LOUIS, MISSOURI 63101-1986

REPLY TO ATTENTION OF

October 17, 1985

Environmental Analysis Branch
Planning Division

Mr. Jerry L. Rasmussen
Acting Field Supervisor
U.S. Fish and Wildlife Service
Rock Island Field Office (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Rasmussen:

This is in response to Mr. Tom Groutage's letter, dated August 15, 1985, regarding the Fish and Wildlife Coordination Act activities for the Lock and Dam 26 Second Lock Environmental Impact Statement (EIS). This letter is intended to provide you with sufficient information about our Second Lock Environmental Impact Statement study for you to complete a Planning Aid Letter on the project.

The following information is provided for purposes of your Planning Aid Letter data needs.

a. Authority for the Second Lock Study. Authority for the Second Lock study is encompassed in P.L. 95-502, Section 101(j), which provides that the Corps will provide for possible future expansion while constructing the replacement project. Authorization is also included in P.L. 99-88.

b. Study Area. The study area will consist of those river reaches containing commercial navigation channels on the Mississippi River main stem, north of Cairo, Illinois and the Illinois River and Waterway, Illinois, excluding other river reaches mentioned in P.L. 95-502.

c. Environmental Impact Statement. An Environmental Impact Statement must be prepared for the Second Lock. Congress has not acted on the Upper Mississippi River Basin Commission's 1982 Master Plan

recommendation to exempt this work from further consideration under the National Environmental Policy Act.

d. Alternative Plans. There are only two plans that must be evaluated:

(1) Future Without the Second Lock (No Action). This alternative assumes that the 1200-foot replacement lock is in place and that the lock and dam improvements, being constructed under the rehabilitation programs of pertinent districts for safety and efficiency purposes, are also in place. This coincides with Scenario III of the Master Plan, which projects that annual navigational tonnage will reach a level of 139.6 million tons by the year 2040.

(2) Future With the Second (600-foot) Lock. This alternative adds a Second (600-foot) Lock to the No Action alternative. This coincides with Scenario III-A of the Master Plan, which projects that annual navigational tonnage will reach a level of 174.4 million tons by the year 2040. This will be the Recommended Plan.

e. Impact Analysis.

(1) Navigation traffic, in tows per day, is the preferred indicator of impacts.

(2) The traffic projections of the Upper Mississippi River Basin Commission's Master Plan will be used for impact analysis purposes. Although you have inquired about the credibility of these traffic projections and we are providing the actual traffic data you have requested, your independent evaluation of these data is not a requirement of the Fish and Wildlife Coordination Act. Consequently, we will not provide transfer funds for such activities nor will we accept a Fish and Wildlife Coordination Act Report based on projections other than those contained in the Commission's Master Plan.

f. Worst Case Analysis.

(1) This will involve an evaluation of the worst possible impacts that could logically be expected to occur with the Recommended Plan (Scenario III-A) in place instead of an evaluation of

an additional scenario (Scenario IV-A) as was initially proposed. The Council on Environmental Quality regulations and Corps of Engineers guidance on this subject limit this analysis to the recommended plan. The Corps of Engineers is not recommending Scenario IV-A; therefore, it is inappropriate to address it.

(2) Council on Environmental Quality regulations and Corps of Engineers guidance place the responsibility for "Worst Case" consideration on the initiating agency. Therefore, we do not believe it is appropriate for you to address this subject in your Fish and Wildlife Coordination Act Report; and we will not transfer funds to your agency for such an evaluation.

g. Significant Resources. A list of significant resources to be evaluated was presented for review at the scoping meetings. There was an apparent consensus that the list was complete. A copy of that list is enclosed.

As a result of the information presented above, it will be necessary to continue negotiations on the level of transfer funds required to support this work, as well as the schedule for its completion. We will schedule a meeting for this purpose with your office in the near future.

Sincerely,

Daniel N. Wilson
Colonel, Corps of Engineers
District Engineer

Enclosure

APPENDIX A - TABLE 1. IDENTIFICATION OF RESOURCES TO BE EVALUATED

Resources	EQ Attributes: Ecological	Cultural	Aesthetic	Significance: Institutional Recognition	Public Recognition	Technical Recognition	Likely To Be Affected (yes/no)	Resource To Be Evaluated (yes/no)
Upper Miss. River System (UMRS)								
Environmental Resources								
Physical Resources	Physical setting					Wide alluvial floodplain system bordered by rock bluff; navigation improvements alter both physical setting and ecosystem	yes	yes
			Visual effects	River & Harbor & Flood control Act of 1970, PL91-611, Sect. 122	Public has indicated aesthetics as as a concern	Natural vegetation, variable topography & proximity to water contribute to attractiveness of area, especially for recreation	yes	yes
Water Resources	Water quantity			NEPA of 1969		Low flow affects water quality, fish, wildlife, & navigation	no	no
	Water quality			Clean water Act of 1977	Public concern expressed	Localized point source problems near urban centers; nonpoint pollution (suspended solids/sediments) in UMRS significant	yes	yes
Biological Resources	Aquatic habitat			Fish & Wildlife Coord. Act of 1958, portions managed by USFWS and state agencies	Public concern expressed	Main channel border, side channels, backwaters of high productivity; numerous fish and mussel species; signif. sport/commercial fishing	yes	yes
	Terrestrial habitat			Fish & Wildlife Coord. Act of 1958, portions managed by USFWS and state agencies	Public concern expressed	Forest and marsh areas high in wildlife productivity; UMRS part of international waterfowl flyway; habitat for colonial nesting birds; signif. hunting/trapping opportunities	yes	yes
	Endangered/ threatened species			Endangered Species Act of 1973, State Wildlife Codes	Public concern expressed		yes	yes
	Wetlands			EO 11990 Protection of wetlands, 1977		Pollutant filter, high biological productivity	yes	yes

APPENDIX A - TABLE 1. IDENTIFICATION OF RESOURCES TO BE EVALUATED

Resources	EQ Attributes: Ecological	Cultural	Aesthetic	Significance: Institutional Recognition	Public Recognition	Technical Recognition	Likely To Be Affected (yes/no)	Resource To Be Evaluated (yes/no)
Cultural Resources		Historic & Prehistoric sites		EO 11593, National Historic Preservational Act of 1966. Many sites recognized by Federal Government as highly signif.		Great II inventory identified 4,000 historic & 1,000 prehistoric sites in Pools 11-22 River Reach	yes	yes
Potential Wilderness Resource Areas	Special Areas			5 National Wildlife Refuges under consideration for wilderness designation; 4 Federal Research Natural areas in Upper Miss. Wildlife & Fish Refuge; various state designed scientific and natural areas		Areas are representative of selected natural environments or important to species maintenance; afford educational & recreational opportunities	yes	yes
Recreational Resources				Flood Control Acts, UMRS includes numerous state and Federal recreation areas	Public concern expressed	Major source of water-based recreation in mid-west; St. Croix River is a prime recreational resource & component of national wild & scenic rivers system	yes	yes
Economic Resources				Rivers & Harbors Acts, Corps is responsible for 9-foot channel UMR, Cairo to St. Paul		UMRS an integral part of regional, national, international transportation system; over 100 million tons of commodities moved annually	yes	yes

DEPARTMENT OF THE ARMY
NORTH CENTRAL DIVISION, CORPS OF ENGINEERS
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605-1592

REPLY TO ATTENTION OF

FEB 28 1986

Mr. Harvey K. Nelson
U.S. Department of the Interior
Fish and Wildlife Service
Federal Building, Ft. Snelling
Twin Cities, Minnesota 55111

Dear Mr. ~~Nelson~~ Harvey:

Since my January 10, 1986, letter to you regarding the lock and dam major rehabilitation activities, I have worked closely with the Rock Island District to resolve the issues raised in your December 23, 1985, letter. Colonel Burns and members of his staff at the Rock Island District have had several meetings with your staff from the Rock Island field office and Mr. Lowry of your staff.

To ensure that the requirements of the National Environmental Policy Act (NEPA) are complied with, the Rock Island District is preparing site specific environmental assessments covering those features of the rehabilitation work which have been identified as not controversial by your Rock Island field office. District personnel are also analyzing available data to determine whether there could be cumulative or systemic impacts on the human environment for those proposed features of the rehabilitation work that your staff has identified as possibly allowing or causing an increase in traffic. If such cumulative or systemic effects are identified, the NEPA guidelines and regulations will be followed including any coordination, review and processing of the NEPA documents deemed to be necessary.

4-34

In complying with Section 101(i) of Public Law 95-502, it is necessary to arrive at a definition of capacity. To understand what Congress intended by this section, we have closely reviewed the legislative and judicial history and the Upper Mississippi River Master Plan report (Master Plan). We have also had discussions with your staff.

In the Master Plan (pages 41-42, main report) there are three definitions of lock capacity that are used in the various Master Plan studies. These three definitions are related to tonnage thruput at a lock and are referred to as "operational capacity" in the Master Plan. In addition to those three definitions, the Master Plan also defines "maximum lock capacity" as it relates to the physical size of each lock. It is noted that this definition was not used in making the traffic projections shown in the Master Plan.

DARUS/jah/384

December 30, 1986

Planning Division

Mr. Richard C. Nelson
Field Supervisor
U.S. Fish and Wildlife Service
Rock Island Field Office
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

We are writing to confirm the understanding reached between our offices concerning your August 26, 1986, letter on the baseline condition for the major rehabilitation NEPA document. As discussed during our meetings on November 25, and December 11, 1986, the Master Plan Scenarios I through III are additive and include a number of features not being proposed in the major rehabilitation effort. Therefore, some modification is necessary to remove these unrelated features. Also, the increment of traffic identified for the second lock at Lock and Dam 26 will be included in the without project condition for the major rehabilitation NEPA document because it is a likely future action not associated with our major rehabilitation effort. Existing regulations require that the increment between the most likely with and without conditions be used to measure impacts. We agree that the key question to be answered in the NEPA document for the major rehabilitation effort concerns the increment of any increase in navigation traffic and resultant environmental impacts.

Should you have further questions, please call Mr. Paul Soyke of our Economic and Social Analysis Branch at 309/788-6361, Ext. 231, or Ms. Karen Bahus of our Environmental Analysis Branch at Ext. 384, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

ORIGINAL SIGNED BY

Dudley H. Hanson, P.E.
Chief, Planning Division

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

December 4, 1985

Planning Division

Mr. Jerry L. Rasmussen
Fish and Wildlife Service
Rock Island Field Office
1830 Second Avenue
Rock Island, Illinois 61201

Dear Mr. Rasmussen:

This is in response to your letter of October 22, 1985, regarding the Rock Island District Lock Rehabilitation Program. The Corps of Engineers views the Lock and Dam 26 second lock and the planned rehabilitation and maintenance of the various locks and dams in the Upper Mississippi River System as totally independent actions and projects. Accordingly, the Lock and Dam 26 second lock Environmental Impact Statement (EIS) is an independent action from the rehabilitation efforts. Further, as a matter of law, a comprehensive programmatic impact statement encompassing the second lock and the rehabilitation work is not required, for there is clearly no segmentation of a single project or group of related actions. Benefits for the second lock are based on reduced locking times at this facility, not on an increase in system capacity. In addition, Congress has recognized the need for the second lock; both for the efficient movement of commodities, and as a backup system since any disruption in the single lock operations could halt shipping on both the Mississippi River and the Illinois Waterway.

The rehabilitation and maintenance at the other locks in the Upper Mississippi River System are primarily to replace worn out features and for safety reasons. The related environmental impacts are to be analyzed on an individual basis rather than as a system approach as you propose. Benefits resulting from the rehabilitation work are based on constrained traffic, and not on increased traffic. Any effects on navigation traffic would be localized and minor, and would not result in systemwide effects requiring a systemic EIS approach.

In order to respond in detail, I have numbered the paragraphs in your letter to correspond with the paragraphs in our letter.

A close reading of P.L. 99-502, Section 101(i) and its legislative history reveals that restricted activities must have an effect that "expands the navigation capacity of locks, dams, and channels," and are "undertaken to increase the navigation capacity of the Upper Mississippi River System." Our review indicates that what Congress meant when it restricted expansion of navigation capacity pertains to increasing the size of the lock chamber (i.e., length, width, depth) or adding additional locks. The planned rehabilitation activities do not involve increasing lock chamber dimensions or adding locks. Therefore, the proposed rehabilitation activities are in compliance with P.L. 99-502.

The additional studies requested by the FWS will be conducted and results handled in accordance with established NEPA procedures for the remaining rehabilitation work within the Rock Island District. This effort will involve considerable input from your staff and will probably take several months to complete prior to public review. We plan to release the Environmental Assessments for Peoria, LaGrange and Lock and Dam 20 within the next 4-6 weeks, addressing the features of the rehabilitation work for which you have previously stated that you have no objection.

I appreciate your assistance in attempting to resolve these matters.

Sincerely,

JOSEPH PRATT
Brigadier General, U.S. Army
Commander and Division Engineer

4-35

Harvey,

I'm convinced we are working out our differences and the final solution will be acceptable to both agencies. Let's keep talking.

Joe

CF:
LMVD
LMS
NCR
NCS

1. The rehabilitation program is being accomplished to assure that the locks and dams in the Rock Island District are repaired and brought to current design standards necessary for continued operation. Each lock is evaluated on an individual basis to determine its problems and specific needs as they relate to the safety of the structure, reduction of future maintenance, efficient operation, and the elimination of hazardous conditions. Executive Order 12196, 29 CFR Part 1960, PL 91-596, and other policies and regulations mandate us to eliminate hazards where possible. Our evaluation includes the specific condition of each lock and a justification of each major component. In this evaluation we have assured that the work being accomplished does not violate Public Law 95-502.

2. You make reference to a statement by Dr. Anatoly B. Hochstein at the National Waterways Conference. This statement was related to more efficient operation at the locks and was his personal opinion.

3. You also quote Charles I. McGinnus. Although his statement did refer to methods of increasing capacity, it is taken out of context and is not reflective of Corps of Engineers policy with regard to the rehabilitation program in the Rock Island District. We cannot agree with your contention that we are "piecemealing a major navigation expansion program in place." Major rehabilitation was begun in the Rock Island District in 1976 in order to rehabilitate deteriorated facilities, improve safety, remove hazardous conditions, and minimize maintenance costs.

4. A rehabilitation program includes not only the latest technology in materials and equipment, but also current design standards. Although the proposals do include some of the items described in Scenario III of the Master Plan, this does not necessarily mean that system capacity will be increased. Traffic levels in Scenario III of the Master Plan are being used as an approximation of the most likely future traffic levels on the system for the preparation of the EIS for the Lock and Dam 26 second lock. This is because it is expected that those conditions are the most likely to be attained. None of the benefits of the rehabilitation work are based on increasing the amount of traffic. The benefits are based on constrained conditions; that is, reduced delays to that traffic which can get to the locks without any improvements.

5. The statements made at the National Waterways Conference quoted by you were not made by or on behalf of any representatives of the Corps of Engineers.

6. The rehabilitation program is not intended to increase system capacity. Each lock and dam, and even each major component, requires a separate evaluation independent of the other sites. Impacts will be addressed in the NEPA document for each project. Design capacity of a lock is controlled by the size of the chamber and the time to raise and lower the water levels. Actual traffic through a given lock depends on a variety of interacting factors, most of which are beyond the control of the Corps of Engineers. These include such things as the number of barges in each tow, crew efficiency, pool levels, tow horsepower, tow configuration, arrival rate, weather conditions, and many other factors. The tonnage through a lock is then further dependent on the type of commodities, load depth, loaded versus empty, and other factors over which the Corps of Engineers has no control.

7. The Master Plan does state that improved tow haulage equipment could increase lock capacity at LaGrange by 28 percent. However, that was based on powered kevels with 1,200-foot guidewalls and a specific set of assumptions. The traveling mooring bits proposed at Peoria and LaGrange are not equivalent to powered kevels. Open pass conditions at Peoria and LaGrange have a major impact on the traffic in that area. Total traffic passing by these two locks is unconstrained when open pass is in effect. This condition is a function of water levels and occurs 40 percent of the time at Peoria and 47 percent of the time at LaGrange.

8. One reason for the Master Plan was to evaluate the need and impacts of a second lock at Lock and Dam 26. The base condition includes a second lock. In either case, traffic would not double. Scenario I projected an average of 13 tows per day in pools 20-25. Scenario III projected only 2 more tows per day in 1990, and a total of 18 per day by 2040. Even under Scenario IV which included additional chambers at Locks 20-26 and at all Illinois Waterway sites, the tows per day increased by only 10 tows.

9. Scenario III includes a number of improvements at a variety of locks to include powered kevels with 1,200-foot upper and lower guidewalls, switch boats,

N-up/N-down lockage policy, mooring cells, increased lock staffing, and widening the Marseilles Canal. These measures result in a 23 percent increase in trafficat the maximum, not the doubling which you state. Furthermore, our rehabilitation does not include powered kevels, widening the Marseillee Canal, or switch boats.

10. The potentially significant impacts you refer to were developed as a part of the UMRBC Master Plan. We recognize these can be the result of commercial and recreation traffic and share your concerns. Where Federal actions result in significant impacts, we will proceed in accordance with existing laws.

11. The bubbler systems and ice passage facilities that you refer to were studied several years ago as a part of a year-round navigation study. However, they do not by themselves result in extension of the navigation season. They are being installed to reduce wear and tear on equipment, provide safer operating conditions, and meet our responsibility to lock vessels that are able to reach the lock. The ice in the channel is the real constraint to winter navigation and we do not control the channel ice.

12. The rehabilitation program is not a program to increase navigation capacity or the number of tows per day. It will reduce delays at some individual locks, but not to any greater extent than would occur at some point due to other factors beyond the control of theC Corps of Engineers. The proper base condition is the number of tows per day that would ultimately transit the system without any measures taken by the Corps of Engineers beyond those necessary to maintain the existing structures and provide for safe and efficient passage of navigation.

13. It has been and will continue to be our policy that if and when we propose actions that will expand the navigation capacity of t[illegible] system, we will prepare appropriate NEPA document[illegible]on to evaluate those impacts as required by law.

14. I am concerned that it [illegible] take you 90 days to complete the Fish and Wildlife Coordination Act Report (FWCA). You previously had agreed to complete the necessary work within 60 days of the receipt of the planning information. If your present workload now prohibits the completion

of the FWCA within the agreed upon time period, I request that you contact my staff to assist you. Timely completion of the required work is critical to our schedule.

Sincerely,

ORIGINAL SIGNED BY

William C. Buras
Colonel, Corps of Engineers
District Engineer

Copies Furnished:

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (RI)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO:
COM: 309-793-5800
FTS: 386-5800

October 22, 1985

Colonel William C. Burns, Jr.
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61201

Dear Colonel Burns:

1. During the past year our offices have been discussing the District's planning for rehabilitation of certain Mississippi River and Illinois River locks and dams. Our letter of February 28, 1985, and all subsequent planning aid letters have expressed our concern that the rehabilitation program will increase navigation capacity on the Upper Mississippi River System (UMRS). This being the case, we continue to disagree with the piecemeal approach that the District has followed in planning the rehabilitation program.

2. We understand the need to improve lock safety and the logic of using current technology for replacement materials and equipment. However, as pointed out by Dr. Anatoly B. Hochstein (waterways consultant) at a recent National Waterways Conference annual meeting:

> "Traffic could also be helped by incorporating ideas for better efficiency in rehabilitation plans. It would be wrong to restrict such work to remaking structures just as they were first built; the latest technology should be incorporated" (Waterways Journal, October 14, 1985).

The implications of your rehabilitation program on increased system capacity is thus very obvious.

3. At the same conference (Waterways Journal, October 14, 1985) Charles I. McGinnus (Maj. Gen. Ret.), also a waterways consultant, stated that "Debottlenecking is often the most cost effective action to expand navigation capacity". McGinnis also alluded to the cost effectiveness of "project phasing" and "build(ing) to present need and design(ing) for expansion". The remarks of both gentlemen (McGinnis is a retired Director of Public Works for the Corps of Engineers) add credibility to our concerns that your present rehabilitation program in concert with reconstruction of Locks and Dam 26, is gradually debottlenecking, project phasing, and designing for expansion in such a way that your are piecemealing a major navigation expansion program in place.

4. In addition to replacement of existing materials and equipment with that of present technology and design, your lock rehabilitation program includes a number of new measures that will improve locking efficiency, thereby, increasing overall lock capacity even further. These measures, varying with each lock, include guidewall extensions, improved tow haulage equipment, air bubblers, improved ice passage capabilities, and guard cells. All of these are new features at the locks in question, and all measures were identified in the UMRS Master Plan as having varying degrees of potential to increase navigation capacity on the system. The proposed rehabilitation program is very similar to Scenario III of the Master Plan and may in fact increase navigation capacity slightly more than Scenario III.

5. Your letter of April 5, 1985, states that "no attempt is being made to increase navigation capacity collectively at the locks and dams or system-wide," and that scheduling precludes preparation of the single environmental assessment requested in our February letter. However, discussions previously cited from the National Waterway Conference would seem to contradict your statements (in their result, if not in their intent).

6. We believe that your rehabilitation program specifically fits the Council on Environmental Quality's regulations regarding cumulative impacts and scope of review under the National Environmental Policy Act. Rehabilitation of the locks are "closely-related actions" [40 CFR 1508.25(a)(1)(i)] that will result in increased navigation capacity over time for the system. Or, as stated by Charles I. McGuinness (Maj. Gen. Ret.) they will "debottleneck", "project phase" and "design for expansion". The current rehabilitation program could thus lay the foundation for future "cumulatively significant impacts" and should be evaluated in a system-wide environmental impact statement [40 CFR 1508.25(a)(2)]. As discussed in the regulations, "cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time" (40 CFR 1508.7). The rehabilitation program is a perfect example of a collectively significant action.

7. Your staff has maintained that there will be no immediate increase in tow traffic in the Rock Island District due to existing constraints or "bottlenecks" at Locks and Dams 24 and 25. However, this will not be the case when debottlenecking is finished on the Mississippi River and is not presently the case for the Illinois River which currently receives approximately 60% of the commercial traffic passing through Lock 26. Therefore, any new construction at the Peoria and LaGrange Locks could result in immediate increases in navigation traffic on the Illinois River. For instance, Master Plan studies estimated that improved tow haulage equipment at LaGrange could increase lock capacity by 28%. This measure is currently included in the rehabilitation program. In addition, we believe that the current status of Locks 24 and 25 should not be viewed as constraints, but as "reasonably foreseeable future actions" (40 CFR 1508.7) that should be taken into consideration in evaluation of the cumulative impacts of the rehabilitation program. We understand that the St. Louis District has previously evaluated similar rehabilitation measures at these two locks, but did not implement them due to the language of Public Law 95-502. The current provisions of Public Law 99-88 may remove this legal constraint and they could soon be "debottlenecked".

8. Furthermore, as you are aware, the St. Louis District is currently planning for a second lock at Lock and Dam 26. A second lock in combination with the rehabilitation program expands capacity to a level similar to the Scenario IIIa alternative in the Master Plan and will result in increased traffic levels ranging from 36% to 200%, depending on reach and season. Based on data submitted to us by the St. Louis District, this substantial increase in traffic may be caused more by the rehabilitation program than the additional lock.

9. According to Master Plan estimates, implementation of any capacity expansion measure may have significant impacts on fish and wildlife resources in two ways. First, a number of measures will increase the overall efficiency of the locks and may result in a greater number of tows traversing a pool or group of pools on the UMRS. For example, implementation of measures similar to those recommended in Scenario III will likely double the number of tows per day in Pools 20-25 by the year 2040. This increase in traffic would have a corresponding impact of passing an additional 85,000 to 400,000 yd^3 of sediment into the backwaters and increasing shoreline erosion up to 10%. Impacts on the Illinois River would be even greater due to its narrower channel, close proximity of the sailing line to the shoreline, shallower depths, and finer bottom sediments.

10. Other potentially significant physical impacts include: 1) waves, 2) shoreline water level drawdowns, 3) velocity changes, 4) increased turbidity, and 5) increased potential for spills of hazardous material. These physical impacts could result in numerous adverse impacts on fish and wildlife resources as depicted in Figure 1. The significance of these impacts at any particular site or reach will depend on (1) distance between sailing line and shoreline, (2) sinuosity of channel, (3) erodibility of banks, (4) depth of channel, (5) size of bottom sediments, and (5) habitats impacted.

4-39

11. The second significant impact on fish and wildlife resources is extension of the navigation season. The air bubblers and improved ice passage capabilities proposed in the rehabilitation program are similar to the measures included in the Rock Island District's "Mississippi River Year-Round Navigation Study, Stage 2, Final Feasibility Report" dated November 1980. This study concluded that the potential "adverse environmental impacts of extended winter navigation appear to be very significant". It also concluded that additional baseline biological information was necessary before the impacts could be fully addressed. The UMRS Master Plan study made a similar recommendation.

12. In summary, increased navigation capacity and the resulting increase in tows per day on the UMRS have the potential to cause significant environmental impacts. These impacts are a result of the complex interrelationship of physical, chemical and biological factors that must be evaluated in a comprehensive form. It is insufficient to assess site specific impacts only. Without a doubt, the collective implementation of the rehabilitation program, will cause an increase in UMRS navigation capacity. We believe it is the Corps of Engineers' responsibility to evaluate the environmental impacts of increased tow traffic on the UMRS. This is essentially the same increase in tow traffic as described by Scenario III over Scenario I of the UMRS Master Plan.

13. As previously pointed out, the St. Louis District is currently planning a second lock at Lock and Dam 26. The second lock and the rehabilitation program are "reasonably foreseeable future actions" that are "closely related" and will have similar "cumulatively significant impacts". In this regard, we recommend that the Rock Island and St. Louis Districts prepare a joint Environmental Impact Statement. Both projects affect system-wide navigation capacity and potentially produce system-wide impacts which are difficult to separate as independent projects. Based on the St. Louis District's current EIS schedule, we believe the rehabilitation program analysis can be incorporated without significantly affecting the construction schedule of any of the subject projects.

To the extent that these concerns are unresolved, we will find it necessary to refer this issue to higher authority. However, we will continue to work with you toward an acceptable resolution if such efforts are productive. In addition, we remind you that this issue may affect your requirements under the Endangered Species Act of 1973, as amended. In accordance with Section 7(c) of the Act, we recommend that you conduct a biological assessment of the entire rehabilitation program.

14. We anticipate providing you our Fish and Wildlife Coordination Act (FWCA) Reports (one report per lock) approximately 90 days after we receive all the necessary planning information from your staff. The recommendations of the FWCA Reports will be site specific and will be contingent on resolution of the above issue.

If you have any questions, do not hesitate to contact me or Gail Peterson.

Sincerely,

Jerry L. Rasmussen
Acting Field Supervisor

cc: IL Dept. of Conservation (Witte, Lutz, Bertrand)
IA Conservation Commission (Wilson, Szeodronski, Conover)
MN Dept. of Natural Resources (Alexander, Skrypek)
MO Dept. of Conservation (Gale, Dieffenbach, Farabee)
WI Dept. of Natural Resources (Besadny, Kernen, Kennedy)
Corps of Engineers (North Central Division, St. Louis District)

APPENDIX V

CULTURAL RESOURCES COORDINATION

JOHN ASHCROFT
Governor

FREDERICK A. BRUNNER
Director

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF PARKS, RECREATION, AND HISTORIC PRESERVATION
P.O. Box 176
Jefferson City, MO 65102
314-751-2479

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation, and Historic Preservation

June 10, 1988

Mr. Dudley N. Hanson
Chief, Planning Division
Department of the Army
Rock Island District, Corps of Engineers
P.O. Box 2004
Rock Island, Illinois 61204-2004

RE: Proposed Major Rehabilitation Effort (COE), Mississippi River Locks and Dams 20 & 22, Lewis and Ralls Counties, Missouri

Dear Mr. Hanson:

5-1

In response to your letter dated 10 March 1988, the Historic Preservation Program has reviewed the proposed project and has determined that such action will have "no effect" on Mississippi River Locks and Dams 20 & 22, Lewis and Ralls Counties, Missouri, properties eligible for inclusion in the National Register of Historic Places.

Therefore, in accordance with Section 800.5(d) of the Advisory Council on Historic Preservation's regulation Protection of Historic Properties (36CFR, Part 800), please retain this documentation in your files for future reference and proceed with the proposed undertaking.

If I can be of further assistance, please write or call 314/751-7958.

Sincerely,

DIVISION OF PARKS, RECREATION,
AND HISTORIC PRESERVATION

Michael B. Weichman
Senior Archaeologist

MBW:nc

State Historical Society of Iowa

The Historical Division of the Department of Cultural Affairs

May 11, 1988

Dudley N. Hanson, P.E.
Chief, Planning Division
U.S. Army Engineer District, Rock Island
Clock Tower Building--P.O. Box 2004
Rock Island, Illinois 61204-2004

RE: COE - ROCK ISLAND DISTRICT - MAJOR REHABILITATION EFFORT, MISSISSIPPI RIVER LOCKS AND DAMS 11 THROUGH 22 IN THE ROCK ISLAND DISTRICT: EVALUATION OF IMPACTS (1988) - CONCURRENCE WITH FINDING OF NO EFFECT AND FINDING OF CONDITIONAL NO ADVERSE EFFECT IN ACCORDANCE WITH THE PROGRAMMATIC AGREEMENT FOR LOCKS AND DAMS 3 THROUGH 22, UPPER MISSISSIPPI RIVER

Dear Mr. Hanson:

We write in response to the above referenced document, dated March 10, 1988, which was received in this office on March 22. We have reviewed the proposed rehabilitation work in accordance with Stipulation 5 of the Programmatic Agreement, and we have assessed effects in accordance with 36 CFR Part 800.5. We concur with your finding of no effect for the addition of bulkhead slots at Locks and Dams 12,13, and 17; the outlet structure at Lock 15, and modification of the bubbler systems, Locks and Dams 11-22. We would concur with a finding of conditional no adverse effect as defined in 800.9 for the vertical lift gate at Lock and Dam 20; the guardwall at Lock and Dam 22; and the upper guidewall extensions, Locks and Dams 12-22; lower guidewall extensions Locks and Dams 21 and 22 if you will agree to provide us with final plans and specifications for our review and approval prior to initiation of the projects.

You should include a copy of this letter with your documented finding to the Advisory Council on Historic Preservation (The Old Post Office Building, 1100 Pennsylvania Avenue, N.W. #809, Washington, D.C. 20004) as specified in 36 CFR 800.6 and described in 800.8 (a). If the Advisory Council has no objections to this finding within 30 days of receipt, you will

☐ 402 Iowa Avenue
Iowa City, Iowa 52240
(319) 335-3916

☐ Capitol Complex
Des Moines, Iowa 50319
(515) 281-5111

☐ Montauk
Box 372
Clermont, Iowa 52135
(319) 423-7173

have satisfied your responsibilities pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended.

If you have questions or comments, please contact me at 515/281-8697.

Sincerely,

Ralph Christian, Consulting Architectural Historian
Review and Compliance Program
Bureau of Historic Preservation

cc: Charlene Dwin, Advisory Council on Historic Preservation
RF

DEPARTMENT OF THE ARMY

REPLY TO ATTENTION OF:

March 10, 1988

RECEIVED

BHPA REVIEW
N/A 3/30/88
RC [redacted]
RR
File RI

Planning Division

SEE DISTRIBUTION LIST

Enclosed for your review is a copy of the report entitled Major Rehabilitation Effort, Mississippi River Locks and Dams 11 through 22 in the Rock Island District; Evaluation of Impacts (1988), prepared by our staff. The purpose of the report is to provide a brief update on the rehabilitation work planned for these facilities during FY 88.

Pursuant to paragraph 5 of the Programmatic Agreement (PA) between the relevant State Historic Preservation Officers (SHPOs), Advisory Council on Historic Preservation (ACHP) and the Corps of Engineers, rehabilitation work anticipated but not yet planned at the time of the MOA writing was to be reviewed by the relevant SHPO and ACHP at the time planning begins. This report discusses work now being considered by the Corps.

Presently, detailed engineering data concerning the size and location of disposal areas for many of these projects is not available to evaluate the site-specific impacts concerning possible dredging and material disposal. Therefore, as each measure is approved for implementation and funding in the future, the District will initiate a separate coordination with your office which will include the additional site-specific impacts of disposal areas.

The PA provides that rehabilitation actions may proceed without further consultation if they are identified in Table 12 (enclosed) as not affecting significant characteristics or if No Effect determinations are appropriate. Rehabilitation projects for significant features and actions which may substantially alter the general, overall appearance/configuration of the system (or any component parts) will be done in accordance with the Secretary of the

TABLE 1

Proposed Construction Efforts, Mississippi River Lock and Dams 11-22
FY 88

	L&D 11 IA	L&D 12 IA	L&D 13 IL	L&D 14 IA	L&D 15 IL	L&D 16 IL	L&D 17 IL	L&D 18 IL	L&D (new) 19 IA	L&D 20 MO	L&D 21 IL	L&D 22 MO	
Vertical Lift Gate										X			No Adverse Effect
Bubbler System	X	X	X	X	X	X	X	X	X	X	X	X	No Effect
Outlet Structure					X								No Adverse Effect
Upper Guidewall Extensions		X	X	X	X	X	X	X	X	X	X	X	No Adverse Effect
Lower Guidewall Extensions											X	X	No Adverse Effect
Guardwall												X	No Adverse Effect
Bulkhead Slots		X	X				X	X					No Effect

MO = Missouri
IA = Iowa
IL = Illinois

CONCUR

By: Theodore Hild
Deputy State Historic Preservation Officer

Date: 4-12-88

-2-

Interior's Standards For Rehabilitation. This report is being supplied to all relevant SHPO's and the ACHP. If all are in agreement with these plans, work will proceed in accordance with the PA.

We request your review and comments on these proposed rehabilitation measures within 30 days. If you have any questions, please call Mr. Floyd Mansberger at 309/788-6361, Ext. 349. Your response may be sent to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

Dudley N. Hanson, P.E.
Chief, Planning Division

Enclosures

CONCUR

By: Theodore Hild
Deputy State Historic Preservation Officer

Date: 4-12-88

MINNESOTA HISTORICAL SOCIETY
FOUNDED IN 1849
Fort Snelling History Center, St. Paul, MN 55111 • (612) 726-1171

July 22, 1988

Mr. Charles E. Workman
St. Paul District, Corps of Engineers
1421 U. S. Post Office & Custom House
St. Paul, Minnesota 55101-1479

Dear Mr. Workman:

Re: Rehabilitation of Lock and Dam No. 3; Goodhue County
Removal of control control station and its replacement with new control station at upstream end of lock chamber
MHS Referral File Number: 88-1898

5-4

Thank you for the opportunity to review and comment on the above-referenced project. It has been reviewed pursuant to responsibilities given the State Historic Preservation Office by the National Historic Preservation Act of 1966 according to 36 CFR Part 800: Protection of Historic Properties, the regulations of the Advisory Council on Historic Preservation governing the Section 106 review process.

We have no objection to the above-referenced project so long as the mitigative measures are carried out. The new work is appropriate to the functional and architectural requirements of the facility.

If you have questions regarding this matter, please contact Ted Lofstrom at the address and telephone number on the letterhead.

Sincerely,

Dennis A. Gimmestad
Deputy State Historic Preservation Officer

DAG:dmb

MAJOR REHABILITATION EFFORT

MISSISSIPPI RIVER LOCKS AND DAMS 11 THROUGH 22 IN THE ROCK ISLAND DISTRICT

EVALUATION OF IMPACTS, FY 88

FEBRUARY 1988

SECTION 1 - INTRODUCTION

The Rock Island District, Corps of Engineers, is currently formulating plans for a major rehabilitation effort for Locks and Dams 11 through 22 located on the Mississippi River between Guttenburg, Iowa, and Keverton, Missouri. The purpose of the rehabilitation effort is to repair structural, cosmetic, and power-related features which have become severely deteriorated since original construction, approximately 50 years ago. Certain safety and energy efficiency improvements also are planned.

The locks and dams on the Mississippi River were constructed mainly in the decade from 1930 to 1940. Time, weather, and increasing use have taken their toll. As the structures and equipment approach the end of their projected lives, breakdowns and failures of mechanical and electrical equipment become more frequent and expensive to maintain. Many major rehabilitation actions can be defined as routine repair and maintenance items expected as a result of normal wear and deterioration.

SECTION 2 - PREVIOUS STUDIES AND COORDINATION

Coordination with SHPO staffs from Illinois and Iowa began in 1979 for the hydropower projects under consideration at that time. The completion of the GREAT II study in 1980 elevated the issue of potential architectural-historical significance of locks and dams to the public record and brought the issues involved to the attention of SHPO staffs from Illinois, Iowa, Missouri, and Wisconsin. Between 1979 and 1983, several letters of objection were received concerning hydropower projects. Basically, the various SHPO staffs were stating that impacts could not be evaluated in the absence of the historical-architectural study suggested in Recommendation 5007 of the GREAT II report. Ordinarily, resources less than 50 years old are not considered for inclusion in the National Register; however, it was felt that the uniqueness of the system and its economic importance justified an evaluation study. Hence, in May of 1984 Rathbun Associates was awarded a contract to document the system and to make recommendations concerning National Register eligibility.

Pursuant to Sections 106 and 110 of the National Historic Preservation Act and 36 CFR Part 800, the Rock Island District conducted a cultural resources study of the Nine-Foot Navigation project. The study focused on the locks and dams located within the Rock Island District and the results are presented in the report entitled Historical-Architectural, and Engineering Study, Locks and Dams 11-22, Nine-Foot Navigation Project, Mississippi River (Rathbun Associates 1985). The Rathbun report evaluated the historic and architectural significance of the lock and dam system and recommended that one representative complex (Lock and Dam 17) be nominated to the National Register of Historic Places. Also as part of this study, Rathbun Associates completed HABS/HAER Inventory cards for significant complexes and individual structures.

In March 1986, the Rock Island District staff compiled the report entitled Major Rehabilitation Program, Mississippi River Locks and Dams 11 through 22 in the Rock Island District: Overview and Cultural Resources Compliance Report with a Programmatic Memorandum of Agreement. This report defined the nature of the significance of the locks and dams as a system, provided an overview of the major rehabilitation effort, summarized the history of the Nine-Foot Navigation project, evaluated rehabilitation program impacts, and proposed a Programmatic Agreement (PA) for the protection of significant aspects of the historic properties. The State Historic Preservation Officers (SHPO) from Illinois, Iowa, Missouri, Wisconsin, and Minnesota, along with the Advisory Council on Historic Preservation (ACHP), all have signed that PA with minor revisions. A copy of the PA is attached as Appendix I.

TABLE 1

Lock and Dam Complex Locations

Lock(s) and Dam Complex	Location	River Mile	State for SHPO Review
11	at Dubuque, Iowa	538.0	IA
12	at Bellevue, Iowa	556.7	IA
13	near Fulton, Illinois	522.5	IL
14	near LeClaire, Iowa	493.3	IA
15	at Rock Island, Illinois	482.9	IL
16	near Muscatine, Iowa	457.2	IL
17	near New Boston, Illinois	437.1	IL
18	near Oquawka, Illinois	410.5	IL
19	at Keokuk, Iowa	364.2	IA
20	near Canton, Missouri	343.2	MO
21	near Quincy, Illinois	324.9	IL
22	near Saverton, Missouri	301.2	MO

The PA states that the major rehabilitation effort may affect properties included on or eligible for inclusion on the National Register of Historic Places. It further states that the Corps has studied the lock and dam system, evaluated the reasons why the system is significant, and consulted with the five SHPO's and the ACHP concerning impacts under major rehabilitation. The PA establishes the process for further coordination of the rehabilitation and maintenance of the lock and dam system.

A stipulation of the PA required that the Corps ensure that a historic record of the locks and dams be made through the National Park Service (HABS/HAER). Documentation of significant features of Locks and Dams 11 through 22 is currently being conducted by Rathbun Associates under contract with the National Park Service and is scheduled for completion in spring 1988. Results of this work will be submitted to the Library of Congress and to the appropriate SHPO offices.

SECTION 3 - REHABILITATION ACTIONS

Work at the locks and dams can be broken down into five major categories: lock rehabilitation, rehabilitation or repairs of the lock gates, rehabilitation of the dam, mechanical repairs or replacement, and electrical repairs or replacement.

Table 12 of the PA summarized the effects of the major rehabilitation actions on the historic character of the lock and dam system as recognized by the Reconnaissance Reports as of that date. Reconnaissance reports have been completed for Locks and Dams 13, 15, 16, 17, 18, 20, 21 and 22. A total of 24 generic work items were listed. Of this total, only three actions were determined to have an adverse effect, based on early rehabilitation plans. By applying the Secretary of the Interior's Standards for Rehabilitation and the attached PA, these effects can be eliminated.

Pursuant to paragraph 5 of the PA, rehabilitation work anticipated but not yet planned at the time of the PA writing was to be reviewed by the Corps, relevant SHPO, and the ACHP at the time planning begins. Table 1 (enclosed) summarizes the rehabilitation work which is currently under consideration. Also enclosed are representative plans and specifications for the various projects.

Vertical Lift Gate at Lock and Dam 20: The vertical lift gate proposed for Lock and Dam 20 would be constructed at the lower end of the auxiliary lock structure, as shown on plate 2. This structure was not planned at the time of the initial PA writing. The vertical lift gate will consist of upper and lower sections, each about 100 feet wide. When submerged, the upper section will slip into a recess behind the lower section. The lower section of the gate will not be moveable. Modifications to the concrete and rock floor of the auxiliary lock are required to form the gate sill. The construction of the vertical lift gate will require dewatering of the auxiliary lock. To close off the lower end of the auxiliary lock, four sheet pile cells, each filled with approximately 675 cubic yards (yd^3) of commercially supplied sand, will be constructed between the riverwall of the dam and the intermediate wall of the main lock. The upper end of the auxiliary lock will be sealed using an existing poiree dam (a prefabricated steel wall-type structure). After the modifications to the lock floor are completed, the sheet pile cells will be removed. The sand will be mechanically removed and disposed of in a 1-acre site located on lock and dam property previously used and assessed in the Environmental Assessment for the Lock and Dam 20 major rehabilitation project. The site has previously been surveyed and cultural clearance gained.

Bubbler Systems, Lock and Dams 2 through 22: Low volume bubbler systems are presently located at several lock sites on the Upper Mississippi River. These low volume bubbler systems generate air through diffusers in the bottom of the lock to prevent ice accumulation on the miter gates. The proposed bubbler system would consist of dual capacity, low volume and high volume blowers, with piping systems located in the miter gate areas, as shown on plate 3. The high volume blower would be capable of producing 1,000 cubic

feet per minute (ft^3/m) of air at 15 pounds per square inch (lbf/in^2) driven by a 125-horsepower motor, while the low volume blower would produce 175 ft^3/m of air at 15 lbf/in^2 driven by a 25-horsepower motor. This dual capacity system would prevent ice accumulation on the miter gates, and also would keep the gate recess clear of floating ice and debris. The piping system for the bubblers would be placed directly on the main lock structure. The upstream and downstream compressors would be placed on top of the lock wall. These improvements, although initially considered for Lock and Dam 15, 16, and 18, are now being considered for Lock and Dams 11-22.

Modification to Outlet Structure, Lock and Dam 15: Lock 15 is composed of a main lock and an auxiliary lock that are independently operated. The filling/emptying systems for both locks are composed of culverts which run through the bottom of the lock walls on each side of the lock, with discharge outlets emptying into the lower end of each lock, as shown on plate 4. The culverts located in the intermediate (riverside) lock wall share a common outlet into both main and auxiliary locks. For example, when the main lock (or auxiliary lock) chamber is emptied, water flows through the culverts in the intermediate wall, and is discharged below the main lock and below the auxiliary lock. The discharge of water from both lock walls into the lower end of the main lock creates severe turbulence causing a safety hazard during double lockages. The turbulence causes tow lines to break loose from the lower guidewall, which creates a safety hazard for tow and lock personnel, as well as for lock visitors. To solve this problem, it is proposed to permanently close the outlet that discharges from the intermediate lock wall below the main lock. This would force all flow from the intermediate wall to permanently discharge into the auxiliary lock. In addition, during double lockages, the landside discharge would be temporarily closed, allowing all of this flow to be temporarily discharged into the auxiliary lock. This procedure would reduce turbulence in the main lock and increase the safety of the lower lock area during double lockages.

Upper Guidewall Extensions, Locks and Dams 12 through 22; Lower Guidewall Extensions, Locks and Dams 21 and 22: Upper guidewall extensions, each of about 625 feet in total length, are proposed for construction at Locks 12, 13, 14, 16, 17, 18, 20, 21, and 22. Lower guidewall extensions, also of about 625 feet in length, are proposed at Locks 21 and 22. These guidewall extensions would consist of a series of 12 sheet pile cells located about 57 feet apart and connected by precast beams and a sheet pile diaphragm, as shown on plate 5. Eleven of the cells would be about 35 feet in diameter; the remaining cell would be about 57 feet in diameter and would serve as an end protection cell. The cells would be founded on H-piles, or directly on rock, depending upon the depth of bedrock at each site. Removal of an unknown quantity of silt by mechanical means also may be required for each extension, and a disposal site would need to be identified.

The upper guidewall extension at Lock 15 consists of two sheet pile cells, each about 30 feet in diameter, located about 600 feet and 1,000 feet above the existing guidewall, as shown on plate 4. A wall-type extension at this site would eliminate access to a backwater area and boat ramp on Arsenal Island. An unknown amount of material may need to be removed in order to construct the cells, and a disposal site would need to be identified.

Currently, Lock 19 does not have an upper guidewall. An upper guidewall is proposed for this site, and would consist of a series of sheet pile cells and precast beams as previously described. The exact length and location of the guidewall has not been determined at this time; a model study is being conducted and should be completed in the summer of 1989. As shown on plate 5, the worst-case design would consist of a guidewall with a length of 800 feet located on the landward side of the lock. Removal by mechanical means of an unknown quantity of material may be needed, and a disposal site should be identified and potentially surveyed for cultural resources. Guidewall extensions were considered a potential Adverse Effect at the time of the PA writing. The PA specified that the Corps would consult with the relevant SHPO to determine an acceptable treatment.

Guardwall at Lock and Dam 22: The guardwall would be constructed in conjunction with the upper guidewall extension at Lock and Dam 22. The guardwall would be about 480 feet long, consisting of about 10 sheet pile cells connected by precast concrete beams, as shown on plate 6. Each cell would be about 30 feet in diameter and would be located about 60 feet apart. Each cell would be founded directly on bedrock, and filled with concrete. Removal by mechanical means of an unknown amount of silt may be needed, and a disposal site should be identified and surveyed for cultural resources.

Bulkhead Slots: Locks and Dams 12 and 13, 17: Bulkhead slots for the lock gates currently are present at all Mississippi River facilities in the Rock Island District, except for Locks and Dams 12 and 13. These proposed slots in the lock wall are designed to hold steel girder bulkheads necessary for the dewatering of the locks and allow for the access to the lock gates. The bulkheads are stored in the service yard. Plate 7 illustrates the design of these bulkhead slots.

SECTION 4 - IMPACT ASSESSMENT

As the Iowa SHPO stated (letter dated March 17, 1986), what defines the historic and architectural significance of the lock and dam system is its general overall configuration and appearance -- buff concrete, miter gated locks, and dam structure with combined tainter and roller gates -- as well as its continued existence as a system capable of functioning in its original capacity.

It is our opinion that the addition of the bulkhead slots, outlet structure at Lock 15, and modification of the bubbler system will have No Effect on these historic properties. It is also our opinion that the proposed vertical lift gate, guardwall, and guidewall extensions will have No Adverse Effect on these significant historic properties if built in keeping with the Secretary of the Interior's Standards for Rehabilitation. The major alteration to the general configuration of the system will be through the construction of guardwalls and guidewall extensions. In keeping with the Secretary of the

TABLE 1

Proposed Construction Efforts, Mississippi River Lock and Dams 11-22
FY 88

	L&D 11 IA	L&D 12 IA	L&D 13 IL	L&D 14 IA	L&D 15 IL	L&D 16 IL	L&D 17 IL	L&D 18 IL	L&D (new) 19 IA	L&D 20 MO	L&D 21 IL	L&D 22 MO	
Vertical Lift Gate										X			No Adverse Effect
Bubbler System	X	X	X	X	X	X	X	X	X	X	X	X	No Effect
Outlet Structure					X								No Adverse Effect
Upper Guidewall Extensions		X	X	X	X	X	X	X	X	X	X	X	No Adverse Effect
Lower Guidewall Extensions											X	X	No Adverse Effect
Guardwall												X	No Adverse Effect
Bulkhead Slots		X	X				X	X					No Effect

MO = Missouri
IA = Iowa
IL = Illinois

Interior's Standards, these extensions will be built of concrete-filled sheet pile cells which will not alter the existing walls of the locks and could be removed in the future if a return to the original condition is desired. Furthermore, the construction technique/style as well as concrete color/texture will clearly set the new construction apart from the original as-built system.

The PA provides that rehabilitation actions may proceed without further consultation if they are identified in Table 12 as not affecting significant characteristics or if No Effect determinations are appropriate. Rehabilitation projects for significant features and actions which may substantially alter the general, overall appearance/configuration of the system (or any component parts) will be done in accordance with the Secretary of the Interior's Standards. Any inability to comply with the Standards will result in the initiation of the normal consultation process in accordance with 36 CFR Part 800.

Advisory Council On Historic Preservation

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

PROGRAMMATIC AGREEMENT
LOCKS AND DAMS 3 THROUGH 22, UPPER MISSISSIPPI RIVER

WHEREAS, the U.S. Army Corps of Engineers, Rock Island and St. Paul Districts, (Corps) proposes to administer a program to rehabilitate the locks and dams under their jurisdiction on the Mississippi River (locks and dams 3 through 22); and,

WHEREAS, the Corps has determined that the program may have an effect upon properties included in or eligible for inclusion in the National Register of Historic Places and has consulted with the Advisory Council on Historic Preservation (Council) and the State Historic Preservation Officers (SHPO) of Missouri, Illinois, Iowa, Wisconsin, and Minnesota pursuant to Section 800.13 of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act (16 U.S.C 470f),

NOW THEREFORE Corps, the Council, and the SHPOs agree that the program shall be administered in accordance with the following stipulations to satisfy the agency's Section 106 responsibilities for all individual undertakings of the program.

Stipulations

The Corps will ensure that the following measures are carried out.

1. In implementing this Agreement and in carrying out all work on the locks and dams, the Corps will seek to ensure that the overall historic character and appearance of the lock and dam system is preserved and restored.

2. Actions which do not affect potentially significant features of the locks and dams, as identified in table 12 (attached) of Major Rehabilitation Program, Mississippi River Locks and Dams 11 through 22 (Rock Island District) and Major Rehabilitation Program, Mississippi River Locks and Dams 3 through 10 (St. Paul District) will be carried out as proposed.

3. Actions which may affect significant features, as identified in table 12, will be carried out as follows:

A. Where the Corps determines that work will be in accordance with the "Secretary of the Interior's Standards for Rehabilitation," the actions will be carried out. The Corps will maintain records of all work performed, which shall be open to inspection by the relevant SHPO, upon request, to verify that the "Standards" are being interpreted in a manner consistent with the policies of the SHPO.

B. Where the Corps determines that work will not be in accordance with the "Secretary of the Interior's Standards for Rehabilitation", or where any guidewall extension; addition of lock structure; or removal, relocation or major alteration of control stations are proposed, the Corps will consult with the relevant SHPO to determine an acceptable treatment. Where the Corps and the SHPO reach agreement, the Corps may proceed in accordance with the agreed upon treatment. Where the Corps and the SHPO cannot reach agreement, the Corps will notify the Council to obtain help in resolving the disagreement and may request the comments of the Council in accordance with 36 CFR Section 800.5(e)(6).

4. The Corps shall ensure that a record is made of locks and dams 3 through 22. The Corps shall request the National Park Service (Historic American Engineering Record) to determine appropriate documentation for the locks and dams. Prior to conducting any rehabilitation, the Corps shall ensure that documentation specified by the National Park Service is completed. Copies of the documentation of the locks and dams within each State's jurisdiction shall be provided to the relevant SHPO. Copies of the documentation of the locks and dams within each Corps district shall be maintained in each district office of the Corps.

5. Rehabilitation work anticipated, but not yet planned, including work at locks and dams 11, 14, and 19 (only the c. 1913 portion of lock and dam complex 19), will be reviewed by the Corps, the relevant SHPO, and the Council at the time planning begins. If the Corps, the SHPO, and the Council agree, such work may be carried out in accordance with the terms of this Agreement.

6. Nothing in this Agreement is intended to prevent the Corps, the SHPOs, or the Council from consulting more frequently or informally concerning any questions that may arise or on the progress of any projects falling under this Agreement.

7. Any of the signatories to this Agreement may request a reconsideration of its terms or revoke the Agreement upon written notice to the other signatories. In the event the Agreement is revoked or for other reasons is not implemented, the Corps will follow the procedures set out in 36 CFR Part 800 to obtain the Council's comments on individual undertakings of the program.

Execution of this Programmatic Agreement and carrying out its terms evidences that the Corps has satisfied its Section 106 responsibilities for all individual undertakings of the program.

(date) 30 May 87
Chairman
Advisory Council on Historic Preservation

(date) 24 June 1987
District Engineer
Rock Island District
Corps of Engineers

(date) 12 June 1987
District Engineer
St. Paul District
Corps of Engineers

(date) July 1987
Illinois State Historic Preservation Officer

(date) 7/24/87
Iowa State Historic Preservation Officer

(date) 8/5/87
Minnesota State Historic Preservation Officer

5-10

(date) Aug. 21 1987
Missouri State Historic Preservation Officer

(date) Aug. 31, 1987
Wisconsin State Historic Preservation Officer

TABLE 12

Impact Summary for Major Rehabilitation Actions
(see also table 11)

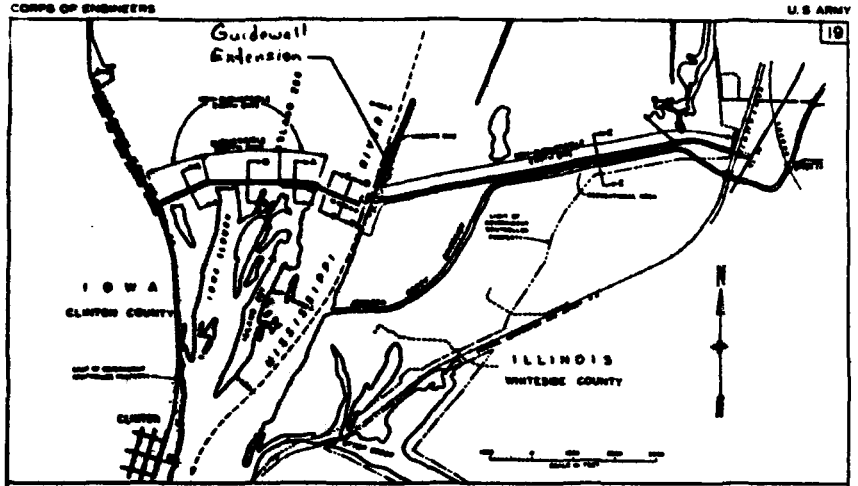
Action	Affect to Significant Fea.	Affect to Potential NRHP Element	Adverse Effect Criteria	No Adverse Effects	Compliance w/Sec'y Interior's Standards	Beneficial Effects
Lockwalls, Guidewalls Walking Surfaces	Yes	Yes	Potentially 1 and 3 for guidewall extensions	All actions except guidewall extensions	Concrete and other replacement will essentially match existing conditions; guidewall extension will match those already in place at some locations and will appear clearly different from original lock walls	Except guidewall extension, required upkeep of structures
Main Lock Miter Gates	Yes	Yes	None apply	All actions	Cleaning and painting essentially as existing	Required maintenance
Lock Dewatering System	No	No	None apply	No effect	Straight forward inspection and repair as existing/original	Required maintenance
Emergency/Auxiliary Lock Miter Gates	No	No	None apply	No effect	Straight forward inspection and repair as existing/original	Required maintenance
Main Lock Miter Gate Machinery	Yes	Yes	None apply	New machinery on lockwall will be a minor intrusion	New machinery on top of lock wall will only be about 3 ft. high and visually unobtrusive; replacement parts for 50-yr.-old equipment cannot be obtained	Required maintenance and removal of machinery from flood susceptible pits
Lock Tainter Valve Machinery	Yes	Yes	None apply	New machinery on lockwall will be a minor intrusion	New machinery on top of lock wall will only be about 3 ft. high and visually unobtrusive; replacement parts for 50-yr.-old equipment cannot be obtained	Required maintenance and removal of machinery from flood susceptible pits
Main Lock [illegible]	No	No	None apply	No effect	Not required	Required resolution of safety hazard
Lock Electrical Equipment	No	No	None apply	No effect	Not required; replacement parts unavailable for 50-yr-old equipment; unobtrusive alteration	Required maintenance to improve operation
Dam Structure	Yes	one at L/D 15 and L/D 17	None apply	All actions	Repair, no overall appearance or function changes	Required maintenance

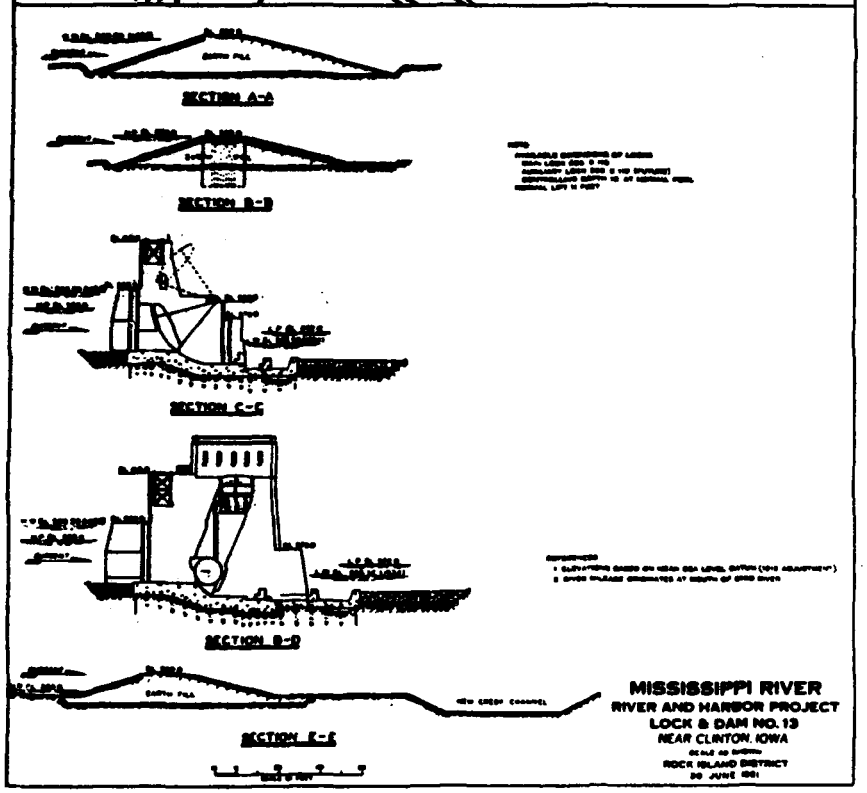
TABLE 12 (Cont'd)

Action	Affect to Significant Fea.	Affect to Potential NRHP Element	Adverse Effect Criteria	No Adverse Effects	Compliance w/Sec'y Interior's Standards	Beneficial Effects
Roller Gates	Yes	Yes	None apply	All actions	Cleaning, painting and wiring plans conform	Routine maintenance
Tainter Gates	Yes	Yes	None apply	All actions	Cleaning, painting, wiring, chain work conform	Routine maintenance
Service Bridge	No	No	None apply	No Effect	Full compliance	Routine maintenance
Piezometers	No	No	None apply	No Effect	Full compliance	Routine maintenance
Emergency Bulkheads	No	No	None apply	No Effect	Full compliance	Routine maintenance
Scour Protection	No	No	None apply	No Effect	Full compliance	Routine maintenance
Storage Yard Tracks	No	No	None apply	No Effect	Full compliance	Routine maintenance
Overflow Section	No	No	None apply	No Effect	Full compliance	Routine maintenance
Storage Yard [illegible]	No	No	None apply	No Effect	Full compliance	Routine maintenance
Non-Overflow Section	No	No	None apply	No Effect	Full compliance	Routine maintenance
Abutments	No	No	None apply	No Effect	Full compliance	Routine maintenance
[illegible]	No	No	None apply	No Effect	Full compliance	Routine maintenance
Powerhouse Generator	Yes	Yes	Criteria 1 could apply for roofs and windows	All actions	Normal wear repairs; roofs and windows could be designed to comply and preserve appearance, profile, and configuration	Routine maintenance
Maintenance Storage Shed	No	No	None apply	No Effect	Normal wear repairs; roofs and windows could be designed to comply and preserve appearance, profile, and configuration including doors	Routine maintenance
Lock Control Stand Enclosures	Yes	Yes	Criteria 1 and 3 for new enclosures could apply	All actions	New enclosures can be designed to blend in with overall concrete matrix and be an improvement over the existing metal ones	Routine maintenance

CORPS OF ENGINEERS U.S. ARMY

19

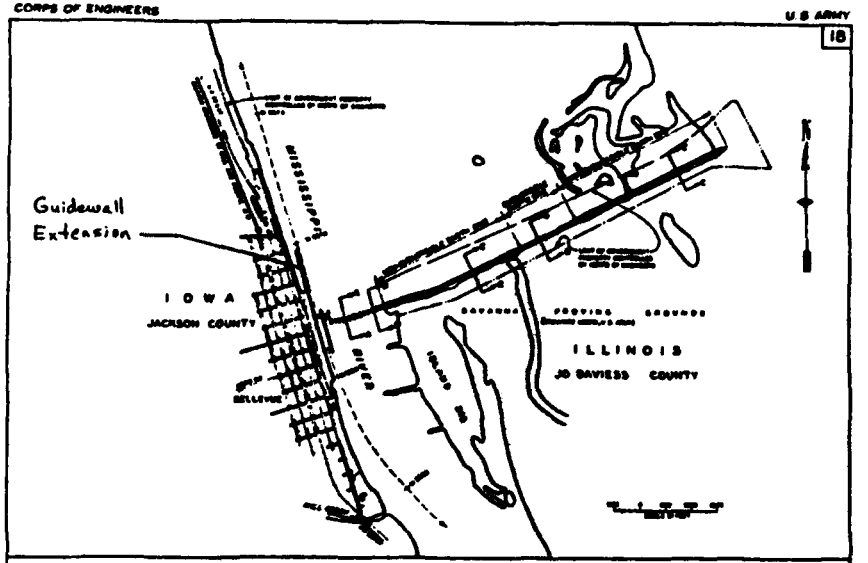


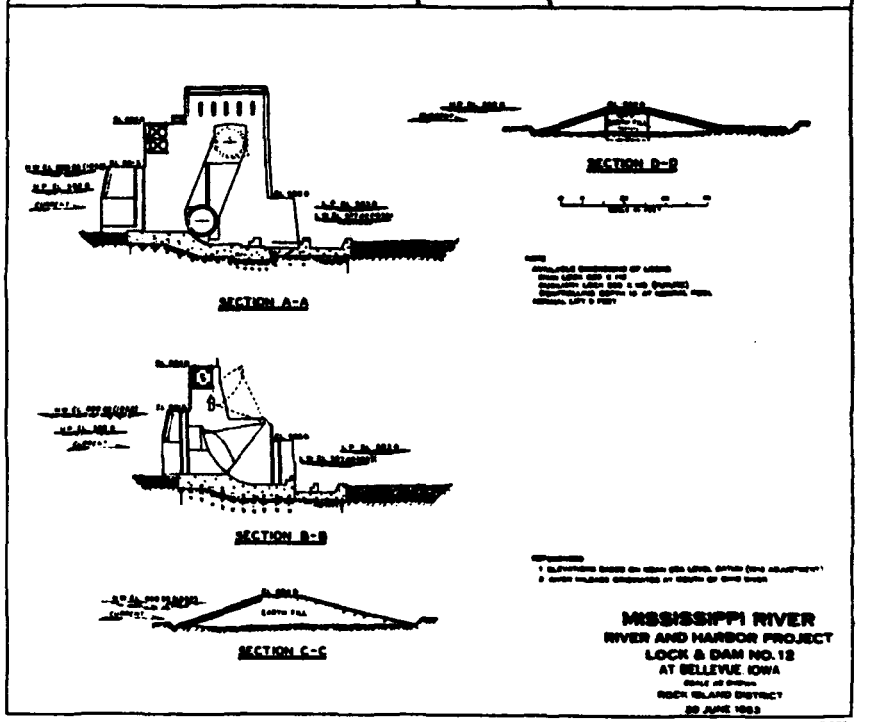


MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 13
NEAR CLINTON, IOWA
ROCK ISLAND DISTRICT
30 JUNE 1981

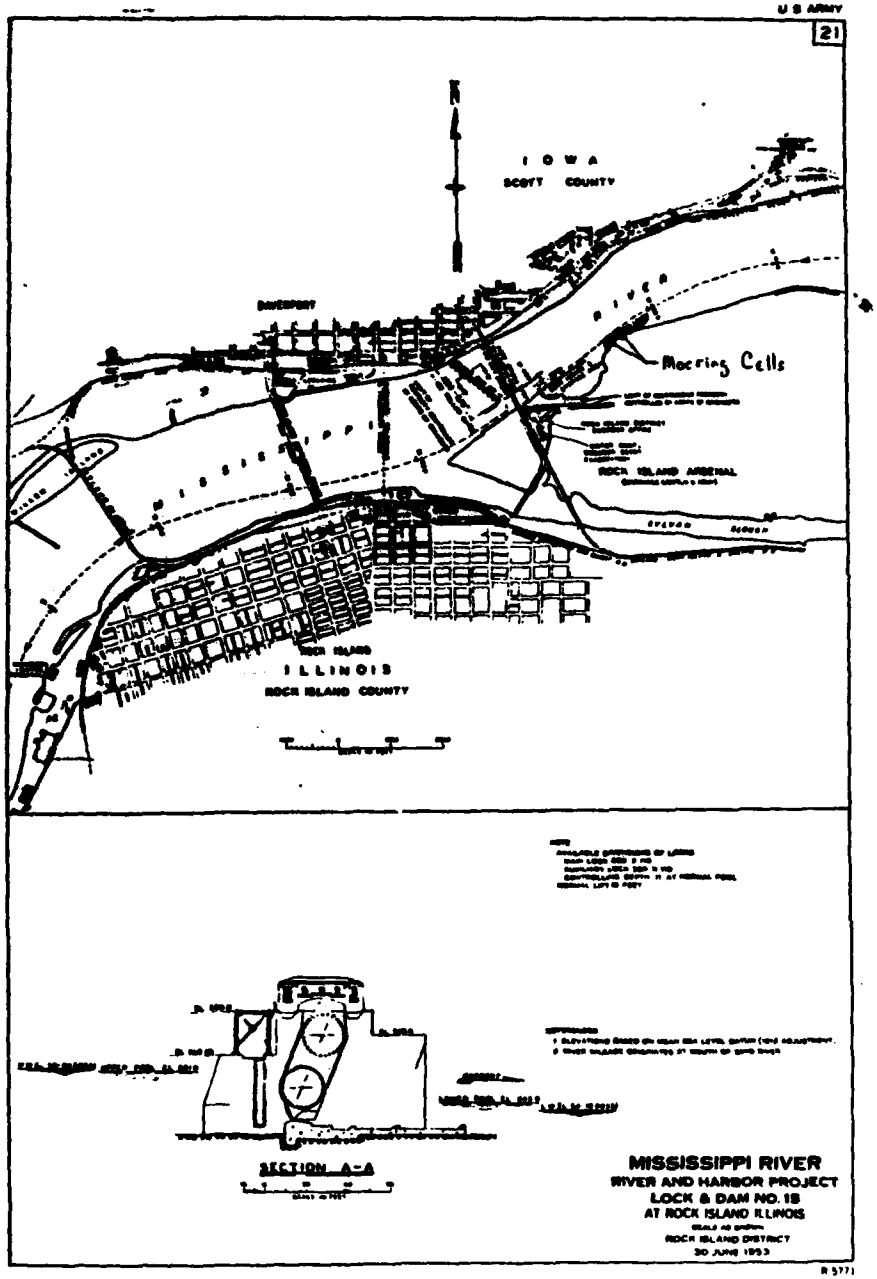
CORPS OF ENGINEERS U.S. ARMY

18





MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 12
AT BELLEVUE, IOWA
ROCK ISLAND DISTRICT
30 JUNE 1983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21
I O W A
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Mooring Cells
ROCK ISLAND ARSENAL
ILLINOIS
ROCK ISLAND COUNTY
SECTION A-A
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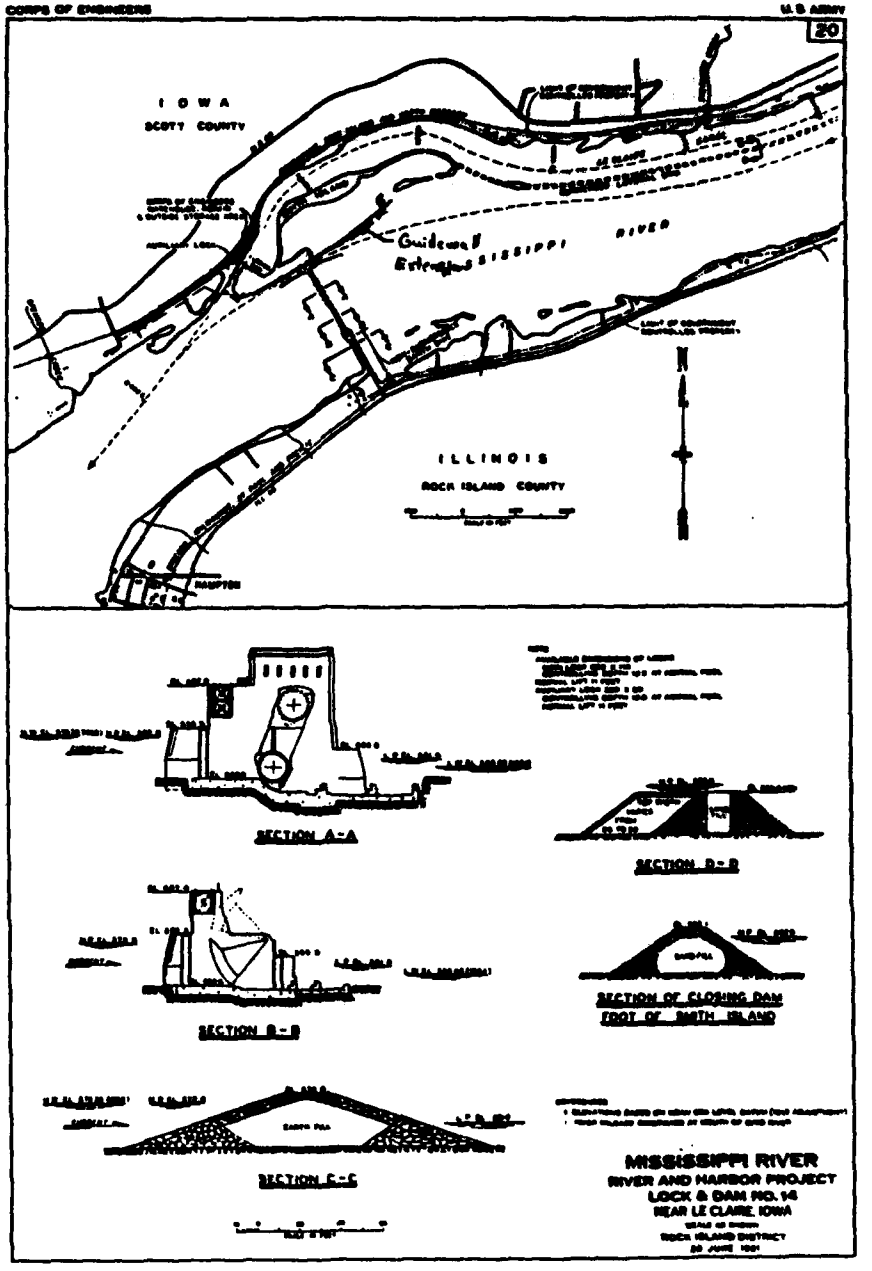
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 15
AT ROCK ISLAND ILLINOIS
ROCK ISLAND DISTRICT
30 JUNE 1953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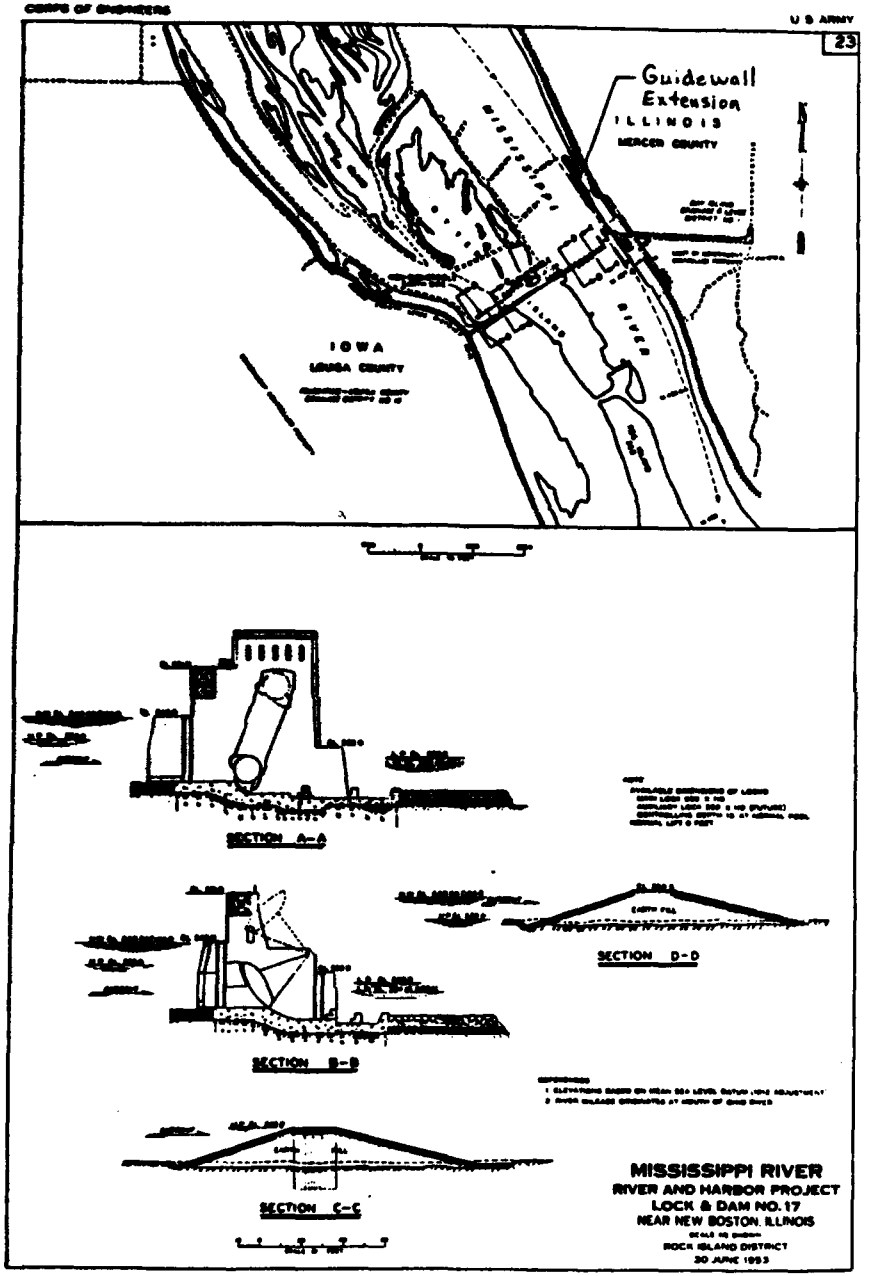
SCOTT COUNTY
ILLINOIS
ROCK ISLAND COUNTY
SECTION A-A
SECTION B-B
SECTION D-D
SECTION OF CLOSING DAM
FOOT OF SMITH ISLAND
SECTION C-C
MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 14
NEAR LE CLAIRE IOWA
ROCK ISLAND DISTRICT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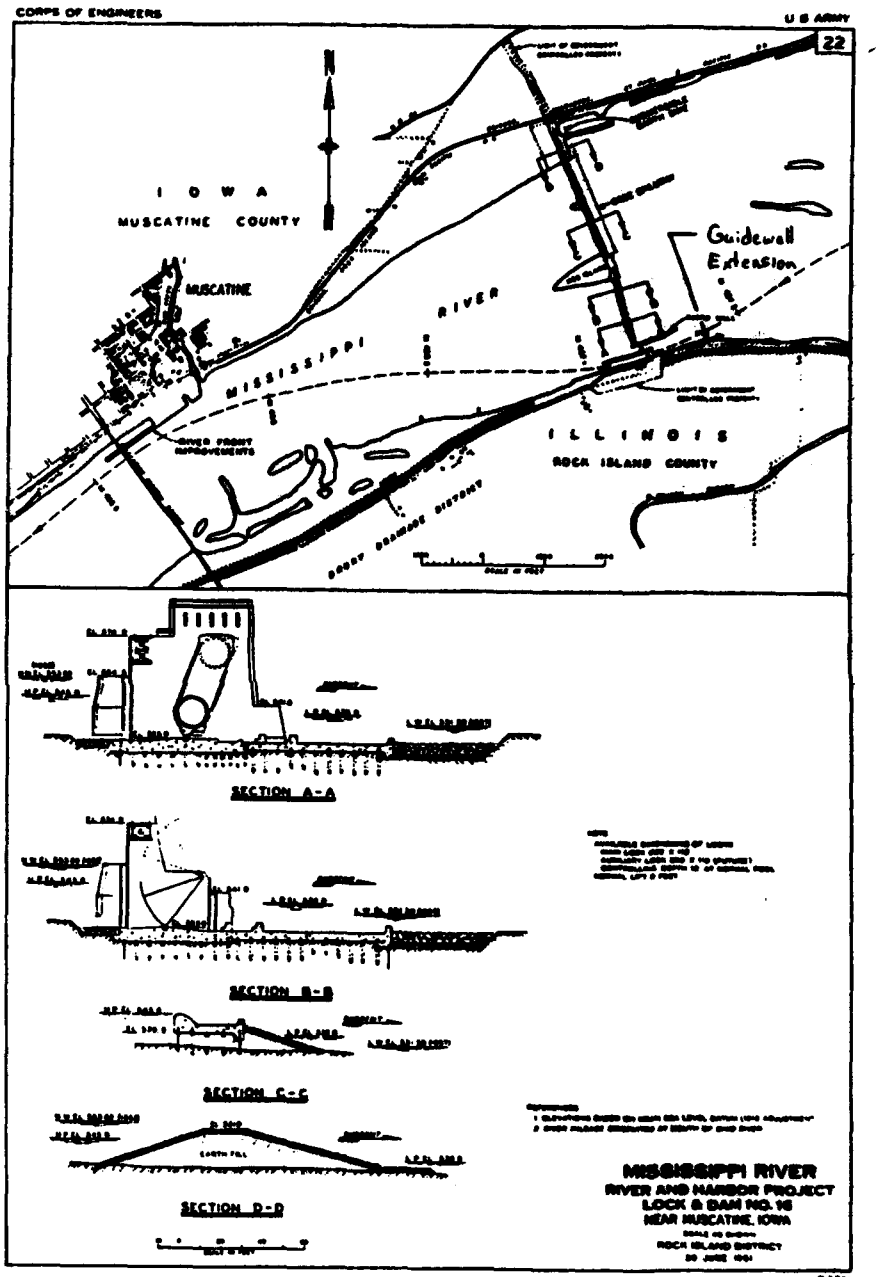
ILLINOIS
MERCER COUNTY
IOWA
LOUISA COUNTY
MISSISSIPPI RIVER
SECTION A-A
SECTION D-D
SECTION B-B
SECTION C-C
MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 17
NEAR NEW BOSTON, ILLINOIS
ROCK ISLAND DISTRICT
30 JUNE 1953
R 5771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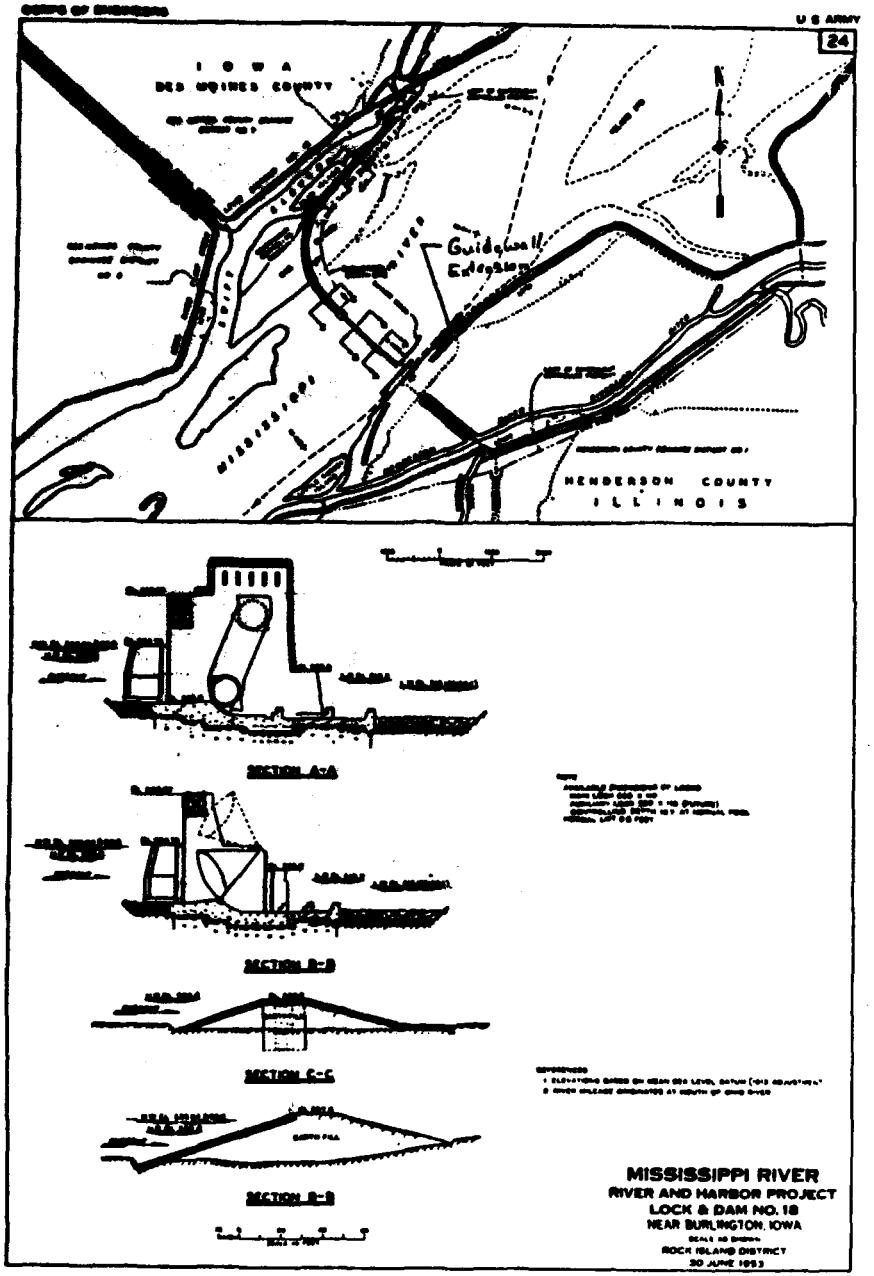
MUSCATINE COUNTY
MUSCATINE
Guidewall Extension
MISSISSIPPI RIVER
ILLINOIS
ROCK ISLAND COUNTY
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 16
NEAR MUSCATINE, IOWA
ROCK ISLAND DISTRICT
R 5771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U S ARMY
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I O W A
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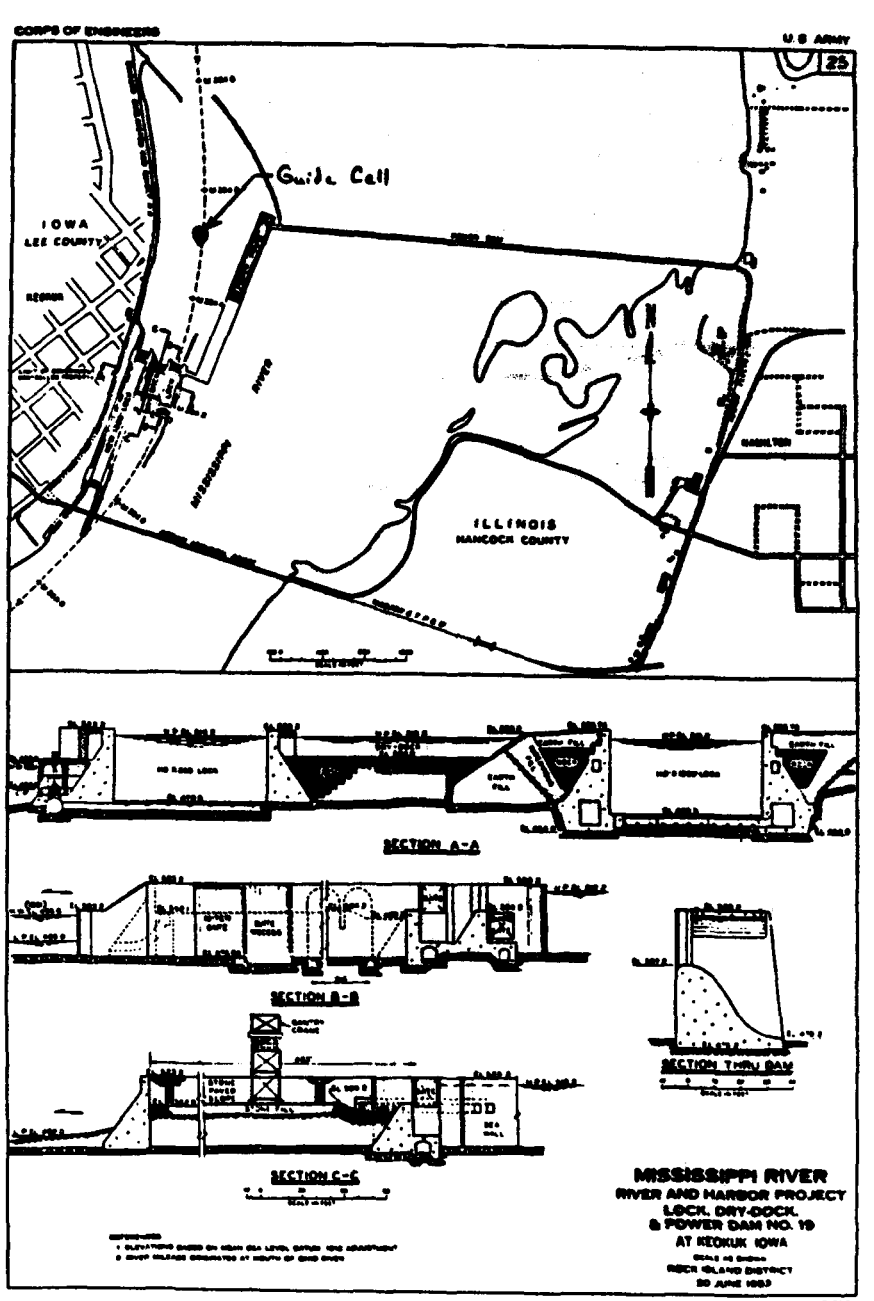
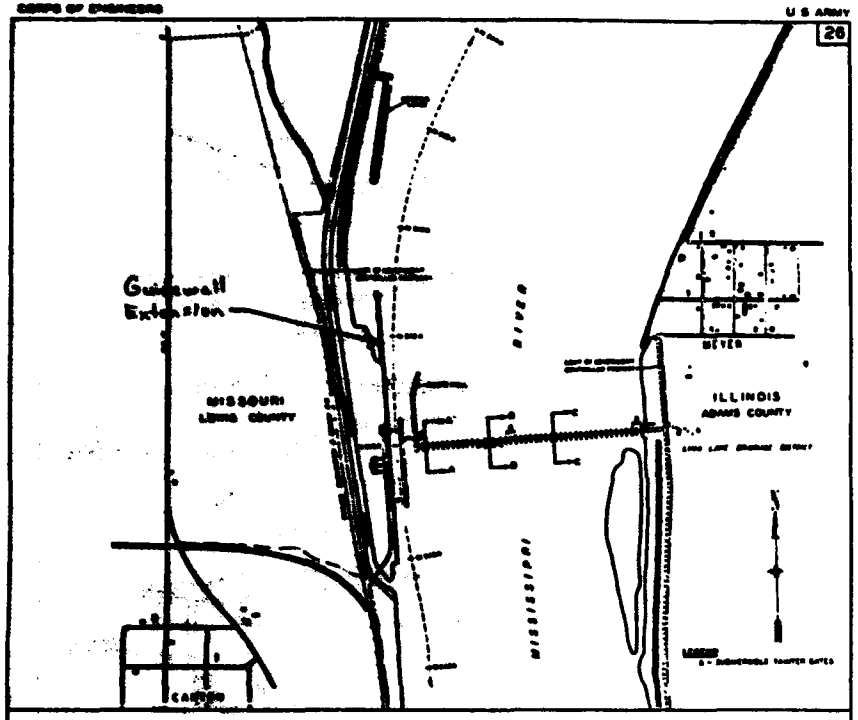
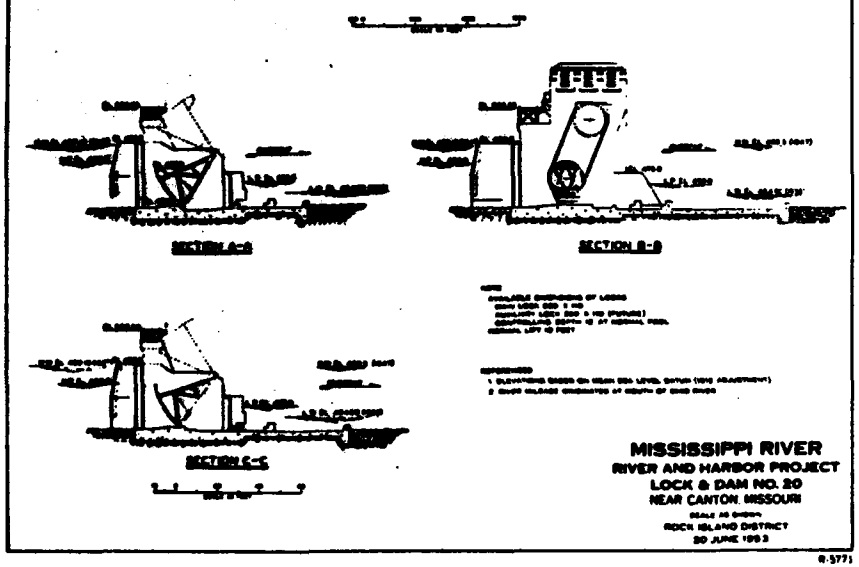
Guidewall
Embankment
MISSISSIPPI
RIVER
HENDERSON COUNTY
ILLINOIS
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 18
NEAR BURLINGTON, IOWA
ROCK ISLAND DISTRICT
30 JUNE 1953
R 5771


CORPS OF ENGINEERS
U S ARMY
25
Guide Call
I O W A
LEE COUNTY
MISSISSIPPI
RIVER
ILLINOIS
HANCOCK COUNTY
SECTION A-A
SECTION B-B
SECTION C-C
SECTION THRU DAM
MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK, DRY-DOCK
& POWER DAM NO. 19
AT KEOKUK IOWA
ROCK ISLAND DISTRICT
30 JUNE 1953
R 5771

CORPS OF ENGINEERS U S ARMY

26



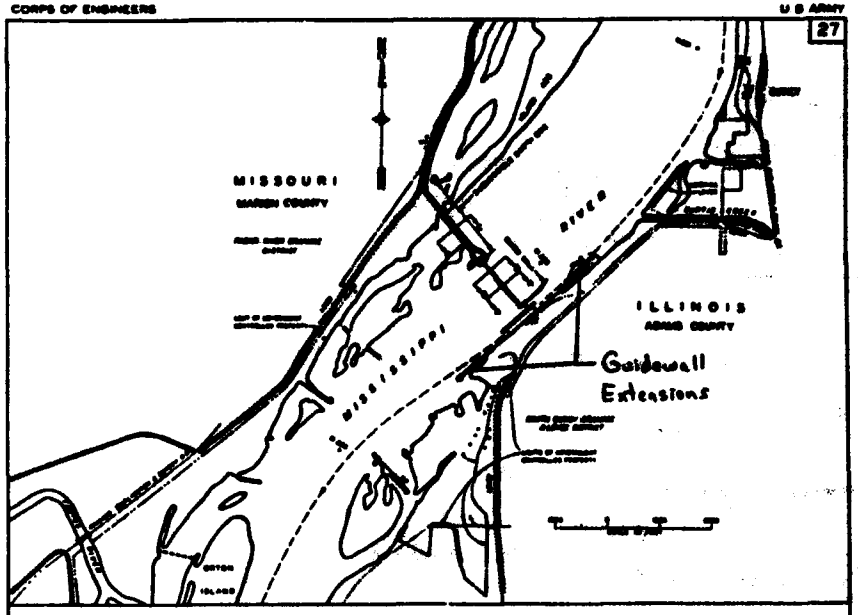


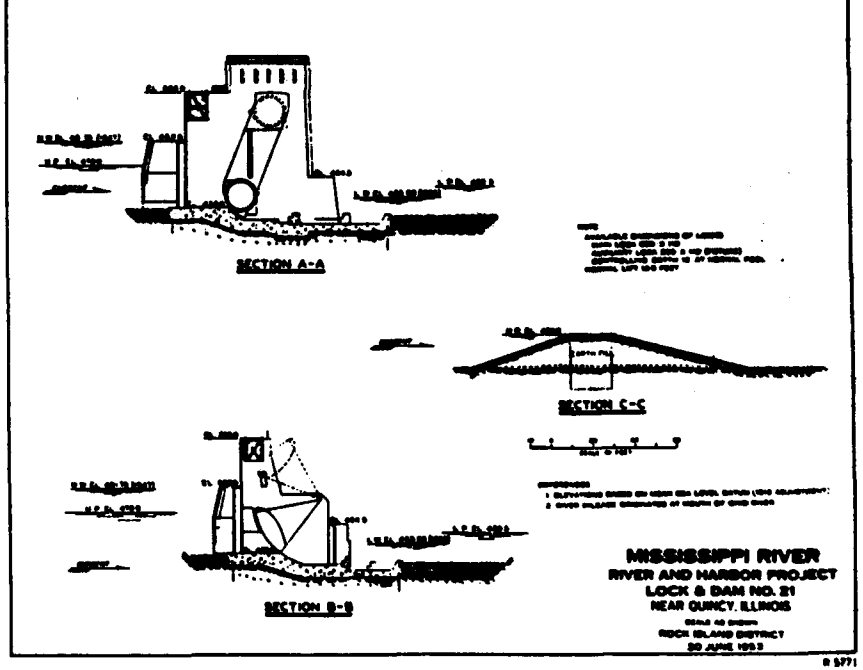
MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 20
NEAR CANTON, MISSOURI
ROCK ISLAND DISTRICT
30 JUNE 1953

0-5771

CORPS OF ENGINEERS U S ARMY

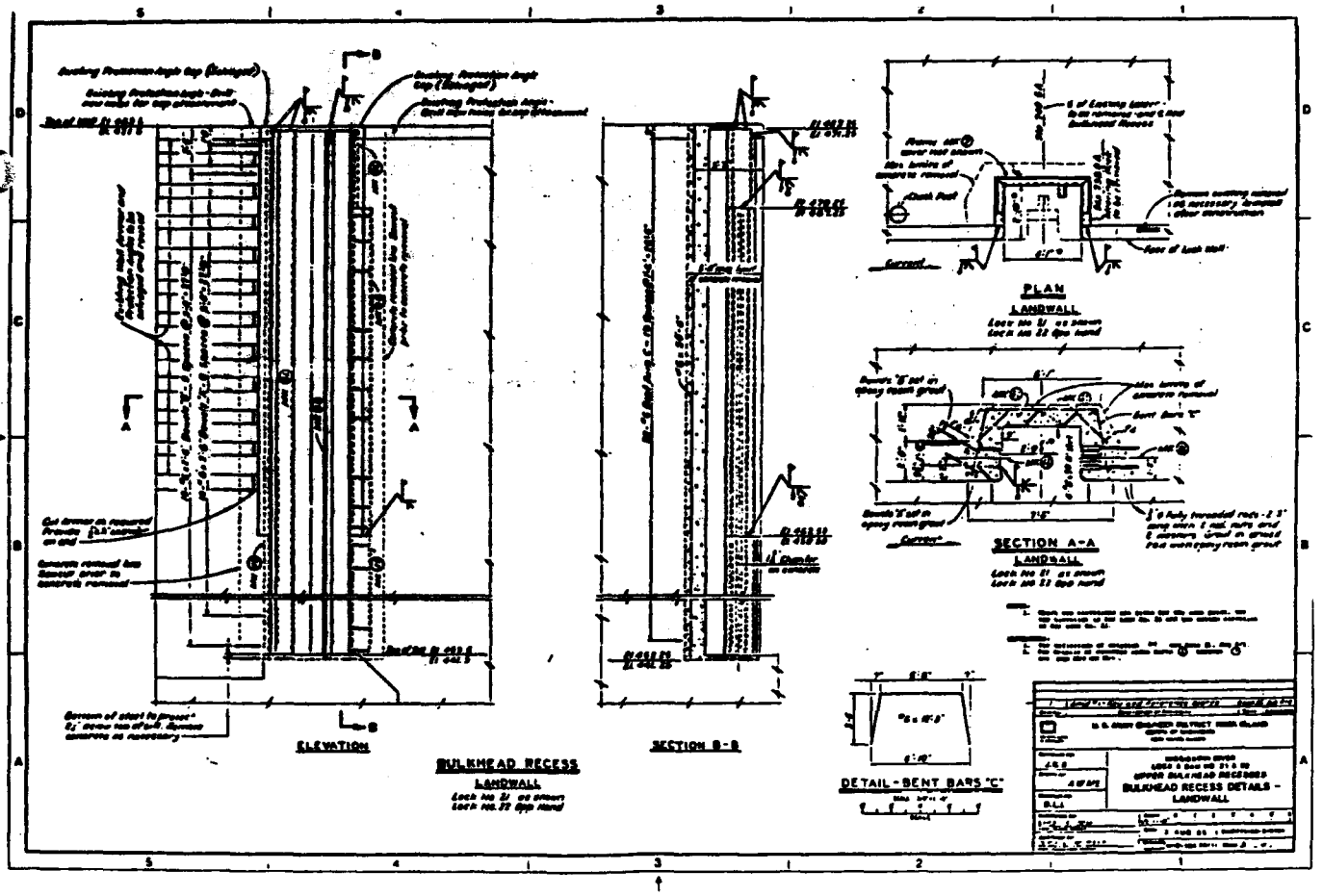
27





MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 21
NEAR QUINCY, ILLINOIS
ROCK ISLAND DISTRICT
30 JUNE 1953

0-5771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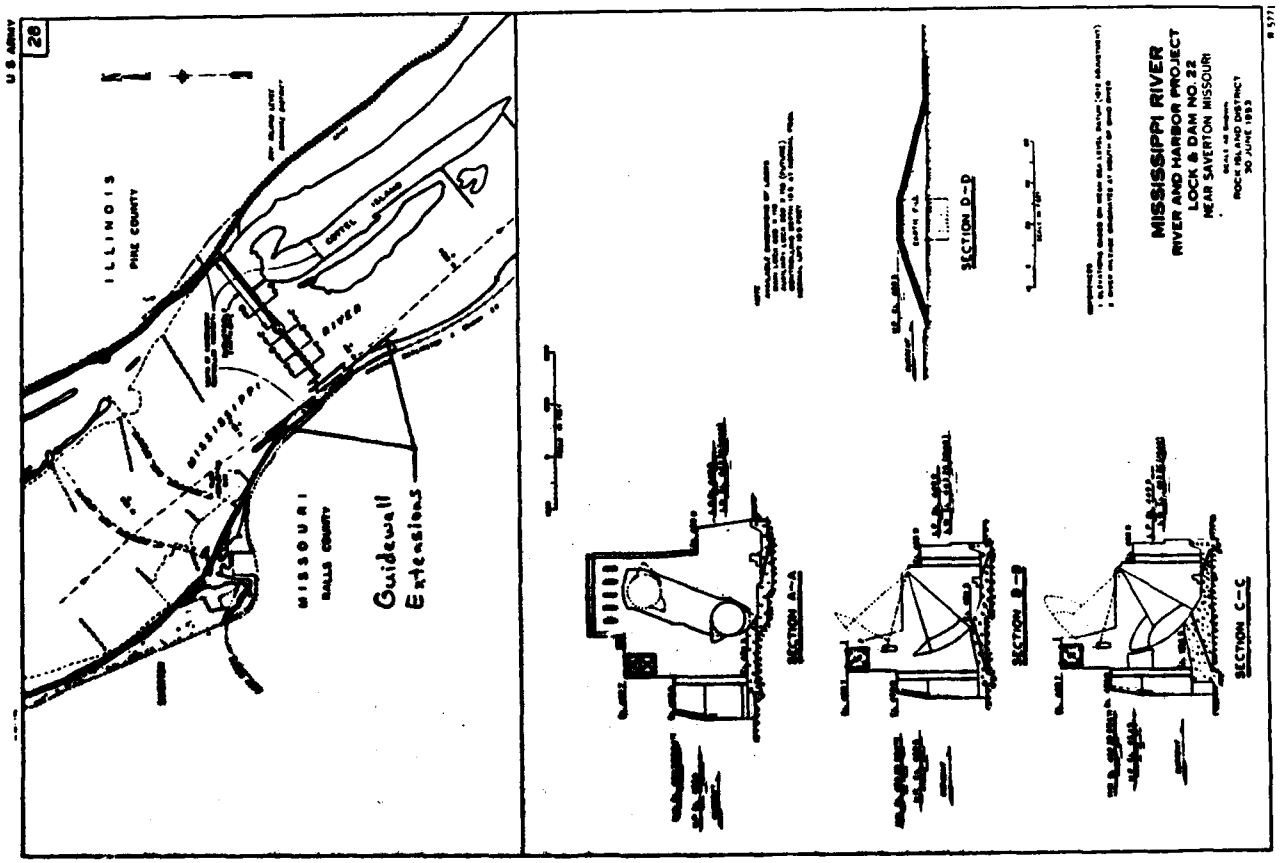
PLAN
LANDWALL
SECTION A-A
LANDWALL
BULKHEAD RECESS
LANDWALL
DETAIL - BENT BARS "C"
UPPER BULKHEAD RECESSES
BULKHEAD RECESS DETAILS - LANDWALL


ILLINOIS
PIKE COUNTY
MISSOURI
CALLS COUNTY
Guidewall Extensions
SECTION D-D
SECTION A-A
SECTION B-B
SECTION C-C
MISSISSIPPI RIVER
RIVER AND HARBOR PROJECT
LOCK & DAM NO. 22
NEAR SAVERTON MISSOURI

Advisory Council On Historic Preservation

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

JUN 21 1985

Colonel William G. Burns
Corps of Engineers
District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204-2004

REF: Generic Rehabilitation Program, Locks and Dams 11-22, Upper Mississippi River

Dear Colonel Burns:

We want to thank you for hosting the meeting on June 4, 1985 to review the historical report on Locks and Dams 11-22 and to discuss the impacts of the rehabilitation program.

The meeting was extremely productive. By bringing together the Council, the State Historic Preservation Offices of Missouri, Illinois, and Iowa, and your office and the St. Paul District, we were able to address comprehensively all aspects of planning for the potential historic attributes of the lock and dam system. Michael Quinn, our participant in the meeting, has prepared comments to follow up the meeting; his report is enclosed.

This is an excellent initiative on your part that not only allows early coordination between our offices but addresses the rehabilitation work as a comprehensive program. This gives us a better understanding of its overall scope and effect. We anticipate being able to resolve any preservation issues in a timely and mutually satisfactory manner.

If we can be of any assistance in elaborating on our comments on the historical report, please contact Michael Quinn at (202) 786-0505.

Sincerely,

for Don L. Klima
Chief, Eastern Division
of Project Review

5-18

Advisory Council On Historic Preservation

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

Comments on:

Historical-Architectural and Engineering Study
Locks and Dams 11 — 22
Nine-Foot Navigation Project
Mississippi River

Advisory Council on Historic Preservation
Michael C. Quinn
June 20, 1985

Introduction.

I have prepared these comments to follow-up the discussions of a meeting on June 4, 1985 involving the Rock Island and St. Paul Districts of the Corps of Engineers, the State Historic Preservation Officers of Illinois, Iowa, and Missouri, and the Advisory Council on Historic Preservation.

I. Rathbun's Recommendations on Significance.

We disagree with their proposal to find only one of the locks and dams eligible for the National Register. The locks and dams were conceived and built as a system to provide a navigation channel on the Upper Mississippi that would accommodate boats drawing up to nine feet (hence its name). The Rathbun report drives home this point on page II-34. Thus the system has an historical significance that is greater than that of any one lock or dam. In fact, given the recent date of the system, it may be difficult to justify that one lock and dam (except the older lock and dam at Keokuk), out of context of the system, possesses enough significance to be eligible for the National Register. The applicable criterion of the National Register is 36 CFR Section 60.4(c), which qualifies districts and complexes whose elements may not be significant individually.

What prompts the Rathbun's to make their recommendation, however, is not the theoretical basis of the the National Register, but a pragmatic concern about how program managers react to the registration of a property. They feel that registering the entire system will undermine the deference that

managers should properly have for such properties, because the managers will learn that a property can be altered even though it is on the Register. The Council cannot endorse this approach. Their premise seems to be that managers should be taught that a Register property is inviolate. We sympathize with their concern that registration translate into tangible protection for a property. But their recommendation is flatly misleading; the Preservation Act makes clear that Register properties are only to be considered, not placed off-limits. After all, that is why the Council is an advisory body, rather than an adjudicatory body. Even if the Rathburn approach were incorporated into law, one could suspect that in the long run it would be counterproductive by generating opposition to National Register listing out of fear of the consequences.

But that we have a choice, but it is preferable to education program people to the complexities of the Register program. This may not be as straightforward a job as proclaiming a property off-limits, or as easily accomplished. But the goal of the Act is to have agencies consider the presence and value of historic properties, incorporating these values into the equation by which the benefits of a project are weighed against its costs. This does not occur effectively unless it is an integral part of the planning process. We've found that it can't be "applied" after the planning decision is made; trying to do so frequently means that many alternatives are already foreclosed, and it naturally leads to very hostile relations, from which we rarely get sympathetic treatment of the resources. The best way to incorporate preservation is to teach the program people to appreciate the resources. This means sharing information on how decisions are made about historic properties, including the fact that register properties can be altered.

One other thing that is troubling about the Rathbun's approach is that it seems somehow to respond to the program rather than try to influence it. The Rathbuns have selected one lock and dam complex for registration because they believe that the Corps can handle one, but not more. In addition they have selected number 17 not just because it is representative, but also because it cannot accommodate hydropower development. Thus they seem to be finding historic properties not where the heritage is, but where the finding is most convenient for program management.

We believe that management of the system would be more logical and consideration of historic values would be facilitated if the Corps were to treat the entire lock and dam system as an interelated group of properties when assessing eligibilty.

II. The Rathbun Report.

The report itself is impressive for the detail and thoroughness of the work that has gone into it. It is a comprehensive history not only of the 9 Foot Project, but of all the navigation improvements on the Upper Mississippi River.

What is needed now is some organizing and editing. This is most critical in the overview, Chapter II, which has most of the information needed to make an overview, but is not concise enough in its organization or writing. The emphasis of the overview should be to provide *an easy way to grasp* the history of the navigational improvements on the Upper Mississippi and

understand what historic properties are likely to have survived. One way to do this would be to more clearly identify the major phases of development, and give them prominence by structuring the overview around them. This would subdivide the chapter as:

1829-66: Minor channel improvements
1866-78: Dredging, experimental and some permanent improvements
1878-1901: 4 1/2 foot project
1907-1930: 6 foot project
1930-present: 9 Foot Project

The overview chapter is also too long. Much detail can be eliminated without decreasing the reader's overall understanding of the development of the river (the detail should be shifted to another part of the report, not dropped). Similarly the treatment of the Illinois and Mississippi Canal and even the first lock and hydropower facility at Keokuk can be abbreviated. An addition is needed to treat the economic impact and history of the 9 foot project after its construction. For example, some information on how much tonnage is transported, how important this is to the region, how this compares to other modes of transportation, etc. would be helpful.

Finally, the document would be improved by editing to vary sentence structure and to clarify the antecedents of the nouns "complex," "unit," "site," "system," and "group" that are used interchangeable and too vaguely. One minor point: 36 CFR Part 800 are regulations, not procedures and, more importantly, are not research standards. With these changes, the chapter would provide an outstanding overview of the history of navigational improvements on the Upper Mississippi.

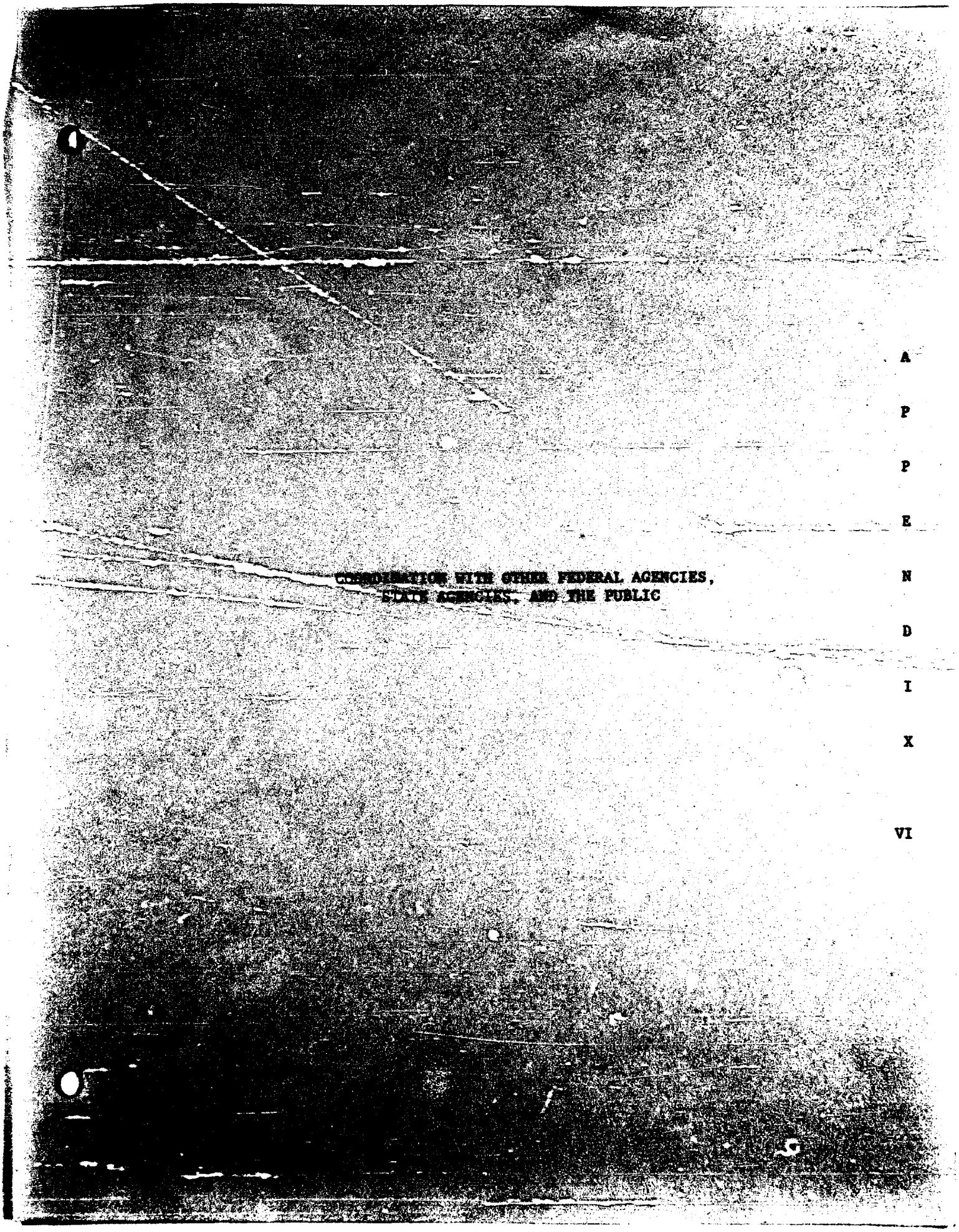
III. Compliance for Generic Lock and Dam Rehab

As was evident at the meeting, there are no major objections to the work proposed in the Generic Rehab program even if all the locks and dams are considered eligible. The reason for this is the type of work proposed and the nature of the lock and dam system's significance. The system is not very old, it does not, as the Rathbun's have established, incorporate any particular technical or engineering innovations, and while it has a very distinctive appearance, its architecture is very spartan and utilitarian. But it has had an enormous impact on transportation in the Upper Mississippi region. Going back to my earlier comments, the concern of the 106 process is for those attributes of the property that define its architectural and historical significance. These would probably be defined as its general overall configuration and appearance--buff concrete, mitre gated locks, and the dam structure with its combined tainter and roller gates--and its continued existence as a system which is capable of functioning. So long as these attributes are left intact, the Corps is not likely to receive outright objections to its plans.

The work proposed does not threaten these essential components; the work is designed to repair normal wear and tear and to accommodate modern traffic through minor changes. The Corps is likely, however, to receive comments on how to conduct the work. You may wish to divide the work into categories based upon the effect on the system and obtain comments on the entire rehab program. Some of the work--for example, the proposed electrical work--would probably be accepted as having no effect. Other aspects, such as repairing missing concrete, will have an effect, but will

probably be acceptable under certain conditions, for example, ensuring that the new concrete matches the old in color. Most concern will be focused on the proposal to lengthen the approach walls to the locks, which is also the greatest physical alteration. This may require consultation on the specific plans for each lock, but may be acceptable under some general guidelines.

You may wish to explore this approach in your planning and consultations with the SHPOs involved. We would also welcome any other approach that feel will effectively respond to the Corps' program needs.



APPENDIX

COORDINATION WITH OTHER FEDERAL AGENCIES, STATE AGENCIES, AND THE PUBLIC

APPENDIX VI

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF:

06 FEB 1988

Mr. Dudley M. Hanson, P. E.
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Hanson:

In September of 1987 you indicated that your agency would be preparing an environmental impact statement (EIS) for the rehabilitation of Locks and Dams 2 through 22 on the Mississippi River, and on the Illinois Waterway from Lockport to LaGrange. As part of the scoping process for the preparation of the EIS, you requested our Agency's review of the traffic analysis for the Upper Mississippi River System (UMRS). The purpose of the analysis was to determine whether the rehabilitation would result in increased commercial traffic. We have also reviewed the responses of your agency to questions posed in an October 21, 1987 letter by the U.S. Fish and Wildlife Service. Based upon our review of their items we have concerns that the model used to predict future traffic patterns may need some revisions. 6-1

Impacts to UMRS traffic were evaluated using the "CONGEST" model. This is the same model that was used during the 1987 Master Plan study. According to the traffic analysis report, the CONGEST model uses input data relating in part to commodity traffic patterns. In the past 10 years, however, commodity traffic on the UMRS has differed from Master Plan study projections for some commodities.

We request information on how well the CONGEST model has been able to predict total UMRS traffic in the past 10 years. We recommend that the model be modified by incorporating the differences between actual predicted input data over the past 10 years, not only for commodity traffic, but for all model parameters. Utilization of this additional information should improve the longterm predictive ability of the model.

It would also be helpful if the analysis included a monthly breakdown on the predicted traffic increases for the UMRS. According to the traffic analysis, rehabilitation construction will result in a 1.4 % increase in the UMRS traffic by 2040. This traffic increase amounts to an average increase of less than one tow per week on the Illinois Waterway and about two tows per week on the Mississippi River. A 1.4 % annual increase in traffic does not appear environmentally significant if this increase is spread evenly throughout the year. If, however, the traffic increase is instead concentrated into a small time frame, adverse environmental impacts may result.

On page 4 (Number 13) of the report, it is stated that commodity flow projections represent reasonable forecasts of longterm waterway activity. However, actual data does not fully support this statement. In addition on page 10 (Number 37), it is estimated that installation of bubbler systems at Locks 21 and 22 will result in a 2.0 percent increase in annual traffic. This increase is based on longer periods of open water, the bubble system prevents the water from freezing. The environmental impact statement that is being prepared for this project should evaluate the impacts associated with the bubbler system, from the additional traffic from the changes in ice conditions and whether the bubbler system will be viable at other sites.

Thank you for the opportunity to review the Traffic Analysis Report. If you have any questions concerning our comments, please contact Ms. Jennifer Brown of the Environmental Review Branch at (312) 886-6873.

Sincerely yours,

William D. Franz

William D. Franz, Chief
Environmental Review Branch
Planning and Management Division

Minnesota
Department of Transportation
Transportation Building
St. Paul, Minnesota 55155

Office of Commissioner (612) 296-3000

November 4, 1987

District Engineer
U.S. Army Engineer District, Rock Island
Attn: Planning Division
Clock Tower Building - P.O. Box 20004
Rock Island, Illinois 61204-2004

Gentlemen:

The Minnesota Department of Transportation (Mn/DOT) considers the Mississippi River commercial navigation system to be a vital element in our state's total transportation network. Because of the long distances our production needs and our products must travel, we in Minnesota, must always be sure that we have available the most economical transport system possible. Water transportation provides that economy especially to our agricultural community, through both its own low rates and through its strong competitive influence on the other modes of transportation.

6-2

Your proposed rehabilitation program for locks 2 through 22 will help to assure that the river continues to provide both economy and competition in the transport of our goods. Many of the proposed projects involve features which were reviewed and recommended by the Upper Mississippi River Masterplan which Mn/DOT helped develop. Guard walls and guide wall extensions were among the many improvements suggested by the study.

With the physical deterioration which has accompanied the aging of the system an appreciable loss of capacity has occurred at the locks. What is looked on as capacity increases resulting from your program could very well involve only recapture of some of that lost capacity. In any event, the low levels of capacity increase anticipated from each project are not great enough to endanger the river ecosystem.

Mn/DOT supports efforts, such as this rehabilitation program, which help assure the continued operational integrity of the system.

Sincerely,

LEONARD W. LEVINE
COMMISSIONER

An Equal Opportunity Employer

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Carroll D Besadny
Secretary

BOX 7921
MADISON, WISCONSIN 53707

October 29, 1987 IN REPLY REFER TO: 1650-2

District Engineer
U.S. Army Engineer District, Rock Island
Attn: Planning Division
Clock Tower Building - P.O. Box 204
Rock Island, IL 61204-2004

Dear Sir:

We have reviewed your traffic analysis for the major rehabilitation effort Environmental Impact Statement for Locks and Dam 2 through 22 on the Mississippi River and Locks and Dams on the Illinois River. Our comments are provided below and are intended to supplement our earlier comments given during the scoping process in June 1987.

Bubbler Systems (Paragraph 34)

There appears to be discrepancy between the bubbler systems proposed in this report and those proposed in the recently completed St. Paul District Corps of Engineers Environmental Assessment (EA) for rehabilitation measures at locks 2-10. For example, in this report, you state that the bubbler systems installed at Upper Mississippi River System (UMRS) locks 2-20 will increase capacity at these locks by 1%. Yet, according to the St. Paul District Corps of Engineers report, the locks 2-10 bubbler systems will have no potential cumulative impacts.

If the bubbler systems that are proposed in this report are of higher capacity, then what is the justification for the increase in capacity? Which bubbler systems will ultimately be installed?

Navigation Capacity Increases (General)

At the present time, we have no reason to doubt your estimates that the proposed actions will result in only a 1.4% increase in UMR system traffic by the year 2040. Nevertheless, we must state our concerns about any increases in the navigation capacity or use of the locks on the UMRS. Small increases, when added together with other increases in the navigation on the river, can ultimately result in significant environmental effects.

There is already concern about the effects of navigation traffic without any more increases in traffic. Congress has acknowledged that existing conditions on the UMRS are already significantly bad enough to warrant environmental rectification measures (Environmental Management Program, Water Resources

Development Act of 1986). We are particularly concerned that the delicate balance between navigation interest and environmental values on the river will be more difficult to maintain in the future with increased navigation traffic.

We recommend you examine alternative designs for the various rehabilitation measures with the objective of creating no increases in navigation capacity on the UMRS. The alternatives should be evaluated in the environmental impact statement.

Increased Navigation Use

We asked in our previous letter on scoping for this project (June 5, 1987) whether the improvements being proposed could encourage more use of the UMRS (i.e., more traffic) because the system will be safer and more efficient? Your traffic analysis does not appear to address this issue. The report does mention the benefits to the towing industry from increased operation safety. We reiterate that the final report should include increases in traffic expected due to improved lock operations because of safety and other improvements.

Locks and Dams 2-10

We believe your report should list other proposed measures of the major rehabilitation program (L&D 2-10 actions) and briefly provide the reasons why increases in navigation capacity are not expected from those activities. Any predicted contributions to increased navigation use should be mentioned.

9-3

Lock and Dam No. 26 Second Lock

Since construction of a second lock at Locks and Dam 26 (replacement) has not yet been funded, you should analyze your proposal using both the with and without second lock traffic conditions. It is also noted your year 2040 predictions are 10 million tons less than the St. Louis District Corps of Engineers predictions (164 million tons vs. 174 million tons shipped on the UMRS in 2040). These differences should be resolved or clarified in the final report.

We hope these comments are helpful in your producing a final traffic analysis for this project. Thank you for the opportunity to submit our comments.

Sincerely,

Howard S. Druckenmiller

Howard S. Druckenmiller, Director
Bureau of Environmental Analysis & Review

HSD:hf

cc:James Lissack - MCD
Douglas Morrissette - SD

7262I

State of Illinois
DEPARTMENT OF AGRICULTURE
Division of Natural Resources
State Fairgrounds, P. O. Box 4906, Springfield, IL 62708-4906, 217/782-6297

Bureau of Farmland Protection Bureau of Soil Conservation

October 14, 1987

Colonel Neil Smart
U.S. Army District, Rock Island
Clock Tower Building
P. O. Box 2004
Rock Island, IL 61204-2004

RE: Interim Report
Upper Mississippi River System
Major Rehabilitation on Mississippi River (L/D 2-22)
and Illinois Waterway (Lockport to LaGrange)

Dear Colonel Smart:

We have reviewed the interim report describing the results of the traffic analysis on the Upper Mississippi River System.

The Department has no further comments at this time. We look forward to receiving the draft EIS and shall submit written comments upon the completion of our review.

Sincerely,

Teresa J. Savko

Teresa J. Savko
Bureau of Farmland Protection

TJS:ll
cc: Lee Rife, IDOA, Marketing

MISSOURI DEPARTMENT OF CONSERVATION

MAILING ADDRESS:
P.O. Box 180
Jefferson City, Missouri 65102-0180

STREET LOCATION:
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Jefferson City, Missouri

Telephone 314/751-4115
LARRY R. GALE, Director

50 YEARS of CONSERVATION
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October 21, 1987

Colonel Neil A. Smart
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Re: Planning Division - Rehabilitation of Lock and Dam 2 through 22

Dear Colonel Smart:

In response to a September 22, 1987 letter concerning the preparation of an environmental impact statement on the site-specific and cumulative impacts of major rehabilitation at Locks and Dams 2 through 22, we have reviewed available data and previous correspondence.

Our major concern is the potential to increase winter and year-round navigation. The discussion on page 16, item 38 gives no assurance that navigation interests will not attempt to stretch the season and thus increase damage to the Upper Mississippi River ecosystem. Perhaps it is time to evaluate means to provide a reasonable winter closing date for navigation. Analysis of historic degree day temperature record and ice formation data could produce criteria allowing the Corps of Engineers to predict ice formation and thus issue winter closure navigation notices. Such a procedure would alleviate many of our concerns regarding winter navigation.

Specific comments:

1. A search of rare and sensitive species information yielded the following:

   Fat pocketbook (Potamilus capax) occurs immediately below Lock and Dam 22. This mussel is endangered at the state and federal levels. The record is from 1984. This species was also recorded between Locks and Dams 20 and 19 in 1986.

   Hickory-nut (Obovaria olivaria) occurs immediately below Lock and Dam 22. This mussel is endangered in Missouri. The record is from 1984.

6-4

Rock pocketbook (Arcidens confragosus) occurs within 2.8 miles downstream of Lock and Dam 22. This mussel is endangered in Missouri. The record is from 1977.

A rookery including Great egret (Casmerodius albus) occurs between Locks and Dams 22 and 21. This bird is watchlisted in Missouri. The record is from 1985.

Bald eagle (Haliaeetus leucocephalus) has a known major roost site just below Keokuk, Iowa, on the Illinois side. Areas near Lock and Dam 18 are considered major winter feeding and resting areas. Restrictions on construction activity periods may be necessary during December through February (including further restriction during severe winters). Locks and Dams 21 and 22 are not considered major wintering areas but effort should be made to reduce disturbance of the birds. The bald eagle is endangered at the state and federal levels. The record is from 1985.

Lake sturgeon (Acipenser fulvescens) may occur between Locks and Dams 20 and 19. This fish is endangered in Missouri and is a federal candidate for listing as a threatened or endangered species. Lake sturgeon were recently reported by commercial fishermen below Lock and Dam 22.

Alabama shad (Alosa alabamae) may occur between Locks and Dams 20 and 19. This fish is rare in Missouri. This historic record is from 1944.

2. Page 3 - Item #8. We are somewhat surprised that Red Rock Reservoir has not eliminated "extensive ice floes and debris during the late fall and early spring" from the Des Moines River.

3. Page 5, Item #17. What is the rationale for utilizing lock capacity data for Lock and Dam 25 other than that generated by the Master Plan Study?

4. Page 7, Item #26. What are "exogenous factors"? Would it include weather, grain prices, impact of oil price changes, etc.? Also, does this item mean economic factors would dictate navigation under ice conditions?

5. Page 8, Item #29. Is the 1.6 percent increase in navigation for the vertical lift gates spread equally throughout the year or is a higher percentage of the increase in late fall/early spring?

6. Page 9, Item #35. The increased traffic with bubbler systems in place is reported by Louis Berger & Associates as 1.0 percent for the

entire year. Will late fall/early spring increases be higher than 1.0 percent?

7. Page 11, Items 041 and 42. The seemingly small increases raise the question of the economic justification for this activity.

8. Page 12, Item 045. The statement, "decrease average downbound approach time by 4.0 minutes" is informative. Based upon staff observations, the problem with locking delays relates to the timing or spacing of tow traffic. If tows were evenly spaced, up and down, it appears there would be excess locking capacity well into the foreseeable future.

I believe these somewhat lengthy comments express our concerns. If you or your staff have questions or wish to discuss these comments, please contact William H. Dieffenbach of my staff.

Sincerely,

Larry R. Gale

LARRY R. GALE
DIRECTOR

cc: U. S. Fish and Wildlife Service
Rock Island, Illinois

6-5

MISSOURI
HIGHWAY AND TRANSPORTATION COMMISSION

October 23, 1987

Rehabilitation of Lock & Dams
2 thru 22

District Engineer
U. S. Army Engineer District,
Rock Island
Attn. Planning Division
Clock Tower Building
P. O. Box 2004
Rock Island, Illinois 61204-2004

Dear Sir:

The interim report, transmitted by your letter of September 22, 1987, concerning the results of a traffic analysis for the work contemplated in the rehabilitation of lock & dams 2 thru 22 has been reviewed by this office. We agree with the conclusions of this report. The work that is planned is very important to the safe operation of these facilities. Therefore, in the interest of safety the work should be completed as soon as possible.

Let us reiterate our position that this rehabilitation restores navigation capacity that was lost due to deteriorated facilities. The report concludes that, by the year 2040, system traffic will only increase by 1.4%. This is an insignificant increase particularly considering the length of the time frame.

We encourage you to move forward with the Environmental Impact Statement for these projects. Hopefully, they can be completed and in use as quickly as possible.

Sincerely,

Sam Masters

Sam Masters
Director of Waterways

SM:bd

Iowa Department of Transportation
800 Lincoln Way, Ames, Iowa 50010   515/239-1646

October 22, 1987

Colonel Neil Smart
District Engineer
Corps of Engineers
Rock Island District
ATTN: Planning Division
Clock Tower Building
P.O. Box 2004
Rock Island, IL   61204-2004

Dear Colonel Smart:

RE: Major Rehabilitation Effort, Environmental Impact Statement,
Traffic Analysis

The Iowa Department of Transportation (DOT) appreciates the opportunity to comment on the traffic analysis Interim Report on the Upper Mississippi River system. The traffic study demonstrates no material increase in navigation capacity through rehabilitation

Completion of the rehabilitation program is projected to extend the design life cycle of a lock and dam for another 50 years. The anticipated 50 year rejuvenation of the infrastructure life cycle would thereby significantly reduce future capital improvement needs programs as a result. This would also improve operational safety and efficiency in the vicinity of the structures. The improved safety not only benefits commercial navigation but all users of the river system.

The Rock Island District serves a significant role in providing transportation services to our state. The reach of the Mississippi within your jurisdiction serves as a funnel through which essential movements must pass. Your district provides benefits to shippers located from the Minneapolis/St. Paul area through St. Louis to New Orleans. The capacity being lost as a result of structure deterioration needs to be restored as we place increased national emphasis on exports to solve the problems of a sagging midwestern agricultural economy.

Through this rehabilitation you have addressed the needs of waterway transportation and the maintenance of navigation capacity to benefit shippers and industries within our region. We recommend the Corps maintain a schedule as previously released and proceed as expeditiously as possible toward the rehabilitation improvements consistent with necessary environmental safe guards during construction activities. The DOT looks forward to working with you and your staff in carrying out the necessary rehabilitation to restore navigation capacity on the Mississippi River.

Sincerely,

Les Holland
Director
Rail and Water Division

LH:zk

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

March 31, 1987

Planning Division

Mr. Larry R. Gale
Director
Missouri Department of Conservation
P.O. Box 180
Jefferson City, Missouri 65102-0180

Dear Mr. Gale:

We are writing in response to your letter dated March 19, 1987, concerning the Public Information Fact Sheet on the Environmental Impact Statement (EIS) being prepared for certain measures of the major rehabilitation effort.

The major rehabilitation effort has no relationship to the Year-Round Navigation Study. Major rehabilitation of the locks and dams is critical to maintaining the safety and design capability of the navigation structures. We are aware that the Year-Round Navigation Study discussed bubbler systems, one of the features that will be addressed in the major rehabilitation EIS. The report for the Year-Round Navigation Study (Rock Island District November 1980) indicated the following for Plan D-Continue the Present Navigation Operational Procedures (No Action Alternative):

> 4-5.022 This alternative would not preclude installation of equipment to improve the lock operation and maintenance which in essence may aid winter navigation: i.e., bubbler systems, etc. The bubbler system has proven to be effective in improving winter lock maintenance and operations and reduces the potential for lock damages. It can be assumed that additional installation of the systems may occur. This equipment is desirable for operation and maintenance of the locks because it will reduce the potential for lock gate damages which can be very costly, and reduce the safety hazard of removing ice from behind the lock gates by hand. The system would also assist in removing debris from the lock gate approaches during other months.

6-7

Bubbler systems are already in place at various locks on the Upper Mississippi River and have been effective in reducing the hazardous practice of manually pushing ice and debris away from the lock gates, and reducing damage to the operating machinery caused by ice and debris. Because of these benefits, bubbler systems are being proposed for all sites in the major rehabilitation effort.

The effects of the bubbler systems on navigation traffic will be addressed in the EIS. However, the principal constraint to year-round navigation in the Upper Mississippi River is the amount of ice in the navigation channel. Bubbler systems located in the miter gate area of the locks have not, and will not affect this constraint.

Because of increased operating costs, and the hazard of tows freezing in, most operators will continue to avoid navigation during ice periods. However, the Corps of Engineers is required to move tows through the locks if they arrive during ice conditions, typically as a result of an early cold spell. The purpose of the bubblers is to get the tows through the locks with a minimum hazard to life and damage to lock equipment and tows.

Thank you for providing the information concerning sensitive species from your reach of the Mississippi River. Should you have any questions, or require further information concerning the major rehabilitation effort, please call Ms. Karen Mahus at 309/788-6361, Ext. 384, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

ORIGINAL SIGNED BY

Dudley H. Hanson, P.E.
Chief, Planning Division

MISSOURI DEPARTMENT OF CONSERVATION

MAILING ADDRESS:
P.O. Box 180
Jefferson City, Missouri 65102-0180

STREET LOCATION:
2901 West Truman Boulevard
Jefferson City, Missouri

Telephone 314/751-4115
LARRY R. GALE, Director

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March 19, 1987

Colonel Neil A. Smart
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Re: Planning Division PD-E

Dear Colonel Smart:

Your "Public Information Fact Sheet" concerning the environmental statement for major rehabilitation of Locks and Dams 2-22 has been reviewed by my staff. A review of the major rehabilitation elements revealed similarities between this effort and the "Year-Round Navigation" study effort conducted in the 1970's.

It was our understanding, based on the notice attached to a July 17, 1981 letter from Colonel Richard T. Robinson, that "The Board (of Engineers for Rivers and Harbors) recommends that no modification of the existing project on the Mississippi River between the Ohio River and Minneapolis, Minnesota be made at this time in the interest of economic development or environmental quality, and that the feasibility study for Mississippi River year-round navigation be terminated". The notice from BERH also indicates that environmental studies can be conducted with operation and maintenance program funds.

We are quite surprised by your recent notice since to our knowledge very little has been accomplished to meet the data needs for year-round navigation on the Upper Mississippi River System. In addition, we are not aware of any major change in the economic picture or public support that were cited in the June 1980 Final Feasibility Report.

We remain concerned with the anticipated impacts that year-round navigation would inflict on the Mississippi River resources. The February 27, 1977 article from the St. Louis Post-Dispatch (copy attached) concerning ice problems on the Mississippi River is provided for your information. I believe there is a great deal of valuable information in the 1970-1980 feasibility study effort. My August 20, 1980 and November 8, 1978 letters to Colonel Frederick W. Mueller, and Mr. Allen Brohn's July 14, 1982 letter to Colonel

6-8

Slofer should be reviewed. Recent correspondence concerning navigation expansion and the U. S. Fish and Wildlife Service report of July 29, 1986 should also be reviewed.

The following information on sensitive species and communities from our reach of the Mississippi River above Saverton, Missouri is provided for your information and use.

Bald eagle (Haliaeetus leucocephalus) - Significant numbers of the endangered bald eagle utilize the river corridor as winter habitat. The expansion of winter navigation would impact this species. Consultation with this Department and the U. S. Fish and Wildlife Service will be necessary.

Lake sturgeon (Acipenser fulvescens) occurs within the proposed site. This species is endangered in Missouri, and is a federal candidate for listing as threatened or endangered species. The record is from 1944.

Alabama shad (Alosa alabamae) occurs within the proposed site. This species is rare in MO. The record is from 1944.

Fat pocketbook (Potamilus capax) occurs within the proposed site. This species is endangered at the state and federal levels. The record is from 1986.

Wild sarsaparilla (Aralia nudicaulis) occurs along the Mississippi River within the proposed site. This species is endangered in MO. The record is from 1939.

Should you or your staff have questions, please contact William H. Dieffenbach of my staff.

Sincerely,

Larry R. Gale

LARRY R. GALE
DIRECTOR

Enclosure
cc: U. S. Fish and Wildlife Service
Rock Island, Illinois

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

May 26, 1987

Planning Division (11-2-240a)

Mr. Larry R. Gale
Director
Missouri Department of Conservation
P.O. Box 180
Jefferson City, Missouri 65102-0180

Dear Mr. Gale:

We are writing in response to your letter dated May 4, 1987, concerning year-round navigation and the major rehabilitation effort. As indicated in my earlier letter, dated March 31, 1987, there is no attempt by the Rock Island District to piecemeal year-round navigation through the major rehabilitation effort.

The year-round navigation study was terminated in 1981, and no authorization or funding is available for future studies. However, environmental studies by the Rock Island District were funded under the GREAT II Implementation Program. The GREAT II Fish and Wildlife Management Work Group recommended studies of winter habitat requirements of fish and wildlife resources of the Upper Mississippi River. The Rock Island District has been funding these studies related to winter biology since Fiscal Year 1983 using project operation and maintenance funds appropriated by Congress. A list of published reports is attached for your information.

We will continue to coordinate with your agency on the major rehabilitation Environmental Impact Statement as the study progresses.

Sincerely,

ORIGINAL SIGNED BY

Dudley M. Hanson, P.E.
Chief, Planning Division

Attachment

6-9

REPORTS RELATING TO WINTER BIOLOGY
OF THE UPPER MISSISSIPPI RIVER

Hubert, W.A., G.E. Darnell, and D.E. Dalk. 1983. Evaluation of wintering benthic macroinvertebrates of pool 13 of the upper Mississippi river. Wyoming Cooperative Fish and Wildlife Research Unit, Laramie, WY. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 30+pp.

Lubinski, K.S. 1984. Winter diving surveys of main channel microhabitats and fish populations in Mississippi River reaches subjected to thalweg disposal. Aquatic Biology Tech. Rpt. 1984(13). IL Natural History Survey. Prepared for Department of the Army, Rock Island District, Corps of Engineers, Rock Island, IL. 41pp.

O'Bryan, C.K. 1982. Hydroacoustic equipment: review and evaluation. Appendix B to a pilot study to evaluate the winter fishery biology or pool 18 of the upper Mississippi river, summary report. U.S. Fish and Wildlife Service, National Reservoir Research Program, Fayetteville, AK. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 12pp.

Peterson, G.A. 1983. Detailed plan of study for evaluation of winter fishery biology of pool 18 of the upper Mississippi river. Appendix D to a pilot study to evaluate the winter fishery biology of pool 18 of the upper Mississippi river, summary report. U.S. Fish and Wildlife Service, Rock Island Field Office, Rock Island, IL. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 6pp.

Peterson, G.A. ed. 1983. A pilot study to evaluate the winter fishery biology of pool 18 of the upper Mississippi river, summary report. U.S. Fish and Wildlife Service, Rock Island Field Office, Rock Island, IL. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 14pp + appendices.

Peterson, G.A. 1982. Winter fishery biology of the upper Mississippi river: a literature review. Appendix A to a pilot study to evaluate the winter fishery biology of pool 18 of the upper Mississippi river, summary report. U.S. Fish and Wildlife Service, Rock Island Field Office, Rock Island, IL. Prepared for U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 27pp.

Stang, D.L. and J.G. Nickum. 1985. Radio-tracking of catfish and buffalo under winter conditions in Pool 13, Upper Mississippi River. Prepared for Fish and Wildlife Interagency Committee and Fish and Wildlife Service, Rock Island, IL and the U.S. Army Corps of Engineers, Rock Island District, Rock Island, IL. 44pp.

Therme, R.E. and G.L. Thomas. 1983. Evaluation of hydroacoustic techniques for study of fish under winter conditions in pool 18, upper Mississippi river. Appendix C to a pilot study to evaluate the winter fishery biology of pool 18 of the upper Mississippi river, summary report. University of Washington, School of Fisheries, Seattle, WA. Prepared for U.S. Fish and Wildlife Service, Rock Island Field Office under Contract No. 14-16-0009-83-015 and U.S. Army Corps of Engineers, Rock Island District, under Letter Order No. NCR-LO-83-C12. 66pp.

MISSOURI DEPARTMENT OF CONSERVATION

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Jefferson City, Missouri

Telephone 314/751-4115
LARRY R. GALE, Director

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May 4, 1987

Colonel Neil Smart
District Engineer
Rock Island District, Corps of Engineers
Clock Tower Building
P. O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Smart:

We appreciate Mr. Dudley M. Hanson's response to my March 19, 1987 letter concerning year-round navigation and major lock and dam rehabilitation. We recognize the District report contained language quoted in Mr. Hanson's letter.

The transmittal from the Chief of Engineers and the Board of Engineers for Rivers and Harbors did not, however, mention the inclusion of bubbler systems in the "Present Navigation Operational Procedures". Our reading of the transmittal (copy attached) shows it contained a recognition of the need for future studies, hopefully before year-round navigation becomes a reality. We would be interested in learning how Rock Island District is pursuing baseline data relating to year-round navigation.

Our basic concern remains that while year-round navigation is piecemealed through bubbler systems, rock removal and other improvements, the data needed to evaluate the impacts are not being gathered.

Comments you may wish to offer on these observations would be appreciated.

Sincerely,

Larry R. Gale

LARRY R. GALE
DIRECTOR

Enclosure
cc: U. S. Fish and Wildlife Service
Rock Island, Illinois

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO ATTENTION OF:

DAEN-CWP-A

SUBJECT: Mississippi River Year-Round Navigation Study

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on the Mississippi River Year-Round Navigation Study. It is accompanied by the reports of the Board of Engineers for Rivers and Harbors and the District and Division Engineers. These reports are in response to resolutions adopted 6 April 1966 by the Committee on Public Works of the United States Senate and 5 May 1966 by the Committee on Public Works of the United States House of Representatives. The Committees requested the Board of Engineers for Rivers and Harbors to review pertinent reports of the Chief of Engineers on the Mississippi River between the Ohio River and Minneapolis, Minnesota, with a view toward determining the practicability and feasibility of modifying the existing project to provide for year-round navigation.

2. The District and Division Engineers find that economic benefits of extended winter navigation are marginal and may not be large enough to support potential environmental project costs. Increased or extended winter navigation could occur under the current operational procedures if economic conditions are such that the waterway industry could operate profitably under winter conditions. They also find that a closed winter navigation season may be beneficial, but considerable environmental studies are required to substantiate the need for a closed season and the establishment of criteria on which to base such action. The reporting officers conclude that further feasibility studies for an extended or closed navigation season are not warranted due to the lack of public support and a specific need for the feasibility studies. However, they also conclude that additional studies are needed to establish baseline environmental data to determine the impacts and acceptability of the current operational procedures. The reporting officers recommend that the Mississippi River Year-Round Navigation Study be terminated, and that environmental study efforts be initiated in coordination with ongoing studies by other agencies to evaluate the Mississippi River environment during the fall and winter months.

6-11

3. The Board of Engineers for Rivers and Harbors, concurring in the findings of the reporting officers, notes that the recommended environmental studies can be conducted under the U.S. Army Corps of Engineers operations and maintenance program if adequate funds are provided. The Board recommends that no modification of the existing project on the Mississippi River between the Ohio River and Minneapolis, Minnesota, be made at this time in the interest of economic development or environmental quality, and that the feasibility study for Mississippi River year-round navigation be terminated.

4. I concur in the recommendation of the Board.

J. K. BRATTON
Lieutenant General, USA
Chief of Engineers

NCRM-PLN (Nov 80) 2d Ind
SUBJECT: Mississippi River Year-Round Navigation Study

Board of Engineers for Rivers and Harbors, Fort Belvoir, Virginia 22060 15 May 1981

TO: Chief of Engineers, Department of the Army

1. The Division Engineer issued a public notice on 20 March 1981 stating the *findings* and recommendations of the reporting officers and affording interested parties an opportunity to present additional information to the Board. No communications have been received in response to the public notice.

2. The reporting officers find that economic benefits of extended winter navigation are marginal and may not be large enough to support potential environmental project costs. Increased or extended winter navigation could occur under the current operational procedures *if* economic conditions change such that the waterway industry could operate profitably under winter conditions. They also find that a closed winter navigation season may be beneficial, but considerable environmental studies are required to substantiate the need for a closed season and the establishment of criteria on which to base such action. The reporting officers conclude that further feasibility studies for an extended or closed navigation season are not warranted due to the lack of public support and a *specific need for the feasibility studies. However, they also* conclude that additional studies are needed to establish baseline environmental data to determine the impacts and acceptability of the current operational procedures. Accordingly, the reporting officers recommend that the Mississippi River Year-Round Navigation Study be terminated, and that environmental study efforts be initiated in coordination with ongoing studies by other agencies to evaluate the Mississippi River environment during the fall and winter months.

3. The Board of Engineers for Rivers and Harbors concurs in the *findings* of the reporting officers and notes that the recommended environmental studies can be conducted under the U.S. Army Corps of Engineers operations and maintenance program if adequate funds are provided. The Board recommends that no modification of the existing project on the Mississippi River between the Ohio River and Minneapolis, Minnesota, be made at this time in the interest of economic development or environmental quality, and that the feasibility study for Mississippi River year-round navigation be terminated.

FOR THE BOARD:

William R. Wray
WILLIAM R. WRAY
Major General, USA
Chairman

STATE OF ILLINOIS
OFFICE OF THE GOVERNOR
SPRINGFIELD 62706

JAMES R THOMPSON
GOVERNOR

SAI# 87-02-20-40

SUBJECT: To assess the potential for cumulative impacts from certain measures of major rehabilitation at Locks and Dams 2 through 22 on the Mississippi River and at locks and dams on the Illinois Waterway from Lockport to LaGrange.

TO: District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division (PD-E)
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

The Illinois State Clearinghouse has reviewed the reference subject pursuant to the National Environmental Policy Act of 1969. State agencies which are authorized to develop and enforce environmental standards have been given the opportunity to comment on this subject. At this time no comments have been received.

Illinois State Clearinghouse

March 24, 1987

Illinois State Water Survey

Telephone (217) 333-2210
2204 Griffith Drive
Champaign, Illinois 61820-7495

April 6, 1987

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204-2004

Dear Colonel Smart:

We would like to comment on the scope of the EIS on the cumulative impacts of rehabilitating the locks and dams on the Mississippi and Illinois Rivers in your district. Our Surface Water Section staff has considerable expertise and interest in the navigation system in and bordering Illinois, but none of them are able to attend the public meetings.

The assessment of the cumulative impact of incremental improvements in lock transit times which result from modernization and repair of the locks will be valuable and in accord with the intent of the Master Plan. This will be especially important on the Illinois River where the impact of navigation is more acute and any increase in navigation capacity may be critical to the ecosystem or discouraging to boaters and sportsmen.

This EIS should review and revise as necessary the traffic projections so that the capacity and incremental changes are as accurate as possible. Traffic since the studies for the Master Plan has not followed those projections, so they should be revised to reflect the actual traffic levels.

Comparison of improvements (levels, mooring piers, extended guide walls, etc.) should be compared with the modifications recommended by the Master Plan to increase traffic capacity.

This EIS may be too late for the Illinois River improvements, which is a mistake because of the degraded ecosystem is already impacted by navigation traffic and fleeting area development.

6-13

We appreciate the chance to comment and support your effort to prepare the system EIS. I would like to remind you of the considerable knowledge of these rivers within the Water Survey and the willingness of my staff to participate in any way possible in the preparation of the EIS.

Sincerely,

Dick Semonin

Richard G. Semonin
Chief

dkm

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

March 30, 1987

Planning Division

Ms. Teresa J. Savko
Bureau of Farmland Protection
Illinois Department of Agriculture
State Fairgrounds, P.O. Box 4906
Springfield, Illinois 62708-4906

Dear Ms. Savko:

This is in reference to your letter dated March 19, 1987, concerning our Public Information Fact Sheet for the major rehabilitation of locks and dams on the Mississippi River and Illinois Waterway. Our responses to the questions you raised are as follows:

Question: What constitutes an increase in traffic?

Response: Any increase in traffic will be determined by comparing the average number of tows expected without the rehabilitation features in place, versus the average number of tows expected with the rehabilitation features in place.

Question: Has a base period been established? If so, when?

Response: The base period for the traffic projections has been determined to be 1986 to 2040.

Question: What about increases due to external market forces and how do we account for these?

Response: The potential increases will be measured by comparing traffic expected over the long-term (1990-2040) without any of the rehabilitation features, against that expected with the features in place. The trends for the major commodities will be those used for the Upper Mississippi River Master Plan. We believe that over the long-term, this will reflect market forces.

Question: How do we account for a change in the market mix; i.e., increased upbound chemical movement versus decreased downbound grain movement?

Response: The mix used for the rehabilitation study will be that as shown in the Upper Mississippi River Master Plan, modified by any changes since 1978, and new data on long-term trends.

Question: In some of our preliminary meetings, it appears as though any changes in operating procedures which might quicken movement through the locks were to be examined under very close scrutiny even though no additional construction was involved. Who has the burden of proof that improved operating procedures will or will not harm the environment in any way?

Response: The features of the major rehabilitation effort which have been identified by agencies and other groups as having the potential to increase traffic were discussed in the Public Information Fact Sheet. An Environmental Impact Statement (EIS) is being prepared to assess the site-specific environmental impacts of these features, as well as any cumulative environmental impacts should navigation traffic be found to increase on the Upper Mississippi River System. During the EIS process, Federal and State agencies, other groups, and the public provide their input and comments on the analysis of environmental impacts, and any mitigation requirements for significant, adverse impacts. The Corps of Engineers, after considering all the comments, makes a final recommendation.

Should you have any further questions, please call Mr. Paul Seyke, Chief of our Economic and Social Analysis Branch, at 309/788-6361, Ext. 231, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

Signed By
J. T. SCHMERPE

Dudley M. Hanson, P.E.
Chief, Planning Division

Copies Furnished:

Commander, North Central Division
ATTN: NCDPD-LR (D. Eitel)

Commander
U.S. Army Engineer District, St. Paul
ATTN: NCSED-M (J. Bailey)
1135 USPO & Custom House
St. Paul, Minnesota 55101-1479

Commander
U.S. Army Engineer District, St. Louis
ATTN: LMSPD-A (O. Dutt)
210 Tucker Boulevard N.
St. Louis, Missouri 63101-1986

Commander
U.S. Army Engineer Division,
Lower Mississippi Valley
ATTN: LMVPD-R (G. Buglewicz)
P.O. Box 80
Vicksburg, Mississippi 39180-0080

6-15

State of Illinois
DEPARTMENT OF AGRICULTURE

Division of Natural Resources
State Fairgrounds, P. O. Box 4906, Springfield, IL 62708-4906, 217/782-6297

Bureau of Farmland Protection Bureau of Soil Conservation

March 19, 1987

Colonel Neil Smart
District Engineer
US Army District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Re: Upper Mississippi River System
Major Rehabilitation on Mississippi River (L/D 2-22)
and the Illinois Waterway (Lockport to LaGrange)

Dear Colonel Smart:

The Illinois Department of Agriculture has reviewed the February 17, 1987 Public Information Fact Sheet for the major rehabilitation of locks and dams on both the Mississippi River and Illinois Waterway. We submit the following comments.

The Division of Natural Resources, Bureau of Farmland Protection, has no comments at this time on the proposed project as it consists of rehabilitating existing structures and equipment, and it appears that the rehabilitation initiatives will not impact the agricultural environment. However, comments will be submitted for the Draft and Final Environmental Impact Statements.

The Division of Markets has several concerns about the proposed project, and they are presented in the following questions.

- What constitutes an increase in traffic?
- Has a base period been established? If so, when?
- What about increases due to external market forces, and how do we account for these?
- How do we account for a change in the market mix; i.e., increased upbound chemical movement versus decreased downbound grain movement?

In some of our preliminary meetings, it appears as though any changes in operating procedures which might quicken movement through the locks were to be examined under very close scrutiny even though no additional construction was involved. Who has the burden of proof that improved operating procedures will or will not harm the environment in any way?

The Department requests a written response to this letter. Should you have any questions regarding our initial comments or our review process, please do not hesitate to contact our office.

Sincerely,

Teresa J. Sovko
Bureau of Farmland Protection

TJS:mdg

cc: Lee Rife, IDOA - Markets

6-16

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

BOX 7921
MADISON, WISCONSIN 53707

June 5, 1987

File Ref. 1650-3

Neil A. Smart, Colonel
Corps of Engineers, District Engineer
U.S. Army Engineer District
Rock Island, Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204-2004

Dear Colonel Smart:

At your recent scoping meetings on the draft environmental impact statement for the major lock rehabilitation project on the Mississippi River and Illinois Waterway, my staff indicated we would send you a list of our suggestions for information to include in the EIS. The following is our list of suggestions for information to include in the EIS.

1. Scope of Activities - The EIS should address all measures that may lead to increased navigation use of the Upper Mississippi River System (UMRS). These measures include those which will increase the navigation capacity of the system as well as those which will encourage more navigation use of the UMRS.

Navigation capacity would be increased by providing measures that increase the ability of the system to handle additional traffic. These measures could include structural measures (modification of outlet structures, extending guidewalls, installing bubbler systems, construction of additional cells) as well as non-structural measures (increased staffing, service order changes).

Navigation use might be encouraged by providing measures designed to improve the safety, reliability and efficiency of the whole navigation system. While these measures may not lead to increased capacity on the UMRS, they may induce additional usage of it, resulting in additional navigation related impacts.

2. Tentative List of Measures - The "Notice of Intent to Prepare an EIS" on the major lock rehabilitation program (2/5/87) identified the following measures that will be analyzed for their cumulative impacts:

Submersible tainter gates at Peoria and La Grange L/D
(Illinois Waterway)
Guardwall at L/D 22
Lower cell at L/D 21
Vertical lift gate at L/D 20
Bubbler systems at all sites (L/D 2-22; Illinois Waterway)
Modification to outlet structure at L/D 15
Construction of two cells above L/D 15

Upper and lower guidewall extension at L/D 21 and 22
Upper guidewall extension at L/D 11-20

The Lock and Dam No. 3 guidewall extension should also be considered for its cumulative impacts, as should the proposed bubbler systems and the tow haulage units. If it is found that certain measures will not result in cumulative impacts, the reasons should be indicated as well as any needed verification.

3. Coordination with Second Lock EIS - Assumptions used in this EIS should be consistent with the assumptions used in development of the EIS for the second lock at Lock and Dam No. 26 (replacement). In particular, the studies need consistent assumptions about when the expected impacts from each will occur. It is not appropriate for the major rehabilitation program EIS to assume the second lock navigation impacts will occur before the impacts of the major rehabilitation program, when, at the same time, the second lock EIS is assuming the navigation impacts of the major lock rehabilitation program will occur before the impacts of the second lock.

4. Expected Environmental Conditions - Formulation and evaluation of alternative plans should be based on the most likely conditions expected to exist in the future with and without the plan. This requires consideration of expected environmental conditions (Principles and Guidelines 1.4.9) and therefore an anticipation of events likely to occur in the future that may affect the river (both positive and negative occurrences).

While this is an ambitious undertaking, it is required if the objective is to predict the future condition of the UMRS in the year 2040. By not making these predictions, one would be assuming all other conditions would be static through the fifty year planning period.

5. Tributaries - The EIS should address all tributaries expected to receive commercial navigation use (St. Croix, Black, Minnesota, Kaskaskia).

I appreciate the opportunity to provide early input into your development of an EIS on the cumulative impacts of the major lock rehabilitation program and look forward to providing additional input into to your study as you proceed into the more detailed stages of plan development.

Sincerely,

H. S. Druckenmiller, Director
Bureau of Environmental Analysis and Review

HSD:MN:jh

cc: James Lissack - WCD
Douglas Morrissette - SD

6-17

The Izaak Walton League of America
INCORPORATED
DEFENDERS OF SOIL, AIR, WOODS, WATERS, AND WILDLIFE

National Office • Suite 1100 • 1701 N. Ft. Myer Dr. • Arlington, Virginia 22209 (703) 528-1818
Upper Mississippi Regional Office • 4601 Auto Club Rd. • Minneapolis, Minnesota 55438 (612) 941-66[illegible]

October 21, 1987

District Engineer
U.S. Army Engineer District, Rock Island
Attn: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Il 61204-2004

Dear Sirs,

These are the comments of the Izaak Walton League of America regarding the interim report on the cumulative impact EIS for the Major Rehabilitation Program on the Mississippi and Illinois Rivers.

The position of the Izaak Walton League of America is unchanged from previous statements and correspondence regarding this project. Specifically:

1) New construction requiring Congressional authorization is a major portion of this program and this authorization has not been obtained by the Corps. This new construction is unneeded due declining traffic levels from levels anticipated by the Corps. It should not be performed without Congressional authority.

2) The portion of the estimated $300 million cost of this program that is new construction should be paid for by the transportation industry directly receiving the benefits of the project through the Inland Waterways Trust Fund, which was set up for this purpose. The overburdened U.S. taxpayer should not be forced to pay for this project.

3) This EIS must be including with the EIS currently being written for the Locks and Dam 26 second lock (replacement). These projects are, as stated in the NEPA regulations, "connected actions, which means that they are closely related and therefore should be discussed in the same impact statement" and are "cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement."

4) This combined impact statement should include an assessment of the increased traffic capacity of the UMR navigation system due to this project. Merely performing the with and without project analysis of traffic increase ignores the potential increase in traffic made possible by the project if economic activity and traffic levels should increase.

5) Justification of the Major Rehabilitation Program on the basis of safety considerations is in direct conflict with the Locks and Dam 26 second lock DEIS, which states: "Accident rates in tow operations are generally low compared with other commodity transportation modes, ranging from 0.0002 to 0.0008 accidents per transit." This reemphasizes that much of the MRP is not needed, that the impact statements should be combined, and that the costs should be borne by the industry through the trust.

I trust that your staff will contact our Upper Mississippi Regional office at the appropriate opportunities for further comment.

Sincerely,

Paul W. Hansen
IWLA Upper Mississippi Regional Representative

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

February 3, 1987

Planning Division

Mr. Paul Hansen
Upper Mississippi Regional Office
Izaak Walton League of America
6601 Auto Club Road
Minneapolis, Minnesota 55438

Dear Mr. Hansen:

I would like to take this opportunity to provide you with the status of the major rehabilitation effort in the Rock Island District, including the joint effort with the St. Paul District. BG Pratt, in his letter of January 15, 1987, provided you with an updated schedule for the site-specific Environmental Assessments and a schedule for the Environmental Impact Statement being prepared to assess those rehabilitation measures that have been identified as having the potential to induce increased navigation traffic and to cause cumulative environmental impacts. A tentative listing of the rehabilitation measures noted above for our sites in the Rock Island and St. Paul Districts is as follows:

* Submersible tainter gate at Peoria and LaGrange Locks and Dams on the Illinois Waterway
* Guardwall at Lock and Dam 22
* Vertical lift gate at Lock and Dam 20
* Bubbler systems at all sites
* Modification to the outlet structure at Lock and Dam 15
* Construction of two cells above Lock and Dam 15
* Upper and lower guidewall extensions at Lock and Dams 21 and 22
* Upper guidewall extensions at Locks and Dams 11 through 20

The Environmental Impact Statement will cover these rehabilitation measures in both the St. Paul and Rock Island Districts for Locks and Dams 2 to 22 on the Upper Mississippi River and for Lockport to LaGrange Locks and Dams on the Illinois Waterway. Alternatives to the proposed action may include various combinations of the proposed measures, modifications to the proposed measures, and the No Federal Action alternative (without condition).

We will analyze existing traffic data in the Upper Mississippi River Master Plan to determine whether any of these proposed measures would induce an increase in navigation traffic. However, the Master Plan scenarios include a number of measures not being proposed in the major rehabilitation effort, such as powered traveling kevels. Therefore, some modifications to the traffic data will be necessary to remove the effects of these unrelated measures. The key question to be answered in our Environmental Impact Statement concerns the incremental increase in navigation traffic induced by our major rehabilitation measures and resultant environmental impacts.

Also, the increment of traffic increase identified for the second lock at Lock and Dam 26 will be included in the without condition for this Environmental Impact Statement because it is a scheduled construction project for which a separate Environmental Impact Statement is being prepared and coordinated.

We have provided you with copies of our major rehabilitation reconnaissance reports for Locks and Dams 13, 15, 16, 17, 18, 21, and 22, and the site-specific Environmental Assessments for Lock and Dam 20, and Peoria and LaGrange Locks and Dams. In the near future, you will be receiving the site-specific Environmental Assessments for Locks and Dams 21 and 22. The reconnaissance reports for Locks and Dams 11, 12, and 14 should be completed later this year. The St. Paul District will correspond directly with you on the site-specific studies for Locks and Dams 2 through 10.

We are also in the process of arranging locations and dates for scoping meetings which we will use to identify the significant resources and concerns of all

interested parties for the Environmental Impact Statement. You will be receiving notice soon concerning these meetings.

Should you have any questions on our major rehabilitation effort, please call Mr. Denny Lundberg, the District Coordinator for Major Rehabilitation, at 309/788-6361, Ext. 632, or Ms. Karen Bahus of our Environmental Analysis Branch at Ext. 384. Please send all correspondence to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
Attn: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

ORIGINAL SIGNED BY

Dudley M. Hanson, P.E.
Chief, Planning Division

Copies Furnished:

Commander, North Central Division
ATTN: NCDPD-ER (Eitel)

Commander
U.S. Army Engineer District, St. Paul
ATTN: NCSED-M (Bailen)
1135 USPO & Custom House
St. Paul, Minnesota 55101-1479

Commander
U.S. Army Engineer District, St. Louis
ATTN: LMSPD-A (Dutt)
210 Tucker Blvd. N.
St. Louis, Missouri 63101-1986

Commander
U.S. Army Engineer Division, Lower Mississippi Valley
ATTN: LMVPD-R (Bugliewicz)
P.O. Box 80
Vicksburg, Mississippi 39180-0080

DEPARTMENT OF THE ARMY
NORTH CENTRAL DIVISION, CORPS OF ENGINEERS
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605-1592

REPLY TO ATTENTION OF

Construction-Operations Division

JAN 15 1987

Mr. Paul Hansen
Upper Mississippi Regional Representative
The Izaak Walton League of America
6601 Auto Club Road
Minneapolis, Minnesota 55438

Dear Mr. Paul Hansen:

The following schedule, for the NEPA document being prepared to assess cumulative impacts for the Major Rehabilitation effort, is furnished for your information. The document will address those major rehabilitation features which may allow an increase in traffic and could result in the potential for cumulative environmental impacts.

Scoping	Dec 86 to Feb 87
Draft EIS Filed with EPA and Distributed to the Public	Mar 88
Final EIS Filed with EPA and Distributed to the Public	Dec 88

In addition, I have enclosed a current schedule for completion of site specific environmental assessments in Rock Island and St. Paul Districts on those rehabilitation features which are not considered to have any cumulative impact.

Sincerely,

JOSEPH PRATT
Brigadier General, U. S. Army
Commander and Division Engineer

Enclosure

6-20

North Central Division
Major Rehabilitation Effort
Site Specific Environmental Assessment Schedule

Project	Initiate NEPA Review
LaGrange L&D, IL	Apr 86
Peoria L&D, IL	Apr 86
L&D 20, MO	May 86
L&D 2, MN	Sep 86
L&D 21, IL	Jan 87
L&D 22, MO	Jan 87
L&D's 3-10, IA,MN,WI	Feb 87
L&D 13, IL	Sep 88
L&D 17, IL	Sep 88
L&D 18, IL	Sep 88
L&D 12, IL	Sep 90
L&D 15, IL	Sep 91
L&D 16, IL	Sep 91
L&D 11, IA	Sep 92
L&D 14, IA	Sep 92

DEPARTMENT OF THE ARMY
NORTH CENTRAL DIVISION, CORPS OF ENGINEERS
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605-1592

REPLY TO ATTENTION OF

JUL 1 1986

Mr. Paul Hansen
Upper Mississippi Regional Representative
The Izaak Walton League of America
6601 Auto Club Road
Minneapolis, Minnesota 55438

Dear Mr. Hansen:

This is in response to your letters of April 23, 1986 and June 20, 1986, regarding the Major Rehabilitation Program. I apologize for not having responded to the April 23, 1986 letter before now; however, as I discussed with you in our telephone conversation on Thursday, June 26, 1986, I believe your questions can be more fully responded to at this time.

The approach to be used for the North Central Division Major Rehabilitation work is to separate the effort into two categories. Those rehabilitation features which are not considered to increase traffic will be the subject of site specific environmental assessments (EAs). Those rehabilitation features which possibly may allow or cause an increase in traffic will be analyzed together in a separate NEPA document to examine the potential for cumulative impacts. This document will address the environmental effects of river traffic in terms of any actual increase projected as a result of rehabilitation and in terms of the incremental increase in the capability of the locks to pass traffic as a result of rehabilitation.

A tentative schedule for completion of site specific EAs in Rock Island District and St. Paul District is enclosed.

As for the cumulative NEPA document, Rock Island District is currently developing a schedule, which is expected to be available by January 1, 1987. The schedule will be furnished to you as soon as it is available.

The St. Louis District is responsible for preparation of the environmental document for the second lock at Lock and Dam 26. I understand it will be available in August, 1986. The second lock at Lock and Dam 26 will be assumed as a baseline condition for the major rehabilitation work in North Central Division.

I hope this information is satisfactory to you in relation to the issues you have raised. I assure you that the Izaak Walton League will be kept informed in regard to actions taken in our major rehabilitation effort. If you have any further questions or concerns please do not hesitate to call me.

Sincerely,

Original Signed
JOSEPH PRATT
Brigadier General, USA
Commander and Division Engineer

Enclosure

CF: LMVD NCR
LMS NCS

6-21

The Izaak Walton League of America
INCORPORATED
DEFENDERS OF SOIL, AIR, WOODS, WATERS, AND WILDLIFE

National Office • Suite 1100 • 1701 N. Ft. Myer Dr. • Arlington, Virginia 22209 (703) 528-1818
Upper Mississippi Regional Office • 6601 Auto Club Rd. • Minneapolis, Minnesota 55438 (612) 941-6654

June 20, 1986

General Joseph Pratt
Division Engineer, North Central Division
U.S. Army Corps of Engineers
536 Clark Street
Chicago, IL 60605

Dear General Pratt,

On April 23, 1986, I wrote you requesting information on the Corps' *Major Rehabilitation Program (MRP)* regarding features of the program which we identified in our analysis of February 4, 1986 as likely to increase navigation capacity. On April 23, I also asked whether the Corps planned to prepare a programmatic assessment to evaluate the cumulative impacts of increased navigation made possible by the MRP.

In the two months since our letter of April 23, we have received no response from you or the Corps on these questions. Several follow-up phone calls to your staff have also yielded little substantive information.

In our meeting in your office on January 8, you and I committed ourselves to trying to resolve issues raised by the MRP outside of the courts. However, the Corps' refusal or inability to keep even the Izaak Walton League informed on this issue seems to leave us no other choice than to pursue a legal remedy.

The Izaak Walton League's annual convention will be held in early July. Unless I have information from the Corps by July 1, 1986 to show that progress is being made on the issues we have raised regarding the MRP, I feel confident that the members of the Izaak Walton League will vote to file for an immediate injunction under NEPA and PL 95-502 to halt all work on the MRP until these issues are resolved.

I look forward to your timely response.

Sincerely,

Paul W. Hansen
Upper Mississippi
Regional Representative

cc IWLA Board, Executive Staff
UWFWS: H. Nelson, R. Nelson, Wellford
COE District Engineers: Wilson, Briggs, Burns

The Izaak Walton League of America
INCORPORATED
DEFENDERS OF SOIL, AIR, WO[illegible]S, WATERS, AND WILDLIFE
National Office • Suite 1100 • 1701 N. Ft. Myer Dr. • Arlington, Virginia 22209 (703) 528-1818
Upper Mississippi Regional Office • 6601 Auto Club Rd • Minneapolis, Minnesota 55438 (612) 941-6654

April 23, 1986

General Joseph Pratt
Division Engineer
U.S. Army Corps of Engineers
North Central Division
536 Clark Street
Chicago, IL 60605

Dear General Pratt,

This is in response to your letter of February 28, 1986 and is also a request for information on any changes made by the Corps regarding the Major Rehabilitation Program (MRP).

Regarding your letter, we appreciate your assurances that the Corps will comply with all laws, regulations, and court decisions relating to the MRP. However, we find nothing in the original authorizing legislation which you reference that provides for the construction of new features or new equipment, such as bubbler systems, extensive new guidewalls or guide cells, submersible tainter gates, and other features which could increase navigation capacity. We maintain that much of the MRP is not merely routine maintenance and therefore requires Congressional authorization and consideration of funding from the Inland Waterways Trust Fund. The enormous costs of these new features should be borne by those who benefit most directly, not by the overburdened U.S. taxpayer.

Your interpretation of the Congressional intent of PL 95-502 Section 101(i) that: "Navigation capacity pertains to increasing size of the lock chamber or adding additional locks," confounds the most cynical perspective on Corps' policy. We find this illogical interpretation to be self-serving and in conflict with the interpretation of virtually every other agency, document, and precedent on the river system. Clearly any feature that enables the movement or processing of more navigation traffic through the system increases the navigation capacity of the system. Most MRP reconnaissance reports emphasize "increasing processing efficiency of the lock" as a major benefit of the MRP improvements. The difference in lexicon does not change the fact that certain features of the MRP could increase navigation capacity and are therefore in direct conflict with the law as stated in PL 95-502 Section 101(i).

In your letter you report that COE Rock Island District personnel are analyzing data to determine whether the MRP could have cumulative or systemic impacts that may allow an increase in traffic. Our position that the MRP will undoubtedly increase the ability of the UMR navigation system to process barge traffic thereby increasing the rate of the associated environmental impacts was clearly described in our analysis of February 4, 1986. We are encouraged that the Corps appears to have accepted our position to the point where the issue is being examined. A decision by the Corps to prepare a programatic environmental assessment to evaluate the potential cumulative impacts of increased navigation traffic due to the MRP could go a long way towards our shared goal of avoiding legal confrontation on the issues raised by this project.

It is also becoming increasingly clear to us as we learn about this issue that the Environmental Impact Statements for the second lock (replacement) at Locks and Dam 26 in Alton, IL and the MRP should be written together. We believe that the courts have clearly stated that when several proposals for action that will have a cumulative environmental impact upon a region are pending concurrently before an agency, the environmental consequences must be considered together. Writing one EIS for the entire project could save some problems down the road.

Please keep us advised of ongoing developments regarding the MRP, the second lock at Locks and Dam 26, and the UMR Environmental Management Program. At this time, we would like to know if the Corps intends to prepare a programmatic EIS to evaluate the cumulative impacts of increased navigation due to the MRP.

Sincerely,

Paul W. Hansen
Upper Mississippi
Regional Representative

cc IWLA Board, Executive Staff
USFWS: H. Nelson, R. Nelson, Wellford
COE District Engineers: Wilson, Briggs, Burns

FEB 2 8 1986

Krumholz/vc/37699
File: IWLA.LTR

Mr. Paul Hansen
Upper Mississippi Regional Representative
Izaak Walton League of America
6801 Auto Club Road
Minneapolis, Minnesota 55438

Dear Mr. Hansen:

This is in response to your letter of January 31, 1986. I understand your concern regarding the major rehabilitation activities scheduled on the Mississippi and Illinois Rivers and can assure you that your comments will be fully considered. We will comply with all laws, regulations and court decisions that relate to this work.

The original authorizing legislation for these navigation projects (Rivers and Harbors Acts of 1927, 1930, and 1935) assigns to the Corps responsibility for repairing and maintaining the locks and dams in a safe and efficient operating condition. The scheduled rehabilitation work is authorized under that legislation.

The funding source for this work is appropriated by Congress consistent with the authority under which the work is being accomplished. Funding from the Inland Waterway Trust Fund must be explicitly appropriated by Congress. This has not been done since the Fund was established.

Based upon a careful review of Congressional authority, I believe that the scheduled rehabilitation activities are in accordance with the authorizing legislation for the navigation projects and with Public Law 95-502. The rehabilitation work is also in compliance with applicable court decisions.

Section 101(i) of Public Law 95-502 states:

> "No replacement, construction, or rehabilitation that expands the navigation capacity of locks, dams, and channels shall be undertaken by the Secretary of the Army to increase the navigation capacity of the Upper Mississippi River System until the master plan prepared pursuant to this section has been approved by the Congress except as provided in Section 102 and except for necessary operating and maintenance activities."

To understand what Congress intended by this section, we have reviewed the legislative and judicial history. This review indicates that what Congress meant when it restricted expansion of navigation capacity pertains to increasing the size of the lock chamber (i.e. length, width, depth) or adding additional locks.

The planned rehabilitation activities do not involve increasing lock chamber dimensions or adding locks. The proposed rehabilitation projects will replace deteriorated concrete as well as remove old, outdated equipment and navigation aids and replace them with modern, efficient equipment and aids. In so doing it is our intention to mak the structures safer and more efficient. I can find no support for the position that improvements in safety and efficiency are prohibite by P.L. 95-502, or are contrary to the decisions in the Lock and Dam 26 litigation. The proposed work does not involve expansion of the navigation capacity of locks, dams, and channels.

To ensure that the requirements of the National Environmental Policy Act (NEPA) are complied with, the Rock Island District is preparing site specific environmental assessments covering those features of the rehabilitation work which have been identified as not controversial. District personnel are also analyzing available data to determine whether there could be cumulative or systemic impacts on the human environment for those proposed features of the rehabilitation work that may possibly allow or cause an increase in traffic. If such cumulative or systemic effects are identified, the NEPA guidelines and regulations will be followed, including any coordination, review and processing of the NEPA documents deemed to b necessary.

I believe the positions outlined above will allow me to fulfill m responsibilities and obligations towards maintaining safe and efficient navigation structures on the Upper Mississippi River system while giving appropriate consideration to the environment. Your concern for the river's resources is appreciated.

Sincerely,

Original Signed

JOSEPH PRATT
Brigadier General, U.S. Army
Commander and Division Engineer

CF:
LMVD — NCR
LMS — NCS

MFR: This letter has been coordinated in draft with DAEN-[illegible]C, NCR NCS and all staff offices on the signature ladder.

Dan Krumholz
NCDCO-MO

6-24

The Izaak Walton League of America
INCORPORATED

DEFENDERS OF SOIL, AIR, WOODS, WATERS, AND WILDLIFE

National Office • Suite 1100 • 1701 N. Ft. Myer Dr. • Arlington, Virginia 22209 (703) 528-1818
Upper Mississippi Regional Office • 6601 Auto Club Rd. • Minneapolis, Minnesota 55438 (612) 941-6654

January 31, 1986

General Joseph Pratt
Division Engineer U.S. Army Corps
of Engineers
North Central Division
536 Clark St.
Chicago, Il. 60605

Dear General Pratt,

Thank you for making time on January 8th to discuss the Corps Major Rehabilitation Program (MRP). I appreciated our candid discussion.

I have finally received information on the MRP from the St. Paul and Rock Island Districts, and I have prepared the enclosed analysis. As you can see, the Izaak Walton League has three major areas of concern with regards to this program: 1) lack of Congressional Authorization and consideration of the applicability of the Inland Waterways Fund, 2) lack of a systemic Environmental Impact analysis, and 3) conflicts with PL 95-502, Section 101(i).

Regarding our disparate interpretations of the navigation capacity expansion made possible by the MRP, I have cited a number of Corps and U.S. Fish and Wildlife Service documents that support our concerns that the MRP could have a substantial impact on navigation traffic levels and the environment of the Upper Mississippi River.

We also continue to question the need for this level of spending on navigation improvements on the Upper Mississippi River (UMR) system given the current decline in barge traffic and the lack of knowledge of the environmental impacts the resultant an expansion could cause. Given the present fiscal crisis facing the Federal government, it seems unwise to add over $300 million for UMR lock rehabilitation to the $225 million now tentatively approved for the second lock at L&D 26 in Alton, IL.

As I stated in our conversation on January 8, we do not desire to be involved in another protracted and expensive legal battle with the Corps. However, the key components of the current situation regarding the MRP bear an uncanny resemblance to the issues in our legal action in 1974. Without somes changes like those outlined in the enclosed analysis, I fear that history may repeat itself. I hope that you will join us in trying to resolve this issue without litigation.

Sincerely,

Paul Hansen
Upper Mississippi Regional Representative

cc:UMR Congressmen
IWLA Executive Board, National Board, Regional Presidents, Staff
USFWS, Nelson, Wellford, Rasmussen
UMRCC Executive Board
Regional Agency Leaders: Gale, Besadny, Alexander, Witte, Wilson
COE District Engineers: Wilson, Briggs, Burns
UMRBA Board and staff
MN-WI Boundary Commission
Conservation organization leadership
Charles Dayton
Joseph Karaganis
River Country Voices: Kerdnt, Black, Burlingame

The Izaak Walton League of America
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6-26

AN ANALYSIS OF THE CORPS OF ENGINEERS MAJOR REHABILITATION PROGRAM FOR UPPER MISSISSIPPI AND ILLINOIS RIVER LOCKS AND DAMS

Paul Hansen
Izaak Walton League of America
Upper Mississippi Regional Office
February 4,1986

HISTORY

In August of 1974 the Izaak Walton League and 22 coplaintiffs filed suit against the U.S. Army Corps of Engineers on the grounds that the Corps had never received Congressional authorization for a major navigation expansion project involving two new replacement locks on the Upper Mississippi River at Lock and Dam 26 in Alton, Illinois. The League won an injunction by establishing that the Corps had not received Congressional authorization for the project, and that the Corps had violated the National Environmental Policy Act (NEPA) by restricting their analysis to the local impacts of the new structure.

The IWLA does not oppose commercial transportation on the Upper Mississippi. Neither do we oppose routine maintenance and repair of the locks and dams. We see commercial navigation as an established and legitimate use of the river. However, commercial navigation is only one of the legitimate multiple uses of the river; it must take its place alongside recreation, fish, wildlife, pleasure boating, commercial fishing, water supply, scenic values, and others. At present, commercial navigation appears to exist in a delicate balance with these other uses and values. We believe that a major increase in barge traffic will drastically tip that balance in favor of navigation and to the detriment of a wide range of alternative public uses and values. Without comprehensive mitigation, widespread biological harm to the living resources of the Upper Mississippi and Illinois River systems will occur from the navigation expansion made possible by the Major Rehabilitation Program.

DESCRIPTION OF THE CORPS MAJOR REHABILITATION PROGRAM

From documents made available to the Izaak Walton League from the Corps and the U.S. Fish and Wildlife Service (USFWS), it has become clear to us that the Corps is now involved in a Congressionally unauthorized "Major Rehabilitation Program (MRP) of Locks and Dams" which includes measures to dramatically expand navigation capacity for certain UMRS locks and dams. According to the Corps figures, this MRP will cost the taxpayer nearly $300 million. It seems equally clear to us that the Corps' decision not to consider the systemic environmental effect of this MRP is in conflict with the ruling of the U.S. District

Court in the League's previous suit and in direct violation of the National Environmental Policy Act, by once again restricting the environmental analysis to the local impacts of the new structures. This MRP also appears to be in violation of PL 99-662 Section 101(i) of the Inland Waterways Authorization Act, which expressly forbids measures that expand navigation capacity prior to Congressional approval of the Comprehensive Master Plan for Management of the Upper Mississippi. A December 10, 1985 review of this situation by the U.S. Department of the Interior Field Solicitor concurs with our contention that the Corps is acting illegally with regard to the MRP.

SUMMARY OF IWLA CONCERNS AND RECOMMENDATIONS

1) Lack of Congressional Authorization for the Corps' Major Rehabilitation.

The proposed work not only includes work which may reasonably be considered "rehabilitation," it also includes major guidewall extensions, guide cells, mooring cells, traveling kevels and other hauling equipment, ice bubblers to extend the navigation season and other features referred to explicitly as "Measures to Increase System Capacity" in the Master Plan for the Management of the Upper Mississippi and subsequent documents.

From data provided to the IWLA from the Corps, we find the just the partial cost for the MRP to be estimated at $251.3 to $266.3 million. This figure does not reflect the MRP costs for Locks 11,12,14,15,24,25, Marseilles and Dresden, which were not provided to us. We assume that the total cost of the MRP, including these Locks, to be well in excess of $300 million. From our analysis of the MRP documents it appears that roughly one half of the costs of the program are for improvements which increase navigation capacity.

While the Corps is pursuing this MRP under the guise of routine maintenance, much of the project features new construction and major renovations which make possible potentially large increases in navigation capacity and the associated environmental impacts. The Corps plan charges the nearly $300 million costs of this project to the U.S. taxpayer by claiming that the MRP is merely ongoing operation and maintenance. However, we believe that it is Congress, not the Corps of Engineers, who should make this determination. It is our strong contention that the majority of this project should be funded by the yet untapped Inland Waterways Trust Fund, not the overburdened U.S. taxpayer. The benefits of the MRP will be substantial for the barge industry, as documented by each Corps' Major Rehabilitation Reconnaissance Reports for the MRP. Congress set up the Inland Waterway Trust Fund for projects of this magnitude and should determine if the fund is applicable for a project of this size and cost. This responsibility should not be usurped by the Corps of Engineers. We recommend that you halt progress on the MRP until Congressional authorization and a decision on the applicability of the Inland Waterways Trust Fund is obtained for the portions of the project which can increase navigation capacity.

2) Lack of an Environmental Impact Analysis

From data provided by the Corps and the USFWS, it is obvious that the MRP will increase systemic navigation capacity and related environmental impacts such as erosion, turbidity and sedimentation on the Mississippi and Illinois Rivers. As in 1974, we contend that your environmental analysis must fully consider the systemic effects of the project. We believe that your current approach of considering only site-specific impacts segments and diminishes the real environmental impacts of the MRP. We feel that this conflicts directly with the National Environmental Policy Act and the U.S. District Court's decision of the previous suit (IWLA-vs-Marsh). Both the USFWS and the state conservation agencies in Missouri, Iowa, Wisconsin, and Illinois have strongly objected to the Corps lack of a systemic environmental analysis of the MRP.

As you know, the USFWS has recommended that:

- "You separate the restoration and maintenance efforts from the improvements and new construction work and that you view the rehabilitation projects as one large project in the District."

- "A single environmental assessment be prepared the restoration and maintenance work at all locks and dams."

We concur with these recommendations.

In addition, you and your staff have heard from the USFWS in correspondence and in discussions, of their opinion that the "rehabilitation" program specifically fulfills the criteria for "closely-related actions," "cumulatively significant impacts" and "reasonably foreseeable future actions" outlined in the Council on Environmental Quality's regulations regarding cumulative impacts and environmental impact review under the NEPA. These regulations clearly require the Corps to prepare a single, system-wide EIS.

Indeed, the U.S. Department of the Interior Field Solicitor has stated that:

> "except for the specifically authorized portions of the Lock and Dam 26 replacement, all other rehabilitation and replacement activities remain subject to NEPA and ordinarily, if separable parts of a project are so interrelated as to make separate review misleading or inadequate (highway segments, for example), those sections will be regarded as a part of one program or project, and courts have required that federal agencies carrying out such projects consider the cumulative impacts of each piece or segment of the project, and conduct the environmental review of the program as a whole."

We strongly recommend that the Corps fulfills its responsibility under the law to prepare a single environmental assessment for the MRP once the Corps receives Congressional authorization for this project.

3) Conflicts with Public Law 95-502 Section 101(i)

Public Law 95-502 Section 101(i) states:

No replacement, construction, or rehabilitation that expands that navigation capacity of locks, dams, and channels shall be undertaken by the Secretary of the Army to increase the navigation capacity of the Upper Mississippi River System, until the master plan prepared pursuant to this section has been approved by the Congress except as provided in section 102 and except for necessary operating and maintenance activities.

We believe that the plain language of this law is clear and will stand up in court. "Replacement, construction, or rehabilitation (our emphasis) that expands the navigation capacity of locks, dams, and channels" is prohibited until Congress approves the Comprehensive Master Plan for the Management of the Upper Mississippi River System. The intent of Congress is clear, however, we find the Corps to be currently involved in activities that expand the navigation capacity of locks and dams, and channels.

NAVIGATION CAPACITY INCREASES FROM THE MRP

Corps officials have stated on several occasions that "no attempt is being made to increase navigation capacity," or that little navigation capacity expansion will occur from the MRP. However, that claim is contradicted by 1) numerous statements from Corps personnel and documents, including the actual reconnaissance reports of the MRP, 2) the U.S. Fish and Wildlife Service, 3) the U.S. Department of the Interior's Field Solicitor, 4) several references in the Comprehensive Master Plan, and 5) a decision not to proceed with the MRP by the Corps' St. Louis District. Regardless of alleged intent, the result of the MRP is large increases in navigation capacity. This is made obvious by a number of sources cited below.

1) Corps statements indicate the the MRP will increase navigation capacity.

"Major rehabilitation of the locks and dams from Locks and Dam 2 through Locks and Dam 10 will be the largest single program (now identified) to be accomplished in the next 25 years. This rehabilitation will be essential to properly accommodate the projected increase of commercial and recreational traffic using the river." (Focus on the Future-A Federal Engineers Perspective on Water Resource Strategies for the Mississippi and Red River of the North Basins, St. Paul District Corps of Engineers, March 1985, page 39.

"Guidewall Extensions, Guardwall, Guardcell... Benefits for construction are derived from two sources: (a) reduced damage to lock and miter gates and dam roller and tainter gates; and (b) increased processing efficiency of the lock (our emphasis)(MRP Reconnaissance Reports for Locks and Dam 22, page B-13; and Locks and Dam 21, page B-9).

"Traffic could also be helped by incorporating ideas for better efficiency in rehabilitation plans." (Anatoly Hochstein Waterways Journal, October 14, 1985).

"Debottlenecking is often the most cost-effective action to expand navigation capacity." Also references to "building to present need and designing for expansion." (Charles I. McGinnis, Retired COE Director of Public Works), Waterways Journal, October 14, 1985.

2) In lengthy correspondence with the Corps, the USFWS has documented that the MRP will increase navigation capacity. For example:

"A second lock in combination with the rehabilitationprogram expands capacity to a level similiar to the Scenario III alternative in the Master Plan and will result in increased traffic levels ranging from 36% to 200%, depending on reach and season. Based on data submitted to us by the St. Louis District, this substantial increase in traffic may be caused more by the rehabilitation program than the additional lock." (USFWS Rock Island Field Office to Corps, Oct. 22, 1985.)

"We are highly concerned with the potential implications of increased navigation traffic that the rehabilitation projects may have on the river ecosystem. The proposed improvements combined with the recently constructed or proposed measures such as mooring cells, kevels, and bubbler systems have the potential to increase the navigation capacity on both the Illinois and Mississippi Rivers." (USFWS Rock Island Field Office, Feb. 28, 1985.)

3)The Corps characterization of all rehabilitation as for safety reasons is not likely to withstand judicial scrutiny under NEPA, whether or not it would under Section 101 (i)." (Office of the Field Solicitor, U.S. Department of the Interior, Dec. 10, 1985.)

4)"Improved approached (guidewall extensions, guide cells, mooring cells)... any modification which can be made to reduce the approach time can have a significant effect on capacity."(Comprehensive Master Plan ,page 45.)

5)Corps St. Louis District staff postponed the MRP due to the conflict of this program with PL 95-502 Section 101 (i)

CONCLUSION

Historically, the Upper Mississippi River holds a special place in the tradition and history of the Izaak Walton League of America. Our founders played a pivotal role in the creation of the Upper Mississippi Wildlife and Fish Refuge and our organization's dedication and bond to this remarkable natural resource has strengthened and matured with each succeeding generation of IWLA conservationists.

The Upper Mississippi is extraordinarily rich in recreational values and biological productivity. Backwater areas, an intricate maze of channels and sloughs often extending for miles on either side of the main channel, provide some of the best wildlife habitat in the nation, excellent fishing, and an irresistible attraction for recreational boaters. At the heart of the Mississippi flyway, the river hosts enormous numbers of migratory waterfowl, including the major continental population of the rare canvasback duck, and a large winter population of endangered bald eagles. Millions of recreationists from the nearby cities each year enjoy the natural beauty of the area, and the Upper Mississippi River Conservation Committee estimates that UMR recreational activities contribute over $1 billion to the area's economy.

We contend that the Corps' MRP violates the NEPA, PL 95-502 Section 101 (i), and is in conflict with the U.S. District Court's ruling on our previous suit. As we have stated, we believe that proceeding with the MRP undermines the intent of Congress with regard to the Inland Waterway Trust Fund. Indeed, it has been suggested to us that the inclusion of navigation expansion projects, such as these, under the guise of routine maintenance, represents new Corps' policy nationwide.

We urge you to acknowledge the responsibility of Congress to authorize costly new construction projects such as this, and to refrain from further progress on the MRP until this program has received appropriate Congressional approval and a Congressional decision on the applicability of the Inland Waterways Trust Fund. We further urge you to evaluate the systemic environmental impacts of the MRP, to prepare a systemic Environmental Impact Statement for the MRP, and to provide for appropriate mitigation on a system-wide basis. USFWS officials indicate that the MRP

The Izaak Walton League of America
INCORPORATED
DEFENDERS OF SOIL, AIR, WOODS, WATERS, AND WILDLIFE

November 27, 1985

Colonel William C. Burns, Jr.
District Engineer, Rock Island District
U.S. Army Corps of Engineers
P.O. Box 2004
Rock Island, IL 61201

Dear Colonel Burns:

As you know, the Izaak Walton League has a long and abiding interest and involvement in the protection of the biological and recreational values of the Upper Mississippi and Illinois Rivers. While we regard commercial navigation of the UMR to be an established and legitimate use of the River, we believe that the commercial, biological, and recreational uses must be carefully balanced and monitored.

In recent months, we have become interested in learning more about plans currently in progress to "rehabilitate" a number of Mississippi River and Illinois River locks and dams. In order to better understand the scope of this project, we request answers to the following questions, and copies of correspondences and any other material which would help us to answer these questions.

1) What are the exact modifications, new construction and other characteristics of the "rehabilitation" project for locks and dams on the Upper Mississippi and Illinois Rivers?

2) What measures listed under enclosed Table V-5 "Selected Measures to Increase System Capacity" (page 47, Comprehensive Master Plan for Management of the UMRS, January 1, 1982) are completed, under construction, planned, or are being considered for locks and dams on the Upper Mississippi River and the Illinois River?

could be responsible for 50% of the impacts caused by future navigation traffic levels. Total mitigation needs must be evaluated and provided for by the program..

It is our profound desire to resolve this issue short of repeating history through another costly legal challenge. It is IWLA policy and practice to use the courts only as a last resort. However, due to our organization's overriding concern for the future of the living resources of this river system, we will be forced to call for Congessional oversight and will be forced to seek an immediate injunction in the U.S. District Court if the Corps of Engineers does not promptly initiate changes based on ther recommendations which we have outlined.

3) What percent increase in navigation capacity will occur or is estimated to occur by pool and systemically from this "rehabilitation" project?

4) What activities are in progress or planned to assess the environmental impacts resulting from the increased navigation capacity made possible by these "rehabilitation" measures?

5) What are the estimated or actual total costs of the planned or completed "rehabilitation" of locks and dams on the Upper Mississippi?

6) What are the estimated or actual costs of "rehabilitation" measures listed under Table V-5 "Selected Measures to Increase System Capacity" (page 47, Comprehensive Master Plan for Management of the UMRS, January 1, 1982) which are completed, under construction, planned, or being considered for locks and dams on the Upper Mississippi River and the Illinois River?

We would appreciate any correspondence, coordination act reports and other information which might enhance our understanding of this project.

We hope to cooperate with you in our goal of insuring the future of the remarkable resources of the Upper Mississippi and Illinois Rivers. If necessary, however, please consider this a request under the Freedom of Information Act. We understand under the terms of the Act that we may be required to cover "reasonable" photocopying costs, and we will be glad to do so up to $25.

We would appreciate this information as soon as possible, and no later than December 31st.

Sincerely,

Paul l Hansen

Paul W. Hansen
Upper Mississippi Regional Representative

cc. Harvey Nelson, USFWS Regional Director
Maitland Sharpe, IWLA Assistant Director
Brigadier General Joseph Pratt, Division Engineer, COE

Table V-5. Selected Measures to Increase System Capacity

	Quantitative Aspects			Qualitative Aspects			
	Annualized Cost ($000)	% Increase in Capacity (typical range)	Cost ($000) for each % Increase	Safety	Operation/ Investment	General Usage	Applicability
SCHEDULING OF LOCK OPERATIONS - ASSISTANCE TO MULTICUT LOCKAGES							
Institute 0-up/N-down Policy	0	13-16	0	HIGH	-	COMMON	MED.
Provide Helper Boats	684	36	[illegible]	MED.	OPER.	RARE	WIDE
Provide Switchboats	1400	37	[illegible]	LOW	OPER.	RARE	LTD.
Institute Ready to Serve Policy	[illegible]	35	60	LOW	OPER.	PROPOSED	LTD.
Improve Tow Haulage Equipment	751	30	27	LOW	INV.	PROPOSED	WIDE
Increase Lock Staffing	82	1-2	30	HIGH	OPER.	PROPOSED	MED.
Institute Lock Scheduling	9	3	3	HIGH	OPER.	RARE	MED.
IMPROVEMENTS TO APPROACHES							
Improvements to Approaches	116	3	30	HIGH	INV.	COMMON	MED.
Provide Adjacent Mooring Cells	30	1-2	14	HIGH	INV.	COMMON	LTD.
Provide Funnel Shaped Guidewalls	N/A	N/A	N/A	HIGH	INV.	PROPOSED	LTD.
Install Wind Deflectors	2-30	0-.1	20-300	HIGH	INV.	PROPOSED	LTD.
TOW CONFIGURATION AND OPERATION							
Use of Regular Bow Thrusters	N/A	4	N/A	HIGH	INV.	RARE	WIDE
Use of Bow Boats	N/A	21	N/A	HIGH	INV.	PROPOSED	WIDE
Tow Size Standardization	N/A	17	N/A	MED.	OPER.	PROPOSED	WIDE
Cooperative Scheduling	N/A	13	N/A	MED.	OPER.	PROPOSED	WIDE
Waterway Traffic Management	5-15	4	3	HIGH	OPER.	PROPOSED	WIDE
Expand Fleeting Areas	300	N/A	N/A	MED.	INV.	COMMON	WIDE
Bridge Maintenance and Operation	N/A	0-5	N/A	HIGH	OPER.	COMMON	WIDE
LOCK OPERATING CONTROLS							
Modify Intake/Outlet Structures	70	4	16	MED.	INV.	RARE	LTD.
Install Trash Racks	29	4	7	MED.	INV.	COMMON	LTD.
Expedite Operations in Ice Condition	23	2	12	MED.	INV.	COMMON	WIDE
Install Air Bubbler System	30	0	-	HIGH	OPER.	COMMON	LTD.
Install Floating Mooring Bitts	14	0	-	HIGH	OPER.	COMMON	LTD.
Improve Lock Operating Equipment	101	0	-	HIGH	INV.	RARE	LTD.
Install Gate Wickets	HIGH	0-1	-	LOW	INV.	PROPOSED	LTD.
Provide Operating Guides	MED.	0-1	-	HIGH	OPER.	PROPOSED	WIDE
Centralize Controls	104	1	104	HIGH	INV.	RARE	WIDE
Provide Replaceable Fenders	LOW	0-1	-	LOW	INV.	PROPOSED	WIDE
Clear Vessel From Filling/ Emptying System	LOW	0	-	HIGH	INV.	COMMON	WIDE
STRUCTURAL ACTIONS							
Reduce Interference from Recreation	410	6	68	MED.	INV.	COMMON	WIDE
Improve Use of Auxiliary Chamber	N/A	10-30	N/A	MED.	OPER.	COMMON	LTD.
Enlarge Lock to 1200 Feet	4575	40	90	LOW	INV.	RARE	WIDE
Physical Lock Replacement	8060	140	61	HIGH	INV.	COMMON	WIDE

N/A = Unavailable

Source: Louis Berger and Associates, Inc., Inventory of Potential Structural and Non-Structural Alternatives for Increasing Navigation Capacity, April, 1981.

UPPER MISSISSIPPI WATERWAY ASSOCIATION

INCORPORATED 1982
P. O. Box 308
Amery, Wisconsin 54001
715-268-6855

Dedicated to navigation and sound water resource management.

August 11, 1986

Colonel William C. Burns
U.S. District Engineer
U.S. Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61204-2004

Dear Colonel Burns:

Your attention to these two related requests is respectfully requested, concerning an EIS we understand you are preparing in response to representations by the Walton League:

1) May we please be listed to receive copies of drafts, or notices to the public?

2) We would like to ask for background data, such as publicly available reports of unfinished, planned or pending maintenance and rehabilitation of locks, cuts, wing dams, etc., but this request is so broad that a telephone call might be the better alternative.

Very truly yours,
UPPER MISSISSIPPI WATERWAY ASSOCIATION

Andrew T. Nelson
Executive Vice President

atn/k

6-32

STATEMENT PRESENTED BY

TRI-COUNTY REGIONAL PLANNING COMMISSION

AT

PUBLIC SCOPING MEETING

To assess the potential for cumulative impacts from certain measures of major rehabilitation at locks and dams on the Illinois and Mississippi Rivers.

Conducted by

U.S. Army Corps of Engineers

Rock Island District

Held In

Holiday Inn

401 North Main Street

East Peoria, Illinois 61611

Wednesday, April 8, 1987

7:00 P.M.

The Tri-County Regional Planning Commission is the local Metropolitan Planning Organization for Tazewell, Peoria and Woodford Counties. The Commission has been actively involved, during the past twenty-nine years, with a multitude of problems and issues concerning water resources within this region.

The Tri-County Regional Planning Commission has formed a Peoria Lakes/Illinois River Advisory Committee. That committee is contending with the problem of siltation within the Peoria Lakes/Illinois River basin (the largest recreational lakes along the Illinois River). Illinois State Water Survey scientists have predicted 10 - 15 years life for the lakes before they become mud flats. This would be a tremendous economic and aesthetic loss to the Tri-County - central Illinois area and to the State of Illinois.

At last week's Governor's Conference on the "Management of the Illinois River System; the 1990's and Beyond" erosion, siltation and the resultant complete degradation of the Illinois River and its system of lakes was the preeminent concern of the conferrees. Governor Thompson's personal interest in the siltation problem was clearly evident by his attendance at the conference and the time he devoted aboard the Coast Guard's "Sangamon" to view firsthand the problem that exists. Clearly, public and state agency concern has been aroused. A special Illinois Legislative Task Force will be meeting on Monday to receive relevant testimony in relation to sedimentation of the Illinois River, as well as proposed solutions, to determine possible legislative action.

The Peoria Lakes/Illinois River Advisory Committee comprised of elected public officials and key community leaders is at work seeking solutions to save the Peoria Lakes and preserve them and other laterial lakes along the River for our present and future generations. It's rather ironic that while members of this committee and the media promulgate the urgency of finding ways and means of saving this invaluable natural resource, projects such as the second lock chamber at Locks and Dam 26 on the Mississippi River and the major rehabilitation at locks and dams on the Illinois and Mississippi Rivers may increase navigation traffic and future accelerate the degredation of central Illinois' most noticeable natural resource, the Illinois River and the Peoria Lakes.

The Commission has presented testimony at various public meetings and hearings expressing its concern over proposed activities/projects for which, no fully comprehensive impact analysis has been completed. The Commission does not object to maintenance and rehabilitation efforts by the U.S. Corps of Engineers proposed for the Peoria Lock and Dam. As a matter of record, the Commission's concerns over the specific period of closing the waterway to traffic was favorably considered by the U.S. Corps of Engineers, thereby providing agricultural commodities to be shipped during months of greatest economic advantage to the shipper. We fully appreciate and compliment the Corps for their action in that matter.

However, the Commission s ngly recommends that no further work take place on the second luck chamber, scheduled for Locks and Dam 26 and that: (1) a combined Environmental Impact Statement be prepared that completely assesses the cumulative navigation impacts, upon the Illinois River and its related land resources, resulting from the construction of a second lock chamber at Locks and Dam 26 and the rehabilitation/maintenance work on the Peoria and LaGrange Locks and Dam; (2) funds from the Environmental Management Program (PL 99-88) be designated for environmental mitigation programs along the Illinois River in proportion to the projected percentages of environmental degradation, and (3) projects be implemented to contend with erosion, suspended sediments/turbidity and backwater sedimentation within Peoria Lakes which are estimated to have an expected life of only 10 to 15 years.

The Commission's concern is more explicitly stated in its March 25, 1987 letter to Colonel Wilson, St. Louis District Engineer, a copy of which is attached hereto, and made a part of this testimony.

TRI-COUNTY REGIONAL PLANNING COMMISSION

832 WEST JEFFERSON STREET MORTON, ILLINOIS 61550-1540
PHONE (309) 694-4391 or (309) 266-9941

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Peoria County

EXECUTIVE DIRECTOR
Robert L. Pinkerton
AICP, ASPA, ICMA

March 25, 1987

Colonel Daniel M. Wilson, District Engineer
U.S. Army Corps of Engineers, St. Louis District
210 Tucker Blvd., North
St. Louis, Missouri 63101-1986

RE: Draft Environmental Impact Statement
Second Lock at Locks and Dam 26 Replacement,
Mississippi River, Alton, Illinois and Missouri

Dear Colonel Wilson:

Pursuant to your March 18th letter, we understand that the second lock and the major rehabilitation program by the Rock Island and St. Paul Districts are separate actions. The Commission however has long advocated and repeatedly recommended that the inter-relationship and compatibility of separate actions, involving the Illinois River system, need to be evaluated simultaneously to obtain optimum protection of the Illinois River and its invaluable land resources.

While the second lock and the major rehabilitation program are authorized by separate legislation, that fact should not preclude the combining of the projects to provide a comprehensive assessment of the damaging effects from increased navigation traffic upon the Illinois River and its delicate environment.

The Commission recommends that the above subject supplemental draft (scheduled for release in September 1987) and the environmental impact statement for the major rehabilitation program (scheduled for release in March 1988) be prepared conjointly. The Commission's views and concerns about the projects are delineated in the enclosed statement.

Sincerely,

Robert L. Pinkerton
Executive Director

DGM:RLP:jr

enclosure

cc: Col. Neil Smart
Senators Simon & Dixon
Congressmen Michel & Evans

TRI-COUNTY REGIONAL PLANNING COMMISSION

632 WEST JEFFERSON STREET MORTON, ILLINOIS 61550-1540
PHONE (309) 694-4391 or (309) 266-9941

March 23, 1987

U. S. Army Engineer District, St. Louis
ATTN: Environmental Analysis Branch, LMSPD-A
210 Tucker Boulevard, North
St. Louis, Missouri 63101-1986

SUBJECT: Draft Environmental Impact Statement Second Lock at Locks and Dam 26 Replacement, Mississippi River, Alton, Illinois and Missouri

Dear Sir:

On July 31, 1985, the Tri-County Regional Planning Commission (Peoria, Tazewell and Woodford Counties, Illinois) responded to the preparation of the above subject Environmental Impact Statement. The Commission recommended: "...that the engineering, design and construction of *a second chamber at Lock and Dam 26 be delayed until specific plans* and programs have been instituted to rehabilitate, enhance, or protect aquatic and terrestrial habitats lost or threatened as a result of man-induced activities or natural factors." The preceding quote is an excerpt from a statement the Commission made during a public hearing in Peoria, Illinois on November 3, 1981 (copy attached to and made a part of this response). The Commission reiterates its earlier position and strongly urges that no work start on the second lock chamber until specific plans and programs are in-place both to prevent and address any further degradation of the Illinois River and its related land resources.

A recently released Illinois State Water Survey report, prepared for the U.S. Army Corps of Engineers, Rock Island District, indicates that Peoria Lakes, the largest lakes along the Illinois River, will become a mud flat in ~15 years. This invaluable natural resource will be gone and pr[illegible] lost forever. The Draft Environmental Impact Statement (DE[illegible]rojects a 27 percent increase in commercial traffic levels on both Illinois and Mississippi River over that of the future with no second lock. The DEIS predicted increases by the year 2040 for erosion, suspended sediments/turbidity, and backwater sediments for the Illinois River to equal 31 percent, 30 percent, and 43 percent respectively. The Commission is extremely concerned that such a substantial increase in barge traffic may lead to the total demise of the Illinois River, as an aquatic habitat for fish and plants, and accelerate the siltation of its adjacent lateral lakes and sensitive wetlands. Presently, the lakes and the Illinois River are silting-in at an alarming rate. At normal pool stage canoes, flat bottom row boats, and many sail boats

can no longer venture outside of the navigation channel without running the risk of getting stuck in the mud. Unless environmental mitigation programs are implemented along the Illinois River, prior to experiencing increased barge traffic as a result of the construction and operation of the second lock chamber at Locks and Dam 26, the Illinois River will not remain a major water based recreation area (EIS-111) but, in fact, may become a mud flat next to a 300 foot wide navigation channel. This would cause recreation and commercial users of the waterway to vie for the same water areas, hence making it difficult and increasingly dangerous, for water oriented recreational activities to take place. It is apparent from the DEIS that the Illinois River will be the "Loser" and sustain the greater percentage of environmental damage as a result of the increase river traffic through the second lock. We propose that environmental management program funds (P.L. 99-88) be proportioned between the Illinois and Mississippi Rivers according to projected percentages of environmental damage expected.

The value of the Illinois River system as a fluid highway for transporting commodities and to our nation's welfare is indisputable. It is the only connecting water link between the Great Lakes/St. Lawrence seaway and the lower Mississippi gateway to the Gulf of Mexico. With the prospect of increased river traffic, the Commission recognizes that there will be a need for more terminals and fleeting sites along the waterway. Perhaps considerably more than is projected in the EIS Pages 112-125. Any placement of terminals and fleeting sites should be carefully considered, evaluated, and designated so as not to create a public safety-hazardous situation or encroach upon the channel of the narrow Illinois waterway. Many communities along the Tri-County reach of the Illinois River, the largest metropolitan area in downstate Illinois, have already or are planning to develop and enhance their waterfronts in order to improve the quality of life for their citizens (EIS-125). The State of Illinois lacks adequate fleeting regulations and without the necessary control to govern where fleeting might best take place, public access ways and riverfront development projects could be in jeopardy. We do not believe that would be in the best interests of the general public.

A citizens committee comprised of elected public officials and key community leaders, formed by the Commission, is at work seeking solutions to save the Peoria Lakes and preserve them and other laterial lakes for our present and future generations.

It's rather ironic that while members of these committees, area citizens, and the media promulgate the urgency of finding ways and means of saving this invaluable natural resource, the EIS (Page 128) "Writes Off" the Illinois River for the sake of time and expediency.

Date 3-17-87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

After reviewing the information on the major rehabilitation of lock and dam sites on the Upper Mississippi and Illinois Rivers, the Federal Highway Administration does not anticipate impacts to the Federal-aid highway system as a result of the proposed work.

Name (Optional) E. V. Heathcock, Director Office of Planning and Program Development

Address 18209 Dixie Highway

Homewood, IL 60430

Telephone Number 312/799-6300 Ext. 135

Do you wish to be placed on the mailing list for the EIS? X Yes ___ No

E V Heathcock

E. V. Heathcock, Director
Office of Planning and Program Development

The master plan submitted to Congress in January, 1982, recommended immediate actions to contend with such problems as we are presently addressing considering the hundreds of millions of dollars being invested in the Locks and Dam 26 project it appears to us that the conclusion "... it has been determined to be too costly to obtain this information" is not justified especially, in light of the rang of negative impacts affecting the Illinois River (EIS Pages 128-132).

The Commission strongly recommends that no further work take place on the second lock chamber, scheduled for Locks and Dam 26 and that (1) a combined Environmental Impact Statement be prepared that completely assesses the cumulative navigation impacts, upon the Illinois River and its related land resources, resulting from the construction of a second lock chamber at Locks and Dam 26 and the rehabilitation/maintenance work on the Peoria and LaGrange Locks and Dam (2) funds from the Environmental Management Program (PL 99-88) be designated for environmental mitigation programs along the Illinois River in proporation to the projected percentages of environmental degradation, and (3) projects be implemented to contend with erosion, suspended sediments/turbidity and backwater sedimentation within Peoria Lakes which have an expected life of only 10-15 years.

Sincerely,

Robert L. Pinkerton
Executive Director

DM:RLP:bs

Date 3/16/87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

EIS FOR REHABILITATION OF LOCKS & DAMS ON THE MISSISSIPPI & ILLINOIS RIVERS ARE NOT BELIEVED TO IMPACT RAILROAD RELOCATION OR INVOLVE THE RAILROADS. HOWEVER SHOULD THE RAILROADS BE AFFECTED WITH THE PROPOSED WORK, OUR AGENCY SHOULD BE FURNISHED AN EIS.

6-37

Name (Optional) REGIONAL DIRECTOR
FEDERAL RAILROAD ADMIN.

Address FEDERAL BLDG - RM1807
911 WALNUT STREET
KANSAS CITY, MO. 64106-2095

Telephone Number (816) 374-2497
FTS 758-2497

Do you wish to be placed on the mailing list for the EIS? ___ Yes ✓ No

Date February 20, 1

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

In regard to the proposed upper and lower guidewall extensions for various locks and dams, I would hope that the EIS will address the alternative of using helper boats versus the high cost/high impact guidewall concept. Outdraft conditions that affect tow maneuver ability at some locks and dams generally occur seasonally. Helper boats utilized during these periods at various UMRS locks and dams have proven to be effective in reducing safet and operating problems. If bubbler systems are proposed for installation to extend the navigation season, the impacts of cold season navigation must be rigorously evaluated.

Name (Optional) Gary Grunwald

Address Area Fisheries Headquarters
P.O. Box 69, Lake City, MN 55041

Telephone Number (612)345-4219

Do you wish to be placed on the mailing list for the EIS? X Yes ___ No

Date 2/18/87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

Fisheries Management, Guttenberg, will submit comments through our Central Office Authority.

We would like to continue knowing about your plans. Perhaps something constructive sometime can be built into them to benefit fisheries interests.

Name (Optional) IOWA D.N.R.
Fishery Management
% Mr. Gary Ackerman
Address 910 S. River Park Dr.
Guttenberg, Iowa 52052-250

Telephone Number 319/252-1156

Do you wish to be placed on the mailing list for the EIS? ✓ Yes ___ No

Date 5/8/87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

Any EIS for Major Rehabilitation must include assessments of improvements in navigation capacity. In other words, improvements in processing efficiency and throughout must be assessed.

Name (Optional) Paul W. Hansen

Address Upper Mississippi Regional Representative
6601 Auto Club Road, Minneapolis, MN 55438

Telephone Number (612) 941-6654

Do you wish to be placed on the mailing list for the EIS? ✓ Yes ___ No

Date 2/24/87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

Excellent Program. Toured Lock #2 [illegible] Yesterday. Very Impressive.

Name (Optional) R. H. HERTZBERG

Address UPPER MISS. WATERWAY ASSOC.
P.O. BOX 7006, ST. PAUL, MN. 55107

Telephone Number 612-224-0057

Do you wish to be placed on the mailing list for the EIS? X Yes __ No

Date 20 Feb. 87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

The Bubbler System for Lock & Dam No. 11 would really be a great improvement and reduce safety hazards at the same time. It would save locking time, but I can't see it extending the Navigation Season, because when the ice gets so thick and builds up, there's no place for bubblers to push any more ice even if it could move it. I see no problem with Environmental Impact at this lock with the proposed Rehabilitation listed in Public Information Fact sheet dated Feb. 17, 87.

Name (Optional) Gilbert Currier, Lockmaster

Address Lock & Dam No. 11
Dubuque, Iowa 52001

Telephone Number 319-582-1204

Do you wish to be placed on the mailing list for the EIS? X Yes __ No

Date February 20, 1987

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

The City of Canton has no objections to the proposed list of measures listed in the Public Information Sheet regarding the verticle lift gate, bubbler systems, or the upper guidewall extension at Lock and Dam 20.

We understand according to a preliminary study at Lock and Dam 20 that a lower guidewall extension was considered. We would be opposed to such an extension as it would have a severe impact on our North Riverfront Park as far as fisherman use and viewing the river, the Bald Eagles and the river traffic in general. Please understand that this is one of the few areas where the river can be accessed easily by the public on the entire City of Canton river frontage and to extend the wall and block the view of the river as well as drastically changing a very heavily fished area would certainly be devastating to the beauty of our Park.

Name (Optional) City of Canton

Address 124 North 5th Street

Canton, MO 63435

Telephone Number (314) 288-4413

Do you wish to be placed on the mailing list for the EIS? X Yes ___ No

Date 2-24-87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

How long or what will the pool stage be? as its presently 11.5 & have been told it will be 9 during const. This would cause us & all Marina's many problems.

Are you going to raise the pool stage last year they were [illegible] 1 to 3 foot higher, this would be a benefit to most of mankind. Thank You

Name (Optional) JOE SODOWSKI

Address SODOWSKI BOAT BASIN
4014 N. GALENA RD.
PEORIA HTS, ILLINOIS, 61614

Telephone Number 309-688-2526

Do you wish to be placed on the mailing list for the EIS? ✓ Yes ___ No

Date 3 March 87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

I see no objection

Leo A Wedekind
County Chairman

Name (Optional) Mercer Co. Board
Address Aledo Ill.

Telephone Number

Do you wish to be placed on the mailing list for the EIS? ___ Yes ___ No

6-41

Date 3/11/87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

I agree with updating waterway systems that are in need of repairs.
Also in whatever needs to be done to help protect our soil from erosion.
We have a problem at the outlet of our waterway that we can't solve.
Our waterway empties into Plum River which empties into the Mississippi River.
Plum River is getting silted in and our water is backing up more every year.
Location - South edge of Savanna Ill.
I am sure there are many situations like ours that can't be corrected without Corps of Engineers help.

Name (Optional) Savanna York Drainage Dist.
James A. Kindrick (Commissioner)
Address 5218 W. Airport Rd.
Savanna Ill. 61074
Telephone Number (815) 273-3270

Do you wish to be placed on the mailing list for the EIS? X Yes ___ No

Date ______

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

The Fabius River Drainage Dist. is in favor of all work listed on the preceding pages and feel the locks should be repaired as outlined.

Name (Optional) Norman L. Hawes
Address Gen. Del.
Taylor, Mo. 63471
Telephone Number 314 393 2175

Do you wish to be placed on the mailing list for the EIS? __ Yes X No

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ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION.

Date 4/7/87

ENVIRONMENTAL IMPACT STATEMENT
FOR MAJOR REHABILITATION

COMMENTS

Peoria Site — & La Grange

To minimize eddies when navigable pass is in use & tainter gate wide open, suggest that sills of "pass" and tainter gate be at same elevation.

4/02-22 — New Guard walls:—

Is it practical* for new guard walls to be of floating type? Other sites on inland waterways have such. (Reference Tennesee river L/D) Of course Ice is a factor, not substantial on Tennesee.

* And competetive

Someday a 1200' lock might be built in the auxiliary lock position. It is believed the "flared" alignment of the walls is not compatible with that possibility. Also a floating wall could be placed in different positions. It is realized that drift is a problem.

Name (Optional) — H. L. [illegible] Boulder City, NV [illegible] — H. L. Goodall
Address
Telephone Number 702-293-1405

Do you wish to be placed on the mailing list for the EIS? X Yes __ No

Reference A-1: How much will difficulty & hazard be reduced? Will manual operation be eliminated?

P.S. Public Information sheet was received to late for comment by 3/20/87

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PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
MAJOR REHABILITATION EFFORT
MISSISSIPPI RIVER LOCKS AND DAMS 2-22
ILLINOIS WATERWAY FROM LA GRANGE TO LOCKPORT LOCKS AND DAMS

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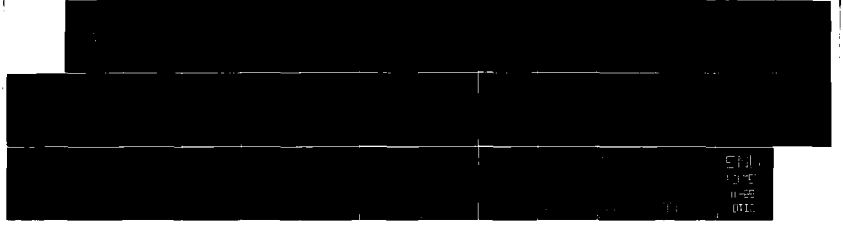

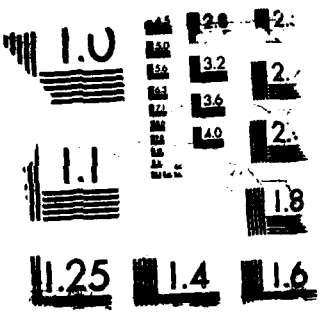
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