

BIOLOGICAL OPINION

1.0 Description of the Proposed Action

The Upper Mississippi River-Illinois Waterway System Navigation Feasibility Study is an investigation addressing navigation system improvement and ecological restoration needs for the Upper Mississippi River and Illinois Waterway system for the years 2000-2050. For the purpose of this consultation, the Service considers that the action area includes the study area as described in the project Integrated Feasibility Report and Programmatic Environmental Impact Statement. This includes the Upper Mississippi River from Minneapolis, Minnesota to Cairo Illinois; the Illinois River from Chicago to Grafton, Illinois; and the navigable portions of the Minnesota, St. Croix, Black, and Kaskaskia Rivers. The action area also includes those floodplain portions of Illinois, Missouri, Iowa, Wisconsin and Minnesota bordering these navigable waters, which totals over 2.6 million acres. As the proposed actions affect pallid sturgeon populations in the lower Missouri and lower Mississippi River reaches, the action area also encompasses these river reaches (see section 5.2 for further discussion).

This consultation focuses on the recommended plan described in the Integrated Feasibility Report, and includes a combination of administrative, operational, and physical construction actions directed at upgrading the existing navigation system and restoring ecosystem components associated with the navigation system in the study area. With the enactment of new authority these actions would include Federal policy changes, interagency coordinating mechanism or institutional arrangement modifications, changes in operation of existing facilities, manipulation of landcover types to change habitat features, and a suite of construction activities for navigation feature improvement, navigation structure modification, and ecosystem restoration. The Integrated Feasibility Report Executive Summary contained the following features in the recommended plan:

1. Structural and nonstructural measures to include:

- a. Mooring facilities at Locks and Dams 12, 14, 18, 20, 22, 24 and LaGrange.
- b. Switchboats at Locks and Dams 20-25.
- c. New 1,200 foot locks at 20-25, La Grange, and Peoria.
- d. Lock extensions at Locks and Dams 14 through 18.

2. Administrative measures to include:

- a. Adaptive implementation to include the following decision points and congressional oversight:
 1. A notification report at the end of design and before construction contract award that presents any new information resulting from monitoring river traffic and markets, and the results of any improved models and analysis.
 2. An evaluation report upon the development and use of any new and widely accepted models concluding with a recommendation to Congress whether or not to stop, or delay lock construction.

3. An updated feasibility report requiring additional authorization before proceeding with the final five locks.
 - b. Continued study and monitoring of the system to include:
 1. Development of an appointment scheduling system.
 2. Development of a new spatial model.
 3. Collection of demand elasticity data.
 4. Monitoring of traffic delays and patterns.
 5. Monitoring of domestic and global grain market conditions, land use, crop yield technology, and developments in China regarding import trends.
 - c. Land acquisition from willing sellers, up to 35,000 acres for ecosystem restoration.
3. Mitigation for site-specific impacts and system-wide fish entrainment.
 - a. Bank armoring and vegetative stabilization
 - b. Regulating works modification.
 - c. Reforestation and submerged aquatic vegetation planting
 - d. Wood structure placement
 - e. Gravel bar placement
 - f. Backwater restoration
4. Ecosystem restoration.

Although the period of analysis for the project is 50 years, the Executive Summary described ecosystem restoration in the context of an incremental approach, and outlined the first 15 year increment of the Alternative D* framework.

Table 1-1 provides the type and estimated number of ecosystem restoration measures to be pursued over the entire analysis period and the first 15 years. This table contains 8 general categories of measures which subsume over 2300 individual actions recorded in the Environmental Objectives Workshop report (USACE 2003).

Island building is recommended to address physical processes and restore habitats lost to inundation and erosion following lock and dam construction. Islands provide habitat diversity and reduce wind fetch that generates waves, resuspends sediments and reduces water quality and aquatic plant growth.

Fish passage, both lateral into the floodplain and longitudinal, is recommended to restore habitat connectivity that was fragmented by navigation system construction and floodplain development. Not all riverine fish are strong swimmers, yet require access to a variety of habitats to complete their life cycles. One native species, the American eel, (*Anguilla rostrata*) is catadromous, meaning it must travel from freshwater to salt water to spawn. Other native species are potadromous and once traveled long distances in seasonal runs throughout the system and tributaries. While fish passage may also benefit invasive aquatic species, the general consensus of river fisheries biologists is that by restoring access opportunities for all species, native species will be better able to compete with non-native species.

Table 1-1. Description of management measures included in the recommended plan and first 15 year increment.

Management Measures	Alternative D*		15-year Implementation Plan	
	Number of Projects	Area of Benefit (acres)	Number of Projects	Area of Benefit (acres)
Adaptive Management				
Cultural Res. Management & Mitigation				
Forest Management				
Real Estate (35,000 acres in MVR and MVS)				
Ecosystem Management and Restoration Measures	1,010	388,281	225	104,986
Island Building	91	91,000	23	23,000
Fish Passage	14		4	
Floodplain Restoration ¹	72	118,756	24	46,056
Water Level Management ²	15		15	
Backwater Restoration	215	124,800	38	24,800
Side Channel Restoration	147	14,700	29	2,900
Wing Dam/Dike Alteration	64	640	19	190
Shoreline Protection ³	392	38,385	73	8,040

¹ – Includes large and small-scale floodplain restoration, dam embankment lowering, and topographic diversity

² – Includes pool-scale drawdowns/changing to dam point control at 2 sites/reducing water level fluctuations on the IL River

³ – Included bankline and island protection

Floodplain restoration encompasses a suite of actions from the relatively passive, such as hydrologic restoration (modified drainage management) and planting, to large-scale construction of water control features in existing levees, new levee or berm construction to facilitate water control, and other earthwork. Larger scale projects and earthwork are intended to restore elements of hydrology, provide topographic diversity and allow planting or other manipulation of landcover to achieve restoration of representative habitat types.

Water level management includes pool-scale drawdowns, moving the pool control point from mid-pool to the dam to effectively control pool elevations near the dam, medium scale projects using levees or berms, as noted above and small scale drawdowns using temporary pumps and control structures to artificially influence local hydrologic conditions to achieve selected habitat objectives.

Backwater restoration generally refers to dredging to regain depths and diversity lost to sedimentation. Dredging may occur with a cutterhead type dredge with disposal of dredged material on the floodplain, behind the levee, or elsewhere for beneficial use; or it may occur with a clamshell bucket or dragline and involve side casting to the shoreline, to an adjacent location for island construction, or to a barge for transport and disposal off-site.

Side channel restoration will involve a variety of approaches, depending on site characteristics. Such approaches include dredging, placement of stone structures to create scouring flow, notching existing closing structures to restore flow, and/or dike alterations as subsequently described. The purpose is to restore habitats lost to channel maintenance and sedimentation, and improve aquatic habitat diversity for all life stages of native fish and freshwater mussels.

Wing dam and dike alterations are proposed to restore flow diversity and beneficially affect sediment distribution. The study area contains over 2,100 wing dams, closing structures, and dikes constructed since the mid 1800s for the express purpose of directing flows to a single main channel. These structures vary greatly in size and performance depending on the river reach. They have altered flows and sediment distribution patterns and contributed to structural homogeneity in aquatic habitats. Wing dams are most common above St. Louis and are not emergent or visible above normal pool elevations. Wing dikes are generally found below St. Louis in the Open River and are emergent or visible at the bankline, and are functional at all river stages.

Shoreline protection generally refers to minimizing further erosion damage to remaining habitats on islands and the floodplain. This may be done through traditional bank armoring with riprap, placement of off-shore revetment, which maintains an area of aquatic habitat between the bankline and revetment, use of wood pilings, placement of downed trees, or placement of dredged material.

Administrative Actions

Adaptive management is proposed to address uncertainty in future habitat conditions and the response to restoration measures of organisms that rely on those habitats. Adaptive management will require focused experimental design to evaluate performance of both common and untried restoration practices. It will require development of both conceptual and predictive models to facilitate communication and inform restoration strategy. It will require agencies to modify their planning, regulatory, and implementation relationships (that is, institutional arrangements) to provide flexibility and improve response to shifting navigation and ecosystem needs over time. As the primary administrative action to be pursued by partner agencies, the adaptive management paradigm requires that regulatory agencies be active participants in management experiments that focus on questions critical to threatened and endangered species survival and habitat restoration programs (Stankey et al 2003). Provision of authority for ecosystem restoration along with existing authority for operation and maintenance of the navigation system will expand Corps capabilities to work outside of the navigation channel. It will allow the opportunistic use of equipment for small scale restoration work, and should increase efficiency by reducing mobilization and demobilization cost and logistics.

Forest Management is the enhancement of the Corps' ongoing Forestry Program, which is targeted to habitat enhancement. This program is coordinated with partner natural resource agencies annually. It has been a relatively small portion of the overall Corps operation and maintenance program to date. Its enhancement is proposed to build on the expertise of Corps forestry staff and take advantage of existing interagency collaboration and coordination mechanisms.

The Corps has proposed to address fleeting through the development of a fleeting plan in collaboration with industry, the Coast Guard, and the Service. Originally scheduled later in the implementation phase, the Corps has agreed to move initiation of the planning process to year one of the project schedule.

Restoration Response Monitoring and Evaluation was recognized by stakeholders as an absolute necessity for successful implementation of adaptive management. Details will be project or

measure-specific and are proposed to be developed by existing field level interagency coordination teams and vetted through a proposed Science Panel (USACE 2004a).

Conservation Measures

Conservation measures to minimize harm to listed species which are proposed by the action agency are considered part of the proposed action and their implementation is required under the terms of the consultation. The Corps included the following Conservation Measures in its March 2004 Biological Assessment (USACE 2004b):

Decurrent false aster

Within potential impact zones, the Corps will conduct field surveys for *B. decurrens*. Survey information would be provided to the Service. If the species is located, a Tier II BA would be prepared and coordinated with the Service. Individual plants that would be affected can be relocated with the Service's approval of the transplant location.

Indiana bat

Any activities that are determined to impact potential Indiana bat habitat will prohibit tree removal/clearing during the period of April 1 to September 30, unless mist net surveys indicate that no bats are present and there is no known roosting at the site. If a site is within a 5-mile radius of hibernacula, the period is April 1 to November 15.

Forest management efforts within the range of the Indiana bat will be carried out to establish and maintain forest species and size class diversity in order to ensure a long-term supply of potential Indiana bat roosting trees.

Current Corps of Engineers operations and maintenance programs will be evaluated to determine if additional opportunities exist to promote hardwood regeneration and species diversity in floodplain forests.

Higgins eye pearlymussel

For pool level drawdowns, the following Conservation Measures avoid and minimize impacts to Higgins eye from stranding:

1. A drawdown will not be implemented that would result in lowering normal water levels more than 1.5 feet at any of the essential, secondary, or relocation habitat areas.
2. A drawdown will not be implemented if pool elevation at the dam is greater than two feet above the secondary control pool elevation in excess of 20 days from April 1 to June 15 in the proposed drawdown year.
3. During the drawdown, water levels will be lowered slowly (0.1 to 0.2 foot per day), allowing the escape of native mussels from the dewatered zone. The rate of drawdown will be commensurate with the proposed level of drawdown and the location of the drawdown.

4. Studies may be completed to evaluate the distribution of Higgins eye in relationship to water depths, the ability of Higgins eye to escape the dewatered zone, and evaluation of the stranding of mussels with ongoing pilot pool drawdowns. As additional information is obtained, the preceding conservation measures will be reviewed and revised, in coordination with the Service

Pallid sturgeon

None provided in the Biological Assessment.

Interior Least Tern

Because of the potential harassment of Interior least terns during ecosystem restoration construction activities, the Corps will consult with the U.S. Fish and Wildlife Service on proposed construction projects that are scheduled between May 1 and September 30 and are within 300 feet of a least tern colony. Currently, reoccurring nesting is known at Marquette Island, Baumgard Island, Brown's Bar and Ellis Island.

If deemed necessary by the Service, the Corps will conduct a least tern nesting survey of the construction area. The results of the survey and details of avoidance measures that will be employed during construction will be coordinated with the Service.

If a least tern colony is found within 300 feet of the construction zone, and impacts to the species cannot be avoided, the project will be conducted when the species is not in the area.

LITERATURE CITED

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- USACE (U.S. Army Corps of Engineers). 2004a. Draft Integrated Feasibility Report and Programmatic EIS for the Upper Mississippi River-Illinois Waterway System Navigation Feasibility Study. U.S. Army Corps of Engineers, Rock Island District, Rock Island, IL
- USACE (U.S. Army Corps of Engineers). 2004b. Biological Assessment of the Upper Mississippi River – Illinois Waterway System Navigation Study. U.S. Army Corps of Engineers, Rock Island, St Paul, and St Louis Districts. 193pp.