SUMMARY OF CUMULATIVE DREDGING, DREDGED MATERIAL PLACEMENT ACTIONS,

AND

PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

FOR

FUTURE DREDGED MATERIAL PLACEMENT ASSOCIATED WITH CHANNEL MAINTENANCE ACTIVITIES

MISSISSIPPI RIVER, RIVER MILES 300-614
AND
ILLINOIS WATERWAY, RIVER MILES 80-286

U.S. ARMY CORPS OF ENGINEERS
ROCK ISLAND DISTRICT

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Contents

Tables

Tables (Continued)

Figures

Plates

(The following list of plates associated with Appendix B are available electronically through the Rock Island District by compact disk or via the World Wide Web.)

Plates (Continued)

Appendices

A – Summary of Historical Channel Maintenance Dredging for Upper Mississippi and Illinois Waterway Pools within the Rock Island District

B – Description of the Geographic Information Systems Analyses Utilized to Summarize Habitat Conditions within Historic and Projected Future Locations of Dredged Material Placement within Floodplain Areas of the Upper Mississippi River and Illinois Waterway Floodplains

C – Summary of Historical Dredged Material Placement Activities by the Rock Island District within the Upper Mississippi River and Illinois Waterway Floodplains

D – Future Projections for Channel Maintenance Dredging Requirements by the Rock Island District for Upper Mississippi and Illinois Waterway Pools

E – Future Projections for Dredged Material Placement by the Rock Island District for Upper Mississippi River and Illinois Waterway Pools

F – Programmatic Agreement

G – Coordination Records

H – Statement of Findings

List of Acronyms within Programmatic Environmental Assessment

ACHP	Advisory Council on Historic Preservation
ASTM	American Society for Testing and Materials
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DMMP	Dredged Material Management Plan
DNR	Department of Natural Resources
DOC	Department of Conservation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ER	Engineering Regulation
FONSI	Finding of No Significant Impact
GIS	Geographic Information Systems
GREAT	Great River Environmental Action Team
HNA	Habitat Needs Assessment
HTRW	Hazardous, Toxic, and Radioactive Waste
IWW	Illinois Waterway
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
PA	Programmatic Agreement
PEA	Programmatic Environmental Assessment
RM	River Mile
SEA	Supplemental Environmental Assessment
SHPO	State Historic Preservation Officer
THPO	Tribal Historic Preservation Officer
UMR	Upper Mississippi River
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Section 1

Purpose and Need

This document has two primary purposes. The first is to better facilitate the U.S. Army Corps of Engineers, Rock Island District's (District) compliance with the National Environmental Policy Act of 1969 (NEPA) by providing a general overview of the environmental impacts associated with new future dredged material placement sites that are generally considered to be the most environmentally acceptable. The second purpose of this Programmatic Environmental Assessment (PEA) is to comprehensively address cumulative floodplain impacts associated with the placement of dredged material resulting from channel maintenance dredging activities. This document is intended to supplement, not replace, the standard dredged material placement planning process.

1.1 NAVIGATION PROJECT BACKGROUND

The District, by authority of the Rivers and Harbors Acts of 1927, 1930, 1932 and 1935; and a Resolution of the House Committee on Flood Control of September 19, 1944, has been assigned responsibility to maintain the navigation channels on the Upper Mississippi River (UMR) (River Mile (RM) 300-614) and Illinois Waterway (IWW) (RM 80-327). These acts stipulate that the District is to maintain a navigation channel not less than 9 feet in depth and 300 feet in width, where feasible (hereafter referred to as the 9-foot channel project). The Corps of Engineers regulation providing guidance for Civil Works Planning Studies is contained in ER 1105-2-100.

The purpose of the 9-foot channel project is to maintain the commercial navigation channel in such a manner as to avoid potential loss of life or personal injury that may result from channel closures and subsequent groundings. The District's responsibility includes developing and maintaining the Nation's waterways and harbors to meet emergency, national defense, and national interest requirements.

Due to the large sediment load carried by the UMR and IWW, as well as continually changing hydrologic conditions, annual maintenance dredging is required at various river locations to prevent shoaling or constriction of the navigation channel. Maintenance includes dredging of accumulated sediment, as necessary, to restore the channel to required navigation dimensions. Channel maintenance dredging is prioritized and scheduled based on soundings and hydrographic surveys performed throughout the navigation season and in response to emergency channel closures created by barge groundings.

1.2 NATIONAL ENVIRONMENTAL POLICY ACT REQUIREMENTS

The Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500 through 1508) and U.S. Army Corps of Engineers (USACE) Procedures for Implementing NEPA (Engineering Regulation (ER) No. 200-2-2) require the District, as well as other federal agencies, to understand and consider during the decision making process, the environmental effects of a proposed federal action. In accordance with NEPA, the impacts associated with dredging to maintain the navigation channel have previously been disclosed in *Operations and Maintenance, Upper Mississippi River, 9-Foot Navigation Channel, Final Environmental Impact Statement*,

(Pools 11 - 22), dated July 1974, and the *Final Environmental Impact Statement for Operation and Maintenance of a Nine-Foot Channel in the Illinois Waterway*, dated 1975.

Although the impacts of dredging activities have been discussed in previous NEPA documents, the impacts resulting from the actual placement of dredged material during channel maintenance have not been addressed on a programmatic level. In accordance with NEPA, the District currently prepares an Environmental Assessment (EA) for each individual channel maintenance project to address the placement of dredged material on all new placement sites as part of the District's operations and maintenance of the 9-foot navigation channel. The District follows the Corps' six step planning process to ensure that all practical and reasonable alternatives for the placement of dredged material are fully considered on an equal basis. This includes the placement of dredged material in the least costly manner, at the most practical location that is consistent with engineering and environmental requirements.

1.3 RECOMMENDATION FOR PROGRAMMATIC NEPA FOR DREDGED MATERIAL PLACEMENT

Historically, the placement of dredged material often occurred within open water, bankline areas, and other nearby floodplain areas adjacent to the dredge cut. However, many of these areas are often considered unacceptable for use as a new placement area because they contain federally protected natural resources. Moreover, many historical placement sites are at their full capacity, and new placement sites may be required for future placement. Existing regulations and environmental concerns typically limit the development of new dredged material placement sites to certain floodplain areas such as agricultural fields behind existing levees. Because of this, and the fact that the District is often looking to develop new placement sites, the District frequently prepares a number of highly similar EAs.

During 1998, representatives of the U.S. Fish and Wildlife Service (USFWS) approached the District about developing a programmatic NEPA document to address dredged material placement sites within the floodplain that are generally considered to be the most environmentally acceptable. Based on recent history with the District's Dredged Material Management Plans (DMMPs), many of the proposed dredged material placement actions can be grouped by typical placement location. By addressing these site-types programmatically, the District would potentially save time and resources and reduce the workload for District staff and the state and federal environmental resource agencies that must review the environmental documents for these individual actions. The District also would be following recommendations of the CEQ (40 CFR 1502.20) by eliminating repetitive discussions in future EAs.

1.4 PURPOSE OF THE PEA

The PEA has two primary purposes. The first is to better facilitate the District's compliance with the NEPA by providing a general overview of the environmental impacts associated with new future dredged material placement sites that are generally considered to be the most environmentally acceptable. This PEA will address only the placement site categories which generally contain similar, acceptable habitat qualities. There are six programmatic site-types that are anticipated to provide the best long-term solution to the dredging problems at many of the District's chronic dredge cuts. One of the programmatic site-types may be used to assist in the determination of the Base Plan (Federal Standard) for future projects. Cost and environmental acceptability are primary considerations in the development of the Base Plan.

The second purpose of this PEA is to comprehensively address cumulative floodplain impacts associated with the placement of dredged material resulting from channel maintenance dredging activities. The PEA will first discuss historical dredging activities of the UMR and IWW, and impacts resulting from historical dredged material placement. The PEA will then discuss projections for future dredging, as well as projections and resulting impacts for all potential future placement actions for dredged material over the next 40 years. Lastly, the PEA will discuss the incremental impacts resulting from placement actions associated with only the programmatic placement site-types that qualify specifically under this PEA.

1.5 PROGRAMMATIC PROCESS

This PEA will address dredged material placement from a general, programmatic perspective. A Supplemental Environmental Assessment (SEA) and corresponding Finding of No Significant Impact (FONSI) would be issued for any future project that would tier from this PEA because these individual placement sites have unique, site-specific characteristics (including return water issues, pipeline corridors, etc.), assuming that site-specific impacts remain below significant levels. The resulting SEA would tier off this PEA in accordance with 40 CFR 1508.20. A supplemental planning and engineering document will be prepared for the SEA. For projects in which it has been determined that a more detailed environmental review is required (e.g., potentially significant environmental and/or socio-economic impacts may occur at the project site) or for placements on sites that do not apply as a programmatic site-type discussed later in this PEA, a separate environmental review process will be required. Such a process would result in a separate, independent environmental document (e.g., EA or Environmental Impact Statement (EIS)) with a DMMP.

This PEA would not imply that all future placement of dredged material would only be limited to these programmatic site-types. For each individual project, an array of potential placement sites will be considered, including locations for beneficial use and habitat improvement measures. Once a range of final sites has been selected, it will be determined if one or more of the sites within the range has been discussed within this PEA. If the general impacts associated with a site have previously been addressed within this PEA, then only the site-specific impacts will be discussed at length in the tiered NEPA documentation. Any site that does not qualify under this PEA will not tier off this document, and will include a full discussion of all impacts associated with that site within separate NEPA documentation. Thus, any future NEPA document may tier off in part, or in full, from this PEA.

1.6 ASSOCIATED PERMITTING ISSUES

District NEPA documents for dredged material placement include discussions to address requirements with Section 404 of the Clean Water Act, including Section 401 Water Quality Certification. As a part of this PEA process, consideration was given to developing a Programmatic 401 Water Quality Certification. However, because actions proposed under this PEA, as well as the impacts resulting from these actions, can vary based on location and other site-specific criteria, the 401 Water Quality Certification and corresponding supplemental NEPA documentation will be required for each individual project tiered off this PEA in accordance with 40 CFR Part 1508.28. Because a site-specific 401 Certification would be required for each individual future project, and because of the activities associated with the Site-Specific Certification, it was determined that a Programmatic Certification would not significantly improve the NEPA or 401 certification process. Therefore, all 401 Water Quality Certification will be addressed for each individual, site-specific future project. Floodplain conveyance will also be addressed within the SEA for each individual project tiered off this PEA.

Description of the Programmatic Site-Types

2.1 OVERVIEW

This PEA will evaluate dredged material placement in floodplain areas typically considered to be the most environmentally acceptable placement option. Following extensive consultation with state and federal resource agencies (e.g., USFWS, U.S. Environmental Protection Agency (EPA), Wisconsin Department of Natural Resources (DNR), Iowa DNR, Illinois DNR, Illinois Department of Agriculture, and Missouri Department of Conservation (DOC)) from 1998 through 2000, six site-types were identified as containing potential environmentally acceptable placement areas. These six site-types are evaluated within this PEA. Because a specific placement site may contain a broad range of environmental conditions, some of the site-types discussed in Section 2.2 below include additional criteria which must be met in order to qualify within the PEA. Placement sites that do not meet the definitions discussed below in Section 2.2 will require separate, non-tiered NEPA documentation. In other words, future actions must meet the identified criteria in order to tier off this PEA.

2.2 PROGRAMMATIC SITE-TYPES EVALUATED IN DETAIL

The site-types listed below are typically the most environmentally acceptable placement sites in terms of their impacts to ecological resources. This is typically because habitat types occurring in these areas are less sensitive than habitats found in other floodplain areas. Habitats typically associated with the site-types outlined below include urban/disturbed habitats, agricultural land, sand/mud areas, and scrub/shrub habitat. One or more of the site-types are anticipated to provide the best long-term solution for the dredged material placement problems at many of the District's dredge cuts. The programmatic site-types may be used to assist in the development of the Base Plan (Federal Standard) for future projects.

2.2.1 Agricultural Field Placement

These sites are located in fields that are, or have recently, been utilized for agriculture purposes.

2.2.2 Behind the Levee Placement

These sites are located on the landward side of an existing levee. Dredged material would be placed behind and beyond the existing levee. Previous coordination with state and federal resource agencies identified "behind the levee" as a placement type for evaluation. However, many habitat types may be located behind levee structures, some of which could potentially have adverse environmental effects resulting from dredged material placement. Therefore, for the purpose of this PEA, behind the levee sites will focus on agricultural fields, or habitats identified as sand/mud, scrub/shrub or developed areas (areas that have been permanently modified for commercial, recreational, or residential use such as a parking lot). Use of such habitats typically would minimize ecological impacts of dredged material placement. It should be noted that some of the other placement types discussed below (i.e., levee stabilization, temporary stockpile, and disturbed

sites) may also occur behind existing levee structures. Issues with these habitat types will be addressed separately below.

2.2.3 Levee Placement

These sites consist of dredged material placed along the landward side of existing levee structures. Dredged material would be placed on or along the existing levee. Such areas are typically identified as sand or scrub/shrub habitat, and are generally not environmentally sensitive. Future sites that encroach into other, more sensitive types will require that impacts be fully disclosed in the associated future NEPA document.

Levee placement, as it applies to projects associated with this PEA, will not increase the effective height of existing levee systems. This constraint does not limit the height of isolated placement sites behind levees to the height of the levee. Any dredged material placement that calls for the creation of a new levee structure, or an increase in the height of an existing levee, will require separate, non-tiered NEPA documentation. To qualify under this PEA, levee placement must also meet additional criteria discussed in Section 2.3.

2.2.4 Temporary Stockpile

These placement areas would have dredged material placed upon them for periods of less than one year. However, temporary stockpile sites may be used more than once over a 40-year period. These temporary stockpiles may be used as transfer sites, emergency sites, or beneficial use stockpiles. In addition, many habitat types could be considered for creation of a temporary stockpile. Therefore, for the purpose of this PEA, temporary stockpile sites also will focus on agricultural fields, sand/mud, scrub/shrub, or developed areas. To qualify under this PEA, temporary stockpiles must also meet additional criteria discussed in Section 2.3.

2.2.5 Beneficial Use Stockpiles/Beneficial Use Areas

Beneficial Use Stockpiles and Beneficial Use Areas are similar to temporary stockpiles, with the exception that material may persist for longer periods of time (i.e., longer than a year). These areas encourage removal of dredged material for beneficial use. As with the above site-types, many habitat types could be considered for creation of a beneficial use stockpile. Therefore, for the purpose of this PEA, beneficial use stockpiles and beneficial use areas also will focus on agricultural fields, sand/mud, scrub/shrub, or developed areas. To qualify under this PEA, these site-types also must meet additional criteria discussed in Section 2.3.

2.2.6 Developed/Disturbed Sites

These sites are highly disturbed habitats that would not experience substantial adverse ecological effects from dredged material placement. These sites may include, but are not limited to, old abandoned quarries, landfills, parking lots, roadbeds, and urbanized areas.

2.3 SCREENING CRITERIA FOR PROGRAMMATIC EVALUATION

This programmatic assessment is targeted at addressing dredged material placement at sites that are generally environmentally acceptable, upon which placement would not be controversial. Previous coordination with state and federal resource agencies identified site-types that should not be evaluated within the PEA. In addition, the District has identified several conditions frequently encountered in the placement of dredged material that may be problematic, even with the use of the

programmatic site-types. Issues such as concerns with hazardous, toxic and/or radioactive waste (HTRW), wetlands, unique resources (e.g., presence of mast producing trees), cultural resources, and state and federal listed species, could be associated with programmatic site-types, even when the majority of the project site is environmentally less sensitive. However, under the PEA, these conditions would be addressed by avoidance and abiding by the criteria given below. Items such as real estate, cost, floodway obstruction, physical access, drainage, containment, and feasibility would be addressed in the planning and engineering supplement to the SEA. The District would use standard NEPA procedures to address placement sites that violate the stipulations of this PEA. This would include non-tiered NEPA documentation for all areas that do not abide by these programmatic criteria.

2.3.1 Wetlands

Wetlands will be avoided to the extent possible. However, if any wetland area is utilized for material placement, these impacts will be minimized and mitigated for as appropriate, utilizing the mitigation plan included in the SEA. Each site will be delineated for presence/absence of wetlands utilizing the criteria developed by the Corps of Engineers (USACE Wetlands Delineation Manual, Technical Report Y-87-1, January 1987). Agricultural areas identified as "prior converted wetlands" may be utilized for dredged material placement without mitigation. The PEA does not propose to address any placement site solely targeted at wetland habitats. Any potential future placement that would affect wetland areas will be coordinated with state and federal resource agencies and thoroughly addressed as a site-specific impact in the SEA.

2.3.2 Federal or State Listed Threatened and Endangered Species

Dredged material placement sites that would impact any state or federal listed species would not be covered by this PEA. This impact would be identified through coordination with the appropriate state and federal resource agencies prior to implementation of the project. Coordination would be in the form of written correspondence with the USFWS as required by the Endangered Species Act of 1973.

2.3.3 Hazardous, Toxic, and Radioactive Waste

Only future dredged material placement sites without HTRW concerns will be considered under this PEA. Such concerns will be evaluated through a HTRW Environmental Site Assessment and provided in a planning and engineering supplement to the SEA. This assessment is done in accordance with ER 1165-2-132, HTRW Guidance for Civil Works Projects, and ER 405-1-12, the Real Estate Handbook, based upon ASTM Standards E 1527-97 and E 1528-96.

2.3.4 Unique Environmental Resources

Future actions that involve unique environmental resources will be avoided to the extent possible. Unique resources would include, but are not limited to, wet floodplain forests, mesic bottomland hardwood forests, seasonally or semi-permanently flooded vegetation, wet meadows, hard and soft mast producing trees, and unique grassland/prairie areas. If such resources are identified within or near a proposed area of placement, their significance will be considered in coordination with appropriate state and federal agencies. This coordination will be in the form of written correspondence with representatives from appropriate state and federal agencies. The PEA does not propose to address any placement site solely targeted at these unique habitat areas.

2.3.5 Areas of Significant Cultural Concern

The District, the Illinois, Iowa, Missouri, and Wisconsin State Historic Preservation Officers (SHPOs), and the Advisory Council on Historic Preservation (ACHP) executed a Programmatic Agreement (PA) for IWW RM 80.0 to 327.0 and UMR RM 300.0 to 614.0 for proposed dredged material placement sites entitled: *Programmatic Agreement Among the Rock Island District of the U.S. Army Corps of Engineers, the Advisory Council on Historic Preservation, and the Illinois State Historic Preservation Officer, the Iowa State Historic Preservation Officer, the Missouri State Historic Preservation Officer, and the Wisconsin State Historic Preservation Officer Regarding Implementation of the Long-Term Management Strategy for Dredged Material Placement* (PA, Appendix F). The PA afforded protection to historic properties during planning, prior to the land acquisition stages of dredged material placement, and is an appropriate vehicle for the programmatic site-types for channel maintenance within this PEA.

To meet the requirements promulgated under new amendments to the National Historic Preservation Act, as amended (NHPA), the District has been coordinating with the appropriate SHPO(s), ACHP, Tribal Historic Preservation Officers (THPOs), Native American Indian Tribes (Tribes), and various interested parties. This coordination has addressed potential effects to significant historic properties resulting from the DMMP, formerly known as the Long-Term Management Plan. This coordination and implementation of the PA will continue in response to new Corps planning procedures and requirements, as addressed in the PEA.

If any previously undocumented historic properties are discovered during the undertaking, the District will discontinue dredging operations and resume coordination with the appropriate state and tribal official to identify the significance of the historic property and determine potential effects under Section 106 of the NHPA.

2.3.6 Floodway/Flood Conveyance Issues

The District will continue to minimize any increases in flood heights resulting from dredged material placement and work to avoid, or mitigate for, any significant increases in flood height resulting from any future dredged material placement. A hydraulic assessment would be performed to identify impacts when needed. Any potential future placement will be coordinated with state and federal resource agencies and thoroughly addressed as a site-specific impact in the SEA.

2.3.7 Levee Issues

Levee placement, as it applies to projects associated with this PEA, will not increase the height of existing levee structures. To preserve geotechnical integrity of the levee, dredged material mixed with more than 5% passing the No. 200 sieve, finer silt and/or clay type materials, would not be placed on the landside slope of the levee or on the existing berm. Stripping and excavation shall not be permitted within 100 feet of the landside toe of the existing levee. New drainage ditches would not be constructed within 100 feet of the landside toe of the existing levee. Site-specific levee issues will be addressed in the planning and engineering supplement to the SEA.

2.4 SITE-TYPES ELIMINATED FROM PROGRAMMATIC EVALUATION

Following initial agency coordination, thalweg habitats, which are riverine areas associated with the deepest part of the main channel, were initially included as habitat types for evaluation. However, coordination with state and federal resource agencies in August 2000 indicated at least partial disagreement on the appropriateness of including thalweg sites within this PEA.

In addition to thalweg sites, rehandle sites also were considered for inclusion in the PEA. Rehandle sites are temporary placement sites in aquatic habitats. However, resource agencies also expressed concern over inclusion of such areas in the PEA. Because this document is intended to target only noncontentious placement areas (areas that are generally considered to be environmentally acceptable), both thalweg sites and rehandle sites will not be evaluated within this PEA.

Affected Environment

3.1 PROJECT AREA

The area affected by future dredged material placement actions addressed within this PEA will include areas identified in Section 2.2 along the UMR and most of the IWW within the Rock Island District. The District has responsibility to maintain the UMR navigation channel from UMR RM 614 near Guttenburg, Iowa, to UMR RM 300 south of Saverton, Missouri. The District also manages the navigation channel on the IWW from IWW RM 80 up to RM 327 (Figure 3-1). Though within the District, dredged material placement above IWW RM 286 (near the Chicago metropolitan area) will require separate NEPA documentation due to the potential for contaminated sediments typically located within this river section. Specific placement sites affected by future projects will be discussed in detail within the tiered SEAs.

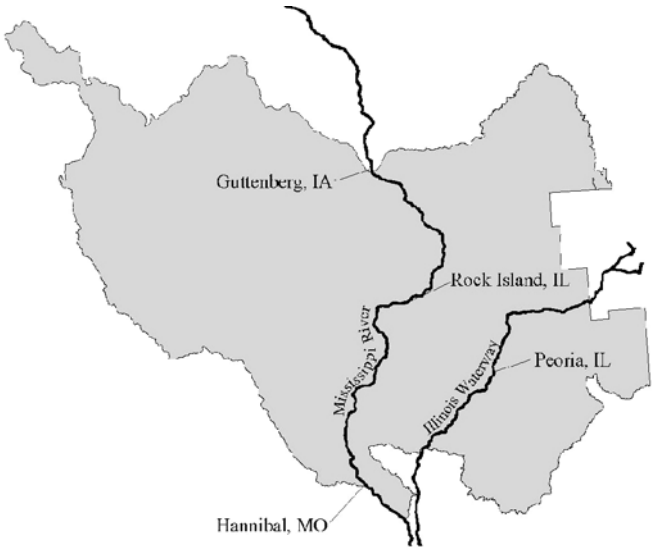

Figure 3-1. Overview of the Rock Island District and corresponding river segments of the Upper Mississippi River and Illinois Waterway.

3.2 UMR AND IWW HABITATS

3.2.1 Upper Mississippi River

The UMR within the District can be divided into two broad reaches: the upper impounded reach, from the head of Pool 11 through Pool 13 at Clinton, Iowa; and the lower impounded reach from Pool 14 through Pool 24 at Saverton, Missouri (USGS 1998). The upper impounded reach is characterized by a large proportion of off-channel aquatic habitat (side channels and backwaters), relatively abundant and diverse aquatic vegetation, good water clarity, and few agricultural levees (USGS 1998; WEST 2000b). In general, the floodplain is narrow (1-3 miles), islands are more common than in other reaches, and woody terrestrial vegetation is more prevalent. Conversely, the lower impounded reach contains a greater proportion of main channel and channel border aquatic habitat, fewer off-channel areas, and a predominance of leveed agricultural land. With the exception of Pool 19, aquatic vegetation is less abundant in this reach. In general, this reach is more uniform, with a fairly straight channel, and large, stable islands and side channels (USGS 1998).

3.2.2 Illinois Waterway

The IWW also can be divided into two distinct geomorphic reaches. These reaches are divided at approximately Starved Rock Lock and Dam (RM 231), with each reach displaying distinct habitat characteristics. The upper reach is highly urbanized and structurally similar to a smaller river, while the lower reach exhibits a low gradient, broad floodplain, narrow channel, and extensive backwaters (USGS 1998). In general, the river has few islands and side channels. Backwater lakes have varying degrees of connectivity, depending on depth of connecting channels and river stage. Sediments are typically finer than those on the Mississippi, and many backwater lakes have experienced large volume losses due to sediment deposition. The prevalence of fine sediments also contributes to a higher ambient suspended sediment load, reduced water clarity, and therefore little aquatic vegetation in the lower river reach (USGS 1998; WEST 2000b). The lower reach is largely agricultural, with levees isolating a substantial portion of the floodplain. A notable feature in this reach is Peoria Lake, a 20-mile-long tributary delta lake. Peoria Lake has experienced severe sediment deposition, and has been the site of several completed or proposed habitat restoration projects.

3.3 ENDANGERED SPECIES

Within the District, the UMR and IWW are home to several federally listed threatened, endangered species and candidate species (Table 3-1). The list includes six threatened and endangered species and two candidate species considered likely to be proposed for listing within the near future. In addition to these federally listed species, several additional species are listed as threatened or endangered by the States of Wisconsin, Iowa, Illinois, and Missouri.

Table 3-1. Federally threatened and endangered species encountered in or along the Upper Mississippi River System.

Species	Status
Indiana bat (*Myotis sodalis*)	Endangered
Bald eagle (*Haliaeetus leucocephalus*)	Threatened
Interior least tern (*Sterna antillarum*)	Endangered
Pallid sturgeon (*Scaphirhynchus albus*)	Endangered
Higgins' eye pearly mussel (*Lampsilis higginsi*)	Endangered
Decurrent false aster (*Boltonia decurrens*)	Threatened
Sicklefin chub (*Hybopsis meeki*)	Likely to be proposed
Sturgeon chub (*Hybopsis gelida*)	Likely to be proposed

As discussed in Section 2.3.2, any placement actions potentially impacting threatened and endangered species will not be included within this PEA.

3.4 BIOTIC COMMUNITIES

The riparian corridor of the UMRS is home to a varied and diverse community of plants and wildlife. Table 3-2 identifies the potentially affected biotic communities in each of the site-types identified in this PEA. In addition to these site-types, a dredged material placement site is characterized for comparison of before and after effects. The biotic community classifications, guilds, and potential occurrence information used to create this table were defined in Theiling *et al*. (2000). Factors that affect the biotic community of an individual site, such as distance to water and elevation, were not considered in this categorization. These site-specific factors and their significance to the local biotic community will be considered in the SEA process.

Table 3-2. Potentially affected biotic communities.

Site-Types	Habitat	Biotic Community (guild)
Agricultural Field Placement	Agricultural fields	**Plant types** – cultivated fields **Mammal** – Small mammal[3], bat[1], commensal pest[3], terrestrial furbearer[3], large game animal[3] **Bird** – waterfowl[3], gulls terns and allies[2], herons ibises and storks[2], rails cranes and allies[3], shorebirds gulls and alcids[3], pheasants grouse and quail[3], diurnal birds of prey[3], owls[3], kingfishers[1], pigeons and doves[3], nightjars[3], woodpeckers and wrynecks[2], swifts[3], perching birds[3] **Amphibian and reptile** - Terrestrial frogs and toads[2], semi-aquatic frogs[1], aquatic frogs[2], arboreal frogs[1], lentic turtles[2], terrestrial turtles[1], woodland turtles[1], prairie lizards[1], prairie snakes[2]
Behind the Levee Placement	Agricultural fields, sand/mud, scrub/shrub, developed	**Plant types** – cultivated fields, buttonbush, false indigo, swamp privet, turf grass **Mammal** - Small mammal[3], bat[3], commensal pest[3], aquatic furbearer[3], terrestrial furbearer[3], large game animal[3] **Bird** – grebes[2], cormorants[2], waterfowl[3], rails gallinules and coots[1], gulls terns and allies[3], herons ibises and storks[3], rails cranes and allies[3], pelicans[3], shorebirds gulls and alcids[3], pheasants grouse and quail[3], diurnal birds of prey[3], owls[3], kingfishers[3], pigeons and doves[3], cuckoos and allies[2], nightjars[3], hummingbirds[3], woodpeckers and wrynecks[3], swifts[3], perching birds[3] **Amphibian and reptile** - Terrestrial frogs and toads[2], semi-aquatic frogs[1], aquatic frogs[2], arboreal frogs[1], lentic turtles[2], terrestrial turtles[1], woodland turtles[1], prairie lizards[1], prairie snakes[2]
Levee Placement	Sand/mud, scrub/shrub	**Plant types** – buttonbush, false indigo, swamp privet **Mammal** - Small mammal[2], bat[2], aquatic furbearer[3], terrestrial furbearer[3], large game animal[2] **Birds** – grebes[2], cormorants[2], waterfowl[3], rails gallinules and coots[1], gulls terns and allies[3], herons ibises and storks[3], rails cranes and allies[3], pelicans[3], shorebirds gulls and alcids[3], diurnal birds of prey[3], owls[3], kingfishers[3], cuckoos and allies[2], nightjars[3], hummingbirds[2], woodpeckers and wrynecks[3], perching birds[3] **Amphibian and reptile** - Semi-aquatic frogs[1], aquatic frogs[2], arboreal frogs[1], lentic turtles[1], lotic turtles[1], terrestrial turtles[1], woodland lizards[1], prairie snakes[1], aquatic snakes[1]
Temporary Stockpile	Agricultural fields, sand/mud, scrub/shrub, developed	Same as behind the levee placement
Beneficial Use Stockpiles/ Beneficial Use Area	Agricultural fields, sand/mud, scrub/shrub, developed	Same as behind the levee placement
Developed/ Disturbed Sites	Urban, rural, residential	**Plant types** – sparsely vegetated or turf grass **Mammal** - Small mammal[3], bat[3], commensal pest[3], terrestrial furbearer[2], large game animal[1] **Birds** - waterfowl[3], gulls terns and allies[3], herons ibises and storks[3], shorebirds gulls and alcids[2], diurnal birds of prey[2], owls[1], kingfishers[1], pigeons and doves[3], nightjars[3], hummingbirds[3], woodpeckers and wrynecks[2], swifts[3], perching birds[3] **Amphibian and reptile** - Terrestrial frogs and toads[1], semi-aquatic frogs[1], aquatic frogs[1], arboreal frogs[1], lentic turtles[2], terrestrial turtles[1], woodland lizards[2], prairie snakes[1].
Dredged Material Placement Area	Sand/mud	**Plant types** – sparsely vegetated **Mammal** – bat[1], aquatic furbearer[1] **Birds** –cormorants[2], waterfowl[3], rails gallinules and coots[1], gulls terns and allies[3], herons ibises and storks[2], pelicans[3], shorebirds gulls and alcids[3], diurnal birds of prey[2], kingfishers[3], perching birds[3] **Amphibian and reptile** - Semi-aquatic frogs[1], aquatic frogs[2], lentic turtles[1], lotic turtles[1], prairie snakes[1]
		1 - low potential occurrence 2 - moderate potential occurrence 3 - high potential occurrence

3.5 RIVER SEDIMENTS

In most cases, channel maintenance dredging involves removal of sediments classified as sand substrates. However, some channel maintenance dredging does involve finer silt and/or clay type materials. In certain instances, these river sediments can contain contaminant substances at levels that could be of concern to the environment. River sediments most likely to contain aquatic contaminants include fine sediment materials (e.g., silt and/or clays) since contaminants have a greater affinity for smaller-sized particles. However, under most conditions, dredged materials removed during channel maintenance activities consist of larger particles (e.g., sand).

For all future dredge placement actions yet to be addressed within NEPA documentation, grain size analysis of dredged materials would be performed to classify river sediments. The District will test samples in accordance with Engineering Manual 1110-2-1906, dated 30 November 1970, revised 1 May 1980 and 20 August 1986. All samples will be visually classified in accordance with "The Unified Soils Classification System." For dredged material with greater than 80% sand/gravel, further testing will not be required since these larger dredged materials are likely to be free from chemical, biological, or other pollutants. An elutriate test will be performed to determine presence/absence of contaminants if the material is greater than 20% silt/clay. Unless there is some other reason to believe dredged material may be contaminated, it is unlikely that testing other than a grain size analysis would be performed. These guidelines for dredged material would meet the exclusion from testing/evaluation criteria as explained in the Clean Water Act 404(b)(1) Guidelines and the Inland Testing Manual.

Historical Channel Maintenance Dredging and Placement Activities

This section begins to address cumulative impacts of dredged material placement by discussing historical dredging and dredged material placement activities. Historical dredging activities will be discussed first, followed by a discussion and impact assessment for historical dredged material placement actions. Discussion of possible impacts resulting from dredging actions have been previously discussed within other NEPA documents (referenced previously in Section 1.2) and are outside of the scope of this document. Thus, a detailed impact assessment for dredging actions will not be discussed here.

4.1 HISTORICAL CHANNEL MAINTENANCE DREDGING ACTIVITIES FOR THE UMR AND IWW WITHIN THE ROCK ISLAND DISTRICT

4.1.1 History of Channel Maintenance Dredging

The Rivers and Harbors Act of 1866 authorized a 4-foot navigation channel project on the UMR. Channel improvements for the Upper Mississippi River 4-Foot Channel Project in the 1860's included blasting a channel in the Rock Island Rapids and some beam scraping of sand bars. Later improvements to the 4.5-foot and 6-foot channel projects were achieved by a system of wing and closing dams, augmented by dredging. The 6-foot project also included a couple of small lock structures to assist with passage at the Rock Island Rapids and the Keokuk Rapids. The District has continued dredging activities to maintain the currently authorized 9-foot navigation channel on the UMR.

For the IWW, Congress authorized the State of Illinois to construct the Illinois and Michigan canal, which connected the Illinois River and Lake Michigan. This construction was completed in 1848. Major improvements began in the 1870's with 4 locks and dams creating the 7-foot navigation channel. The Rivers and Harbors Act of 1927 authorized a 9-foot project for the IWW from Utica to the Mississippi River, above St. Louis. This was modified in 1930 to include the State of Illinois project between Utica and Lockport, and further modified in 1935 to upgrade the waterway to the current 9-foot x 300-foot project. Responsibility for maintaining the IWW above RM 80 (near La Grange Lock and Dam) originally belonged to the Chicago District, Corps of Engineers. This responsibility for the IWW was transferred to the Rock Island District in the mid-1980's. St. Louis District is responsible for the lower portion of the IWW from RM 80 downstream to its confluence with the UMR. Dredging has continued in order to maintain the 9-foot navigation channel on the IWW.

4.1.2 Location and Methods for Channel Maintenance Dredging

Channel maintenance dredging on the UMR and IWW is conducted in main channel areas where sediment accumulates, resulting in shoals. These areas are generally at channel crossings (where the river thalweg crosses from one side to the other), at point bars (where sediment builds on the inside of bends and extends into the navigation channel), at and downstream of large tributary delta areas, and near locations where secondary channels diverge from the main channel. The dredge cuts have become named sites, and dredging records provide the frequency of repeated dredging.

Channel maintenance dredging on the UMR and IWW is accomplished using both hydraulic and mechanical machinery. The hydraulic dredging method utilized by the District involves mechanical disturbance of the riverbed by a cutterhead and the pumping of a sediment-water slurry through a pipeline to the placement site. Most mechanical dredging is conducted using a crane equipped with a clamshell bucket, a backhoe, or a dragline. Mechanically dredged material is placed on barges for off-loading elsewhere.

4.1.3 Historical Dredging Records

Although channel maintenance dredging has occurred since the 1800's, records of early dredging activities no longer exist. However, reliable records of dredging and material placement on the UMR have been maintained since 1940. Conversely, dredging records for the IWW are much less reliable due to minimal record keeping methods and a loss of some records during the transfer of channel maintenance responsibilities from the Chicago District to the Rock Island District. Although less comprehensive than those for the UMR, these records also date back to the 1940's. Therefore, to most accurately characterize historical dredging actions, the following discussion is based on dredging activities since 1940.

4.1.4 Summary of Historical Channel Maintenance Dredging for the UMR

From 1940 to 2000, a total of about 57.4 million cubic yards (y^3) of material has been dredged from the UMR within the District (Table 4-1). This material has been removed from a total of 116 dredge cuts (Appendix A). Although significant dredging has historically occurred in most pools within the District, the heaviest dredging in terms of total volume of material removed, has generally occurred in Pools 11, and 18 through 22 (Table 4-1, Appendix A). The total quantity of material dredged historically ranges from over 8 million y^3 in Pool 22, to less than 500,000 y^3 in Pool 15. The total quantity of material dredged from individual dredge cuts ranges from about 2.3 million y^3 from the North East Missouri Power dredge cut (Pool 22) to less than 50,000 y^3 for several dredge cuts within the District; many of which have not been dredged within the last 20 years (Appendix A).

Historical dredging data were plotted for three time periods: 1940 through 1959; 1960 through 1979; and 1980 through 2000. Based on available historical records, annual dredging needs have, in general (though not in all areas), decreased over time within the Rock Island District. Evaluation of individual pools shows that dredging, in terms of average annual volume, decreased over time within most pools, with the most substantial reductions occurring in Pools 11 and 19. However, Pools 16 and 24 have seen an increase in average annual volume removed over time (Figure 4-1).

Evaluation of individual pools identifies 116 areas where dredging has been performed in association with maintenance of the 9-foot channel project between 1940 and 2000. Although many dredge cuts have not been dredged since the 1940 through 1959 period, some new areas have

required dredging in the last 20 years that have not been dredged prior (Appendix A). In many instances, dredging needs as measured by average annual volumes, have decreased over time for many dredge cuts within the District. However, some dredge cuts have seen an increase in average annual volume dredged. Dredge cuts such as Island 241 (Pool 12), Savannah Bay (Pool 13), Buffalo and Hershey Chute (Pool 16), Buzzard Island (Pool 20), and Lock 22 Lower (Pool 24), have seen a noticeable increase in the average annual volume dredged when comparing the period 1980 through 2000 to other periods. A complete review of historical dredging by pool and dredge cut is included at Appendix A.

Changes in dredging activities over time are due to a number of factors. Many of these were outlined by WEST in its June 2000 Geomorphic Assessment. Assessment factors include improved agricultural land use practices, construction of numerous large reservoirs on most major tributaries, improved sediment management practices resulting from environmental laws, improved dredging practices, and economic considerations. WEST further noted that *"It is also recognized that remobilization of stored sediments is a factor in the supply of coarse sediment to the UMR. The remobilization of stored material may delay the impacts of other influences, such as improved land use practices and reservoirs. The concentration of flow and general narrowing of the main channel caused by wing dams, deposition of sediment in channel borders and backwater areas, and dredging may have also increased the sediment transport capacity of the main channel*."

"Channel maintenance practices have improved in recent years. Reduced depth dredging, confined, disposal of dredge material, and more efficient hydrographic surveying techniques have all contributed to reductions in annual dredge material volumes...

Reduced depth dredging began in 1973 and resulted in an immediate reduction in dredging... Reduced depth dredging involved a reduction in the maximum dredging depth along the UMR from 13 or more feet to… 11 to 12 feet in Rock Island District. Reduced depth dredging is intended to maintain a smaller and slightly more efficient channel cross section in dredge cut areas decreasing the trap efficiency of dredge cuts, and increasing the sediment load to the downstream reach. If the downstream reach can convey the inflowing sediment load while maintaining an adequate cross section for navigation, a net reduction in dredging has been achieved. However, it is noted that generally the total volume of required dredging would not change with reduced depth dredging, if the average sediment supply to the UMR remains the same. In fact, the frequency of dredging would be expected to increase if other conditions affecting sediment transport remained the same."

Table 4-1. Summary of Rock Island District channel maintenance dredging activities, by pool, for the Upper Mississippi River between 1940 and 2000.

Pool	Total Volume of Dredged Material (y^3)	Number of Dredging Events 1940 to 2000
11	5,144,085	102
12	1,848,206	30
13	4,703,840	68
14	3,971,595	73
15	489,569	20
16	2,178,176	61
17	2,469,522	35
18	7,042,619	135
19	6,973,232	102
20	5,769,919	71
21	7,766,117	137
22	8,107,712	123
24*	963,374	21
Total	**57,427,966**	**978**

*Indicates the portion of Pool 24 within the Rock Island District. This includes from Lock and Dam 22 (RM 301.2) downstream to RM 300.

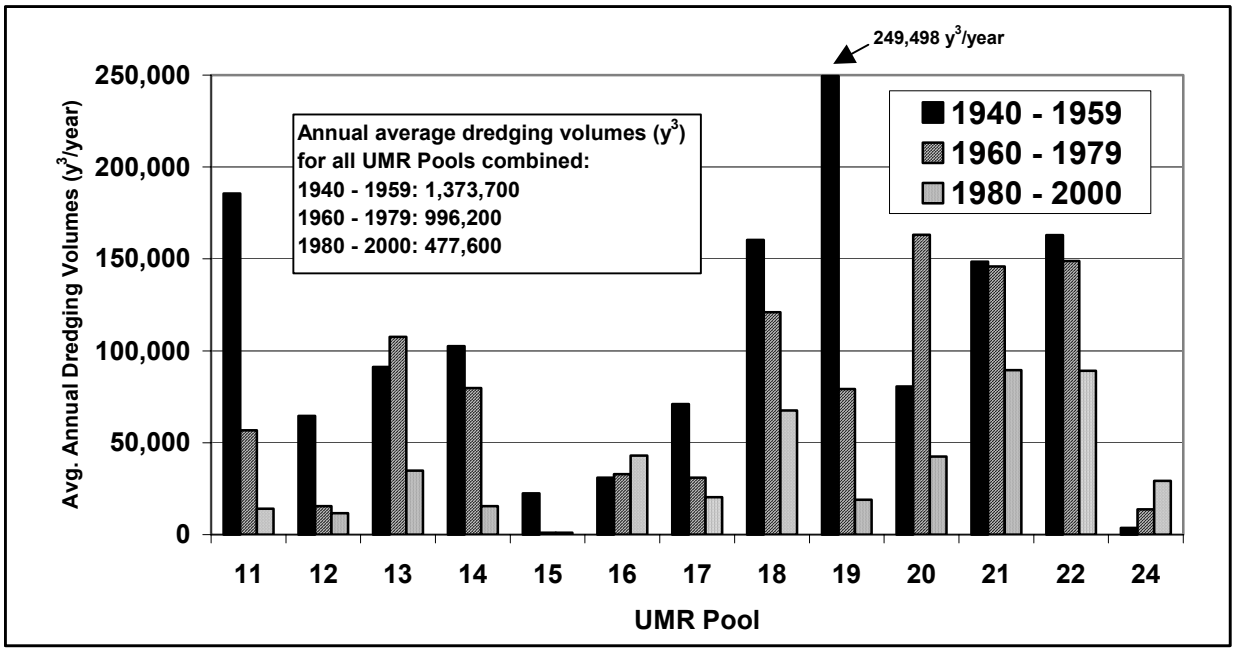

Figure 4-1. Summary of annual average dredging volumes removed by the Rock Island District from each pool of the Upper Mississippi River between 1940 and 2000.

4.1.5 Summary of Historical Channel Maintenance Dredging for the IWW

District dredging records for the IWW are not as comprehensive as those for the UMR. Thus, caution must be exercised when analyzing and interpreting data for historical dredging activities and dredged material placement. The discussion below is based on existing records and is provided to give an insight into historical channel maintenance dredging on the IWW. Due to incomplete records, total dredging volumes, particularly for pools upstream of Peoria Pool, are greater than the information provided below. However, the District believes that the general trends observed in terms of dredging activities over time are similar in upstream pools, as they are in Peoria and La Grange Pools.

From 1940 to 2000, at least 19.4 million y^3 of material has been dredged from the IWW within the District (Table 4-2). This material has been removed from at least 63 separate dredge cuts (Appendix A). Although dredging has historically occurred in all pools within the District, the heaviest dredging in terms of both frequency of dredging events, and total volume of material removed, has occurred in Peoria and La Grange Pools (Table 4-2). The total quantity of material dredged historically ranges from over 13 million y^3 in La Grange Pool to about 340,500 y^3 in Starved Rock Pool (Table 4-2). The total quantity of material historically dredged from individual dredge cuts ranges from about 2.9 million y^3 from the Mackinaw Dredge Cut (La Grange Pool) to potentially less than 10,000 y^3 for several dredge cuts within the District (Appendix A).

Historical dredging data were evaluated for three time periods: 1940 through 1959; 1960 through 1979; and 1980 through 2000. However, due to limitations in available data prior to 1980, particularly for Dresden, Marseilles and Starved Rock Pools, discussions are limited compared to those for the UMR. Based on historical records, annual dredging needs have, in general, decreased since the 1940's and 1950's within the Peoria and La Grange Pools. Dredging needs have generally decreased more substantially within Peoria Pool than in La Grange Pool (Figure 4-2, Appendix A).

Table 4-2. Summary of Rock Island District channel maintenance dredging activities, by pool, for the Illinois Waterway between 1940 and 2000.

Pool	Total Volume of Dredged Material (y^3)	Total Number of Dredging Events
Dresden Island*	372,625	66
Marseilles*	428,604	97
Starved Rock*	340,487	61
Peoria	5,178,455	119
La Grange	13,037,456	223
Total	**19,383,545**	**593**

* Records for Dresden, Marseilles, and Starved Rock Pools are estimated for 1940 through 1980.

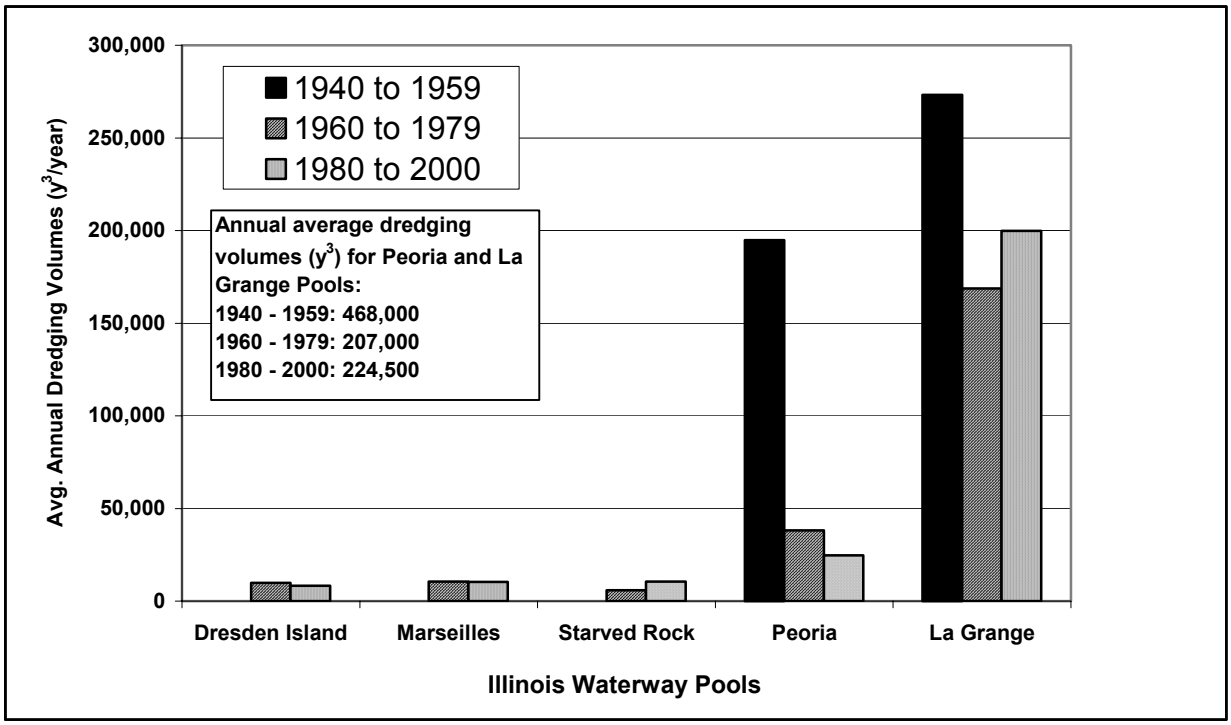

Figure 4-2. Summary of annual average dredging volumes removed by the Rock Island District from each pool in the Illinois Waterway between 1940 and 2000. Due to incomplete records, annual average dredging volumes are estimated for Dresden, Marseilles, and Starved Rock Pools prior to 1980.

4.2 HISTORICAL DREDGED MATERIAL PLACEMENT ACTIVITIES FOR CHANNEL MAINTENANCE DREDGING OF THE UMR

4.2.1 District Records of Dredged Material Placement

Although dredging has occurred since the 1800's, records of early dredged material placement activities no longer exist. Most of the older dredged material placement sites above water level have become vegetated and now are generally indistinguishable from surrounding island and floodplain areas.

Reliable records of dredged material placement for the UMR have been maintained since about 1939. Therefore, to most accurately characterize historical dredged material placement actions, the following discussion is based on placement activities since 1939.

Conversely, historical records for the IWW are less reliable due to sporadic record keeping and a loss of information with the transfer of channel maintenance responsibilities to the Rock Island District. Data for La Grange and Peoria Pools exist back to 1949, although the number and location of placement sites are in question. Data for Starved Rock, Marseilles, and Dresden are even less reliable, with most records only dating back to the 1980's. Discussions for historical material placement on the IWW will be made as far back as these existing records provide, although it is recognized that these records are highly limited.

4.2.2 Methods for Assessment

Impacts resulting from dredged material placement were evaluated through spatial analyses. These analyses were performed to quantify the types of land cover/use present in historical dredged material placement areas. A Geographic Information Systems (GIS) database of the locations of historical dredged material placement was created by the District as the basis of this work for both the UMR and IWW. Impacts resulting from dredged material placement were investigated by overlaying material placement on top of land cover/use within the GIS database.

For the UMR, available placement data exist for the period 1939 through 1998. Conversely, for the IWW, available placement data are less comprehensive. Data for Peoria and La Grange Pools are available for the period 1949 through 1996, while data for Dresden, Marseilles, and Starved Rock Pools are only available from about 1980 through 1996.

For UMR pools, land cover information (Habitat Needs Assessment (HNA) GIS Query Tool; USACE 2000), developed based on 1989 aerial photography, was used to identify the type(s) of land cover present within the historical placement areas (Figure 4-3). Thus, impacts resulting from dredged material placement were investigated by overlaying material placement on top of the land cover/use database within the HNA GIS Query Tool.

For IWW pools, land cover information was developed from multiple sources to be utilized as a basis of comparison. The HNA GIS Query Tool has habitat coverage data for Peoria Pool and most of La Grange Pool. For a portion of La Grange Pool immediately below Peoria Lock and Dam (about 2,337 floodplain acres), as well as Starved Rock, Marseilles, Dresden and Brandon Road Pools, separate satellite data were utilized to identify land cover types present within the floodplain (Figure 4-3). The habitat class types identified through these satellite data are different than those identified from the 1989 aerial photography. Thus, data from these different IWW pools cannot be easily grouped with the data from the 1989 photography.

For UMR and IWW pools, two time periods were investigated with respect to the land cover database and the historical dredging records. The first period examined dredging activities prior to and including 1989, and the second examined dredging activities since 1989. The land cover types present in the locations of historical dredged material placement within the HNA GIS Query Tool are reflective of, and influenced by, the past dredged material placement activities. Thus, the land cover database within the HNA GIS Query Tool, which is based upon 1989 aerial photography, provides an estimate of the distribution of land cover types present within these historical placement sites. It may not necessarily reflect the type of habitat present immediately prior to placement. Conversely, the land cover database does provide an estimate as to the quantity and types of habitat that have been impacted by dredged material placement activities since 1989. Appendix B provides a detailed description of these GIS analyses for the cumulative impacts assessment.

The methodology discussed above deviates slightly for La Grange Pool of the IWW. Land cover types within the HNA GIS Query Tool for this pool are based on 1991 aerial photographs (Figure 4-3). Thus, the analysis for La Grange Pool was performed for all years up through 1991, and then for all years since and including 1992.

Because of the substantial lack of material placement data prior to 1980 for Starved Rock, Marseilles, and Dresden, no detailed analysis or comparison was performed. For existing dredged material placement data for these pools, material placement locations were placed on top of land

cover/use data within the GIS database. This information is provided below. However, because of its limited nature, it is difficult, if not impossible, to draw even general conclusions.

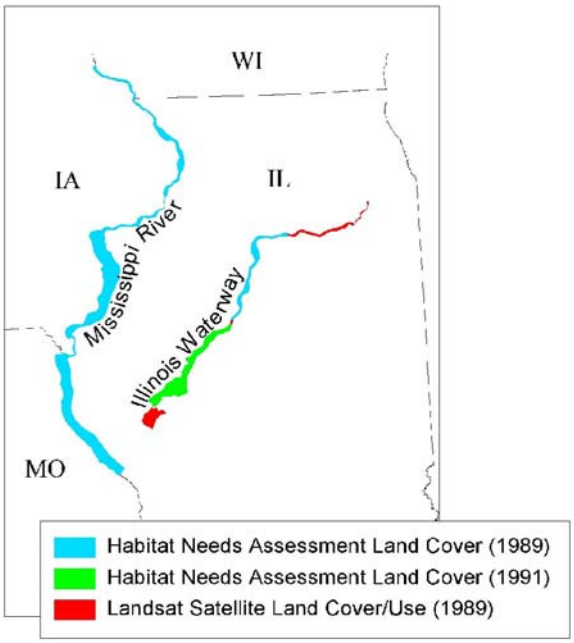

Figure 4-3. Delineation of land use data utilized for evaluation of specific locations of the Upper Mississippi River and Illinois Waterway within the Rock Island District.

4.2.3 Summary of Historical Dredged Material Placement by Habitat Type for Channel Maintenance Dredging of the UMR

During the period 1939 to 1998, the District has placed dredged material upon a total of about 3,958 acres of the UMR floodplain (Table 4-3). This equates to about 0.5% of the total floodplain area. Placement ranges from a high of about 597 acres of floodplain habitat in Pool 22, to about 50 acres in Pool 24 (Table 4-3). In terms of the relative percent of floodplain placed upon, the District has placed upon a high of about 1.2% of the total floodplain area for Pool 14, to a low of 0.1% for Pool 24 (Table 4-3). Between 1939 and 1998, the District has placed dredged material upon less than 1.0% of total floodplain area in 11 of 13 pools within the District, and upon 0.5% or less of total floodplain area in 5 of 13 pools within the District.

Table 4-3. Total aerial coverage (in acres) for dredged material placement by pool within the UMR floodplain between 1939 and 1998.

Pool	Total Floodplain Placement (acres)	Total Floodplain Area (acres)	Percent of Floodplain Total
Pool 11	312.8	29,271.3	1.1%
Pool 12	127.5	20,428.6	0.6%
Pool 13	391.2	59,207.4	0.7%
Pool 14	315.2	25,935.0	1.2%
Pool 15	72.1	9,221.8	0.8%
Pool 16	152.8	26,821.0	0.6%
Pool 17	145.8	72,362.2	0.2%
Pool 18	495.0	134,450.1	0.4%
Pool 19	445.1	118,926.4	0.4%
Pool 20	399.3	75,281.1	0.5%
Pool 21	453.8	66,616.7	0.7%
Pool 22	597.0	84,303.6	0.7%
Pool 24*	50.4	71,257.4*	0.1%
Total	3,958.0	794,082.6	**0.5%**

*Indicates placement totals for the portion of Pool 24 within the Rock Island District, and the corresponding amount of Pool 24 floodplain within the Rock Island District.

Habitat Analysis for Historical Placement: 1939 through 1989

As of 1989, about 80% of the UMR floodplain area that had been utilized for dredged material placement existed as either open water or wet floodplain forest. Almost 1,900 acres that had previously been utilized for dredged material placement existed as open water habitat in 1989. Over 1,000 acres historically utilized for dredged material placement is identified as wet floodplain forest. Conversely, about 160 acres of floodplain utilized for dredged material placement existed as sand/mud habitat, and 112 acres existed as scrub/shrub habitat (Table 4-4). These two communities may represent areas where little recovery has occurred from historical dredged material placement. However, only 16% (160 acres) of the habitat identified as sand/mud habitat, and less than 1% (112 acres) of the habitat identified as shrub/scrub habitat had previously been utilized for material placement. Thus, it is likely that most of these habitat types existed outside of effects of dredged material placement. Other notable areas of historical dredged material placement existed as developed (urban) areas, salix communities, submersed aquatic vegetation, and as wet meadow.

Table 4-4. Summary of 1989 habitat conditions resulting from Rock Island District dredged material placement activities from 1939 through 1989 for Pools 11 through 24 of the Upper Mississippi River.

HNA Land Use/Land Cover Types	HNA Land Cover in Dredged Material Placement Areas (acres) [b]	Total Habitat Type in UMR (HNA) (acres)	Percent Total Cover[c]
Agriculture	13.0	274,446.9	0.0%
Developed	165.7	36,290.8	0.5%
Floating-Leaved Aquatic Bed	3.0	12,123.3	0.0%
Grassland	3.8	1,070.2	0.4%
Mesic Bottomland Hardwood Forest	9.3	11,141.6	0.1%
No Photo Coverage[a]	0.0	162,773.8	0.0%
Open Water	1,896.6	128,104.7	1.5%
Populus Community	19.4	1,309.2	1.5%
Salix Community	40.1	2,160.6	1.9%
Sand/Mud	160.3	984.7	16.3%
Scrub/Shrub	112.2	21,680.3	0.5%
Seasonally Flooded Emergent Perennial	3.5	1,873.0	0.2%
Semi-Permanently Flooded Emergent Annual	0.0	68.7	0.0%
Semi-Permanently Flooded Emergent Perennial	11.1	10,058.1	0.1%
Submersed Aquatic Bed	45.5	15,799.2	0.3%
Wet Floodplain Forest	1,061.7	97,417.2	1.1%
Wet Meadow	85.3	16,780.3	0.5%
Total	**3,630.4**	**794,082.6**	**0.5%**

[a] Constitutes portions of the UMR floodplain not included within the HNA database due to lack of coverage within the source aerial photographs. Habitat types within these areas cannot be identified.
[b] Acres have been rounded to tenths, 0.0 acres represents acreage of less than 0.05.
[c] Dredged material placement may have affected this habitat type, though impacts appear as 0.0% on this table due to rounding.

Review of historical placement data shows that the trends for individual pools generally reflect those observed for the entire UMR. For most pools within the District, areas of historical placement most commonly existed as either open water or wet floodplain forest as of 1989. Other common habitat areas identified as historical placement sites, as of 1989, include sand/mud habitat, scrub/shrub habitat, and developed areas. A complete review of historical dredged material placement actions within individual UMR pools is provided at Appendix C.

Historical Placement: 1990 through 1998

For channel maintenance dredging for the period 1990 through 1998, the District has placed material on nearly 330 acres (less than 0.1%) of the UMR floodplain. Based on habitat conditions as of 1989, about 153 acres of this area was open water, and about 40 acres was wet floodplain forest (Table 4-5, Appendix C). Dredged material also was placed on about 50 acres of sand/mud habitat, 25 acres of agricultural land, 22 acres of scrub/shrub habitat, and about 11 acres of

developed land. With the exception of sand/mud habitat, all of these placement actions constitute well under 1% of the total UMR floodplain area for each of these habitat types.

Table 4-5. Summary of habitat areas utilized by the Rock Island District for dredged material placement from 1990 through 1998 for Pools 11 through 24 of the Upper Mississippi River.

HNA Land Use/Land Cover Types	HNA Land Cover in Dredged Material Placement Areas (acres)[b]	Total Habitat Type in UMR (HNA) (acres)	Percent Total Cover[c]
Agriculture	25.2	274,446.9	0.0%
Developed	11.2	36,290.8	0.0%
Floating-Leaved Aquatic Bed	0	12,123.3	0.0%
Grassland	0.4	1,070.2	0.0%
Mesic Bottomland Hardwood Forest	3.3	11,141.6	0.0%
No Photo Coverage[a]	0	162,773.8	0.0%
Open Water	152.8	128,104.7	0.1%
Populus Community	3.9	1,309.2	0.3%
Salix Community	6.9	2,160.6	0.3%
Sand/Mud	49.9	984.7	5.1%
Scrub/Shrub	22.1	21,680.3	0.1%
Seasonally Flooded Emergent Perennial	0	1,873.0	0.0%
Semi-Permanently Flooded Emergent Annual	0	68.7	0.0%
Semi-Permanently Flooded Emergent Perennial	0.6	10,058.1	0.0%
Submersed Aquatic Bed	4.7	15,799.2	0.0%
Wet Floodplain Forest	39.6	97,417.2	0.0%
Wet Meadow	6.9	16,780.3	0.0%
Total	**327.5**	**794,082.6**	**0.0%**

[a] Constitutes portions of the UMR floodplain not included within the HNA database due to lack of coverage within the source aerial photographs. Habitat types within these areas cannot be identified.
[b] Acres have been rounded to tenths, 0.0 acres represents acreage of less than 0.05.
[c] Dredged material placement may have affected this habitat type, though impacts appear as 0.0% on this table due to rounding.

4.2.4 Summary of Historical Dredged Material Placement for Channel Maintenance Dredging of the IWW

As mentioned above in 4.2.2, historical placement records for the IWW are less reliable than those for the UMR. Summaries of available data result in just under 2,000 acres of IWW floodplain habitat being utilized for dredged material placement between 1949 through 1996 (Table 4-6). However, dredged material has almost certainly been placed on additional floodplain area. Existing data suggest that the greatest dredging and dredged material placement has occurred in Peoria and La Grange Pools. Although records are more available for Peoria and La Grange Pools, it is believed that this general trend has occurred historically.

Table 4-6. Total aerial coverage (in acres) for available dredged material placement records, by pool, within the IWW floodplain between 1949 and 1996. Total coverage is likely greater than the acreages indicated below.

Pool	Total Floodplain Placement (acres)	Total Floodplain Area (acres)	Percent of Floodplain Total
Dresden Pool	24.7	6,085.3	0.4%
Marseilles Pool	29.4	25,523.3	0.1%
Starved Rock Pool	33.2	13,956.2	0.2%
Peoria Pool	356.5	96,250.5	0.4%
La Grange Pool	1,511.9	201,133.6	0.8%
Totals	**1,955.6**	**342,948.9**	**0.6%**

Historical Dredged Material Placement

As of 1989 in Peoria Pool, and 1991 in La Grange Pool, over 70% of the IWW floodplain area historically placed upon existed as either open water or wet floodplain forest. About 143 acres of placement in Peoria Pool existed as open water, and almost 700 acres in La Grange Pool existed as wet floodplain forest (Table 4-7). In terms of relative percent, areas utilized for material placement were identified by 1989 (Peoria) and 1991 (La Grange) land cover as populus communities (almost 10%), scrub/shrub (almost 3%), and wet floodplain forest (almost 2%; Table 4-7). A complete review of historical dredged material placement actions within individual IWW pools is provided at Appendix C.

Table 4-7. Summary of habitat conditions resulting from dredged material placement activities from 1949 through 1989 for Peoria Pool, and 1949 through 1991 for La Grange Pool of the Illinois Waterway.

HNA Land Use/Land Cover Types	HNA Land Cover in Dredged Material Placement Areas (acres)		Total Habitat Type in Pools (HNA) (acres)	Percent of Total Cover[d]
	Peoria Pool[a, c]	La Grange Pool[b, c]		
Agriculture	3.4	13.5	86,566.9	0.0%
Developed	33.9	44.2	9,921.3	0.8%
Floating-Leaved Aquatic Bed	0.0	0.0	513.5	0.0%
Grassland	0.0	5.0	6,270.8	0.1%
Mesic Bottomland Hardwood Forest	10.2	20.1	6,152.1	0.5%
No Photo Coverage	0.0	0.0	54,312.1	0.0%
Open Water	143.0	171.4	59,483.4	0.5%
Populus Community	14.0	24.8	394.4	9.8%
Salix Community	2.8	15.4	3,241.6	0.6%
Sand/Mud	0.0	57.2	2,206.3	2.6%
Scrub/Shrub	7.1	68.2	8,024.3	0.9%
Seasonally Flooded Emergent Perennial	0.0	0.0	45.6	0.0%
Semi-Permanently Flooded Emergent Perennial	0.0	3.8	751.5	0.5%
Submersed Aquatic Bed	0.0	0.7	1,430.7	0.0%
Wet Floodplain Forest	55.7	694.1	44,361.4	1.7%
Wet Meadow	6.7	85.7	11,372.5	0.8%
Total	**276.8**	**1,204.1**	**295,048.4**	**0.5%**

[a] Historical placement for Peoria Pool based through 1989 because land cover database for Peoria Pool was developed with 1989 aerial photography.
[b] Historical placement for La Grange Pool based through 1991 because land cover database for La Grange Pool was developed with 1991 aerial photography. Note that additional floodplain for La Grange Pool that is not covered by the 1991 photography is included within additional satellite coverages discussed below.
[c] Acres have been rounded to tenths, 0.0 acres represents acreage of less than 0.05.
[d] Dredged material placement may have affected this habitat type, though impacts appear as 0.0% on this table due to rounding.

Because of the lack of detailed material placement data for Starved Rock, Marseilles, and Dresden Pools, no detailed analysis or comparison was performed. For existing dredged material placement data for these pools, material placement locations were placed on top of available land cover/use data within the GIS database. This information is provided in Table 4-8 below. However, because of its limited nature, it is difficult to draw even general conclusions.

Table 4-8. Summary of 1989 habitat conditions resulting from historical dredged material placement activities for Dresden, Marseilles, Starved Rock, and portions of La Grange Pools of the IWW. Dredged material placement areas date back to about 1986.

1989 Satellite Land Use/Land Cover Types[a]	Land Cover in Dredged Material Placement Areas[b] (acres)	Total Habitat Type in IWW (acres)	Percent Total Cover[c]
Agriculture	0.0	14,931.4	0.0%
Grasses/Forbs	13.8	4,417.2	0.3%
Hydrophytic Vegetation	3.8	838.9	0.5%
No Data/Clouds	0.0	4.0	0.0%
Open Water	20.7	10,908.8	0.2%
Sand	0.2	45.8	0.5%
Urban/Developed	0.0	6,869.5	0.0%
Woody Terrestrial	105.1	9,884.9	1.1%
Total	**143.6**	**47,900.6**	**0.3%**

[a] Habitat class types identified through satellite data differ from those identified by aerial photography.
[b] Acres have been rounded to tenths, 0.0 acres represents acreage of less than 0.05.
[c] Dredged material placement may have affected this habitat type, though impacts appear as 0.0% on this table due to rounding.

Historical Placement: 1990 through 1996

For channel maintenance dredging for the period 1990 through 1996 on Peoria Pool, and 1992 through 1996 on La Grange Pool (areas of the IWW included within the HNA GIS Query Tool), the District has placed material on nearly 237 acres (about 0.1%) of the IWW floodplain (Table 4-9). Based on habitat conditions as of 1989 in Peoria Pool and 1991 in La Grange Pool, about 80 acres of this area was open water, 59 acres was wet floodplain forest, 35 acres was wet meadow, and about 26 acres was sand/mud (Table 4-9). With the exception of sand/mud habitat, all of these placement actions constitute well under 1% of the total area for each of these habitat types.

Table 4-9. Summary of habitat areas utilized for dredged material placement from 1990 through 1996 for Peoria Pool, and 1992 through 1996 for La Grange Pool of the Illinois Waterway.

HNA Land Use/Land Cover Types	HNA Land Cover in Dredged Material Placement Areas (acres)		Total Habitat Type in Pools (HNA) (acres)	Percent of Total Cover[d]
	Peoria Pool[a, c]	La Grange Pool[b, c]		
Agriculture	6.2	5.2	86,566.9	0.0%
Developed	0.7	1.2	9,921.3	0.0%
Floating-Leaved Aquatic Bed	0.0	0.0	513.5	0.0%
Grassland	0.0	0.0	6,270.8	0.0%
Mesic Bottomland Hardwood Forest	0.0	1.7	6,152.1	0.0%
No Photo Coverage	0.0	0.0	54,312.1	0.0%
Open Water	29.8	50.6	59,483.4	0.1%
Populus Community	0.0	6.3	394.4	1.6%
Salix Community	0.0	2.8	3,241.6	0.1%
Sand/Mud	0.0	25.9	2,206.3	1.2%
Scrub/Shrub	5.5	6.4	8,024.3	0.1%
Seasonally Flooded Emergent Perennial	0.0	0.0	45.6	0.0%
Semi-Permanently Flooded Emergent Perennial	0.0	0.0	751.5	0.0%
Submersed Aquatic Bed	0.0	0.0	1,430.7	0.0%
Wet Floodplain Forest	31.7	27.6	44,361.4	0.1%
Wet Meadow	5.8	29.4	11,372.5	0.3%
Total	**79.7**	**157.1**	**295,048.4**	**0.1%**

[a] Historical placement for Peoria Pool based through 1989 because land cover database for Peoria Pool was developed with 1989 aerial photography.
[b] Historical placement for La Grange Pool based through 1991 because land cover database for La Grange Pool was developed with 1991 aerial photography.
[c] Acres have been rounded to tenths, 0.0 acres represents acreage of less than 0.05.
[d] Dredged material placement may have affected this habitat type, though impacts appear as 0.0% on this table due to rounding.

For channel maintenance dredging for the period 1990 through 1996 on sections of the IWW evaluated through interpretation of satellite data (including Dresden, Marseilles, Starved Rock, and portions of La Grange Pools), the District has placed material on about 94 additional acres (less than 0.1%) of the IWW floodplain. Based on habitat conditions as of 1989, about 47 acres of this area was woody terrestrial, 29 acres was open water, and about 13 acres was grasses/forbs (Table 4-10). With the exception of sand/mud habitat, all of these placement actions constitute about 0.2% or less of the total area for each of these habitat types. A complete review of historical dredged material placement actions within individual IWW pools is provided at Appendix C.

Table 4-10. Summary of habitat areas utilized for dredged material placement from 1990 through 1996 for Dresden, Marseilles, Starved Rock, and portions of La Grange Pools of the IWW.

1989 Satellite Land Use/Land Cover Types[a]	Land Cover in Dredged Material Placement Areas (acres)	Total Habitat Type in IWW Satellite Coverage (acres)	Percent Total Cover[c]
Agriculture	2.8	14,931.4	0.0%
Grasses/Forbs	13.2	4,417.2	0.3%
Hydrophytic Vegetation	0.2	838.9	0.0%
No Data/Clouds	0.0[b]	4.0	0.0%
Open Water	29.2	10,908.8	0.3%
Sand	0.3	45.8	0.7%
Urban/Developed	1.6	6,869.5	0.0%
Woody Terrestrial	47.0	9,884.9	0.5%
Total	**94.3**	**47,900.6**	**0.2%**

[a] Habitat class types identified through satellite data differ from those identified by aerial photography.
[b] Acres have been rounded to tenths, 0.0 acres represents acreage of less than 0.05.
[c] Dredged material placement may have affected this habitat type, though impacts appear as 0.0% on this table due to rounding.

4.2.5 Discussion of Impacts Resulting from Historical Dredged Material Placement for Channel Maintenance Dredging of the UMR and IWW

The placement of dredged material in main channel and channel border aquatic habitat areas suffocates the existing flora and fauna and covers the existing substrate, woody debris, and bed forms. Depending upon the depth of placement, riverbed forms may re-establish over a few days, although the water depth would likely remain less for some time. In other instances, conversion of aquatic area to terrestrial area through substantial material placement may have long-term impacts to the general habitat type. Potential impacts to the recolonization of benthic macroinvertebrates in open water dredged material placement sites is currently under investigation by the District.

Placement of dredged material in shallow aquatic, wetland, and floodplain terrestrial areas changes habitat conditions at all dredged material placement sites. Existing substrates, vegetation cover, and associated organisms are buried with dredged materials; typically washed sand. The resulting sand deposits on floodplain terrestrial sites are generally hostile to the short-term recolonization by plants. Dredged material deposits may be slow to recolonize except at locations where finer dredged material is placed over the sand and at sites where soil amendments are added and vegetation is planted. The rate of recolonization of dredged material placement sites is influenced by the thickness of the dredged material deposit, the grain size distribution of the material, the height above the water surface, the degree of shading, protection from wind, vegetative encroachment, and organic matter provided from adjoining areas.

Although the impacts discussed above are typically observed immediately following dredged material placement, the land cover data previously discussed for material placement from 1940

through 1989 suggest that historical placement sites may not have persisted long term as unproductive, disturbed areas. Observations from the 1989 land cover suggest that many areas historically utilized for dredged material placement exist as open water and wet floodplain forest habitats. Admittedly, it is impossible to identify the habitats that existed within these areas prior to material placement. It is possible that areas identified as wet floodplain forest existed previously as shallow aquatic or open water habitat. Moreover, evaluation of impacts on such a broad scale may not allow for a clear identification of impacts. For example, historical areas of dredged material placement may be identified as wet floodplain forest without an indication as to the health or quality of the community, compared to undisturbed wet floodplain forest habitats. However, this approach does provide general, broad-scale insight into the habitat types that have resulted from historical placement activities.

Short-term impacts resulting from dredged material placement actions since 1990 are generally similar to those identified above. However, the long-term impacts of this material placement, and the probable future habitat conditions of these areas are difficult to predict. The District is currently pursuing studies to evaluate short-term and long-term impacts resulting from dredged material placement on mussels, invertebrates, fisheries, and terrestrial vegetation resources.

Future Projections for District Channel Maintenance Dredging and Dredged Material Placement

The District will need to continue to perform dredging as long as it is required to maintain the 9-foot navigation channel. Dredging methods will be evaluated, including the frequency and volume of annual dredging actions. This may include evaluation of regulating structures at key locations and their impact on future dredging needs, and working with agencies such as the Natural Resources Conservation Service (NRCS) to understand sediment inputs from tributary streams.

5.1 PROJECTIONS FOR FUTURE DREDGING NEEDS

To the extent possible, the District has projected channel maintenance dredging needs for the next 40 years for both the UMR and IWW. Future projections for channel maintenance dredging are made based on long-term and short-term historical dredging activities, recent hydrographic surveys, and professional experience. It is important to note that these projections are simply a "best guess" or estimate on what future dredging needs may be required using conventional technology and existing channel maintenance practices. Because of the dynamic nature of river flows and sediment movement, actual dredging needs could potentially be quite different than the projections discussed below. In addition, changes in river regulating structures, or future dredging practices (e.g., dredging technology, dredging authorities, etc.), could contribute to differences in realized future dredging actions.

5.1.1 Projections of Channel Maintenance Dredging for the UMR

The District completed its 40-year projections for the UMR in 1999, and has projected dredging needs, both in terms of dredging frequency and dredging volume, for the period 1999 through 2039 (Figure 5-1). Based on projections over the next 40 years, a total of about 18.9 million y^3 of material may be dredged from the UMR within the District (Table 5-1). Projections suggest 531 dredging events may occur over the next 40 years, with an average of almost 35,600 y^3 of material removed per event. Although dredging is projected for all pools within the District, the heaviest dredging in terms of total volume of material removed (over 2 million y^3) may occur in Pools 18, and 20 through 22 (Table 5-1; Appendix D). The total quantity of material dredged from individual dredge cuts could potentially range from over 2 million y^3 from Buzzard Island dredge cut (Pool 20) to no projected dredging for several dredge cuts within the District (Appendix D). A complete listing of projected future dredging needs for both the UMR and IWW pools and individual dredge cuts is provided at Appendix D.

Table 5-1. Summary of projected channel maintenance dredging activities by pool for the Upper Mississippi River for the period 1999 through 2039 (40-year projections).

Pool	Total Volume (y^3)	Average Annual Volume* (y^3)	Number of Events	Average Vol. per Event (y^3)	Frequency of Dredging (Events per Year)
Pool 11	1,053,400	26,335	46	22,900	1.2
Pool 12	590,000	14,750	12	49,167	0.3
Pool 13	1,625,000	40,625	41	39,634	1.0
Pool 14	1,120,000	28,000	36	31,111	0.9
Pool 15	72,000	1,800	16	4,500	0.4
Pool 16	1,710,000	42,750	64	26,719	1.6
Pool 17	933,000	23,325	23	40,565	0.6
Pool 18	2,005,000	50,125	61	32,869	1.5
Pool 19	1,090,300	27,258	30	36,343	0.8
Pool 20	2,580,000	64,500	50	51,600	1.3
Pool 21	2,759,800	68,995	81	34,072	2.0
Pool 22	2,780,000	69,500	58	47,931	1.5
Pool 24	585,000	14,625	13	45,000	0.3
Totals	**18,903,500**	**472,588**	**531**	**35,600**	**13.3**

*Average annual volume is the total projected quantity of dredged material averaged out for each year of the 40-year period.

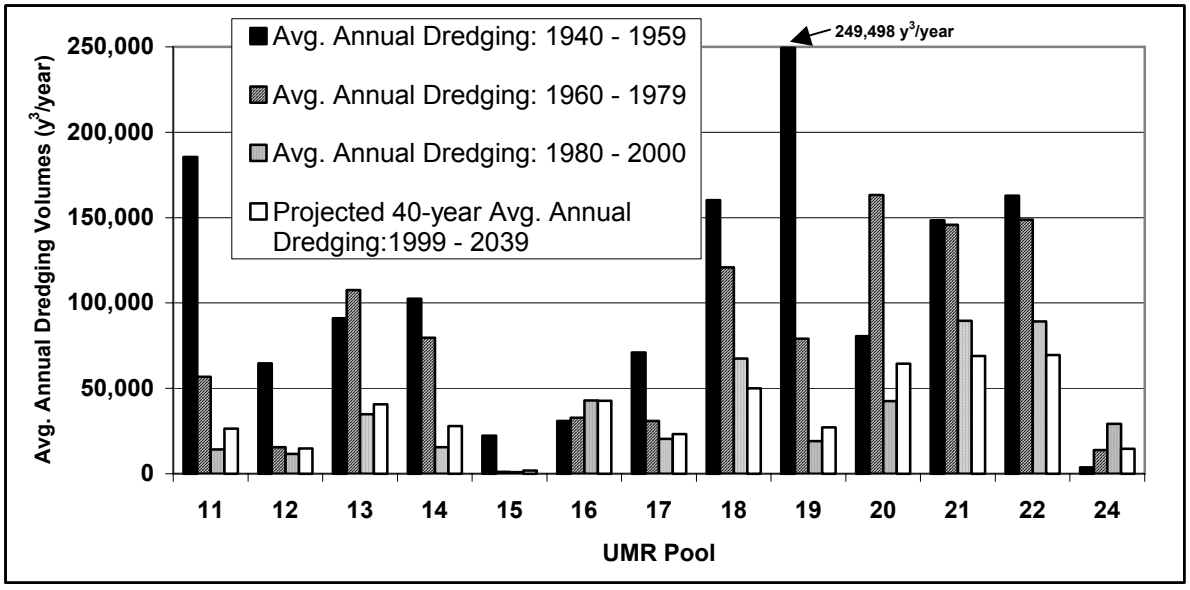

Figure 5-1. Comparison of 40-year projected dredging needs, in terms of projected average annual volume, to historical dredging actions within Upper Mississippi River pools of the Rock Island District.

5.1.2 Projections of Channel Maintenance Dredging for the IWW

The District completed its 40-year projections for the IWW in 2000, and has projected dredging needs, both in terms of dredging frequency and dredging volume, for the period 2000 through 2040 (Figure 5-2). Based on projections over the next 40 years, a total of about 11.4 million y^3 of material may be dredged from the IWW within the District (Table 5-2). Projections suggest 565 dredging events may occur over the next 40 years, with an average of over 20,100 y^3 of material removed per event. Although dredging is projected for all pools within the District, the heaviest dredging in terms of both frequency of dredging events, and total volume of material removed, will likely occur in Peoria and La Grange Pools (Table 5-2; Appendix D). In fact, over 70% of the projected volume will likely come from La Grange Pool alone. The total quantity of material dredged from individual dredge cuts could potentially range from over 2 million y^3 from the Mackinaw dredge cut (La Grange Pool), to no projected dredging for several dredge cuts within the District (Appendix D).

Table 5-2. Summary of projected channel maintenance dredging activities by pool for the Illinois Waterway for the period 2000 through 2040 (40-year projections).

Pool	Total Volume (y^3)	Average Annual Volume* (y^3)	Number of Events	Average Vol. per Event (y^3)	Frequency of Dredging (Events per Year)
Dresden Pool	180,300	4,508	58	3,109	1.5
Marseilles Pool	760,800	19,020	105	7,246	2.6
Starved Rock Pool	389,000	9,725	53	7,340	1.3
Peoria Pool	1,874,800	46,870	137	13,685	3.4
LaGrange Pool	8,165,700	204,143	212	38,517	5.3
Totals	**11,370,600**	**284,265**	**565**	**20,125**	**14.1**

* Average annual volume is the total projected quantity of dredged material averaged out for each year of the 40-year period.

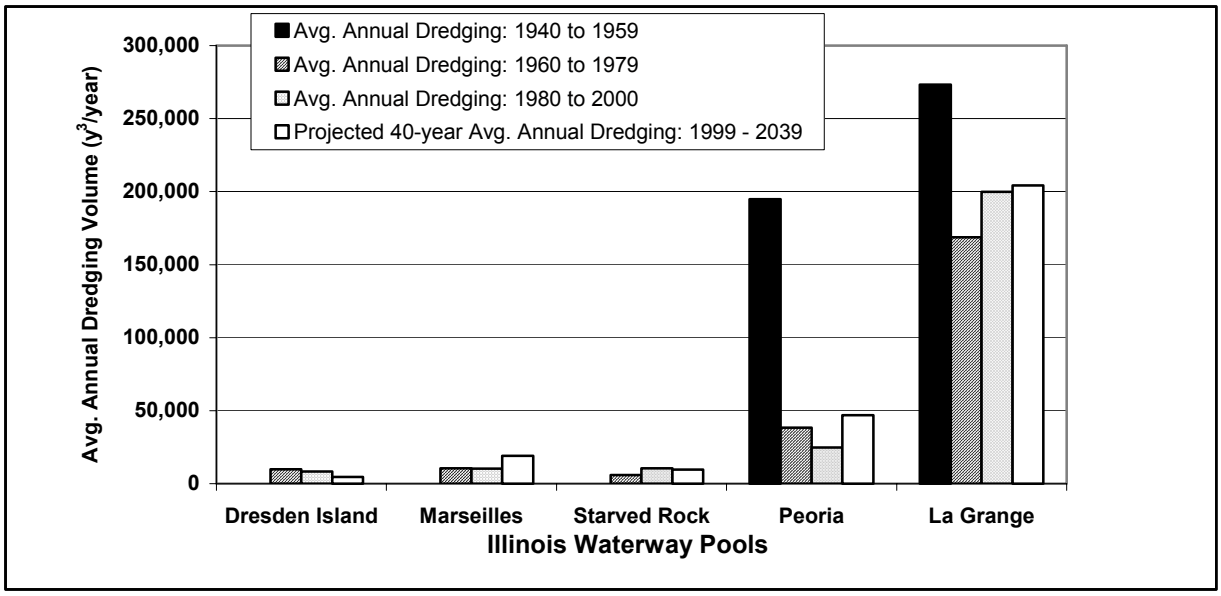

Figure 5-2. Comparison of 40-year projected dredging needs, in terms of projected average annual volume, to historical dredging actions within Illinois Waterway pools of the Rock Island District.

5.2 PROJECTED AERIAL COVERAGE FOR FUTURE DREDGED MATERIAL PLACEMENT ACTIONS ASSOCIATED WITH CHANNEL MAINTENANCE DREDGING OF THE UMR AND IWW

To better understand potential future impacts resulting from dredged material placement, the District has assembled a listing of sites for potential future material placement. To develop this list of potential sites, the District considered the location, timing, and volume of future dredging needs. From this, the District has identified potential areas that may be utilized for dredged material placement on both UMR and IWW. The size and location of these sites are based on likely dredging needs, available habitat areas, and proximity to the dredge cuts.

It should be noted that projections of future dredged material placement sites also can be uncertain. Locations for future dredged material placement will be dependent upon locations of future dredging needs, which as mentioned above, can also be dynamic. Specific locations of future sites also are uncertain due to issues with funding, as well as real estate, regulatory, and other permitting and policy issues; all of which can be highly dynamic over the 40-year planning horizon.

Future sites considered as a part of this process have been selected with varying levels of certainty. For example, many of these sites have already been approved through various implemented DMMPs and accompanying EAs. Other sites may currently be in the planning process, with the DMMP and EA under development. Still other sites have not been selected through any sort of formal planning process. However, projections for future placement at these highly uncertain sites represent the District's current estimate of where these future placements may occur.

5.2.1 Methods for Assessment of Impacts Resulting from Future Dredged Material Placement

A GIS database of the potential locations of future dredged material placement has been created by the District to help identify potential impacts resulting from future dredged material placement. Future impacts resulting from dredged material placement were evaluated through a spatial analysis that was similar to that performed for the analysis of historical dredged material placement actions. For the UMR, impacts resulting from dredged material placement within the floodplain were investigated by overlaying GIS data for material placement on top of the 1989 land cover/use within the HNA GIS Query Tool (USACE 2000).

For the IWW, impacts were investigated by overlaying GIS data for projected future placement sites on top of available land cover data. Available land cover/land use data included the HNA GIS Query Tool (USACE 2000) for Peoria Pool and most of La Grange Pool. Additionally, 1989 satellite data were utilized for the remainder of La Grange Pool, as well as Starved Rock, Marseilles, and Dresden Pools. Brief mention also is given to a small placement area (0.5 acre) for the portion of Alton Pool within the District (area immediately below La Grange Lock and Dam). Because of the small size of the placement area and the relatively large size of Alton Pool (almost 200,000 acres), the Alton placement is grouped with the placement sites for the other satellite coverages.

Potential effects to the identified habitat types resulting from dredged material placement were evaluated on both pool and District scales for both the UMR and IWW. A detailed description of these GIS analyses for the cumulative impacts assessment, including a full list of assumptions, is included in Appendix B.

5.2.2 Results for the UMR

Based on future projections, the District would potentially place material on over 1,300 acres of UMR floodplain habitats. This constitutes only about 0.2% of the total UMR floodplain for areas of Pools 11 through 24 within the Rock Island District (Table 5-3). Of these 1,300 acres, about 277 acres consist of areas previously utilized for dredged material placement. The two predominant floodplain habitats with the greatest total aerial coverage of placement include open water (457 acres) and agricultural areas (314 acres; Table 5-3). This constitutes only 0.4% of all open water habitat, and only 0.1% of all agricultural land within these pools. In terms of relative percentage of habitat placed upon, the greatest percent of habitat affected by placement is sand/mud habitat, with about 7% of this habitat utilized within these pools. All other habitats are projected to have less than 1% of total aerial coverage utilized for dredged material placement (Figure 5-3).

Table 5-3. Summary of the aerial coverage of projected dredged material placements, by habitat type, for areas of Pools 11 through 24 of the Upper Mississippi River within the Rock Island District for the period 2000 through 2040 (40-year projections).

HNA Habitat Types	Total Placement on Habitat Type	Percent of Total Aerial Placement	Total Floodplain Acreage	Percent of Habitat Type Impacted[d]
Agriculture	314.4	23.7%	274,446.9	0.1%
Developed	50.4	3.8%	36,290.8	0.1%
Floating-Leaved Aquatic Bed	2.8	0.2%	12,123.3	0.0%
Grassland	3.6	0.3%	1,070.2	0.3%
Mesic Bottomland Hardwood Forest	4.6	0.3%	11,141.6	0.0%
No Photo Coverage[a]	32.5[a]	2.4%	162,773.8	0.0%
Open Water	456.5	34.3%	128,104.7	0.4%
Populus Community	0.0	0.0%	1,309.2	0.0%
Salix Community	1.5	0.1%	2,160.6	0.1%
Sand/Mud	70.1	5.3%	984.7	7.1%
Scrub/Shrub	165.6	12.5%	21,680.3	0.8%
Seasonally Flooded Emergent Perennial	0.8	0.1%	1,873.0	0.0%
Semi-Permanently Flooded Emergent Annual	0.0[c]	0.0%	68.7	0.0%
Semi-Permanently Flooded Emergent Perennial	0.2	0.0%	10,058.1	0.0%
Submersed Aquatic Bed	17.2	1.3%	15,799.2	0.1%
Wet Floodplain Forest	118.0	8.9%	97,417.2	0.1%
Wet Meadow	60.4	4.5%	16,780.3	0.4%
Unknown Placement Area[b]	30.6[b]	2.3%	-	-
Total	**1,329.2**	**100.0%**	**794,082.6**	**0.2%**

[a] Constitutes portions of the UMR floodplain not included within the HNA database due to lack of coverage within the source aerial photographs. Habitat types within these areas cannot be identified within GIS. However, further review of the projected 32.5 acres shows that this area, as of PEA preparation, occurs completely on an agricultural habitat type.
[b] Placement area has not been identified; thus, evaluation of impacts to specific habitat types is not possible.
[c] Acres have been rounded to tenths, 0.0 acres represents acreage of less than 0.05.
[d] Dredged material placement may affect this habitat type, though impacts appear as 0.0% on this table due to rounding.

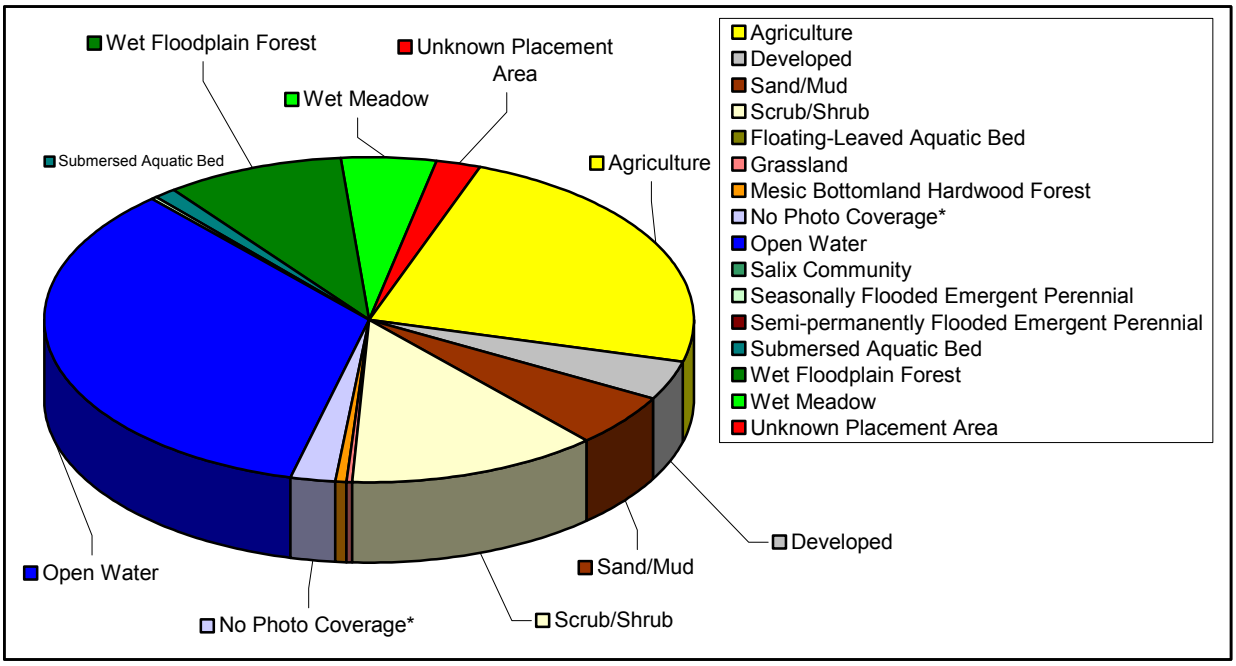

Figure 5-3. Summary of the relative aerial coverage of projected dredged material placements, by habitat type, for areas of Pools 11 through 24 of the Upper Mississippi River within the Rock Island District for the period 2000 through 2040 (40-year projections).

For individual pools, the projected aerial coverage of future dredged material placement may range from 4 acres in Pool 15, to about 233 acres in Pool 22 (Appendix E). Pools 13, 18, and 22 are projected to have over 200 acres of floodplain covered with dredged material. Conversely, 8 of the 13 pools within the District are projected to have less than 100 acres of floodplain impacted by District dredged material placement actions. Moreover, all pools within the District will probably have 0.4% or less of their floodplain placed upon by District dredged material placement actions (Appendix E).

When considering individual habitat types for each pool, dredged material placement actions will, in most cases, cover less than 1% of most habitat types within each of the 13 pools (Appendix E). Some habitat types will see dredged material placement in excess of 1% of that habitat for a given pool. However, only sand/mud habitat is projected to see impacts of 10% aerial coverage or more projected from dredged material placement. Pools 11, 14, 16, and 17 are projected to have over 10% of their total sand/mud habitat impacted (Appendix E). All other habitats in all 13 pools within the District will have less than 10% of their habitat impacted.

5.2.3 Results for the IWW

Based on future projections, the Rock Island District will potentially place material on about 890 acres of IWW floodplain habitats (Tables 5-4 and 5-5). Of these 890 acres, about 103 acres consist of areas previously utilized for dredged material placement. This constitutes only about 0.2% of the total IWW floodplain for pools within the District. The two predominant floodplain habitats with the greatest total aerial coverage of dredged material placement include agricultural areas (377 acres) and open water (194 acres; Tables 5-4 and 5-5). This constitutes only about 0.2% of all open water and agricultural habitat within IWW pools within the District.

Based on future projections, the majority of dredging and dredged material placement activities will occur within Peoria and La Grange Pools. Over the next 40 years, the Rock Island District will potentially place material on almost 800 acres of floodplain habitats within Peoria and La Grange Pools (Tables 5-4, 5-5 and Appendix E). This constitutes only 0.3% of the total floodplain within these pools. The two predominant floodplain habitats with the greatest total aerial coverage of dredged material placement include agricultural areas (373 acres) and open water (132 acres). This constitutes only 0.4% of all agricultural habitat, and only 0.2% of all open water habitat within these two pools (Appendix E). In terms of relative percentage of habitat placed upon, the greatest percent of habitat affected by dredged material placement is sand/mud habitat, with about 2% of this habitat within IWW pools utilized for dredged material placement. All other habitats will have less than 1% of total aerial coverage utilized for dredged material placement (Figures 5-4 and 5-5).

Table 5-4. Summary of the aerial coverage of projected dredged material placements, by habitat type, for Peoria and La Grange Pools of the Illinois Waterway for the period 2000 through 2040 (40-year projections).

HNA Habitat Types	Total Placement on Habitat Type[b]	Percent of Total Aerial Placement	Total Floodplain Acreage	Percent of Habitat Type Impacted[c]
Agriculture	372.7	50.2%	86,566.9	0.4%
Developed	28.6	3.8%	9,921.3	0.3%
Floating-Leaved Aquatic Bed	0.0	0.0%	513.5	0.0%
Grassland	1.0	0.1%	6,270.8	0.0%
Mesic Bottomland Hardwood Forest	2.5	0.3%	6,152.1	0.0%
No Photo Coverage[a]	0.0	0.0%	54,312.1	0.0%
Open Water	132.2	17.8%	59,483.4	0.2%
Populus Community	1.0	0.1%	394.4	0.3%
Salix Community	6.2	0.8%	3,241.6	0.2%
Sand/Mud	49.4	6.6%	2,206.3	2.2%
Scrub/Shrub	30.1	4.0%	8,024.3	0.4%
Seasonally Flooded Emergent Perennial	0.0	0.0%	45.6	0.0%
Semi-Permanently Flooded Emergent Perennial	0.0	0.0%	751.5	0.0%
Submersed Aquatic Bed	0.0	0.0%	1,430.7	0.0%
Wet Floodplain Forest	58.3	7.9%	44,361.4	0.1%
Wet Meadow	60.9	8.2%	11,372.5	0.5%
Total	**742.8**	**100.0%**	**295,048.4**	**0.3%**

[a] Constitutes portions of the IWW floodplain not included within the HNA database due to lack of coverage within the source aerial photographs. Habitat types within these areas cannot be identified.
[b] Acres have been rounded to tenths, 0.0 acres represents acreage of less than 0.05.
[c] Dredged material placement may affect this habitat type, though impacts appear as 0.0% on this table due to rounding.

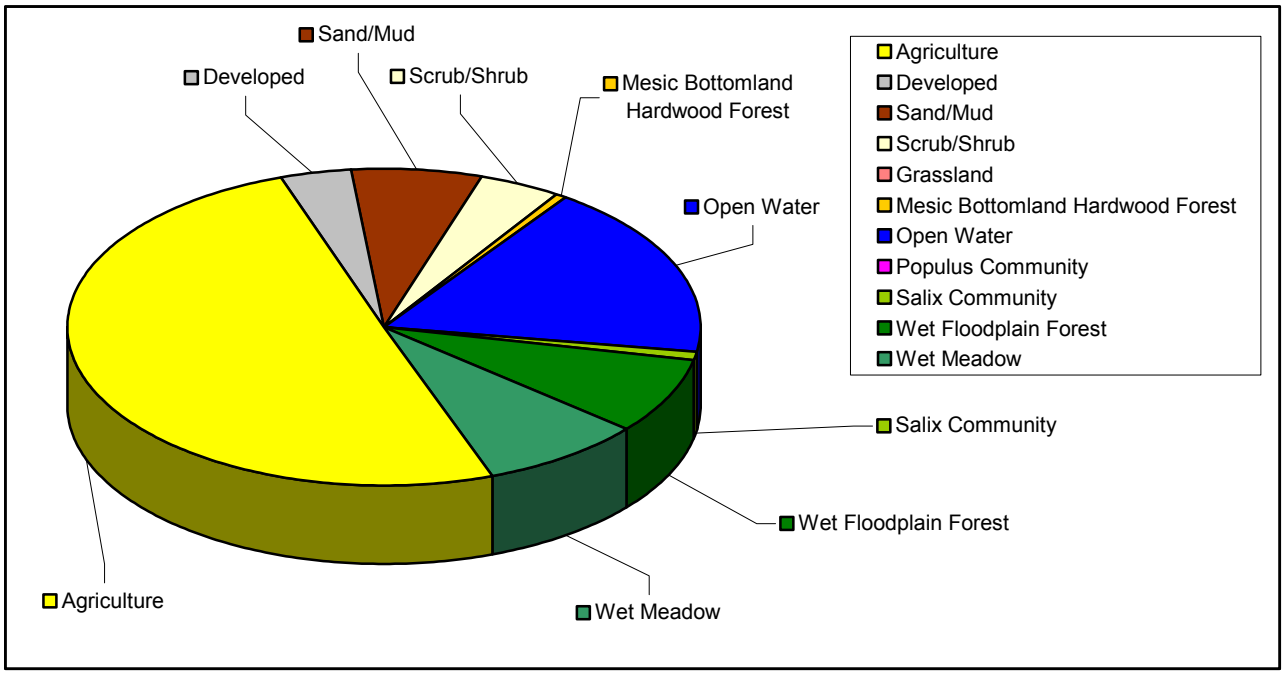

Figure 5-4. Summary of the relative aerial coverage of projected dredged material placements, by habitat type, for areas of Peoria and La Grange Pools of the Illinois Waterway within the Rock Island District for the period 2000 through 2040 (40-year projections).

Table 5-5. Summary of the aerial coverage of projected dredged material placements, by habitat type, for Dresden, Marseilles, Starved Rock, and small portions of La Grange and Alton Pools of the Illinois Waterway, for the period 2000 through 2040 (40-year projections). Data constitute portions of the IWW within the Rock Island District not covered by the HNA GIS Query Tool (USACE 2000).

HNA Habitat Types	Total Placement on Habitat Type	Percent of Total Aerial Placement	Total Floodplain Acreage	Percent of Habitat Type Impacted[c]
Agriculture	4.3[a]	2.9%	14,931.4[b]	0.0%
Grasses/Forbs	1.9	1.3%	4,417.2	0.0%
Hydrophytic Vegetation	0.1	0.1%	838.9	0.0%
No Data/Clouds	0.0	0.0%	4.0	0.0%
Open Water	61.9	42.0%	10,908.8	0.6%
Sand	1.8	1.2%	45.8	4.0%
Urban/Developed	12.3	8.3%	6,869.5	0.2%
Woody Terrestrial	47.9	32.5%	9,884.9	0.5%
Unknown Placement Area	17.3	11.7%	0.0	--
Total	**147.6**	**100.0%**	**47,900.6**	**0.3%**

[a] Includes 0.5 acre of agricultural placement in Alton Pool.

[b] Does not include floodplain agricultural land from Alton Pool. Alton Pool contains another 153,000 acres of agricultural land.

[c] Dredged material placement may affect this habitat type, though impacts appear as 0.0% on this table due to rounding.

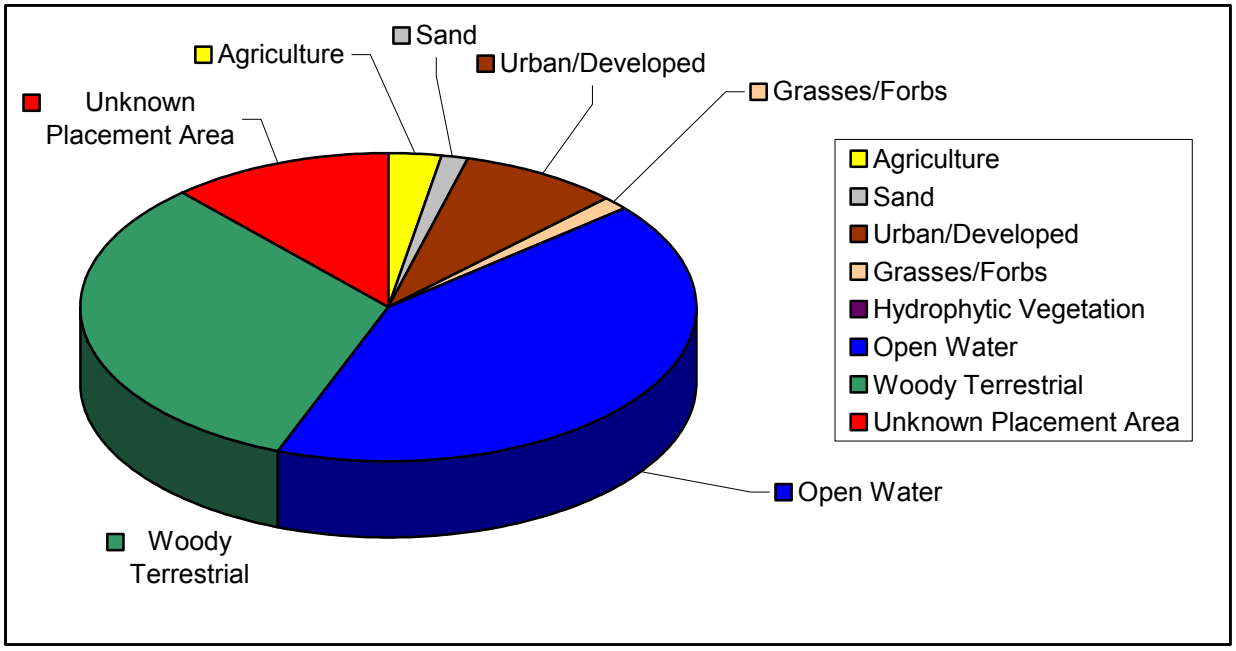

Figure 5-5. Summary of the relative aerial coverage of projected dredged material placements, by habitat type, for areas of Dresden, Marseilles and Starved Rock Pools of the Illinois Waterway within the Rock Island District for the period 2000 through 2040 (40-year projections).

5.2.4 Discussion of Results for UMR and IWW

Impacts that could be anticipated from future dredged material placement on floodplain habitats would be similar to those previously discussed above in Section 4.2.5. Future projections indicate a relatively large percentage of future placement in open water habitat areas. These open water placement areas on the UMR will largely be limited to deepwater thalweg areas where native mussels are less abundant than in channel border areas. These thalweg areas are mostly historical placement sites, with two areas in Pool 13 currently under development as new thalweg placement sites.

These results also demonstrate the trend of the Rock Island District to place larger quantities of dredged material in less sensitive environmental areas. Compared to historical placement, much more material will be placed on agricultural areas over the next 40 years. These areas usually are less environmentally sensitive than other floodplain habitats. The District recognizes that the widespread conversion of farmland for the purpose of dredged material placement also is undesirable. To the extent possible, the District will continue to try to reduce impacts to agricultural resources over the next 40 years. However, it should be reiterated that over the next 40 years, it is projected that only 0.1% of all UMR floodplain agricultural land and 0.4% of IWW floodplain agricultural land will be converted for dredged material placement.

Future placement of dredged material also will occur more frequently along the landward side of existing levee structures, as well in historical placement areas. This is likely demonstrated by the relatively large proportion of sand/mud and scrub/shrub habitat utilized for placement. These habitats are often observed in levee and historical placement areas, which are sandy substrates

dominated by scrub/shrub vegetation. Often, these areas also are less sensitive than other floodplain habitats.

Conversely, future placement of dredged material is less likely to occur in sensitive environmental areas, including wetlands, forests, vegetated aquatic areas, and other vegetated areas that are periodically flooded. Some of these areas will be utilized for future material placement, but only after other placement options have been fully evaluated.

More channel maintenance dredged material also will be used in habitat restoration projects, such as island construction in the lower parts of navigation pools. The area "footprint" of future dredged material placement sites in the Rock Island District will continue to decrease as various planning documents such as Dredged Material Management Plans, Channel Maintenance Management Plans, and Pool Plans are implemented. Existing sand and mud dredged material deposits no longer receiving dredged material will become vegetated, either through planting or natural succession.

Evaluation of Programmatic Placement Site-Type

This section of the PEA will discuss impacts associated with the programmatic placement site-type from a general, broad perspective, with the focus on general trends for impacts to different types of floodplain habitats. Habitat types that will be evaluated for potential impacts will include the same floodplain habitats identified within the HNA GIS Query Tool. Specific sites affected by future projects will be discussed within the Supplemental EA documents that will tier from this PEA. Thus, considerations that are highly site-specific will not be evaluated in the PEA. For example, specific discussion of impacts associated with return water and pipeline corridors will be addressed within the supplemental NEPA documents. Other site-specific details, such as construction/ implementation cost, are beyond the scope of this PEA and will be addressed in the planning and engineering effects for each SEA.

6.1 SITE-TYPES FOR EVALUATION

As discussed previously in Section 2.2., this PEA includes six programmatic site-types for evaluation. These include:

1. Agricultural Field
2. Behind the Levee Placement
3. Levee Placement
4. Temporary Stockpile
5. Beneficial Use Areas/Beneficial Use Stockpiles
6. Disturbed Sites

All future NEPA documents (both tiered and non-tiered) discussing new dredged material placement sites will discuss a No Project alternative as a part of the planning process. However, a No Project alternative would preclude future federal involvement in dredged material placement projects at new sites. Consequently, no dredging would occur. Without dredging, it is probable that shoaling would occur, resulting in the closure of the channel to commercial navigation. Thus, the No Project alternative would likely not be feasible because it is contrary to the congressional mandate to maintain a commercial navigation channel. For these reasons, the analysis below will discuss impacts from the six site-types discussed above.

6.2 ENVIRONMENTAL IMPACTS OF PROJECT SITE-TYPES

6.2.1 Methods for Evaluation

To evaluate environmental impacts, future placement sites evaluated in the analysis discussed above were further reviewed to identify which future sites might fit into the site-types outlined for programmatic consideration. Future placement sites were labeled as one of several types, including

several sites that were labeled as fitting one of the programmatic site-types. These future sites that were labeled as one of the programmatic site-types were then analyzed in the same GIS database format performed above for all future placement actions. Resulting habitats affected by each programmatic site-type are addressed below.

It should be noted that some of the future placement sites could fit under more than one programmatic placement site-type. For example, an agricultural field site behind an existing levee structure could fit under the Agricultural Field site-type, or the Behind the Levee site-type. However, for this analysis, each placement site was designated to fit under only one site-type.

6.2.2 Projected Future Placements on the UMR and IWW for Programmatic Site-Types

The programmatic site-types would potentially affect about 612 acres of floodplain habitat on the UMR and about 472 acres on the IWW (Tables 6-1, 6-2, and 6-3). Based on land cover data, habitats most affected would include agricultural land and scrub/shrub habitat. Agricultural land affected would include about 314 acres on the UMR and about 362 acres on the IWW. This constitutes about 0.1% of all agricultural land within identified pools of the UMR floodplain and about 0.4% of all agricultural land within identified pools of the IWW floodplain (Tables 6-1, 6-2, and 6-3 and Figures 6-1 and 6-2).

Conversely, about 141 acres of UMR scrub/shrub habitat and about 20 acres of similar habitat on the IWW would be affected by the programmatic site-types. This constitutes about 0.6% of such habitat on the UMR and 0.2% of this habitat on the IWW (Tables 6-1, 6-2, and 6-3). Placement on this habitat type largely represents placement on existing sand levee structures which commonly are represented by this habitat type. In addition, the programmatic site-types would affect about 5 acres of UMR floodplain, and about 4 acres of IWW floodplain identified as sand or sand/mud habitat. In addition, about 38 acres of developed UMR floodplain and 41 acres of developed IWW floodplain would be utilized for placement.

Programmatic site-types also would affect about 59 acres of UMR floodplain and 18 acres of IWW that are identified as areas without photo coverage, or as unknown placement areas (Tables 6-1 and 6-3). This is projected to occur for two reasons. First, some of the projected sites occur outside of available habitat coverage. This is primarily limited to about 33 acres identified for agricultural field placement in UMR Pool 24. Field observations confirm that most, if not all, of this habitat is in fact agricultural field. However, the remaining area and corresponding sites on the UMR and IWW identified as unknown are largely temporary stockpile sites, the exact location of which has not been identified for several sites. Because their location is unknown, including them within the GIS database would be highly speculative and may not be indicative of the habitat upon which these placement sites may ultimately occur. Such future sites would receive full review and disclosure of environmental impacts within their future site-specific NEPA document.

Programmatic site-types will largely affect less sensitive environmental habitats, such as ag fields, scrub/shrub habitat, sand/mud habitat, or developed areas. In fact, over 80% of UMR and IWW programmatic placements are projected to occur within these types of areas. However, future projections indicate that other, more sensitive habitats may also be placed upon. These include grasslands, floating-leaved aquatic beds, open water, salix community, submersed aquatic bed, wet floodplain forests, and wet meadow. This is generally limited to areas on the periphery of projected future programmatic placement sites. Moreover, many of these areas have been, or are currently being addressed through NEPA documentation. For example, of the projected 3.6 acres of UMR Grassland habitat affected by programmatic placement (Table 6-1), 2.9 acres of this is addressed within the Beaver Island DMMP. The remainder of the projected grassland acreage has

been addressed within the implemented Turkey River DMMP. Similarly, many of the areas identified as wet floodplain forest also have been or are currently being addressed through a DMMP. Although the relative coverage would be minimal, all sensitive UMR and IWW areas with projected dredged material placement would require full disclosure of impacts within any future supplemental NEPA documents.

Table 6-1. Summary of the aerial coverage for projected dredged material placements resulting from programmatic site-types, for Pools 11 through 24 of the Upper Mississippi River for the period 2000 through 2040 (40-year projections).

HNA Habitat Types	Total Placement Acres by Habitat (acres)	Total by Habitat (acres)	Percent of Habitat Type Impacted[c]
Agriculture	314.4	274,446.9	0.1%
Developed	37.7	36,290.8	0.1%
Grassland	3.6	1,070.2	0.3%
Floating-Leaved Aquatic Bed	2.8	12,123.3	0.0%
Open Water	5.7	128,104.7	0.0%
Sand/Mud	5.1	984.7	0.5%
Salix Community	0.3	2,160.6	0.0%
Scrub/Shrub	140.9	21,680.3	0.6%
Submersed Aquatic Bed	1.8	15,799.2	0.0%
Wet Floodplain Forest	36.2	97,417.2	0.0%
Wet Meadow	3.5	16,780.3	0.0%
No Coverage	32.5[a]	--	--
Unknown Placement Area	26.7	--	--
Total	**611.2**	**794,082.6**[b]	**0.1%**

[a] Constitutes portions of the UMR floodplain not included within the HNA database due to lack of coverage within the source aerial photographs. However, further review of the projected 32.5 acres shows that this area, at the time of developing this PEA, is projected to occur completely on an agricultural habitat type.
[b] Total UMR floodplain area within the Rock Island District.
[c] Percentages have been rounded to tenths, 0.0% represents an impact of less than 0.05%. Dredged material placement would affect these habitat types at a site-specific scale.

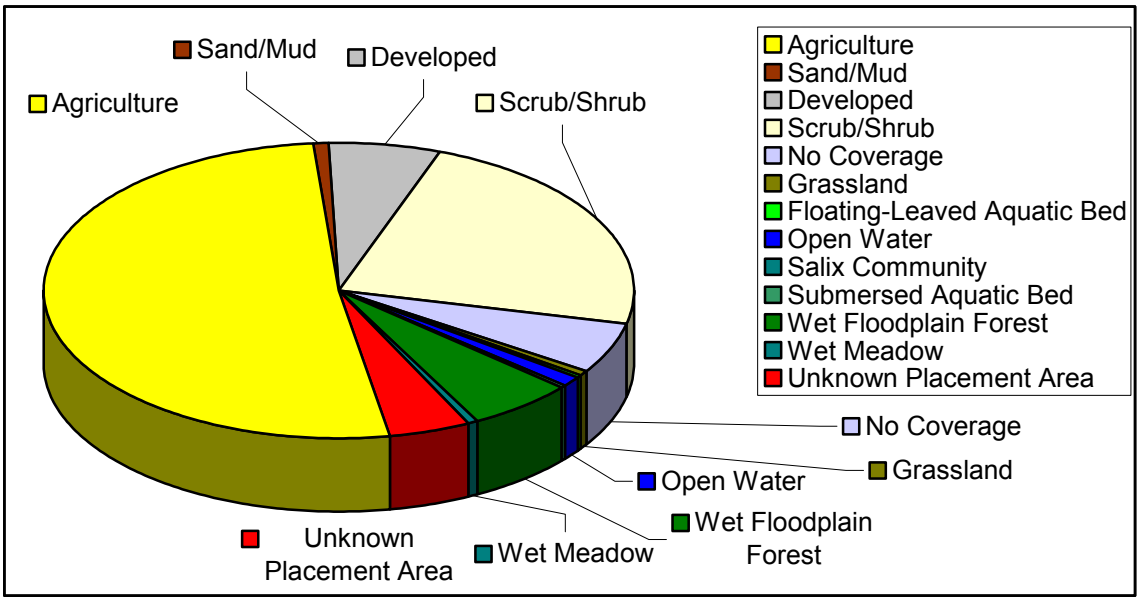

Figure 6-1. Summary of the relative aerial coverage of projected programmatic site-type dredged material placements, by habitat type, for areas of Pools 11 through 24 of the Upper Mississippi River within the Rock Island District for the period 2000 through 2040 (40-year projections). Review of the placement area projected to fall outside of the land cover database (labeled as "No Coverage"), at the time of developing this PEA, is projected to occur completely on an agricultural habitat type.

Table 6-2. Summary of the aerial coverage for projected dredged material placements, resulting from programmatic site-types, for La Grange and Peoria Pools of the Illinois Waterway, for the period 2000 through 2040 (40-year projections).

HNA Habitat Types	Total Placement Acres by Habitat (acres) [b]	Total by Habitat (acres)	Percent of Habitat Type Impacted [c]
Agriculture	358.3	86,566.9	0.4%
Developed	28.2	9,921.3	0.3%
Grassland	0.9	6,270.8	0.0%
Mesic Bottomland Hardwood Forest	0.0	6,152.1	0.0%
Open Water	3.0	59,483.4	0.0%
Salix Community	2.8	3,241.6	0.1%
Sand/Mud	2.8	2,206.3	0.1%
Scrub/Shrub	20.1	8,024.3	0.2%
Wet Floodplain Forest	4.4	44,361.4	0.0%
Wet Meadow	12.5	11,372.5	0.1%
Total	**432.9**	**295,048.4** [a]	**0.1%**

[a] Total IWW floodplain area within the Rock Island District.
[b] Acres have been rounded to tenths, 0.0 represents an acreage of less than 0.05.
[c] Percentages have been rounded to tenths, 0.0% represents an impact of less than 0.05%. Dredged material placement would affect most of these habitats at a site-specific scale.

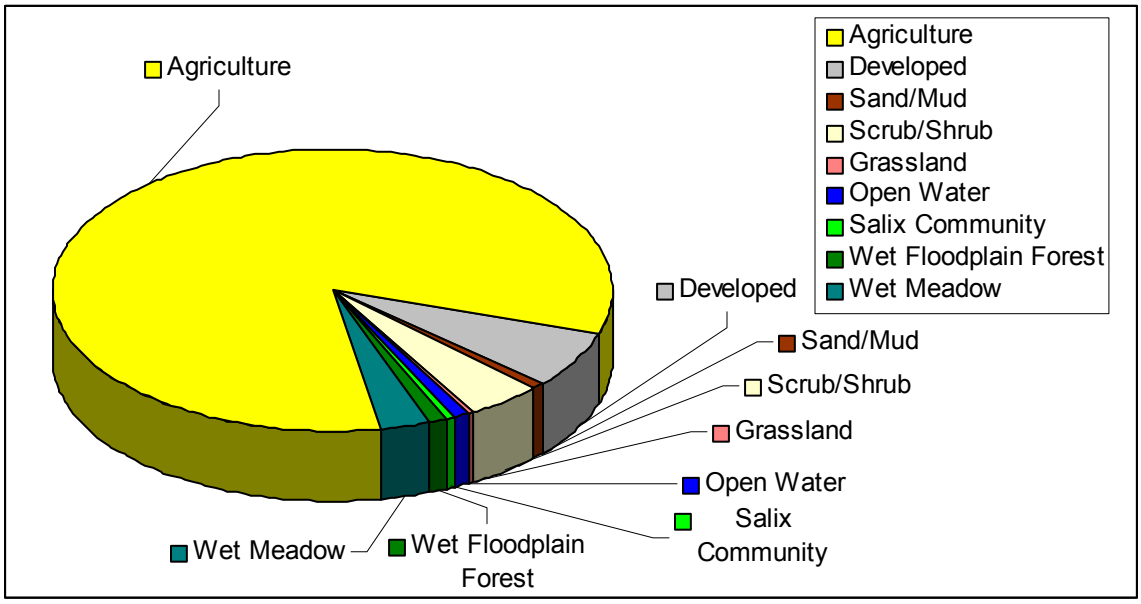

Figure 6-2. Summary of the relative aerial coverage of projected programmatic site-type dredged material placements, by habitat type, for areas of La Grange and Peoria Pools of the Illinois Waterway within the Rock Island District for the period 2000 through 2040 (40-year projections).

Table 6-3. Summary of the aerial coverage for projected dredged material placements, resulting from programmatic site-types, for Dresden, Marseilles, Starved Rock and portions of La Grange Pools of the Illinois Waterway, for the period 2000 through 2040 (40-year projections).

Satellite Habitat Types[1]	Total Placement Acres by Habitat (acres)	Total by Habitat (acres)	Percent of Habitat Type Impacted[d]
Agriculture	4.3[a]	14,931.4[b]	0.0%
Grasses/Forbs	0.3	4,417.2	0.0%
Open Water	0.7	10,908.8	0.0%
Sand	1.4	45.8	3.1%
Urban/Developed	12.3	6,869.5	0.2%
Woody Terrestrial	2.4	9,884.9	0.0%
Unknown Placement Area	17.3	--	--
Total	**38.7**	**47,900.6**[c]	**0.1%**

[a] Includes 0.5-acre temporary stockpile site in Alton Pool.
[b] Because only a single programmatic site is projected for Alton Pool, the above comparison was made to available agricultural habitat in Dresden, Marseilles, Starved Rock, and the upper range of La Grange Pools. Alton Pool contains an additional 153,000 acres of agricultural land.
[c] Total floodplain area for satellite coverage, excluding Alton Pool.
[d] Percentages have been rounded to tenths, 0.0% represents an impact of less than 0.05%. Dredged material placement would affect these habitat types at a site-specific scale.

6.2.3 Environmental Impacts of Programmatic Site-Types

Natural Resources. General discussion on impacts of dredged material placement to floodplain habitats was provided in Section 4.2.5. In general, programmatic placement along the UMR and IWW would be limited to agricultural, developed, sand/mud, and scrub/shrub habitats. Such areas generally are less environmentally sensitive, and utilization of such areas typically minimizes impacts. Although not typically a concern with these habitat types, any supplemental NEPA document will discuss, if appropriate, any known critical wildlife habitats, wetlands, sand beaches, water-oriented recreational facilities, public parks, recreational areas, or water sport areas. Any supplemental document would discuss issues with off-site erosion or migration of dredged material, should such issues be of concern with individual sites. Any supplemental document also would discuss other site-specific issues, such as concerns often associated with return water and pipeline corridors.

Other impacts possibly resulting from using the habitat types largely targeted by the programmatic site-types may include biota that utilize crop fields and scrub/shrub habitat for feeding, loafing, dusting, etc. Though habitat improvements are limited, turtle nesting may be facilitated as a result of these types of projects, and the elevated floodplain placement site could function as a terrestrial refuge in times of flood. Several conclusions were reached in a report entitled, *Final Report, Natural Resource Survey of Fauna Inhabiting Dredged Material Disposal Sites in Pool 18 of the Upper Mississippi River,* February 1985. No significant difference was detected between the dredged material placement sites and the floodplain forest areas with respect to small mammal capture rates. Evidence of opossum and cottontail rabbit usage was only observed on dredged material placement sites. Fox squirrels and woodchuck signs were observed in both habitat types. Turtles, snakes, and toads were more abundant on dredged material placement sites.

The programmatic site-types do not direct placement of dredged materials on sensitive habitats such as grasslands, floating-leaved aquatic beds, wet floodplain forests, and wet meadow. However, such areas could be placed upon, likely at the periphery of programmatic placement sites. Although projections indicate that the relative amount of these sensitive habitats impacted by programmatic site-types would be 0.1% or less of the total UMR or IWW floodplain habitat, this document does not serve to clear the utilization of such habitat areas. Impacts to sensitive habitats will need to be considered on a site-by-site and case-by-case basis within future NEPA documents.

For additional discussion of possible impacts resulting from dredged material placement, please refer to Section 5.2.4.

Endangered Species. In general, utilization of the programmatic site-types would not be expected to adversely affect state or federal listed species. However, extensive coordination was not pursued to identify endangered species concerns with sites that may be involved with programmatic site-types. Therefore, for all future projects, early coordination with state and federal resource agencies will be performed to identify any objections or concerns over potential impacts to any state or federal threatened or endangered species.

Agricultural Resources. As discussed above, the programmatic site-types are largely limited to placement on existing agricultural areas. In fact, over 60% of the combined area affected by the programmatic site-types on the UMR and IWW is agricultural field. Projections indicate that about 314 acres of UMR habitat and another 363 acres of IWW floodplain habitat recently identified as agricultural land may be utilized for placement. An additional 33 acres of projected UMR floodplain placement that fall outside of the land cover database also has been identified as

agricultural area. However, all future programmatic placement on agricultural fields would constitute only about 0.1% and 0.4% of all UMR and IWW floodplain agricultural land, respectively.

The District recognizes that the widespread transformation of agricultural land is undesirable and will attempt to minimize agricultural impacts by continuing to keep dredging quantities to the minimum required to maintain safe navigation and by phasing the project to allow farming on the best fields as long as possible. For placement on agricultural fields, every effort will be made to acquire real estate interest from willing landowners. Every effort also will be made to place dredged material on non-prime farmland, or on prime farmland meeting one or more of the following criteria:

- Remote field with poor access;
- Low lying land which floods frequently (non-wetland);
- Severed parcels and uneconomical remnants less than 3 acres in size;
- Previously disturbed borrow sites; or
- Existing state-owned or other public lands.

If prime farmland cannot be avoided, then a series of measures will be pursed to minimize impacts to agricultural interests. These may include reducing the footprint by placing dredged material higher, acquiring only the minimum amount of land needed for material placement, or establishing a lease agreement for farming of a placement site until the site is needed for placement.

Historic Properties. In conjunction with compliance, consultation, and coordination completed for all proposed dredging, dredged material placement, and any other channel maintenance activities, the District conducts an archival search for historic properties following the "Policy and Procedures for the Conduct of Underwater Historic Resource Surveys for Maintenance Dredging and Disposal Activities" (DGL-89-01, March 1989). The District also queries the most recent historic property state site file database for historic properties within those areas of potential effect. To determine potential effects to significant historic properties in compliance with Section 106 of the NHPA, and its implementing regulations 36 CFR Part 800: "Protection of Historic Properties," and dredging guidance/regulations, the District has conducted, and will continue to conduct, numerous investigations, research, and documentation through study reports.

These study reports include: (1) archeological studies (management of documented and undocumented historic properties), (2) architectural and engineering studies (buildings, structures, and objects associated with the IWW and UMR Multiple Property National Register Districts), (3) erosion studies (priority to areas impacted by commercial navigation), (4) land form sediment assemblage studies (geomorphology), (5) site-specific studies (lock and dam potential effects and effects to archeology sites), and (6) submerged historic property studies (historic shipwrecks and other underwater or previously inundated historic properties). These study reports aid in partial fulfillment of compliance with the NHPA and DGL-89-01, and provide support documentation for the coordinating and consultation concerning site-specific and systemic/programmatic tasks and activities. Final study reports and historic property investigation reports are archived at the District and placed in permanent files of the appropriate SHPO(s) as evidence of compliance. When applicable, portions of these studies, and any appropriate recommendations and conclusions with compliance correspondence, are included within District planning, management, and environmental documents associated with dredging, dredged material placements, and ancillary channel maintenance activities.

In 1996, the District, the Illinois, Iowa, Missouri, and Wisconsin State Historic Preservation Officers (SHPOs), and the Advisory Council on Historic Preservation (ACHP) executed a Programmatic Agreement (PA, Appendix F) for the protection of significant historic properties in support of the District dredged material placement program (Dredged Material Management Plan, formerly Long-Term Management Plan) on the IWW and UMR. By letter dated July 8, 1999, the District contacted the SHPOs, ACHP, and approximately 70 Tribal Historic Preservation Officers (THPOs) and Native American Indian Tribes (Tribes) enclosing the Tribal Distribution List and PA.

The THPOS, Tribes, and SHPOs were asked to review the Tribal Distribution List for corrections and/or additions. Also, the Tribes were notified that in 1996, the PA was executed regarding implementation of the long-term management strategy for dredged material placement for Illinois Waterway RM 80.0 to 327.0 and Mississippi RM 300.0 to 614.0 (Appendix F). The Tribes were requested to notify the District of special concerns or potential effects. The District received responses/comments by letter from the Menominee Indian Tribe of Wisconsin (Keshena, Wisconsin), Citizen Potawatomi Nation (Shawnee, Oklahoma) and Delaware Tribe of Western Oklahoma (Anadarko, Oklahoma). The District met the immediate requests of these Tribes and included them on the lists generated by the District for the DMMP reports.

Adherence to the new 1999 amendments to the NHPA requires the District to consult with THPOs, Tribes, and other interested parties, and include all consulting parties in the planning process relative to historic properties. As a result, the Corps has assembled a PEA distribution list to include THPOS, Tribes, and other consulting parties. Those on the PEA distribution list were notified of the availability of this PEA with the appended PA, as part of the consultation process outlined in 36 CFR Part 800.8(c)(1). The PA will be referenced as a factor of consideration PEA Finding of No Significant Impact (FONSI) and included within appropriate site-specific environmental documents.

6.2.4 Probable Adverse Environmental Impacts which Cannot be Avoided

The programmatic site-types would potentially affect about 314 acres of UMR floodplain agricultural land and about 363 acres of IWW floodplain agricultural land. An additional 33 acres of projected UMR floodplain placement that fall outside of the land cover database also has been identified as agricultural area. However, all future agricultural placements would constitute only about 0.1% and 0.4% of all UMR and IWW floodplain agricultural land, respectively. The District will attempt to minimize agricultural impacts by continuing to keep dredging quantities to the minimum required to maintain safe navigation and phasing the project to allow farming on the best fields as long as possible.

During utilization of placement sites, some temporary disturbance of wildlife may be expected during placement. However, due to existing recreational use and farming activity within the UMR and IWW floodplain, as well as past dredging events, local wildlife has become accustomed to some level of disturbance. Temporary avoidance of the project area would cause only short-term and minimal impacts to area wildlife.

Other unavoidable impacts may be observed with the programmatic site-types. These will be reviewed and disclosed in future NEPA documents should these impacts arise.

6.2.5 Social and Economic Impacts of Programmatic Site-Types

A. Community and Regional Growth. No significant impacts to community or regional growth would be expected to result from implementation of these programmatic site-types.

B. Community Cohesion. Implementation of the programmatic site-types would generally not be expected to affect community cohesion. However, implementation of individual projects would be evaluated for possible public opposition within any supplemental NEPA document.

C. Displacement of People. Any potential displacement of people would be evaluated for each individual future project within any supplemental NEPA document. To the extent possible, such actions would be avoided.

D. Property Values and Tax Revenues. The programmatic site-types could greatly affect some individual agricultural properties within the floodplain of the UMR and IWW. Such actions could possibly affect property values and tax revenues for the individual sites utilized for placement. However, evaluation of property values and tax revenues for individual sites is beyond the scope of this PEA. Any potential impacts to property values and tax revenues would be evaluated for all future projects within any supplemental NEPA documents.

E. Public Facilities and Services. Maintenance of the navigation channel provides positive impacts to public facilities and services. Any impacts to public facilities or services, including any potential new services, would be addressed within any supplemental NEPA document.

F. Life, Health, and Safety. Impacts to life, health, or safety generally would not be expected from implementation of the programmatic site-types. However, should any such impacts be anticipated prior to evaluation of a site-specific project, such impacts would be thoroughly disclosed in the supplemental NEPA document.

G. Business and Industrial Growth. Any impacts to agricultural business are expected to be minor as the programmatic site-types would only impact about 0.1% of all UMR agricultural land, and about 0.4% of all IWW agricultural land. These impacts would be evaluated on a site-by-site basis within any supplemental NEPA document. It is not believed that the programmatic site-types would adversely affect industrial growth. However, any adverse impacts would be addressed within any supplemental NEPA document.

H. Employment and Labor Force. No significant impacts on employment or labor force in the project vicinity would be expected from implementation of the programmatic site-types. However, should any such impacts be anticipated prior to evaluation of a site-specific project, such impacts would be thoroughly disclosed in the supplemental NEPA document.

I. Farm Displacement. It is unlikely that the programmatic site-types would displace any one individual farm. The programmatic site-types may remove from production about 314 acres of cropland on the UMR floodplain, and another 363 acres of cropland in the IWW. An additional 33 acres of projected UMR floodplain placement that fall outside of the land cover database also has been identified as agricultural area. However, impacts would be relatively minor as this would only affect about 0.1% of floodplain agricultural land on the UMR, and about 0.4% of all agricultural land on the IWW floodplain.

J. Noise Levels. For the programmatic site-types, there would be a temporary increase in noise levels during future material placement. However, no long-term impacts are evident.

K. Aesthetics. The programmatic site-types would result in dredged material placement sites in a variety of habitats of the UMR and IWW. However, only about 0.1% of both floodplains would be affected through placement. Substantial adverse impacts to aesthetics would not be anticipated with the programmatic site-types. However, should any such impacts become significant for any site-specific project, such impacts would be thoroughly disclosed in the supplemental NEPA document.

6.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES IF PROJECT SITE-TYPES ARE IMPLEMENTED

Typically, resources such as fuel consumed, manpower expended, and the commitment of construction materials are considered to be irretrievable. As discussed above, the programmatic site-types also would result in agricultural lands being removed from production.

6.4 RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

The Mississippi River is a vital component of the national transportation infrastructure. It will continue to serve commercial, recreational, and environmental interests for the long term with timely and appropriate maintenance as well as environmentally sensitive planning and implementation.

6.5 COMPLIANCE WITH ENVIRONMENTAL QUALITY STATUTES

A. National Historic Preservation Act and Appropriate Regulations, etc. Those on the PEA distribution list, which includes THPOs, Tribes, and other consulting parties relative to historic properties, promulgated by the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR Part 800: "Protection of Historic Properties" will be notified of the availability of the PEA with executed PA for a programmatic approach to identify effects to historic properties, as part of the consultation process outlined in 36 CFR Part 800.8(c)(1). All consulting party comments, requests, and/or views will be taken under consideration in future undertakings, consultation, and environmental documents.

Allowing for THPOs, Tribes, and other interested parties to review and comment contributes to fulfilling obligations as set forth in the NHPA (PL 89-665), as amended; the NEPA (PL 91-190); Executive Order (EO) 11593 for the "Protection and Enhancement of the Cultural Environment" (Federal Register, May 13, 1971); the Archaeological and Historical Preservation Act of 1974 (PL 93-291); the ACHP "Regulations for the Protection of Historic and Cultural Properties" (36 CFR, Part 800); and the applicable National Park Service and Corps of Engineers regulations.

Although the District PA assures NHPA compliance, consultation concerning all historic property findings, and that any determination of effects have been identified and documented within the area of potential effect and the District has taken into account all historic properties relative to the planning process through consultation and coordination, if any undocumented historic properties are identified or encountered during the undertaking, the Corps will discontinue all dredging, dredged placement, and any ancillary maintenance activities and resume coordination with the appropriate SHPOs, THPOs, Tribes, other consulting parties to identify the significance of the historic property and determine potential effects as executed by the PA.

B. Clean Air Act, as amended. It is not anticipated that the programmatic site-types, either short-term or long-term, would result in violations to air quality standards. The environment would not be exposed to contaminants/pollutants in such quantities and of such duration as may be or tend to be injurious to human, plant, or animal life, or property, or which unreasonably interferes with the comfortable enjoyment of life, or property, or the conduct of business.

C. Clean Water Act (Sections 401 and 404), as amended. As discussed above, consideration was given to developing Programmatic 404(b)(1) and 401 Water Quality Certification. Because actions proposed under this PEA, as well as the impacts resulting from these actions, can vary based on location and other site-specific criteria, a 404(b)(1), the 401 Water Quality Certification and corresponding supplemental NEPA documentation will be required for each individual project tiered off this PEA in accordance with 40 CFR Part 1508.28. Because a site-specific 401 Certification would be required for each individual project, and because of the activities associated with the Site-specific Certification, it was determined that a Programmatic Certification would not significantly improve the NEPA or 401 certification process. Therefore, all 404(b)(1) and 401 Water Quality certification will be addressed for each individual, site-specific project.

D. Endangered Species Act of 1973, as amended. As previously discussed, utilization of the programmatic site-types generally would not be expected to adversely affect state or federal listed species. However, extensive coordination was not pursued to identify endangered species concerns with sites that may be involved with programmatic site-types. Therefore, all future supplemental documents that tier from this document will include discussion of impacts to any state or federal threatened or endangered species.

E. Farmland Protection Policy Act of 1981. Detailed evaluation of all agricultural sites was not performed during this process. Thus, for the use of all future agricultural sites, a complete review will be performed by federal, state, and local agencies using the appropriate, approved criteria. This would include the District and the appropriate County District Conservationist completing an AD-1006 Farmland Impact Conversion Rating for each site.

The District recognizes that the transformation of agricultural land, particularly prime farmland, is undesirable but sometimes necessary to meet the District's mandate of maintaining the navigation system. The programmatic site-types could result in the conversion of approximately 314 acres of UMR farmland and 363 acres of IWW farmland, much of which may prove to be prime farmland. An additional 33 acres of projected UMR floodplain placement that fall outside of the land cover database also has been identified as agricultural area. All future dredged material placement projects will consider alternative actions that could lessen adverse effects to farmland. The programmatic site-types would be, to the extent practicable, compatible with state, unit of local government, and private programs and policies to protect farmland.

F. Federal Water Project Recreational Act. Effort was not made to identify opportunities for recreational development or aspects of the programmatic site-types conducive to recreational development. Should these be identified for future sites, they will be discussed within any supplemental NEPA document.

G. Fish and Wildlife Coordination Act. This project has been coordinated with the U.S. Fish and Wildlife Service, the Wisconsin Department of Natural Resources (DNR), the Iowa DNR, the Illinois DNR, and the Missouri Department of Conservation. The District's coordination letter and resource agency responses appear in Appendix G.

H. Flood Plain Management (Executive Order 11988). Implementation of the programmatic site-types would avoid, to the extent possible, long- and short-term adverse impacts associated with the occupancy and modification of the base floodplain. They also would avoid direct and indirect support of development or growth (construction of structures and/or facilities, habitable or otherwise) in the base floodplain wherever there is a practicable alternative. However, for any future NEPA document, additional evaluations will be performed to identify any changes to the 100-year flood profile. The District would obtain and adhere to all stipulations of the floodplain permit from the appropriate state agency prior to implementation of this proposed project.

I. National Environmental Policy Act of 1969, as amended. The compilation of this PEA addresses utilization of the identified programmatic site-types. Any site-specific project that would tier off this PEA would do so with a supplemental NEPA document.

J. National Historic Preservation Act of 1966. Any documented effects would be mitigated through measures stipulated by the Programmatic Memorandum of Agreement presently implemented.

K. Protection of Wetlands (Executive Order 11990). The programmatic site-types presented here avoid, to the extent possible, placement of material in wetlands. Any wetland areas that may be affected by a future placement would require disclosure within the appropriate NEPA document. This includes possible farmed wetlands, which may exist within the agricultural land targeted for future placement.

L. Rivers and Harbors Act. The programmatic site-types would not place any obstruction across navigable water or place obstructions to navigation outside established federal lines.

M. Wild and Scenic Rivers Act of 1968, as amended. The UMR and IWW within the District are not listed in the National Rivers Inventory (NRI). The NRI is used to identify rivers that may be designated by Congress to be component rivers in the National Wild and Scenic Rivers System.

6.6 COORDINATION FOR THIS PEA

Coordination between the District and state and federal agencies for this PEA has occurred on different occasions between 1998 and 2001. The District held a meeting with state and federal resource agencies on August 10, 2000, to discuss issues associated with the project. As a part of the environmental review process, public meetings were held in Peoria, Illinois, and Bettendorf, Iowa, on September 6 and 7, 2000, respectively. The meetings were held to notify the public of the proposed NEPA document and to solicit initial comments. Notification of the meetings was distributed to over 1,100 entities, including governmental agencies, media outlets, levee districts, libraries, state and county representatives, and other members of the public.

This Draft PEA has been distributed for comment to state and federal agencies of Wisconsin, Iowa, Illinois, and Missouri. Additional correspondence for this PEA can be found at Appendix G.

This document also is available to the public in electronic format through the World Wide Web (please see the Rock Island District home page). An electronic copy of this document also is available upon request by way of compact disk.

6.7 REFERENCES

Theiling, C. H., C. Korschgen, H. De Haan, T. Fox, J. Rohweder, and L. Robinson. 2000. Habitat needs assessment for the Upper Mississippi River System: Technical Report. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, WI. 248pp + appendices A to AA.

USACE. 2000. Habitat Needs Assessment GIS Query Tool for the Upper Mississippi River System. Users Manual. U.S. Army Corps of Engineers, St. Louis District. December 2000.

USACE. 1975. *Final Environmental Impact Statement for Operation and Maintenance of a Nine-Foot Channel in the Illinois Waterway*.

USACE. 1974. *Operations and Maintenance, Upper Mississippi River, 9-Foot Navigation Channel, Final Environmental Impact Statement*, *(Pools 11 - 22)*, dated July 1974.

USGS. 1998. Ecological Status and Trends of the Upper Mississippi River System 1998: A report of the Long Term Resource Monitoring Program. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin. April 1999. LTRMP 99-T001. 236pp.

WEST. 2000a. Upper Mississippi River and Illinois Waterway Cumulative Effects Study. Volume 1: Geomorphic Assessment. Prepared by WEST Consultants, Inc. Bellevue, WA. Submitted to U.S. Army Corps of Engineers, Rock Island District. June 2000.

WEST. 2000b. Upper Mississippi River and Illinois Waterway Cumulative Effects Study. Volume 2: Ecological Assessment. Prepared by WEST Consultants, Inc. Bellevue, WA. Submitted to U.S. Army Corps of Engineers, Rock Island District. June 2000.

FINDING OF NO SIGNIFICANT IMPACT

PROGRAMMATIC SITE-TYPES FOR THE PLACEMENT OF DREDGED MATERIAL WITHIN THE UPPER MISSISSIPPI RIVER AND ILLINOIS WATERWAY

I have reviewed the information in this Programmatic Environmental Assessment (PEA), along with data obtained from state and federal agencies having jurisdiction by law or special expertise, and from the interested public. I find that the placement of dredged material in accordance with the programmatic site-types, would not significantly affect the quality of the human environment. It is recognized that for all future sites that will tier off this document, a supplemental National Environmental Policy Act (NEPA) document would be prepared. This document also would be subject to the public review process. Therefore, it is my determination that for this programmatic document, an Environmental Impact Statement (EIS) is not required. This determination will be reevaluated if warranted by later developments.

Programmatic site-types considered along with the preferred action were:

- Agricultural Field
- Behind the Levee Placement
- Levee Placement
- Temporary Stockpile
- Rehandle Sites
- Disturbed Sites

Factors considered in making the determination that an EIS was not required are as follows:

a. The U.S. Fish and Wildlife Service recommended implementation of programmatic site-types. These site-types are targeted at what are typically considered environmentally acceptable placement sites that avoid or minimize adverse impacts to sensitive floodplain habitats.

b. Overall, the programmatic site-types would affect a relatively small portion of the UMR and IWW floodplains.

c. Utilization of the programmatic site-types largely places material upon habitat types that generally are not environmentally sensitive.

d. Implementation of this document encourages the District to continue to utilize alternatives that minimize environmental damage.

e. All future projects would require a supplemental NEPA document that would still follow the public review process. Should any impacts rise to significant levels, these impacts would be disclosed within future NEPA documentation that does not tier from this PEA.

f. The programmatic site-types proposed would not significantly affect water quality of the Mississippi River System or cultural/historic resources. Should such effects become significant, these effects would be fully documented within the future supplemental NEPA document.

g. The programmatic site-types are not anticipated to have an effect on federally or state listed endangered or threatened species. However, all future projects will review and consider

federally and state listed species. Should any endangered species issues arise, these issues would be addressed within the future NEPA document.

h. Impacts of farmland conversion to non-agricultural uses have been considered. Measures to avoid and/or minimize effects of farmland conversion will be considered for all future projects.

i. The implementation of the programmatic site-types as proposed would generally not be expected to result in increases in cost or prices for consumers, individual industries, and federal, state, or local government agencies, nor would it impair, in any way, the ability of the U.S. to compete with foreign-based enterprises in domestic or export markets.

j. The programmatic site-types are anticipated to provide the best long-term solution to the dredging problems at many of our chronic dredge cuts. One of the programmatic site-types will be integral in determining the Base Plan (Federal Standard) for most, if not all, future projects.

3 March 2003
Date

William J. Bayles
Colonel, U.S. Army
District Engineer