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January 22, 2021

The Honorable John Barrasso
The Honorable Tom Carper
United States Senate

The Honorable Peter A. DeFazio
Chairman
The Honorable Sam Graves
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

U.S. Army Corps of Engineers: Information on the Navigation and Ecosystem Sustainability Program

The Upper Mississippi River system provides approximately \$1 billion in annual benefits to the nation's economy through boating, fishing, and other uses, according to the U.S. Army Corps of Engineers (Corps).¹ The river system also supports irreplaceable habitats and ecosystems—including more than 2.5 million acres of aquatic, wetland, forest, grassland, and agricultural habitats across the states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. In 1986, Congress declared its intent to recognize the Upper Mississippi River system as a nationally significant commercial navigation system and a nationally significant ecosystem.²

The Corps is responsible for operating and maintaining the navigation infrastructure along the Upper Mississippi River system and for managing, restoring, and protecting the surrounding ecosystem.³ According to the Corps, balancing the navigational importance of the river system with the need to protect the ecosystem is challenging. The Corps operates 37 lock and dam sites and maintains 1,200 miles of 9-foot deep navigation channels along the Upper Mississippi River and the Illinois Waterway, which connects with the Mississippi River and lies within the Upper Mississippi River basin. (See enc. I for a map of the Upper Mississippi River basin and locations of the Corps' 37 locks and dams.)

Because of increased commercial traffic and environmental deterioration in the Upper Mississippi River basin, the Corps initiated separate reconnaissance studies for the Illinois

¹The Upper Mississippi River system comprises those river reaches having commercial navigation channels on the Mississippi River main stem north of Cairo, Illinois; the Illinois River and Waterway; and four other midwestern rivers: St Croix, Minnesota, Black, and Kaskaskia. See 33 U.S.C. § 652(b)(1).

²Pub. L. No. 99-662, § 1103(a)(2), 100 Stat. 4082, 4225 (codified as amended at 33 U.S.C § 652(a)(2)).

³The Corps, located within the Department of Defense, has both a military and Civil Works program. This report focuses on the Civil Works program, which is responsible for investigating, developing, and maintaining water resource projects. Specifically, the Corps plans, designs, constructs, operates, and maintains water resource projects to address the three primary Civil Works missions: (1) restoration, protection, and management of aquatic ecosystems; (2) flood risk management; and (3) support of commercial navigation.

Waterway and the Upper Mississippi River in 1989 and 1990, respectively. The studies were to determine major constraints of the river system and to make a preliminary determination of benefits and costs related to improving it.⁴ In 1991, the Corps combined the reconnaissance studies and, in 1993, it initiated a feasibility study to address the economic losses resulting from commercial traffic delays along the river system. The Corps restructured the feasibility study in 2001 to include the river system's ecosystem restoration needs and issued its feasibility report in 2004. Projects identified in the feasibility report fall within the responsibility of the Corps' Mississippi Valley Division.⁵ In 2007, Congress formally authorized navigation improvements and ecosystem restoration to the river system substantially in accordance with the feasibility report.⁶ The Corps refers to its program to undertake such navigation improvements and ecosystem restoration projects as the Navigation and Ecosystem Sustainability Program (NESP).⁷

You asked us to review the Corps' implementation of NESP. This report describes (1) the steps the Corps has taken to implement NESP and (2) challenges the Corps has identified to fully implementing the program and steps the Corps is taking to address them.

To describe the Corps' steps to implement NESP, we reviewed Corps documents and data, and we interviewed agency officials. Specifically, we reviewed the 2004 NESP feasibility study and the program's 2019 economic reevaluation report to understand the Corps' progress in implementing the program. We also reviewed the Corps' data on the program's funding and status of projects from fiscal year 2005—the year in which the Corps began implementing NESP projects—through fiscal year 2020. We reviewed the agency's data system documentation and interviewed relevant officials and determined that the data were sufficiently reliable to describe project funding and status. We interviewed agency officials and staff from the Corps' headquarters, the Mississippi Valley Division, and the Rock Island District—the offices that oversee NESP—to discuss the work they conducted in support of the program.

To describe the challenges the Corps has identified and the steps it is taking to address them, we reviewed agency documents, including project execution and financial summaries from fiscal years 2005 through 2010 and the 2019 economic evaluation.⁸ We also interviewed Corps

⁴Prior to 2014, the Corps conducted studies in two phases—reconnaissance and feasibility. Corps district offices conducted reconnaissance studies to determine if a problem warranted federal participation in a feasibility study and how the problem could be addressed. In 2014, Congress eliminated the requirement to first perform a reconnaissance study, so the Corps can now proceed directly to the feasibility phase. See Pub. L. No. 113-121, § 1002(a), 128 Stat. 1193, 1198.

⁵The Corps' Civil Works program is organized into three tiers: (1) headquarters in Washington, D.C.; (2) eight regional divisions; and (3) 38 districts nationwide. Three of the Mississippi Valley Division's districts—Rock Island, St. Louis, and St. Paul—are responsible for NESP projects. The Corps designated the Rock Island District as the coordinating district for the program.

⁶Water Resources Development Act of 2007 (WRDA 2007), Pub. L. No. 110-114, §§ 8001-8005, 121 Stat. 1041, 1283. WRDA 2007 uses the term "plan" to refer to the project for navigation and ecosystem improvements for the Upper Mississippi River and Illinois Waterway System: *Report of the Chief of Engineers* dated December 15, 2004. *Id.* § 8001. In this report, we refer to the plan as the "feasibility report."

⁷The program affects five states (Illinois, Iowa, Minnesota, Missouri, and Wisconsin), 77 counties, and 38 major river communities. The total estimated cost for the navigation and environmental projects is \$7.9 billion.

⁸NESP did not receive funding in fiscal years 2011 through 2017. In fiscal year 2018, the Corps funded an economic review of NESP, which was completed in 2019. The Corps used funding provided in fiscal year 2020 to continue design activities on projects already initiated as well as beginning design activities for several new projects.

headquarters, division, and district officials overseeing the program about any challenges they identified, their perspective on actions needed to further implement the program, and steps they have taken to mitigate challenges.

We conducted this performance audit from June 2020 to January 2021 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our finding and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Navigation on the Upper Mississippi River System

The Upper Mississippi River navigation system has been the historical export outlet for much of the agricultural production of the Upper Midwest. Five of the nation's top agricultural production states—Illinois, Iowa, Minnesota, Missouri, and Wisconsin—have generally relied on the river system as their principal conduit for export-bound agricultural products. Commodities, such as corn and soybeans, are transported along the river by a collection of barges and towboats. Dams hold water back and form deeper navigation pools along the river system.⁹ The dams allow commercial barges and recreational boats to use a series of locks to step up or down the river from one pool to another.

The Corps built most of the locks and dams within the Upper Mississippi River system in the 1930s.¹⁰ Most of them were originally designed to accommodate 600-foot-long barge transports. Since then, standard transports have grown to over 1,100 feet—nearly the length of four football fields. A modern commercial river transport consists of 15 barges and a towboat and can haul the equivalent of 1,050 semi-trucks (26,250 tons, 937,387 bushels of corn) or 240 rail cars. These transports must traverse locks using a time-consuming, two-step process in which a transport must be split to move through the lock. The first three rows of barges—nine total barges—move through the lock first, followed by the remaining two rows of barges and the towboat. (See fig. 1.) The two-step process has resulted in significant delays and economic losses.¹¹

⁹Dams along the Upper Mississippi River system are for navigation purposes rather than flood control.

¹⁰The Corps is one of the world's largest public engineering, design, and construction management agencies.

¹¹According to a Corps report, the two-step process can take approximately 1.5 to 2 hours. A 15-barge transport can traverse a larger, 1,200-foot lock in approximately 0.5 to 1 hour. The Corps reported that delays at Locks 22 to 25 have cost \$35 million annually.

Figure 1: Towboat and Barges at Lock and Dam 15 in Rock Island, Illinois

The size of transports (groups of barges towed together) has increased, since most locks were constructed in the 1930s, and most modern transports must be split up to traverse locks.



Source: U.S. Army Corps of Engineers. | GAO-21-240R

Upper Mississippi River System Ecosystem

The Upper Mississippi River system consists of 2.5 million acres of aquatic, wetland, forest, grassland, and agricultural habitats. This ecosystem supports hundreds of species of birds, mammals, amphibians and reptiles, fish, and mussels. For example, more than 40 percent of North America's migratory birds depend on the food resources, shelter, and nesting habitats that the system provides. The ecosystem also supports recreational activities, including boating, fishing, and sightseeing. Figure 2 depicts a recreational area on the Upper Mississippi River. However, according to the Corps' 2004 feasibility report, the environmental quality of the river system has declined, in part, from construction and operation of the navigation system.¹² Human activities have led to backwater and secondary channel sedimentation and loss of habitats and floodplain connectivity, as well as impeded fish migration—contributing to a decline in species abundance and diversity. Other ecological stressors have included land use changes, floodplain development, and pollution.¹³

¹²According to a Corps report, environmental quality is an assessment of ecosystem completeness and diversity.

¹³Land use changes include agricultural development and navigation improvements along the river system. According to a Corps report, logging or flooding of floodplain forests, draining of wetlands, building of levees, and plowing of prairies have caused a direct reduction in the amount and diversity of available aquatic and terrestrial habitat.

Figure 2: U.S. Army Corps of Engineers Managed Recreation Area on the Mississippi River near Hull, Illinois



Source: U.S. Army Corps of Engineers. | GAO-21-240R

Process for Funding Corps Projects

Congress generally provides appropriations to the Corps at the account level rather than for specific projects.¹⁴ The Corps funds studies, and preconstruction engineering and design work using its general investigations account and funds new and ongoing design and construction using its construction general account. Reports accompanying appropriations acts, such as conference reports or explanatory statements, generally identify specific Corps projects and programs to receive appropriated funds.¹⁵ Since 2014, Congress has also specified the number of new construction starts the Corps can initiate in a given fiscal year. Once the Corps receives an appropriation, Corps districts identify and submit priority projects to the division to be considered among other division priorities. Divisions submit their priorities to headquarters for consideration. Corps headquarters submits its recommendation to the Assistant Secretary of the Army for Civil Works and the Office of Management and Budget for further coordination and determination of project funding allocations.

When the planning phase is complete and funds are specifically appropriated and allocated, the project enters the preconstruction engineering and design phase.¹⁶ According to Corps officials, Congress must identify projects as new construction starts and provide construction-specific funding for the projects to move from the preconstruction engineering and design phase to the

¹⁴The Corps' nine Civil Works accounts are (1) Construction, (2) Investigations, (3) Operation and Maintenance, (4) Regulatory Program, (5) Mississippi River and Tributaries, (6) Expenses, (7) Flood Control and Coastal Emergencies, (8) Formerly Utilized Sites Remedial Action Program, and (9) the Assistant Secretary of the Army (Civil Works). Congress provides the majority of the Corps' funding to two accounts—Construction, and Operation and Maintenance.

¹⁵NESP projects have not been identified in this manner.

¹⁶Preconstruction engineering and design activities include planning studies and detailed technical studies and designs—such as environmental impact studies—needed to begin construction. For purposes of this report, we refer to these studies as “design activities.”

construction phase. Once projects are in the construction phase, the Corps may be required to share their costs between its construction general account and other funds or nonfederal sponsors.¹⁷

The Corps Proposed an Implementation Plan and Identified Projects for NESP in the Upper Mississippi River System, but Funding Was Not Provided for Several Years

The Corps has taken some steps to implement NESP in support of navigation improvement and ecosystem restoration, with limited funding. The Corps identified 24 navigation and 1,010 ecosystem projects at an estimated program cost of \$7.9 billion. The Corps initiated design activities for 47 navigation and ecosystem projects but discontinued work from fiscal years 2011 through 2017 because funding was not provided. From fiscal years 2005 through 2020, the Corps allocated about \$65 million to support NESP activities.

The Corps' Implementation Plan Includes More Than 1,000 Navigation and Ecosystem Projects at an Estimated Cost of \$7.9 Billion

The Corps' 2004 feasibility report identified more than 1,000 navigation and ecosystem projects at an estimated program cost of \$7.9 billion.¹⁸ To address NESP's navigation improvement goals, the report proposed a staggered implementation plan for navigation projects to be completed throughout a 50-year period. The report identified 24 navigation projects that consist of small- and large-scale efforts to help alleviate current commercial traffic delays and improve navigation infrastructure, at an estimated cost of \$2.6 billion. For example, the Corps is to implement small-scale projects to reduce time spent moving through the locks and reduce delays. These projects include mooring facilities that allow barge transports to wait closer to the lock chamber during the two-step process to traverse the lock.¹⁹ These small-scale projects can be constructed within 2½ years. Large-scale projects include constructing seven new 1,200-foot locks or extending five 600-foot locks to 1,200 feet to accommodate the larger modern transports. The feasibility report indicated that, once initiated, these large-scale projects can take a decade or longer to complete.

To address ecosystem restoration under NESP, the Corps' 2004 feasibility report proposed an initial 15-year plan to implement 225 of the 1,010 ecosystem restoration projects, with the remainder to be carried out through the life of the program. The feasibility report states that the 1,010 ecosystem restoration projects are intended to restore, protect, and enhance the environment of the Upper Mississippi River system. These ecosystem projects are estimated to cost \$5.3 billion, the first 15 years of which are expected to cost nearly \$1.5 billion. The report identified an array of ecosystem management and restoration measures. These include island building and protection, shoreline protection, fish passage construction, floodplain restoration,

¹⁷For example, the federal government and the Inland Waterways Trust Fund share most costs for inland waterway construction and major rehabilitation. Nonfederal sponsors generally provide land or share construction costs for projects to reduce flood risks or restore ecosystems.

¹⁸In WRDA 2007, Congress authorized just over \$2.2 billion in navigation improvement projects and approximately \$1.72 billion for ecosystem restoration projects under NESP. Water Resources Development Act of 2007, Pub. L. No. 110-114, §§ 8003(a)(2), (b)(2), 8004(f)(1). In addition, WRDA 2007 also authorized \$10.4 million per fiscal year to carry out an ecosystem monitoring program. *Id.* § 8004(f)(4). According to Corps officials, the estimated program cost of \$7.9 billion is in 2004 dollars and would likely be larger today.

¹⁹Moorings are tie-off facilities that allow the next barge transport to wait near the lock.

water level management,²⁰ and backwater and side channel restoration.²¹ The Corps expects the 225 projects in the initial 15-year plan to provide benefits to about 105,000 acres of ecosystem. The Corps is to implement an adaptive management strategy to carry out the ecosystem restoration projects.²²

The Corps Initiated Design Activities for 47 NESP Projects, but Projects Did Not Receive Funding for Several Years

Corps data indicate that the Corps initiated design activities for 41 NESP projects in fiscal years 2005 through 2010 and for an additional six projects in fiscal year 2020. From fiscal years 2011 through 2017, the Corps did not conduct work on the 41 projects because the program did not receive funding, given other priorities.

Among the projects initiated in 2005 through 2010 were 10 navigation projects that include mooring facilities at three lock and dam sites and three lock improvement projects. During the same period, the Corps also initiated design activities for 31 ecosystem projects throughout the Upper Mississippi River system. According to Corps data, the Corps has completed between 2 and 90 percent of designs necessary to begin construction for the navigation and ecosystem projects.²³ The program initiated additional design activities for one navigation project and five ecosystem projects in fiscal year 2020. Table 1 shows the number of NESP projects planned and initiated.

²⁰Water-level management includes maintaining water levels in the channel to support commercial navigation, modifications of the dam operating procedures for environmental benefits, or managing water levels in isolated areas on the floodplain.

²¹Backwater habitats support many popular sport fish, waterfowl, shorebirds, and wading birds. Side channels provide off-channel habitat that shelters fish and other animals from the harsh conditions of the main channel.

²²According to a Corps report, adaptive management is a process that seeks to aggressively use management intervention as a tool to strategically probe the functioning of an ecosystem. Management measures are designed to test key hypotheses about the structure and functioning of the ecosystem. Adaptive management identifies uncertainties and then establishes methodologies to test hypotheses concerning those uncertainties. It uses management actions as tools to not only change the system but as tools to learn about the system.

²³Corps officials said that they will reevaluate the status of these designs as they restart specific projects.

Table 1: Number of Projects Planned and Initiated in the U.S. Army Corps of Engineers' (Corps) Navigation and Ecosystem Sustainability Program (NESP)

	Number of projects identified ^a	Initial 15-year plan ^b	Projects initiated in FY2005-2010 ^c	Projects initiated in FY2020 ^d
Navigation projects	24	N/A	10	1
Ecosystem projects	1,010	225	31	5
Total	1,034	225	41	6

Source: GAO analysis of Corps information. | GAO-21-240R

Note: In 2007, Congress formally authorized navigation improvements and ecosystem restoration along the Upper Mississippi River system in accordance with the Corps' 2004 feasibility report. The dual-purpose program is to be implemented over a 50-year period.

^aThe Corps' 2004 feasibility report identified a range of projects to be implemented throughout a 50-year period.

^bThe feasibility report specified projects that were to be carried out in NESP's initial 15 years.

^cInitiated projects are those that have begun preconstruction engineering and design activities.

^dNESP did not receive funding in fiscal years (FY) 2011 through 2017. In FY 2018, the Corps funded an economic review of NESP, which was completed in 2019. The Corps used funding provided in FY 2020 to continue design activities on projects already initiated, as well as beginning design activities for several new projects.

The Corps Has Allocated Approximately \$65 Million to Support NESP Design Activities

In fiscal years 2005 through 2020, the Corps allocated about \$65 million in general investigation funds to support NESP activities.²⁴ According to Corps data, the Corps funded design activities for 41 navigation and ecosystem projects from fiscal years 2005 through 2010, spending approximately \$60 million on these projects.²⁵ In fiscal year 2018, the Corps allocated \$1 million to update the economic analysis for navigation projects, which was completed in December 2019. The Corps also allocated \$4.5 million in its fiscal year 2020 work plan to advance designs and studies under NESP: \$3.0 million for navigation projects and \$1.5 million for ecosystem projects. Initiated NESP projects and their design status are listed in enclosure II.

Corps officials told us they selected NESP projects for funding based on the projects' ability to be construction ready by fiscal year 2021 and the expected return on investment.²⁶ According to Corps officials, they are using fiscal year 2020 funding for NESP to prepare 10 projects that could be ready for construction within a year.²⁷ For example, the Corps is pursuing a small-scale navigation project at Lock 25, located on the Mississippi River between Missouri and Illinois, specifically related to the existing river wall. The Corps will also focus on the Twin Islands shoreline erosion protection project on the Illinois River, which has 65 percent of its design complete, and will continue planning and design activities on other projects.²⁸ According

²⁴The Corps uses funds from its investigations account to conduct design and engineering activities. Other types of activities, such as construction or operation and maintenance, use funds from one of the other eight accounts.

²⁵There are also four program management-related projects.

²⁶Corps officials said that a project's return on investment is calculated using benefit-cost ratios. According to Corps officials, for navigation projects, this calculation can include the potential life, property, or economic loss. The Corps has developed an ecosystem restoration return on investment process that considers the ecosystem as a provider of goods and services.

²⁷According to Corps data, projects include three navigation and seven ecosystem projects. The Corps initiated design activities for two navigation projects and two ecosystem projects prior to 2011; the remaining projects were newly initiated in fiscal year 2020.

²⁸Physical effects generated by commercial navigation traffic, such as drawdown, waves, return flow, propeller jets, and disturbed local flows have the potential to produce erosion. Bank erosion caused by commercial navigation could be significant in mooring areas, some lock approach and waiting areas, and in some very narrow channel reaches.

to these officials, construction of these navigation and ecosystem restoration projects could start within the first year following receipt of construction funds. See enclosure III for a time line of NESP activities.

The Corps Identified Several Challenges in Implementing NESP and Has Taken Some Steps to Mitigate Them

Corps officials have identified several challenges in implementing NESP—including funding, cost-sharing requirements, and partnership agreements—and have taken some steps to mitigate these challenges.

Corps officials noted that the gap in funding for NESP in fiscal years 2011 through 2017 made it challenging to implement NESP projects. According to Corps data and officials, while the Corps allocated funding to NESP from fiscal years 2005 through 2010, the program did not receive funding in fiscal years 2011 through 2017. Officials said that NESP projects did not receive funding in those years in part because the Corps identified other projects as higher priorities. Rock Island District officials said they discontinued design activities on NESP projects during those years.

According to Rock Island District officials, they took several steps to help ensure that NESP could be implemented when funds were made available. For example, while NESP did not receive specific funding from fiscal years 2011 through 2017, the Corps reprogrammed funds from other projects to update and validate project costs and help ensure that the program remained active and ready to resume design activities.²⁹ Officials also noted that they retained information on NESP project design activities conducted before 2011, which allowed them to quickly resume design activities when funding was provided.

Corps officials also indicated that cost-sharing requirements will make it challenging to begin construction on NESP navigation projects. Corps officials told us that many NESP navigation projects will require cost-sharing between the Corps' appropriated funds and the Inland Waterways Trust Fund (Trust Fund) once projects move from the design phase to construction.³⁰ Congress has generally required that costs of waterway construction and major rehabilitation be paid with 50 percent of the funds coming from the Corps and 50 percent from the Trust Fund.³¹ However, according to headquarters officials, the Trust Fund did not have funds available to support new construction for NESP projects, given other priorities. Corps headquarters officials said that funding availability from the Trust Fund would make NESP projects a higher priority for Corps construction funding. To ensure that NESP projects are

²⁹The Corps may reprogram funds among projects, according to Corps officials. Reprogramming is defined as shifting funds among projects within an appropriation account, which agencies may generally do as part of their duty to manage their funds. GAO, *A Glossary of Terms Used in the Federal Budget Process*, [GAO-05-734SP](#) (Washington, D.C.: September 2005), at 85.

³⁰The Water Resources Development Act of 2020, enacted in December 2020, changes the cost share requirement for construction of navigation projects from 50-50 to 65-35, with 35 percent of costs to be paid from the Trust Fund. Pub. L. No. 116-260, div. AA, § 109, 134 Stat. 1182, 2624. According to Corps officials, as of January 2021, they have not developed guidance to implement this change.

³¹The Trust Fund is used to fund new construction and major rehabilitation of locks and dams as well as other channel and waterway improvements. It is funded through a 29-cent tax on fuel used in commercial transportation on inland waterways.

ready to begin construction when Trust Fund resources become available, Corps officials said that they are using general investigation funds to complete NESP project design activities.

Corps officials said it is challenging to establish agreements with nonfederal sponsors for NESP ecosystem projects because of uncertainty with program funding and the time it takes to execute these agreements.³² According to Corps officials, nonfederal sponsors may be reluctant to enter into agreements that require their financial commitment to a project while NESP experiences funding uncertainty. In addition, Rock Island District officials said that it can take the Corps 6 to 18 months to secure agreements with sponsors. There are two types of agreements, depending on the level of involvement from the nonfederal sponsor. The first type of agreement is a project partnership agreement, which is to be executed before the Corps begins the project design, according to Corps officials. According to headquarters officials, 15 to 20 percent of NESP ecosystem projects will require this type of agreement, which commits nonfederal sponsors to sharing 35 percent of the project costs, typically through the purchase of land for the project. These project partnership agreements can take up to 18 months to put in place because they can require land acquisitions and other long-term commitments.

Corps officials also said that the federal government will fully fund the remaining 80 to 85 percent of NESP's ecosystem projects. However, some of these ecosystem restoration projects may require the Corps to enter into the second type of agreement, binding a nonfederal sponsor to cover the costs of ongoing operation and maintenance once the project is complete. This will require a memorandum of agreement with the sponsor for operation and maintenance requirements, which can take 6 months to put in place.

Corps officials said that they have managed this challenge by prioritizing projects that do not require the project partnership agreements through the construction phase.³³ They have pursued projects in fiscal year 2020 that can begin the design phase without the commitment of a nonfederal partner. However, according to Corps officials, four of the five projects will require a memorandum of agreement with a nonfederal sponsor to perform ongoing operation and maintenance once the project is complete. Corps officials said that nonfederal sponsors have supported NESP since its initiation and that the Corps' established relationships with such sponsors are likely to make executing these agreements easier. However, Corps officials also said that before committing to these agreements, nonfederal sponsors need to have confidence that the federal government will fund these projects.

Agency Comments

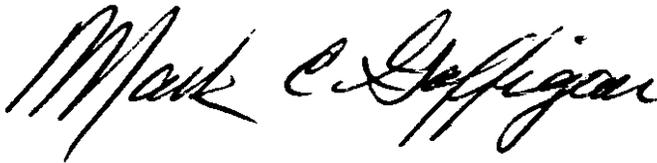
We provided a draft of this report to the Department of Defense for review and comment. We received technical comments from the Department of Defense, which we incorporated as appropriate.

³²Nonfederal sponsors can include tribes, counties, states, or local governments.

³³According to Corps officials, the initial five ecosystem projects were selected because they were the most advanced when the district left off its work in 2010. They also considered the return on investment when selecting these projects.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense, the Assistant Secretary of the Army for Civil Works, the Chief of Engineers and Commanding General of the U.S. Army Corps of Engineers, and other interested parties. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or gaffiganm@gao.gov. Contact points for our Offices Congressional relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report include Anne-Marie Fennell (Director), Vondalee R. Hunt (Assistant Director), John W. Hocker (Analyst-in-Charge), Cindy Gilbert, Gwen Kirby, Tricia Moye, and Dan Royer.

A handwritten signature in black ink that reads "Mark C. Gaffigan". The signature is written in a cursive, flowing style.

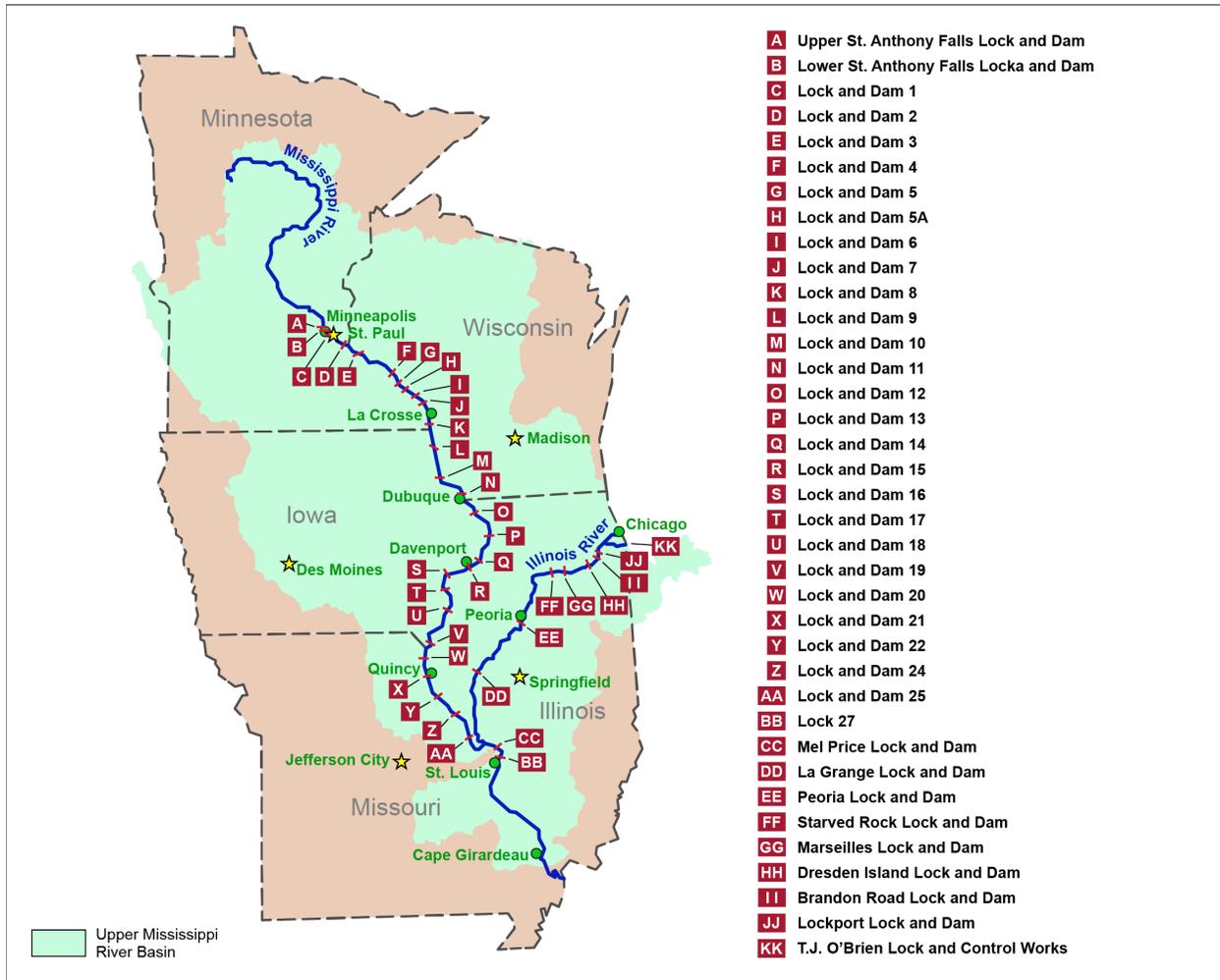
Mark Gaffigan

Managing Director, Natural Resources and Environment

Enclosures – 3

Enclosure I: Map of the Upper Mississippi River Basin and Locks and Dams

Figure 3: Map of the Upper Mississippi River Basin and Locks and Dams Operated by the U.S. Army Corps of Engineers



Sources: U.S. Army Corps of Engineers information; Map Resources (map). | GAO-21-240R

Enclosure II: NESP Project Design Completion and Funding for Fiscal Years 2005 through 2020

Table 2: Navigation and Ecosystem Sustainability Program (NESP) Project Design Completion and Funding for Fiscal Years 2005 through 2020

Project	Funding^a (dollars)	Percent of design completed^b
Ecosystem projects	\$25,292,567	-
Adaptive Management Administration	6,073,311	10
Lock and Dam 22 – fish passage	4,425,116	35
Lock and Dam 26 – fish passage	2,390,935	5
Upper Mississippi River system planning	2,347,404	25
Cultural stewardship	1,192,055	10
Pool 18 – water level management	1,070,708	10
Herculaneum – wing dam/dike alteration	958,464	35
Lock and Dam 25 – dam point control	851,580	5
Buffalo Island – side channel	731,554	10
Forestry management	723,645	15
Lock and Dam 8 – lower dam embankment	578,470	10
Island shoreline protection	562,126	10
Backwater restoration (dredging)	541,266	35
Pool water level management	471,048	10
Fleeting plan	417,291	10
Pool 5 – water level management	393,045	10
Emiquon West, IL – floodplain restoration	281,747	10
Pool 2 – wing dam/dike alteration	254,844	65
Pool 11 – island building	239,622	5
Restoration report to Congress	131,792	20
Illinois Waterway – reduce water level	123,439	5
Schenimann Chute – side channel	93,790	35
Pool 9 – water level management	89,691	10
Twin Island – shoreline protection	78,431	65
Root River, MN – floodplain restoration	76,389	10
Starved Rock	65,160	65
Floodplain restoration	44,858	2
Pierce County, WI – floodplain restoration	27,751	10
Lock and Dam 3 – lower dam embankment	26,849	10
Alton Pool	25,402	65
Maple Island – side channel	1,017	2
Illinois Waterway	957	2
Peoria Islands	722	65
Iowa River – backwater restoration	709	2
Lead Chute – backwater restoration	709	2
Long Island	674	65

Project	Funding^a (dollars)	Percent of design completed^b
Navigation projects	32,139,046	-
Lock and Dam 25 – new 1,200' lock	13,318,075	45
Lock and Dam 22 – new 1,200' Lock	9,275,414	40
Monitoring and evaluation	4,892,561	10
System mitigation	1,887,410	5
Lock and Dam LaGrange – new 1,200' lock	1,716,084	10
Lock and Dam 14 – mooring cell	328,726	90
Switchboats – Phase 1	320,596	10
Lock and Dam LaGrange – mooring cell	187,771	35
Appointment scheduling system	131,056	10
Lock and Dam 24 – mooring cell	57,322	10
Moore's Towhead - mitigation	24,032	65
Programmatic projects	7,233,657	-
Program management	4,953,447	10
Public involvement	1,105,154	10
Feasibility efforts	749,346	100
Institutional arrangements	425,710	25
Fiscal years 2005-2020 total	64,665,270	-

Source: GAO analysis of U.S. Army Corps of Engineers data. | GAO-21-240R

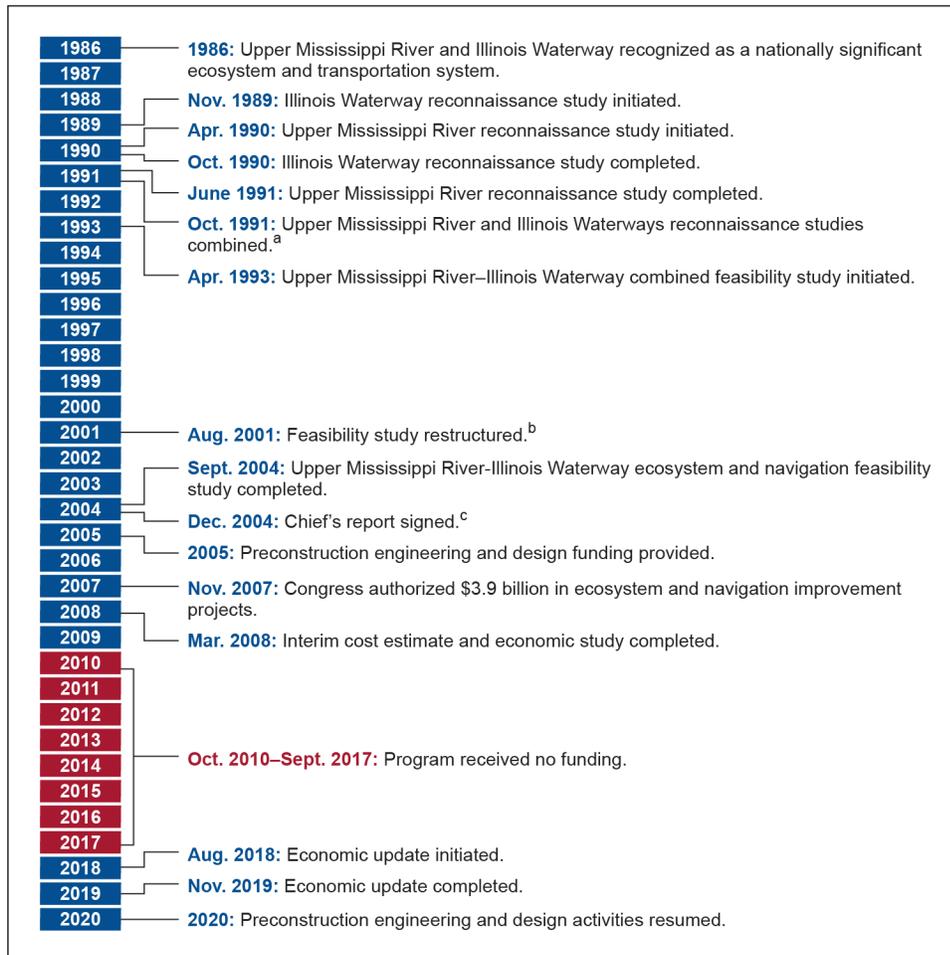
Note: In 2007, Congress formally authorized navigation improvements and ecosystem restoration along the Upper Mississippi River system in accordance with the U.S. Army Corps of Engineers' (Corps) feasibility 2004 report. The Corps has identified 23 navigation and 1,010 ecosystem projects to be carried out under the program. The dual-purpose program is to be implemented over a 50-year period.

^aTotals may not sum due to rounding.

^bPercentage reflects project status as of October 2020. The Corps plans to reevaluate projects prior to beginning construction.

Enclosure III: Time Line of NESP Activities

Figure 4: Time Line of Navigation and Ecosystem Sustainability Program (NESP) Activities, 1986-2020



Source: GAO analysis of U.S. Army Corps of Engineers Information. | GAO-21-240R

Note: In 2007, Congress formally authorized navigation improvements and ecosystem restoration along the Upper Mississippi River system in accordance with the U.S. Army Corps of Engineers’ (Corps) feasibility 2004 report. The Corps has identified 23 navigation and 1,010 ecosystem projects to be carried out under the program. The dual-purpose program is to be implemented over a 50-year period.

^aThe two studies were combined to provide a system approach in solving navigation problems common to both rivers.

^bThe restructured feasibility study focused on the authorized federal navigation projects on the Upper Mississippi River system (including the Illinois Waterway) and the ecological and floodplain resources that are affected by these navigation projects. The objectives of this restructured feasibility study were to relieve lock congestion, achieve an environmentally sustainable navigation system, and address ecosystem and floodplain management needs related to navigation in a holistic manner.

^cA Chief’s report is a letter from the Chief of the U.S. Army Corps of Engineers to the authorizing Senate and House committees of the conclusions and recommendations of the feasibility study.

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