



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SOUTH ATLANTIC DIVISION
60 FORSYTH STREET SW, ROOM 10M15
ATLANTA, GA 30303-8801

CESAD-PDP (1105)

15 August 2022

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Mobile District,
109 St. Joseph Street, Mobile, AL 36602

SUBJECT: Approval of Review Plan for the Claiborne and Millers Ferry Locks and Dams
Fish Passage Study, Alabama River, Alabama

1. References:


a. Mobile District, CESAM-PM-C memorandum (Approval of Review Plan for the Claiborne and Millers Ferry Locks and Dams Fish Passage Study, Alabama River, Alabama), 7 July 2022.

b. HQUSACE, CECW-P memorandum (Revised Delegation of Authority in Section 2034(a)(5)(A) of the Water Resources Development Act of 2007 (WRDA 2007), as amended (33 U.S.C. 2343)), 7 June 2018.

2. Mobile District prepared the review plan for the Claiborne and Millers Ferry Locks and Dams Fish Passage Study consistent with EC 1165-2-217. Mobile District coordinated the review plan and request for exclusion from Independent External Peer Review (IEPR) with the National Planning Center of Expertise for Ecosystem Restoration (ECO-PCX), which is the lead office to execute this review plan. For further information, contact Ms. Katie Opsahl, ECO-PCX account manager for South Atlantic Division, at (651) 290-5259.

3. I approve this review plan and the request for exclusion from IEPR. The approved review plan is subject to change as circumstances require, consistent with study development under the project management business process. Subsequent revisions to this approved review plan due to significant changes in the study or level of review will require new written approval from this office.

4. The point of contact for this action is David Bauman, CESAD-PDP, at (404) 562-5202 or David.J.Bauman@usace.army.mil.


JASON E. KELLY, PMP
Brigadier General, USA
Commanding

**CLAIBORNE AND MILLERS FERRY LOCKS & DAMS FISH
PASSAGE STUDY
SECTION 216 – REVIEW OF COMPLETED PROJECTS
REVIEW PLAN**

Prepared: June 2022

OVERVIEW

Project Name: Claiborne and Millers Ferry Locks and Dams Fish Passage Study (Alabama River, Alabama)

P2 Number: 488519

Decision Document Type: Feasibility Report

Project Business Line: Ecosystem Restoration

District: Mobile District

District Contact: Project Manager, (251) 690-2243; Lead Planner, (251) 694-4637

Major Subordinate Command (MSC): South Atlantic Division

MSC Contact: 678-526-3048

Review Management Organization (RMO): Ecosystem Restoration National Planning Center of Expertise (ECO-PCX)

RMO Contact: ECO-PCX Account Manager, 651-290-5259

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: 21 June 2022

Date of MSC Approval of Review Plan: 15 Aug 2022

Date of IEPR Exclusion Approval: 15 Aug 2022

Has the Review Plan changed since RMO Endorsement? No

Date of Last Review Plan Revision: None

Date of Review Plan Web Posting: September 2022

Date of Congressional Notifications: Pending

Milestones and Other Key Dates

Milestone	Scheduled	Actual	Compete
FCSA Execution	30 NOV 2021	23 NOV 2021	Yes
Alternatives Milestone	24 FEB 2022	24 FEB 2022	Yes
Tentatively Selected Plan	MAR 2023	-	-
Release Draft Report to Public	MAY 2023	-	-
Agency Decision Milestone	AUG 2023	-	-
Final Report Transmittal	JUL 2024	-	-
Senior Leaders Briefing	OCT 2024	-	-
Chief's Report	NOV 2024	-	-

Project Fact Sheet

June 2022

Project Name: Claiborne and Millers Ferry Locks and Dams Fish Passage Study (Alabama River, Alabama)

Location: Alabama River, Alabama
Claiborne Lock and Dam - Clarke, Monroe, & Wilcox Counties, Alabama;
Alabama River, river mile 72.5
Millers Ferry Lock and Dam - Dallas and Wilcox Counties, Alabama; Alabama River, river mile 133.0

Authority: This study is authorized by Section 216 of the Flood Control Act of 1970 (33 U.S.C. 549a) for “investigations for modification of completed projects or their operations when found advisable due to significantly changed physical or economic conditions and for improving the quality of the environment in the overall public interest.”

Sponsor: The Nature Conservancy (TNC)

Type of Study: Feasibility Study

SMART Planning Status: 3x3x3 Compliant

Project Area: The Project Area is part of the Alabama-Coosa-Tallapoosa (ACT) River Basin extending from the Alabama River “below” (i.e., downstream) Claiborne Lock and Dam to the Millers Ferry pool “above” (i.e., upstream) Millers Ferry Lock and Dam. The Project Area extends approximately 165 river miles and includes two lock and dam structures located within the project reach, Claiborne Lock and Dam and Millers Ferry Lock and Dam.

The Claiborne Project is the southernmost lock and dam on the Alabama River and was constructed between 1966 and 1970. The project is primarily a navigation structure, but also reregulates the peaking power releases from the upstream Millers Ferry Project. Other project purposes include water quality, recreation, and fish and wildlife conservation and mitigation. There is no flood risk management storage for this project.

Millers Ferry is upstream of the Claiborne Project on the Alabama River and was constructed between 1964 and 1970. The project purposes include hydropower and navigation. Other project purposes include recreation, water quality and fish and wildlife conservation and mitigation. There is no flood risk management storage for this project.

Problem Statement: Loss of habitat connectivity from below Claiborne L&D to the Cahaba River above Millers Ferry L&D is causing a decline in native aquatic species populations. There is restricted longitudinal habitat connectivity for fish movements through the locks and dams. Spawning habitat in the lower Alabama River and the Cahaba River has been cut off. Millers Ferry and Claiborne locks and dams have disrupted natural fish migration patterns resulting in increased threat to species survival. These ecosystems can be characterized by lateral (river/floodplain), longitudinal (upstream/downstream), vertical and temporal relationships. A “healthy” river maintains its

connectivity as determined by the geomorphologic characteristics of the watershed. These physical connections allow river ecosystems to be resilient to external stresses within a certain range of natural variation, maintaining a self-sustaining condition of the ecosystem. Disruption of these relations can lead to degradation of the river ecosystem and a decline in native populations in the river.

Federal Interest: Section 216 of the Flood Control Act of 1970 authorizes the Secretary of the Army, acting through the Chief of Engineers, to review operations of completed projects, when found advisable due to changed physical, economic, or environmental conditions. The proposed project will address ecosystem restoration in what is recognized as one of the most diverse ecosystems in the United States. The two existing lock and dam structures on the lower Alabama River, Claiborne and Millers Ferry, has impeded the historical migration of numerous fish species, including several that are designated threatened or endangered such as the Alabama sturgeon.

Objectives: Specific planning objectives have been identified to reach the desired outcomes by solving the problems and taking advantage of the opportunities. These planning objectives are focused on species access and habitat biodiversity and are as follows:

1. Increase spatial distribution of aquatic species while encouraging balanced native populations in the Alabama River system.
2. Increase habitat connectivity for migration, spawning, foraging and nurseries for native fish and mussel species in the Alabama River system.
3. Restore a more natural flow regime to improve migration and post-spawning life cycle requirements.

Inventory and Forecast:

Existing Conditions: There are two existing lock and dam structures on the lower Alabama River, Claiborne and Millers Ferry. These lock and dam structures may impede migratory fish and limit the spawning habitat historically available to many species. Fish species populations have been in decline for decades.

The primary project purpose for the Claiborne Lock and Dam is navigation while the primary purposes for the Millers Ferry Lock and Dam includes both navigation and hydropower. Navigation use at both facilities is largely recreational. Neither structure provides flood risk management storage.

The Mobile-Tensaw Delta and the Cahaba River are nationally recognized as significantly diverse ecosystems. The aquatic ecosystem is considered impaired, impacting several species including some designated as threatened or endangered. The Claiborne and Millers Ferry Lock and Dam structures have created a loss of connectivity between the Gulf of Mexico, Mobile Bay, the Mobile-Tensaw Delta and critical aquatic spawning habitat in the Alabama and Cahaba Rivers. There are declining populations for several fish species, including the Alabama Sturgeon and the Gulf Sturgeon. In addition, the structures act as sediment transport barriers, resulting in a sediment rich system upstream and sediment deprivation downstream.

Future without project condition (FWOP): The locks and dams will continue to impede migratory fish and limit spawning areas historically available to many species. Fish species populations will

continue to decline, and increased severe weather events, such as droughts and floods may limit the ability to support flow rates needed to facilitate fish migration.

Potential temperature increases associated with climate change may further affect native species populations. Increased droughts and floods associated with climate change may limit the systems' ability to support the flow rates needed to facilitate fish migration. Continued land use changes will exacerbate water quality issues in the river. Sediment will be blocked from replenishing the sediment deprived systems downstream resulting in additional habitat losses.

Future with project condition: A successful project would improve fish passage of migratory fish species and mussel populations that depend on fish movement for dispersal in the lower Alabama River and restore connectivity of historical migratory pathways for fish species between the significantly diverse ecosystems of the Cahaba River, the Lower Alabama River, and the Mobile-Tensaw Delta.

Potential measures: Potential measures include both structural and non-structural measures. Structural measures may include fish ladders, natural bypass channels, lock and dam modifications, or dam removal(s). Non-structural measures may include conservation locking operational changes or trap and haul operations.

Risk Identification: At this time, the District Chief of Engineering assumes that life safety concerns are not likely due to low and low to moderate risk considerations presented in existing Periodic Assessment Reports for Claiborne Lock & Dam and Millers Ferry Lock & Dam, respectively. A summary of risk considerations for both Claiborne Lock & Dam and Millers Ferry Lock & Dam are provided below.

Claiborne Lock & Dam: A review of existing documentation for Periodic Inspection and Period Assessment Reports for Claiborne Lock & Dam (2019) indicate the incremental risk associated with a dam breach is considered low. The incremental risks are primarily driven by the potential for backward erosion piping in the right abutment foundation contact and spillway Tainter gate failure due to trunnion friction. The estimated population at risk due to dam breach is zero. Additionally, personnel life loss not associated with an uncontrolled release of impounded water (i.e., loss of damming surface) is not expected at this project. There is no flood risk management storage for this project.

Based on the latest Modeling, Mapping and Consequence model screening process which considers site information, data contained in the Screening for Portfolio Risk Analysis (SPRA) report, aerial photography in the public domain, and any available existing inundation mapping and Flood Insurance Study data, life loss and significant property damage due to dam breach are very unlikely.

Claiborne Lock & Dam is categorized as Dam Safety Action Classification (DSAC) IV based on the project's latest SPRA and Periodic Assessment. A DSAC IV rating is characterized as low urgency, low incremental risk. The next Periodic Inspection and Periodic Assessment for Claiborne Lock & Dam are scheduled for June 2023 and June 2028, respectively.

Millers Ferry Lock & Dam: A review of latest available documentation for Periodic Inspection and Period Assessment Reports for Millers Ferry Lock & Dam (2013) indicate the incremental risk associated with a dam breach is considered low to moderate. The incremental risks are mostly driven

by the potential for spillway gate failure due to buckling or trunnion rod failure, and seepage and piping of embankment features.

Downstream areas are primarily rural and agricultural, and there are no major damage centers downstream, nor areas protected by levees. According to inundation mapping from Dam Break Study for Millers Ferry Lock & Dam dated July 1983, no major out-of-banks flooding will occur from a failure at Millers Ferry Dam. The areas adjacent to and downstream of the dam are rural; therefore, there is no apparent population at risk of inundation from failure. There is no flood risk management storage for this project.

Millers Ferry Lock & Dam is categorized as Dam Safety Action Classification (DSAC) IV based on the project's latest SPRA and Periodic Assessment. A DSAC IV rating is characterized as low urgency, low incremental risk. Dams in this class are inadequate with low risk such that the combination of life, economic, or environmental consequences with a probability of failure is low. The next Periodic Inspection and Periodic Assessment for Millers Ferry Lock & Dam are scheduled for January 2023 and January 2023, respectively.

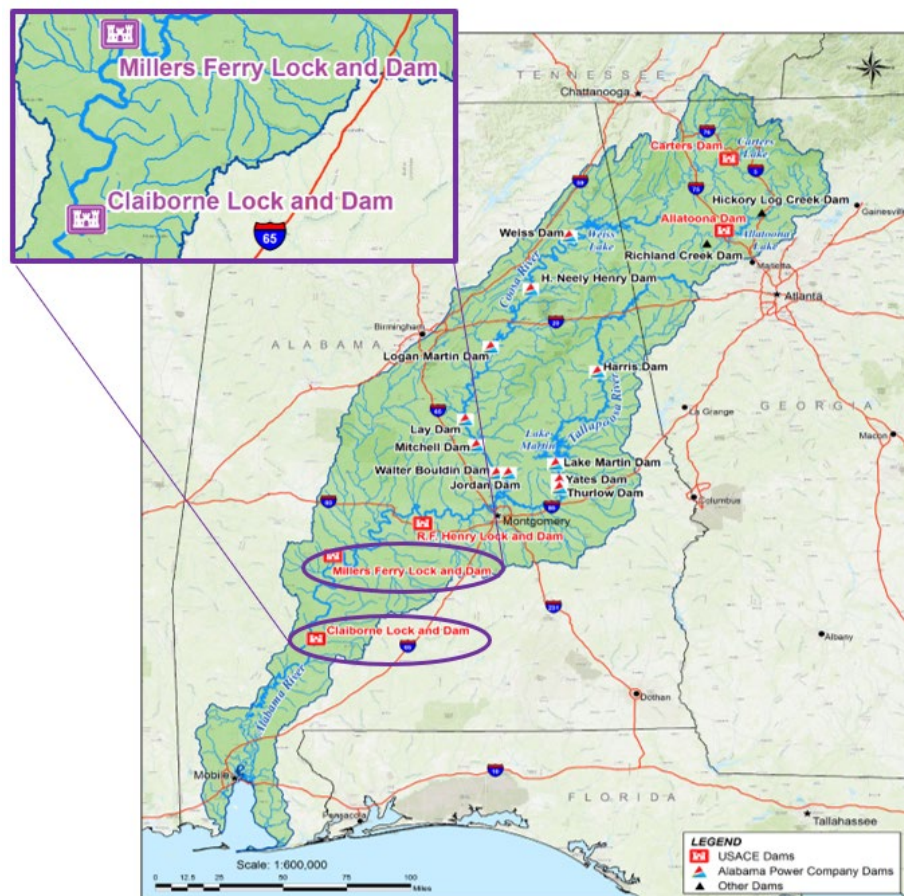


Figure 1: The study area is located from below Claiborne Lock and Dam to above Millers Ferry Lock and Dam within the Alabama – Coosa – Tallapoosa River Basin (ACT River Basin). The Project Area extends approximately 165 river miles and includes two lock and dam structures located within the project reach, Claiborne Lock and Dam (Figure 2) and Millers Ferry Lock and Dam (Figure 3).

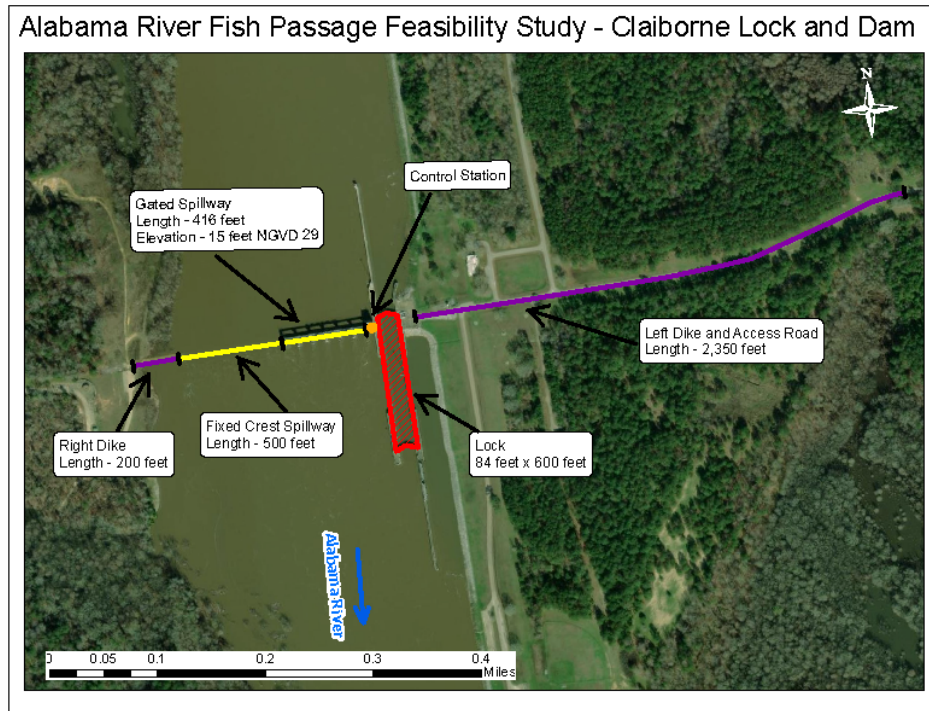


Figure 2: Claiborne Lock and Dam is located 72.5 miles above the mouth of the Alabama River in the southwestern part of Alabama.

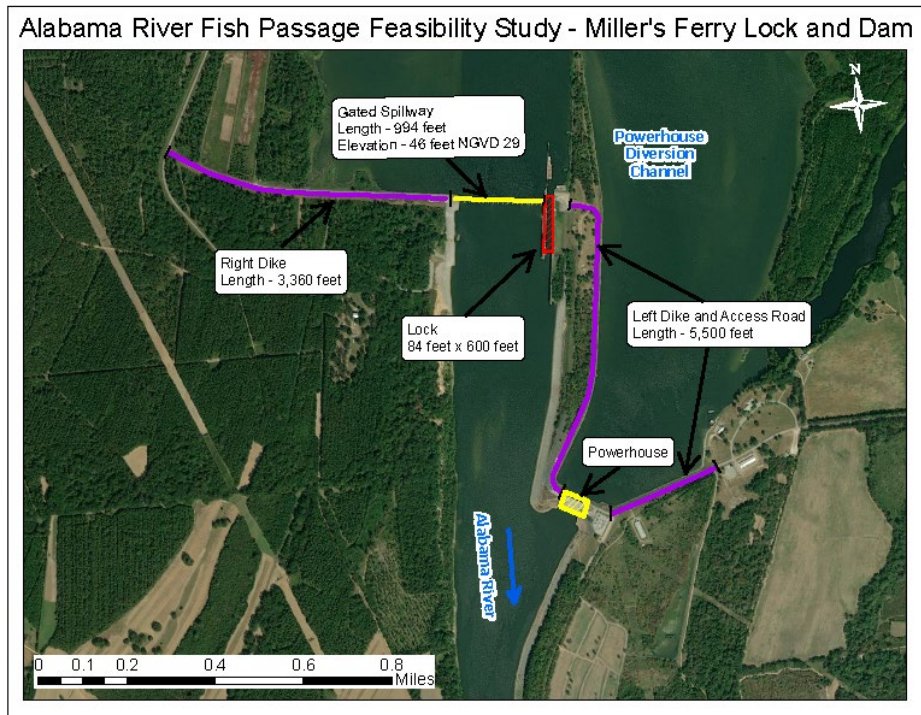


Figure 3: Millers Ferry Lock and Dam is located 133.0 miles above the mouth of the Alabama River in the southwestern part of the State of Alabama about 10 miles northwest of the city of Camden, Alabama, and 30 miles southwest of the city of Selma, Alabama.

DOCUMENTATION OF RISKS AND ISSUES

1. FACTORS AFFECTING THE LEVELS AND SCOPES OF REVIEWS

Mandatory IEPR Triggers.

IEPR is mandatory if any one of three conditions is met.

- Is the estimated total project cost, including mitigation, greater than \$200 million? The estimated project first costs for several structural alternatives being considered are estimated to be greater than \$200 million.¹
- Has the Governor of an affected state requested a peer review by independent experts? No, a peer review has not been requested by the Governor of Alabama.
- Has the Chief of Engineers determined the project study is controversial due to significant public dispute over the size, nature or effects of the project or the economic or environmental costs or benefits of the project? No, the project study has not been deemed controversial by the Chief of Engineers. The study/project is not likely to involve significant public dispute as to its size, nature or effects of the project or its economic or environmental costs or benefits as improvements to habitat connectivity are proposed at the project locations.

IEPR may be excluded according to criteria described in paragraph 6.6.1 of ER 1165-2-217. A project study subject to peer review because total costs are greater than \$200M may be excluded from IEPR if any of the following sets of conditions apply:

1. If the project study does not include an EIS and:
 - a. Is not controversial;
 - b. Has no more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources;
 - c. Has no substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures; and
 - d. Has, before implementation of mitigation measures, no more than a negligible adverse impact on a species listed as endangered or threatened species under the Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.) or the critical habitat of such species designated under such Act.

OR

2. If the project study:
 - a. Involves only the rehabilitation or replacement of existing hydropower turbines, lock structures, or flood control gates within the same footprint and for the same purpose as an existing water resources project;
 - b. Is for an activity for which there is ample experience within USACE and the industry to treat the activity as being routine; and
 - c. Has minimal life safety risk;

OR

3. If the project study:

¹ If a non-structural solution is determined to be the selected plan, then mandatory IEPR trigger related to cost may no longer be met.

- a. does not include an EIS and is being conducted under the general continuing authorities of the Continuing Authorities Program.

Level and Scope of Review.

- Will the study likely be challenging? Yes, it is anticipated that study will likely be challenging. The study covers a large area and involves analyzing and screening of alternatives at two separate existing project locations. The study area is also part of a regulated and managed river system of lock and dam structures where any changes made to a downstream project (e.g., Millers Ferry and/or Claiborne lock and dams) will have impacts on the operations of completed projects upstream. There are also a large number of interest groups and users within and near the study area that will likely have feedback on the Recommended Plan to be taken into consideration. Additionally, the number of impacted species is diverse and selecting an alternative to accommodate the needs of all or most species adds to the challenges.
- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks. While addressing the purpose of ecosystem restoration, the economics and intended project purposes associated with the two existing lock and dam structures will need to identify an economically justified plan without impacting authorized project purposes such as hydropower operations at Millers Ferry and potential for future navigation along the lower Alabama River. Additionally, the measures to be analyzed and screened during the study include lock and dam removal, which would likely encounter political opposition and require Congressional authorization.
- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? No, significant life safety issues are unlikely to be involved.
- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? No, the anticipated project design will not be based on novel methods, involve innovative materials or techniques or present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices. The methods, measures, and alternatives to be analyzed and screened are all widely used and proven to improve fish passage around locks and dams.
- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? No, the project design is not expected to require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule.
- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? No, the project is not expected to have significant adverse impacts on scarce or unique tribal, cultural, or historic resources.
- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? No, the project is not expected to have substantial adverse impacts on fish and wildlife species and their habitat.
- Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat? No, the project is not expected to have more than a negligible adverse impact on endangered or threatened species and their habitat.

Assessment of the District Chief of Engineering. The District Chief of Engineering has evaluated risks and determined there is not a significant threat to human life associated with the study or failure of the project. Therefore, a Safety Assurance Review is not called for at this time. The team will continue to assess potential safety concern and a Safety Assurance Review may be called for during design and implementation.

2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. The RMO is the designated USACE organization overseeing the quality reviews by reviewing and endorsing the RP. In addition, the RMO manages the review efforts for ATR, IEPR, or SAR. All review team members, except for DQC, will be conducted by experts outside the District who are not associated with the work being reviewed. This helps ensure independent review as required by law or USACE policy. The designated RMO will consult with appropriate allied functional offices (e.g., engineering and real estate), relevant CXs, and other offices, as needed, to help ensure that review teams with appropriate independence and expertise are assembled to accomplish cohesive and comprehensive reviews. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

District Quality Control. All decision documents and accompanying components (including data, analyses, environmental compliance documents, planning documents, draft report, and final Chief's report) will undergo DQC. DQC begins with a discipline peer review of all products developed. This level of DQC will be overseen and managed by the individual discipline's supervisory chain or discipline leads. The second level of DQC is PDT review of all decision documents and accompanying components. The PDT review is responsibility of the Project Manager, Planning Lead and Engineering Technical Lead. The third level of DQC is the official DQC review documented in the DQC report. This level of DQC is the responsibility of the PM and identified DQC Team Lead. This comprehensive internal review process covers basic science and engineering work products. It fulfills the project quality requirements of the Project Management Plan. DQC of engineering, environmental and economic models will occur once modeling of the Future Without Project Condition (FWOP) models have been completed. DQC of all decision documents and accompanying components will occur following the TSP milestone on draft documentation and again following the ADM milestone on final documentation.

Agency Technical Review. All decision documents and accompanying components (including data, analyses, environmental compliance documents, planning documents, draft report, and final Chief's report) will undergo Agency Technical Review (ATR). ATR will be performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC. ATR will occur at two points. A full ATR review of all engineering, environmental and economic decision documents and accompanying components will occur following DQC review, the TSP milestone on draft documentation, and again following the ADM milestone on final documentation.

Cost Engineering Review. All decision documents will be coordinated with the Cost Engineering Mandatory Center of Expertise (MCX). The MCX assisted in determining the expertise needed on the ATR team. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews occur as part of ATR.

Model Review and Approval/Certification. EC 1105-2-412 mandates the use of certified or approved models for all planning work to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. The ECO-PCX will review any planning models needing certification and will supply documentation supporting the use of the tool(s) in the study.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H, and Director’s Policy Memorandum 2019-01, both provide guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander.

Table 1 provides the schedules and costs for reviews. The specific expertise required for the teams are identified in later subsections of this plan covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

Table 1: Schedule and Costs of Reviews

Products to undergo Review	Review Level	Site Visit	Start Date	End Date	Cost	Complete
<i>Draft Feasibility Report / EA</i>	<i>District Quality Control</i>	<i>No</i>	<i>April 13, 2023</i>	<i>April 23, 2023</i>	<i>\$25,000</i>	<i>No</i>
<i>Draft Feasibility Report / EA</i>	<i>Agency Technical Review</i>	<i>No</i>	<i>May 2, 2023</i>	<i>June 20, 2023</i>	<i>\$35,000</i>	<i>No</i>
<i>Draft Feasibility Report / EA</i>	<i>Policy and Legal Review</i>	<i>No</i>	<i>May 2, 2023</i>	<i>July 24, 2023</i>	<i>n/a</i>	<i>No</i>
<i>Final Feasibility Report / EA</i>	<i>District Quality Control</i>	<i>N/A</i>	<i>December 20, 2023</i>	<i>January 24, 2024</i>	<i>\$25,000</i>	<i>No</i>
<i>Final Feasibility Report / EA</i>	<i>Agency Technical Review</i>	<i>N/A</i>	<i>January 25, 2024</i>	<i>February 28, 2024</i>	<i>\$40,000</i>	<i>No</i>
<i>Final Feasibility Report / EA</i>	<i>Policy and Legal Review</i>	<i>N/A</i>	<i>March 28, 2024</i>	<i>May 21, 2024</i>	<i>n/a</i>	<i>No</i>

a. DISTRICT QUALITY CONTROL

The home district will manage DQC and will appoint a DQC Lead to manage the local review (see ER 1165-2-217, Chapter 4). Table 2 identifies the required expertise for the DQC team. The DQC Team members should not be involved in the production of any of the products reviewed.

Table 2: Required DQC Expertise

DQC Team Disciplines	Expertise Required
DQC Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).
Planning	A senior water resources planner with experience in Section 216, review of completed projects and Aquatic Ecosystem Restoration.
Economics	An experienced economist that understands Cost Effectiveness-Incremental Cost Analyses (e.g. identifying Best Buy Plans); the use of RECONS model to address regional economic development (RED) associated with a project; the discussion of other social effects (OSE) associated with ecosystem restoration;

	and the environmental quality (EQ) account for justification of ecosystem restoration plans in accordance with current USACE policy.
Environmental Resources	A senior environmental resources specialist with experience with environmental evaluation and compliance requirements pursuant to the “Procedures for Implementing NEPA” (ER 200-2-2), national environmental laws and statutes, applicable Executive Orders, and other federal planning requirements for Civil Works projects, including mitigation planning.
Cultural Resources	A senior cultural resource specialist with experience with cultural resource survey methodology, area of potential effects, Section 106 of the National Historic Preservation Act, and state and federal laws/executive orders pertaining to American Indian Tribes.
Hydrology	A hydrologist with familiarity of inland hydrology climate change assessment and experience in HEC-HMS and associated one and/or two-dimensional models, floodplain delineation, risk and uncertainty analysis, and a number of other closely associated technical subjects. The hydrologic reviewer could also serve as the hydraulic reviewer.
Hydraulic Engineering	A hydraulic engineer with experience with river hydraulics, HEC-GeoRAS, HEC-RAS and associated one and/or two-dimensional models, hydrologic statistics, sediment transport analysis, channel stability analysis, risk and uncertainty analysis, dam and levee safety, and a number of other closely associated technical subjects. The hydraulic reviewer could also serve as the hydrology reviewer.
Engineering – Geotechnical	A geotechnical engineer with experience with levee and riverbank stabilization design, construction, and maintenance.
Engineering – Structural	A structural engineer with experience in dam and levee design, construction, and maintenance.
Cost Engineering	A cost engineer with experience using required cost estimation software; working knowledge of construction and ecosystem restoration; capable of making professional determinations based on experience.
Construction/Operations	A Civil/Mechanical engineer with experience in operating and maintaining navigation projects and hydropower projects, to include: maintaining navigation channels, lock operations, spillway operations, hydropower operations, and asset management.
Real Estate	A real estate specialist with experience in development of Real Estate Plans in accordance with Chap. 12, ER 405-1-12, and have experience in real estate fee/easement acquisition and residential/business relocations for Federal and/or Federally-Assisted Programs as needed for implementation of Civil Works projects.

Documentation of DQC. Quality Control will be performed continuously. A specific certification of DQC completion will be prepared at the draft and final report stages. Documentation of DQC will follow the District Quality Manual and the MSC Quality Management Plan. Dr. Checks will be used for documentation of DQC comments. An example DQC Certification statement is provided in ER 1165-2-217, Appendix D.

Documentation of completed DQC will be provided to the MSC, RMO and ATR Team leader. Documentation available at the time of ATR will be made available to the ATR Team. The team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort.

b. AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. The RMO will manage the ATR. The review will be conducted by an ATR Team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see ER 1165-2-217, Chapter 5.5.3). Table 3 identifies the disciplines and required expertise for this ATR Team (also see Attachment 1 - the ATR Team roster).

Table 3: Required ATR Team Expertise

ATR Team Disciplines	Expertise Required
ATR Lead (the ATR Lead should be from outside of the home MSC)	A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning).
Planning	A senior water resources planner with experience in Review of Completed Projects and Aquatic Ecosystem Restoration.
Economics	A senior economist with experience in Cost Effectiveness-Incremental Cost Analyses using the IWR Planning Suite tool, the RECONS model to address regional economic development (RED) associated with a project, the discussion of other social effects (OSE) associated with ecosystem restoration, and the understanding of the environmental quality (EQ) account's which display of non-monetary effects on ecological, cultural, and aesthetic resources.
Environmental Resources	A senior environmental resources specialist with experience with environmental evaluation and compliance requirements pursuant to the "Procedures for Implementing NEPA" (ER 200-2-2), national environmental laws and statutes, applicable Executive Orders, and other federal planning requirements for Civil Works projects, including mitigation planning and Fish Passage studies.
Cultural Resources	A senior cultural resource specialist with experience with cultural resource survey methodology, area of potential effects, Section 106 of the National Historic Preservation Act, and state and federal laws/executive orders pertaining to American Indian Tribes.
Hydrology	A hydrologist with familiarity of inland hydrology and experience in HEC-HMS and associated one and/or two-dimensional models, floodplain delineation, risk and uncertainty analysis, and a number of other closely associated technical subjects. The hydrologic reviewer could also serve as the hydraulic reviewer and/or climate preparedness reviewer, as applicable.
Hydraulic Engineering	A hydraulic engineer with experience with river hydraulics, HEC-GeoRAS, HEC-RAS and associated one and/or two-dimensional models, hydrologic statistics, sediment transport analysis, channel stability analysis, risk and uncertainty analysis, and a number of other

	closely associated technical subjects. The hydraulic reviewer could also serve as the hydrology reviewer.
Engineering – Geotechnical	A geotechnical engineer with experience with levee and dam safety, design, construction, and maintenance.
Engineering – Structural	A structural engineer with experience in levee and dam safety, design, construction and maintenance.
Cost Engineering	A cost engineer with experience using required cost estimation software; working knowledge of construction and ecosystem restoration; capable of making professional determinations based on experience.
Construction/Operations	A Civil/Mechanical engineer with experience in operating and maintaining navigation projects and hydropower projects, to include: maintaining navigation channels, lock operations, spillway operations, hydropower operations, and asset management.
Real Estate	A specialist with experience in development of Real Estate Plans in accordance with Chap. 12, ER 405-1-12, and experience in real estate fee/easement acquisition and residential/business relocations for Federal and/or Federally-Assisted Programs as needed for implementation of Civil Works projects.
Climate Preparedness and Resilience CoP Reviewer	A member of the Climate Preparedness and Resiliency Community of Practice will participate in the ATR review. The reviewer should have knowledge of inland hydrology climate change assessment policy and practice. This role can be filled by another discipline.

Documentation of ATR. DrChecks will be used to document all ATR comments, responses, and resolutions. Comments should be limited to those needed to ensure product adequacy. All members of the ATR team will use the four part comment structure (see ER 1165-2-217, Chapter 5). If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team to resolve using the issue resolution process in ER 1165-2-217, chapter 5.9. Concerns will be closed in DrChecks by noting the concern has been elevated. The ATR Lead will prepare a Statement of Technical Review (see ER 1165-2-217, chapter 5.11 and Appendix D), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR will be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

c. INDEPENDENT EXTERNAL PEER REVIEW

Section 2034 of the Water Resources Development Act (WRDA) of 2007 (P.L. 10-114), as amended (33 U.S.C. 2343), includes requirements for review by external experts. The Act requires independent peer review, known as IEPR, of project decision documents under certain conditions. These conditions, as well as exclusion criteria, are outlined in ER-1165-2-217.

Documentation of IEPR. IEPR is managed outside of the USACE and conducted on studies. IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in evaluation of environmental impacts of proposed projects, or biological opinions of the project study.

The Outside Eligible Organization will submit a final Review Report no later than 60 days after the end of the draft report public comment period. USACE shall consider all recommendations in the Review Report and prepare a written response for all recommendations. The final decision document will summarize the Review Report and USACE response and will be posted on the internet.

Independent External Peer Review Determination.

This project does not trigger WRDA 2007 Section 2034 factors for Independent External Peer Review. Therefore, a review under Section 2034 is not required. The factors in determining whether a review of a project are necessary as stated under Section 2034, along with this RP's applicability statements, follow:

- (1) Failure of the project would pose a significant threat to human life.
Failure of the project would not pose a threat to human life due to existing low and low to moderate risk considerations presented in existing Periodic Assessment Reports for Claiborne Lock & Dam and Millers Ferry Lock & Dam, respectively. Additionally, the estimated population at risk due to dam breach at both lock and dams is zero. The measures being considered would not transfer or transform risk up or downstream of the project area.
- (2) The project involves the use of innovative materials or techniques.
This project will utilize methods and techniques used by the USACE on other similar projects.
- (3) The project design lacks redundancy.
There is no need for redundant design features for fish passage measures since no risks to life safety are involved.
- (4) The project has unique construction sequencing or a reduced or overlapping design construction schedule.
The project does not have or pose unique sequencing or a reduced or overlapping design. The construction methods and procedures have been used successfully by the USACE on other similar works.

Further, a selected plan for this project would meet the exclusion case outlined in ER 1165-2-217, as discussed below.

The project study could be subject to peer review because of total costs are greater than \$200M. However, even if costs exceed \$200 million, it may be excluded from IEPR if all the following set of exclusion conditions are met:

- *does not include an EIS and;*
 - *has not been determined as controversial*
 - *has no more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources*
 - *has no substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures*
 - *has, before implementation of mitigation measures, no more than a negligible adverse impact on a species listed as endangered or threatened species under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) or the critical habitat of such species designated under such Act.*

The potential factors triggering an IEPR for this project are if the estimated cost were to exceed \$200 million or if an EIS is deemed necessary. However, at this time it is recommended that no IEPR be

performed. The PDT's risk informed assessment, including criteria from ER 1165-2-217 and considerations documented in Section 2 of this Review Plan, is that the study/project meets conditions warranting exclusion from IEPR.

d. SAFETY ASSURANCE REVIEW

Based on the assessed risk factors, the District Chief of Engineering, as the Engineer-In-Responsible-Charge, does not recommend a Safety Assurance Review in this feasibility study. If the project scope is changed, this determination will be reevaluated.

e. MODEL CERTIFICATION OR APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR. The following models may be used to develop the decision document:

Table 5: Planning Models.

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
IWR Planning Suite II (Version 2.0.9)	The software supports plan formulation and evaluation using the following modules: Plan Generator; Cost-Effectiveness and Incremental Cost Analysis; Annualizer; Multi-Criteria Decision Analysis; Uncertainty Analysis; and Watershed Wizard. It will be used to evaluate /compare plans to aid in selecting a recommended plan.	Certified
Watershed-Scale Upstream Connectivity Toolkit (WUCT)	This model quantifies the benefits associated with removal of organism movement barriers within a watershed (e.g., dam removal, culvert repair, fish ladder installation) or impacts of barrier addition (e.g., dam construction, weir installation). The model focuses on upstream movement of migratory organisms such as fish and is intended for application at the watershed-scale. The algorithm is based on four primary components: habitat quantity upstream of a dam, habitat quality upstream of a dam, the passability of a structure for a given organism, and the shape/topology of the watershed. This algorithm combines these data to estimate quality-weighted, accessible habitat at the watershed scale. It will be used to quantify habitat benefits and compare plans to aid in selecting a recommended plan.	Certified

Habitat Suitability Indices (HSI) for various species: Paddlefish, smallmouth buffalo, striped bass, walleye, American shad	HSIs are a numerical index that represents the capacity of a given habitat to support a selected species. These models will be used in conjunction with the WUCT model and may also be used in environmental impacts analysis.	Approved
Fish Passage Connectivity Index (FPCI)	The FPCI was developed to evaluate ecosystem outputs of alternative measures for fish passage improvements on the Upper Mississippi River System (UMRS) for cost effectiveness and incremental analysis. The model was initially developed for use in the plan formulation process for the Navigation and Ecosystem Sustainability Program for the Lock and Dam 22 fish passage improvement project. The model is applicable to fish passage improvement projects at other navigation dams on the UMRS. With the approval of the ECO-PCX, this model may be used to quantify habitat benefits and compare alternatives to select a recommended plan.	Certified for Regional Use - Upper Mississippi River System CESAM will seek certification for use in the Alabama River system.

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR. These models may be used to develop the decision document:

Table 6: Engineering Models.

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
HEC-RAS 6.1	The software performs 1-D steady and unsteady flow river hydraulics calculations and has capability for 2-D (and combined 1-D/2-D) unsteady flow calculations. It will be used for 1-D/2-D unsteady flow analysis to evaluate the future without-project and future with-project conditions.	Certified
HEC-HMS 4.8	This software simulates the hydrologic process of a watershed. It will be used to estimate future flows for the project location.	Certified
HEC-ResSIM 3.1	This software simulates reservoir operations. This model will be used to quantify the impacts on project purposes.	Certified

f. POLICY AND LEGAL COMPLIANCE REVIEW

Policy and legal compliance reviews for draft and final planning decision documents have been delegated to the MSC (see Director's Policy Memorandum 2019-01).

(i) Policy Review.

The policy review team will be selected through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team may be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences, or other vertical team meetings plus the milestone events.
- The input from the Policy Review team will be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR will be distributed to all meeting participants.
- In addition, teams may choose to capture policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations will be documented in an MFR.

(ii) Legal Review.

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC and HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases, legal review input may be captured in the MFR for the meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.
- Each participating Office of Counsel member will determine how to document legal review input.

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