



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
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WASHINGTON, DC 20310-2600

DAEN

JUL 06 2026

SUBJECT: Lower Osage River Basin, Miller, Osage and Cole Counties, Missouri,
Aquatic Ecosystem Restoration

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on aquatic ecosystem restoration recommendations for the Lower Osage River Basin, Miller, Osage and Cole Counties, Missouri. It is accompanied by the report of the Kansas City District and Northwestern Division engineer(s). This study is in response to the authorization in Section 201(a)(16) of the Water Resources Development Act (WRDA) of 2020, Public Law 116-260. The authorization provided that the Secretary of the Army conduct a feasibility study for an ecosystem restoration project in the Lower Osage River. Congress began appropriating funds for the improvement of the Osage River as early as the 1871 Rivers and Harbors Act, chap. 118, 16 Stat. 538, 541. Dredging, snagging, and construction of river training structures continued throughout the late 1800s and early 1900s. Congress authorized construction of Lock and Dam 1 (LD1) in the 1890 River and Harbor Act, chap. 907, 26 Stat. 426, 451. However, in 1952, the Chief of Engineers advised Congress that USACE was discontinuing maintenance of LD1. Congress authorized the Secretary of the Army to dispose of the project structure and appurtenances, including real property, as it was no longer economically serving the purpose for which it was constructed, Public Law 84-996, 70 Stat. 1062-1063. In accordance with that authorization, the Government conveyed LD1 to private interests. LD1 and the other river improvements have continued to degrade and are now causing life safety concerns as well as contributing to erosion and a declining aquatic ecosystem. Preconstruction engineering and design activities, if funded, will continue under the same Section 201(a)(16) authority.

2. The reporting officers recommend authorization of a project to remove Lock and Dam No. 1 on the Lower Osage River that will provide 1,596 net Average Annual Habitat Units (AAHUs) of aquatic ecosystem structure and function from restoration of approximately 376 acres of aquatic habitat and reconnection of 7,100 acres of thalweg and main channel habitat. The Recommended Plan is the National Ecosystem Restoration (NER) Plan that addresses habitat quality and connectivity problems in the basin. The NER Plan includes compensation for unavoidable induced flooding impacts from the removal of the dam to an estimated 41.94 acres of land along 30 river miles. A preliminary takings analysis determined the least cost option will be the purchase of permanent flowage easements. The Recommended Plan includes the following features:

a. Removal of the failing Lock and Dam No. 1 (LD1) structure.

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b. Replacement of LD1 with four grade control structures.

3. The Missouri Department of Natural Resources is the non-federal cost sharing sponsor for all features of the project. Based on January 2026 price levels, the estimated total project first cost is \$146,667,000. The total project first cost includes the value of lands, easements, rights-of-way, relocations, and disposal areas (LERRDs) estimated to be \$1,087,000, which includes the Sponsor's incidental administrative expenses estimated to be \$567,500. The current project plan requires (a) the standard Temporary Work Area Easements for staging and access; (b) the standard Road Easements for staging and access; (c) the standard Flowage Easements for areas subject to induced flooding that a preliminary analysis has determined to be takings; and (d) the standard Fee Estate for the land required for Lock and Dam removal and replacement with grade control structures. Cost sharing is applied in accordance with the provisions of Section 103 of the WRDA of 1986 (33 U.S.C. § 2213), as follows:

a. The federal share of the project first cost for initial construction is estimated at \$95,334,000 and the non-federal share is estimated at \$51,333,000, which equates to 65 percent federal and 35 percent non-federal. The non-federal sponsor will receive credit for the value of LERRDs provided, included in the estimate, toward the non-federal share.

b. The additional annual cost of operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) for the Recommended Plan is estimated to be \$200,000. OMRR&R activities include adding stone to grade control structures (estimated at two times over a 50-year project life) and access road maintenance (every 10 years). The non-federal sponsor will be responsible for 100 percent of the cost of project OMRR&R.

c. The estimated project first cost includes monitoring costs of \$348,000 and adaptive management costs of up to \$1,659,000. Cost-shared monitoring will occur for up to 10 years beginning upon completion of each functional portion of the project.

4. Based on a 3.25% discount rate and a 50-year period of analysis, the equivalent average annual costs are estimated at \$5,973,787 for Lock and Dam removal with grade control structures. The average annual cost per habitat unit for the Lock and Dam is \$3,743.

5. The Recommended Plan proposes the removal of LD1 to enhance aquatic connectivity and increase habitat quality within the Lower Osage River basin. This project would directly address the national emphasis on ecological connectivity, as outlined in the Council on Environmental Quality's 2023 guidance on ecological connectivity and wildlife corridors.

6. Removal of LD1 will reconnect over 7,100 acres of the Lower Osage River and its tributaries to the Missouri River, providing critical spawning habitat for native fish

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species, including the state-endangered Lake Sturgeon, which was recently documented spawning downstream of LD1, and the federally endangered Pallid Sturgeon. The gravelly substrates of the Lower Osage River are particularly suitable for Pallid Sturgeon spawning, and this substrate is much more abundant in the Lower Osage than in the Missouri River.

7. Removal of LD1 also mitigates a life safety risk associated with low-head dam hydraulics. The proposed replacement with four grade control structures will eliminate this hazard to boaters and recreationists and prevent potential uncontrolled headcut erosion from the dam's continued degradation.

8. The ecological significance of this area is historically recognized through prior federal investments in the river's navigation system. While the Recommended Plan addresses habitat quality and connectivity problems in the basin, it does not address the existing erosion issues, as these issues are being monitored and partially addressed through ongoing habitat restoration obligations formalized through the Federal Energy Regulatory Commission licensing requirements for Bagnell Dam, administered via the Lower Osage River Protection and Enhancement Plan (LORPEP) in partnership with the Missouri Department of Conservation (MDC) and the U.S. Fish and Wildlife Service (USFWS). The presence of extensive threatened and endangered mussel species further underscores the ecological value of the Lower Osage River basin.

9. The proposed Lower Osage River project aligns with the current administration's priorities for jobs and economic development by increasing local and regional benefits associated with project construction. Long-term economic benefits would likely occur with increased recreational opportunities and experiences following removal of LD1.

10. All compliance with required applicable environmental laws and regulations has been completed. A Programmatic Agreement has been entered into between USACE and Missouri SHPO, with the Osage Nation as an invited signatory. This PA requires cultural survey of affected areas prior to construction. Coordination with USFWS resulted in a not likely to adversely affect determination for the Threatened and Endangered mussel species in the Lower Osage, however, re-engagement with the USFWS, a detailed survey, and potential relocation is required at each site prior to construction.

11. In accordance with USACE policy on the review of decision documents, all technical, engineering, and scientific work underwent an open, dynamic, and rigorous review process. The comprehensive review process included District Quality Control Review, Agency Technical Review, and Headquarters Policy and Legal Compliance review to confirm the planning analyses, alternative design and safety, and the quality of decisions. Washington-level review indicates that the plan recommended by the reporting officers complies with all essential elements of the U.S. Water Resources Council's Economic and Environmental Principles, Requirements, and Guidelines for

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Water and Land Related Resources Implementation Studies, as well as other administrative and legislative policies and guidelines. The views of interested parties, including federal, state, and local agencies, were considered and all comments from public reviews have been addressed and incorporated into the final report documents where appropriate.

12. USACE decision documents recognize cost risk and uncertainty surrounding implementation. All cost estimates will carry a degree of uncertainty. The estimated total project first cost for the Recommended Plan at the 80% confidence interval is estimated at \$146,667,000. This project carries a degree of uncertainty such that if the main drivers described below are realized, the first cost for the Recommended Plan could increase to approximately \$171,421,000. The recommended plan has various construction and non-construction components. These components range from 30 to 100 percent in project definition. The overall recommended plan is at 35% percent design maturity. Based on the recommended project design of the construction components and scope definition of the non-construction components, the total project cost is designated as a Class 3 estimate. The total project first cost includes a contingency value of \$40,271,000, which is approximately 39% percent of the estimated base project cost of \$106,395,000. The cost contingencies are intended to cover cost and schedule increases due to the identified project risks and their probability of occurrence. Changes to assumptions or the basis of design can result in additional risks not currently identified.

13. For the Recommended Plan project first costs, the currently known major uncertainty drivers are the following: 1) limited survey data may result in rock quantity or excavation quantity changes; 2) further refinements of hydraulics and hydrology modeling in the next phase may result in refinements to feature designs, quantity changes, and mitigation requirements; 3) variation in major material costs and bid assumptions, 4) ability of the non-federal sponsor to provide their share of funds and obtain all required real estate interests in a timely fashion as reflected in the project schedule, and 5) any changes to assumptions on productivity, construction sequencing due to funding allocations, and future market conditions can affect overall project cost. As the project moves into the next phases, USACE will focus risk management and mitigation on the primary cost and other significant risk drivers to the extent within USACE control. This would include seeking a collaborative delivery method such as a Design Build to Budget (DB2B) acquisition strategy for the Design and Construction of this project. A DB2B acquisition strategy leverages the efficiencies and speed of private industry to design and construct federal projects within a budget cap. However, there still exists the potential for other unanticipated and uncontrollable changes in environmental or economic conditions that could further increase the total project first cost beyond the current estimate and/or necessitate changes in the project's design.

14. In full consideration of the risks as documented in the preceding paragraphs in this report, I concur with the findings, conclusions, and recommendation of the reporting

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officers. Accordingly, I recommend that the Lower Osage River Ecosystem Restoration General Investigation be authorized in accordance with the reporting officers' Recommended Plan at an estimated total project first cost of \$146,667,000 with such modifications as in the discretion of the Chief of Engineers may be advisable. Federal implementation of the project for ecosystem restoration includes, but is not limited to, the following items of local cooperation to be undertaken by the non-federal sponsor in accordance with applicable federal laws, regulations, and policies:

a. Provide the non-federal share of project costs including 35 percent of construction costs allocated to ecosystem restoration, as further specified below:

i. Provide, during design, 35 percent of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

ii. Provide all lands, easements, and rights-of-way, including those required for relocations and placement areas, and perform all relocations determined by the Federal Government to be required for the project; and

iii. Provide, during construction, any additional contribution necessary to make its total contribution equal to 35 percent of construction costs.

b. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the outputs produced by the project, hinder operation and maintenance of the project, or interfere with the project's proper function;

c. Ensure that the project or lands, easements, and rights-of-way required for the project shall not be used as a wetlands bank or mitigation credit for any other project;

d. Operate, maintain, repair, rehabilitate, and replace the project or functional portion thereof at no cost to the Federal Government, in a manner compatible with the project's authorized purposes and in accordance with applicable federal laws and regulations and any specific directions prescribed by the Federal Government;

e. Hold and save the Federal Government free from all damage arising from design, construction, operation, maintenance, repair, rehabilitation, and replacement of the project, except for damages due to the fault or negligence of the Federal Government or its contractors;

f. Perform, or ensure performance of, any investigations for hazardous toxic, and radioactive wastes (HTRW) that are determined necessary to identify the existence and extent of any HTRW regulated under the Comprehensive Environmental Response,

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Compensation, and Liability Act (CERCLA), 42 U.S.C. §9601-§9675, and any other applicable law, that may exist in, on, or under real property interests that the Federal Government determines to be necessary for construction, operation, and maintenance of the project.

g. Agree, as between the Federal Government and the non-federal sponsor, to be solely responsible for the performance and costs of cleanup and response of any HTRW regulated under applicable law that are located in, on, or under real property interests required for construction, operation, and maintenance of the project, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination, without reimbursement or credit by the Federal Government;

h. Agree, as between the Federal Government and the non-federal sponsor, that the non-federal sponsor shall be considered the owner and operator of the project for the purpose of CERCLA liability or other applicable law, and to the maximum extent practicable shall carry out its responsibilities in a manner that will not cause HTRW liability to arise under applicable law; and

i. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, (42 U.S.C. §4630 and §4655) and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring real property interests necessary for construction, operation, and maintenance of the project including those necessary for relocations, and placement area improvements; and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

15. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the Executive Branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to Congress, the non-federal sponsor, interested federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.



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