



West Ditch-Main Ditch Sub-Watershed Plan Environmental Assessment



Photo: Erosion on West Ditch – Main Ditch, Conservation Works Joint Venture Partner November 2024

For More Information Contact:

Andrew Rackers – NRCS Acting Assistant State Conservationist for Water Resources and Easements
601 Business Loop W Ste 250, Columbia, MO 65203
573-876-9376
andrew.rackers@usda.gov

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PROPOSAL INFORMATION

General Information

Proposal Name Draft West Ditch – Main Ditch Subwatershed Plan for Flood Damage Reduction in the West Ditch Watershed

Unique Identification #: EAXX-005-53-029-1381927276

Proposal Initiation Date: 1/15/2025

Proponent Name: Drainage District 01 of Stoddard County (DD01)

Signing Authority: Responsible Official

Responsible Official: Nate Goodrich

Unit: Missouri State Office

Anticipated Implementation of Proposal: If financial assistance is available, it is anticipated that design and permitting will occur in 2027-2028 and construction will take place 2028-2032.

General Location of Proposal: The West Ditch – Main Ditch Subwatershed encompasses approximately 17,631-ac and corresponds to 12-digit Hydrologic Unit Code (HUC12) 080202040504. The Subwatershed is within Stoddard and Dunklin counties, Missouri. For the purposes of this report, discussion throughout this Plan is solely focused within Stoddard County. DD01 jurisdiction lies within the Subwatershed in Stoddard County. Within the Subwatershed, the Project Area evaluated in this Plan is limited to approximately 341-ac and corresponds to the locations of proposed improvements along the West Ditch – Main Ditch, East lateral No. 1 and No. 2, DD Walker Lateral, West Lateral, Garner Lateral, and Tuttle Lateral.

Purpose and Need: Why do we need to act?

The purpose of the Proposed Action is to implement targeted measures along the West Ditch – Main Ditch and associated laterals (Project Area) in the Subwatershed to provide flood reduction measures for agricultural lands, community infrastructure, and downstream areas. These measures are designed to minimize damage from erosion, flooding, and sediment accumulation.

This project meets the P.L. 83-566 authorized purpose of flood prevention (flood damage reduction). The Natural Resources Conservation Service (NRCS) National Watershed Program Manual defines flood prevention (or flood damage reduction) as measures installed to prevent or reduce damages caused by floodwater. Flood damage reduction is further defined as the control and disposal of surface water caused by abnormally high direct precipitation, stream overflow, or floods aggravated or caused by wind or tidal effects.

Proposed Action: What are we proposing to do?

The Proposed Action (Alternative 2) involves flood damage reduction measures aimed at better protecting the Subwatershed from flood damage and soil erosion. This will be achieved by removing accumulated sediment to restore the drainage system's capacity to its original design, stabilizing banks, and implementing native vegetation for multiple benefits, including safeguarding landowners' property, reducing safety risks, and preserving farmland. Additionally,

the Project would include development of a comprehensive plan to manage runoff and drainage for the benefit of local landowners, farmers, and communities.

Alternatives to the Proposed Action: Are there other ways to meet the purpose and need?

The alternatives described below were selected for inclusion into the Final Array of Alternatives.

Alternative 1: No Action (FWOFI)

The No Action alternative was carried forward as if no work was done. This action is required to be carried forward to serve as a baseline for comparison of the action alternatives.

Alternative 2: Vegetative Buffer, Bank Toe Armoring and Parallel Drains, Riprap Armoring with Grade Stabilization Structures

Alternative 2 is a structural alternative that consists of structural and vegetative practices intended to stabilize ditch banks and reduce ongoing erosion under NRCS Streambank and Shoreline Protection (Code 580). Measures include toe-of-slope riprap armoring, additional armoring at road crossings, outlet protection, grade stabilization structures, parallel subsurface drainage systems, and vegetative buffers.

Alternative 3: Easement Acquisition

Alternative 3 is a non-structural alternative that would involve the acquisition of floodplain conservation easements on agricultural lands and buying out building structures subject to inundation during the 100-year flood event. Hydraulic screening identified, approximately 8259-ac within the Project Area as potentially eligible for easement acquisition consideration and 23 building structures that would need to be bought out.

Alternatives Considered but Not Analyzed in Detail

Structural: Two-Stage Ditch Conversion

This alternative would involve conversion of selected ditch reaches to a two-stage ditch configuration, requiring excavation of approximately 205,000 cubic yards (cu-yds) of material within high priority areas of the Project. Implementation would require expansion of the existing right-of-way (ROW), raising concerns related to landowner coordination, loss of productive agricultural land, and spoil disposal. Due to limited on-site placement opportunities, a substantial portion of excavated material would likely require off-site hauling, increasing construction complexity and cost.

Construction activities could result in short-term impacts to ditch stability and surface water quality due to extensive excavation and soil disturbance. Although a two-stage ditch configuration may provide long-term erosion reduction benefits and could facilitate future parallel drainage installation, overall feasibility was determined to be limited due to high construction costs, ROW constraints, and uncertainty regarding landowner participation. Based on these considerations, Alternative 4 was eliminated from detailed analysis due to poor efficiency and acceptability.

INTERDISCIPLINARY PROPOSAL SCREENING

Given the nature of the proposal, the responsible official is requesting documentation to demonstrate compliance with the following legal and regulatory considerations in addition to NEPA:

☒ Endangered Species Act (ESA)

☒ National Historic Preservation Act (NHPA)

☒ Tribal Consultation (EO 13175)

☒ Clean Air Act (CAA)

☒ Clean Water Act (CWA)

☒ Pertinent Executive Orders

Special Management Areas:

☐ Coastal Zone Management Areas

☐ Conservation Easements

☐ Coral Reefs

☐ Inventoried Roadless

☐ Marine Sanctuaries

☐ National Recreation Areas

☐ National Scenic & Historic Trails

☐ Research or Experimental Areas

☐ Wild & Scenic River Corridors

☐ Wilderness

☐ Other: n/a

Scope of Analysis

The following describes how the agency drew a reasonable and manageable line relating to its consideration of environmental effects from the proposed action (and action alternatives, if any) that extend outside the geographical territory of the proposal or might materialize later in time.

Scoping is used to identify the issues relevant to defining the problems and formulating and evaluating the alternative solutions in an environmental assessment. Significant issues will be analyzed in detail in subsequent sections of the Plan. Scoping issues that were considered, but then determined not to be significant, were eliminated from detailed study as explained below.

The Project planning team conducted scoping efforts to identify economic, environmental, cultural, and social issues that are important in the Affected Resource Areas (ARAs) and associated with the alternatives being evaluated for the Proposed Action. Resource concerns that may be affected by the Proposed Action that are not limited to the ARAs were evaluated at the watershed level. Input from Drainage District 01 of Stoddard County (DD01), interested agencies, and local residents was collected and documented through correspondence and public meetings. An interdisciplinary planning team with experts in engineering, hydraulics, biology, economics, resource conservation, water quality, soils, archeology, and geology identified factors that have the potential to affect soil, water, air, plants, animals, and the human environment.

Agencies and Persons Consulted

Given the nature of the proposal, the responsible official consulted the following agencies, organizations, tribes, and persons during development and analysis of the proposal:

Native American Tribes

- Osage Nation
- Quapaw Nation
- Absentee-Shawnee Tribe of Indians of Oklahoma
- Shawnee Tribe
- Eastern Shawnee Tribe of Oklahoma

After the cultural resources inventory of the ARAs associated with the alternatives was complete, NRCS sent National Historic Preservation Act (NHPA) Section 106 consultation request letters to the Tribes listed above on July 15, 2025. The consultation letter presented the area of potential effect, the proposed alternatives, the historic property identification efforts, determinations of eligibility, and the determination of effect. Copies of the cultural resource inventory report, site forms, and maps of the Area of Potential Effect (APE) were submitted with the consultation letter to support the finding of no historic properties affected.

Copies of all correspondence related to the alternatives are provided in Plan-Appendix A.

The Quapaw Nation stated they believe the proposed project will have no effect on known properties of cultural or sacred significance to the Quapaw Nation in an email received July 23, 2024. However, in a second email dated March 17, 2025, the Quapaw Nation Historic Preservation Program indicated that they concur with the agency's recommendations that a SURVEY should be conducted.

The Osage Nation Historic Preservation Office determined that the proposed project most likely will not adversely affect any sacred properties and/or properties of cultural significance to the Osage Nation in a letter dated April 23, 2025.

Agencies

Federal Agencies. The planning team coordinated technical submissions and drafts of the Plan and associated technical documents with NRCS. Technical review comments from NRCS were incorporated into the documents. NRCS served as the Tribal liaison for the project.

Additional input was solicited from other Federal agencies listed below. Input that was received is summarized (see Plan-Appendix A for detailed records of comments):

- U.S. Environmental Protection Agency (USEPA)
 - Comments included recommendations regarding 303(d) impaired waters (Lateral No. 2 Main Ditch), wetlands and streams and applicability of Section 404 of the CWA, air quality considerations during construction, infrastructure resiliency, demolition debris and contamination, energy efficiency, pollinator habitat and native plant species, and land use planning coordination.
- U.S. Fish and Wildlife Service (USFWS)
 - The official species list is included in Plan-Appendix A.
 - NRCS sent an email to U.S. Fish and Wildlife Service to initiate consultation in accordance with Section 12 of PL 83-566 on March 12, 2026.
 - NRCS and USFWS exchanged additional emails on March 16, 2026, March 17, 2026, April 6, 2026, April 7, 2026, April 8, 2026, and April 21, 2026, with the final email being from USFWS concurring with the determinations for listed species.
 - An updated official species list was obtained on June 30, 2026. No additional species were identified.
- U.S. Army Corps of Engineers (USACE)
 - Requested to be a cooperating agency on July 29, 2024. USACE has jurisdiction under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act.
- Federal Emergency Management Agency
- U.S. Geological Survey
- USDA Farm Service Agency
- USDA Forest Service
- USDA Rural Development

State Agencies. Input was solicited from the State agencies listed below.

- Missouri Department of Conservation
 - A Natural Heritage Review Level Two Report was generated on January 27, 2025.
 - A Natural Heritage Review Report was generated on February 18, 2025.
- Missouri Department of Natural Resources
 - MDNR provided comments for consideration in a letter dated August 12, 2024 including the following topics: location within the New Madrid Seismic Zone;

karst geology and groundwater sensitivity; public and private wells within the Project vicinity; public lands, including Morris State Park and Malden COA; water quality protection and designated uses; 303(d)-listed impaired waters and waters with TMDLs; applicability of CWA Sections 401 and 404; stream and wetland mitigation requirements under state methodology; land disturbance and sediment management; hazardous waste considerations; air quality during construction; floodplain coordination; and state-listed species coordination.

- Missouri Department of Natural Resources, State Historic Preservation Office
 - NRCS consulted with SHPO regarding the determination of no adverse effect and the National Register of Historic Places (NRHP) eligibility of resource AR-1 on October 21, 2024. SHPO concurred with NRCS's finding in a letter dated March 27, 2025.
- Missouri State Emergency Management Agency (SEMA)
- Missouri State Floodplain Administrators
- Missouri Department of Agriculture
- Missouri Department of Transportation
- Missouri Farm Bureau

Local Entities

Input was solicited from local entities as listed below. There were no responses received from local entities.

- City of Bernie
- Stoddard County Commission
- Stoddard County Soil and Water Conservation District
- Drainage District 1 - Stoddard County

Elected Officials and Delegates

Input was solicited from governmental entities listed below. There were no responses received from elected officials.

- Governor of Missouri
- US Congress – Senate
- US Congress – House, 8th Congressional District
- Missouri State Senate – Senate District 25
- Missouri State Representative – House District 151

Individuals

- Landowners who owned property within or adjacent to the project areas were invited to attend the initial public meeting at Stoddard County USDA Service Center in Dexter, MO on August 22, 2024. Comments were received from at least one individual during this meeting, and are included in **Plan-Appendix A**.
- The final public meeting is yet to be held.

**Substantive Issues Considered for Analysis**

Resource Concern	Rationale
Soil	
Erosion and Sedimentation	Sediment accumulates in the drainage network ditches due to sheet and rill erosion, gully erosion, and documented bank instability, leading to deposition of sediment in the ditches and areas downstream.
Prime and Unique Farmland and Farmland of Statewide Importance	Prime and Unique Farmland are more frequently flooded due to sediment-compromised ditch and lateral capacity. This also creates head-cuts into prime and unique farmland and farmland of statewide importance.
Water	
Floodplain Management	The ditch drainage system in the Project Area is in Federal Emergency Management Agency flood hazard zone A, within the 100-year floodplain. Sediment buildup within the system reduces floodplain effectiveness, thereby reducing the ability to protect nearby farmland and communities from flooding.
Waters of the U.S. (Streams, Lakes, and Wetlands)	Streams (ditches) are negatively impacted by sedimentation from uplands and ditch banks. Neither wetlands nor open water features (beyond the ditches) were identified in the Project Area.
Surface Water Quantity	The Project Area is subject to inundated ground surfaces due to increasing flooding concerns.
Surface Water Quality (Clean Water Act)	Surface water quality is affected by erosion and transport of natural and chemical laden sediment, from agricultural practices, into the drainage system. No waters were listed by Missouri Department of Natural Resources (MDNR 2020a) in response to the Section 303(d) list for impaired waters.
Regional Watershed Management Plans	The state Missouri Water Resources Plan includes information and strategies for the region in which the Project is located.
Groundwater and Sole Source Aquifers	While groundwater levels remain stable, flooding and prolonged ponding in fields may harm groundwater quality from increasing nutrient and pathogen leaching and infiltration into aquifers. Sole source aquifers were not identified in the watershed.
Air	
Air Quality (Clean Air Act)	Construction practices can lead to short-term negative effects on air quality.



Resource Concern	Rationale
Plants and Animals	
Fish and Wildlife Habitat and Conservation	The watershed does not contain Essential Fish Habitat. The potential for fish and wildlife habitat within the Project Area is very limited, as the area is already highly disturbed by ongoing sedimentation and routine maintenance activities.
Threatened and Endangered Species	Four federal and numerous state-listed species have the potential to occur within the Project Area, according to publicly available data from the U.S. Fish and Wildlife Service (USFWS) and the MDNR.
Migratory Bird Treaty Act/Bald and Golden Eagle Protection Act	The Project is within the Mississippi Flyway, and migratory birds have been observed in the Project Area.
Invasive Species	Invasive species have been documented in the Subwatershed.
Natural Areas	MDNR data indicates one Conservation Area and one Conservation Opportunity Area within the Subwatershed.
Riparian Areas	Riparian areas along the ditches are minimal and highly disturbed by normal ditch maintenance.
Human Environment	
Socioeconomic Issues	Flooding damages agricultural lands and impacts communities socially and economically by disrupting access to essential services and roadways during flood events.
Recreation	Flooding and drainage conditions may affect seasonal hunting and other recreation activities.
Public Health and Safety	The current infrastructure is vulnerable to failure due to flooding and overtopping, and contributes to property damage, disruption of public services, and potential loss of life. Extended ponding due to inadequate capacity from flood events, and other drainage challenges also lead to mosquito proliferation, increasing the vectors for mosquito-borne illnesses.
Potable Water Supply	Potable water intake is through groundwater wells; county and private wells may be impacted by pollutants percolating through soil to the aquifer.
Historic and Cultural Resources	Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to account for the potential effects of proposed undertakings on historic properties. The potential for historic or cultural resources in the Project Area was evaluated. No archaeological sites or cultural features were documented during the survey. One architectural area (AR-1) was identified within the survey area, but was determined as not eligible for NRHP listing.
Energy	Energy use is associated with irrigation and drainage pumping within the Subwatershed.



Issues Considered but Dismissed from Detailed Analysis

Concern	Rationale
Water	
Wild and Scenic Rivers	Wild and scenic rivers were not identified in the watershed (National Wild and Scenic Rivers System 2025).
Coastal Zone Management Areas	The watershed is not in a coastal zone management area (NOAA 2005).
Plants and Animals	
Coral Reefs	Coral reefs do not exist in the Subwatershed (USGS 1990).
Human Environment	
Scenic and Visual Resources	Not applicable as the Project Area possesses minimal scenic or visual resource potential as identified during scoping (NRCS 2022).

ENVIRONMENTAL REVIEW & CONSULTATION

The following information documents compliance with the National Environmental Policy Act (NEPA) and other relevant environmental laws, executive orders, and regulations.

NEPA: Consideration of Reasonably Foreseeable Impacts

Potentially Affected Environment

Land Use and Land Cover (LULC)

Land use within the Subwatershed is dominated by agriculture, including cultivated cropland and pasture, which account for approximately 87 percent (14,798-ac) of total land cover. Developed lands and deciduous forest represent smaller proportions of the Subwatershed. Agricultural production is expected to remain the predominant land use.

The Project Area is predominantly agricultural, with approximately 71 percent (241-ac) classified as cultivated cropland. Proposed improvements are limited to drainage ditches and associated levee corridors with narrow adjacent buffers. Scattered trees and small forested patches occur along portions of the Project corridor (Plan-Appendix C).

Climate

The region experiences a humid subtropical climate characterized by warm summers, mild winters, and a growing season that typically extends from mid-April through mid-October. Based on 1991–2020 climate normals, average summer temperatures are approximately 77°F, with average highs near 88°F, while winter temperatures average approximately 41°F (NOAA 2025).



Average annual precipitation is approximately 56.6-in, with the majority occurring between May and October. Periodic high-intensity rainfall events contribute to surface runoff, erosion, and flooding within the Subwatershed.

Topography

The Project Area occurs within a relatively flat floodplain landscape drained by engineered, low-sinuosity ditches. Local relief is minimal and primarily defined by levees constructed and maintained along drainage features. Ground elevations generally range from approximately 285 feet (ft) above mean sea level (msl) in downstream reaches to approximately 310-ft msl in upstream reaches (Plan-Appendix C, Figure 2).

Historical topographic mapping indicates that engineered drainage features have been present in the area since at least the early twentieth century.

Geologic Setting

Stoddard County lies within the transition between the Ozark Uplift and the Mississippi Alluvial Plain. The Project Area is underlain by unconsolidated Quaternary alluvial and loess deposits over older Coastal Plain sediments. These deposits form a broad, low-relief floodplain that supports highly productive agricultural soils but also influences drainage behavior, sediment transport, and bank stability within the ditch system.

Ecoregion

The Project Area is located within the Mississippi Alluvial Plain ecoregion. This region is characterized by low-lying terrain historically dominated by wetlands and bottomland hardwood forests and now largely converted to row-crop agriculture. Extensive drainage modification has occurred throughout the region, and the area remains susceptible to periodic flooding.

Soils

Soils in the Subwatershed and Project Area are derived primarily from silty, sandy, or clayey alluvium parent materials and are typically very deep, poorly drained to somewhat poorly drained, and loamy or clayey in texture. The depth to the seasonal high-water table for the majority of soils within the Project Area ranges from approximately 0 to 24-in below ground surface. The Project Area is dominated by Tuckerman and Lilbourn soil series (see table below). Acreages and percentages of soil map units, drainage class, and hydrologic soil groups are included in Table 1, and maps are provided in Plan-Appendix C, Figures 6a – 6g.

Table 1. Dominant Soils in the Subwatershed and Project Area

Soil Type	Subwatershed (Stoddard County)		Project Area	
	Acres	Percent	Acres	Percent
Lilbourn	4,626	26	139	41
Tuckerman	1,637	9	98	29
All Remaining Soils	11,368	65	104	30
Total	17,631	100	341	100



Without effective field-scale and regional drainage management, these soil conditions result in excess ponding and flooding, which can limit agricultural productivity and contribute to sediment delivery to the drainage system (NRCS 2025).

Erosion and Sedimentation

Erosion and sedimentation within the Subwatershed occur both within drainage ditches and from overland flow originating in adjacent agricultural fields. Water erosion is the dominant erosive force acting on soils in the Subwatershed; however, wind erosion is also a contributing factor (NRCS 2025). Wind Erodibility Index (WEI) values within the Subwatershed range from approximately 60 to 97, indicating moderate susceptibility to wind erosion (USDA 2025).

Within the Project Area, the majority of soils are classified as Hydrologic Soil Group B/D, comprising approximately 56 percent of mapped soils. Dual hydrologic group classifications reflect drained and undrained areas. Under drained conditions, group B soils exhibit moderate infiltration and water transmission rates. Group D soils exhibit very slow infiltration and high runoff potential. These characteristics increase susceptibility to sheet and rill erosion, particularly during high-intensity rainfall events (NRCS 2025).

Runoff from adjacent croplands and from ditch bank areas containing previously excavated sediment contributes additional sediment loads to the drainage system. Saturation of these banks reduces soil strength and leads to bank sloughing, further increasing in-ditch sediment accumulation. In locations where runoff becomes concentrated at the interface between agricultural fields and ditch banks, gully head cuts form, accelerating localized erosion and sediment delivery.

Recent increases in conventional tillage practices to address herbicide-resistant weeds, combined with limited use of conservation practices such as reduced tillage, cover cropping, riparian buffers, and introducing crops with higher conservation value, have increased the amount of exposed soil across the landscape. These conditions reduce the landscape's capacity to slow runoff and trap sediment before it enters the drainage system. Accumulated sediment reduces ditch conveyance capacity, increases maintenance requirements, and contributes to downstream sediment transport (NRCS 2022). Additionally, the presence of low-shear-strength and dispersive soils within the drainage system contributes to unstable ditch banks and continued sloughing, further impairing floodwater conveyance.

Prime and Unique Farmland and Farmland of Statewide Importance

NRCS classifies soil map units based on soil characteristics that are best suited to growing food, feed, fiber, forage, and oilseed crops. Within the approximately 17,631-ac Subwatershed, 80 percent (14,139-ac) are classified as Prime Farmland, Prime Farmland if Drained, and Farmland of Statewide Importance (Plan-Appendix C, Figure 7 and Table).

Table 2. Farmland Classification in the Subwatershed and Project Area

Classification	Subwatershed		Project Area	
	Acres	Percent	Acres	Percent
Prime Farmland if Drained ¹	9,712	55	341	100
All Areas Prime Farmland	4,363	24.7	0	0



Classification	Subwatershed		Project Area	
Not Prime Farmland	3,492	20	0	0
Farmland of Statewide Importance	64	0.3	0	0
Total	17,631	100	341	100

Source: NRCS 2025.

¹ Nearly all soils within the Project Area are artificially drained.

Within the Project Area, 100 percent are classified as Prime Farmland if Drained. (Plan-Appendix C, Figures 6a – 6g).

Air Quality

The Clean Air Act (42 U.S.C. §§ 7401–7671, as amended) authorizes the USEPA to establish National Ambient Air Quality Standards (NAAQS) for criteria pollutants, including carbon monoxide, nitrogen dioxide, ozone, particulate matter (PM_{2.5} and PM₁₀), sulfur dioxide, and lead (USEPA 2024c).

The MDNR operates ambient air monitoring stations and reports data to the USEPA Air Quality System database (USEPA 2024d). Stoddard County is designated as in attainment for all applicable NAAQS pollutants, including particulate matter and ozone (MDNR 2024b), and no nonattainment areas are designated within the Project Area (USEPA 2024e). The Project Area is located within a predominantly rural setting characterized by cropland and scattered farmsteads.

Water

Floodplain Management

Drainage ditches in the Project Area are mapped within FEMA Zone A special flood hazard areas (Plan-Appendix C, Figure 11), consistent with Executive Order 11988 – Floodplain Management (FEMA 2024). Zone A represents areas subject to a 1-percent annual chance of flooding and is associated with a 26-percent chance of flooding over the life of a 30-year mortgage (FEMA 1983a,b).

Waters of the U.S. (Streams, Lakes, and Wetlands)

Surface waters within the Project Area generally flow from north to south, originating near the northern boundary of the Subwatershed and continuing from ditches or drainage features located upstream. Tributary ditches generally flow from northeast to southwest before joining the primary ditch feature, identified as West Ditch – Main Ditch. In some locations, tributary ditches flow parallel to West Ditch – Main Ditch before converging at multiple junctions. Downstream of the Subwatershed, the ditch system continues southward into Arkansas before ultimately discharging into the Mississippi River.

The Project Area includes approximately 18-mi of specific reaches of perennial streams, which consist primarily of engineered drainage ditches (Table). These primary ditches are fed by approximately 12 tributary ditches within the Project Area. (Plan-Appendix C, Figure 8).



Table 3. WOTUS Features Identified in the Project Area

Feature			Subwatershed Area		Project Area		
	Type	Miles (mi)	Linear Feet (LF)	Percentage	Miles (mi)	Linear Feet (LF)	Percentage
West Ditch – Main Ditch	Perennial	8.1	42,874	16.2	7.1	37,616	40.1
Lateral No. 2	Perennial	2.0	10,984	4.2	1.3	7,016	7.5
Unnamed Laterals	Perennial	40.2	212,196	79.6	9.3	49,142	52.4
Total		50.3	266,054	100		93,774	100

According to the National Wetlands Inventory (NWI), the Project Area contains approximately 30-ac of riverine wetlands, 9-ac of forested/shrub wetlands, and 3-ac of freshwater emergent wetlands (Plan-Appendix C, Figure 9 and Table).

Table 4. NWI Wetland and Water Features in the Subwatershed and Project Area

NWI Mapped Feature	Subwatershed Area		Project Area	
	Acres	Percentage	Acres	Percentage
Riverine	152	46	30	71
Freshwater Forested/Scrub-shrub Wetland	84	25	9	21
Freshwater Pond	69	21	0	0
Freshwater Emergent Wetland	29	9	3	7
Total	335	100	42	100

Source: USFWS 2024a.

The forested/shrub wetlands are associated with broadleaf deciduous systems and are seasonally flooded. Nearly all riverine wetlands within the Project Area are associated with active stream channels and are also seasonally flooded.

The Project Area was reviewed for the possible delineation of wetlands in November 2024 in accordance with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (USACE 2010). NWI mapping reflects riverine and seasonally flooded features associated with the drainage network; however, field indicators sufficient to meet Corps wetland criteria were not observed during the November 2024 site review.



Surface Water Quantity

The Project Area is subject to excess surface water due to flat terrain and poorly drained soils. Ponding and inundation are common, and clay-rich soil layers limit infiltration to deeper subsurface zones, resulting in slow drainage and increased surface water retention without effective drainage management (NRCS 2022).

Although annual precipitation generally supports agricultural production, precipitation timing and intensity often require managed drainage during wet periods and supplemental irrigation during dry periods. According to the 2022 Census of Agriculture, approximately 197,380-ac (47.2 percent) of annual cropland in Stoddard County were irrigated (NASS 2025a).

Surface Water Quality (Clean Water Act)

Current surface water quality conditions were evaluated using information from the MDNR and the EPA (MDNR 2020a, 2022, USEPA 2024a). For this reporting period, no waters are listed on Missouri's 2020 303(d) list of impaired waters (Plan-Appendix C, Figure 12; Table).

Table 5. Water Quality Conditions of Streams in the Project Area

Stream Name	State Waterbody ID	Listed on Missouri 2020 303(d) List	Waterbody Condition
Main Ditch	MO_3115.00	No	Unknown

Sources: MDNR 2020a, USEPA 2024a.

Based on the nature and location of the proposed Project activities, which are primarily limited to rehabilitation within the existing drainage system footprint, water quality certification requirements under Section 401 of the Clean Water Act (CWA) are expected to be addressed through existing MDNR certification processes, as applicable. Any required coordination with MDNR would occur during permitting to ensure compliance with state water quality standards.

Regional Watershed Management Plans

No watershed-specific management plans have been developed for the Project Area; however, MDNR maintains the Missouri Water Resources Plan, which provides statewide water resource assessments and planning considerations (MDNR 2020b). The Project Area is located within the Southeastern Missouri Region and the Lower Mississippi–St. Francis Subregion.

The Missouri Water Resources Plan indicates that water resources in the Southeastern Missouri Region are generally non-limiting, with recharge exceeding consumption, although groundwater declines have been documented in portions of the adjacent Mississippi Delta region in Arkansas and demands in southeastern Missouri are projected to increase by approximately 17 percent by 2060. The plan also identifies aging infrastructure as a regional challenge and recommends continued monitoring and investment (MDNR 2020b).



Groundwater Quality and Sole Source Aquifers

The Project Area is located within the Southeastern Lowlands Groundwater Province (MDNR 2024a). The Alluvial Aquifer serves as the primary groundwater source for most uses, with additional deeper aquifers including the Wilcox and McNairy. Water quality within the Alluvial Aquifer is generally suitable for irrigation, although elevated iron concentrations are common. Irrigation pumping may cause localized drawdown but generally does not result in long-term regional declines, and the aquifer is readily recharged by precipitation and hydraulic connection with surface waters.

Few groundwater-related environmental concerns have been documented in the Southeastern Lowlands Groundwater Province; however, contamination from agricultural inputs represents a potential concern, and periodic flooding or prolonged ponding may increase nutrient and pathogen transport under certain conditions (MDNR 2021). According to USEPA, no Sole Source Aquifers are located within the Subwatershed (USEPA 2024b).

Plants and Animals

Fish and Wildlife Habitat Conservation

The Project Area supports wildlife typical of agricultural and riparian landscapes, including white-tailed deer, coyote, rabbit, gray squirrel, bats, turtles, water snakes, frogs, otters, beavers, wild turkey, mourning doves, and waterfowl. The area lies within the Mississippi Flyway and provides habitat for migratory birds. Recreational fishing opportunities are limited to oxbow lakes, rivers, and bayous. Fish species known to occur include largemouth bass, smallmouth bass, catfish, drum, bluegill, gar, and yellow perch (NRCS 2022).

Threatened and Endangered Species

The Federal Endangered Species Act of 1973 (ESA) establishes protections for fish, wildlife, and plant species listed as threatened and endangered, and requires federal agencies to ensure that actions they authorize, fund, or carry out do not result in the “take” of listed species, except as permitted under the Act.

As part of Project planning, an updated official species list was obtained from the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool on June 30, 2026, to identify federally listed, proposed, and candidate species that may occur in the Project Area. The IPaC species list identified the following species as having potential occurrence:

- Indiana bat (*Myotis sodalis*) – Endangered
- Tricolored bat (*Perimyotis subflavus*) – Proposed Endangered
- Alligator snapping turtle (*Macrochelys temminckii*) – Proposed Threatened
- Monarch butterfly (*Danaus plexippus*) – Proposed Threatened

No areas of designated Critical Habitat were identified within the Project Area (Plan-Appendix A). Additional details on the official species list are provided in Table .

Table 6. Threatened and Endangered Species Listed in the Project Area

Scientific Name	Common Name	Federal Status	State Status	Findings	Potential Habitat or Population Present	Carried Forward for Analysis
Mammals						
<i>Myotis sodalis</i>	Indiana bat	E	E	Potentially suitable habitat observed in the Project Area.	yes	yes
<i>Perimyotis subflavus</i>	tricolored bat	PE	N/A	Potentially suitable habitat observed in the Project Area.	yes	yes
Reptiles						
<i>Macrochelys temminckii</i>	alligator snapping turtle	PT	N/A	Species unlikely to occur in the Project Area due to the degraded condition of the heavily sedimented drainage canals.	no	no
Insects						
<i>Danaus plexippus</i>	monarch butterfly	PT	N/A	Individual monarchs as well as suitable habitat were observed in the Project Area.	yes	yes

Sources: USFWS 2026 and MDC 2024a.

E = endangered, T = threatened, C = candidate species, PE = proposed endangered, PT = proposed threatened
The Missouri Department of Conservation Natural Heritage Review Report (MDC NHRR) dated February 18, 2025 indicated no federal or state-listed species or critical habitats documented within the Project Area. However, the NHRR noted that Indiana bats are known to occur in Stoddard County, although records are outside of the Subwatershed. Consistent with USFWS guidance, Indiana bats are assumed to be present wherever suitable habitat occurs (USFWS 2024b). A complete list of species is provided in Table . The NHRR report is included in Plan-Appendix A.

Table 7. State-Ranked Species in the Project Area

Scientific Name	Common Name	State Rank	Proximity to Watershed	Primary Habitat
Bird				
<i>Lanius ludovicianus</i>	Loggerhead Shrike	S2	<5-mi	Grassland matrix, Old field/shrub, Savanna pasture/orchard, Savanna
<i>Ixobrychus exilis</i>	Least Bittern	S3	<5-mi	Marsh
<i>Porzana carolina</i>	Sora	S2	<5-mi	Marsh, Moist edge/mudflat



Scientific Name	Common Name	State Rank	Proximity to Watershed	Primary Habitat
Fish				
<i>Erimyzon sucetta</i>	Lake Chubsucker	S2	<2-mi	River/stream, Swamp, Pond/lake/deep oxbows & slough
<i>Fundulus dispar</i>	Starhead Topminnow	S2	<5-mi	Swamp, Pond/lake/deep oxbows & slough, Shallow oxbow/slough
<i>Lepomis symmetricus</i>	Bantam Sunfish	S2	<5-mi	Swamp, Shallow oxbow/slough
<i>Notropis chalybaeus</i>	Ironcolor Shiner	S1	<2-mi	River/stream
<i>Notropis texanus</i>	Weed Shiner	S3	<1-mi	River/stream
Mammal				
<i>Sylvilagus aquaticus</i>	Swamp Rabbit	S2	<5-mi	Forrest bottomland, Wetland matrix
Amphibian				
<i>Pseudacris illinoensis</i>	Illinois Chorus Frog	S2	<1-mi	Sand prairie/savannah, Crop field, Ephemeral pools, Wet ditches
<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	S2	<5-mi	Grassland matrix, Ephemeral pools, Wet ditches
Reptile				
<i>Farancia abacura reinwardtii</i>	Western Mudsnake	S2	<5-mi	Forrest bottomland, Wetland matrix
Crustacean				
<i>Creaserinus fodiens</i>	Digger Crayfish	S2S3	<3-mi	Wetland matrix, River/stream
Insect				
<i>Satyrodes appalachia leeuwi</i>	Appalachian Eyed Brown	S1	<5-mi	Woodland, Swamp
<i>Euphyes dukesi</i>	Duke's Skipper	S1	<4-mi	Shrub swamp, Shallow oxbow/slough, Swamp
Plant				
<i>Carex albolutescens</i>	Greenish-white Sedge	S1S2	<5-mi	Fen/seep, Forest bottomland, Wet ditches
<i>Carex reniformis</i>	Reniform Sedge	S1	<5-mi	Forest bottomland
<i>Carex oxylepis</i>	Sharp-scale Sedge	S2	<1-mi	Forest matrix
<i>Carex triangularis</i>	Triangular Sedge	S2	<4-mi	Swamp, Forest bottomland, Roadside/railroad
<i>Limnosciadium pinnatum</i>	Pinnate Dogshade	S1	<5-mi	Glade complex, Grassland native prairie, Roadside/railroad

Scientific Name	Common Name	State Rank	Proximity to Watershed	Primary Habitat
<i>Peltandra virginica</i> <i>ssp. Virginica</i>	Arrow Arum	S2	<5-mi	Wet ditches, Shallow oxbow/slough, Moist edge/mudflat
<i>Physostegia intermedia</i>	A False Dragonhead	S1	<5-mi	Wet ditches, Fen/seep, Swamp, Roadside/railroad
<i>Pycnanthemum muticum</i>	Blunt Mountain Mint	S2	<3-mi	Forest bottomland, Wet ditches, Swamp, Fen/seep
<i>Spermolepis diffusa</i>	Rough-fruit Spermolepis	S1	<4-mi	Grassland native prairie, Roadside/railroad
<i>Wolffiella gladiata</i>	Wolffiella	S1	<5-mi	Pond/lake/deep oxbows & slough

Source: MDC 2025.

S1: Critically Imperiled: Critically imperiled in the state because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.

S2: Imperiled: Imperiled in the state because of rarity due to very restricted range, very few populations or occurrences, steep declines, or other factors making it very vulnerable to extirpation from the state.

S3: Vulnerable: Vulnerable in the state due to a restricted range, relatively few populations or occurrences, recent and widespread declines, or other factors making it vulnerable to extirpation.

S#S#: Range Rank: A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species.

A field assessment conducted in November 2024 identified trees with potential summer roosting characteristics for Indiana and tricolored bats. Although the field assessment occurred outside of the milkweed growing season, conditions along ditch banks were generally suitable for milkweed establishment, indicating potential monarch habitat.

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) as well as the Migratory Bird Treaty Act (MBTA). Bald and golden eagles are both known to exist in the watershed. No other MBTA-protected migratory birds were identified as potentially occurring in the Project Area. Eagle and migratory bird species potentially occurring in the watershed as identified in the USFWS IPaC review are listed in Table . During the field assessment, habitat for migratory birds was observed, and several shorebirds were observed along the drainage laterals in the Project Area. Bald eagles were not observed within or adjacent to the Project Area.

Table 8. Eagles and Migratory Birds Listed in the Project Area

Scientific Name	Common Name	Breeding Season
<i>Haliaeetus leucocephalus</i>	bald eagle	Breeds September 1 to July 31
<i>Chaetura pelagica</i>	chimney swift	Breeds Mar 15 to Aug 25
<i>Geothlypis formosa</i>	Kentucky warbler	Breeds Apr 20 to Aug 20
<i>Tringa flavipes</i>	lesser yellowlegs	Breeds elsewhere
<i>Egretta caerulea</i>	little blue heron	Breeds Mar 10 to Oct 15
<i>Calidris melanotos</i>	pectoral sandpiper	Breeds elsewhere

<i>Setophaga discolor</i>	prairie warbler	Breeds May 1 Jul 31
<i>Protonotaria citrea</i>	prothonotary warbler	Breeds Apr 1 to Jul 31
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	Breeds May 10 to Sep 10
<i>Euphagus carolinus</i>	rusty blackbird	Breeds elsewhere

Source: USFWS 2026.

Invasive Species

Developing a comprehensive list of invasive species with the potential to occur within the Subwatershed is challenging due to the large number of species involved, the inclusion of multiple taxa (e.g., terrestrial plants and aquatic organisms), and variations in how “invasive species” are defined. As a result, this assessment focuses on species documented within the Project Area during field investigations.

During the November 2024 field assessment, several invasive plant species were documented within the Project Area, including autumn olive (*Elaeagnus umbellata*), Japanese hop (*Humulus japonicus*), and sericea lespedeza (*Lespedeza cuneata*). In addition, Johnsongrass (*Sorghum halepense*), which is designated as a noxious weed by the Missouri Department of Agriculture (MDA 2025), was documented. A complete list of vegetation recorded during the field assessment, including invasive species, is provided in Table .

Table 9. Vegetation Observed in the Project Area

Scientific Name	Common Name	Wetland Indicator Status (AGCP Region ¹)	Native (N) or Introduced (I)
Scattered trees adjacent to drainage canals			
<i>Acer saccharinum</i>	silver maple	FAC	N
<i>Gleditsia tricanthos</i>	honey locust	FAC	N
<i>Populus deltoides</i>	cottonwood	FAC	N
<i>Platanus occidentalis</i>	sycamore	FACW	N
<i>Salix nigra</i>	black willow	OBL	N
Herbaceous vegetation along ditch slopes – includes scrub-shrub species and young saplings			
<i>Albizia julibrissin</i>	Mimosa	N/A	I
<i>Amaranthus spinosus</i>	spiny amaranth	FACU	N
<i>Ambrosia trifida</i>	ragweed	FAC	N
<i>Andropogon gerardii</i>	big bluestem	FAC	N
<i>Anoda cristata</i>	crested anoda	FAC	N
<i>*Arundinaria gigantea</i>	giant cane	FACW	N
<i>Asclepias syriaca</i>	common milkweed	UPL	N
<i>Campsis radicans</i>	trumpet creeper	FAC	N
<i>Cephalanthus occidentalis</i>	buttonbush	OBL	N
<i>Elaeagnus umbellata</i>	autumn olive	UPL	I
<i>Equisetum hyemale</i>	rough horsetail	FACW	N



Scientific Name	Common Name	Wetland Indicator Status (AGCP Region ¹)	Native (N) or Introduced (I)
<i>Fallopia scandens</i>	climbing false buckwheat	FAC	N
<i>Gleditsia triacanthos</i>	honeylocust	FAC	N
<i>Humulus japonicus</i>	Japanese hop	FAC	I
<i>Lespedeza cuneata</i>	sericea lespedeza	FACU	I
<i>Morus alba</i>	white mulberry	FACU	I
<i>Oenothera pilosella</i>	meadow evening primrose	FACU	N
<i>Panicum virgatum</i>	switchgrass	FAC	N
* <i>Persicaria amphibia</i>	water smartweed	OBL	N
* <i>Persicaria hydropiperoides</i>	swamp smartweed	OBL	N
* <i>Persicaria pensylvanica</i>	pinkweed	FACW	N
<i>Phalaris arundinacea</i>	reed canarygrass	OBL	N
<i>Potamogeton sp.</i>	pondweed	OBL	N
<i>Rhus glabra</i>	smooth sumac	UPL	N
<i>Ranunculus repens</i>	creeping buttercup	FACU	I
<i>Rumex crispus</i>	curly dock	FAC	I
<i>Setaria faberi</i>	giant foxtail	UPL	I
<i>Setaria pumila</i>	yellow foxtail	FAC	I
<i>Solidago altissima</i>	tall goldenrod	FACU	N
<i>Sorghum halepense</i>	johnsongrass	FACU	I
<i>Toxicodendron radicans</i>	poison ivy	FAC	N
<i>Vernonia missurica</i>	Missouri ironweed	FAC	N
* <i>Typha latifolia</i>	broadleaf cattail	OBL	N

Sources: USACE 2010

FAC = facultative, FACU = facultative upland, FACW = facultative wetland, UPL = upland, OBL = obligate

*Primarily found at toe of ditch slope or in erosive areas of sloughing.

AGCP = Atlantic and Gulf Coastal Plain Region

Natural Areas

No designated Natural Areas occur within the Project Area. MDC and conservation partners have also identified Conservation Opportunity Areas (COAs), which are priority landscapes important for sustaining wildlife populations and associated ecological systems. Conservation Opportunity Areas differ from MDC Conservation Areas in that COAs represent broad priority landscapes intended to guide voluntary conservation efforts, whereas Conservation Areas are discrete properties managed for public use and habitat objectives. The Malden Terrestrial COA occurs within the Project Area (Plan-Appendix A). COAs within or near the Subwatershed are depicted in Plan-Appendix C, Figure 10 (MDC 2024a, 2024b).



Riparian Areas

Riparian functions within the Project Area are primarily associated with the drainage ditch network. Historic bottomland hardwood forests and floodplain wetlands were largely removed or modified through land clearing and channelization. As a result, existing riparian areas are generally narrow and fragmented, consisting primarily of herbaceous vegetation with scattered trees and limited native woody cover (NRCS 2022).

Human Environment

Socioeconomic Issues

According to the U.S. Census Bureau (USCB) American Community Survey (ACS), Stoddard County has a population of approximately 28,400, with agriculture comprising over 80 percent of total land area and representing a primary driver of the local economy (USGS 2021, USCB 2023a). In 2021, agricultural activities contributed approximately 74 percent of household income within Stoddard County (MDA 2021, USCB 2023a).

Socioeconomic indicators show a median household income of \$51,700, with approximately 17 percent of households living below the poverty level and approximately 18 percent of the population having attained less than a high school diploma. By comparison, Missouri's statewide median household income is \$61,043, with approximately 13 percent of households living below the poverty level and approximately eight percent of the population having attained less than a high school diploma (USCB 2023a–p). Additional regional socioeconomic data are provided in Table 1 and 11.

Table 1. Household Age and Income; Persons Below Poverty Line

Geography	Population	Median Age	Number of Households	Per Capita Income	Median Household Income	Persons Below Poverty Line
State of Missouri	6,168,000	38.9	2,485,000	\$34,400	\$61,043	12.6%
Stoddard County	28,400	41.3	11,600	\$27,400	\$51,700	16.5%
Malden	3,818	38.6	1,554	\$22,813	\$38,786	23.3%
Bernie	1,872	48.2	760	\$22,014	\$42,417	17.2%

Source: USCB 2023 a,b,i,j,n,o

Table 2. Per Capita and Median Household Income (MHI)

Geography	Per Capita Income	MHI ¹	MHI < \$50,000	MHI \$50,000-\$100,000	MHI \$100,000-\$200,000	MHI > \$200,000
State of Missouri	\$34,400	\$61,043	36.5%	30.8%	24.6%	8.1%

Geography	Per Capita Income	MHI ¹	MHI < \$50,000	MHI \$50,000-\$100,000	MHI \$100,000-\$200,000	MHI > \$200,000
Stoddard County	\$27,400	\$51,700	47.1%	31.7%	19.2%	2.0%
Malden	\$22,813	\$38,786	60.9%	26.9%	9.7%	2.5%
Bernie	\$22,014	\$42,417	55.4%	30.4%	13.8%	0.4%

Sources: USCB 2023 a,b; Census Reporter 2023

Regarding educational attainment, the population in the county has lower levels of higher education than the state average (Table 12).

Table 12. Educational Attainment

Geography	Population	High School Diploma or Higher	Bachelor's Degree or Higher
State of Missouri	6,168,000	91.6%	33.2%
Stoddard County	28,400	82.4%	16.4%
Malden	3,818	80.9%	8.4%
Bernie	1,872	41.4%	15.0%

Sources: USCB 2023 f,g,i; Census Reporter 2023

Regarding housing, the percentage of owner-occupied housing in Stoddard County and the town of Bernie is generally in line with the state average. However, Malden has a lower owner-occupied rate (Table 13).

Table 33. Occupied Housing Units by Tenure

Geography	Households	Owner Occupied	Renter Occupied
State of Missouri	2,485,000	67.9%	32.1%
Stoddard County	11,600	70.7%	29.3%
Malden	1,554	51.5%	48.5%
Bernie	760	68.4%	31.7%

Sources: USCB 2023 d,f,g,k,p; Census Reporter 2023

Regarding race in the Subwatershed, the area is predominantly White with little diversity (Table 14).

Table 14. Racial and Ethnic Composition

Geography	Population	White	Black	Hispanic	Other
State of Missouri	6,168,000	4,737,581	680,587	311,924	437,908
Stoddard County	28,400	26,586	275	597	942
Malden	3,818	2,986	528	162	142



Geography	Population	White	Black	Hispanic	Other
Bernie	1,872	1,592	33	65	182

Sources: USCB 2020 ; USCB 2023 f,g,l; Census Reporter 2023

The median population age of the county is in line with state averages; however, the population aged 65 years and older is slightly higher in the county. The town of Bernie is the exception, with a higher median age than the county and state. The city also has a higher proportion of residents aged 65 years and over compared to the other towns, Stoddard County, and the State of Missouri (Table 15).

Table 15. Age Distribution

Geography	Median Age ¹	Under 18 Years ²	18 Years and Over ²	65 Years or Over ²
State of Missouri	38.9	22.5%	60.0%	17.5%
Stoddard County	41.3	22.3%	57.3%	20.4%
Malden	38.6	28.1%	54%	17.9%
Bernie	48.2	19.1%	56.3%	24.7%

Sources: USCB 2023 g,l; Census Reporter 2023

In summary, the county and towns within the Subwatershed are generally less populated, less educated, less diverse, and have a higher percentage of individuals living below the poverty line than state averages.

Recreation

There are a variety of outdoor recreation opportunities in the watershed, including Morris State Park. Morris State Park is owned and managed by MDC and is open to the public for recreational use (MDC 2024b).

Morris State Park is located at the base of Crowley's Ridge in the southwestern portion of the Subwatershed. This Ridge is a geographical oddity rising 200-ft above the Mississippi River floodplain. It contains unusual soil types and more than 300 different types of plant species. The area also provides habitat for over 80 different bird species and has various trails available for public use.

Public Health and Safety

Communities in proximity to the Project Area include Dexter, Bernie, and Malden, which are connected by local and state roadways crossing the drainage system. Major transportation routes serving the region include Missouri State Highway 25 and Missouri State Highway U.

Residents rely on these roadways for access to schools, employment, medical services, and other essential services. Flood-related roadway inundation presents a public safety hazard and may delay emergency response services, increasing risks to residents within and adjacent to the Project Area (NRCS 2022).



Potable Water Supply

Based on MDNR data, the Project Area includes approximately 312 active wells, nine drinking water wells, 11 tanks, and three public drinking water supply wells (MDNR 2024c,d). Public drinking water systems serving the Subwatershed include Stoddard County Public Water Supply District No. 6 and Dunklin County Public Water Supply District No. 1 (MDNR 2024e).

Groundwater levels are generally stable due to consistent recharge from precipitation and hydraulic connectivity with the Mississippi River, although localized drawdown may occur near high-capacity irrigation wells during peak demand. Groundwater from the alluvial aquifer generally meets potable supply criteria, although treatment may be required for naturally occurring constituents such as calcium, iron, sulfate, sodium, and manganese (MDNR 2024e).

Energy Use

Energy use within the Project Area is primarily associated with agricultural water management, including irrigation and drainage operations. Although gravity-fed systems are used where feasible, flat topography and soil conditions often require electric- or fuel-powered pumping systems to deliver irrigation water during dry periods and remove excess water during wet conditions (NRCS 2022). Energy consumption associated with these activities represents an ongoing operational requirement for agricultural producers and is directly related to drainage system performance.

Historical and Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects of undertakings on historic properties and to provide the Missouri State Historic Preservation Office (SHPO) an opportunity to comment.

A literature review for previously recorded cultural resources and an archeological and architectural survey was conducted for the Area of Potential Effects (APE) in December 2024. The APE was based on the initial scope and design of the proposed project. Through Section 106 consultation, the APE was further refined and is defined as approximately 56,067 square meters (m), encompasses approximately 13.8-ac and including construction footprints, borrow areas, access routes, staging areas, and locations of potential indirect or visual effects.

Review of the historical and archival records found no known archaeological sites or historic structures within or adjacent to the APE. One architectural resource (AR-1) greater than 50 years of age was identified. A pedestrian survey completed on December 5, 2024, identified no archeological sites or cultural features. AR-1 was evaluated and determined as not eligible for listing due to lack of historic and architectural significance.

Based on these findings, NRCS issued a determination of No Adverse Effect pursuant to 36 CFR 800.5(b), and the Missouri SHPO concurred by letter dated March 27, 2025, (Plan-Appendix A). Tribal consultation letters were distributed on October 21, 2024, and no comments were received. No additional archaeological investigations are recommended. A summary of findings is provided in Plan-Appendix D, Section D9, and the complete Cultural Resources Report is included in Plan-Appendix E.



See **National Historic Preservation Act – Section 106 Review** below for more details.

Provisioning Services

The Subwatershed provides provisioning ecosystem services primarily through the production of food, fiber, and biofuel crops. Cotton, soybeans, and corn are the dominant commodity crops produced and together accounted for approximately 97 percent of the cultivated farmland acreage within the Subwatershed in 2024. Cotton accounted for approximately 45 percent of cultivated acreage and is produced primarily for fiber, while corn and soybeans are commonly used for livestock feed and biofuel production (NASS 2025b). Winter wheat, peanuts, and specialty crops represent a smaller portion of total production.

Existing drainage infrastructure supports these provisioning services by providing flood protection and water management for approximately 17,000-ac of cropland within the Subwatershed. Farms in Stoddard County average approximately 655-ac in size, underscoring the importance of effective drainage systems for maintaining agricultural productivity and economic viability.

Regulating Services

Regulating ecosystem services in the Subwatershed, including flood attenuation, erosion control, and water quality regulation, have been substantially altered by historical conversion of wetlands and bottomland forests to agriculture. The managed drainage system provides some regulation of water quantity, flow velocity, erosion, and sediment transport; however, aging infrastructure and sediment accumulation have reduced system performance.

Many drainage ditches lack vegetated buffers capable of filtering sediment, nutrients, and agricultural contaminants from adjacent cropland. Adoption of soil health practices such as cover crops and reduced tillage remains limited in portions of the Subwatershed. Native riparian vegetation and pollinator habitat are minimal. Because approximately 87 percent of land use is agricultural, crop pollination represents an important regulating service, with pollinators contributing to an estimated 35 percent of global food crops (USDA 2024).

Cultural Services

Cultural ecosystem services within the Subwatershed include recreation, heritage values, and outdoor activities. Hunting contributes to Missouri's cultural heritage and economy, with more than 500,000 participants statewide accounting for approximately 10 million hunter-days annually (HWMO 2024). Southeast Missouri is recognized for waterfowl hunting due to regional landscape characteristics and migratory bird use (SMSG 2024).

One Conservation Area managed by the MDC (Otter Slough Conservation Area) is located approximately 5-mi west of the Project Subwatershed. Waterfowl observation is an encouraged activity within the area, as this approximately 4,866-ac area attracts nearly 60,000 ducks and 250,000 snow geese (MDC 2024b). The City of Dexter maintains Dexter Lake, an approximately 11-ac fishing lake that provides handicap-accessible recreational opportunities (City of Dexter 2008).



Environmental Impacts

What are the reasonably foreseeable short- and long-term and adverse or beneficial effects of the proposed action and alternatives (if any) on the environment, to public health and safety, on economics, and to the quality of life of the American people?

Soils

Erosion and Sedimentation

for the Proposed Action, the combined approach of full-bank riprap, parallel subsurface drains, and vegetative buffers would stabilize banks, reducing headcutting and slumping. Regraded sediment and vegetative buffers would limit surface runoff and decrease sediment deposition within the ditches. Improved bank stability may reduce turbidity and sedimentation downstream. The introduction of riprap and armoring may produce minor scouring upstream and downstream of implementation. Sedimentation upstream and downstream of the riprapped section could increase as erosional headcuts develop. These potential negative effects would be minimized through the existing ditch geometry and the planned use of armor and slope stabilization techniques. Cumulatively, implementation of this alternative may provide regional sediment reduction downstream.

Prime and Unique Farmland and Farmland of Statewide Importance

Under the Proposed Action, bank toe and side-slope armoring, parallel subsurface drainage, and vegetative buffers would stabilize drainage ditches and protect Prime Farmland adjacent to treated reaches. These measures would reduce soil loss from field margins, limit lateral bank migration into cropland, and decrease the potential for headcutting and bank failure, thereby preserving farmland immediately adjacent to stabilized ditches. Hydraulic modeling of the 100-year floodplain indicates that Alternative 2 generally reduces flood extent and duration across much of the Subwatershed, while identifying limited locations where localized increases or decreases in flood depth or inundation extent may occur. These localized changes are associated with redistribution of flows within the existing drainage network and site-specific hydraulic controls such as channel geometry, crossings, and stabilization features. Localized sediment redistribution may occur near armored reaches, including sediment deposition upstream or localized scour downstream of riprap installations. Where present, these effects would be confined to discrete segments and would not alter overall system performance. Overall, Alternative 2 is expected to result in a net beneficial effect on Prime Farmland by reducing erosion rates, sediment delivery, and long-term flood impacts.

Air Quality

The Proposed Action would result in short-term, localized increases in air pollutant emissions from heavy equipment during installation. These emissions would be temporary and limited to the construction period.

Over the long term, air quality impacts are expected to be neutral to positive. The establishment of native vegetation and bank stabilization would reduce wind erosion of bank soils, thereby decreasing dust generation. In addition, riprap could also have positive long-term effects on air



quality, as it would lead to decreased use of heavy equipment in regular maintenance of eroding ditch banks, resulting in reduced long-term emissions compared to the No Action Alternative.

Water

Floodplain Management

Under the Proposed Action, bank stabilization and associated measures would increase conveyance capacity within treated reaches and reduce sediment inputs from unstable banks. These improvements would not occur uniformly across the Project Area but would generally improve drainage performance in stabilized segments. Parallel subsurface drains would lower localized groundwater levels adjacent to treated reaches, reducing ponding in those areas.

Hydraulic modeling of the 100-year floodplain indicates that Alternative 2 generally reduces flood extents and duration across much of the Project Area, while identifying limited, discrete locations where flood depth or inundation extent increases relative to the FWOFI condition. These localized increases reflect redistribution of flows within the existing drainage network and are influenced by site-specific hydraulic controls, including channel geometry, crossings, outlet discharges, and stabilization features.

Localized sediment redistribution may occur adjacent to armored reaches, including upstream deposition or downstream scour. Where present, these effects would be confined to discrete segments and would not alter overall system performance. Across the Project Area, Alternative 2 is expected to result in a net beneficial effect on floodplain management by reducing long-term bank instability, sediment accumulation, and overall flood duration, while localized increases in flooding may occur near stabilized reaches.

Waters of the U.S. (Streams, Lakes, and Wetlands)

The Proposed Action could result in short-term, localized disturbances to WOTUS during construction, including temporary increases in turbidity and localized displacement of benthic organisms associated with excavation, grading, and armoring activities. Effects would be short-term and confined to active work areas. Indirect effects could include localized changes in sediment transport and hydraulic conditions near stabilized ditches following installation of permanent armoring.

Over the long term, bank stabilization and reduced erosion would decrease sediment inputs and improve channel stability within treated segments. Localized adverse effects may occur where altered hydraulics result in upstream sediment deposition or downstream scour adjacent to armored sections; these effects would be confined to discrete reaches.

When evaluated at the watershed scale, cumulative effects on streams and mapped wetlands are expected to be minor to beneficial, as reductions in bank erosion and sediment delivery would partially offset ongoing impacts associated with regional agricultural drainage and land management.



Surface Water Quantity

Under the Proposed Action, stabilized portions of the drainage system would convey floodwaters more efficiently, reducing ponding and flood duration in many areas. Improved conveyance and reduced sediment accumulation would benefit agricultural lands, roadways, and infrastructure within treated reaches. Parallel subsurface drains would further reduce localized ponding by lowering shallow groundwater levels adjacent to stabilized segments. Effects would be short-term and confined to active work areas. As described in Section 6.2.2, localized changes in flood depth or extent may occur in limited areas due to redistribution of flows.

Across the Project Area, the Proposed Action is expected to result in a net beneficial effect on surface water quantity by reducing long-term sediment accumulation, improving drainage efficiency, and decreasing overall flood duration, despite localized increases in flooding near treated segments.

Surface Water Quality (Clean Water Act)

The Proposed Action could reduce bank erosion and sediment delivery in treated reaches, which may lower turbidity and sediment-associated transport of nutrients and contaminants. These changes are expected to support incremental water quality improvements over time, including reduced sediment loading consistent with the sediment TMDL framework.

Short-term construction effects could include localized increases in suspended sediment and turbidity within active work areas. In addition, riprap may cause localized sediment redistribution near armored reaches (e.g., minor deposition upstream or scour downstream) due to site-specific hydraulic adjustments. Effects would be short-term and confined to active work areas.

Overall, The Proposed Action is expected to have a net beneficial effect on surface water quality by reducing sediment loading and improving channel stability, despite localized short-term construction effects and limited reach-scale hydraulic adjustments.

Regional Watershed Management Plans

The Proposed Action would have no impact on the Missouri Water Resources Plan as developed by MDNR.

Ground Water and Sole Source Aquifers

Under the Proposed Action, effects on groundwater quality would be minor. Reduced surface ponding and improved drainage within stabilized reaches would slightly alter shallow subsurface hydrologic conditions adjacent to treated ditches. These changes may reduce the duration of saturated conditions and associated nutrient transport to shallow groundwater in localized areas.

Localized changes in infiltration patterns may occur where banks are armored or regraded; however, these effects would be limited in extent and would not be expected to result in measurable degradation of groundwater quality. Effects would be short-term and confined to active work areas. Overall, groundwater conditions are expected to remain stable, with localized



indirect effects generally neutral to slightly beneficial due to improved surface water management.

Plants and Animals

Fish and Wildlife Habitat and Conservation

The Proposed Action may result in temporary, localized disturbance to aquatic and riparian habitats during construction, including vegetation removal and short-term increases in turbidity within active work areas. Wildlife species may be temporarily displaced from these areas during installation activities. Effects would be short-term and confined to active work areas. As described in Section 6.2.2, localized changes in flood depth or extent may occur in limited areas due to redistribution of flows.

Over the long term, the Proposed Action is expected to result in net beneficial effects to habitat conditions. Bank stabilization and reduced sedimentation would improve aquatic conditions within stabilized reaches. Establishment of vegetative buffers would increase plant diversity along ditch corridors and provide enhanced pollinator and terrestrial wildlife habitat. Overall, benefits associated with erosion control and vegetative establishment are expected to outweigh localized adverse effects.

Threatened and Endangered Species

The Proposed Action may result in minor, short-term direct effects associated with construction-related disturbances, including temporary increases in turbidity, noise, and human activity within active work areas. These effects would be localized and temporary. Effects would be short-term and confined to active work areas.

Field assessments identified minimally suitable habitat for federally listed bat species within the Project Area. Limited tree removal may be required, which could result in temporary disturbance or loss of marginal roosting habitat. These effects would be localized and short term.

Over the long term, effects are expected to be neutral to slightly beneficial due to reduced erosion and sedimentation and improved habitat continuity along stabilized drainage corridors.

Agency coordination indicates no documented occurrences of federally listed species or designated critical habitat within the Project Area. Based on available information, effects are insignificant or discountable for federally listed species.

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

Effects to migratory birds would be consistent with those described for wildlife habitat above and would be short-term and confined to active work areas.

Over the long term, stabilized banks and vegetated buffers may increase habitat continuity along drainage corridors and provide additional foraging and cover opportunities for migratory birds. Bald eagles observed in the Project Area primarily utilize larger regional water bodies; therefore, long-term effects to eagles would be minimal.



Across the Project Area, the Proposed Action would result in neutral to minor beneficial effects for migratory birds through incremental increases in linear vegetative cover, while effects to bald eagles would be negligible.

Invasive Species

The Proposed Action would result in short-term, localized increases in invasive species potential associated with soil disturbance and equipment activity during construction. Disturbed soils within active work areas could provide favorable conditions for invasive species documented during field assessments, including Johnsongrass (*Sorghum halepense*), Japanese hop (*Humulus japonicus*), and sericea lespedeza (*Lespedeza cuneata*). These effects would be localized and temporary. Effects would be short-term and confined to active work areas.

Indirect effects could occur if invasive species establish within disturbed areas before native vegetation becomes established, resulting in localized reductions in habitat quality. Over the long term, stabilized banks and reduced erosion would decrease the frequency of bare soil exposure, which is a primary driver of invasive species establishment.

Overall, cumulative effects are expected to be neutral to minor beneficial, as reduced erosion and stabilized ditch banks would limit conditions that favor continued invasive species colonization.

Natural Areas

No Missouri Natural Areas or COAs occur within the Project Area. All proposed activities would be confined to previously disturbed drainage corridors and adjacent agricultural lands. Implementation of the Proposed Action would not affect the condition, integrity, or management objectives of nearby Natural Areas or COAs.

Riparian Areas

The Proposed Action may result in short-term, localized disturbance to riparian vegetation and soils within active work areas during construction. Effects would be short-term and confined to active work areas.

Over the long term, bank stabilization and vegetative establishment may increase riparian vegetation cover within treated reaches and reduce ongoing erosion. Indirect effects would include localized improvements in water quality and reductions in sediment and nutrient delivery adjacent to stabilized segments. Localized adverse effects may occur where altered hydraulics influence sediment redistribution near armored reaches.

Overall, the Proposed Action is expected to result in net beneficial effects to riparian function through reduced erosion and expanded vegetative cover, despite localized short-term disturbances and isolated hydraulic adjustments.

Human Environment

Socioeconomic, Social and Cultural Issues



The Proposed Action may result in short-term economic activity associated with construction-related labor, materials, and equipment use. No displacement of residents or long-term access restrictions are anticipated.

Over the long term, improved drainage efficiency and reduced bank erosion would help preserve productive farmland and stabilize agricultural income. Reduced flood frequency and duration would improve roadway reliability and access to essential services and reduce flood-related damage to property and infrastructure.

Recreation

Implementation of the Proposed Action would occur primarily on privately owned agricultural lands where formal recreational facilities are not present. No direct adverse impacts to designated recreational areas are anticipated. Temporary construction-related disturbances, including noise and equipment activity, may limit informal recreational uses such as hunting or wildlife observation within active work areas; however, these effects would be localized and short term.

Over the long term, improved riparian stability and vegetative establishment may enhance habitat conditions within treated reaches, potentially supporting wildlife species utilized for hunting and wildlife observation. When evaluated at the watershed scale, recreational effects are expected to be neutral to minor beneficial.

Public Health and Safety

The Proposed Action may result in short-term, localized safety risks associated with construction activities, including heavy equipment operation and increased vehicle traffic within active work areas.

Over the long term, improved drainage performance and reduced bank erosion would generally decrease flood-related disruptions to roadways and surrounding properties. As described in Section 6.2.2, localized changes in flood depth or extent may occur in limited areas due to redistribution of flows.

Reduced sediment accumulation and improved drainage efficiency may decrease the frequency and duration of standing water in many areas, which may reduce localized public health concerns associated with prolonged ponding. Overall, Alternative 2 is expected to result in net beneficial effects on public health and safety through reduced flood-related disruptions, despite localized increases in flooding near stabilized reaches.

Potable Water Supply

Short-term soil disturbance during construction could generate localized sediment runoff. Direct adverse effects to municipal or private drinking water wells are not anticipated, as construction would occur within existing drainage corridors and agricultural fields and would not involve deep excavation near potable water wells. Effects would be short-term and confined to active work areas.

Indirect effects are expected to be neutral to minor beneficial. Reduced bank erosion and sedimentation would decrease sediment- and nutrient-associated contaminant loading to surface



waters and adjacent recharge areas. Vegetative buffers and stabilized banks may incrementally reduce contaminant transport to shallow groundwater in localized areas.

Overall, effects on potable water supplies are expected to be negligible to minor beneficial.

Historical and Cultural Resources

Implementation of the Proposed Action would occur within previously disturbed drainage corridors and the established APE. Based on the results of cultural resources surveys, NRCS determination and consultation with the Missouri SHPO, no historic properties would be adversely affected. The proposed activities are consistent with ongoing maintenance and improvements to the drainage system and would not alter the characteristics that define the historic integrity of identified resources. Therefore, no change to existing conditions and no adverse effects to historic or cultural resources are anticipated.

Energy Use

Implementation of the Proposed Action would result in a short-term increase in energy consumption during construction activities due to the operation of heavy equipment, transportation of materials, and installation of stabilization measures.

Indirect and long-term effects are expected to be beneficial. Following construction, stabilized banks, vegetative buffers, and improved drainage efficiency may reduce erosion, sedimentation, and the frequency of maintenance activities. As a result, long-term energy use associated with ditch maintenance, sediment removal, and emergency repairs would be reduced compared to the No Action Alternative.

Cumulative effects are expected to be beneficial, as reduced maintenance demands and improved system performance would contribute to lower long-term energy consumption and increased operational efficiency across the drainage system and surrounding agricultural landscape.

Provisioning Services: Food, Fiber, and Biofuel Production and Water Use and Management

The environmental consequences of the Proposed Action on agricultural resources are addressed in previous sections from the perspective of soils, including erosion and sedimentation and impacts to Prime Farmland, Unique Farmland, and Farmland of Statewide Importance. When evaluated more broadly as provisioning services, impacts to food, fiber, and biofuel production involve multiple interacting variables, including crop type, location relative to drainage improvements, and the frequency and magnitude of flooding events. As such, precise quantification of impacts to individual agricultural commodities is not practicable.

The Proposed Action is expected to provide beneficial effects to agricultural production in areas adjacent to stabilized ditch reaches by reducing erosion-related loss of farmland and improving drainage efficiency. In most locations, these improvements would be expected to decrease flood-related crop damage; however, planning-level hydraulic modeling indicates the potential for localized increases in flood extent in limited areas. The degree of benefit to food, fiber, and biofuel production would vary depending on crop types, location relative to modified reaches, and site-specific hydraulic conditions.



Vegetative buffers would provide secondary benefits by filtering agricultural runoff, enhancing soil organic matter, and supporting pollinator habitat, all of which contribute to sustained agricultural productivity. Bank armoring and erosion control would reduce downstream sediment and nutrient transport, improving surface water quality and increasing the reliability of water resources used for irrigation and livestock.

Similar benefits apply to potable water supplies. The Proposed Action would reduce the transport of nutrients and agricultural chemicals to groundwater through improved drainage performance and vegetative filtration. The extent of benefit to individual wells would depend on hydrogeologic conditions, proximity to affected recharge areas, and the overall effectiveness of the selected alternative.

Regulating Services: Flood Control and Potable Water Supply

The Proposed Action would provide measurable benefits by improving water quality, enhancing floodwater conveyance, and supporting more effective management of surface and subsurface water for flood reduction and agricultural use.

Improved water regulation under the Proposed Action would have positive effects on other regulating services, including reduced erosion and sedimentation, enhanced habitat function, improved pollination services, and reductions in public safety risks associated with flooding. These improvements also support broader socioeconomic benefits, including increased agricultural resilience, reduced infrastructure damage, and improved energy efficiency associated with drainage system O&M.

As with provisioning services, the magnitude and distribution of these benefits would vary by location, resource type, and the effectiveness of the selected alternative.

Cultural Services: Recreation Opportunities, and Historical and Cultural Resources

The Proposed Action would not result in adverse effects to historic or cultural resources and is expected to provide neutral to beneficial effects on recreational opportunities.

Improvements to riparian habitat quality, water clarity, and wildlife presence would enhance informal recreational activities such as wildlife viewing, hunting, and nature appreciation where access is permitted. These benefits would occur incrementally over time and would be influenced by land ownership, access limitations, and the pace of vegetation establishment.

What are the negative environmental impacts or consequences to public health and safety, economics, or the quality of life of the American people if the proposed action or alternatives (if any) are not implemented?

Soils

Erosion and Sedimentation

Under the No Action/FWOFI, sheet, rill, and gully erosion from cultivated fields would continue to deliver sediment to the drainage ditches. Concentrated flow at field overfalls would persist, allowing gully headcuts to migrate upslope and contributing to continued soil loss from agricultural lands. Sediment deposition within ditches would further reduce conveyance efficiency and increase maintenance needs. These conditions would occur in the short term and



are expected to worsen over time as erosion and sediment accumulation continue. Although the Sponsor would likely continue routine sediment removal as part of ongoing O&M such activities would be limited to in-ditch material above the ordinary high water mark and would not address upland erosion sources or ongoing soil loss from agricultural fields.

Prime and Unique Farmland and Farmland of Statewide Importance

Under the No Action/FWOFI alternative, existing conditions would persist. Routine maintenance activities within the West Ditch – Main Ditch system would continue but would not address ongoing bank erosion, sedimentation, or declining drainage capacity. Over time, ditch banks would continue to erode laterally into adjacent fields, resulting in loss of Prime Farmland, increased sediment delivery, and more frequent and prolonged flooding of agricultural lands. Soil-bound nutrients would continue to be lost through erosion, reducing soil health and nutrient cycling efficiency and contributing to degraded water quality. Standing water would continue to pool on Prime Farmland following flood events due to reduced system capacity and degraded drainage infrastructure.

Air Quality

Under the No Action/FWOFI alternative, existing air quality conditions would persist. The counties in the Project Area are not designated as nonattainment areas for NAAQS. There could be temporary localized increases in air pollutant emissions from heavy equipment during routine O&M activities, including sediment removal and reshaping of ditch bank walls following flood events. Since the ditch walls are not armored by rock or vegetation, heavy equipment would be needed more often to address erosion from flood events, resulting in periodic short-term emissions.

Water

Floodplain Management

Under the No Action/FWOFI alternative, existing floodplain conditions would persist. O&M activities would continue but would not address declining conveyance capacity or ongoing channel degradation. Flooding would continue to affect agricultural land, property, and infrastructure, and flood frequency and duration would likely increase over time as sediment accumulation and bank instability further reduce channel capacity.

Waters of the U.S. (Streams, Lakes, and Wetlands)

Under the No Action/FWOFI alternative, existing conditions would persist. Following flood events, previously removed sediment and eroding ditch banks would continue to contribute sediment to streams (ditches), adversely impacting water quality and aquatic habitat. Ponding would occur on agricultural fields and roadways.

Although the NWI mapping identifies riverine and forested wetlands within the Project Area, no lakes or wetlands were identified during field surveys, likely reflecting extensive historical drainage modification and intensive agricultural land use. Under FWOFI, conditions affecting waters of the U.S. (WOTUS) would remain unchanged, and mapped wetlands would continue to



be indirectly influenced by sedimentation, altered hydrology, and ongoing drainage system degradation.

Surface Water Quantity

Under the No Action/FWOFI alternative, existing conditions would persist. Floodwater would continue to pond on agricultural fields and roadways due to inadequate drainage capacity and ongoing sediment accumulation within the ditch system. Sedimentation would restrict flow in the drainage ditches, creating localized pools of standing water and prolonged inundation following precipitation events.

Surface Water Quality (Clean Water Act)

Under the No Action/FWOFI alternative, conditions would remain unchanged. Continued and potentially worsening erosion would increase turbidity and nutrient loading as more soil erodes into streams (engineered ditches). Sedimentation in ditches would create localized areas of reduced flow and standing water, which may further degrade water quality through reduced dissolved oxygen and increased nutrient concentrations.

Regional Watershed Management Plans

The No Action/FWOFI alternative, would have no adverse impact on the Regional Water Management Plan.

Ground Water and Sole Source Aquifers

Under the No Action/FWOFI alternative, existing groundwater conditions would persist. Continued ponding of floodwaters on agricultural fields could increase transport of nutrients and pollutants into groundwater, particularly in areas with poorly drained soils. Ongoing erosion and sediment accumulation would continue to impair drainage efficiency, prolonging saturation and increasing the potential for nutrient leaching. No Sole Source Aquifers are located within the Project Area.

Plants and Animals

Fish and Wildlife Habitat and Conservation

Under the No Action/FWOFI alternative, existing habitat conditions would persist and may gradually degrade. Continued bank erosion and sloughing would introduce sediment into drainage ditches, increasing turbidity and reducing aquatic habitat quality. Sedimentation would restrict flow capacity, resulting in localized ponding and altered hydrologic conditions. Habitat structure would remain simplified, with limited vegetative diversity and minimal pollinator habitat along ditch banks. Over time, reduced water quality and continued disturbance would limit habitat suitability for fish, amphibians, invertebrates, and wildlife species that utilize the drainage corridors.



Threatened and Endangered Species

Under the No Action/FWOFI alternative, conditions would remain unchanged. Habitat conditions within the Project Area would continue to be influenced by ongoing bank erosion, sedimentation, and routine maintenance activities. Few trees remain in the Project Area, and suitable roosting habitat for federally listed bat species is limited. No milkweed species were observed during field surveys, indicating limited suitability for monarch butterfly breeding habitat. As a result, no new direct or indirect impacts to federally listed species are anticipated under this alternative beyond those already occurring under existing conditions.

Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

Under the No Action/FWOFI alternative, existing conditions would persist. Continued bank erosion and sloughing would result in the gradual loss of scattered trees and marginal woody vegetation along the ditches, reducing the availability of nesting, roosting, and foraging habitat for migratory birds. These effects would occur incrementally over time as a result of ongoing erosion and maintenance activities. No new impacts specific to bald eagles are anticipated beyond existing conditions.

Invasive Species

Under the No Action/FWOFI alternative, conditions would remain unchanged. Invasive plant species would continue to colonize areas disturbed after flooding events or be transported downstream during flood events, outcompeting native vegetation. Flood events would facilitate the downstream transport of invasive plants, allowing these species to outcompete native vegetation and further degrade habitat quality within the drainage corridor.

Natural Areas

No Missouri Natural Areas or COAs occur within the Project Area. Under the No Action/FWOFI alternative, existing conditions would persist, and no impacts to designated Natural Areas or COAs would occur.

Riparian Areas

Under the No Action/FWOFI alternative, the riparian areas would continue to degrade due to ongoing bank erosion, limited native vegetation, and repeated disturbances. Sedimentation would continue to accumulate in the ditches, creating small pools of standing water and reducing conveyance capacity, and further limiting riparian function and habitat quality.

Human Environment

Socioeconomic, Social and Cultural Issues

Under the No Action/FWOFI alternative, existing conditions would persist. Continued bank erosion, sediment accumulation, and drainage inefficiencies would adversely affect agricultural productivity and farm income. Flood-related inundation of farmland would reduce crop yields and increase economic uncertainty for producers.



Flood events would continue to disrupt transportation networks, resulting in roadway closures, delayed emergency response, and temporary impacts to schools, businesses, and residential areas. These effects would persist and may increase over time as channel capacity declines.

Recreation

Under the No Action/FWOFI alternative, existing conditions would persist. Continued bank erosion and habitat degradation would maintain current limitations on wildlife viewing and hunting opportunities within the Subwatershed. During flood events, roadway inundation would continue to limit access to recreational areas, including informal recreation on private lands and nearby publicly accessible areas.

Public Health and Safety

Under the No Action/FWOFI alternative, standing water from flood events would continue to impact local roadways, forcing residents to either drive flooded roadways or postpone traveling to medical appointments, grocery stores, work, school or other locations. The response time for emergency medical services would be impacted. School buses would not be able to travel on flooded roads, causing children to miss school and caretakers to be forced to miss work to provide childcare. Standing water would create a mosquito habitat, increasing the risk of mosquito-borne illnesses.

Potable Water Supply

Under the No Action/FWOFI alternative, continued ponding and flooding could facilitate the movement of nutrients, sediments, and other agricultural contaminants into shallow groundwater through infiltration, potentially affecting groundwater quality over time. Because potable water in the Project Area is primarily supplied by private and municipal wells, these conditions could continue to pose a localized risk to drinking water quality, particularly in areas with shallow water tables.

Historical and Cultural Resources

Under the No Action/FWOFI alternative, existing conditions would be unchanged. No new archeological sites or cultural materials were identified or recovered. One architectural resource was identified (Main Ditch and associated laterals) but was determined as not eligible for NRHP listing. Continued routine maintenance and natural erosion under existing conditions would not be expected to result in adverse effects to historic properties.

Energy Use

Under the No Action/FWOFI alternative, energy consumption associated with routine O&M of the drainage system would continue and may increase over time as erosion, sedimentation, and bank instability worsen. The Sponsor would continue to rely on mowing, sediment removal, and heavy equipment to maintain ditch geometry, particularly following flood events. Gravity-fed and pumped systems would continue to be used to remove excess floodwater from agricultural fields, with energy demands potentially increasing during periods of frequent or intense rainfall.



Provisioning Services: Food, Fiber, and Biofuel Production and Water Use and Management

The environmental consequences of the No Action/FWOFI alternative on agricultural resources are addressed in previous sections from the perspective of soils, including erosion and sedimentation and impacts to Prime Farmland, Unique Farmland, and Farmland of Statewide Importance. When evaluated more broadly as provisioning services, impacts to food, fiber, and biofuel production involve multiple interacting variables, including crop type, location relative to drainage improvements, and the frequency and magnitude of flooding events. As such, precise quantification of impacts to individual agricultural commodities is not practicable.

Regulating Services: Flood Control and Potable Water Supply

The environmental consequences of the No Action/FWOFI alternative on regulating services related to water use and management are addressed in Section 6.2 for soils, surface water, groundwater, plants and animals, and the human environment.

Cultural Services

The No Action/FWOFI alternative, would have no long-term adverse effects as existing conditions would be unchanged.

Will the proposed action or action alternatives (if any) make an irreversible or irretrievable commitment of Federal resources?

Irreversible effects or irretrievable commitment of resources are considered permanent. This alternative would not have irreversible effects or irretrievable commitment of Federal resources.

Construction equipment and materials, labor, and fuel consumption during construction activities are irretrievable. The cost of this alternative is irretrievable in the short-term but the investment will be realized in the long term due to risk reduction downstream.

How will the irreversible or irretrievable commitment of Federal resources, if any, contribute to a loss of long-term productivity for the human environment?

Long-term productivity for the human environment is likely to be minor if not negligible as the impacted resources of prime farmland are small and costs of materials, labor, and fuel will be considered an investment in reduction of downstream flood risk for the foreseeable future.

Endangered Species Act

The pertinent subject matter expert(s) reviewed the proposed action (and action alternatives, if any) and documented determinations for threatened, endangered, proposed and/or candidate species (TEPC) and/or critical habitat in a biological assessment. A “may affect, likely to adversely affect” determination was reached for the following species:

Table 16: May Affect, Likely to Adversely Affect Determination for TEPC Species/Critical Habitat

Species/Habitat	Status	Proposed or Designated Critical Habitat Present?	Brief Rationale (or refer to other proposal documentation)
Indiana Bat (<i>Myotis sodalis</i>)	Endangered	No	Live and dead trees that offer potential bat habitat are present in and near the ARA and records show that Indiana bats exist within Stoddard County. To avoid adverse impacts, no snag or tree removal will occur during the maternity roosting season, from November 16 through March 31. These dates will likely change prior to implementation as new guidance is issued and the updated tree clearing date limitations will be followed. If tree clearing must occur during this time, a bat survey will be conducted. The Project is anticipated to have a determination of <i>may affect, not likely to adversely affect</i> the northern long-eared bat.
Monarch Butterfly (<i>Danaus plexippus</i>)	Candidate	No	The monarch butterfly range is within ARA limits. There is the potential for milkweed species to inhabit areas within the ARA limits and therefore, there is the potential for suitable habitat for the monarch butterfly. The monarch butterfly is currently a candidate species. If the monarch butterfly becomes listed prior to construction, consultation with USFWS would occur and avoidance measures would be followed. Conservation measures will include adding milkweed species into the seeding plan to increase forage available for the species.
Tri-Colored Bat (<i>Perimyotis subflavus</i>)	Proposed Endangered	No	Live and dead trees that offer potential bat habitat are present in and near the ARA. Tri-colored bats are known within Missouri; however, the known species range given by USFWS is outside of the ARA. To avoid potential adverse impacts, snag or tree removal should be avoided during the maternity roosting season, from November 16 through March 31. These dates may change prior to implementation depending on listing status. The tri-colored bat is currently a proposed federally listed species, and a federal listing opinion is anticipated. If it becomes listed prior to construction, consultation with USFWS would occur and avoidance measures would be followed. The Project is anticipated to have a determination of <i>may affect, not likely to adversely affect</i> the tri-colored bat.

National Historic Preservation Act – Section 106 Review

The pertinent subject matter expert has reviewed the proposed action (and action alternatives, if any) and made the following determination:



No historic properties affected. Section 106 Review has been completed for the project area and no National Register eligible cultural sites were found.

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. § 306108) and its implementing regulations (36 CFR Part 800) require federal agencies to take into account the effect of undertakings on cultural resources that are listed on or are eligible for listing on the National Register of Historic Places (NRHP). Cultural resources are physical or other expressions of human activity or occupation and include archeological sites, buildings, bridges, business districts, culturally significant landscapes, isolated artifacts or features, culturally sacred places, and objects of cultural and historic significance. In order for a cultural resource to be eligible for the NRHP as a historic property, it must be associated with events significant to the broad patterns of history; associated with the lives of persons significant in the past; embody distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity; and/or must yield or be likely to yield, information important to history or prehistory. If an undertaking will alter, damage, or destroy a historic property, the agency has a responsibility to avoid, minimize, or mitigate the adverse effect.

Consultation with the State Historic Preservation Office (SHPO), Federally Recognized Tribes, and other interested parties (36 CFR 800.2), is required for any federal action that may affect historic properties. The identification and analysis of cultural resources was carried out in accordance with the guidance found in the NRCS National Cultural Resources Procedures handbook and MO SHPO's Guidelines for Phase I Archaeological Surveys and Reports (MO SHPO 2023). The list of consulting parties and a summary of NHPA Section 106 consultation is provided in Chapter 6.

A literature review for previously recorded cultural resources and an archeological and architectural survey was conducted for the Area of Potential Effects (APE) in December 2024. The APE was based on the initial scope and design of the proposed project. Through Section 106 consultation, the APE was further refined, and is defined as approximately 56,067 square meters (m), encompasses approximately 13.8-ac and including construction footprints, borrow areas, access routes, staging areas, and locations of potential indirect or visual effects.

The cultural resources investigation for the Project APE included both a Phase I reconnaissance survey and an archaeological review of literature. During the pedestrian surveys, no cultural features or structures were encountered within the APE beyond the ditches themselves. The literature review revealed that previous investigations and surveys have been recorded. However, no NRHP-eligible or listed historic properties were identified within a 1-mi radius of the APE. No new archeological sites or cultural materials were identified or recovered. A total of one resource 50 years of age and older was identified within the architectural survey area. Sections of this resource, a man-made earthen canal designated AR-1, date from prior to 1903, with later alterations and improvements added between 1914 and 1920 based on archival research and historic map review.

AR-1 was determined as not eligible for NRHP listing on both a regional and national level due to its lack of historic and architectural significance. AR-1 is not significant under Criterion A as it is not significant within the context of flood control and land drainage of the Mississippi River



watershed in the area, being constructed piecemeal on an as-needed basis. Under Criterion B, AR-1 does not have any significant associations with persons important to the local, state, or national history of the area. It is not significant under Criterion C as it is a common example of its type that lacks distinction. The NRCS determination was a finding of No Adverse Effect to Historic Properties for AR-1 with SHPO concurrence in the March 27, 2025, letter mentioned above.

Consultation with Federally Recognized Tribes

Consultation with federally recognized tribes was conducted as follows:

NRCS solicited input from the Tribal governments listed below during development of this Plan on July 15, 2024. Federally recognized Tribal lands, as defined in the NHPA, do not occur in Missouri. The invitation to participate as a consulting party was requested pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. § 470 et seq.), and the Protection of Historic Properties regulations (36 CFR Part 800). The five Tribes listed below were identified as having Tribal interests in Stoddard County (MODOT 2024). Tribes were invited to participate as consulting parties regarding potential effects to historic properties, including Traditional Cultural Properties, Places of Religious and Cultural Significance, Indian Sacred Sites, and other culturally sensitive resources.

Tribal responses indicated no adverse effects to historic properties based on the alternatives evaluated in this Plan. Correspondence is provided in **Plan-Appendix A**.

Consulted Tribes included:

- Osage Nation
- Quapaw Nation
- Absentee-Shawnee Tribe of Indians of Oklahoma
- Shawnee Tribe
- Eastern Shawnee Tribe of Oklahoma

Clean Water Act

The pertinent subject matter expert has reviewed the proposed action (and action alternatives, if any) and made the following determination:

The project will not affect any waters, including wetlands, and no further permits or modifications are needed to ensure compliance.

Portions of the Project are anticipated to qualify for the Section 404(f)(1)(C) exemption for the maintenance of currently serviceable drainage ditches and therefore may not require permitting by the USACE. However, ditches exhibiting perennial flow were identified during Project planning that may be subject to federal jurisdiction. The USACE Memphis District, will make the final determination regarding jurisdiction and applicability of the Section 404(f)(1)(C) exemption through the AJD process.

If any Project components are determined not to qualify for the exemption, an individual Section 404 permit may be required for the discharge of dredged or fill material. In that event, an individual Section 401 Water Quality Certification from the Missouri Department of Natural Resources (MDNR) would also be required prior to permit issuance.



Permanent impacts to WOTUS, if present, may require compensatory mitigation in the form of restoration (re-establishment or rehabilitation), enhancement, or establishment of aquatic resources. The need for compensatory mitigation would be evaluated during the Clean Water Act Section 404 permitting process, if applicable.

The Preferred Alternative would not impact wetlands. Project activities would occur within existing drainage ditches and associated banks that have been constructed, operated, and maintained for agricultural drainage purposes. The Sponsor will request an Approved Jurisdictional Determination (AJD) from the U.S. Army Corps of Engineers (USACE), Memphis District, to determine whether the drainage ditches are subject to federal jurisdiction under Section 404 of the CWA and whether the proposed activities qualify for exemption under Section 404(f)(1)(C) for the maintenance of currently serviceable drainage ditches.

Guidance for applying the Section 404(f)(1)(C) exemption is provided in a joint memorandum issued by the USACE and the U.S. Environmental Protection Agency (USACE 2020). That guidance clarifies that maintenance activities that do not convert a water of the United States to a new use or expand the original footprint of a drainage system may be exempt from permitting and compensatory mitigation requirements.

Implementation of the Preferred Alternative would involve work within approximately 93,850 linear feet (17.8-mi) of existing drainage ditches. The AJD will determine whether these ditches are jurisdictional waters of the United States and whether the proposed activities qualify for exemption under Section 404(f)(1)(C).

If the ditches are determined to be jurisdictional and the proposed work is not exempt, the nature and extent of impacts would be evaluated in coordination with the USACE to determine whether compensatory mitigation is required. If mitigation is necessary, it would be assessed using the Missouri Stream Mitigation Method or another agency-approved functional assessment methodology, as appropriate.

An approved in-lieu fee mitigation provider serves the Missouri Bootheel Region and would be available if compensatory mitigation is required. Any mitigation would be implemented consistent with the 2008 Compensatory Mitigation Rule, including the established mitigation preference hierarchy and watershed-based considerations.

The Project Area consists of manmade drainage ditches constructed and maintained by DD01, including the Main Ditch and associated laterals, which have served a consistent agricultural drainage function since the early 1900s. Project activities are intended to maintain and stabilize the existing drainage system and would not expand its footprint or convert the ditches to a new use.

The National Pollutant Discharge Elimination System (NPDES) regulates discharges of pollutants from point sources to waters of the United States (USEPA 2024f). Construction activities associated with the Project will involve land disturbance and may result in sediment discharges to drainage ditches.

Prior to construction, the Sponsor will obtain coverage under the NPDES Construction General Permit through MDNR. Permit coverage will require preparation and implementation of a



Stormwater Pollution Prevention Plan (SWPPP) outlining BMPs, inspection requirements, and reporting procedures to minimize water quality impacts during construction.

Clean Air Act

The pertinent subject matter expert has reviewed the proposed action (and action alternatives, if any) and made the following determination:

The project will not result in permanent air emissions and no modifications or further coordination needs to occur to ensure compliance.

Special Management Area Considerations

The pertinent subject matter expert has reviewed the proposed action (and action alternatives, if any) and made the following determinations based on special management area presence, proximity, or lack of:

No activities are proposed within or in the vicinity of Special Management Areas.

Pertinent Executive Orders

The applicable subject matter experts have determined the proposed action (and action alternatives, if any) are in compliance with the following Executive Orders (EO), which were deemed pertinent based on the nature of the proposal:

EO 11990, Protection of Wetlands – avoid actions within wetlands unless there are no practical alternatives, and the action includes all practicable means to minimize harm to wetlands.

The project would not impact wetlands. Project activities would occur within existing drainage ditches and associated banks that have been constructed, operated, and maintained for agricultural drainage purposes.

EO 13007, Indian Sacred Sites – avoid adversely affecting the physical integrity of these sites.

Consultation with Federally Recognized Tribes was completed as described above. No Indian Sacred Sites were identified.

EO 13112, Invasive Species – prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

Best management activities for reducing risk of invasive species transport and establishment include using fill material that is guaranteed to be free from invasive species, all imported material sources locally, not importing topsoil, and cleaning equipment prior to its use within the ARAs.

EO 13186, Migratory Birds – identify actions that may have a measurable negative effect on migratory bird populations.

There would be no tree clearing from May 1 to July 15, or a nesting survey will be required.



Certifying Statement for EA Page Limit and Deadline

The Responsible Official certifies that this EA:

- ☐ Demonstrates the agency has thoroughly considered the factors mandated by NEPA;
- ☐ Represents the agency's good-faith effort to prioritize documentation of the substantive issues and most important considerations required by NEPA within the congressionally mandated page limits;
- ☐ Reflects the agency's expert judgment.
- ☐ Addressed briefly, or left unaddressed, any issues or considerations that were, in the agency's judgment, comparatively not of a substantive nature;
- ☐ Represents the agency's good-faith effort to fulfill NEPA's requirements within the Congressional timeline (or within the minimally extended timeline) and this effort is substantially complete; and
- ☐ Contains analysis that is adequate to inform and reasonably explain the responsible official's final decision regarding the proposed action or selected alternative.

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Proposal Name: West Ditch-Main Ditch Sub-Watershed Plan Environmental Assessment

Proposal Tracking #: EAXX-005-53-029-1381927276

Agency Name: Natural Resources Conservation Service

Unit Name: Missouri State Office

Documentation Informing the FONSI

This Finding of No Significant Impact incorporates the Environmental Assessment and relies on documentation in the associated proposal record.

Activities Approved

I have decided to approve the "[Proposed Action](#)" as described in the "[Proposal Information](#)" section of the Environmental Assessment.

Determination of No Significant Impacts

I have determined no significant impacts are anticipated for the activities approved based on the discussion provided under the "[NEPA: Consideration of Significant Impacts](#)" section, and as informed by other analysis and determinations provided in the "[Environmental Review](#)" section of the Environmental Assessment.

The EA evaluated both the beneficial and adverse impacts of the proposed action, which is the authorization of funds to administer a watershed protection program offering technical and financial assistance to address flooding and flood damage. Water from adjacent farmland has been transporting sediment to the drainage ditches for around a century. The sediments have accumulated over time and have reduced the drainage system's capacity and ability to prevent flooding.

As the drainage system have aged and sediment has built up they have become less effective at preventing floods, the flooding events themselves continue to degrade the system, contributing to failures of ditch bank slopes. The drainage ditches overflow and flood adjacent cropland, resulting in harvest interruptions, prevented plant acres, and loss of farm income. Given the importance of agricultural crop production to the region's economy and the increasing intensity of storms due, measures are needed to improve ditch infrastructure and protection of farming operations.

As summarized in "NEPA: Consideration of Reasonably Foreseeable Impacts" section, the proposed action's environmental benefits would outweigh the potential environmental costs of the program, which would be temporary and occur primarily during construction of individual treatment projects. Impacts to cultural and socio-economic resources would be primarily positive and minimized by project-specific systems to reduce impacts. Long-term impacts of the projects over the project life would outweigh the short-term, adverse impacts of construction. Overall, the



program is estimated to result in long-term beneficial impacts to water quality, and other ecosystem services; and reduce flooding and negative stormwater impacts.

A cultural resources inventory of the area of potential effects (APE) was undertaken. During this survey and the proposed work has been evaluated as having 'no adverse effect' under Section 106. NRCS completed consultation with Missouri SHPO, and the following five Tribes; Osage Nation, Quapaw Nation, Shawnee Tribe, Absentee-Shawnee Tribe of Oklahoma, and Eastern Shawnee Tribe of Oklahoma. The Missouri State Historic Preservation Office (SHPO) concurred with the NRCS finding of 'no adverse effect' in a letter dated March 27, 2025. Tribal responses can be found in Appendix A of the Watershed Plan and indicate that there will be no adverse effects.

The recommended action is not anticipated to have adverse long-term effects on fish and wildlife habitat, floodplains, migratory birds, park lands, prime farmlands, rare, threatened, and endangered species of plants and animals, scenic beauty, wild and scenic rivers, or ecologically critical areas.

No threatened or endangered species in the watershed will be affected by the project.

The effects of the recommended action are not considered highly uncertain nor involve unique or unknown risks.

The project is not of National Significance and implementing the proposed alternative will not establish a precedent for future actions with significant effects, nor does it represent a decision in principle about future considerations.

The proposed action will not violate Federal, State, or local law requirements imposed for protection of the environment. Consultations required by the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, National Historic Preservation Act, and Marine Mammal Protection Act have been completed. The recommended action is consistent with the requirements of these laws. The local sponsors will obtain any necessary permits before they begin implementation of the project.

The recommended action will not result in significant adverse cumulative impacts. The cumulative effects of this project are very positive for protection of downstream loss of life and property. The planned action is the most practical, complete, and acceptable means of protecting life and property of downstream residents. There are no significant negative short-term or long-term environmental or human impacts associated with the implementation of this action.

The action alternative would require construction equipment and materials and other energy in the form of labor and fossil fuels. Using these items would be generally irretrievable. The expenditure of financial resources is irretrievable in the short term, but the investment could be retrieved over the life of the projects by increasing the value of ecological resources and a reduction in flooding and stormwater damages.

Anticipated Implementation of Authorized Activities

I intend to implement the approved activities starting 1 year from authorization, depending on funding availability. Following authorization, design and construction phase funding will be requested. The implementation is expected to take 3-10 years.



Finding of No Significant Impact (FONSI)

Signature and Authorization Date

Nate Goodrich

Date:

NATHAN
GOODRICH

Digitally signed by
NATHAN GOODRICH
Date: 2026.10.05
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NRCS Missouri State Conservationist