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# APPENDIX E

## OTHER SUPPORTING INFORMATION

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 **Natural Resources Conservation Service**  
U.S. DEPARTMENT OF AGRICULTURE**Missouri State Office**

601 Business Loop 70 West  
Suite 250  
Columbia, Missouri 65203  
PHONE: 573.876.0901

Dawn Scott, Director SHPO MDNR/DSP  
P. O. Box 176  
Jefferson City, MO 65102

October 10, 2024

RE: Whitewater Watersheds Project, Stoddard County, Missouri – Section 106 Consultation

Dear Ms. Scott,

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Missouri received a request for federal assistance from the Little River Drainage District for watershed planning and project funding through the PL-566 Small Watershed Program for the Whitewater River watershed. Pursuant to 36 CFR § 800.4(b)(1) of the National Historic Preservation Act (NHPA) of 1966 (as amended), as a part of the “reasonable and good faith effort” to identify historic properties in each project’s area of potential effect (APE), NRCS informed the Missouri SHPO regarding this project in a letter dated July 15th, 2022. We are writing to continue Section 106 consultation (36 CFR § 800.4(d)(2)) on the Whitewater River Watershed project.

The Whitewater River watershed is in the southeastern lowlands in Scott County, Missouri. The goal of the Little River Drainage District is to make enhancements to the aging drainage infrastructure to reduce the risk of flooding in the area. Project actions may include sediment basin clearance and repair, reshaping and reinforcement of drainage canal banks, establishment of native grasses on drainage canals, or installation of drop pipe structures to control gully erosion in drainage ditches. Ditch repairs and streambank stabilization will occur within the drainage ditch rights-of-way. Ground disturbance actions may include dredging, spreading soils along the ditch banks, and seeding these soils with native vegetation.

A cultural resources reconnaissance survey was conducted for this undertaking. Archaeological field work was conducted by WSP USA Environment & Infrastructure, Inc., Jefferson City office on 14 December 2023. Prefield investigation revealed that there had been no previous cultural resource survey or known archaeological or historical sites located within the APE and only one cultural resource site located within one mile. No cultural materials were identified during the archaeological field survey; however, the architectural-historic resource evaluation of the Little River Drainage Ditch - Ditch No. 1 identified the ditch as an archaeological site Eligible to the National Register of Historic Places under Criterion A, B, & C.

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**Natural Resources Conservation Service**

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Based on these findings, NRCS has determined that the enhancements to the aging drainage infrastructure to reduce the risk of flooding in the area of the Whitewater River Watershed Project will have no adverse effect to historic properties. Included for this consultation are the cultural resource survey-historic survey report, and architectural/historic inventory record for your review and records.

If any changes are made to the described planned project, NRCS will provide revised information and update this consultation pursuant to Section 106 of the NHPA. In the event of any potential Cultural Resources being discovered during any phase of work, implementation will be immediately stopped, NRCS will be notified, and NRCS will conduct the required Section 106 coordination with the Missouri SHPO.

We are seeking your concurrence regarding this No Adverse Effects determination. Please review the information provided and advise NRCS if you have any questions or concerns, and we will address your input prior to proceeding. Please respond electronically to our Cultural Resources Specialist Russell Snyder ([russell.snyder@usda.gov](mailto:russell.snyder@usda.gov), 573-876-9342) within 30 days.



**Russell Snyder**  
NRCS CRS-State Archaeologist

Enclosed:

1. Whitewater Review Compliance Information Form
2. Whitewater Cultural Resource Investigation Report
3. WSP Whitewater Cultural Resource-Historic Resource Report
4. WSP Whitewater AR-1 Historic Resource Site Form

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Michael L. Parson  
Governor

Dru Buntin  
Director

October 21, 2024

Russell Snyder  
USDA-NRCS  
601 W. Business Loop 70, Suite 250  
Columbia, MO 65203

**Re: SHPO Project Number: 001-ST-25** — Phase I Cultural Resource Survey, Whitewater River Watershed, Chaffee, Scott County, Missouri (NRCS)

Dear Russell Snyder:

Thank you for submitting information to the State Historic Preservation Office (SHPO) regarding the above-referenced project for review pursuant to Section 106 of the National Historic Preservation Act, P.L. 89-665, as amended (NHPA), and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which require identification and evaluation of historic properties.

We have reviewed the information regarding the above-referenced project and have included our comments on the following page(s). Please retain this documentation as evidence of consultation with the Missouri SHPO under Section 106 of the NHPA. SHPO concurrence does not complete the Section 106 process as federal agencies will need to conduct consultation with all interested parties. **Please be advised that, if the current project area or scope of work changes, such as a borrow area being added, or cultural materials are encountered during construction, appropriate information must be provided to this office for further review and comment.**

If you have questions, please contact the SHPO at (573) 751-7858 or call/email Jeremy Morin, (573) 526-3761, [jeremy.morin@dnr.mo.gov](mailto:jeremy.morin@dnr.mo.gov). If additional information is required, please submit the information via email to [MOSection106@dnr.mo.gov](mailto:MOSection106@dnr.mo.gov).

Sincerely,

STATE HISTORIC PRESERVATION OFFICE



Dawn Scott, Director  
Deputy State Historic Preservation Officer

C Steven Hefner, USDA-NRCS  
Michelle Jesse, USDA-NRCS



October 21, 2024  
Russell Snyder  
Page 2 of 2

**SHPO Project Number: 001-ST-25** — Phase I Cultural Resource Survey, Whitewater River Watershed, Chaffee, Scott County, Missouri (NRCS)

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COMMENTS:

We have reviewed the cultural resources survey report entitled *Phase I Cultural Resource Survey, Whitewater River Watershed, Scott County, Missouri*, by Clay Cantrell of WSP. SHPO concurs that the project as described will have **no adverse effect** on the historic constructed watershed and has no objection to the initiation of project activities.

SHPO Reviewer: Jeremy Morin, (573) 526-3761, [jeremy.morin@dnr.mo.gov](mailto:jeremy.morin@dnr.mo.gov)



**Missouri State Office**  
601 Business Loop 70 West, Suite 250  
Columbia, MO 65203

September 19, 2025

**DAWN SCOTT**  
*Director SHPO*  
*MDNR/DSP*  
*Post Office Box 176*  
*Jefferson City, Missouri 65102*

Dear Ms. Scott:

Per 36 CFR 800.3, the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Missouri is continuing consultation on SHPO Project Nr. 001-ST-25 Phase 1 Cultural Resource Survey, Whitewater River Watershed, Chaffee, Scott County, Missouri (NRCS).

Please find attached a resubmittal of the Phase 1 Cultural Resources Survey, Whitewater River Watershed, Scott County, Missouri and the AR-1 Architectural/Historic Inventory Form for the Whitewater River segment of the Little River Drainage Ditch No. 1 (AR-1). This segment of the Little River Drainage Ditch No. 1 was recorded in December 2023 by WSP USA, Inc. for NRCS Missouri. This record was submitted as part of the Phase 1 Cultural Resource Survey report but did not receive comment on its eligibility to the National Register of Historic Places. The Whitewater River segment of the Little River Drainage Ditch No. 1 (AR-1) was recommended eligible to the National Register of Historic Places under Criterion A, B & C. SHPO Project Nr. 001-ST-25 was determined 'no adverse effect' on the historic constructed watershed.

NRCS Missouri has determined that the Whitewater River segment of the Little River Drainage Ditch No. 1 (AR-1) is eligible for the National Register of Historic Places. NRCS Missouri concurs with the findings presented by WSP USA, Inc., and has determined that the site is eligible under Criterion A, Criterion B, and Criterion C.

We are seeking your concurrence regarding this eligibility determination. Please review the information provided and advise NRCS if you have any questions or concerns. Please respond electronically to our Cultural Resources Specialist Russell Snyder at [russell.snyder@usda.gov](mailto:russell.snyder@usda.gov) or 573-876-9342 within 30 days.

Sincerely,

**NATE GOODRICH**  
*Missouri NRCS Acting State Conservationist*

Enclosure

1. Architectural Survey Results segment of the Phase 1 Cultural Resource Survey, Whitewater River Watershed, Scott County, Missouri
2. WSP Whitewater AR-1 Site Form



Mike Kehoe  
Governor

Kurt U. Schaefer  
Director

October 23, 2025

Russell Snyder  
USDA-NRCS  
601 W. Business Loop 70, Suite 250  
Columbia, MO 65203

**Re: SHPO Project Number: 001-ST-25** — Phase I Cultural Resource Survey, Whitewater River Watershed, Chaffee, Scott County, Missouri (NRCS)

Dear Russell Snyder:

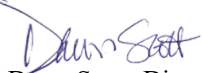
Thank you for submitting information to the State Historic Preservation Office (SHPO) regarding the above-referenced project for review pursuant to Section 106 of the National Historic Preservation Act, P.L. 89-665, as amended (NHPA), and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which require identification and evaluation of historic properties.

We have reviewed the information regarding the above-referenced project and have included our comments on the following page(s). Please retain this documentation as evidence of consultation with the Missouri SHPO under Section 106 of the NHPA. SHPO concurrence does not complete the Section 106 process as federal agencies will need to conduct consultation with all interested parties. **Please be advised that, if the current project area or scope of work changes, such as a borrow area being added, or cultural materials are encountered during construction, appropriate information must be provided to this office for further review and comment.**

If you have questions, please contact the SHPO at (573)751-7858 or call/email Aaron Schmidt, (573) 522-4641, [aaron.schmidt2@dnr.mo.gov](mailto:aaron.schmidt2@dnr.mo.gov). If additional information is required, please submit the information via email to [MOSection106@dnr.mo.gov](mailto:MOSection106@dnr.mo.gov).

Sincerely,

STATE HISTORIC PRESERVATION OFFICE



Dawn Scott, Director  
Deputy State Historic Preservation Officer

c: Rex McAliley, USDA  
Michelle Jesse, USDA

October 23, 2025  
Russell Snyder  
Page 2 of 2

**SHPO Project Number: 001-ST-25** — Phase I Cultural Resource Survey, Whitewater River Watershed, Chaffee, Scott County, Missouri (NRCS)

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COMMENTS:

We have reviewed the cultural resources survey report entitled *Phase I Cultural Resource Survey, Whitewater River Watershed, Scott County, Missouri* by Clay Cantrell of WSP. SHPO concurs that Architectural Resource (AR) 1, the Whitewater River Segment of the Little River Drainage District No. 1, is potentially eligible for the National Register of Historic Places (NRHP). However, the scope of work, as described in the previous submission, will not affect the ditch's integrity or the character-defining features that would make this system eligible for listing on the NRHP. Therefore, SHPO concurs that this undertaking will have **no adverse effect**.

SHPO Reviewer: Aaron Schmidt, (573) 522-4641, [aaron.schmidt2@dnr.mo.gov](mailto:aaron.schmidt2@dnr.mo.gov)

# Waters of the U.S. Delineation and Threatened and Endangered Species Assessment

## for Whitewater River Watershed Cape Girardeau and Scott Counties, Missouri

Prepared for  
USDA Natural Resources Conservation Service

Prepared by  
Conservation Works Joint Venture (CWJV) Partner  
Prairie Engineers, PC



Ditch Number 1 at confluence with Caney Creek, looking upstream.

January 2024





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## Abbreviations and Acronyms

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|       |                                          |
|-------|------------------------------------------|
| BGEPA | Bald and Golden Eagle Protection Act     |
| CFR   | Code of Federal Regulations              |
| CWA   | Clean Water Act                          |
| ESA   | Endangered Species Act                   |
| FEMA  | Federal Emergency Management Agency      |
| GIS   | geographical information system          |
| GPS   | global positioning system                |
| MBTA  | Migratory Bird Treaty Act                |
| MDC   | Missouri Department of Conservation      |
| MDNR  | Missouri Department of Natural Resources |
| NHD   | National Hydrography Dataset             |
| NWI   | National Wetland Inventory               |
| NRCS  | Natural Resources Conservation Service   |
| msl   | mean seal level                          |
| OHWM  | ordinary high water mark                 |
| PEM   | palustrine emergent wetland              |
| PFO   | palustrine forested wetland              |
| PSS   | palustrine scrub-shrub wetland           |
| PUB   | palustrine unconsolidated bottom (pond)  |
| PBRT  | potential bat roost tree                 |
| T&E   | threatened and endangered                |
| USACE | U.S. Army Corps of Engineers             |
| USDA  | U.S. Department of Agriculture           |
| USEPA | U.S. Environmental Protection Agency     |
| USFWS | U.S. Fish and Wildlife Service           |
| USGS  | U.S. Geological Survey                   |
| WOTUS | waters of the U.S.                       |



## 1. INTRODUCTION

In support of the Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture (USDA), Prairie Engineers, P.C. (Prairie), a partner of Conservation Works Joint Venture (CWJV), conducted a waters of the U.S. (WOTUS) delineation and threatened and endangered (T&E) species assessment for the Whitewater River Watershed Project in Southeast, Missouri. As project sponsor, the Little River Drainage District (LRDD) proposes a Watershed and Flood Prevention Operations Public Law (PL) 83-566 project to address agricultural water management in the watershed. This watershed resides in Cape Girardeau and Scott counties, Missouri but the project will also address downstream flood control concerns in Dunklin, New Madrid, Pemiscot, and Stoddard counties. The area proposed for improvement as part of the project, and the focus of this report is located in Scott County, Missouri (approximate latitudinal and longitudinal coordinates – 37.127791, -89.722924).

The purpose of the proposed project is to prevent damage from erosion, floodwater, and excessive sediment deposition in and adjacent to drainage ditches (ditches) within the LRDD that support agricultural cropland. The primary PL 83-566 authorized purpose is agricultural water management improvements which would benefit local landowners, farmers, and communities as well as fulfill the general purposes of PL 83-566. The need of the project is to address flood damages and aged infrastructure.

Structural and non-structural erosion, flood, and sediment control and reduction alternatives were evaluated for the project. A reach of drainage ditch, Ditch Number 1, was designated for the watershed planning project as a critical area for structural improvements to reduce erosion, sedimentation, and reduce flood damage. As identified on Figure 1-1, the project reach of Ditch Number 1 is located at the downstream (southern) boundary of the Whitewater River Watershed. At this time, proposed improvements include riprap armoring on either bank of Ditch Number 1 for approximately 11,200 linear feet (LF).

This report provides the results of the WOTUS delineation and T&E assessment of the proposed project area. The purpose of the study was to delineate potential WOTUS features as well as potentially suitable habitat or the presence of federal and state listed T&E species within the project area. Results of the study will be used for resource analysis for the project's Watershed Plan – Environmental Assessment (Plan-EA), including consultation with U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), Missouri Department of Conservation (MDC), and Missouri Department of Natural Resources (MDNR) to help determine potential impacts to identified resources. Further, the findings of this report will allow for avoidance and minimization efforts and assist in potential permitting needs for the selected alternative(s). For more information regarding the watershed planning project or details regarding WOTUS or T&E species for the entire watershed, please refer to the project's Plan-EA.

Waters of the U.S. are those waters subject to federal jurisdiction under the Clean Water Act (CWA) and may include wetlands, streams, lakes, ponds, or other water features that are hydrologically connected to traditional navigable waters. New and amended definitions of "waters of the United States" were published in 2023 and can be found at 33 CFR Part 328 (Department of the Army) and 40 CFR Part 120 [U.S. Environmental Protection Agency (USEPA)]. Determining whether a water feature would be

considered WOTUS requires an evaluation in accordance with current regulations, case law, and clarifying guidance. Prairie has provided its opinion of WOTUS status for the water features identified in the project area; however, the USACE and the USEPA have the ultimate authority as to which water features would be considered federally jurisdictional WOTUS and subject to CWA Section 404/401 permitting.

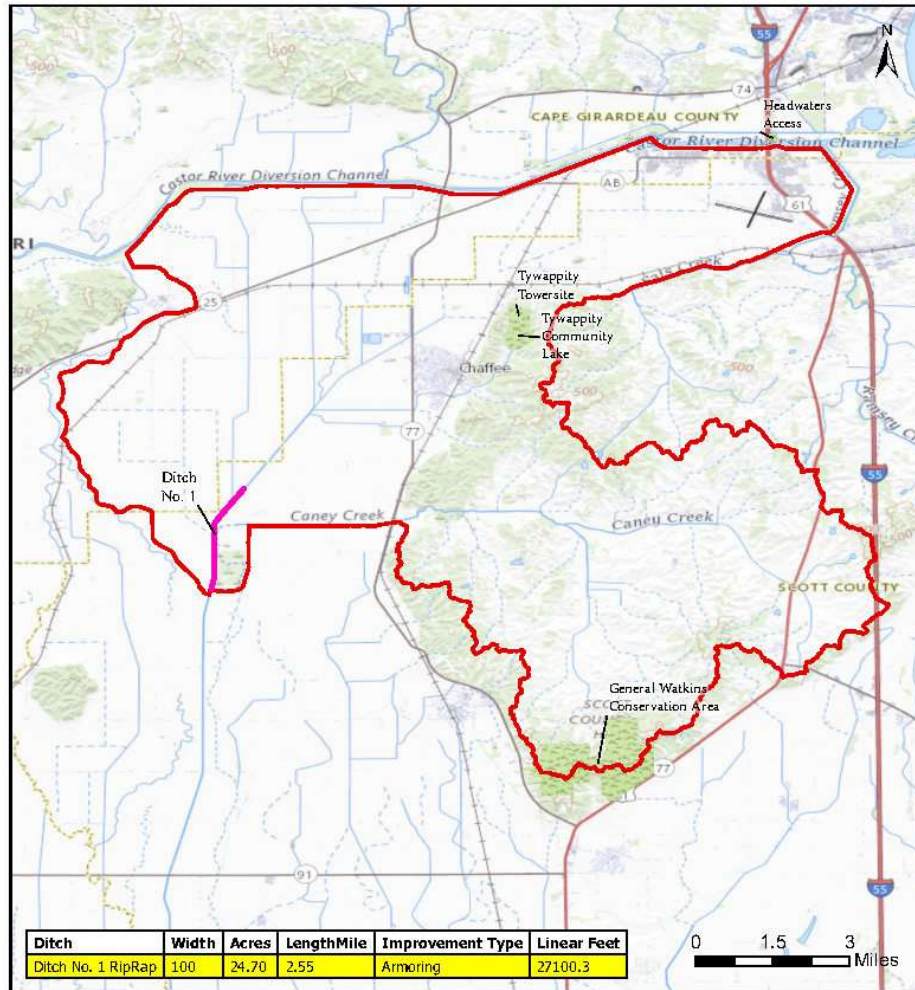


Figure 1-1  
Whitewater River Watershed  
Project Location Map

Whitewater River HUC 10  
 Ditch No. 1 Project Area



**Figure 1-1. Project Location Map.**



## 2. METHODOLOGY

### 2.1. Resource Data Review

Several resource data sources were reviewed as planning tools prior to field reconnaissance. These include, but are not limited to the following:

- National Wetland Inventory (NWI) maps
- National Hydrography Dataset (NHD)
- U.S. Geological Survey (USGS) topographic maps
- Federal Emergency Management Agency (FEMA) maps
- Recent and historical aerial imagery
- NRCS soil survey
- USFWS Information for Planning and Consultation (IPaC)
- Client-provided previous data and reports
- Interagency scoping responses

#### 2.1.1. Threatened and Endangered Species

Both the overall Whitewater River Watershed and the project area were reviewed through USFWS IPaC to obtain federally listed T&E species that are protected under the Endangered Species Act (ESA) (see Table 2-1). The two queries resulted in the same species. Critical habitat for listed species was not identified in the IPaC reports. Further, the state status of listed species was reviewed on MDC's *Missouri Species and Communities of Conservation Concern Checklist*. The state status of each listed species is also identified in Table 2-1 below.

Though interagency scoping for the project, MDC provided a Natural Heritage Review Report (NHRR) for the overall Whitewater River Watershed on October 2, 2023. The NHRR indicates that records of wildlife preserves; designated wilderness areas or critical habitats; and federal-listed species do not exist in the watershed, public land survey sections, or adjacent sections. MDC indicated that state-listed endangered species do not occur in the watershed; however, state-ranked species were identified near the watershed and are listed below in Table 2-2. Note that no current regulatory requirements are associated with these state-ranked species other than voluntary stewardship. The IPaC reports and NHRR are included in Appendix A.

**Table 2-1. Threatened and Endangered Species Listed in the Watershed and Project Area**

| Scientific Name               | Common Name               | Federal Status | State Status |
|-------------------------------|---------------------------|----------------|--------------|
| <b>Mammals</b>                |                           |                |              |
| <i>Myotis grisescens</i>      | gray bat                  | E              | E            |
| <i>Myotis sodalis</i>         | Indiana bat               | E              | E            |
| <i>Myotis septentrionalis</i> | northern long-eared bat   | E              | T            |
| <i>Perimyotis subflavus</i>   | tricolored bat            | PE             | N/A          |
| <b>Reptiles</b>               |                           |                |              |
| <i>Macrochelys temminckii</i> | alligator snapping turtle | PT             | N/A          |
| <b>Insects</b>                |                           |                |              |
| <i>Danaus plexippus</i>       | monarch butterfly         | C              | N/A          |

Sources: USFWS 2023a and MDC 2022

E = endangered, T = threatened, C = candidate species; PE = proposed endangered; PT = proposed threatened

**Table 2-2. State-Ranked Species near the Watershed**

| Scientific Name               | Common Name          | State Rank | Proximity to Watershed | Primary Habitat                                                  |
|-------------------------------|----------------------|------------|------------------------|------------------------------------------------------------------|
| <b>Mammals</b>                |                      |            |                        |                                                                  |
| <i>Taxidea taxus</i>          | American badger      | S3         | < 3 miles              | grassland matrix, savanna pasture/orchard, row/close grown crops |
| <b>Fish</b>                   |                      |            |                        |                                                                  |
| <i>Erimyzan sucetta</i>       | lake chubsucker      | S2         | < 6 miles              | rivers/streams                                                   |
| <i>Notropis texanus</i>       | weed shiner          | S3         | < 6 miles              | rivers/streams                                                   |
| <i>Opsopoeodus emiliae</i>    | Pugnose minnow       | S4         | < 4 miles              | rivers/streams                                                   |
| <b>Amphibians</b>             |                      |            |                        |                                                                  |
| <i>Pseudacris illinoensis</i> | Illinois chorus frog | S2         | < 6 miles              | grassland matrix, ephemeral pools, wet ditches                   |
| <b>Plants</b>                 |                      |            |                        |                                                                  |
| <i>Carex oxylepis</i>         | sharp-scale sedge    | S2         | < 6 miles              | forest matrix                                                    |

Source: MDC 2023

S2 = Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (6 to 20 occurrences or few remaining individuals; S3 = Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically, 21 to 100 occurrences or between 3,000 and 10,000 individuals; SU = Currently unrankable due to a lack of information or due to substantially conflicting information about status or trends.

### 2.1.2. Migratory Birds and Bald Eagles

Both the overall Whitewater River Watershed and the project area were reviewed via USFWS IPaC to obtain migratory bird species protected by the Migratory Bird Treaty Act (MBTA) or the Bald and Golden Eagle Protection Act (BGEPA). Twelve migratory bird species are found in the watershed; however, neither migratory nor bald eagles were identified within the project area. Further, the IPaC indicates that there are not documented bald eagles in the project area. Protected bird species within the watershed are listed in Table 2-3. The IPaC reports are included in Appendix A.

**Table 2-3. Migratory Birds Listed in the Watershed**

| Scientific Name                   | Common Name            | Breeding Season               |
|-----------------------------------|------------------------|-------------------------------|
| <i>Pluvialis dominica</i>         | American golden-plover | Breeds elsewhere              |
| <i>Haliaeetus leucocephalus</i>   | bald eagle             | Breeds September 1 to July 31 |
| <i>Chaetura pelagica</i>          | chimney swift          | Breeds March 15 to August 25  |
| <i>Oporornis formosus</i>         | Kentucky warbler       | Breeds April 20 to August 20  |
| <i>Tinga flavipes</i>             | lesser yellowlegs      | Breeds elsewhere              |
| <i>Egretta caerulea</i>           | little blue heron      | Breeds March 10 to October 15 |
| <i>Calidris melanotos</i>         | pectoral sandpiper     | Breeds elsewhere              |
| <i>Protonotaria citrea</i>        | prothonotary warbler   | Breeds April 1 to July 31     |
| <i>Melanerpes erythrocephalus</i> | red-headed woodpecker  | Breeds May 10 to September 10 |
| <i>Euphagus carolinus</i>         | rusty blackbird        | Breeds elsewhere              |
| <i>Elanoides fortifcatus</i>      | swallow-tailed kite    | Breeds March 10 to June 30    |
| <i>Hylocichla mustelina</i>       | wood thrush            | Breeds May 10 to August 31    |

Source: USFWS IPaC 2023b.



## 2.2. Field Methods

Fieldwork was conducted in September 2023 following desktop review to verify mapped resources. The field survey team consisted of three biologists with training and expertise in WOTUS delineations and T&E habitat assessments, and specific knowledge and expertise in local flora and fauna. Sampling points, features, and boundaries were located using global positioning system (GPS) devices which were subsequently downloaded into ArcView geographical information system (GIS). The GIS information collected during desktop review and fieldwork was used to refine feature boundaries as well as generate feature measurements and report figures. Data and features presented herein are intended to provide an overview of potential resource concerns within the project area. Once design plans are completed, additional delineation efforts may be needed to supplement Section 404/401 permitting, should it be needed for the selected alternative.

### 2.2.1. Waters of the U.S.

#### 2.2.1.1. Wetlands

Potential wetland areas were evaluated in general accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* (Version 2.0) (USACE 2010). Areas were identified as wetlands if current conditions met specific criteria identified in the *Manual* regarding the presence of dominant wetland vegetation, hydric soils, and a source of hydrology to support these two criteria.

#### 2.2.1.2. Streams

Streams meeting WOTUS criteria typically exhibit an ordinary high water mark (OHWM) as the lateral jurisdictional limits. 33 CFR 328.3(c)(4) defines OHWM as “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.” Streams and drainage ditches were observed for evidence of an OHWM as well as general stream and riparian corridor characteristics.

### 2.2.2. Threatened and Endangered Species

The T&E field survey entailed documenting general observations of the project area for potentially suitable habitat and evidence of listed species. Trees within and adjacent to the project area were observed in accordance with USFWS’ 2023 *Range-Wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines* (March 2023). Suitable summer habitat for the Indiana, northern long-eared, and tricolored bats includes trees within or near forested habitat that exhibit specific characteristics as described in the *Guidelines*. The gray bat occupies cave or cave-like structures year-round. Further, the listed bat species may also be found in anthropogenic structures such as bridges, culverts, buildings, and barns. In addition to field surveys for potentially suitable habitat and evidence of listed species, Prairie biologists reviewed the project area for other protected species such as the bald eagle.



### 3. PROJECT SETTING

The Whitewater River Watershed is located in the “bootheel” of southeast Missouri which is comprised of vast Mississippi River floodplain and is a natural basin for flooding. Historically, the area was subject to overflow flooding from the Mississippi and Ohio Rivers as well as from Ozark highland streams that flow to the vast floodplain. These historical flooding events resulted in extensive deposition of nutrient-rich and fertile soil and what was once nearly uninhabitable swamp was transformed into agricultural land through a vast network of drainage ditch infrastructure. Today, 91 percent of land cover in the watershed is comprised of cultivated crops (NLCD 2019).

The project area consists of a reach of man-excavated drainage ditch, Ditch Number 1, and is integral infrastructure within the regional drainage system. The proposed improvement area includes the bank slope and adjacent top of levee areas supporting Ditch Number 1. The Old Caney Basin conservation area (CA) is east-adjacent to the project area. Caney Creek flows through this CA and discharges to Ditch Number 1 near the southern boundary of the Whitewater River Watershed and southern boundary for the proposed improvements.

#### 3.1. Ecoregions

The project area is located in the Mississippi Alluvial Plain level III ecoregion which extends from the confluence of the Mississippi and Ohio Rivers in southern Illinois to the Gulf of Mexico. The Mississippi Alluvial Plain ecoregion consists of a broad, flat, alluvial plain with relief provided by natural and man-made levees as well as river terraces. In the early 20th century, the Mississippi Alluvial Plain was extensively cleared of timber, removing most natural bottomland deciduous forest, and then the region was drained for agriculture. In Missouri, the Mississippi Alluvial Plain is the northern biotic limit for many coastal plain species. Major crops include rice, cotton, and soybeans (Chapman et al. 2002).

More specifically, the project area resides in the Pleistocene Valley Trains level IV ecoregion. This ecoregion is situated between the Holocene Meander Belts along the Mississippi River and Ozark Highlands. Formed from Pleistocene glacial outwash deposits from the Mississippi and Ohio Rivers, the region contains fertile, thick, alluvial, and wind-blown deposits. Sand dune fields and wind-blown deposits occur within ridges within this ecoregion, including along the eastern border of Sikeston Ridge, center of the New Madrid Seismic zone and located with the Whitewater River Watershed. Historically, this ecoregion was covered with bald cypress, tupelo swamp forest, mixed deciduous bottomland forest, with grasslands covering sandy terraces; however, the ecoregion is primarily in row crop production today (Chapman et al. 2002).

#### 3.2. USGS Topography

According to USGS quadrangle maps, topography of the project area consists of a flat floodplain landscape drained by ditches (ditches) with little sinuosity. Relief within the project area is provided by levees created by the construction and maintenance of these ditches. The manmade ditch, Ditch Number 1 is depicted as far back as 1934. Caney Creek is depicted as an intermittent stream, discharging to Ditch Number 1, a perennial stream, near the southern project boundary. Three other, unnamed

perennial streams (ditches) are depicted discharging to Ditch Number 1 in the project area. Old Caney Basin is shown as a swamp east and adjacent to the project area (USGS multiple years).

### 3.3. Water Quality

Current water quality conditions of the streams in the project area were reviewed through MDNR and USEPA resources. Two segments of Ditch Number 1 exist in the project area and the water quality is currently reported as either in good or unknown condition. Ditch Number 1 is not listed on Missouri’s 2020 303(d) list of impaired waters. See Table 3-1.

**Table 3-1. Water Quality Conditions of Ditch Number 1 in the Project Area**

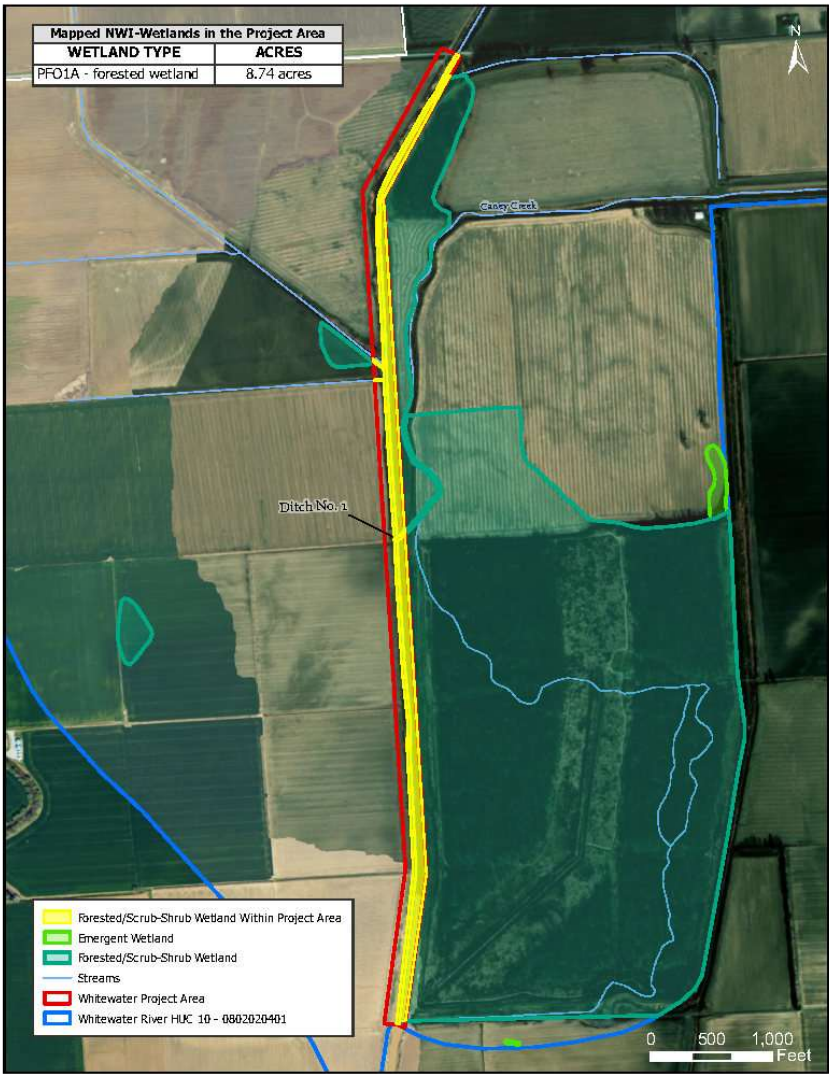
| Stream Name                               | State Waterbody ID | Listed on Missouri 2020 303(d) List <sup>1</sup> | Waterbody Condition <sup>2</sup> |
|-------------------------------------------|--------------------|--------------------------------------------------|----------------------------------|
| Ditch Number 1<br>(northernmost 1,500 LF) | MO_3052.00         | no                                               | unknown                          |
| Ditch Number 1                            | MO_3050.00         | no                                               | good                             |

<sup>1</sup> MDNR. 2020.

<sup>2</sup> USEPA. 2023.

### 3.4. National Wetland Inventory

According to the NWI Wetlands Mapper, Ditch Number 1 is depicted as a permanently flooded, lower perennial riverine habitat with an unconsolidated bottom that was excavated by humans (R2UBHx). A large, forested wetland complex (PFO1A) is depicted adjacent and east of Ditch Number 1, mainly associated with the Old Caney Basin. Forested wetlands are also depicted along the west bank of Ditch Number 1 at its confluence with Ditch Number 20, identified as an intermittent, excavated, seasonally flooded stream (R4SBCx). An emergent, temporarily flooded, partially drained/ditched persistent wetland (PEM1Ad) is depicted on the west side of Ditch Number 1 at its confluence with Ditch Number 15, in the northern reaches of the project area. A scrub-shrub, temporarily flooded, broad-leaved deciduous wetland in depicted is also depicted west of Ditch Number 1 in the northern reaches of the project area. The NWI indicates 8.74 acres of forested wetlands mapped within the project area. NWI-mapped wetlands and water features are illustrated in Figure 3-1.



**Figure 3-1. NW1 Map of the Project Area.**

**3.5. Floodplain Mapping**

According to available FEMA Flood Insurance Rate Maps of the project area (Map Number 29201C0100D and Map Number 29201C0200D, both effective June 5, 2012), the project area exists in a Zone A flood hazard area subject to inundation by the 1% annual chance of flood (FEMA 2023).

### 3.6. Soils

According to the NRCS Web Soil Survey, the project area has been mapped with four soil series, two of which are characterized with either 90 or 100 percent hydric rating. NRCS defines hydric soils as those “formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.” Table 3-2 lists project area soils and pertinent characteristics.

**Table 3-2. Soils in the Project Area**

| Map Unit Symbol | Map Unit Name                                                        | Hydric Rating | Natural Drainage Class    | Depth to Water Table |
|-----------------|----------------------------------------------------------------------|---------------|---------------------------|----------------------|
| 86056           | Sharkey silty clay, 0 to 1 percent slopes, occasionally flooded      | 90            | Poorly drained            | ~ 0 to 12 inches     |
| 86038           | Mhoon silt loam, 0 to 1 percent slopes, occasionally flooded         | 100           | Poorly drained            | ~ 0 to 9 inches      |
| 86006           | Adler silt loam, 0 to 1 percent slopes, occasionally flooded         | 10            | Moderately poorly drained | ~ 24 to 36 inches    |
| 86127           | Commerce silty clayloam, 0 to 1 percent slopes, occasionally flooded | 10            | Somewhat poorly drained   | ~ 12 to 16 inches    |

Source: USDA-NRCS. 2023.

## 4. RESULTS

Prairie Engineers, PC conducted a WOTUS delineation and field assessment of potentially suitable habitat of T&E listed species for the project area in September 2023. Results of these studies are summarized herein and presented in Figure 4-1. The Wetland Determination Data Sheet is included as Appendix B. Representative photographs are included in Appendix C. During the delineation, including the desktop review of the project area, five streams (drainage ditches) were observed in the project area. Although a large wetland complex (Old Caney Basin) was observed adjacent and east of the project area, wetlands were not identified within the limits of proposed improvements.

It is worth noting that according to Community Collaborative Rain, Hail & Snow Network (CoCoRaHS) 24-Hour Precipitation Records, Scott County, Missouri received an average of 7.88 inches of precipitation from August 3 through 6, 2023. Evidence of ditch overtopping during the 4-day extreme rain event was observed in the form of debris drift lines and water/sediment marks. However, the skewed hydrology indicators were noted as an anomaly and not necessarily characteristic of normal conditions.

The project area primarily includes the slopes and adjacent top of bank areas along approximately 11,200 linear feet (LF) of Ditch Number 1. Generally, the top of bank slopes are 15 to 20 feet above the OHWM, disconnecting the ditches from their floodplain and providing an upland habitat. A few scattered potentially suitable summer bat roosting trees were observed in the project area. A significant population of monarch butterflies was observed in the project area.

### 4.1. Waters of the U.S.

The project area includes reaches of five streams (drainage ditches) as identified in Table 4-1. Neither wetlands nor open water features were identified within the project area.

**Table 4-1. WOTUS Features Identified in the Project Area**

| Feature          | Type      | Measure                               |
|------------------|-----------|---------------------------------------|
| <b>Streams</b>   |           | <b>Linear Feet (LF) (approximate)</b> |
| Ditch Number 1   | Perennial | 11,200                                |
| Caney Creek      | Perennial | 100                                   |
| Ditch Number 19A | Perennial | 100                                   |
| Ditch Number 20  | Perennial | 100                                   |
| Ditch Number 15  | Perennial | 100                                   |
| <b>Total</b>     |           | <b>11,600</b>                         |

Ditch Number 1 is a man-made ditch measuring approximately 50 feet wide with 15- to 20-foot-high banks at approximately a 2:1 slope. The stream bed is primarily comprised of clay, silt, sand, gravel, and riprap adjacent to previous stabilization projects. The stream was observed to have approximately two to three feet of water and support fish, turtles, and other aquatic species. Except for the Old Caney Basin, farming occurs up to the top of the Ditch Number 1 slopes. The remaining streams (drainage ditches) in the project area are also man-made or altered with the same general characteristics of Ditch Number 1 except narrower, ranging from 10 to 25 feet wide.

#### 4.2. Threatened and Endangered Species

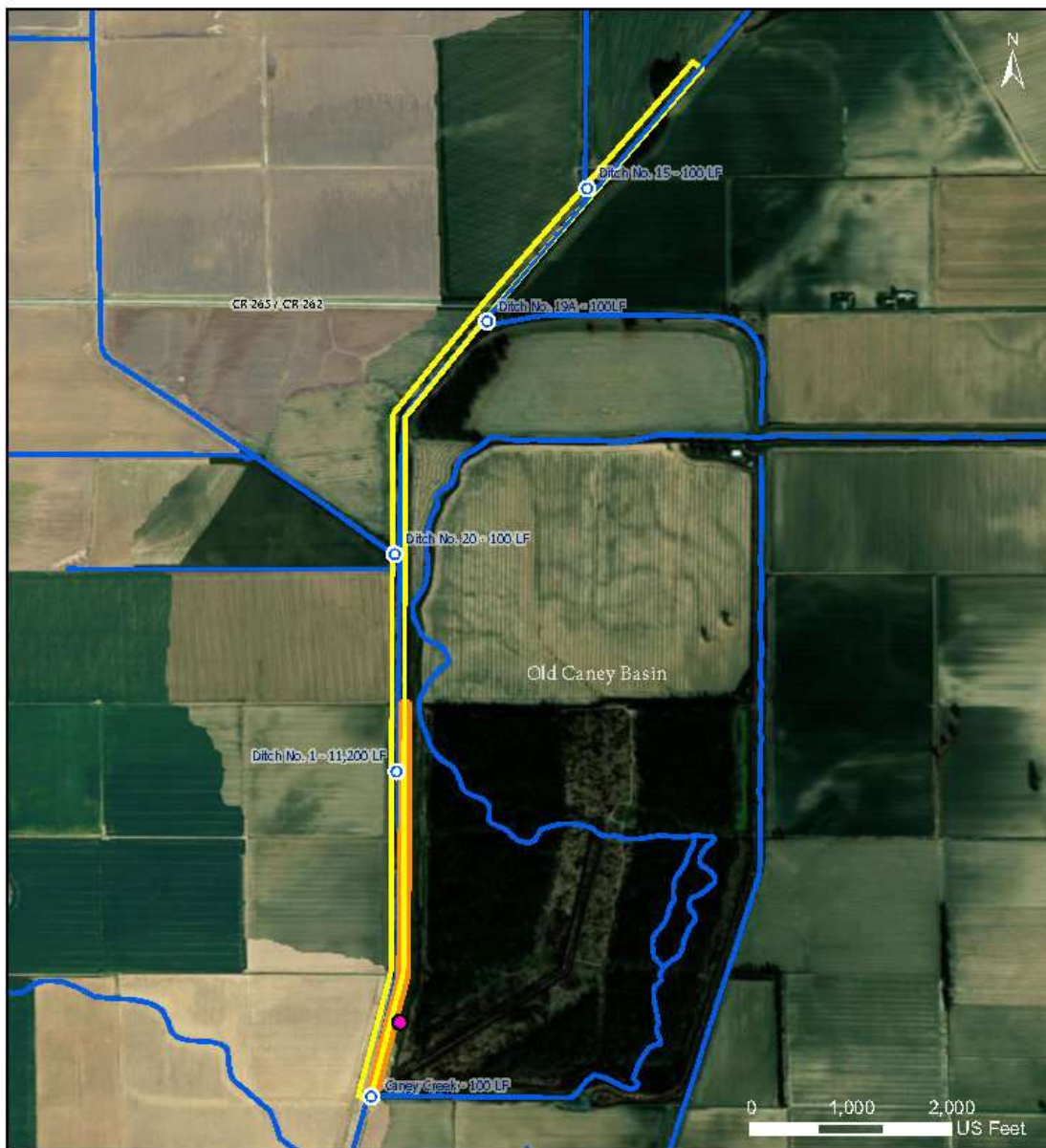
During the field assessment, a few scattered trees exhibiting characteristics of potentially suitable habitat for the Indiana, northern long-eared, and tricolored bats were observed in and adjacent to the project area. A significant population of common milkweed (*Asclepias syriaca*) was observed along the eastern bank of Ditch Number 1, extending from near Country Road (CR) 266 to the northern reach of Old Caney Basin. The milkweed along with an abundant and diverse population of native wildflowers was observed supporting a significant population of monarch butterflies within this reach of Ditch Number 1 levee slope. Table 4-2 lists the findings of the T&E assessment for the project area.

**Table 4-2. Threatened and Endangered Species Listed in the Project Area and Findings**

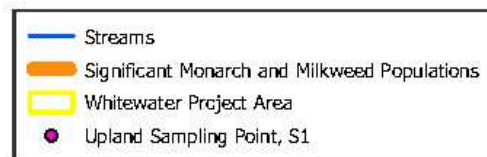
| Scientific Name               | Common Name               | Federal Status | State Status | Findings - Potential Habitat or Population Present                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|---------------------------|----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mammals</b>                |                           |                |              |                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>Myotis grisescens</i>      | gray bat                  | E              | E            | Caves are not present in the project area; therefore, this species is unlikely to occur.                                                                                                                                                                                                                                                                                                       |
| <i>Myotis sodalis</i>         | Indiana bat               | E              | E            | Potentially suitable habitat observed in the project area.                                                                                                                                                                                                                                                                                                                                     |
| <i>Myotis septentrionalis</i> | northern long-eared bat   | E              | T            | Potentially suitable habitat observed in the project area.                                                                                                                                                                                                                                                                                                                                     |
| <i>Perimyotis subflavus</i>   | tricolored bat            | PE             | N/A          | Potentially suitable habitat observed in the project area.                                                                                                                                                                                                                                                                                                                                     |
| <b>Reptiles</b>               |                           |                |              |                                                                                                                                                                                                                                                                                                                                                                                                |
| <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 ditches.                                                                                                                                                                                                                                                                        |
| <b>Insects</b>                |                           |                |              |                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>Danaus plexippus</i>       | monarch butterfly         | C              | N/A          | A significant population of monarch butterflies was observed along the eastern bank of Ditch Number 1. Although a significant population and habitat for this species exists in the project area, this species is currently not legally protected. However, efforts will be made to save existing <i>Asclepias syriaca</i> seed and re-seed post construction along with other native species. |

Sources: USFWS 2023a and MDC 2022

E = endangered, T = threatened, C = candidate species; PE = proposed endangered; PT = proposed threatened



**Figure 4-1 Waters of the U.S. Delineation and Threatened and Endangered Species Assessment**



**Figure 4-1. Waters of the U.S. Delineation and Threatened and Endangered Species Assessment.**



## 5. CONCLUSION

### 5.1. Waters of the U.S.

Ditch Number 1 as well as each contributing stream (Ditches Numbers 15, 19A, and 20 and Caney Creek) will likely be considered jurisdictional WOTUS and be subject to Section 404 and 401 permitting. However, regarding ditch or ditch improvements, the project may meet the Section 404(f)(1)(C) exemption for maintenance of drainage ditches and therefore not be subject to permitting by the USACE. However, the USACE has the final determination as to which waterbodies fall under their jurisdiction and which are subject to Section 404 permitting. Proposed improvements would entail placing rock materials below the OHWM for a volume exceeding nationwide permit (NWP) thresholds. Therefore, if the project does not meet Section 404(f)(1)(C) exemptions, an individual Section 404 permit may be required. Should an individual Section 404 permit be required, an individual Section 401 Water Quality Certification from MDNR may also be required.

### 5.2. Threatened and Endangered Species

Although few trees are present in the project area, those present exhibited characteristics of potentially suitable summer habitat for the three T&E listed bat species. We recommend further assessment be conducted once design plans are prepared. Should trees exhibiting potential bat habitat need cleared as part of the final alternative(s), we recommend incorporating conservation measures by clearing these trees during the winter months of November 1 through March 31.

Further, a significant population of monarch butterflies were observed in the project area. Efforts will be made to save existing common milkweed (*Asclepias syriaca*) seed from the project area prior to grading activities. Saved milkweed seed will be incorporated back into the landscape along the top of slope which will remain vegetated.



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## APPENDIX A

### AGENCY CORRESPONDENCE RESULTS AND REPORTS

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*Waters of the U.S. Delineation and  
Threatened and Endangered Species Assessment  
Whitewater River Watershed*

*B-1*

*January 2024*



---

**APPENDIX B**

**WETLAND DETERMINATION DATA SHEET**

---

## APPENDIX C PHOTOGRAPHS

|  |                                                                                                                                                                                                                                          |
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|  | <p>Photo 1.</p> <p>Ditch Number 1, near upper limits of proposed improvements, looking downstream (south). Cottonwood trees in the background on the opposite (east) slope are potential bat roost trees.</p> <p>September 19, 2023.</p> |
|  | <p>Photo 2.</p> <p>Ditch Number 1, looking upstream (north) from near its intersection with CR 262.</p> <p>September 20, 2023.</p>                                                                                                       |

|                                                                                    |                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | <p>Photo 3.</p> <p>Caney Creek, looking upstream from its confluence with Ditch Number 1.</p> <p>September 19, 2023.</p>                                                                                                 |
|  | <p>Photo 4.</p> <p>Discharge pipe from Old Caney Basin dry dam structure in center photo. Caney Creek is shown to the right. Photo taken at confluence of Caney Creek and Ditch Number 1.</p> <p>September 19, 2023.</p> |



Appendix C - Photographs

|  |                                                                                                                                                                                                                     |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Photo 5.</p> <p>Ditch Number 1, looking downstream (south) from its confluence with Caney Creek.</p> <p>September 19, 2023.</p>                                                                                  |
|  | <p>Photo 6.</p> <p>Ditch Number 1, looking upstream (north) from its confluence with Caney Creek. Note the sediment deposition and bank erosion on the west slope in the background.</p> <p>September 19, 2023.</p> |

## Phase I Cultural Resource Survey, Whitewater River Watershed, Scott County, Missouri

Prepared for: United States Department of Agriculture, Natural Resources Conservation Service

WSP Project No.: 8275000495  
WSP Cultural Report of Investigations No.: 23-061



September 2024



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## **Phase I Cultural Resource Survey, Whitewater River Watershed, Scott County, Missouri.**

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## MANAGEMENT SUMMARY

Archaeologists from WSP USA Environment & Infrastructure, Inc. (WSP) conducted a Phase I cultural resource survey within a portion of the Whitewater River Watershed in Scott County, Missouri, in December 2023. The project was completed as part of the Conservation Works JV (CWJV) team, on behalf of the Natural Resources Conservation Service (NRCS) to identify and document cultural resources within the Area of Potential Effect (APE). As the lead federal agency, the NRCS must comply with Section 106 of the National Historic Preservation Act (NHPA), and this work fulfills that goal.

The APE is defined as approximately 3,370 linear meters (11,056 feet / 2.09 miles) along a portion of the drainage canal of Hubble Creek. The section of canal paralleled a portion of Caney Creek and was bisected by County Road 262. Background research revealed no previously recorded archaeological sites within or intersecting the APE; likewise, examination of historic mapping did not reveal any known historic structures within or adjacent to the APE.

Due to primarily excellent surface visibility—between 25-50 percent in wooded areas and 80-100 percent in agricultural fields or where the ground sloped more than 20 percent within the drainage canal—the APE was systematically pedestrian surveyed. As a result of the survey, no new cultural sites were identified nor cultural materials recovered; therefore, WSP recommends no further archaeological work.

A total of one resource over 50 years of age and older was identified within the architectural survey area. This resource, a man-made earthen canal designated Architectural Resource 1 (AR-1), dates from between 1914 and 1920 based on archival research and historic map review. AR-1 is recommended eligible for the NRHP for its historic and architectural significance to the development of southeast Missouri, its association with prominent individuals, as well the architectural engineering as the largest drainage project in the United States.

While changes to the NRHP eligible canal system are proposed, the modifications are consistent with upgrades and continued improvements to the drainage ditches that do not change its historic integrity of location, association, setting, material, and feeling. Nor does it change the historic function from which the Little River Drainage Ditch No 1 gains its historic significance. As such, WSP recommends that there would be no adverse effect to the system. No further work is recommended for the resource documented.



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## 1.0 INTRODUCTION

On December 14, 2023, archaeologists from WSP USA Environment & Infrastructure, Inc. (WSP) conducted a Phase I cultural resources survey within a portion of the Whitewater River Watershed in Scott County, Missouri (**Figures 1.1-1.2**). The project was completed as part of the Conservation Works JV (CWJV) team, on behalf of the Natural Resources Conservation Service (NRCS) to identify and document cultural resources that may be adversely affected by proposed activities within the area of potential effect (APE). The proposed activities are needed to support the aging infrastructure and consist of the fortification of a sediment basin, fortification of drainage canal banks, establishing native grasses on canals, or installation of pipe structure to control erosion on canals. As the lead federal agency, the NRCS must comply with Section 106 of the National Historic Preservation Act (NHPA), and this work fulfills that goal. This archaeological investigation was conducted in compliance with Public Law 89-665, the National Historic Preservation Act of 1966 (as amended), 16 U.S.C. 470 (f), and Presidential Executive Order 11593. This project complies with established specifications for field investigations and National Register of Historic Places (NRHP) assessment according to the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (48FR 44716) (USDOL, NPS 1983). The survey was also compliant with guidelines established by the Missouri State Historic Preservation Office (SHPO) to ensure compliance with state and federal regulations.

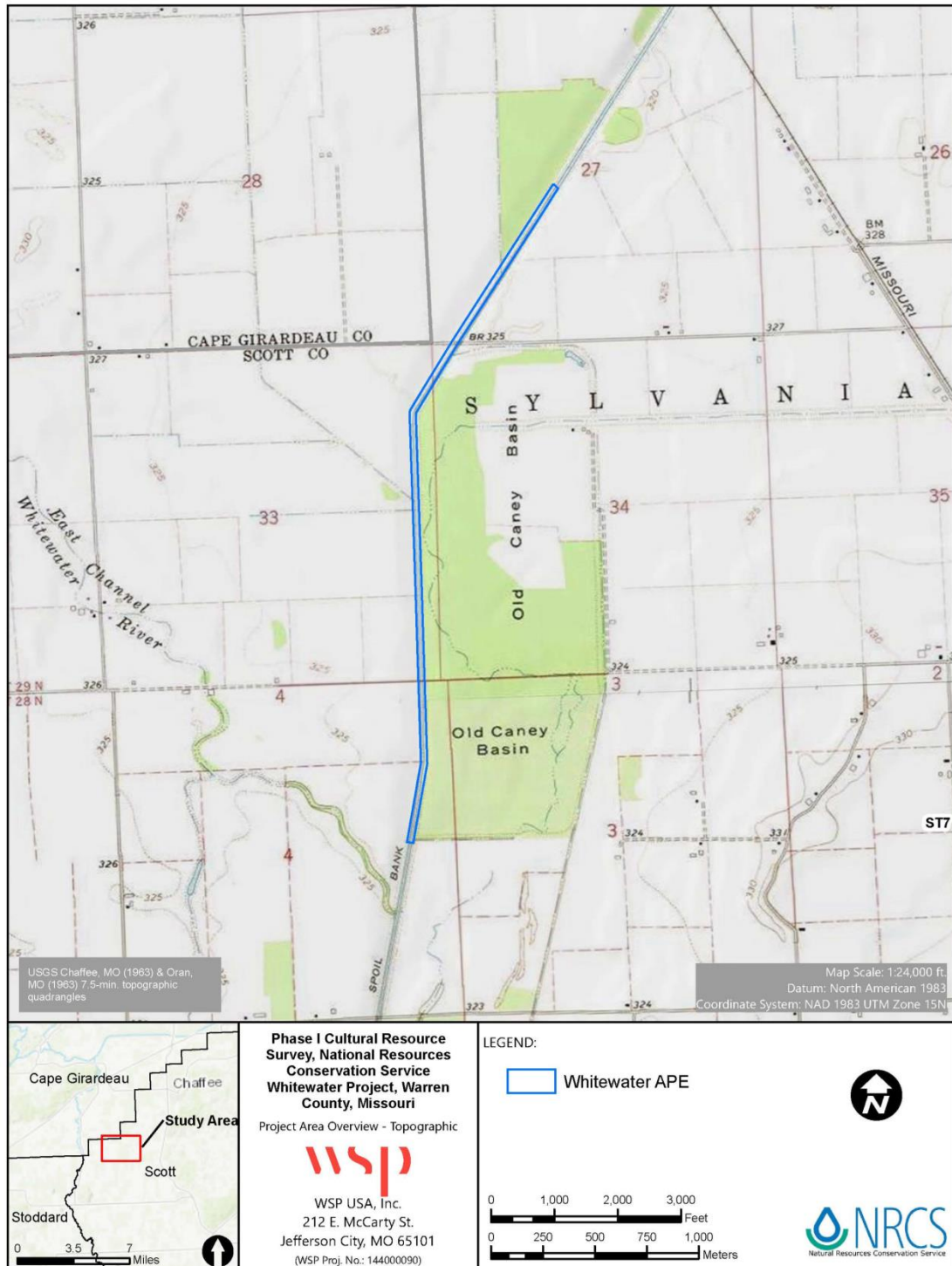
The APE is defined as an approximately 3,370-linear meter (11,056 feet / 2.09 miles) section of the drainage canal. The width of survey was 30 meters (98.4 feet) from center of the canal, totaling 50 acres in size. Due to excellent surface visibility, or where the ground slope was greater than 20 percent, the APE was systematically pedestrian surveyed. As a result of the archaeological survey, no new cultural sites were identified nor materials recovered; therefore, WSP recommends no further archaeological work.

The architectural survey area consisted of a rural agricultural landscape. The architectural survey APE consisted of the aforementioned 2.09-mile-long segment of the original Ditch No. 1. A total of one resource over 50 years of age was identified within the architectural survey area and consists of a man-made earthen canal designated Architectural Resource 1 (AR-1). Although the exact date of the segment associated with AR-1 is unknown, it was likely built between 1914 and 1920 based on archival research and historic mapping. AR-1 is recommended eligible for the NRHP based on its historic significance to the development and settlement of southeast Missouri under Criterion A, under Criterion B for its connection to design engineer Otto L. Kochtitzky, as well the architectural engineering as the largest drainage project in the United States under Criterion C.

Although there are proposed changes to the NRHP eligible canal system, the alterations are consistent with upgrades and continued improvements to the drainage ditches that do not change its historic integrity of location, association, setting, material, and feeling. Nor does it change the historic function from which the Little River Drainage Ditch No. 1 gains its historic significance. The planned rehabilitation design will continue to generally maintain the current look and style of

the existing elements. As such, WSP recommends that there would be no adverse effect to the system. No further work is recommended for the resource documented.

WSP archeologist Clay Cantrell conducted the archaeological survey under the direction of Principle Investigator, Kathryn Drennan Warner, MA for this project. He was assisted in the field by archaeologist John Hallemeier. Mr. Cantrell and architectural historian Matthew Prybylski, MHP prepared the report. John Bybee, archaeologist/GIS Analyst, provided GIS support, mapping, and report production assistance.



**Figure 1.1. APE shown on the Chaffee, MO 7.5' USGS topographic map.**



**Figure 1.2. APE location shown on high resolution aerial imagery.**

## 2.0 ENVIRONMENTAL SETTING

### 2.1 Physical Setting

Scott County lies in eastern Missouri, near the Mississippi River. Scott County (426-mi<sup>2</sup>) is bordered on the north by Cape Girardeau County, Missouri, on the east by the Mississippi River and Alexander County, Illinois, and on the south by New Madrid, Stoddard, and Mississippi Counties, Missouri. It is located within the Mississippi Alluvial Plain physiographic region of Missouri (MoDNR 2021). The Mississippi Alluvial Plains is a mix of undulating, open prairies and swampy lowlands along the Mississippi River embayment. The floodplain along the Mississippi River region is skirted with lagoons, lakes, and morasses, from St. Genevieve to the Arkansas border, and in many places is lined with flood levees. The soils are a mix of clayey soils, and silty, sandy alluvial soils along riverine areas. The eastern edge of the Ozarks, together with the Ouachita Mountains to the south, forms a major area of uplands in the mid-southern United States, and skirts the northwestern edge of the county (Wood and McMillan 1976). The highest point in Scott County is Jackson Hill, in the extreme northern portion of the county, and sits 183 meters (600 feet) above mean sea level.

### 2.2 Geology

The underlying geology of the APE consists of Quaternary-aged deposits. In southeastern Missouri, this series is comprised of Holocene alluvium, consisting of clay, silt, sand, and some gravel (Anderson 1979). Light gray to white chert nodules are prevalent, which were used for stone tools during precontact periods.

### 2.3 Soils

Three specific soil types were identified within the APE. **Table 2.1** summarizes these soils (NRCS 2024).

**Table 2.1. Soils in the APE.**

| NRCS Map Unit Symbol | Soil Name and Attributes                                        |
|----------------------|-----------------------------------------------------------------|
| 86006                | Adler silt loam, 0 to 1 percent slopes, occasionally flooded    |
| 86038                | Mhoon silt loam, 0 to 1 percent slopes, occasionally flooded    |
| 86056                | Sharkey silty clay, 0 to 1 percent slopes, occasionally flooded |

### 2.4 Flora and Fauna

Before historic settlement, the Mississippi Coastal plains were covered with oak-hickory forests with patches of prairie on upland surfaces. Once the area was settled, trees were harvested to make way for cultivation. Some of these trees include oak, hickory, walnut, elm, hackberry, sycamore, maple, and box elder (Wood et al. 1995).

Fauna at the time of settlement was diverse with white-tailed deer, bison, and elk, with only deer remaining today. Other game include mink, cottontail rabbits, beaver, porcupine, raccoons, opossum, skunk, and squirrels. Black bears, mountain lion, wolf, fox, and wildcat used to be prevalent, but now only foxes, mountain lions, and a few bears remain (Wood et al. 1995).

## **2.5 Climate**

The climate of this region is one of cold winters and long, hot summers. The growing season extends from the first thaw in spring to the first freeze in fall, generally from mid-April to mid-October. Temperature extremes range from 90+degrees Fahrenheit in the summer to below zero in the winters. These extremes generally do not last for extended periods of time. In summer, the average temperature is 75 degrees with an average high of 88 degrees, and in winter the average temperature is 35 degrees. The average annual rainfall is approximately 45 inches at Cape Girardeau (Festervand 1981). Between 1981 and 2010, the annual average precipitation for Scott County was approximately 48.25 inches (USDA 2010). Most of the precipitation falls between May to October, with heavy rainfall or thunderstorms occurring between May and August when the moist air from the Gulf of Mexico interacts with the dry continental air. The average seasonal snowfall is 20 inches with the maximum snow depth recorded at 35 inches (Festervand 1981).

### 3.0 CULTURAL CONTEXT AND PREVIOUS INVESTIGATIONS

The history of human activity in this region of Missouri spans thousands of years. The earliest groups to leave a definitive material record of their presence were early Paleoindians who entered the region during the Late Pleistocene glacial epoch more than 10,000 years ago. The precontact era lasted until the beginning of the Contact Period, which was marked by the arrival of the first European explorers and settlers.

While cultural change is a slow and continual process, archaeologists and other researchers divide the human history of a region into distinct cultural periods. This section is divided into chronological periods that are widely accepted for the cultural sequence of Missouri. Missouri's cultural sequence can be divided into five general periods, four of which are associated with the precontact occupation of the project area:

- Paleoindian Period (ca 9250-7500 BCE)
- Archaic Period (7500-600 BCE)
- Woodland Period (600 BCE-CE 900)
- Mississippian Period (CE 900-ca 1541)
- Historic Period (ca 1541-present)

#### 3.1 Paleoindian: (9250-7500 BCE)

Although the early occupation of North America is highly debated, due primarily to lack of data and controversial radiocarbon dates (O'Brien and Wood 1998:37-38), strong evidence indicates that the earliest inhabitants arrived in North America by at least 9,250 BC. At the time, Paleoindian groups likely subsisted on the hunting of now-extinct megafauna. In addition, the warming climate resulted in new vegetation that may have supplemented their diet. Around 9,000 BC, when the extinction of the megafauna occurred, having a more diverse diet became important as hunters grew more dependent on bison in the west and deer and small game in the east. In terms of settlement patterns, it is likely that Paleoindian people were organized into nomadic or semi-nomadic groups. Regarding technology, tool kits most commonly contained lanceolate or fluted spear points (such as Clovis, Folsom, and Dalton), as well as chipped-stone scrapers, adzes, and knives (O'Brien and Wood 1998).

One of the most prominent Paleoindian sites within Missouri is the Big Eddy Site. Located on the Sac River in southwestern Missouri, the Big Eddy is one of the few well-stratified, multi-component sites that has yielded artifacts ranging from pre-Clovis age to the Mississippian period. At Big Eddy, the Paleoindian period was represented by a diversity of point types including Clovis, Dalton, and San Patrice. Use-wear analysis of some of the tools indicates a variety of activities took place here, supporting the idea that Big Eddy was a base settlement (Lopinot et al. 2000).

### 3.2 Archaic Period (7500-600 BCE)

The Archaic period has three subdivisions: Early (7500-5000 BC), Middle (5000-3000 BC), and Late (3000-600 BC) (O'Brien and Wood 1998). In the Midwest, climate change marks the beginning of the Archaic Period. At this time, Missouri occupied a critical position on the boundary between the Great Plains to the west and deciduous forests to the east and southeast (O'Brien and Wood 1998). As temperatures increased and precipitation decreased, the eastern fringes of the Plains expanded while the forested environments shrank, causing the border between these two areas to shift (O'Brien and Wood 1998).

This not only impacted the plants and animals across the landscape, but also changed how humans exploited resources. For instance, Archaic populations adapted to changing fauna by relying on smaller mammals including white-tailed deer, turkey, squirrels, rabbits, and fish, among others. In addition, they began to incorporate seasonal exploitation of plant resources such as nuts, berries, seeds, bulbs, and greens (O'Brien and Wood 1998).

#### 3.2.1 Early Archaic (7500-5000 BCE)

During the Early Archaic period, settlement pattern is characterized as a mobile group foraging economy as resources would have been widely dispersed. In addition, human populations appear to be small and of low-density (O'Brien and Wood 1998). Early Archaic sites were typically located on terraces and other lowlands. The Early Archaic artifact assemblage was comprised of drills, numerous scrapers, including endscrapers and hafted endscrapers, and projectile points, with the lanceolate points of the late Paleoindian giving way to corner-notched and basal-notched point types (O'Brien 1996). Typical projectile point and knife styles included Rice Lobed, Rice Contracting Stemmed, and Graham Cave Notched, along with styles typical of the Dalton period (i.e., Dalton Serrated and Agate Basin Lanceolate) (Chapman 1975).

#### 3.2.2 Middle Archaic (5000-3000 BCE)

During the Middle Archaic period, climatic change continued. The decrease in moisture intensified, and prairie vegetation took over previously forested areas toward the east. Typical prairie fauna, such as bison and pronghorn, have been found at sites in the forested Ozarks. Evidence of lower water tables in the central Mississippi River valley indicate that aquatic resources were also negatively affected. As people continued to rely on forest and forest-edge species, Middle Archaic sites continued to be located on terraces and other lowlands in Missouri (O'Brien 1996).

Middle Archaic diagnostic artifacts included side-notched and stemmed projectile points such as Jakie Stemmed and Raddatz. In addition to lithic artifacts, cave sites such as Arnold Research Cave and Graham Cave yielded ornaments of shell and bone, a bag of woven grass, and a moccasin of deer hide and grass (Chapman 1975).

#### 3.2.3 Late Archaic (3000-600 BCE)

During the Late Archaic period, forests began to expand and reclaim areas that were taken over by grasslands. Despite the slow reversal of the dry conditions of the Hypsithermal, people continue to stay in the lowlands and terraces, but expanded their occupation along major streams. At this time, evidence appears for focused

activities and camps that were occupied for longer periods in the form of more permanent features such as houses, storage pits, and deep trash middens. People continued to subsist on deer and other mammals, but now included fish, squash, gourds, nuts, and seeds (O'Brien 1996; O'Brien and Wood 1998).

The Late Archaic lithic toolkit included projectile points, manos, drills, bannerstones, anvils, and hammerstones (Chapman 1975). Diagnostic artifacts included Smith Basal Notched, Afton Corner Notched, Sedalia Lanceolate, Nebo Hill Lanceolate, and Table Rock Stemmed projectile points. Generally, sites containing Late Archaic artifacts were larger and more dense than Early or Middle Archaic sites in the Eastern Ozarks, further supporting the idea of more permanent settlements (O'Brien and Wood 1998).

However, it is important to note that the increase in size and density of Late Archaic sites could be due to preservation issues. In the Mississippi River Valley, traces of Early Archaic and Middle Archaic sites were eradicated by the meandering of the river throughout the Holocene Period. Conversely, Late Archaic sites on former point bars and levee remnants throughout the region have not been destroyed (O'Brien and Wood 1998). Indeed, numerous Late Archaic surface scatters, often containing Poverty Point objects, are found throughout the river valley, mainly in the southeastern portion of the state. These sites are often large and dense, some containing middens that extend a meter below the ground surface (O'Brien and Wood 1998).

### **3.3 Woodland Period (600 BCE-CE 900)**

The Woodland period is subdivided into the Early Woodland (600-250 BC), Middle Woodland (250 BC-AD 450), and the Late Woodland (AD 450-900). The use of the term Woodland in this period is derived from the intensification of forest resources in the East and Midwest (O'Brien and Wood 1998). Another hallmark of the Woodland period is pottery. Although pottery first appears in the southeastern United States around the third millennium BC and parts of Missouri around the second millennium BC, it does not become prominent until the beginning of the Early Woodland period around 600 BC (O'Brien and Wood 1998).

#### **3.3.1 Early Woodland Period (600-250 BCE)**

During the transition between the Late Archaic and Early Woodland periods, the climate became warmer. In addition, precipitation in parts of the Midwest declined, creating drought like conditions in what is referred to as the Sub-Atlantic climatic episode which lasted from around 800 BC to AD 300 (O'Brien and Wood 1998). At this time, hunting and plant resources continued to be increasingly important with most resources becoming important diet staples (O'Brien 1996). In terms of settlement patterns, people typically engaged in mobile resource procurement excursions in territories surrounding a region of semi-permanent base camps (Chapman 1980).

Diagnostic artifacts expanded from contracting and straight-stemmed projectile points to include pottery. Early pottery in Missouri included Marion thick, Black Sand, and Tchula (O'Brien and Wood 1998). However, populations in the Western Prairie and

the Southwest Drainage Regions, developed or assimilated ceramic technology later than the Northeast Prairie, Ozark Highland, and Southeast Riverine Regions of Missouri (Chapman 1980).

### 3.3.2 Middle Woodland Period (250 BCE-CE 450)

Throughout the Middle Woodland Period, ceramic technology continued to develop. Types became regionalized and vessel manufacture became more refined. Vessels were globular, had strap handle appendages, and flared rims (Chapman 1980). Designs included incising, dentate stamping, punctation, and cross-hatching. The tempering agent was usually grit. Lithic artifacts included Steuben Expanded Stemmed projectile points, Snyder projectile points, scrapers, hammerstones, nutting stones, and bipoined knives. Other materials included bone, antler, and copper (Chapman 1975). In addition to hunting, subsistence became even more dependent on plant resources such as goosefoot, sunflower, knotweed, little barley, and maygrass (O'Brien 1996). Settlement patterns became more sedentary during this period.

During the Middle Woodland Period, the Hopewellian Interaction Sphere extended into Missouri. This Sphere was defined by the presence of certain images, exotic materials, and earthworks, and included multiple centers and extensions (Chapman 1980). For example, the Havana tradition extended along the Mississippi River valley; Kansas City and Big Bend centers extended along the Missouri River valley; and the Cooper extension of the Kansas City and Big Bend centers extended through southwestern Missouri.

### 3.3.3 Late Woodland Period (CE 450-900)

Late Woodland settlement patterns were characterized by dispersed, seasonal, semi-permanent base camps that exploited marginal areas. Burial mounds continued but became less elaborate. According to O'Brien and Wood, "many of the Late Woodland burials and burial structures are different from those that immediately preceded them. The log tombs and doughnut-shaped earthen ramp, and the elaborate grave offerings that accompanied the bodies, were not continued into the Late Woodland period" (1998:223). During this period, subsistence was more generalized, and plant resources constituted a smaller portion of the diet; however, maize began to be incorporated into the diet (Chapman 1980).

Lithic technology changed during the Late Woodland Period with the invention of the bow and arrow. Smaller, lightweight arrow points were produced, as opposed to the heavier, more cumbersome dart and spear points. Diagnostic projectile points include the Scallorn Corner Notched and the Rice Side Notched. Pottery forms became less elaborate during this period. In general, the Late Woodland seemed to place little emphasis upon arts and crafts (Chapman 1980). Vessel forms included jars and bowls with brushed, combed, cord roughened, plain or fabric impressed surfaces.

Decoration included cord-wrapped dowel impressions, punctations, scalloping, or notching. Tempering agents included limestone in central and northeast Missouri, and sand and grog in southeast Missouri (Chapman 1980).

One example of a Late Woodland Period site is the Range Site, located on an abandoned channel of the Mississippi River near Dupo, Illinois. Excavation revealed a complex array of approximately 5,500 pit features, house basins, and other auxiliary features (O'Brien and Wood 1998). This site vastly expanded how archaeologists understand the move toward settlement nucleation in the Mississippi River valley during the latter half of the Late Woodland period (O'Brien and Wood 1998). Numerous Late Woodland Period sites have been found in southeast Missouri and include low lying burial mounds and cairns that are reported to extend down the St. Francis River (O'Brien and Wood 1998).

### **3.4 Mississippian Period (CE 900-ca 1541)**

The Mississippian period has been divided into Early Mississippian (AD 900-1200), Middle Mississippian (AD 1200-1450), and Late Mississippian (AD 1450-1700) (Chapman 1980). At this time, the cultivation of maize increased, which led to more sedentary settlement patterns. In addition, societies were no longer egalitarian, and chiefdoms became the predominant political structure. As a result, social and vocational roles were prescribed.

#### **3.4.1 Early Mississippian Period (CE 900-1200)**

During the Early Mississippian period, subsistence strategies included the cultivation of beans, maize, and squash; faunal resources included white-tailed deer, fowl, and fish. With access to reliable resources population grew, and permanent, often fortified, population centers developed, surrounded by smaller villages or hamlets. Platform mounds developed as civic and religious centers (Chapman 1980). Also at this time, Cahokia became the largest cultural occurrence in the Mississippi Valley and possibly all of North America, north of Mexico City. The population at Cahokia was estimated to have been 20,000 or more. Shell tempered pottery was produced, long distance trade was common, and small, intricate, triangular arrow points were manufactured at these mound complexes. Another large mound center of this period, possibly second in size to Cahokia, was located on an upper terrace of the Mississippi River in what is now St. Louis. "St. Louis early on had been dubbed the Mound City because of the large number of earthworks contained within its corporate limits, the most impressive of which, termed the 'Big Mound', lay on the second terrace of the Mississippi River in what by the 1850s was the north-central part of the city" (O'Brien and Wood 1998:286). The Big Mound was said to be only one of about 25 mounds in the complex. Unfortunately, urban growth destroyed nearly all traces of the mound group during the mid-nineteenth century (O'Brien and Wood 1998).

At this time, southeastern Missouri saw significant changes in settlement distribution. Populations began to centralize into fortified, palisade centers (O'Brien and Wood 1998). One example is the Powers phase which refers to settlements arranged in a

tiered structure starting with a central area (possibly mounded) at the top and ending with single family living structures at the bottom. Powers phase was named after the Powers Fort, the only mounded, palisaded center in the Western Lowlands of Missouri (O'Brien and Wood 1998). Other Powers phase settlements in the Western Lowlands of southeast Missouri include the Turner, McCarty-Moore, Smith, and Snodgrass sites. There are currently an estimated twelve Powers Phase settlements across southeastern Missouri (O'Brien and Wood 1998).

### 3.4.2 Middle Mississippian Period (CE 1200-1450)

Mississippian culture peaked during the Middle Mississippian period. However, Chapman (1980:228) suggests that the typical Early Mississippian assemblage continued into the Middle Mississippian period, especially in the western portion of Missouri. At this time, western Missouri was exploited primarily for its resources rather than a region of intense settlement. In contrast, the eastern portion of Missouri, near the confluence of the Missouri and Mississippi Rivers, was still a highly active cultural center. Many Powers phase settlements established in the Early Mississippian Period continued and flourished into the Middle Mississippian Period. Most of these settlements were found along the Little Black River in the Western Lowlands of southeastern Missouri. The Turner site in Butler County, near the project area, contains elements of both Early and Middle Mississippian Periods (O'Brien and Wood 1998).

### 3.4.3 Late Mississippian Period (CE 1450-1700)

During the Late Mississippian period, all aspects of the Mississippian culture declined. Some archaeologists argue that large portions of land in Missouri were abandoned around A.D. 1350 – 1400 leaving little trace of human activity. In portions of southeastern Missouri, cultures such as the Nodena have been identified, but the presence of Native American groups was clearly reduced on the Missouri landscape.

At least 14 sites near or along Pemiscot Bayou in southeastern Missouri and northeastern Arkansas have produced Late Mississippian artifacts. These sites contain traditional Mississippian period native artifacts and post contact Spanish items such as glass beads, rolled copper, and knife blade fragments. Sites characterized as Pemiscot Bayou include the Campbell, Berry, Brooks, Cagle Lake, Denton Mounds, and Murphy sites (O'Brien and Wood 1998). Information from these sites provide insight into precontact life in southeastern Missouri on the eve of the Contact period, directly or indirectly, with the Spanish (O'Brien and Wood 1998).

## 3.5 Historic Period (CE 1541-present)

The Historic Contact period, also known as Protohistoric, began with the arrival of European explorers and colonists, and ended with the establishment of the first permanent European settlements. In Missouri, the Mississippian Period briefly extended into the known Historic Contact Period, as illustrated by the Pemiscot Bayou Site in southeast Missouri. It is likely that diseases introduced by Europeans on the eastern seaboard contributed to the decline of Mississippian Period cultures throughout the state of Missouri, as well as the nation. When Jesuit Missionaries Jolliet and Marquette traveled down the Mississippi in 1673, the Missouri and Osage Tribes

were the only tribes noted (Wiegers 1999). The French were among the first European explorers and traders in the Missouri region. Between 1673 and 1762 the French attempted to exploit the fur trade and create a profitable colony in “French Louisiana,” which included Missouri (Wiegers 1999). The French established the first permanent European settlements in Missouri; St. Genevieve was founded in 1735, and a fur trade post called St. Louis was founded in 1764. These settlements were quickly followed by Spanish settlements and westward expansion of the United States of America.

The first European settlements were French trading posts along the Mississippi and Missouri Rivers. In 1762, after losing their lands east of the Mississippi River, the French transferred their remaining western lands to the Spanish for diplomatic reasons. Under Spanish jurisdiction the region prospered economically because of lead mining. However, the Spanish never eliminated French influence in the region, nor were they able to halt westward American expansion from the east. Ultimately, in 1800, Napoleon Bonaparte, Emperor of France, reclaimed the Louisiana Territory from Spain and sold it to the United States Government just three years later. Captain Amos Stoddard of the U. S. Army accepted the territory from Spanish governor De Lassus on March 4, 1804 (Wiegers 1999).

Despite becoming U.S. land, the region did not fall into the province of the Northwest Ordinance and consequently slavery remained legal. By 1812, the Missouri Territory was established with some semblance of self-government. However, it was subject to numerous Native American raids instigated by the British as part of a plan of harassment during the War of 1812. Although settlement of the area stalled during this period, by 1820 immigration into the territory was rapid (Parrish 1971). Additionally, many southerners moved into the region due to the lack of prohibition against slavery. St. Louis and the Missouri Territory gained a reputation as a crossroad between East and West. The economy was characterized by farming, mining, and trading (Parrish 1971).

Missouri was soon marked by controversy. In 1817, settlers clamored for statehood and slavery became the pivotal issue for determining status. Until now, representation in Congress was equal between the North and South, and Missouri would shift the balance. Each side lobbied for Missouri’s statehood according to their respective political agendas. Henry Clay worked out a compromise, accordingly, named the Missouri Compromise of 1820. Under this agreement, Missouri would be admitted as a slave state and Maine, which had applied for statehood after Missouri, would be admitted as a free state. After this point, any state admitted below the southern boundary of Missouri, which sat on latitude 36°30’N, could be admitted as a slave state, ensuring that the balance in Congress was maintained and that the South could add slave states in the future (Parrish 1971).

In 1821, Missouri became a state and even the most remote areas were being settled by Euro-Americans. Russel Gerlach (1986) labeled this period of rapid settlement as the “Passing of the Frontier (1804-1830)” and the next thirty years as the “Post-Frontier Period (1830-1860)”. During this time, the state continued to be populated by Euro-Americans along with transient tribes such as the Kickapoo, Iowa, Sac, and Fox, who were given reservation land. During the late nineteenth century, railroads entered the

state allowing settlement and commerce to reach remote areas far from the major rivers. By the early twentieth century, vast regions of timber were harvested, and farming was the main rural industry. However, rural populations declined as new generations migrated towards larger cities for better paying jobs.

With the advent of World War I (1914 – 1918), Missouri was industrially prosperous and undertook numerous reforms. Over 140,000 Missouri residents served in World War I (Parrish 1971). After the war, many returned to a prosperous economy for both industry and agriculture. In 1921, agriculture dove into an economic slump that would not recover until after World War II (1939 – 1945). In the early 1920s, the Missouri government strove to improve the state with programs such as “Get Missouri Out of the Mud,” a large road construction program (Parrish 1971). In 1929, this growth and prosperity ended with the crash of the Stock Market and the beginning of the Great Depression.

In 1941, the US entered World War II. Missouri had not recovered from its economic slump and numerous Federal programs for construction began in the state. The government again tackled the issue of political reform (Parrish 1971). The economy recovered as the war progressed and demands for natural resources increased. In addition, the McDonnell Aircraft Corporation began manufacturing aircraft parts. Missouri’s greatest victory in World War II was the election of Missouri Senator Harry S. Truman to the presidency.

In 1945, Missouri wrote its fourth constitution, which allowed for unions, the streamlining of the executive department, and the modernization of the tax system (Parrish 1971). The constitution also segregated schools, a move that would haunt the state well into the next century. Manufacturing and industry began to decline in the 1960s and 1970s and the service sector replaced much of this work. Subsistence farming was replaced by large-scale agricultural entities.

Two major issues would define Missouri from the 1980s through the end of the century: segregation and the environment. Although the landmark 1954 case *Brown v. Board of Education* outlawed segregation, changes in racial attitudes affected a true solution. In 1980, court ordered desegregation began in Missouri’s schools, attempting to alleviate the racial isolation of African American students. Courts determined that the State of Missouri was required to pay for half of the cost of school desegregation plans. In 1993, the Outstanding Schools Act was passed. It was a \$310 million measure to reform Missouri schools and their funding (Missouri Digital Heritage 2017). Taxation of school funds led to the 1995 *Missouri v. Jenkins* case, which required the consideration of achievement in across-the-board pay raises in Kansas City schools (*Missouri v. Jenkins*). Many people called for the voluntary segregation of schools, due to control of schools and the costs of desegregation.

The environment was also a major concern. By 1985, the residents in Times Beach had abandoned their homes due to dioxin contamination, a component of Agent Orange (Missouri Legends 2017). Massive clean-up efforts were launched by the Environmental Protection Agency (EPA) at Times Beach and 28 other sites in the state.

This evacuation led to an awareness of environmental issues in the state and numerous state-wide environmental reforms.

Other issues have affected the citizens of the State of Missouri in the last 20 years. In 1987, Whiteman Air Force Base in Knob Knoster was designated as the home of the B-2 Stealth Bomber unit. In 1992, Missouri voters approved riverboat gambling excursions on the Mississippi and Missouri rivers. The Great Flood of 1993 devastated numerous parts of Missouri, as well as other areas in the Midwest (Missouri Digital Heritage 2017). Missouri has been a state rich in cultural history from the time of early precontact people to the modern era.

### 3.5.1 Scott County

Scott County is in the southeastern part of Missouri, bounded on the north by Cape Girardeau County, Missouri and Alexander County, Illinois, and on the south by Mississippi, New Madrid, and Stoddard counties, in Missouri. Scott County is approximately 426 square miles, or 272,640 acres (USDA 1978).

Native Americans were the first settlers in the area known today as Scott County. When it became a state in 1821, Missouri had a Native American population estimated at around 20,000 (Genealogy Trails 2024). Tribes within the state included the Kickapoo, Shawnee, Ioway, Otoe, Delaware, and Osage. Many of these nations had been driven to Missouri from the east by the growing population of white inhabitants. In an 1808 treaty, the Osage gave up most of their land in southern Missouri Territory, believing the treaty permitted them to continue hunting and fishing in this region (Genealogy Trails 2024). Conflict between Native and European Americans grew as Missouri's white population increased and expanded from its earliest areas of settlement along the Mississippi and Missouri rivers into the ancestral lands of the Osage (Genealogy Trails 2024). By the 1830s most Native Americans had been forced out of Missouri. There are no federally recognized Native American tribes within the state today, yet many Missouri placenames are of Native American origin. Many Tribes, located outside of the state, maintain an interest in the archaeological investigations of their ancestral homelands.

Scott County was named after John Scott, one of the first state representatives from the region (Genealogy Trails 2024). Its county seat, Benton, was likewise named for Thomas Hart Benton, Missouri's first senator. Benton's courthouse is situated on the town square and consists of a two-story brick building constructed in 1883 (Genealogy Trails 2024). The Benton Bank was created in 1903.

Chaffee, the closest incorporated town to the current APE, was platted in 1905. The land on which the town lies was purchased by the Frisco Railroad, which subsequently divided the land into lots. Later, the town became a depot on the railroad connecting Cape Girardeau and other cities to the south (Genealogy Trails 2024).

Near Scott County's boundary with the Mississippi River lies a rock island in the river called Cape La Croix, on which a Jesuit missionary named Father De Montigny constructed a cross that exists today.

During the Civil War, the county was harried by guerrilla raids. Later, commercial activity developed quickly, from the 1870s to the turn of the twentieth century. Dense forests of hardwoods and pine were then timbered; likewise, railroads traversing the area were constructed around this time (Genealogy Trails 2024). Many towns were then founded, including Morley, Diehlstadt, Perkins, Oran, Blodgett, Vanduser, Chaffee, and Kelso. The Thebes-Mississippi River Railroad Bridge near Illmo was constructed in 1905 (Genealogy Trails 2024).

Around the turn of the twentieth century, common crops in the area were cotton, soy, melons, and grains. In the eastern portion of the county, between the Mississippi River and the western floodplain, lies the Crowley's Ridge drainage system, one of the oldest drainage systems in the country; this system is a remnant of an old coastal floodplain and natural levee that traverses the country (Genealogy Trails 2024).

### 3.5.2 History of Drainage Systems, Scott County

The system of canals and made-made channels that make up the Little River Drainage in southeast Missouri is the largest drainage project of the United States. The drainage district is approximately 90 miles long (north to south) by 10 to 20 miles wide (east to west). In the nineteenth century, the land that makes up southern and eastern Scott County was characterized as a massive swampland covering approximately half a million acres of heavily flooded land. The flood waters persisted due to its location along the Mississippi River and downflow of water from the Ozark Plateau (Figure 3.1). The Swamp Land Act of 1850 provided a way for the swamp land to revert from federal ownership to state ownership, under the acknowledgement that Missouri would eventually drain the land and make it agriculturally viable (The Little River Drainage District 2021).

By 1905, a new law established the Little River Drainage District. At first, the many railroads in the area opposed the new drainage district. However, by 1909, engineers for Little River Drainage District had created a plan for the creation of drainage canals, and southeast Missouri landowners were soon taxed, generating revenue to be used for the project (The Little River Drainage District 2021). The overall design and engineering of the system can be attributed to Otto Leander Kochtitzky Sr. (1855–1935) who was the architect behind the Little River Drainage District. Kochtitzky consulted with other prominent drainage engineers, Isham Randolph and Arthur E. Morgan, when developing the plan (Southeast Missouri State University 2024). Based on their ideas and layout of the drainage system, several million acres of unusable swampland were converted into the vast agricultural fields of southeastern Missouri.

Kochtitzky's plan called for two separate drainage systems. After construction began, the northern district consisted of diversion channels for upland runoff, in Bollinger, Cape Girardeau, and Scott counties (History 2021). The southern district consisted of 85 drainage canals, laid out by four survey crews. Ditch No. 1, the longest ditch in the system, travels southwest about 98 miles. Figure 3.2 illustrates construction of one of the channels. Later, in 1985, a series of relief walls were constructed along the Headwater Diversion Channel Levee.

Today, the landscape of southeastern Missouri appears much different than it did in the past. The region that was once a tangle of vegetation and backwater is now almost completely flat agricultural land, due to the singular engineering design of the Little River Drainage District itself (The Little River Drainage District 2021).



**Figure 3.1. Example of flooding prior to the formation of the drainage district (The Little River Drainage District 2024).**



**Figure 3.2. Canal construction, circa 1918 (The Little River Drainage District 2024).**



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## 4.0 BACKGROUND RESEARCH

### 4.1 Previous Sites and Surveys

A review of the Missouri SHPO archaeological and historic architectural site and survey data was conducted for the APE. The search revealed that no previously recorded sites or surveys occur within or adjacent to the APE. Likewise, no sites or surveys have been recorded within a one-mile (1.61 km) buffer of the APE.

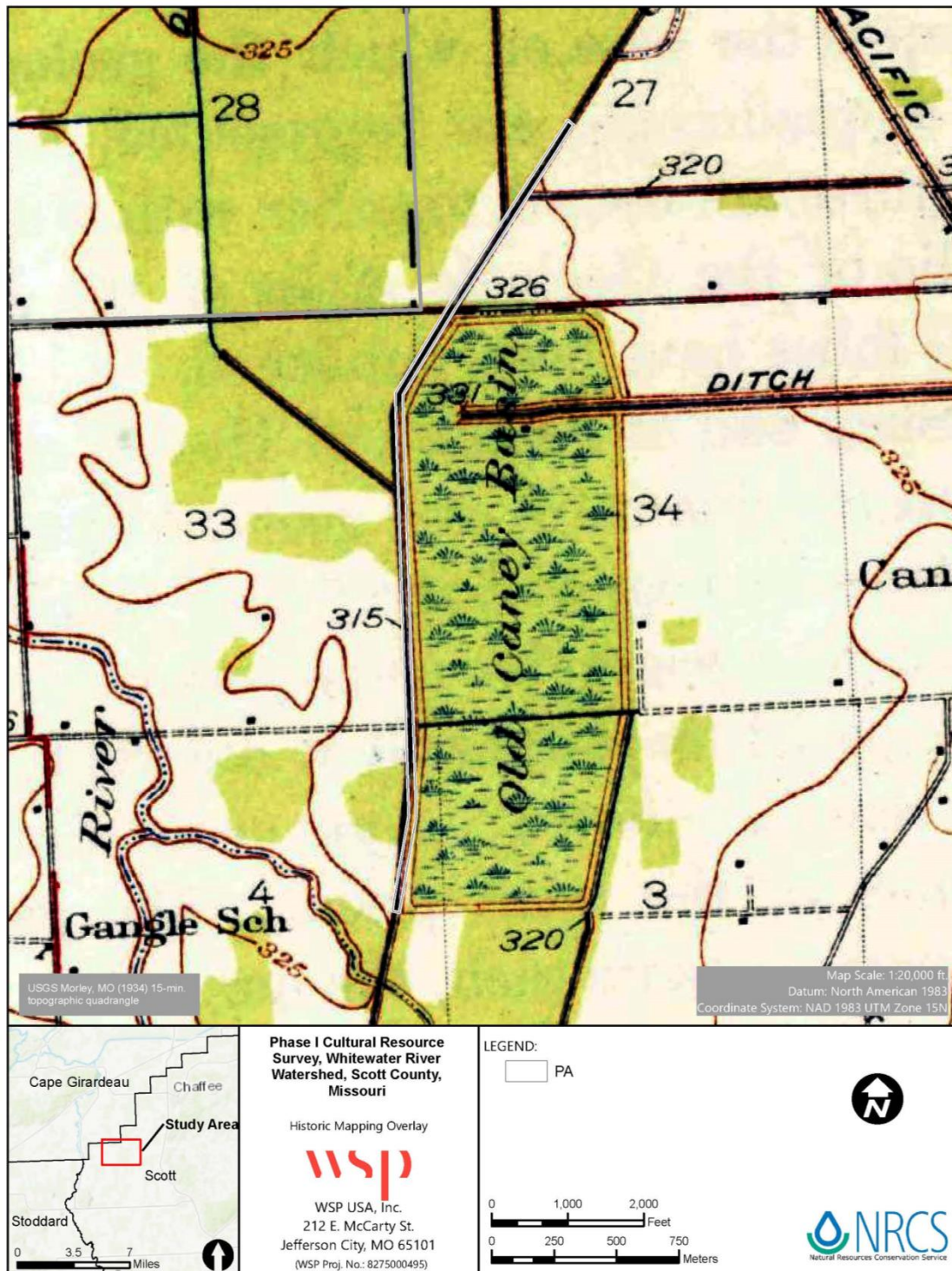
### 4.2 Historic Mapping

Historic maps were reviewed to gain insight into the historic land use of the area and to investigate the presence of historic structures. The 1930 W. W. Hixson & Co. Plat of Scott County, Missouri (**Figure 4.1**); the 1934 USGS Morley, Missouri 15-minute series topographic map (**Figure 4.2**); and the 1963 USGS Chaffee and Oran, Missouri 7.5-minute series topographic maps (**Figure 4.3**) were reviewed for the presence of historic structures or cultural features.

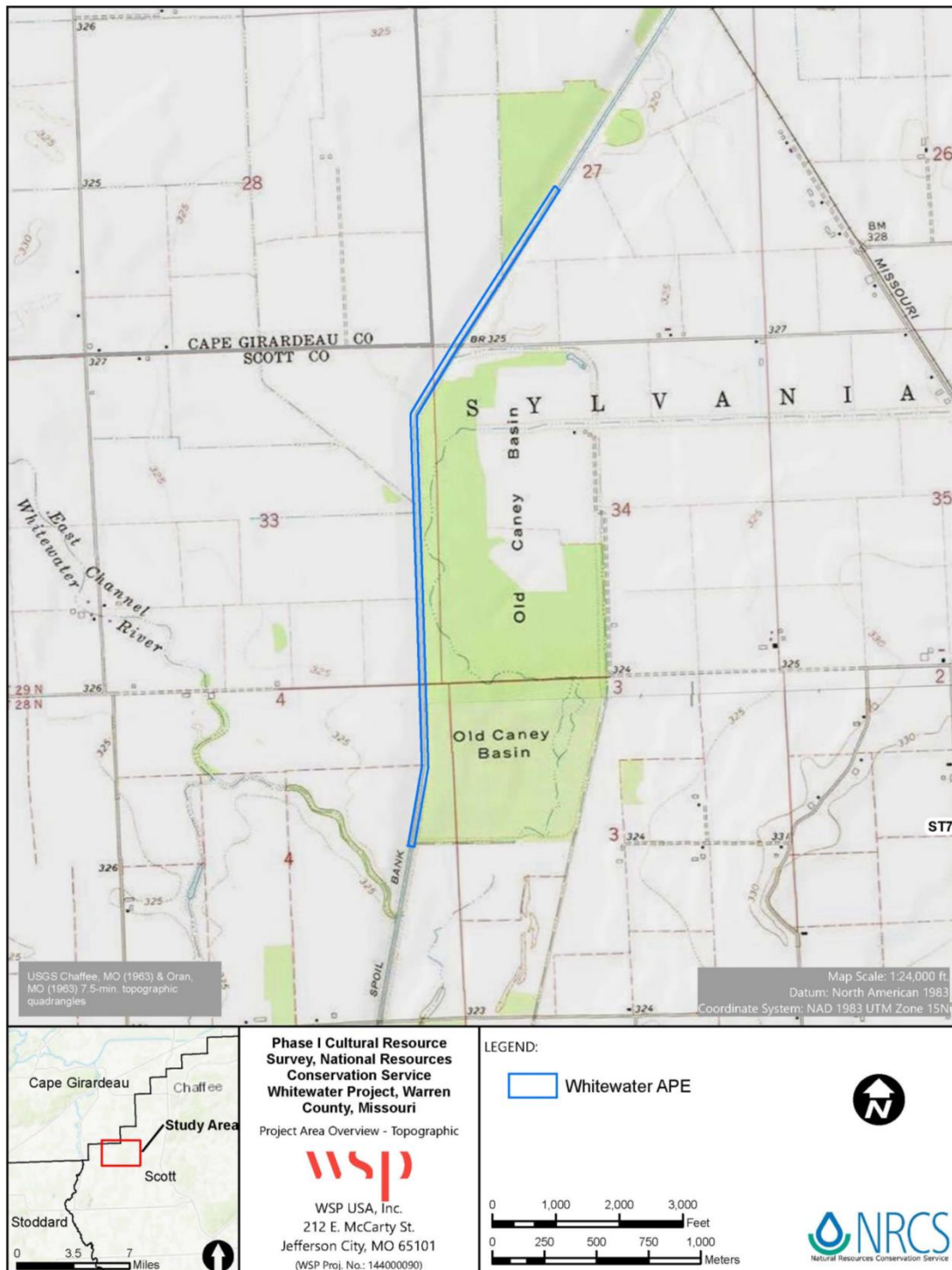
The 1930 plat map shows the land parcels within the vicinity of the APE and lists the names of the landowners circa 1930. The 1934 topographic map depicts nineteen structures to the east, west, southeast, and southwest of and outside the current APE (see **Figure 4.2**). It also shows a swamp area where Caney Creek now drains north to south, called Old Caney Basin. Many of these residences disappear or have been demolished in the 1963 topographic map (see **Figure 4.3**).



**Figure 4.1. Whitewater APE shown on the 1930 W. W. Hixson & Co. Plat Map of Scott County, Missouri.**



**Figure 4.2. Whitewater APE shown on the 1934 USGS Morley, Missouri Topographic Map.**



**Figure 4.3. Whitewater APE shown on the 1963 USGS Chaffee and Oran, Missouri Topographic Maps.**

## 5.0 METHODS

The purpose of the cultural resource survey was to identify archaeological sites, architectural properties, or any other cultural resources located within the project area. Resources were assessed against the criteria for the NRHP to determine their potential eligibility. These criteria require that the quality of significance in American history, architecture, culture, and archaeology should be present in buildings, structures, objects, sites, or districts that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that the buildings, structures, objects, sites, or districts that:

- A. Are associated with events that have made a significant contribution to the broad patterns of our history; or,
- B. Are associated with the lives of persons significant to our past; or,
- C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or,
- D. Have yielded, or may be likely to yield, information important in prehistory or history (USDOL, NPS 2002).

Precontact and historic archaeological sites typically consist of buried below ground artifact concentrations, though they may be associated with above ground features such as Native American burial mounds or historic houses, barns, and other structures. The significance of archaeological sites is often assessed under Criterion D. In general, archaeological sites that lack sub-plow zone artifact-bearing deposits, that have low-density artifact distributions, that contain evidence of deep plowing, that lack spatial integrity, that lack artifact concentrations, and / or that exhibit signs of earth disturbing activities do not appear to be good candidates for inclusion on the NRHP. Sites that contain concentrations of artifacts, intact surface and/or subsurface features, or intact subsurface remains may be recommended for additional evaluation to determine if they are eligible for inclusion on the NRHP. Further investigations of these intact archaeological contexts can yield important data on various aspects of the lives of the precontact and historic peoples who left them.

In short, the integrity of a site (and thereby potential for NRHP eligibility) is directly tied to its capacity to address research questions. Integrity can be related to any or all of the following (USDOL, NPS 2002):

Location: the place where the historic property (or properties) was/were constructed or where the historic event(s) occurred;

Design: the combination of elements that create the form, plan space, structure, and style of a property (or properties);

Setting: the physical environment of the historic property (or properties);

Materials: the physical elements that were combined to create the property (or properties) during the associated period of significance.

Workmanship: the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;

Feeling: the property's or (properties') expression of the aesthetic or historic sense of the period of significance; and

Association: the direct link between the important historic event(s) or person(s) and the historic property (or properties).

## 5.1 Archaeological Field Methods

The project methods follow the MO SHPO's Guidelines for Phase I Archaeological Surveys and Reports. Areas within the APE exhibiting greater than 25 percent ground surface visibility, greater than 20 percent slope, that were wet and/or inundated, that were protected wetlands, or that were obviously disturbed were pedestrian surveyed at no more than 5-m (16.4-ft) interval transect.

Mapping for the project was completed using a handheld GPS unit capable of sub-meter accuracy. Detailed notes were maintained daily regarding the areas surveyed, methods employed within sections of the project area, and environmental conditions within the project area.

## 5.2 Architectural Field Methods

WSP staff utilized NRHP Bulletin #15, *How to Apply the National Register Criteria for Evaluation* (USDOL, NPS 2002) to assess the buildings, structures and/or man-made historic resources over 50 years of age for NRHP eligibility. The methodology for the architectural field survey follows the standards established by the National Park Service and the MO SHPO. To properly assess integrity, a series of steps must be followed. First, the physical features must be defined and determined if visible enough to convey historic significance. Second, it must be determined if the property is the lone example of its kind, or if it needs to be compared with other, similar properties. Finally, the aspects of integrity must be identified and established as essential to the historic significance of a property.

Fieldwork entailed inspection and documentation of aboveground structures over 50 years of age within the architectural survey areas. The architectural APE extended 2.09 miles along the original Headwater Division Channel "Ditch No. 1." Ditch No. 1 is the longest channel within the Little River Drainage District, extending approximately 98 miles. Fieldwork included written and photographic documentation of resources to determine the architectural and historic details of each historic property.

Aboveground resources recorded in the field were given individual Architectural Resource (AR) numbers.

In addition to the MO SHPO literature review discussed in Section 4.0, detailed archival research was also conducted. Archival research, which included local histories, atlases, historic maps, aerial photographs, and other pertinent information, were researched to identify specifications of existing resources and to gain a better understanding of the history and development of the project. This research was used to help determine a variety of attributes such as date of construction, when alterations may have occurred, as well as materials.



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## 6.0 PROJECT OVERVIEW AND SURVEY RESULTS

WSP conducted a Phase I cultural resource survey of the APE, as defined by NRCS. Detailed field notes, field forms, and photographic documentation were completed. GPS data was collected throughout the APE to document survey methods, photographed locations, and disturbed areas. No new archaeological sites were identified during the survey. One architectural resource over 50 years of age was identified within the APE, a man-made earthen canal designated AR-1 that dates from between 1914 and 1920 based on archival research and historic map review.

### 6.1 Archaeological Field Conditions and Survey Results

The APE covers approximately 3,370 linear meters (11,056 feet / 2.09 miles) along the drainage canal, which is located in agricultural fields, partially wooded areas, and wetlands. The width of the APE measures 30 meters (98.4 feet) on either side from center of the ditch. Vegetation consisted of wetland grasses, mixed deciduous trees with varying levels of underbrush, tall grass, and bare or harvested agricultural fields (**Figures 6.1-6.5**). Ground surface visibility varied from 25 to 100 percent, depending on location. Portions of the APE that were in agricultural fields predominantly had a high degree of surface visibility (80 to 100 percent), while one field still contained plant material from the previous harvest resulting in a lower surface visibility (40 to 50 percent). The APE was investigated completely by pedestrian survey in 5-meter transects (**Figure 6.6**). During the survey, no sites or cultural materials were identified.



**Figure 6.1. Agricultural field within Whitewater APE, facing northeast.**



**Figure 6.2. Partially wooded area within Whitewater APE, facing east.**



**Figure 6.3. Sloped area within canal in Whitewater APE, facing south.**



**Figure 6.4. Agricultural field outside canal, facing east.**



**Figure 6.5. View of canal interior, facing west.**



**Figure 6.6. Overall survey results within the Whitewater APE.**

## 6.2 Architectural Survey Results

### Architectural Resource 1 - Water Diversion/Drainage Ditch

AR-1 is a segment of the original Ditch No. 1 (**Figures 6.7**). Ditch No. 1 is the longest channel within the Little River Drainage District, extending approximately 98 miles. AR-1 is located along the southern most stretch of the drainage system's Southern District. Although the exact construction date of the canal segment associated with AR-1 is unknown, it was likely built between 1914 and 1920 based on archival research and historic mapping. Construction of Ditch No. 1 began in 1914, in Cape Girardeau County, then extending southeast into Scott County. As such, the Scott County portion that includes AR-1 would have been the last section to be completed.

#### *Resource Description*

Documentation of AR-1 included photographs taken at regular intervals along the channel and designated by location as "Photographic Points." A total of nine Photographic Points were recorded and labeled Point 1 through Point 9 extending from north to south (**Figure 6.8**). AR-1 consists of a man-made earthen channel that extends 2.09 miles and measures approximately 5 feet to up to 25 feet wide (**Figures 6.9 - 6.17**). Water depth fluctuates throughout the year based on precipitation; however, at the time of the survey, the channel was only a few feet deep along the entire length of the survey area. In the 100+ years since the construction of the drainage ditch, the channel itself has obtained the appearance of a natural wetland landscape surrounded by rural agricultural fields, lightly wooded stands, marshy areas, and grassy basin side slopes. As previously mentioned, the ditch was originally constructed for flood control, and functions by diverting rain waters and snow melt along a series of drainage ditches. The ditch still functions as it was historically intended.

#### *Current Condition and Alterations*

AR-1 is currently in good condition and has undergone no alterations since its original construction. As with all open and exposed earthen water structures, there are always various amounts of weathering and soil erosion, although much of this has been controlled by the natural vegetation growth and routine maintenance. Due to the minimal amount of physical change and function, AR-1 retains its integrity of location, setting, design, association, workmanship, material and feeling.

#### *NRHP Recommendations*

AR-1 is recommended as eligible individually for NRHP listing on both a regional and national level due to its historic and architectural significance. Ditch No. 1 (AR-1) is part of the greater Little River Drainage District, the largest drainage system in the Nation. While recommendations on the NRHP eligibility as part of a multiple property and/or historic district listing was beyond the scope of this project, it is likely that the entire Little River Drainage District could be eligible as a historic landscape.

Under Criterion A, Little River Drainage Ditch No. 1 (AR-1) is recommended eligible for listing on the NRHP based on its connection to historically significant flood control and land drainage needs of Missouri and the US during the early to mid-1900s. As the largest drainage project in the US, the Little River Drainage Ditch No. 1 (AR-1) represents a unique and essential element of the original design for flood control and land reclamation objectives and directly contributes to the historical significance of the region, as well as the US as a whole. Considerable effort went into planning, designing, and constructing the facilities of the canal system. Years of detailed studies and site surveys in and around the greater Mississippi River watershed were conducted to locate specific design needs and to identify natural/human impacts by such an immense engineering project. Without these endeavors in architecture for the canal system, agricultural endeavors would not have been able to exist in such a successful manner historically. The large-scale engineering used to create the canal system represents an excellent example of the development of innovations, while solving the problem of the region's greater flood control needs. The specific episode of the canal system's construction significantly changed the Missouri landscape to produce immense amounts of harvests for US markets and consumption. Without the land reclamation created at the Little River Drainage Ditch No. 1 (AR-1), the area of southeast Missouri would never have developed in the capacity that it has over the last century. Moreover, the canal system has developed into important natural assets. The removal of the swamplands and subsequent agricultural development activities in the mid-1900s essentially created the need for infrastructure such as roads and utilities, as well as businesses like restaurants and shopping areas in the nearby town of Cape Girardeau. As a direct result of the land reclamation for which the drainage system was created, farmers came to the area to cultivate numerous crops in the ideal climate and later as a destination to build suburban homes outside of Cape Girardeau. Furthermore, these designed elements and canals retain a high degree of material integrity to the point that they appear together as a natural lake setting.

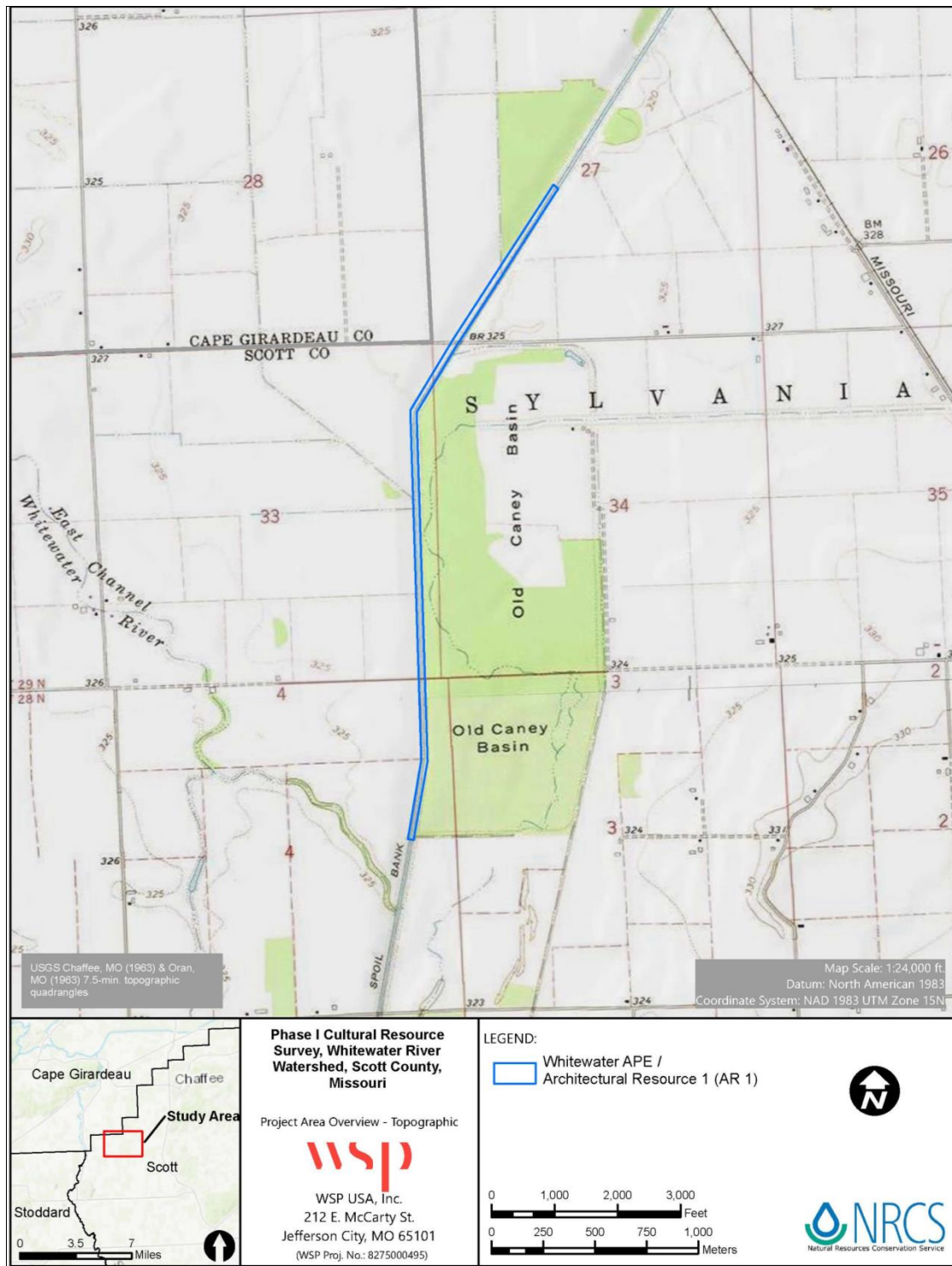
Little River Drainage Ditch No. 1 (AR-1) is recommended as eligible under Criterion B due to its association with Otto L. Kochtitzky. Given that many individuals were important to the building of the canal system as monumental constructions, background research suggests that the overall design and construction of the Little River Drainage Ditch No. 1 (AR-1) can be contributed directly to Mr Kochtitzky's designs and engineering efforts. His direction of the people and design teams directly contributed to its success and significance be readily attributed to this individual.

Under Criterion C, the Little River Drainage Ditch No. 1 (AR-1) is recommended eligible for listing on the NRHP based on its role as an architecturally designed canal system that has continually served the objectives of flood control and land reclamation since its creation in the early part of the last century. While the overall architectural design of the canal system is not unique, its construction is a major engineering accomplishment, and it represents the ingenuity of architects to build and operate substantial structures that radically change the landscape for the goal of land recovery for use as agricultural fields. The Little River Drainage Ditch No. 1 (AR-1) was in the forefront of large-scale flood control development in Missouri and the US at large during the 1900s. It should also be noted that out of the thousands of canal systems, the Little River Drainage District continues to be the largest system of its type in the US,

making the Little River Drainage Ditch No. 1 (AR-1) a unique canal system type nationally. Moreover, the engineering theories, innovations, and techniques behind land reclamation systems are exemplified at Little River Drainage Ditch No. 1 (AR-1), making it an excellent representation of its kind. The Little River Drainage Ditch No. 1 (AR-1) is significant as the singular catalyst for which the entire historic development of southeastern Missouri and its substantial agricultural enterprise would not exist. Based on its relatively unchanged architectural elements and design, the Little River Drainage Ditch No. 1 (AR-1) individually retains much of its material and historic integrity.

Properties evaluated under Criterion D typically consider archaeological sites that may have the potential to contribute important information to our understanding of history. As such, recommendations in reference to AR-1 based on archaeological data can be found in Section 6.1.

While there are proposed changes to the NRHP eligible canal system, the alterations are consistent with upgrades and continued improvements to the drainage ditches that do not change its historic integrity of location, association, setting, material, and feeling. Nor does it change the historic function from which the Little River Drainage Ditch No. 1 gains its historic significance. The planned rehabilitation design will continue to generally maintain the current look and style of the existing elements. As such, WSP recommends that there would be no adverse effect to the system.



**Figure 6.7. Modern Topographic map showing layout of AR-1.**



**Figure 6.8. Aerial map showing location of Photographic Points used to document AR-1.**



**Figure 6.9. AR-1 as seen from Photographic Point 1 at the northern most extent, facing south.**



**Figure 6.10. Overview of AR-1 as seen from Photographic Point 2, facing south**



**Figure 6.11. AR-1 as seen from Photographic Point 3 at the CR 262 Bridge, facing south.**



**Figure 6.12. Overview of AR-1 as seen from Photographic Point 4, facing south**



**Figure 6.13. Overview of AR-1 as seen from Photographic Point 5, facing west**



**Figure 6.14. Overview of AR-1 as seen from Photographic Point 6, facing west**



**Figure 6.15. Overview of AR-1 as seen from Photographic Point 7, facing southwest**



**Figure 6.16. Overview of AR-1 as seen from Photographic Point 8, facing southwest**



**Figure 6.17. Overview of AR-1 as seen from Photographic Point 9 at the southern-most extent, facing west**

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

On December 14, 2023, archaeologists from WSP conducted a Phase I cultural resource investigation of a portion of the Whitewater River Watershed. The survey was conducted to identify and document cultural resources within the APE. The project consisted of pedestrian survey of an approximately 3,370-linear meter (11,056 feet / 2.09 miles) drainage canal.

The APE was investigated completely by pedestrian survey. It exhibited over 25 percent surface visibility or greater than 20 percent slope and was surveyed at 5-m intervals. The APE was also photographed at varying intervals, depending on accessibility.

During the survey, no new archaeological sites or cultural materials were identified or recovered. WSP recommends no further archaeological work.

A total of one resource over 50 years of age and older was identified within the architectural survey area. This resource, a man-made earthen canal designated AR-1, dates from between 1914 and 1920 based on archival research and historic map review. AR-1 is recommended eligible due to a direct and significant association with the development of southeastern Missouri, flood control, land reclamation, as well as the tremendous engineer efforts and architectural designs, spearheaded by Otto Kochtitzky that made these goals possible. Moreover, this resource has retained much of its material integrity.

While there are proposed changes to the NRHP eligible canal system, the alterations are consistent with upgrades and continued improvements to the drainage ditches that do not change its historic integrity of location, association, setting, material, and feeling. Nor does it change the historic function from which the Little River Drainage Ditch No. 1 gains its historic significance. The planned rehabilitation design will continue to generally maintain the current look and style of the existing elements. As such, WSP recommends that there would be no adverse effect to the system. No further work is recommended for this resource.



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