APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): Jan 27, 2023

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: SWT-2020-00662

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: Oklahoma County/parish/borough: Tulsa County City: Glenpool
Center coordinates of site (lat/long in degree decimal format): Lat. 35.964015° **N**, Long. -96.008164° **W**.
Universal Transverse Mercator: 14
Name of nearest waterbody: Coal Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Arkansas River
Name of watershed or Hydrologic Unit Code (HUC): 111101010111

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: Jan 27, 2023
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☒ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☒ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands:

FS-1, Jurisdictional Intermittent Stream; 378 linear feet, 20 feet width
FS-2, Jurisdictional Forested Wetland; 0.22 acres
FS-5, Jurisdictional Ephemeral Stream; 882 linear feet, 4 feet width
FS-6, Jurisdictional Ephemeral Stream; 380 linear feet, 2 feet width
FS-7, Jurisdictional Forested Wetland; 0.09 acres
acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Established by OHWM.**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

FS-3, Non-jurisdictional Pond; 1.2 acres
FS-4, Non-jurisdictional Ephemeral Stream; 39 linear feet; 2 feet width
.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: 24,286 **acres**
Drainage area: FS-1: 1,170 acres; FS-4: 15 acres; FS-5: 3 acres; FS-6: 8 **acres**
Average annual rainfall: 41.91 inches
Average annual snowfall: 8.3 inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☒ Tributary flows through **3** tributaries before entering TNW.

Project waters are **30 (or more)** river miles from TNW.
Project waters are **1 (or less)** river miles from RPW.
Project waters are **30 (or more)** aerial (straight) miles from TNW.
Project waters are **1 (or less)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: N/A.

Identify flow route to TNW[5]: Coal Creek, Polecat Creek, Arkansas River, Arkansas River Section 10 TNW.
Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural

☒ Artificial (man-made). Explain: FS-3 and FS-4 appears to have been created, historically, for WWTP purposes.

☒ Manipulated (man-altered). Explain: FS-5 and FS-6 appears to have developed in a disturbed area previously impacted for WWTP purposes.

Tributary properties with respect to top of bank (estimate):

Average width: FS-1: 30 feet; FS-4: 2 feet; FS-5: 4 feet; FS-6: 2 feet

Average depth: FS-1: 30 feet; FS-4: 1 foot; FS-5: 1 foot; FS-6: 1 feet

Average side slopes: **2:1.**

Primary tributary substrate composition (check all that apply):

☒ Silts ☐ Sands ☐ Concrete

☐ Cobbles ☐ Gravel ☐ Muck

☐ Bedrock ☐ Vegetation. Type/% cover:

☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Relatively stable.

Presence of run/riffle/pool complexes. Explain: FS-1 exhibits seasonal pools.

Tributary geometry: **Relatively straight**

Tributary gradient (approximate average slope): 2 %

(c) Flow:

Tributary provides for: **Seasonal flow**

Estimate average number of flow events in review area/year: **20 (or greater)**

Describe flow regime: FS-1 exhibits seasonal flow. FS-4, FS-5, and FS-6 flow during and immediately after rainfall events.

Other information on duration and volume: .

Surface flow is: **Confined.** Characteristics: Flow typically occurs within the stream channel, until a flood event.

Subsurface flow: **Unknown**. Explain findings: .

☐ Dye (or other) test performed: .

Tributary has (check all that apply):

☒ Bed and banks

☒ OHWM[6] (check all indicators that apply):

☒ clear, natural line impressed on the bank

☐ changes in the character of soil

☐ shelving

☒ vegetation matted down, bent, or absent

☒ leaf litter disturbed or washed away

☐ sediment deposition

☐ water staining

☐ other (list):

☐ the presence of litter and debris

☒ destruction of terrestrial vegetation

☐ the presence of wrack line

☐ sediment sorting

☐ scour

☒ multiple observed or predicted flow events

☐ abrupt change in plant community

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:

☐ oil or scum line along shore objects

☐ fine shell or debris deposits (foreshore)

☐ physical markings/characteristics

☐ tidal gauges

☐ other (list):

☐ Mean High Water Mark indicated by:

☐ survey to available datum;

☐ physical markings;

☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: Relatively clear.

Identify specific pollutants, if known: The waters are in the vicinity of historic and current WWTP operations.

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

☒ Riparian corridor. Characteristics (type, average width): Forested, width varies.
☒ Wetland fringe. Characteristics: Forested wetlands are adjacent to FS-1 and FS-6.
☒ Habitat for:
☒ Federally Listed species. Explain findings: Tricolored Bat habitat is present.
☐ Fish/spawn areas. Explain findings: .
☐ Other environmentally-sensitive species. Explain findings: .
☒ Aquatic/wildlife diversity. Explain findings: The channels serve as habitat for a variety of species.

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:
Properties:
Wetland size: FS-2: 0.22 acre; FS-7: 0.09 acres
Wetland type. Explain: Forested.
Wetland quality. Explain: Relatively high.
Project wetlands cross or serve as state boundaries. Explain: N/A.

(b) General Flow Relationship with Non-TNW:
Flow is: **Ephemeral flow**. Explain: Sheetflow occurs during and immediately after rainfall events.

Surface flow is**: Overland sheetflow**
Characteristics: Sheetflow occurs during and immediately after rainfall events.

Subsurface flow: **Unknown**. Explain findings: .
☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:
☒ Directly abutting
☒ Not directly abutting
☒ Discrete wetland hydrologic connection. Explain: FS-7 directly abuts FS-6.
☒ Ecological connection. Explain: FS-2 is adjacent to FS-1.
☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW
Project wetlands are **30 (or more)** river miles from TNW.
Project waters are **30 (or more)** aerial (straight) miles from TNW.
Flow is from: **Wetland to navigable waters.**
Estimate approximate location of wetland as within the **50 - 100-year** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Forested.
Identify specific pollutants, if known: The wetlands are in the vicinity of historic and current WWTP operations.

(iii) Biological Characteristics. Wetland supports (check all that apply):

☒ Riparian buffer. Characteristics (type, average width): Forested / width varies.
☒ Vegetation type/percent cover. Explain: Forested / percent cover varies.
☒ Habitat for:
☒ Federally Listed species. Explain findings: Tricolored Bat habitat is present.
☐ Fish/spawn areas. Explain findings: .
☐ Other environmentally-sensitive species. Explain findings: .
☒ Aquatic/wildlife diversity. Explain findings: The wetlands serve as habitat for a variety of species.

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **2**
Approximately (0.31) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
FS-2 N	0.22 acre		
FS-7 Y	0.09 acre		

Summarize overall biological, chemical and physical functions being performed: The wetlands act as small catchment areas for sediments carried via storm water toward the adjacent tributary. Sediments and attached nutrients, pollutants, and/or other elements become deposited and captured within the wetland, as opposed to flowing directly to the tributary in question and ultimately to the Arkansas River. Because these wetlands are located in close physical proximity to a historic WWTP site, the potential for storm water to carry pollutants is high. Wetlands have been documented as having the capability of providing a long-term sink for nutrients present within waste, pesticides and fertilizers, primarily through their biogeochemical cycling (Walbridge and Lockaby 1994, Axt and Walbridge 1999). Due to this function, wetlands have long been termed the "kidneys of the landscape", due to their capacity to assist with pollutant filtration (Mitsch and Gosselink 2000). Because of the wetlands' fluctuating hydrologic conditions, they likely host a variety of organisms dependent upon this type of system. The wetlands have the capacity to physically affect the conditions of the adjacent or abutting tributary through their ability to store storm water in times of heavy rain events. Grass and leaf litter, and other organic materials also assist with slowing the flow of water and aiding with trapping sediments. By reducing the volume and velocity of storm water entering the adjacent or abutting tributary, the wetland minimizes the erosive forces of the storm water. By reducing the volume and velocity of flow, erosion potentials decrease and sediment transport downstream becomes minimized. This affects the Arkansas River and its tributaries, by reducing sediment input and erosion within these waters.

Axt, J.R., and M.R. Walbridge. 1999. Phosphate removal capacity of palustrine forested wetlands and adjacent uplands in Virginia. Soil Science Society of American Journal 63:1019-1031.

Mitsch, W.J. and J.G. Gosselink. 2000. Wetlands. John Wiley and Sons, Inc. New York, New York.

Walbridge, M.R. and B.G. Lockaby. 1994. Effects of forest management on biogeochemical functions in southern forested wetlands. Wetlands 14:10-17.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:

Ephemeral non-Relatively Permanent Water (non-RPW) FS-5, possesses hydrologic connectivity to the Arkansas River (Traditional Navigable Water) into which it ultimately flows. Hydrologic connectivity refers to the flow that transports organic matter and nutrients, energy, and aquatic organisms throughout the system (Freeman et al. 2006). Evidence of this connection and, consequently, a significant nexus is supported by the observations and scientific literature in the following paragraphs. This non-RPW possesses features of an ephemeral tributary with an ordinary high water mark (OHWM).

Solid organic matter (OM), such as leaves and other detrital material, is processed by a feeding group referred to as "shredders", which includes crayfish, larvae of craneflies, caddisflies, and nymphs of stoneflies. Shredders break down this coarse material, and allow the material to be utilized by a secondary group known as "collectors". Collectors further process the OM and produce dissolved OM and fine particulate matter, which flow downstream. Generally, as the solid OM is processed and translocated downstream, so are the microorganisms and invertebrates which utilize the material (Smith and Smith 2001). As such, headwater tributaries like this ephemeral stream represent the base of the food chain and, therefore, comprise one of the most important components of a watershed (Meyer et al. 2007). That is, the diversity of aquatic fauna in this headwater stream contributes to the biodiversity of Arkansas River and its tributaries by fitting into the complex foodweb of the river basin. Furthermore, the frequency of major rainfall events in the watershed results in pulsating hydrology, which sustains the local waterways, and subsequently, the Arkansas River system. This influences the chemistry of the Arkansas River basin via the transport of sediments and nutrients and geochemical cycling which occur during these pulses.

Various pollutants are likely present since this stream is located in close proximity to a historic WWTP site. Typical pollutants, such as oil, become suspended in storm water and, without adequate filtration, are transported downstream. After water is conveyed through the tributary, drying occurs in the headwater stream. This process of drying produces natural chemical and physical changes in the headwater stream. According to Izbicki (2007), even while headwater streams are drying, they remain an integral part of the overall stream because of this influence on the chemistry of the river downstream.

Finally, headwater streams, such as the subject tributary, have been documented as providing necessary habitat for birds, mammals, reptiles, and amphibian populations (Meyer 2007). The small catchment area of headwater streams results in some of the most diverse habitats within a lotic system. Since the channels are greatly affected by precipitation events, the physical and chemical state of the streams change rapidly and frequently which allows the habitat to be utilized by a large variety of species. Headwater streams are utilized not only by species which are unique to headwater streams, but also by animals which depend on such an environment for certain stages of their life cycles and those which migrate between headwater environments and larger waters.

This non-RPW possesses a hydrologic connection to Arkansas River through an open and defined channel. Due to this hydrologic connection, the tributary has the capacity to contribute hydrology, carry pollutants, provide habitat for aquatic life cycles, and provide food in the form of organic matter to waters downstream, all of which illustrates that this non-RPW possesses a significant nexus to the Arkansas River.

LITERATURE CITED:

Freeman, M. C., C. M. Pringle, and C. R. Jackson. 2007. Hydrologic Connectivity and the Contribution of Stream Headwaters to Ecological Integrity at Regional Scales. Journal of the American Water Resources Association. 43: 5-14.

Izbicki, J. A. 2007. Physical and Temporal Isolation of Mountain Headwater Streams in the Western Mojave Desert, Southern California. Journal of the American Water Resources Association. 43: 26-40.

Meyer, J. L., D. L.Strayer, J. B. Wallace, S. L. Eggert, G. S. Helfman, and N. E. Leonard. 2007. The Contribution of Headwater Streams to Biodiversity in River Networks. Journal of the American Water Resources Association. 43: 86-103.

Smith, R. L. and T. M. Smith. 2001. Ecology and Field Biology. Benjamin Cummings, New York. Pp. 644-650.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

Ephemeral non-Relatively Permanent Water (non-RPW) FS-6 and Forested Wetland FS-7, possesses hydrologic connectivity to the Arkansas River (Traditional Navigable Water) into which they ultimately flows. Hydrologic connectivity refers to the flow that transports organic matter and nutrients, energy, and aquatic organisms throughout the system (Freeman et al. 2006). Evidence of this connection and, consequently, a significant nexus is supported by the observations and scientific literature in the following paragraphs. This non-RPW possesses features of an ephemeral tributary with an ordinary high water mark (OHWM).

Solid organic matter (OM), such as leaves and other detrital material, is processed by a feeding group referred to as "shredders", which includes crayfish, larvae of craneflies, caddisflies, and nymphs of stoneflies. Shredders break down this coarse material, and allow the material to be utilized by a secondary group known as "collectors". Collectors further process the OM and produce dissolved OM and fine particulate matter, which flow downstream. Generally, as the solid OM is processed and translocated downstream, so are the microorganisms and invertebrates which utilize the material (Smith and Smith 2001). As such, headwater tributaries like this ephemeral stream represent the base of the food chain and, therefore, comprise one of the most important components of a watershed (Meyer et al. 2007). That is, the diversity of aquatic fauna in this headwater stream contributes to the biodiversity of Arkansas River and its tributaries by fitting into the complex foodweb of the river basin. Furthermore, the frequency of major rainfall events in the watershed results in pulsating hydrology, which sustains the local waterways, and subsequently, the Arkansas River system. This influences the chemistry of the Arkansas River basin via the transport of sediments and nutrients and geochemical cycling which occur during these pulses.

Various pollutants are likely present since this stream is located in close proximity to a historic WWTP site. Typical pollutants, such as oil, become suspended in storm water and, without adequate filtration, are transported downstream. After water is conveyed through the tributary, drying occurs in the headwater stream. This process of drying produces natural chemical and physical changes in the headwater stream. According to Izbicki (2007), even while headwater streams are drying, they remain an integral part of the overall stream because of this influence on the chemistry of the river downstream.

Finally, headwater streams, such as the subject tributary, have been documented as providing necessary habitat for birds, mammals, reptiles, and amphibian populations (Meyer 2007). The small catchment area of headwater streams results in some of the most diverse habitats within a lotic system. Since the channels are greatly affected by precipitation events, the physical and chemical state of the streams change rapidly and frequently which allows the habitat to be utilized by a large variety of species. Headwater streams are utilized not only by species which are unique to headwater streams, but also by animals which depend on such an environment for certain stages of their life cycles and those which migrate between headwater environments and larger waters.

The associated wetland (FS-7) acts as small catchment areas for sediment carried via storm water toward the abutting tributary. Sediment and attached nutrients, pollutants, and/or other elements become deposited and captured within the wetland, as opposed to flowing directly to the tributary in question and ultimately to the Arkansas River. Because these wetlands are located in close physical proximity to a historic WWTP site, the potential for storm water to carry pollutants is high. Wetlands have been documented as having the capability of providing a long-term sink for nutrients present within waste, pesticides and fertilizers, primarily through their biogeochemical cycling (Walbridge and Lockaby 1994, Axt and Walbridge 1999). Due to this function, wetlands have long been termed the "kidneys of the landscape", due to their capacity to assist with pollutant filtration (Mitsch and Gosselink 2000).

Because of the wetland's fluctuating hydrologic conditions, it likely hosts a variety of organisms dependent upon this type of system. The wetland has the capacity to physically affect the conditions of the adjacent tributary through its ability to store storm water in times of heavy rain events. Grass and leaf litter, and other organic materials also assist with slowing the flow of water and aiding with trapping sediments. By reducing the volume and velocity of storm water entering the adjacent or abutting tributary, the wetland minimizes the erosive forces of the storm water. By reducing the volume and velocity of flow, erosion potentials decrease and sediment transport downstream becomes minimized. This affects the Arkansas River and its tributaries by reducing sediment input and erosion.

This non-RPW and its associated wetland possess a hydrologic connection to the Arkansas River and its tributaries through an open and defined channel. Due to this hydrologic connection, the tributary has the capacity to contribute hydrology, carry pollutants, provide habitat for aquatic life cycles, and provide food in the form of organic matter to waters downstream, all of which illustrates that the non-RPW and its associated wetland possess a significant nexus to the Arkansas River.

LITERATURE CITED:

Axt, J.R., and M.R. Walbridge. 1999. Phosphate removal capacity of palustrine forested wetlands and adjacent uplands in Virginia. Soil Science Society of American Journal 63:1019-1031.

Freeman, M. C., C. M. Pringle, and C. R. Jackson. 2007. Hydrologic Connectivity and the Contribution of Stream Headwaters to Ecological Integrity at Regional Scales. Journal of the American Water Resources Association. 43: 5-14.

Izbicki, J. A. 2007. Physical and Temporal Isolation of Mountain Headwater Streams in the Western Mojave Desert, Southern California. Journal of the American Water Resources Association. 43: 26-40.

Meyer, J. L., D. L.Strayer, J. B. Wallace, S. L. Eggert, G. S. Helfman, and N. E. Leonard. 2007. The Contribution of Headwater Streams to Biodiversity in River Networks. Journal of the American Water Resources Association. 43: 86-103.

Mitsch, W.J. and J.G. Gosselink. 2000. Wetlands. John Wiley and Sons, Inc. New York, New York.

Smith, R. L. and T. M. Smith. 2001. Ecology and Field Biology. Benjamin Cummings, New York. Pp. 644-650.

Walbridge, M.R. and B.G. Lockaby. 1994. Effects of forest management on biogeochemical functions in southern forested wetlands. Wetlands 14:10-17.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

Intermittent Seasonal Relatively Permanent Water (seasonal-RPW) FS-1 and Forested Wetland FS-2, possesses hydrologic connectivity to the Arkansas River (Traditional Navigable Water) into which they ultimately flows. Hydrologic connectivity refers to the flow that transports organic matter and nutrients, energy, and aquatic organisms throughout the system (Freeman et al. 2006). Evidence of this connection and, consequently, a significant nexus is supported by the observations and scientific literature in the following paragraphs. This seasonal-RPW possesses features of an intermittent tributary with an ordinary high water mark (OHWM).

Solid organic matter (OM), such as leaves and other detrital material, is processed by a feeding group referred to as "shredders", which includes crayfish, larvae of craneflies, caddisflies, and nymphs of stoneflies. Shredders break down this coarse material, and allow the material to be utilized by a secondary group known as "collectors". Collectors further process the OM and produce dissolved OM and fine particulate matter, which flow downstream. Generally, as the solid OM is processed and translocated downstream, so are the microorganisms and invertebrates which utilize the material (Smith and Smith 2001). As such, headwater tributaries like this intermittent stream represent the base of the food chain and, therefore, comprise one of the most important components of a watershed (Meyer et al. 2007). That is, the diversity of aquatic fauna in this headwater stream contributes to the biodiversity of Arkansas River and its tributaries by fitting into the complex foodweb of the river basin. Furthermore, the frequency of major rainfall events in the watershed results in pulsating hydrology, which sustains the local waterways, and subsequently, the Arkansas River system. This influences the chemistry of the Arkansas River basin via the transport of sediments and nutrients and geochemical cycling which occur during these pulses.

Various pollutants are likely present since this stream is located in close proximity to a historic WWTP site. Typical pollutants, such as oil, become suspended in storm water and, without adequate filtration, are transported downstream. After water is conveyed through the tributary, drying occurs in the headwater stream. This process of drying produces natural chemical and physical changes in the headwater stream. According to Izbicki (2007), even while headwater streams are drying, they remain an integral part of the overall stream because of this influence on the chemistry of the river downstream.

Finally, headwater streams, such as the subject tributary, have been documented as providing necessary habitat for birds, mammals, reptiles, and amphibian populations (Meyer 2007). The small catchment area of headwater streams results in some of the most diverse habitats within a lotic system. Since the channels are greatly affected by precipitation events, the physical and chemical state of the streams change rapidly and frequently which allows the habitat to be utilized by a large variety of species. Headwater streams are utilized not only by species which are unique to headwater streams, but also by animals which depend on such an environment for certain stages of their life cycles and those which migrate between headwater environments and larger waters.

The associated wetland (FS-2) acts as small catchment areas for sediment carried via storm water toward the adjacent tributary. Sediment and attached nutrients, pollutants, and/or other elements become deposited and captured within the wetland, as opposed to flowing directly to the tributary in question and ultimately to the Arkansas River. Because these wetlands are located in close physical proximity to a historic WWTP site, the potential for storm water to carry pollutants is high. Wetlands have been documented as having the capability of providing a long-term sink for nutrients present within waste, pesticides and fertilizers, primarily through their biogeochemical cycling (Walbridge and Lockaby 1994, Axt and Walbridge 1999). Due to this function, wetlands have long been termed the "kidneys of the landscape", due to their capacity to assist with pollutant filtration (Mitsch and Gosselink 2000).

Because of the wetland's fluctuating hydrologic conditions, it likely hosts a variety of organisms dependent upon this type of system. The wetland has the capacity to physically affect the conditions of the adjacent tributary through its ability to store storm water in times of heavy rain events. Grass and leaf litter, and other organic materials also assist with slowing the flow of water and aiding with trapping sediments. By reducing the volume and velocity of storm water entering the adjacent or abutting tributary, the wetland minimizes the erosive forces of the storm water. By reducing the volume and velocity of flow, erosion potentials decrease and sediment transport downstream becomes minimized. This affects the Arkansas River and its tributaries by reducing sediment input and erosion.

This seasonal-RPW and its associated wetland possess a hydrologic connection to the Arkansas River and its tributaries through an open and defined channel. Due to this hydrologic connection, the tributary has the capacity to contribute hydrology, carry pollutants, provide habitat for aquatic life cycles, and provide food in the form of organic matter to waters downstream, all of which illustrates that the seasonal-RPW and its associated wetland possess a significant nexus to the Arkansas River.

LITERATURE CITED:

Axt, J.R., and M.R. Walbridge. 1999. Phosphate removal capacity of palustrine forested wetlands and adjacent uplands in Virginia. Soil Science Society of American Journal 63:1019-1031.

Freeman, M. C., C. M. Pringle, and C. R. Jackson. 2007. Hydrologic Connectivity and the Contribution of Stream Headwaters to Ecological Integrity at Regional Scales. Journal of the American Water Resources Association. 43: 5-14.

Izbicki, J. A. 2007. Physical and Temporal Isolation of Mountain Headwater Streams in the Western Mojave Desert, Southern California. Journal of the American Water Resources Association. 43: 26-40.

Meyer, J. L., D. L.Strayer, J. B. Wallace, S. L. Eggert, G. S. Helfman, and N. E. Leonard. 2007. The Contribution of Headwater Streams to Biodiversity in River Networks. Journal of the American Water Resources Association. 43: 86-103.

Mitsch, W.J. and J.G. Gosselink. 2000. Wetlands. John Wiley and Sons, Inc. New York, New York.

Smith, R. L. and T. M. Smith. 2001. Ecology and Field Biology. Benjamin Cummings, New York. Pp. 644-650.

Walbridge, M.R. and B.G. Lockaby. 1994. Effects of forest management on biogeochemical functions in southern forested wetlands. Wetlands 14:10-17.

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
☐ TNWs: linear feet width (ft), Or, acres.
☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
☒ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: Regarding FS-1, continuous flow occurs seasonally for at least 3 months of the year.

Provide estimates for jurisdictional waters in the review area (check all that apply):
☒ Tributary waters: **FS-1, Jurisdictional Intermittent Stream: 378** linear feet **20** width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☒ Tributary waters: **FS-5, Jurisdictional Ephemeral Stream: 882 linear feet and FS-6, Jurisdictional Ephemeral Stream: 380** linear feet **FS-5: 4 feet width and FS-6: 2 feet** width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: **FS-2, Jurisdictional Forested Wetland; 0.22** acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☒ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: **FS-7, Jurisdictional Forested Wetland; 0.09** acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **.**
☒ Other: (explain, if not covered above): **The manmade FS-3, Non-jurisdictional Pond and FS-4, Non-jurisdictional Ephemeral Stream were likely historically created in uplands in association with the WWTP. Overland sheetflow occurs between FS-3/ FS-4 and downstream waters. FS-3 and FS-4 are isolated.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☒ Non-wetland waters (i.e., rivers, streams): **FS-4, Non-jurisdictional Ephemeral Stream; 39** linear feet **2** width (ft).
☒ Lakes/ponds: FS-3, Non-jurisdictional Pond; 1.2 acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Blackshare Environmental Solutions, Wetland and Waterway Delineation, Associated with the Glenpool WWTP, Tulsa County, Oklahoma, March 2022.
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .

---

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☒ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: 1:24,000; Sapulpa South, Oklahoma Quadrangle, 7.5 Minute Series.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.
☒ National wetlands inventory map(s). Cite name: https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Google Earth 1995-2022 Aerial Images.
or ☐ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☒ Applicable/supporting scientific literature: See above citations.
☒ Other information (please specify):
List of Navigable Waters within Tulsa District: https://www.swt.usace.army.mil/Missions/Regulatory/Section-10-Waters/
List of NRCS State Soil Data Access (SDA) Hydric Soils: https://www.nrcs.usda.gov/publications/query-by-state.html
Oklahoma Climatological Survey Tulsa County Climate Summary: https://climate.ok.gov/county_climate/Products/QuickFacts/tulsa.pdf
.

B. ADDITIONAL COMMENTS TO SUPPORT JD: .